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
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
JAN-9201
JAN-7201
JAN-9202
JAN-7202

MARINE RADAR EQUIPMENT
ECDIS
CONNING DISPLAY
FIELD SERVICE MANUAL

JRC Japan Radio Co., Ltd.

Combined sparepart and heatsink for CPA-264 replacement kit.

Replace procedures

Replacing the modulator circuit (CPA-264A).

●The new CPA-264A is equipped with the heat sink A, four screws and four thermal conductive sheets. The heat sink depends on unit type, see the table 1 and figure below. If the heat sink B or C is used, please use the thermal conductive sheets that packed.

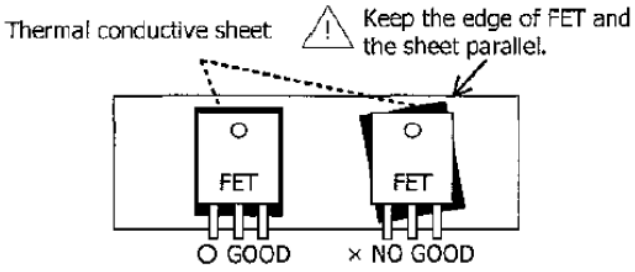
Table 1. Combination of heat sink and Unit

Mod. Circuit type	Unit type	Heat sink type
CPA-264A	NKE-1125	A
	NKE-2254	
	NKE-1130	B
	NTG-3225	C
	NTG-3230	

Note: Four thermal conductive sheets are included with new CPA-264A.
Attach the thermal conductive sheet between each FET and the heat sink as shown in the figure below.

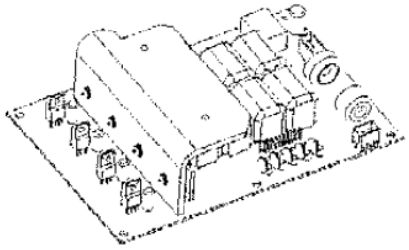
Table 2. Names of parts(see figure below)

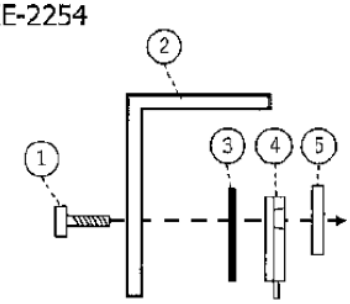
Number	Name
①	Screws
②	Heat sink (A~C)
③	Thermal conductive sheet
④	FET
⑤	Nut plate



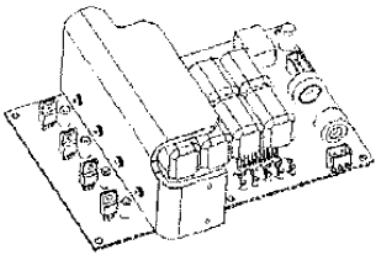
●Figures. Combination of heat sink and Unit

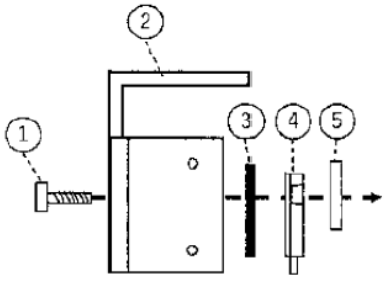
Heat sink A NKE-1125 & NKE-2254



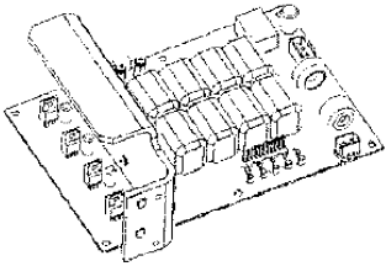


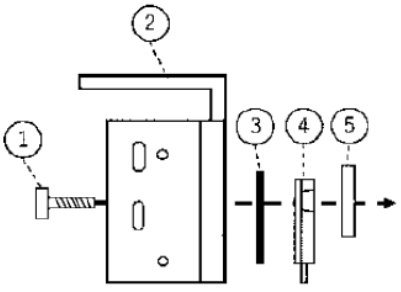
Heat sink B NKE-1130





Heat sink C NTG-3225 & NTG-3230



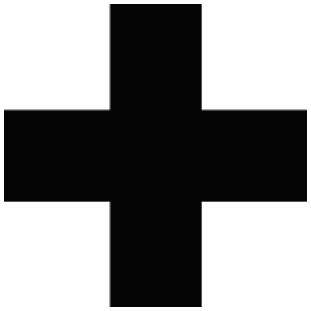


PREFACE

This Field Service Manual describes the structure, I/O specifications and method for maintenance of JMR-7200/JMR-9200 series and JAN-7200/JAN-9200 series.

- For maintenance, inspection, repair, please use this manual.
- Keep this manual in a convenient place for future reference.
- The LCD of this equipment uses thin film transistors (TFT). If some pixels on the screen are not clear, the color is different, or the screen is brighter than usual, it is not because of defect, instead it is because of inherent characteristic of the TFT display technology.
- The information in this manual is subject to change without notice at any time.

● Safety Cautions ●



Cautions for High Voltage

High voltages, ranging from several hundreds to tens of thousands of volts, are used in electronic apparatus, such as radio and radar instruments. These voltages are totally harmless in most operations. However, touching a component inside the unit is very dangerous. (Any person other than authorized service engineers should not maintain, inspect, or adjust the unit.)
High voltages on the order of tens of thousand volts are most likely to cause instant deaths from electrical shocks. At times, even voltages on the order of several hundred volts could lead to electrocution. To defend against electrical shock hazards, don't put your hand into the inside of apparatus. When you put in a hand unavoidably in case of urgent, it is strongly suggested to turn off the power switch and allow the capacitors, etc. to discharge with a wire having its one end positively grounded to remove residual charges. Before you put your hand into the inside of apparatus, make sure that internal parts are no longer charged. Extra protection is ensured by wearing dry cotton gloves at this time. Another important precaution to observe is to keep one hand in your pocket at a time, instead of using both hands at the same time.
It is also important to select a secure footing to work on, as the secondary effects of electrical shock hazards can be more serious. In the event of electrical shocks, disinfect the burnt site completely and obtain medical care immediately.

Precautions for Rescue of Victim of Electric Shock

When a victim of electric shock is found, turn off the power source and ground the circuit immediately. If this is impossible, move the victim away from the unit as quick as possible without touching him or her with bare hands. He or she can safely be moved if an insulating material such as dry wood plate or cloth is used.
Breathing may stop if current flows through the respiration center of brain due to electric shock. If the electric shock is not large, breathing can be restored by artificial respiration. A victim of electric shock looks pale and his or her pulse may become very weak or stop, resulting in unconsciousness and rigidity at worst. It is necessary to perform first aid immediately.

● Emergency Measures ●

Method of First-Aid Treatment

☆Precautions for First-Aid Treatments

Whenever a person is struck by an electrical shock, give the patient artificial respiration immediately on the spot, unless it is absolutely necessary to move the patient for safety's sake. Once started, artificial respiration should be continued rhythmically.

(1) Refrain from touching the patient carelessly as a result of the accident; the first-aider could suffer from electrical shocks by himself or herself.

(2) Turn off the power calmly and certainly, and move the patient apart from the cable gently.

(3) Call or send for a physician or ambulance immediately, or ask someone to call doctor.

(4) Lay the patient on the back, loosening the necktie, clothes, belts and so on.

(5) (a) Feel the patient's pulse.
(b) Check the heartbeat by bringing your ear close to the patient's heart.
(c) Check for respiration by bringing your face or the back of your hand to the patient's face.
(d) Check the size of patient's pupils.

(6) Opening the patient's mouth, remove artificial teeth, cigarettes, chewing gum, etc. if any. With the patient's mouth open, stretch the tongue and insert a towel or the like into the mouth to prevent the tongue from being withdrawn into the throat. (If the patient clenches the teeth so tight that the mouth won't open, use a screwdriver or the like to force the mouth open and then insert a towel or the like into the mouth.)

(7) Wipe off the mouth to prevent foaming mucus and saliva from accumulating.

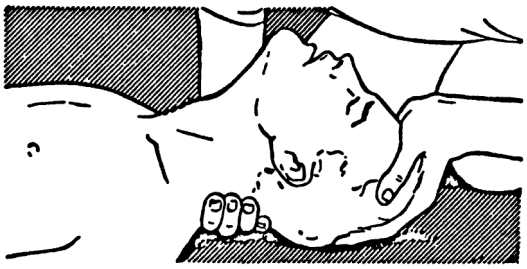
☆Treatment to Give When the Patient Has a Pulse Beating but Has Ceased to Breathe

∗ Performing mouth-to-mouth artificial respiration - Fig. 1

(1) Bend the patient's face backward until it is directed to look back. (A pillow may be placed under the neck.)
(2) Pull up the lower jaw to open up the airway. (To spread the airway)
(3) Pinching the patient's nose, breathe deeply and blow your breath into the patient's mouth strongly, with care to close it completely. Then, move your mouth away and take a deep breath, and blow into his or her mouth. Repeat blowing at 10 to 15 times a minute (always with the patient's nostrils closed).
(4) Continue artificial respiration until natural respiration is restored.
(5) If the patient's mouth won't open easily, insert a pipe, such as one made of rubber or vinyl, into either nostril. Then, take a deep breath and blow into the nostril through the pipe, with the other nostril and the mouth completely closed.
(6) The patient may stand up abruptly upon recovering consciousness. Keep the patient lying calmly, giving him or her coffee, tea or any other hot drink (but not alcoholic drink) to keep him or her warm.

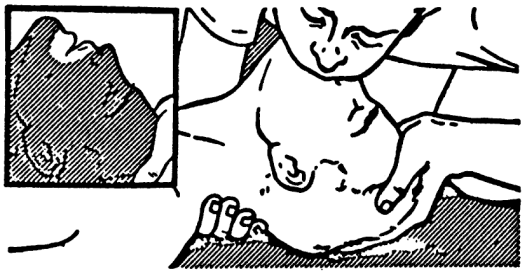
Mouth-to-mouth artificial respiration with the patient's head lifted

[1]



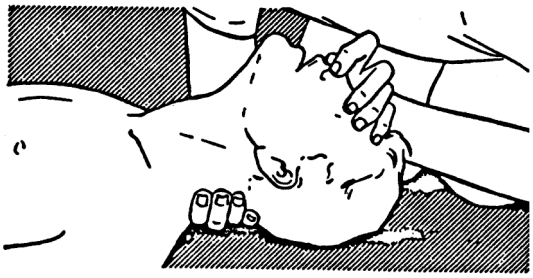
(1) Lift the back part of the patient's head. Support the forehead with one of your hand and the neck with the other hand.→[1].
Many patients will have their airways opened by lifting their head in this way to ease mouth-to-mouth artificial respiration.

[2]



(2) Closing the patient's mouth with your mouth, press your cheek against the patient's nose→ [2].
Alternatively, hold the patient's nose with your finger to prevent air leak → [3].

[3]



(3) Blowing air into the patient's lungs. Blow air into the patient's lungs until chest is seen to rise. The first 10 breaths must be blown as fast as possible.

Fig. 1 Mouth-to-mouth artificial respiration

First Aid Method
Flow of Cardiopulmonary Resuscitation (CPR)

A person is collapsing.
- Secure the safety of the surrounding area.
- Prevent secondary disasters.

↓

Check for response.
- Call while tapping the shoulder.

→ Responding → Listen to the appeal of the injured or ill person and give the necessary first-aid

↓ Not responding or indeterminate state

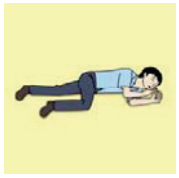
Ask for help.
- Make an emergency call.
- Ask to bring an AED.

If you call an ambulance, you can get instructions regarding how to judge cardiac arrest and how to do cardiopulmonary resuscitation (CPR).

↓

Check for breathing and judge cardiac arrest.
- Check for breathing.

→ Breathing → Recovery position
- Lay the injured or ill person on his/her side and wait for the arrival of the emergency services.



↓ Not breathing or indeterminate state

Chest compressions
- With each compression, depress the chest wall to a depth of approximately 5 cm.
- Perform compressions at the rate of 100 - 120 times per minute.

Combination of chest compressions and rescue breaths Note(1)
- If the first-aider is not trained in rescue breaths, he/she should perform only chest compressions. See Note(1) for the details.

Note(1) Combination of chest compressions and rescue breaths
- If the first-aider is not trained in rescue breaths, he/she should perform only chest compressions.
- If the first-aider is trained in rescue breath, and has the skill and will to do it, he/she should perform the combination of chest compressions and rescue breaths at the ratio of 30:2. If there is a fear of infection, he/she should use a personal protective equipment (mouthpiece for rescue breathing).

↓

Arrival of an AED
- Turn on the power.
- Use the AED by following its voice prompts. Fitting of the electrode pads, etc.

↓

Automatic electrocardiogram analysis
- Do not touch the injured or ill person.

→ Electric shock is not needed.

↓ Electric shock is needed.

Delivery of electric shock

↓

Resume CPR from chest compressions by following the voice prompts of the AED.

The AED automatically analyzes the heart rhythm every 2 min.

→ When to stop CPR → When the injured or ill person has been handed over to the emergency services or has started moaning or breathing normally, lay him/her on his/her side in a recovery position and wait for the arrival of emergency services.

Specific Procedures for Cardiopulmonary Resuscitation (CPR)

1. Check the scene for safety to prevent secondary disasters

a) Do not touch the injured or ill person in panic when an accident has occurred. (Doing so may cause electric shock to the first-aiders.)

b) Do not panic and be sure to turn off the power. Then, gently move the injured or ill person to a safe place away from the electrical circuit.

2. Check for responsiveness

a) Tap the shoulder of the injured or ill and shout in the ear saying, "Are you OK?"

b) If the person opens his/her eyes or there is some response or gesture, determine it as "responding." But, if there is no response or gesture, determine it as "not responding."



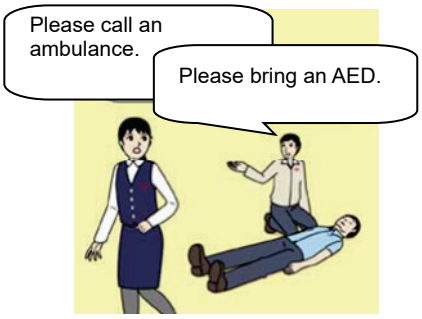
3. If responding

a) Give first-aid treatment.

4. If not responding

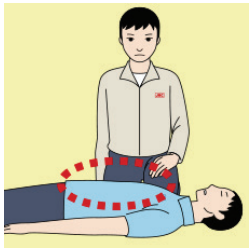
a) Ask for help loudly. Ask somebody to make an emergency call and bring an AED.

- Somebody has collapsed. Please help.
- Please call an ambulance.
- Please bring an **AED**.
- If there is nobody to help, call an ambulance yourself.



5. Check for breathing

a) Look to see if the chest and abdomen of the injured or ill person are rising and falling.



b) If the injured or ill person is breathing, place him/her in the recovery position and wait for the arrival of the emergency services.

• Position the injured or ill person on his/her side.

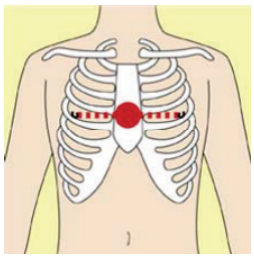


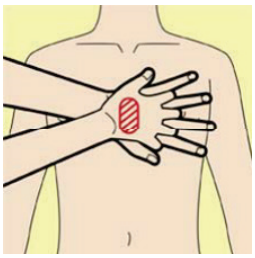
6. Cardiopulmonary resuscitation (CPR) (combination of chest compressions and rescue breaths)

a) Chest compressions

1) Position of chest compressions

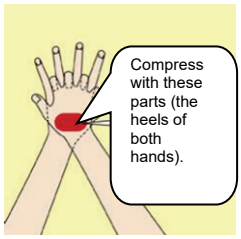
• Position the heel of one hand in the center of the chest, approximately between the nipples, and place your other hand on top of the one that is in position.

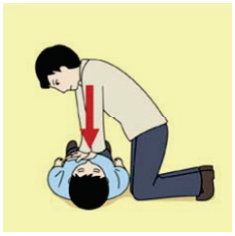




2) Perform chest compressions

Perform uninterrupted chest compressions of 30 at the rate of about 100 - 120 times per minute, while locking your elbows positioning yourself vertically above your hands.





• With each compression, depress the chest wall to a depth of approximately 5 cm.

b) Combination of 30 chest compressions and 2 rescue breaths

1) If the first-aider is not trained in rescue breaths, he/she should perform only chest compressions.

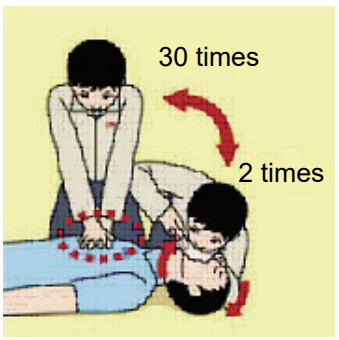
2) If the first-aider is trained in rescue breath, and has the skill and will to do it, he/she should perform 30 chest compressions, then give 2 rescue breaths.

3) If there is a fear of infection, he/she should use a personal protective equipment (mouthpiece for rescue breathing).

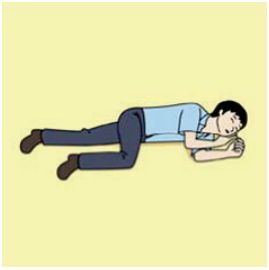
4) Continuously perform the combination of 30 chest compressions and 2 rescue breaths without interruption.

5) If there are two or more first-aiders, alternate with each other approximately every two minutes (five cycles) without interruption.





7. When to stop cardiopulmonary resuscitation (CPR)



a) When the injured or ill person has been handed over to the emergency services

b) When the injured or ill person has started moaning or breathing normally, lay him/her on his/her side in a recovery position and wait for the arrival of emergency services.

8. Arrival and preparation of an AED



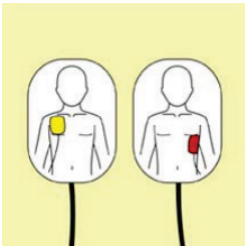


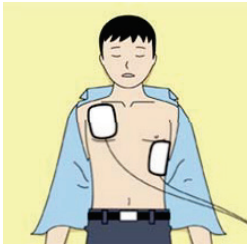
a) Place the AED at an easy-to-use position. If there are multiple first-aiders, continue CPR until the AED becomes ready.

b) Turn on the power to the AED unit. Depending on the model of the AED, you may have to push the power on button, or the AED automatically turns on when you open the cover.

c) Follow the voice prompts of the AED.

9. Attach the electrode pads to the injured or ill person's bare chest





a) Remove all clothing from the chest, abdomen, and arms.

b) Open the package of electrode pads, peel the pads off and securely place them on the chest of the injured or ill person, with the adhesive side facing the chest. If the pads are not securely attached to the chest, the AED may not function. Paste the pads exactly at the positions indicated on the pads, If the chest is wet with water, wipe dry with a dry towel and the like, and then paste the pads. If there is a pacemaker or implantable cardioverter defibrillator (ICD), paste the pads at least 3 cm away from them. If a medical patch or plaster is present, peel it off and then paste the pads. If the injured or ill person's chest hair is thick, paste the pads on the chest hair once, peel them off to remove the chest hair, and then paste new pads.

c) Some AED models require to connect a connector by following voice prompts.

d) The electrode pads for small children should not be used for children over the age of 8 and for adults.

10. Electrocardiogram analysis



a) The AED automatically analyzes electrocardiograms. Follow the voice prompts of the AED and ensure that nobody is touching the injured or ill person while you are operating the AED.

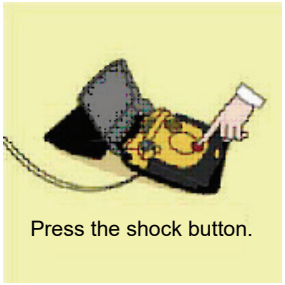
b) On some AED models, you may need to push a button to analyze the heart rhythm.

11. Electric shock (defibrillation)

a) If the AED determines that electric shock is needed, the voice prompt saying, "Shock is needed" is issued and charging starts automatically.

b) When charging is completed, the voice prompt saying, "Press the shock button" is issued and the shock button flashes.

c) The first-aider must get away from the injured or ill person, make sure that no one is touching him/her, and then press the shock button.



Press the shock button.

d) When electric shock is delivered, the body of the injured or ill person may jerk.

12. Resurgence of cardiopulmonary resuscitation (CPR)

a) Resume chest compressions by following the voice prompts of the AED.

- With each compression, depress the chest wall to a depth of approximately 5 cm.
- Perform compressions at the rate of 100 - 120 times per minute.



13. Automatic electrocardiogram analysis

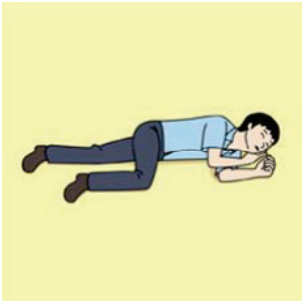
a) When 2 minutes have elapsed since you resumed cardiopulmonary resuscitation (CPR), the AED automatically analyzes the electrocardiogram.

b) If you suspended CPR by following voice prompts and AED voice prompt informs you that shock is needed, give electric shock again by following the voice prompts.
If AED voice prompt informs you that no shock is needed, immediately resume CPR.

14. When to stop CPR (Keep the electrode pads on.)

a) When the injured or ill person has been handed over to the emergency services

b) When the injured or ill person has started moaning or breathing normally, lay him/her on his/her side in a recovery position and wait for the arrival of emergency services.



● Pictorial Indication ●

Pictorial Indication

Various pictorial indications are included in this manual and are shown on this equipment so that you can operate them safely and correctly and prevent any danger to you and / or to other persons and any damage to your property during operation. Such indications and their meanings are as follows.
Please understand them before you read this manual:

DANGER	This indication is shown where incorrect equipment operation due to negligence may cause death or serious injuries.
WARNING	This indication is shown where any person is supposed to be in danger of being killed or seriously injured if this indication is neglected and these equipment are not operated correctly.
CAUTION	This indication is shown where any person is supposed to be injured or any property damage is supposed to occur if this indication is neglected and these equipment are not operated correctly.

Examples of Pictorial Indication



Electric Shock

The △ mark represents CAUTION (including DANGER and WARNING).
Detailed contents of CAUTION ("Electric Shock" in the example on the left) is shown in the mark.



Disassembling Prohibited



The ⃠ mark represents prohibition.
Detailed contents of the prohibited action ("Disassembling Prohibited" in the example on the left) is shown in the mark.



Disconnect the power plug



The ● mark represents instruction.
Detailed contents of the instruction ("Disconnect the power plug" in the example on the left) is shown in the mark.

Warning Label

There is a warning label on the top cover of the equipment.
Do not try to remove, break or modify the label.

● Precautions upon Equipment Operation ●

⚠ DANGER	
	Never attempt to check or repair the inside of the equipment. Checking or repair by an unqualified person may cause a fire or an electric shock. Contact our head office, or a nearby branch or local office to request servicing.
	Never remove the cover of this equipment. Touching the high-voltage section inside will cause an electric shock.
	Do not attempt to disassemble or tamper with this equipment. Otherwise, a fire, an electric shock, or a malfunction may occur.
	When conducting maintenance, make sure to turn the main power off. Failure may result in electric shock.
	Turn off the main power before cleaning the equipment. Especially when a rectifier is used, 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 its main power off. 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.

⚠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 bride, on the trestle, or on the radar mast so that no one can get close to it.

Microwave radiation level of the radar antenna:
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^2	20 W/m^2	2.5 W/m^2
NKE-2103	n/a	26 cm	123 cm
NKE-1125/1129/2254	5 cm	81 cm	162 cm
NKE-1130/1139	11 cm	76 cm	181 cm
NKE-2632	1.38cm	3.1cm	209.76cm
NKE-1632	1.45cm	3.25cm	128.37cm
NKE-1696	29cm	46cm	130cm

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.

⚠WARNING

When cleaning the display screen, do not wipe it too strongly with a dry cloth. Also, do not use gasoline or thinner to clean the screen. Failure will result in damage to the screen surface.

Do not change MBS Level/Area unless absolutely necessary.
Incorrect adjustment will result in deletion of nearby target images and thus collisions may occur resulting in death or serious injuries.

Confirm computer virus does not exist in USB flash memory beforehand when reading and writing of the file by using USB flash memory.
Influences other equipment when the display unit is infected with the virus, and it may cause a breakdown.

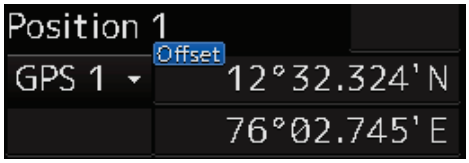
Do not remove USB flash memory while the access lamp (in USB flash drive) is flashing.
Data may be damaged when the USB flash memory is inserted or removed while accessing it, and it may cause a breakdown.

Do not place a glass or cup containing water, etc., or a small metal object on this equipment.
If water or such object gets inside, a fire, an electric shock, or a malfunction may occur.

In case water or a metal object gets inside the equipment, turn off the power immediately, unplug the power supply cable from an electric outlet, and contact our head office, or a nearby branch or local office to request servicing.
Keeping the equipment in operation under such condition may cause a fire, an electric shock or a malfunction.

In case you find smoke, unusual odor or extreme high heat coming from the equipment, turn off the power immediately, unplug the power supply cable from an electric outlet, and contact our head office, or a nearby branch or local office to request servicing.
Keeping the equipment in operation under such condition may cause a fire or an electric shock.

Do not use the offset function during navigation.
If the equipment is used with the offset value entered as the own ship position (deviated from the actual position), accidents may result.
When the offset values are entered, the [Offset] badge is displayed at the position display on the Own Ship Information. Check the indication, and cancel the offset function if necessary. Also, the message "Position Shift" is displayed in the message display area.



⚠WARNING

	Before starting automatic sailing, be sure to check the safety of the route and the safety when crossing safety contour. Otherwise, accidents may result.
	If the own ship has arrived at the boundary of a WPT during automatic sailing, be sure to check the safety and perform turning manually by the operator him/herself. Otherwise, the ship keeps the course with the leg bearing, and accidents may result.
	Input the ship's parameter accurately according to the specification of the ship. Otherwise, accidents may result.
	Change of the color of the Day/Night button, particularly the use of the [Night] color, may interfere with the recognition of display information.
	When moving the dialog box, move to the position that does not cover the operation area. If the dialog box covers the operation area, it may interfere the recognition of the display information.
	Do not apply strong shock to the coaxial cable by striking it with a tool or hammering it. Otherwise, an open circuit failure may result.
	Do not place anything heavy on the coaxial cable. Otherwise, an open circuit failure may result.
	Do not twist or pull the coaxial cable. Otherwise, an open circuit failure may result.

⚠CAUTION

	Use the radar only as a navigation aid. The final navigation decision must always be made by the operator him/herself. Making the final navigation decision based only on the radar display information may cause accidents such as collisions or running aground.
	A malfunction as the screen is disordered or unshown may occur if the power in the ship is instantaneously interrupted during operation of the radar. In this case, the power should be turned on again.
	Use Target Tracking (TT) function only as a navigation aid. The final navigation decision must always be made by the operator him/herself. Making the final navigation decision based only on tracking target information may cause accidents. Tracking target information such as vector, target numerical data, and alarms may contain some errors. Also, targets that are not detected by the radar cannot be acquired or tracked. Making the final navigation decision based only on the radar display may cause accidents such as collisions or running aground.
	In the short distance range, do not set the sea clutter suppression function so that all reflections from the sea are suppressed. This suppresses not only the echo from waves, etc., but also the echo from floating objects such as ships or dangerous objects, etc., and obstructs their detection. When using the sea clutter suppression function, always make the best suppression setting.
	Do not set the rain/snow clutter suppression setting to an excessive level, because not only the echo from rain or snow but also the echo from floating objects such as ships or dangerous objects, etc., and obstructs their detection. When using the rain/snow clutter suppression function, always make the best suppression setting.
	When setting a guard zone, make sure to properly adjust gain, sea-surface reflection suppression level, and rain/snow reflection suppression level so that the optimal target images are always on the radar screen. The guard zone alarm will not be activated for targets undetected by the radar, and it may result in accidents such as collisions.
	The simulation function is used exclusively for deciding whether or not target tracking is properly operating. Therefore, never use this function unless you wish to check target tracking operations. Note especially that, if this function is used during actual navigation, simulated targets are displayed and may become confused with other actual targets. Therefore, never use this function during actual navigation.

⚠CAUTION

	**Since these alarms may include some errors depending on the target tracking conditions, the navigation officer himself should make the final decision for ship operations such as collision avoidance.** **Making the final navigation decision based only on the alarm may cause accidents such as collisions.**
	Optimal values have been set for VD Level and Constant; therefore, never change their values unless absolutely necessary. Failure may result in accidents that would lower target tracking performance.
	When replacing magnetrons, make sure to shut off the main power and let the equipment stand for more than 5 minutes to discharge the high-voltage circuit. Failure may result in electric shock.
	Make sure to take off your watch when your hand must get close to the magnetron. Failure may result in damage to the watch since the magnetron is a strong magnet.
	Make sure that two or more staff member work together when replacing the LCD. If only one person attempts to replace the LCD, he/she may drop it and become injured.
	Do not directly touch the inverter circuit of the LCD display with a bare hand since high voltage temporarily remains in the circuit even after the main power is shut off. Failure may result in electric shock.
	Any adjustments must be made by specialized service personnel. Incorrect settings may result in unstable operation, and this may lead to accidents or equipment failure.
	Do not make any adjustments during navigation. Failure may result in adverse effects on the radar function which may lead to accidents or equipment failure.
	Do not change the quantization level settings unless absolutely necessary. If set at an inappropriate value, the acquisition of target tracking function and the tracking function deteriorate, and this may lead to accidents.
	Do not use or leave the equipment under direct sunlight for a long time or in the temperatures above 55°C. Otherwise, a fire or a malfunction may occur.

⚠CAUTION



Do not block the ventilation opening of the equipment.
Otherwise, heat may accumulate inside to cause a fire or a malfunction.



This equipment is intended for use as an aid to navigation only.

- If no backup measures, such as using another ECDIS unit for confirmation, are taken, be sure to use official marine charts together with this equipment to make any navigational decision.
- This equipment is not designed to assess the positional information automatically.
  The positional information should always be checked by the operator.
  Otherwise, accidents may result.



Do not touch the equipment with hands or gloves wet with water.
Otherwise, an electric shock or a malfunction may occur.



Do not leave the disc in the DVD drive.
Malfunctions of the drives may result.



- Do not place any object on the operation panel.
  In particular, if a hot object is placed on the operation panel, it can cause deformation of the surface of the operation panel.
- Do not apply any undue shock on the operation panel, trackball and dials.
  Otherwise, a malfunction may result.



Make sure that the main power is turned off before inspection or replacement of parts.

Otherwise, an electric shock, a fire, or a malfunction may occur.



- If a fan alarm or CPU temperature rise alarm has occurred, immediately turn off the power.
  Keeping the equipment in operation under such condition may cause a fire or a malfunction.
  After turning off the power, contact our head office, or a nearby branch or local office to request servicing.



Edit routes in accordance with the world geodetic system (WGS-84).
Use of routes edited with any other geodetic systems may cause accidents.

⚠CAUTION

During sailing, be sure to check the own ship's position and bearing as often as necessary, regardless of whether the automatic sailing is in operation or not.
Otherwise, accidents may result.

Do not turn off the power during Backup/Restore.
Otherwise, a function may fail, and an accident may occur.

Do not do the backup operation of data while sailing.
The radar application should be ended to begin the data backup. It becomes impossible to observe using radar and this may lead to accidents.

Since the image within the previous observation range is displayed by expanding/contracting for the period from immediately after switching of the observation range from the next image updating, do not use this image for navigation.

If this image is used for navigation, an accident may occur.

In the case of turning on the power under the condition of low temperature, do pre-heat more than 30 minutes.
Otherwise, an operation failure may occur and an accident may occur.

Normally, use the automatic tuning mode.

If you use the manual tuning mode, an accident may be caused by a transmission/reception problem.

Use the manual tuning mode only when you cannot bet the best tuning conditions in the automatic tuning mode.

Always keep the sensitivity adjusted to the best condition.

If you raise the sensitivity excessively, the visibility of the target will be reduced by unwanted signals including receiver noise and pseudo image. This may cause an accident.

If the sensitivity is reduced excessively, detection of a target such as a ship or hazardous material will be interrupted.

Adjust the preset of the observation scene according to the oceanographic condition, with the thorough understanding of the features of the radar signal processing setting. The optimum radar performance may not be able to be demonstrated due to the contents of the changed setting or the oceanographic condition at that time.

Glossary

AIO	:	Admiralty Information Overlay. AIO is a digital dataset that is designed to provide additional information to the navigation published by United Kingdom Hydrographic Office (UKHO).
AIS	:	Automatic Identification System
ARCS	:	Admiralty Raster Chart Service. A raster chart published by UKHO
ARPA	:	Automatic Radar Plotting Aid
AUTO SAIL	:	The system automatically navigates to keep the scheduled route. Same as automatic sailing.
AZ	:	Acquisition/Activation zone
Anti-clutter rain	:	Rain/snow clutter suppression
Anti-clutter sea	:	Sea clutter suppression
AZI	:	AZImuth stabilization mode
Base CD	:	Chart CD containing a complete chart data
BCR/BCT	:	Bow Crossing Range/Bow Crossing Time
Cell Permit	:	A file containing an encryption key for S-63 chart. Supplied by UKHO, PRIMAR STAVANGER, and Hydrographic and Oceanographic Department of Japan Coast Guard.
Chart Maintenance	:	Software to manage the charts. Imports and updates the charts.
C-MAP Ed.3	:	C-MAP Edition 3. A digital chart format by Jeppesen (formerly, C-MAP, Norway)
C-MAP	:	Digital chart data by Jeppesen (formerly, C-MAP, Norway)
CTS	:	Course To Steer. Heading command.
COG	:	Course Over the Ground
C up	:	Course up. Own ship’s course is pointed to the top center of the radar display.
CCRP	:	Consistent Common Reference Point. The own ship position, to which all horizontal measurements such as target range, bearing, relative course, relative speed, CPA or TCPA are referenced, typically the conning position of the bridge.

CORREL	:	CORRELation
CPA/TCPA	:	Distance to the Closest Point of Approach/Time to the Closest Point of Approach.
CTW	:	Course Through Water. The direction of the ship's movement through the water
Data Server	:	Organization providing S-63 chart
DIST	:	Distance
DR	:	Dead Reckoning
Dynamic License	:	Dynamic licensing of C-Map chart license by Jeppesen
DNV	:	Det Norske Veritas
DRIFT	:	The current velocity for manual correction or the current speed on the horizontal axis of the 2-axis log is displayed.
EBL	:	Electronic Bearing Line
ECDIS	:	Electronic Chart Display and Information System
ENC	:	Electronic Navigation Chart. Meaning S-57 and S-63.
ETA	:	Estimated Time of Arrival
ETD	:	Estimated Time of Departure
ENH	:	Enhance
F.ETA	:	Final Estimated Time of Arrival. Extimated time of arrival to the last WPT
GC	:	Great Circle
GPS	:	Global Positioning System
HDG	:	Heading. Ship’s heading
HL	:	Heading Line
HSC	:	High Speed Craft. Vessels which comply with the definition in SOLAS for high speed craft
H up	:	Head up. Own ship’s heading line is always pointed to the top center of the radar display.
IHO	:	International Hydrographic Office
IMO	:	International Maritime Organization

IR	:	Radar Interference Rejecter
ISW	:	InterSWitch unit
LMT	:	Local Mean Time
LON	:	Longitude
LAT	:	Latitude
LP	:	Long Pulse
MED	:	Marine Equipment Directive. Request standard for standardization of marine equipment within the EU region
MFD	:	Abbreviation of this equipment name. The formal name is Multi Function Display. The navigation support functions such as radar, ECDIS, CID, and AMS with this equipment can be executed by switching.
MMSI	:	Maritime Mobile Service Identity
MOB	:	Man Over Board
MON	:	Performance MOnitor
MP	:	Medium Pulse
NM	:	Nautical Mile 1 NM=1852 m
N up	:	The north is always pointed to the top center of the radar display. (North up)
P0N	:	Unmodulated pulse, which is a type of transmission radio wave. While it is a type of radio wave usually used by radars equipped with magnetrons, radio waves with a short pulse length are used also by solid-state radars for short-range detection.
PRIMAR STAVENGER	:	A Norwegian company supplying charts. Publisher of encrypted charts, S-63
PI	:	Parallel Index line
Past positions	:	Equally time-spaced past position marks of a tracked or AIS target and the own ship.
POSN	:	POSitioN
PRF	:	Pulse Repetition Frequency. The number of radar pulses transmitted each second.
PROC	:	PROCess. Radar signal processing function

Q0N	:	A type of radio wave with intra-pulse frequency modulation. It is used for solid-state pulse compression radars.
RL	:	Rhumb Line
RR	:	Range Rings
Relative vector	:	A predicted movement of a target relative to own ship's motion
RM	:	Relative Motion. A display on which the position of own ship remains fixed, and all targets move relative to own ship.
RM(R)	:	Relative Motion. Relative Trails
RM(T)	:	Relative Motion. True Trails
ROT	:	Rate Of Turn. Change of heading per time unit
Route	:	A set of waypoints
S-57	:	IHO Transfer Standard for Digital Hydrographic Data
S-63	:	IHO Data Protection Scheme
SA Certificate file	:	An electronic file certifying the supplier of S-63 chart. Required for import/ update of S-63 chart.
SENC	:	System Electronic Navigational Chart
SOG	:	Speed Over the Ground
SART	:	Search And Rescue Transponder
SET	:	The current direction for manual correction or the current speed on the horizontal axis of the 2-axis log is displayed.
SP	:	Short Pulse
STAB	:	STABilization
STW	:	Speed Through Water
TCS	:	Track Control Systems
TCPA	:	Time to Closest Point of Approach to own ship
TM	:	True Motion. A display across which the own ship and targets move with their own true motions.
To WPT	:	To Waypoint
Trails	:	Tracks displayed by the radar echoes of targets in the form of an afterglow

Trial maneuver	:	A graphical simulation facility used to assist the operator to perform a proposed maneuver for navigation and collision avoidance purposes
True vector	:	A vector representing the predicted true motion of a target, as a result of input of the course and speed of the own ship
TT	:	Target Tracking
TTG	:	Time To Go. Time to next waypoint.
TXRX	:	Transmitter-Receiver Unit
UKHO	:	United Kingdom Hydrographic Office
Update CD	:	Chart CD containing the chart data updated from Base CD. This can be used when Base CD data has been imported.
USER CODE	:	A user-specific code assigned by JRC. Required in using ARCS and S-63 charts.
UTC	:	Universal Time, Coordinated
VRM	:	Variable Range Marker
VDR	:	Voyage Data Recorder
WOL	:	Wheel Over Line
WOP	:	Wheel Over Point
WPT	:	Waypoint
WPT-WPT	:	The division of the leg specified by two points. Displays data between two consecutive waypoints.
XTD	:	Cross Track Distance
XTL	:	Cross Track Limit

Activated target	:	A target representing the automatic or manual activation of a sleeping AIS target for the display of additional information
Associated target	:	A target simultaneously representing a tracked target and a AIS target which are decided as the same
Chirp	:	A type of transmission waveform with intra-pulse frequency modulation used by solid-state radars. Its radio wave type is classified as Q0N.
Clutter	:	Unwanted reflections on a radar screen, from sea surface, rain or snow.

Display : Screen displayed on the LCD

Frequency deviation range : The range of variation of the Q0N frequency used for transmission waves of a solid-state radar. Generally, the greater the frequency deviation range, the higher the resolution in the range direction.

Hydrographic and Oceanographic Department :

Hydrographic and Oceanographic Department of Japan Coast Guard. Publisher of ENC

Import (Chart Maintenance) : A procedure of enabling the chart supplied by Base CD to be displayed on ECDIS

Interswitch Unit : A device to switch over two or more radar display units and two or more radar antennas

Leg : Line between two consecutive waypoints

Lost AIS target : A target symbol representing the last valid position of an AIS target before the reception of its data was lost, or its last dead-reckoned position.

Lost tracked target : One for which target information is no longer available due to poor, lost or obscured signals.

Power amplifier : A radio frequency amplifier circuit consisting of semiconductor elements used for solid-state radars. It employs a high frequency, high power FET.

Primary : Main positioning sensor

Pulse compression : Correlation processing performed when a transmitted chirp signal is received by a solid-state radar after reflecting off the target. This processing gain enables the radar to have necessary detection capability even when a transmission power is low.

Radar beacon : A navigation aid which responds to the radar transmission and generates radio wave

Range : An area of the chart displayed on the screen. Represented by one half of the length of the chart display screen.

Reference target : A fixed target specified to calculate the speed over the ground

Report : User report to be issued periodically for using the Dynamic License method of Jeppesen continuously

Rubber band : Border that indicates the selected range.

Scale : The display scale

Sea state	:	Status of the sea condition due to the weather environment, expressed as a sea state 0 for flat conditions with minimal wind, to sea state 8 for very rough sea conditions.
Ship-avoiding operation	:	To operate the ship in order to avoid obstacles during automatic navigation, regardless of the scheduled route
Sleeping AIS target	:	A target indicating the presence and orientation of a vessel equipped with AIS
Spot depth	:	Numeric representation of depth
SSR: Solid State Radar	:	Radar that uses semiconductor elements instead of magnetron, which requires periodic replacement. It is built with a system that ensures necessary detection capability even when a transmission output is low, by using chirp signals with a long pulse length upon transmission and performing pulse compression upon reception
Update (Chart Maintenance)	:	A procedure of reflecting the update data supplied by Update CD on the imported chart.

How to Use This Manual

Structure of this manual

This manual is structured as shown below. Read the necessary section according to the purpose.

Item	Contents
Preface	Describes the purposes of using this equipment.
Safety Cautions Emergency Measures	Describes the cautions for a high voltage, precautions for rescue of victims of an electric shock, and the method of First-Aid treatment.
Pictorial Indication Precautions Upon Equipment Operation	Describes the safety precautions and warning on this equipment.
Glossary	Describes the special terminologies and equipment-specific terminologies that are used in this manual.
How to use this manual	This page.
System Overview (Chapter 1)	Describes the common functions of RADAR / ECDIS / MFD.
System Configuration (Chapter 2)	Describes the System Configuration of Scanner Units and Display Units.
Repair Parts (Chapter 3)	Describes the Repair Parts.
Replacement Procedure (Chapter 4)	Describes the Replacement Procedure.
Program Update (Chapter 5)	Describes the Program Update Procedure.
Connection Settings with External Equipment (Chapter 6)	Describes the Connection Settings with External Equipment.
Trouble Shooting (Chapter 7)	Describes the Trouble Shooting and passwords.
Appendix (Chapter 8)	Drawings of Display units and Scanner units.

Notations

Operation notations

Track ball operations on the operation panel are expressed as follows.

Operation	Notation
Click the left button.	Click Example: Click on the object.
Double-click the left button.	Double-click Example: Determine the drawing by double-click.
Click the right button	Click the right mouse button Example: Display the context menu by clicking the right mouse button.

The buttons and dialog boxes on the screen are expressed as follows.

Button type	Notation
Button with button name indicated	Example: AUTO →[AUTO] button
Button with an indication other than the button name such as an icon	Shown as follows. Example:  →Day/Night button

A series menu selection operations is expressed as follows.

Click on [User Map]—[Information Mark Property]—[Position] on the menu.

Touch panel operation

In this manual, the use of a track ball is applied as the precondition of the operation explanation. When the optional touch panel is used, read the notations in this manual as follows.

Track ball operation	Touch panel operation
(Left) click	Single tap
Double-click	Double tap
Right click	Long tap

For the operations that can be executed by touch panel operations, refer to the section “3.16 Touch Panel (Option)”.

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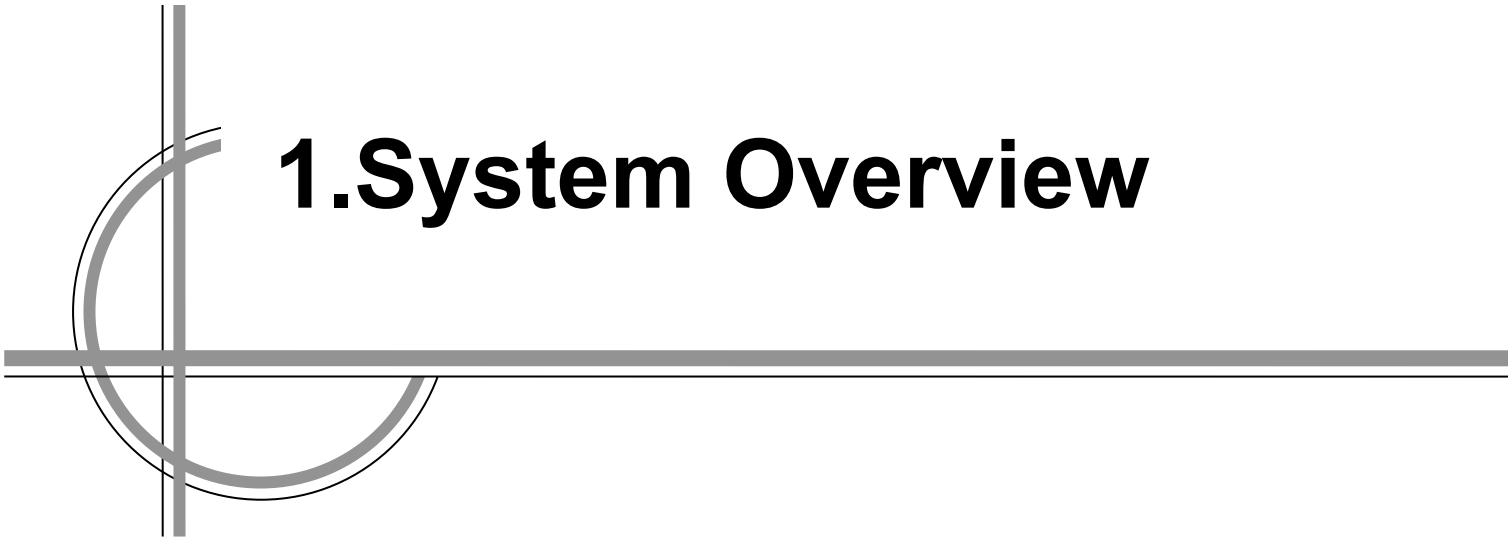
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1.System Overview

Chapter 1 System Overview

1.1 Functions

Multi Function Display (referred to as "this equipment" or "MFD" in this manual) is navigation equipment that satisfies the following IMO performance standards.

- IMO Resolution MSC192(79): Performance standards for radar equipment
- IMO Resolution MSC232(82): Performance standards for electronic chart display and information systems (ECDIS)
- IMO Resolution MSC191(79): Performance standards for the presentation of navigation related information on shipborne navigational displays
- IMO Resolution MSC74(69) Annex 2: TCS performance standards
- IMO Resolution A.694(17): General requirements for shipborne radio equipment

This equipment has the following functions for "securement of navigation safety" and "navigation energy saving", as the core equipment of INS (Integrated Navigation System) and IBS (Integrated Bridge System), which can also support a one-man bridge.

- RADAR
- ECDIS
- CID (Conning Information Display)
- AMS (Alert Management System), etc.

Main functions of the RADAR mode

- Sensitivity adjustment, sea clutter and rain/snow clutter suppression
- Interference rejection
- Bearing and range measurement using a cursor, fixed/variable range markers, and electronic bearing line
- Colored own track display
- User map creation and display
- TM (True Motion) presentation
- Self-diagnostic facilities
- Radar performance monitoring (Performance Monitor)
- Target tracking functions (manual/automatic target acquisition and tracking, vector and trail displays and alarm displays)
- 8-unit switchover (Inter-switch) function (Option)
- Electronic navigational chart display[*1] (Option)

  [*1]: The following databases can be displayed (ARCS cannot be displayed.)

  - S-57 Ed3.0/3.1
  - S-63
  - C-Map Ed3.0 Professional/Professional+
  - C-Map ENC
  - Jeppesen PRIMAR ECDIS Service

Main functions of ECDIS mode

- The following databases can be displayed.
  - S-57 Ed3.0/3.1
  - S-63
  - C-Map Ed3.0 Professional/Professional+
  - C-Map ENC
  - Jeppesen PRIMAR ECDIS Service
  - ARCS
- Own ship's track display and planned-route display on the electronic chart
- Automatic checking of the safety contours and dangerous areas of the own ship (not available for ARCS)
- TT target display and AIS target display on the electronic chart
- Overlay of radar echo on the electronic chart
- True/Relative motion display
- North-up/Course-up/Head-up/Waypoint-up display
- Display of route information such as latitude/longitude at destinations, bearings/ranges up to waypoints, and planned arrival time
- Availability of two EBLs/VRMs
- Writing of memos with alphabetic characters into the electronic chart
- Display of information such as the date/time, current position, heading, and ship's speed
- Selection of colors (conforming to the IMO/IHO) suitable for the daytime, nighttime, dawn and evening
- Editing of route information
  Addition, deletion, and modification of WPTs on the electronic chart or the list
  Calculation of the distance between WPTs, bearings, and planned arrival time
  Up to 512 WPTs per route
  Checking on the crossing of the safety contours and dangerous areas on created routes
- Route tracking (option)
- Course change
- Safety contours crossing alarm
- Dangerous areas approaching warning
- Waypoint arrival warning
- Off-track warning
- Logging of navigation information onto the SSD
- Own ship's playback using logged data

Note

This manual describes the methods of handling the RADAR mode and the ECDIS mode, however, this manual does not describe the handling method of the Conning mode. For the handling of the conning mode, refer to the "JAN-7202/9202 Conning Display Instruction Manual".

1.2 Features

This MFD has the following features:

Common functions:

Utilization of an icon menu

Intuitive operation system based on the workflow

High-resolution large screen

Message reception notification function

Notifies arrival of a new AIS message and so on with a sound and a badge.

Utilization of a common information window

Enables display of target information and simple conning information (wind direction/wind speed information, etc.) with a simple switching operation.

Display of chart information read results by grouping

Enables immediate access to the required information.

Display of the cause of alert as well as the action guideline

Equipped with the Help function

The built-in HTML Help enables the search of operation methods in this equipment instead of the hardcopy manual whenever required.

Visual highlight of target symbols

Enables identification of the target that matches the condition such as the sailing direction, ship's length, and ship's type by highlighted display.

Wave analysis function (option)

Analyzes and displays information on the surrounding waves (height, length, cycle, and direction of waves) and enables monitoring of dangerous waves for ships.

Equipped with the white list type virus protection function of Trend Micro Incorporated

RADAR function:

Realized a clear large screen with its high resolution.

By using the high definition 26inch color LCD of 1920×1200 pixels, radar image display of diameter 320mm or more is secured. Image presentation of high resolution is also possible in near ranges.

Equipped with high performance radar signal processing ASIC BLZZARD™ of new design

By eliminating unnecessary signals (clutters) from the radar video signals obtained from a wide dynamic range receiver, target detection is enhanced.

Target tracking (TT) function by utilizing the latest technology

By using the latest high-speed DSP and tracking algorithm, the target acquisition/tracking performance is improved, achieving stable operation for target tracking inside of clutters also.

- Acquisition and tracking of up to 100 targets as standard
- Expressing danger status with a sound and shape and color of a symbol
- Equipped with a trial maneuvering function
- Capable of 10-color coded display by storing target trails.

Background tracking function (Full-screen acquisition function)

Since detectable radar echoes are acquired and tracked automatically in background, the vector can be displayed immediately after initial acquisition.

Top screen with strictly selected information

Information that is constantly displayed on the Top screen of the radar is strictly selected to enable users to find the required information effortlessly.

Sortable TT/AIS list

Provides a sortable TT/AIS list (for instance in the TCPA descending order) to enable users to check the ship in the highest danger.

Dual PPI display

Capable of monitoring of near-range images and far-range images concurrently with one radar (JMR-9200 Series only).

Superimposed display of radar image, chart, and own ship's trail

Capable of superimposed display of a user-created map, an imported chart of a coastline and buoys, own ship's trail, and other ship's trails, radar images, and radar trails in all the display modes including Head Up display.

Improved Day/Night function

The Day/Night function supports up to 5 types of display screen color combinations and enables users to reproduce screen colors suitable for the user utilization environment with simple key operations. The function provides easy-to-understand screens through color coded radar images and a variety of graphics.

Built-in self-diagnosis program

By constantly monitoring all the system functions, this program displays a warning message on the screen at detection of function deterioration and issues a warning sound. The system function test can be performed easily during normal operation (excluding some tests).

Performance monitor function

This function monitors radar performance (transmission output and reception sensitivity) on the screen.

Interswitch function (Option)

By connecting to the interswitch unit (optional), up to 8 radars can be inter-switched with simple operations.

Up to 4 units: An interswitch unit separate type from the indicator and cable for connecting each indicator are necessary.

Up to 8 units: An interswitch unit separate type from the indicator and cable for connecting each indicator are necessary.

ECDIS function:

This function minimizes the information that is displayed constantly and expands the chart display area.

- Can display vector charts (ENC and C-MAP) and raster chart (ARCS).
- Realizes safer sailing through the safety contour line and crossing and approaching danger zone monitoring function. (Excluding ARCS)
- Realizes high operability through high-speed drawing and high-speed processing.
- Facilitates creation of user charts.
- Applies a multi-display screen that can display two charts concurrently. (ARCS and C-MAP Ed.3 cannot be displayed concurrently with a chart of a different type)
- Enables a course plan with multi-view.
- Can display a wide view screen while a single chart or multi-view is displayed.
- Enables creation of a route plan with the table editing function and the graphic editing function.
- Can create an alternative route while sailing.
- Automatic sailing is enabled by connecting with Auto Pilot. (option)
- The playback function enables checking of the sailed routes.
- The S-57 chart can be updated. (Chart Maintenance)

1.3 Scanner Units



S-band Magnetron 30kW 3units 12ft. Scanner Unit: NKE-1139



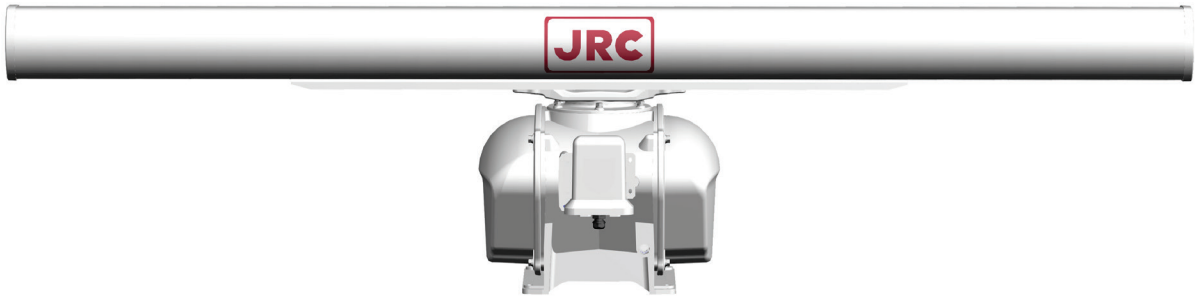
S-band Magnetron 30kW 2units 12ft. Scanner Unit: NKE-1130



S-band Solid State 250W 2units 12ft. Scanner Unit: NKE-1632



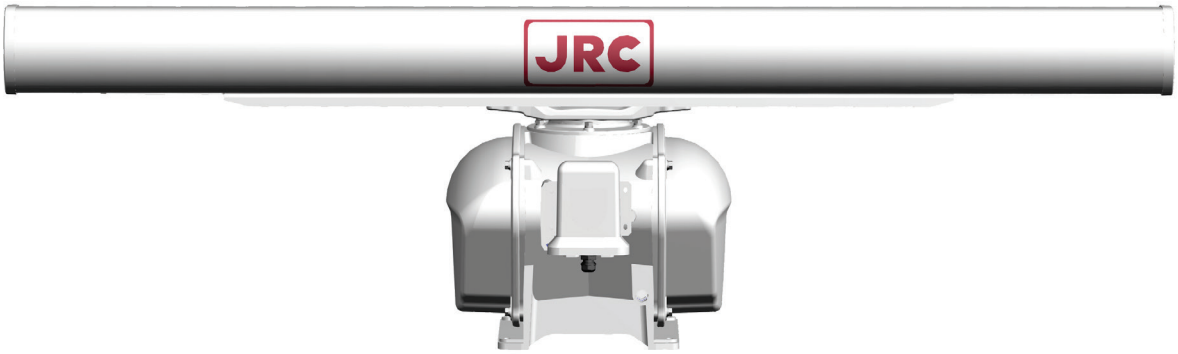
S-band Solid State 250W 2units 8ft. Scanner Unit: NKE-2632
S-band Solid State 250W 2units 8ft. High Speed Scanner Unit: NKE-2632-H



X-band Magnetron 25kW 3units 7ft. Scanner Unit:　NKE-1129-7



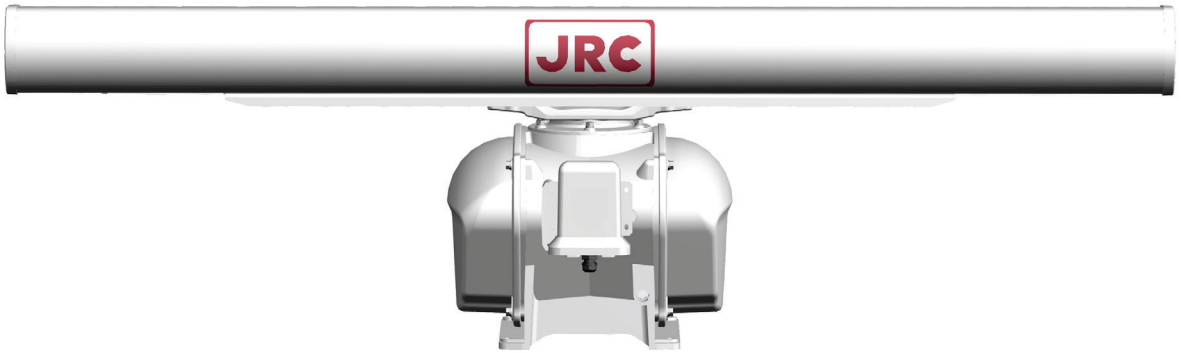
X-band Magnetron 25kW 3units 9ft. Scanner Unit:　NKE-1129-9



X-band Magnetron 25kW 2units 6ft. Scanner Unit:　NKE-1125-6



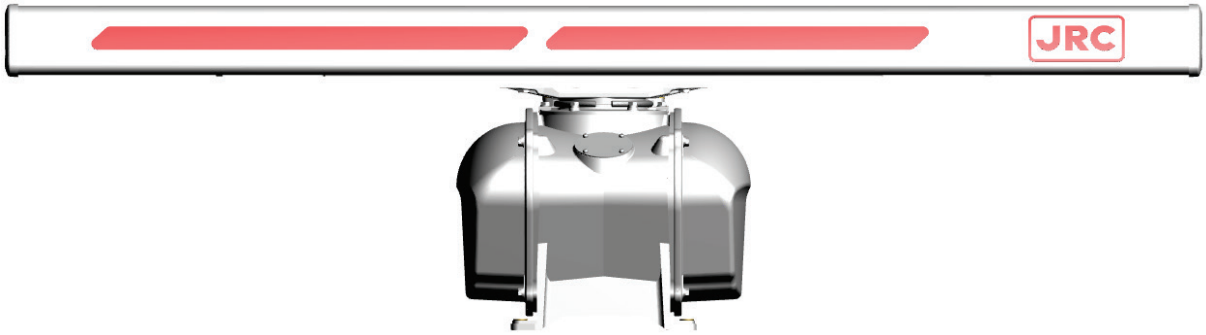
X-band Magnetron 25kW 2units 9ft. Scanner Unit:　NKE-1125-9



X-band Magnetron 25kW 2units 6ft. High Speed Scanner Unit: NKE-2254-6HS



X-band Magnetron 10kW 2units 6ft. Scanner Unit: NKE-2103-6
X-band Magnetron 10kW 2units 6ft. High Speed Scanner Unit: NKE-2103-6HS



X-band SolidState 600W 2unit 6ft. scanner unit: NKE-1696-6



X-band SolidState 600W 2unit 9ft. scanner unit: NKE-1696-9

1.4 Transmitter Receiver Units

The transmitter-receiver unit generates radar signals for transmission, amplifies and demodulates received signals. It sends the radar video signals to the display unit along with the transmission timing signals and antenna rotation signals.

Four types of transmitter-receiver units are available, which are suited to different uses:

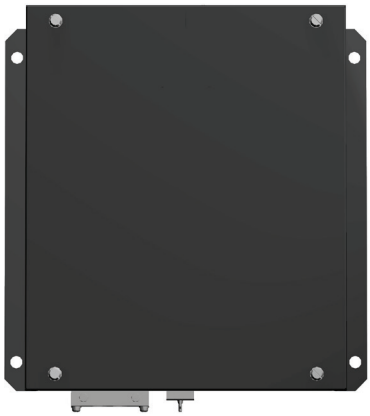
1) X band Magnetron 10 kW type: Compact and lightweight
2) X band Magnetron 25 kW type: High resolution, high sensitivity
3) S band Magnetron 30 kW type: All-weather type
4) S band Solid State 250 W type: All-weather, high durability
5) X band Solid State 600 W type: All-weather, high durability

The X band 25 kW type and the S band 30 kW type are available as either a 2-unit type, in which the transmitter-receiver unit is built into the scanner unit, or a 3-unit type, which has a separate transmitter-receiver unit to be installed inside the cabin. The S band solid state 250W type, X band solid state 600W type and X band 10 kW type are only available as a 2-unit type.

For the 3-unit types, radio wave signals are fed between the indoor transmitter-receiver unit and the outdoor scanner unit through a waveguide for the X band types or a coaxial tube for the S band type.



S-band Magnetron 30kW Transmitter-Receiver Unit: NTG-3230 (for NKE-1139 Scanner Unit)



1.5 Display Units

19-inch and 26-inch display units are available:

1) 19-inch type (effective size: 250 mm or more) : JMR-7200/JAN-7200 Series
2) 26-inch wide type (effective size: 320 mm or more) : JMR-9200/JAN-7200 Series

JMR-7200/9200 series represents the RADAR or MFD.
JAN-7200/9200 series represents the ECDIS or Conning display.



JMR-7200/JAN-7200 Series display unit



JMR-9200/JAN-9200 Series display unit



Trackball Operation Unit: TOPU NCE-5605



Keyboard Operation Unit: KOPU NCE-5625 (Option)



Central Control Unit: CCU NDC-1590/A



Power Supply Unit: PSU NBD-913



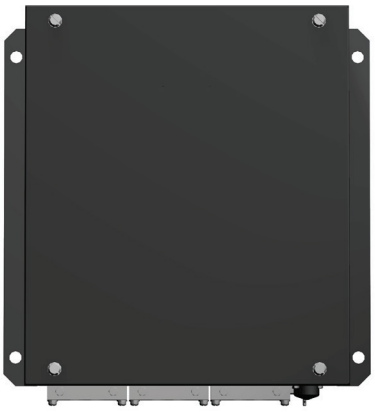
Junction Box: JB NQE-1143（Option）



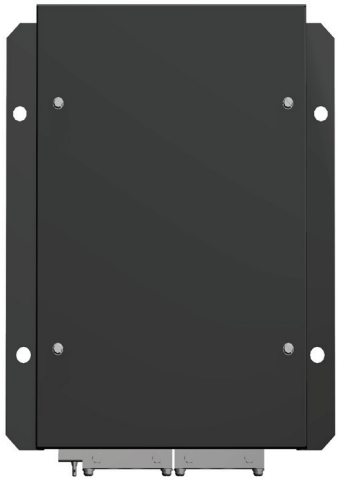
19 inch Monitor Unit: MNU NWZ-207/214



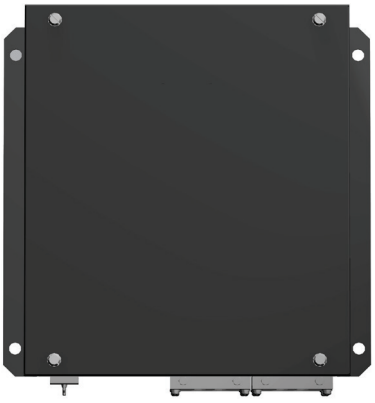
26 inch Monitor Unit: MNU NWZ-208



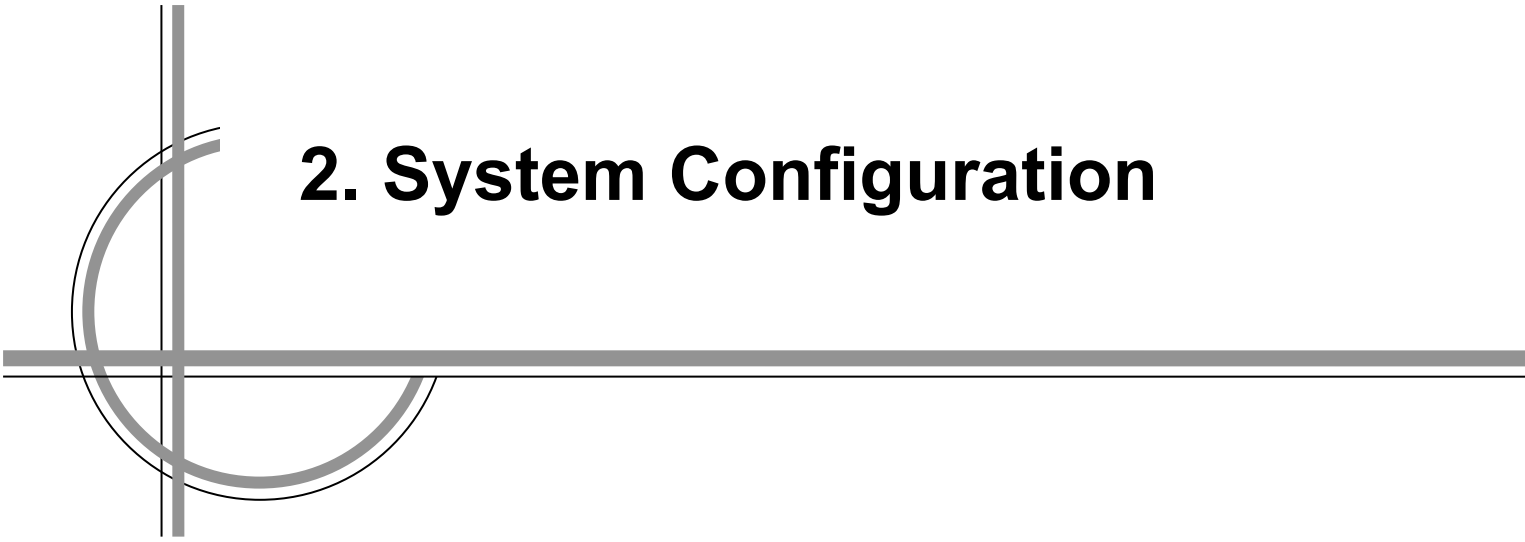
Power Control Unit:　NQE-3167 (Option）



4ch. Inter Switch Unit: NQE-3141-4A (Option)



8ch. Inter Switch Unit: NQE-3141-8A (Option)



2. System Configuration

Chapter 2. System Configuration

2.1 Components

A list of components and optional accessories is shown below.

Components of the Display Unit

Table 2.1.1 The list of components of the Display Unit

Unit			Type name	Q'ty	Remarks
LCD monitor		(JMR-92XX/JAN-92XX)	NWZ-208	1	26inch LCD monitor
		(JMR-72XX/JAN-72XX)	NWZ-207		19inch LCD monitor
			NWZ-214		19inch LCD monitor
Touch Panel monitor		(JMR-92XX/JAN-92XX)	NWZ-208-TP		Option 26inch
		(JMR-72XX/JAN-72XX)	NWZ-207-TP		Option 19inch
			NCM-928	1	Standard Equipment
Control Unit	Power Supply Unit		NBD-913	1	Standard Equipment
	Central Control Unit		NDC-1590/A	1	Standard Equipment
		8GB System SSD	CDD-752/A	1	Included in the NDC-1590/A
		256GB Data SSD	CDD-753/A	1	
		DVD Drive	CDD-754	1	
		HASP	CYC-344	1	
		Central Processing Circuit	CDC-1410/A	1	
		CCU Interface Circuit	CMH-2406	1	
		CCU Interface Terminal	CQD-2286	1	
		CCU Interconnection	CML-902/A	1	
		COM Express Board	CMC-1406/A	1	
		WES7P Licence	CYC-847/A	1	
		TMSL Licence	CYC-848	1	
		eToken	CYC-5025	1	Option for Jeppesen ENC service and Jeppesen Ed.3 Professional/+
	Trackball Operation Unit		NCE-5605	1	Standard Equipment
		Operation Circuit A	CCK-1050	1	Included in the NCE-5605
		Trackball	CCK-1060	1	
		Operation Circuit SW	CCK-1069	1	
		Operation Circuit CN	CCK-1070	1	
		TOPU Interconnection	CMD-1103	1	
Keyboard Operation Unit			NCE-5625	1	Option(NCE-5625 or CWB-1593)
		Operation Circuit B	CCK-1059	1	Included in the NCE-5625
		Option Keyboard	CCK-1061	1	
		KOPU Interconnection	CMD-1106	1	
Large Tray			CWB-1593	1	Option(NCE-5625 or CWB-1593)
UPS		QUINT-PS/1AC/24DC/20	-	1	Option
		QUINT-BAT/24DC/3.4AH	-	1	
		QUINT-DC-UPS/24DC/20 or QUINT-UPS/24DC/24DC/20	-	1	
		ME-MAX-NEF/QUINT20	-	1	

Table 2.1.2 The list of components of the Display Unit

Unit		Type name	Q'ty	Remarks
Junction Box		NQE-1143	1	Option
	Serial LAN Circuit	CMH-2370	max 2	Option
	Analog Option Circuit	CMJ-560	1	Option
	Gyro Interface Circuit	CMJ-554	1	Option
	Radar Interface Circuit	CQD-2273	1	Option
	Scanner AC Power Cable	CML-836AC	1	Any one of these cables included in the CQD-2273
	Scanner AC Power Cable(F)	CML-836ACF		
	Scanner DC Power Cable	CML-836DC		
	Scanner DC Power Cable(F)	CML-836DCF		
Sensor LAN Switch Unit		NQA-2443/A	max 2	Option In case of standalone type 26inch:max 2 19inch:only 1
	16Port Switch HUB	CQL-221	1	Included in the NQA-2443
	Sensor LAN Switch Interconnection	CML-841	1	
Stand-alone type Frame & Cables	26inch Display Mount Kit	CWA-246	1	For 26inch Monitor
	19inch Display Mount Kit	CWA-245		For 19inch Monitor
	Display Unit Interconnection	CML-901	1	Cables for stand-alone
	Relay Terminal	CQD-2312	1	For AC/DC Power dis tribution
	Touch Panel Interconnection	CML-839	1	Option
Desktop type Frame & Cables	26inch Desktop Frame	CWB-1595	1	For 26inch Monitor
	19inch Desktop Frame	CWB-1594		For 19inch Monitor
	19inch Desktop Frame	CWB-1659		For 19inch Monitor
	OPU Desktop Frame	CWB-1596	1	For operation unit
	Display Unit Interconnection(F)	CML-901-F	1	Longer than CML-901
	Touch Panel Interconnection(F)	CML-839-F	1	Option
Flush-mount type Cables	Display Unit Interconnection(F)	CML-901-F	1	Longer than CML-901
	Touch Panel Interconnection(F)	CML-839-F	1	Option
Interswitch Unit	4ch	NQE-3141-4A	1	Option
	8ch	NQE-3141-8A	1	Option
Power Control Unit		NQE-3167	1	Option
Digital Signal Converter	32ch	NCT-82	1	Option
	64ch	NCT-83	1	Option
Buzzer Unit		CGC-25	1	Option TCS Buzzer
Remote monitor display connection	RGB Video Distribution Amplifier	VAC-2001HB-A	1	Option
	Monitor Extension Kit	CFQ-5957	1	Option
Cover	(JMR-92XX/JAN-92XX)	CWB-1621	1	Option
	(JMR-72XX/JAN-72XX)	CWB-1619		
Hood	(JMR-92XX/JAN-92XX)	CWB-1620	1	Option
	(JMR-72XX/JAN-72XX)	CWB-1618		Option
Accessory	CD Cleaner	7ZZNA0426B	1	Packing 1 box
Spare Parts	NBD-913 Spare Parts	7ZXNA4021	1	Packing 1 box
	CMH-2370 Spare Parts	7ZXNA4020	1	Option
	CMJ-554 Spare Parts	7ZXNA4022	1	Option
	7HPNA4004 Printer spare parts	7ZXNA4024A	1	Option
	NCT-82/83 Spare Parts	7ZXNA4017	1	Option
Printer	Printer	7HPNA4004	1	Option
	L-Type Stopper(Printer fixture)	QL-58	1	

Manuals

Table 2.1.3 The list of Manuals

Model	Title	Code	Remarks
JMR-7200/9200 Series	JMR-7200/9200 Series Marine Radar Equipment Instruction Manual <Basic Operation> (1/3) *English	7ZPNA4446*1	Standard Equipment
	JMR-7200/9200 Series Marine Radar Equipment Instruction Manual <Function> (2/3) *English	7ZPNA4447*1	Standard Equipment
	JMR-7200/9200 Series Marine Radar Equipment Instruction Manual <Reference> (3/3) *English	7ZPNA4448*1	Standard Equipment
	JMR-7200/9200 Series Marine Radar Equipment Quick Operation Guide *English	7ZPNA4395*1	Standard Equipment
	JMR-7200/9200 Series JAN-7201/9201 Marine Radar Equipment ECDIS Additional Manual for Chart Installation *English	7ZPNA4461*1	Option
	JMR-7200/9200 Series JAN-7201/9201 JAN-7202/9202 Marine Radar Equipment ECDIS Conning Display Installation Manual *English	7ZPNA4466*1	Option
	JMR-7200/9200 Series JAN-7201/9201 JAN-7202/9202 Marine Radar Equipment ECDIS Conning Display Field Service Manual *English	7ZPNA4467*1	Option
JAN-7201/9201	JAN-7201/9201 ECDIS Instruction Manual <Basic Operation> (1/3) *English	7ZPNA4449*1	Standard Equipment
	JAN-7201/9201 ECDIS Instruction Manual <Function> (2/3) *English	7ZPNA4450*1	Standard Equipment
	JAN-7201/9201 ECDIS Instruction Manual <Reference> (3/3) *English	7ZPNA4451*1	Standard Equipment
	JAN-7201/9201 ECDIS Quick Operation Guide *English	7ZPNA4405*1	Standard Equipment
	JMR-7200/9200 Series JAN-7201/9201 Marine Radar Equipment ECDIS Additional Manual for Chart Installation *English	7ZPNA4461*1	Option
	JAN-7201/9201 ECDIS Additional Manual for Automatic Sailing YOKOGAWA Autopilot PT900 TCS model Category C *English	7ZPNA4538*1	Option
	JAN-7201/9201 ECDIS Additional Manual for Automatic Sailing TOKYO KEIKI Autopilot PR-9000 TCS model Category C *English	7ZPNA4463*1	Option
	JAN-7201/9201 ECDIS Additional Manual for Automatic Sailing ALPHATRON Autopilot AlphapilotMFM TCS model Category C *English	7ZPNA4749*1	Option
	JAN-7201/9201 ECDIS Additional Manual for S-JOY YDK S-JOY *English	7ZPNA4610*1	Option
	JMR-7200/9200 Series JAN-7201/9201 JAN-7202/9202 Marine Radar Equipment ECDIS Conning Display Installation Manual *English	7ZPNA4466*1	Option
	JMR-7200/9200 Series JAN-7201/9201 JAN-7202/9202 Marine Radar Equipment ECDIS Conning Display Field Service Manual *English	7ZPNA4467*1	Option
JAN-7202/9202	JAN-7202/9202 Conning Display Instruction Manual *English	7ZPNA4452*1	Standard Equipment
	JMR-7200/9200 Series JAN-7201/9201 JAN-7202/9202 Marine Radar Equipment ECDIS Conning Display Installation Manual *English	7ZPNA4466*1	Option
	JMR-7200/9200 Series JAN-7201/9201 JAN-7202/9202 Marine Radar Equipment ECDIS Conning Display Field Service Manual *English	7ZPNA4467*1	Option

*1 Revision symbol(A,B,C..) is added to the end of each type name.

Radar Antenna Types and Specifications

Table 2.1.4 The list of Radar Antenna Types and Specifications

Radar antenna type	Radio wave type	ft	Transmitter-receiver unit	Transmitting power	Band	Power supply	Rate of rotation	Category
NKE-1632	P0N,Q0N	12	-	250W	S	AC	24rpm	CAT 1C
NKE-2632	P0N,Q0N	8	-	250W	S	AC	24rpm	CAT 1C
NKE-2632-H	P0N,Q0N	8	-	250W	S	AC	48rpm	CAT 1C
NKE-1139	P0N	12	NTG-3230	30kW	S	AC	24rpm	CAT 1C
NKE-1130	P0N	12	-	30kW	S	AC	24rpm	CAT 1C
NKE-1696-9	P0N,Q0N	9	-	600W	X	AC	24rpm	CAT 1C
NKE-1696-6	P0N,Q0N	6	-	600W	X	AC	24rpm	CAT 1C
NKE-1129-9	P0N	9	NTG-3225	25kW	X	AC	24rpm	CAT 1C
NKE-1129-7	P0N	7	NTG-3225	25kW	X	AC	24rpm	CAT 1C
NKE-1125-9	P0N	9	-	25kW	X	AC	24rpm	CAT 1C
NKE-1125-6	P0N	6	-	25kW	X	AC	24rpm	CAT 1C
NKE-2254-6HS	P0N	6	-	25kW	X	DC	48rpm	CAT 1C
NKE-2103-6	P0N	6	-	10kW	X	DC	27rpm	CAT 1C
NKE-2103-6HS	P0N	6	-	10kW	X	DC	48rpm	CAT 1C

General Type Name

Table 2.1.5 The list of General Type Name

General type name	Model	Radar antenna	Transmitter-receiver unit	Display	Ship's mains
JMR-9272-S *	RADAR/MFD	NKE-1632	-	26inch NWZ-208	Specify 100-115VAC or 220-240VAC when ordering. 50/60 Hz Single phase 24VDC (For backup)
JMR-9282-S *		NKE-2632	-		
JMR-9282-SH *		NKE-2632-H	-		
JMR-9230-S3		NKE-1139	NTG-3230		
JMR-9230-S		NKE-1130	-		
JMR-9296-9X		NKE-1696-9	-		
JMR-9296-6X		NKE-1696-6	-		
JMR-9225-9X3		NKE-1129-9	NTG-3225		
JMR-9225-7X3		NKE-1129-7	NTG-3225		
JMR-9225-9X		NKE-1125-9	-		
JMR-9225-6X		NKE-1125-6	-		
JMR-9225-6XH		NKE-2254-6HS	-		AC wide range Input 24VDC (For backup)
JMR-9210-6X		NKE-2103-6	-		
JMR-9210-6XH		NKE-2103-6HS	-		
JAN-9201	ECDIS	-	-		
JAN-9202	Conning	-	-		
JMR-7272-S	RADAR/MFD	NKE-1632	-	19inch NWZ-207 or NWZ-214	Specify 100-115VAC or 220-240VAC when ordering. 50/60 Hz Single phase 24VDC (For backup)
JMR-7282-S		NKE-2632	-		
JMR-7282-SH		NKE-2632-H	-		
JMR-7230-S3		NKE-1139	NTG-3230		
JMR-7230-S		NKE-1130	-		
JMR-7296-9X		NKE-1696-9	-		
JMR-7296-6X		NKE-1696-6	-		
JMR-7225-9X3		NKE-1129-9	NTG-3225		
JMR-7225-7X3		NKE-1129-7	NTG-3225		
JMR-7225-9X		NKE-1125-9	-		
JMR-7225-6X		NKE-1125-6	-		
JMR-7225-6XH		NKE-2254-6HS	-		AC wide range Input 24VDC (For backup)
JMR-7210-6X		NKE-2103-6	-		
JMR-7210-6XH		NKE-2103-6HS	-		
JAN-7201	ECDIS	-	-		
JAN-7202	Conning	-	-		

Option list of radar antenna

Table 2.1.6 Option list of radar antenna

Name	Model name	Remarks
Performance monitor	NJU-84	For S-band radars excluding NKE-1632, 2632 and 2632-H
	NJU-85	For X-band radars excluding NKE-1696
4 unit switching interswitch	NQE-3141-4A	Separate unit
8 unit switching interswitch	NQE-3141-8A	Separate unit (special order)
Power control unit	NQE-3167	Separate unit

Note:

1. The drive motor for the radar antenna is available in 100-115VAC 50/60 Hz single phase or 220-240VAC 50/60 Hz single phase type for NKE-1632/2632/1139/1130/1696/1129/1125 /2254/2103 series. Please specify the power source type when ordering.
2. The radar antenna can be equipped with anti-icing system (neck heater) as an option, and '-D' shall be suffixed to the type name ('-D' or '-E' shall be suffixed to NKE-1632, NKE-2632, NKE-2632-H, and NKE-1696.). '-D' ・・・100Vac (50/60Hz)
   '-E' ・・・220Vac (50/60Hz)

Reference:

The suffix(s) in the type name is/are changed by applying motor voltage, anti-icing system, etc.

(Example) NKE-1130-1D

D: Attached anti-icing system
1: Motor voltage 100-115Vac (50/60Hz)
2: Motor voltage 220-240Vac (50/60Hz)

3. When using the ship's mains of 440VAC as the radar power source, a step-down transformer shall be used.
4. The following are the each unit name on the one's plate:

Rader antenna	SCANNER UNIT
Transmitter-receiver unit	TRANSMITTER-RECEIVER UNIT
Display section	MONITOR UNIT
Track ball operation section	TRACK BALL OPERATION UNIT
Keyboard operation section	KEYBOARD OPERATION UNIT
Central processing section	CENTRAL CONTROL UNIT
Power supply section	POWER SUPPLY UNIT
Junction box	JUNCTION BOX
Rader LAN switch section	RADAR LAN SWITCH UNIT
Sensor LAN switch section	SENSOR LAN SWITCH UNIT
Cradle frame	CRADLE FRAME

5. In JMR-9225-9X3/JMR-9225-7X3 and JMR-7225-9X3/JMR-7225-7X3, the following type name of JRC is used for the waveguide between the transmitter-receiver unit and the radar antenna.

Waveguide	Length	Type name of JRC
FR-9	20MT	H-7AWRD0003
FR-9	30MT	H-7AWRD0004

6. In JMR-9230-S3 and JMR-7230-S3, the following type name of JRC is used for the coaxial cable between the transmitter-receiver unit and the radar antenna.

Coaxial cable	Length	Type name of JRC

HF-20D	30MT	HF-20D (30MT)

2.2 Power System Diagram

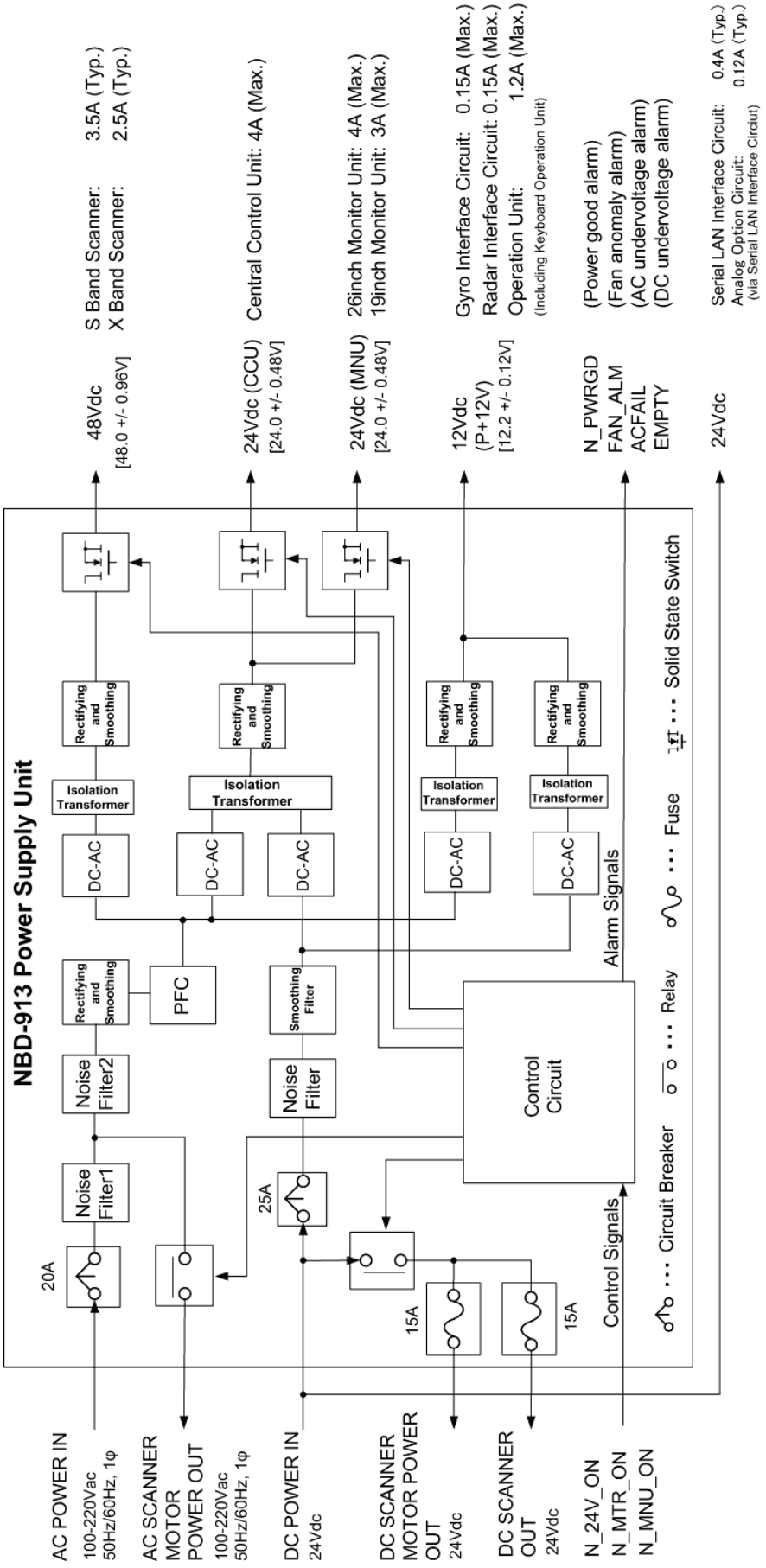


Fig. 2.2.1 The Power System Diagram

Table. 2.2.1 General Specification of Power Supply Unit NBD-913

GENERAL SPECIFICATION	NBD-913: Power Supply Unit
AC Input	
Voltage	100 to 115VAC, 50/60Hz, single phase
	220 to 240VAC, 50/60Hz, single phase
Voltage Range	85 to 264VAC
Overvoltage Protection	295VAC ±2V
Input Current	Max 6.8A(100VAC) / 3.4A(220VAC)
Over current Protection	YES
DC Input	
Voltage	24VDC
Voltage Range	21.6 to 31.2VDC
Overvoltage Protection	42V
Input Current	Max 16A
Over current Protection	YES
Rated Output	
Output 1	12.0V ±0.24V 2A
Output 2A (for CCU)	24.0V ±0.48V 4A
Output 2B (for MNU)	24.0V ±0.48V 6A
Output 3 (for TXRX)	48.0V ±0.96V 4A
Mechanical	
Dimension	Width 400 x Depth 240 x Height 85 (mm)
Mass	4.2kg
FAN	2
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/s2 and for 2h on each resonance, otherwise 2h at 30Hz in all three axes
EMC	IEC60945-Ed4.0
Ingress Protection Rating	IP20

The power system diagram is shown in Fig. 2.2.1.

PSU (Power Supply Unit: NBD-913) supplies power to the Scanner Unit and Display Unit which consists of MNU(Monitor Unit), CCU (Central Control Unit), OPU(Operation Unit), and JB(Junction Box). The lists of Input/Output features of the PSU are given in Table 2.2.2 and Table 2.2.3.

Table 2.2.2 The list of PSU input section

Input	Detail
AC Input	
Voltage	100 to 115Vac 220 to 240Vac
Voltage ranges	85 to 264VAC
Overvoltage Protection	295VAC±2V,
Frequency	50Hz / 60Hz
Input Current	Max 6.8A(100VAC) / 3.4A(220VAC)
Over current Protection	equipped
DC Input	
Voltage	24Vdc
Voltage ranges	21.6 to 31.2Vdc
Overvoltage Protection	42V
Input Current	Max 16A
Over current Protection	equipped
Control Signals	
N_24V_ON	CCU power control signal. Open Collector Input. Logic Level L: 24Vdc (CCU) ON.
N_MTR_ON	Scanner unit power control signal. Open Collector Input. Logic Level L: 100-220Vac, 48Vdc, 24Vdc (M+. M-), and 24Vdc (1A, 2A) ON.
N_MNU_ON	Monitor unit power control signal. Open Collector Input. Logic Level L: 24Vdc (MNU) ON.

Table 2.2.3 The list of PSU output section

Output	For	Detail
AC Output		
100-220Vac 50/60Hz Single phase	AC Scanner Motor	Through output. Overcurrent protection by a circuit breaker.
DC Output		
48Vdc	AC Scanner	Overvoltage and overcurrent protection by a solid state switch.
24Vdc (M+, M-)	DC Scanner Motor	Through output. Overcurrent protection by a blade fuse.(15A)
24Vdc (1A, 2A)	DC Scanner	Through output. Overcurrent protection by a blade fuse.(15A)
24Vdc (CCU)	CCU	Overvoltage and overcurrent protection by a solid state switch.
24Vdc (MNU)	MNU	Overvoltage and overcurrent protection by a solid state switch.
12Vdc (P+12V)	CCU, OPU, GIF, RIF	Standby output.
Alarm Signals		
AC FAIL	CCU	AC input low voltage alarm. Open Collector Output Logic Level H (within 40ms) :100-220Vac IN is less than 75Vac typ.
DC EMPTY	CCU	DC input low voltage alarm. Open Collector Output Logic Level H (within 40ms) : 24Vdc IN is less than 18Vdc typ.
FAN_ALM	CCU	Fan anomaly alarm. Open Collector Output Logic Level H: the Fan motor anomaly.
N_PWRGD	CCU	Power good signal. Open Collector Output. Logic Level H: PSU has low output voltage under output anomaly (overvoltage, overcurrent) or inner temperature anomaly.

PSU Input Section

To drive PSU, AC power input, DC power input, and control signal inputs are required.

The ship's AC power supply is input to each stabilized power supply circuit via a circuit breaker and a line filter, and generates the required voltage. If only DC power (24Vdc) is input to PSU, It will not generate 48Vdc. Each power supply circuit is a highly efficient switching power supply circuit.

PSU is equipped with overvoltage protection. If the input voltage exceeds the set upper limit, the circuit breaker trips to prevent the excessive voltage from being applied to the system. It is not necessary to change input voltage setting of 100 or 220Vac because PSU has a wide range AC input.

Control signals are used to control the outputs which are 100-220Vac, 48Vdc, 24Vdc(M+, M-), 24Vdc(1A, 2A), 24Vdc(MNU), 24Vdc(CCU). They are open collector signals.

The control signals are the follows:

N_24V_ON	: CCU power control signal
N_MTR_ON	: Scanner unit power control signal
N_MNU_ON	: Monitor unit power control signal

PSU Output Section

The Outputs of PSU are 100-220Vac, 48Vdc, 24Vdc (M+, M-), 24Vdc (1A, 2A), 24Vdc (MNU), 24Vdc (CCU), 12Vdc (P+12V), and alarm signals.

12Vdc (P+12V) power supply operates even when the operating unit is turned off. This power supply is used in functions such as the control circuit of the power supply circuit and the interswitch control function.

When the power switch of OPU is turned on, PSU used in the system is activated and outputs power at the following voltages:

24Vdc (MNU)	: for Monitor Unit
24Vdc (CCU)	: for Central Control Unit

100-220Vac and 48Vdc power supply for the AC scanner power are output independently from the power for the system itself. When N_MTR_ON the scanner unit power control signal is input from the interswitch unit, 100-220Vac and 48Vdc power supply come on. Where the interswitch function is not used, these actions are linked to the power switch of OPU. 48Vdc power supply is used in the internal control circuit of the AC scanner unit and in the transmitter-receiver unit. It is the same for DC scanner power. In DC scanner, 24Vdc (M+, M-) and 24Vdc (1A, 2A) are used.

Each power supply output has output overcurrent protection, so that if there is a short circuit of the load or the rated output is exceeded, protective functions are activated and shut down the output.

The system is equipped with a function to provide notification that the ship's AC power supply is shut off. Connecting the system to the ship's battery (24V) makes it possible for an alarm to be sounded from the OPU when the ship's AC power supply is shut down.

The alarm signals are the follows:

ACFAIL	: AC input undervoltage alarm
DC EMPTY	: DC input undervoltage alarm
FAN_ALM	: Fan anomaly alarm
N_PWRGD	: Power good signal

2.3 Function System Diagrams

2.3.1 Scanner unit / transmitter-receiver unit

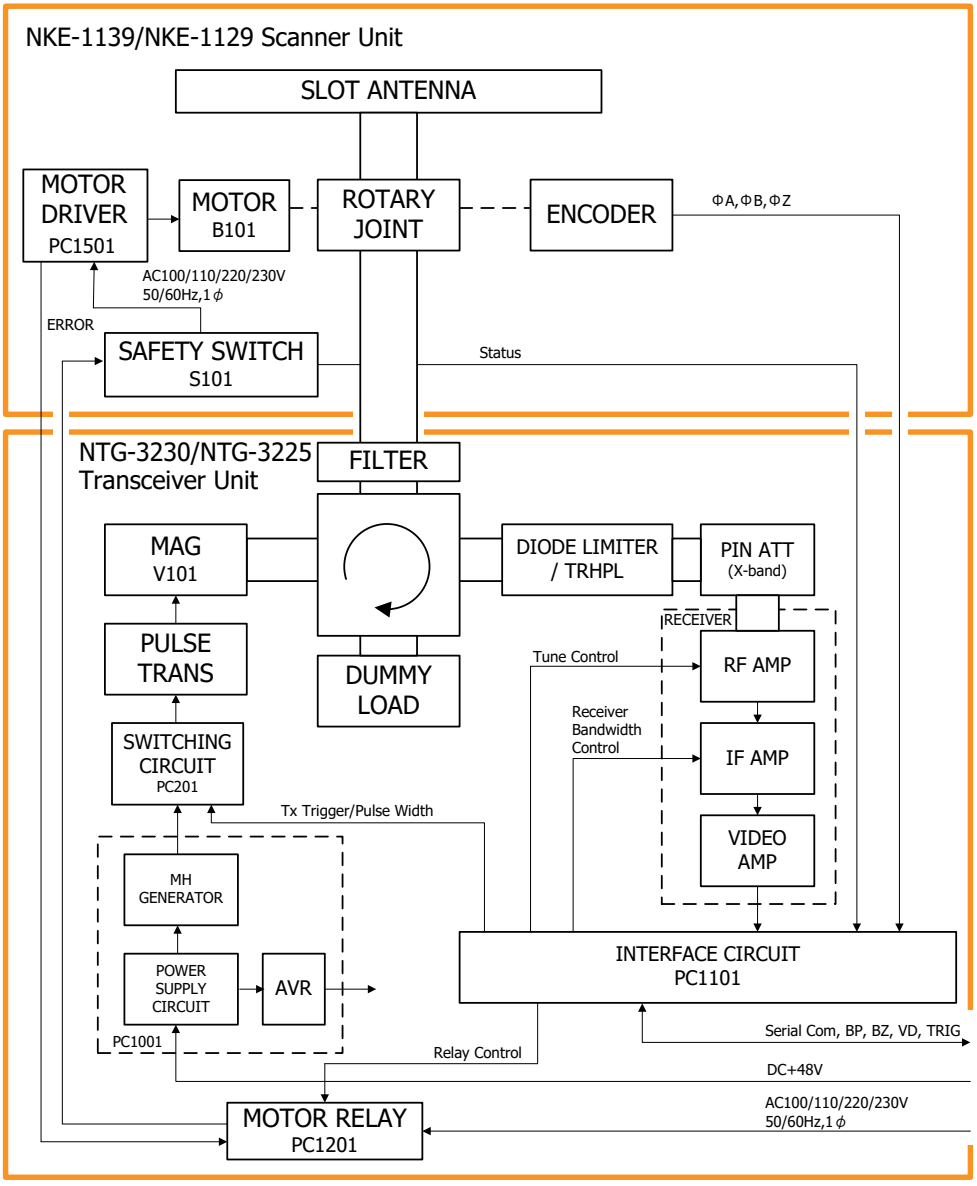


Fig. 2.3.1 Function Diagram of 3-unit Scanner/Transmitter-Receiver unit

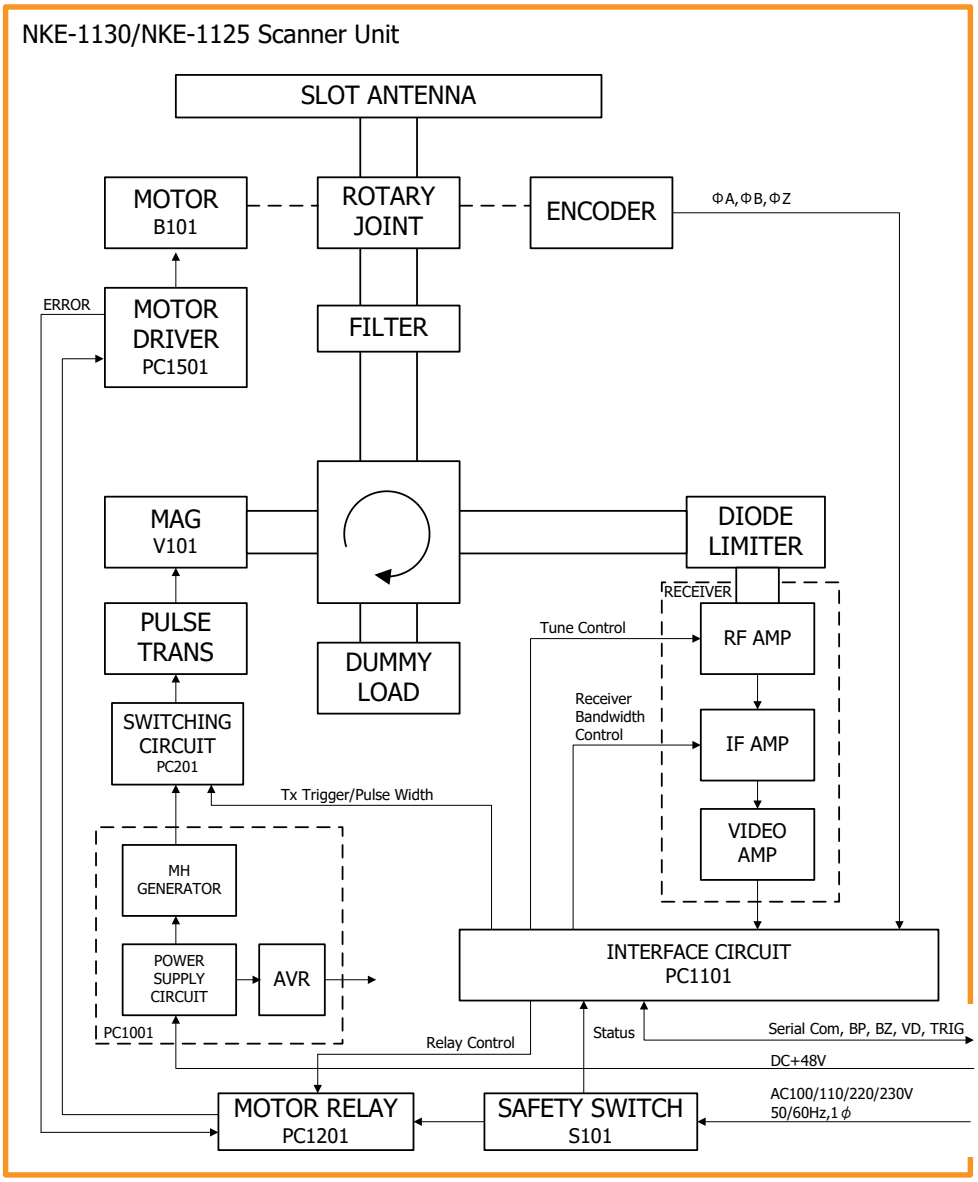
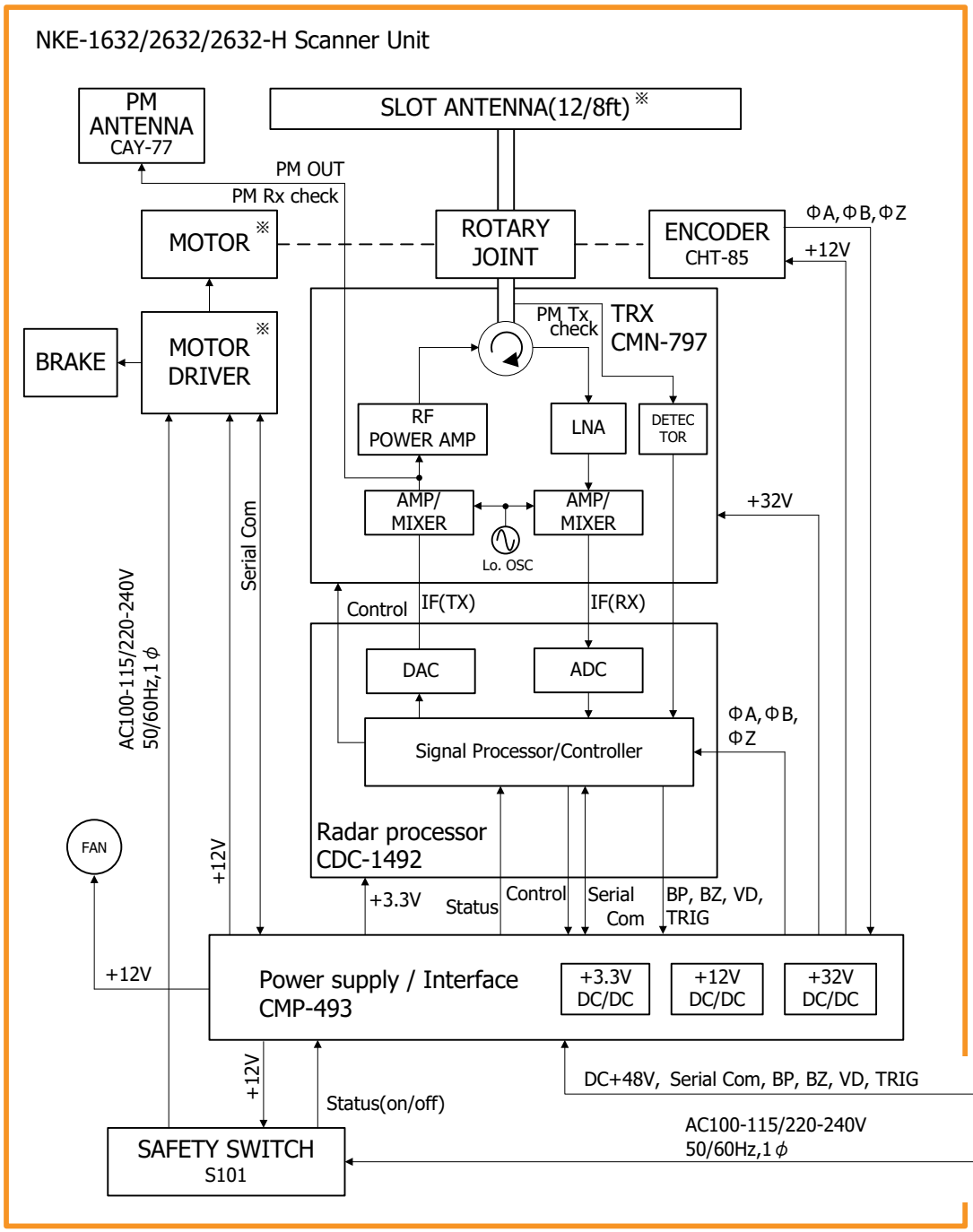


Fig. 2.3.2 Function Diagram of 2-unit Scanner/Transmitter-Receiver unit



※ SLOT ANTENNA : 12ft (for NKE-1632)
8ft (for NKE-2632/2632-H)

MOTOR : MDBW10832 (for NKE-1632/2632)
MDBW10967 (for NKE-2632-H)
MOTOR DRIVER : CBD-1949 (for NKE-1632/2632)
CBD-1950 (for NKE-2632-H)

Fig. 2.3.3 Function Diagram of S-band Solid state Scanner/Transmitter-Receiver unit

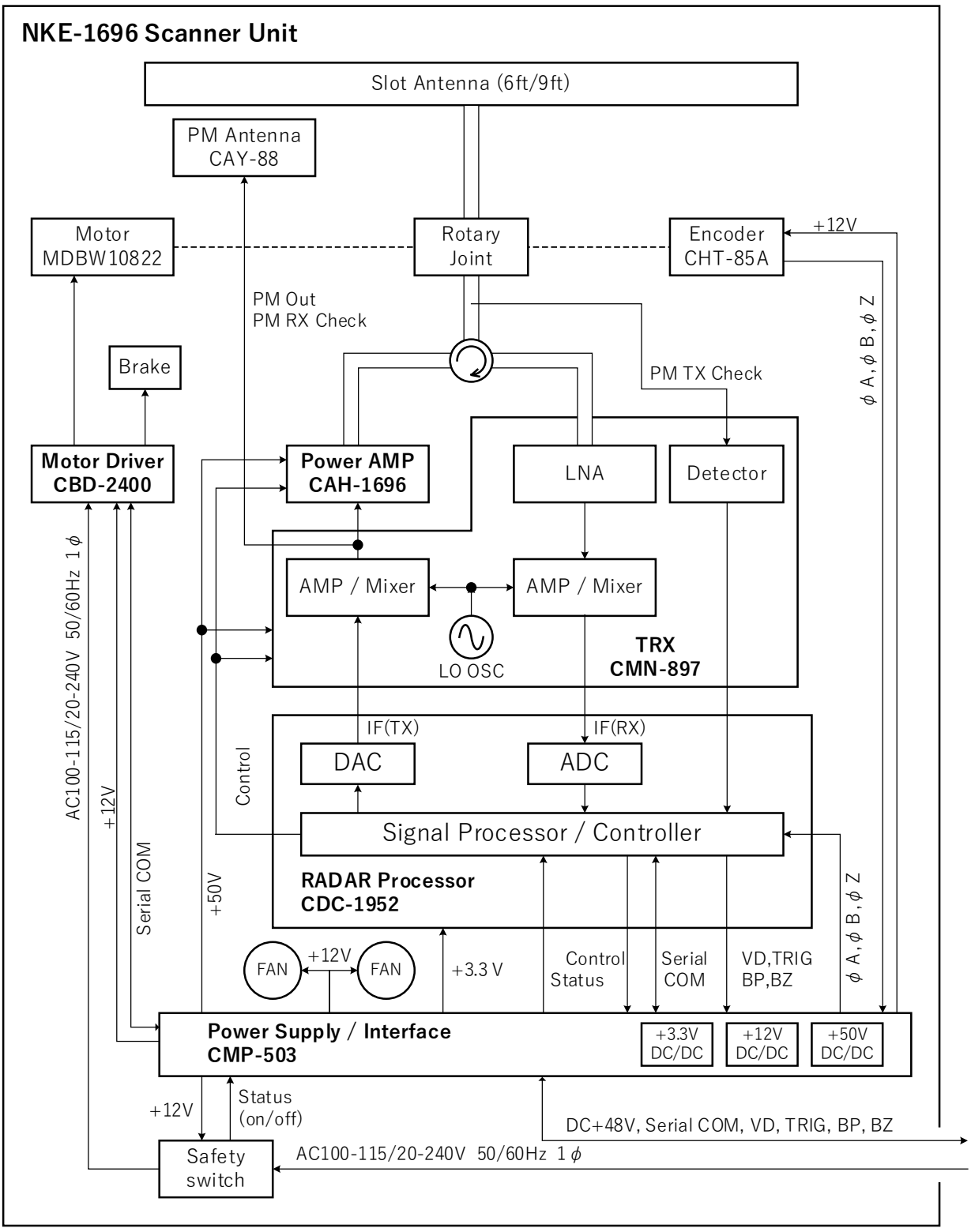


Fig. 2.3.4 Function Diagram of X-band Solid state Scanner/Transmitter-Receiver unit

Fig. 2.3.1, Fig. 2.3.2, Fig. 2.3.3 and Fig. 2.3.4 show the function system diagram for the scanner unit / transmitter-receiver unit of 3-unit, 2-unit, S band and X band 2-unit solid state respectively. In the 3-unit type, the transmitter-receiver unit is installed indoors, away from the scanner unit. In the 2-unit type, the transmitter-receiver unit is installed inside the scanner unit.

Magnetron Scanner Unit

When the +48V power supply in the display unit starts, the power supply circuit in the transmitter-receiver unit activates and power is supplied to the circuits in the scanner unit and the transmitter-receiver unit. Once the power supply starts, the CPU in the interface circuit starts and perform initial settings. Then the preheating of the magnetron begins, and the transmitter-receiver unit waits for a communication signal to be sent from the display unit. When it receives the communication signal from the display unit, a communication link is established, and the scanner unit and the transmitter-receiver unit are subsequently controlled from the display unit.

While the magnetron is preheating, the interface circuit sets the operation of the various circuits in the transmitter-receiver unit according to the initial setting values it receives from the display unit. When the preheating is complete, the transmitter-receiver unit notifies the display unit. When the user performs the operation to start transmission, the display unit sends the transmission start command via the communication line and the transmitter-receiver unit starts the rotation of the antenna motor and begins transmission.

A transmission timing pulse is generated in the interface circuit, which is input to the modulator switching circuit for high voltage switching. The pulse transformer further increases the voltage of the high-voltage pulse, and the high voltage is applied to the magnetron. In this way, pulse-modulated microwaves are obtained. The pulse width of the radar wave and the pulse-repetition frequency are specified by means of control commands from the display unit.

The radar wave passes through a duplexer circuit that uses a circulator and then through a rotary joint, before being transmitted into the air from the antenna. A signal reflected from a target is input from the antenna to the receiving block using the duplexer function. The received signal is amplified before being converted to the IF frequency, after which logarithmic detection is performed and the signal becomes a radar video signal. If the receiving tuning function is set to the auto mode, the interface circuit processes the received signal and automatically controls the tuning voltage so as to match the optimum local frequency.

When the interface circuit turns on the scanner unit relay, AC power is supplied to the motor driver circuit and the antenna motor rotates. If the safety switch is off, the power supplied to the motor driver is forcibly shut off, stopping the rotation of the antenna motor. The beam azimuth of the antenna is detected by the encoder.

The received radar video signal, the transmission timing signal, and the antenna rotation signal are all sent to the display unit. The radar video signal is an unprocessed log-compressed signal. The antenna rotation signal is an incremental signal which uses the 2048 pulse/rotation pulse and the azimuth reference pulse.

When a set period of time has elapsed after the communication signal from the display unit has

stopped, the interface circuit switches to the protection mode and forcibly stops transmission and the rotation of the antenna.

When the radiator is subjected to external force of wind (corresponding wind speed is greater than 51.5m/s) that exceed the ability to drive the scanner unit, the scanner unit stop to drive the motor. Because a built-in overload protection circuit is activated. If the scanner unit rotates by the wind in a counterclockwise direction, the TXRX[Reverse] alarm will be appeared, and stop to transmit. If the scanner unit rotates by the wind in a clockwise direction, the scanner unit stops to drive the motor. Therefore the TXRX[AZI] alarm will be appeared when the wind is calm down.

When the corresponding wind speed is less than or equal to 51.5m/s, the break circuit (in the scanner unit) can reduce the scanner rotation speed to 11rpm less than, therefore the radar can transmit normally.

Solid state Scanner Unit

Fig. 2.3.3 and Fig. 2.3.4 shows the Function diagram of solid state scanner unit.

Solid state scanner unit consists of motor drive unit, transceiver/receiver unit, and power supply unit. It constructs 2-unit type marine radar equipment by connecting with the display unit.

When the +48V power supply in the display unit starts, the power supply circuit in the solid state scanner unit activates and power is supplied to each circuits of it. Once the power supply starts, the CPU in the Radar processor unit starts and performs initial settings. Then it waits for a communication signal to be sent from the display unit. Solid state scanner does not need preheating. When it receives the communication signal from the display unit, a communication link is established, and the scanner units are subsequently controlled from the display unit.

When the Radar processor received range table data that includes information such as the pulse width of the radar wave and the pulse-repetition frequency, it starts the function setting sequence corresponding to designated transmission and reception spec. When the function setting sequence is finished, the Radar processor notifies the transmission and reception preparation completion status to the display unit.

When the user performs the operation to start transmission, the display unit sends the transmission start command via the communication line and the scanner unit starts the rotation of the antenna motor and begins transmission.

Since solid state scanner unit does not use a magnetron, it needs no preheating. Therefore, it can begin transmission and reception immediately after the end of above settings. In this time, the transmission control signals such as the transmission trigger signal that synchronized with the transmission IF signal flow together, and perform the operation timing control of TRX module. The transmission IF signal consists of unmodulated pulse signal P0N and frequency modulation pulse signal Q0N.

TRX module performs time division transmission control. That allows P0N narrow pulse width signal to be used for detection at the range scale which would be the blind echo in the main-bang of Q0N wide pulse width signal. Transmission RF signal is amplified by the power amplifier unit constituted of RF FETs, and it is outputs as the transmission signal from TRX module via circulator. This signal is input to the antenna port, and then it is transmitted into the air from the antenna.

A part of the signal is reflected from a target and received by the antenna. The signal received by

the antenna which is the same as transmitting, and it is input to receiver unit of the TRX module as the reception signal via the circulator.

After amplification the signal level by Low Noise Amplifier, the reception RF signal that is input to the receiver unit is downconverted into the reception IF signal by frequency converter unit. Then it is amplified to desired signal level again, flows into the AD converter via the BPF of the radar processor.

The digital signal that has converted by the AD converter is supplied to the Radar processor, and it undergoes the digital signal processing such as pulse compression processing, coherent integration processing, and, P0N and Q0N transmission synthesis processing. After conversion into analog signal by the DA converter, this processed analog signal is input to the display unit as the radar video signal. Simultaneously, the bearing pulse signal, the heading line signal, and the transmission trigger signal are input together.

The performance monitor function that monitors the degradation state of transmission and reception performance of the radar equipment is follows. In order to monitor the transmission system, the level detector unit monitors the output level of the power amplifier unit. In order to monitor the reception system, the radar antenna monitors the reception level of the PM signal which is emitted to the air by the TRX module via the PM antenna.

Since AC power for the motor driven is supplied via the safety switch, it can be forced outage of the motor when it is turned off under maintenance. The state of the safety switch is always monitored as the status signal, and it is sent to the display unit. Though the motor and motor driver circuit are varied by the Radar antenna type, the setting of motor power 100Vac or 220Vac is set by jumper plug of the motor driver circuit.

2.3.2 Display unit

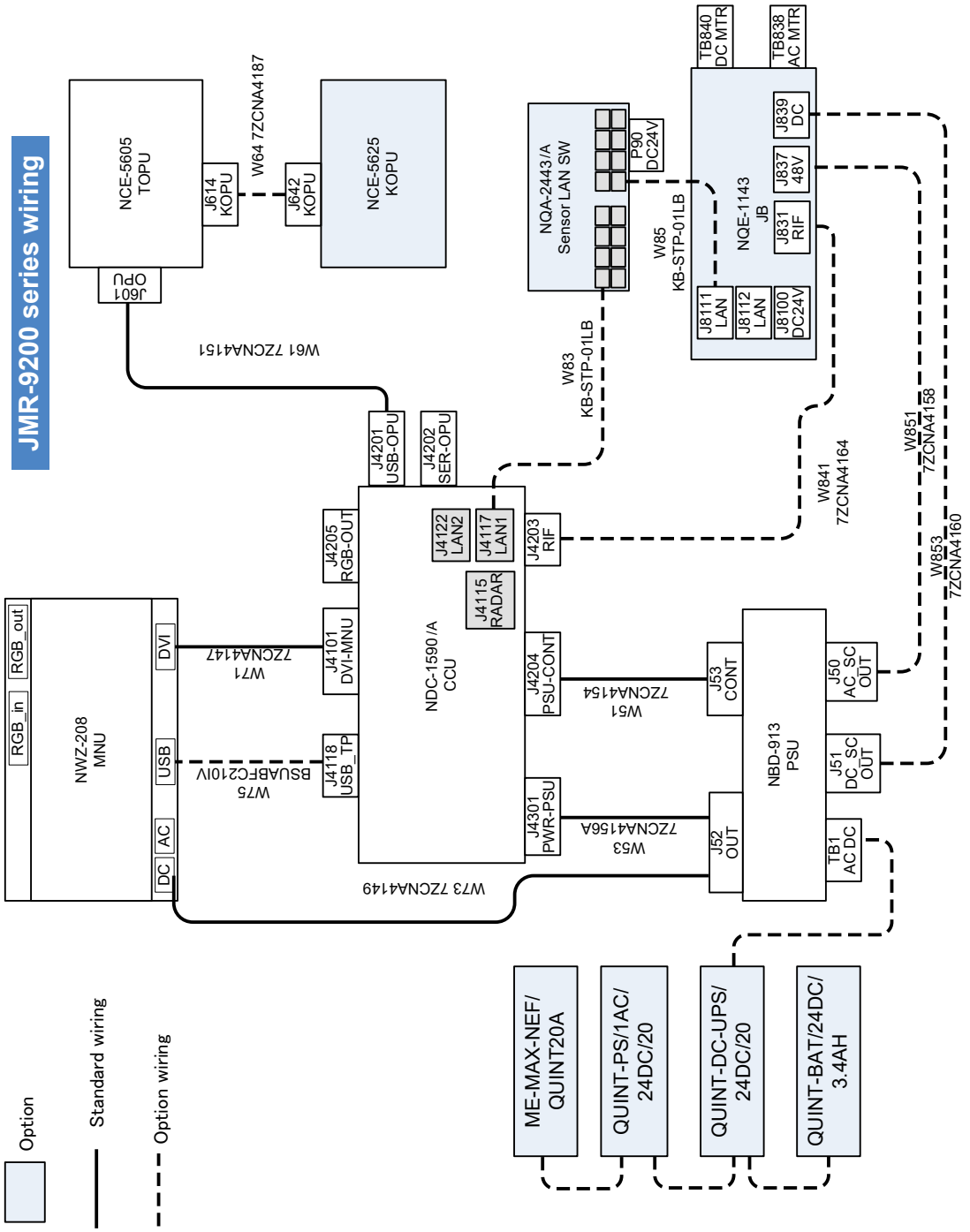


Fig. 2.3.4 Block diagram of Display unit (26inch)

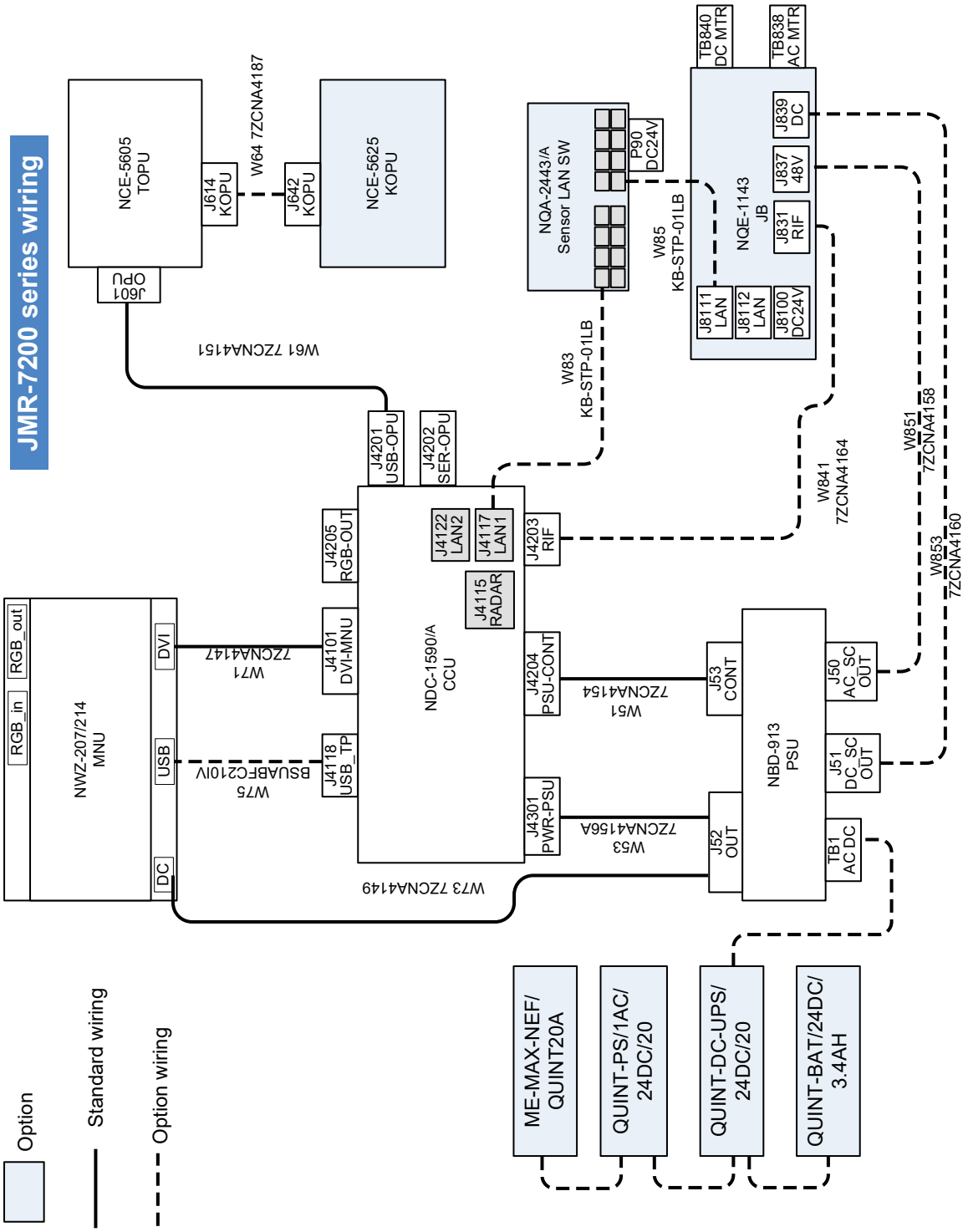


Fig. 2.3.5 Block diagram of Display unit (19inch)

The function system diagram of Display Unit is shown in Fig. 2.3.4 and Fig. 2.3.5

Display Unit is composed of following units:

MNU : Monitor Unit	NWZ-208 (26inch)
	NWZ-207/214 (19inch)
CCU : Central Control Unit	NDC-1590/A
PSU : Power Supply Unit	NBD-913
TOPU : Trackball Operation Unit	NCE-5605
KOPU : Keyboard Operation Unit	NCE-5625(*)
Sensor LAN Switch Unit	NQA-2443/A(*)
JB : Junction Box	NQE-1143(*), (**)

(*) Option.

(**) JB may include following circuits and they depend on the system:

SLC : Serial LAN Interface Circuit	CMH-2370
AOC : Analog Option Circuit	CMJ-560
GIF : Gyro Interface Circuit	CMJ-554
RIF : Radar Interface Circuit	CQD-2273

Starting the system

Turning on the power switch of TOPU starts PSU, 24Vdc (MNU) and 24Vdc (CCU) are supplied to MNU and CCU respectively. After starting its OS up, CCU initializes the various parameters and DSPs and it provides the functions such as Radar processing and display function, Electronic Chart Display function, Ship's sensors Information display function and more.

After that, CCU sets the internal status according to the sensor data input from the various communication lines, such as the GYRO and GPS, and issues an initialization command to the transmitter-receiver unit via the communication line to initialize the transmitter-receiver unit. This concludes the initialization of the system.

Circuit functions

Operation circuit detects the operating status of the switches and dials of the TOPU and KOPU and sends the operation data to the CCU through the communication line.

SLC : Serial LAN Interface Circuit converts serial signals sent by ship's various sensors into LAN data packets. It sends that signal to CCU via an Ethernet cable.

AOC : Analog Option Circuit mediates Ship's analog sensor signals to CCU via SLC. It has four input ports. You can choose the kind of input type for each port which are -10V to 10V voltage input or 4-20mA current loop input.

GIF : Gyro Interface Circuit processes the gyro signal, which is in the synchro or step format, calculates the true azimuth, and sends the true azimuth data to the radar processing circuit at regular intervals using serial communication. As long as the GIF circuit is receiving the gyro signal,

it is supplied with power and the CPU operates even if the display unit power is turned off. Therefore, even if the display unit power is turned off, the GIF circuit can continue to calculate the true azimuth.

RIF : Radar Interface Circuit mediates radar signals from transmitter-receiver unit or interswitch unit to CCU. Also, it mediates the power such as 100-220Vac, 48Vdc, and 24Vdc from PSU to scanner motor and transmitter-receiver unit.

Basic radar operations

In magnetron radar, the preheating of the magnetron of the transmitter-receiver unit is required. It takes several tens of seconds. When the preheating of the magnetron is complete, the display unit will be on standby state for transmitting. In solid state radar, no preheating is required. the display unit will be standby state at the same time as starting up.

By clicking the TX/STBY button in the screen or pressing that button on the KOPU, the system will be in transmission state. CCU issues a start transmission command to the transmitter-receiver unit, the transmitter-receiver unit starts transmitting, and the antenna starts to rotate. The radar signals sent by the transmitter-receiver unit are input to CCU via RIF. Unwanted waves are suppressed by powerful DSPs and advanced signal processing technologies. The radar image will always be displayed optimal in every range.

The switches and dials on KOPU can be used to change the settings of the signal processing in CCU and the screen display, the results of which are immediately reflected in the radar image display.

Interswitch Function

The interswitch NQE-3141 allows the user to freely switch the connections between multiple display units and the scanner unit, so that even if there is a problem with one display unit, the operation of the system as a whole is maintained. For example, without the interswitch function, if a problem occurred in the No.1: S-band display unit, it would become impossible to use the S band radar, which would affect maritime safety in adverse weather conditions. With the inter switch function, however, it is possible to connect the functioning No. 1 scanner unit to the No. 2 display unit, and continue to use S band radar. The inter switch is easily operated from the radar screen.

CCU automatically detects, when the system is started, whether or not there is an interswitch. If there is, it operates in the interswitch mode. If there is no inter switch, or if the interswitch or its cable is damaged, preventing the inter switch from being detected, CCU automatically operates in the standalone mode.

2.4 I/O Specifications

2.4.1. CCU : Central Control Unit NDC-1590/A I/O Specifications

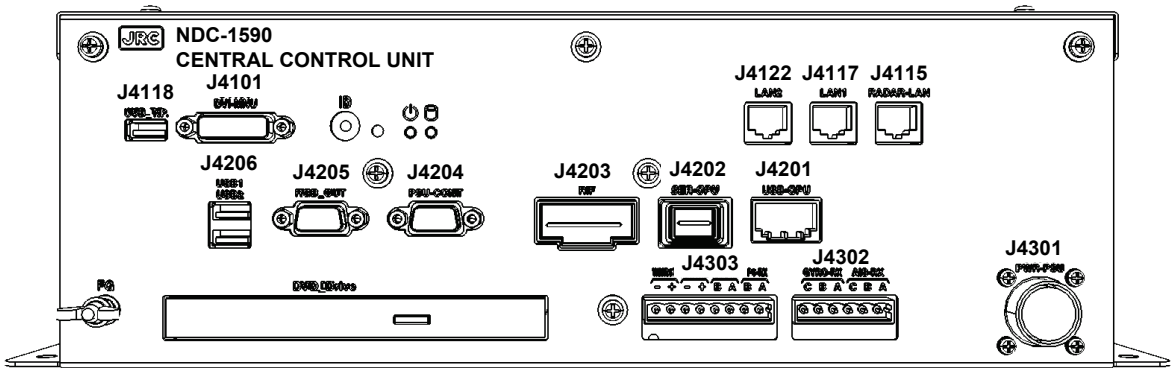


Fig. 2.4.1 CCU front view

Table 2.4.1 CCU I/O specifications 1

Label	Name	Pin	Signal Name	I/O	Specification	Detail
J4101	DVI-MNU	—	DVI-MNU	I/O	DVI-D WUXGA	Internal wiring
J4118	USB. T.P.	—	USB. T.P.	I/O	USB 2.0	Internal wiring
J4201	USB-OPU	—	USB-OPU	I/O	Operation Unit	Internal wiring
J4202	SER-OPU	—	SER-OPU	I/O	Operation Unit	Internal wiring
J4203	CCU-RIF	—	CCU-RIF	I/O	Radar Interface Circuit	Internal wiring

Table 2.4.2 CCU I/O specifications 2

Label	Name	Pin	Signal Name	I/O	Specification	Detail
J4204	PSU-CONT	1	AC FAIL	IN	Open Collector Input	3.3Vdc, 10k ohm Internal Pull-up.
		2	DC EMPTY	IN	Open Collector Input	3.3Vdc, 10k ohm Internal Pull-up.
		3	FAN ALM	IN	Open Collector Input	3.3Vdc, 10k ohm Internal Pull-up.
		4	N_PWRGD	IN	Open Collector Input	3.3Vdc, 10k ohm Internal Pull-up.
		5	SG	-	-	-
		6	SG	-	-	-
		7	N_24V_ON	OUT	Open Collector Output	Logic level L: 24Vdc (Motor) ON
		8	N_MTR_ON	OUT	Open Collector Output	Logic level L: ACOUT_L/N and 48Vdc ON
		9	N_MNU_ON	OUT	Open Collector Output	Logic level L: 24Vdc(MNU) ON
J4206	USB1 USB2	—	USB1 USB2	I/O	USB 2.0	Internal wiring

Table 2.4.3 CCU I/O specifications 3

Label	Name	Pin	Signal Name	I/O	Specification	Detail
J4303	GPS-RX	A	GPS-RX	IN	IEC61162-1 A	See Fig. 2.4.2 CCU GPS-RX detail
		B		IN	IEC61162-1 B	
	SDME-RX	A	SDME-RX	IN	IEC61162-1 A	See Fig. 2.4.3 CCU SDME-RX detail
		B		IN	IEC61162-1 B	
	PWR FAIL	+	PWR FAIL	—	Dry Contact Out Normally-closed (Factory default)	Choose Normally-open/ closed by TB2. See Fig. 2.4.4 CCU PWR FAIL detail
		-		—		
	WMRST	+	WMRST	—	Dry Contact Out Normally-open (Factory default)	Choose Normally-open/ closed by TB2. See Fig. 2.4.5 CCU WMRST detail
		−		—		

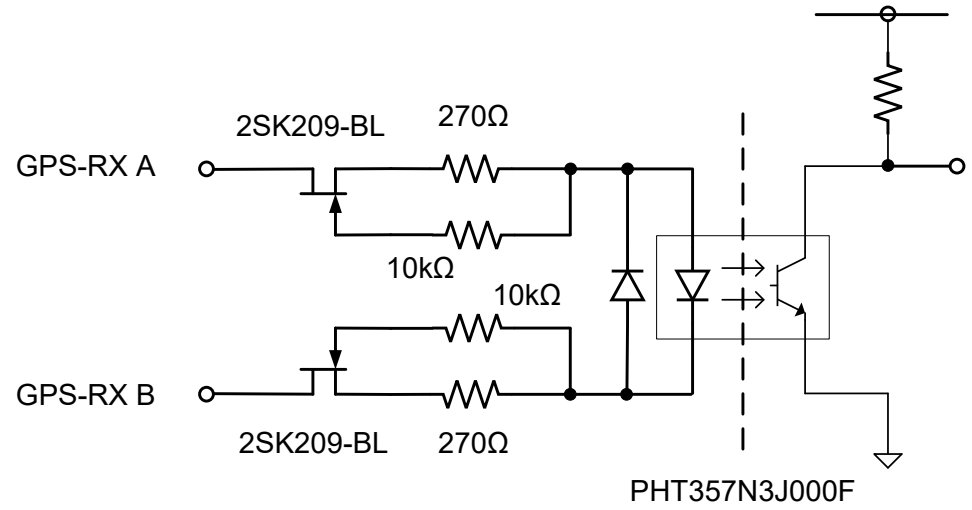


Fig. 2.4.2 CCU GPS-RX detail

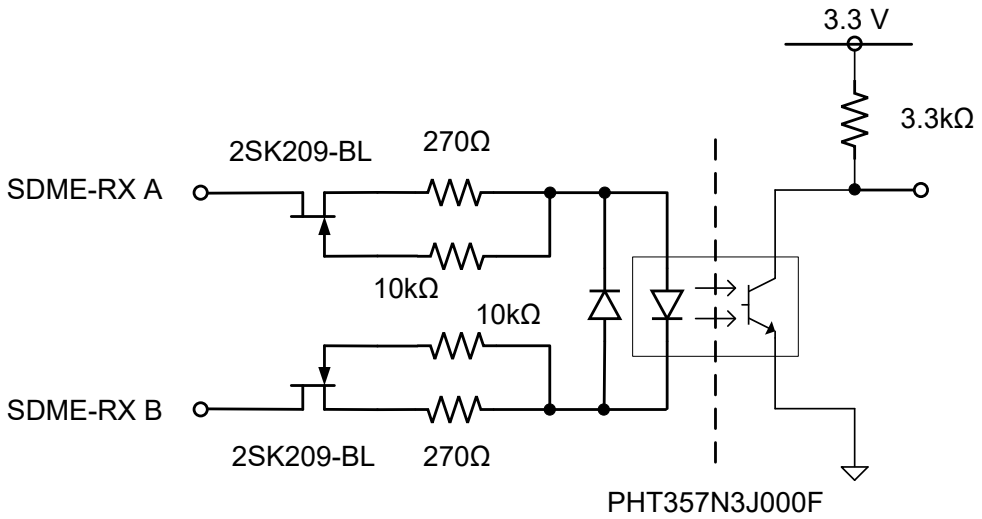
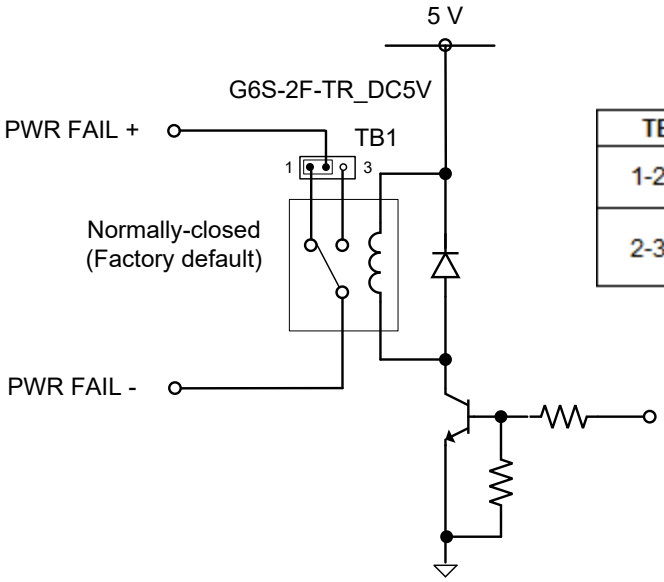
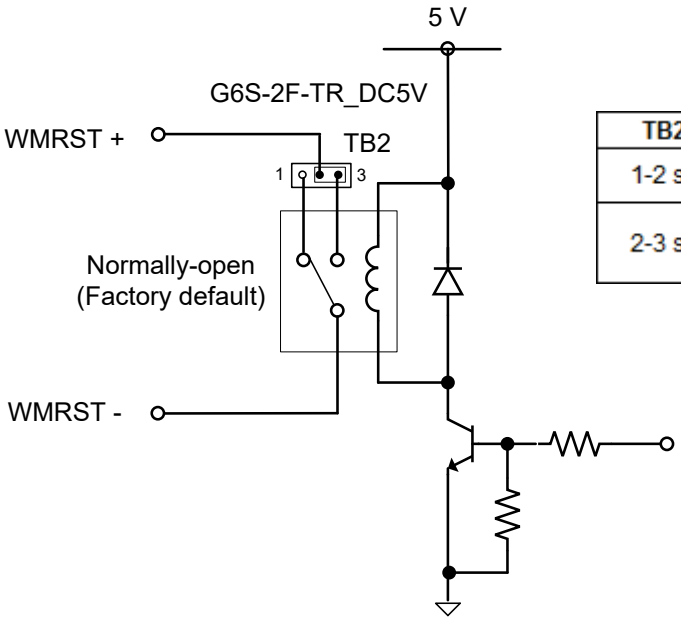


Fig. 2.4.3 CCU SDME-RX detail



TB1 settings	Description
1-2 short circuit	Normally-closed (Factory default)
2-3 short circuit	Normally-open

Fig. 2.4.4 CCU PWR FAIL detail

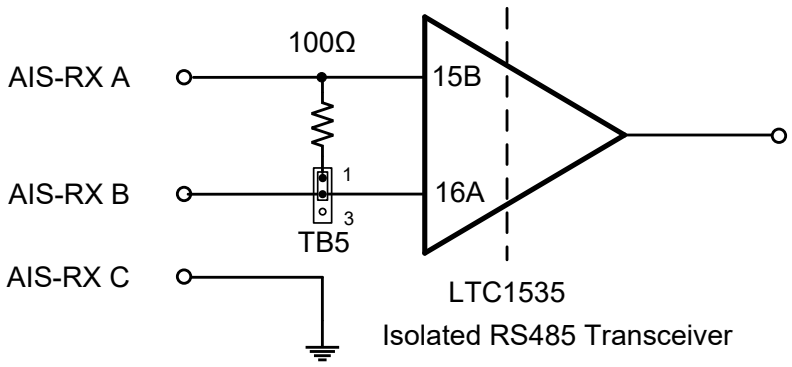


TB2 settings	Description
1-2 short circuit	Normally-closed
2-3 short circuit	Normally-open (Factory default)

Fig. 2.4.5 CCU WMRST detail

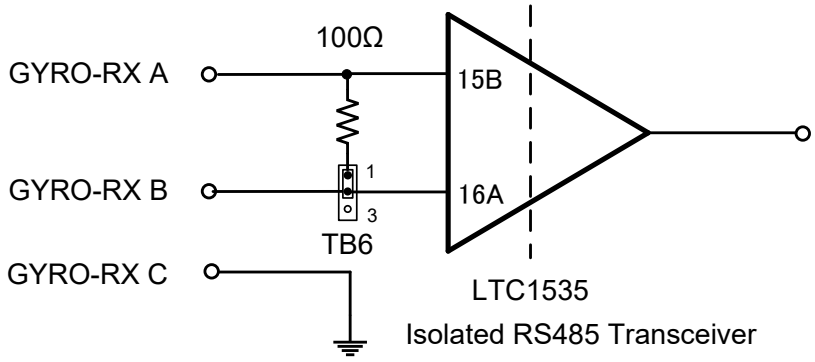
Table 2.4.4 CCU I/O specifications 4

Label	Name	Pin	Signal Name	I/O	Specification	Detail
J4302	AIS-RX	A	AIS-RX	IN	IEC61162-2 A	By TB5, choose Termination enabled or disabled. See Fig. 2.4.6 CCU AIS-RX detail
		B		IN	IEC61162-2 B	
		C		—	IEC61162-2 C	
	GYRO-RX	A	GYRO-RX	IN	IEC61162-2 A	By TB6, choose Termination enabled or disabled. See Fig. 2.4.7 CCU GYRO-RX detail
		B		IN	IEC61162-2 B	
		C		—	IEC61162-2 C	



TB5 settings	Termination resistor
1-2 short circuit	100 ohm termination resistor. (Factory default)
2-3 short circuit	OFF

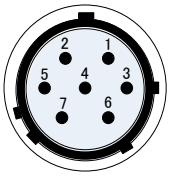
Fig. 2.4.6 CCU AIS-RX detail



TB6 settings	Termination resistor
1-2 short circuit	100 ohm termination resistor. (Factory default)
2-3 short circuit	OFF

Fig. 2.4.7 CCU GYRO-RX detail

Table 2.4.5 CCU I/O specifications 5

Label	Name	Pin	Signal Name	I/O	Specification	Detail
J4301	PWR-PSU	1	P+12V	IN	12Vdc	 CCU Front View
		2	P+12VE	IN	Common wire for P+12V	
		3	+24V	IN	24Vdc	
		4	+24V	IN		
		5	+24VE	IN	Common wire for +24V	
		6	+24VE	IN		
		7	F.G.	IN	F.G.	
J4115	RADAR-LAN	-	-	I/O	IEC61162-450	10BASE-T / 100BASE-TX / 1000BASE-T
J4117	LAN1	-	-	I/O	IEC61162-450	10BASE-T / 100BASE-TX / 1000BASE-T
J4122	LAN2	-	-	I/O	IEC61162-450	10BASE-T / 100BASE-TX / 1000BASE-T

2.4.2. PSU : Power Supply Unit NBD-913 I/O specifications

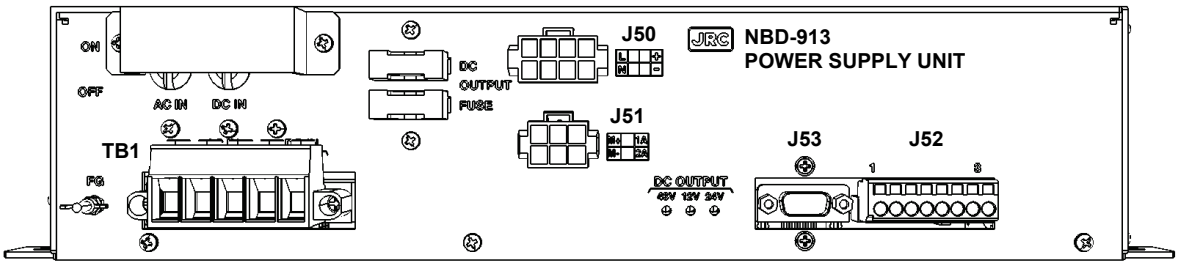


Fig. 2.4.8 PSU front view

Table 2.4.6 PSU I/O specifications 1

Label	Name	Pin	Signal Name	I/O	Specification	Detail
TB1	ACIN	1	AC IN : L	IN	100-220Vac , 50/60Hz, Single phase	Overvoltage protection by a circuit breaker
		2	AC IN : N	IN		
	N.C.	3	-	-	N.C.	-
	DCIN	4	DC IN +	IN	24Vdc +	Overvoltage protection by a circuit breaker
		5	DC IN -	IN	24Vdc -	
J50	AC SCANNER POWER	1	ACOUT: L	OUT	100-220Vac, 50/60Hz, single phase	-
		2	N.C.	-	N.C.	-
		3	+	OUT	48Vdc +	-
		4	N.C.	-	N.C.	-
		5	ACOUT: N	OUT	100-220Vac, 50/60Hz, single phase	-
		6	F.G.	-	F.G.	-
		7	-	OUT	48Vdc -	-
		8	N.C.	-	N.C.	-

Table 2.4.7 PSU I/O specifications 2

Label	Name	Pin	Signal Name	I/O	Specification	Detail
J51	DC SCANNER POWER	1	M+	OUT	24Vdc + (Motor)	15A Fuse
		2	N.C.	-	N.C.	-
		3	1A	OUT	24Vdc +	15A Fuse
		4	M-	OUT	24Vdc - (Motor)	-
		5	N.C.	-	N.C.	-
		6	2A	OUT	24Vdc -	-
J52	CCU_MNU POWER	1	24V	OUT	24Vdc+ (MNU)	-
		2	GND	-	24Vdc- (MNU)	-
		3	F.G.	-	F.G.	-
		4	24V	OUT	24Vdc+ (CCU)	-
		5	GND	-	24Vdc- (CCU)	-
		6	12V	OUT	P+12V +	-
		7	GND	-	P+12V -	-
		8	F.G.	-	F.G.	-

Table 2.4.8 PSU I/O specifications 3

Label	Name	Pin	Signal Name	I/O	Specification	Detail
J53	PSU_CONT	1	AC FAIL	OUT	Open Collector Output	Logic level H (within 40ms) : AC IN is less than 75Vac typ.
		2	DC EMPTY	OUT	Open Collector Output	Logic level H (within 40ms) : DC IN is less than 18Vdc typ.
		3	FAN ALM	OUT	Open Collector Output	Logic level H: The Fan motor anomaly.
		4	N_PWRGD	OUT	Open Collector Output	Logic level H: PSU has low output voltage under output anomaly such as overvoltage, overcurrent or inner temperature anomaly. It is enabled while N_MTR_ON is L. If it is H, N_PWRGD is forced to be L except under inner temperature anomaly.
		5	SG	-	-	-
		6	SG	-	-	-
		7	N_24V_ON	IN	Open Collector Input	Logic level L: 24Vdc (CCU) ON
		8	N_MTR_ON	IN	Open Collector Input	Logic level L: ACOUT(L/N), 48Vdc(+,-), 24Vdc(M+, M-), and 24Vdc(1A, 2A) ON
		9	N_MNU_ON	IN	Open Collector Input	Logic level L: 24Vdc (MNU) ON

2.4.3. SLC : Serial LAN Interface Circuit CMH-2370

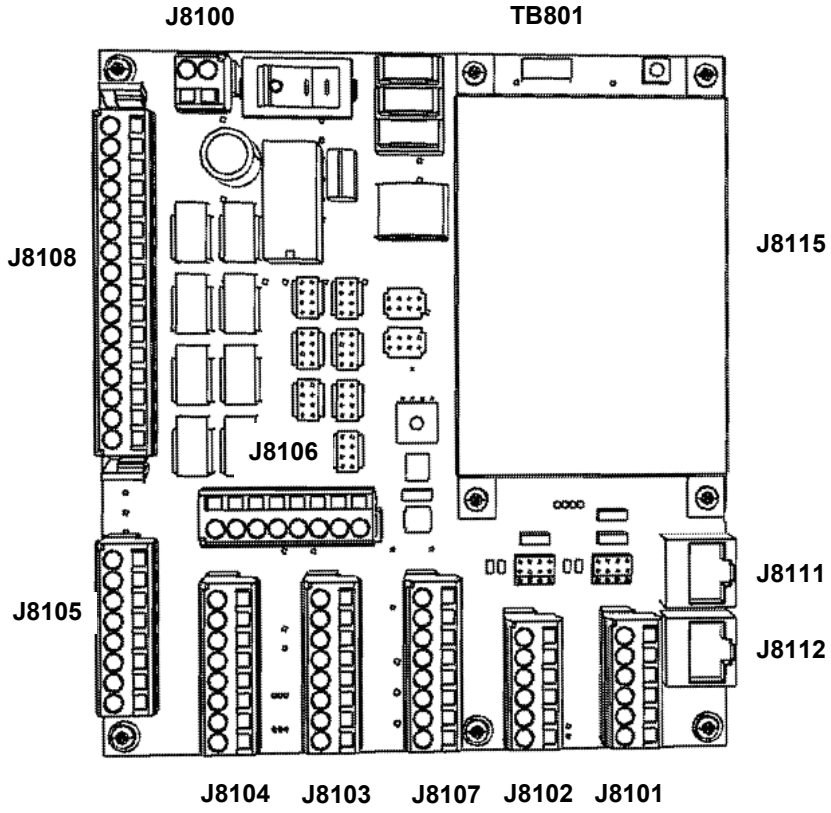


Fig. 2.4.9 SLC top view

Table 2.4.9 SLC I/O specifications 1

Label	Name	Pin	Signal Name	I/O	Specification	Detail
J8100	DC24V IN	1	24V+	POWER	21.6Vdc to 31.2Vdc 400mA(Typ.)	Reverse connection protection by 3A blade fuses (FS1, FS2).
		2	24V_GND			

Table 2.4.10 SLC I/O specifications 2

Label	Name	Pin	Signal Name	I/O	Specification	Detail
J8101	IEC61162-2 Ch.1	1	TX10A	OUT	IEC61162-2 A	By TB3, choose full duplex mode or half duplex mode. By TB15, Choose Termination enabled or disabled. See Fig. 2.4.10 SLC IEC61162-2 TXRX detail
		2	TX10B	OUT	IEC61162-2 B	
		3	TX10C	-	IEC61162-2 C	
		4	RX10A	IN	IEC61162-2 A	
		5	RX10B	IN	IEC61162-2 B	
		6	RX10C	-	IEC61162-2 C	
J8102	IEC61162-2 Ch.0	1	TX9A	OUT	IEC61162-2 A	By TB2, choose full duplex mode or half duplex mode. By TB14, Choose Termination enabled or disabled. See Fig. 2.4.10 SLC IEC61162-2 TXRX detail
		2	TX9B	OUT	IEC61162-2 B	
		3	TX9C	-	IEC61162-2 C	
		4	RX9A	IN	IEC61162-2 A	
		5	RX9B	IN	IEC61162-2 B	
		6	RX9C	-	IEC61162-2 C	

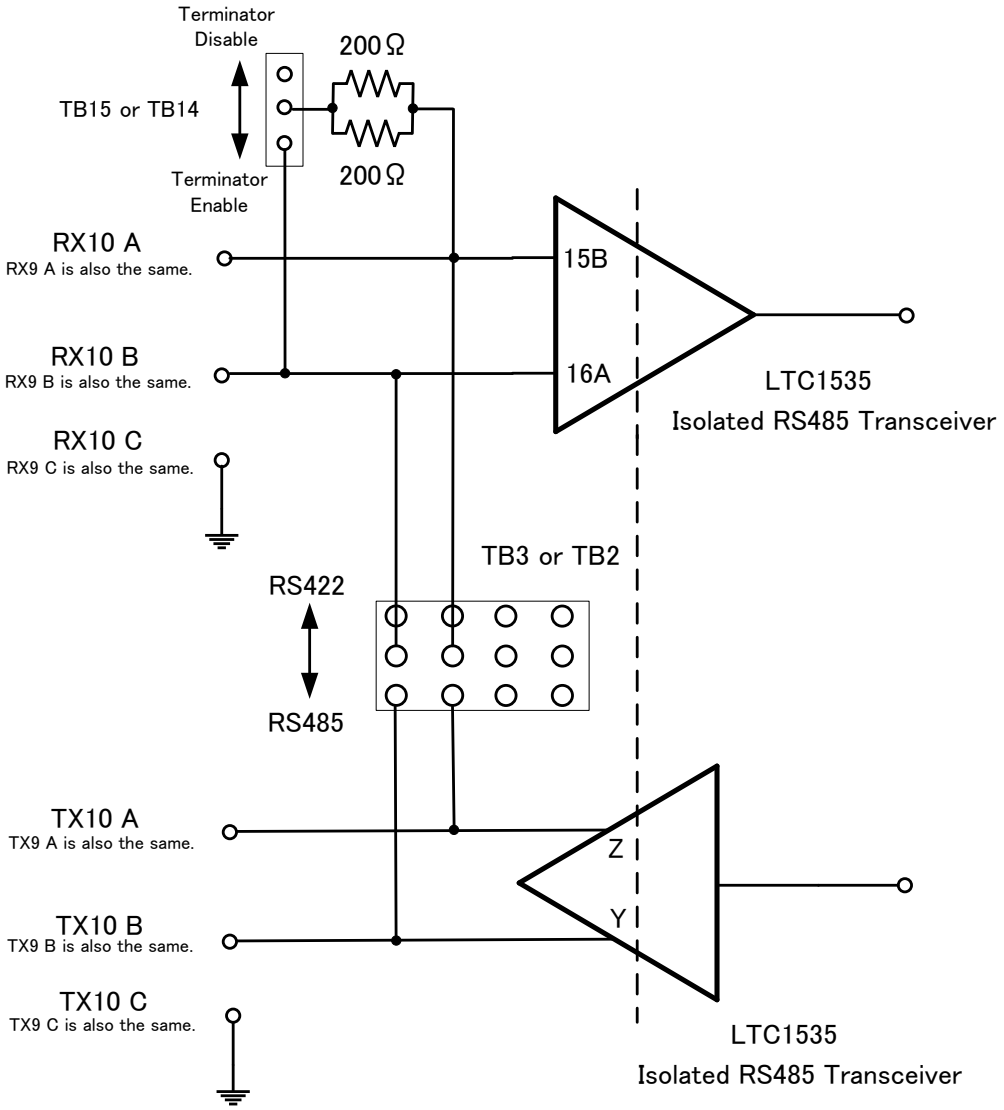


Fig. 2.4.10 SLC IEC61162-2 TXRX detail

Table 2.4.11 SLC I/O specifications 3

Label	Name	Pin	Signal Name	I/O	Specification	Detail
J8105	IEC61162-1 1/2	1	RX1A	IN	IEC61162-1 A	See Fig. 2.4.11 SLC IEC61162-1 RX1 detail
		2	RX1B	IN	IEC61162-1 B	
		3	TX1A	OUT	IEC61162-1 A	See Fig. 2.4.12 SLC IEC61162-1 TX1 detail
		4	TX1B	OUT	IEC61162-1 B	
		5	RX2A	IN	IEC61162-1 A	See Fig. 2.4.11 SLC IEC61162-1 RX1 detail
		6	RX2B	IN	IEC61162-1 B	
		7	TX2A	OUT	IEC61162-1 A	See Fig. 2.4.12 SLC IEC61162-1 TX1 detail
		8	TX2B	OUT	IEC61162-1 B	
J8104	IEC61162-1 3/4	1	RX3A	IN	IEC61162-1 A	See Fig. 2.4.11 SLC IEC61162-1 RX1 detail
		2	RX3B	IN	IEC61162-1 B	
		3	TX3A	OUT	IEC61162-1 A	See Fig. 2.4.12 SLC IEC61162-1 TX1 detail
		4	TX3B	OUT	IEC61162-1 B	
		5	RX4A	IN	IEC61162-1 A	See Fig. 2.4.11 SLC IEC61162-1 RX1 detail
		6	RX4B	IN	IEC61162-1 B	
		7	TX4A	OUT	IEC61162-1 A	See Fig. 2.4.12 SLC IEC61162-1 TX1 detail
		8	TX4B	OUT	IEC61162-1 B	

Table 2.4.12 SLC I/O specifications 4

Label	Name	Pin	Signal Name	I/O	Specification	Detail
J8103	IEC61162-1 5/6	1	RX5A	IN	IEC61162-1 A	See Fig. 2.4.11 SLC IEC61162-1 RX1 detail
		2	RX5B	IN	IEC61162-1 B	
		3	TX5A	OUT	IEC61162-1 A	See Fig. 2.4.12 SLC IEC61162-1 TX1 detail
		4	TX5B	OUT	IEC61162-1 B	
		5	RX6A	IN	IEC61162-1 A	See Fig. 2.4.11 SLC IEC61162-1 RX1 detail
		6	RX6B	IN	IEC61162-1 B	
		7	TX6A	OUT	IEC61162-1 A	See Fig. 2.4.12 SLC IEC61162-1 TX1 detail
		8	TX6B	OUT	IEC61162-1 B	
J8106	IEC61162-1 7/8	1	RX7A	IN	IEC61162-1 A	See Fig. 2.4.11 SLC IEC61162-1 RX1 detail
		2	RX7B	IN	IEC61162-1 B	
		3	TX7A	OUT	IEC61162-1 A	See Fig. 2.4.12 SLC IEC61162-1 TX1 detail
		4	TX7B	OUT	IEC61162-1 B	
		5	RX8A	IN	IEC61162-1 A	See Fig. 2.4.11 SLC IEC61162-1 RX1 detail
		6	RX8B	IN	IEC61162-1 B	
		7	TX8A	OUT	IEC61162-1 A	See Fig. 2.4.12 SLC IEC61162-1 TX1 detail
		8	TX8B	OUT	IEC61162-1 B	

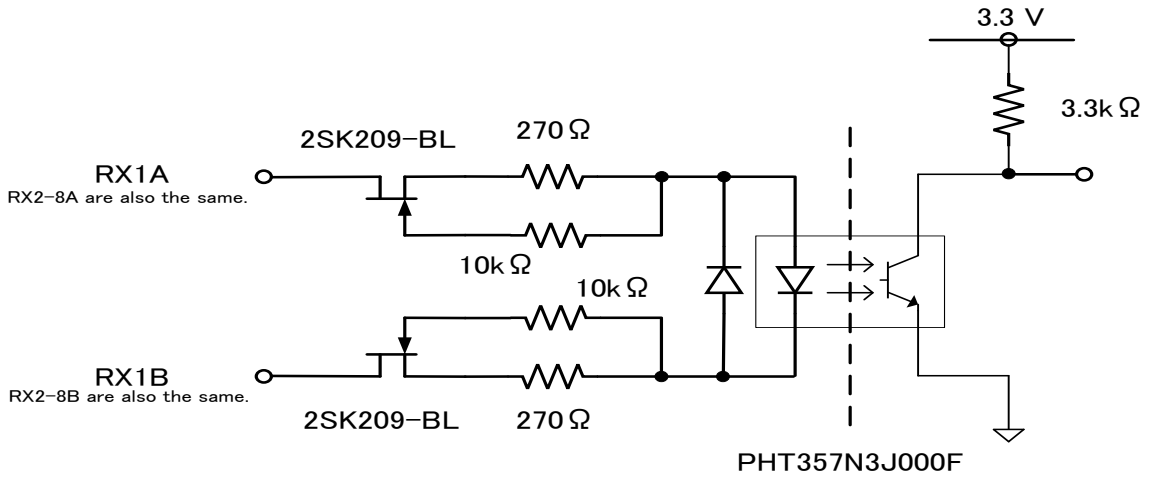


Fig. 2.4.11 SLC IEC61162-1 RX1 detail

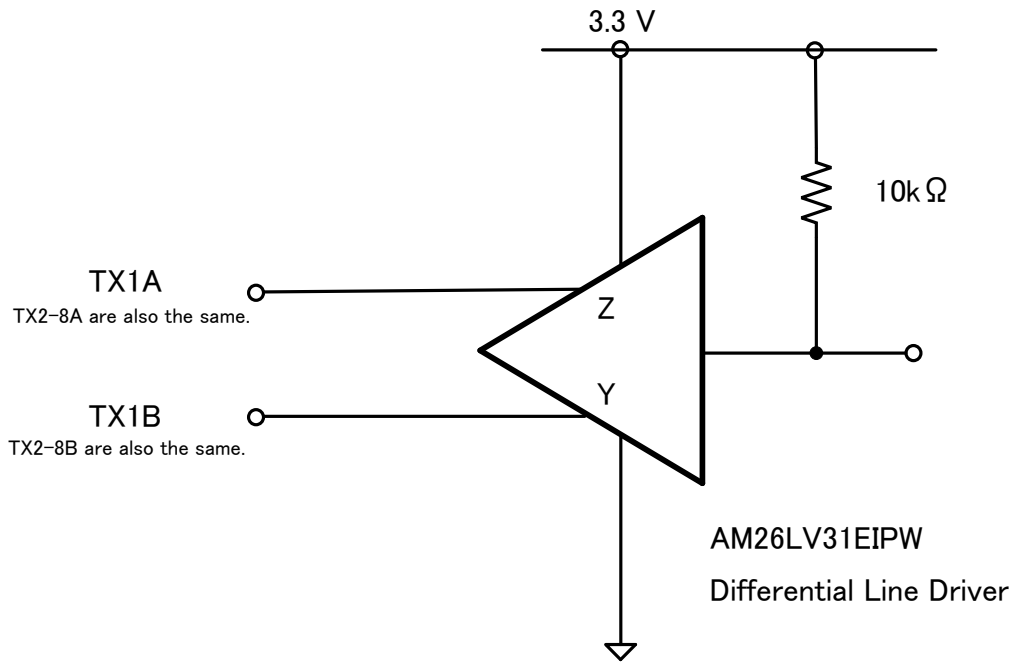


Fig. 2.4.12 SLC IEC61162-1 TX1 detail

Table 2.4.13 SLC I/O specifications 5

Label	Name	Pin	Signal Name	I/O	Specification	Detail
J8107	Contact In	1	IN1	IN	Dry Contact Input 5V/50mA	5V, 1k ohm Internal Pull-up. See Fig. 2.4.13 SLC Contact In detail.
		2	GND	-		
		3	IN2	IN		
		4	GND	-		
		5	IN3	IN		
		6	GND	-		
		7	IN4	IN		
		8	GND	-		

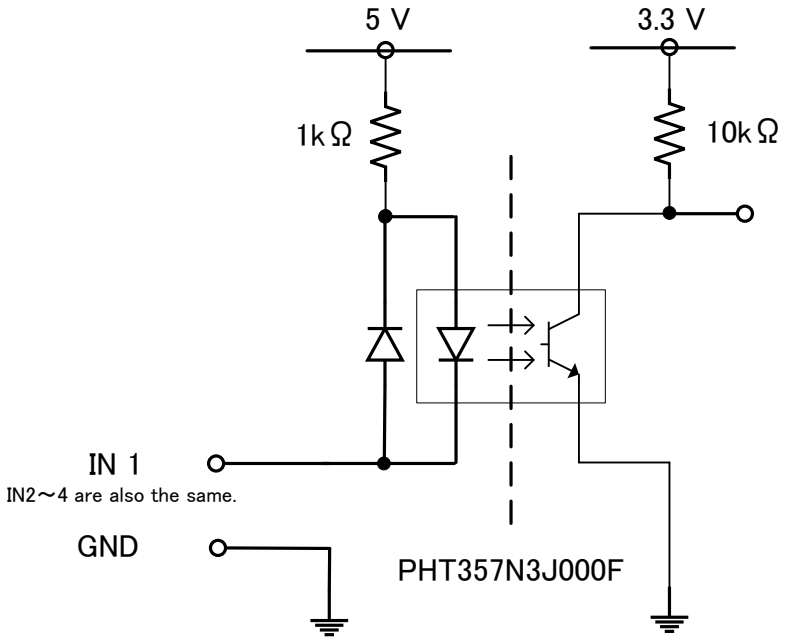


Fig. 2.4.13 SLC Contact In detail

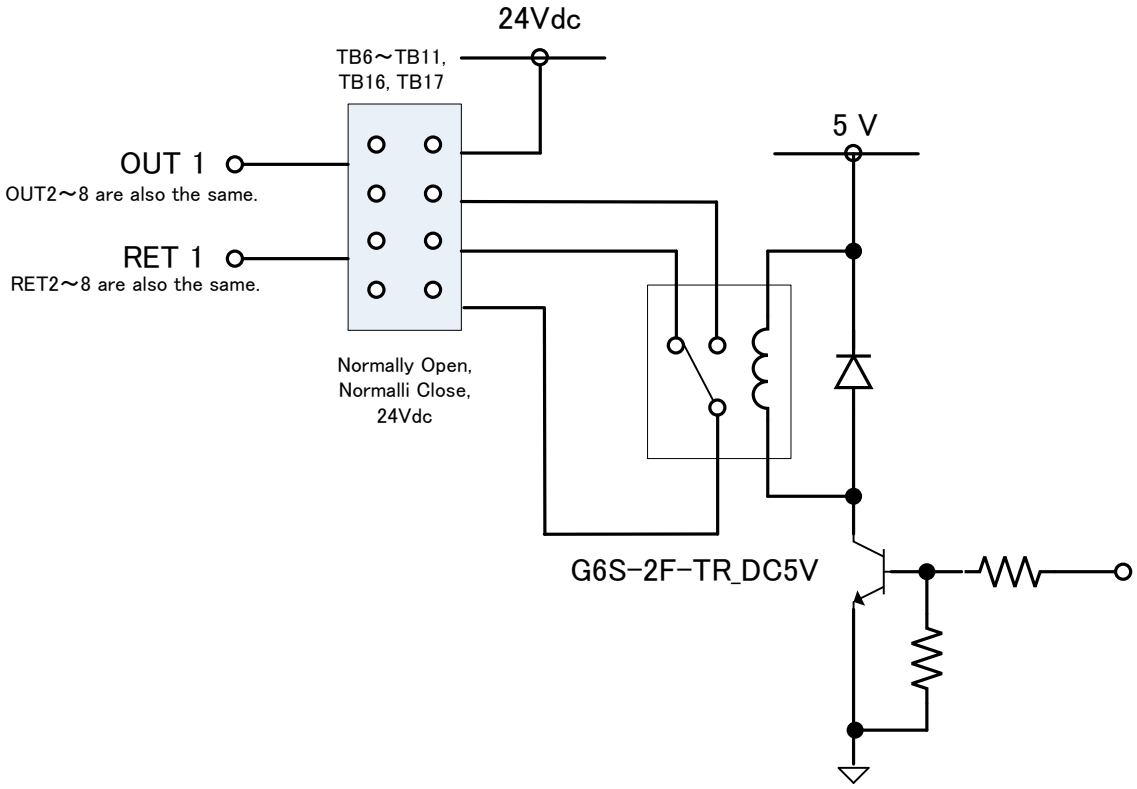
Table 2.4.14 SLC I/O specifications 6

Label	Name	Pin	Signal Name	I/O	Specification	Detail
J8108	Contact Out	1	OUT1	-	Dry Contact 1 or 24V Supply 1 for Buzzer Max. 2A	Choose Normally Open, Normally Close, or 24VDC by TB6. See Fig. 2.4.14 SLC Contact Out detail.
		2	RET1	-		
		3	OUT2	-	Dry Contact 2 or 24V Supply 2 for Buzzer Max. 2A	Choose Normally Open, Normally Close, or 24VDC Output by TB7. See Fig. 2.4.14 SLC Contact Out detail.
		4	RET2	-		
		5	OUT3	-	Dry Contact 3 or 24V Supply 3 for Buzzer Max. 2A	Choose Normally Open, Normally Close, or 24VDC Output by TB8. See Fig. 2.4.14 SLC Contact Out detail.
		6	RET3	-		
		7	OUT4	-	Dry Contac 4 or 24V Supply 4 for Buzzer Max. 2A	Choose Normally Open, Normally Close, or 24VDC Output by TB9. See Fig. 2.4.14 SLC Contact Out detail.
		8	RET4	-		

Table 2.4.15 SLC I/O specifications 7

Label	Name	Pin	Signal Name	I/O	Specification	Detail
J8108	Contact Out	9	OUT5	-	Dry Contact 5 or 24V Supply 5 for Buzzer Max. 2A	Choose Normally Open, Normally Close, or 24VDC Output by TB17. See Fig. 2.4.14 SLC Contact Out detail.
		10	RET5	-		
		11	OUT6	-	Dry Contact 6 or 24V Supply 6 for Buzzer Max. 2A	Choose Normally Open, Normally Close, or 24VDC Output by TB16. See Fig. 2.4.14 SLC Contact Out detail.
		12	RET6	-		
		13	OUT7	-	Dry Output 7 or 24V Supply 7 for Buzzer Max. 2A	Choose Normally Open, Normally Close, or 24VDC Output by TB11. See Fig. 2.4.14 SLC Contact Out detail.
		14	RET7	-		
		15	OUT8	-	Dry Contact 8 or 24V Supply 8 for Buzzer Max. 2A	Choose Normally Open, Normally Close, or 24VDC Output by TB10. See Fig. 2.4.14 SLC Contact Out detail.
		16	RET8	-		

These 24Vdc output for buzzer are overcurrent protected by a common 15A blade fuse. (FS3)



Matched TB each Terminal			Normaly Close Output (OUTx / RETx, TBx–TBxx)			Normaly Open Output (TBx–TBxx, OUTx / RETx)			24V Output for BUZZER (24V, TBx–TBxx, OUTx / RETx, TB4 or TB5)		
			TB6–TB11 TB16, TB17	TB4/TB5		TB6–TB11 TB16, TB17	TB4/TB5		TB6–TB11 TB16, TB17	TB4/TB5	
P8108											
1	OUT1	TB6	Short Terminals as below	TB4	Open	Short Terminals as below	TB4	Open	Short Terminals as below	TB4	#1–#5 for OUT1
2	RET1										
3	OUT2	TB7									#2–#6 for OUT2
4	RET2										
5	OUT3	TB8									#3–#7 for OUT3
6	RET3										
7	OUT4	TB9									#4–#8 for OUT4
8	RET4										
9	OUT5	TB17		TB5	Open		TB5	Open		TB5	#1–#5 for OUT5
10	RET5										
11	OUT6	TB16									#2–#6 for OUT6
12	RET6										
13	OUT7	TB11									#3–#7 for OUT7
14	RET7										
15	OUT8	TB10									#4–#8 for OUT8
16	RET8										

N.C Output

N.O Output

Fig. 2.4.14 SLC Contact Out detail.

Table 2.4.16 SLC I/O specifications 8

Label	Name	Pin	Signal Name	I/O	Specification	Detail
J8111	LAN ch.0	-	-	I/O	IEC61162-450	10BASE-T / 100BASE-TX
J8112	LAN ch.1	-	-	I/O	IEC61162-450	10BASE-T / 100BASE-TX
J8115	GIF_SLC	-	-	I/O	Gyro Interface Circuit	Internal wiring
TB801	SLC-AOC	-	-	I/O	Analog Option Circuit	Internal wiring

Note: The number of LAN port that you can use is only 1 port, either J8111 or J8112.

2.4.4. AOC : Analog Option Circuit CMJ-560 I/O specifications

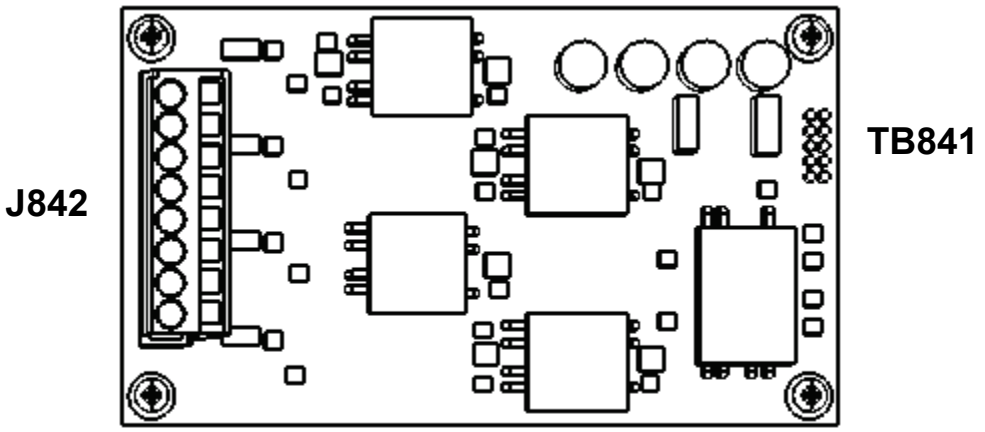


Fig. 2.4.15 AOC top view

Table 2.4.17 AOC I/O specifications 1

Label	Name	Pin	Signal Name	I/O	Specification	Detail
TB841	AOC_SLC	-	-	I/O	Serial LAN Circuit	Internal wiring

Table 2.4.18 AOC I/O specifications 2

Label	Name	Pin	Signal Name	I/O	Specification	Detail
J842	Analog Sensor Input	1	AN1+	IN	+/- 10V Input or 4-20mA Current Loop Input	Choose +/- 10V Input or 4-20mA Input by TB2, TB6, and TB7. See Fig. 2.4.16 and 2.5 DIP-SW and Jumper Pin Settings.
		2	AN1-	IN		
		3	AN2+	IN	+/- 10V Input or 4-20mA Current Loop Input	Choose +/- 10V Input or 4-20mA Input by TB3, TB6, and TB7.. See Fig. 2.4.16 and 2.5 DIP-SW and Jumper Pin Settings.
		4	AN2-	IN		
		5	AN3+	IN	+/- 10V Input or 4-20mA Current Loop Input	Choose +/- 10V Input or 4-20mA Input by TB4, TB6, and TB7.. See Fig. 2.4.16 and 2.5 DIP-SW and Jumper Pin Settings.
		6	AN3-	IN		
		7	AN4+	IN	+/- 10V Input or 4-20mA Current Loop Input	Choose +/- 10V Input or 4-20mA Input by TB5, TB6, and TB7.. See Fig. 2.4.16 and 2.5 DIP-SW and Jumper Pin Settings.

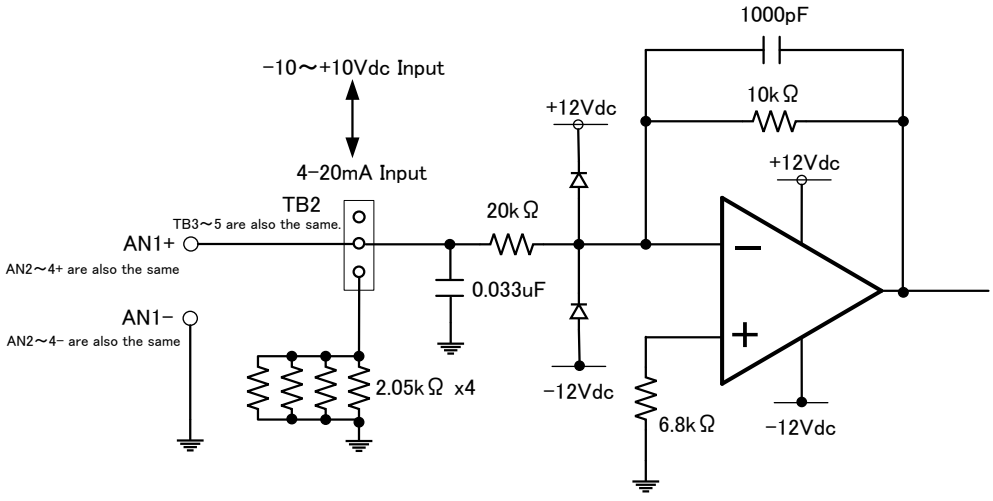


Fig. 2.4.16 AOC input detail.

2.4.5. GIF : Gyro Interface Circuit CMJ-554 I/O specifications

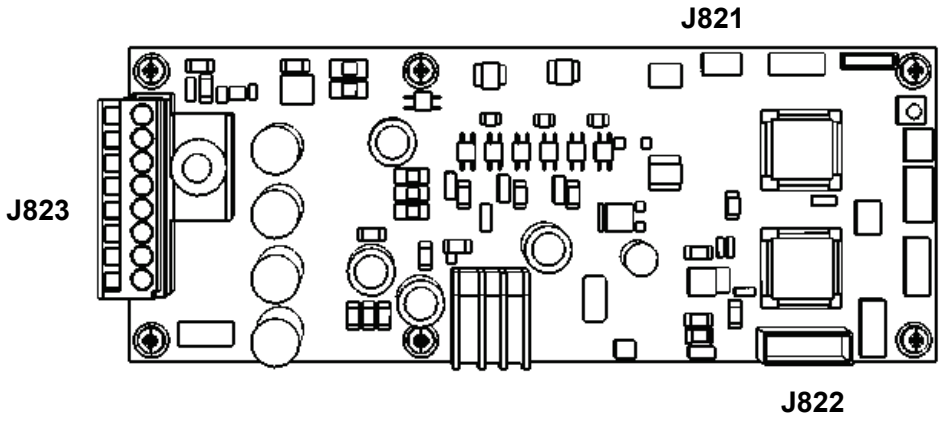


Fig. 2.4.17 GIF top view

Table 2.4.19 GIF I/O specifications 1

Label	Name	Pin	Signal Name	I/O	Specification	Detail
J821	SLC_GIF	-	-	I/O	Serial LAN Circuit	Internal wiring
J822	RIF_GIF	-	-	I/O	Radar Interface Circuit	Internal wiring

Table 2.4.20 GIF I/O specifications 2

Label	Name	Pin	Signal Name	I/O	Specification	Detail
J823	Gyro	1	1_R1	IN	Synchro/Step Gyro Compass Input	Choose Sync Gyro or Step Gyro Input by TB1. Sync Gyro: AC24 - 115V (50 / 60 / 400Hz) Step Gyro: DC21.6 - 70V 36x / 90x / 180x / 360x
		2	2_S1	IN		
		3	3_S2	IN		
		4	S3	IN		
		5	5_R2	IN		
	-	6	N.C.	-	N.C.	-
	Log	7	P+	IN	Pulse Log Input	0-50V, Vth = 2V. 5V, 1k ohm Internal Pull-up 100p / 200p / 400p/ 800p See Fig. 2.4.18 GIF Log Input detail.
		8	P-	IN		

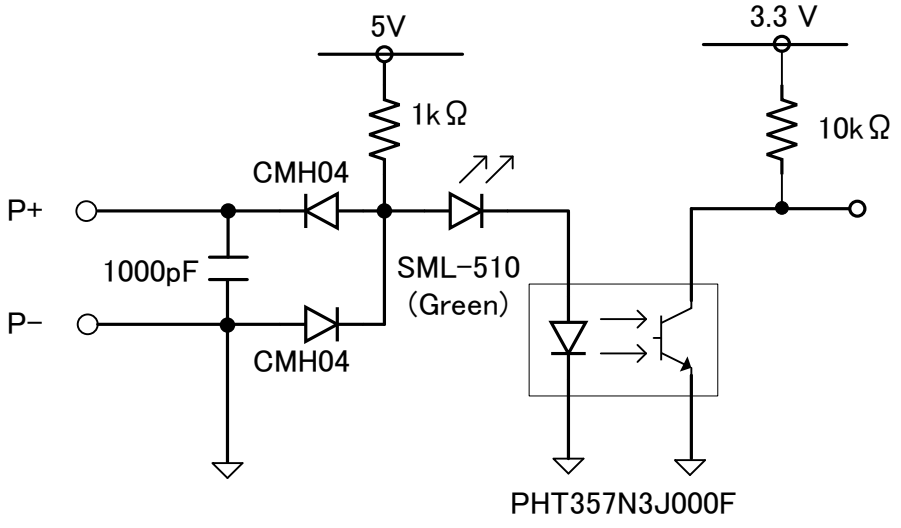


Fig. 2.4.18 GIF Log Input detail.

2.4.6. RIF :Radar Interface Circuit CQD-2273 I/O specifications

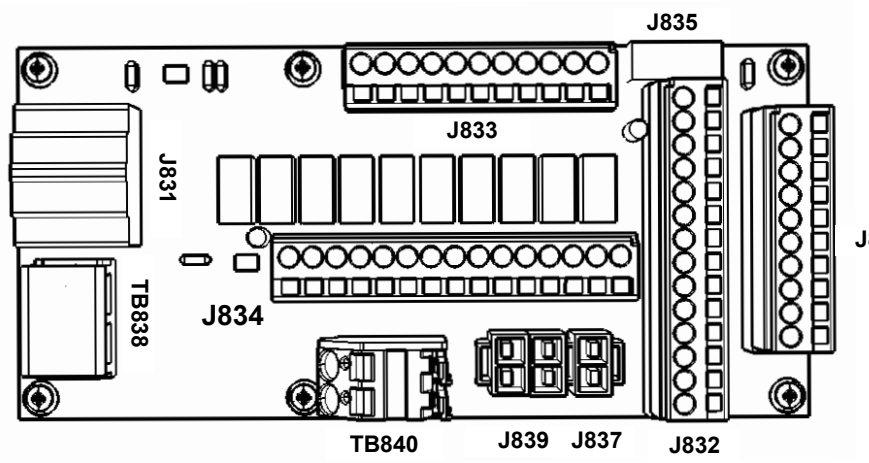


Fig. 2.4.19 SLC Contact In detail

Table 2.4.21 RIF I/O specifications 1

Label	Name	Pin	Signal Name	I/O	Specification	Detail
J831	CCU I/F	-	CCU I/F	I/O	Central Control Unit	Internal wiring

Table 2.4.22 RIF I/O specifications 2

Label	Name	Pin	Signal Name	I/O	Specification	Detail
J832	SCANNER	1	VD+	IN	Radar Video Signal. 0 to -2.6V (except NKE-2103) 0 to -1.8V (NKE-2103)	See Fig. 2.4.20 RIF VD TRG signals detail.
		2	VD-	IN		
		3	TRG+	IN	Radar Trigger Signal 0 to +13.6V (min. 10.6V)	Pulse Width : 1us to 4.4us See Fig. 2.4.20 RIF VD TRG signals detail.
		4	TRG-	IN		
		5	BP+	IN	Bearing Pulse 0 to +5V, Pull-up	2048 pulses / 1 rotation See Fig. 2.4.21 RIF BP BZ signals detail
		6	BP-	IN		
		7	BZ+	IN	Bearing Zero Open Collector Input.	1 pulse / 1 rotation 5V, 510ohm Internal Pull-up. See Fig. 2.4.21 RIF BP BZ signals detail
		8	BZ-	IN		
		9	MTR+	I/O	RS-485, UART 9600 to 38400 bps Start bit: 1bit Stop bit: 2bits Parity bit: Even Parity Data bit: 8bits	-
		10	MTR-	I/O		
		11	MTRG	-		
		12	N.C.	-	N.C.	-
		13	DC+	OUT	48Vdc or 24Vdc	Depends on the Scanner Type
		14	DC-	OUT		

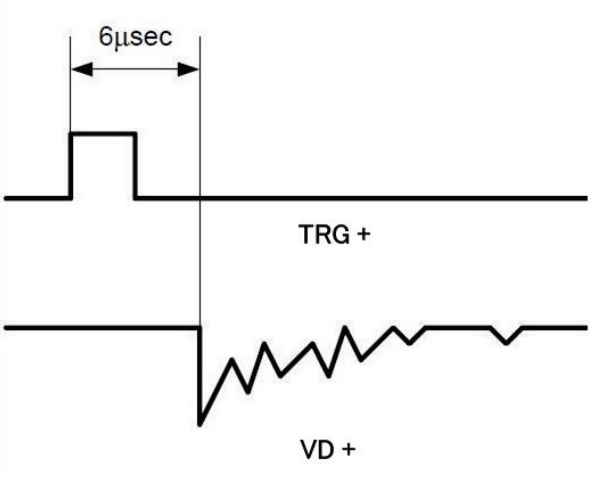


Fig. 2.4.20 RIF VD TRG signals detail

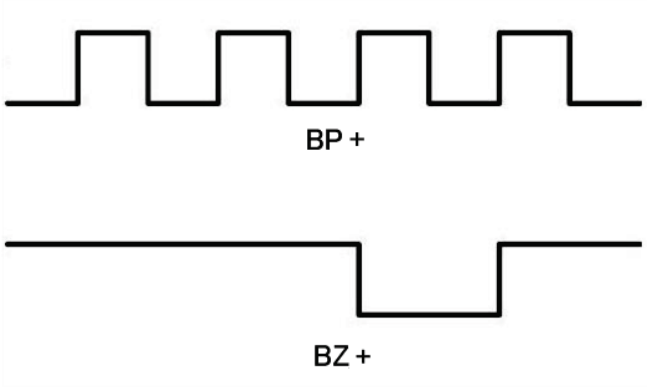


Fig. 2.4.21 RIF BP BZ signals detail

Table 2.4.23 RIF I/O specifications 3

Label	Name	Pin	Signal Name	I/O	Specification	Detail
J833	ISW_OUT	1	ISWO_VD+	OUT	Interswitch Unit	-
		2	ISWO_VD-	OUT		
		3	ISWO_TRG+	OUT		
		4	ISWO_TRG-	OUT		
		5	ISWO_BP+	OUT		
		6	ISWO_BP-	OUT		
		7	ISWO_BZ+	OUT		
		8	ISWO_BZ-	OUT		
		9	ISWO_MTR+	I/O		
		10	ISWO_MTR-	I/O		
		11	ISWO_MTRG	I/O		
J834	ISW_IN	1	ISWI_VD+	IN	Interswitch Unit	-
		2	ISWI_VD-	IN		
		3	ISWI_TRG+	IN		
		4	ISWI_TRG-	IN		
		5	ISWI_BP+	IN		
		6	ISWI_BP-	IN		
		7	ISWI_BZ+	IN		
		8	ISWI_BZ-	IN		
		9	ISWI_MTR+	I/O		
		10	ISWI_MTR-	I/O		
		11	ISWI_MTRG	I/O		
		12	PWROUT	OUT		
		13	PWROUTE	OUT		
		14	PWRIN	IN		
		15	PWRINE	IN		

Table 2.4.24 RIF I/O specifications 4

Label	Name	Pin	Signal Name	I/O	Specification	Detail
J835	GYRO I/F	-	GYRO I/F	I/O	Gyro Interface Circuit	Internal wiring
J836	EX_OUT	1	VD_OUT+	OUT	0 to -2.6V Output Z : 50 ohm 50dB / V	See Fig. 2.4.22 RIF VD_OUT detail
		2	VD_OUT-	OUT		
		3	TRG_OUT+	OUT	0 to 4V Output Z : 50 ohm Pulse width : 1us	See Fig. 2.4.23 RIF TRG_OUT detail
		4	TRG_OUT-	OUT		
		5	BP_OUT+	OUT	Open Collector Output 5V, 1k ohm Pull-up is recommended.	See Fig. 2.4.24 RIF BP BZ_OUT detail
		6	BP_OUT-	OUT		
		7	BZ_OUT+	OUT		
		8	BZ_OUT-	OUT		
		9	GND	-	GND	-
		10	N.C.	-	N.C.	-
J837	AC_SC_IN (DC48V)	-	AC_SC_IN (DC48V)	-	Power Supply Unit	Internal wiring
TB838	AC_MTRPWR (AC100/220V)	1	U	OUT	100-220Vac , 50/60Hz, Single phase	Depends on PSU AC IN
		2	V	OUT		
J839	DC_SC_IN (DC24V PSU)	-	DC_SC_IN (DC24V PSU)	-	Power Supply Unit	Internal wiring
TB840	DC_MTRPWR (DC24V MTR)	1	+	OUT	24Vdc	PSU DC IN
		2	−	OUT		

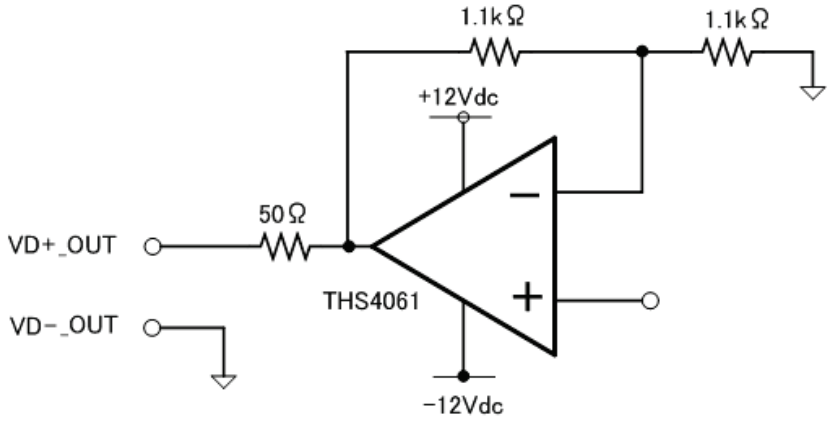


Fig. 2.4.22 RIF VD_OUT detail

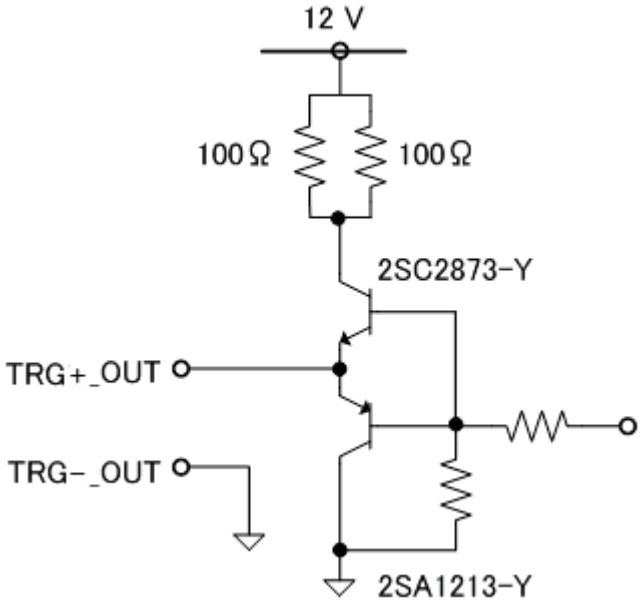


Fig. 2.4.23 RIF TRG_OUT detail

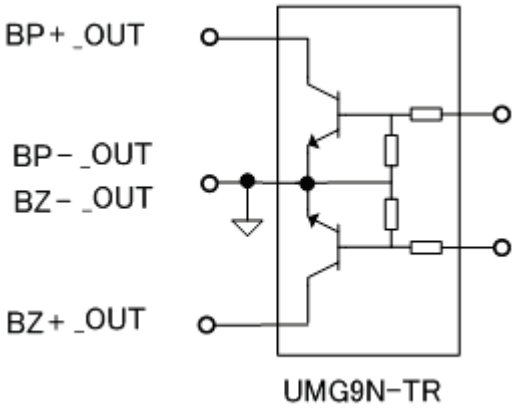


Fig. 2.4.24 RIF BP BZ_OUT detail

2.5 DIP-SW and Jumper Pin Settings

2.5.1. Setting for CQD-2273 Radar Interface Circuit

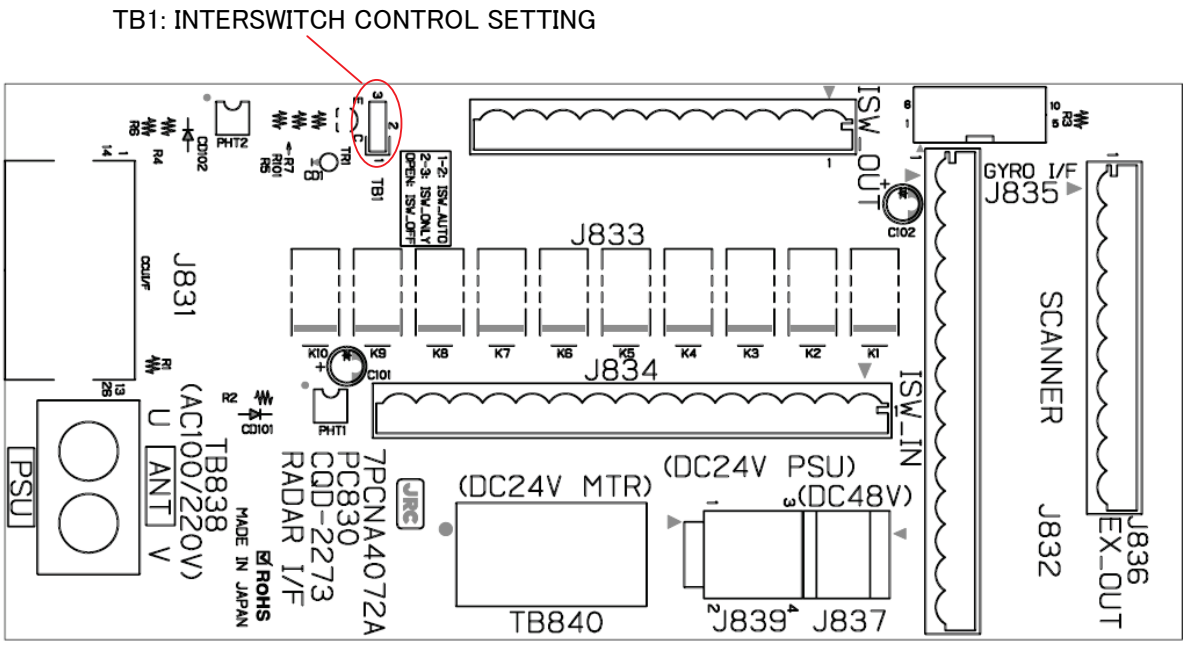


Fig. 2.5.1 CQD-2273 Radar Interface Circuit

Table. 2.5.1 Radar Interface Circuit TB1 Settings

Radar Interface Circuit TB1 Settings		Description
1-2 SHORT CIRCUIT	ISW_AUTO (Factory default)	You can switch the scanner unit to be used on your Display unit via the Interswitch unit.
2-3 SHORT CIRCUIT	ISW_ONLY (Not allowed)	Scanner signals always come down to your Display unit via the Interswitch unit. You can switch them on your Display unit in service menu.
OPEN	ISW_OFF (Not allowed)	Scanner signals come down to your Display unit directly. Since they do not come through the Interswitch unit, you cannot switch them.

If it is not suggested from JRC office, do not set the TB1 of Radar Interface Circuit to “2-3 SHORT CIRCUIT” or “OPEN”.

• It may cause a lower radar system performance.

Connection procedure with Scanner Units

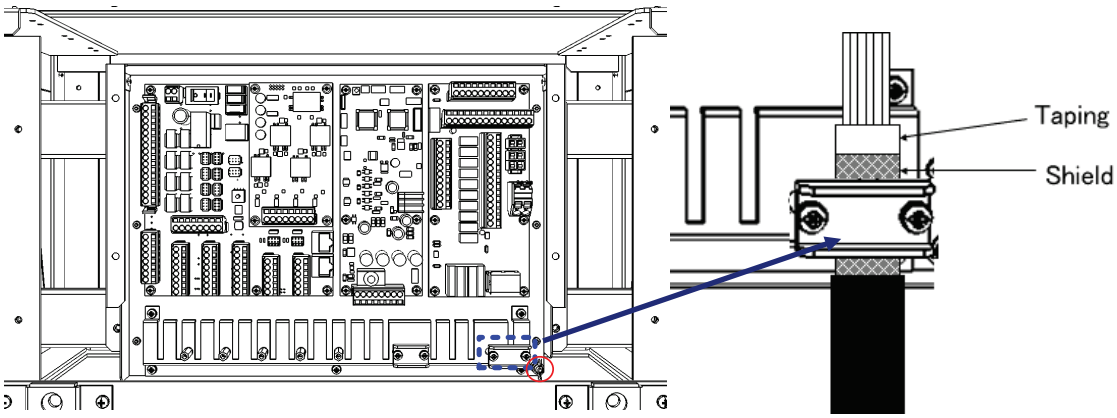
1. Connect the scanner unit to J832 and TB838 or TB840 as follows.

   J832: Radar signals. TB838: AC motor power. TB840: DC motor power.

AC Motor Scanner Unit： NKE-1139、NKE-1130、NKE-1632、NKE-2632、NKE-2632-H、 NKE-1129-7、NKE-1129-9、NKE-1125-6、NKE-1125-9	J832 and TB838
DC Motor Scanner Unit： NKE-2254-6HS、NKE-2103-6、NKE-2103-6HS	J832 and TB840

• For the procedures for processing the equipment cable end, see **Chapter 2 of Installation Manual**..

• Fix the shield part of the equipment cable with pressing by metal fittings which is surrounded by a dotted line frame in the figure below. Connect the shield to the thumbscrew surrounded by the circle.(Recommended crimp terminals V5.5)



So that the braided shield is not short-circuited to the power supply terminal block, please insulate the cable and fix with cable tie. Please put the Extra length of the cable to the bottom of the display unit so that the not shorted to

2. When connecting the interswitch unit, see **INSTALLATION MANUAL 5.1 Installation of Interswitch Unit.**

3. When connecting the ECDIS, see **INSTALLATION MANUAL 3.8 Connection with ECDIS.**

2.5.2. Settings for CMJ-554 Gyro Interface Circuit

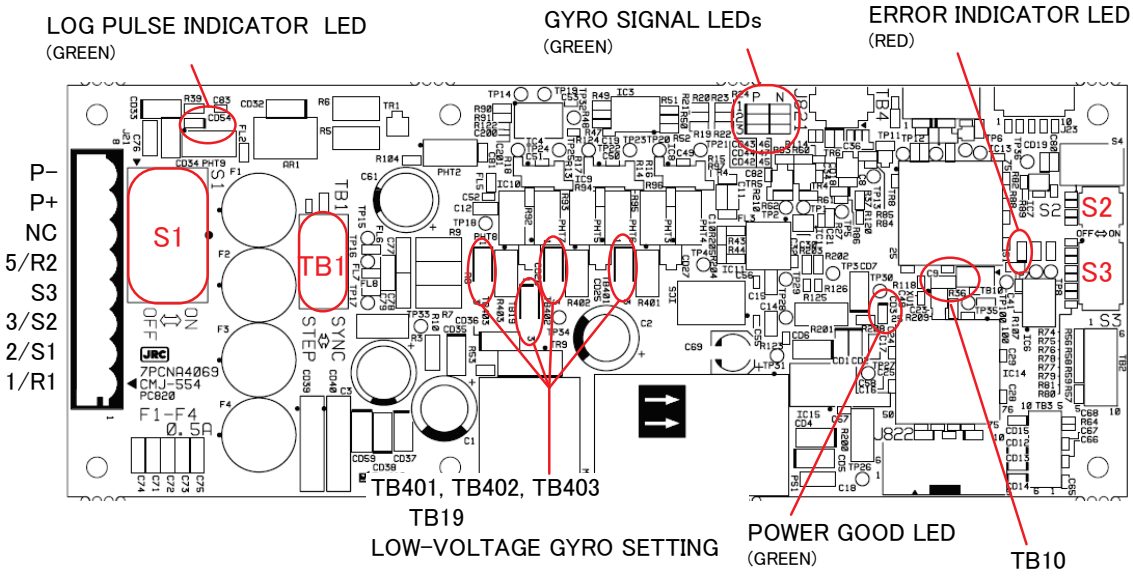


Fig. 2.5.2 CMJ-554 Gyro Interface circuit

Table. 2.5.2 GIF TB1 settings

TB1 Settings	Description
SYNC	Synchro type Gyro compass
STEP	Step type Gyro compass

Table. 2.5.3 GIF TB401, TB402, TB403, TB19 settings

TB401, TB402, TB403, TB19 Settings	Description
1-2 SHORT CIRCUIT	Factory default
2-3 SHORT CIRCUIT	Low voltage settings

Table. 2.5.4 GIF TB10 settings

TB10 Settings	Description
SHORT CIRCUIT	Factory default
OPEN	Not allowed



If it is not suggested from JRC office, do not set the TB10 of Gyro Interface Circuit to “OPEN”.

• It may cause a lower radar system performance.

Table. 2.5.5 GIF S1 settings

S1 Settings	Description
OFF	Gyro signals will be disconnected.
ON	Gyro signals will be connected.

Table. 2.5.6 GIF S2 settings

S2 Settings		1	2	3	4
GYRO SIM	Simulator ON	ON			
	Simulator OFF	OFF			
LOG SIM	Simulator ON		ON		
	Simulator OFF		ON		
	NC				

Table. 2.5.7 GIF S3 settings

S3 Settings		1	2	3	4	5	6	7	8
GYRO SETTING	GYRO TYPE "STEP"	ON							
	GYRO TYPE "SYNC"	OFF							
GYRO RATIO	RATIO 36x		ON	ON					
	RATIO 90x		ON	OFF					
	RATIO 180x		OFF	ON					
	RATIO 360x		OFF	OFF					
GYRO DIRECTION	Direction 'REVERSE'				ON				
	Direction 'NORMAL'				OFF				
GYRO ALARM TIME	LONG					ON			
	SHORT					OFF			
LOG ALARM	LOG ALARM						ON		
							OFF		
LOG SETTING	RATIO 100P							ON	ON
	RATIO 200P							ON	OFF
	RATIO 400P							OFF	ON
	RATIO 800P							OFF	OFF

Connection procedure with Gyro Compass

1. Turn S1 off

Gyro Compass and Gyro Interface Circuit will be disconnected.

2. Switch TB1 for the type of your Gyro Compass

Synchro type Gyro Compass: Set TB1 to “SYNC”

Step type Gyro Compass: Set TB1 to “STEP”

3. Set S3 as follows for your Gyro Compass and Speed Log according to Table. 2.5.7 GIF S3 settings.

S2-1 : Gyro type (STEP / SYNC)

S2-2/3 : Gyro speed ratio

S2-4 : The direction of rotation

S2-5 : Gyro alarm time (LONG / SHORT)

S2-6 : Log alarm (ON / OFF)

S2-7/8 : Log settings

4. Set TB401-403 and TB19 as follows if your Gyro Compass signals are less than 22V.

1-2 SHORT CIRCUIT: Factory default.

2-3 SHORT CIRCUIT: Set this if voltages of step Gyro signals are less than 22V.

5. Connect your Gyro Compass and Speed Log to J823 of CMJ-554 Gyro Interface Circuit as follows.

Table. 2.5.8 GIF input section

Gyro and Log	J823	Description
Synchro Gyro	R1, S1, S2, S3 and R2.	24 - 115Vac (50 / 60 / 400Hz)
Step Gyro	1, 2, 3 and 5 (5 for common)	21.6 - 70V
Pulse Log	P+, P-	0-50V, Vth = 2V. (5V, 1k ohm Internal Pull-up)

6. Turn S1 on

Your Gyro compass will be connected to the Gyro interface circuit.

7. Check your Radar Echo and True Bearing Value to make sure that your Gyro Compass is working correctly.

8. Set S3-4 to “REVERSE” if your Radar Echo and True Bearing have Reverse rotation.

Table. 2.5.9 shows the setting examples for some gyro compasses.

Table. 2.5.9 Setting examples for some gyro compasses

item / Manufacture	Gyro Compasses	Repeater Motors (For reference only)	Excitation Voltage	Gyro Select Swiches (S3, TB1 located on the CMJ-554) S3 settings 1	2	3	4	5	6	7	8	TB1 setting
東京計器 TOKYO KEIKI (JAPAN) スペリー Sperry (U.S.A)	ES-2/11 GLT-100～103/105/106K/107/1104, NJZ-501(R501)	Synchro Motor INMS (TS63N7E13) (36X)	115V AC 60Hz	OFF	ON	ON	OFF					SYNC
	ES-11A, GM-11/11A/21/110/120, MS-2000/3000 PR-222R/226/237/237-L /1*8*/2022/2023/22**, TG-200	Synchro Motor TSAN60E11 (90X)	110V AC 60Hz	OFF	OFF	ON						SYNC
	GLT-201/202/203, MK-14/14T, MKE-1/14T, MOD-1/2/T, PR-500/2502/2503/2507/2507L /3507/4507/5507, SR-130/140, TG-100/5000	Step Motor GA-2001G Drawing# 103590810 600 excitation (180X)	70V DC	ON	ON	OFF						STEP
	ES-16 SR-120/220	Step Motor GA-2001G Drawing# 103590820 150 excitation (180X)	35V DC	ON	ON	OFF						STEP
	CMZ-700D ES140/160 PR-26**/6*6*/6*7*, SR-140/160 TG-6000/8000		24V DC									
横河電機 YOKOGAWA (JAPAN)	C-1A/2/3/E, HOKUSHIN PLATH-55/C, PLATH HKRK-C3	Synchro Motor YM-14 TS-19 (360X)	60V AC 60Hz	OFF	OFF	OFF						SYNC
	C1JR, C-1JUNIOR, CMZ-200A/300, D-1, IPS, IPS-2-H2/2B/2B-H2C/5, KM008, KR-053, PLATH NAVIGAT-1, PT11-H2/21/21-H2	Synchro Motor PY76-N2 (360X)	100V AC 50/60Hz	OFF	OFF	OFF						SYNC
アーマーブラウン ARMA BROWN (France)	1351, MK-1～7/10/20, MKL-1, NOD-4, NB-23-88, SERIE, SGB-1000	Step Motor BZ-2191 (180X)	50V DC	ON	ON	OFF						STEP
アンシッツ ANSCHUTZ (Germany)	110-301, 139-31, ANSCHUTZ-1～6/12/14/Z, GM-BH, K8051, NB23-126, Z0658U	Synchro Motor NB23-91 (360X)	50V AC 50Hz	OFF	OFF	OFF						SYNC
プラート社 C. PLATH (Germany)	NAVIGAT 763-331E, PLATH NAVIGAT-II/III	Synchro Motor YM14A (360X)	50V AC 50Hz	OFF	OFF	OFF						SYNC

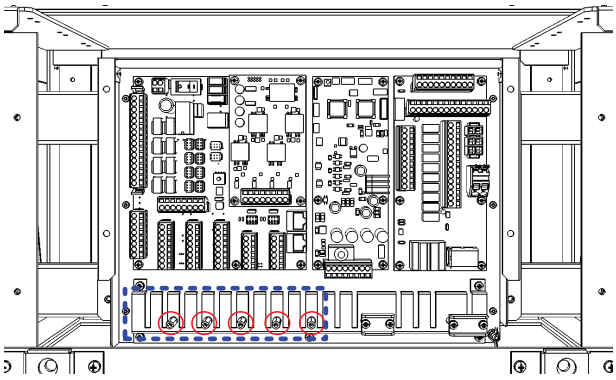
*: Numeric Number

2.5.3. Settings for CMH-2370 Serial LAN Interface Circuit

IEC61162-1 Connections

Connect the communication signals from sensors to the IEC61162-1 port located on the CMH-2370 in JUNCTION BOX NQE-1143. Received signals from sensors will be connected to terminals RX_A and RX_B which is IEC61162 standards. Transmit signals to sensors will be connected to terminals TX_A and TX_B which are IEC61162 standards. The number of port for IEC61162-1 on CMH-2370 is 8 ports including each receiver and transmitter allocated at J8103-J8106 on CMH-2370.

- See **Fig. 2.5.5** Connector location of CMH-2370 Serial LAN interface circuitabout location of J8103-J8106 on CMH-2370.
- To configure the port, refer to **Chapter 4 of Installation Manual**
- Fix the signal cable with the clamp surrounded by the doted line in the figure below.
- Connect the cable shield to the hex spacer surrounded by the circle in the figure below. (Recommended crimp terminals V5.5)



⚠ So that the braided shield is not shorted to the power supply terminal block, please insulate the cable and fix with cable tie. Please put the Extra length of the cable to the bottom of the display unit so that the not shorted to the UPS or SENSOR LAN switch unit.

Table. 2.5.10 Terminal Assign of J8103-J8106

Terminal Number	J8105	J8104	J8103	J8106
1	RX1A	RX3A	RX5A	RX7A
2	RX1B	RX3B	RX5B	RX7B
3	TX1A	TX3A	TX5A	TX7A
4	TX1B	TX3B	TX5B	TX7B
5	RX2A	RX4A	RX6A	RX8A
6	RX2B	RX4B	RX6B	RX8B
7	TX2A	TX4A	TX6A	TX8A
8	TX2B	TX4B	TX6B	TX8B

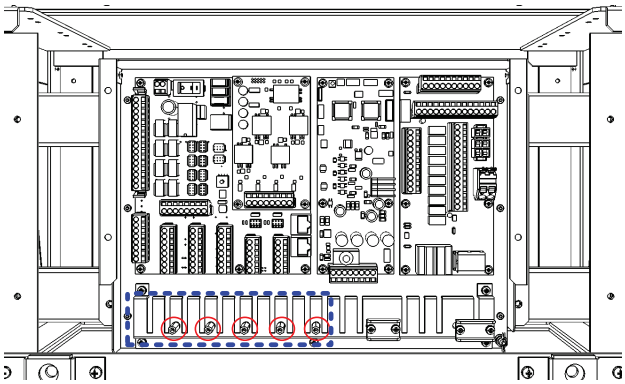
IEC61162-2 Connections

Connect the communication signals from sensors to the IEC61162-2 port located on the CMH-2370 in JUNCTION BOX NQE-1143. Communication signals from sensors will be connected to terminals RX_A, RX_B and RX_C which are IEC61162 standards. Communication signals to sensors will be connected to terminals TX_A, TX_B and TX_C which is IEC61162 standards.

The number of port for IEC-61162-2 on CMH-2370 is two ports including each receiver and transmitter allocated at J8101 and J8102 on CMH-2370.

- See **Fig. 2.5.5** Connector location of CMH-2370 Serial LAN interface circuitabout location of J8101-J8102 on CMH-2370.
- To configure the port, refer to **Chapter 4 of Installation Manual**
- Fix the signal cable with the clamp surrounded by the doted line in the figure below.
- Connect the cable shield to the hex spacer surrounded by the circle in the figure below.

(Recommended crimp terminals V5.5)



So that the braided shield is not shorted to the power supply terminal block, please insulate the cable and fix with cable tie. Please put the Extra length of the cable to the bottom of the display unit so that the not shorted to the UPS or SENSOR LAN switch unit.

Table. 2.5.11 Terminal Assign of J8101 and J8102

Terminal Number	J8102	J8101
1	TX9A	TX10A
2	TX9B	TX10B
3	TX9C	TX10C
4	RX9A	RX10A
5	RX9B	RX10B
6	RX9C	RX10C

ex. Data communication example of AIS:

AIS data will be displayed on the radar screen by connecting sensor data from AIS to RX_A, RX_B and RX_C.

By connecting to AIS from TX_A, TX_B and TX_C, it is possible to stop the AIS alarm displayed on the radar screen.

Communication Type and termination

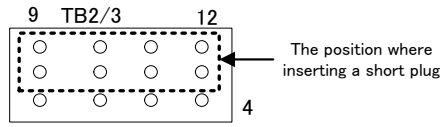
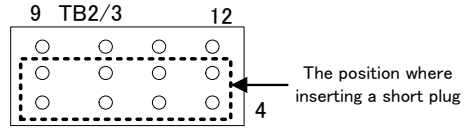
Communication type of IEC61162-2 can be selected full duplex (IEC61162-2) mode or half duplex (RS-485) mode by TB2 and TB3 setting on CMH-2370.

To select communication type for channel9, terminal of TB2 will be short-circuited by Short Plug.

To select communication type for channel10, terminal of TB3 will be short-circuited by Short Plug.

To set TB2 and TB3, refer to **Table. 2.5.12** and **Fig. 2.4.10** SLC IEC61162-2 TXRX detail.

Table. 2.5.12 Setting of communication type

Type	Short terminal No. of TB2 and TB3
Full duplex (IEC61162-2)	5-9, 6-10, 7-11, 8-12 
Half Duplex (RS-485)	5-1, 6-2, 7-3, 8-4 

And the termination of receiver can be removable for multi connections by TB14 and TB15 setting on CMH-2370.

To set the termination for channel9, terminal of TB14 will be short-circuited by Short Plug.

To set the termination for channel10, terminal of TB15 will be short-circuited by Short Plug.

To set TB14 and TB15, refer to **Table. 2.5.13** Short terminal to select communication typeand **Fig. 2.4.10** SLC IEC61162-2 TXRX detail.

Table. 2.5.13 Short terminal to select communication type

Termination	Short terminal No. of TB14 and TB15
w Termination	2-3 (Factory default)
w/o Termination	1-2

Note: The location of TB2, TB3, TB14, TB15, Refer to **Fig. 2.5.5.**

LAN Connection

CMH-2370 converts the serial data from each sensor into LAN protocol. And the data converted by CMH-2370 transfer to DISPLAY UNIT via SENSOR LAN UNIT NQE-2443. It can transfer the data not only received from sensors to DISPLAY UNIT but also transmitted to sensor from DISPLAY UNIT.

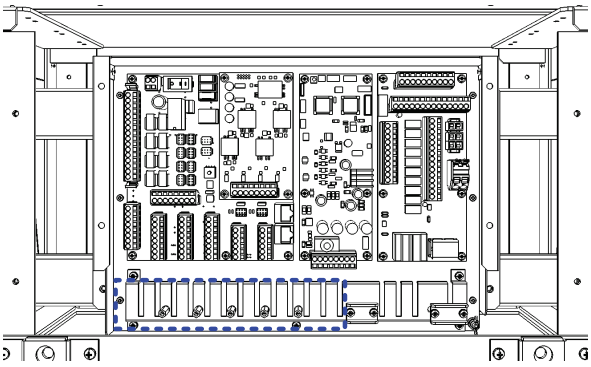
CMH-2370 will be connected to NQE-2443 each RJ-45 by an Ethernet cable.

> ⚠ If it is not suggested from JRC office, do not connect PC or other maker's system to JRC-LAN.
> **•Connecting PC or other maker's system may cause a lower system performance.**

Either J8111 or J8112 selected by S4 will be used as an active LAN port.
And, you can select the data format either IEC61162-450 or JRC Formant by S4.

To set S4, refer to **Table. 2.5.14**.
The location of J8111, J8112 and S4, refer to **Fig. 2.5.5**

Fix the signal cable with the clamp surrounded by the dotted line in the figure below.



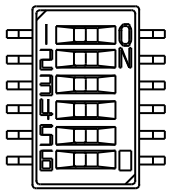


Fig. 2.5.3
Outline of S4

Table. 2.5.14 SLC S4 setting table

SW1	LAN Setting	OFF	Main Channel	Use J8111
		ON	Sub Channel	Use J8112
SW2	LAN Type	OFF	Standard	IEC61162-450
		ON	JRC	JRC Format
SW3	Always set to OFF			
SW4	Always set to OFF			
SW4	Always set to OFF			
SW6	Always set to OFF			

To apply the setting, please restart CMH-2370 with the S1, because it will be reflected in the startup.

If some number of CMH-2370s have been installed and connected to the same SENSOR LAN UNIT NQE-2443, you should change IP address of each CMH-2370 by S3 setting. Refer to **Table. 2.5.15.**

CMH-2370 to be connected to the IAS (Integrated Automation System) or AMS (Alert Management System) is set the operation mode: ALC (Alert LAN Converter). Also in this case, set the IP address in refer to **Table. 2.5.15.**

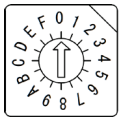


Fig. 2.5.4 Outline of S3

The location of S3, refer to **Fig. 2.5.5.**

Table. 2.5.15 IP Address setting table

S3 Position	Mode	No.	IEC61162-450		JRC Format	
			Main LAN	Sub LAN	Main LAN	Sub LAN
0	SLC	SLC1	172.16.60.107	172.17.60.107	192.168.60.107	192.168.61.107
1		SLC2	172.16.60.108	172.17.60.108	192.168.60.108	192.168.61.108
2		SLC3	172.16.60.109	172.17.60.109	192.168.60.109	192.168.61.109
3		SLC4	172.16.60.110	172.17.60.110	192.168.60.110	192.168.61.110
4		SLC5	172.16.60.111	172.17.60.111	192.168.60.111	192.168.61.111
5		SLC6	172.16.60.112	172.17.60.112	192.168.60.112	192.168.61.112
6		SLC7	172.16.60.113	172.17.60.113	192.168.60.113	192.168.61.113
7		SLC8	172.16.60.114	172.17.60.114	192.168.60.114	192.168.61.114
8		SLC9	172.16.60.115	172.17.60.115	192.168.60.115	192.168.61.115
9		SLC10	172.16.60.116	172.17.60.116	192.168.60.116	192.168.61.116
A		SLC11	172.16.60.117	172.17.60.117	192.168.60.117	192.168.61.117
B		SLC12	172.16.60.118	172.17.60.118	192.168.60.118	192.168.61.118
C	ALC	ALC1	172.16.60.119	172.17.60.119	192.168.60.119	192.168.61.119
D		ALC2	172.16.60.120	172.17.60.120	192.168.60.120	192.168.61.120
E		ALC3	172.16.60.121	172.17.60.121	192.168.60.121	192.168.61.121
F		ALC4	172.16.60.122	172.17.60.122	192.168.60.122	192.168.61.122

SFI:System Function ID of each IEC 61162 channel will also be changed depending on the IP address.

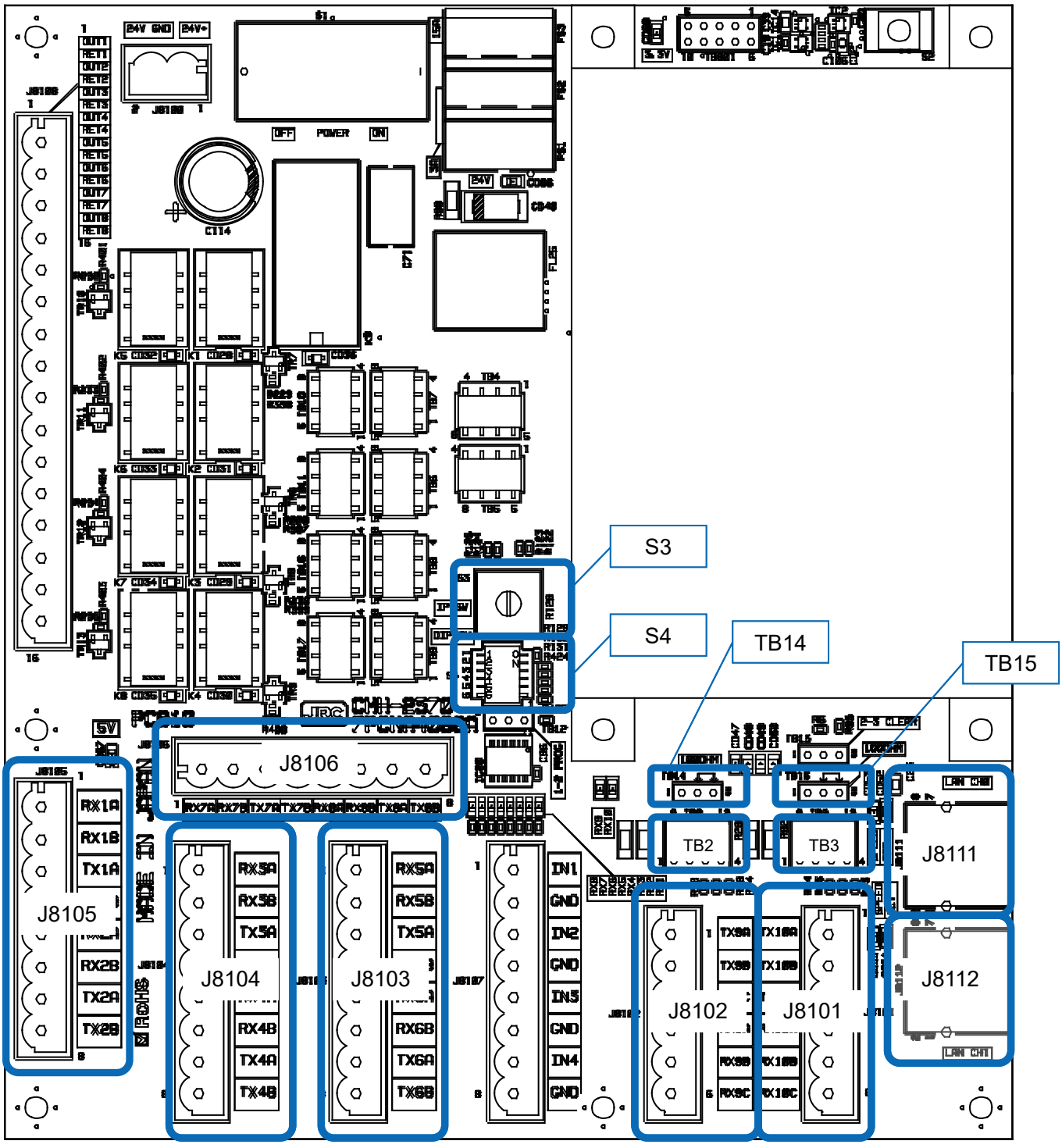


Fig. 2.5.5 Connector location of CMH-2370 Serial LAN interface circuit

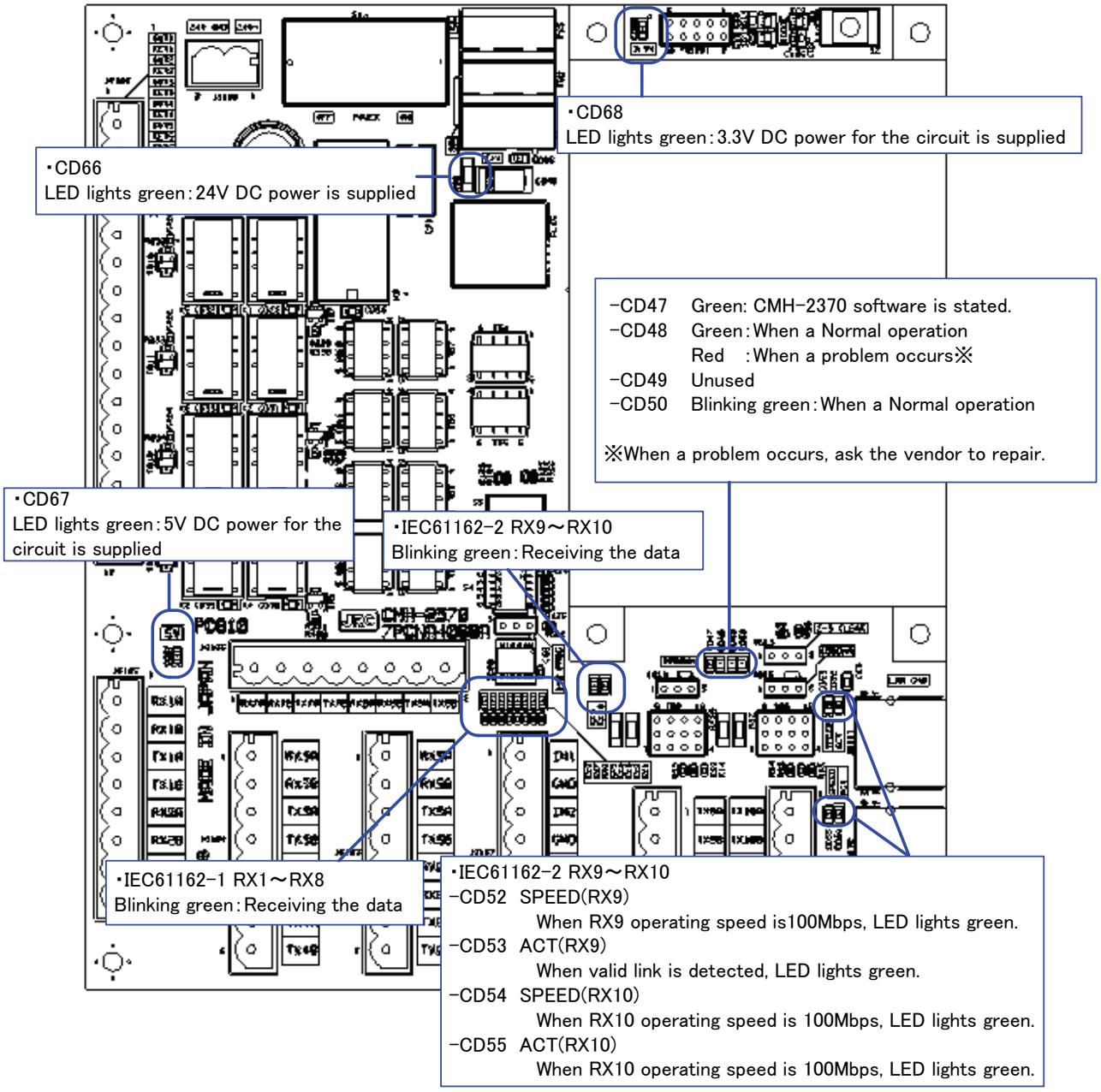


Fig. 2.5.6 LED Indication of CMH-2370 Serial LAN interface circuit

Contact Input/Output

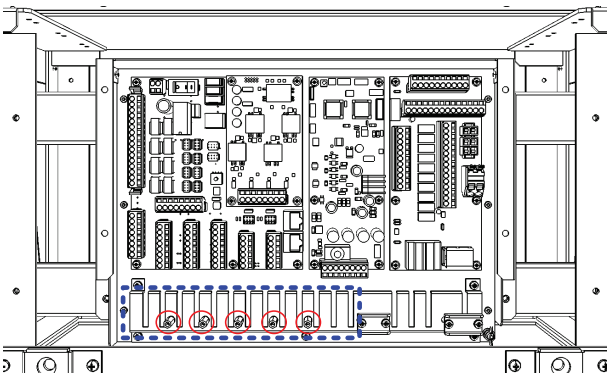
Contact Input

Connect the dry contact of other equipment to the Input port which is on CMH-2370 in JUNCTION BOX NQE-1143. The number of Input port on CMH-2370 is 4 ports allocated at J8107. Terminal assign of J8107, refer to Table. 2.5.16.

Dry contact of other equipment will be connected to terminals IN and GND.

- See **Fig. 2.5.9** Dry Contact Connector and TB location on CMH-2370about location of J8107 on CMH-2370.
- To configure the port, refer to **Chapter 4 of Installation Manual.**
- Fix the signal cable with the clamp surrounded by the dotted line in the figure below.
- Connect the cable shield to the hex spacer surrounded by the circle in the figure below.

  (Recommended crimp terminals V5.5)



So that the braided shield is not shorted to the power supply terminal block, please insulate the cable and fix with cable tie. Please put the Extra length of the cable to the bottom of the display unit so that the not shorted to the UPS or SENSOR LAN switch unit.

Table. 2.5.16 Terminal Assign of J8107

Terminal Number	J8107
1	IN1
2	GND1
3	IN2
4	GND2
5	IN3
6	GND3
7	IN4
8	GND4

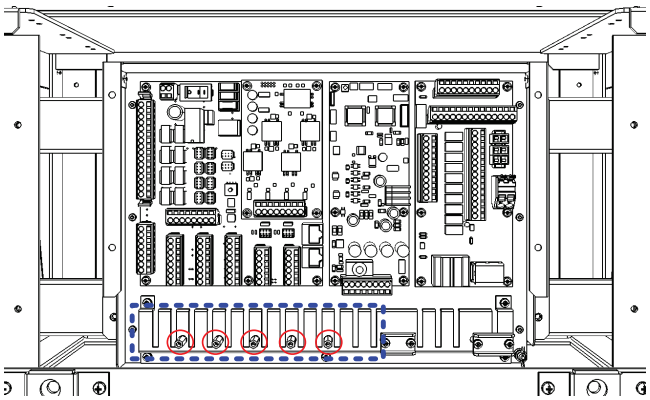
Do not apply a voltage signal to contact input ports. Because they have pulled up to 5V with 1k ohm internally, connecting a voltage signal may cause malfunction.

Contact Output

Connect the input of other equipment to the output port which is located on CMH-2370 in JUNCTION BOX NQE-1143. The number of output ports on CMH-2370 is 8 ports allocated at J8108. Terminal assign of J8108, refer to **Table. 2.5.17**

- See **Fig. 2.5.9.** about location of J8108 on CMH-2370.
- To configure the port, refer to **Chapter 4 of Installation Manual.**
- Connect the cable shield to the hex spacer surrounded by the circle in the figure below.

(Recommended crimp terminals V5.5)



So that the braided shield is not shorted to the power supply terminal block, please insulate the cable and fix with cable tie. Please put the Extra length of the cable to the bottom of the display unit so that the not shorted to the UPS or SENSOR LAN switch unit.

Table. 2.5.17 Terminal Assign of J8108

Terminal Number	J8107
1	OUT1
2	RET1
3	OUT2
4	RET2
5	OUT3
6	RET3
7	OUT4
8	RET4
9	OUT5
10	RET5
11	OUT6
12	RET6
13	OUT7
14	RET7
15	OUT8
16	RET8

Each Output port can be selected matched interface for your input device as below by setting TB4-TB11, TB16 and TB17 shown in Fig. 2.2.1.

- Dry contact: Normally Open
- Dry contact: Normally Close
- 24V dc for Buzzer: Normally no Supply
- 24V dc for Buzzer: Normally Supply

> ⚠ 24V dc for buzzer will be supplied from main power supply of CMH-2370 via 15A fuse.
> If you set OUT as dry contact, do not set the terminal to GND on TB4 or TB5 which is matched to OUT you want.

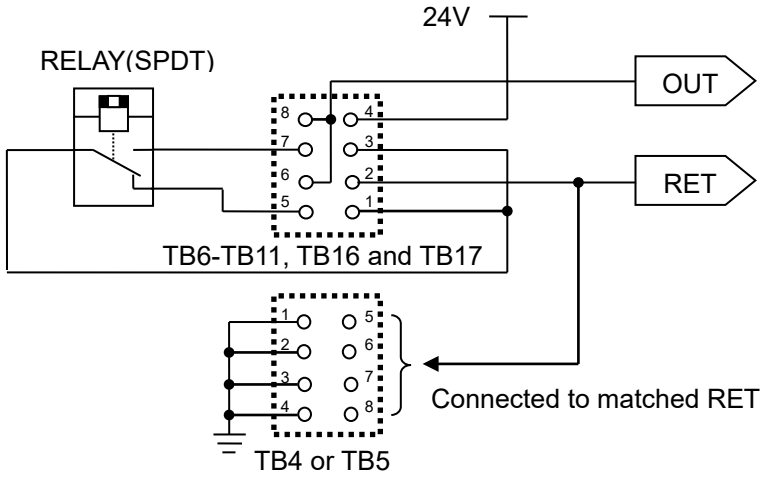


Fig. 2.5.7 Output port circuit diagram

Matched TB for each OUT and RET is shown in **Table. 2.5.18**
And, to select Output, the terminals of each TB will be set by Short Plugs shown in **Fig. 2.5.8.**

Table. 2.5.18 Matched TB for OUT setting

Port	Jumper No.	24VDC Power GND
OUT1/RET1	TB6	TB4: 1-5 short circuit
OUT2/RET2	TB7	TB4: 2-6 short circuit
OUT3/RET3	TB8	TB4: 3-7 short circuit
OUT4/RET4	TB9	TB4: 4-8 short circuit
OUT5/RET5	TB17	TB5: 1-5 short circuit
OUT6/RET6	TB16	TB5: 2-6 short circuit
OUT7/RET7	TB11	TB5: 3-7 short circuit
OUT8/RET8	TB10	TB5: 4-8 short circuit

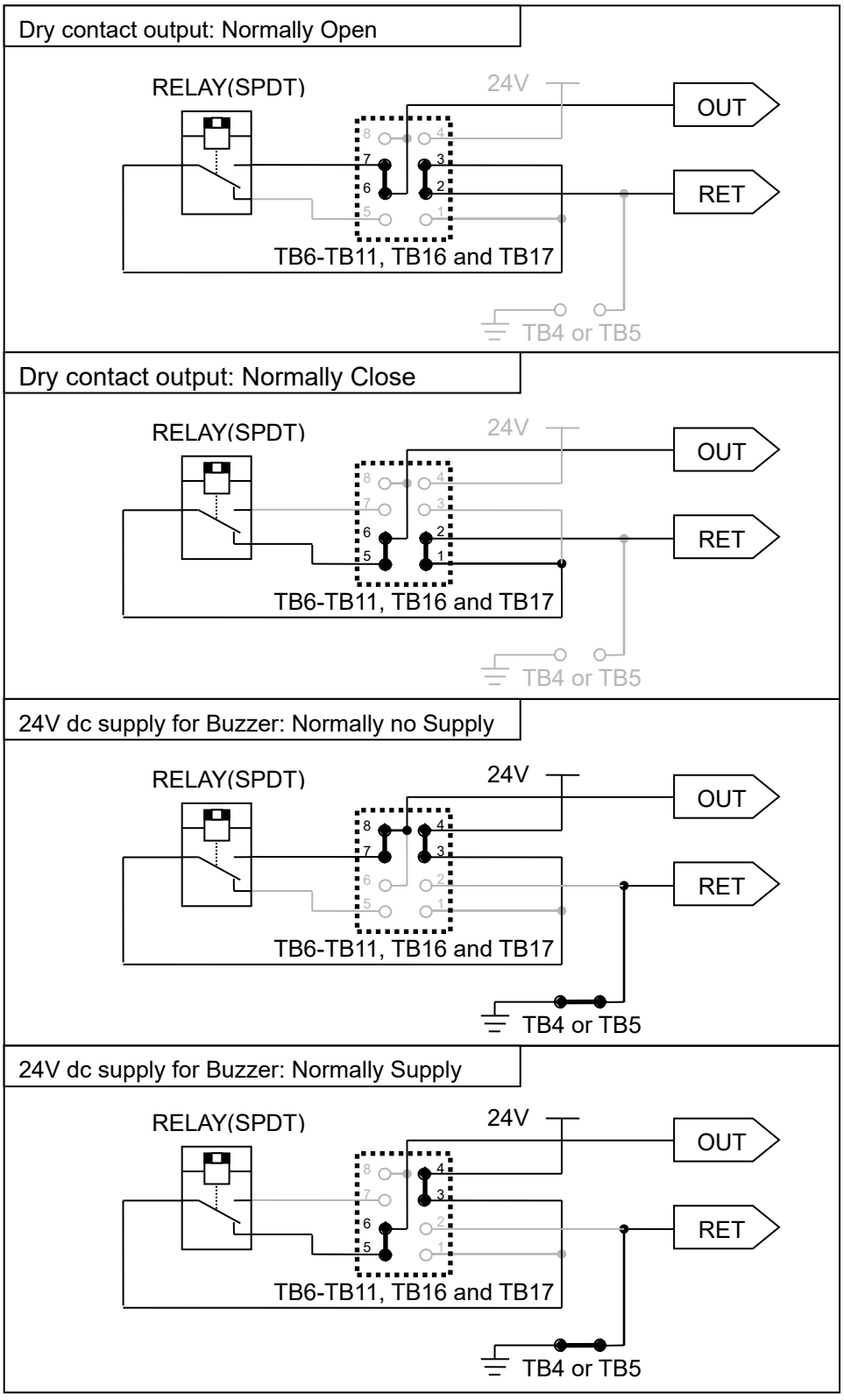


Fig. 2.5.8 Output port setting by TB

⚠ Maximum current of RELAY is 2A.

Do not connect the load including inrush current which exceed maximum current

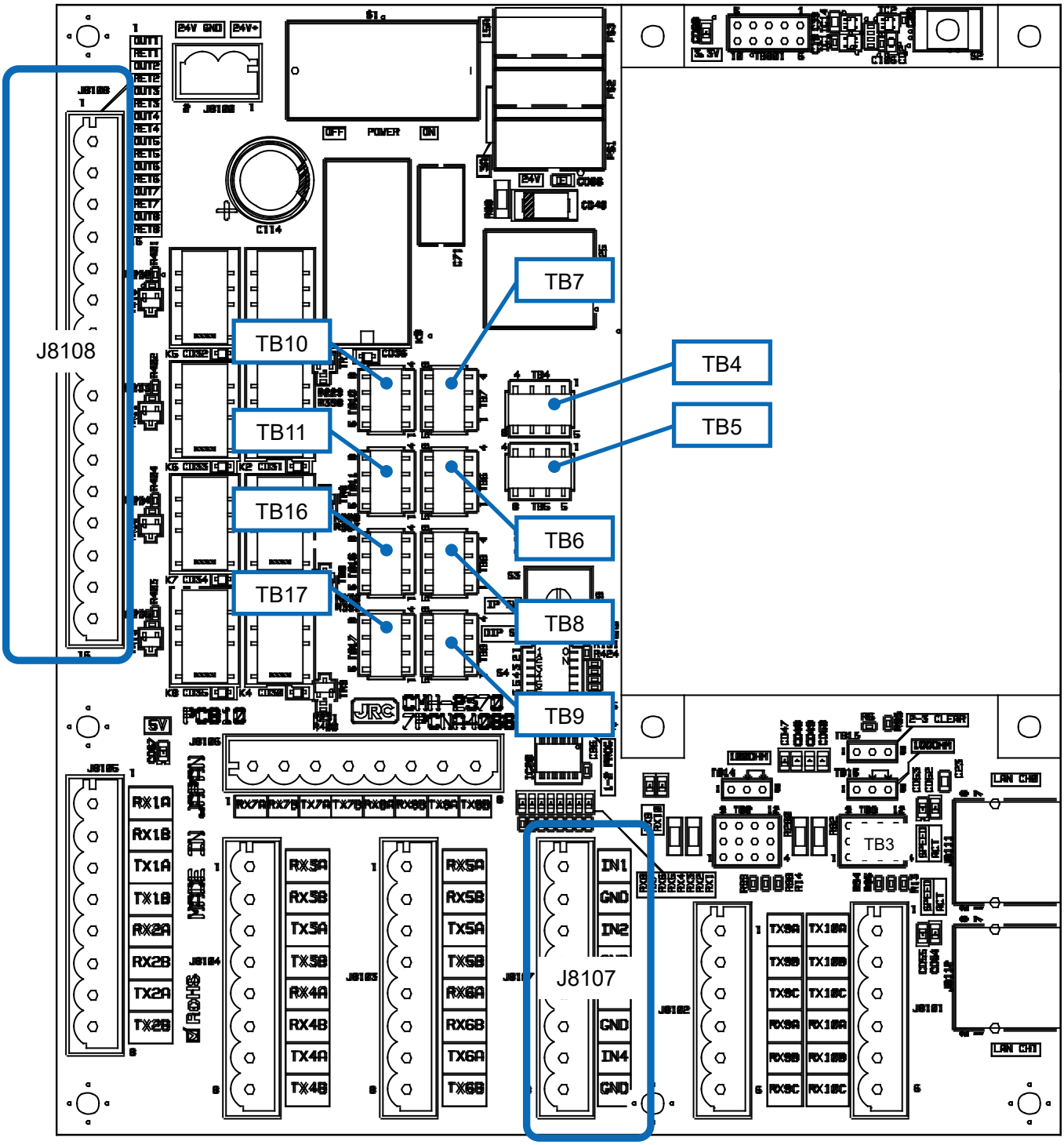


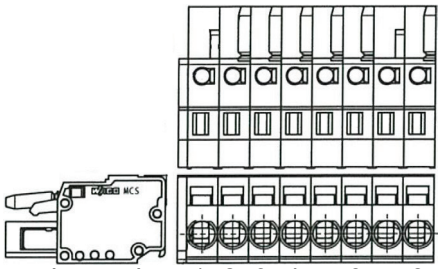
Fig. 2.5.9 Dry Contact Connector and TB location on CMH-2370

2.5.4. Settings for CMJ-560 Analog Option Circuit

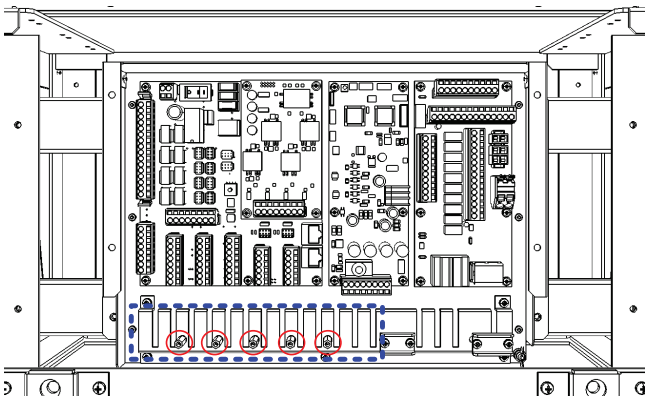
Connect the analog signals from sensors to J842 located on the CMJ-560 Analog Option Circuit:AOC in JUNCTION BOX NQE-1143. AOC has four channel analog signal inputs.

The terminal assign of J842 is shown below.

AOC J842 Connector



- Wiring to AOC J842
  1 : channel 1 sensor input+
  2 : channel 1 sensor input-
  3 : channel 2 sensor input+
  4 : channel 2 sensor input-
  5 : channel 3 sensor input+
  6 : channel 3 sensor input-
  7 : channel 4 sensor input+
  8 : channel 4 sensor input-



So that the braided shield is not shorted to the power supply terminal block, please insulate the cable and fix with cable tie. Please put the Extra length of the cable to the bottom of the display unit so that the not shorted to the UPS or SENSOR LAN switch unit.

AOC shall be configured in accordance with the analog sensor output specifications to be connected. Set the AOC correctly by referring next page.

Set TB2-7 of CMJ-560 Analog Option Circuit according to ship's analog sensors.

Settings for voltage signal input

When Analog Sensors output specifications is Voltage, set as follows.

・Input Signal Range　: -10V to +10V

Table. 2.5.19 Setting Table of Voltage Signal Input

Setting Table of Voltage Signal Input		
Channel	**Reference**	**Setting**
1	TB2	Short-circuit the pins 1-2 or Open all pins
	TB7(±10V)	Short-circuit the pins 1-5
2	TB3	Short-circuit the pins 1-2 or Open all pins
	TB7(±10V)	Short-circuit the pins 2-6
3	TB4	Short-circuit the pins 1-2 or Open all pins
	TB7(±10V)	Short-circuit the pins 3-7
4	TB5	Short-circuit the pins 1-2 or Open all pins
	TB7(±10V)	Short-circuit the pins 4-8

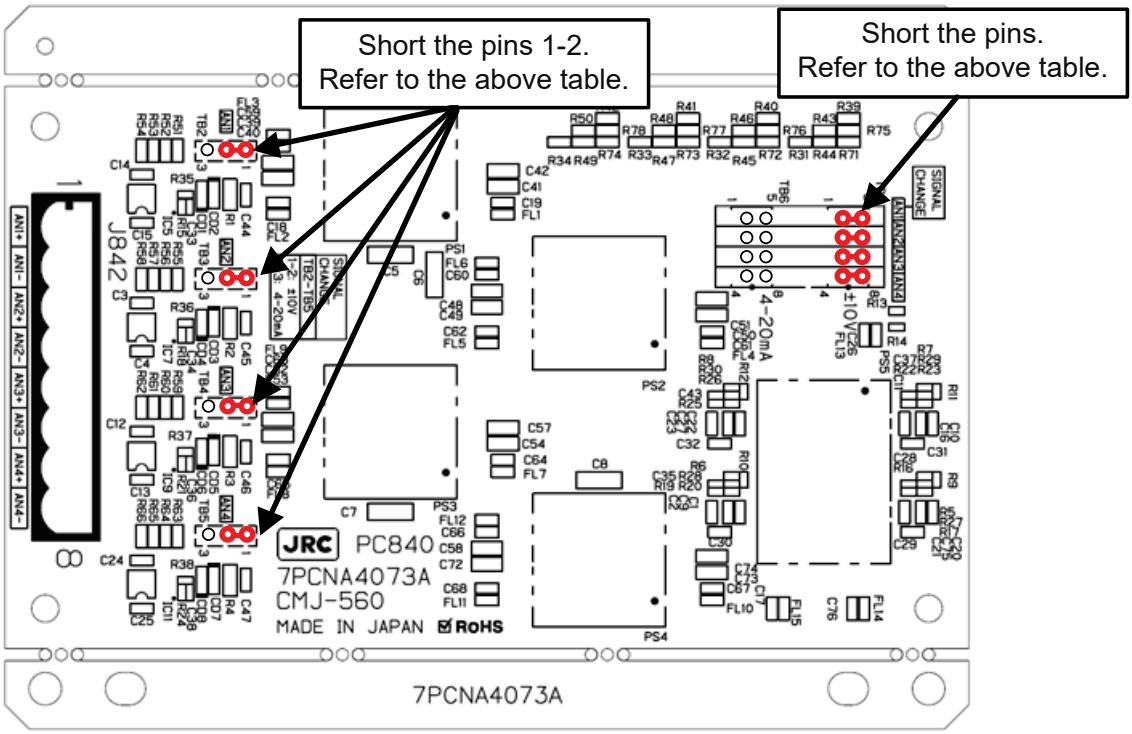


Fig. 2.5.10 Voltage input Settings for CMJ-560 Analog Option Circuit

Current Signal Input

When Analog Sensors output specifications is Current, set as follows.

・Input Signal Range ：4mA to 20mA

Table. 2.5.20 Setting Table of Current Signal Input

Setting Table of Current Signal Input		
Channel	**Reference**	**Setting**
1	TB2	Short-circuit the pins 2-3
	TB6(4-20mA)	Short-circuit the pins 1-5
2	TB3	Short-circuit the pins 2-3
	TB6(4-20mA)	Short-circuit the pins 2-6
3	TB4	Short-circuit the pins 2-3
	TB6(4-20mA)	Short-circuit the pins 3-7
4	TB5	Short-circuit the pins 2-3
	TB6(4-20mA)	Short-circuit the pins 4-8

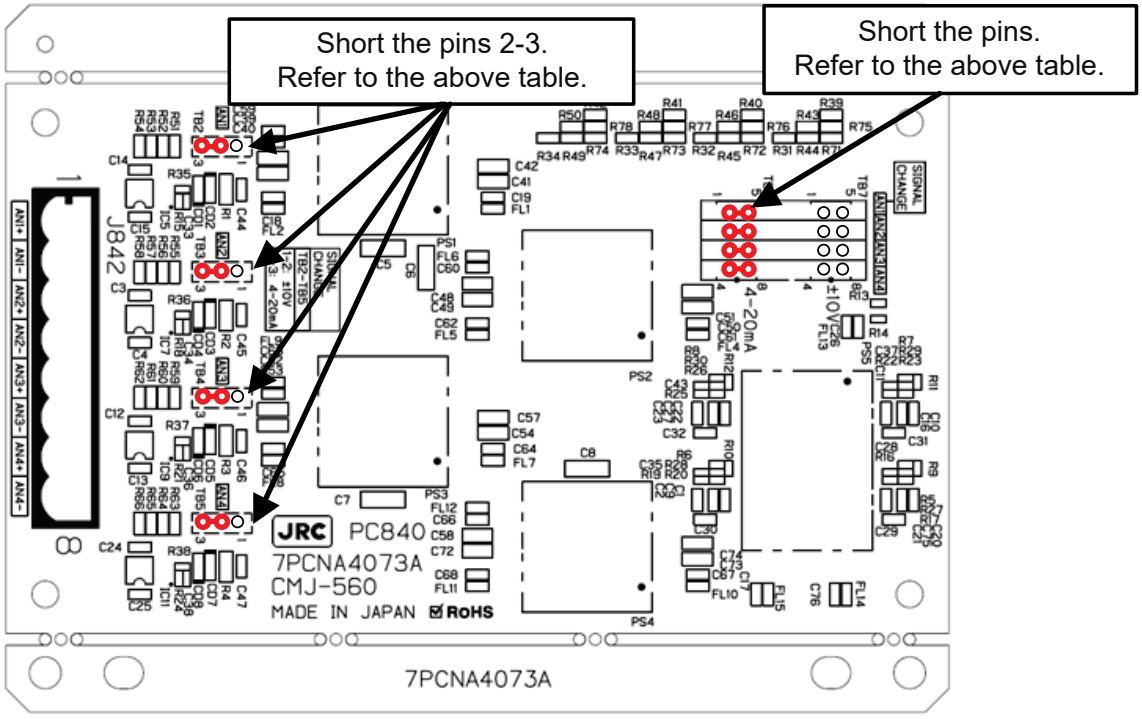


Fig. 2.5.11 Current input settings for CMJ-560 Analog Option Circuit

2.5.5. Settings for NDC-1590/A Central Control Unit: CCU

⚠ If it is not suggested from JRC office, this VGA monitor setting is not necessary. Wrong monitor setting may lose video output.

⚠ Do NOT set the ID rotary switch to position “2” when a DVI monitor is / or both a DVI monitor and a VGA monitor are connected to the CCU.
Wrong monitor setting may lose video output.

Settings for ONLY connection of the VGA monitor to CCU.

This section describes the video output setting that CCU has the only VGA monitor for its display. A VGA monitor will be connected to J4025 (Analog RGB) on CCU.

1. Turn off the CCU power. Then, Set the ID rotary switch as follows.
2. Turn on the CCU power. Confirm that the VGA output displays correctly.

Table. 2.5.21 ID rotary switch settings for CCU NDC-1590

CCU NDC-1590	
ID rotary switch settings	**Description**
2	Only the VGA monitor is connected to J4205 (RGB_OUT) on the CCU.
Other (Factory default = 0)	A DVI monitor is connected to J4101 (DVI_MNU) on the CCU. Or, both a DVI monitor and a VGA monitor are connected to J4101 (DVI_MNU) and J4205 (RGB_OUT) respectively on the CCU.

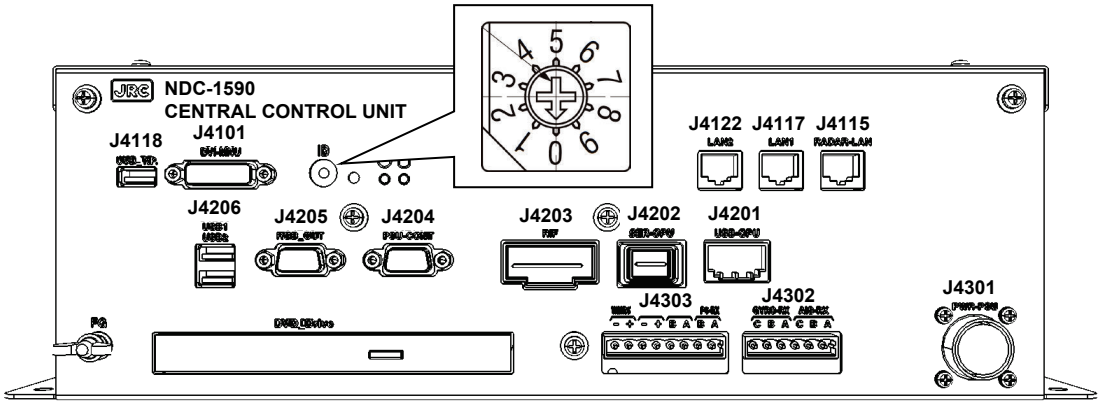


Fig. 2.5.12 ID rotary switch on CCU

NOTE

If the CCU has 16-posintions rotary switch (0 to F), it is not supported this VGA monitor setting.



Settings for J4303: WMRST / PWRFAIL contact output.

PWRFAIL and WMRST contact output configuration can be changed by TB1 and TB2 on the CCU I/F circuit CMH-2406.

1. Disassemble the CCU. Divide it into Upper base and Bottom base. For further information, see "**Field Service Manual 4.3.3.2 Replacing with the CCU Repair Kit NZC-1590**".
2. Set TB1 and TB2 as follows. They are on the CCU I/F circuit mounted on the Upper base.

Table. 2.5.22 TB1, TB2 settings on the CCU I/F circuit CMH-2406

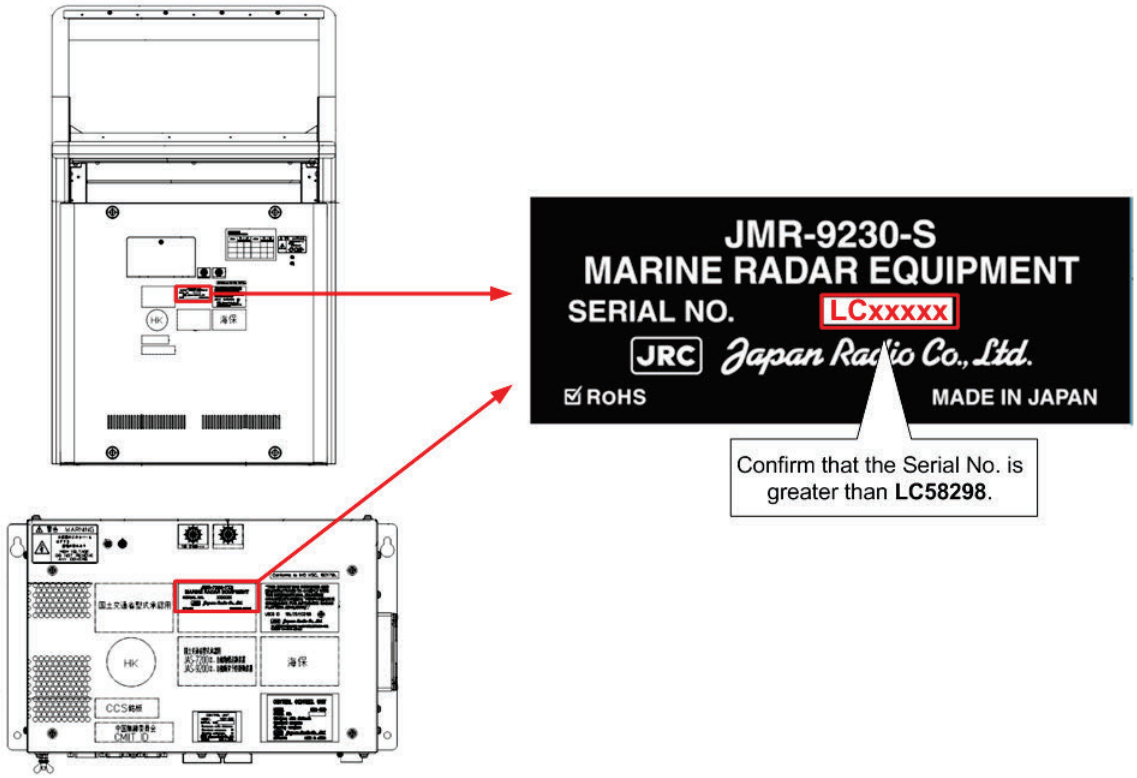
CCU I/F circuit CMH-2406			
J4303	**TB setting**		**Description**
PWRFAIL	TB1	1-2 short circuit	Normally-closed (Factory default)
		2-3 short circuit	Normally-open
WMRST	TB2	1-2 short circuit	Normally-closed
		2-3 short circuit	Normally-open (Factory default)

J4302: Termination resistor settings for GYRO-RX / AIS-RX

Termination resistor ON / OFF setting for GYRO-RX and AIS-RX can be changed by TB5 and TB6 on the CCU I/F circuit CMH-2406.

⚠ If the Display Unit has the Serial number of **"LC58298"** or less, this setting is not available.

1. Confirm that the Serial number of the Display unit is greater than **"LC58298".**
   - Stand alone type : The Serial number has been affixed to the front cover of the Display Unit mount kit.
   - Desktop / Flush mount type : The Serial number has been affixed to the top side of NDC-1590 :CCU.



2. Disassemble the CCU. Divide it into Upper base and Bottom base. For further information, see "**Field Service Manual 4.3.3.2 Replacing with the CCU Repair Kit NZC-1590**".
3. Set TB5 and TB6 as follows. They are on the CCU I/F circuit mounted on the Upper base.

Table. 2.5.23 TB5, TB6 settings for CCU I/F circuit CMH-2406

CCU I/F circuit CMH-2406			
J4302	**TB settings**		**Termination resistor**
AIS-RX	TB5	1-2 short circuit	100 ohm termination resistor. (Factory default)
		2-3 short circuit	OFF
GYRO-RX	TB6	1-2 short circuit	100 ohm termination resistor. (Factory default)
		2-3 short circuit	OFF

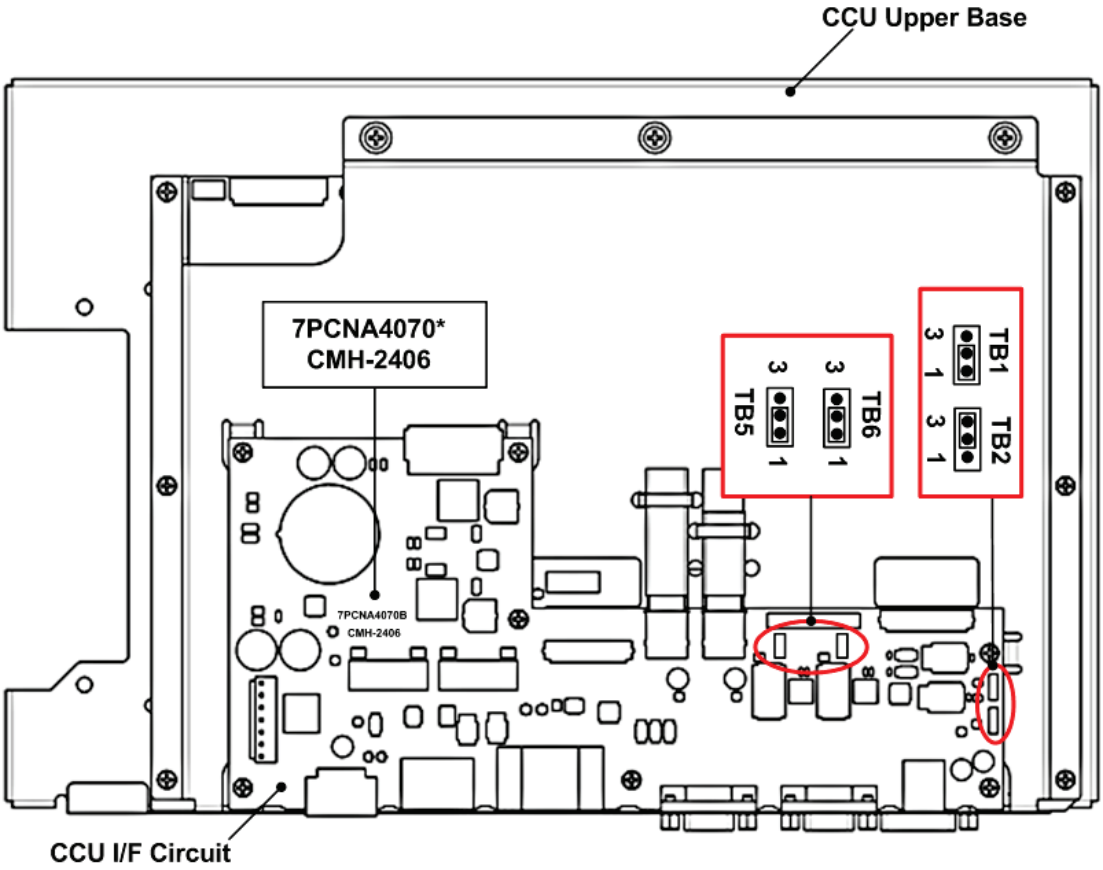


Fig. 2.5.13 CCU Upper base and CCU I/F circuit

⚠ The PCB type code of CMH-2406 which is included to the CCU of **"LC58298"** or less is 7PCNA4070A. Suffix "A" PCB of CMH-2406 is not supported termination resistor ON / OFF setting.

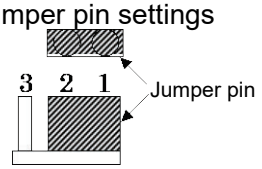
2.5.6. Settings for T/R Control circuit CMC-1205R

[DIP switch types]
- SW1, SW2

[Jumper pin types]
- J92, J93, J95, J96

◎NKE-2254 (25 kW, X-band, 2 units, DC motor)

- Jumper pin settings



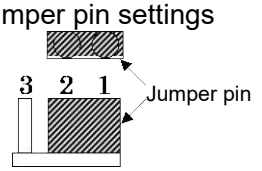
J92,J93,J95,J96: 1-2 short circuit

- DIP switch settings (■ indicates a switch.)



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

- Jumper pin settings



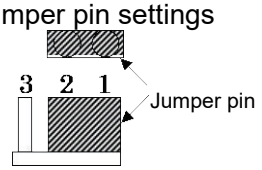
J92,J93,J95,J96: 1-2 short circuit

- DIP switch settings (■ indicates a switch.)



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

- Jumper pin settings



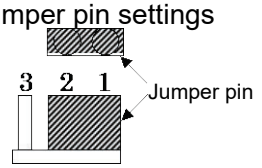
J92,J93,J95,J96: 1-2 short circuit

- DIP switch settings (■ indicates a switch.)



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

- Jumper pin settings



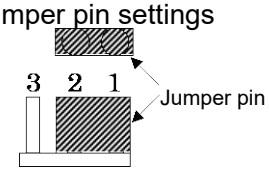
J92,J93,J95,J96: 1-2 short circuit

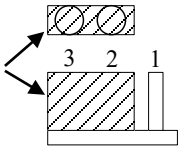
- DIP switch settings (■ indicates a switch.)



◎NTG-3225 (25 kW, X-band, 3 units, AC motor)

- Jumper pin settings





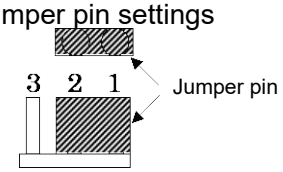
J92,J93 • • 1-2 short circuit J95,J96 • • 2-3 short circuit

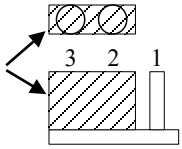
- **DIP switch settings (■ indicates a switch.)**



◎NTG-3230 (30 kW, S-band, 3 units, AC motor)

- Jumper pin settings





J92,J93 • • 1-2 short circuit J95,J96 • • 2-3 short circuit

- **DIP switch settings (■ indicates a switch.)**



2.5.7. Settings for NKE-1632 Scanner Unit

Voltage Selection of Motor Driver Circuit CBD-1949

1. Set JP1 as follows according to your ship's AC voltage.

Table. 2.5.24 JP1 settings for Motor Driver Circuit CBD-1949

Motor Driver Circuit CBD-1949	
JP1 Settings	**Description**
1-2 short circuit	100Vac
2-3 short circuit	220Vac

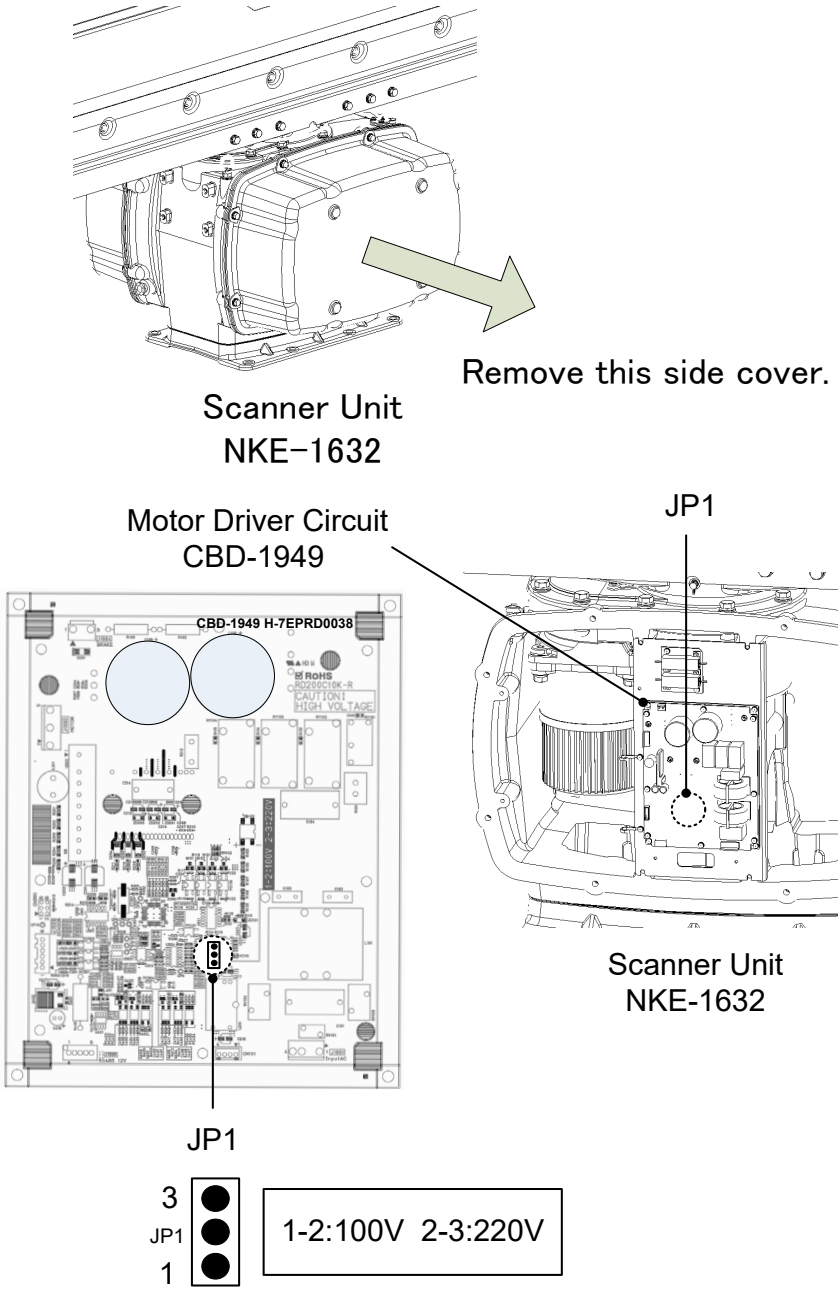


Fig. 2.5.14 Motor Driver Circuit CBD-1949 in NKE-1632

2.5.8. Settings for NKE-2632 Scanner Unit

Voltage Selection of Motor Driver Circuit CBD-1949

3. Set JP1 as follows according to your ship's AC voltage.

Table. 2.5.25 JP1 settings for Motor Driver Circuit CBD-1949

Motor Driver Circuit CBD-1949	
JP1 Settings	**Description**
1-2 short circuit	100Vac
2-3 short circuit	220Vac

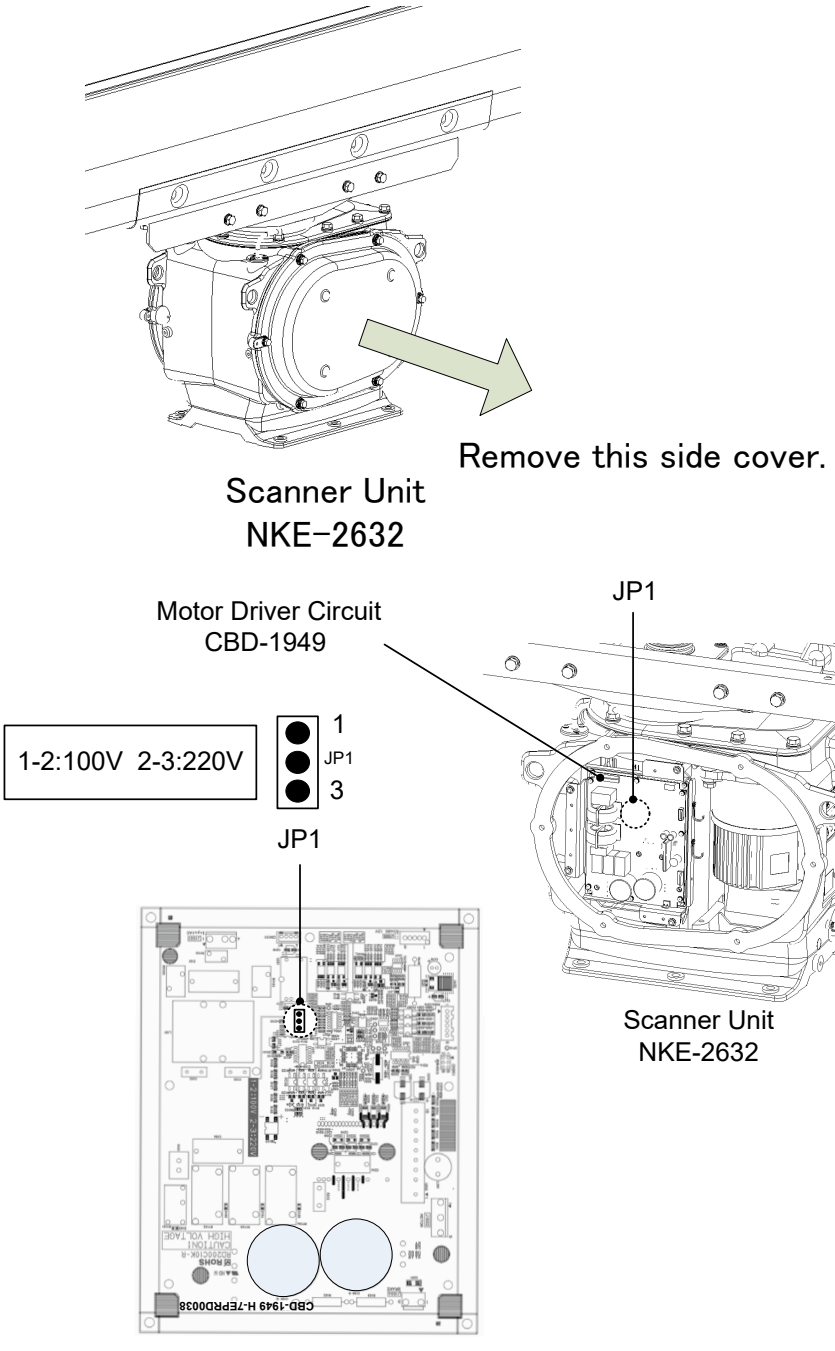


Fig. 2.5.15 Motor Driver Circuit CBD-1949 in NKE-2632

2.5.9. Settings for NKE-2632-H Scanner Unit

Voltage Selection of Motor Driver Circuit CBD-1950

1. Set JP1 as follows according to your ship's AC voltage.

Table. 2.5.26 JP1 settings for Motor Driver Circuit CBD-1950

Motor Driver Circuit CBD-1950	
JP1 Settings	**Description**
1-2 short circuit	100Vac
2-3 short circuit	220Vac

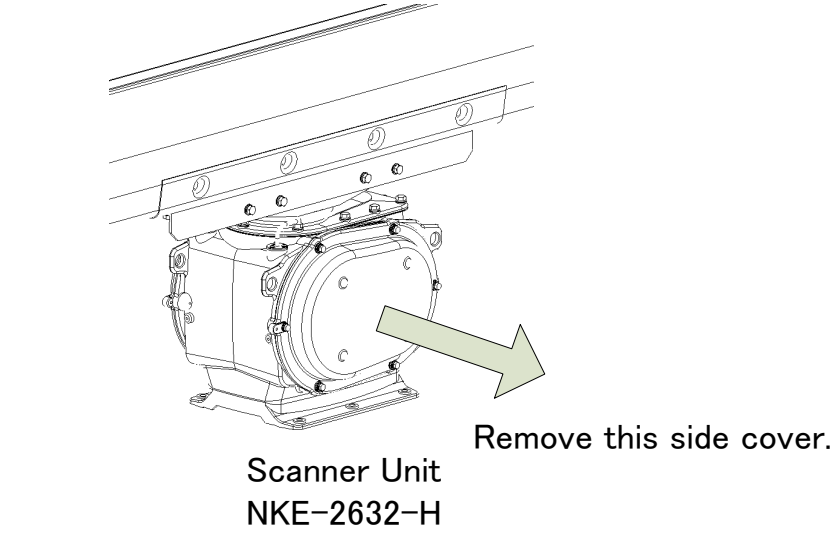


Fig. 2.5.16 Motor Driver Circuit CBD-1950 in NKE-2632-H

2.5.10. Setting for NKE-1696 Scanner Unit

Voltage Selection of Motor Driver Circuit CBD-2400

Set SW301 to all ON and set JP1 as follows according to your ship's AC voltage.

Table. 2.5.27 SW301 and JP1 settings for Motor Driver Circuit CBD-2400

SW301 Settings		JP1 Settings	
SW301-1	ON	1-2 short circuit	100Vac
SW301-1	ON	2-3 short circuit	220Vac
SW301-1	ON		
SW301-1	ON		

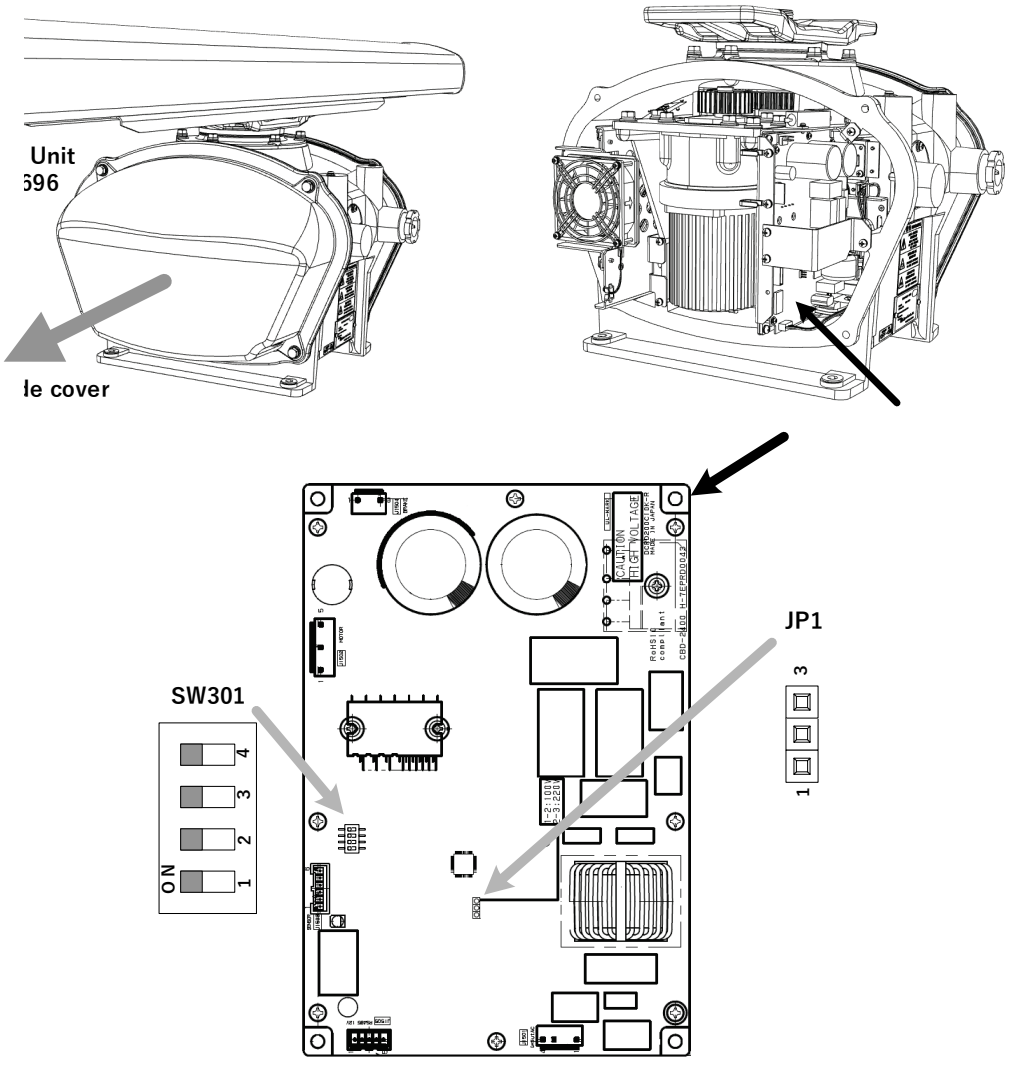


Fig. 2.5-17 Motor Driver Circuit CBD-2400 in NKE-1696

2.5.11. Setting for UPS

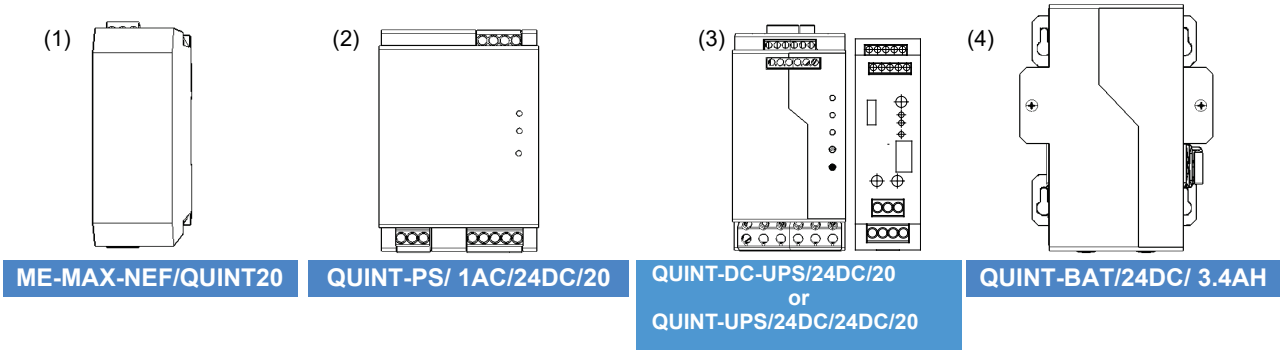


Fig. 2.5.18 UPS components

Setting for QUINT-DC-UPS/24DC/20 or QUINT-UPS/24DC/24DC/20

1. Set Bat-Select rotary switch of QUINT-DC-UPS/24DC/20 to 3.4.

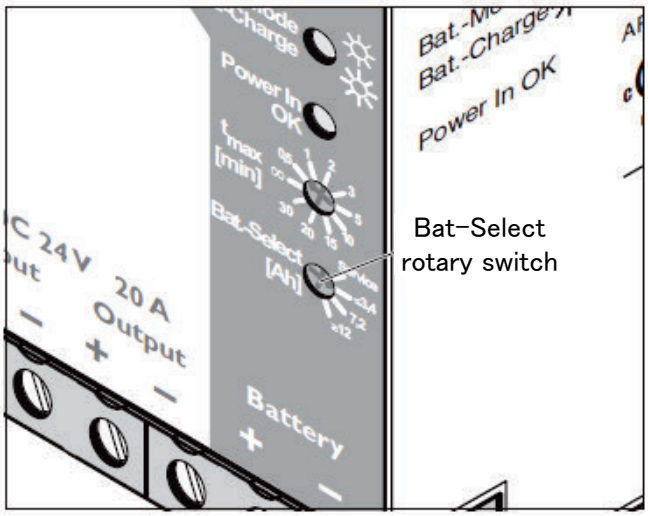
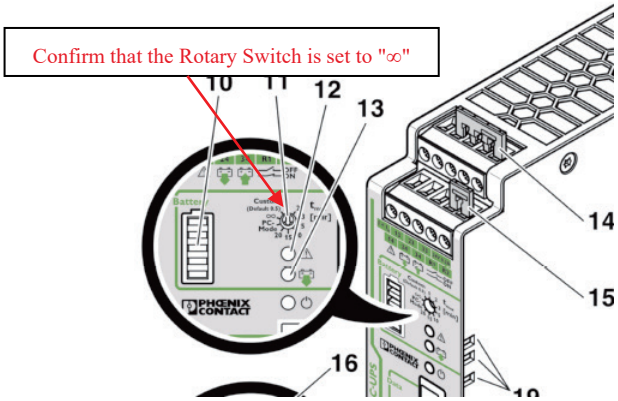


Fig. 2.5.19 QUINT-DC-UPS/24DC/20 Bat-Select rotary switch

For QUINT-UPS/24DC/24DC/20, set Buffer time setting to "∞".



2.5.12. Settings for Interswitch

> ⚠ Since settings have been normally made upon shipment from factory, do not edit them if it is not suggested from JRC office.
> **• It may cause a lower radar system performance.**

4ch Interswitch NQE-3141-4A

Set dip switches SW11, SW12, and SW13 as shown below. For further information, see **Chapter 5 of Installation Manual**

1) SW11 setting (expansion mode, master/slave setting)



Set all OFF.

2) SW12 setting (radar connection setting)

Radar Connection Setting



1	ON	No. 1 display unit connected
	OFF	No. 1 display unit NOT connected
2	ON	No. 1 antenna unit connected
	OFF	No. 1 antenna unit NOT connected
3	ON	No. 2 display unit connected
	OFF	No. 2 display unit NOT connected
4	ON	No. 2 antenna unit connected
	OFF	No. 2 antenna unit NOT connected
5	ON	No. 3 display unit connected
	OFF	No. 3 display unit NOT connected
6	ON	No. 3 antenna unit connected
	OFF	No. 3 antenna unit NOT connected
7	ON	No. 4 display unit connected
	OFF	No. 4 display unit NOT connected
8	ON	No. 4 antenna unit connected
	OFF	No. 4 antenna unit NOT connected

3) SW13 (unused)



Set all OFF

8ch Interswitch NQE-3141-8A

8ch Interswitch has two CCL-304Rs like a two-storied structure. Although dip switches settings are basically the same as the settings shown in above, it is necessary to make settings for each of the two SW12. For further information, see **Chapter 5 of Installation Manual.**

Factory default setting	(bit1-bit2-bit3-bit4)
SW11-upper	OFF-OFF-OFF-ON
SW11-lower	OFF-OFF-ON-ON
SW13-both	OFF-OFF-OFF-OFF

- Setting of upper CCL-304R, SW12 (radar connection setting)



Radar Connection Setting

1	ON	No. 1 display unit connected
	OFF	No. 1 display unit NOT connected
2	ON	No. 1 antenna unit connected
	OFF	No. 1 antenna unit NOT connected
3	ON	No. 2 display unit connected
	OFF	No. 2 display unit NOT connected
4	ON	No. 2 antenna unit connected
	OFF	No. 2 antenna unit NOT connected
5	ON	No. 3 display unit connected
	OFF	No. 3 display unit NOT connected
6	ON	No. 3 antenna unit connected
	OFF	No. 3 antenna unit NOT connected
7	ON	No. 4 display unit connected
	OFF	No. 4 display unit NOT connected
8	ON	No. 4 antenna unit connected
	OFF	No. 4 antenna unit NOT connected

- Setting of lower CCL-304R, SW12 (radar connection setting)



Radar Connection Setting

1	ON	No. 5 display unit connected
	OFF	No. 5 display unit NOT connected
2	ON	No. 5 antenna unit connected
	OFF	No. 5 antenna unit NOT connected
3	ON	No. 6 display unit connected
	OFF	No. 6 display unit NOT connected
4	ON	No. 6 antenna unit connected
	OFF	No. 6 antenna unit NOT connected
5	ON	No. 7 display unit connected
	OFF	No. 7 display unit NOT connected
6	ON	No. 7 antenna unit connected
	OFF	No. 7 antenna unit NOT connected
7	ON	No. 8 display unit connected
	OFF	No. 8 display unit NOT connected
8	ON	No. 8 antenna unit connected
	OFF	No. 8 antenna unit NOT connected

3. Repair Parts

Chapter 3. Repair Parts

3.1 List of Repair Parts

3.1.1 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
NDC-1590/A	Central Control unit	FAN	40,000 hours	7ZYNA4006
NKE-1130	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	S band radar antenna	Motor	10,000 hours	MDBW10823
NTG-3230	S band transceiver	Magnetron	4,000 hours	5VMAA00104
NKE-1125	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	X band radar antenna	Motor	10,000 hours	MDBW10822
NTG-3225	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 magnetron	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	S band Solid state Radar antenna	Motor	10,000 hours	MDBW10823
		FAN	100,000 hours	109L0912S410
NKE-2632	S band Solid state radar antenna	Motor	10,000 hours	MDBW10823
		FAN	100,000 hours	109L0912S410
NKE-2632-H	S band Solid state radar	Motor	10,000 hours	MDBW10967
		FAN	100,000 hours	109L0912S410

Part type	Name	Part name	Life expectancy	Replacement kit type
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	7BFRD0013

3.1.2 Spares

List of Fuses

Name	Unit Name	Location	Qty	Specification	Type (Code)
Blade Fuse (Auto Fuse)	NBD-913	PSU	2	DC32V 15A	1015(5ZFCK00008)
Blade (mini) Fuse (Auto Fuse)	NQE-1143	JB	1	DC32V 15A	1215(5ZFCK00017)
Blade (mini) Fuse (Auto Fuse)			2	DC32V 3A	1203(5ZFCK00016)
Glass Fuse			4	250V 0.5A	MF51NR 250V 0.5 (5ZFGD00019)

3.1.3 Special Parts

NKE-1125, NKE-2254

Corresponding model: JMR-9225-6X/9X/6XH
JMR-7225-6X/9X/6XH

List of Special Parts of NKE-1125/2254

Parts No.	Name	Type	Manufacture	Location	Code
V101	Magnetron	CMG-347	New JRC	Scanner Unit	CMG347
A101/A102	Circulator	NJC3901M	New JRC	Scanner Unit	5AJBV00007
A103	Dummy	NJC4002	New JRC	Scanner Unit	5ANDF00001
A104	Filter	NJC9952	New JRC	Scanner Unit	5AWAX00002
A301	Diode Limiter	NJS6930	New JRC	Scanner Unit	5ATBT00006

NTG-3225

Corresponding model: JMR-9225-7X3/9X3
JMR-7225-7X3/9X3

List of Special Parts of NTG-3225

Parts No.	Name	Type	Manufacture	Location	Code
V101	Magnetron	CMG-347	New JRC	Transmitter Receiver Unit	CMG347
A101/A102	Circulator	NJC3901M	New JRC	Transmitter Receiver Unit	5AJBV00007
A103	Dummy	NJC4002	New JRC	Transmitter Receiver Unit	5ANDF00001
A104	Filter	NJC9952	New JRC	Transmitter Receiver Unit	5AWAX00002
A301	Diode Limiter	NJS6930	New JRC	Transmitter Receiver Unit	5ATBT00006
A302	PIN Attenuator	NJS6926	New JRC	Transmitter Receiver Unit	5ATBT00007

NKE-1130

Corresponding model: JMR-9230-S
JMR-7230-S

List of Special Parts of NKE-1130

Parts No.	Name	Type	Manufacture	Location	Code
V101	Magnetron	CMG-348	New JRC	Scanner Unit	CMG348
A101	Circulator	NJC3316	New JRC	Scanner Unit	5AJBV00008
A301	Diode Limiter	NJS6318	New JRC	Scanner Unit	5ATBT00005

NTG-3230

Corresponding model: JMR-9230-S3
JMR-7230-S3

List of Special Parts of NTG-3230

Parts No.	Name	Type	Manufacture	Location	Code
V101	Magnetron	CMG-348	New JRC	Transmitter Receiver Unit	CMG348
A101	Circulator	NJC3317	New JRC	Transmitter Receiver Unit	5AJBV00009
A301	TR Limiter	TL378A	New JRC	Transmitter Receiver Unit	5VLAA00037

NKE-2103-6, NKE-2103-6HS

Corresponding model: JMR-9210-6X/6XH
JMR-7210-6X/6XH

List of Special Parts of NKE-2103-6/6HS

Parts No.	Name	Type	Manufacture	Location	Code
V101	Magnetron	MAF1565N	New JRC	Scanner Unit	5VMAA00102
A101/A102	Circulator	FCX68R	Orient Microwave	Scanner Unit	5AJIX00027
A103	Dummy	NJC4002	New JRC	Scanner Unit	5ANDF00001
A104	Filter	NJC9952	New JRC	Scanner Unit	5AWAX00002
A301	Diode Limiter	NJS6930	New JRC	Scanner Unit	5ATBT00006

NKE-1696

Corresponding model: JMR-9296-6X/9X
JMR-7296-6X/9X

List of Special Parts of NKE-1696

部品番号	品名	型名	メーカ	使用箇所	コード
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

3.1.4 Circuit blocks

NKE-1125

Corresponding model: JMR-9225-6X/9X
JMR-7225-6X/9X

Circuit blocks of NKE-1125

Circuit Block	Type	Remarks
GEARED MOTOR	MDBW10822*	For 100 / 220VAC
ENCODER	CHT-71*	
MOTOR DRIVER CIRCUIT	H-7EPRD0034*	For 220VAC
MOTOR DRIVER CIRCUIT	H-7EPRD0035*	For 100VAC
BRAKE CIRCUIT	CFA-253	
BRAKE CONTROL CIRCUIT	CCB-655*	
BRAKE UNIT	NZR-16	Including CFA-259 / 260
PERFORMANCE MONITOR	NJU-85	
T/R CONTROL CIRCUIT	CMC-1205R2	
MODULATOR UNIT	NMA-550-1	Including CPA-264A, CMB-404, and CFR-229. Excluding Magnetron.
MODULATOR CIRCUIT	CPA-264A	
RECEIVER UNIT	NRG-162*	Including CMA-866*
POWER SUPPLY CIRCUIT	CBD-1682A	
RELAY FILTER CIRCUIT	CSC-656	
FAN	H-7BFRD0002*	

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

NKE-1129

Corresponding model: JMR-9225-7X3/9X3
JMR-7225-7X3/9X3

Circuit blocks of NKE-1129

Circuit Block	Type	Remarks
GEARED MOTOR	MDBW10822*	For 100/220VAC
ENCODER	CHT-71*1	
MOTOR DRIVER CIRCUIT	H-7EPRD0034*	For 220VAC
MOTOR DRIVER CIRCUIT	H-7EPRD0035*	For 100VAC
BRAKE CIRCUIT	CFA-253	
BRAKE CONTROL CIRCUIT	CCB-655*	
BRAKE UNIT	NZR-15	Including CFA-259/260
PERFORMANCE MONITOR	NJU-85	

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

NTG-3225

Corresponding model: JMR-9225-7X3/9X3
JMR-7225-7X3/9X3

Circuit blocks of NTG-3225

Circuit Block	Type	Remarks
T/R CONTROL CIRCUIT	CMC-1205R2	
MODULATOR UNIT	NMA-552-1	Including CPA-264A, CMB-405, and CFR-229. Excluding Magnetron.
MODULATOR CIRCUIT	CPA-264A	
RECEIVER UNIT	NRG-162*3	Including CMA-866*3
POWER SUPPLY CIRCUIT	CBD-1682A	
RELAY FILTER CIRCUIT	CSC-656	

NKE-1130

Corresponding model: JMR-9230-S
JMR-7230-S

Circuit blocks of NKE-1130

Circuit Block	Type	Remarks
GEARED MOTOR	MDBW10823*	For 100/220VAC
ENCODER	CHT-71*	
MOTOR DRIVER CIRCUIT	H-7EPRD0034*	For 220VAC
MOTOR DRIVER CIRCUIT	H-7EPRD0035*	For 100VAC
BRAKE CIRCUIT	CFA-225	
BRAKE CONTROL CIRCUIT	CCB-655*	
BRAKE UNIT	NZR-17	Including CFA-261 / 262
PERFORMANCE MONITOR	NJU-84	
T/R CONTROL CIRCUIT	CMC-1205R2	
MODULATOR UNIT	NMA-551-1	Including CPA-264A, CMB-406, and CFR-229. Excluding Magnetron
MODULATOR CIRCUIT	CPA-264A	
RECEIVER UNIT	NRG-229	Including CAF-595 / CAE-499.
POWER SUPPLY CIRCUIT	CBD-1682A	
RELAY FILTER CIRCUIT	CSC-656	
FAN	H-7BFRD0002	

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

NKE-1139

Corresponding model: JMR-9230-S3
JMR-7230-S3

Circuit blocks of NKE-1139

Circuit Block	Type	Remarks
GEARED MOTOR	MDBW10823*	For 100/220VAC
ENCODER	CHT-71*1	
MOTOR DRIVER CIRCUIT	H-7EPRD0034*	For 220VAC
MOTOR DRIVER CIRCUIT	H-7EPRD0035*	For 100VAC
BRAKE CIRCUIT	CFA-255	
BRAKE CONTROL CIRCUIT	CCB-655*	
BRAKE UNIT	NZR-17	Including CFA-261 / 262
PERFORMANCE MONITOR	NJU-84	

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

NTG-3230

Corresponding model: JMR-9230-S3
JMR-7230-S3

Circuit blocks of NTG-3230

Circuit Block	Type	Remarks
T/R CONTROL CIRCUIT	CMC-1205R2	
MODULATOR UNIT	NMA-553-1	Including CPA-264A, CMB-407, and CFR-229. Excluding Magnetron.
MODULATOR CIRCUIT	CPA-264A	
RECEIVER UNIT	NRG-229	
POWER SUPPLY CIRCUIT	CBD-1682A	
RELAY FILTER CIRCUIT	CSC-656	

NKE-2254

Corresponding model: JMR-9225-6XH
JMR-7225-6XH

Circuit blocks of NKE-2254

Circuit Block	Type	Remarks
GEARED MOTOR	H-7BDRD0045A	DC Brushless
ENCODER	CHT-71*	
MOTOR DRIVER CIRCUIT	CBD-1779	
BRAKE CIRCUIT	CFA-257	
PERFORMANCE MONITOR	NJU-85	
HEATER CONTROLL CIRCUIT	CHG-216	Option（100VAC）
POWER SUPPLY CIRCUIT	CBD-1682A	
T/R CONTROL CIRCUIT	CMC-1205R2	
MODULATOR UNIT	NMA-550-1	Including CPA-264A, CMB-404, CFR-229. Excluding Magnetron.
MODULATOR CIRCUIT	CPA-264A	
RECEIVER UNIT	NRG-162*	Including CMA-866*.
FAN	H-7BFRD0002	

NKE-2103, NKE-2103-HS

Corresponding model: JMR-9210-6X/6XH
JMR-7210-6X/6XH

Circuit blocks of NKE-2103, NKE-2103-HS

Circuit Block	Type	Remarks
GEARED MOTOR	H-7BDRD0048*	DC Brushless (Common with HS)
RECEIVER MODULATOR CIRCUIT	NZK-2103	Including the CME-363A, NRG-610A, internal harness
POWER SUPPLY CIRCUIT	CBD-1783	
ENCODER	CHT-71*	
MOTOR CONTROL POWER SUPPLY	CBD-1779	
BRAKE CIRCUIT	CFA-252	
PERFORMANCE MONITOR	NJU-85	
FAN	H-7BFRD0002	

NKE-1632

Corresponding model: JMR-9272-S
JMR-7272-S

Circuit blocks of NKE-1632

Circuit Block	Type	Remarks
TRX MODULE	CMN-797	
RADAR PROCESS UNIT	NDC-4920	
POWER SUPPLY / INTERFACE CIRCUIT	CMP-493	
ENCORDER	CHT-85	
FAN MOTOR	NZF-100	9LG0912S4005
MOTOR DRIVER	CBD-1949	
MOTOR	MDBW10823	

NKE-2632

Corresponding model: JMR-9282-S
JMR-7282-S

Circuit blocks of NKE-2632

Circuit Block	Type	Remarks
TRX MODULE	CMN-797	
RADAR PROCESS UNIT	NDC-4920	
POWER SUPPLY / INTERFACE CIRCUIT	CMP-493	
ENCORDER	CHT-85	
FAN MOTOR	NZF-100	9LG0912S4005
MOTOR DRIVER	CBD-1949	
MOTOR	MDBW10823	

NKE-2632-H

Corresponding model: JMR-9282-SH
JMR-7282-SH

Circuit blocks of NKE-2632-H

Circuit Block	Type	Remarks
TRX MODULE	CMN-797	
RADAR PROCESS UNIT	NDC-4920	
POWER SUPPLY / INTERFACE CIRCUIT	CMP-493	
ENCORDER	CHT-85	
FAN MOTOR	NZF-100	9LG0912S4005
MOTOR DRIVER	CBD-1950	
MOTOR	MDBW10967	

NKE-1696

Corresponding model: JMR-9296-6X/9X
JMR-7296-6X/9X

Circuit blocks of NKE-1696

Circuit Block	Type	Remarks
PA MODULE	CAH-1696	
TRX MODULE	CMN-897	
RADAR PROCESS UNIT	NDC-4921	
POWER SUPPLY / INTERFACE CIRCUIT	CMP-503	
ENCORDER	CHT-85*	
FAN for Processor	109L0912S410	
FAN for Amplifier	7BFRD0013	
MOTOR DRIVER	CBD-2400	
MOTOR	MDBW10822*	

* indicates a revision such as A and B.

Display Unit

Corresponding model: JMR-92xx / JMR-72xx
JAN-92xx / JAN-72xx

Circuit blocks of Display Unit

Circuit Block	Type	Remarks
Monitor Unit	NWZ-208	26inch
26 inch MNU Replacement FAN kit	H-7ZYNA4005	Included in NWZ-208
Monitor Unit	NWZ-207	19inch
19 inch MNU Replacement FAN kit	H-7ZYNA4004	Included in NWZ-207
Monitor Unit	NWZ-214	19inch
19 inch MNU Replacement FAN kit	H-7BFRD0008	Included in NWZ-214
Power supply Unit	NBD-913	
PSU Replacement FAN kit	H-7ZYNA4007	Included in NBD-913
Central Control Unit	NDC-1590/A	
SSD 256GB	CDD-753	
DVD drive	CDD-754	Included in NDC-1590
CCU Replacement FAN kit	H-7ZYNA4006	
CCU Repair kit	NZC-1590/A	
Trackball Operation Unit	NCE-5605	
Trackball	CCK-1060	Included in 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	Included in NCE-5625
Option Keyboard	CCK-1061	
Knob dia. 38mm	MPHD30460	
Knob dia. 22mm	MPHD30459	
Screw cover (L)	MTV305169	
Screw cover (U)	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 Unit	NQA-2443/A	

3.2 Exploded view drawings

NKE-2103

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
1	Radiator Assy.	MDNAX5041	NAX-16B-6	NAX-16B-6
1-1	Radiator Assy.	MDNAX5041		
1-2	Bolts	BRTG07249		M10X35SUS S-cort
1-3	Spring Washers	BRTG00404		SW10 SUS
1-4	Washers	MTL315466		
2	Support Assy.	MPGK31182		
2-1	Antenna Support	MTC301684		
2-2	Slide Plate	MTT309252		
2-3	Waterproof Ring	ＭＴ Ｔ309256A		
2-4	O-Ring	BRPK00054		P42
3	Upper Housing Assy.	MPBX44085		
3-1	Upper Housing	MTC301682		
3-2	V-Ring	BRPK00189		V-100A
3-3	Liquid-Tight Cable Clamps	BRBP06738		OA-W1611EC1-BB
4	Drive Assy.	MPGK31181		
4-1	Main Shaft	MTC301685		
4-2	Main Gear	MTG300511		
4-3	Gear	MTG300424A		
4-4	Bracket	MTC301655		
4-5	Key	MTL325003		
4-6	Spacer 1	MTL325004		
4-7	Spacer 2	MTL325005		
4-8	Bearing	BRGK05420		6011ZZ
4-9	Bearing	BRGK05409		6009ZZ
4-10	Retaining Ring Type-C	BRTG05289		HC75 SK5
4-11	Bearing Nut	BRTG06929		AN09
4-12	Cross-recessed Head Screw	BSNC03010B		NC3X8Bs
5	Rotary Joint	MPAB31563		
6	Motor	H-7BDRD00048	7BDRD00048	CBP-202

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
7	Wave Guide Unit	MPAB31564		
7-1	Wave Guide	MTM301722A		
7-2	Flange	MTM301843		
7-3	Push Plate	MTB366792A		
7-4	Bolts	BRTG08900		M4X25 SUS SW W
8	Encoder Assy.	MPEM30205		
8-1	Encoder	MDMW11070	CHT-71A	
8-2	Gear	MTT006909B		
8-3	Turn-Stopper	MTD001842		
9	Lower Housing Assy.	MPBX44086A		
9-1	Lower Housing	MTC301683		
9-2	Packing	MTT312329		
9-3	Breathing Cap	MTV302550		
9-4	Packing	MTT305919A		
9-5	Switch Cover	MPPK00925A		
9-6	Cable Push Plate	MTB366112		
9-7	Cable Clamp	BRBP00009		
9-8	Cross-recessed Head Screw	BSNK04010B		NK4X10Bs
9-9	Cross-recessed Head Screw	BSNC04010B		NC4X10Bs
9-10	Cross-recessed Head Screw	BSNB05010B		NB5X10Bs
10	Transceiver Assy.	MDNZT5023		NZT-2103
10-1	Main Chassis	MPBX44420		
10-2	Wave Guide Circuit	MPAB31606		
10-2-1	CIR-Attachment	MTB389799		
10-2-2	Receiver Unit	MDNRG5093	NRG-610	NRG-610
10-2-3	Diode Limiter	5ATBT00006		NJS6930
10-2-4	Circulator	5AJIX00027		FCX68R
10-2-5	Filter	5AWAX00002		NJC-9952
10-2-6	Guide Plate	MTL326122		
10-2-7	Dummy Load	5ANDF00001		NJC4002
10-2-8	Spacer	MTL318403		
10-2-9	MG-PIN	MTL325492		
10-2-11	Bolts	BRTG07397		M4X12 SW SUS304
10-2-12	Cross-recessed Head Screw	BRTG07156		M4X70 Bs
10-2-13	Cross-recessed Head Screw	BSNC04010B		NC4X10Bs
10-2-14	Spring Washers	BSSW04000S		SW4

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
10-2-15	Washers	BSFW04000B		W4Bs
10-3	Modulator Unit	MPBX44290	CME-363	
10-4	Power Supply Unit	MPBX44291	CBD-1783	
10-5	Motor Control PC	MDBW10832	CBD-1779	CBD-1779
10-6	Magnetron	5VMAA00102	5VMAA00102	MAF1565N
10-7	Resistors	-		CFA-252
10-8	Filter PC	-		CFR-234
10-9	Cover	MTB389805		
10-10	Nut Plate	MTB388518		
10-11	Connection Plate	MTB388903		
10-12	Motor Cover	MTB391765		
10-13	Cross-recessed Head Screw	BSNB04012B		NB4X12Bs
10-14	Cross-recessed Head Screw	BSNC04010B		NC4X10Bs
10-15	Cross-recessed Head Screw	BSNC04016B		NC4X16Bs
10-16	Cross-recessed Head Screw	BSNC03008B		NC3X8Bs
11	Encoder Plate	MTB388510A		
12	Stay	MPDM30321		
13	Grand-Cable	H-7ZCRD1504		
14	Shaft	MTL325006		
15	Bolts	MTL006545A		M8X35 Machining
16	Spring Washers	BRTG00747		SW8 SUS
17	Washers	BRTG00224		W8
18	O-Ring	BRPK00027		P7
19	Clamp Gland	MPTG30399		
20	Cover	BRTG01414		
21	Gasket	MTT308695A		
22	Washers	BRTG00883		
25	Corted Bolts	BRTG09192		M8X20 SUS304 corted

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
26	Sealing Washers	BRTG06850		SUSW8S1
27	Hex-Head Setscrew	BRTG1030G		M4X0.7X6 SUS304
28	Bolts	BRTG09297		M8X25SFESWWZMC4RBU
29	Bolts	BRTG09296		M6X70FESWWZMC4RBU
30	Cross-recessed Head Screw	BSNC04025B		NC4X25Bs
31	Bolts	BRTG06852		M4X12 SW W SUS304
32	Bolts	BRTG09004		M5X16 SW W SUS304
33	Cross-recessed Head Screw	BSNB05010B		NB5X10Bs
34	Cross-recessed Head Screw	BSNB04012B		NB4X12Bs
35	Cross-recessed Head Screw	BSNC04010B		NC4X10Bs
36	Cross-recessed Head Screw	BSNC03008B		NC3X8Bs

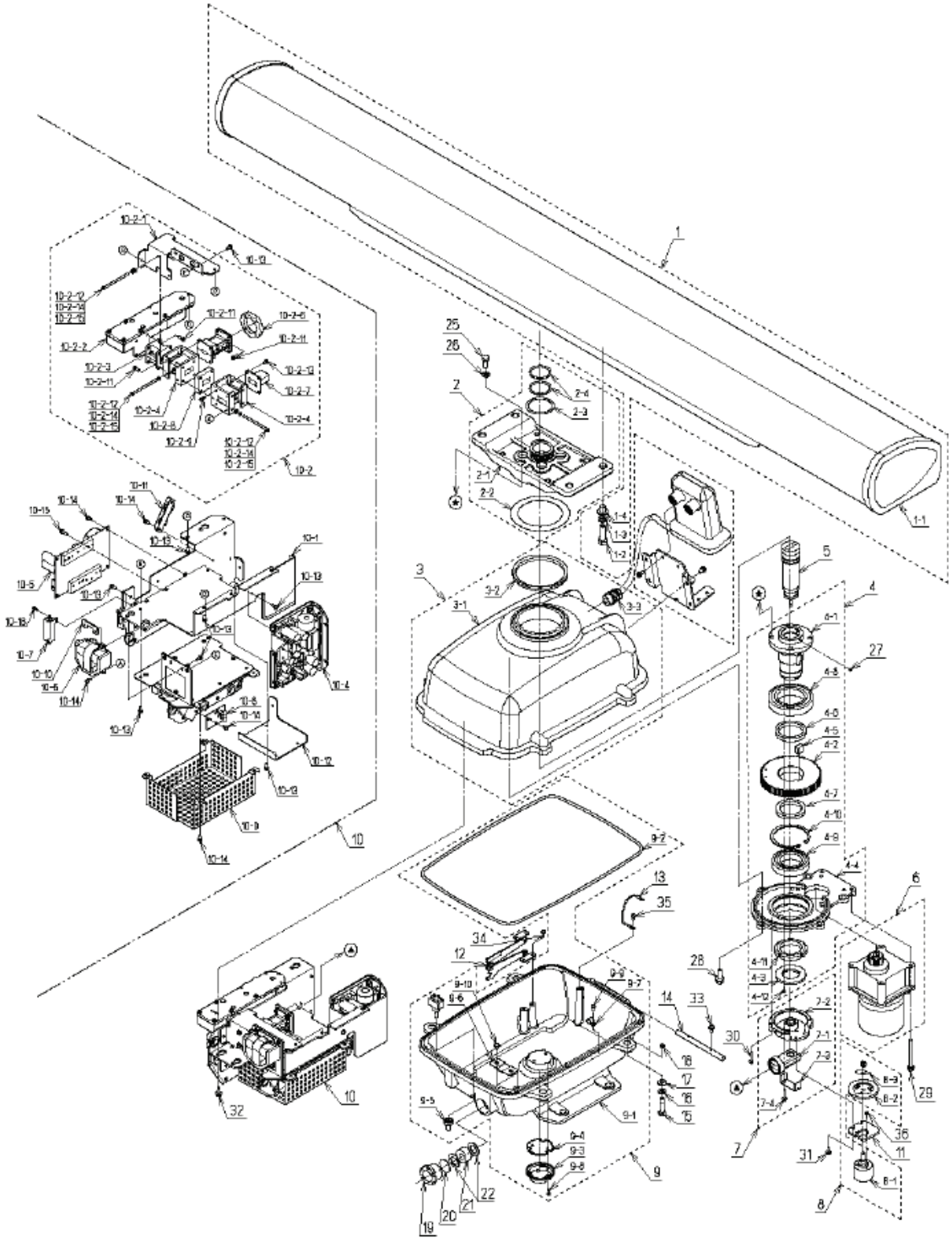


Fig. 3.2.1 Exploded view of NKE-2103

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
1	Radiator Assy.		NAX-16B-6	6ft
1-1	Bolt	BRTG07249		HEX10X35 SUS304
1-2	Spring Washer	BRTG00404		SW10
1-3	Washer	MTL315466		
2	Support Assy.	MPBX40223		
2-1	Antenna Support	MTC301223A		
2-2	Slide Plate	MTT309252		
2-3	O-Ring	BRPK00054		P42 ID41.7 D3.5
3	Housing Assy.			
3-1	Housing	MTC301727		
3-2	Sleev	MTL317432		
3-3	Breathing Cap	MTT309253		
3-4	Upset Bolt	BRTG09305		M5X12 FF ZMC4RBU
3-5	Toggle Switch	MDLW11931		CSD-654
3-6	Cover for SW	MPPK00925A		
3-7	Cover	MTB389969		
3-8	Cover	MTB389970		
3-9	NK5X10Bs	BSNK05010B		
3-10	NK5X12Bs	BSNK05012B		
4	Cover Assy.	MPBX44875		
4-1	Cover	MTC301729		
4-2	Packing	MTV303883		
4-3	Bolt	MPTG31381		
4-5	Spring Washer	BRTG00747		M8SUS304 3.2X2
4-4	Washer	BRTG00224		M8 SUS304
4-6	Sealing Washer	BRTG01826		M8 SUS
5	Drive Assy.	MPGK30895C		
5-1	Flange	MTC301224A		
5-2	Main Shaft	MTH300568A		
5-3	Main Gear	MTG300423A		
5-4	Gear	MTG300424		
5-5	Spacer	MTB366794A		
5-6	Key	MTL317433		

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
5-7	Bearing	BRGK05410		6012ZZ CM/5K
5-8	Bearing	BRGK05409		6009ZZ CM/5K
5-9	Retaining Ring-C Type	BRTG06164		
5-10	Roling Bearing Washer	BRTG07261		AW10X ID50
5-11	O-Ring	BRPK05043		G155
5-12	Roling Bearing Locknut	BSAN10000S		AN10 M50X1.5
6	V-Ring	BRPK00189		V-100A
7	Bolt	BRTG07268		M8X25 TI
8	Spring Washer	BRTG07270		M8 TI
9	Washer	BRTG07267		M8 TI
10	Bolt	BRTG06849		M8X23 SUS304
11	Rotary Joint Assy.	MPAB31188		
12	Wave Guide	MPAB31207A		
13	Encoder Assy.	MPEM30202		
13-1	Encoder	MDMW11068	CHT-71A	CHT-71
13-2	Spur Gear	MTT006909B		
13-3	Click	MTD001842		
13-4	Plate Encoder Mounting	MTB366793A		
13-5	Upset Bolt	BRTG06852		M4X12SWWSUS304
14	Motor Assy.	-		
14-1	Motor	-	7BDRD0045A	
14-2	-	-		
14-3	Flange for Motor	MTC301225		
14-4	Bolt	BRTG09307		M8X30 SW W SUS304
14-5	Bolt	BRTG09306		M8X20 ZMC FESWW
15	Clump Gland Assy.(A30)	MPJD30062A		
15-1	Clump Gland	MPTG31572A		
15-2	Gasket	BRPK00108		
15-3	Washer	BRTG01246		30B AL
15-4	Cover	BRTG01415		30 AL
16	Clump Gland Assy.(A25)	MPJD30063A		
16-1	Clump Gland	MPTG31573A		
16-2	Gasket	BRPK00134		A25a
16-3	Washer	BRTG00883		25A AL
16-4	Cover	BRTG01414		25 AL
17	Heat radiation Board	MPBC43035		

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
18	Power Supply Unit	MPBX44439		
18-1	Chassis for Power Supply	MPBX44440		
18-2	Power Supply PC	MDBW10837		CBD-1682A
19	-	-		
20	Motor Control Assy.	MPBX44318A		
20-1	Chassis for Control	MPBX44319		
20-2	Motor Power Supply PC	MDBW10832		CBD-1779
21	Tranceiver Assy.	MDNZT5024A		NZT-1125
21-1	Modulator Unit	MDNMA5077A		NMA-550-1
21-2	Main Chassis	MPBX44445		
21-3	Cover Assy.(L)	MPBX44446		
21-4	Cover Assy.（S）	MPBX44447		
21-5	Modulator PC	MDLW11930	CPA-264 (MDLW11927)	CPA-264
21-6	Magnetoron	-	5VMAA00106	
21-7	Pulse Transformer	-		
21-8	Flame	MPBC43040		
21-9	Holding Plate	MTB389330		
21-10	Circulator	-		
21-11	Diord Limiter	-		
21-12	Wave Guide	MPAB31622		
21-13	Guide Plate	MTL318911A		
21-14	Spacer	MTL318403		
21-15	Spurious Filter	-		NJC9952
21-16	Dummy Load	-		NJC4002
21-17	TR-Control PC	-	CMC-1205R	CMC-1205R
21-18	Receiver Assy.	MDNRG5094A	NRG-162A	NRG-162A
21-19	Nut Plate	MTB389894		
21-20	FAN	MPEM30151		
21-21	Cross-Recessed Head Screw	BSNC04030B		
21-22	Bolt	BRTG07502		M5X16 SW W SUS304
21-23	O-Ring	BRPK00019		
21-24	Bolt	BRTG07397		M4X12 SW SUS304
21-25	Cross-recessed Head Screw	BRTG05659		NK4X0.7X65Bs
22	Performance Monitor Unit	-	NJU-85	NJU-85
23	PM Adapter	MPBC43041A		

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
24	Neck Heator kit	MDMW11067A		(CHG-216)
24-1	Neck Heator Unit	-		
24-2	Plate Clamp	MTB374149		
24-3	Plate Clamp	MTB374150		
24-4	Terminal Board for heater	-		
25	Cross-recessed Head Screw	BSNC04010B		M4X10 SW LW
26	Cross-recessed Head Screw	BSNC04016B		M4X16 SW LW

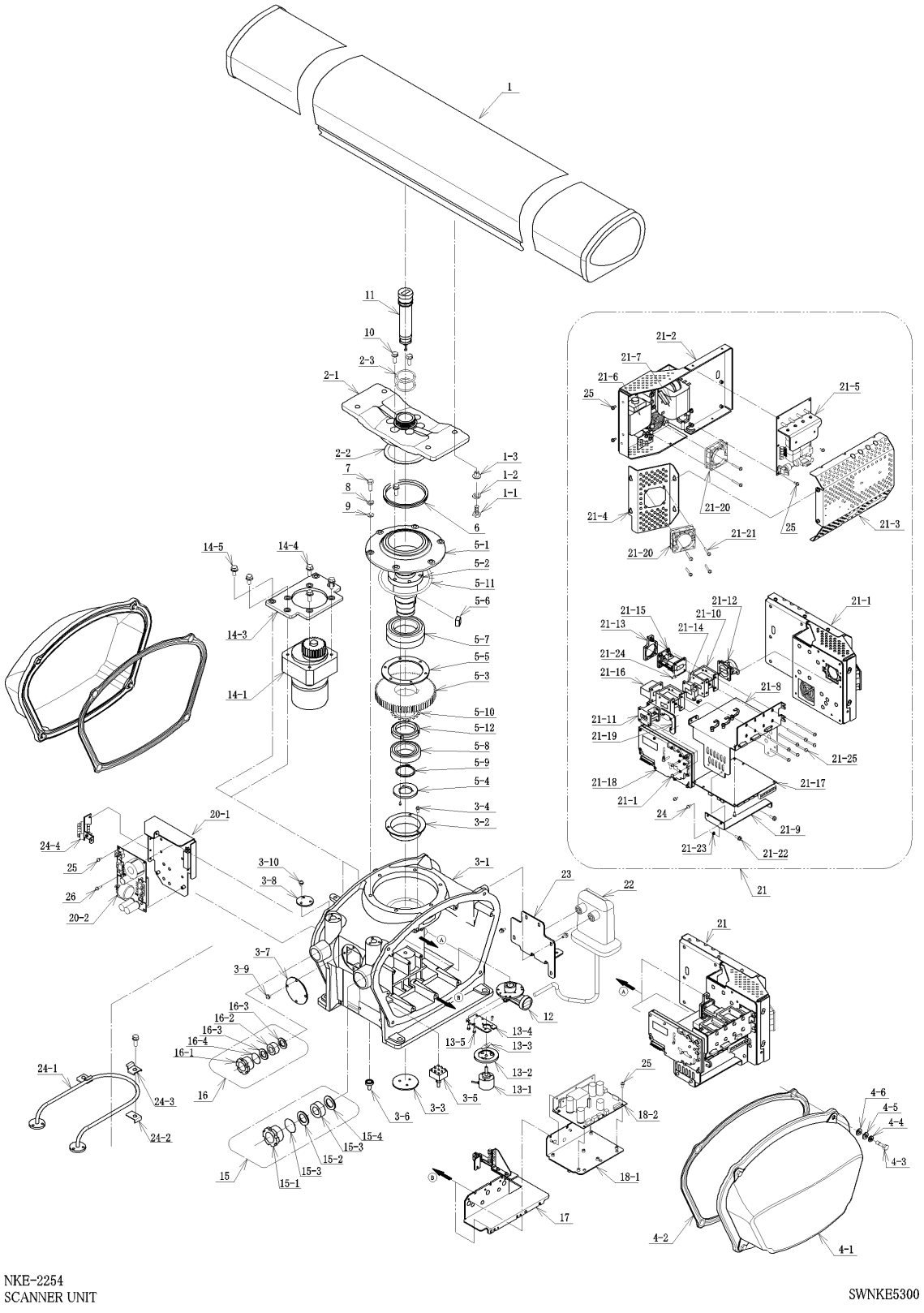


Fig. 3.2.2 Exploded view of NKE-2254

NKE-1125

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
1	Radiator Assy.		NAX-16B	9ft/7ft/6ft
1-1	Bolt	BRTG07249		HEX10X35 SUS304
1-2	Spring Washer	BRTG00404		SW10
1-3	Washer	MTL315466		
2	Support Assy.	MPBX40223		
2-1	Antenna Support	MTC301223A		
2-2	Slide Plate	MTT309252		
2-3	O-Ring	BRPK00054		P42 ID41.7 D3.5
3	Housing Assy.			
3-1	Housing	MTC301727		
3-2	Sleev	MTL317432		
3-3	Breathing Cap	MTT309253		
3-4	Upset Bolt	BRTG09305		M5X12 FFZMC4RBU
3-5	Toggle Switch	MDLW11931		CSD-654
3-6	Cover for SW	MPPK00925A		
3-7	Cover	MTB389969		
3-8	Cover	MTB389970		
3-9	NK5X10Bs	BSNK05010B		
3-10	NK5X12Bs	BSNK05012B		
4	Cover Assy.	MPBX44875		
4-1	Cover	MTC301729		
4-2	Packing	MTV303883		
4-3	Bolt	MPTG31381		
4-5	Spring Washer	BRTG00747		M8SUS304 3.2X2
4-4	Washer	BRTG00224		M8 SUS304
4-6	Sealing Washer	BRTG01826		M8 SUS
5	Drive Assy.	MPGK30895C		
5-1	Flange	MTC301224A		
5-2	Main Shaft	MTH300568A		
5-3	Main Gear	MTG300423A		
5-4	Gear	MTG300424		
5-5	Spacer	MTB366794A		

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
5-6	Key	MTL317433		
5-7	Bearing	BRGK05410		6012ZZ CM/5K
5-8	Bearing	BRGK05409		6009ZZ CM/5K
5-9	Retaining Ring-C Type	BRTG06164		
5-10	Roling Bearing Washer	BRTG07261		AW10X ID50
5-11	O-Ring	BRPK05043		G155
5-12	Roling Bearing Locknut	BSAN10000S		AN10 M50X1.5
6	V-Ring	BRPK00189		V-100A
7	Bolt	BRTG07268		M8X25 TI
8	Spring Washer	BRTG07270		M8 TI
9	Washer	BRTG07267		M8 TI
10	Bolt	BRTG06849		M8X23 SUS304
11	Rotary Joint Assy.	MPAB31188		
12	Wave Guide	MPAB31207A		
13	Encoder Assy.	MPEM30202		
13-1	Encoder	MDMW11068	CHT-71A	CHT-71A
13-2	Spur Gear	MTT006909B		
13-3	Click	MTD001842		
13-4	Plate Encoder Mounting	MTB366793A		
13-5	Upset Bolt	BRTG06852		M4X12SWWSUS304
14	Motor Assy.	-		
14-1	Motor	MPEM30201	MDBW10822	CBP-203
14-2	Spur Gear	MTG300425		
14-3	Flange for Motor	MTC301225		
14-4	Bolt	BRTG09307		M8X30SWWSUS304
14-5	Bolt	BRTG09306		M8X20 SWWFEZMC
15	Clump Gland Assy.(A30)	MPJD30062A		
15-1	Clump Gland	MPTG31572A		
15-2	Gasket	BRPK00108		
15-3	Washer	BRTG01246		30B AL
15-4	Cover	BRTG01415		30 AL
16	Clump Gland Assy.(A25)	MPJD30063A		
16-1	Clump Gland	MPTG31573A		
16-2	Gasket	BRPK00134		A25a
16-3	Washer	BRTG00883		25A AL
16-4	Cover	BRTG01414		25 AL

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
17	Heat radiation Board	MPBC43035		
18	Power Supply Unit	MPBX44439		
18-1	Chassis for Power Supply	MPBX44440		
18-2	Power Supply PC	MDBW10837	CBD-1682A	CBD-1682A
19	Plate for Terminal Board	MTB389888		
19-1	Plate	MTB389888		
19-2	Terminal Board	-		
20	Motor Control Assy.	MPBX45038		
20-1	Chassis for Control	MPBX45039		
20-2A	Motor Driver for 100V	-	7EPRD0035	CBD-2001
20-2B	Motor Driver for 220V	-	7EPRD0034	CBD-2000
20-3	Relay PC	-	CSC-656	CSC-632
20-4	Brake control PC	-	CCB-655	CCB-655
21	Tranceiver Assy.	MDNZT5024A		NZT-1125
21-1	Modulator Unit	MDNMA5077A		NMA-550-1
21-2	Main Chassis	MPBX44445		
21-3	Cover Assy.(L)	MPBX44446		
21-4	Cover Assy.（S）	MPBX44447		
21-5	Modulator PC	MDLW11930	CPA-264 (MDLW11927)	CPA-264
21-6	Magnetoron	-	5VMAA00106	
21-7	Pulse Transformer	-		
21-8	Flame	MPBC43040		
21-9	Holding Plate	MTB389330		
21-10	Circulator	-		
21-11	Diord Limiter	-		
21-12	Wave Guide	MPAB31622		
21-13	Guide Plate	MTL318911A		
21-14	Spacer	MTL318403		
21-15	Spurious Filter	-		NJC9952
21-16	Dummy Load	-		NJC4002
21-17	TR-Control PC	-	CMC-1205R	CMC-1205R
21-18	Receiver Assy.	MDNRG5094A	NRG-162A	NRG-162A
21-19	Nut Plate	MTB389894		
21-20	FAN	MPEM30151		
21-21	Cross-Recessed Head Screw	BSNC04030B		

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
21-22	Bolt	BRTG07502		M5X16SWW SUS304
21-23	O-Ring	BRPK00019		
21-24	Bolt	BRTG07397		M4X12 SW SUS304
21-25	Cross-recessed Head Screw	BRTG05659		NK4X0.7X65Bs
22	Performance Monitor Unit	-	NJU-85	NJU-85
23	PM Adapter	MPBC43041A		
24	Neck Heator kit	MDMW11067A		(CHG-216)
24-1	Neck Heator Unit	-		
24-2	Plate Clamp	MTB374149		
24-3	Plate Clamp	MTB374150		
24-4	Terminal Board for heater	-		
25	Cross-recessed Head Screw	BSNC04010B		M4X10 SW LW
26	Cross-recessed Head Screw	BSNC04008B		M4X8 SW LW

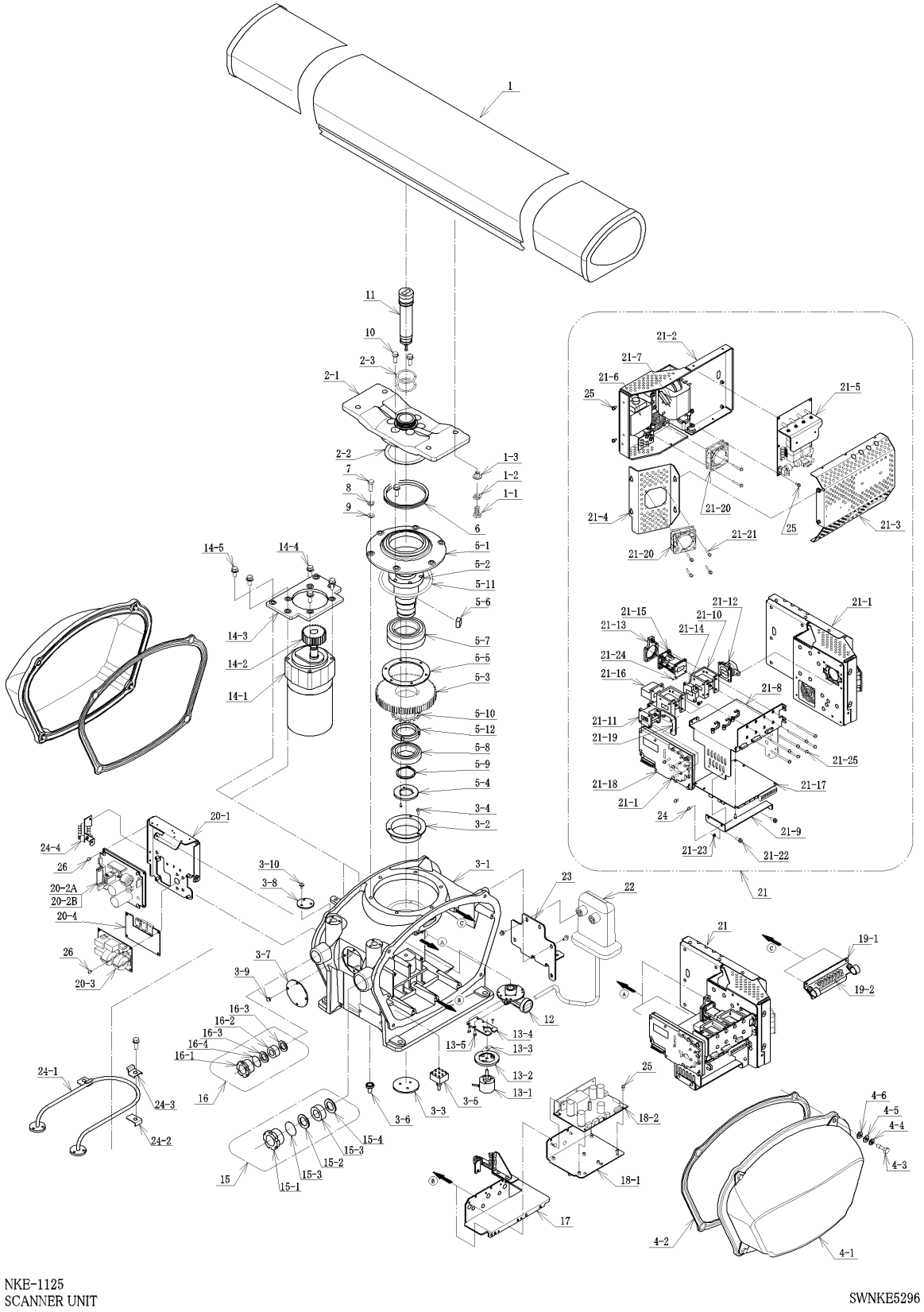


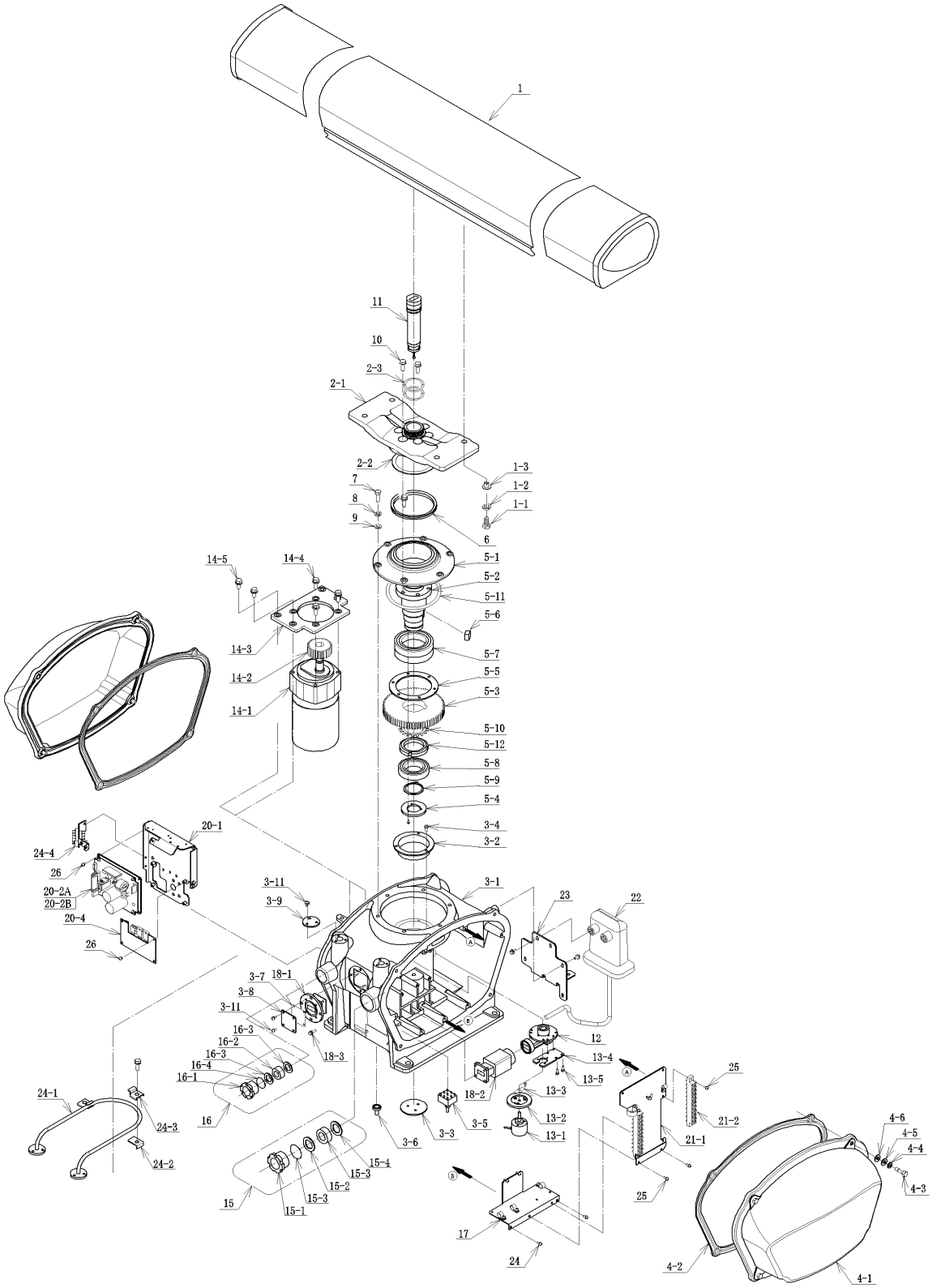
Fig. 3.2.3 Exploded view of NKE-1125

NKE-1129

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
1	Radiator Assy.		NAX-16B	9ft/7ft
1-1	Bolt	BRTG07249		HEX10X35 SUS304
1-2	Spring Washer	BRTG00404		SW10
1-3	Washer	MTL315466		
2	Support Assy.	MPBX40223		
2-1	Antenna Support	MTC301223A		
2-2	Slide Plate	MTT309252		
2-3	O-Ring	BRPK00054		P42 ID41.7 D3.5
3	Housing Assy.			
3-1	Housing	MTC301727		
3-2	Sleev	MTL317432		
3-3	Breathing Cap	MTT309253		
3-4	Upset Bolt	BRTG09305		M5X12 FF ZMC4RBU
3-5	Toggle Switch	MDLW11931		CSD-654
3-6	Cover for SW	MPPK00925A		
3-7	Cover	MTB389969		
3-8	Cover	MTB389970		
3-9	NK5X10Bs	BSNK05010B		
3-10	NK5X12Bs	BSNK05012B		
4	Cover Assy.	MPBX44875		
4-1	Cover	MTC301729		
4-2	Packing	MTV303883		
4-3	Bolt	MPTG31381		
4-5	Spring Washer	BRTG00747		M8SUS304 3.2X2
4-4	Washer	BRTG00224		M8 SUS304
4-6	Sealing Washer	BRTG01826		M8 SUS
5	Drive Assy.	MPGK30895C		
5-1	Flange	MTC301224A		
5-2	Main Shaft	MTH300568A		
5-3	Main Gear	MTG300423A		
5-4	Gear	MTG300424		
5-5	Spacer	MTB366794A		
5-6	Key	MTL317433		

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
5-7	Bearing	BRGK05410		6012ZZ CM/5K
5-8	Bearing	BRGK05409		6009ZZ CM/5K
5-9	Retaining Ring-C Type	BRTG06164		
5-10	Roling Bearing Washer	BRTG07261		AW10X ID50
5-11	O-Ring	BRPK05043		G155
5-12	Roling Bearing Locknut	BSAN10000S		AN10 M50X1.5
6	V-Ring	BRPK00189		V-100A
7	Bolt	BRTG07268		M8X25 TI
8	Spring Washer	BRTG07270		M8 TI
9	Washer	BRTG07267		M8 TI
10	Bolt	BRTG06849		M8X23 SUS304
11	Rotary Joint Assy.	MPAB31188		
12	Wave Guide	MPAB31207A		
13	Encoder Assy.	MPEM30202		
13-1	Encoder	MDMW11068	CHT-71A	CHT-71
13-2	Spur Gear	MTT006909B		
13-3	Click	MTD001842		
13-4	Plate Encoder Mounting	MTB366793A		
13-5	Upset Bolt	BRTG06852		M4X12 SW W SUS304
14	Motor Assy.	-		
14-1	Motor	MPEM30201	MDBW10822	CBP-203
14-2	Spur Gear	MTG300425		
14-3	Flange for Motor	MTC301225		
14-4	Bolt	BRTG09307		M8X30 SW W SUS304
14-5	Bolt	BRTG09306		M8X20SWWFE ZMC
15	Clump Gland Assy.(A30)	MPJD30062A		
15-1	Clump Gland	MPTG31572A		
15-2	Gasket	BRPK00108		
15-3	Washer	BRTG01246		30B AL
15-4	Cover	BRTG01415		30 AL

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
16	Clump Gland Assy.(A25)	MPJD30063A		
16-1	Clump Gland	MPTG31573A		
16-2	Gasket	BRPK00134		A25a
16-3	Washer	BRTG00883		25A AL
16-4	Cover	BRTG01414		25 AL
17	Bracket	MPBC38474		
18	Connection Waveguide	MPAB31264A		
18-1	Waveguide Transformer	MTM301850		
18-2	Waveguide(for 3unit)	MTM301571A		
19	-	-		
20	Motor Control Assy.	MPBX45041		
20-1	Chassis for Control	MPBX45039		
20-2A	Motor Driver	-	7EPRD0035	CBD-2001
20-2B	Motor Driver	-	7EPRD0034	CBD-2000
20-3	-	-		
20-4	Brake control PC	-	CCB-655	CCB-655
21	Terminal Board Assy.	MPTE30368A		
21-1	Chassis for Terminal Board	MPBC38473A		
21-2	Terminal Board	MPTE00753		
22	Performance Monitor Unit	-	NJU-85	NJU-85
23	PM Adapter	MPBC43041A		
24	Neck Heator kit	MDMW11067A		(CHG-216)
24-1	Neck Heator Unit	-		
24-2	Plate Clamp	MTB374149		
24-3	Plate Clamp	MTB374150		
24-4	Terminal Board for heater	-		
25	Cross-recessed Head Screw	BSNC04010B		M4X10 SW LW
26	Cross-recessed Head Screw	BSNC04008B		M4X8 SW LW



NKE-1129
SCANNER UNIT

SWNKE5298

Fig. 3.2.4 Exploded view of NKE-1129

NKE-1130

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
1	Radiator Assy.	MPAE30494		Sband-12ft
1-1	Bolt	MPTG30317		M10X35SUS
1-2	Spring Washer	BRTG00404		SW10 SUS
1-3	Washer	BRTG00402		W10 SUS
2	Support Assy.	MPGK31208		
2-1	Antenna Support	MTC301654		
2-2	Slide Plate	MTB085860		
2-3	Angle Mounting	MTA301876		
2-4	Flange	MTC301697		
2-5	Plate	MTB388904		
2-6	Bolt	BRTG00413		M10X25SUS
2-7	O-Ring	BRPK00077		
2-8	O-Ring	BRPK00102		
3	Housing Assy.	MPBX44644		
3-1	Housing	MTC301650A		
3-2	Cover	MTB391089		
3-3	Cover	MTB388905		
3-4	Cover	MTB389970		
3-5	Eeybolt	BRTG09377		M10X25SUS
3-6	Bolt	BRTG00876		HEX6X12SUS_SW_W
4	Cover Assy.	MPBX44206		
4-1	Cover	MTC301653A		
4-2	Packing	MTV304394		
4-3	Bolt	MPTG31381		B8X30
4-4	Spring Washer	BRTG00224		SW8 SUS304
4-5	Washer	BRTG00747		W8 SUS304
4-6	Sealing Washer	BRTG01826		
5	Drive Assy.	MPGK31207		
5-1	Flange	MTC301652A		
5-2	Main Shaft	MTH300660		
5-3	Main Gear	MTG300493		
5-4	Gear	MTG300424A		
5-5	Spacer	MTL325042		

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
5-6	-	-		
5-7	Key	MTK300651		
5-8	Plate	MTL325041		
5-9	Bearing	BRGK05486		6018ZZCM/5K
5-10	Bearing	BRGK05419		6014ZZCM/5K
5-11	V-Ring	BRPK00337		V-180A
5-12	Bearing case	MTL325043		
5-13	Bolt	BRTG04290		CAP8X30_SCM435
5-14	Roling Bearing Locknut	BSAN13000S		AN13
5-15	Roling Bearing Locknut	BSAN18000S		AN18
5-16	Roling Bearing Washer	BSAW13000S		AW13
5-17	Roling Bearing Washer	BSAW18000S		AW18
5-18	Bolt	BRTG09193		M10X30SUS
6	Rotary Joint Assy.	MPAB31588		
7	Motor Assy.	MDBW10823	MDBW10823	CBP-205
7-1	Motor	-		
7-2	Spur Gear	MTG300142A		
7-3	Bolt	BRTG00752		HEX10X40SUS
8	Turning Switch Assy.	-		
8-1	Cap	MPDM30338		
8-2	Toggle Switch	MPSW30170		CSD-656
8-3	Housing	MTV001589		
8-4	Cover for SW	MPPK00925A		
9	Clump Gland Assy.(A30)	MPJD30062A		
9-1	Clump Gland	MPTG31572A		
9-2	Gasket	BRPK00108		
9-3	Washer	BRTG01246		
9-4	Cover	BRTG01415		
10	Clump Gland Assy.(A25)	MPJD30063A		
10-1	Clump Gland	MPTG31573A		
10-2	Gasket	BRPK00134		
10-3	Washer	BRTG00883		
10-4	Cover	BRTG01414		
11	Encoder Assy.	MPEM30199		
11-1	Encoder	MDMW11068	CHT-71A1	CHT-71A1
11-2	Plate Encoder Mounting	MTB366793A		

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
11-3	Spur Gear	MTT006909B		
11-4	Click	MTD001842		
12	Wave Guide ASSY	MPAB31722		
12-1	Circulator	-		NJS6318
12-2	Spurious Filter	MPAB31663		
12-3	Diord Limiter	-		
12-4	Dummy Load	MPAB31595		
12-5	Plate	MTB391087		
13	Internal unit guide ASSY	MPBP31560		
14	Wave Guide ASSY	MPAB31723A		
15	Power Supply Unit	MPBX44646		
15-1	Chassis for Power Supply	MPBC43418		
15-2	Power Supply PC	MDBW10837A	CBD-1682A	CBD-1682A
16	Modulator Unit	MDNMA5080A		NMA-551-1
16-1	Main Chassis	MPBC43438		
16-2	Modulator PC	MDLW11946	CPA-264 (MDLW11927)	CPA-264
16-3	Magnetoron	-	5VMAA00104	
16-4	Holding Plate for Magnetoron	MPBP31522		
16-5	FAN	-	7BFRD0002	
16-6	Fan guard	-		
16-7	Cross-recessed Head Screw	BSNC04030B		NC4X30Bs
16-8	Cross-recessed Head Screw	BSNB04010B		NC4x10Bs
17	Receiver Assy.	MPBX45031		
17-1	Chassis for Receiver	MPBX45032		
17-2	Receiver	MDNRG5092B	NRG-229	NRG-229
17-3	Chassis for TRCONT	MPBC43420		
17-4	TR-Control PC		CMC-1205R	CMC-1205R
17-5	Terminal Board	MPBC43421		
17-6	Relay PC		CSC-656	CSC-656
17-7	Chassis for Control	MPBX45027		
17-8	Brake control PC		CCB-655	CCB-655
18	Motor Control Assy.	MPBX44651		
18-1	Chassis for Motor Control	MPBX44653		
18-2A	Motor Driver for 100V	-	7PERD0035	CBP-2001
18-2B	Motor Driver for 220V	-	7PERD0034	CBP-2000

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
19	Holding PlateA for Unit	MPBP31565		M6X16SWW SUS304
20	Holding PlateA for Modulator	MTB391101		
21	Holding PlateB for Modulator	MTB391102		
22	Holding PlateB for Receiver	MTB391103		
23	Performance Monitor Unit	-		
23-1	Performance Monitor	-	NJU-84	NJU-84
23-2	Cradle	MTB391104		
23-3	Bolt	BRTG01690		HEX5X12SUS
24	Neck Heater kit	MDMW11048		(CHG-215)
24-1	Neck Heater Unit	-		
24-2	Plate Clamp	MTB388896		
24-3	Plate Clamp	MTB388897		
24-4	Bolt	BRTG00671		HEX6X16SUS

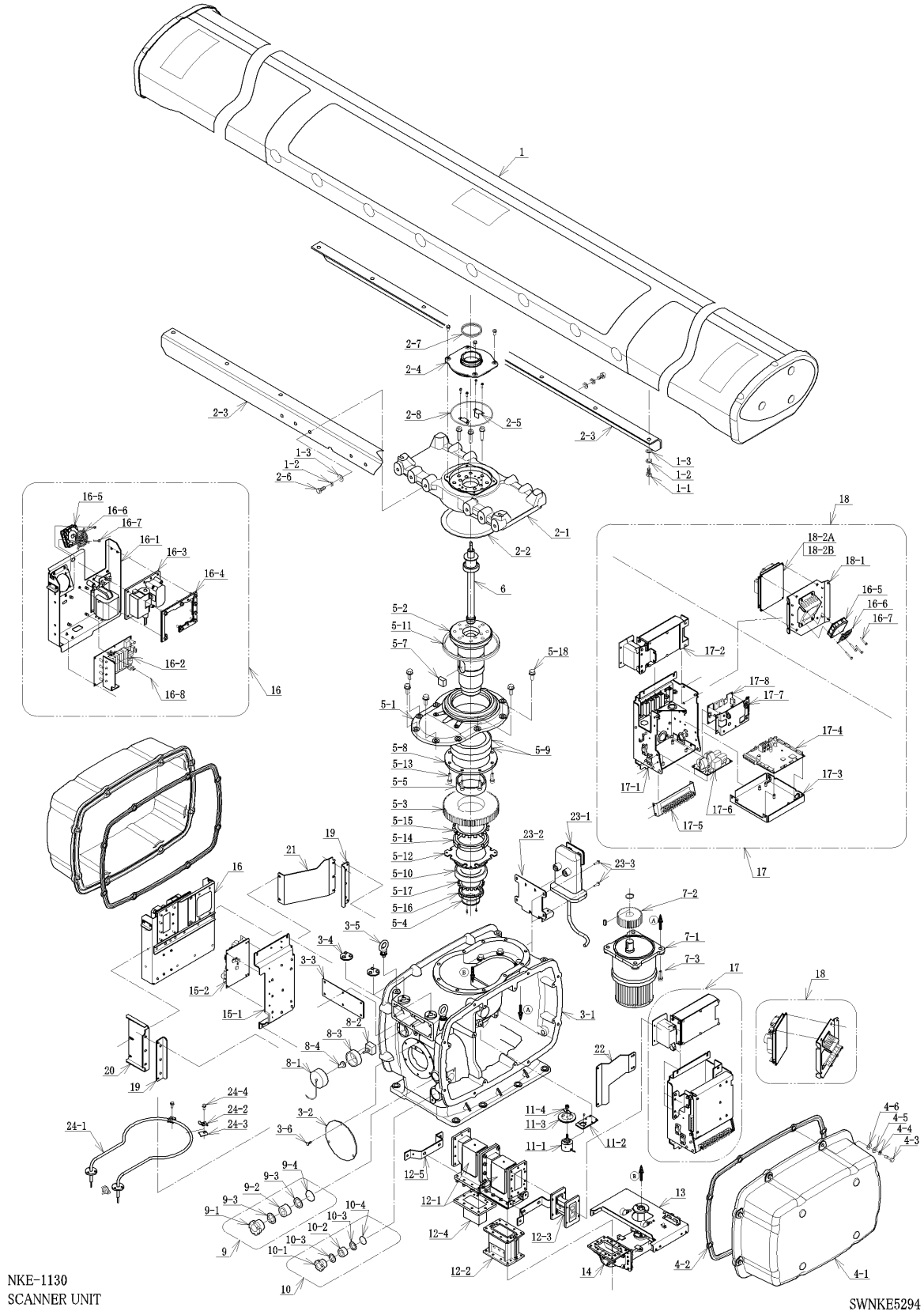


Fig. 3.2.5 Exploded view of NKE-1130

NKE-1139

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
1	Radiator Assy.	MPAE30494		Sband-12ft
1-1	Bolt	MPTG30317		M10X35SUS
1-2	Spring Washer	BRTG00404		SW10 SUS
1-3	Washer	BRTG00402		W10 SUS
2	Support Assy.	MPGK31208		
2-1	Antenna Support	MTC301654		
2-2	Slide Plate	MTB085860		
2-3	Angle Mounting	MTA301876		
2-4	Flange	MTC301697		
2-5	Plate	MTB388904		
2-6	Bolt	BRTG00413		M10X25SUS
2-7	O-Ring	BRPK00077		
2-8	O-Ring	BRPK00102		
3	Housing Assy.	MPBX44644		
3-1	Housing	MTC301650A		
3-2	Cover	MTB391089		
3-3	Cover	MTB388905		
3-4	Cover	MTB389970		
3-5	Eeybolt	BRTG09377		M10X25SUS
3-6	Bolt	BRTG00876		HEX6X12SUS_SW_W
4	Cover Assy.	MPBX44206		
4-1	Cover	MTC301653A		
4-2	Packing	MTV304394		
4-3	Bolt	MPTG31381		B8X30
4-4	Spring Washer	BRTG00224		SW8 SUS304
4-5	Washer	BRTG00747		W8 SUS304
4-6	Sealing Washer	BRTG01826		
5	Drive Assy.	MPGK31207		
5-1	Flange	MTC301652A		
5-2	Main Shaft	MTH300660		
5-3	Main Gear	MTG300493		
5-4	Gear	MTG300424A		
5-5	Spacer	MTL325042		

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
5-6	-	-		
5-7	Key	MTK300651		
5-8	Plate	MTL325041		
5-9	Bearing	BRGK05486		6018ZZCM/5K
5-10	Bearing	BRGK05419		6014ZZCM/5K
5-11	V-Ring	BRPK00337		V-180A
5-12	Bearing case	MTL325043		
5-13	Bolt	BRTG04290		CAP8X30_SCM435
5-14	Roling Bearing Locknut	BSAN13000S		AN13
5-15	Roling Bearing Locknut	BSAN18000S		AN18
5-16	Roling Bearing Washer	BSAW13000S		AW13
5-17	Roling Bearing Washer	BSAW18000S		AW18
5-18	Bolt	BRTG09193		M10X30SUS
6	Rotary Joint Assy.	MPAB31588		
7	Motor Assy.	MDBW10823	MDBW10823	CBP-205
7-1	Motor(AC110V 1φ)	-		
7-2	Spur Gear	MTG300142A		
7-3	Bolt	BRTG00752		HEX10X40SUS
8	Turning Switch Assy.	-		
8-1	Cap	MPDM30338		
8-2	Toggle Switch	MPSW30170		CSD-656
8-3	Housing	MTV001589		
8-4	Cover for SW	MPPK00925A		
9	Clump Gland Assy.(A30)	MPJD30062A		
9-1	Clump Gland	MPTG31572A		
9-2	Gasket	BRPK00108		
9-3	Washer	BRTG01246		
9-4	Cover	BRTG01415		
10	Clump Gland Assy.(A25)	MPJD30063A		
10-1	Clump Gland	MPTG31573A		
10-2	Gasket	BRPK00134		
10-3	Washer	BRTG00883		
10-4	Cover	BRTG01414		
11	Encoder Assy.	MPEM30199		
11-1	Encoder	MDMW11068	CHT-71A1	CHT-71A1
11-2	Plate Encoder Mounting	MTB366793A		

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
11-3	Spur Gear	MTT006909B		
11-4	Click	MTD001842		
14	Wave Guide	MPAB31727		
15	Wave Guide Gland ASSY	MPJD30077		
15-1	Flange	MTC301681		
15-2	Clump Gland	MPTG31993		
15-3	Cover	MTD300791		
15-4	Washer	BRTG01190		
15-5	Gasket	BRPK00013		
15-6	Bolt	BRTG04312		HEX6X20SUS_SW_W
16	Motor Control Assy.	MPBC43925		
16-1	Chassis for Control	MPBC43926		
16-2A	Motor Driver for 100V	-	7PERD0035	CBP-2001
16-2B	Motor Driver for 220V	-	7PERD0034	CBP-2000
16-3	Brake control PC	MPBX45028		
16-4	Brake PC	MPBX45029		
17	Terminal Board Assy.	MPBX44654A		
17-1	Plate for Terminal Board	MTB391106		
17-2	Terminal Board	-		
17-3	Cross-recessedScrew Head	BSNC04020B		
23	Performance Monitor Unit	-		
23-1	Performance Monitor	-	NJU-84	NJU-84
23-2	Cradle	MTB391104		
23-3	Bolt	BRTG01690		HEX5X12SUS
24	Neck Heater kit	MDMW11048		(CHG-215)
24-1	Neck Heater Unit	-		
24-2	Plate Clamp	MTB388896		
24-3	Plate Clamp	MTB388897		
24-4	Bolt	BRTG00671		HEX6X16SUS

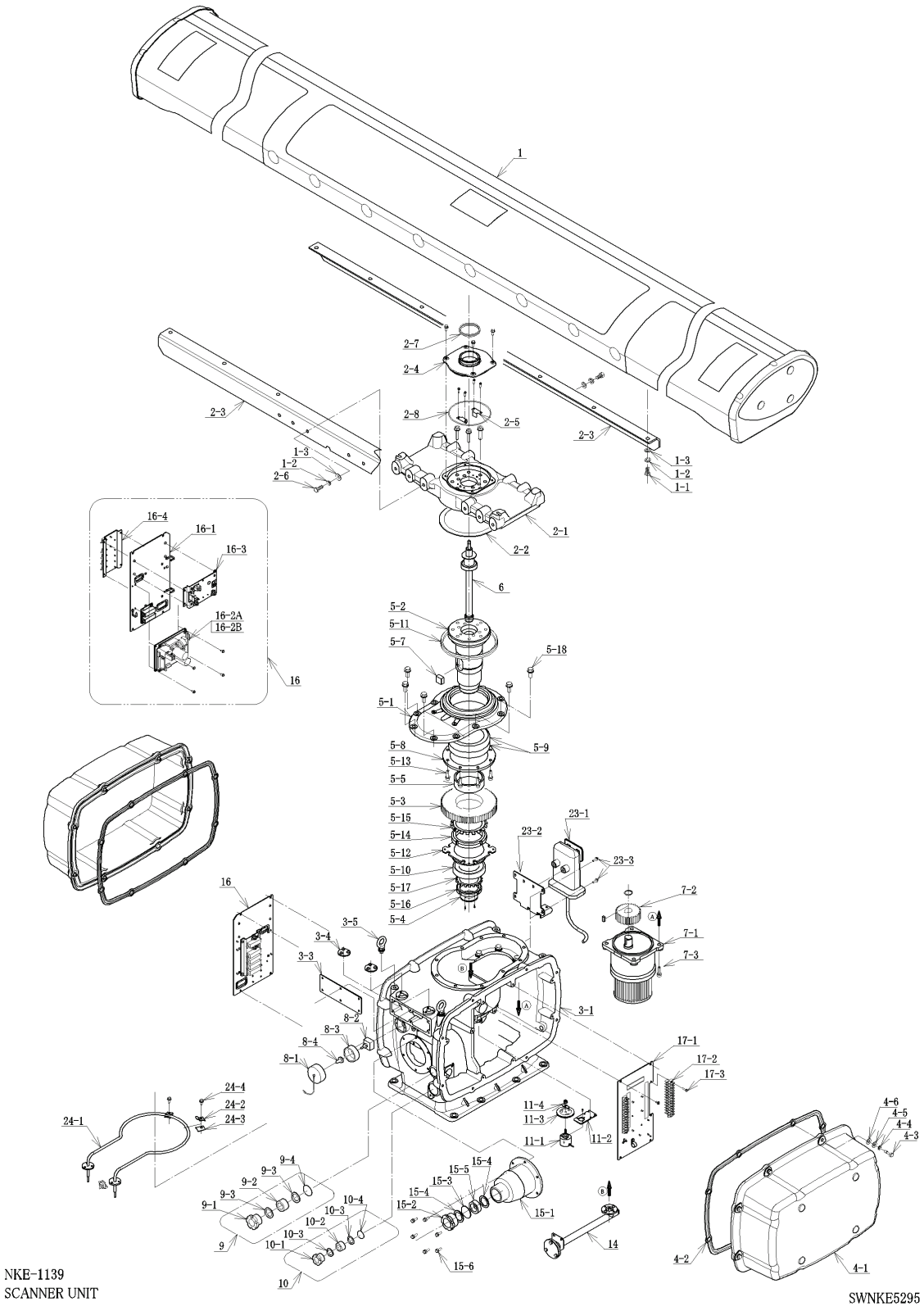


Fig. 3.2.6 Exploded view of NKE-1139

NKE-1632

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
1	Radiator Assy.	MPAE30494	NAX-80	
1-1	Bolt	MPTG30317		M10X35SUS
1-2	Spring Washer	BRTG00404		SW10 SUS
1-3	Washer	BRTG00402		W10 SUS
2	Support Assy.	MPGK31208A		
2-1	Antenna Support	MTC301654		
Angle	Slide Plate	MTB085860		
2-3	Angle Mounting	MTA301876		
2-4	Flange	MTC301697A		
2-5	Plate	MTB388904		
2-6	Bolt	BRTG00413		M10X25SUS
2-7	O-Ring	BRPK00077		
2-8	O-Ring	BRPK00102		
3	Housing Assy.	MPBX45478		
3-1	Housing	MTC301650B		
3-2	Cover	MTB391089		
3-3	-	-		
3-4	Cover	MTB389970		
3-5	Eeybolt	BRTG09377		M10X25SUS
3-6	Bolt	BRTG00876		HEX6X12SUS_SW_W
4	Cover Assy.	MPBX44206A		
4-1	Cover	MTC301653B		
4-2	Packing	MTV304394		
4-3	Bolt	MPTG31381		B8X30
4-4	Spring Washer	BRTG00224		SW8 SUS304
4-5	Washer	BRTG00747		W8 SUS304
4-6	Sealing Washer	BRTG01826		

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
5	Drive Assy.	MPGK31207		
5-1	Flange	MTC301652A		
5-2	Main Shaft	MTH300660		
5-3	Main Gear	MTG300493		
5-4	Gear	MTG300424A		
5-5	Spacer	MTL325042		
5-6	-	-		
5-7	Key	MTK300651		
5-8	Plate	MTL325041		
5-9	Bearing	BRGK05486		6018ZZCM/5K
5-10	Bearing	BRGK05419		6014ZZCM/5K
5-11	V-Ring	BRPK00337		V-180A
5-12	Bearing case	MTL325043		
5-13	Bolt	BRTG04290		CAP8X30_SCM435
5-14	Roling Bearing Locknut	BSAN13000S		AN13
5-15	Roling Bearing Locknut	BSAN18000S		AN18
5-16	Roling Bearing Washer	BSAW13000S		AW13
5-17	Roling Bearing Washer	BSAW18000S		AW18
5-18	Bolt	BRTG09193		M10X30SUS Plating
6	Rotary Joint Assy.	MPAB31588A		
7	Motor Assy.	MDBW10823	MDBW10823	CBP-205
7-1	Motor	-		
7-2	Spur Gear	MTG300142A		
7-3	Bolt	BRTG00752		HEX10X40SUS
8	Turning Switch Assy.	MPSW30204		
8-1	Cap	MPDM30356		
8-2	Toggle Switch	MPSW30204		
8-3	Housing	MTV304855		
8-4	Cover for SW	MPPK00925A		

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
9	Clump Gland Assy.(A30)	MPJD30062A		
9-1	Clump Gland	MPTG31572A		
9-2	Gasket	BRPK00108		
9-3	Washer	BRTG01246		
9-4	Cover	BRTG01415		
10	Clump Gland Assy.(A25)	MPJD30063A		
10-1	Clump Gland	MPTG31573A		
10-2	Gasket	BRPK00134		
10-3	Washer	BRTG00883		
10-4	Cover	BRTG01414		
11	Encoder Assy.	MPEM30264		
11-1	Encoder	MDMW11233		
11-2	Plate Encoder Mounting	MTB366793A		
11-3	Spur Gear	MTT006909B		
11-4	Click	MTD001842		
12	Clump Gland Assy.(A15)	MPJD30067		
12-1	Clump Gland	MPTG31574A		
12-2	Gasket	BRPK00222		
12-3	Washer	BRTG01341		
12-4	Cover	BRTG01402		
13	20D-N Type Connector	MPAB32437		
14	Cable	-		
15	Power supply I/F Unit	MPBX48307		
15-1	Power supply I/F Circuit	-	CMP-493	
15-2	Chassis for Power Supply	MPBC48362		
15-3	Back Cover	MTB407208		

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
16	Transmission and Receiver Unit	MDNZT5034	NZT-1632	
16-1	Signal processing Unit	MDNDC5537	NDC-4920	
16-2	Transmission and Receiver Circuit	MDHW10842	CMN-797	
16-3	Main Chassis	MPBX47975		
16-4	FAN	-		
16-5	Fan Base	MTB407209		
16-6	Cross-recessed Head Screw	BSNC04035B		M4X35Bs_SW_LW
16-7	Cross-recessed Head Screw	BSNC04016B		M4X16Bs_SW_LW
17	Tarminal Board Assy.	MPBP31963		
18	Baseboard	MPBC48375		
19	Motor Control Assy.	MPBX48308		
19-1	Chassis for Motor Control	MPBC48809		
19-2	Motor Driver for 100V	-	CBD-1949	
20	Performance Monitor Unit	-	CAY-77	
20-1	PM Radome	MTV305275		
20-2	PM Packing	MTV305274		
20-3	Cross-recessed Head Screw	BRTG00522		
20-4	Plate	MTB406039		
21	Neck Heater kit	MDMW11243	CHG-235	
21-1	Neck Heater Unit	-		
21-2	Plate Clamp	MTB388896		
21-3	Plate Clamp	MTB388897		
21-4	Bolt	BRTG00671		HEX6X16SUS

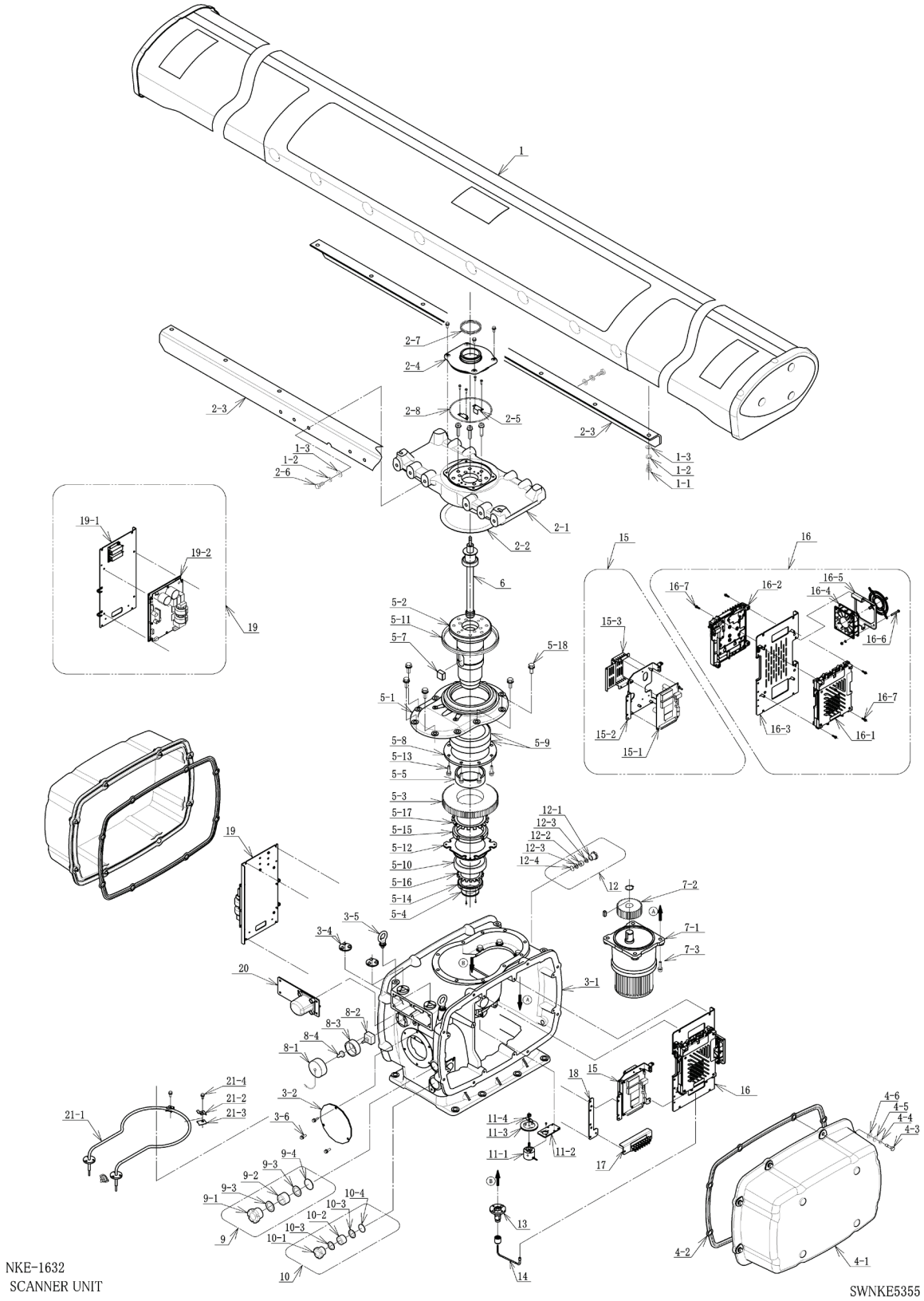


Fig. 3.2.7 Exploded view of NKE-1632

NKE-2632

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
1	Radiator Assy.	MDNAX5078		NAX-110
1-1	Bolt	MPTG01390		M10X30SUS
1-2	Spring Washer	BRTG00404		SW10 SUS
1-3	Washer	BRTG00402		W10 SUS
2	Support Assy.	MPGK31559		
2-1	Antenna Support	MTC302006A		
2-2	Slide Plate	MTT314616		
2-3	Angle Mounting	MTA302014		
2-4	Flange	MTC301697A		
2-5	Plate	MTB402474		
2-6	Bolt	BRTG00413		M10X25SUS
2-7	O-Ring	BRPK00102		
2-8	O-Ring	BRPK00077		
2-9	Bolt	BRTG00671		M6X16SUS
3	Housing Assy.	MPBX48305		
3-1	Housing	MTC302003A		
3-2	-	-		
3-3	-	-		
3-4	Cover	MTB389970		
4	Cover Assy.	MPBX48304		
4-1	Cover	MTC302005A		
4-2	Packing	MTV305276		
4-3	Bolt	MPTG31381		B8X30
4-4	Spring Washer	BRTG00747		SW8 SUS304
4-5	Washer	BRTG00224		W8 SUS304
4-6	Sealing Washer	BRTG01826		

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
5	Drive Assy.	MPGK31557		
5-1	Flange	MTC302004A		
5-2	Main Shaft	MTH300728		
5-3	Main Gear	MTG300550		
5-4	Gear	MTG300424A		
5-5	Spacer	MTL330503		
5-6	Support Ring	MTB402490A		
5-7	Key	MTK300677		
5-8	Plate	MTL330502		
5-9	Bearing	BRGK05419		6014ZZCM/5K
5-10	Bearing	BRGK05420		6011ZZCM/5K
5-11	V-Ring	BRPK05214		V-160A
5-12	Coaxial Flange			MTL330501A
5-13	Bolt	BRTG03882		CAP8X20_SCM435
5-14	Roling Flange Locknut	BSAN14000S		AN14
5-15	Roling Flange Locknut	BSAN11000S		AN11
5-16	Roling Bearing Washer	BSAW14000S		AW14
5-17	Roling Bearing Washer	BSAW11000S		AW11
5-18	Bolt	BRTG09193		M10X30SUS Plating
6	Rotary Joint Assy.	MPAB32497		
7	Motor Assy.	MDBW10823	CBP-205	
7-1	Motor	7BDRD0049		
7-2	Spur Gear	MTG300142A		
7-3	Bolt	BRTG00752		HEX10X40SUS
8	Turning Switch Assy.	MPSW30203		
8-1	Cap	MPDM30357 B		
8-2	Toggle Switch	MPSW30202		
8-3	Housing	MTV304855		
8-4	Cover for SW	MPPK00925A		

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
9	Clump Gland Assy.(A30)	MPJD30062A		
9-1	Clump Gland	MPTG31572A		
9-2	Gasket	BRPK00108		
9-3	Washer	BRTG01246		
9-4	Cover	BRTG01415		
10	Clump Gland Assy.(A25)	MPJD30063A		
10-1	Clump Gland	MPTG31573A		
10-2	Gasket	BRPK00134		
10-3	Washer	BRTG00883		
10-4	Cover	BRTG01414		
11	Encoder Assy.	MPEM30263		
11-1	Encoder	-	CHT-85	
11-2	Plate Encoder Mounting	MTB405539		
11-3	Spur Gear	MTT006909B		
11-4	Click	MTD001842		
12	-	-		
13	20D-N Type Connector	MPAB32436		
14	Cable	-		
15	Power supply I/F Unit	MPBX48307		
15-1	Power supply I/F circuit	-	CMP-493	
15-2	Chassis for Power Supply	MPBC48362		
15-3	Back Cover	MTB407208		
16	Transmission and Receiver Unit	MDNZT5036	NZT-2632	
16-1	Signal processing Unit	MDNDC5537	NDC-4920	
16-2	Transmission and Receiver circuit	MDHW10842	CMN-797	
16-3	Main	Chassis	MPBX48314	
16-4	FAN	-	109L0912S410	
16-5	Fan Base	MTB407209		
16-6	Cross-recessed Head Screw	BSNC04035B		M4X35Bs_SW_LW
16-7	Cross-recessed Head Screw	BSNC04016B		M4X16Bs_SW_LW

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
17	Tarminal Board Assy.	MPBP31963		
18	Base board	MPBC48800		
19	Motor Control Assy.	MPBX48306		
19-1	Chassis for Motor Control	MPBC48799		
19-2	Motor Driver for 100V	-	CBD-1949	
20	Performance Monitor Unit	MPAE30619	CAY-77	
20-1	PM Radpme	MTV305275		
20-2	PM Packing	MTV305274		
20-3	Cross-recessed Head Screw	BRTG00522	M4X12 SUS	
21	Neck Heater kit	MDMW11242	CHG-234	
21-1	Neck Heater Unit	-		
21-2	Plate Clamp	MTB388896		
21-3	Plate Clamp	MTB388897		
21-4	Bolt	BRTG00671	HEX6X16SUS	

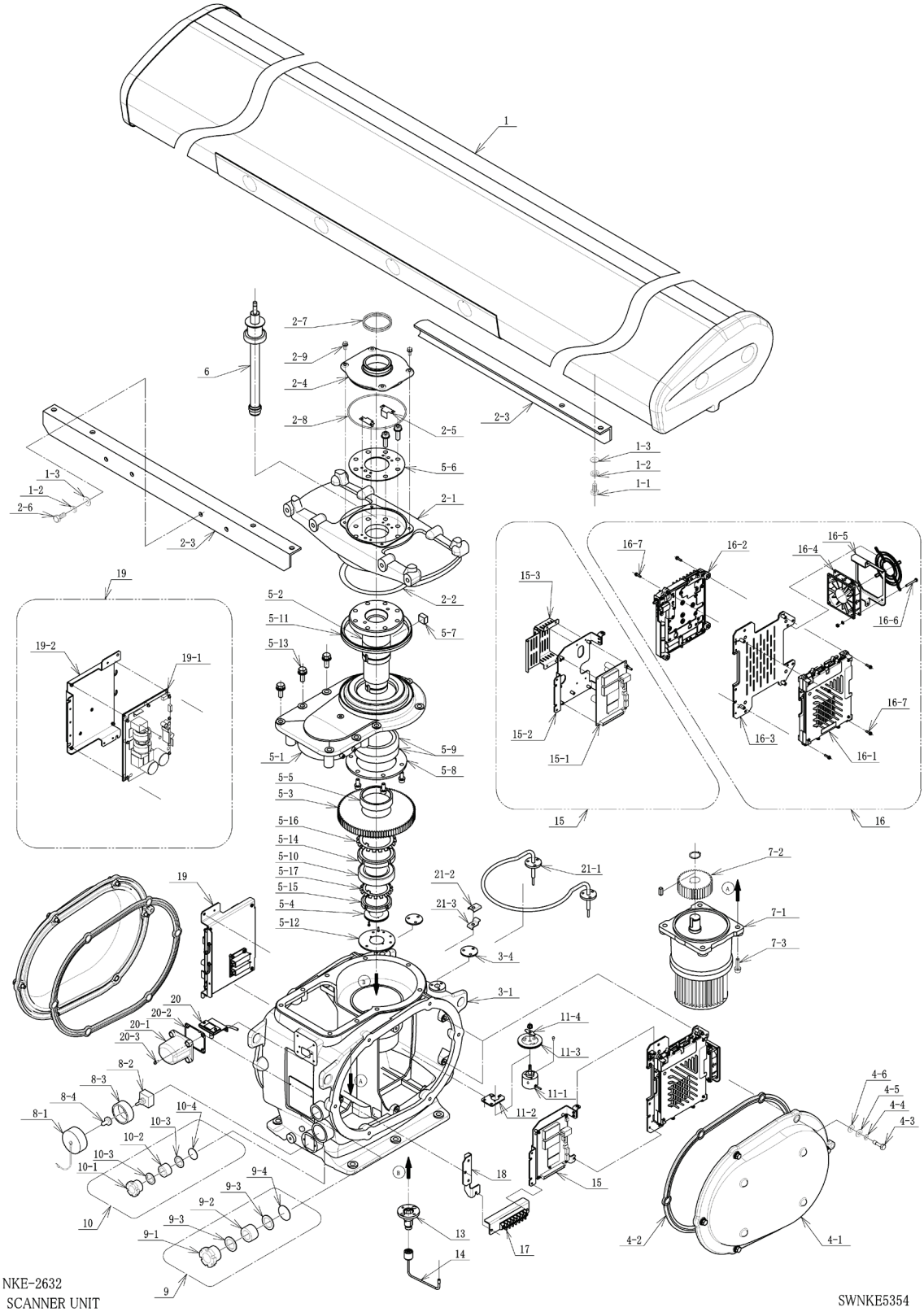


Fig. 3.2.8 Exploded view of NKE-2632

NKE-2632-H

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
1	Radiator Assy.	MDNAX5078	NAX-110	
1-1	Bolt	MPTG01390		M10X30SUS
1-2	Spring Washer	BRTG00404		SW10 SUS
1-3	Washer	BRTG00402		W10 SUS
2	Support Assy.	MPGK31559		
2-1	Antenna Support	MTC302006B		
2-2	Slide Plate	MTT314616		
2-3	Angle Mounting	MTA302014		
2-4	Flange	MTC301697A		
2-5	Plate	MTB402474		
2-6	Bolt	BRTG00413		M10X25SUS
2-7	O-Ring	BRPK00077		
2-8	O-Ring	BRPK00102		
2-9	Bolt	BRTG00671		M6X16SUS
3	Housing Assy.	MPBX48305		
3-1	Housing	MTC302003A		
3-2	-	-		
3-3	-	-		
3-4	Cover	MTB389970		
4	Cover Assy.	MPBX48304		
4-1	Cover	MTC302005A		
4-2	Packing	MTV305276		
4-3	Bolt	MPTG31381		B8X30
4-4	Spring Washer	BRTG00747		SW8 SUS304
4-5	Washer	BRTG00224		W8 SUS304
4-6	Sealing Washer	BRTG01826		

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
5	Drive Assy.	MPGK31557		
5-1	Flange	MTC302004A		
5-2	Main Shaft	MTH300728A		
5-3	Main Gear	MTG300550		
5-4	Gear	MTG300424A		
5-5	Spacer	MTL330503		
5-6	Support Ring	MTB402490A		
5-7	Key	MTK300677		
5-8	Plate	MTL330502		
5-9	Bearing	BRGK05419		6014ZZCM/5K
5-10	Bearing	BRGK05420		6011ZZCM/5K
5-11	V-Ring	BRPK05214		V-160A
5-12	Coaxial Flange	MTL330501A		
5-13	Bolt	BRTG03882		CAP8X20_SCM435
5-14	Rolling Flange Locknut	BSAN14000S		AN14
5-15	Rolling Flange Locknut	BSAN11000S		AN11
5-16	Rolling Bearing Washer	BSAW14000S		AW14
5-17	Rolling Bearing Washer	BSAW11000S		AW11
5-18	Bolt	BRTG09865		M10X30SUS
6	Rotary Joint Assy.	MPAB32497		
7	Motor Assy.	MDBW10967	MDBW10967	CBP-227
7-1	Motor	7BDRD0050		
7-2	Spur Gear	MTG300142A		
7-3	Bolt	BRTG00752		HEX10X40SUS
8	Turning Switch Assy.	MPSW30203		
8-1	Cap	MPDM30357B		
8-2	Toggle Switch	-		
8-3	Housing	MTV304855		
8-4	Cover for SW	MPPK00925A		

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
9	Clump Gland Assy.(A30)	MPJD30062A		
9-1	Clump Gland	MPTG31572A		
9-2	Gasket	BRPK00108		
9-3	Washer	BRTG01246		
9-4	Cover	BRTG01415		
10	Clump Gland Assy.(A25)	MPJD30063A		
10-1	Clump Gland	MPTG31573A		
10-2	Gasket	BRPK00134		
10-3	Washer	BRTG00883		
10-4	Cover	BRTG01414		
11	Encoder Assy.	MPEM30263		
11-1	Encoder	5BPAN00009	CHT-85	
11-2	Plate Encoder Mounting	MTB405539		
11-3	Spur Gear	MTT006909B		
11-4	Click	MTD001842		
12	-	-		
13	20D-N Type Connector	MPAB32436		
14	Cable	-		
15	Power supply I/F Unit	MPBX48307		
15-1	Power supply I/F circuit	-	CMP-493	
15-2	Chassis for Power Supply	MPBC48362		
15-3	Back Cover	MTB407208		
16	Transmission and Receiver Unit	MDNZT5036	NZT-2632	
16-1	Signal processing Unit	MDNDC5537	NDC-4920	
16-2	Transmission and Receiver circuit	MDHW10842	CMN-797	
16-3	Main Chassis	MPBX48314		
16-4	FAN	5BFAB00768	109L0912S410	109L0912S410
16-5	Fan Base	MTB407209		
16-6	Cross-recessed Head Screw	BSNC04035B		M4X35Bs_SW_LW
16-7	Cross-recessed Head Screw	BSNC04016B		M4X16Bs_SW_LW

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
17	Terminal Board Assy.	MPBP31963		
18	Base board	MPBC48800		
19	Motor Control Assy.	MPBX48306		
19-1	Chassis for Motor Control	MPBC48799		
19-2	Motor Driver for 100V	-	CBD-1950	
20	Performance Monitor Unit	MPAE30619	CAY-77	
20-1	PM Radome	MTV305275		
20-2	PM Packing	MTV305274		
20-3	Cross-recessed Head Screw	BRTG00522		M4X12 SUS
21	Neck Heater kit	MDMW11242	CHG-234	
21-1	Neck Heater Unit	-		
21-2	Plate Clamp	MTB388896		
21-3	Plate Clamp	MTB388897		
21-4	Bolt	BRTG00671		HEX6X16SUS

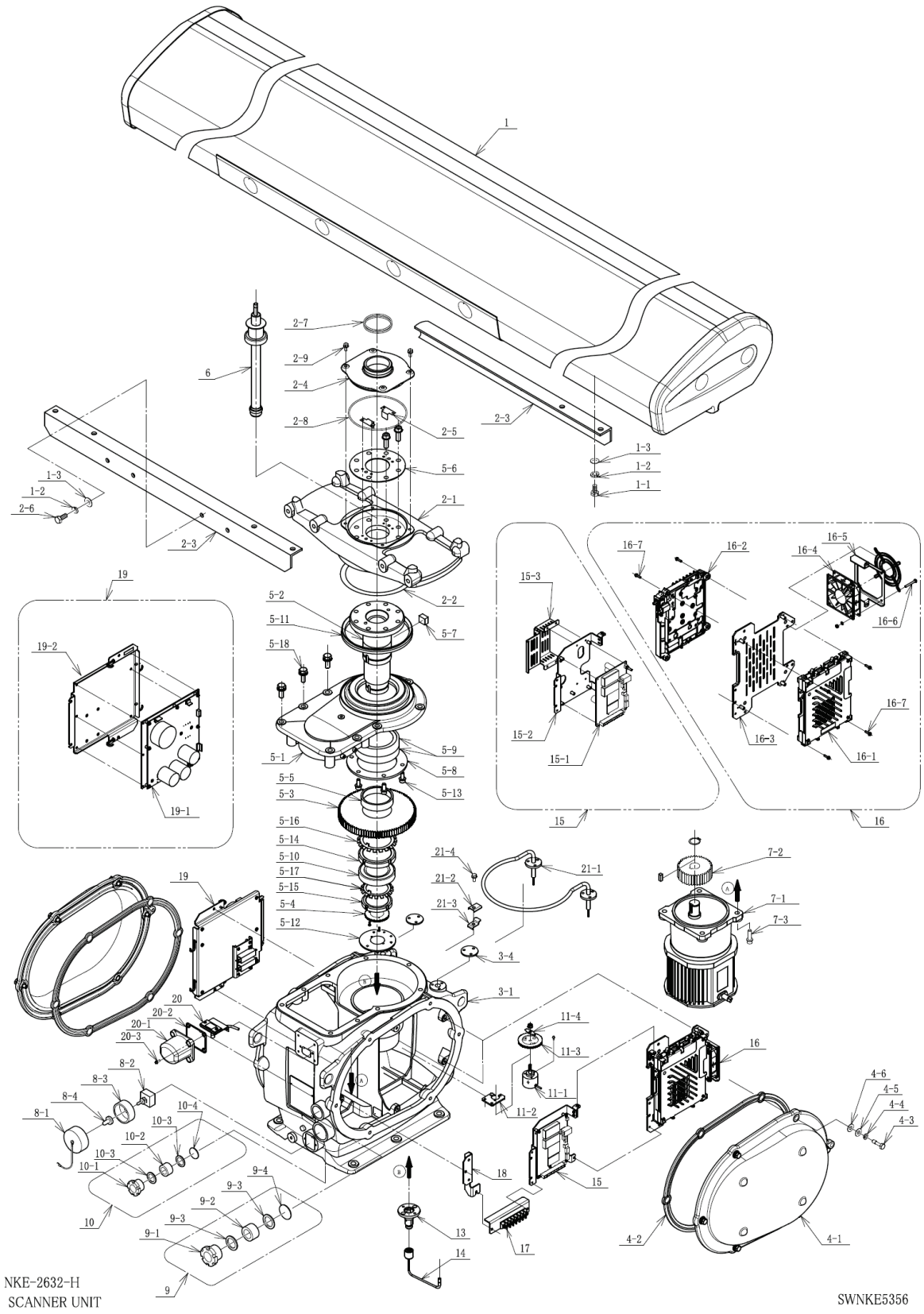


Fig. 3.2.9 Exploded view of NKE-2632-H

NKE-1696

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
1	Radiator Assy.	-	NAX-16C	9ft/6ft
1-1	Bolt	BRTG07249		HEX10X35 SUS304
1-2	Spring Washer	BRTG00404		SW10
1-3	Washer	MTL325583		
2	Support Assy.	MPBX50278		
2-1	Antenna Support	MTC332209		
2-2	Slide Plate	MTT309252		
2-3	O-Ring	BRPK00054		P42 ID41.7 D3.5
3	Housing Assy.	MPBX49956		
3-1	Housing	MTC332176		
3-2	Sleev	MTL317432		
3-3	Vent Cap	MTT309253		
3-4	Upset Bolt	BRTG09305		M5X12 FF ZMC4RBU
3-5	Safety switch	MDLW12375		CSD-713
3-6	Cover for SW	MPPK00925A		
3-7	Cover	MTB389969		
3-8	Cross-Recessed Head Screw	BSNK05012B		M5X12BS
4	Cover Assy.	MPBX50279		
4-1	Cover	MTC332210		
4-2	Packing	MTV303883		
4-3	Bolt	MPTG31381		
4-4	Spring Washer	BRTG00747		M8SUS304 3.2X2
4-5	Washer	BRTG00224		M8 SUS304
4-6	Sealing Washer	BRTG01826		M8 SUS

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
5	Drive Assy.	MPGK31847		
5-1	Flange	MTC332208		
5-2	Main Shaft	MTH300568A		
5-3	Main Gear	MTG300423A		
5-4	Gear	MTG300424		
5-5	Spacer	MTB366794A		
5-6	Key	MTL317433		
5-7	Bearing	BRGK05410		6012ZZ CM/5K
5-8	Bearing	BRGK05409		6009ZZ CM/5K
5-9	Retaining Ring-C Type	BRTG06164		SC45
5-10	Roling Bearing Washer	BRTG07261		AW10X ID50
5-11	O-Ring	BRPK05043		G155
5-12	Rolling Bearing Locknut	BSAN10000S		AN10 M50X1.5
6	V-Ring	BRPK00189		V-100A
7	Bolt	BRTG07268		M8X25TI
8	Spring Washer	BRTG07270		M8TI SW
9	Washer	BRTG07267		M8 TI
10	Coated Bolt	BRTG09863		M8X23 SUS304
11	Rotary Joint Assy.	MPAB31188		
12	Waveguide Unit	MPAB33198		
12-1	Waveguide Assy	MPAB33200		
12-2	Waveguide mounting plate	MTB422544		
12-3	Upset Bolt	BRTG06852		
13	Encoder Assy.	MDMW11292		
13-1	Encoder	-	CHT-85A	CHT-85A
13-2	Spur Gear	MTT006909B		
13-3	Stopper Plate	MTD001842		
13-4	Encoder Mounting Plate	MTB423021		
13-5	Upset Bolt	BRTG06852		M4X12SUS SW W
13-6	Cross-Recessed Head Screw	BSNC03008B		M3X8BS SW LW
13-7	Spring Washer	-		
13-8	Nut	-		

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
14	Motor Assy.	MPEM30201A		
14-1	Motor	-	CBP-203	CBP-203
14-2	Spur Gear	MTG300425		
14-3	Flange for Motor	MTC332211		
14-4	Bolt	BRTG09307		M8X30SUS SW W
14-5	Bolt	BRTG09306		M8X20FE SW W
15	Clump Gland Assy.(A30)	MPJD30066		
15-1	Clump Gland	MPTG31572A		
15-2	Gasket	BRPK00108		
15-3	Washer	BRTG01246		30B AL
15-4	Cover	BRTG01415		30 AL
16				
17	Base Plate	MPBP32458		
17-1	Base Plate Assy	MPBP32459		
17-2	Heat dissipation Block	MTL338610		
17-3	Heat dissipation sheet	-		TC-1000CAT-10
17-4	Low head screw	BRTG11486		M4X10SUS
17-5	Countersunk screw	BSSK03010B		M3X10BS
17-6	Cross-Recessed Head Screw	BSNC04010B		M4X10BS SW LW
18	PS IF circuit Assy	MDBW11092	CMP-503	CMP-503
18-1	PS IF circuit	-		
18-2	Heat dissipation plate	MTB423207		
18-3	Cross-Recessed Head Screw	BSNC03008B		M3X8BS SW LW
18-4	Upset Bolt	BRTG06852		M4X12SUS SW W
18-5	Heat dissipation sheet	-		TC-100CAT-20
18-6	Heat dissipation sheet	-		TC-400CAT-20
19				

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
20	Signal Processing Unit Assy	MPBC55611		
20-1	Signal Processing Unit	MDNDC5626	NDC-4921	NDC-4921
20-2	Mounting Plate	MPBC55610		
20-3	Cross-Recessed Head Screw	BRTG03740		M4X18BS SW LW
20-4	Fan mounting bracket	MPBC55613		
20-5	Fan(90mm)	-	109L0912S410	109L0912S410
20-6	Cross-Recessed Head Screw	BSNC04035B		M4X35BS SW LW
20-7	Cross-Recessed Head Screw	BSNC04010B		M4X10BS SW LW
21	Terminal block Assy	MPTE30518		
21-1	Terminal block mounting plate	MPBC55609		
21-2	Terminal block	-		OGM300NE-2P-C
21-3	Cross-Recessed Head Screw	BRTG03740		M4X18BS SW LW
21-4	Cross-Recessed Head Screw	BSNC04010B		M4X10BS SW LW
22	Motor Control Assy	MPBX52184		
22-1	Chassis for Motor Control	MPBX52185		
22-2	Motor Driver Circuit	-	CBD-2400	CBD-2400
22-3	Mounting plate	MTB392884		
22-4	Cross-Recessed Head Screw	BSNC04008B		M4X8BS SW LW
22-5	Cross-Recessed Head Screw	BSNC04010B		M4X10BS SW LW
23	Waveguide Assy	MPBC55615		
23-1	Circulator mounting bracket	MTB423154		
23-2	Dummy Load	-		NJC4002
23-3	Circulator	-		FCX-68
23-4	Diode limiter	-		NJS6930
23-5	Upset Bolt	BRTG06852		M4X12SUS SW W
23-6	Cross-Recessed Head Screw	BRTG01248		M4X60BS
23-7	Cross-Recessed Head Screw	BSNC04010B		M4X10BS SW LW

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
24	PA mounting plate	MPBC55616		
24-1	Fan bracket	MPBC55617		
24-2	Fan(60mm)	-	9LG0612P4M001	9LG0612P4M001
24-3	Cross-Recessed Head Screw	BSNC04010B		M4X10BS SW LW
24-4	Cross-Recessed Head Screw	BSNC04035B		M4X35BS SW LW
25	PA circuit	MDTW10838	CAH-1696	CAH-1696
25-1	PA Unit	MDTW10839		
25-2	Presser plate	MTB423334		
25-3	Retaining Washer	BRTG03256		TM-147-1
25-4	Cross-Recessed Head Screw	BRTG03028		M3X4BS SW LW
25-5	Cross-Recessed Head Screw	BRTG08858		M4X22BS SW LW
25-6	Retaining Washer	BRTG10169		CP-29-PA-3
26	TRX circuit	MDHW10965	CMN-897	CMN-897
26-1	TRX Unit	MDHW10966		
26-2	Mounting Plate(top)	MTB423332		
26-3	Mounting Plate (bottom)	MTB423333		
26-4	Cross-Recessed Head Screw	BSNC03010B		M3X10BS SW LW
26-5	Cross-Recessed Head Screw	BSNC03016B		M3X16BS SW LW
26-6	Cross-Recessed Head Screw	BRTG02029		M4X55BS
26-7	Flange nut	BRTG11487		M4SUS
26-8	Retaining washer	BRTG10169		CP-29-PA-3
27	Performance monitor	MDAW10372		CAY-88
27-1	Performance Monitor circuit	-		
27-2	Cross-Recessed Head Screw	BSNC04010B		M4X10BS SW LW
28	Performance monitor radome	MTT316730		

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
29	Neck Heator Kit	MDCW11425		CCK-1105
29-1	Neck Heator Unit	-		
29-2	Plate Clamp	MTB414163		
29-3	Plate Clamp	MTB414164		
29-4	Terminal Board for Heater	MPTE30480		
29-5	Neck heator Housing	MTC332212		
29-6	Gasket	MTT317040		
29-7	Cover	MTB414165		
29-8	Sealing Washer	BRTG06637		SUS W4-S1
29-9	Packing	MTT317041		
29-10	Clump Gland	MPTG31573A		
29-11	Gasket	BRPK00134		
29-12	Washer	BRTG00883		25A AL
29-13	Cover	BRTG01414		25 AL
29-14	Upset Bolt	BRTG07814		M5X20SUS SW W
29-15	Upset Bolt	BRTG09004		M5X16SUS SW W
29-16	Cross-Recessed Head Screw	BSNB04012B		M4X12BS SW W
30	Cross-Recessed Head Screw	BSNC04010B		M4X10BS SW LW

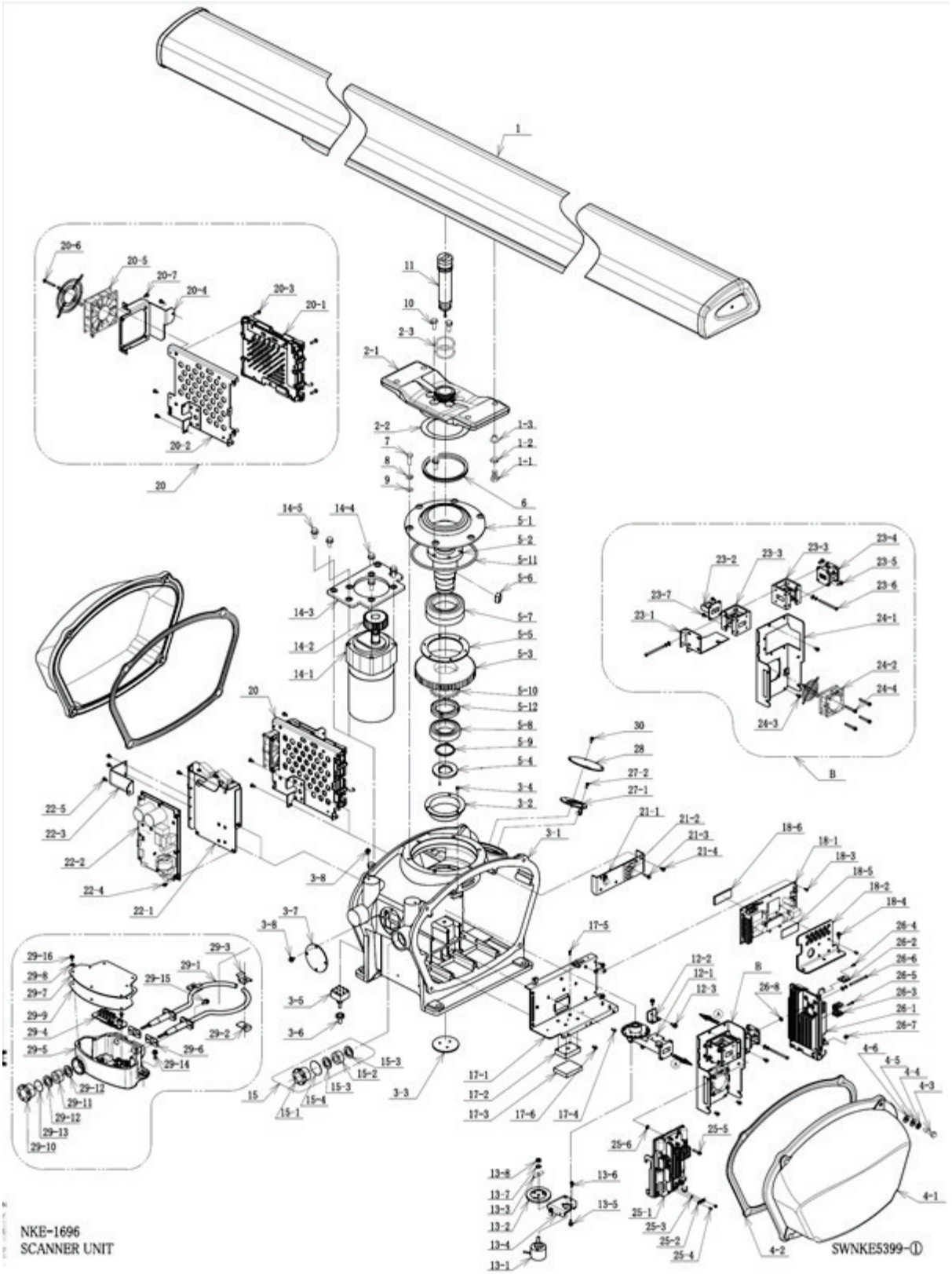


Fig. 3.2.10 Exploded view of NKE-1696

NTG-3225

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
1	Chassis Assy.	MPBX44429		
1-1	Chassis	MPBC43018		
1-2	Bracket for Modulator	MPBC42790		
1-3	Fixing Plate	MTB389236		
1-4	Clamp	MTL305132		
1-5	Clamp	MTL305133		
1-6	Bolt	BRTG00930		B6X40SUS
1-7	Bracket	MTB371097		
1-8	Bracket	MPBC43020		
1-9	Terminal Board	MPTE00753		
1-10	Guide Pin	BRTG00313		
1-11	Teflon Seat	MTT016920		
1-12	Cover	MTB005980A		
1-13	Upset Bolt	BRTG07397		M4X12 SW SUS304
1-14	Cross-recessed Head Screw	BSNB06030B		NB6X30Bs
2	Cover Assy.	MPBC43061		―
2-1	Thumb Screw	MPTG32003		
2-2	Nut	MTB089176		
2-3	Washer	BRTG00224		W8 SUS
2-4	Spring Washer	BRTG00747		SW8 SUS
3	Wave Guide Assy.	MPAB31620		
3-1	Wave Guide	MTM300794		
3-2	Bracket for Circulator	MTB370775		
3-3	Circulator	-		NJC3901M
3-4	Diode Limitter	-		NJS6930
3-5	Dummy Load	-		NJC4002
3-6	Waveguide Transformer	MTM301849		
3-7	Spurious Filter	-		NJC-9952
3-8	Upset Bolt	BRTG07397		M4X12 SW SUS304
3-9	Cross-recessed Head Screw	BRTG05659		M4X0.7X65BS
3-10	Cross-recessed Head Screw	BSNC06016B		NC6X16Bs
3-11	Spring Washer	BSSW04000S		SW4
3-12	Washer	BSFW04000B		W4Bs

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
4	Clamping Plate Assy.	MPBP31515		
4-1	Bracket1	MTB370773A		
4-2	Bracket2	MTB389242		
4-3	Spacer	MTL306498		
4-4	Upset Bolt	BRTG06852		M4X12 SW W SUS304
5	Modulator Unit	MDNMA5076A	NMA-1252	
5-1	Chassis for Modulator	MPBC43021		
5-2	Cover for Modulator	MTB389249		
5-3	Modulator	MDLW11926	CPA-264 (MDLW11927)	
5-4	Pulse Transformer	-		
5-5	Waveguide	MPAB31622		
5-6	Magnetron	-	5VMAA00106	
6	Receiver	MDNRG5094	NRG-162A	
6-1	Bracket for Receiver	MTB389833		
7	Power Supply Unit	MPBX44430A		
7-1	Chassis for Power supply	MPBC43022		
7-2	Power Supply PC	MDBW10837	CBD-1682A	
8	Relay Unit	MPTE30365A		
8-1	Chassis for Relay	MPBC43023A		
8-2	Relay PC	-	CSC-656	
9	TR Control PC	-	CMC-1205R	
10	Cover TR Control	MTB371105		
11	Spacer	BRBP06891		BSB-440E
12	Cross-recessed Head Screw	BSNC04012B		NC4X12Bs
13	Cross-recessed Head Screw	BSNC04010B		NC4X10Bs

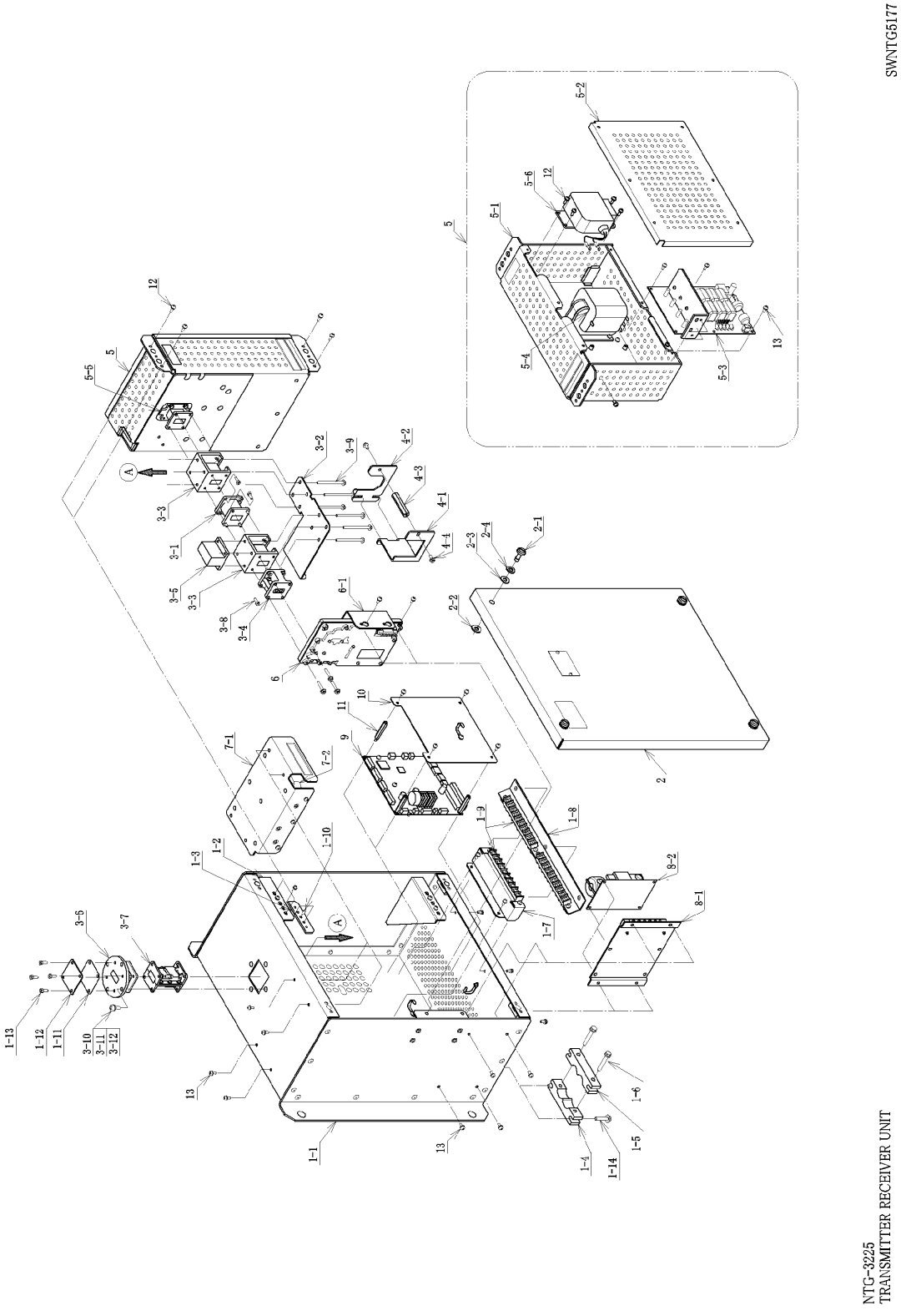


Fig. 3.2.11 Exploded view of NTG-3225

NTG-3230

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
1	Chassis Assy.	MPBX44501		
1-1	Chassis	MPBC43175		
1-2	Bracket	MPBC38083		
1-3	Clamp	MTL305132		
1-4	Clamp	MTL305133		
1-5	Bolt	BRTG00930		B6X40 SUS304
1-6	Cross-recessed Head Screw	BSNB06035B		M6X35Bs SW W
1-7	Spring Washer	BSSW06000S		
1-9	Terminal Board	MPTE00753		
2	Cover Assy.	MPBC43178		
2-1	Thumb Screw	MPTG32003		
2-2	Nut	MTB089176		
2-3	Spring Washer	BRTG00747		SW8 SUS
2-4	Washer	BRTG00224		W8 SUS
3	Wave Guide Assy.	MPAB31661A		
3-1	Flange	MTC301710		
3-2	Circulator	-		
3-3	Diode Limiter	-		
3-4	Spurious Filter	MPAB31663		
3-5	Wave Guide CornerA	MPAB31664		
3-6	Dummy Load	MPAB31595		
3-7	Cover	MTB328936		
3-8	Upset Bolt	BRTG06626		M6X20 SUS304 SW W
3-9	Upset Bolt	BRTG07502		M5X16 SUS304 SW W
4	Modulator Unit	MDNMA5078A	NMA-553-1	
4-1	Chassis for Modulator	MPBC43180		
4-2	Modulator	MDLW11926	CPA-264 (MDLW11927)	
4-3	Pulse Transformer	-		
4-4	Clamping Plate for Magnetron	MPBP31522		
4-5	Magnetron	-	5VMAA00104	
5	Receiver Unit	MDNRG5092B	NRG-229	
5-1	Bracket for Receiver	MTB388395		

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
5-2	Bracket for Receiver	MTB388396		
6	Power Supply Unit	MPBX44503		
6-1	Chassis for Power Supply	MPBC43181		
6-2	Power Supply PC	MDBW10837A	CBD-1682A	
7	Relay Unit	MPTE30365A		
7-1	Chassis for Relay	MPBC43023A		
7-2	Relay PC	-	CSC-656	
8	TR Control PC	-	CMC-1205R	
9	Cover	MTB390275		
10	Cross-recessed Head Screw	BSNC06016B		NC6X16Bs
11	Cross-recessed Head Screw	BSNC04012B		NC4X12Bs
12	Cross-recessed Head Screw	BSNC04010B		NC4X10Bs

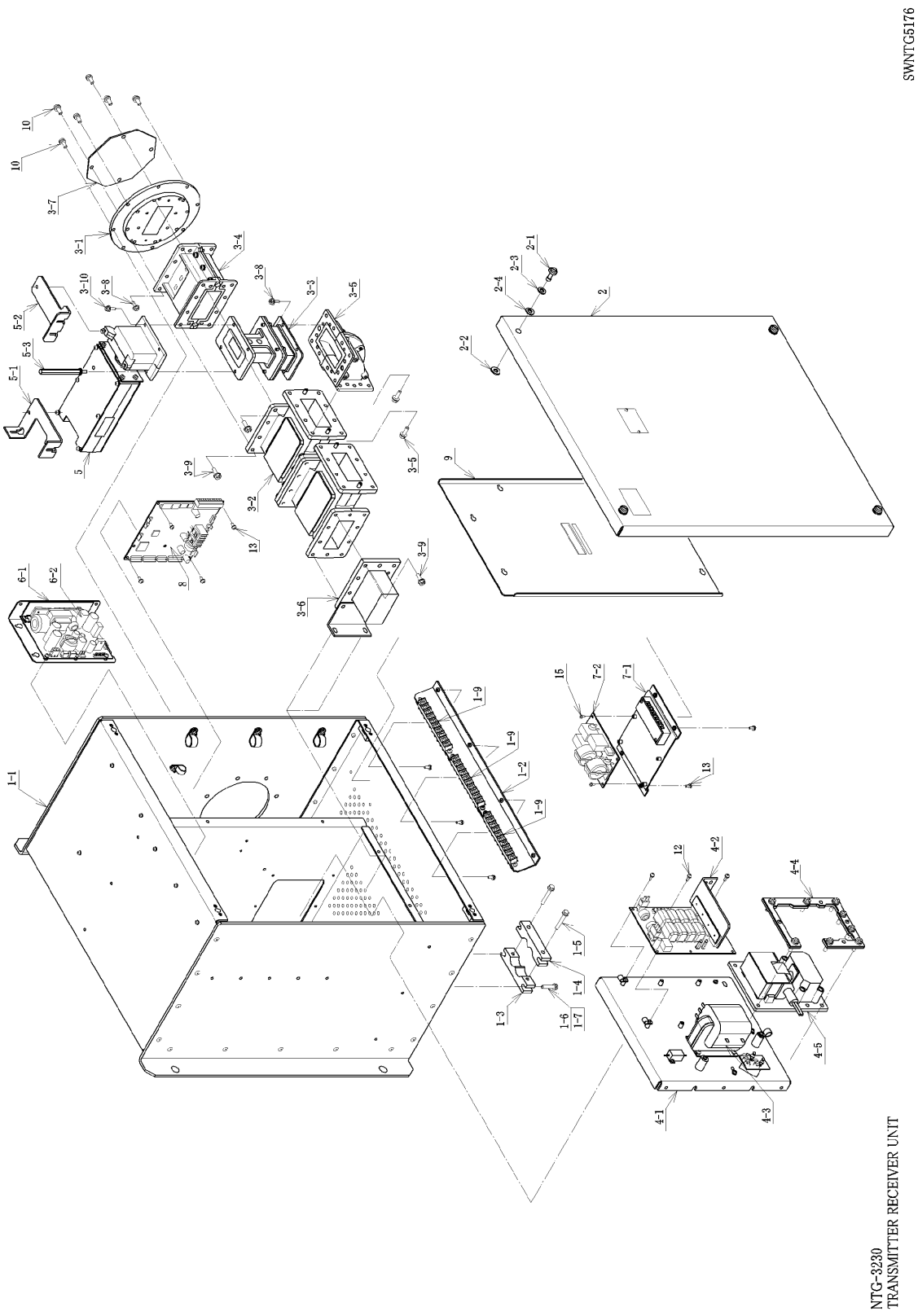


Fig. 3.2.12 Exploded view of NTG-3230

NQE-3167

No.	PARTS NAME	PRODUCT CODE	SERVICE CODE	NOTE
1	Chassis Assy.	MPBX43912		
1-1	Chassis	MPBC42355		
1-2	Clamp	MTL305132		
1-3	Clamp	MTL305133		
1-4	Bolt	BRTG00930		
1-5	Cross-recessed Head Screw	BSNB03060B		NB6X30Bs
2	Cover Assy.	MPBC41009		
2-1	Cover	MTB383852		
2-2	Thumb Screw	BRTG05973		TL-233-8 M6X15
3	Partition board Assy.	MPBC42360		
4	Inside board Assy.	MPBC42362A		
5	Power Supply for Modulator	-		LEP240F-48-T
6	Power Supply for Motor	-		LEP240F-24-T
7	Connected circuit PC	-	CQP-58	
8	Fan for Power Supply	-		
8-1	Fan	7BFRD00002		109P0612M601
8-2	Fan guard	-		
8-3	Cross-recessed Head Screw	BSNC04030B		NC4X30Bs
9	Cross-recessed Head Screw	BSNC03008B		NC3X8Bs
10	Cross-recessed Head Screw	BSNB04010B		NB4X10Bs

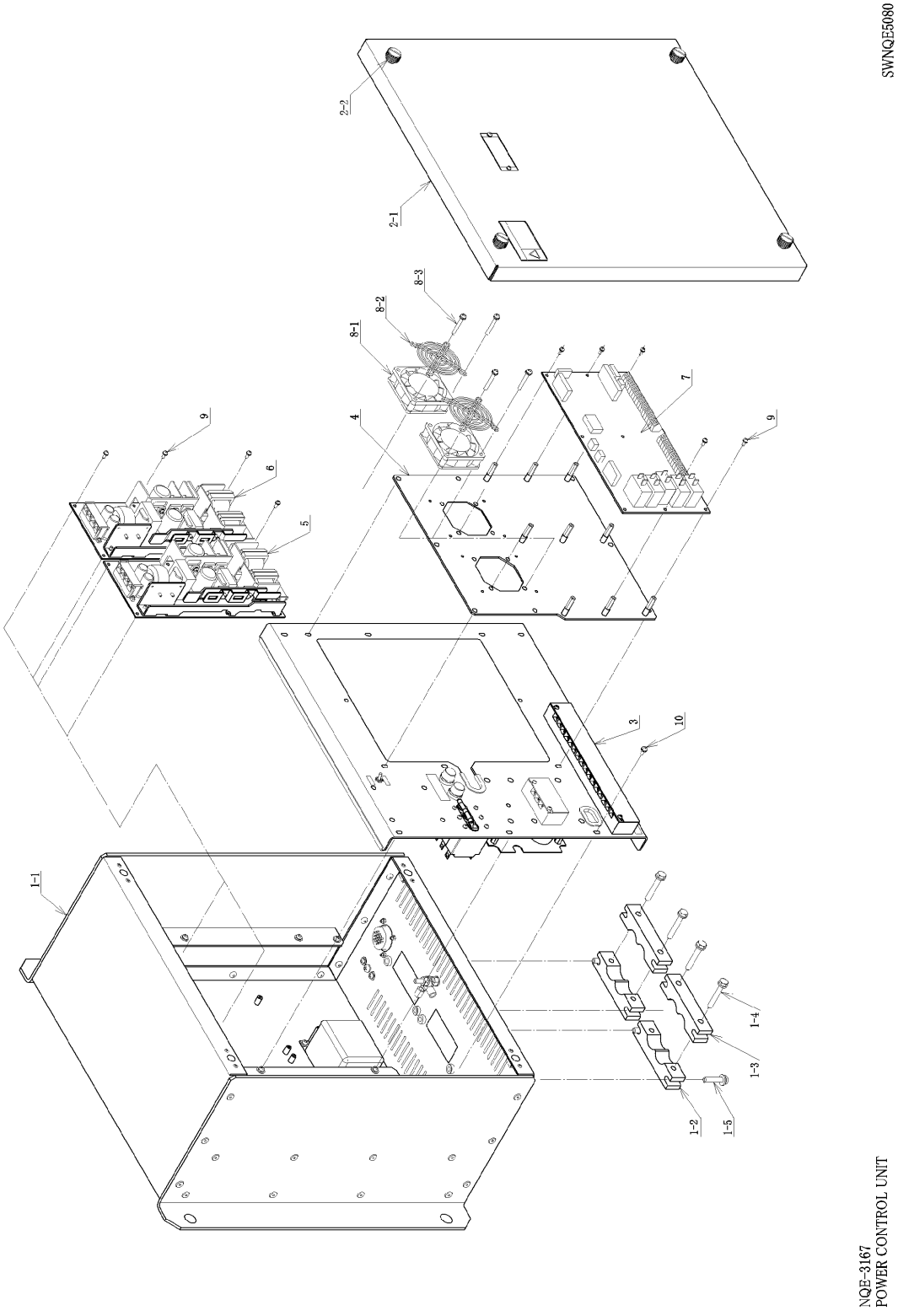


Fig. 3.2.13 Exploded view of NQE-3167

Display Unit (JMR-92xx / JAN-92xx)

No.	DESCRIPTION		DRAWING No. CODE	NOTE
1	MONITOR UNIT	NWZ-208	-	
2	CROSS RECESSED HEAD SCREW WITH CAPTIVE WASHER	M5X14SUS SW W BLACK	BRTG10239	
3	MONITOR COVER		MTB405535A	
4	CROSS RECESSED HEAD SCREW WITH CAPTIVE WASHER	M3X8SUS SW W BLACK	BRTG10238	
5	TRACKBALL OPERATION UNIT	NCE-5605	-	
6	CROSS RECESSED HEAD SCREW WITH CAPTIVE WASHER	M5x10SUS SW W	BRTG03536	
7	SCREW COVER (L)		MTV305169	
8	KEYBOARD OPERATION UNIT	NCE-5625	-	
9	SCREW COVER (U)		MTV305170	
10	CENTRAL CONTROL UNIT	NDC-1590/A	-	
11	TABLE 26		MPBC48027	
12	POWER SUPPLY UNIT	NBD-913	-	
13	CWB-1592	CWB-1592	-	
14	SENSOR LAN SWITCH UNIT	NQA-2443/A	-	
15	UPS FILTER	ME-MAX-NEF/QUINT20A	-	
16	ACDC PSU	QUINT-PS/1AC/24DC/20	-	
17	DC UPS	QUINT-DC-UPS/24DC/20 or QUINT-UPS/24DC/24DC/20	-	
18	UPS BATTERY	QUINT-BAT/24DC/3.4AH	-	

No.	DESCRIPTION		DRAWING No. CODE	NOTE
19	CROSS RECESSED HEAD SCREW WITH CAPTIVE WASHER	M4x10SUS SW W	BRTG03527	
20	LAN MOUNTING BLACKET		MPBX48433	
21	CROSS RECESSED HEAD SCREW WITH CAPTIVE WASHER	M3X12FE SW W	BSNB03012R	
22	BLANK COVER （L）		MPBC48036	
23	BLANK COVER （L）		MPBC48037	
24	HEXAGON HEAD SCREW WITH CAPTIVE WASHER	M5X14SUS SW W	BRTG09016	
25	FRONT COVER 26		MPBC48027	
26	REAR COVER		MPBC48436	
27	26INCH DISPLAY UNIT MOUNT KIT	CWA-246	-	

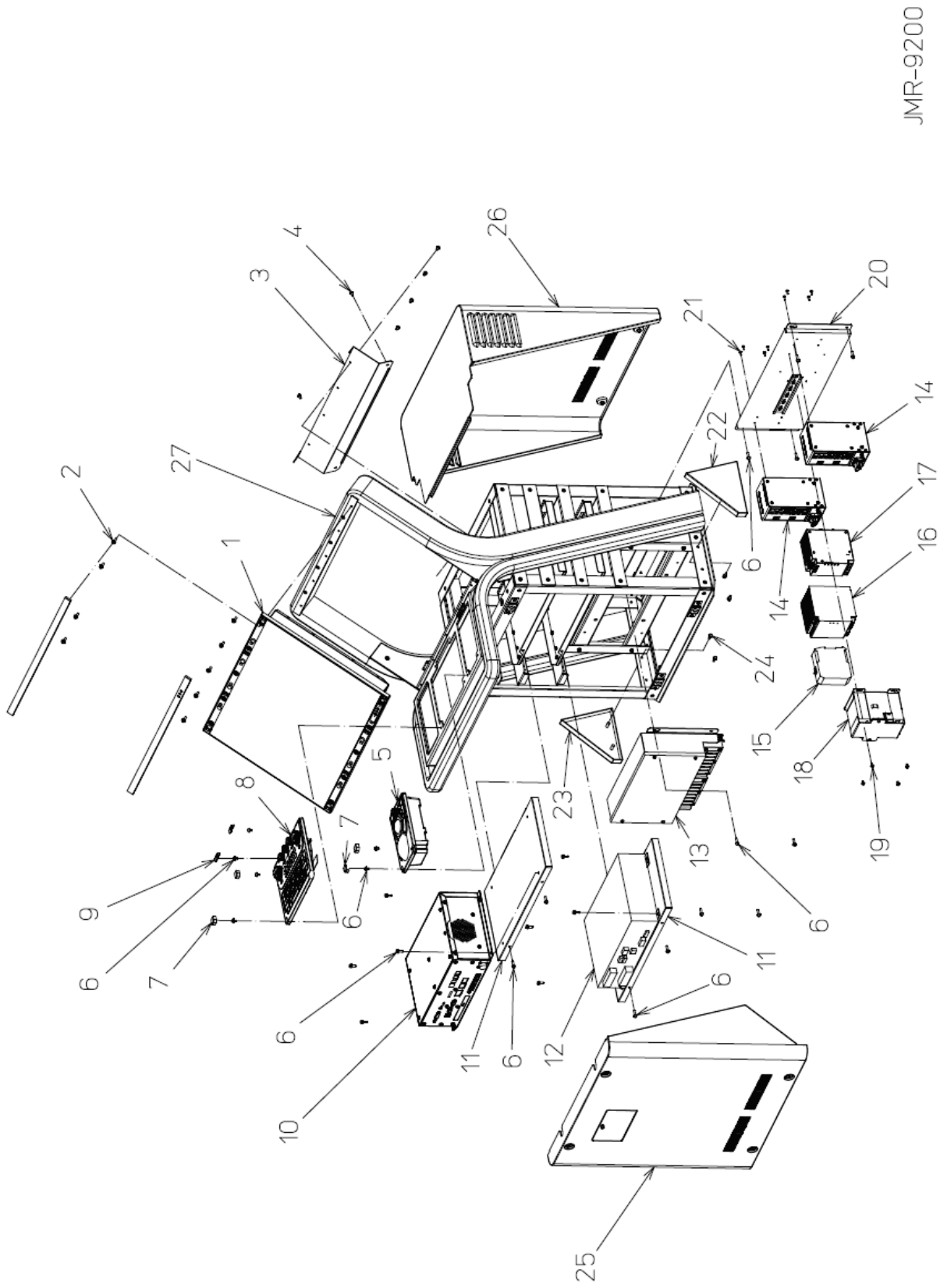


Fig. 3.2.14 Exploded view of JMR-92xx / JAN-92xx Display Unit

Display Unit (JMR-72xx / JAN-72xx)

No.	DESCRIPTION		DRAWING No. CODE	NOTE
1	MONITOR UNIT	NWZ-208	-	
2	CROSS RECESSED HEAD SCREW WITH CAPTIVE WASHER	M5X14SUS SW W BLACK	BRTG10239	
3	MONITOR COVER		MTB405535A	
4	CROSS RECESSED HEAD SCREW WITH CAPTIVE WASHER	M3X8SUS SW W BLACK	BRTG10238	
5	TRACKBALL OPERATION UNIT	NCE-5605	-	
6	CROSS RECESSED HEAD SCREW WITH CAPTIVE WASHER	M5x10SUS SW W	BRTG03536	
7	SCREW COVER (L)		MTV305169	
8	KEYBOARD OPERATION UNIT	NCE-5625	-	
9	SCREW COVER (U)		MTV305170	
10	CENTRAL CONTROL UNIT	NDC-1590/A	-	
11	TABLE 26		MPBC48027	
12	POWER SUPPLY UNIT	NBD-913	-	
13	CWB-1592	CWB-1592	-	
14	SENSOR LAN SWITCH UNIT	NQA-2443/A	-	
15	UPS FILTER	ME-MAX-NEF/QUINT20A	-	
16	ACDC PSU	QUINT-PS/1AC/24DC/20	-	
17	DC UPS	QUINT-DC-UPS/24DC/20 or QUINT-UPS/24DC/24DC/20	-	
18	UPS BATTERY	QUINT-BAT/24DC/3.4AH	-	

No.	DESCRIPTION		DRAWING No. CODE	NOTE
19	CROSS RECESSED HEAD SCREW WITH CAPTIVE WASHER	M4x10SUS SW W	BRTG03527	
20	LAN MOUNTING BLACKET		MPBX48441	
21	CROSS RECESSED HEAD SCREW WITH CAPTIVE WASHER	M3X12FE SW W	BSNB03012R	
22	BLANK COVER （L）		MPBC48036	
23	BLANK COVER （L）		MPBC48037	
24	HEXAGON HEAD SCREW WITH CAPTIVE WASHER	M5X14SUS SW W	BRTG09016	
25	FRONT COVER 19		MPBC48356	
26	REAR COVER		MPBC48357A	
27	19INCH DISPLAY UNIT MOUNT KIT	CWA-246	-	

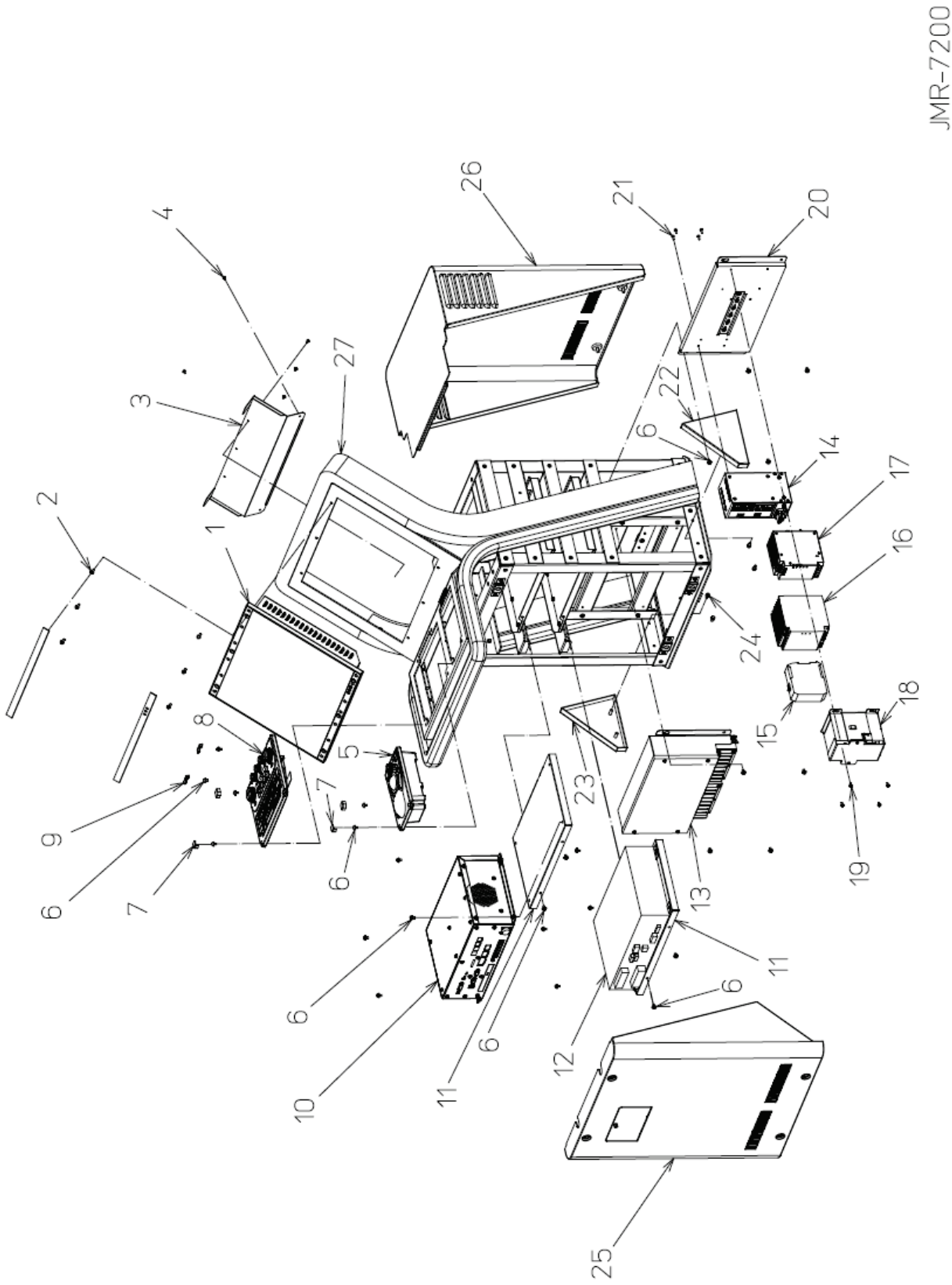


Fig. 3.2.15 Exploded view of JMR-72xx / JAN-72xx Display Unit

4. Replacement Procedure

Chapter 4. Replacement Procedure

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

4.1 Replacement Procedures for Scanner Unit

Precautions

⚠WARNING

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

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

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

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

Microwave radiation level of the Scanner unit

System	50 W/m^2	20 W/m^2	2.5 W/m^2
NKE-2103	n/a	26 cm	123 cm
NKE-1125/1129/2254	5 cm	81 cm	162 cm
NKE-1130/1139	11 cm	76 cm	181cm
NKE-2632	1.38cm	3.1cm	209.76cm
NKE-1632	1.45cm	3.25cm	128.37cm
NKE-1696	29cm	46cm	130cm

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

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

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

Precautions in mounting the cover

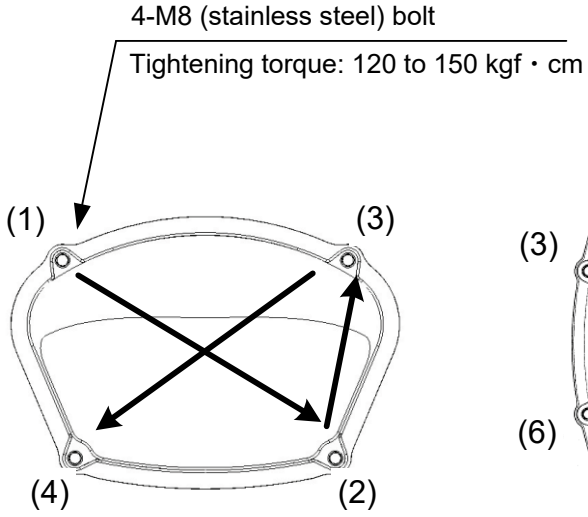
When the cover is removed for regular inspection and replacement of parts and refitted after such work, the procedures of fastening bolts shall be taken with the following precautions:

(1) The proper fastening torque of the fitting bolts (M8) is 1176 to 1470 N•cm (120 to 150 kgf•cm) (which makes the inside water-tight and protects the packings against permanent compressive strain). The packings start sticking out from the cover at a torque of approximately 1470 N•cm (150 kgf•cm). Do not fasten the bolts with a torque exceeding the specified value. Otherwise, the screws may be broken.

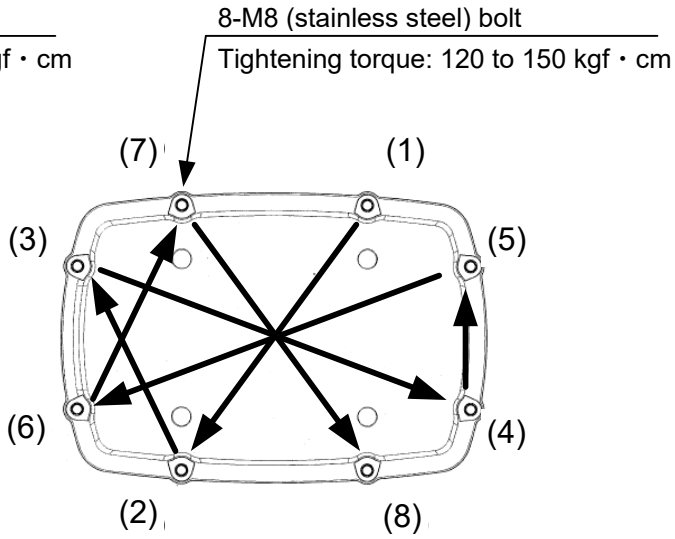
(2) Use a box wrench of 11 mm × 13 mm or an open-end wrench of 13 mm × 17 mm (not longer than 200 mm).

(3) Screw all the bolts by hand first to prevent them playing, then fasten them evenly in order not to cause one-sided fastening. (Fasten the bolts with 25% of the required torque at the first step.)

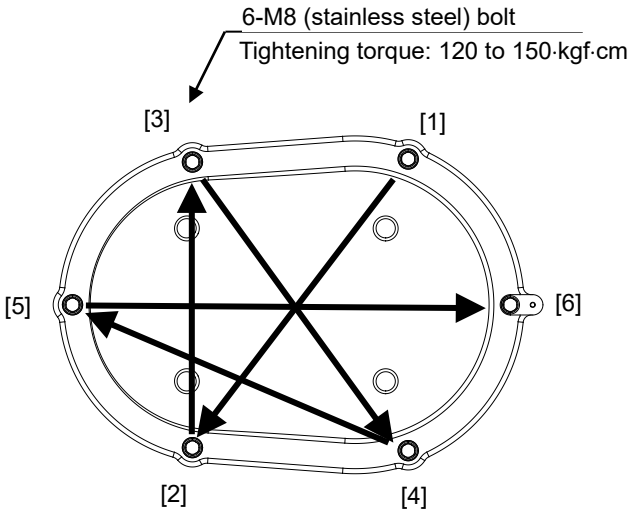
*: Fasten the bolts in the diagonal order.



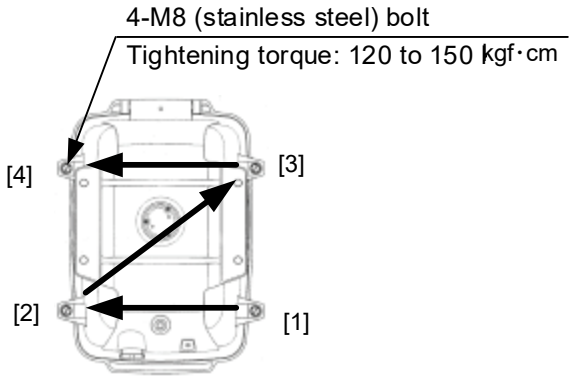
Bolt Tightening Order of
NKE-1125/1129/1696 Cover



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



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



Bolt Tightening Order of
NKE-2103 Cover

Radiator

Perform inspection and cleaning of the radiator.

Note

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

Rotating section

Supply oil seal

For machines without a grease nipple, the replenishment of grease oil is unnecessary.
For machines with a grease nipple, remove the cap on the grease nipple located on the front of the part at which the radiator is supported, and grease with a grease gun. Make the oiling every six months. The oil quantity shall be approximate 100 g, which is as much as the grease comes out of the oil seal. Use the grease of Mobilux2 of Mobil Oil.

Oiling gears

Apply grease evenly to the tooth surfaces of the main shaft drive gear and the encoder drive gear with a spreader or brush. Oiling in short intervals is more effective to prevent the gears from wear and tear and extend their service life, but oil at least every six months.
Use the grease of Mobilux2 of Mobil Oil or equivalent.

Mounting legs

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

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

Note

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

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

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

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

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

Transmitter-receiver (NTG-3225/3230)

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

Display unit

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

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

4.1.1 NKE-1130 Scanner Unit

4.1.1.1 Magnetron Replacement/NKE-1130

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

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

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

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

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

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

[Required Tools]

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

Table Required Tools

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

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

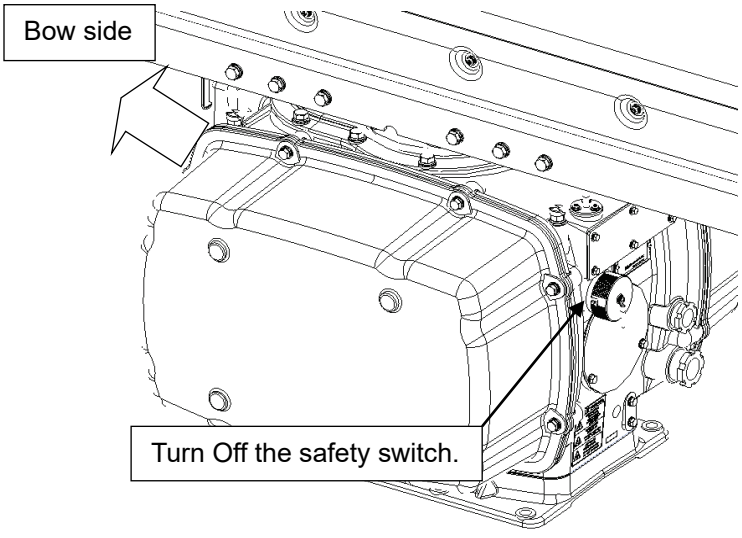
⚠ Before beginning work, turn Off the safety switch of the Scanner unit.

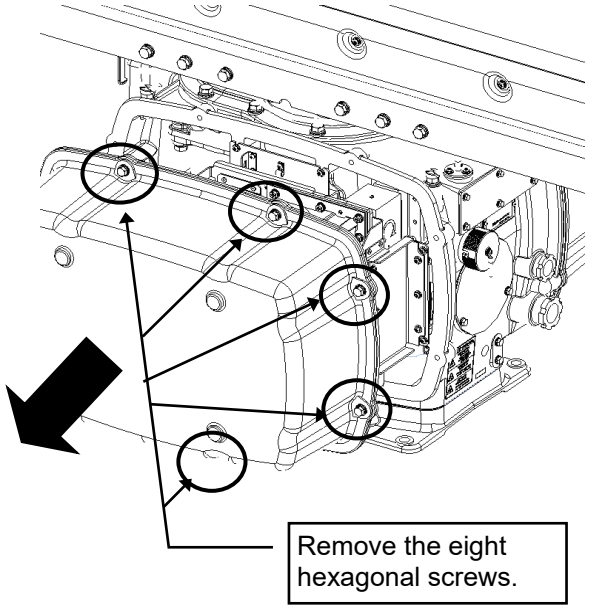
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

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

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

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

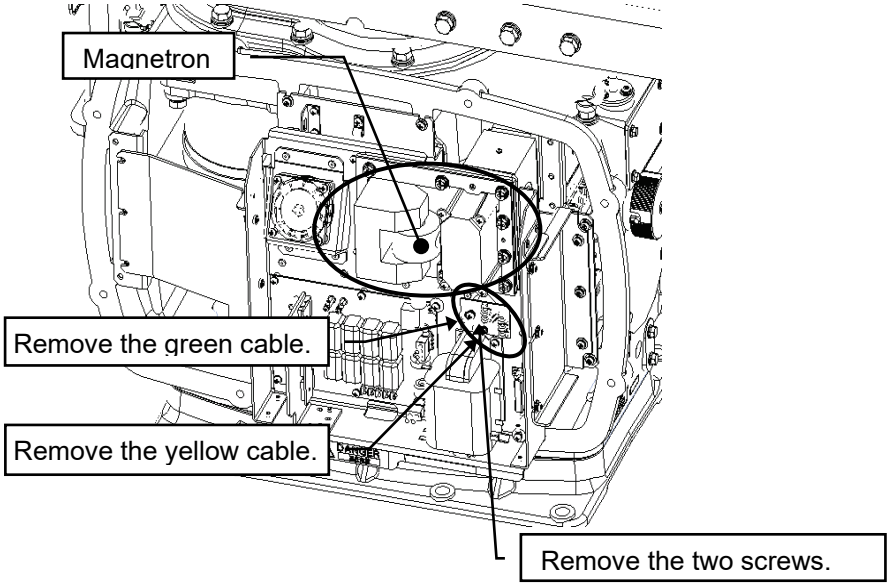




Example: Port side cover removal

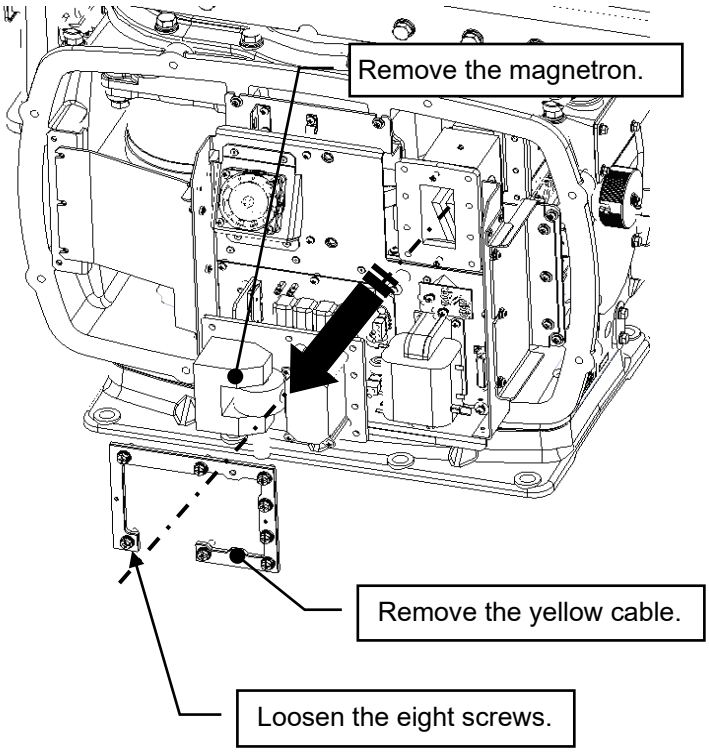
Step 2 Remove the screws holding the magnetron cables.

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



Step 3 Remove the fixture holding the magnetron.

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



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

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

Step 4 Install the new magnetron.

Install the new magnetron together with the fixture and tighten the screws to hold the cables. Follow the removal procedure in the reverse order.

Do not forget to tighten the bolts or screws, and make sure that the cables are connected.

Step 5 Operation check

After you have completed the replacement work, turn On the safety switch and follow the procedure below to check the operation.

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

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

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

4. Finally, initialize the transmission time in the service engineer menu.

This completes magnetron replacement.

4.1.1.2 Motor Replacement/NKE-1130

[Required Tools]

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

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2, Size #3	
2	Open-end wrench*1	Width across flats 13 mm (for M8 screws), 17 mm (for M10 screws)	
3	Socket wrench*1	Width across flats 13 mm (for M8 screws), 17 mm (for M10 screws)	

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

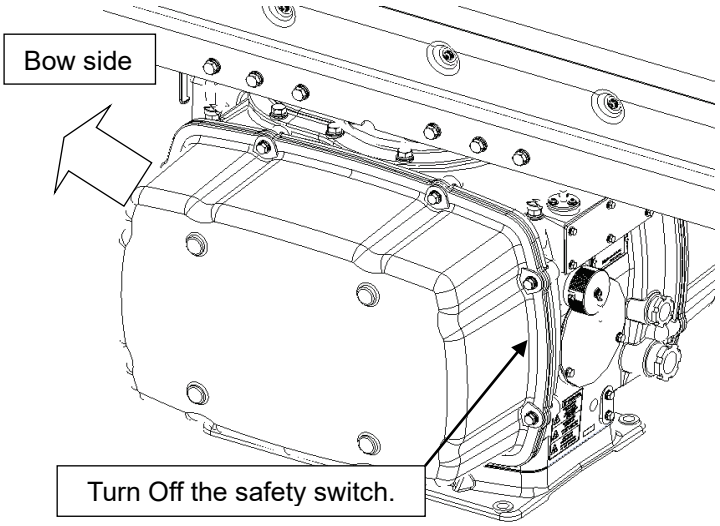
⚠ Before beginning work, turn Off the safety switch of the Scanner unit.

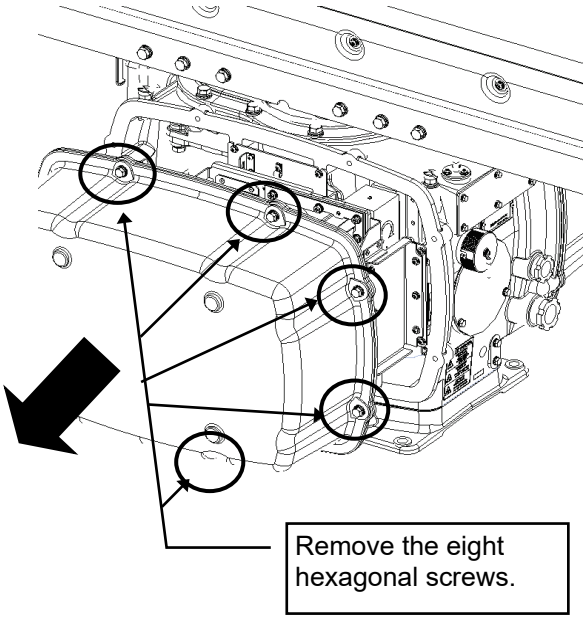
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

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

Step 1 Set the safety switch to Off (down side) and remove the covers on both sides.

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

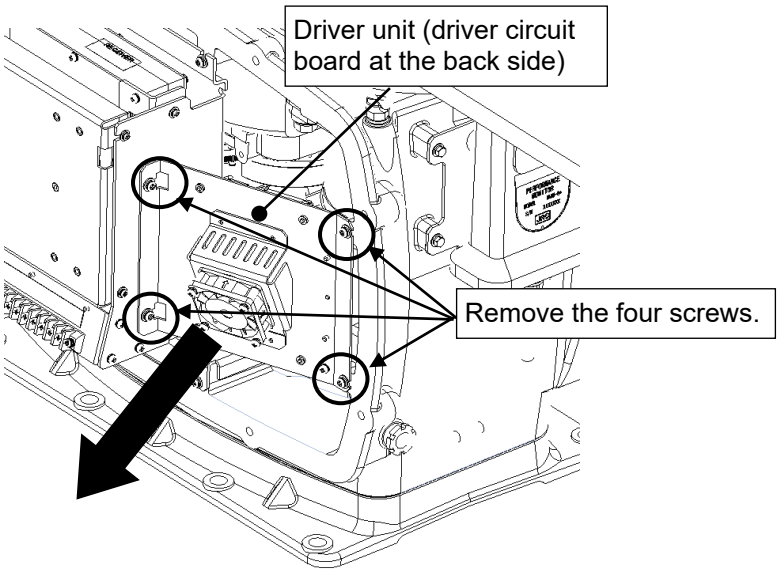


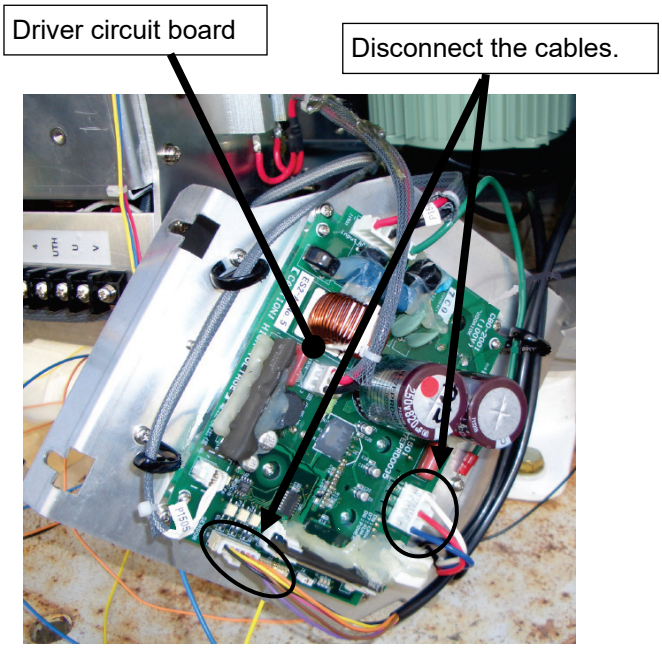


Example: Port side cover removal

Step 2　　Remove the motor driver circuit board.

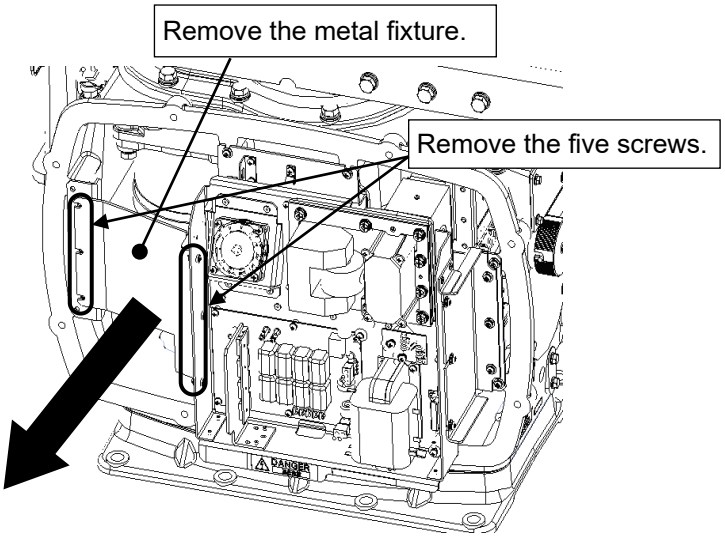
Loosen the four screws (M4) to remove the driver unit, which has the motor driver circuit board on its back side. Disconnect the cables connecting the motor to the motor driver circuit board.





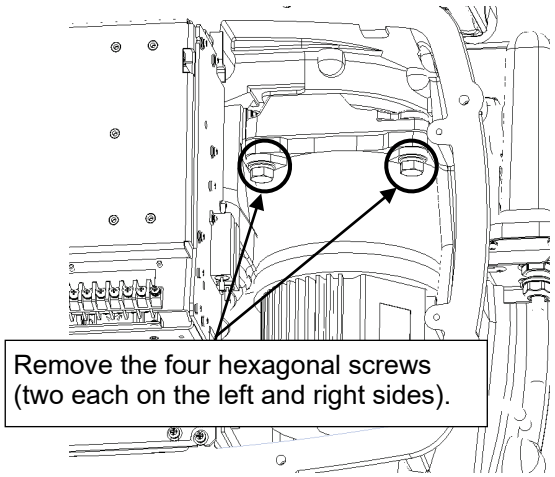
Step 3 Remove the motor fixture.

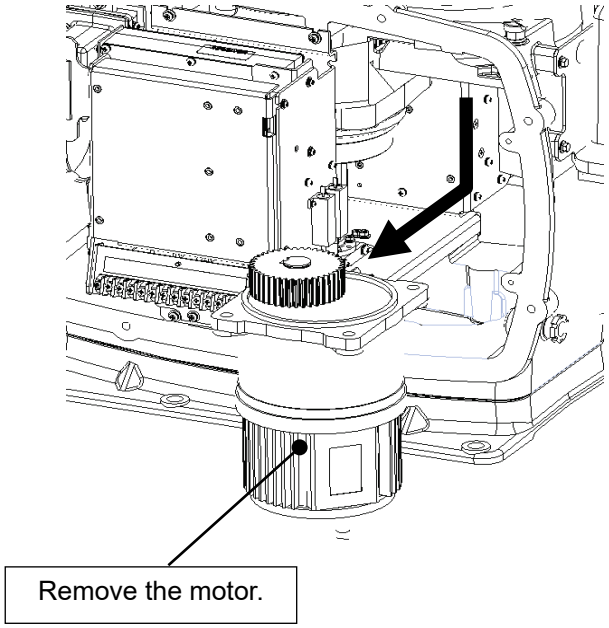
Remove the cover on the left (port) side and remove the five screws (M5) to remove the fixture.



Step 4 Remove the motor.

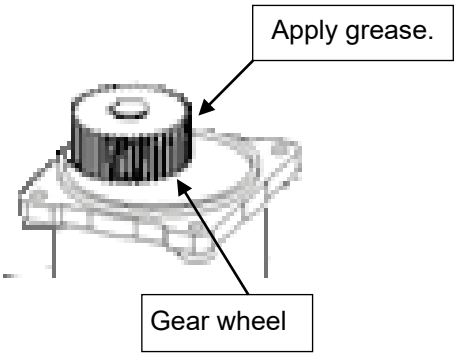
Remove the four hexagonal screws (M10x40, SW10, and W10) that hold the motor from both the right and left sides to remove the motor.





Step 5 Apply grease to the new motor.

Apply grease to the gear wheel of the new motor.



Step 6 Install the new motor.

Install the new motor in the scanner unit and secure it using the hexagonal screws. Tighten the screws with the specified torque (350 kgf•cm). After replacing the motor, assemble the unit in the reverse order of the disassembly procedure. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.

Step 7 Operation check

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

1. Turn On the Display unit. After the preheat countdown is completed, start transmission and check that the radar image appears without error. Check that you do not hear any unusual sound when the motor starts, rotates, and stops.
2. Open the service engineer menu to initialize the motor rotation time.

This completes motor replacement.

4.1.1.3 Motor Driver Circuit Replacement/NKE-1130

[Required Tools]

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

Table Required Tools

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

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

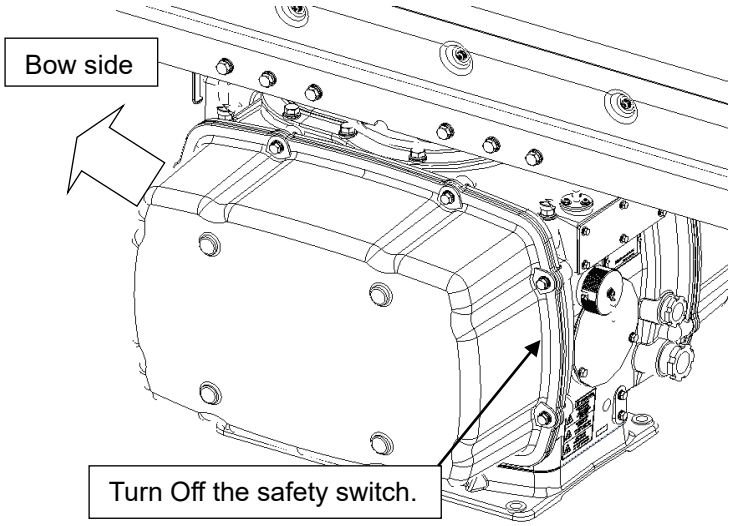
⚠ Before beginning work, turn Off the safety switch of the Scanner unit.

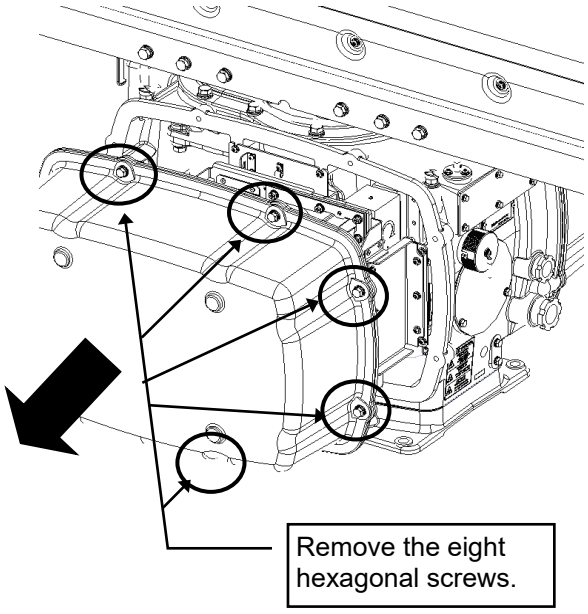
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

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

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

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

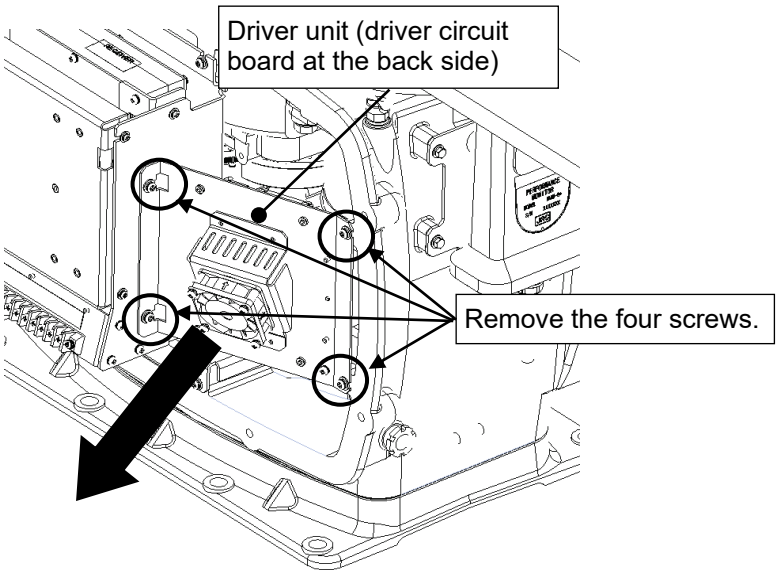


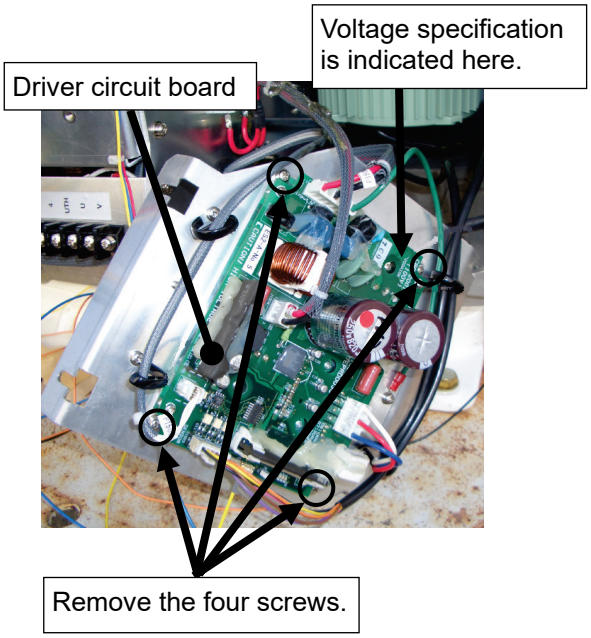


Example: Port side cover removal

Step 2 Remove the motor driver circuit board.

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





Step 3 Incorporate the new motor driver circuit.

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

100V AC: 7EPRD0035
220V DC: 7EPRD0034

After replacing the motor driver circuit board, follow the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.

Step 4 Operation check

After replacing the motor driver circuit board, turn On the safety switch and follow the steps below to check the operation.

1. Turn On the Display unit. After the preheat countdown is completed, start transmission and check that the radar image appears without error. Check that you do not hear any unusual sound when the motor starts, rotates, and stops.

This completes motor driver circuit board replacement.

4.1.1.4 Motor Drive Circuit Board Fan Replacement/NKE-1130

[Required Tools]

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

Table Required Tools

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

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

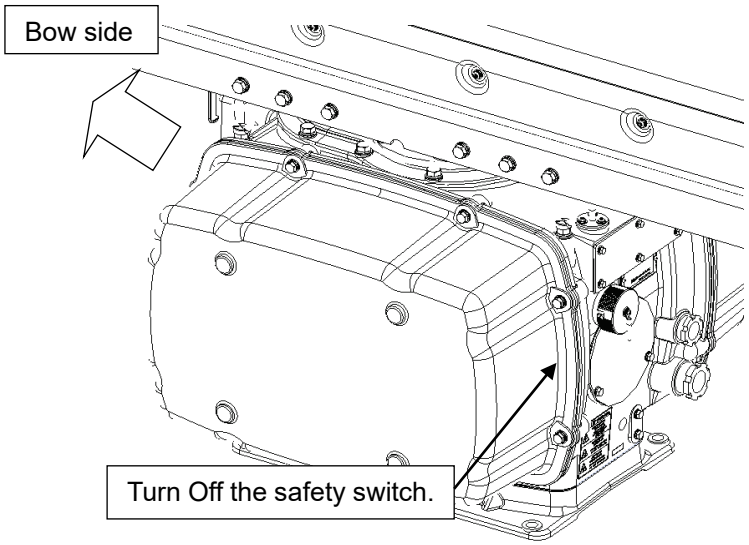
⚠ Before beginning work, turn Off the safety switch of the Scanner unit.

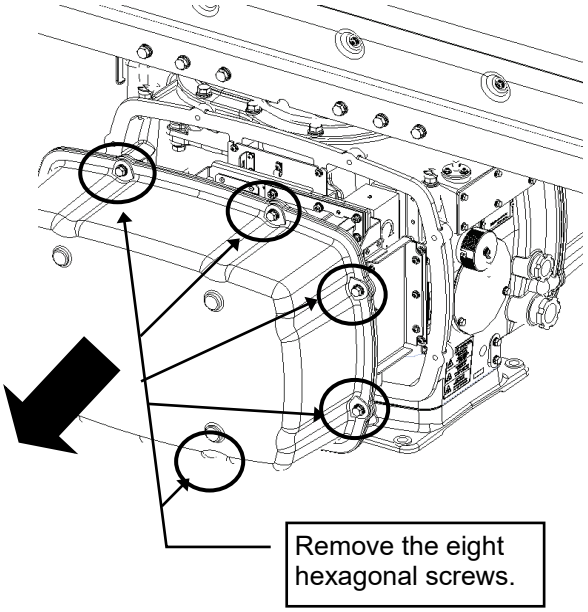
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

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

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

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

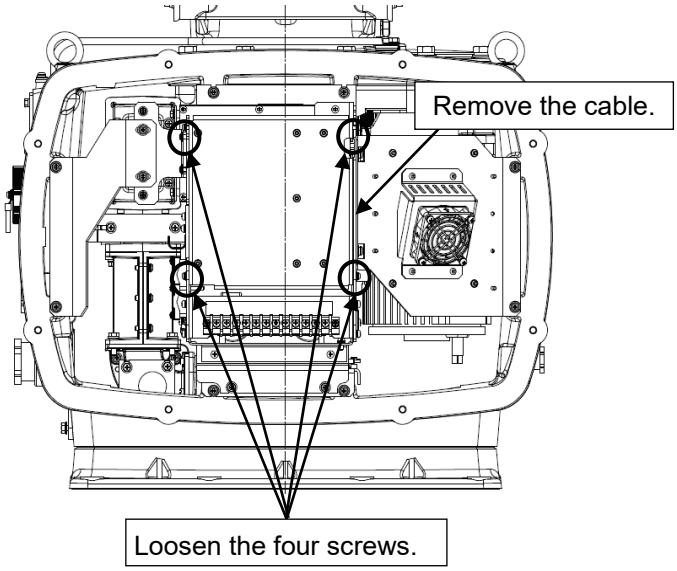


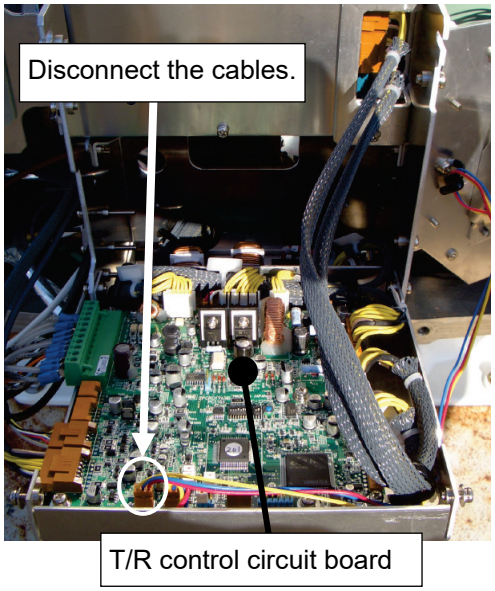


Example: Port side cover removal

Step 2 Remove the fan cable.

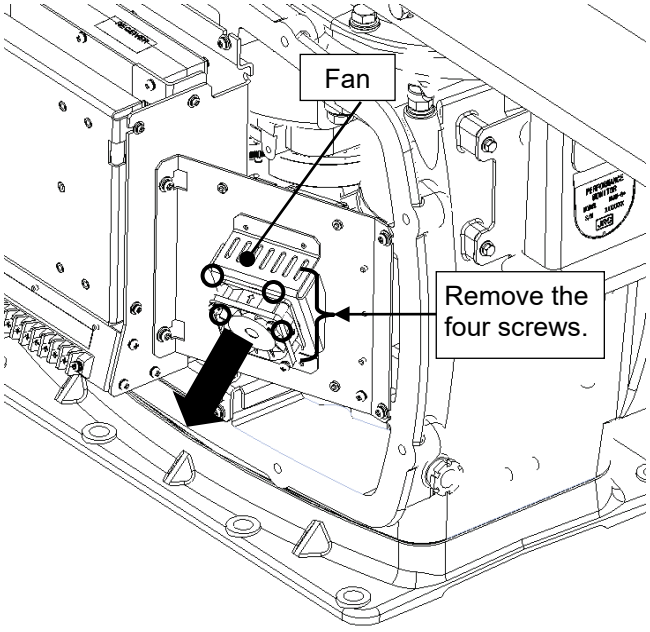
Remove the cover on the right (starboard) side and loosen the four screws (M4) to open the cover for the T/R control circuit board. Remove the motor driver circuit board fan cable (connector P1114) from the T/R control circuit board.





Step 3 Replace the fan.

Remove the four screws (M4) to replace the fan. After replacing the fan, assemble the unit in the reverse order of the disassembly procedure. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 4 Operation check

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

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

This completes modulation unit fan replacement.

4.1.1.5 Modulation Unit fan Replacement/NKE-1130

[Required Tools]

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

Table Required Tools

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

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

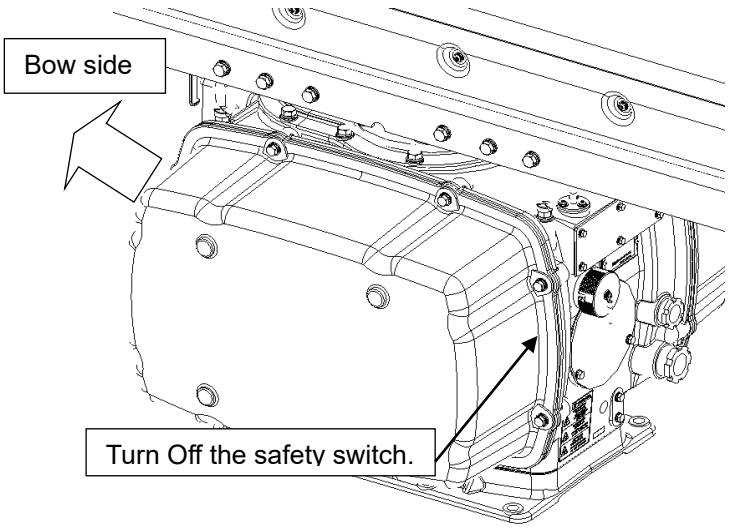
⚠ Before beginning work, turn Off the safety switch of the Scanner unit.

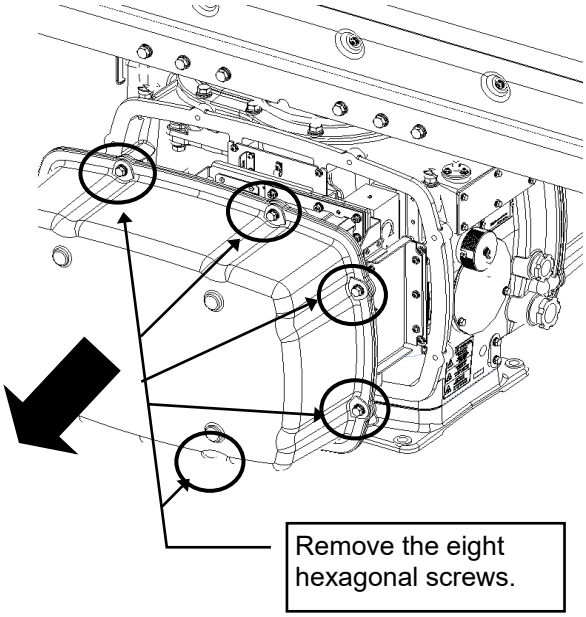
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

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

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

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

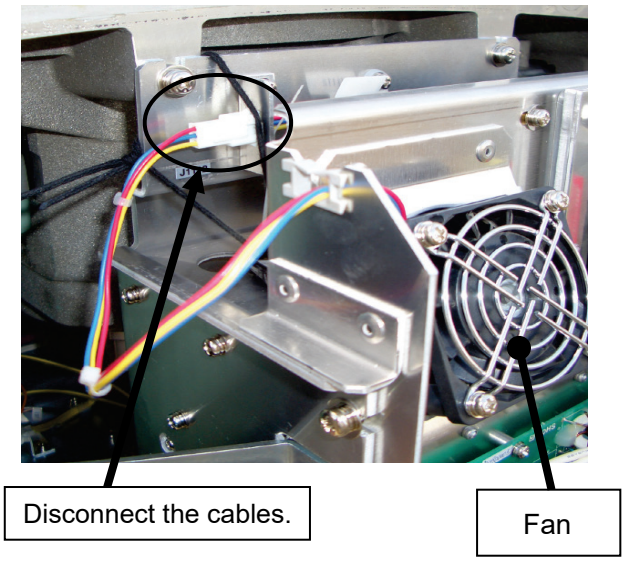




Example: Port side cover removal

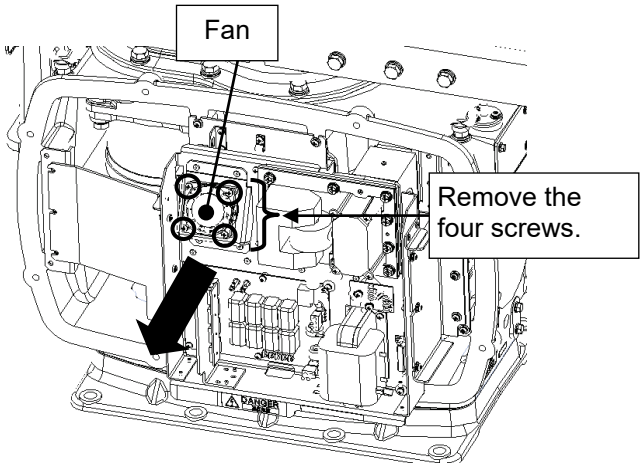
Step 2 Remove the modulation unit fan cable.

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



Step 3 Replace the modulation unit fan cable.

Remove the four screws (M4) to replace the fan. After replacing the fan, assemble the unit in the reverse order of the disassembly procedure. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 4 Operation check

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

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

This completes modulation unit fan replacement.

4.1.1.6 Modulation Circuit Board (CPA-264) Replacement/NKE-1130

[Required Tools]

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

Table Required Tools

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

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

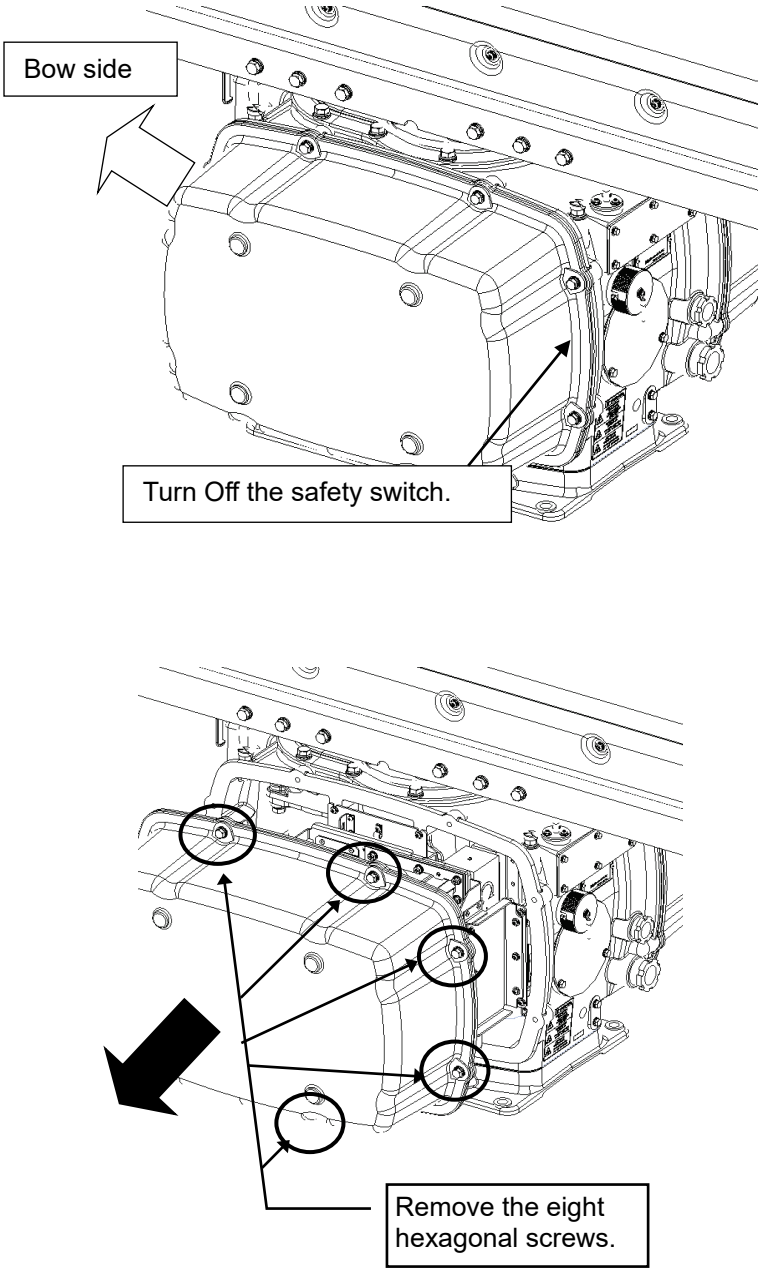
⚠ Before beginning work, turn Off the safety switch of the Scanner unit.

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

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

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

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



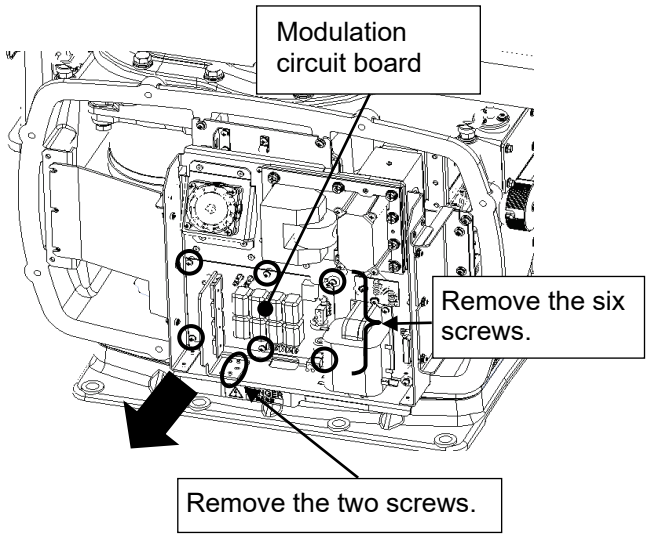
Example: Port side cover removal

Step 2 Remove the modulation circuit board cables.

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

Step 3 Replace the modulator circuit board.

Remove the two screws (M4) holding the metal sheet and the radiating plate of the modulation circuit board and the six screws (M4) holding the modulation circuit board, to replace the modulation circuit board. If reusing the heat radiation plate on the modulator, be sure to install the insulation sheet between the TR5-8 and the heat radiation plate so that it is straight. After replacing the modulation circuit board, assemble the unit in the reverse order of the disassembly procedure. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 4 Operation check

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

(1) Turn On the Display unit. After the preheat countdown is completed, start transmission and check that the radar image appears without error.
Transmit the radio wave in long pulse range mode and open the service engineer menu to check that the magnetron current stands between the 5th and 7th calibration markings.

This completes modulation circuit board replacement.

4.1.1.7 Modulation Circuit Board (NMA-551) Replacement/NKE-1130

[Required Tools]

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

Table Required Tools

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

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

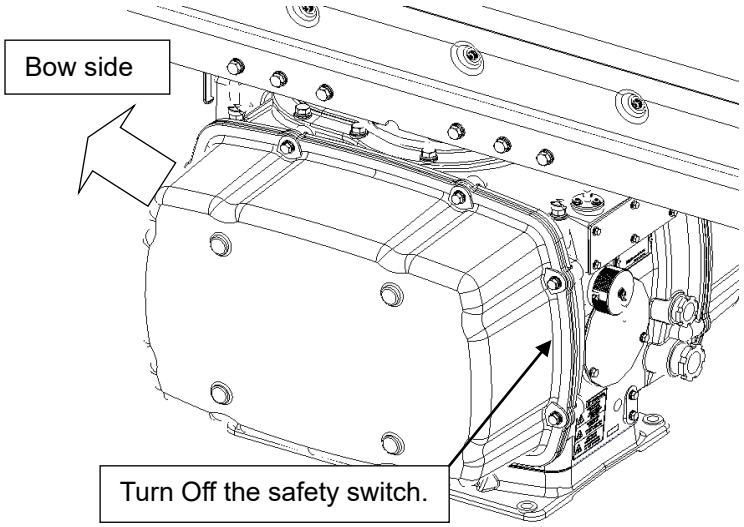
⚠ Before beginning work, turn Off the safety switch of the Scanner unit.

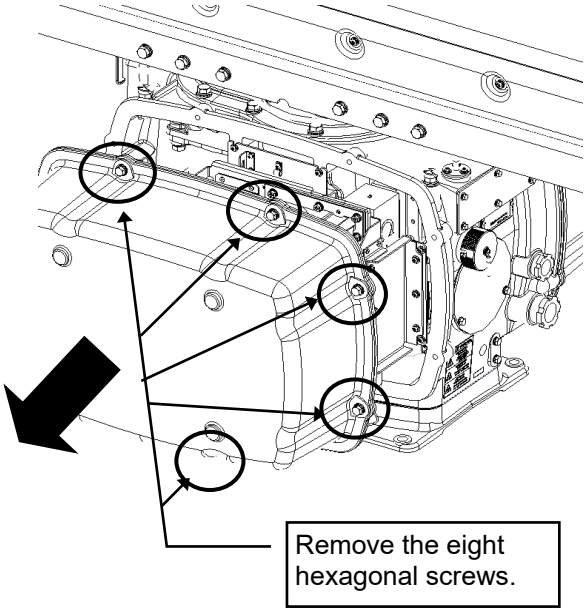
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

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

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

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

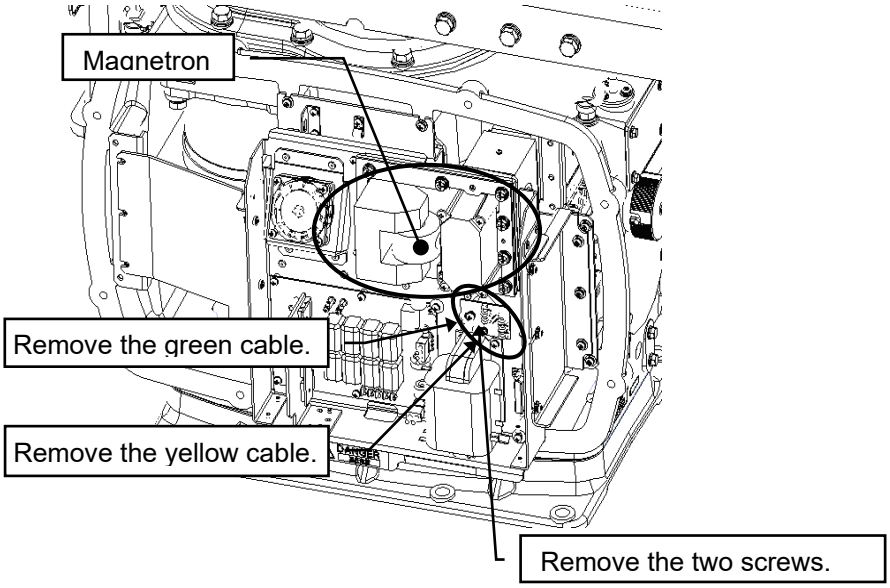




Example: Port side cover removal

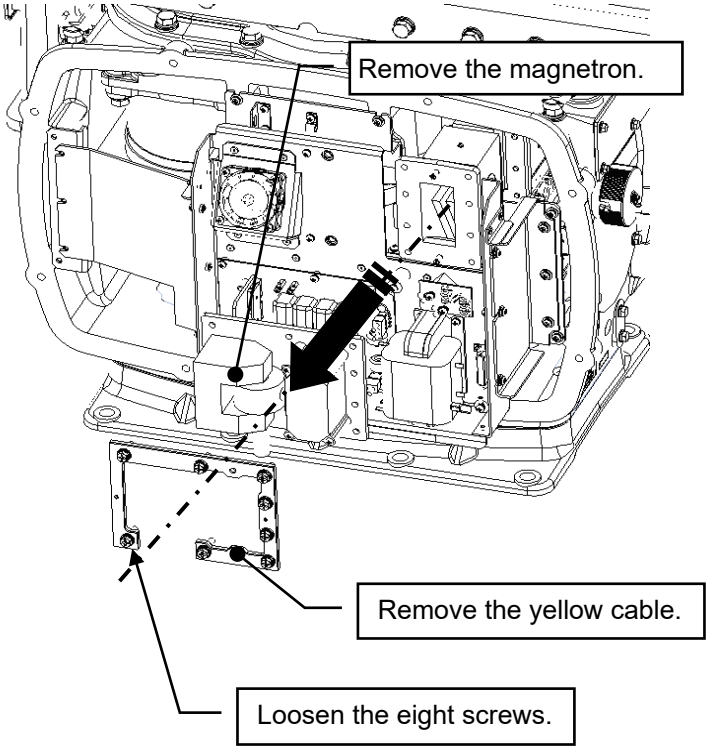
Step 2 Remove the screws holding the magnetron cable.

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



Step 3 Remove the fixture holding the magnetron.

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

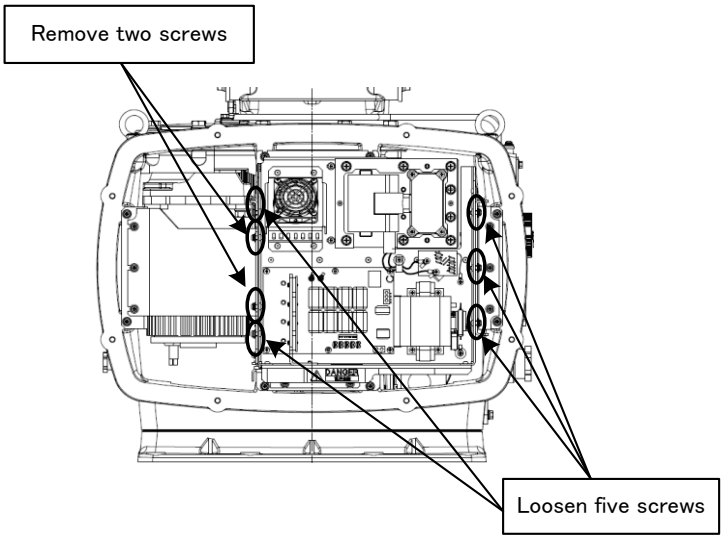


⚠ The magnetron is held by a hook, but be careful not to let it fall.

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

Step 4 Replace the modulation unit.

Remove the two screws (M5), loosen the five screws (M5) holding the modulation unit, and replace it. After replacing the modulation circuit board, assemble the unit in the reverse order of the disassembly procedure. Install the magnetron that was removed to the original position. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 5 Operation check

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

(1) Turn On the Display unit. After the preheat countdown is completed, start transmission and check that the radar image appears without error.
Transmit the radio wave in long pulse range mode and open the service engineer menu to check that the magnetron current stands between the 5th and 7th calibration markings.

This completes modulation unit replacement.

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

[Required Tools]

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

Table Required Tools

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

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

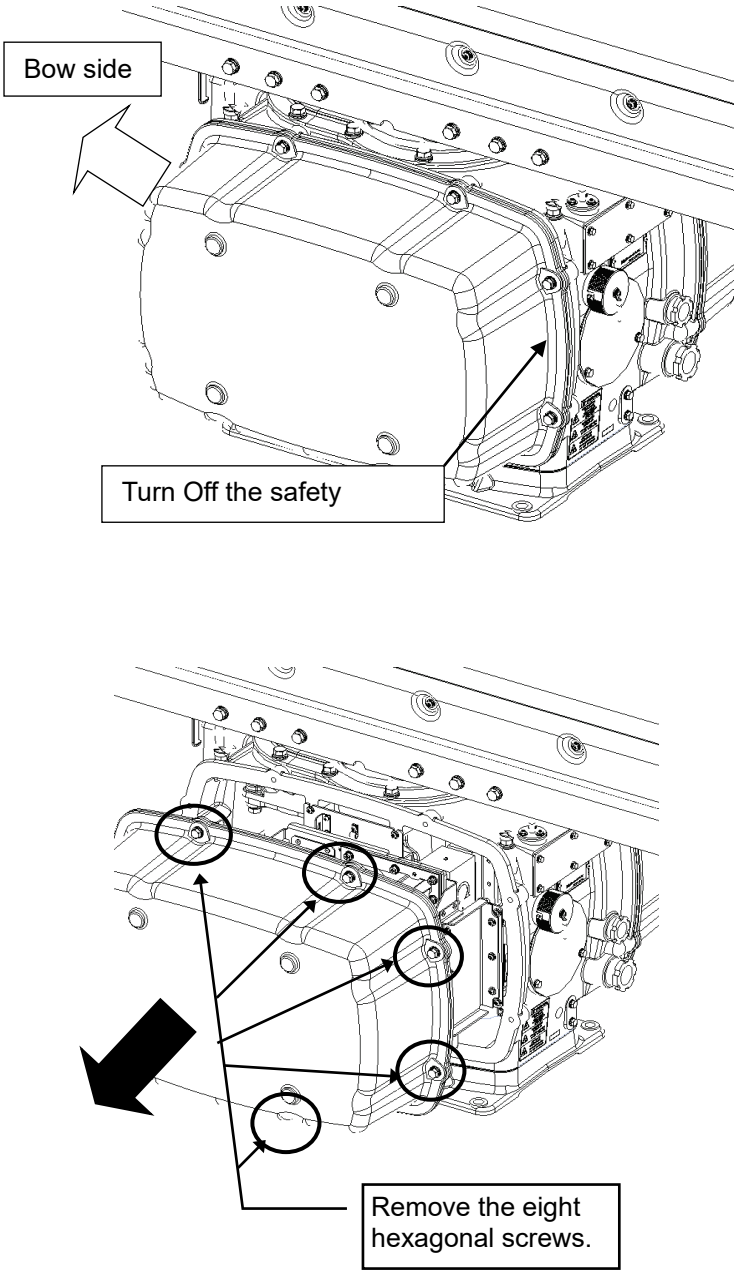
⚠ Before beginning work, turn Off the safety switch of the Scanner unit.

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

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

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

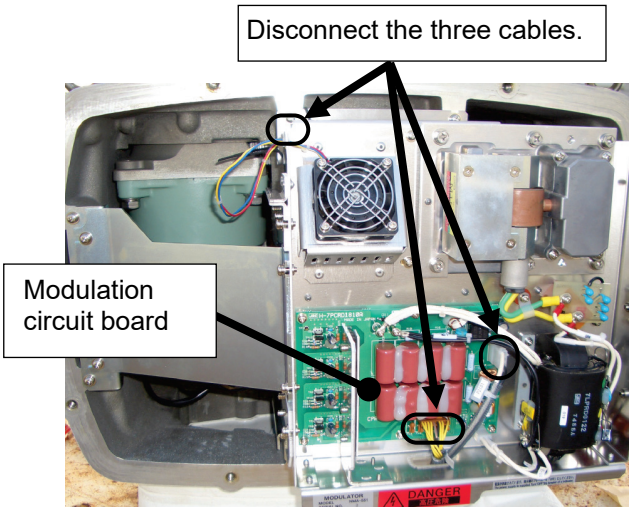
The safety switch is located on the rear (stern) side of the scanner unit. Open the cover for the safety switch and turn it Off (to the lower side). Remove the cover on the left (port) side.



Example: Port side cover removal

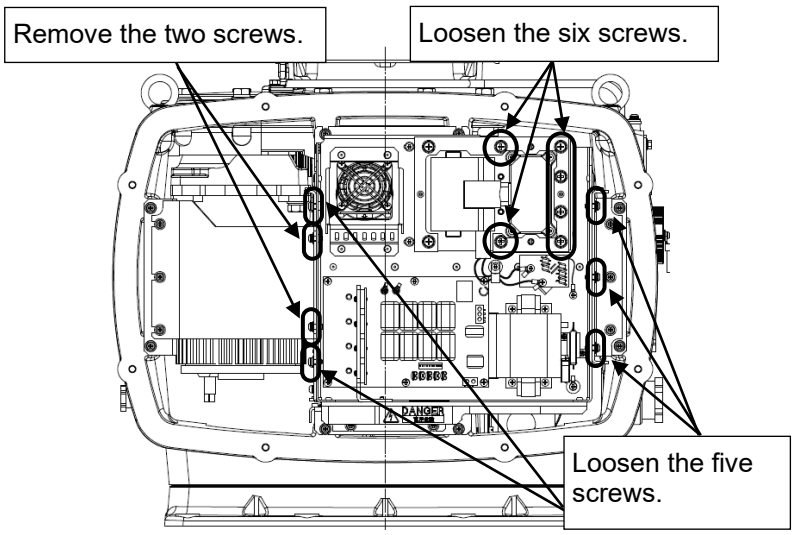
Step 2 Remove the modulation circuit board cables.

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



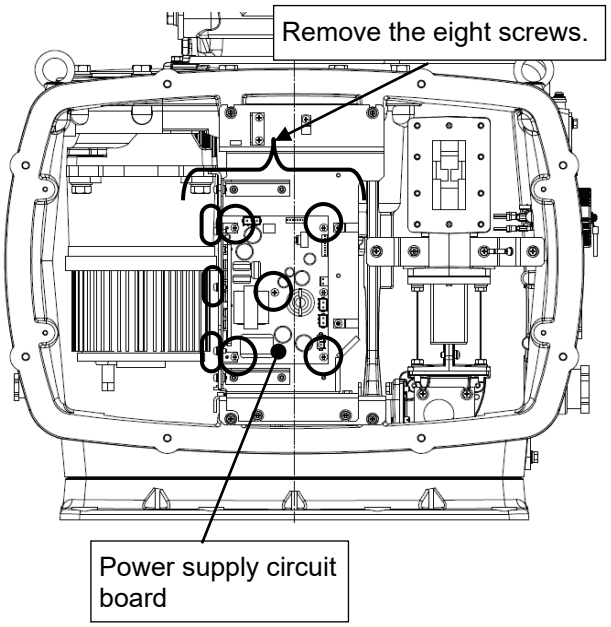
Step 3 Remove the modulation circuit board.

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



Step 4 Replace the power supply circuit board

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



Step 5 Operation check

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

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

This completes power supply circuit board replacement.

4.1.1.9 T/R Control Circuit Board (CMC-1205R) Replacement/NKE-1130

[Required Tools]

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

Table Required Tools

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

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

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

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

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

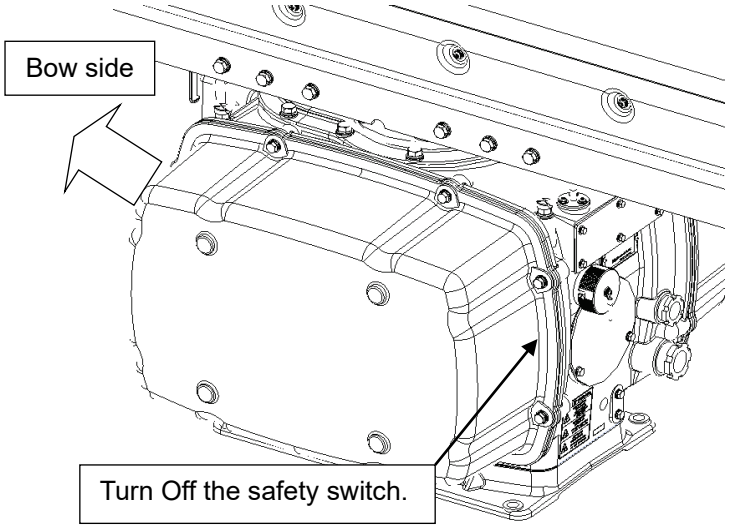
Step 1 Back up the scanner unit data.

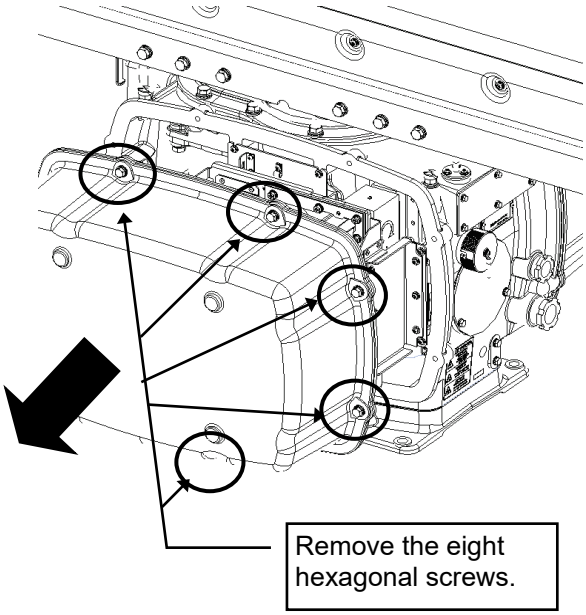
Before starting replacement work, open the service engineer menu on the display unit and back up the scanner unit data (transmission time and motor rotation time).

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

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

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

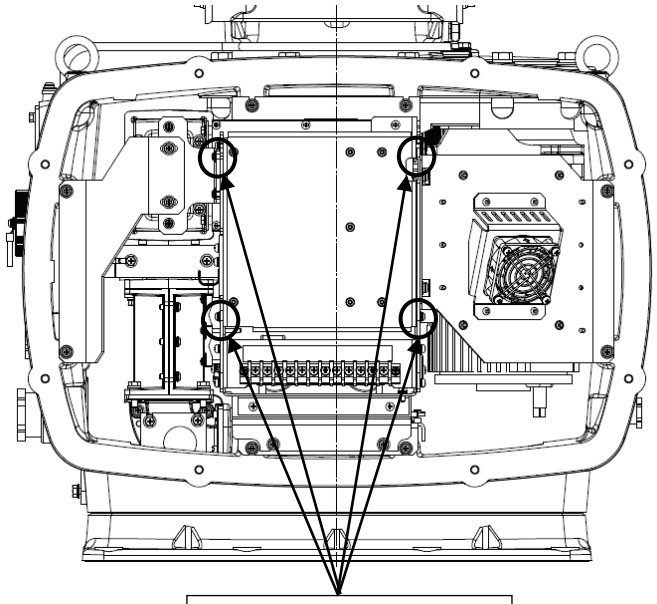




Example: Port side cover removal

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

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



Loosen the four screws.

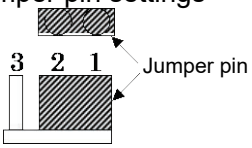
Step 3 Replace the T/R control circuit board.

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

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

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

- Jumper pin settings

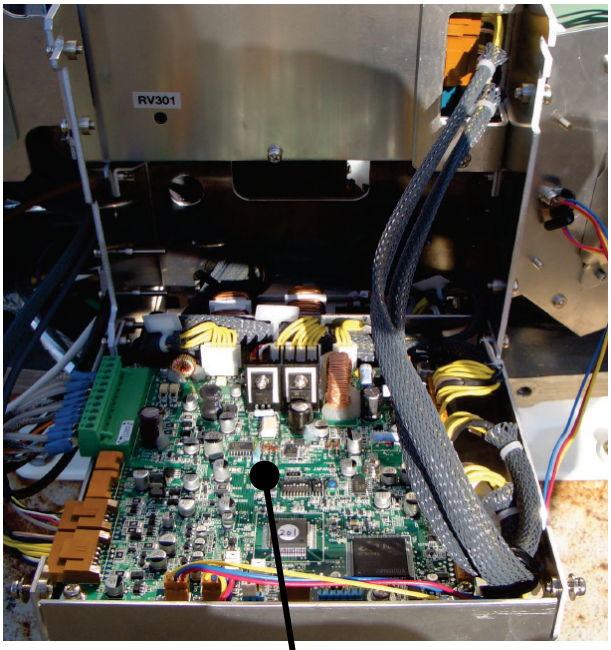


J92,J93,J95,J96: 1-2 short circuit

- DIP switch settings (■ indicates a switch.)



After replacing the T/R control circuit board, assemble the unit in the reverse order of the disassembly procedure. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



T/R control circuit board

Step 4 Operation check

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

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

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

This completes T/R control circuit board replacement.

4.1.1.10 Relay Filter Circuit Board (CSC-656) Replacement/NKE-1130

[Required Tools]

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

Table Required Tools

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

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

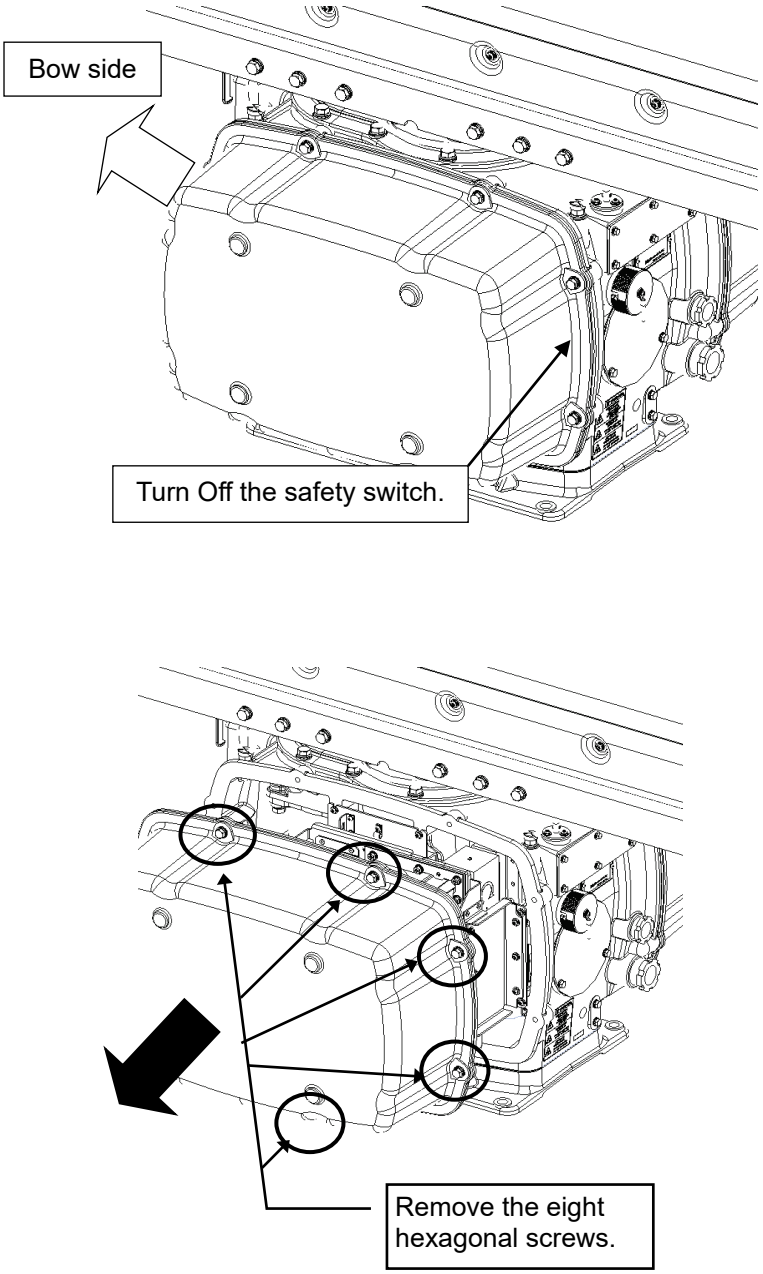
⚠ Before beginning work, turn Off the safety switch of the Scanner unit.

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

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

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

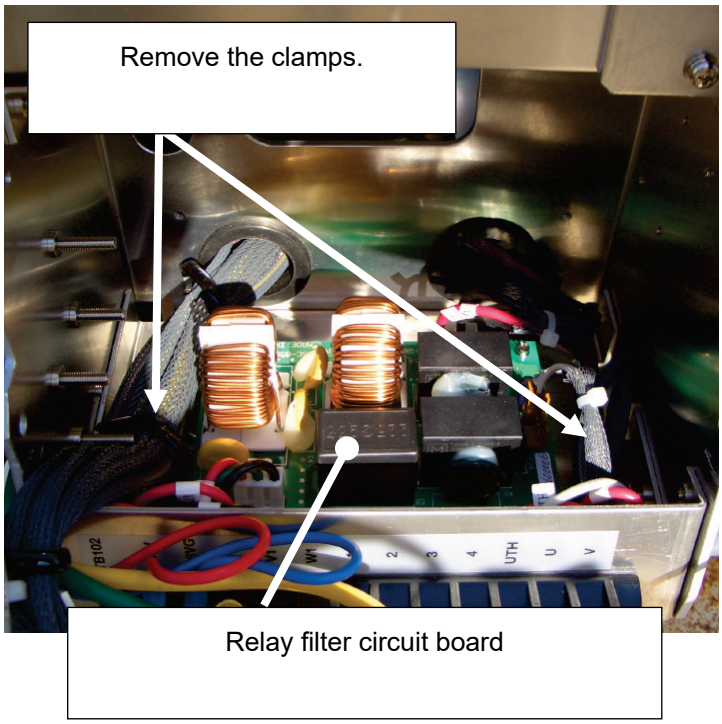
The safety switch is located on the rear (stern) side of the scanner unit. Open the cover for the safety switch and turn Off it (to the lower side). Remove the cover on the right (starboard) side.



Example: Port side cover removal

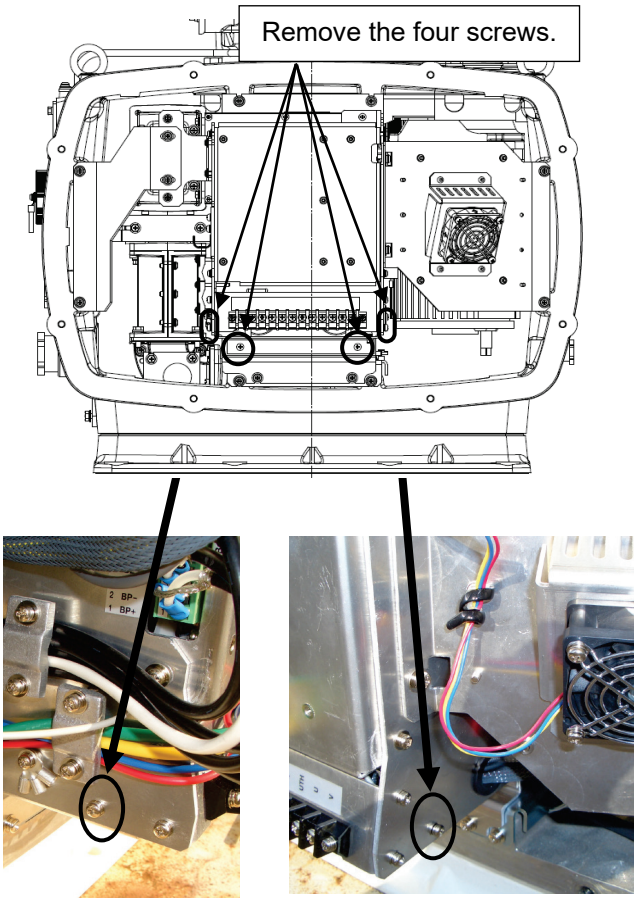
Step 2 Remove the cable clamps around the relay filter circuit board.

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



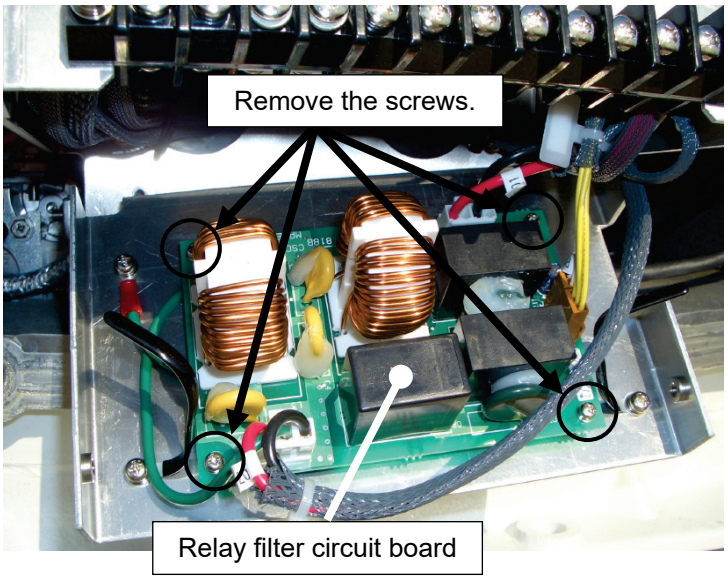
Step 3 Remove the metal fixture holding the relay filter circuit board.

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



Step 4 Replace the relay filter circuit board

Remove the cable connected to the relay filter circuit board and the four screws (M4) to replace the relay filter circuit board. After replacing it, follow the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 5 Operation check

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

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

This completes T/R control circuit board replacement.

4.1.1.11 Receiving Unit (NRG-229) Replacement/NKE-1130

[Required Tools]

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

Table Required Tools

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

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

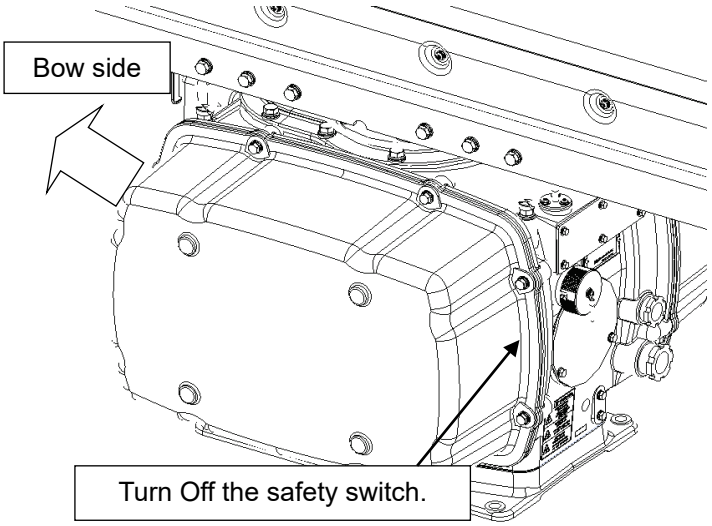
⚠ Before beginning work, turn Off the safety switch of the Scanner unit.

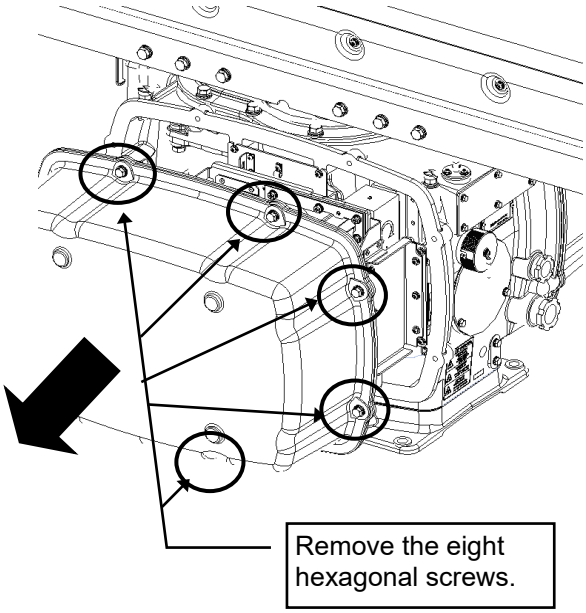
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

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

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

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

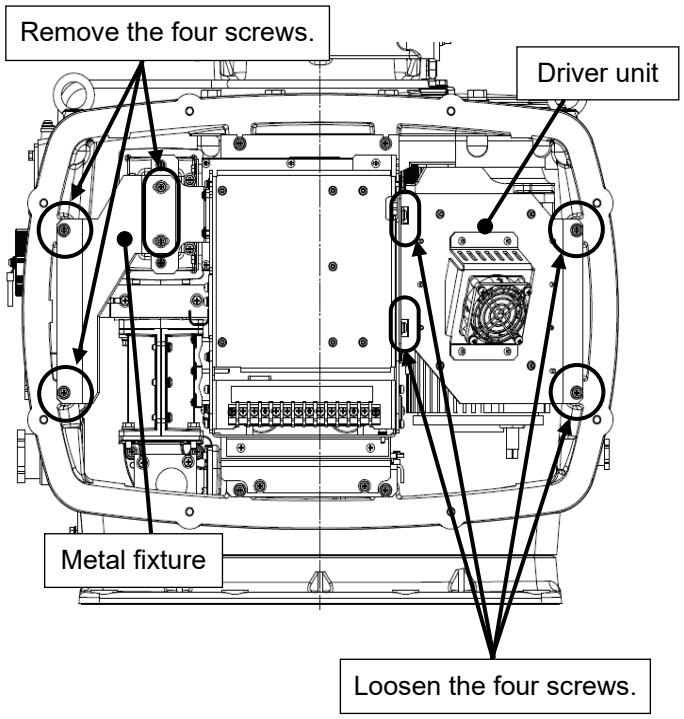




Example: Port side cover removal

Step 2 Remove the driver unit.

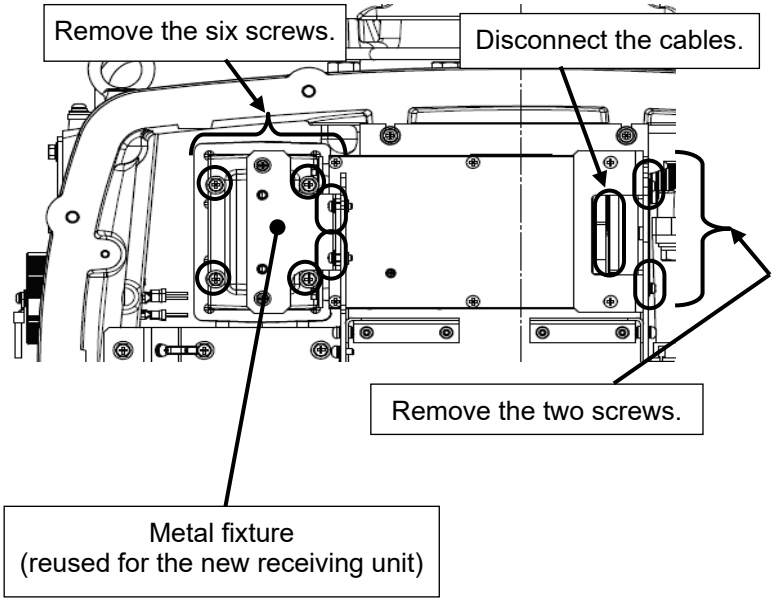
Remove the cover on the right (starboard) side. Remove the four screws (M5) to remove the metal fixture. Loosen the four screws (M4) to remove the driver unit.



Step 3 Replace the receiving unit.

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

Attach the metal fixture attached to the flange removed from the receiving unit you just removed and put it onto the new receiving unit. After replacing the receiving unit, assemble the unit in the reverse order of the disassembly procedure. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 4 Operation check

After replacing the receiving unit, check operation by following the procedure below.

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error. Transmit the radio wave in the long range mode and open the service engineer menu to perform tuning adjustment. Adjust the setting in the service engineer menu until the tuning indication bar on the display unit reaches the 8th calibration marking.

This completes receiving unit replacement.

4.1.1.12 Encoder (CHT-71A) Replacement/NKE-1130

[Required Tools]

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

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2, Size #3	
2	Open-end wrench*1	Width across flats 7 mm (for M4 screws), 8 mm (for M6 screws), 13 mm (for M8 screws)	
3	Socket wrench*1	Width across flats 7 mm (for M4 screws), 8 mm (for M6 screws), 13 mm (for M8 screws)	

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

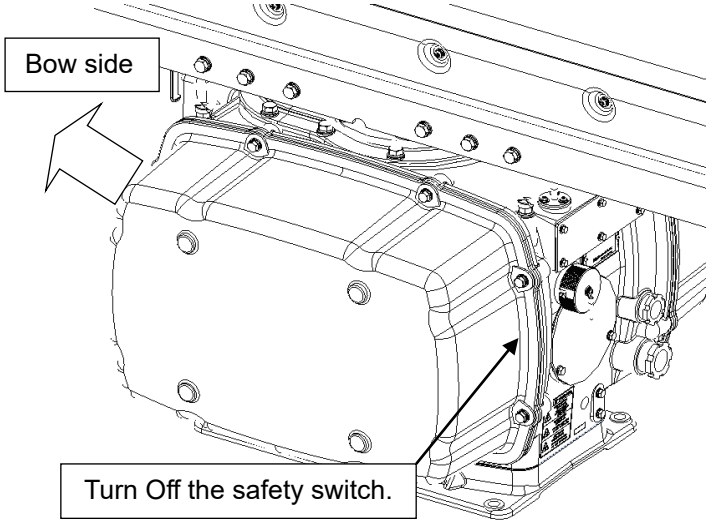
⚠ Before beginning work, turn Off the safety switch of the Scanner unit.

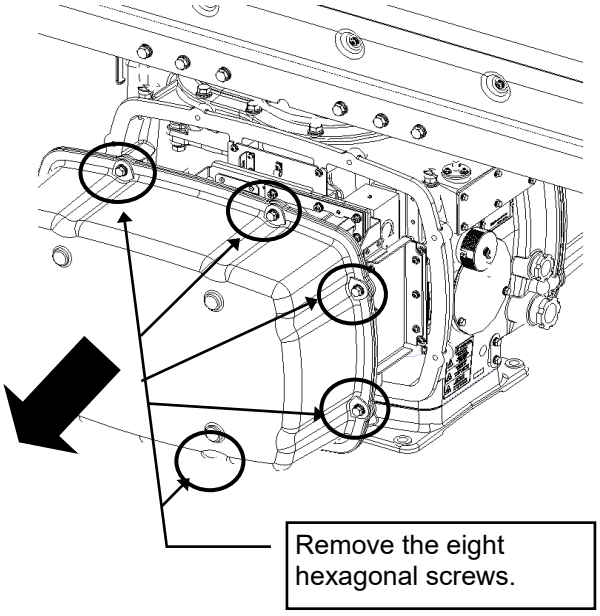
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

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

Step 1 Set the safety switch to Off and remove the covers on both sides.

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

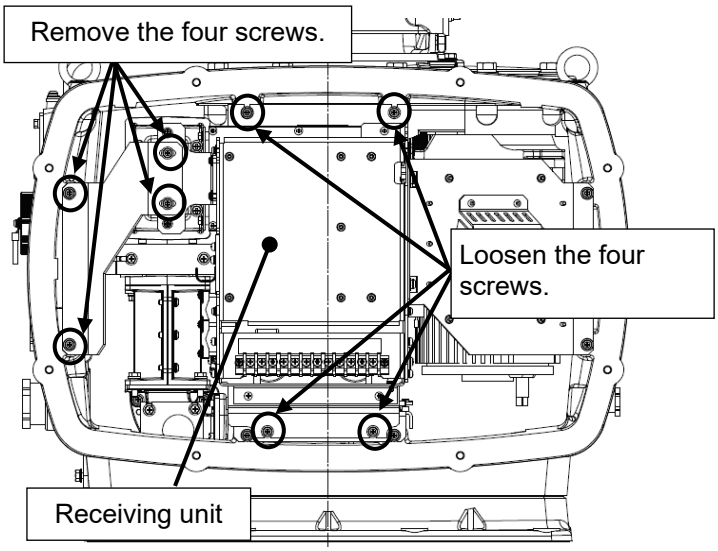




Example: Port side cover removal

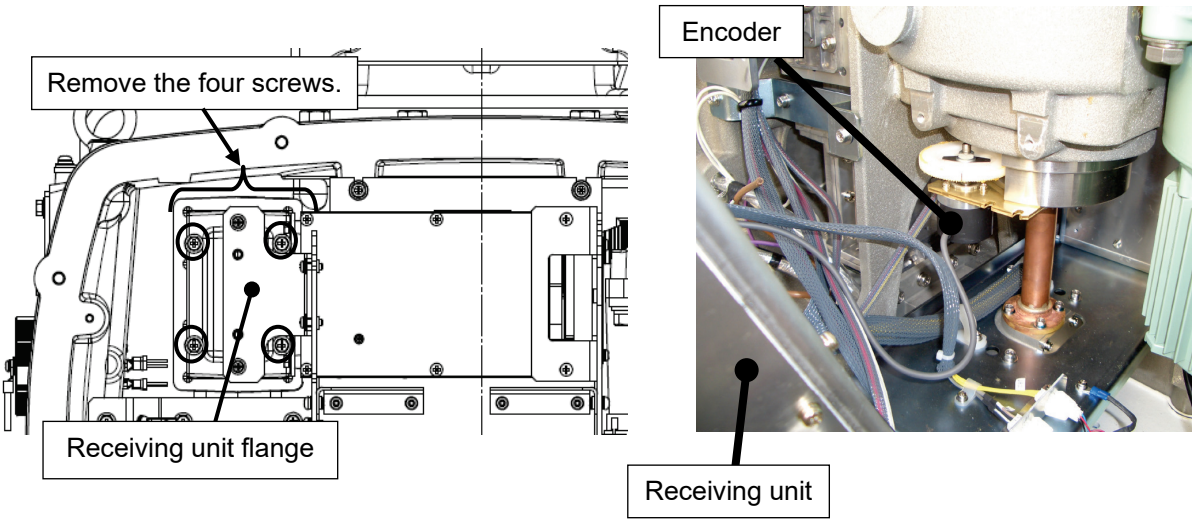
Step 2 Loosen the receiving unit.

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



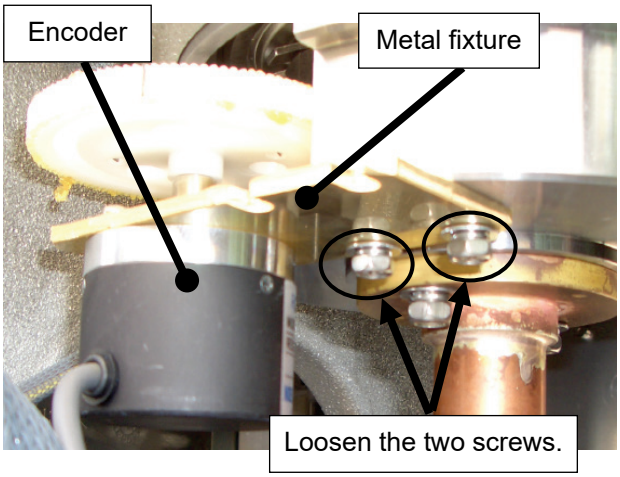
Step 3 Remove the receiving unit.

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



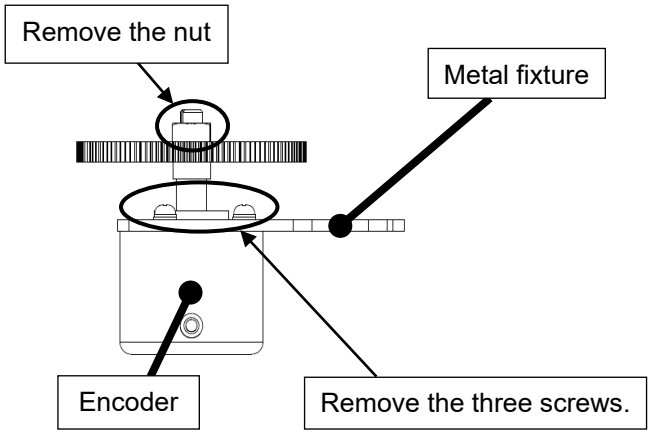
Step 4 Remove the encoder.

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



Step 5 Replace the encoder.

Remove the metal fixture and the gear wheel attached to the encoder. Put them onto the new encoder and put it back into the unit. After replacing the encoder, follow the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 6 Operation check

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

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error. Open the service engineer menu to perform azimuth adjustment.

This completes encoder replacement.

4.1.1.13 Brake Control Circuit (CCB-655A) Replacement/NKE-1130

[Required Tools]

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

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2, Size #3	
2	Open-end wrench*1	Width across flats 7 mm (for M4 screws), 13 mm (for M8 screws)	
3	Socket wrench*1	Width across flats 7 mm (for M4 screws), 13 mm (for M8 screws)	

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

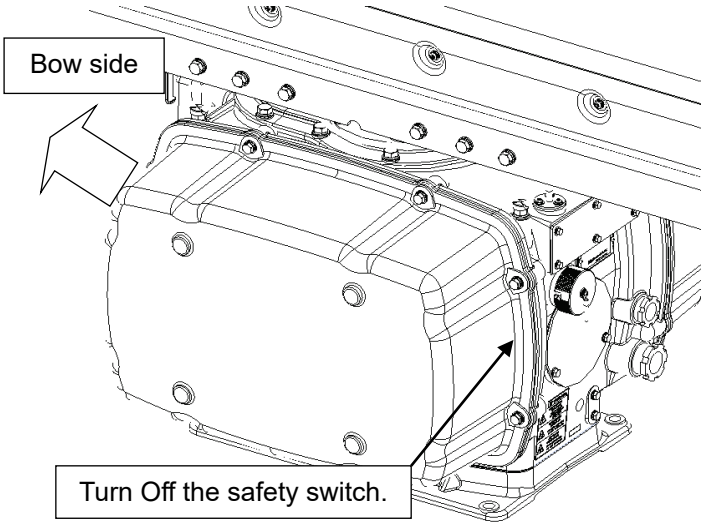
⚠ Before beginning work, turn Off the safety switch of the Scanner unit.

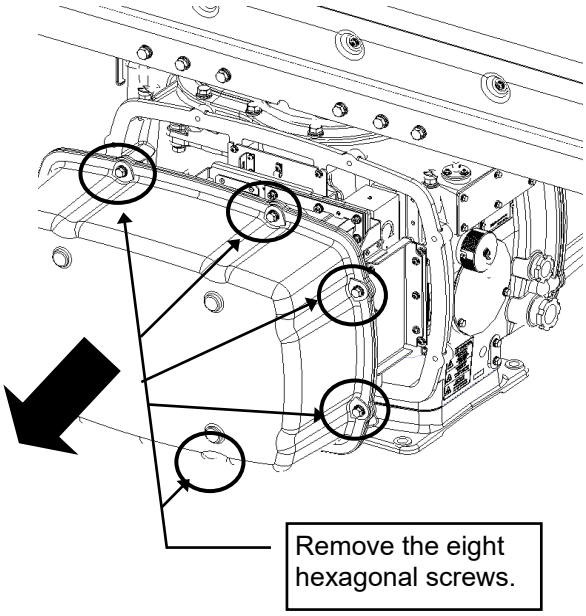
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

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

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

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

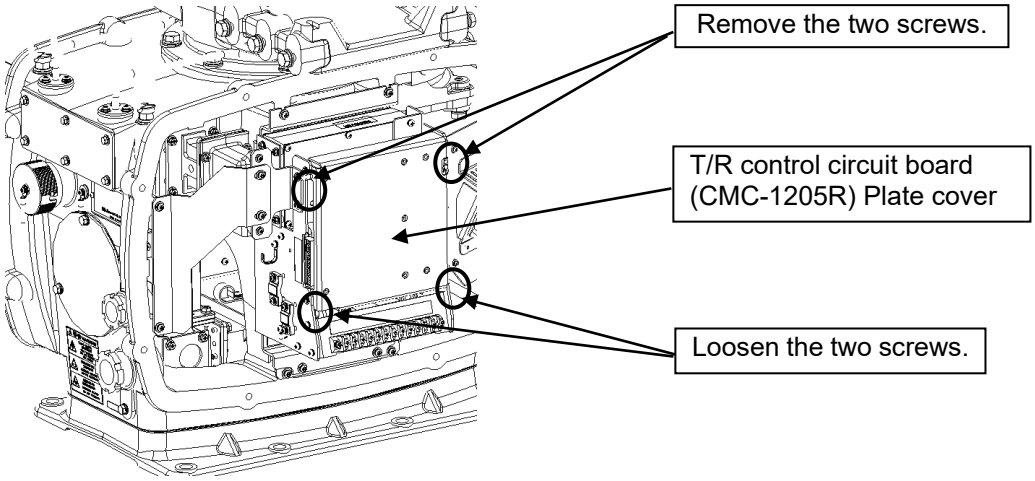




Example: Port side cover removal

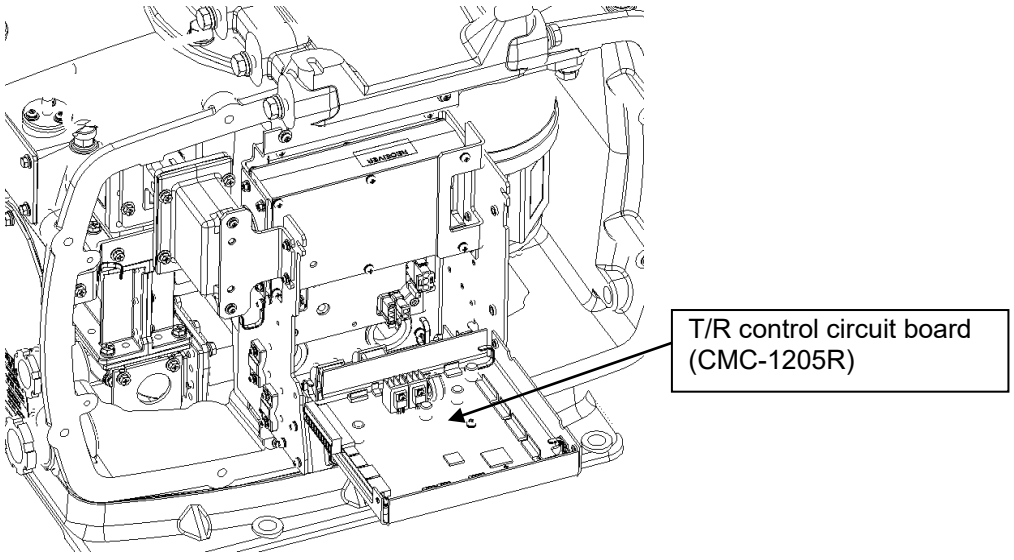
Step 2 Loosen the screws of the T/R control circuit board plate cover.

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



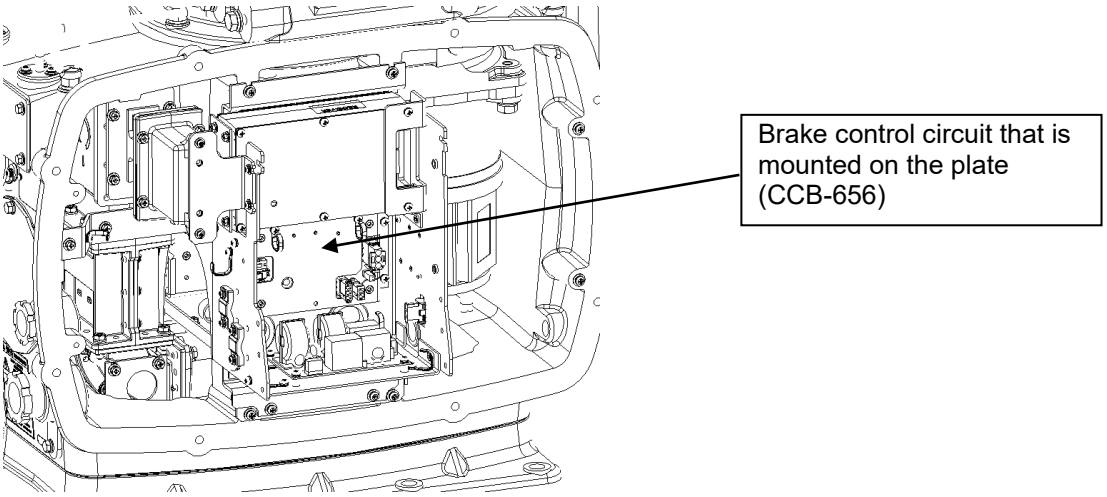
Step 3 Remove the T/R control circuit.

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



Step 4 Replace the brake control circuit.

Remove all the connectors that are connected to the brake control circuit (CCB-656). Remove the four screws (M4) from the plate on which the brake control circuit is held and replace it together with the plate. After replacing the brake control circuit, reassemble the unit by following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 5 Operation check

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

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

This completes brake control circuit replacement.

4.1.1.14 Brake Circuit (CFA-255) Replacement/NKE-1130

[Required Tools]

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

Table Required Tools

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

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

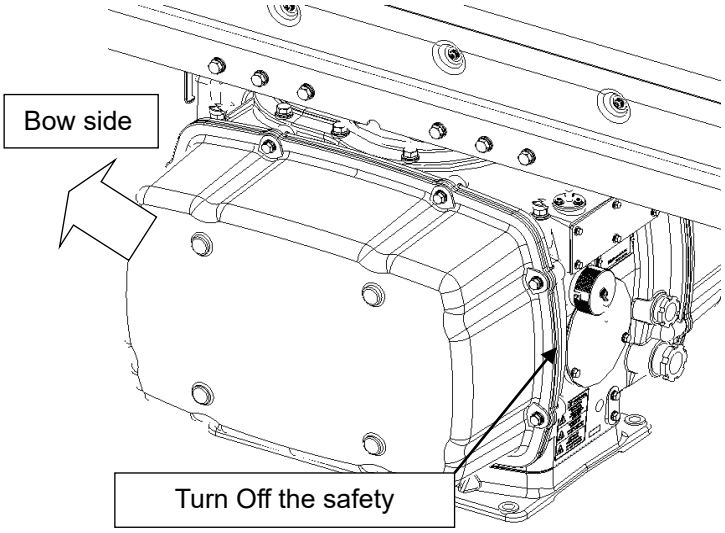
⚠ Before beginning work, turn Off the safety switch of the Scanner unit.

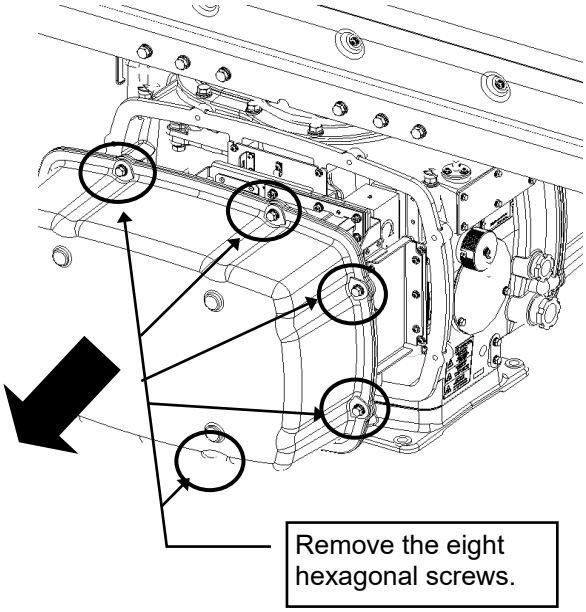
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

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

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

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

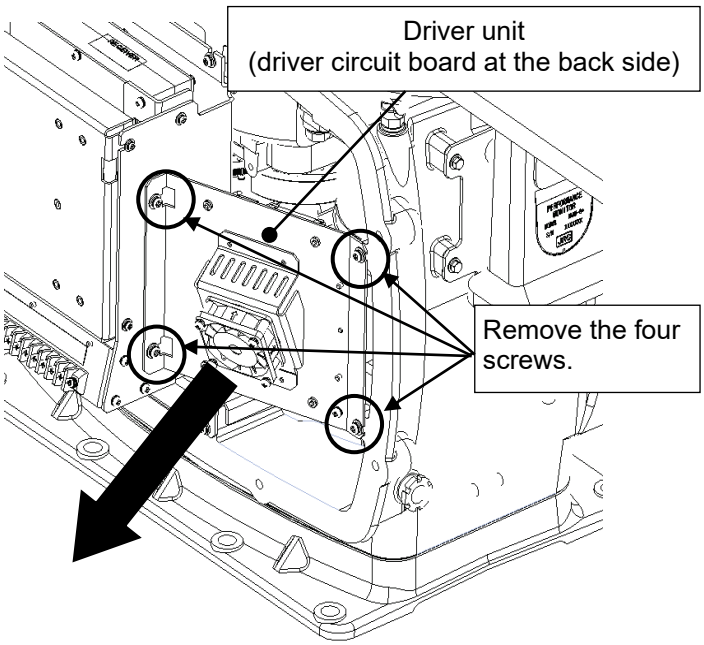




Example: Port side cover removal

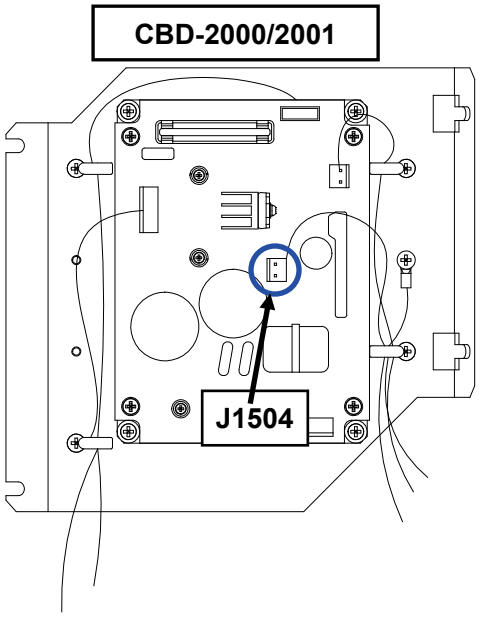
Step 2 Remove the motor driver unit.

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



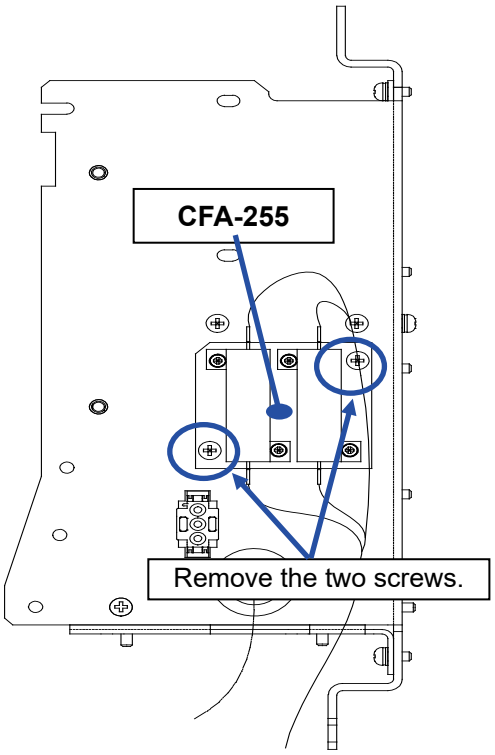
Step 3 Remove the motor driver circuit board.

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



Step 5 Replace the brake circuit.

Remove the two screws (M4) holding the brake circuit on the right side of the chassis and replace it (CFA-255: resistor with cable). After replacing the brake circuit, reassemble the unit by following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 6 Operation check

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

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

This completes brake circuit replacement.

4.1.1.15 Brake Circuit Unit (NZR-17) Replacement/NKE-1130

[Required Tools]

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

Table Required Tools

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

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

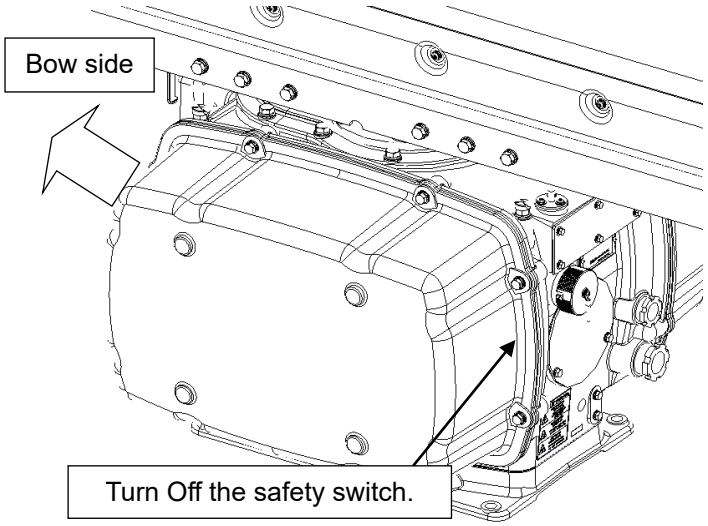
⚠ Before beginning work, turn Off the safety switch of the Scanner unit.

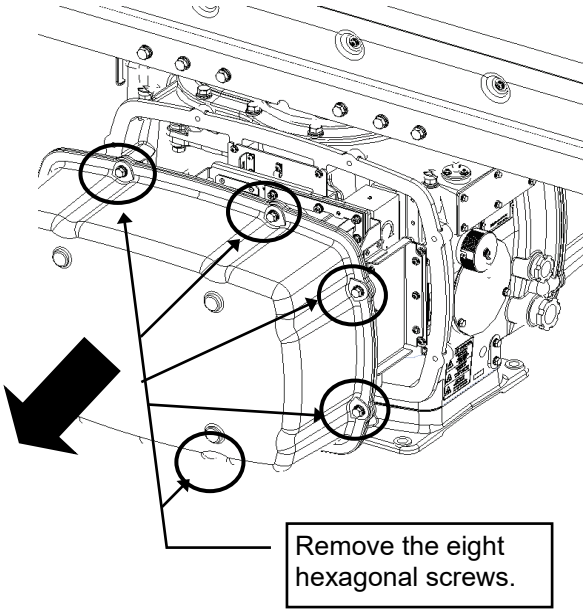
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

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

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

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

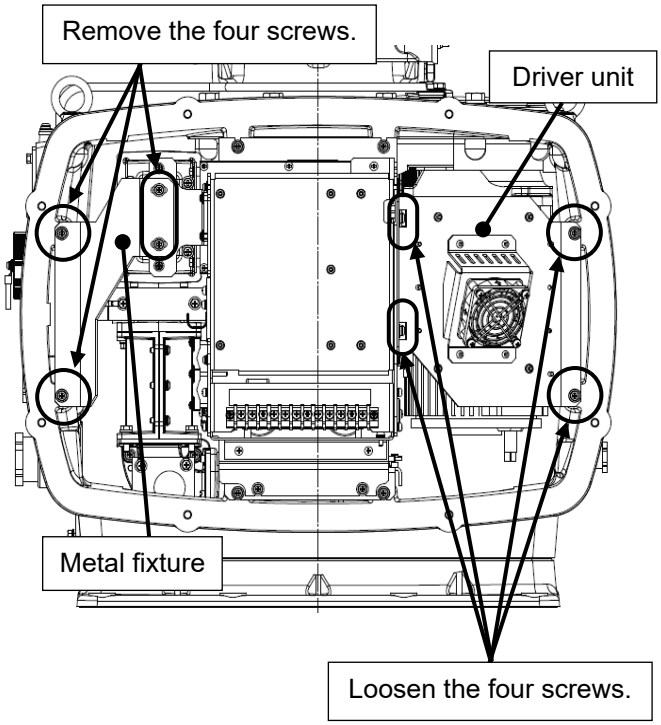




Example: Port side cover removal

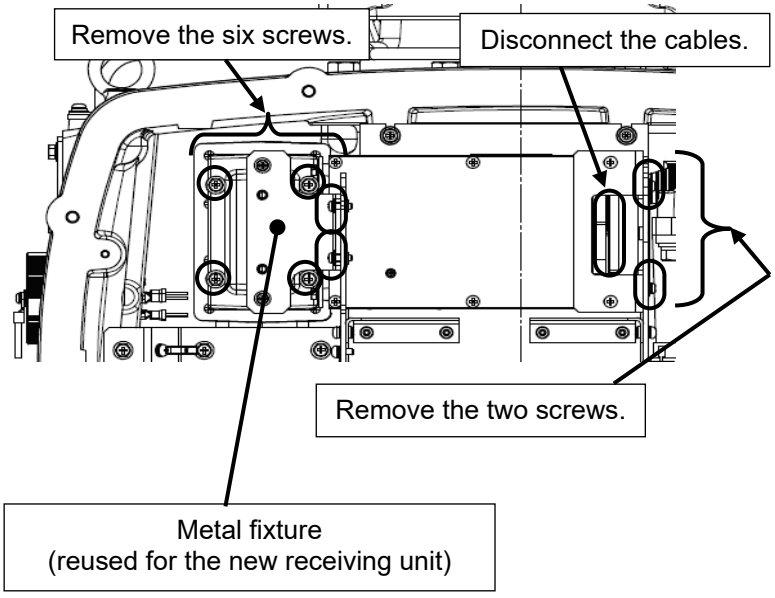
Step 2 Remove the driver unit.

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



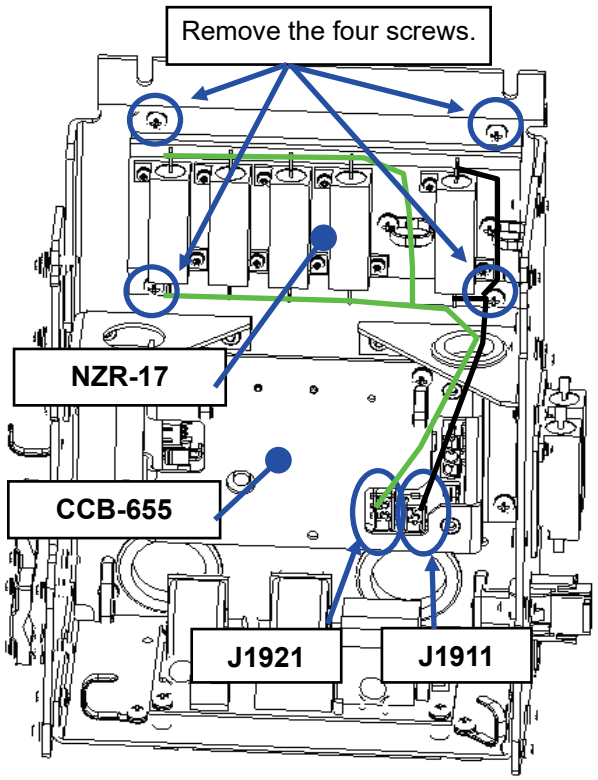
Step 3 Remove the receiving unit.

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



Step 4　　Replace the brake circuit unit.

Remove the cables that are connected to J1921 and J1911 of the brake control circuit (CCB-655). Remove the four screws (M4) and replace the brake circuit unit (NZR-17). After replacing the brake circuit, reassemble the unit by following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 5　Operation check

After completing the replacement work, turn On the safety switch and carry out the following work.

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

This completes brake circuit unit replacement.

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

Instruction for Equipment

装備要領

1. Adapter installation
アダプタの取り付け

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

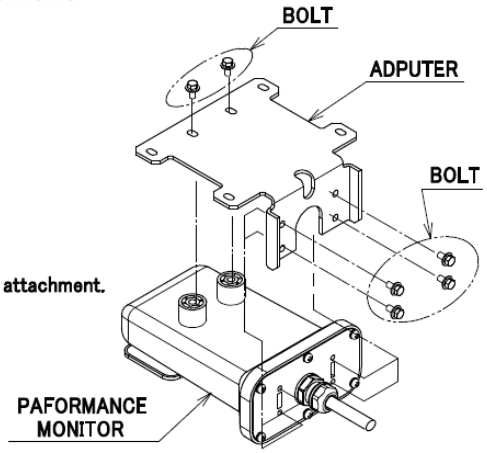


Fig1 (図1)

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

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

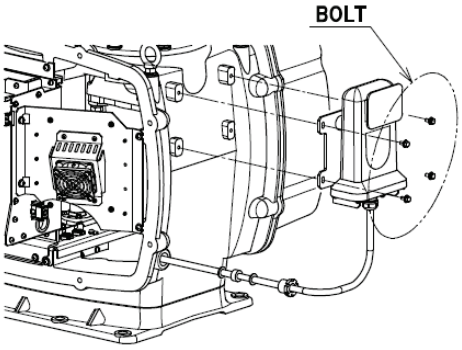


Fig2 (図2)

3.Wiring
配線

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

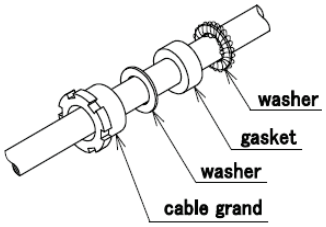


Fig3 (図3)

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

4.Check and adjustment
確認と調整

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

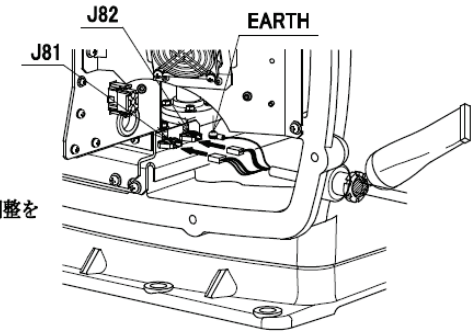


Fig4 (図4)

5. Water proof
防水処理

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

4.1.2 NKE-1139 Scanner Unit

4.1.2.1 Motor Replacement/NKE-1139

[Required Tools]

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

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2, Size #3	
2	Open-end wrench*1	Width across flats 13 mm (for M8 screws), 17 mm (for M10 screws)	
3	Socket wrench*1	Width across flats 13 mm (for M8 screws), 17 mm (for M10 screws)	

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

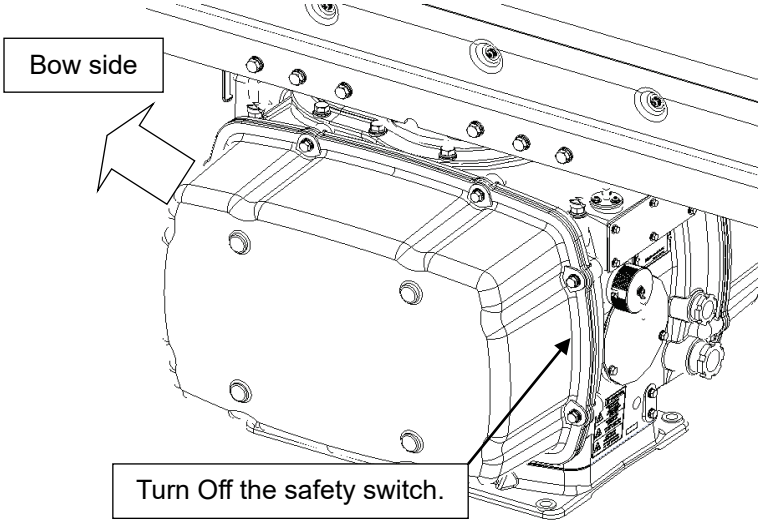
⚠ Before beginning work, turn Off the safety switch of the Scanner unit.

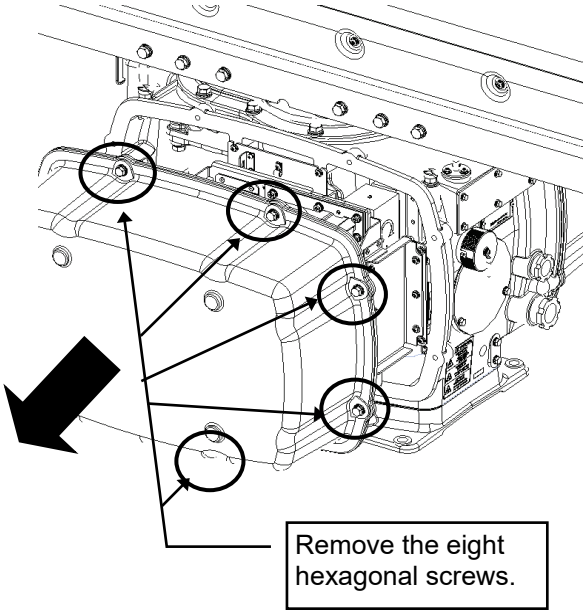
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

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

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

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

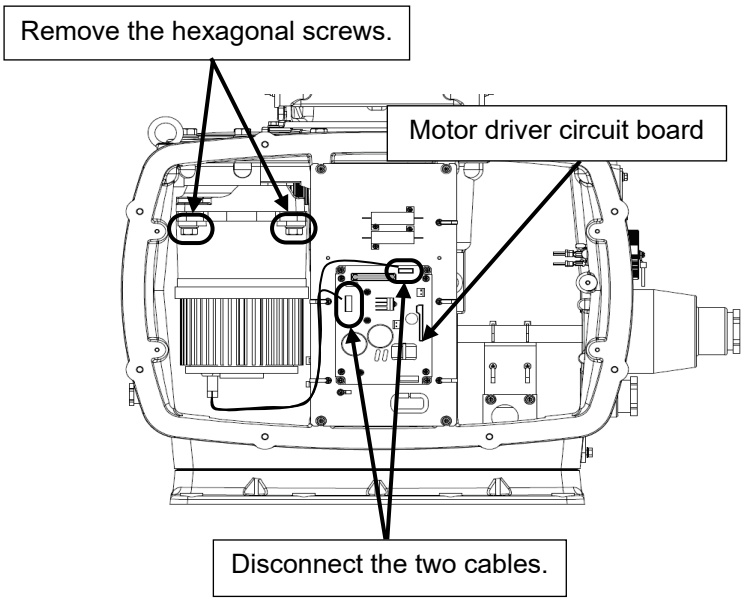




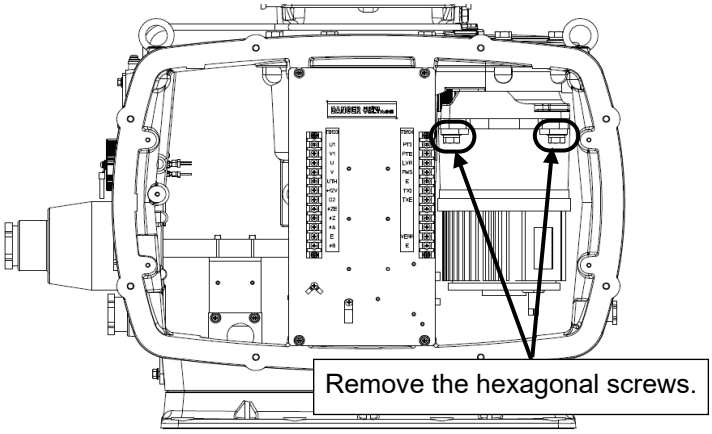
Example: Port side cover removal

Step 2 Remove the motor.

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



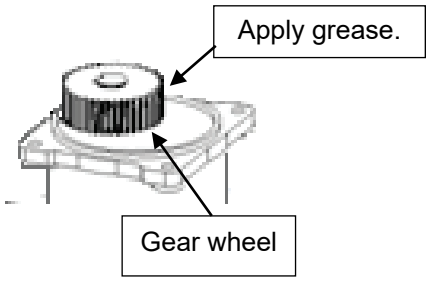
Port side



Starboard side

Step 3 Apply grease to the new motor.

Apply grease to the gear wheel of the new motor.



Step 4 Place the replacement motor.

Place the replacement motor in the scanner unit and fix it in place with the hexagonal bolts. Tighten the bolts to the appropriate torque (350 kgf•cm) 34Nm, so they are free of looseness. After having replaced the motor, reassemble the unit following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.

Step 5 Operation check

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

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

This completes motor replacement.

4.1.2.2 Motor Drive Circuit Board Replacement/NKE-1139

[Required Tools]

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

Table Required Tools

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

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

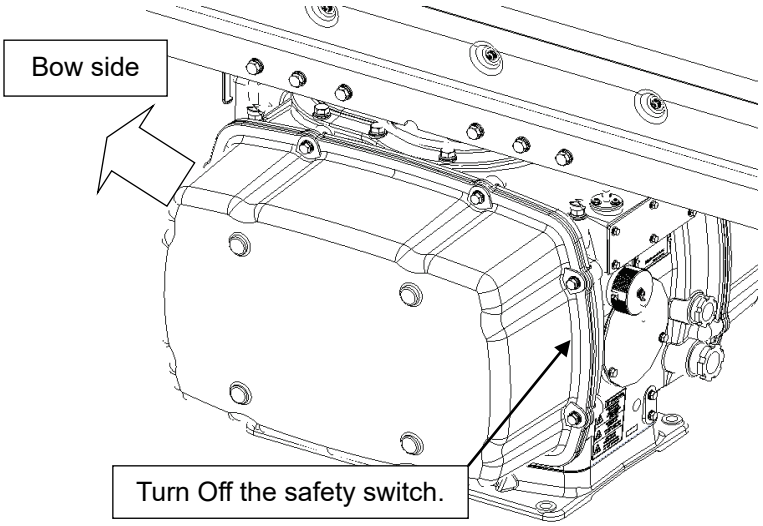
⚠ Before beginning work, turn Off the safety switch of the Scanner unit.

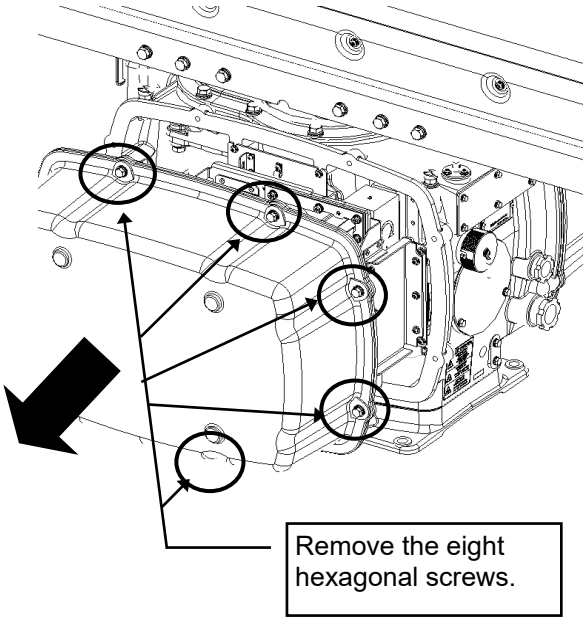
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

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

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

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





Example: Port side cover removal

Step 2 Replace the driver circuit board.

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

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

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

Step 3 Operation check

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

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

This completes motor replacement.

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

[Required Tools]

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

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2, Size #3	
2	Open-end wrench*1	Width across flats 7 mm (for M4 screws), 8 mm (for M6 screws), 13 mm (for M8 screws)	
3	Socket wrench*1	Width across flats 7 mm (for M4 screws), 8 mm (for M6 screws), 13 mm (for M8 screws)	

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

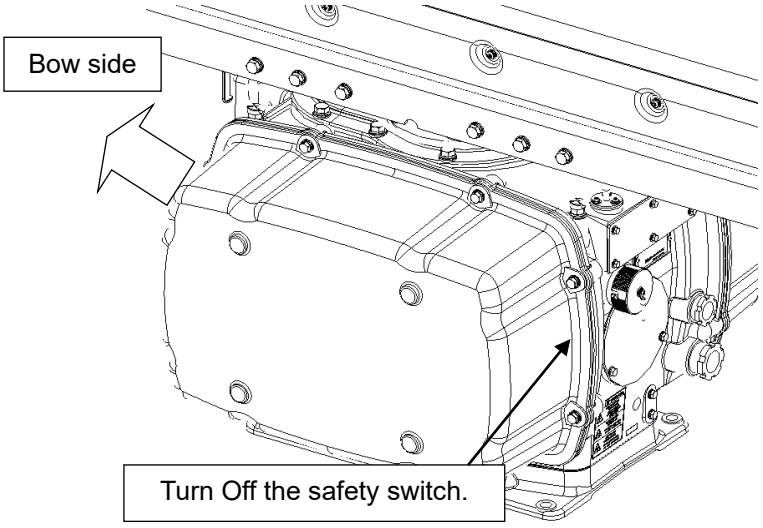
⚠ Before beginning work, turn Off the safety switch of the Scanner unit.

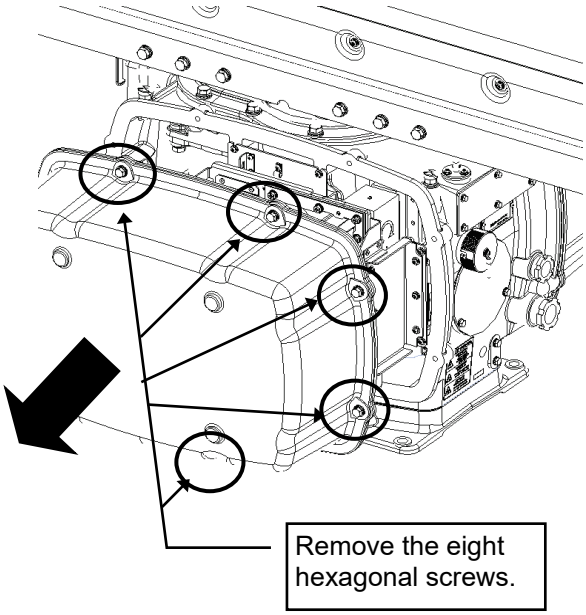
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

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

Step 1 Set the safety switches to Off (down) and remove the covers on both sides.

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

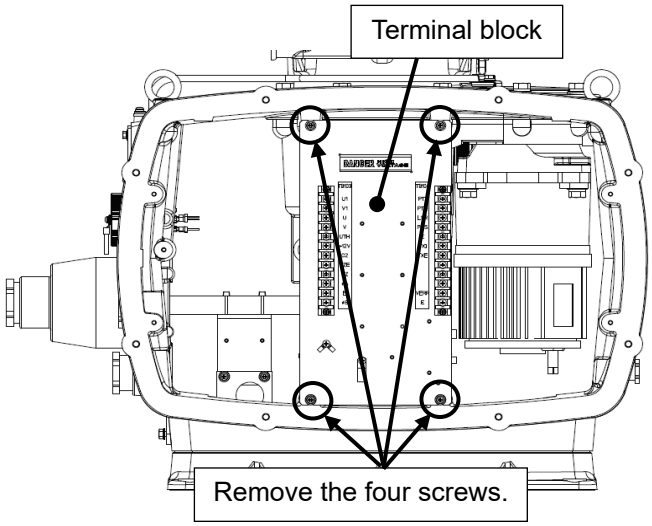




Example: Port side cover removal

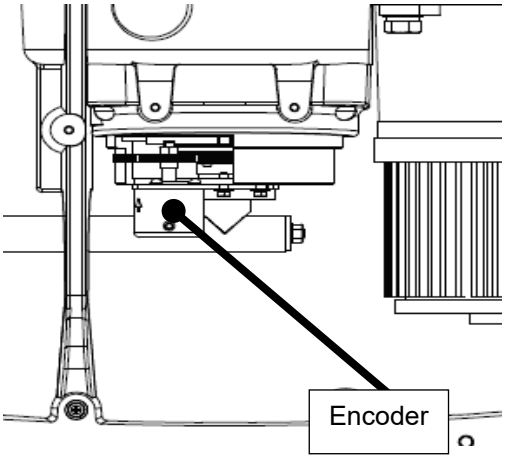
Step 2 Remove the terminal block

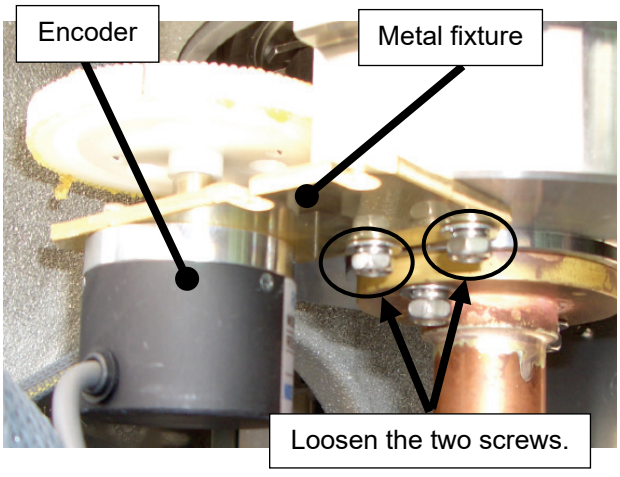
Remove the cover from the right (starboard) and remove the screws (four M5 screws) to remove the terminal block.



Step 3 Remove the encoder block

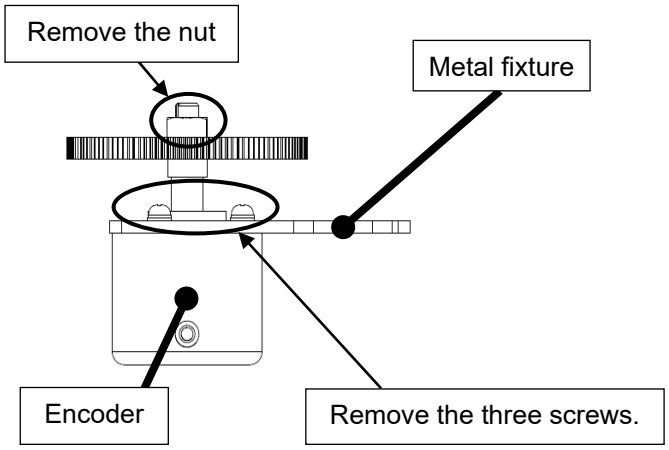
Loosen the two screws (M4) to remove the encoder together with the metal fixture.





Step 4 Replace the encoder

Remove the metal fixture and the gear wheel attached to the encoder. Put them onto the new encoder and put it back into the unit. After replacing the encoder, follow the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 5 Operation check

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

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error. Open the service engineer menu to perform azimuth adjustment.

This completes encoder replacement.

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

[Required Tools]

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

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2, Size #3	
2	Open-end wrench*1	Width across flats 7 mm (for M4 screws), 13 mm (for M8 screws)	
3	Socket wrench*1	Width across flats 7 mm (for M4 screws), 13 mm (for M8 screws)	

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

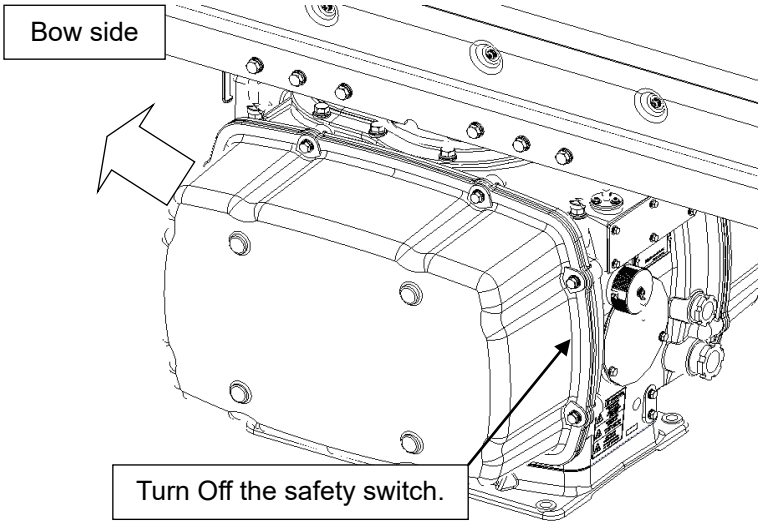
⚠ Before beginning work, turn Off the safety switch of the Scanner unit.

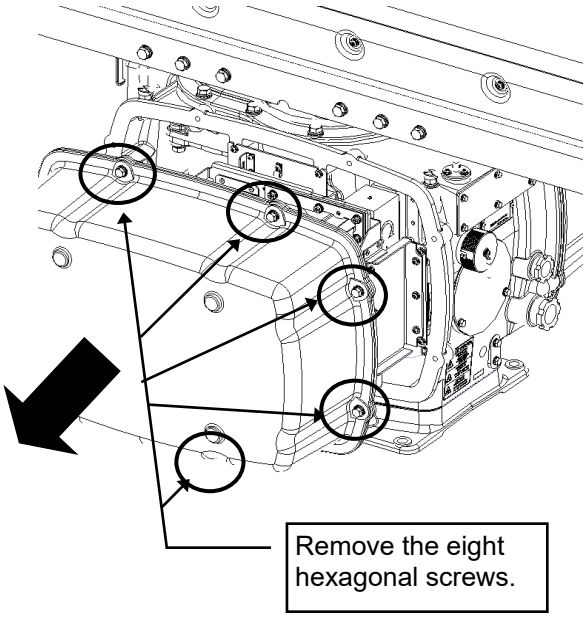
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

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

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

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

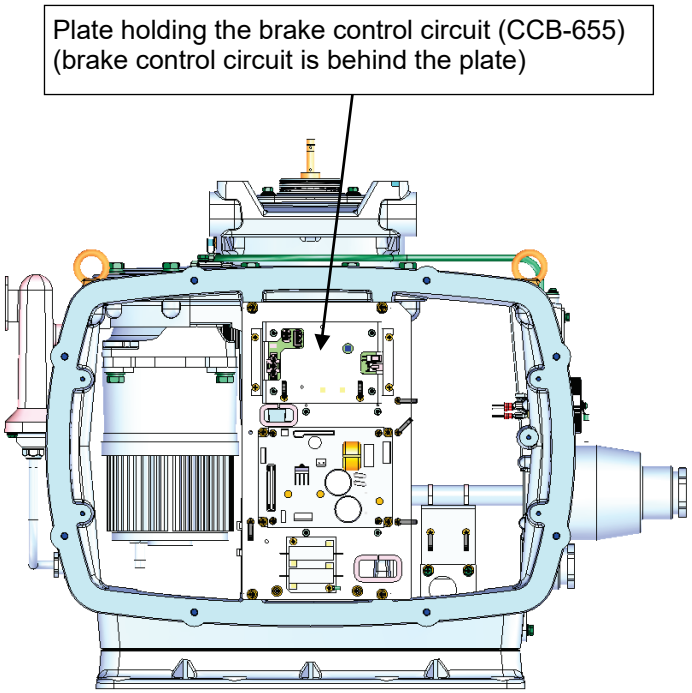




Example: Port side cover removal

Step 2 Replace the brake control circuit.

Remove the cover on the left side (port side) and remove all the connectors that are connected to the brake control circuit (CCB-655). Remove the four screws (M4) that are holding the mounting plate and replace it by removing the existing one together with the plate. After replacing the brake control circuit, reassemble the unit by following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 3 Operation check

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

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

This completes brake control circuit replacement.

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

[Required Tools]

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

Table Required Tools

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

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

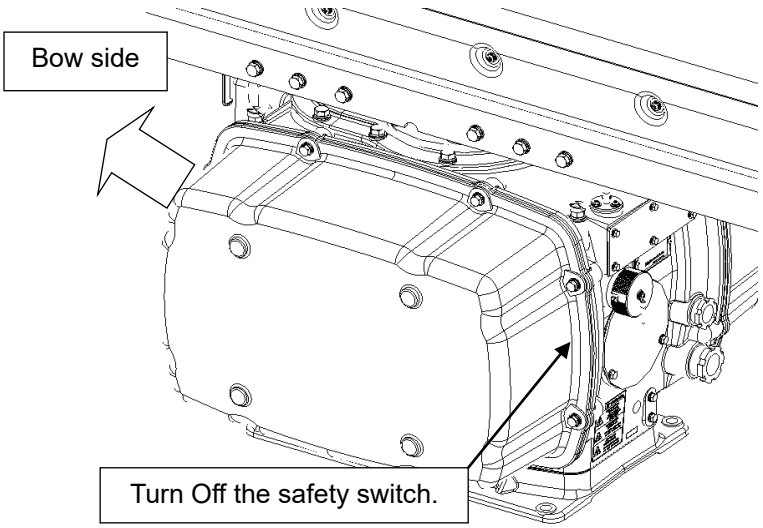
⚠ Before beginning work, turn Off the safety switch of the Scanner unit.

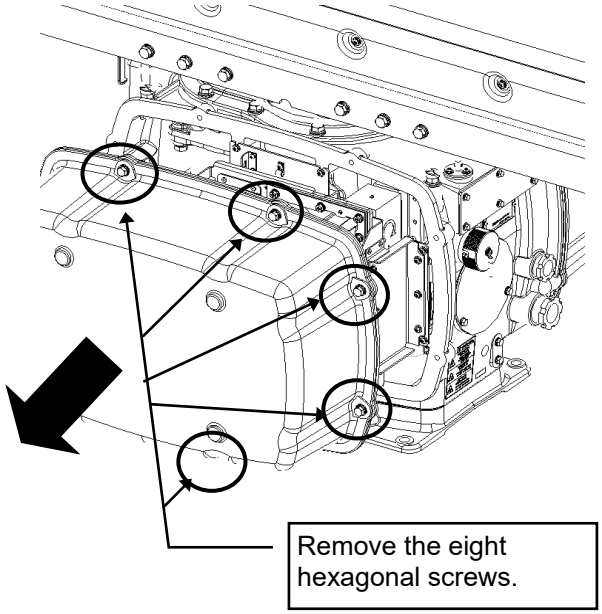
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

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

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

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

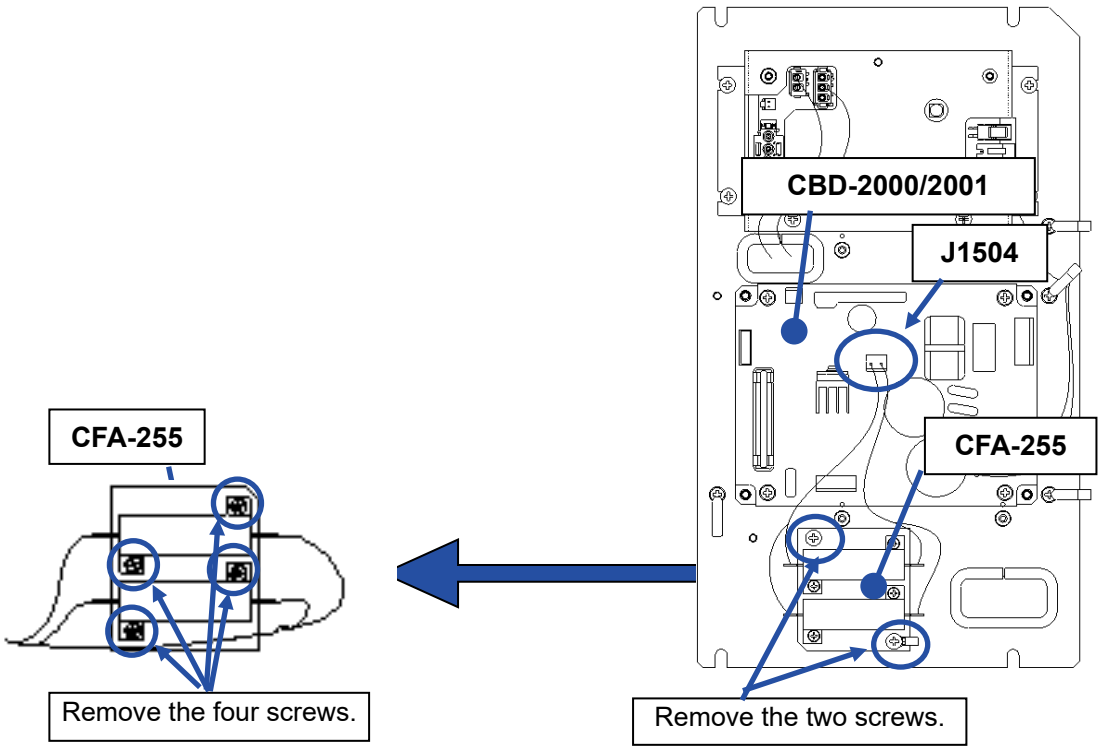




Example: Port side cover removal

Step 2 Replace the brake circuit.

Remove the cover on the port side and remove the cable that is connected to J1504 of the motor driver circuit (7EPRD0034/35). Remove the two screws (M4) and replace the brake circuit (CFA-255: resistor with cable). After replacing the circuit, reassemble the unit by following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 3 Operation check

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

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

This completes brake circuit replacement.

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

[Required Tools]

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

Table Required Tools

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

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

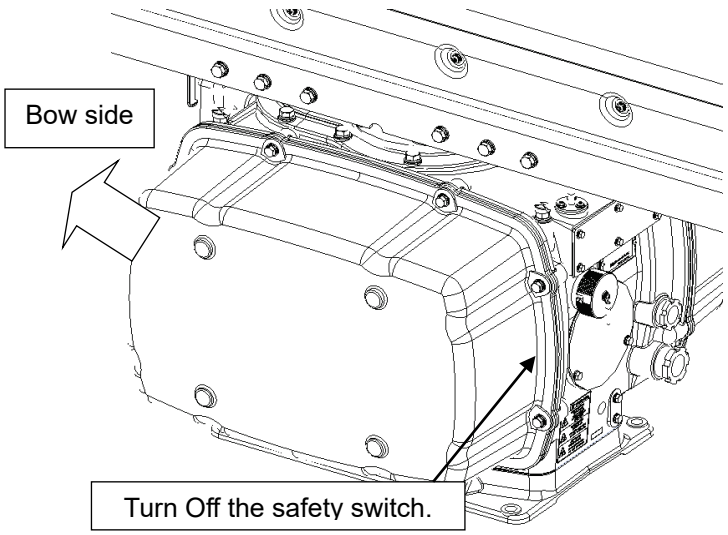
⚠ Before beginning work, turn Off the safety switch of the Scanner unit.

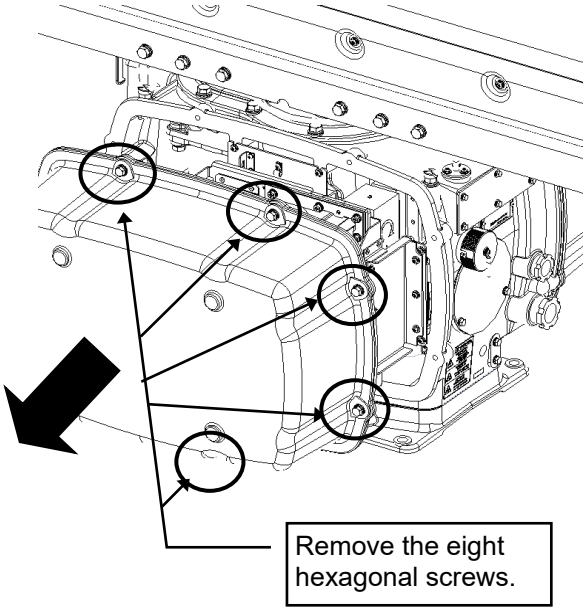
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

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

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

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

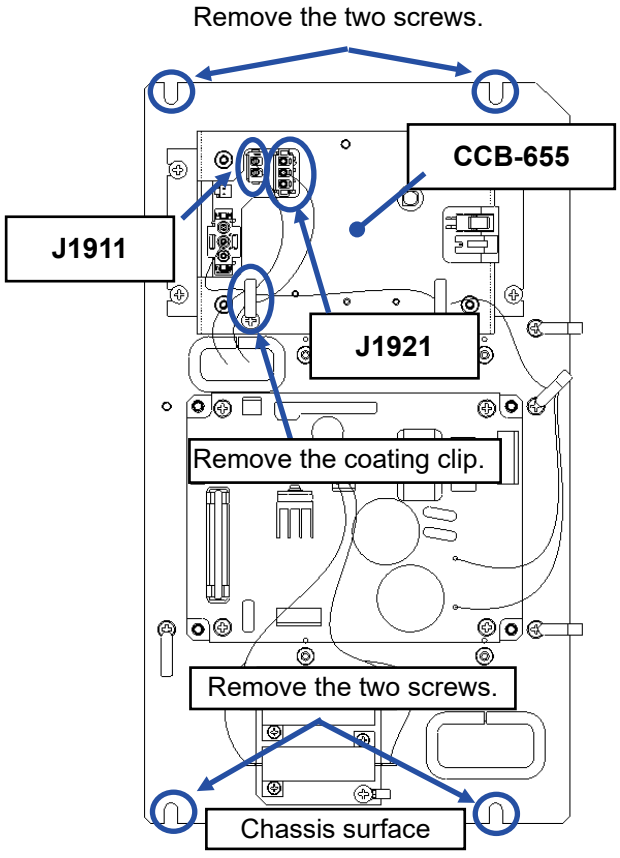




Example: Port side cover removal

Step 2 Remove the cable from rake control circuit.

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



Step 3 Replace the brake circuit unit.

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

Remove the four screws that are holding the brake circuit at the rear of the chassis and then remove it. Remove the eight screws (CFA-261) or two screws (CFA-262) that are holding the resistor and replace it. After replacing the brake circuit unit, reassemble the unit by following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.

Step 4 Operation check

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

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

This completes brake circuit unit replacement.

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

Instruction for Equipment
装備要領

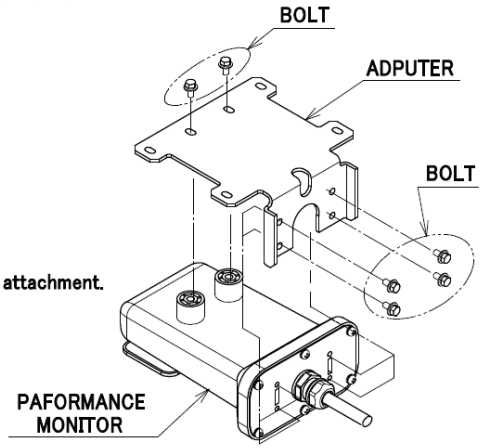


Fig1 (図1)

1. Adapter installation
アダプタの取り付け

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

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

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

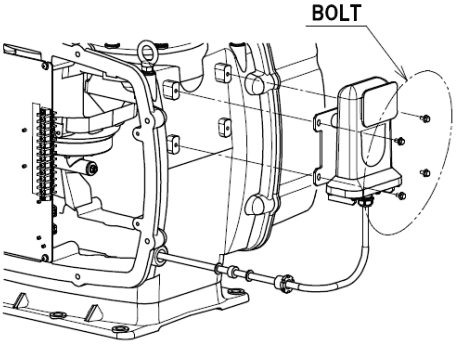


Fig2 (図2)

3.Wiring
配線

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

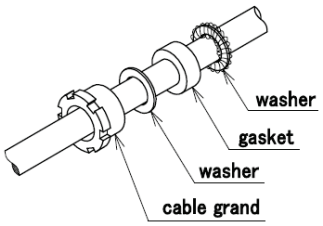


Fig3 (図3)

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

4.Check and adjustment
確認と調整

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

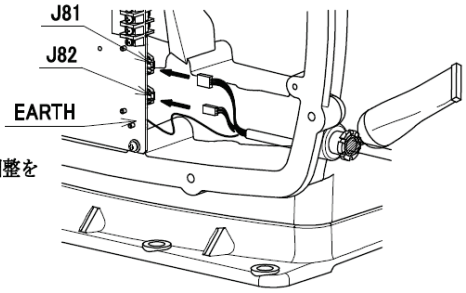


Fig4 (図4)

5. Water proof
防水処理

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

4.1.3 NKE-1125 Scanner Unit

4.1.3.1 Magnetron Replacement/NKE-1125

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

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

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

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

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

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

[Required Tools]

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

Table Required Tools

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

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

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

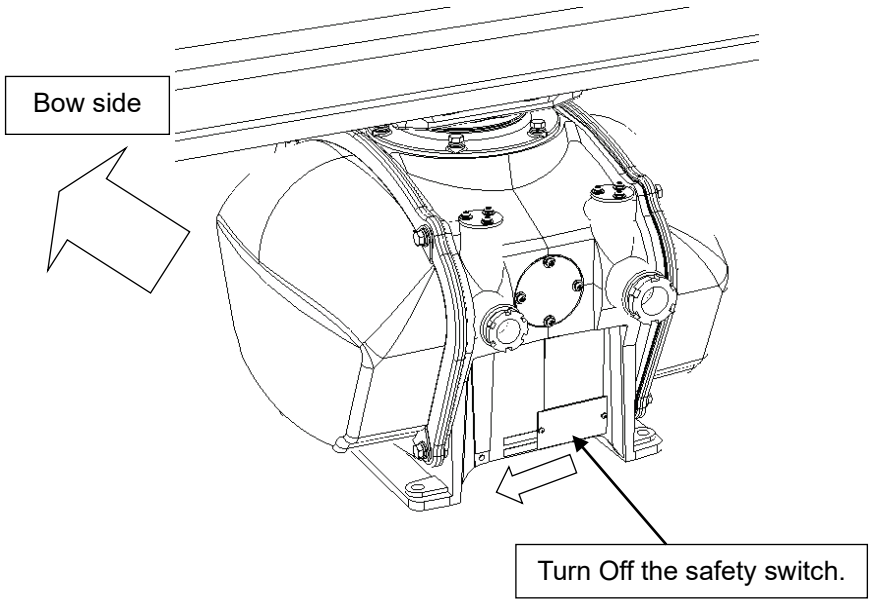
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

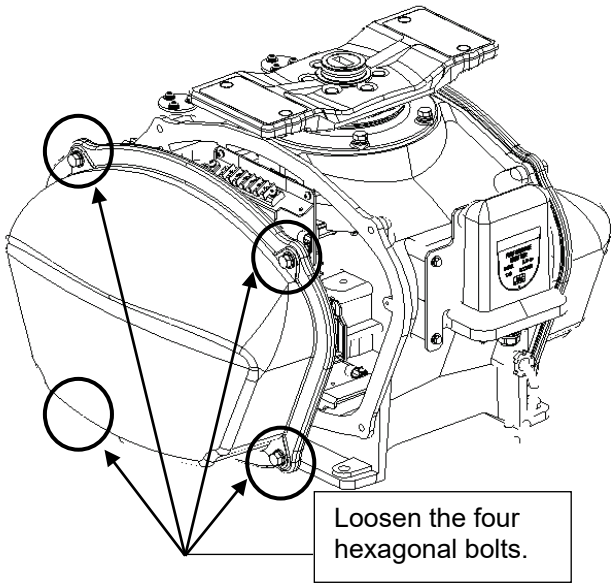
⚠ Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

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

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

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

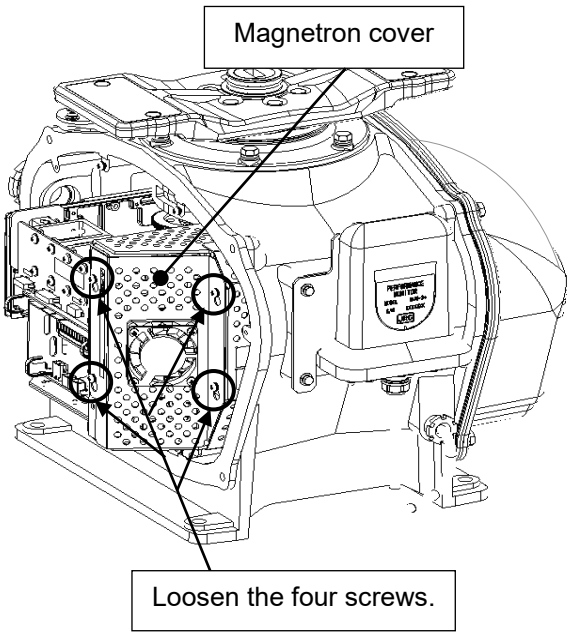




Example: Starboard side cover removal

Step 2 Remove the magnetron cover.

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



Step 3 Replace the magnetron cover.

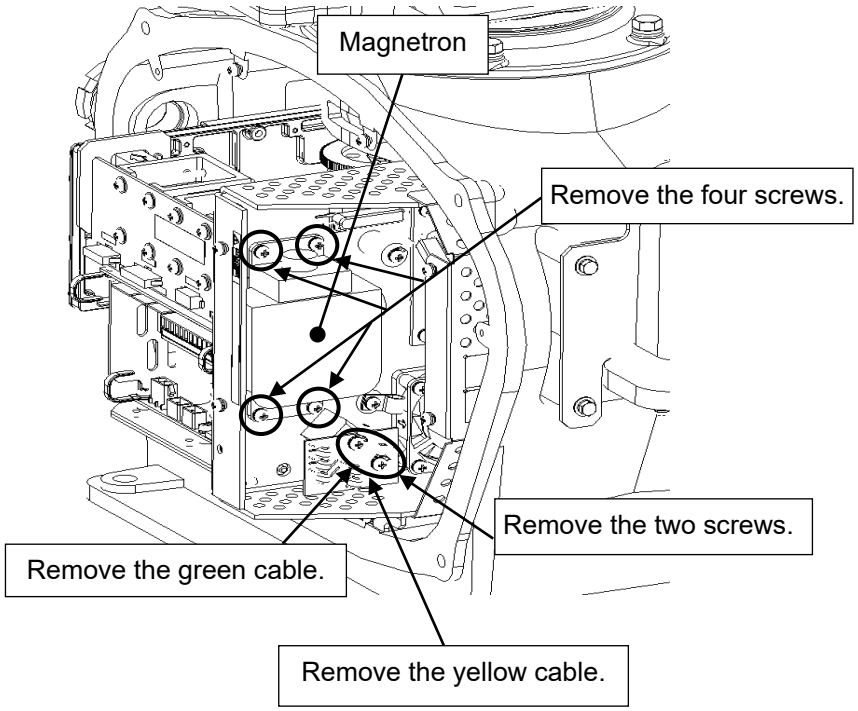
Make sure there is no charge remaining in the modulation high-voltage circuit board, and then remove the screws (two M4 screws) holding the magnetron cables (yellow and green) in place.

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

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

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

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



Step 4 Operation check

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

(1) Turn On the radar and allow sufficient preheating time (20 to 30 minutes in the STBY mode).

(2) Start transmission on a short pulse range and change the range to the longer ranges. Open the service engineer menu and provisionally adjust the tuning.

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

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

(4) Finally, initialize the transmission time in the service engineer menu.

This completes magnetron replacement.

4.1.3.2 Motor Replacement/NKE-1125

[Required Tools]

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

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2, Size #3	
2	Open-end wrench*1	Width across flats 13 mm (for M8 screws), 17 mm (for M10 screws)	
3	Socket wrench*1	Width across flats 13 mm (for M8 screws), 17 mm (for M10 screws)	

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

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

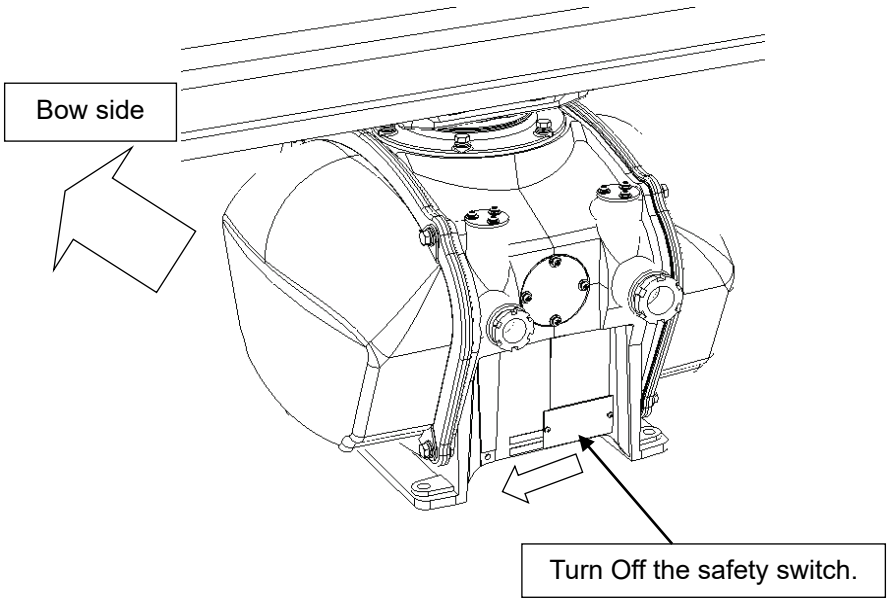
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

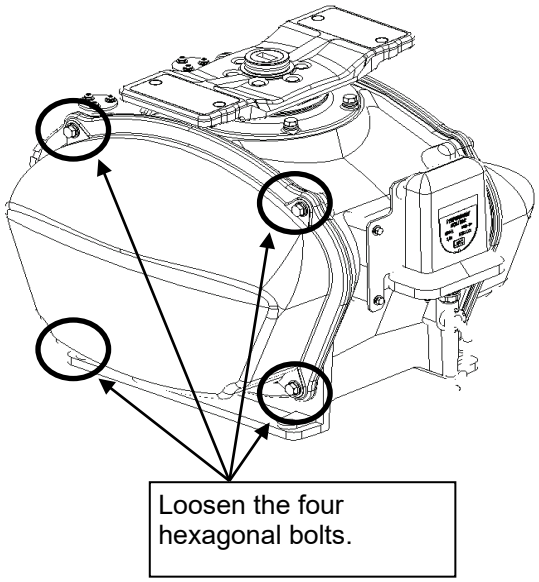
⚠ Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

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

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

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

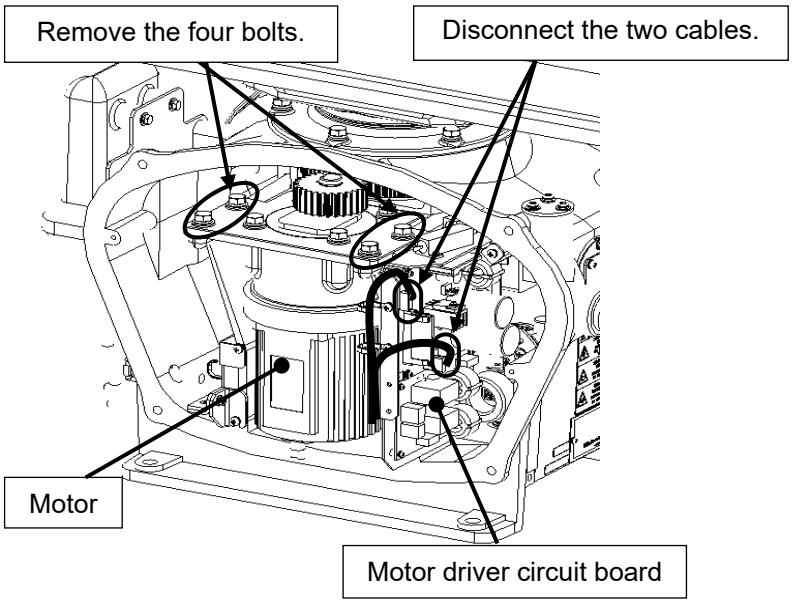




Example: Starboard side cover removal

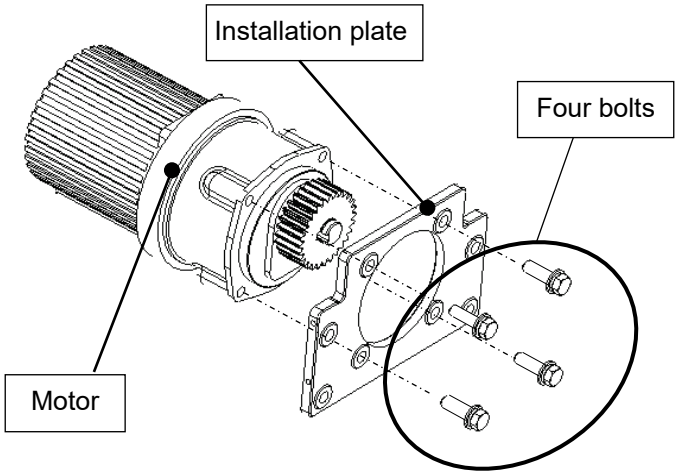
Step 2 Remove the motor.

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

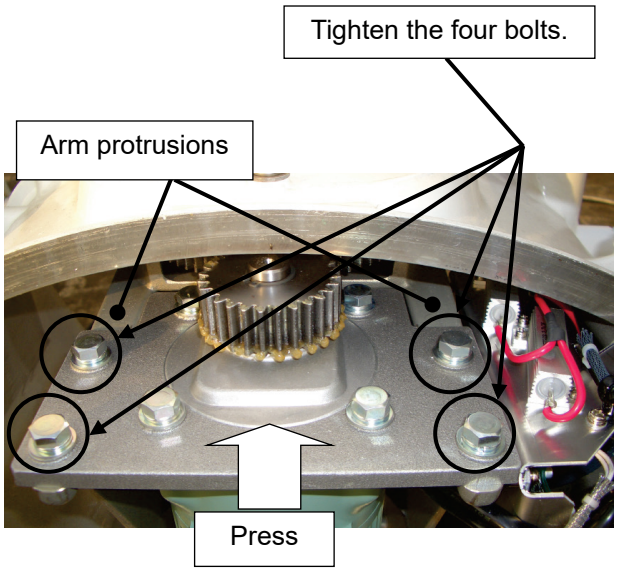


Step 3 Replace the motor.

Remove the hexagonal bolts (four M8 bolts) and remove the installation plate from the motor. Attach the installation plate to the replacement motor. Do not forget to tighten the hexagonal bolts to an appropriate torque (140 kgf•cm) so they are free of looseness.

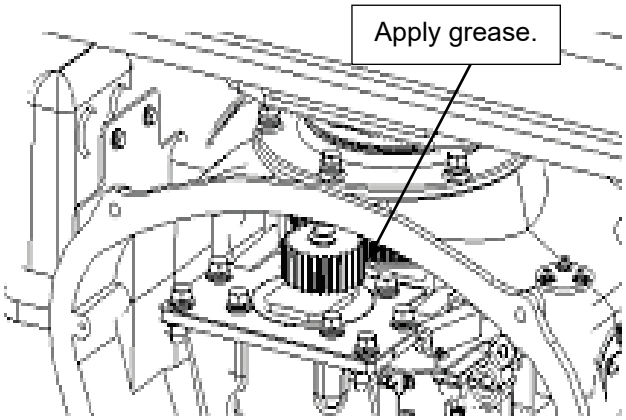


Install the motor into the scanner unit. Press the motor against the protrusions of the arm fixed to the motor on which the arm extends through the wall of the casing, adjust it to minimize backlash, and fix it in place. Do not forget to tighten the hexagonal bolts, to an appropriate torque (140 kgf•cm)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



Step 4 Apply grease to the new motor.

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



Step 5 Operation check

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

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error. Check that the motor does not make any abnormal sound when it starts to rotate, while it is rotating, or when it stops.

This completes motor replacement.

4.1.3.3 Motor Drive Circuit Board Replacement/NKE-1125

[Required Tools]

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

Table Required Tools

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

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

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

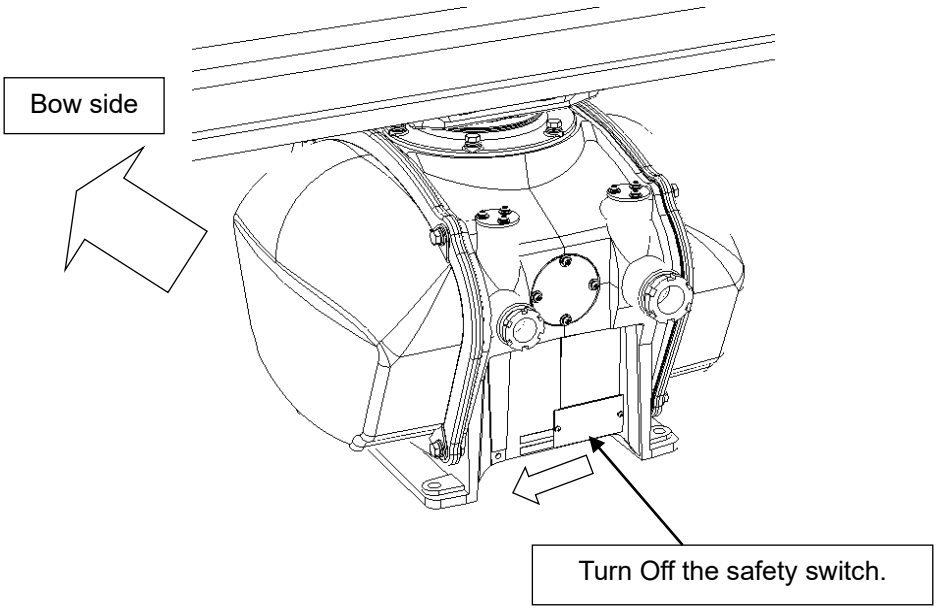
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

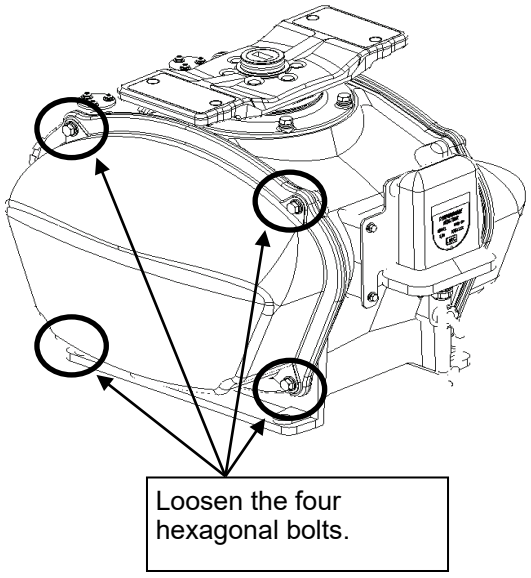
⚠ Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

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

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

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

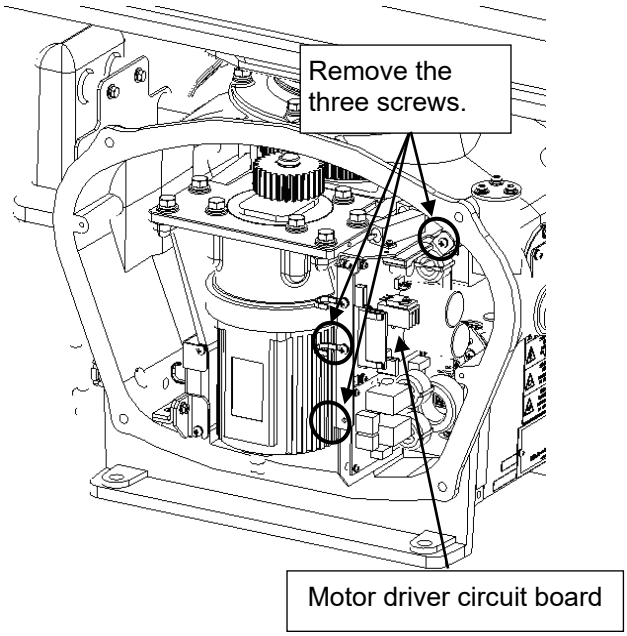




Example: Starboard side cover removal

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

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

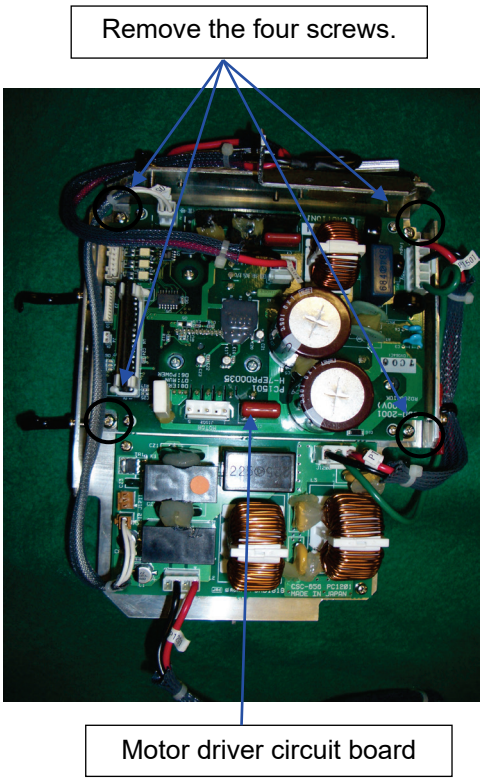


Step 3 Replace the motor driver circuit board.

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

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

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



Step 4 Operation check

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

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error. Check that the motor does not make any abnormal sound when it starts to rotate, while it is rotating, or when it stops.

This completes motor driver circuit board replacement.

4.1.3.4 Magnetron Fan Replacement/NKE-1125

[Required Tools]

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

Table Required Tools

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

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

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

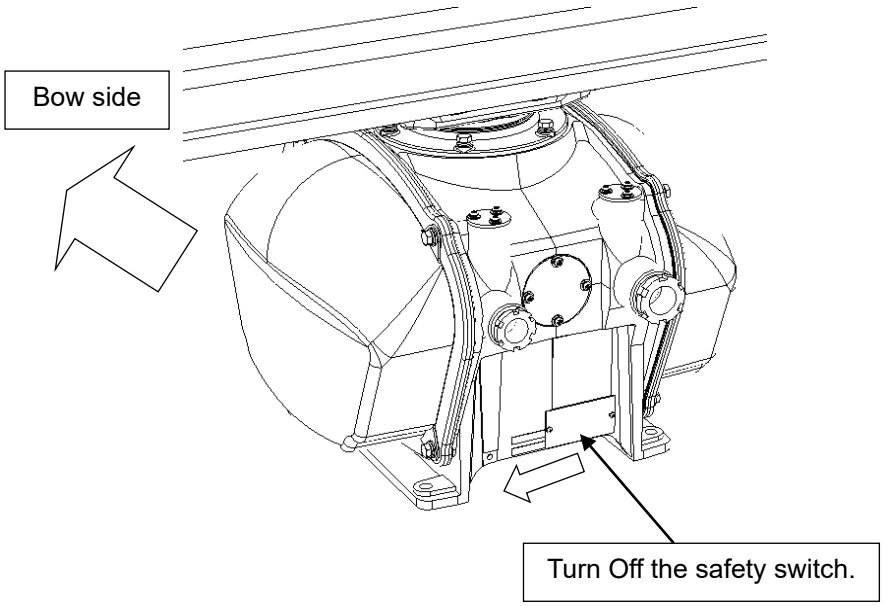
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

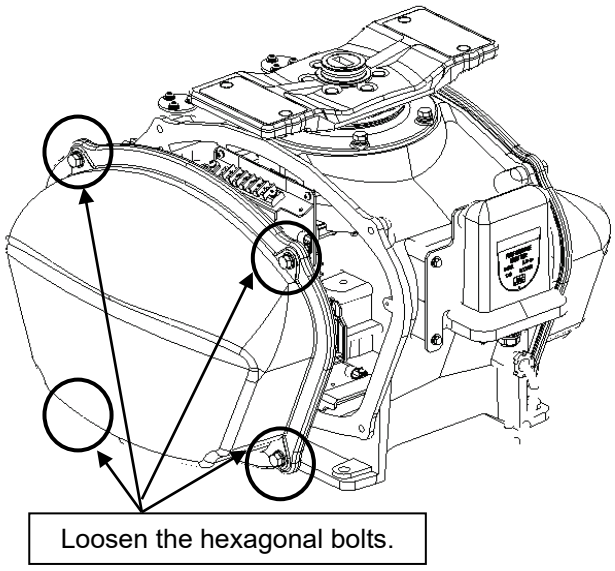
⚠ Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

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

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

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

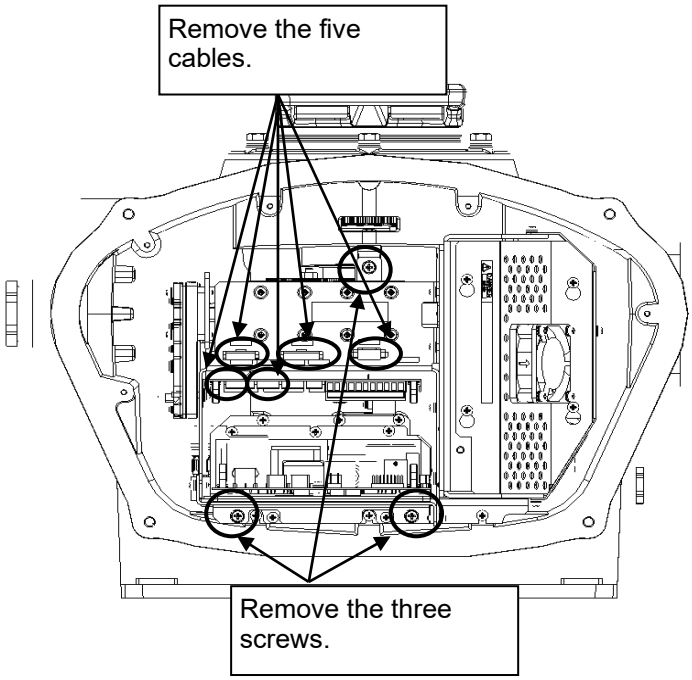




Example: Starboard side cover removal

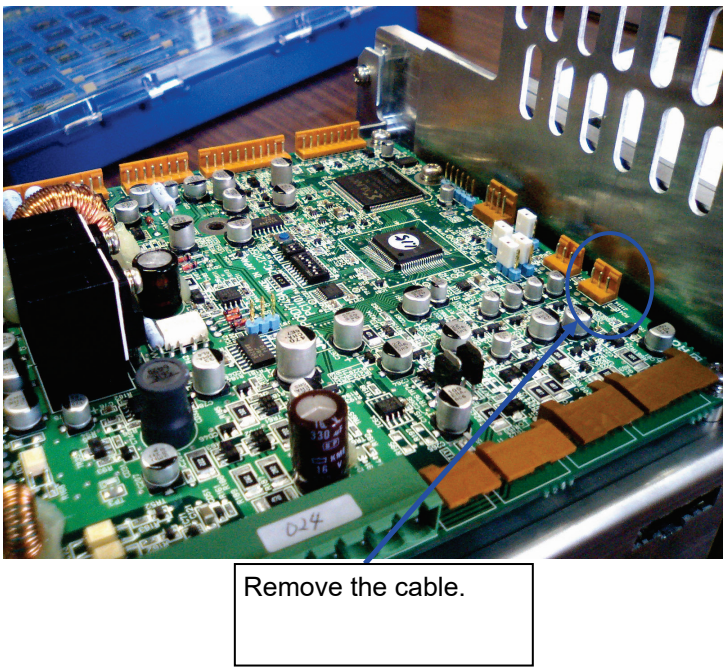
Step 2 Remove the transmitter-receiver unit.

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



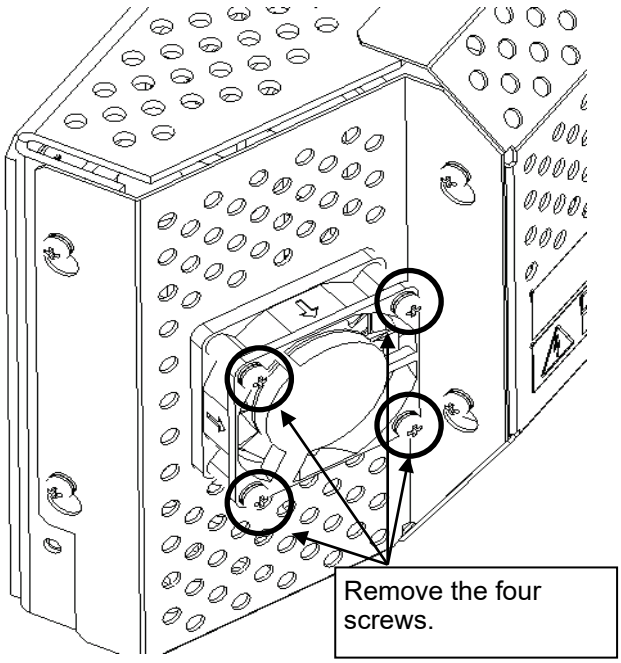
Step 3 Remove the fan cable.

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



Step 4 Replace the fan.

Remove the screws (four M4 screws) holding the fan in place and replace it. After replacing the fan, assemble the unit in the reverse order of the disassembly procedure. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 5 Operation check

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

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

This completes magnetron fan replacement.

4.1.3.5 Modulator Circuit (CPA-264) Replacement/NKE-1125

[Required Tools]

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

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2	
2	Open-end wrench*1	Width across flats 7 mm (for M4 screws), 13 mm (for M8 screws)	
3	Socket wrench*1	Width across flats 7 mm (for M4 screws), 13 mm (for M8 screws)	

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

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

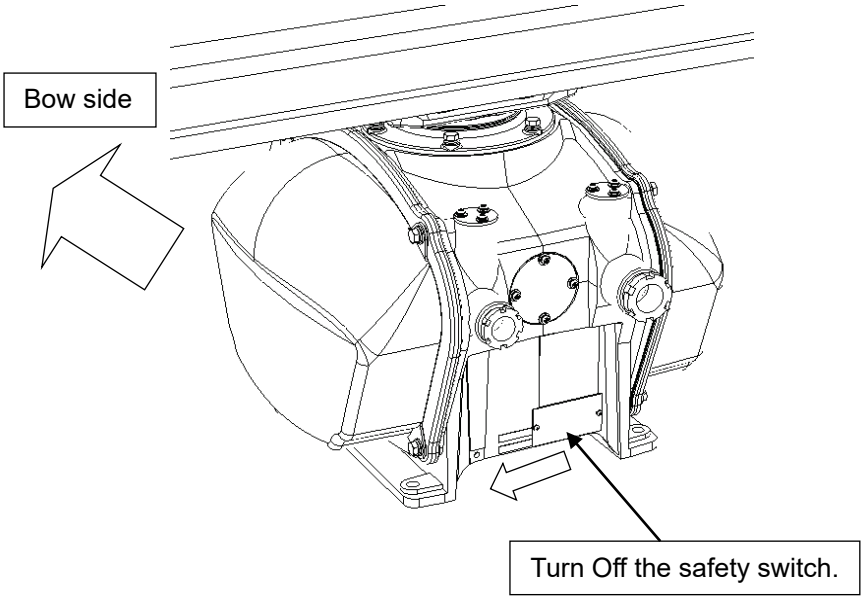
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

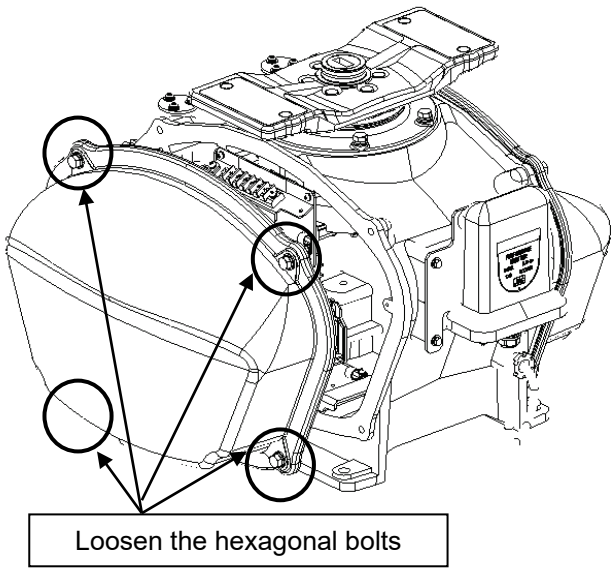
⚠ Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

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

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

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

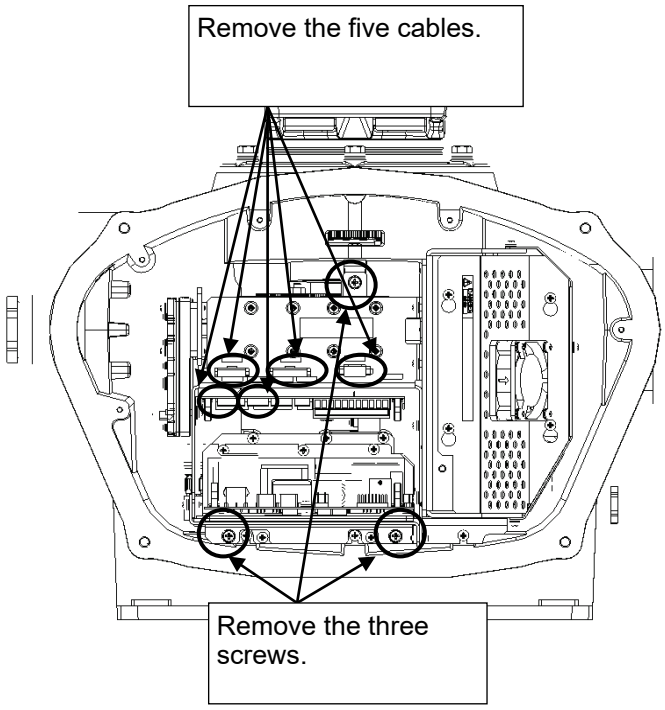




Example: Starboard side cover removal

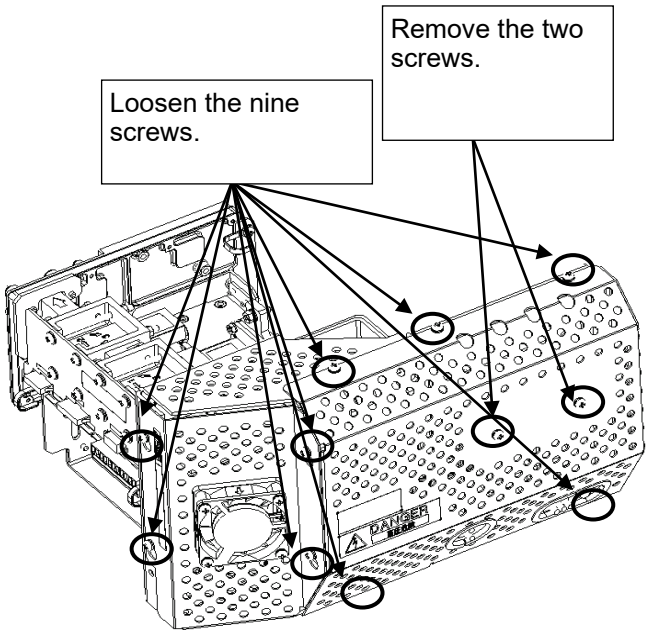
Step 2 Remove the transmitter-receiver unit.

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



Step 3 Remove the modulator circuit board cover.

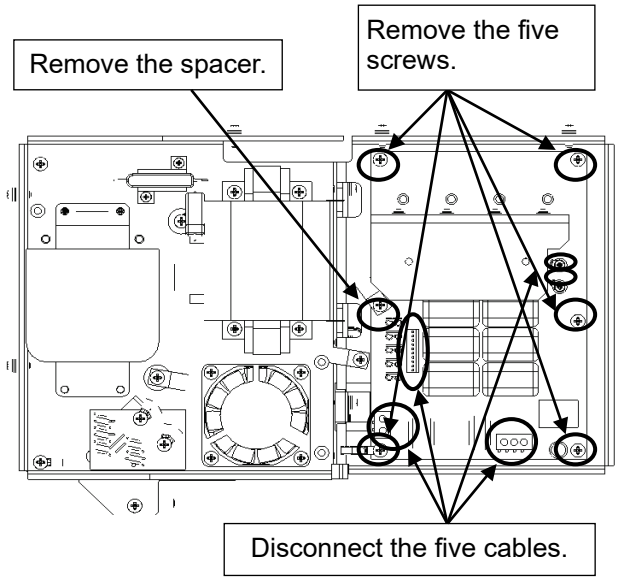
Loosen the screws (nine M4 screws) holding the cover in place, remove the screws (two M4 screws) holding the heat radiation plate in place, and then remove the cover.



Step 4 Replace the modulator circuit board.

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

If reusing the heat radiation plate on the modulator, be sure to install the insulation sheet between the TR5-8 and the heat radiation plate so that it is straight. After having replaced the modulator circuit board, reassemble the unit following the disassembly procedure in the reverse order. Do not forget to tighten the screws and connect the cables.



Step 5 Operation check

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

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error.
Emit the radio wave in long pulse range mode and open the service engineer menu to check that the magnetron current stands between the 5th and 7th calibration markings.

This completes modulator circuit board replacement.

4.1.3.6 Modulation Unit Fan Replacement/NKE-1125

[Required Tools]

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

Table Required Tools

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

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

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

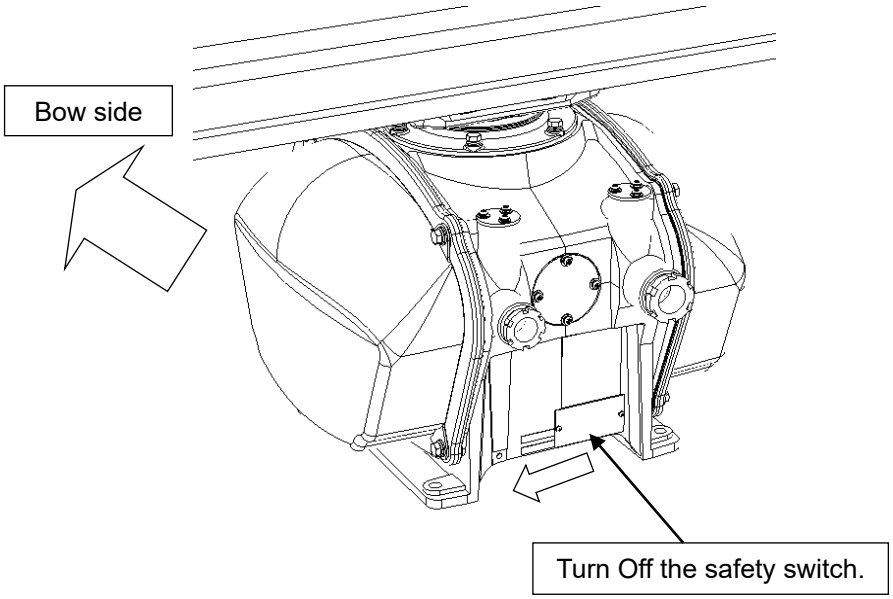
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

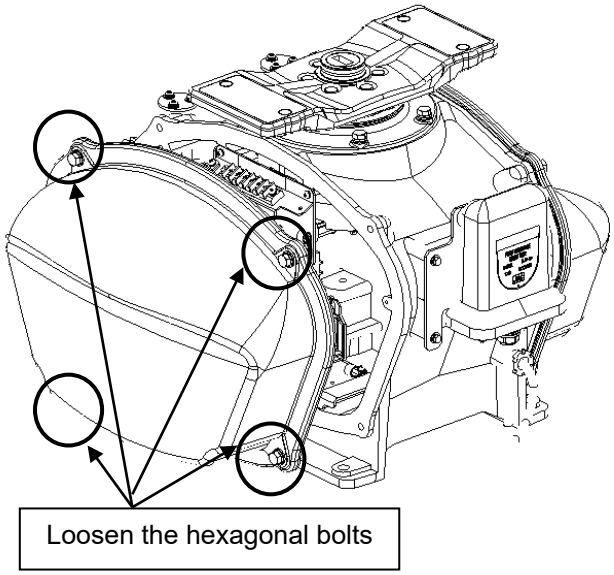
⚠ Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

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

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

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

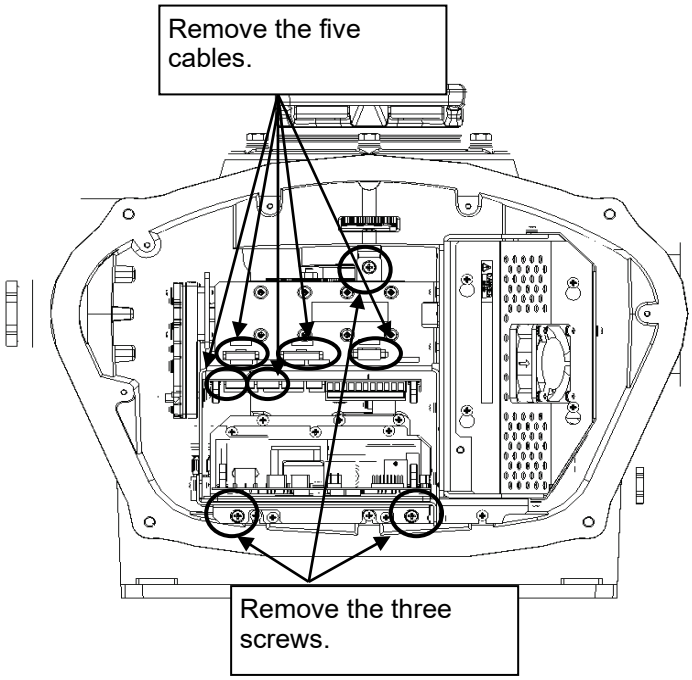




Example: Starboard side cover removal

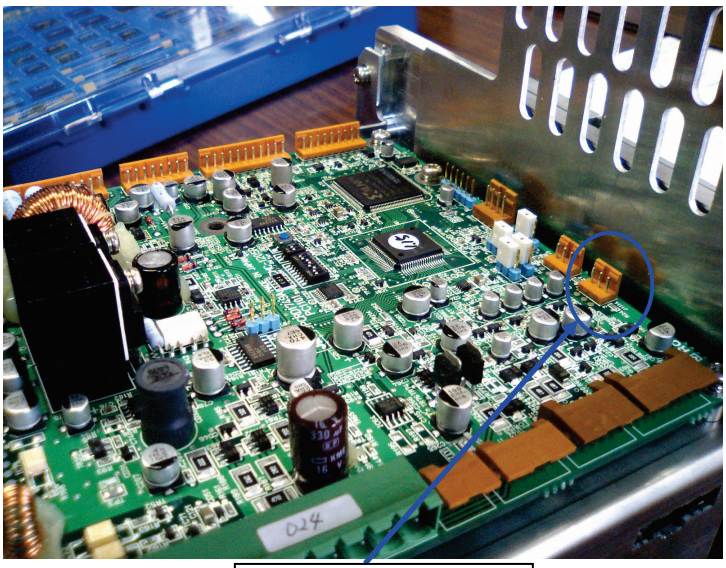
Step 2 Remove the transmitter-receiver unit.

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

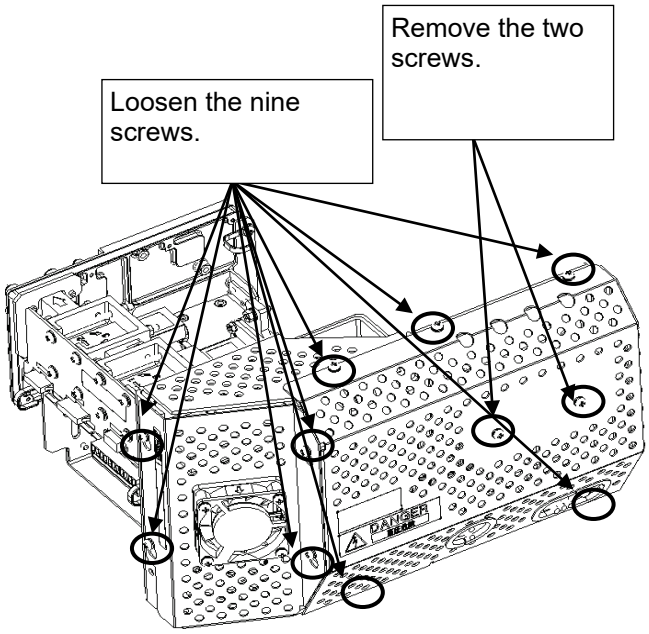


Step 3 Remove the fan cable.

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

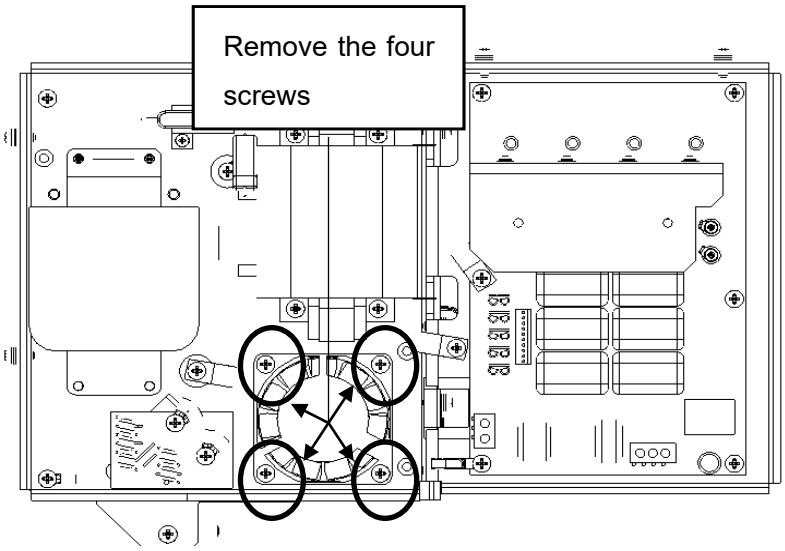


Loosen the screws (nine M4 screws) holding the cover in place, remove the screws (two M4 screws) holding the heat radiation plate in place, and remove the cover.



Step 4 Replace the modulation unit fan cable.

Remove the screws (four M4 screws) holding the fan in place and replace it. After replacing the fan, assemble the unit in the reverse order of the disassembly procedure. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 5 Operation check

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

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

This completes modulation unit fan replacement.

4.1.3.7 Modulation Unit (NMA-550) Replacement/NKE-1125

[Required Tools]

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

Table Required Tools

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

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

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

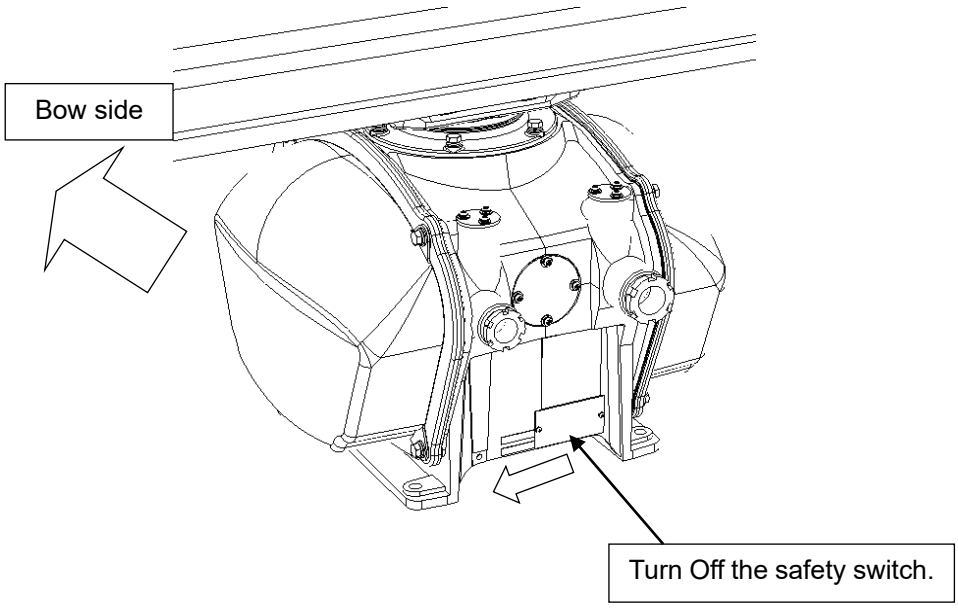
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

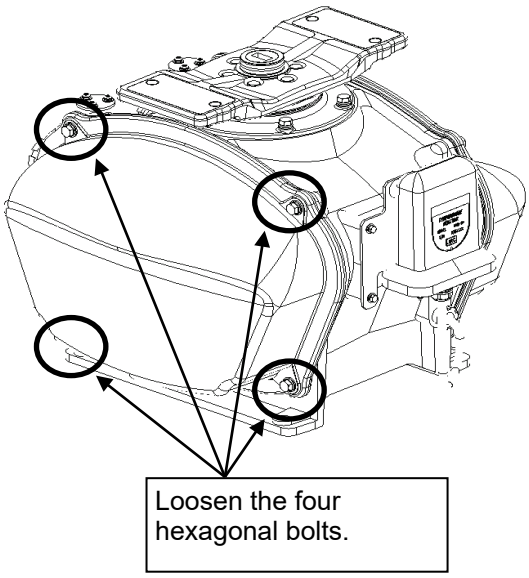
⚠ Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

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

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

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

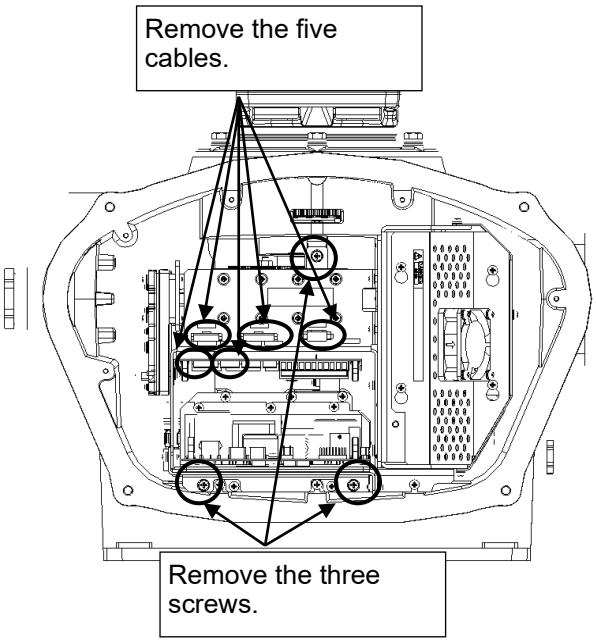




Example: Starboard side cover removal

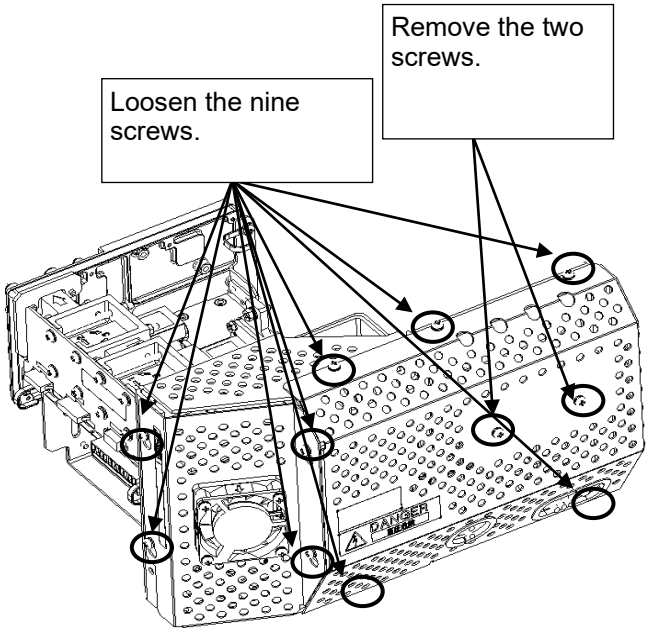
Step 2 Remove the transmitter-receiver unit.

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



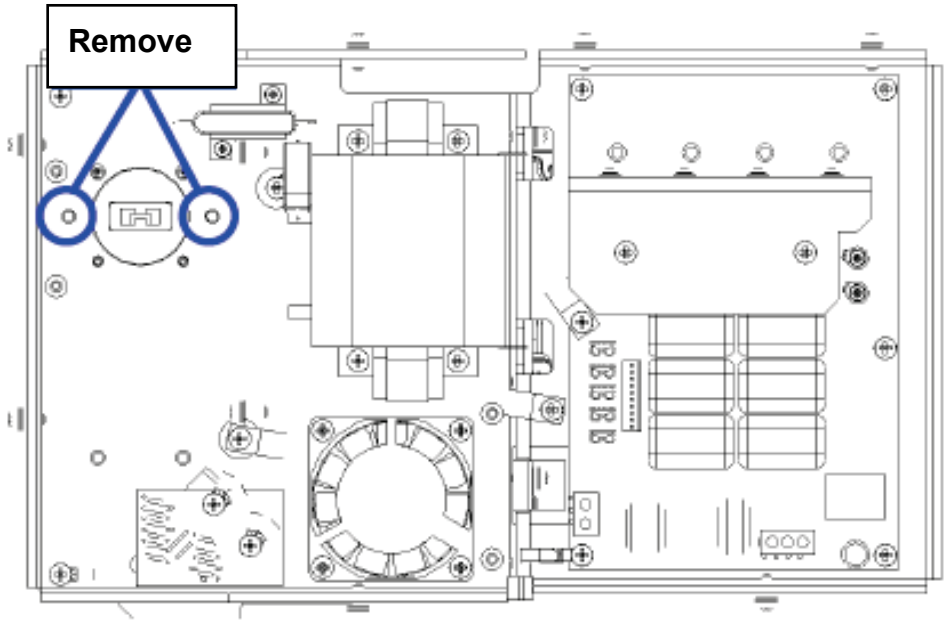
Step 3 Remove the transmitter-receiver unit cover and remove the magnetron.

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



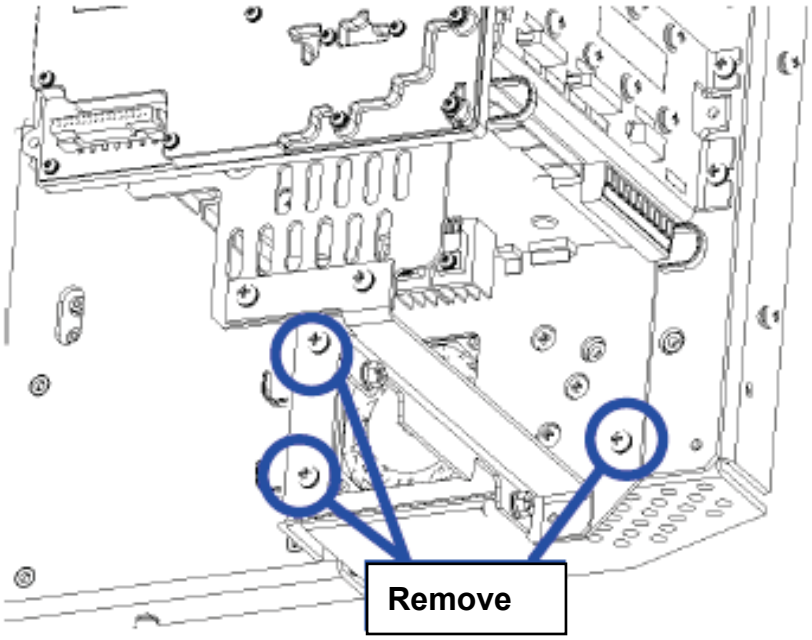
Step 4 Remove the waveguide holding screws.

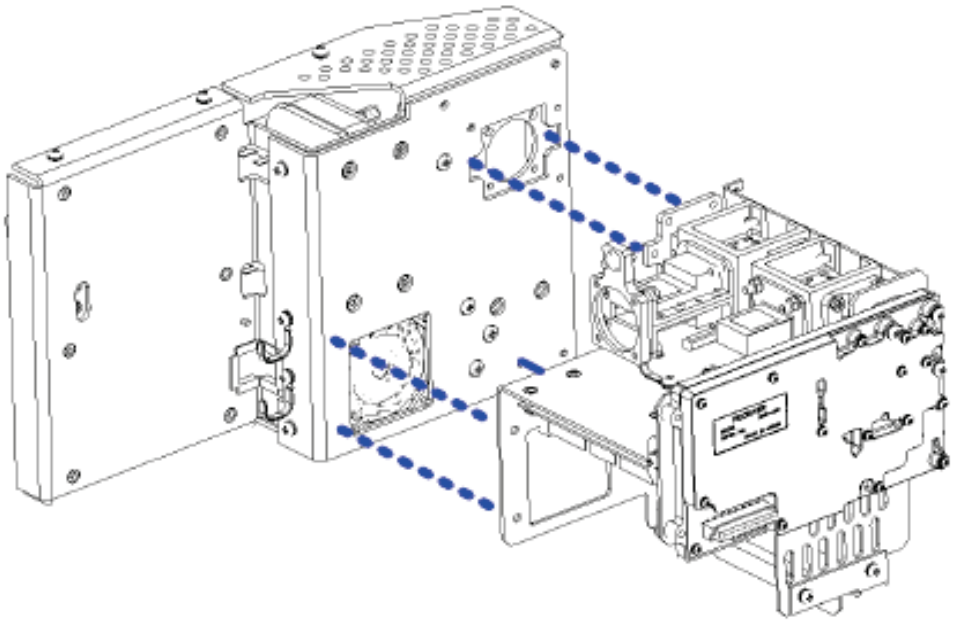
Remove the two connection waveguide holding screws (M4).



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

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

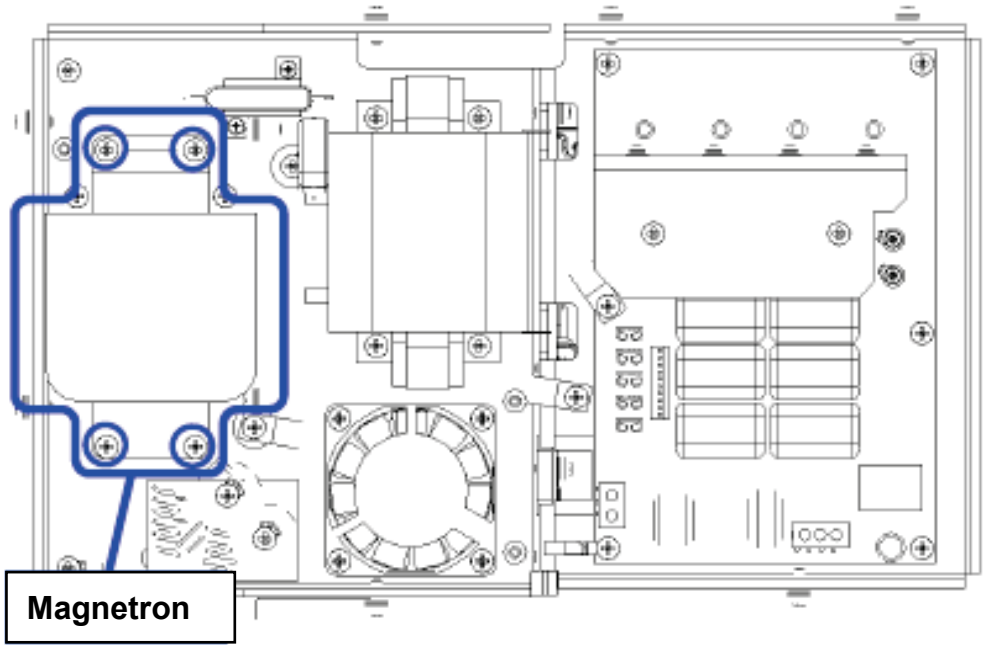




Step 6 Replace the modulation unit.

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

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



Step 7 Operation check

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

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error.
Transmit the radio wave in long pulse range mode and open the service engineer menu to check that the magnetron current stands between the 5th and 7th calibration markings.

This completes modulation unit replacement.

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

[Required Tools]

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

Table Required Tools

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

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

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

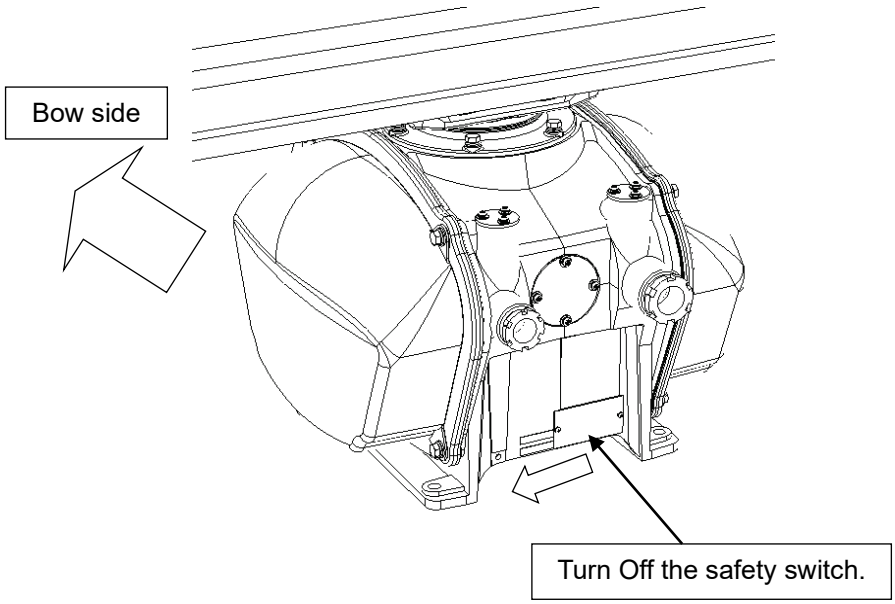
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

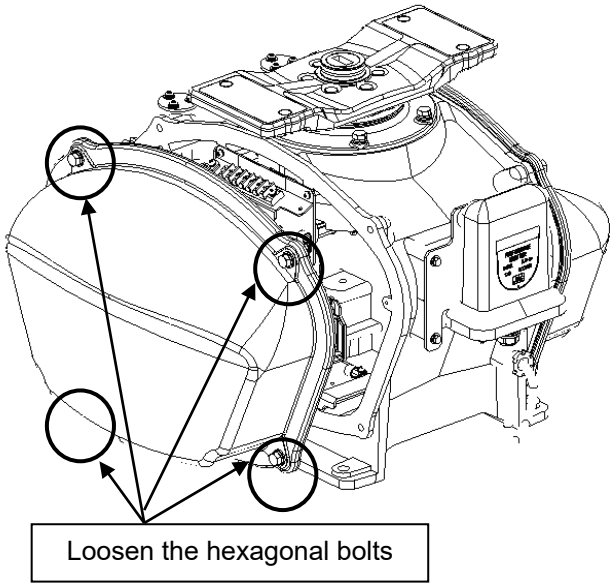
⚠ Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

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

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

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

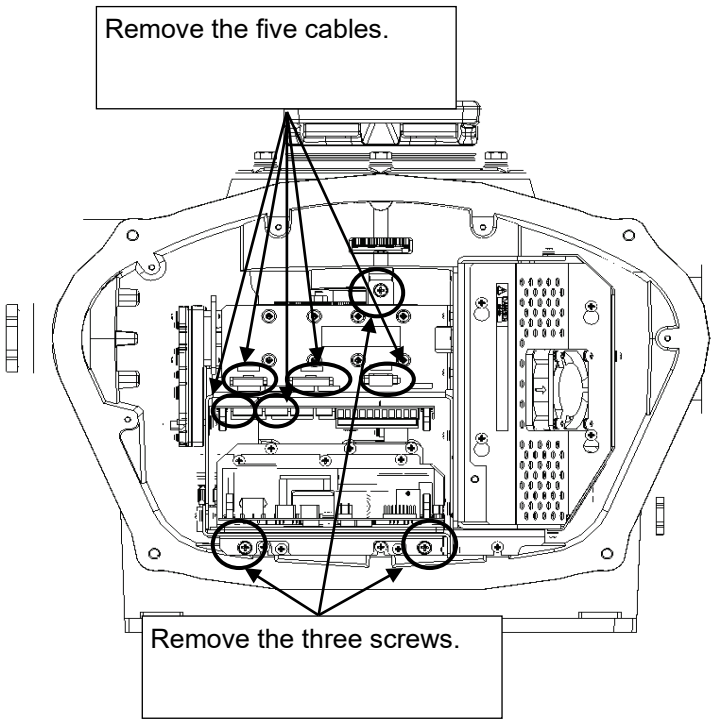




Example: Starboard side cover removal

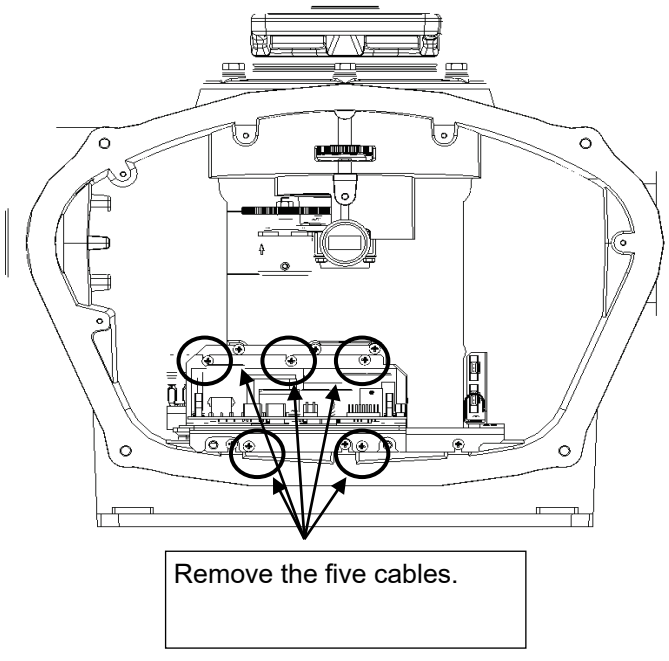
Step 2 Remove the transmitter-receiver unit.

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



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

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

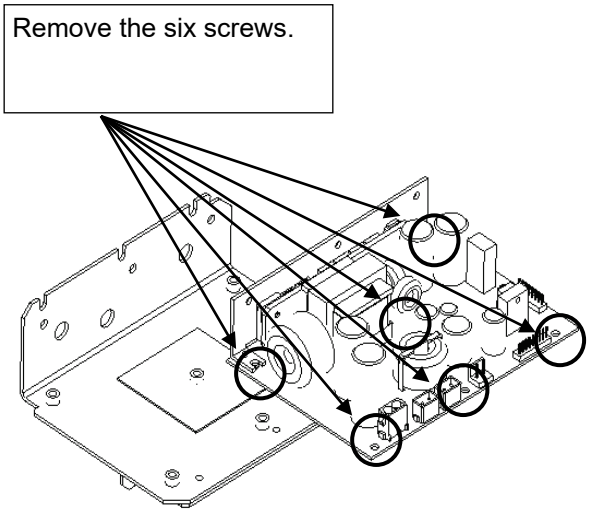


Step 4 Replace the power supply circuit board

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

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

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



Step 5 Operation check

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

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

This completes power supply circuit board replacement.

4.1.3.9 T/R Control Circuit (CMC-1205R) Replacement/NKE-1125

[Required Tools]

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

Table Required Tools

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

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

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

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

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

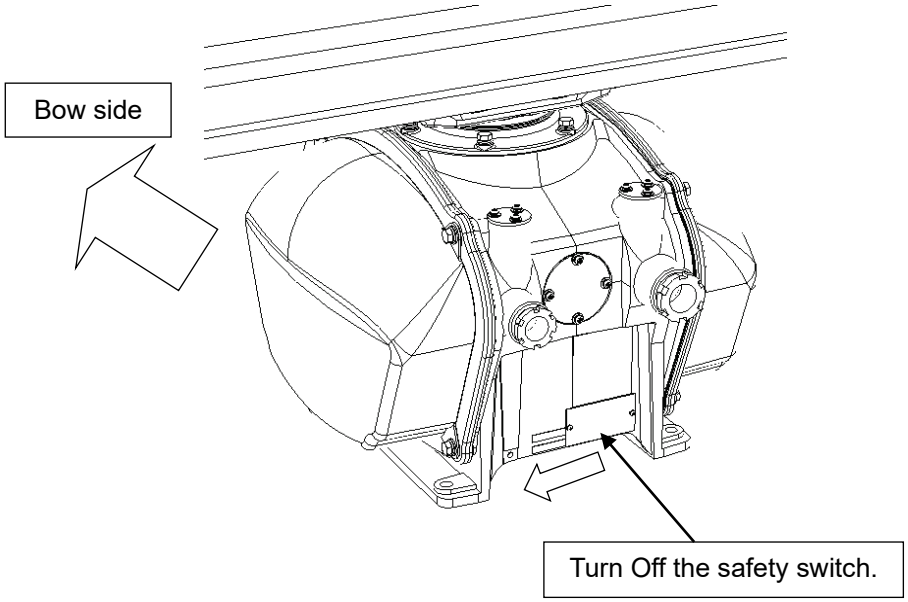
Step 1 Back up the scanner unit data.

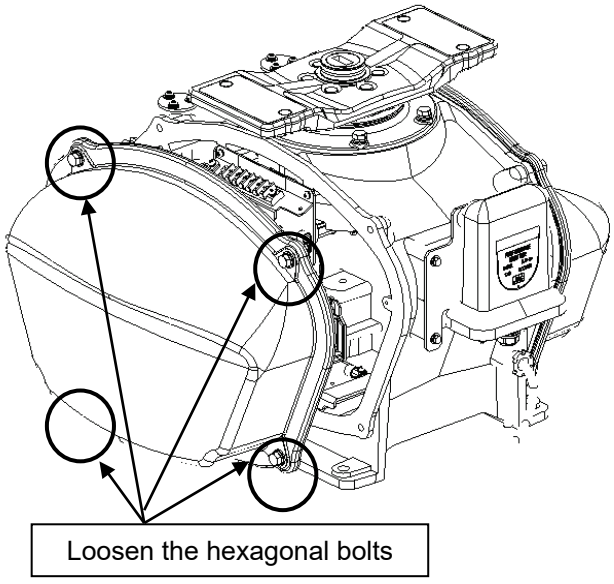
Before beginning the replacement procedure, open the service engineer menu of the radar display unit and back up the scanner unit data (transmission time and motor rotation time).

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

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

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

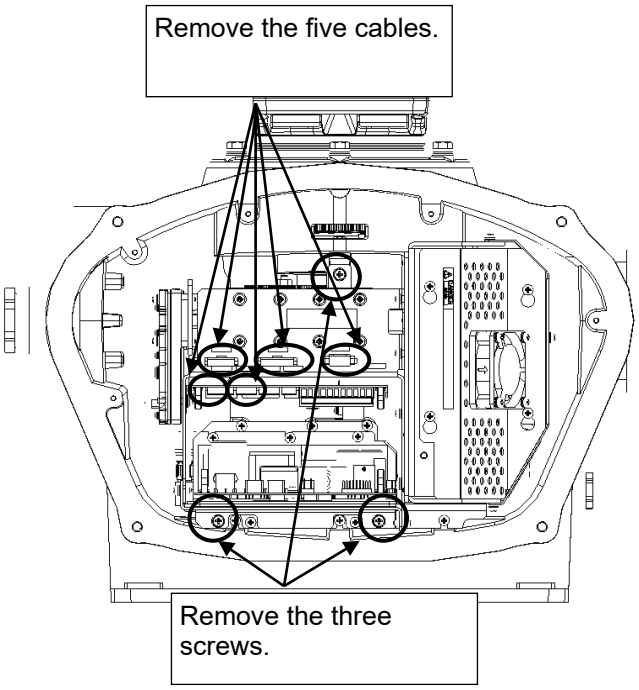




Example: Starboard side cover removal

Step 3 Remove the transmitter-receiver unit.

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



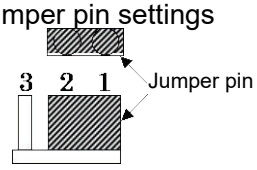
Step 4 Replace the T/R control circuit board.

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

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

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

• Jumper pin settings



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

• DIP switch settings (■ indicates a switch.)



After replacing the T/R control circuit board, assemble the unit in the reverse order of the disassembly procedure. Do not forget to tighten the screws and connect the cables.

Step 5 Operation check

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

(1) Turn On the radar, open the service engineer menu, restore the scanner unit times, and make sure that the data has been correctly continued before/after the T/R control circuit board replacement (check the transmission time and the motor rotation time).

(2) Begin transmission once the countdown is complete and check that the radar image is correctly displayed.

This completes T/R control circuit board replacement.

4.1.3.10 Relay Filter Circuit (CSC-656) Replacement/NKE-1125

[Required Tools]

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

Table Required Tools

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

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

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

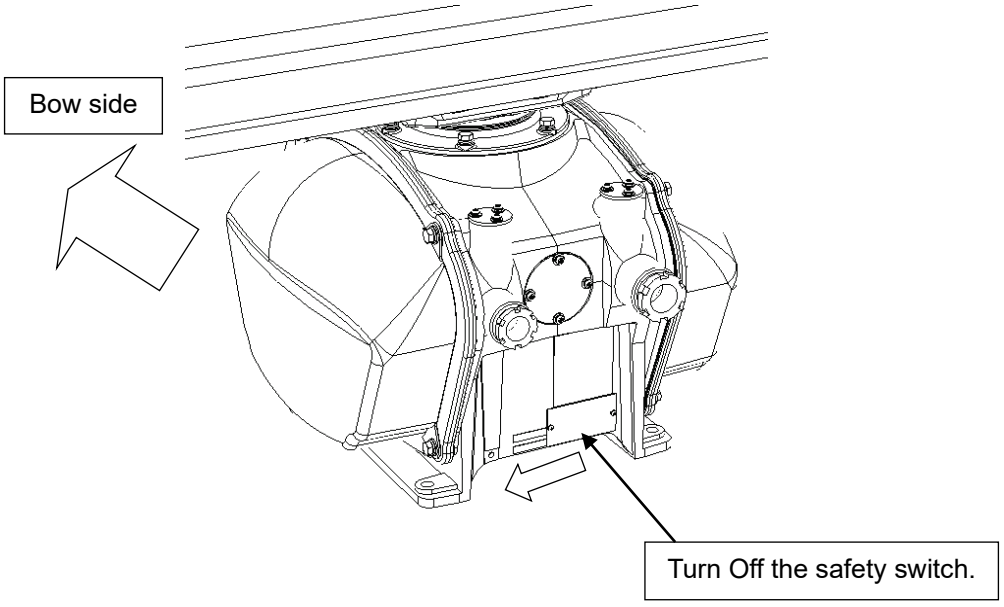
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

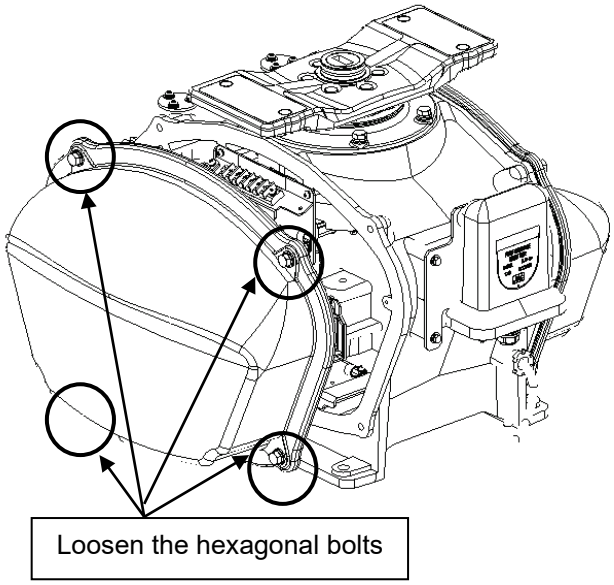
⚠ Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

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

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

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

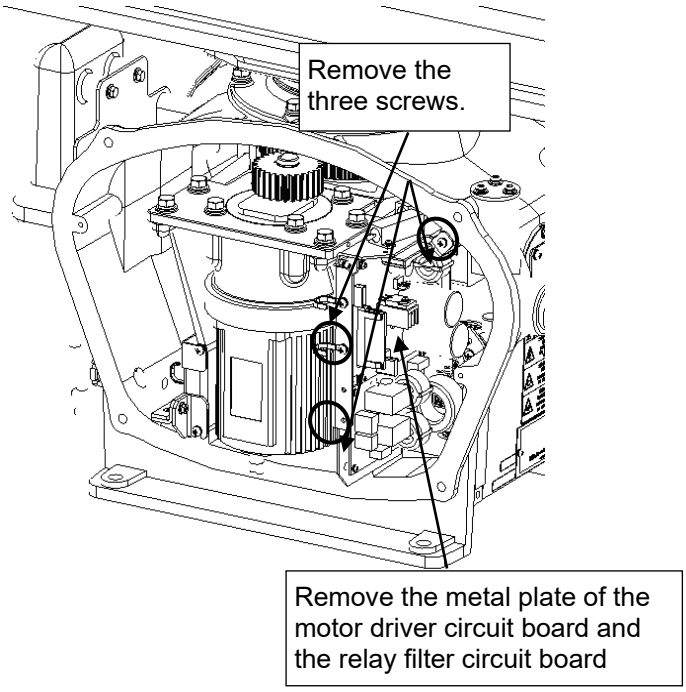




Example: Starboard side cover removal

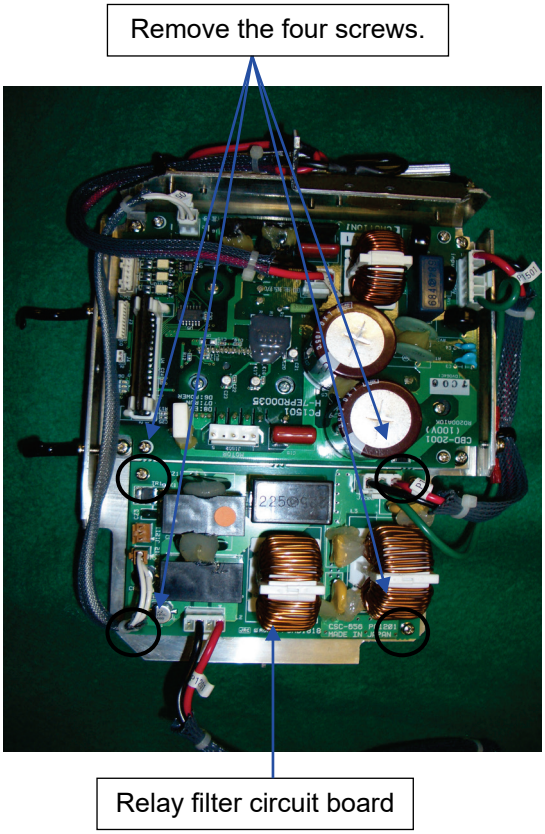
Step 2 Remove the metal plate of the motor driver circuit board and relay filter circuit board

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



Step 3 Replace the relay filter circuit board.

Remove the screws holding the relay filter circuit board in place (four M4 screws) and replace it. After having replaced the relay filter circuit board, reassemble the unit following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 4 Operation check

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

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

This completes relay filter circuit board replacement.

4.1.3.11 Receiver (NRG-162A) Replacement/NKE-1125

[Required Tools]

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

Table Required Tools

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

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

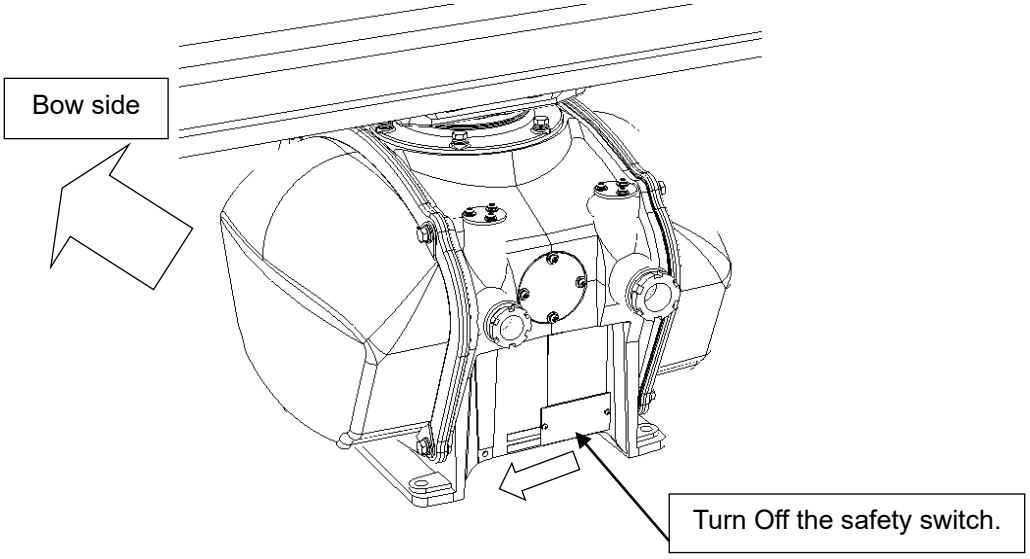
⚠ Before beginning work, turn Off the safety switch of the Scanner unit.

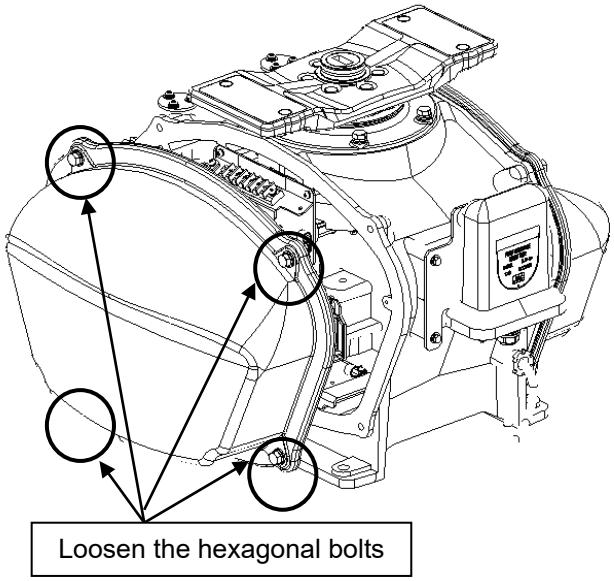
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

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

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

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

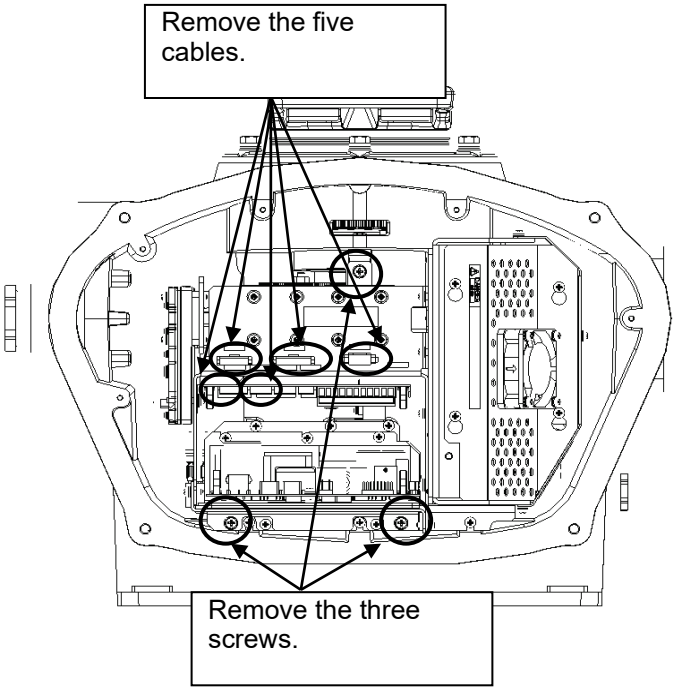




Example: Starboard side cover removal

Step 2 Remove the transmitter-receiver unit.

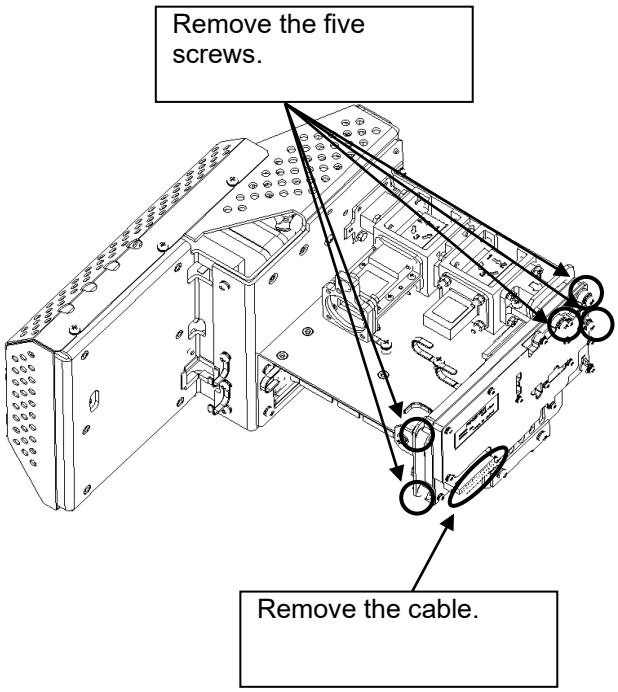
Remove the cover on the right (starboard) side. Remove the cables connected to the transmitter-receiver unit and the screws (three M5 screws) holding it in place, and then remove it.



Step 3 Replace the receiving unit.

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

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



Step 4 Operation check

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

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error. Transmit the radio wave in the long range mode and open the service engineer menu to perform tuning adjustment. Perform the adjustment in the service engineer menu until the tuning display bar on the display unit reaches the 8th calibration mark.

This completes receiving unit replacement.

4.1.3.12 Encoder (CHT-71A) Replacement/NKE-1125

[Required Tools]

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

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2, Size #3	
2	Open-end wrench*1	Width across flats 7 mm (for M4 screws), 8 mm (for M6 screws), 13 mm (for M8 screws)	
3	Socket wrench*1	Width across flats 7 mm (for M4 screws), 8 mm (for M6 screws), 13 mm (for M8 screws)	

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

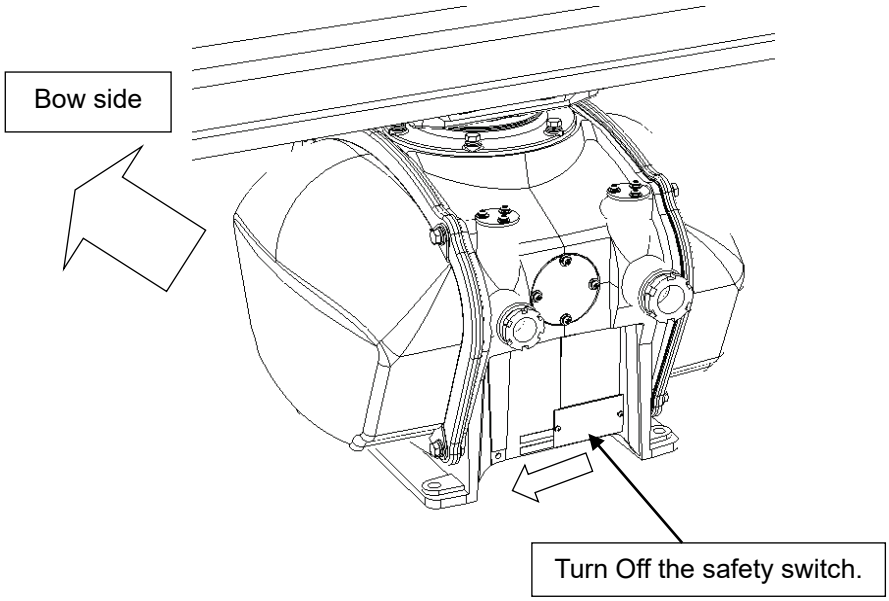
⚠ Before beginning work, turn Off the safety switch of the Scanner unit.

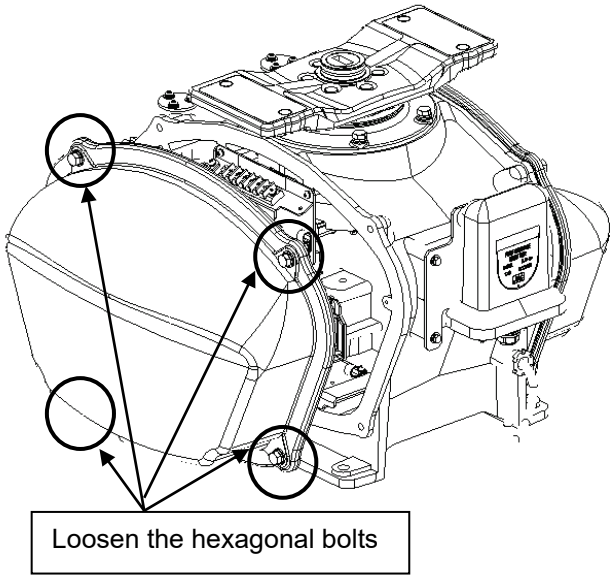
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

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

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

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

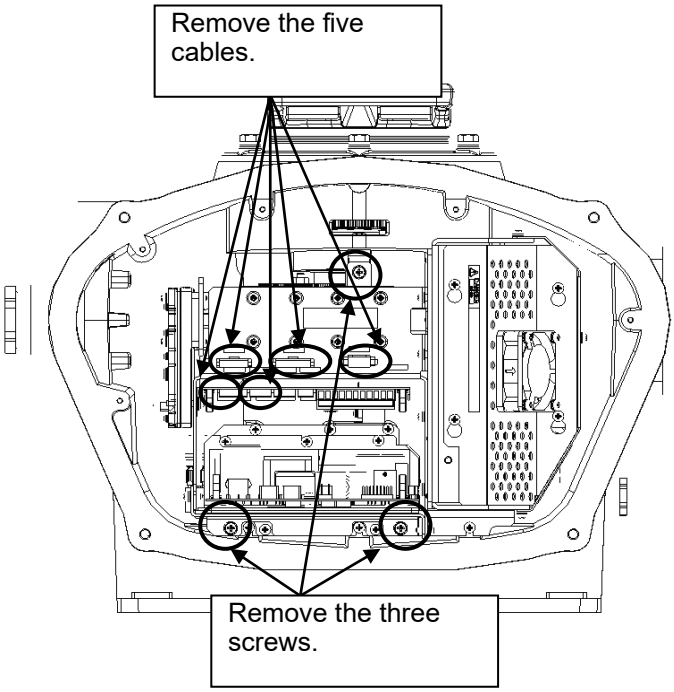




Example: Starboard side cover removal

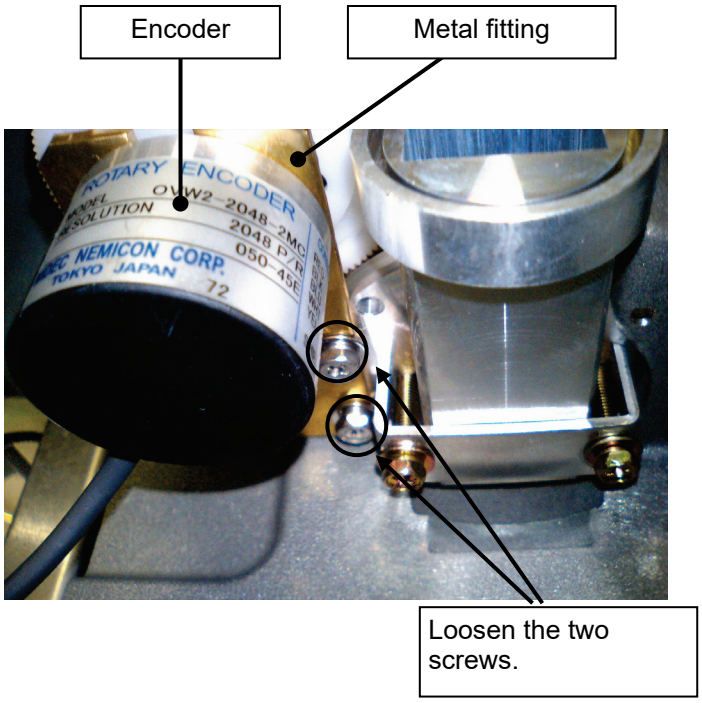
Step 2 Remove the transmitter-receiver unit.

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



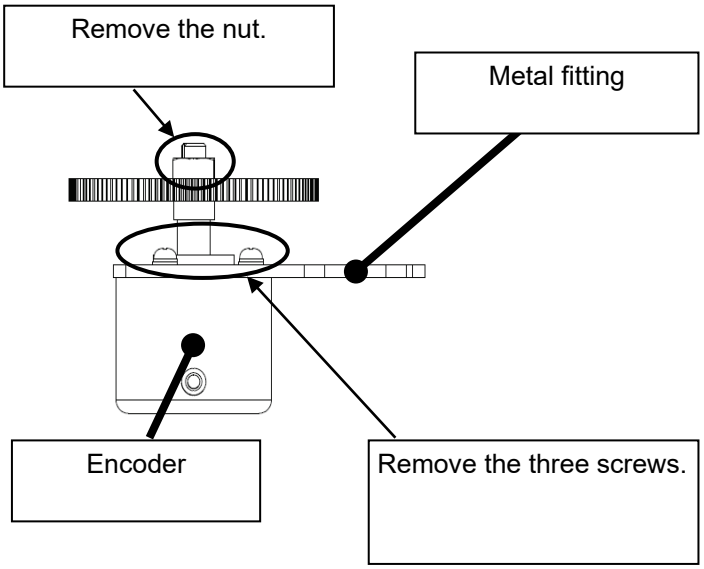
Step 3 Remove the encoder.

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



Step 4 Replace the encoder.

Remove the metal fixture and the gear wheel attached to the encoder. Put them onto the new encoder and put it back into the unit. After replacing the encoder, follow the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 5 Operation check

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

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error. Open the service engineer menu to perform azimuth adjustment.

This completes encoder replacement.

4.1.3.13 Brake Control Circuit (CCB-655A) Replacement/NKE-1125

[Required Tools]

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

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2, Size #3	
2	Open-end wrench*1	Width across flats 7 mm (for M4 screws), 13 mm (for M8 screws)	
3	Socket wrench*1	Width across flats 7 mm (for M4 screws), 13 mm (for M8 screws)	

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

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

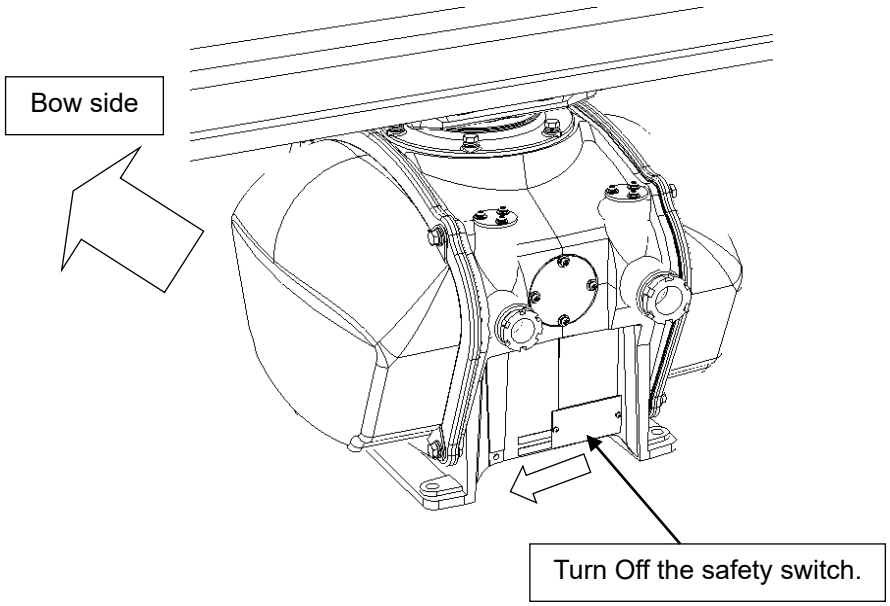
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

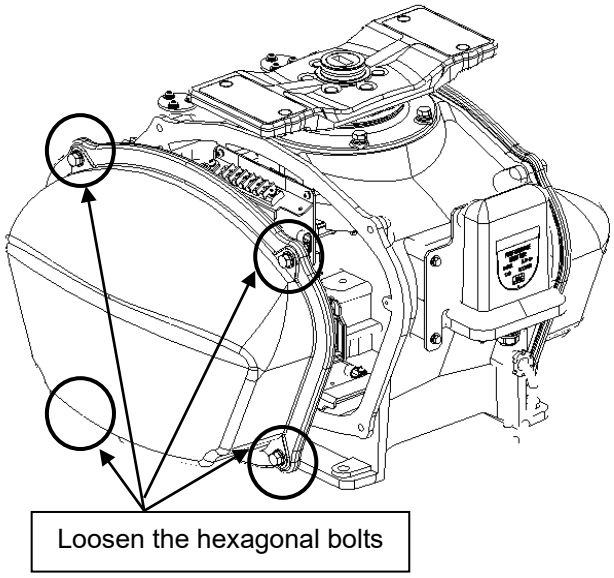
⚠ Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

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

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

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

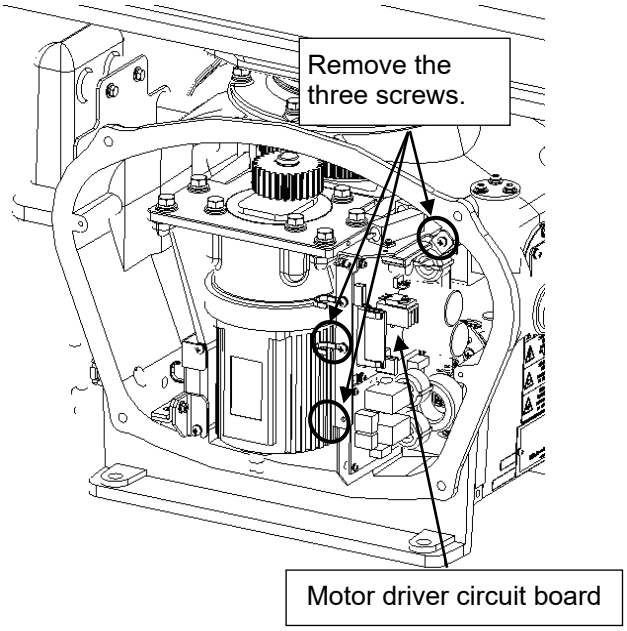




Example: Starboard side cover removal

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

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

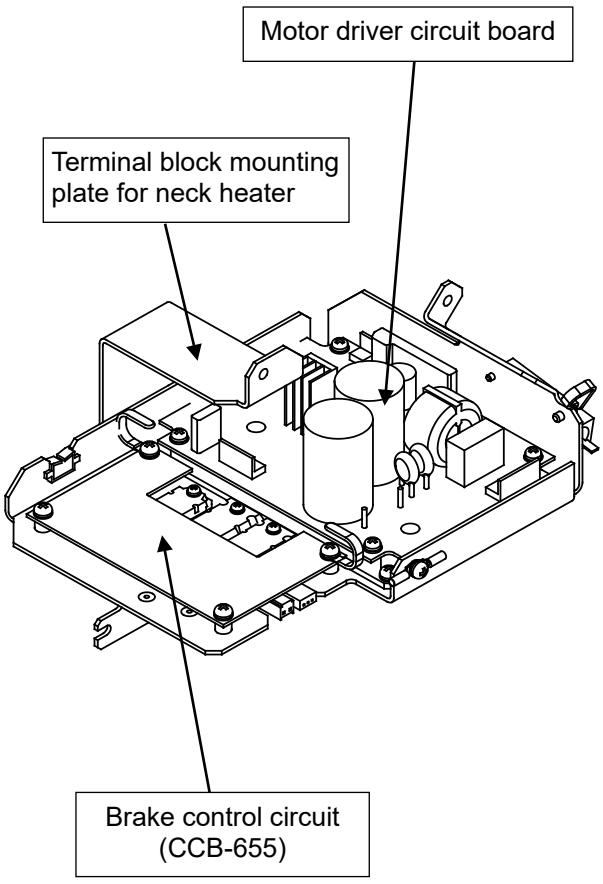


Step 3 Replace the brake control circuit.

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

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

Replace the brake control circuit by removing the four spacers (M4) and two FET screws (M3) that are holding the circuit board. After replacing the brake control circuit, reassemble the unit by following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 4 Operation check

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

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

This completes brake control circuit replacement.

4.1.3.14 Brake Circuit (CFA-253) Replacement/NKE-1125

[Required Tools]

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

Table Required Tools

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

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

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

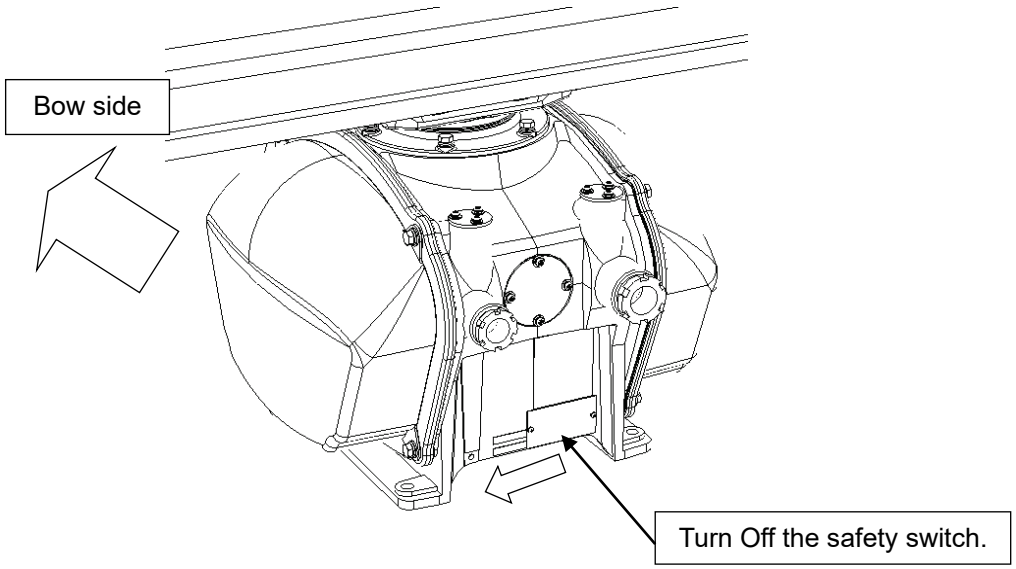
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

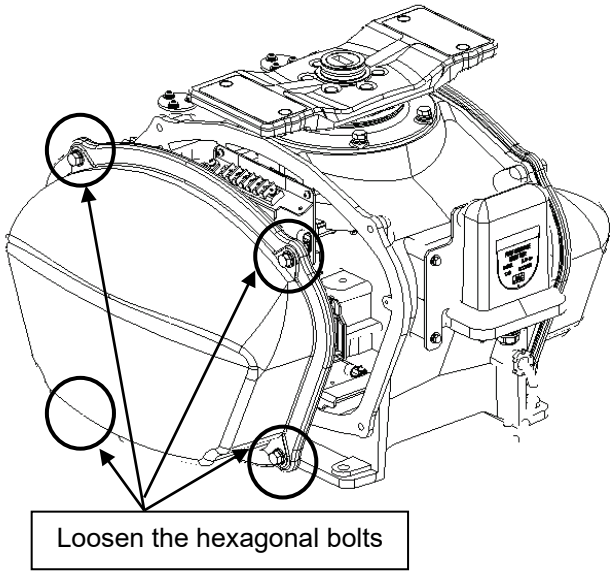
⚠ Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

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

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

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

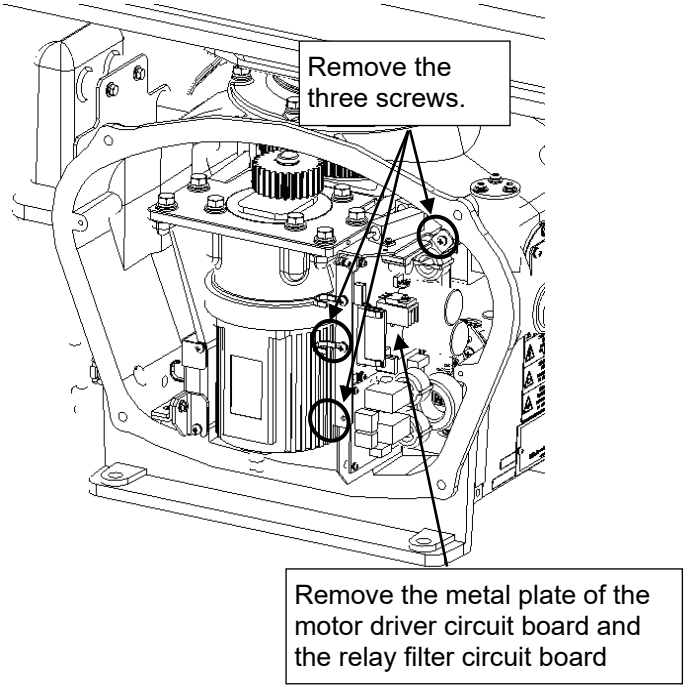




Example: Starboard side cover removal

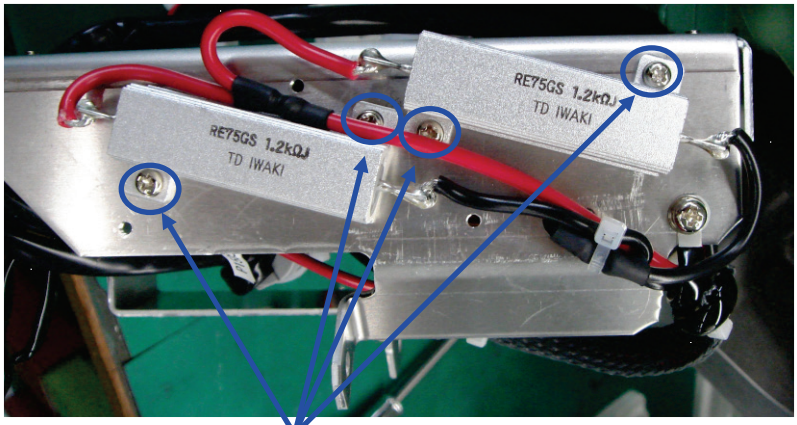
Step 2 Remove the metal plate of the motor driver circuit board and relay filter circuit board

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



Step 3 Replace the brake circuit.

Remove the four screws (M4) on the resistors at the top of the unit. Remove the cable that is connected to J1504 of the motor driver circuit, and replace the brake circuit (CFA-253: resistor with cable). After replacing the brake circuit, reassemble the unit following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Remove the four screws.

Step 4 Operation check

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

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

This completes brake circuit replacement.

4.1.3.15 Brake Circuit Unit (NZR-16) Replacement/NKE-1125

[Required Tools]

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

Table Required Tools

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

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

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

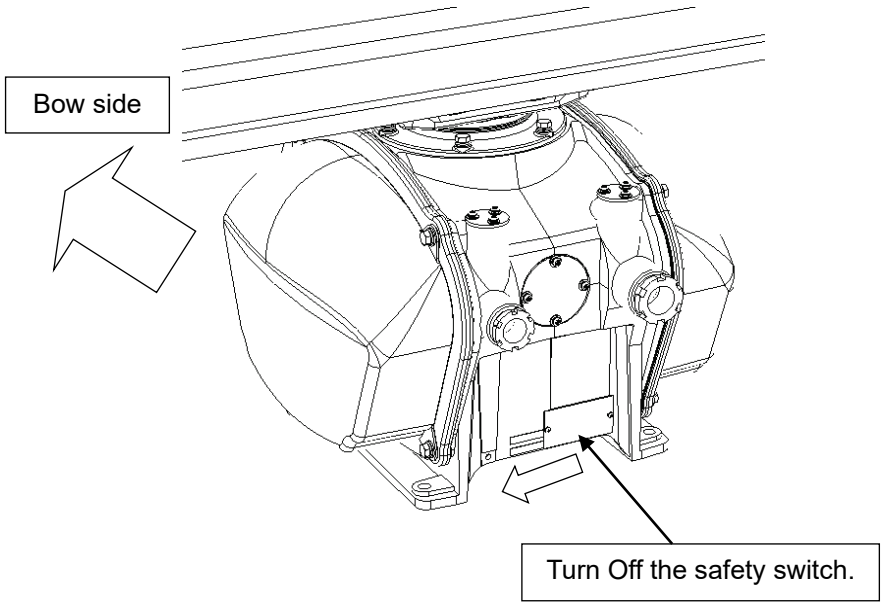
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

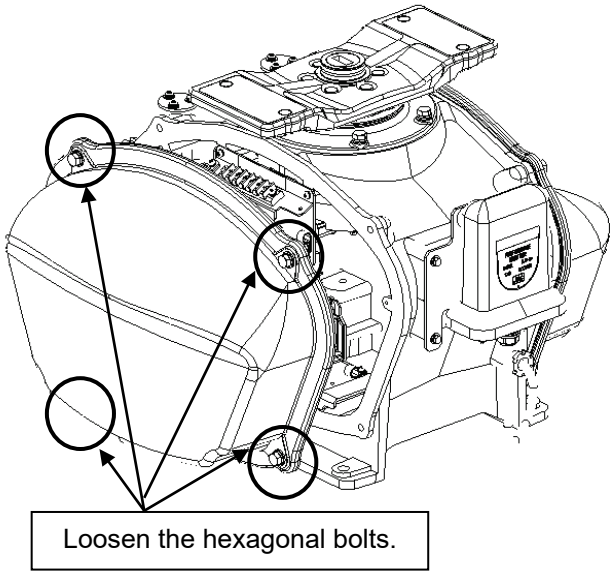
⚠ Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

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

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

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

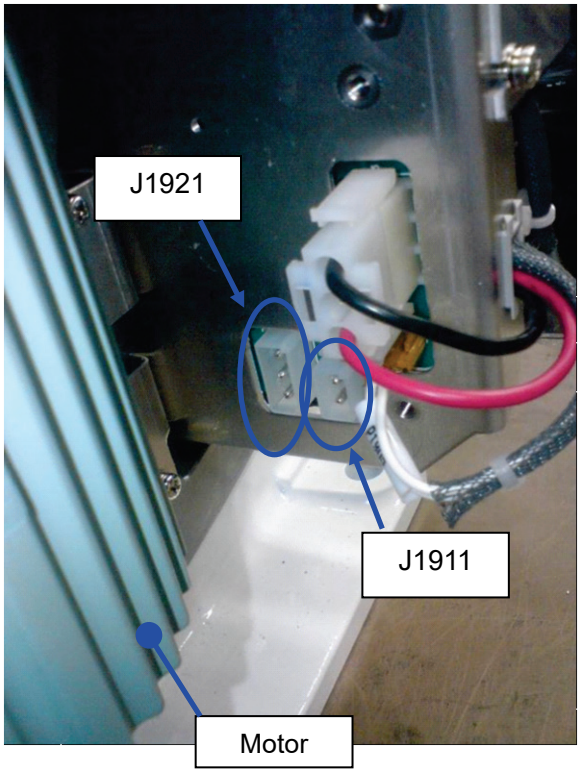




Example: Starboard side cover removal

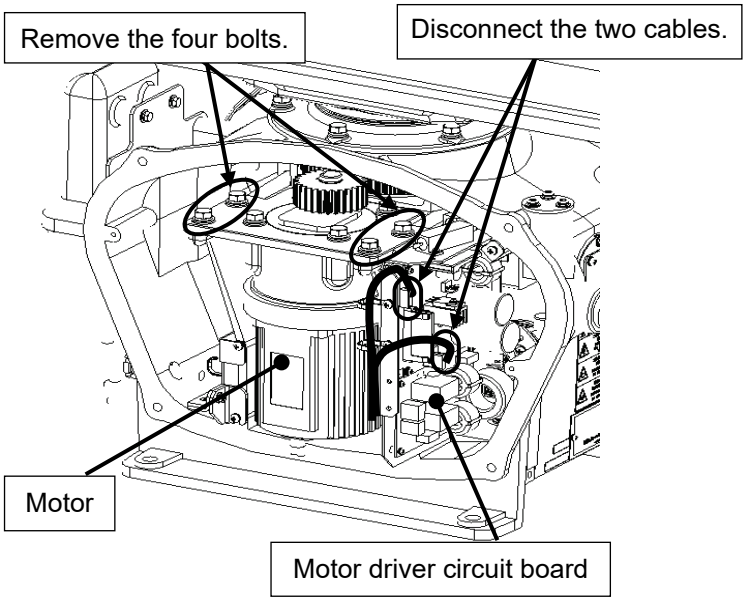
Step 2 Remove the brake control circuit cable

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



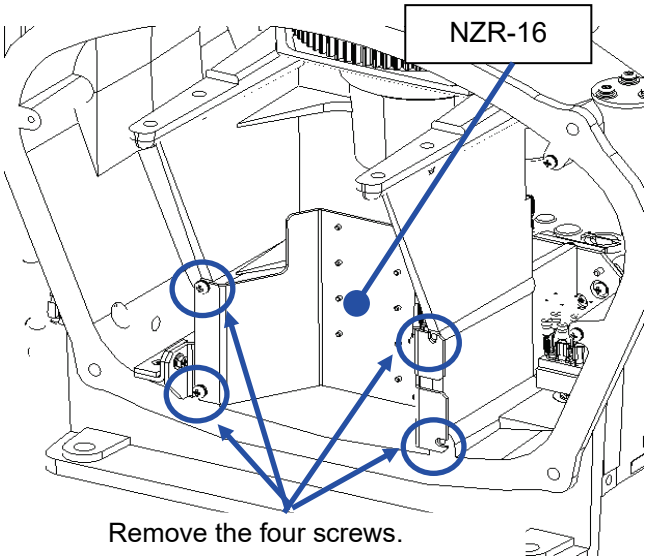
Step 3 Remove the motor.

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



Step 4 Replace the brake circuit unit.

Remove four screws (M4) and replace the break circuit unit (NZR-16). After replacing the brake circuit, reassemble the unit following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 5 Operation check

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

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

This completes brake circuit unit replacement.

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

Instruction for Equipment

装備要領

1. Adapter installation
アダプタの取り付け

The adapter is installed in Performance Monior(NJU-85) with the bolt of the attachment.
(6-B5X12SUS,SW5,W5)
パフォーマンスモニタ(NJU-85)にアダプタを付属のボルトで固定する。
(6-B5X12SUS、SW5,W5)

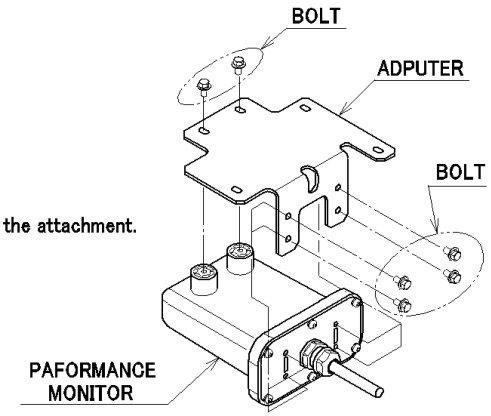


Fig1 (図1)

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

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

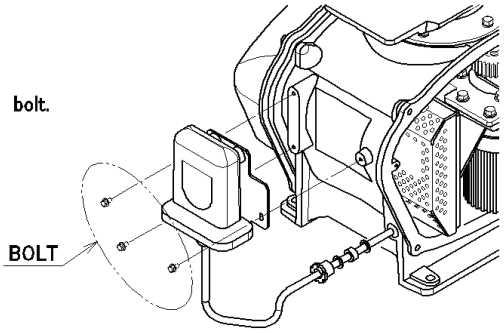


Fig2 (図2)

3.Wiring
配線

Put the cablegrand into the Cable ,as shown in Fig.3
Each connector (J81,J82) and the earth terminal are connected. ,as shown in Fig.4
ケーブルに締付グランド ワッシャ ガスケットをケーブルに通します。(図3)
コネクタ(J81、J82)に接続して、アースはねじにて固定します。(図4)

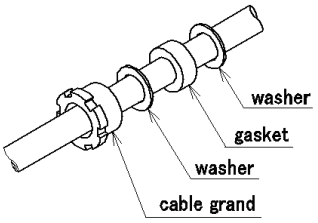


Fig3 (図3)

4.Check and adjustment
確認と調整

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

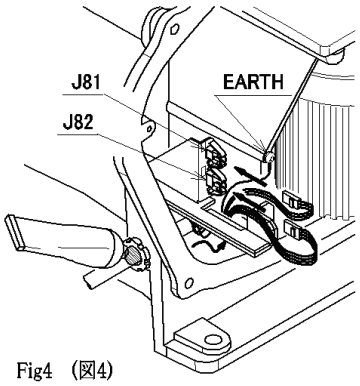


Fig4 (図4)

5. Water proof
防水処理

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

MTZ303916

4.1.4 NKE-1129 Scanner Unit

4.1.4.1 Motor Replacement/NKE-1129

See the section for NKE-1125.

4.1.4.2 Motor drive Circuit Board Replacement/NKE-1129

See the section for NKE-1125.

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

[Required Tools]

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

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2, Size #3	
2	Open-end wrench*1	Width across flats 7 mm (for M4 screws), 8 mm (for M6 screws), 13 mm (for M8 screws)	
3	Socket wrench*1	Width across flats 7 mm (for M4 screws), 8 mm (for M6 screws), 13 mm (for M8 screws)	

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

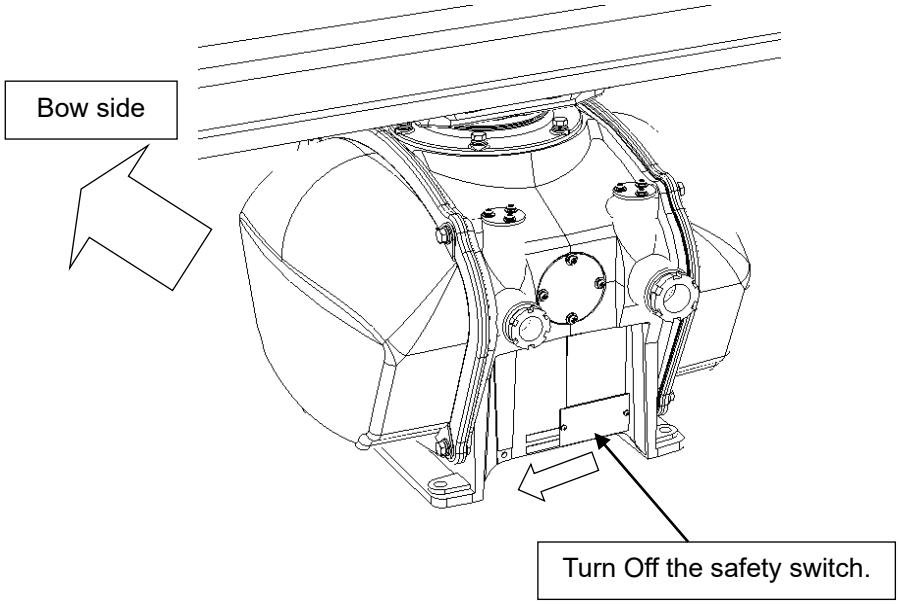
⚠ Before beginning work, turn Off the safety switch of the radar antenna.

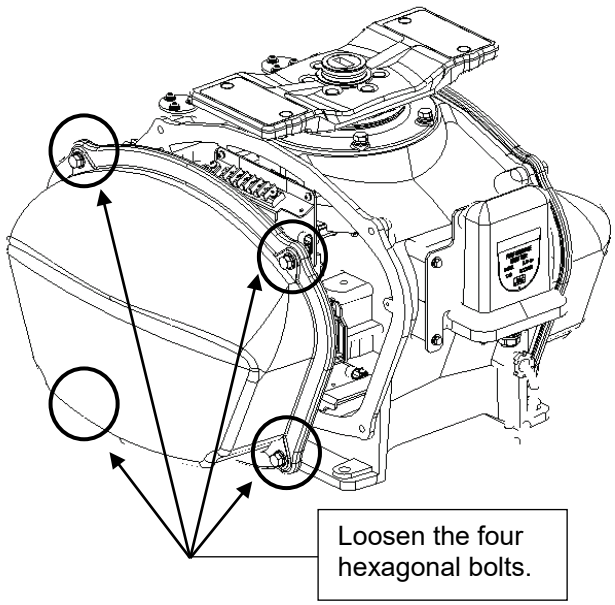
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

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

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

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

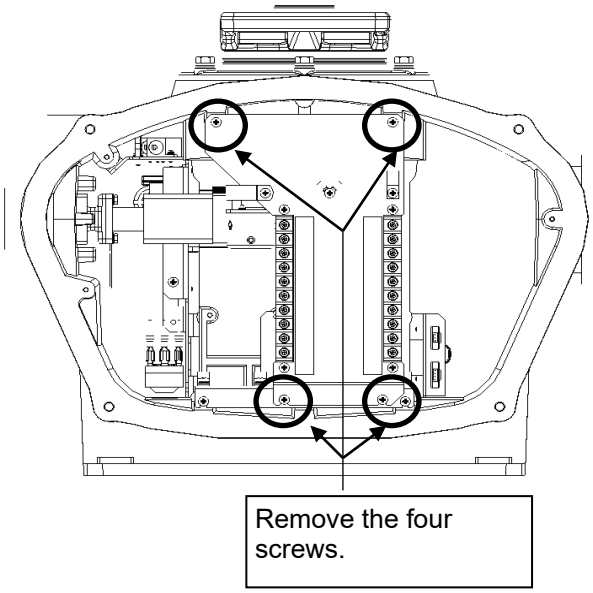




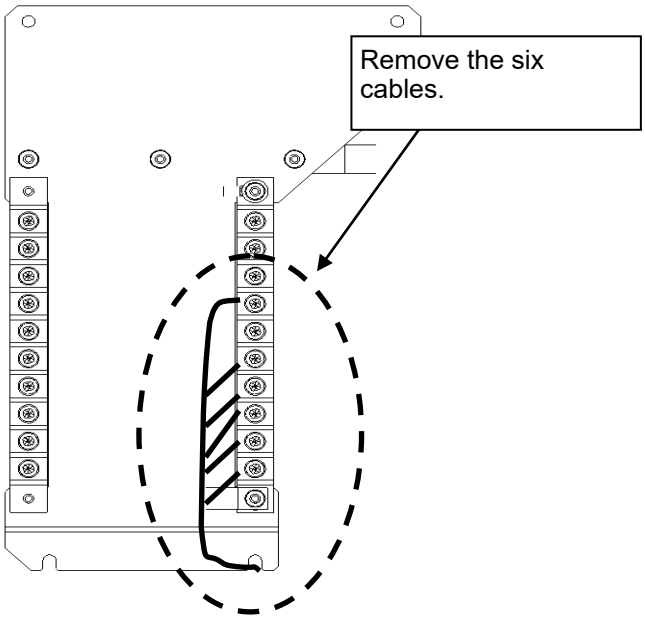
Example: Removal of starboard si de cover.

Step 2 Remove the plate from the terminal block.

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

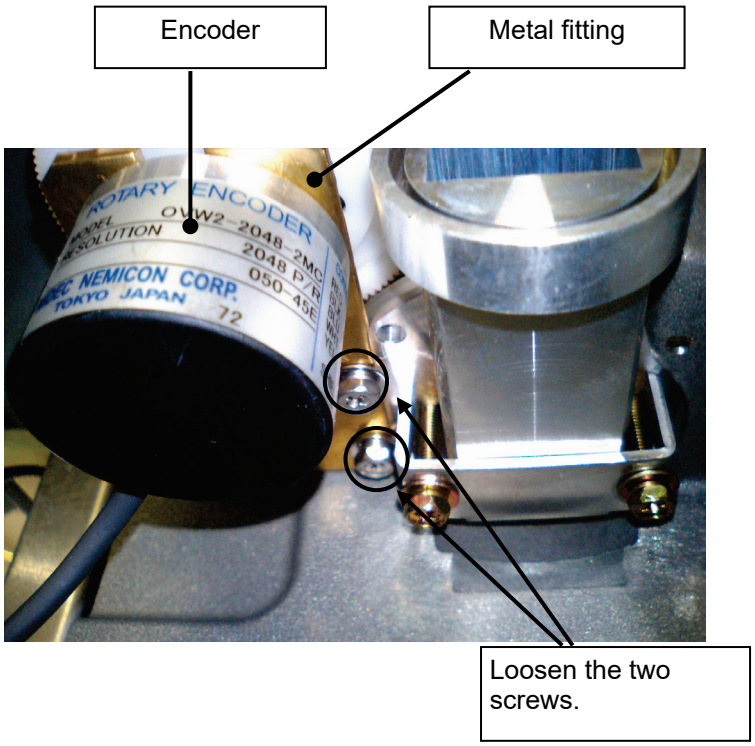


Step 3 Remove the encoder cable.



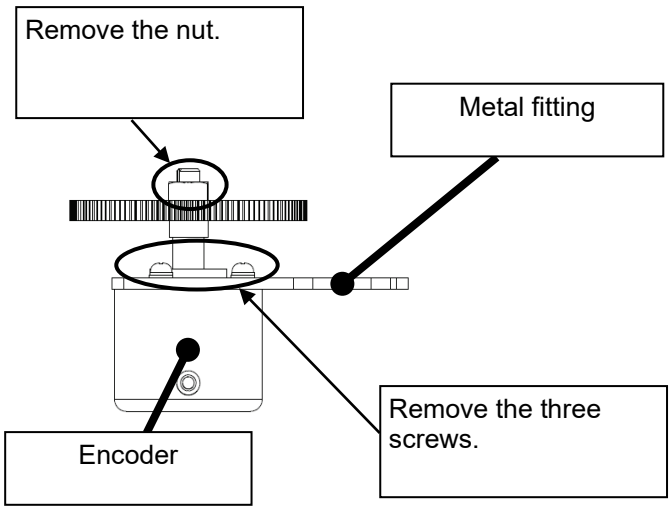
Step 4 Remove the encoder.

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



Step 5 Replace the encoder.

Remove the metal fixture and the gear wheel attached to the encoder. Put them onto the new encoder and put it back into the unit. After replacing the encoder, follow the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 6 Operation check

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

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error. Open the service engineer menu to perform azimuth adjustment.

This completes encoder replacement.

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

See the section for NKE-1125.

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

See the section for NKE-1125.

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

See the section for NKE-1125.

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

See the section for NKE-1125.

4.1.5 NKE-2254-HS Scanner Unit

4.1.5.1 Magnetron Replacement/NKE-2254-HS

See the section for NKE-1125.

4.1.5.2 Motor Replacement/NKE-2254-HS

[Required Tools]

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

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2, Size #3	
2	Open-end wrench*1	Width across flats 13 mm (for M8 screws), 17 mm (for M10 screws)	
3	Socket wrench*1	Width across flats 13 mm (for M8 screws), 17 mm (for M10 screws)	

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

⚠ Before beginning work, turn Off the safety switch of the radar antenna.

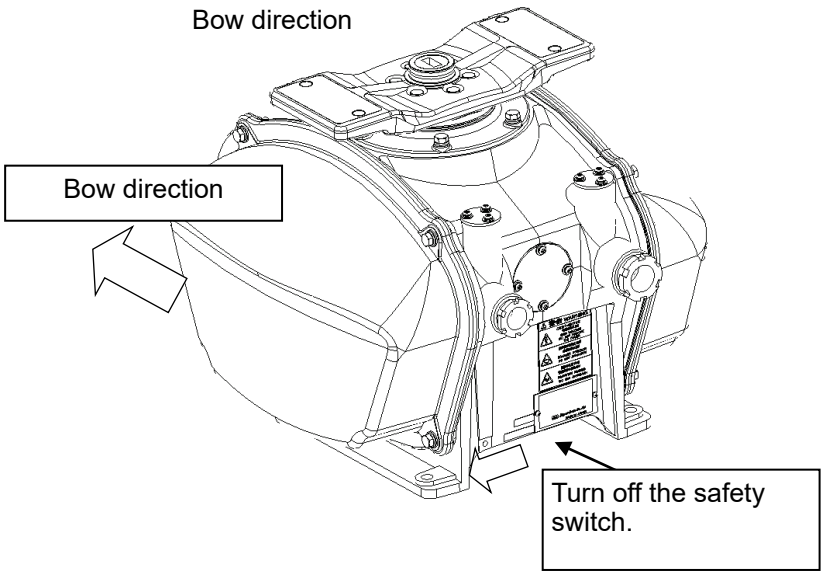
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

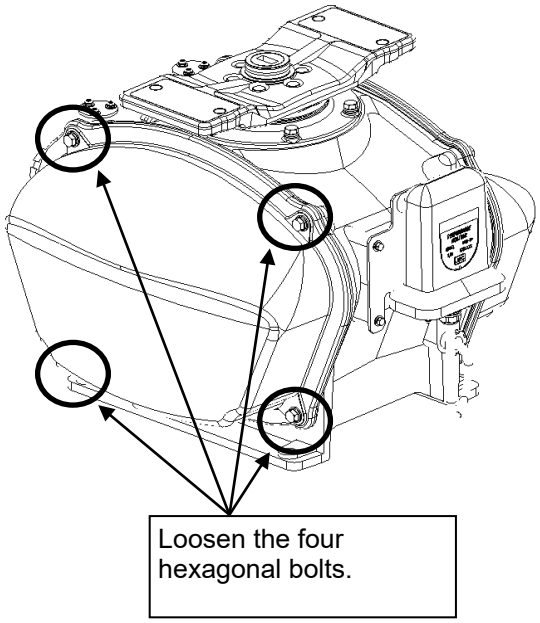
⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

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

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

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

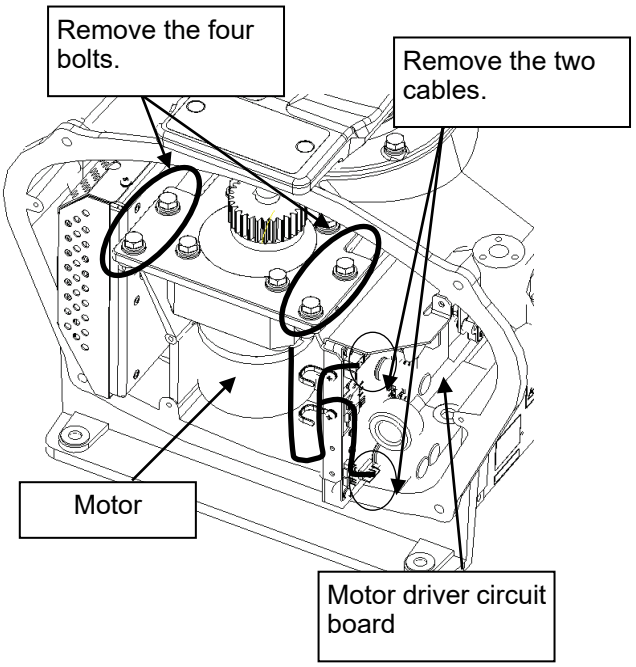




Example: Removal of starboard side cover.

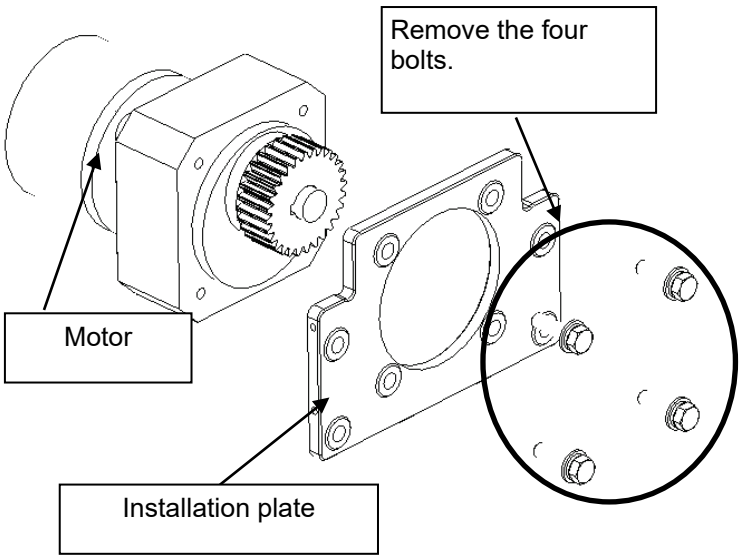
Step 2 Remove the motor.

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

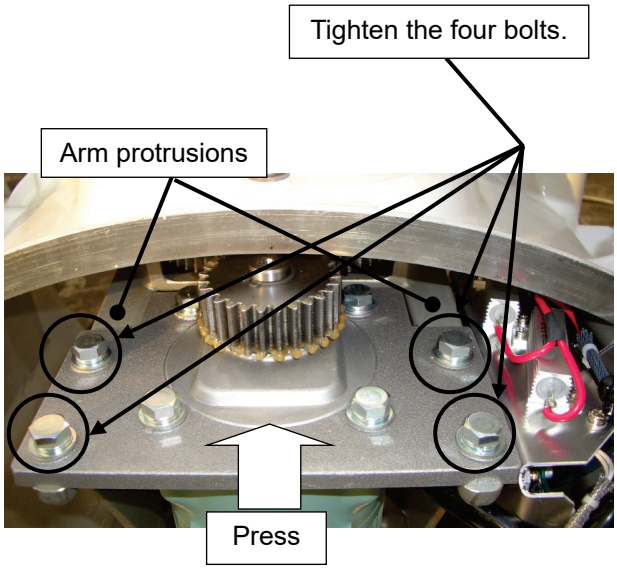


Step 3 Replace the motor.

Remove the hexagonal bolts (four M8 bolts) and remove the installation plate from the motor. Attach the installation plate to the replacement motor. Do not forget to tighten the hexagonal bolts to an appropriate torque (140 kgf･cm) so they are free of looseness.

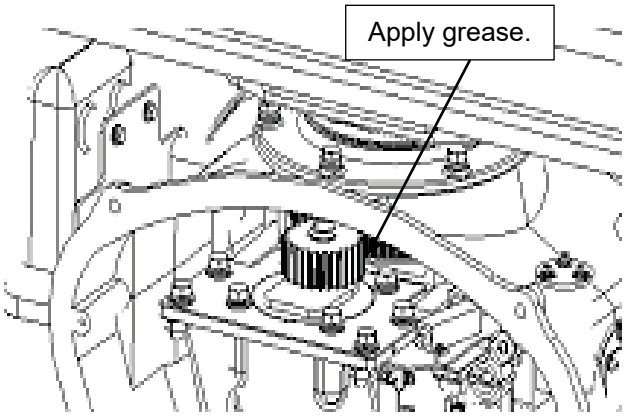


Install the motor into the scanner unit. Press the motor against the protrusions of the arm fixed to the motor on which the arm extends through the wall of the casing, adjust it to minimize backlash, and fix it in place. Do not forget to tighten the hexagonal bolts, to an appropriate torque (140 kgf･cm)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



Step 4 Apply grease to the new motor.

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



Step 5 Operation check

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

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error. Check that the motor does not make any abnormal sound when it starts to rotate, while it is rotating, or when it stops.

This completes motor replacement.

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

[Required Tools]

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

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2	
2	Open-end wrench*1	Width across flats 13 mm (for M8 screws), 17 mm (for M10 screws)	
3	Socket wrench*1	Width across flats 13 mm (for M8 screws), 17 mm (for M10 screws)	

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

⚠ Before beginning work, turn Off the safety switch of the radar antenna.

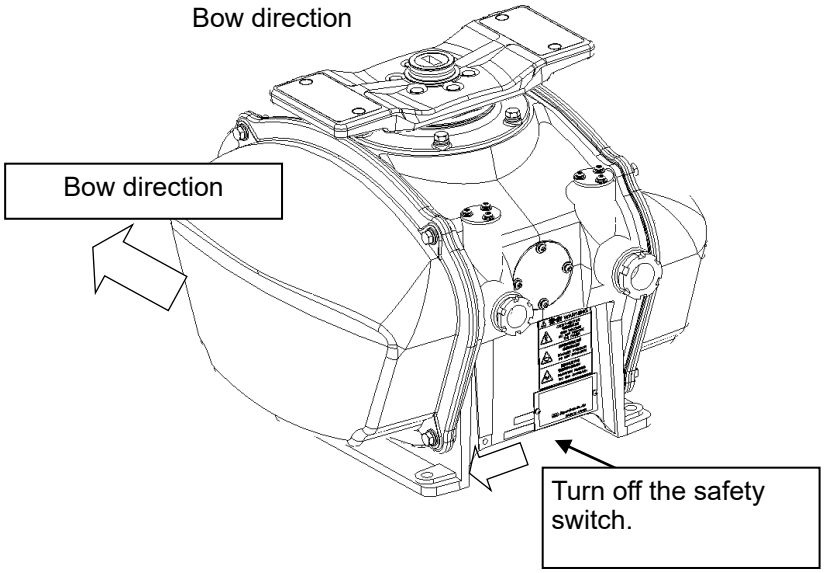
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

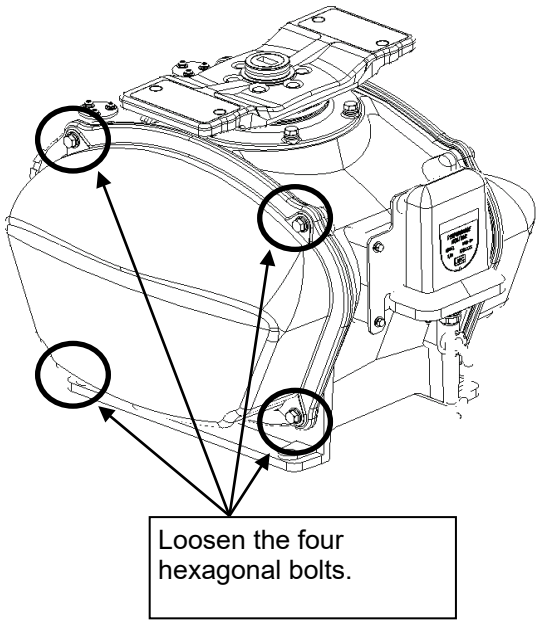
⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

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

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

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

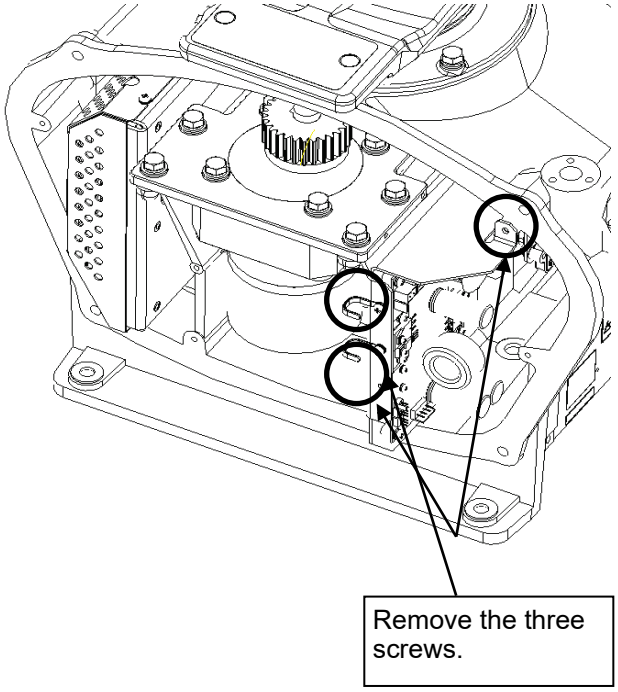




Example: Removal of starboard si de cover.

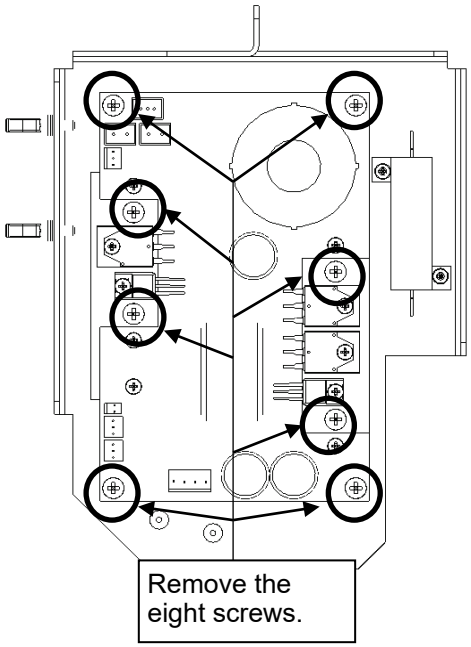
Step 2 Remove the plate of the Motor driver circuit.

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



Step 3 Replace the Motor driver circuit.

Remove the cables connected to the motor driver circuit board. Remove the screws (four M4 screws) and then replace it. After having replaced the driver circuit board, reassemble the unit by following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 4 Operation check

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

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error. Check that the motor does not make any abnormal sound when it starts to rotate, while it is rotating, or when it stops.

This completes Motor driver circuit replacement.

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

See the section for NKE-1125.

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

See the section for NKE-1125.

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

See the section for NKE-1125.

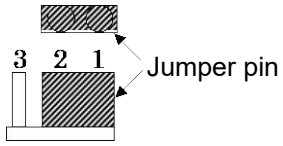
4.1.5.7 T/R Control Circuit (CMC-1205R) Replacement/NKE-2254-HS

See the section for NKE-1125.

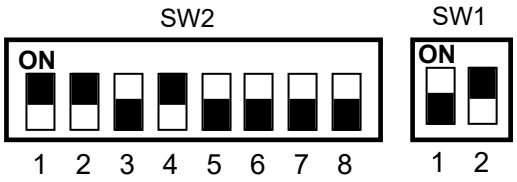
For NKE-2254-HS, set the jumper pins and Dip switches as follows.

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

• Jumper pin settings



• DIP switch settings (■ indicates a switch.)



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

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

See the section for NKE-1125.

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

See the section for NKE-1125.

4.1.5.10 Magnetron Fan Replacement/NKE-2254-HS

See the section for NKE-1125.

4.1.5.11 Modulator Fan Replacement/NKE-2254-HS

See the section for NKE-1125.

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

[Required Tools]

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

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2	
2	Open-end wrench*1	Width across flats 13 mm (for M8 screws), 17 mm (for M10 screws)	
3	Socket wrench*1	Width across flats 13 mm (for M8 screws), 17 mm (for M10 screws)	

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

⚠ Before beginning work, turn Off the safety switch of the radar antenna.

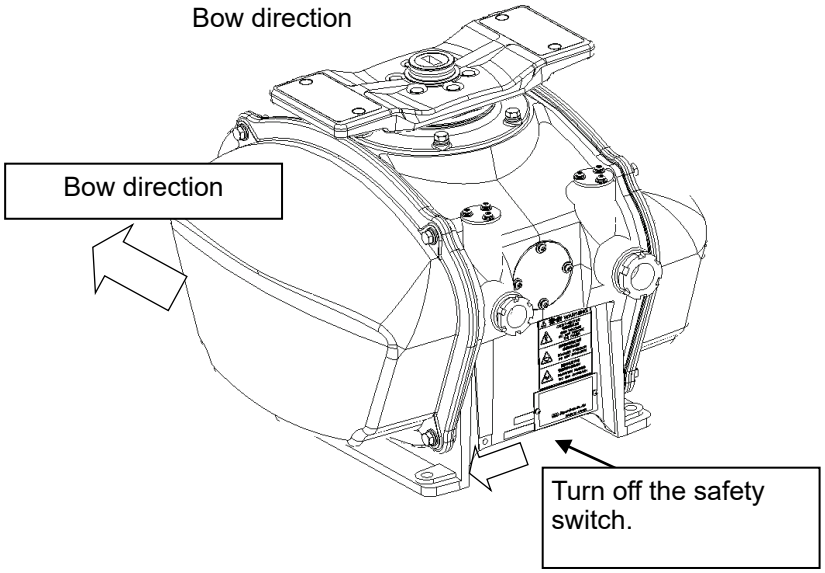
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

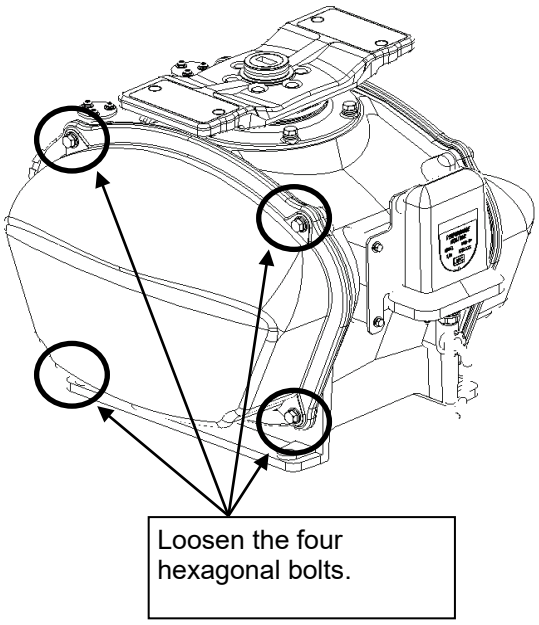
⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

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

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

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

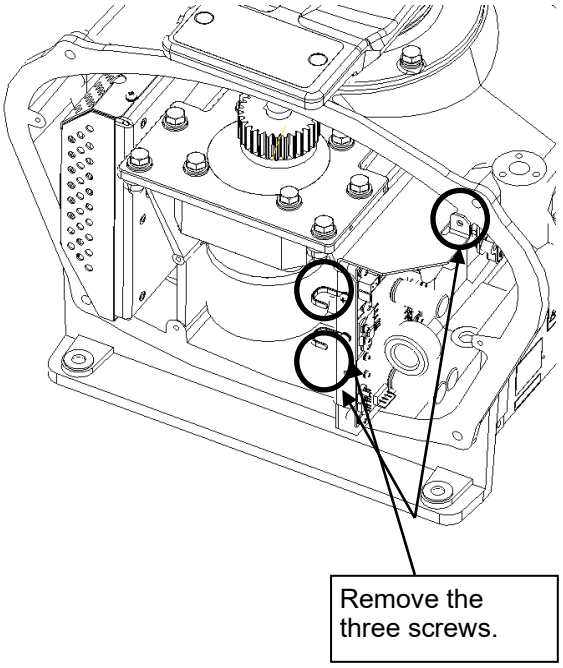




Example: Removal of starboard side cover.

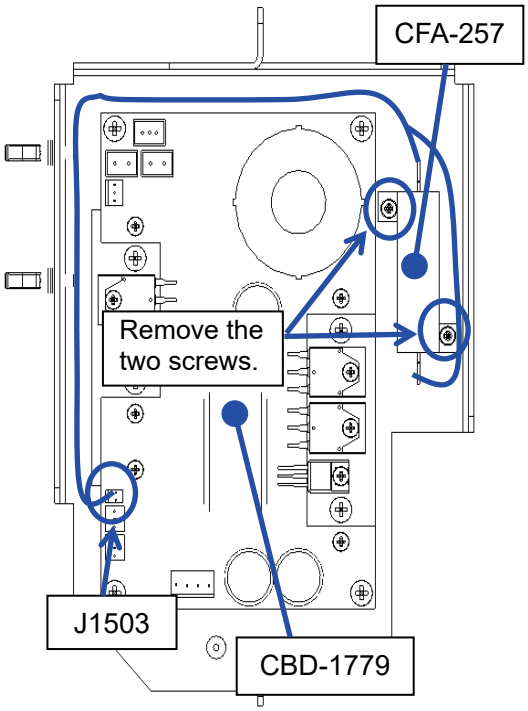
Step 2 Remove the plate from the Motor driver circuit.

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



Step 3 Replace the brake circuit.

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



Step 4 Operation check

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

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

This completes brake circuit replacement.

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

See the section for NKE-1125.

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

4.1.6.1 Magnetron Replacement/NKE-2103

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

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

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

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

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

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

[Required Tools]

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

Table Required Tools

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

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

⚠ Before beginning work, turn Off the safety switch of the radar antenna.

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

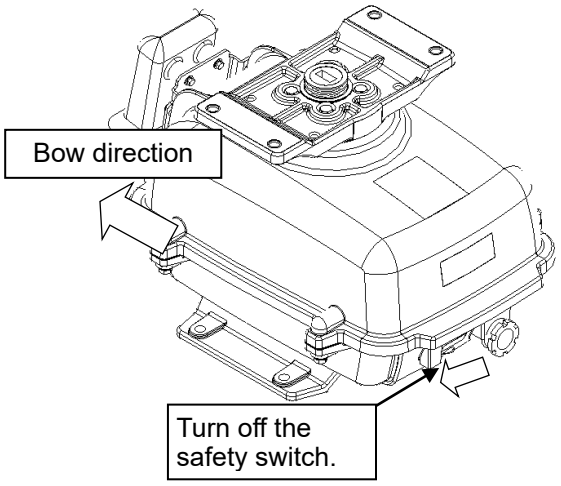
⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

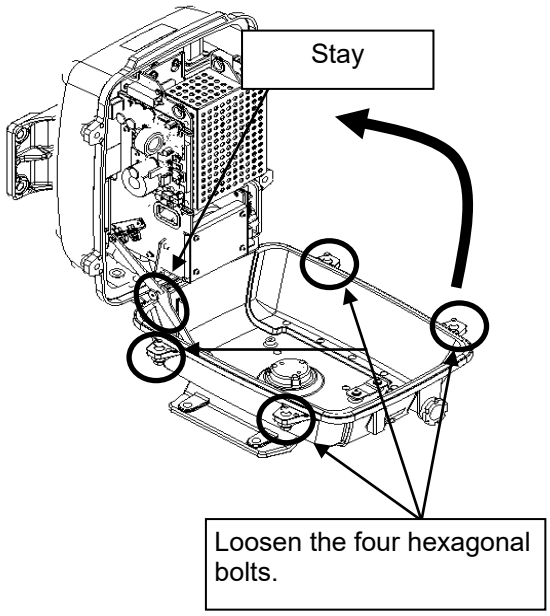
Step 1 Turn Off the safety switch and open the cover.

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

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

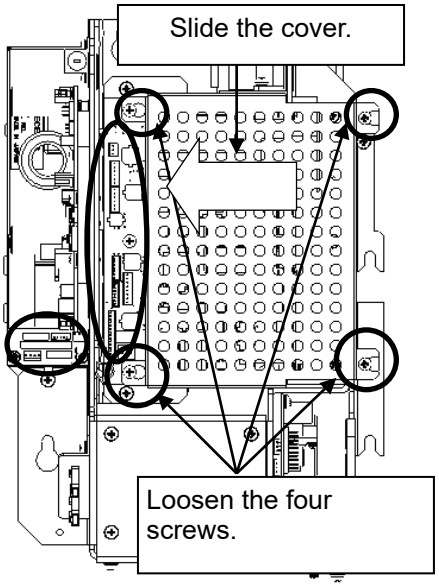
⚠ When closing the upper cover, release the stay stopper and then tighten the cover.





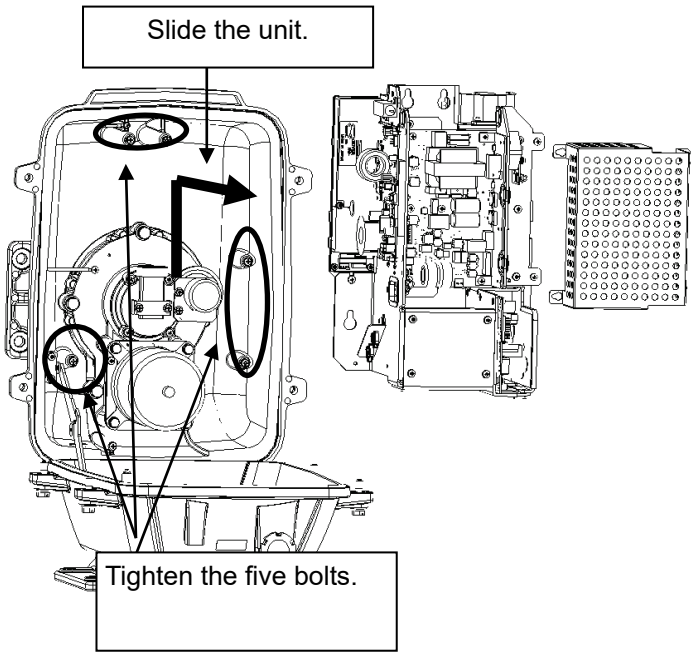
Step 2 Remove the transmitter-receiver unit cover

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



Step 3 Remove the transmitter-receiver unit

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



Step 4 Replace the magnetron cover.

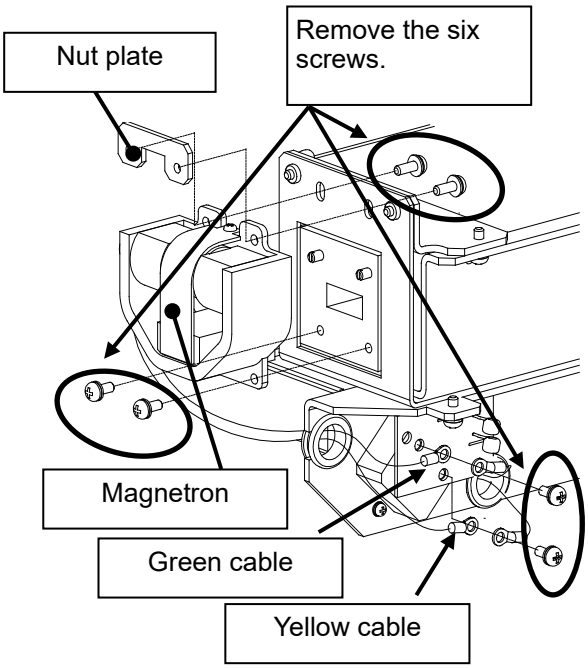
Remove the screws (six M4 screws) holding the magnetron in place and then replace it.

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

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

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

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



Step 5 Operation check

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

(1) Turn On the radar and allow sufficient preheating time (20 to 30 minutes in the STBY mode).

(2) Start transmission on a short pulse range and change the range to the long pulse range. Open the service engineer menu and provisionally adjust the tuning.

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

(3) After transmitting on a long range for about fifteen minutes, return to the service engineer menu and adjust the tuning. Perform the adjustment in the service engineer menu until the tuning display bar on the display unit reaches the 8th calibration mark. With the service engineer menu open, also make sure the magnetron current is shown between the 4th and 7th calibration markings.

(4) Finally, initialize the transmission time in the service engineer menu.

This completes magnetron replacement.

4.1.6.2 Motor Replacement/NKE-2103

[Required Tools]

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

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2, Size #3	
2	Open-end wrench*1	Width across flats 10 mm (for M6 screws), 13 mm (for M8 screws)	
3	Socket wrench*1	Width across flats 10 mm (for M6 screws), 13 mm (for M8 screws)	

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

⚠ Before beginning work, turn Off the safety switch of the radar antenna.

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

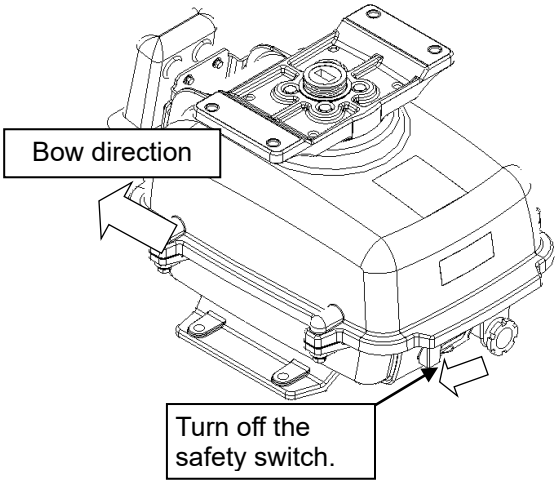
⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

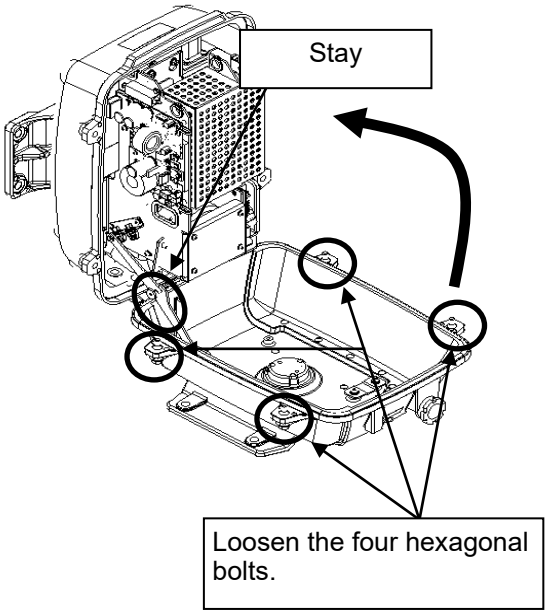
Step 1 Turn Off the safety switch and open the cover.

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

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

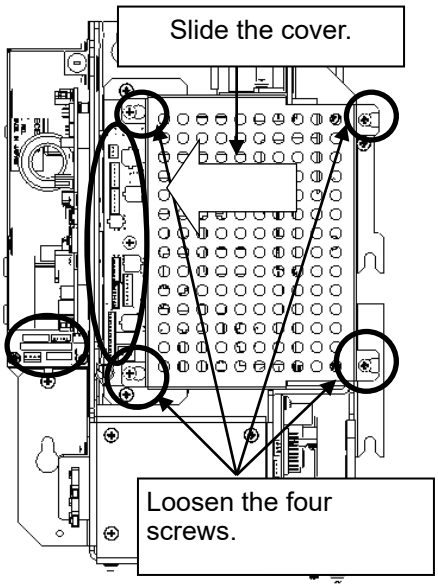
⚠ When closing the upper cover, release the stay stopper and then tighten the cover.





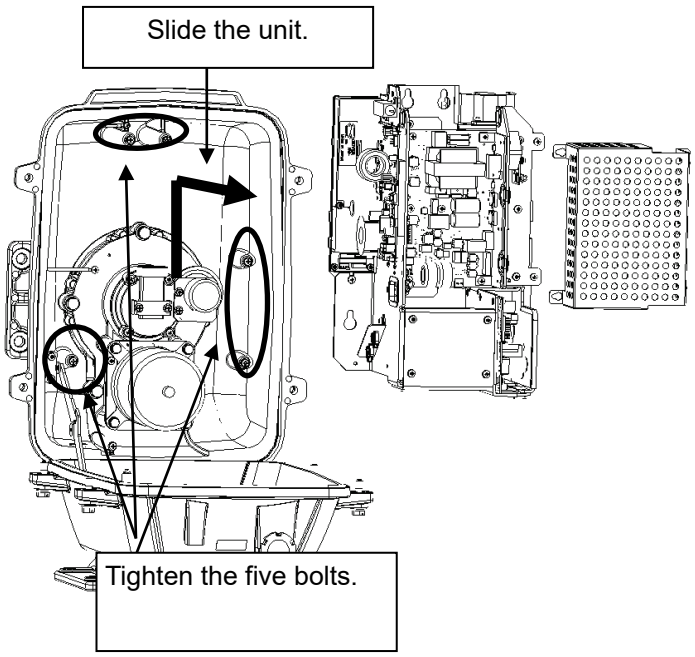
Step 2 Remove the transmitter-receiver unit cover

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



Step 3 Remove the transmitter-receiver unit

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



Step 4 Replace the motor.

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

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

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

Step 5 Operation check

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

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error. Check that the motor does not make any abnormal sound when it starts to rotate, while it is rotating, or when it stops.

This completes motor replacement.

4.1.6.3 Motor driver circuit Replacement/NKE-2103

[Required Tools]

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

Table Required Tools

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

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

⚠ Before beginning work, turn Off the safety switch of the radar antenna.

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

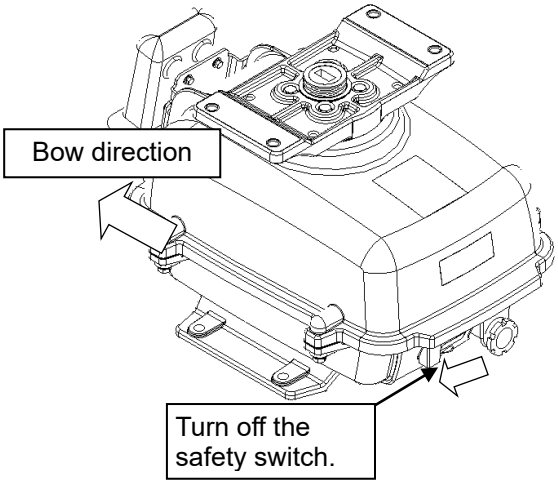
⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

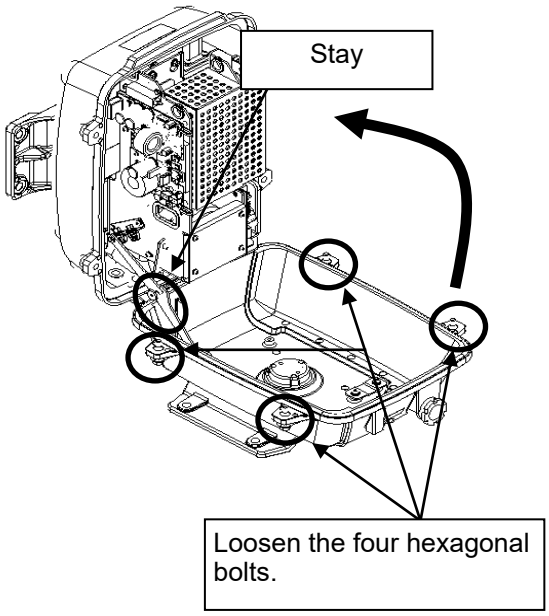
Step 1 Turn Off the safety switch and open the cover.

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

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

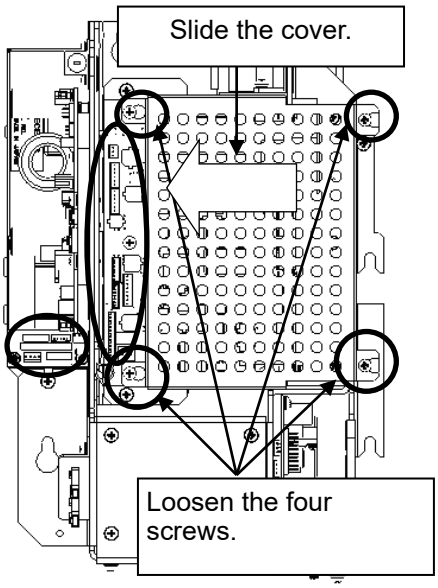
⚠ When closing the upper cover, release the stay stopper and then tighten the cover.





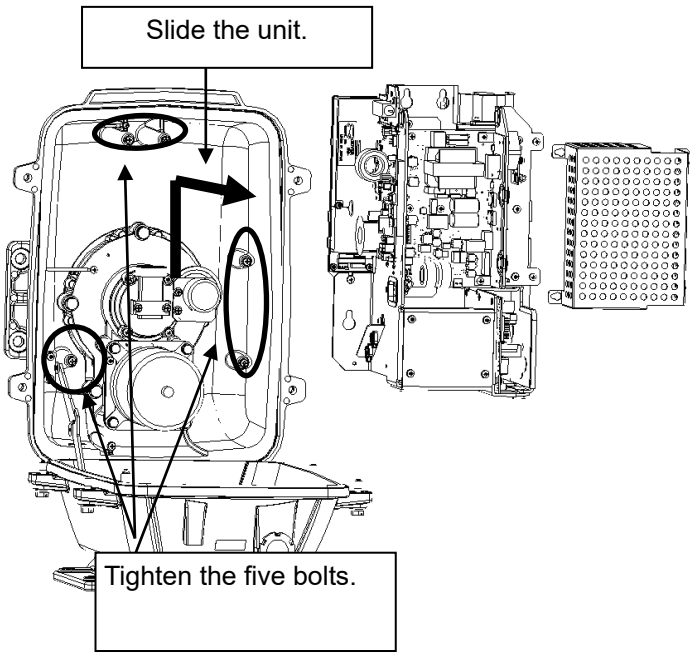
Step 2 Remove the transmitter-receiver unit cover

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



Step 3 Remove the transmitter-receiver unit

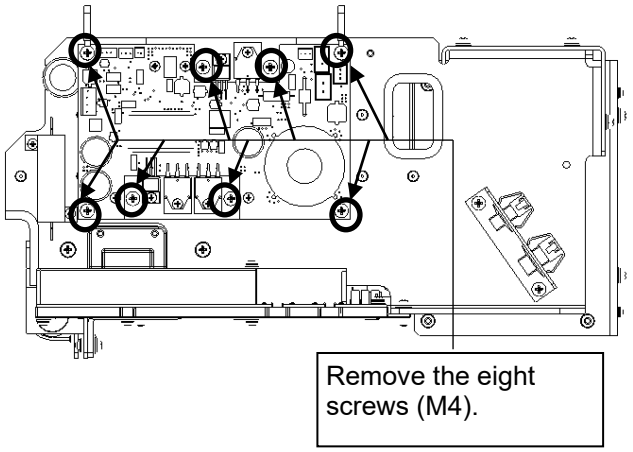
Loosen the bolts (five M5 bolts) and remove the transmitter-receiver unit. Slide it upward to remove.



Step 4 Replace the Motor driver circuit.

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

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



Step 5 Operation check

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

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

This completes Motor driver circuit replacement.

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

[Required Tools]

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

Table Required Tools

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

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

⚠ Before beginning work, turn Off the safety switch of the radar antenna.

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

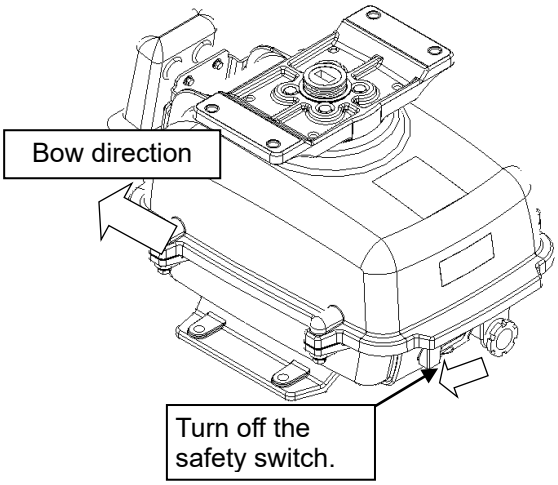
⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

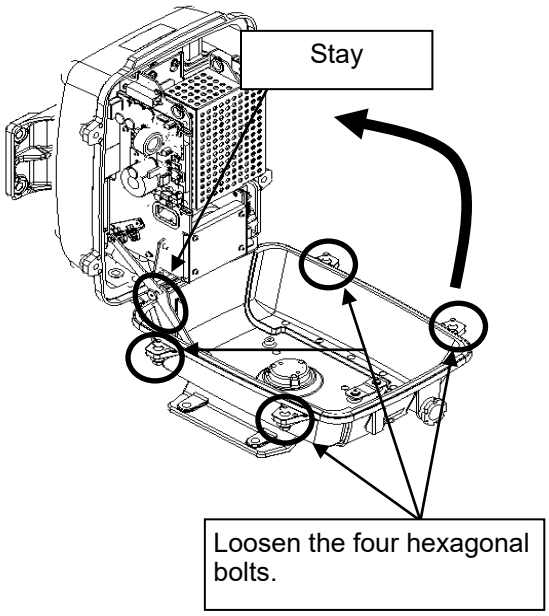
Step 1 Turn Off the safety switch and open the cover.

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

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

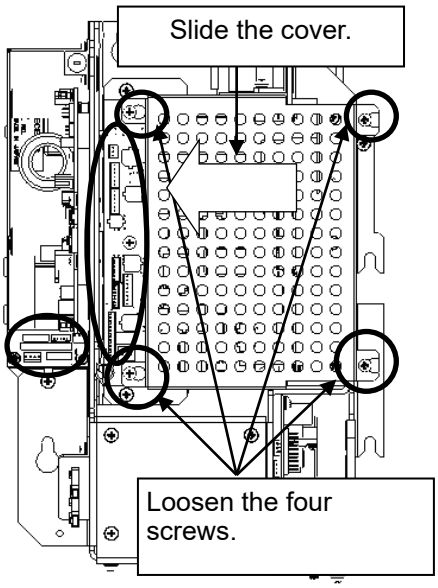
⚠ When closing the upper cover, release the stay stopper and then tighten the cover.





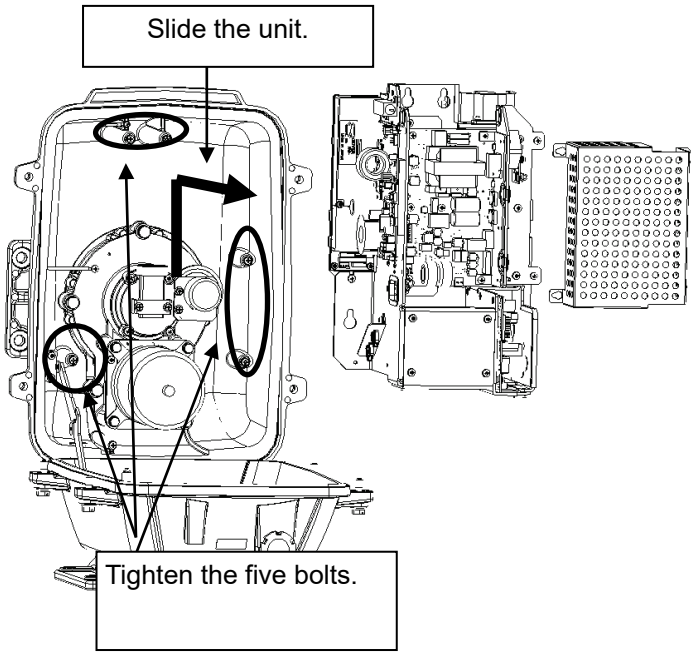
Step 2 Remove the transmitter-receiver unit cover

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



Step 3 Remove the transmitter-receiver unit

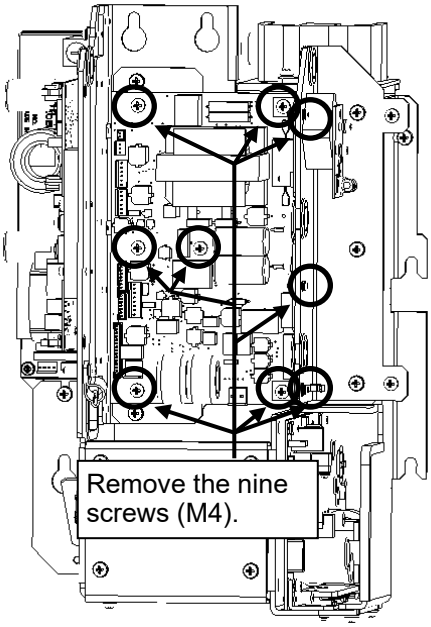
Loosen the bolts (five M5 bolts) and remove the transmitter-receiver unit. Slide it upward to remove.



Step 4 Replace the modulator circuit board.

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

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



Step 5 Operation check

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

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error.
Transmit the radar wave in long pulse range mode and open the service engineer menu to check that the magnetron current stands between the 5th and 7th calibration markings.

This completes modulator circuit board replacement.

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

[Required Tools]

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

Table Required Tools

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

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

⚠ Before beginning work, turn Off the safety switch of the radar antenna.

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

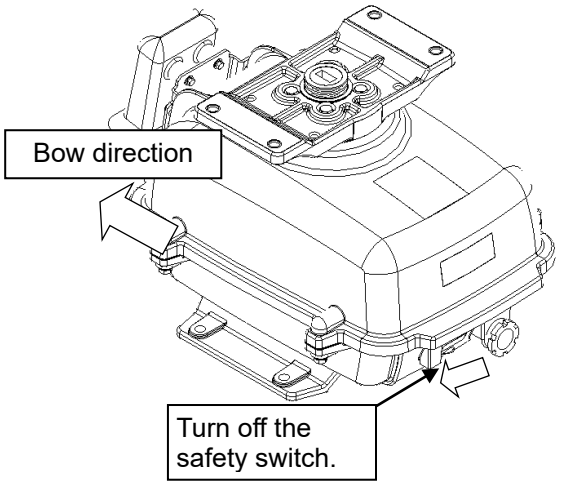
⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

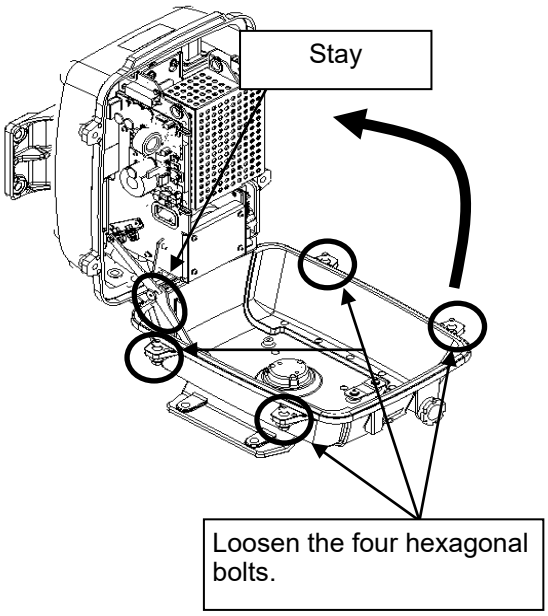
Step 1 Turn Off the safety switch and open the cover.

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

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

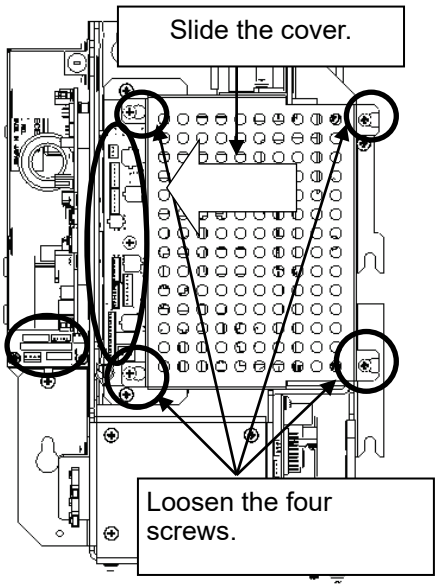
⚠ When closing the upper cover, release the stay stopper and then tighten the cover.





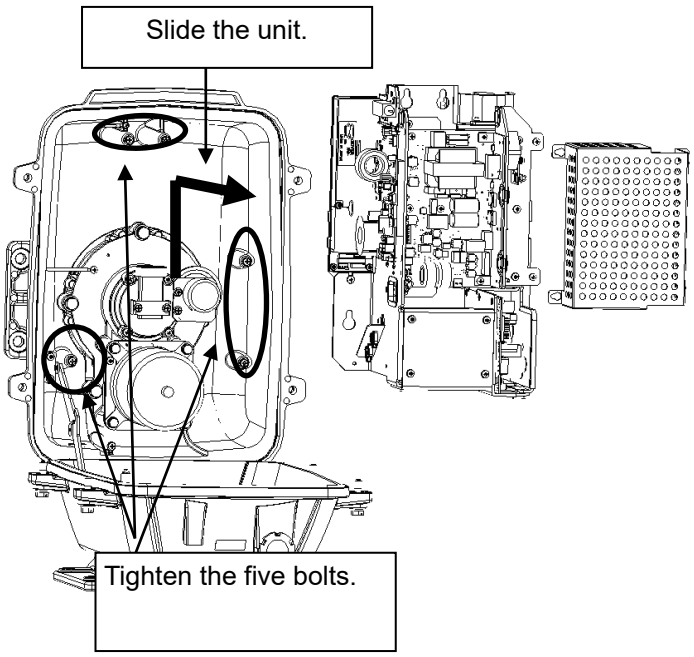
Step 2 Remove the transmitter-receiver unit cover

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



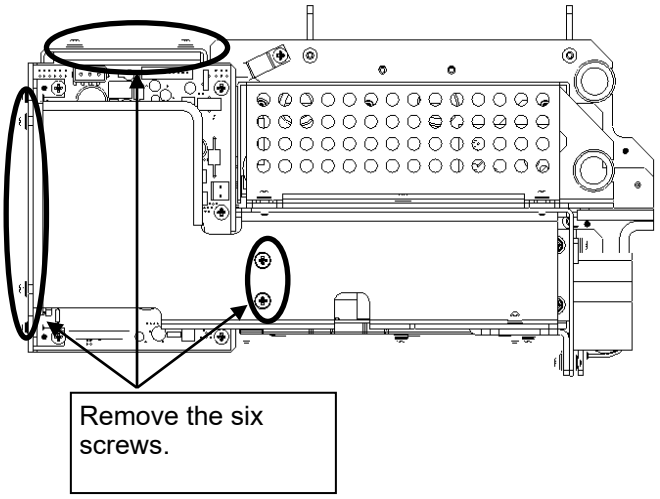
Step 3 Remove the transmitter-receiver unit

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



Step 4 Remove the power supply.

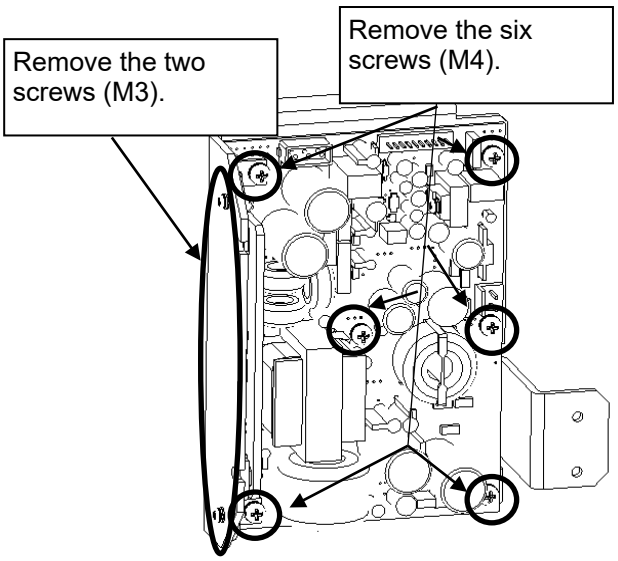
Remove the cables and screws (six M4 screws). Remove the power supply unit from the transmitter-receiver unit.



Step 5 Replace the power supply circuit board

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

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



Step 6 Operation check

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

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image is correctly displayed.

This completes power supply circuit board replacement.

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

[Required Tools]

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

Table Required Tools

No	Name	Size	Appearance
1	Non-magnetic Phillips screwdriver	Size #2, Size #3	
2	Open-end wrench*1	Width across flats 7 mm (for M4 screws) 13 mm (for M8 screws)	
3	Socket wrench*1	Width across flats 7 mm (for M4 screws) 13 mm (for M8 screws)	

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

⚠ Before beginning work, turn Off the safety switch of the radar antenna.

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

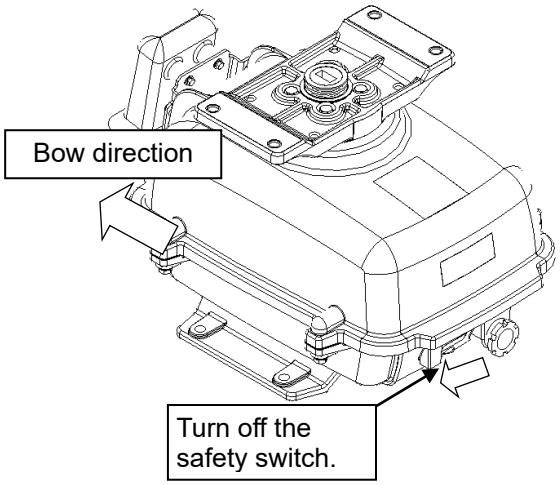
⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

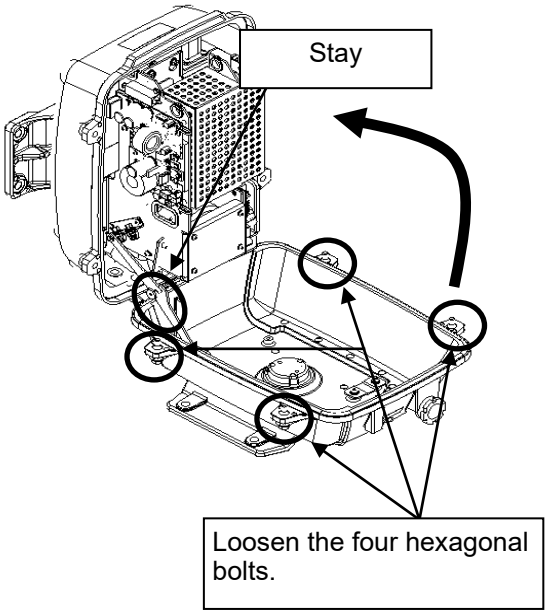
Step 1 Turn Off the safety switch and open the cover.

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

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

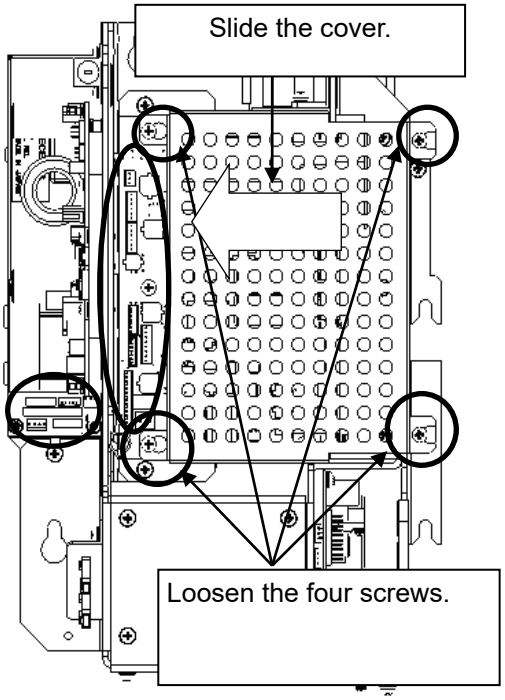
⚠ When closing the upper cover, release the stay stopper and then tighten the cover.


Bow direction
Turn off the safety switch.


Stay
Loosen the four hexagonal bolts.

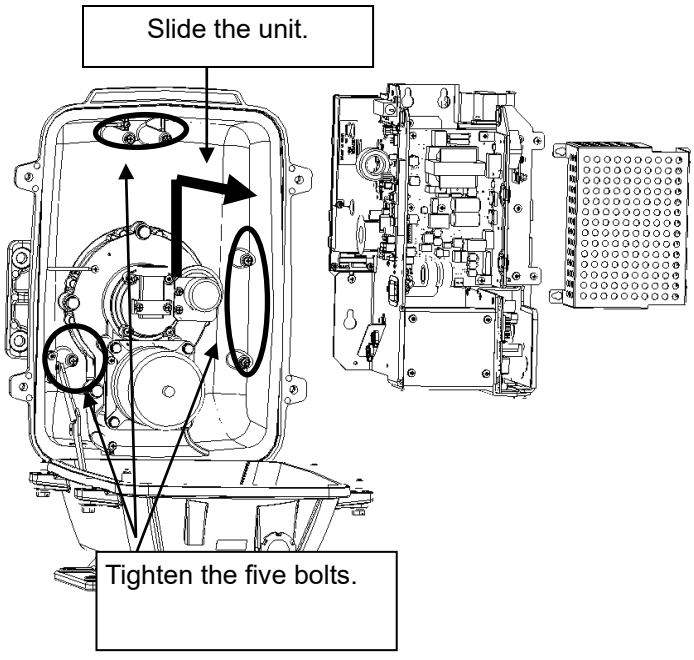
Step 2 Remove the transmitter-receiver unit cover

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



Step 3 Remove the transmitter-receiver unit

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

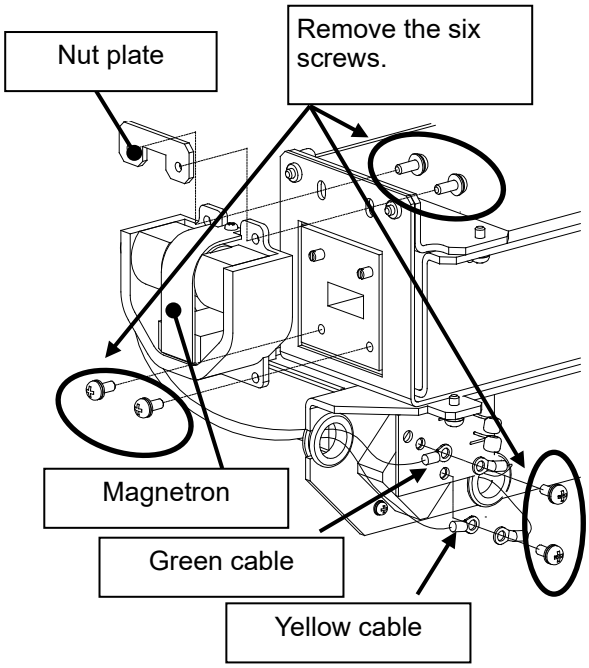


Step 4 Remove the magnetron.

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

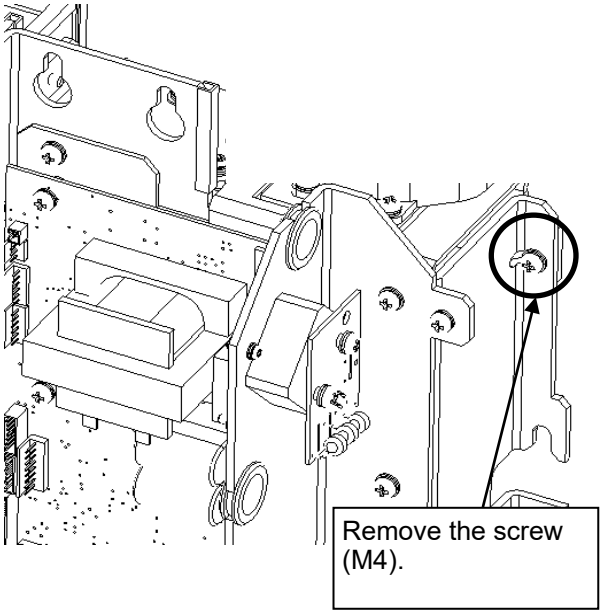
⚠ Use a non-magnetic screwdriver because the contact of the metal tool with the magnetron causes deterioration of its performance.

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



Step 5 Remove the microwave transmission circuit.

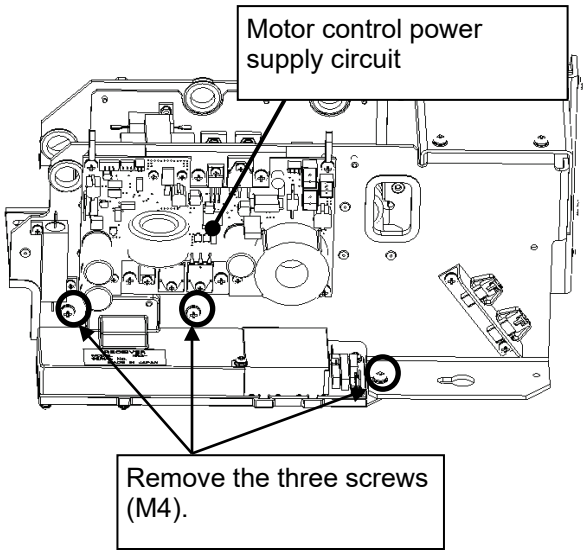
Remove the M4 screw near the magnetron.



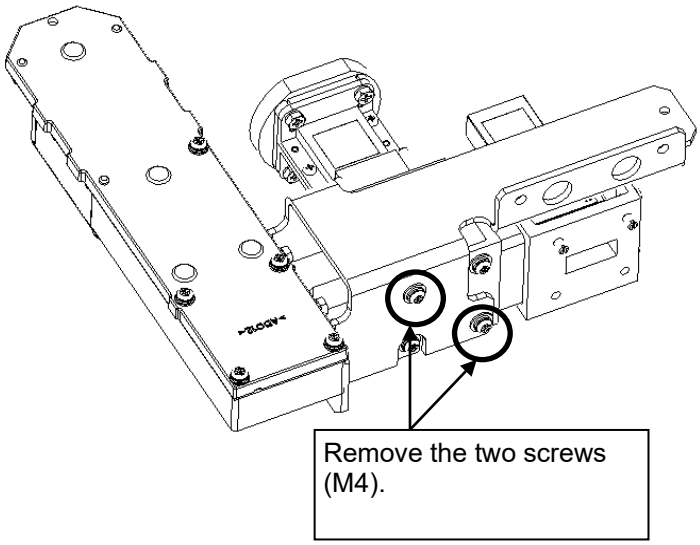
Remove the screws (three M4 screws) on the motor control power supply side, and remove the microwave transmission circuit from the chassis.

Step 6 Replace the receiver.

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

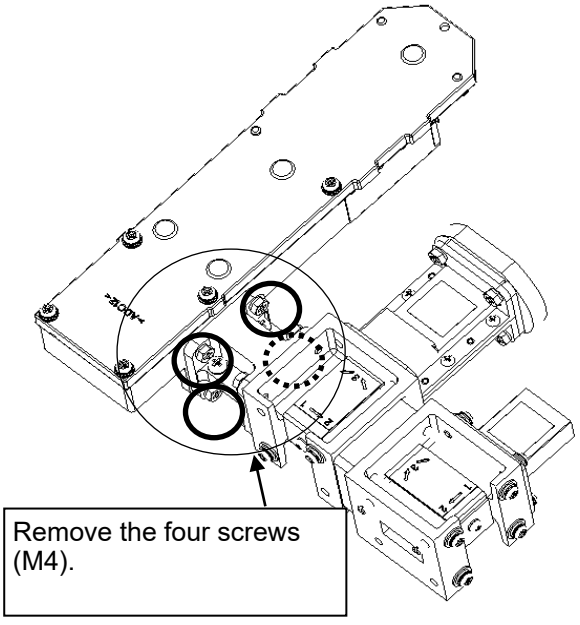


Remove the two screws (M4) holding the microwave transmission circuit to remove it from the installation plate.



Remove the screws (four M4 screws) holding the receiver in place and replace it. After having replaced the receiver, reassemble the unit by following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.

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



Step 4 Operation check

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

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error. Transmit the radar wave in the long range mode and open the service engineer menu to perform tuning adjustment. Perform the adjustment in the service engineer menu until the tuning display bar on the display unit reaches the 8th calibration mark.

This completes receiving unit replacement.

4.1.6.7 Encoder Replacement/NKE-2103

[Required Tools]

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

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2, Size #3	
2	Open-end wrench*1	Width across flats 7 mm (for M4 screws), 13 mm (for M8 screws)	
3	Socket wrench*1	Width across flats 7 mm (for M4 screws), 13 mm (for M8 screws)	

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

⚠ Before beginning work, turn Off the safety switch of the radar antenna.

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

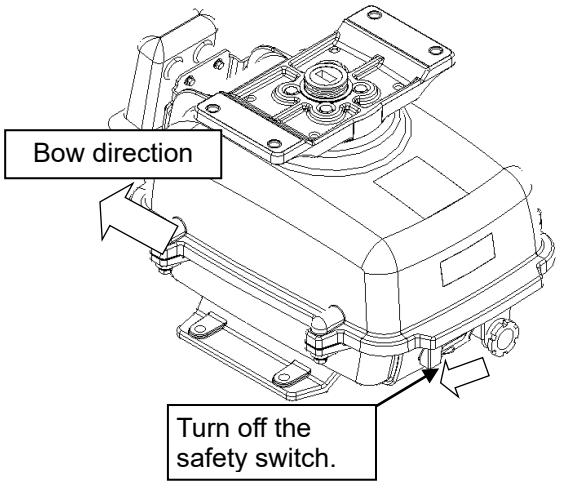
⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

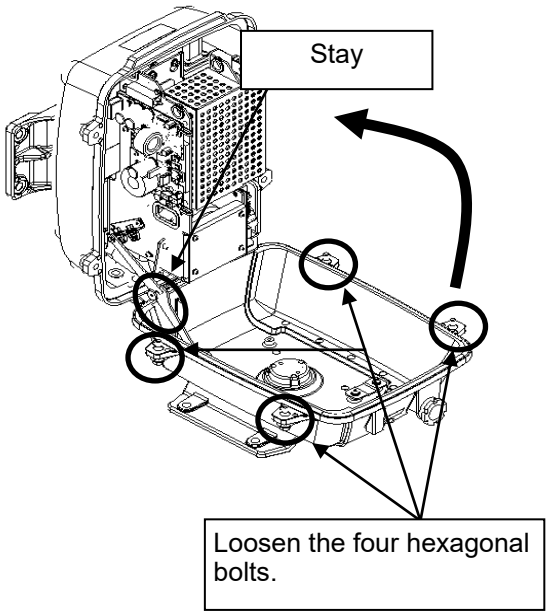
Step 1 Turn Off the safety switch and open the cover.

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

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

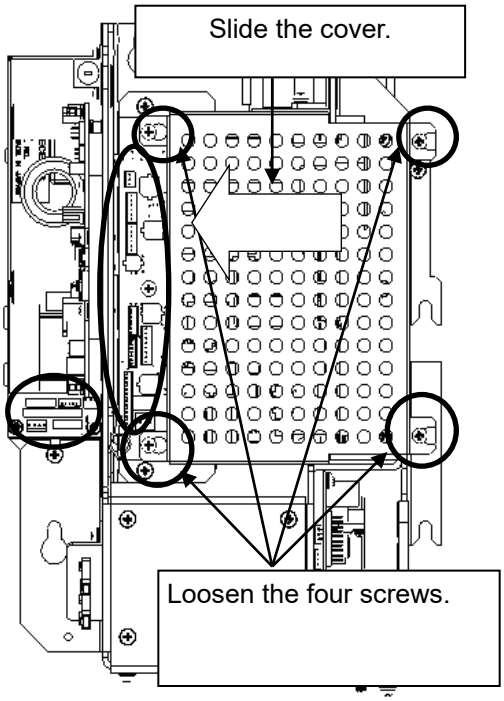
⚠ When closing the upper cover, release the stay stopper and then tighten the cover.





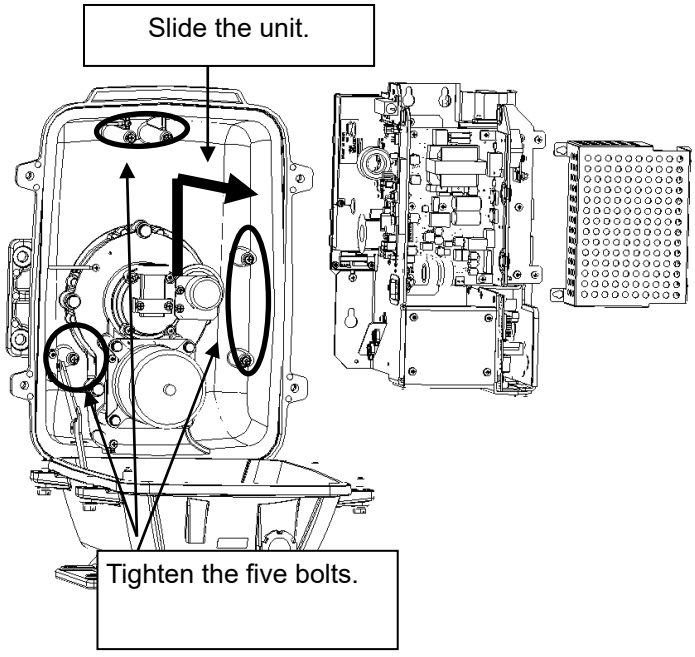
Step 2 Remove the transmitter-receiver unit cover

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



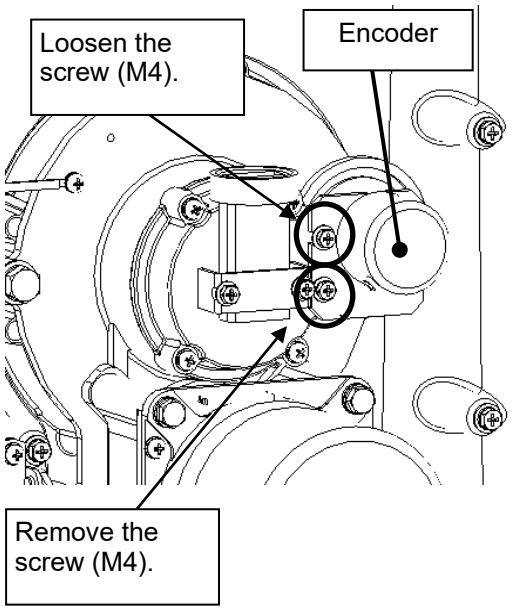
Step 3 Remove the transmitter-receiver unit

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



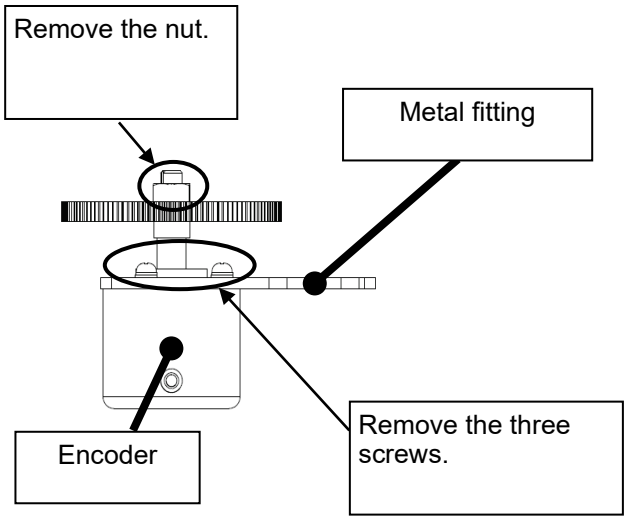
Step 4 Remove the encoder.

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



Step 5 Replace the encoder.

Remove the metal fixture and the gear wheel attached to the encoder. Put them onto the new encoder and put the encoder back into the unit. After replacing the encoder, follow the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 6 Operation check

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

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error. Open the service engineer menu to perform azimuth adjustment.

This completes encoder replacement.

4.1.6.8 Brake Circuit (CFA-252) Replacement/NKE-2103

[Required Tools]

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

Table Required Tools

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

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

⚠ Before beginning work, turn Off the safety switch of the radar antenna.

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

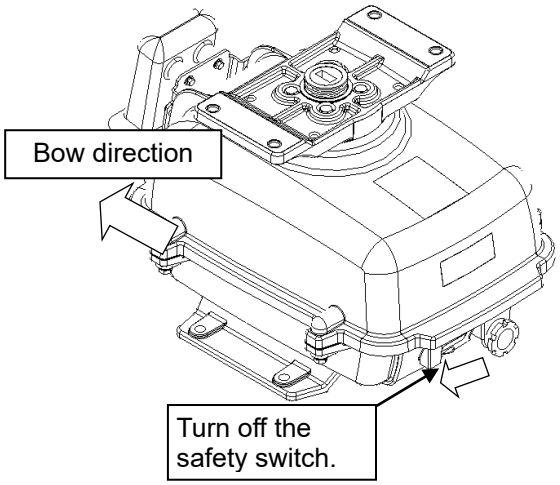
⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

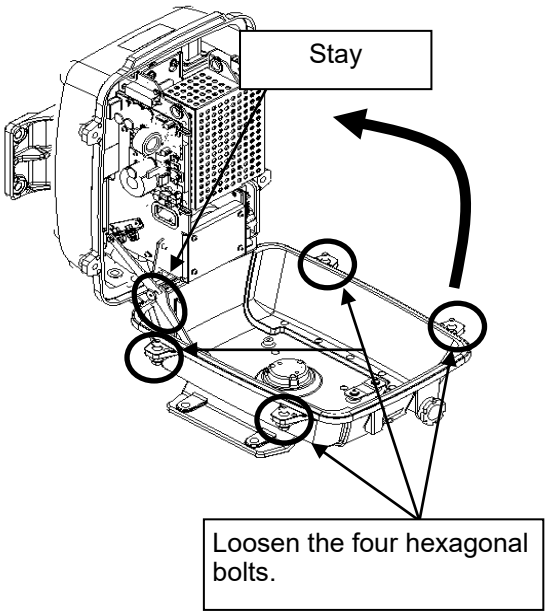
Step 1 Turn Off the safety switch and open the cover.

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

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

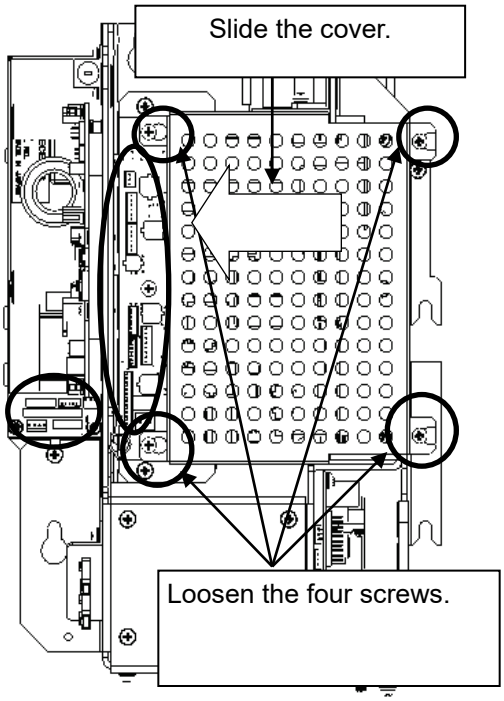
⚠ When closing the upper cover, release the stay stopper and then tighten the cover.





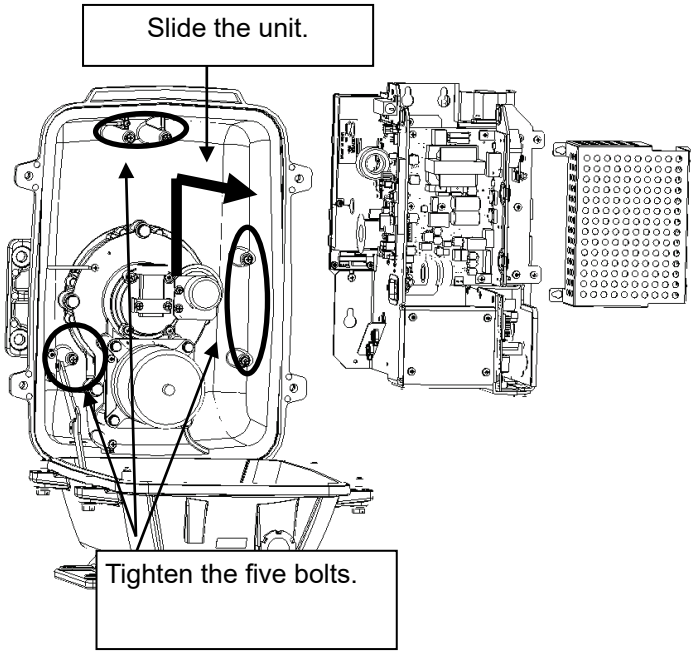
Step 2 Remove the transmitter-receiver unit cover

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



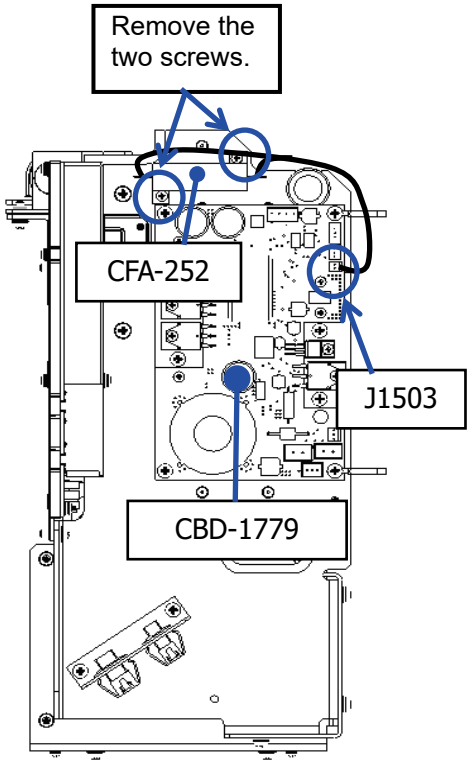
Step 3 Remove the transmitter-receiver unit

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



Step 4 Replace the brake circuit.

Disconnect the cable that is connected to J1503 of the Motor driver circuit (CBD-1779). Remove the two screws (M3) that are holding the resistor and then replace the brake circuit (CFA-252: Resistor with cable). After replacing the brake circuit, reassemble the unit following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 5 Operation check

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

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

This completes brake circuit replacement.

4.1.6.9 Performance Monitor (NJU-85) Replacement/NKE-2103

Instruction for Equipment
装備要領

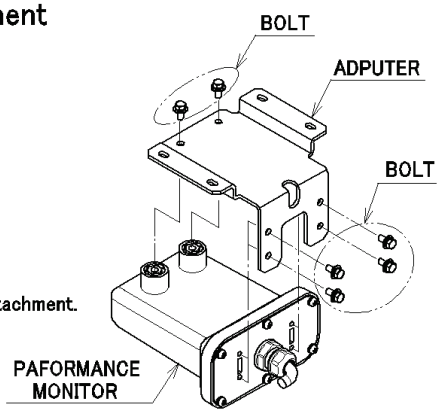


Fig1 (図1)

1. Adapter installation
アダプタの取り付け

The adapter is installed in Performance Monior(NJU-85) with the bolt of the attachment.
(6-B5X12SUS,SW5,W5)
パフォーマンスモニタ(NJU-85)にアダプタを付属のボルトで固定する。
(6-B5X12SUS、SW5,W5)

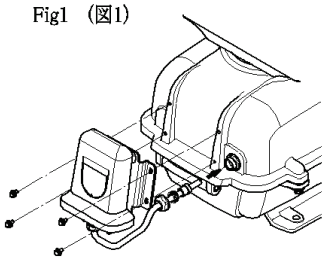


Fig2 (図2)

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

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

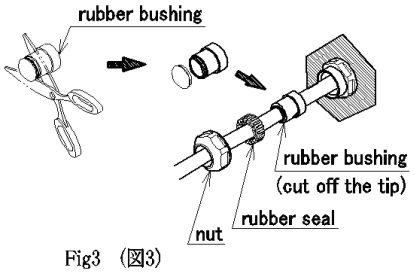


Fig3 (図3)

3.Wiring
配線

Remove the nut out and cut off the tip of the rubber bushing (shrouded end).
Put the nut into the Cable ,as shown in Fig.3
Each connector (J81,J82) and the earth terminal are connected. ,as shown in Fig.4
ナットを取り外し、ゴムブシュの先端をカットします。
ナット、ラバーシール、ゴムブッシュをケーブルに通します。(図3)
コネクタ(J81、J82)に接続して、アースはねじにて固定します。(図4)

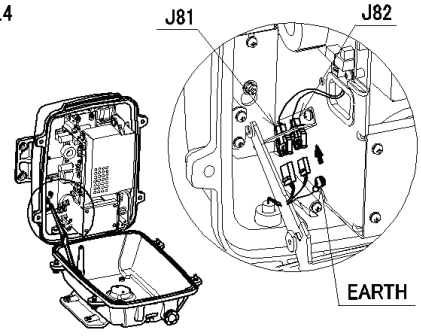


Fig4 (図4)

4.Check and adjustment
確認と調整

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

5. Water proof
防水処理

Apply silicone sealant around the cable inlet, ,as shown in Fig.5
ケーブルグランド部をシールする。(図5)

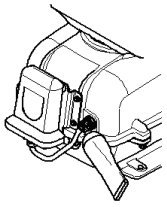


Fig5 (図5)

MTZ303917

4.1.7 NKE-1632 Scanner Unit

4.1.7.1 TRX Module (CMN-797) Replacement/NKE-1632

[Required Tools]

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

Table Required Tools

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

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

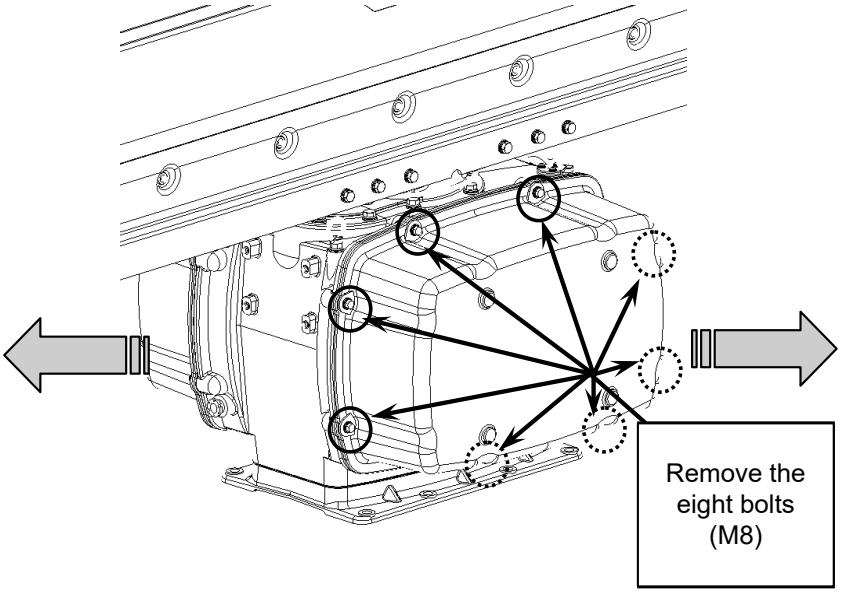
⚠ Before beginning work, turn Off the safety switch of the radar antenna.

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

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

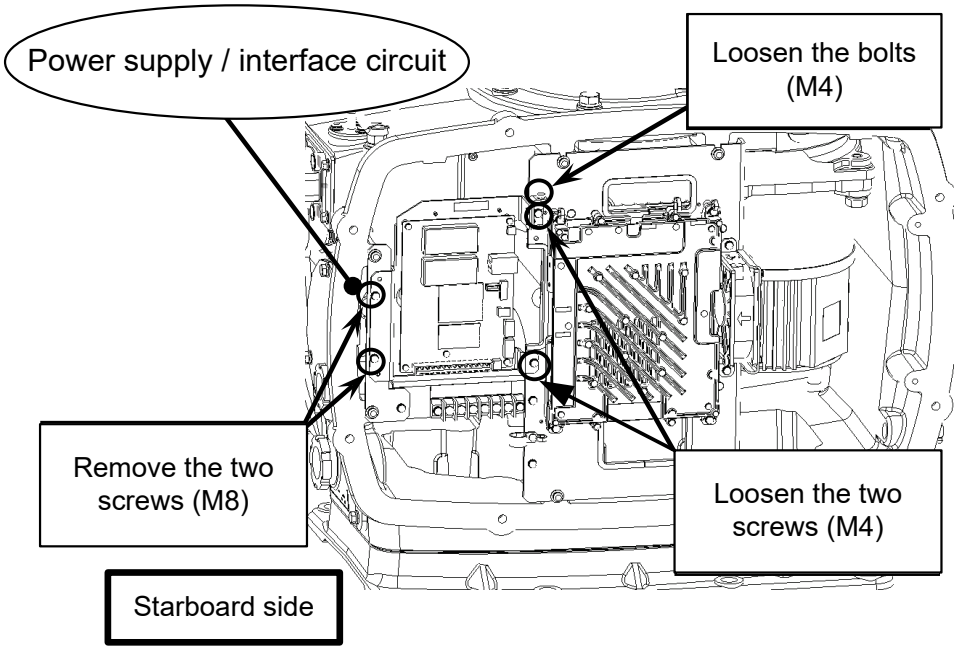
Step 1 Remove the cover.

Remove the eight fall prevention bolts (M8) and remove the cover.

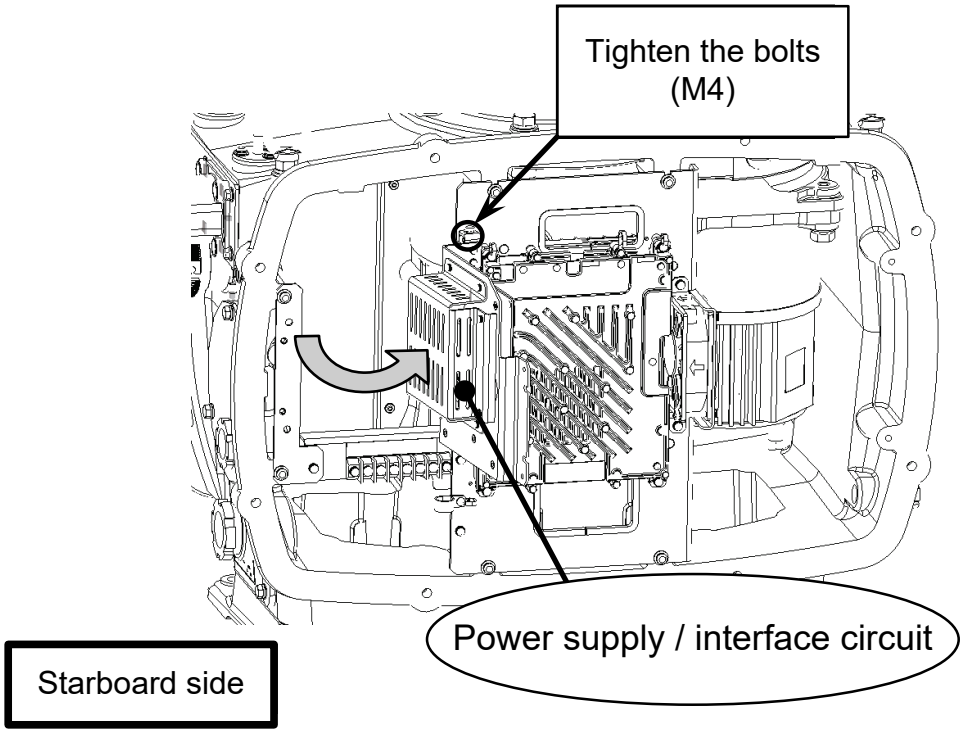


Step 2 Open the power supply/interface circuit unit (on the starboard side).

[Starboard side] By loosening the bolts (M4) and two screws (M4), the power supply/interface circuit can be opened towards the front.

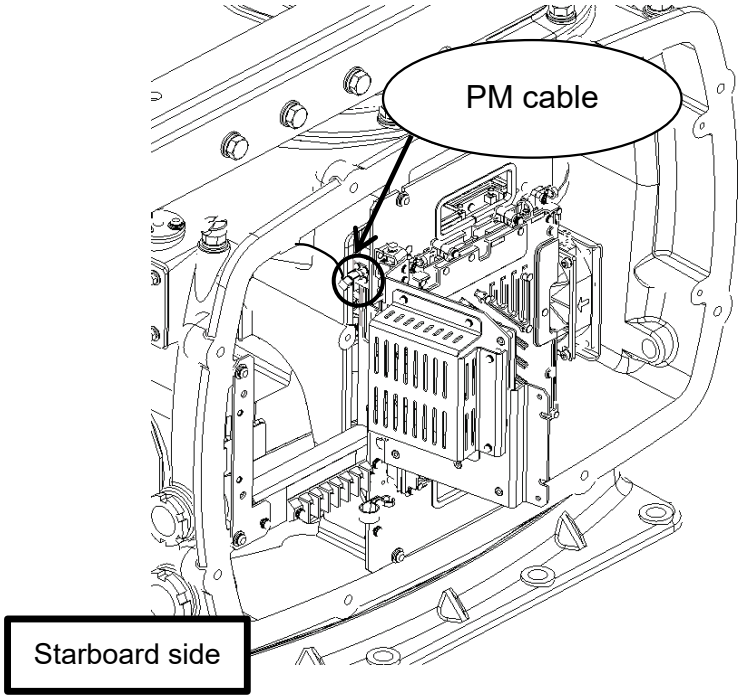


Hold the unit in place by tightening the bolts (M4) and opening the power supply/interface circuit.



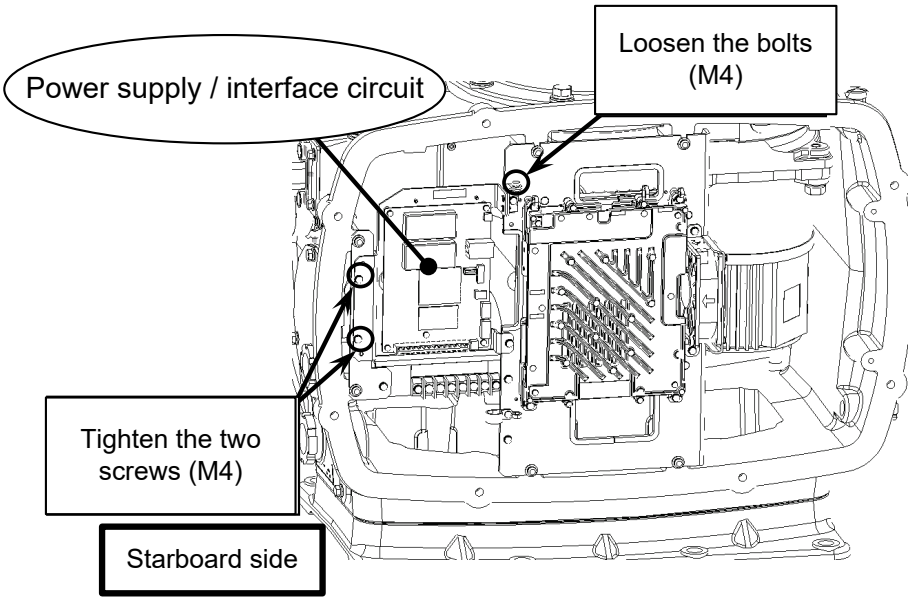
Step 3 Remove the PM cable.

[Starboard side] Remove the PM cable.



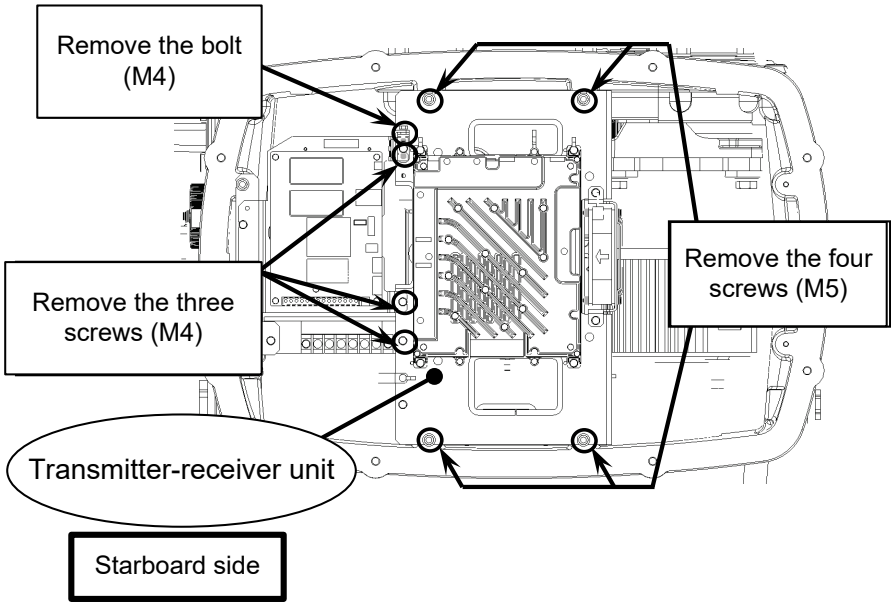
Step 4 Close the power supply/interface circuit unit.

Loosen the M4 bolts and close the power supply/interface circuit unit. Fix only two screws (M4) on the stern side.

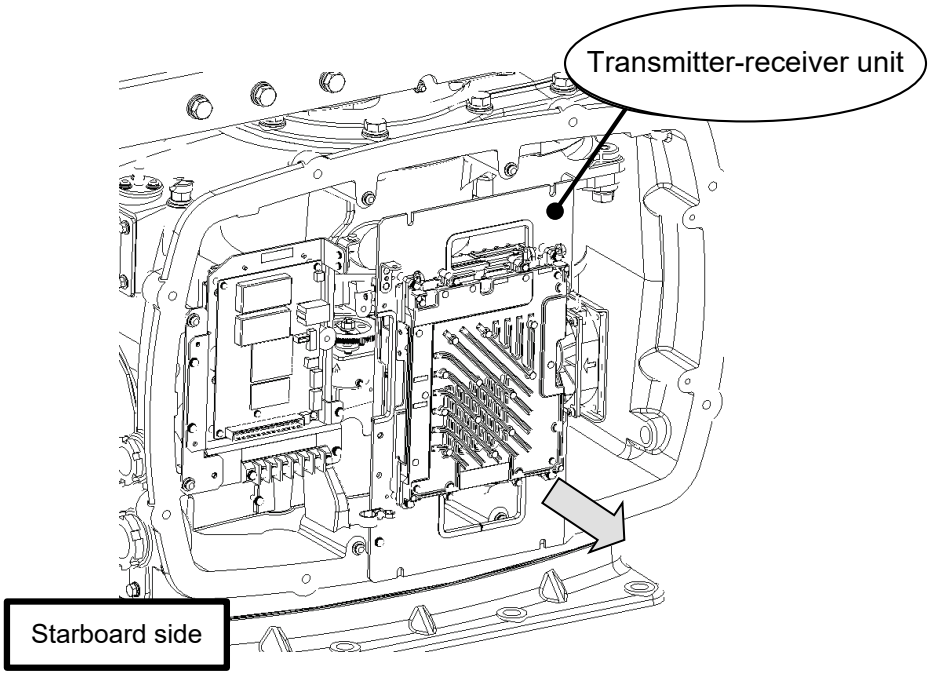


Step 5 Remove the transmitter-receiver unit.

[Starboard side] Remove the four screws (M5). Remove the bolt (M4). Remove the three screws (M4).

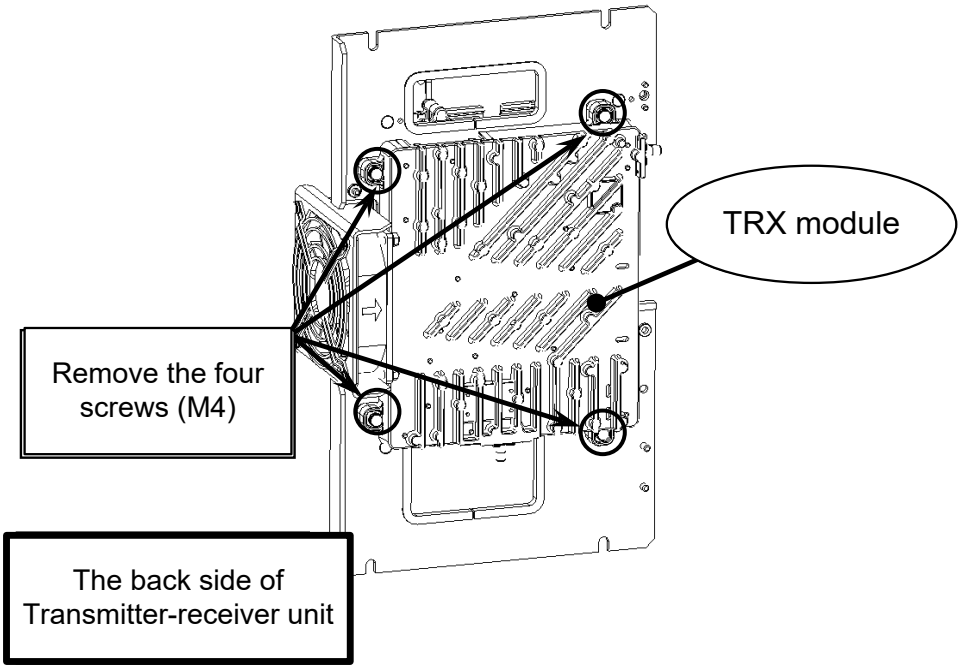


Remove the cable that is connected to the transmitter-receiver unit and remove the unit towards the front.



Step 6 Replace the TRX module.

The TRX module is held at the back of the receiver unit. Remove the four screws (M4) and replace the TRX module. After replacing the TRX module, close the cover following the disassembly procedure in the reverse order. Set the safety switch to On and check the operation. This completes TRX module replacement.



Step 7 Operation check

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

(1) Turn On the Display unit. Start transmission and check that the radar image appears without error.

This completes TRX module replacement.

4.1.7.2 Encoder (CHT-85) Replacement/NKE-1632

[Required Tools]

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

Table Required Tools

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

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

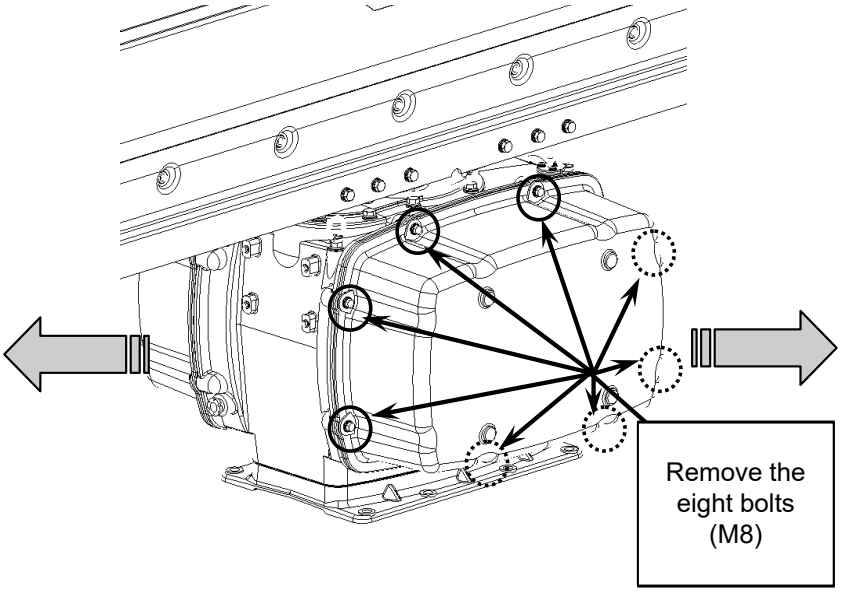
⚠ Before beginning work, turn Off the safety switch of the radar antenna.

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

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

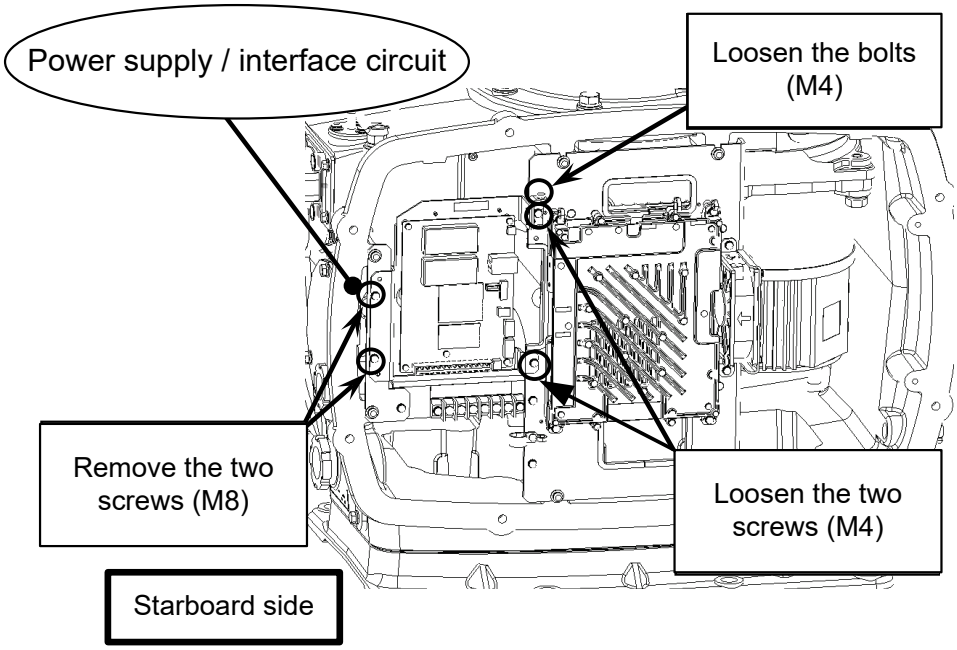
Step 1 Remove the cover.

Remove the eight M8 fall prevention bolts (M8) and remove the cover.

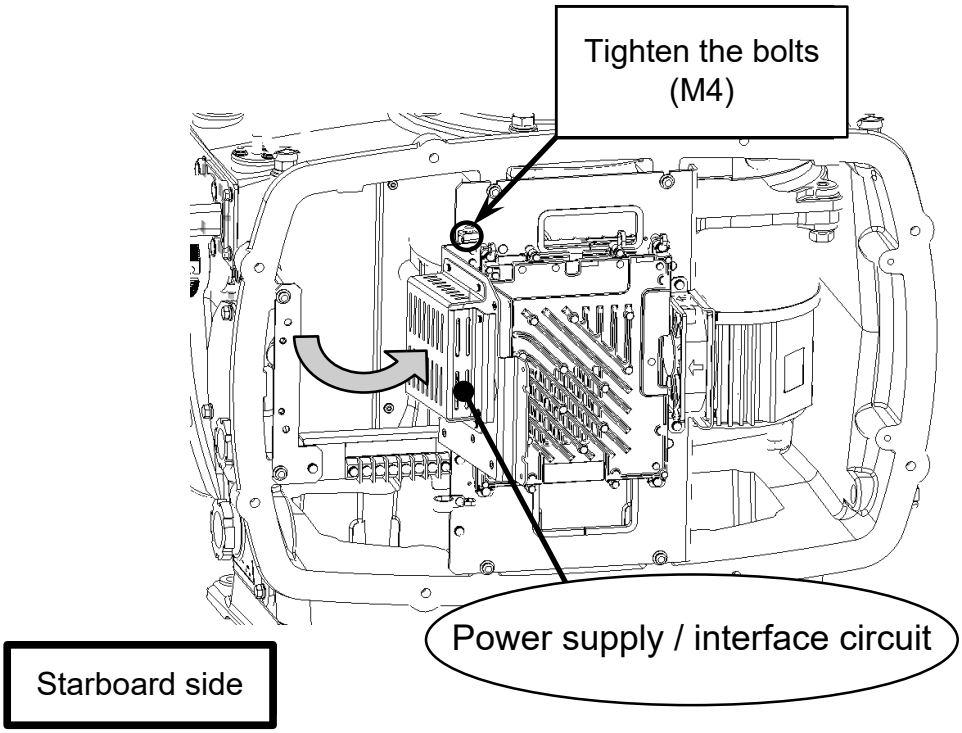


Step 2 (Starboard side) Open the power supply/interface circuit unit.

[Starboard side] By loosening the bolt (M4) and the two screws (M4) and then removing the two screws (M4), the power supply/interface circuit unit can be opened towards the front.

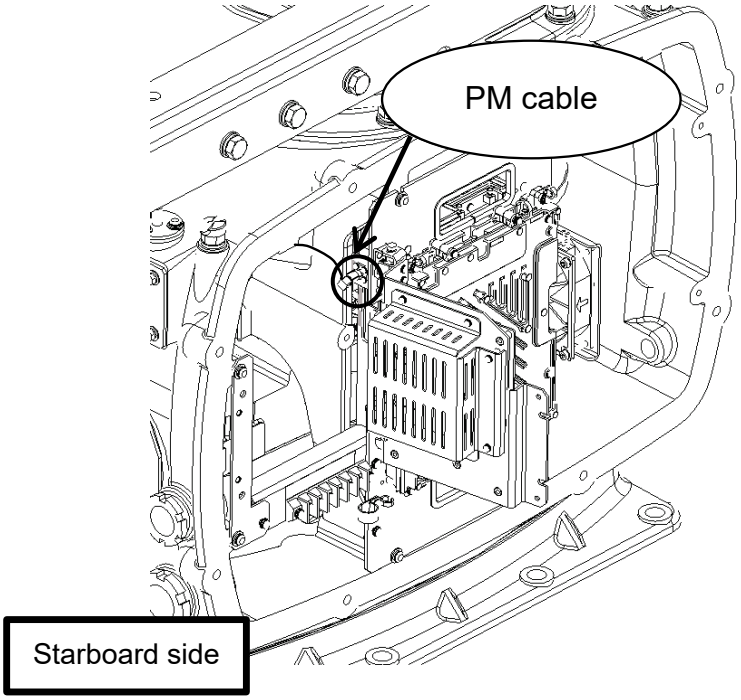


Tighten the bolt (M4) and hold the unit while the power supply/interface circuit is opened.



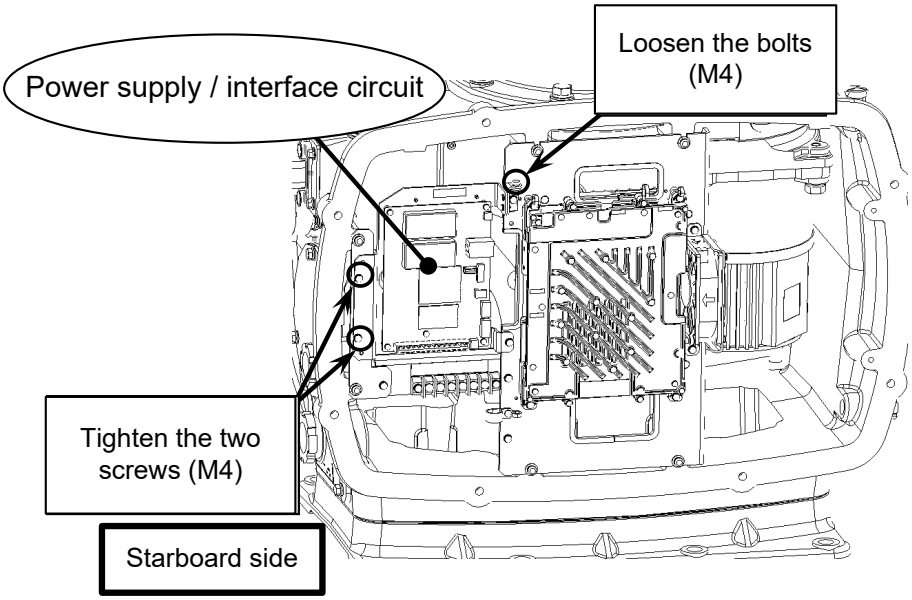
Step 3 Remove the PM cable.

[Starboard side] Remove the PM cable.



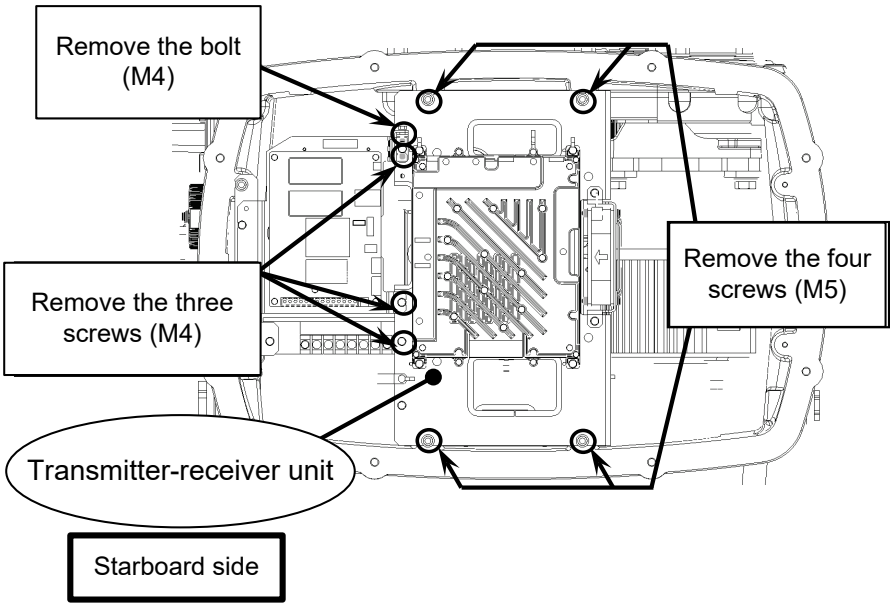
Step 4 Close the power supply/interface circuit unit.

Loosen the bolt (M4) and close the power supply/interface circuit unit. Fasten only the two screws (M4) on the stern side.

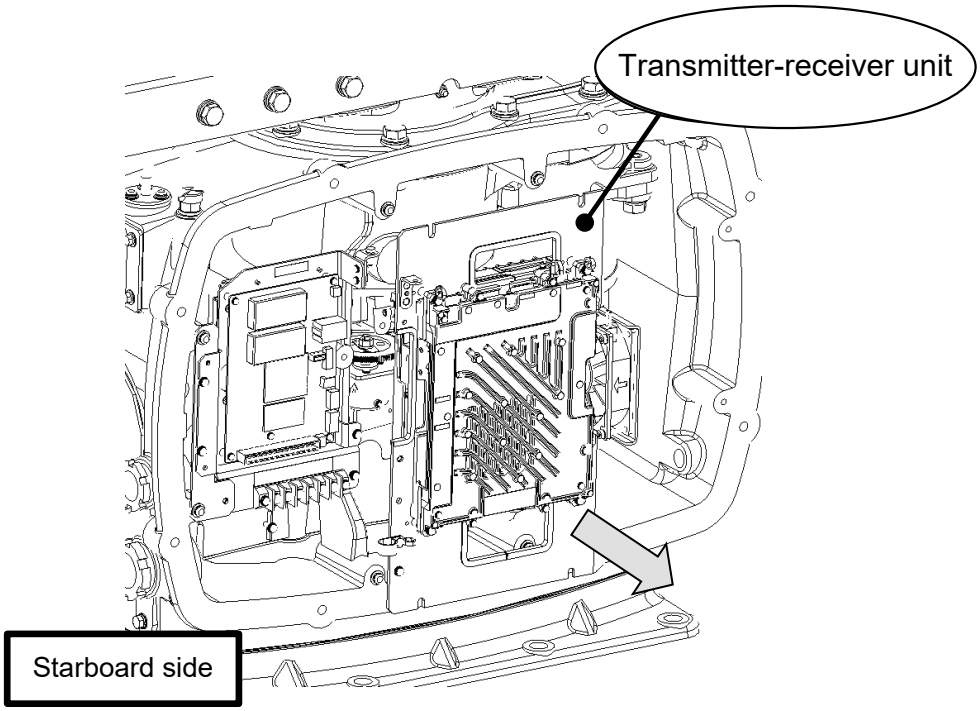


Step 5 Remove the transmitter-receiver unit.

[Starboard side] Remove the four screws (M5). Remove the bolt (M4) and remove the three screws (M4).

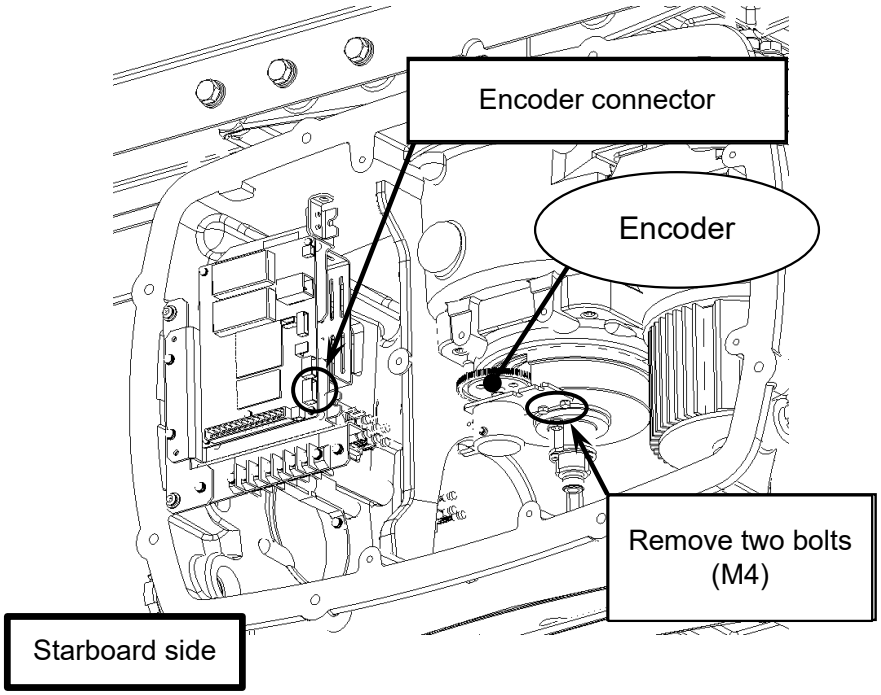


Remove the cable that is connected to the transmitter-receiver unit and remove the unit towards the front.



Step 6 Replace the encoder.

Remove the two bolts (M4) that hold the encoder and replace it. Hold the gear of the encoder by lightly pressing it to the gear of the main shaft. After replacing the encoder, close the cover following the disassembly procedure in the reverse order. Finally, set the safety switch to On and check the operation.



Step 7 Operation check

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

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error. Open the service engineer menu to perform azimuth adjustment.

This completes encoder replacement.

4.1.7.3 Power Supply/Interface Circuit (CMP-493) Replacement/NKE-1632

[Required Tools]

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

Table Required Tools

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

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

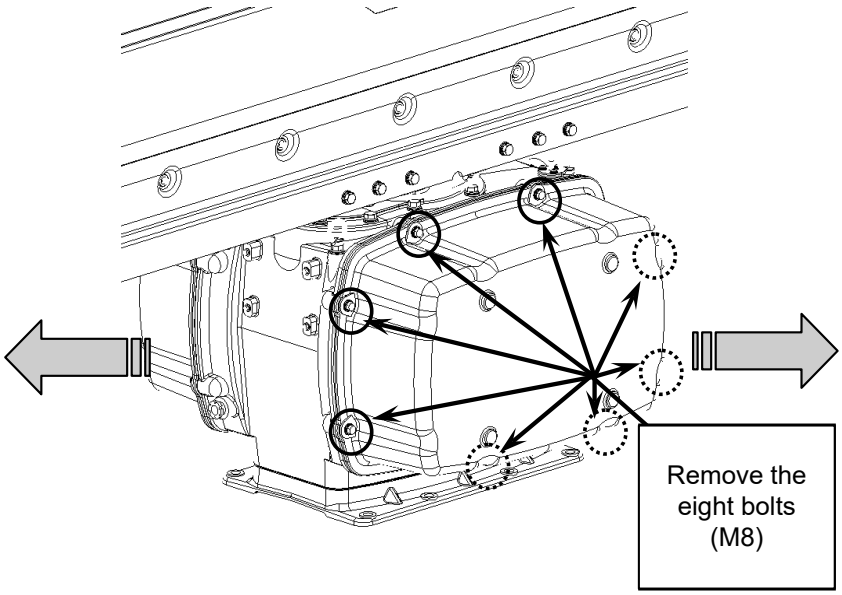
⚠ Before beginning work, turn Off the safety switch of the radar antenna.

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

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

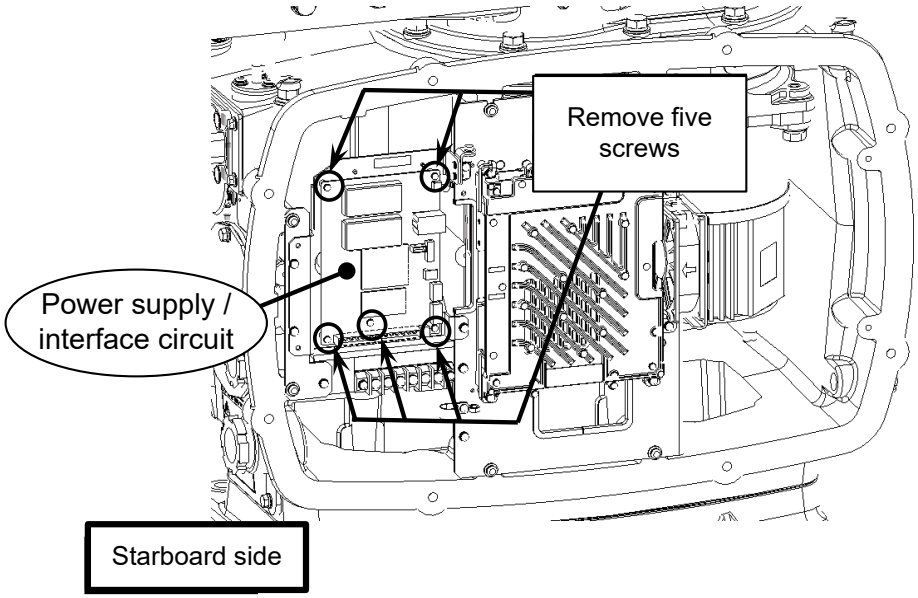
Step 1 Remove the cover.

Remove the eight fall prevention bolts (M8) and remove the cover.



Step 2 Replace the power supply/interface circuit.

The power supply/interface circuit is installed on the starboard side. Remove all the connectors that are connected to the power supply/interface circuit. Remove the five screws that are holding the power supply/interface circuit and replace it. Connect the power supply/interface circuit following the disassembly procedure in the reverse order. Finally, set the safety switch to On and check the operation.



Step 3 Operation check

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

(1) Turn On the Display unit. Start transmission and check that the radar image appears without error.

This completes the power supply/interface circuit. replacement.

4.1.7.4 Radar Processor Unit (NDC-4920) Replacement/NKE-1632

[Required Tools]

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

Table Required Tools

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

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

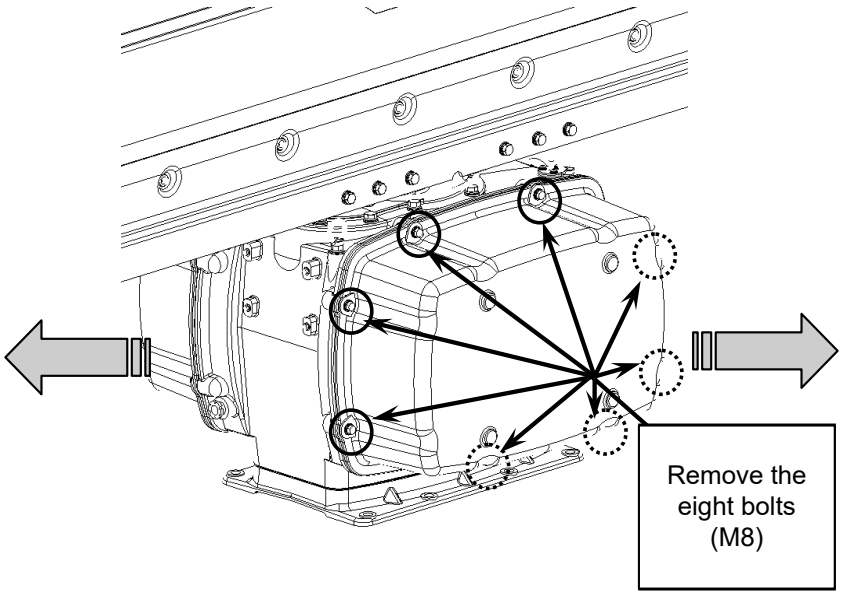
⚠ Before beginning work, turn Off the safety switch of the radar antenna.

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

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

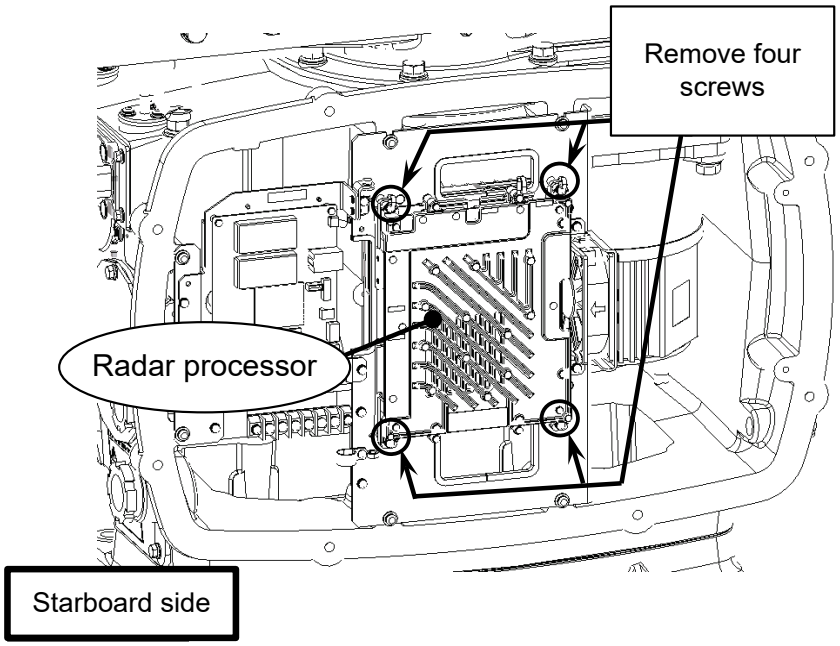
Step 1 Remove the cover.

Remove the eight fall prevention bolts (M8) and remove the cover.



Step 2 Replace the radar processor unit.

The radar processor unit is installed on the starboard side. Remove all the connectors that are connected to the radar processor unit. Remove the four screws that are holding the radar processor unit and replace it. Connect the radar processor unit following the disassembly procedure in the reverse order and close the cover. Finally, set the safety switch to On and check the operation. This completes the radar processor unit replacement.



Step 3 Operation check

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

(1) Turn On the Display unit. Start transmission and check that the radar image appears without error.

This completes radar processor unit replacement.

4.1.7.5 Motor Replacement/NKE-1632

[Required Tools]

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

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2	
2	Open-end wrench*1	Width across flats 8 mm (for M5 screws). 13 mm (for M8 screws). 17 mm (for M10 screws)	
3	Socket wrench*1	Width across flats 8 mm (for M5 screws). 13 mm (for M8 screws). 17 mm (for M10 screws)	

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

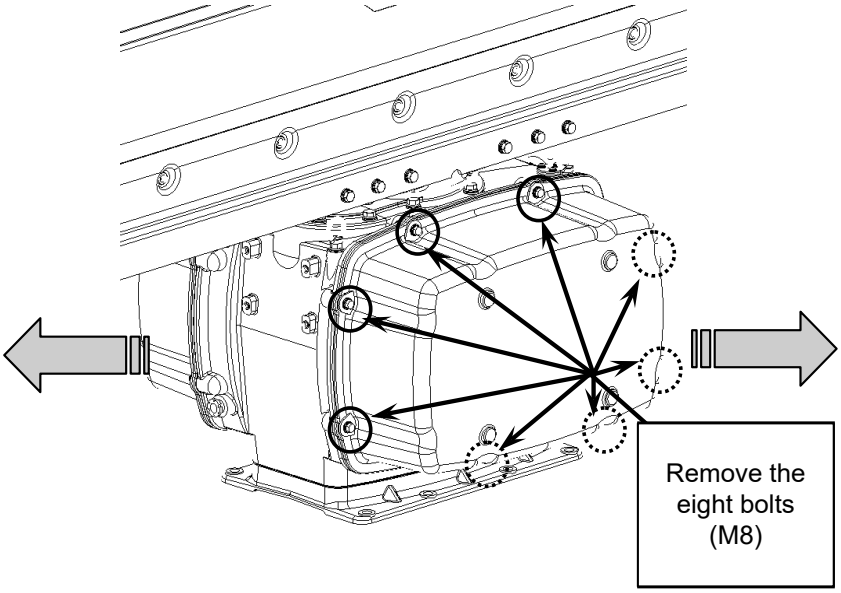
⚠ Before beginning work, turn Off the safety switch of the radar antenna.

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

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

Step 1 Remove the cover.

Remove the eight fall prevention bolts (M8) and remove the cover.



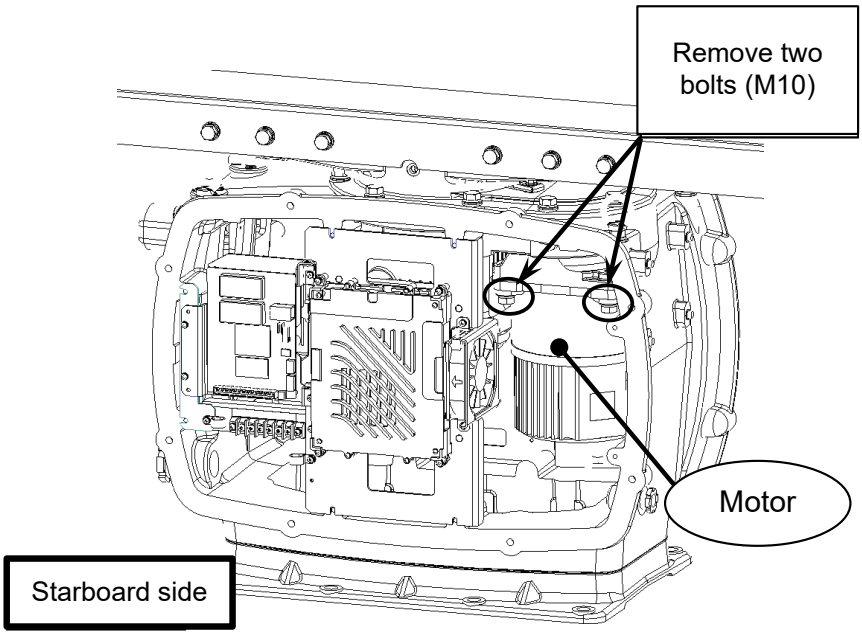
Step 2 Replace the motor.

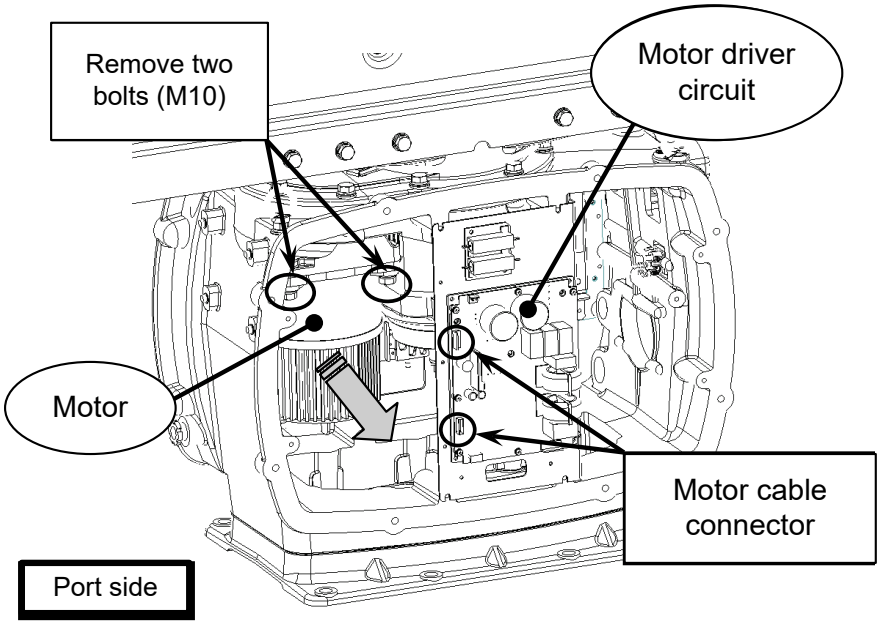
[Starboard side] Remove the two bolts (M10).

[Port side] Remove the motor cable that is connected to the motor driver unit. Remove the two bolts (M10) and remove the motor towards the front.

Apply grease, in advance, on the gear of the motor to be replaced.

Tighten the hexagon head bolts with the proper torque (350 kgf･cm) to guarantee tightening them and not leaving loose bolts. After replacing the motor, close the cover following the disassembly procedure in the reverse order. Finally, set the safety switch to On and check the operation.





Step 3 Operation check

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

1. Turn On the Display unit. Start transmission and check that the radar image appears without error. Check that the motor does not make any abnormal sound when it starts to rotate, while it is rotating, or when it stops.
2. Open the service engineer menu to initialize the motor rotation time.

This completes motor replacement.

4.1.7.6 Motor Drive Circuit Board (CBD-1949) Replacement/NKE-1632

[Required Tools]

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

Table Required Tools

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

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

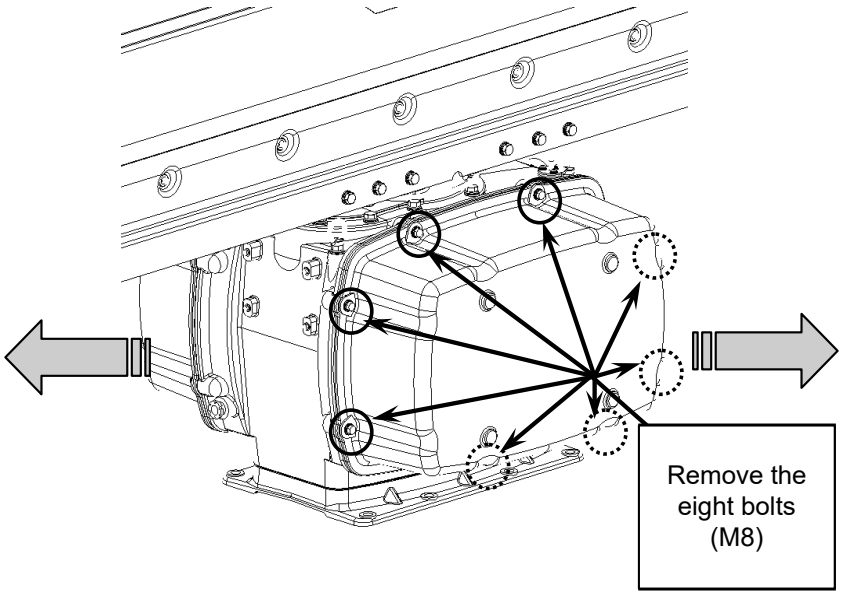
⚠ Before beginning work, turn Off the safety switch of the radar antenna.

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

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

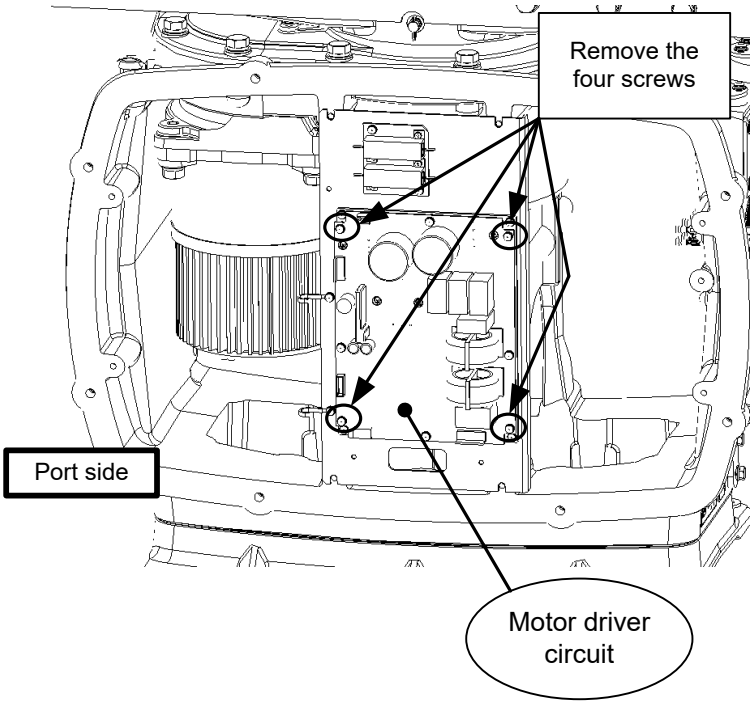
Step 1 Remove the cover.

Remove the eight fall prevention bolts (M8) and remove the cover.



Step 2 Remove the motor driver circuit board.

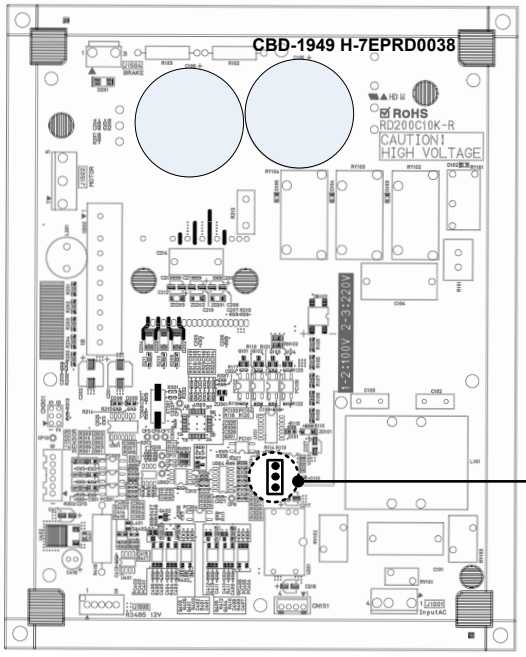
Remove all the connectors that are connected to the motor driver. Remove the four screws that hold the motor driver unit.



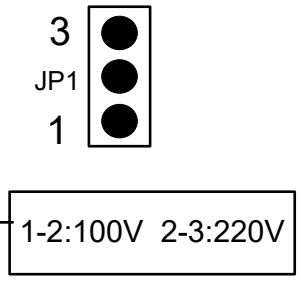
Step 3 Check the setting of the motor driver circuit.

The motor driver applies the 100 V/220 V common circuit. Before commencing replacement, set the power supply of the driver to be replaced according to the power supply specification.

Motor Driver Circuit CBD-1949



Motor drive circuit board CBD-1949	
JP1 setting	**Description**
1-2 Short-circuit	100 VAC
2-3 Short-circuit	220 VAC



Step 4 Operation check

After replacing the motor driver circuit board, turn On the safety switch and follow the steps below to check the operation.

1. Turn On the Display unit. Start transmission and check that the radar image appears without error. Check that the motor does not make any abnormal sound when it starts to rotate, while it is rotating, or when it stops.

This completes motor drive circuit board replacement.

4.1.7.7 Fan Replacement/NKE-1632

[Required Tools]

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

Table: Required Tools

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

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

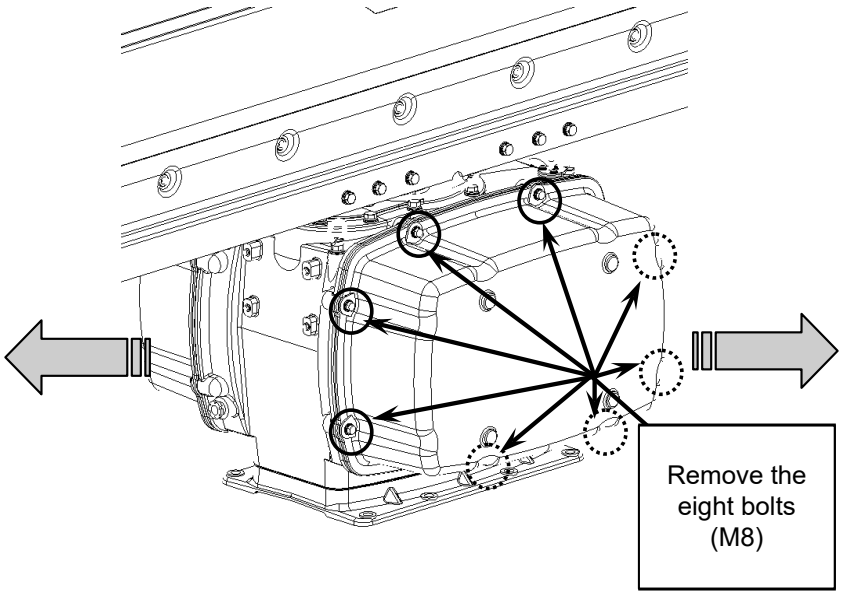
⚠ Before beginning work, turn Off the safety switch of the radar antenna.

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

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

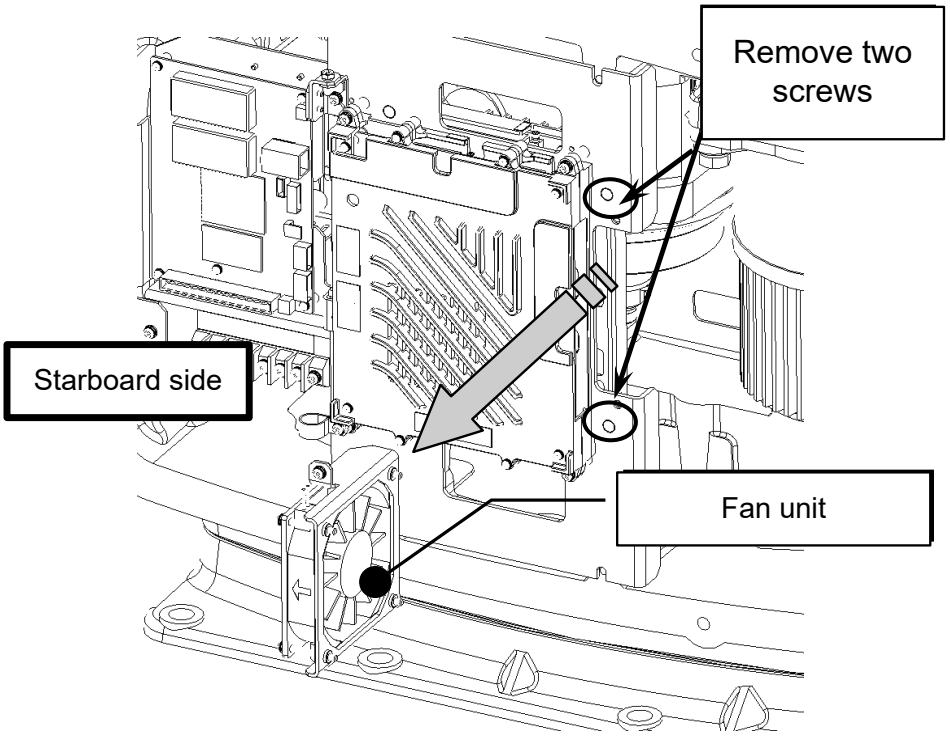
Step 1 Remove the cover.

Remove the eight fall prevention bolts (M8) and remove the cover.



Step 2 Remove the fan unit.

[Starboard side] Remove the connector that connects the fan. Remove the two screws that hold the fan unit.

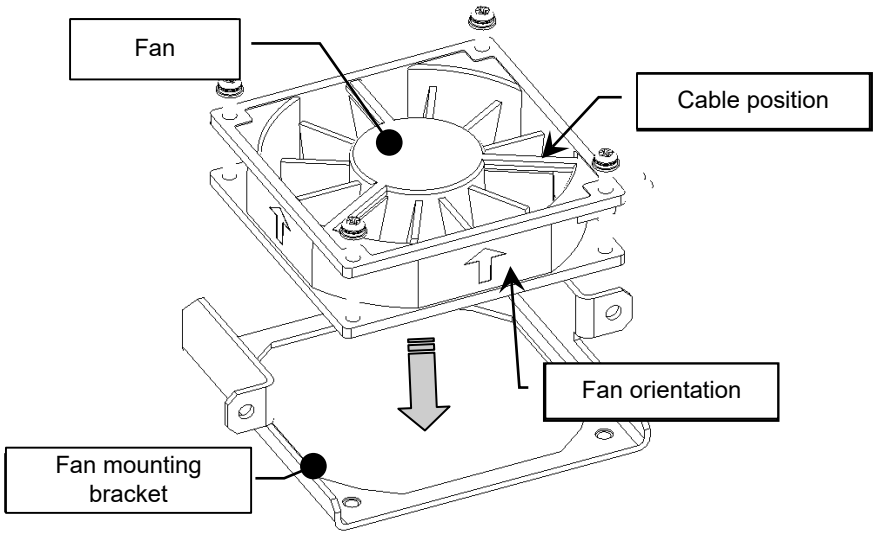


Step 3 Replace the fan.

[Starboard side] Remove the connector that connects the fan. Remove the two screws that hold the fan unit. Remove the fan from the fan unit that was removed.

Remove the four fan screws and replace the fan. After fan replacement, install the fan by checking the “orientation of the fan” and the “cable position”.

After replacing the fan, install the fan unit following the disassembly procedure in the reverse order. Finally, set the safety switch to On and check the operation.



Step 4 Operation check

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

(1) Turn On the Display unit and check that radar images are displayed correctly without issuing a fan alarm.

This completes fan replacement.

4.1.8 NKE-2632, NKE-2632-H Scanner Unit

4.1.8.1 TRX Module (CMN-797) Replacement/NKE-2632, NKE-2632-H

[Required Tools]

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

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2	
2	Open-end wrench*1	Width across flats 8 mm (for M5 screws), 13 mm (for M8 screws), 17 mm (for M10 screws)	
3	Socket wrench*1	Width across flats 8 mm (for M5 screws), 13 mm (for M8 screws), 17 mm (for M10 screws)	

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

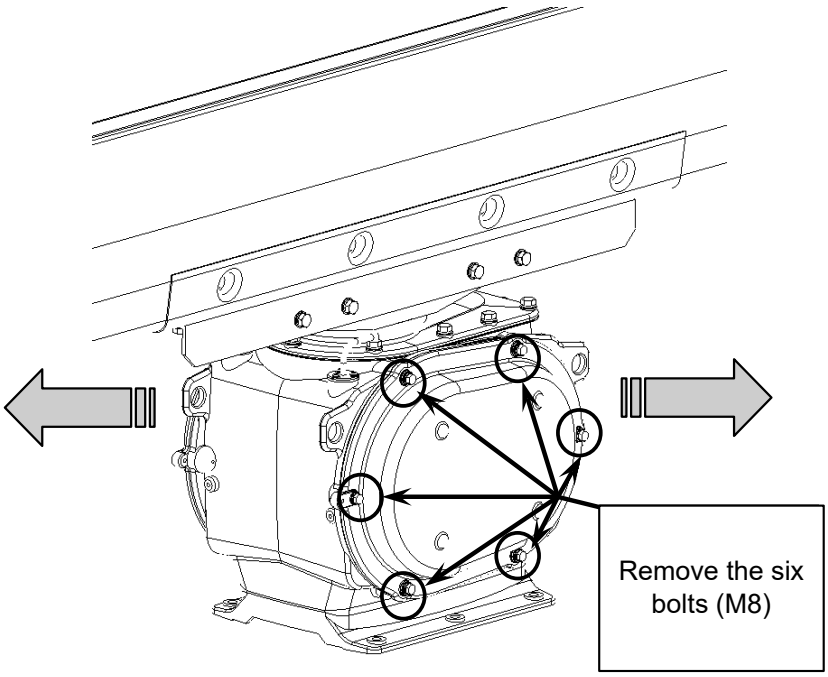
⚠ Before beginning work, turn Off the safety switch of the radar antenna.

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

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

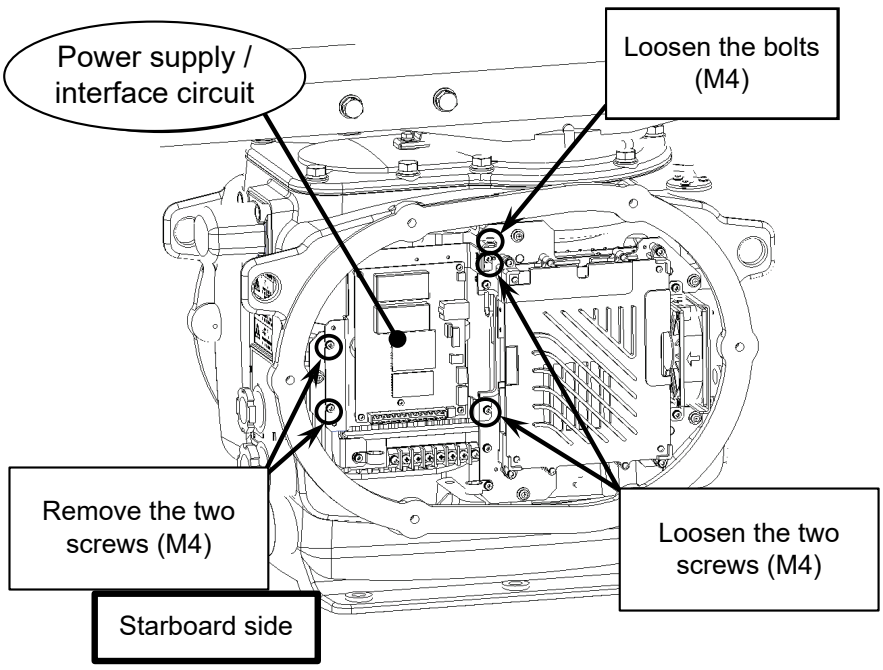
Step 1 Remove the cover.

Remove the six fall prevention bolts (M8) and remove the cover.

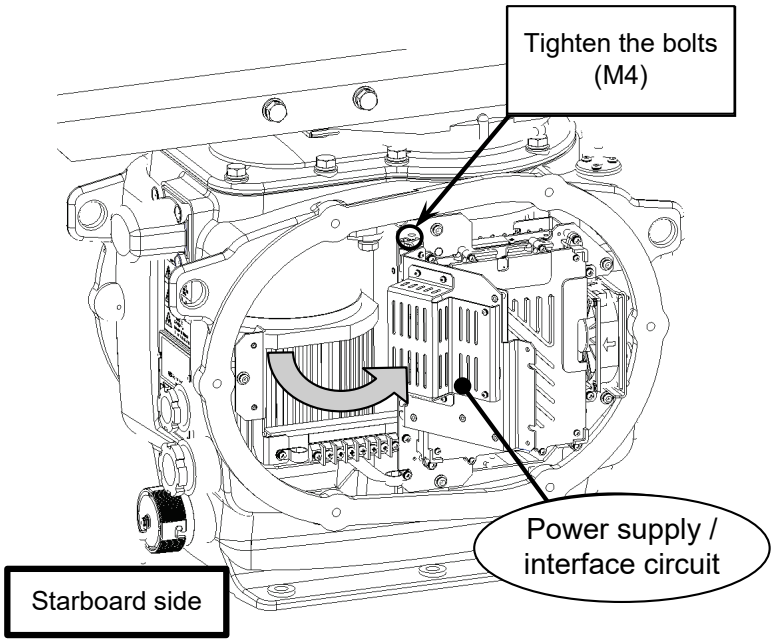


Step 2 (Starboard side) Open the power supply/interface circuit unit.

[Starboard side] By loosening the bolt (M4) and the two screws (M4) and removing the two screws (M4), the power supply/interface circuit unit can be opened towards the front.

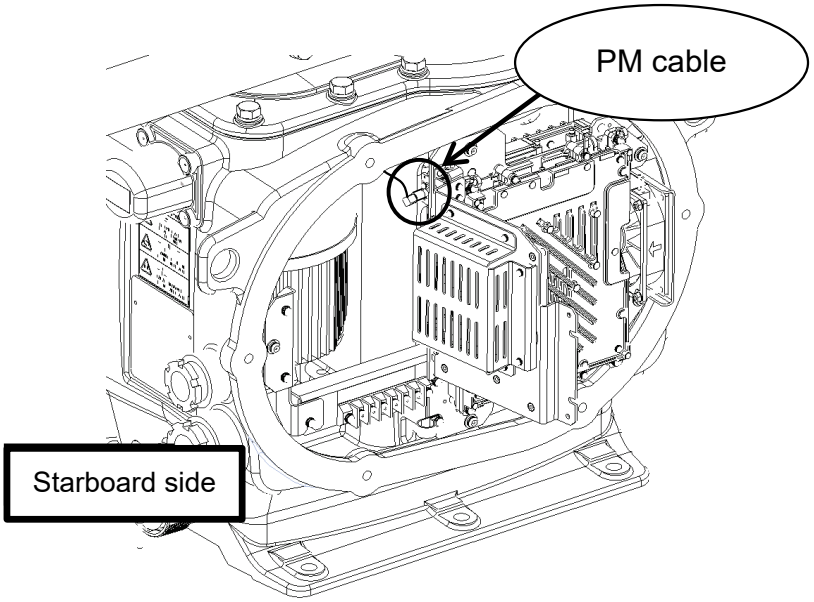


Tighten the bolt (M4) and hold the unit while the power supply/interface circuit is opened.



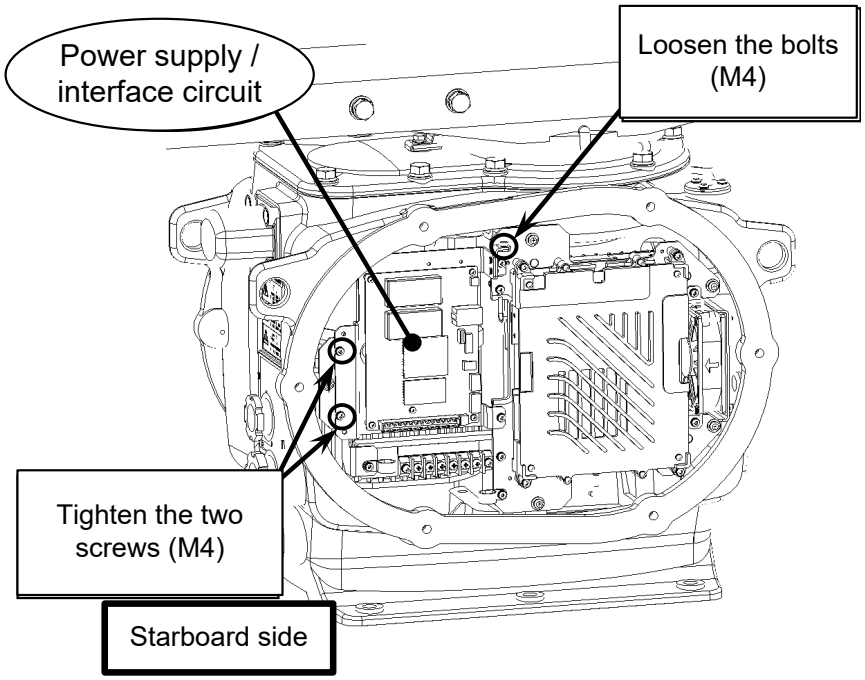
Step 3 Remove the PM cable.

Remove the PM cable.



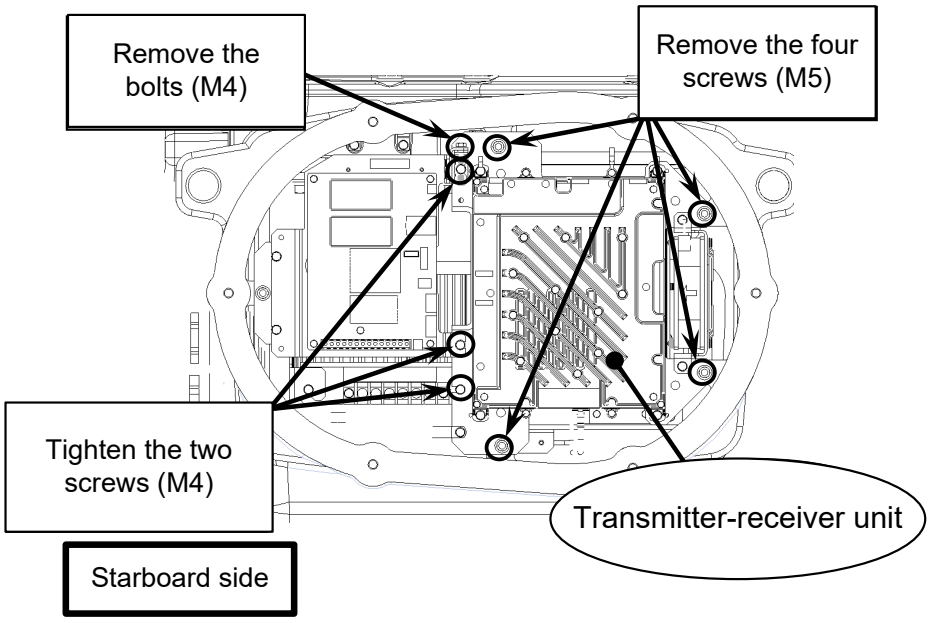
Step 4 Close the power supply/interface circuit.

Loosen the bolt (M4) and close the power supply/interface circuit. Fasten only the two screws (M4) on the stern side.

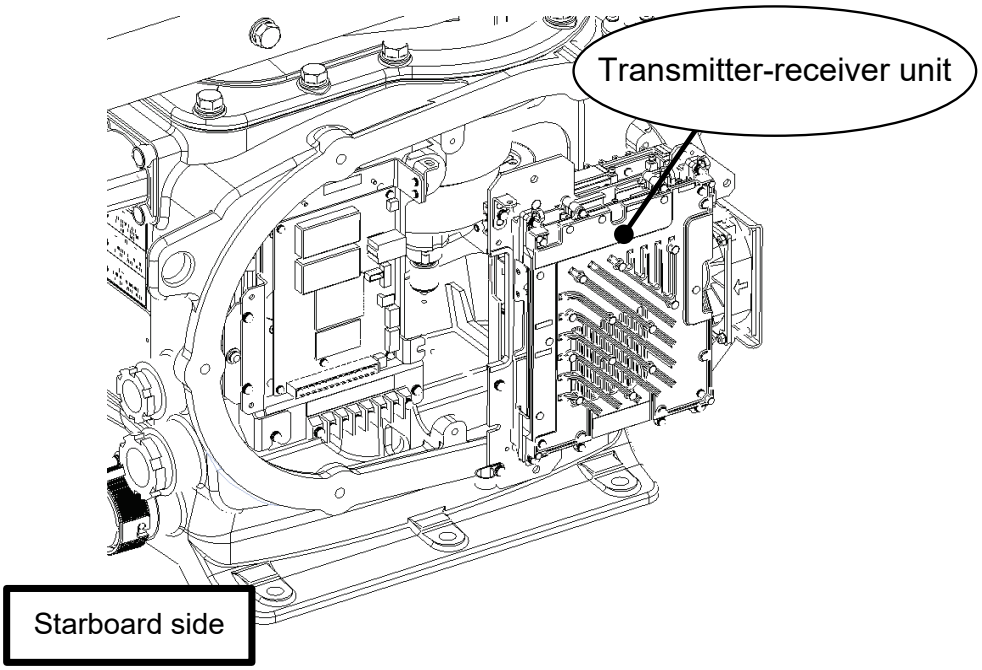


Step 5 Remove the transmitter-receiver unit.

Remove the four screws (M5). Remove the M4 bolt. Remove the three screws (M4).

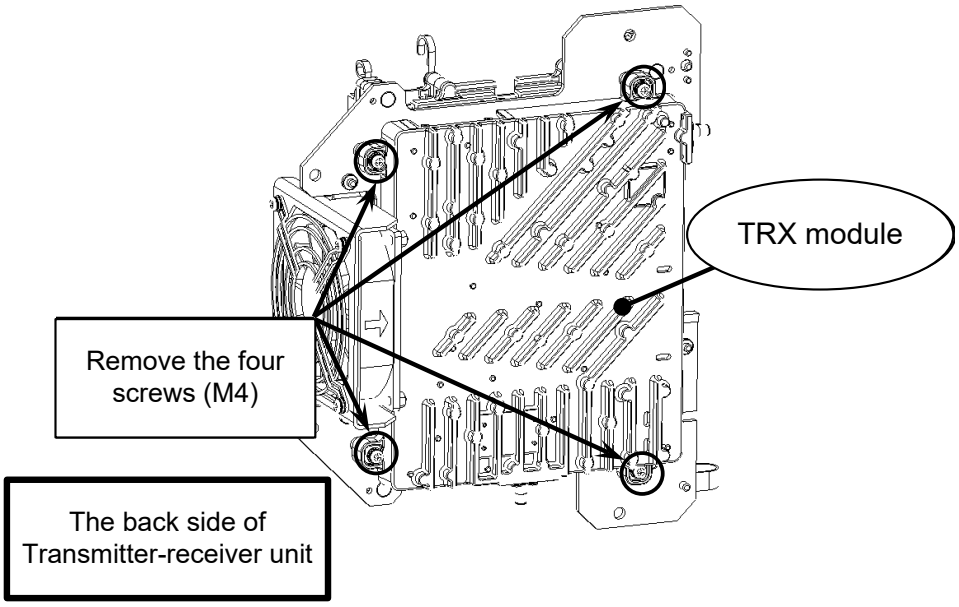


Remove the cable that is connected to the transmitter-receiver unit and remove the unit towards the front.



Step 6 Replace the TRX module.

The TRX module is installed at the rear of the transmitter-receiver unit. Remove the four screws (M4) and replace the TRX module. After replacing the module, close the cover following the disassembly procedure in the reverse order. Finally, set the safety switch to On and check the operation.



Step 7 Operation check

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

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

This completes TRX module replacement.

4.1.8.2 Encoder (CHT-85) Replacement/NKE-2632, NKE-2632-H

[Required Tools]

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

Table Required Tools

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

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

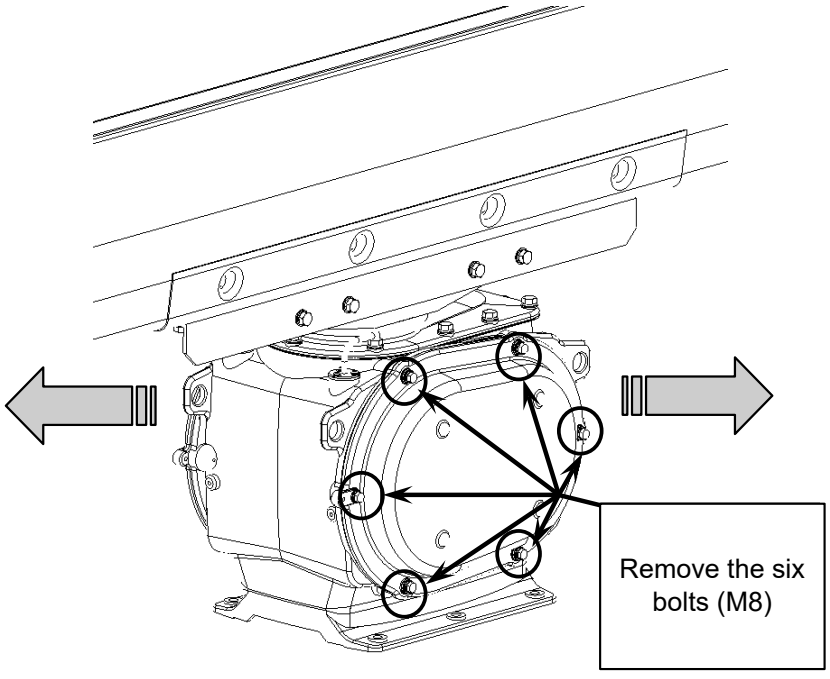
⚠ Before beginning work, turn Off the safety switch of the radar antenna.

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

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

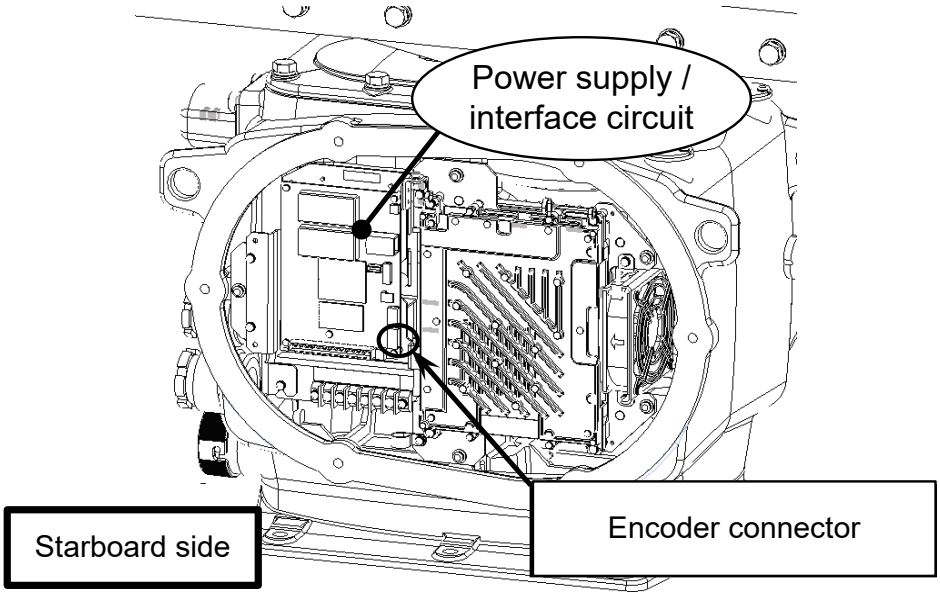
Step 1 Remove the cover.

Remove the six fall prevention bolts (M8) and remove the cover.



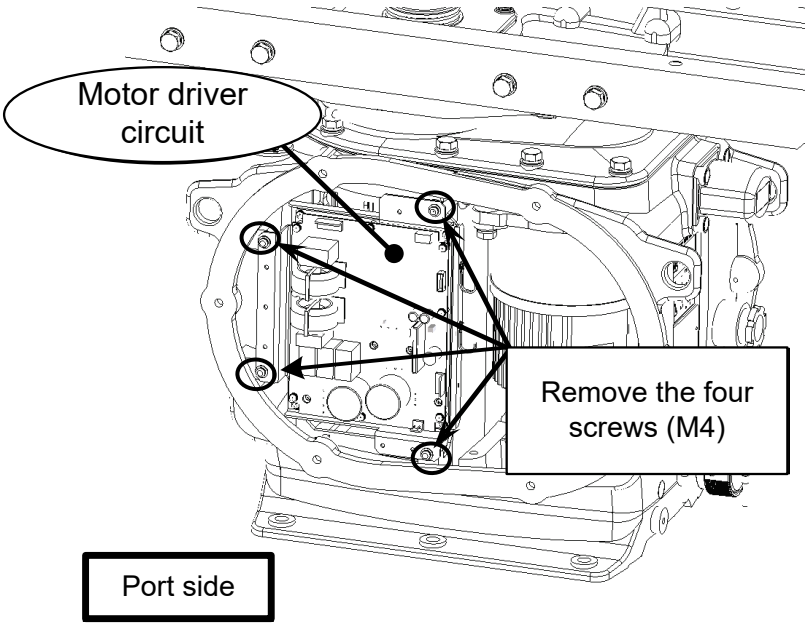
Step 2 Remove the connector of the encoder.

The connector of the encoder is connected to the power supply/interface circuit on the starboard side. Remove the connector of the encoder that is connected to the power supply/interface circuit.



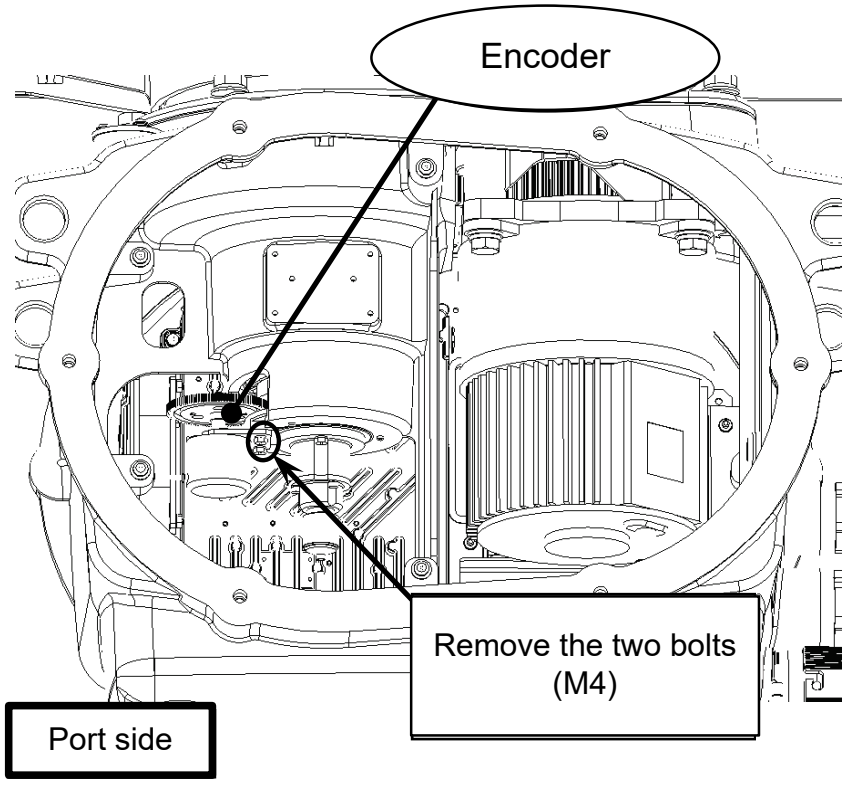
Step 3 Remove the motor driver circuit unit.

The encoder is installed at the rear of the motor driver circuit on the port side. Remove the four screws (M4) that hold the driver circuit unit and remove it.



Step 4 Replace the encoder.

Remove the two bolts (M4) that hold the encoder and replace it. Hold the gear of the encoder by lightly pressing it to the gear of the main shaft. After replacing the encoder, close the cover following the disassembly procedure in the reverse order. Finally, set the safety switch to On and check the operation. This completes encoder replacement.



Step 5 Operation check

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

(1) Turn on the Display unit. Start transmission and check that the radar image appears without error. Open the service engineer menu to perform azimuth adjustment.

This completes encoder replacement.

4.1.8.3 Power Supply/Interface Circuit (CMP-493) Replacement/NKE-2632, NKE-2632-H

[Required Tools]

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

Table Required Tools

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

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

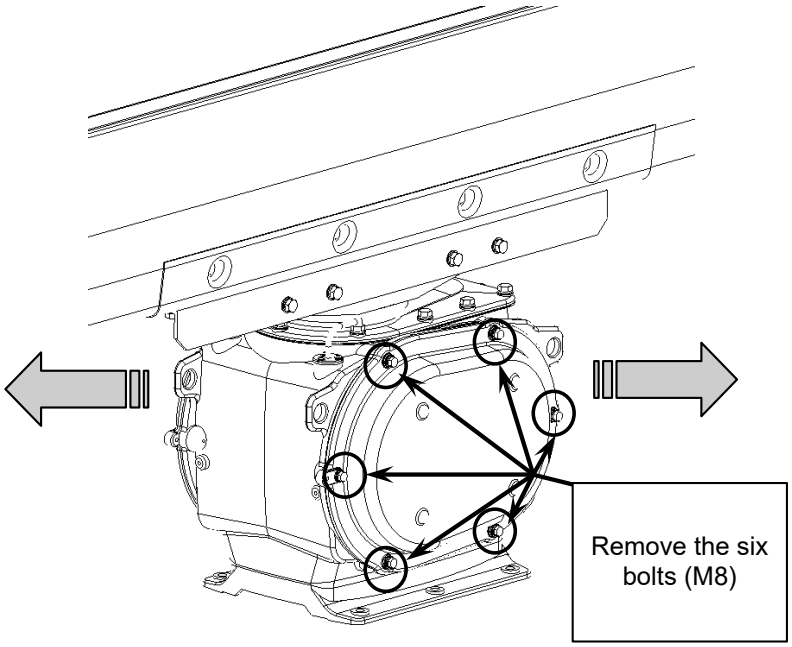
⚠ Before beginning work, turn Off the safety switch of the radar antenna.

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

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

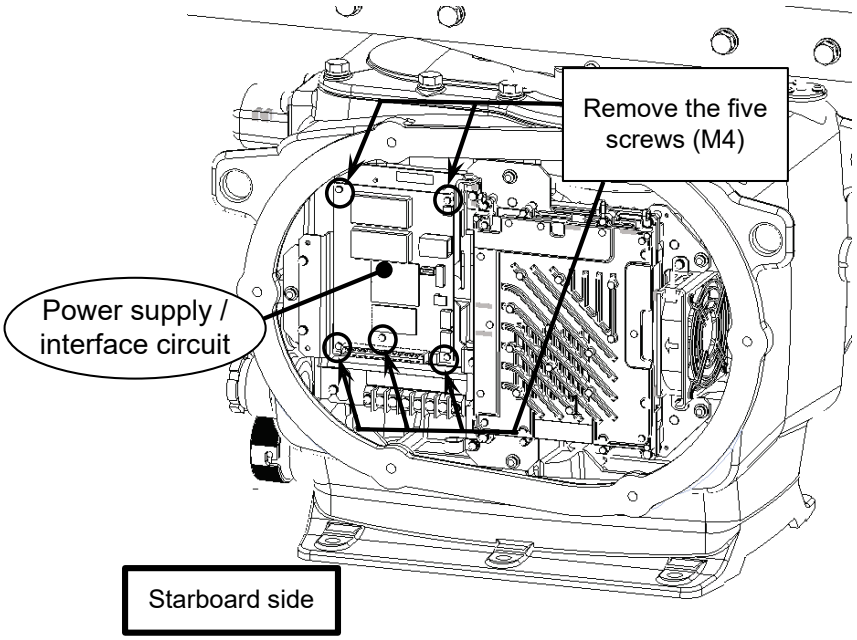
Step 1 Remove the cover.

Remove the eight fall prevention bolts (M8) and remove the cover.



Step 2 Replace the power supply/interface circuit.

[Starboard side] The power supply/interface circuit is installed on the starboard side. Remove all the connectors that are connected to the power supply/interface circuit. Remove the five screws that are holding the power supply/interface circuit and replace it. After replacing the power supply/interface circuit, connect the circuit following the disassembly procedure in the reverse order. Finally, set the safety switch to On and check the operation.



Step 3 Operation check

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

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

This completes the power supply/interface circuit replacement.

4.1.8.4 Radar Processor Unit (NDC-4920) Replacement/NKE-2632, NKE-2632-H

[Required Tools]

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

Table Required Tools

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

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

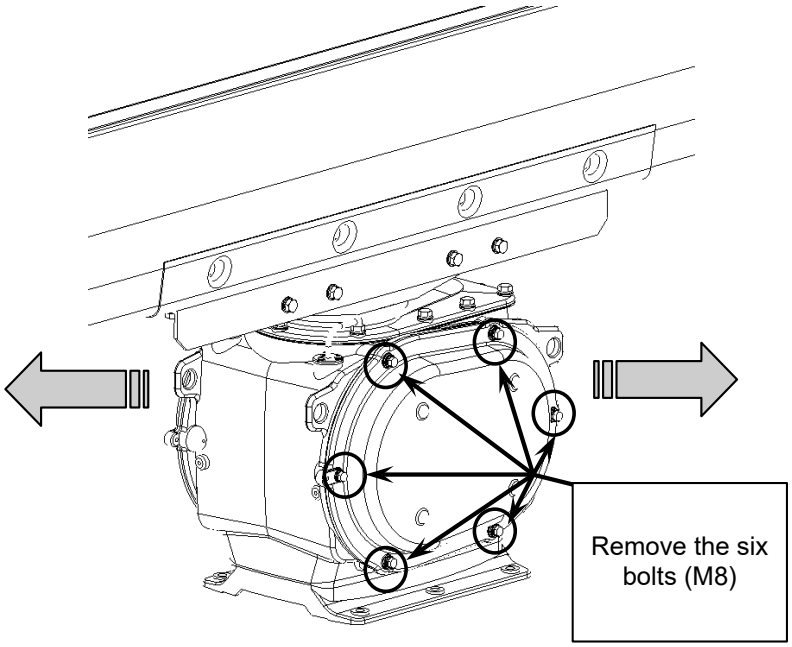
⚠ Before beginning work, turn Off the safety switch of the radar antenna.

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

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

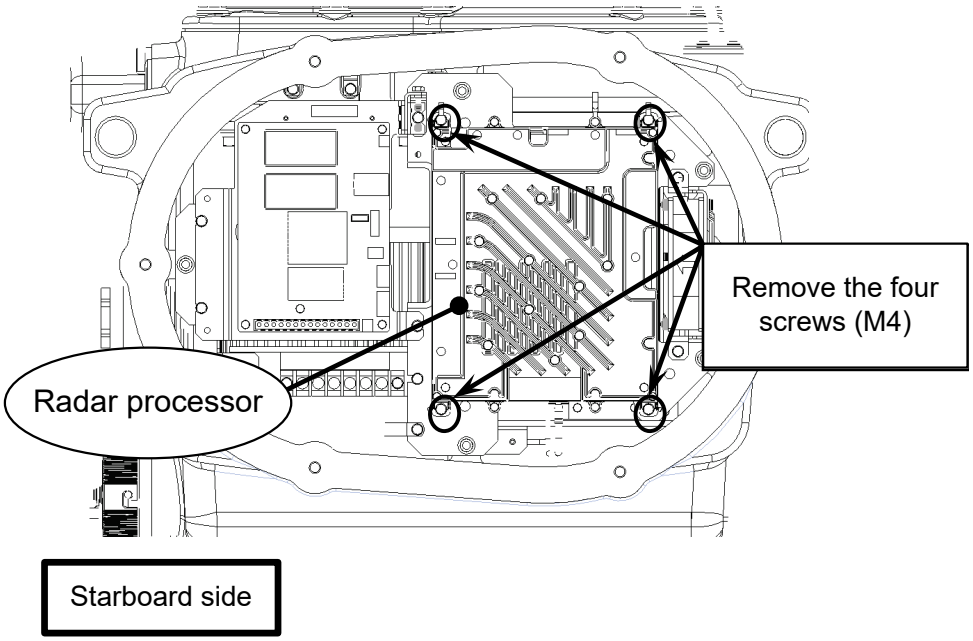
Step 1 Remove the cover.

Remove the eight fall prevention bolts (M8) and remove the cover.



Step 2 Replace the radar processor unit.

The radar processor unit is installed on the starboard side. Remove all the connectors that are connected to the radar processor unit. Remove the four screws that are holding the radar processor unit and replace it. After completing the replacement, connect the radar processor unit following the disassembly procedure in the reverse order and close the cover. Finally, set the safety switch to On and check the operation.



Step 3 Operation check

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

(1) Turn On the Display unit. Check that the radar image appears without error.

This completes radar processor unit replacement.

4.1.8.5 Motor Replacement/NKE-2632, NKE-2632-H

[Required Tools]

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

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2	
2	Open-end wrench*1	Width across flats 8 mm (for M5 screws). 13 mm (for M8 screws). 17 mm (for M10 screws)	
3	Socket wrench*1	Width across flats 8 mm (for M5 screws). 13 mm (for M8 screws). 17 mm (for M10 screws)	

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

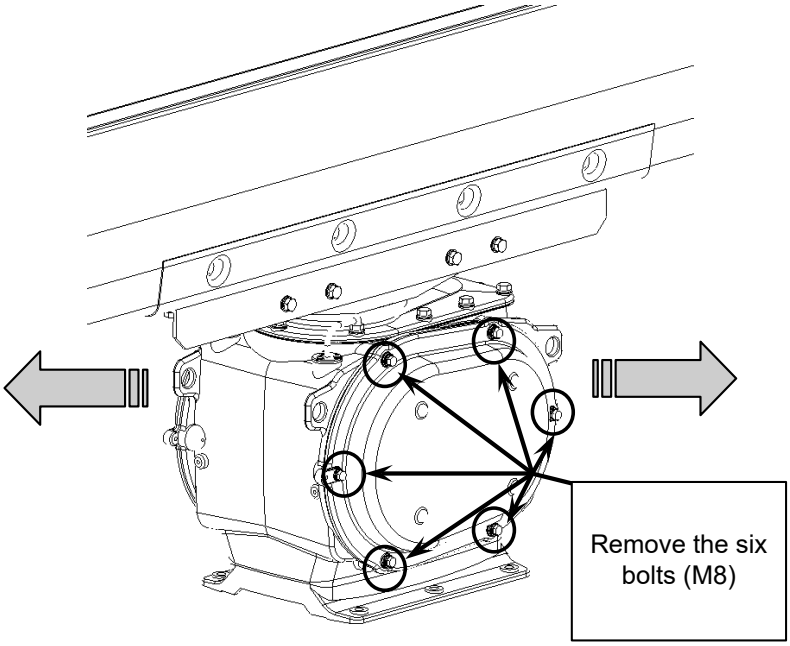
⚠ Before beginning work, turn Off the safety switch of the radar antenna.

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

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

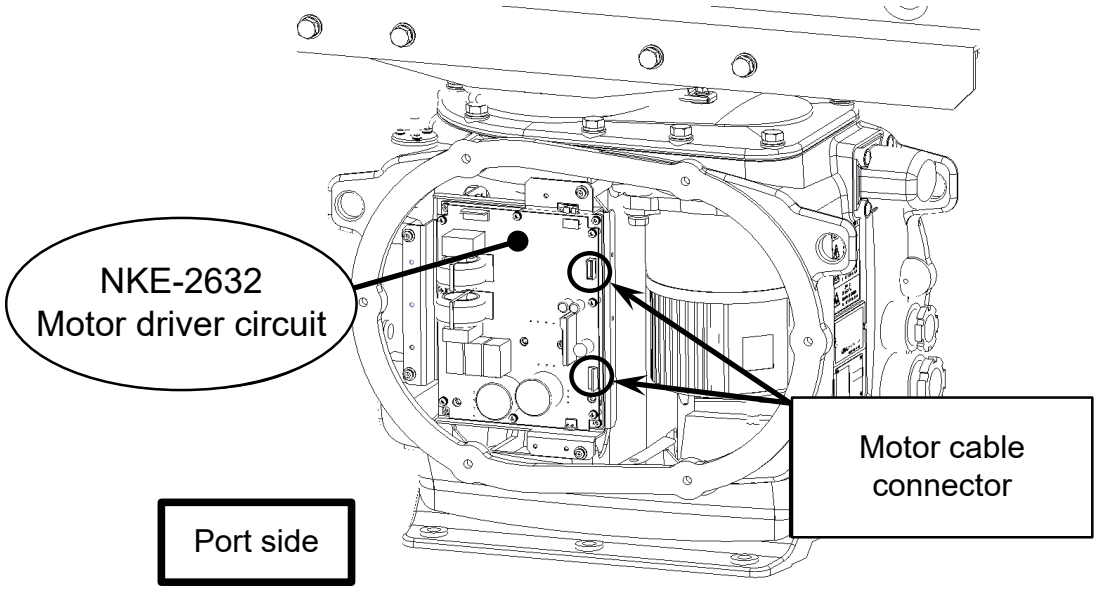
Step 1　　Remove the cover.

Remove both the left and right covers before replacing the motor. Remove the covers by removing the fall prevention bolts (M8: 6 bolts on one side, 12 bolts on both sides).



Step 2　　(Port side) Remove the motor cable.

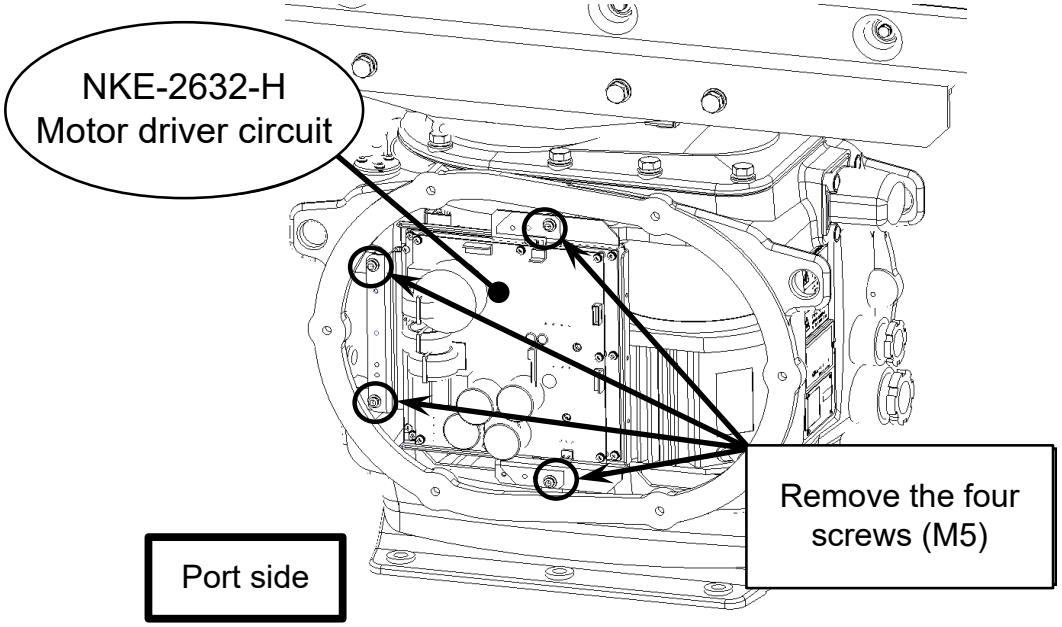
[Port side] Remove the motor cable that is connected to the motor driver unit.



Step 2-1 In the case of *NKE-2632-H (port side): Remove the motor cable.

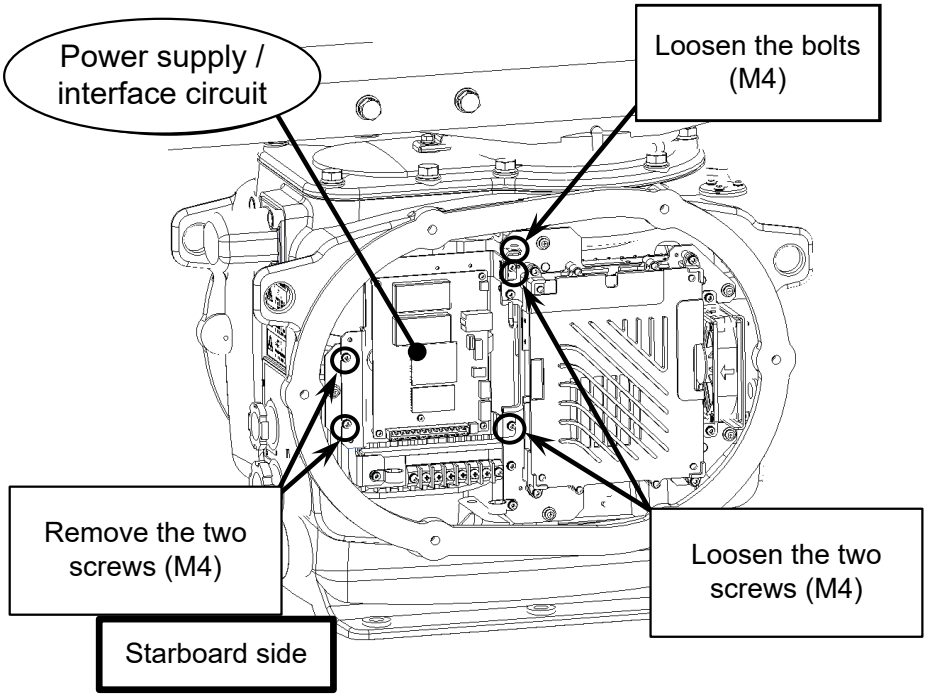
In the case of *NKE-2632-H, the HS motor driver unit must be removed.

[Port side] Remove the cable that is connected to the HS motor driver. Remove the four screws (M5) and remove the motor driver.

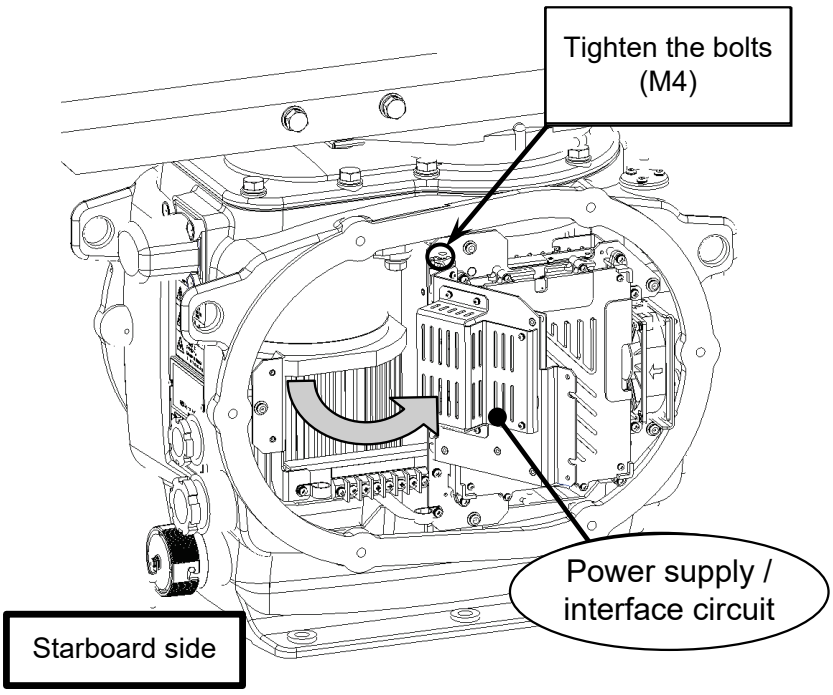


Step 3 (Starboard side) Open the power supply/interface circuit unit.

[Starboard side] By loosening the bolt (M4) and the two screws (M4) and removing the two screws (M4), the power supply/interface circuit unit can be opened towards the front.

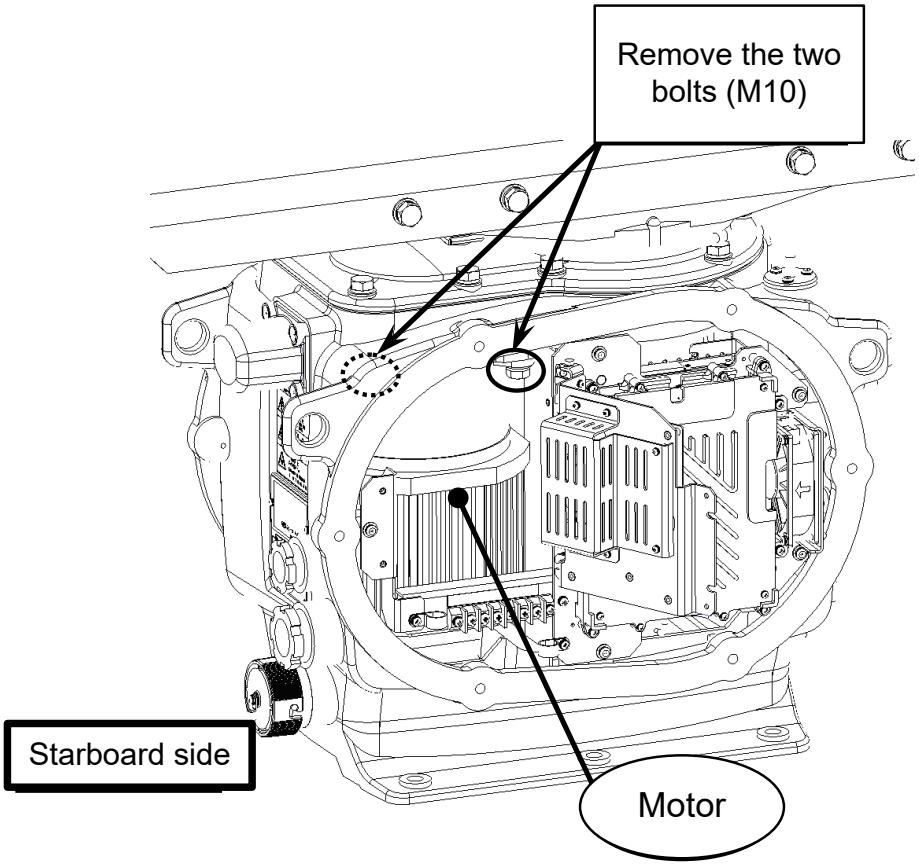


Tighten the bolt (M4) and hold the unit while the power supply/interface circuit is opened.

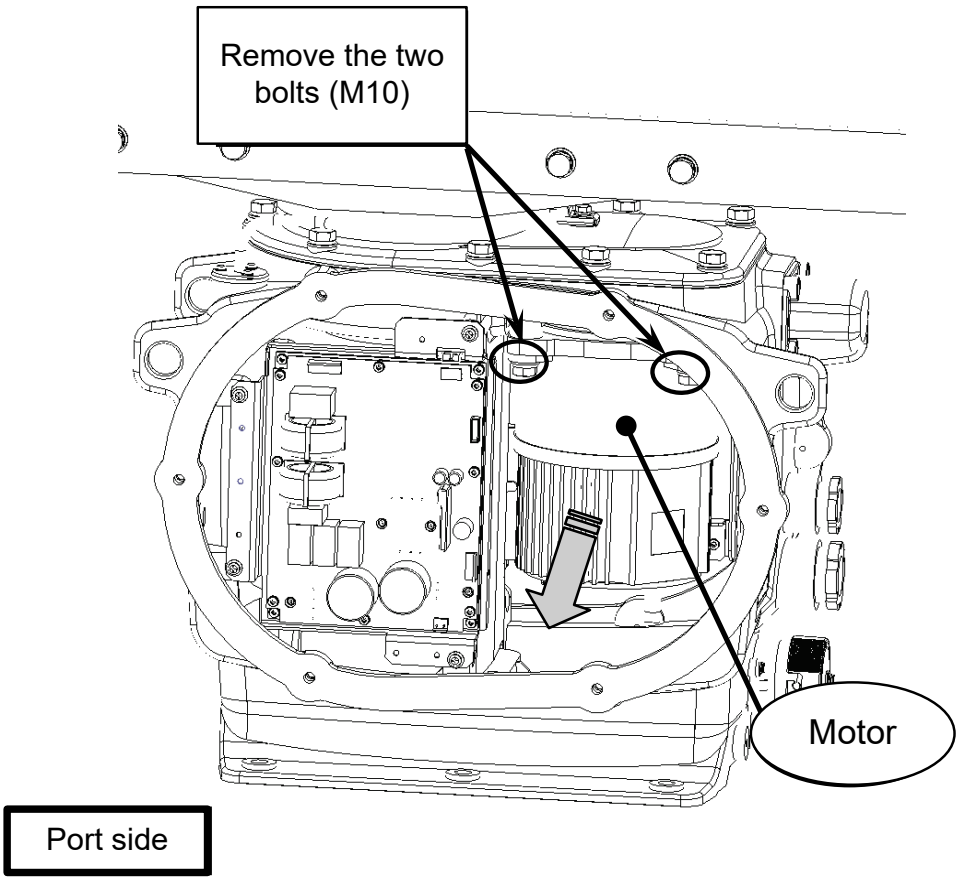


Step 4 Remove the motor.

[Starboard side] Remove the two bolts (M10).



[Starboard side] Remove the two bolts (M10) and remove the motor towards the front.



Apply grease, in advance, on the gear of the motor to be replaced.

Tighten the hexagon head bolts with the proper torque (350 kgf･cm) to guarantee tightening them and not leaving loose bolts. After replacing the motor, close the cover following the disassembly procedure in the reverse order. Finally, set the safety switch to ON and check the operation.

Step 5 Operation check

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

1. Turn On the Display unit. Start transmission and check that the radar image appears without error. Check that the motor does not make any abnormal sound when it starts to rotate, while it is rotating, or when it stops.
2. Open the service engineer menu and initialize the motor rotation time.

This completes motor replacement.

4.1.8.6 Motor Driver Circuit (CBD-1949) Replacement/NKE-2632

[Required Tools]

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

Table Required Tools

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

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

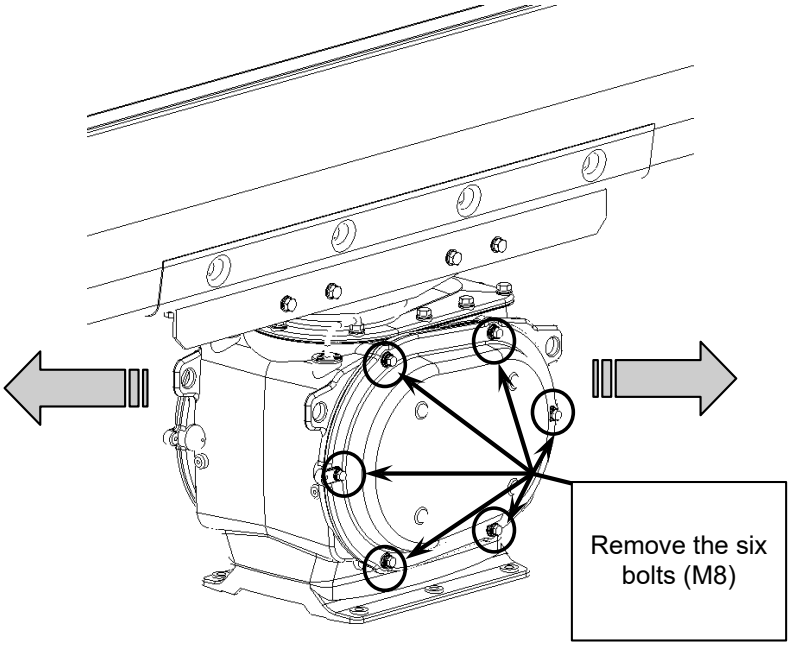
⚠ Before beginning work, turn Off the safety switch of the radar antenna.

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

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

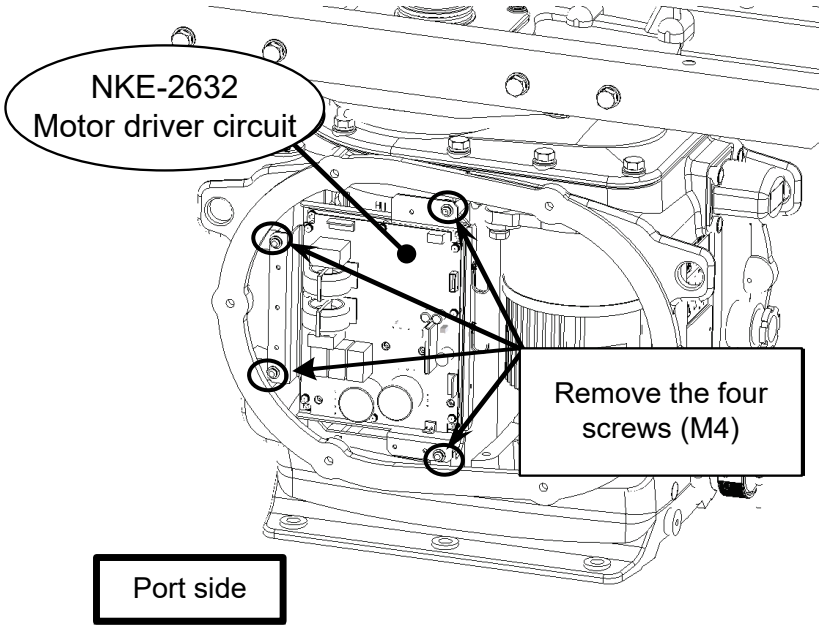
Step 1 Remove the cover.

Remove the six fall prevention bolts (M8) and remove the cover.



Step 2 Remove the motor driver circuit board.

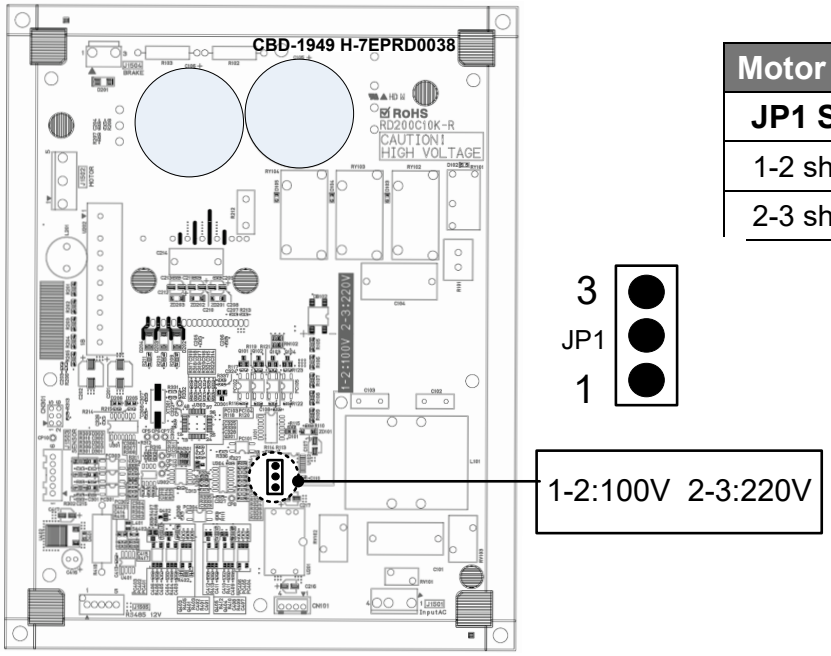
Remove all the connectors that are connected to the motor driver. Remove the four screws that hold the motor driver unit.



Step 3 Check the setting of the motor driver circuit.

The motor driver applies the 100 V/220 V common circuit. Before commencing replacement, set the power supply of the driver to be replaced according to the power supply specification.

Motor Driver Circuit CBD-1949



Motor Driver Circuit CBD-1949	
JP1 SETTING	**Description**
1-2 short-circuit	100 VAC
2-3 short-circuit	220 VAC

Step 4 Operation check

After replacing the motor driver circuit board, turn On the safety switch and follow the steps below to check the operation.

1. Turn On the Display unit. Start transmission and check that the radar image appears without error. Check that the motor does not make any abnormal sound when it starts to rotate, while it is rotating, or when it stops.

This completes motor driver circuit replacement.

4.1.8.7 Motor Driver Circuit Board (CBD-1950) Replacement/NKE-2632-H

[Required Tools]

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

Table Required Tools

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

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

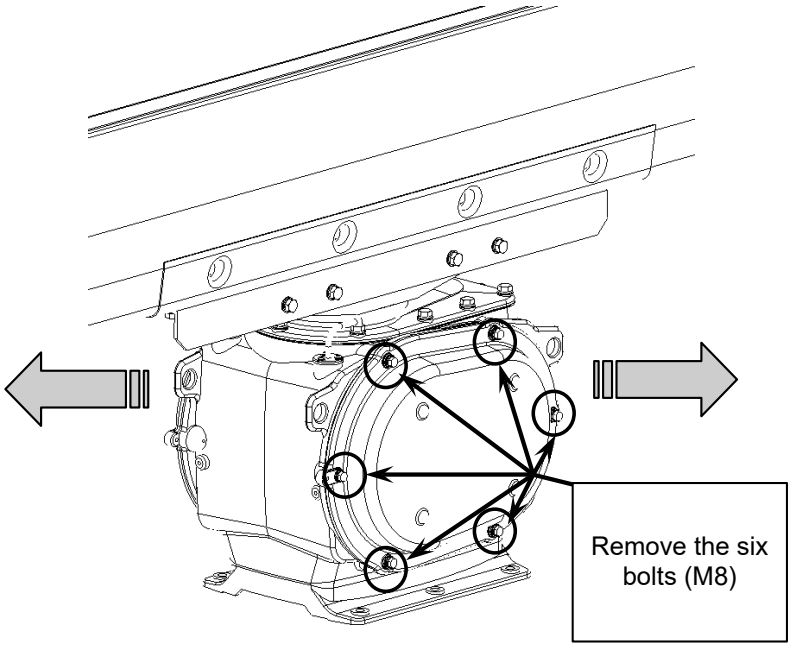
⚠ Before beginning work, turn Off the safety switch of the radar antenna.

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

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

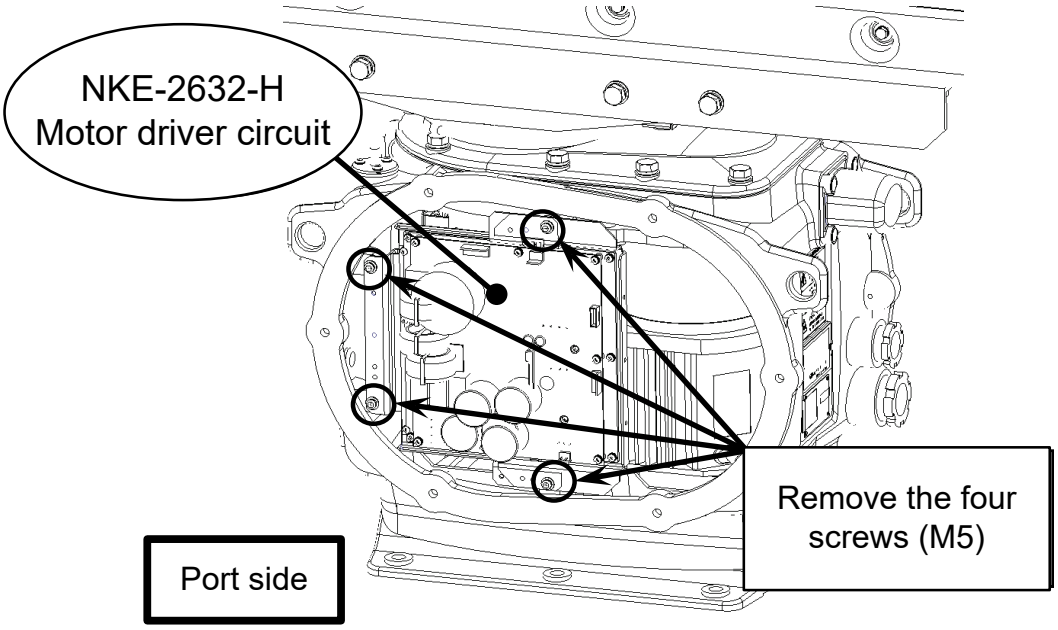
Step 1 Remove the cover.

Remove the six fall prevention bolts (M8) and remove the cover.



Step 2 Remove the motor driver circuit board.

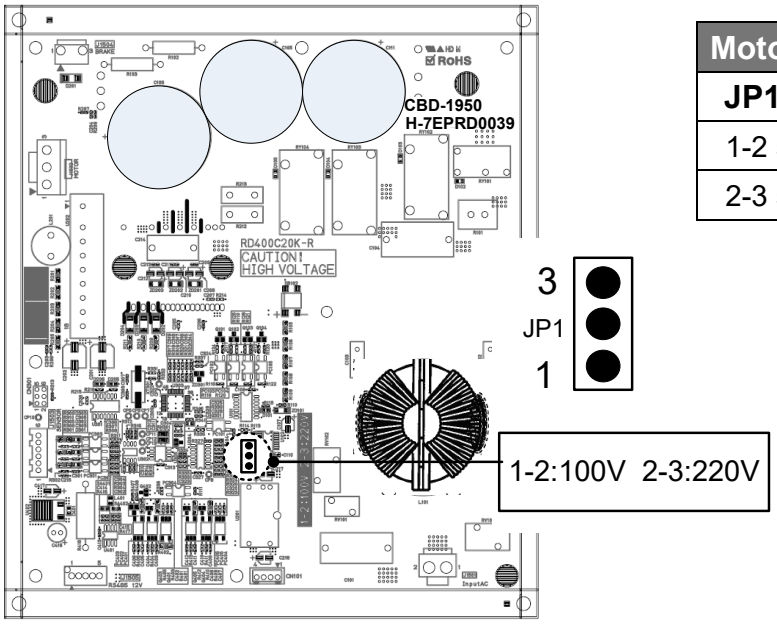
Remove all the connectors that are connected to the motor driver. Remove the four screws that hold the motor driver unit.



Step 3 Check the setting of the motor driver circuit.

The motor driver applies the 100 V/220 V common circuit. Before commencing replacement, set the power supply of the driver to be replaced according to the power supply specification.

Motor Driver Circuit CBD-1950



Motor Driver Circuit CBD-1950	
JP1 SETTING	**Description**
1-2 short-circuit	100 VAC
2-3 short-circuit	220 VAC

Step 4 Operation check

After replacing the motor driver circuit board, turn On the safety switch and follow the steps below to check the operation.

1. Turn On the Display unit. Start transmission and check that the radar image appears without error. Check that the motor does not make any abnormal sound when it starts to rotate, while it is rotating, or when it stops.

This completes motor driver circuit replacement.

4.1.8.8 Fan Replacement/NKE-2632, NKE-2632-H

[Required Tools]

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

Table Required Tools

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

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

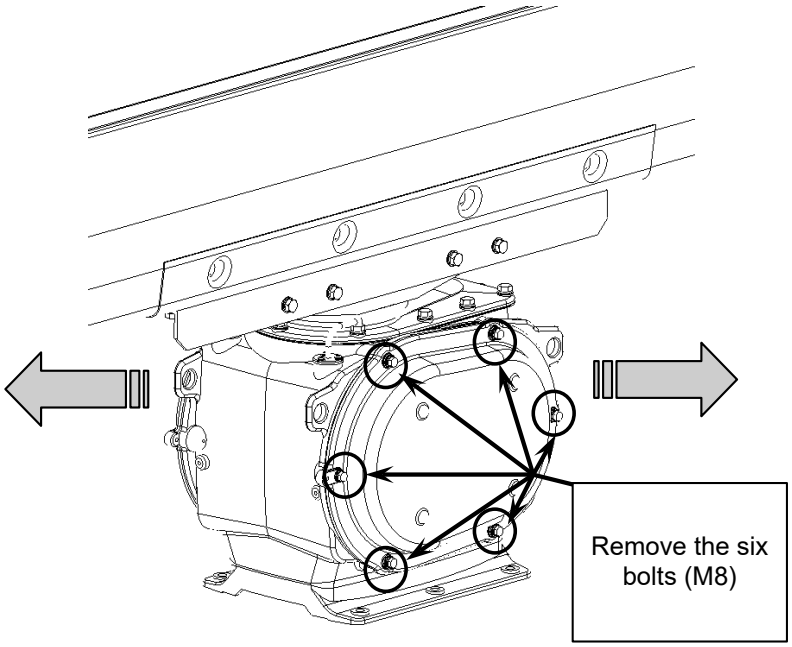
⚠ Before beginning work, turn Off the safety switch of the radar antenna.

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

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

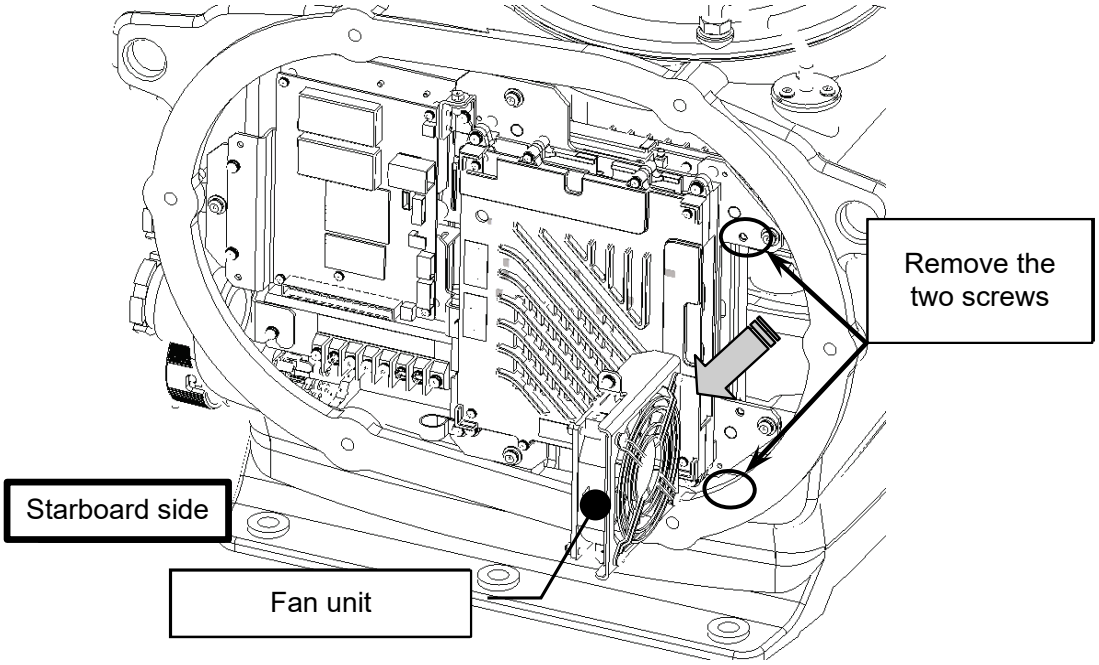
Step 1 Remove the cover.

Remove both the left and right covers before replacing the fan. Remove the covers by removing the fall prevention bolts (M8: 6 bolts on one side, 12 bolts on both sides).



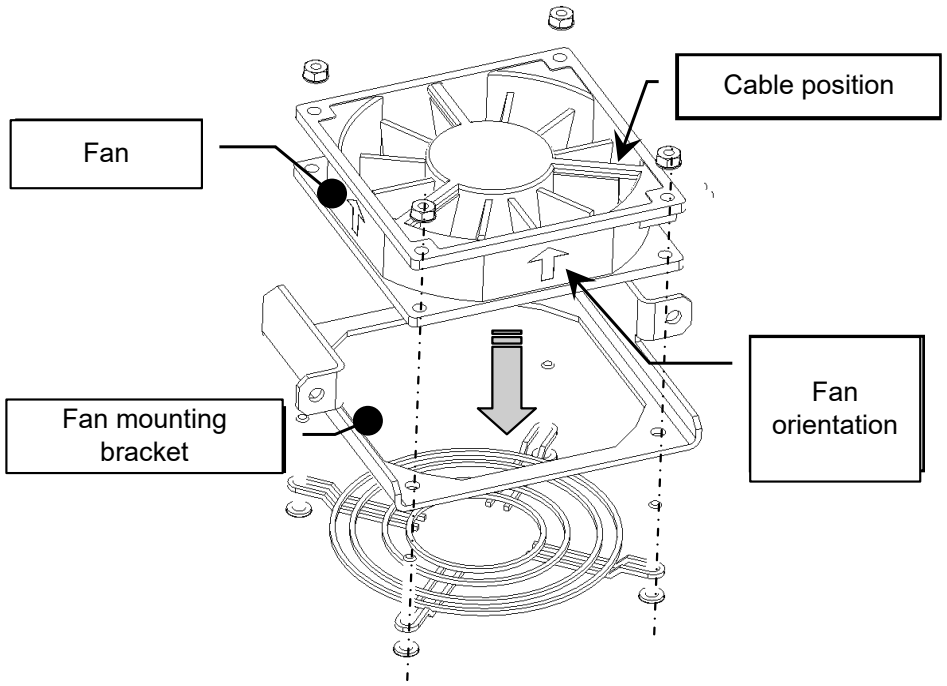
Step 2 Remove the fan unit.

[Starboard side] Remove the connector that connects the fan. Remove the two screws that hold the fan unit.



Step 3 Replace the fan.

After replacing the fan, install the fan unit following the disassembly procedure in the reverse order and close the cover. Finally, set the safety switch to On and check the operation.



Step 4 Operation check

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

(1) Turn On the Display unit and check that radar images are displayed correctly without issuing a fan alarm.

This completes fan replacement.

4.1.9 NKE-1696 Scanner Unit

4.1.9.1 PA Circuit (CAH-1696) Replacement/NKE-1696

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2,#3	
2	Open-end wrench*1	Width across flats 13mm (for M8 screws) Width across flats 7mm (for M4 screws)	
3	Socket wrench*1	Width across flats 13mm (for M8 screws) Width across flats 7mm (for M4 screws)	

*1 Either the wrench (adjustable wrench) or socket wrench is mandatory. (mounting/removing the cover, etc.)

⚠ Before beginning work, turn Off the safety switch of the radar antenna.

⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

Step 1: Turn off the radar.

Before starting work, make sure that all radars (or all if multiple radars are equipped) are turned off. It is also recommended to turn off the circuit breaker of the main power supply for safety.

Step 2: Turn off the antenna safety switch.

The safety switch is located on the bottom of the stern side of the scanner unit.

Step 3: Remove the starboard side cover.

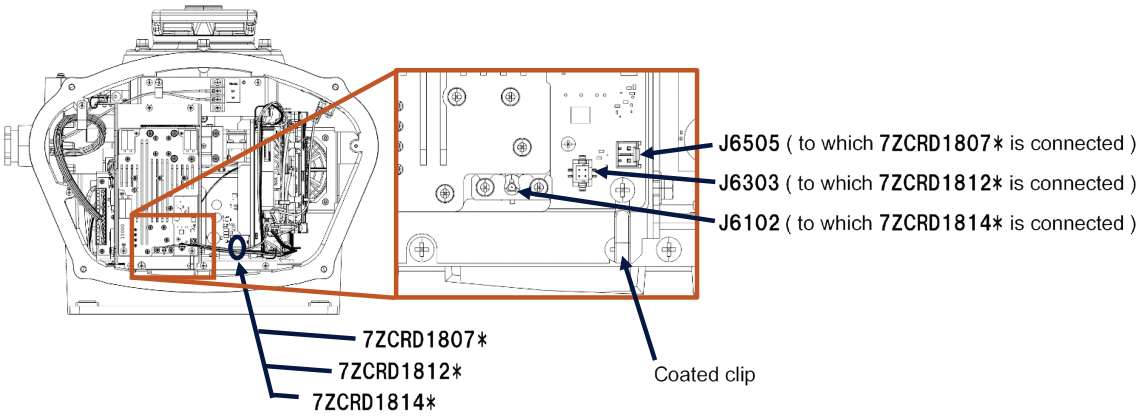
Loosen the four dropout prevention hex bolts (M8) on the starboard sides of the scanner unit and remove the cover.

❗ Place the removed cover in a safe place.
Also, be careful not to allow dust to adhere to the packing.

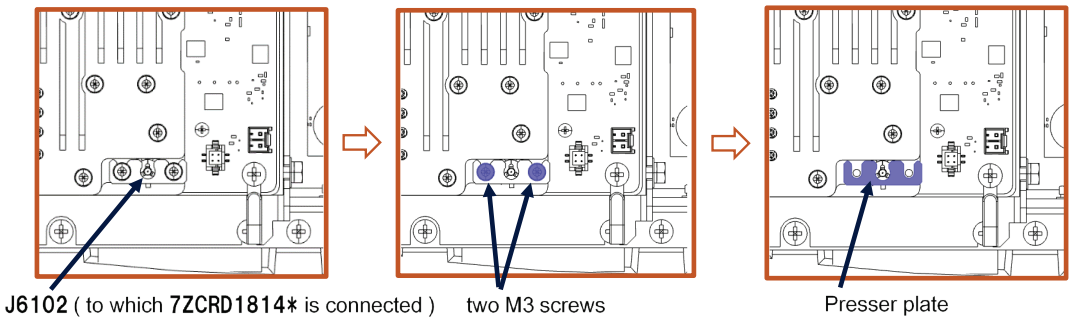
Step 4: Remove the PA circuit CAH-1696.

(1) Untie the coated clip that holds the cables **7ZCRD1807∗**, **7ZCRD1812∗** and **7ZCRD1814∗** together.

And then, unplug these cables from the connector **J6505**, **J6303** and **J6102**.



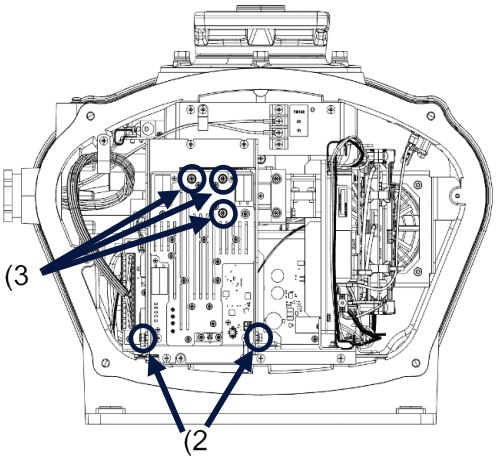
To remove the **7ZCRD1814∗** from the **J6102**, it is necessary to remove the two M3 screws and remove the presser plate.



When removing the **7ZCRD1814∗** from **J6102**, be sure to hold the base of the cable and remove it in the direction perpendicular to the connector.

(2) Loosen the two M4 upset bolts.

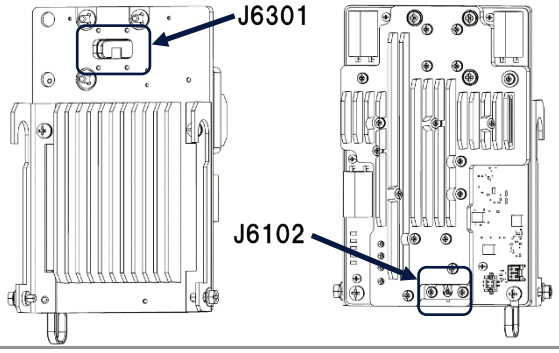
(3) Loosen the three M4 dropout prevention screws and remove the PA circuit CAH-1696



Step 5: Replace with the new PA circuit CAH-1696 and connect the cables in its original condition.

(1) Prepare a new PA circuit for replacement.

Be sure to remove the electrostatic protection tape if there is it on **J6301** and **J6102** before mounting.

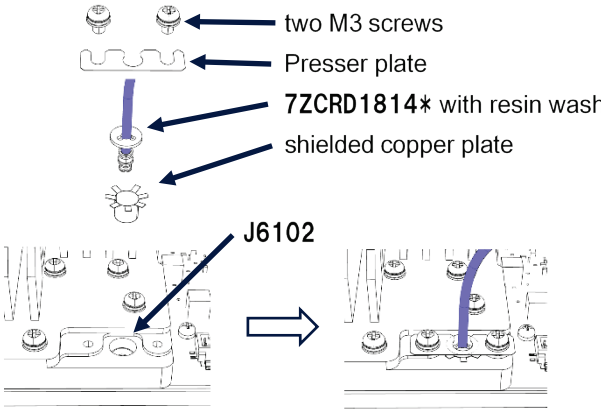


(2) Follow steps 4-(3), 4-(2), and 4-1(1) in that order to install the PA circuit.

When tightening the screws and bolts, do not fully tighten them from the beginning, but temporarily tighten them once.

※Temporarily tighten the three M4 screws in step 4-(3), and then temporarily tighten the two M4 bolts in step 4-(2). After that, fully tighten everything and install it.

When connecting the **7ZCRD1814*** to the **J6102**, make sure that a resin washer is attached to the cable side, hold the base of the cable, and insert it vertically into the connector. After connection, fix the resin washer with the presser plate and two M3 screws so that the retaining washer can be pressed. In addition, **J6102** contains a shielded copper plate. Be sure to put it in without discarding it.



Step 6: Tighten the starboard side cover.

Step 7: Operation check.

After replacing the PA circuit, turn on the safety switch and check the following operation.

① After turning on the radar power, set to transmit it and check that the normal radar image is displayed.

② Make initial adjustments to the performance monitor.

4.1.9.2 TRX Circuit (CMN-897) Replacement/NKE-1696

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2,#3	
2	Open-end wrench	Width across flats 13mm (for M8 screws) *1 Width across flats 7mm (for M4 screws)	
3	Socket wrench	Width across flats 13mm (for M8 screws) *1	

*1 Either the wrench (adjustable wrench) or socket wrench is mandatory. (mounting/removing the cover, etc.)

⚠ Before beginning work, turn Off the safety switch of the radar antenna.

⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

Step 1: Turn off the radar.

Before starting work, make sure that all radars (or all if multiple radars are equipped) are turned off. It is also recommended to turn off the circuit breaker of the main power supply for safety.

Step 2: Turn off the antenna safety switch.

The safety switch is located on the bottom of the stern side of the scanner unit.

Step 3: Remove the starboard side cover.

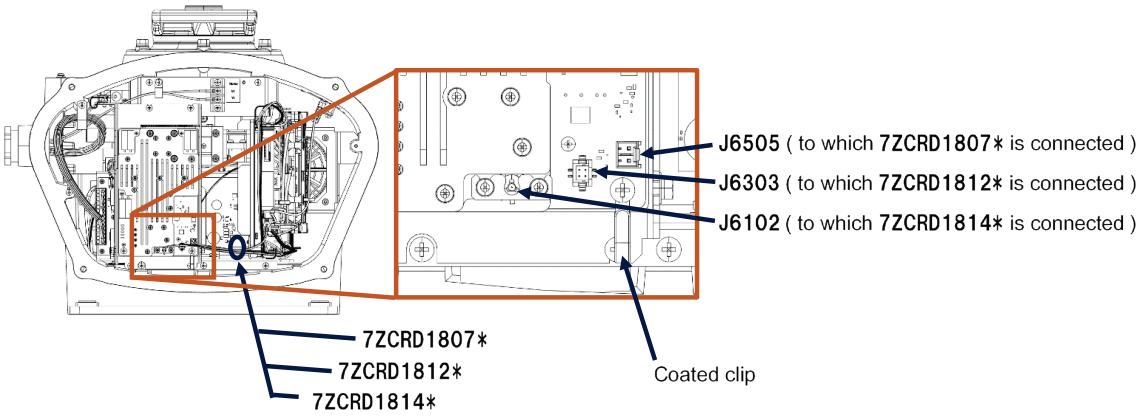
Loosen the four dropout prevention hex bolts (M8) on the starboard sides of the scanner unit and remove the cover.

❗ Place the removed cover in a safe place.
Also, be careful not to allow dust to adhere to the packing.

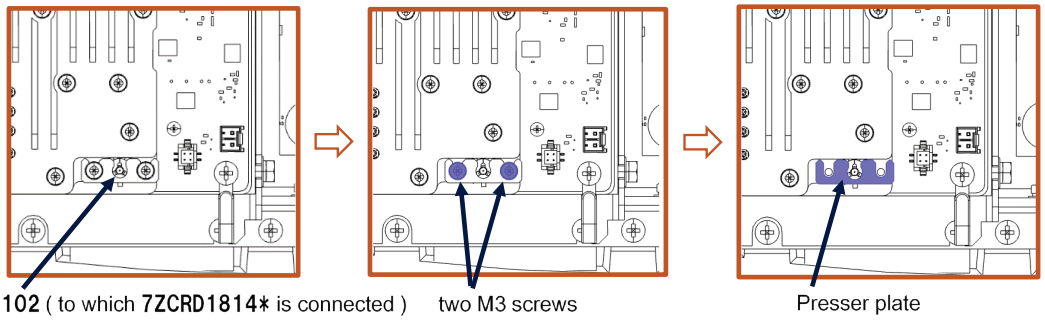
Step 4: Unplug the cable 7ZCRD1814* from the connector J6102 at PA circuit.

Untie the coated clip that holds the cables **7ZCRD1807***, **7ZCRD1812*** and **7ZCRD1814*** together.

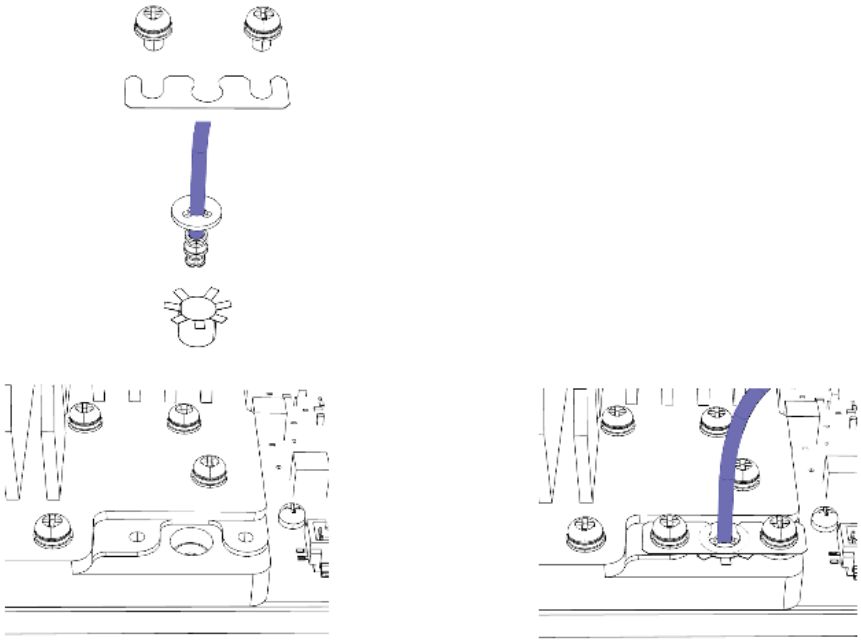
And then, unplug these cables from the connector **J6505**, **J6303** and **J6102**.



To remove the **7ZCRD1814*** from the **J6102**, it is necessary to remove the two M3 screws and remove the presser plate.



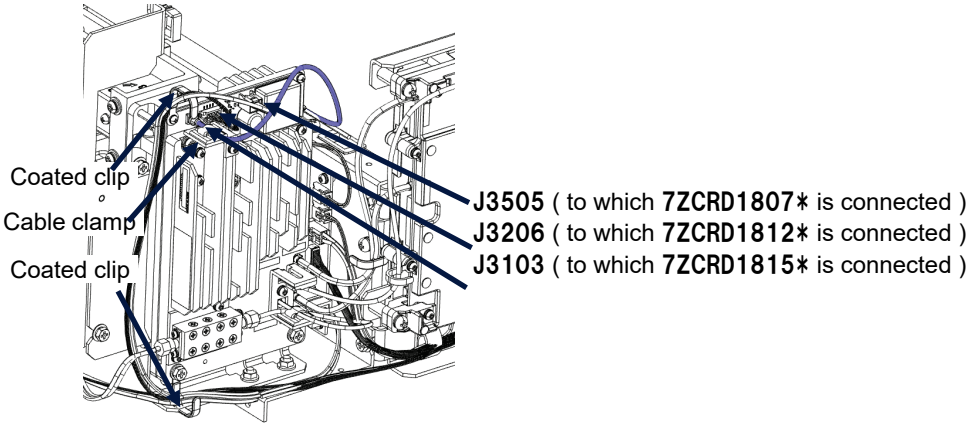
When removing the **7ZCRD1814*** from **J6102**, be sure to hold the base of the cable and remove it in the direction perpendicular to the connector.



Step 5: Remove the TRX circuit CMN-897.

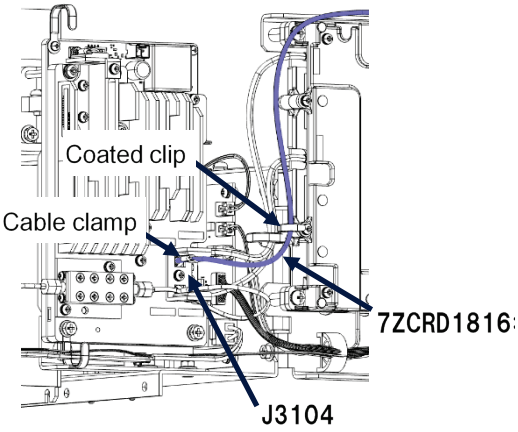
(1) Untie the coated clips and open the cable cramp, and unplug **7ZCRD1815*** from **J3103**, **7ZCRD1812*** from **J3206**, and **7ZCRD1807*** from **J3505**.

> When unplugging the **7ZCRD1815*** from **J3103**, open the cable clamp, then be sure to hold the base of the cable and remove it in the direction perpendicular to the connector.



(2) Untie the coated clip and open the cable cramp and unplug the **7ZCRD1816*** from **J3104**.

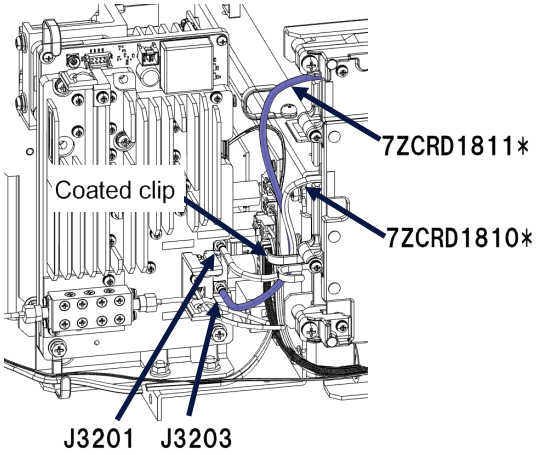
> When unplugging the **7ZCRD1816*** from **J3104**, open the cable clamp, then be sure to hold the base of the cable and remove it in the direction perpendicular to the connector.

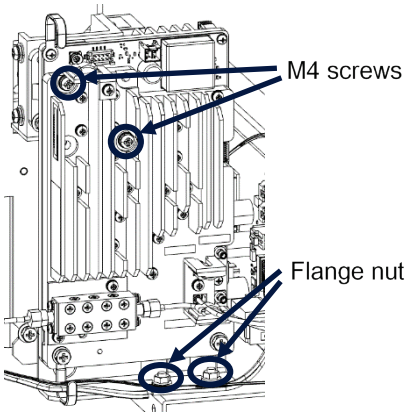


(3) Untie the coated clip and unplug **7ZCRC1810*** from **J3201** and **7ZCRD1811*** from **J3203**.

(4) Loosen the two flange nuts at the bottom of the TRX circuit.

(5) Loosen the two M4 dropout prevention screws on the top of the TRX circuit and remove the TRX circuit.

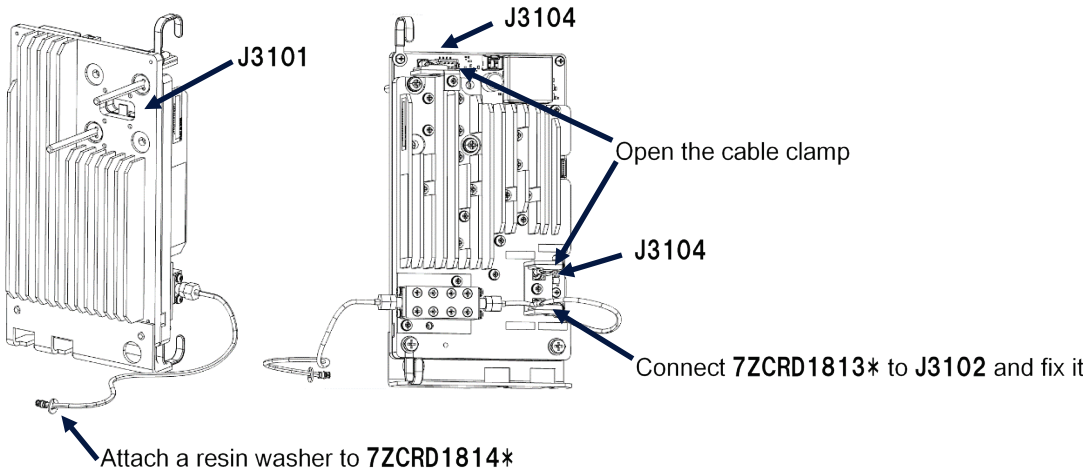




Step 6: Replace with the new TRX circuit CMN-897 and connect the cables in its original condition.

(1) Prepare a new TRX circuit for replacement.

- Connect **7ZCRD1813 ∗** to **J3102** and fix it with a cable clamp.
- Attach a resin washer to **7ZCRD1814 ∗**.
- Open the cable clamps near **J3103** and **J3104**.



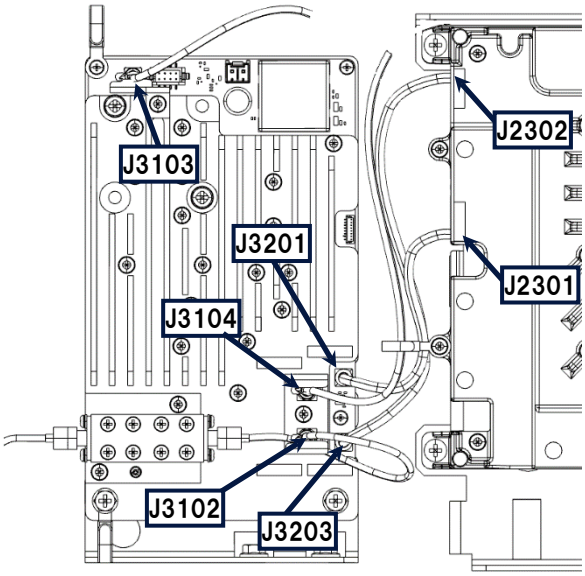
!	Be sure to remove the electrostatic protection tape if there is it on **J3101** and **J3104** before mounting.
!	When connecting **7ZCRD1813∗** to **J3102**, be sure to hold the base of the cable and insert it vertically into the connector. Also, after connecting, fix it with a cable clamp.

(2) Install and connect the TRX circuit in the order of steps 5- (5) to 5- (1) and step 4.

!	When tightening the screws, do not fully tighten them from the beginning, but temporarily tighten them once. ※Temporarily tighten the two M4 dropout prevention screws in step 5-(5), and then temporarily tighten the two flange nuts in step 5-(4). After that, fully tighten everything and install it.

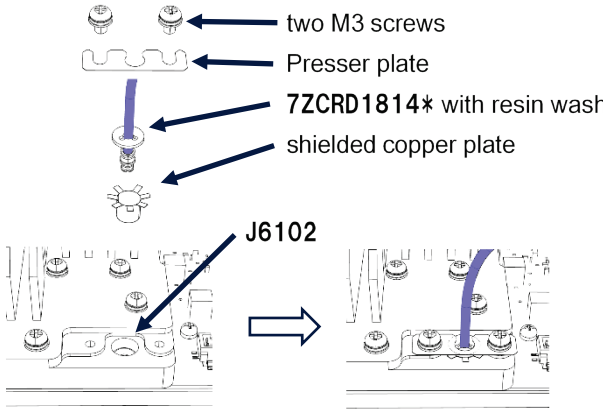
J3201 / **7ZCRD1810*** and **J3203** / **7ZCRD1811*** in step 5-(3) are the same connector shape. Be careful not to make a wrong connection.

J3104 / **7ZCRD1816*** in step 5-(2) and **J3103** / **7ZCRD1815*** in step 5-(1) are the same connector shape. Be careful not to make a wrong connection. Also, when connecting, be sure to hold the base of the cable and plug it from the direction perpendicular to the connector.
Also, when connecting, be sure to hold the base of the cable and insert it vertically to the connector.



7ZCRD1815*	**J3103**	WG Coax convertor (Center of scanner)
7ZCRD1816*	**J3104**	PM Antenna (Bow side of scanner)
7ZCRD1810*	**J3201**	**J2301**
7ZCRD1811*	**J3203**	**J2302**

⚠ When connecting the **7ZCRD1814*** to the **J6102**, make sure that a resin washer is attached to the cable side, hold the base of the cable, and insert it vertically into the connector. After connection, fix the resin washer with the presser plate and two M3 screws so that the retaining washer can be pressed.
In addition, **J6102** contains a shielded copper plate. Be sure to put it in without discarding it.



Step 7: Tighten the starboard side cover.

Step 8: Operation check.

Turn on the safety switch and check the following operation.

① After turning on the radar power, set to transmit it and check that the normal radar image is displayed.

② Make initial adjustments to the performance monitor.

4.1.9.3 Power Supply / Interface circuit (CMP-503) Replacement/NKE-1696

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2,#3	
2	Open-end wrench*1	Width across flats 13mm (for M8 screws) Width across flats 7mm (for M4 screws)	
3	Socket wrench*1	Width across flats 13mm (for M8 screws) Width across flats 7mm (for M4 screws)	

*1 Either the wrench (adjustable wrench) or socket wrench is mandatory. (mounting/removing the cover, etc.)

⚠ Before beginning work, turn Off the safety switch of the radar antenna.

⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

Step 1: Turn off the radar.

Before starting work, make sure that all radars (or all if multiple radars are equipped) are turned off. It is also recommended to turn off the circuit breaker of the main power supply for safety.

Step 2: Turn off the antenna safety switch.

The safety switch is located on the bottom of the stern side of the scanner unit.

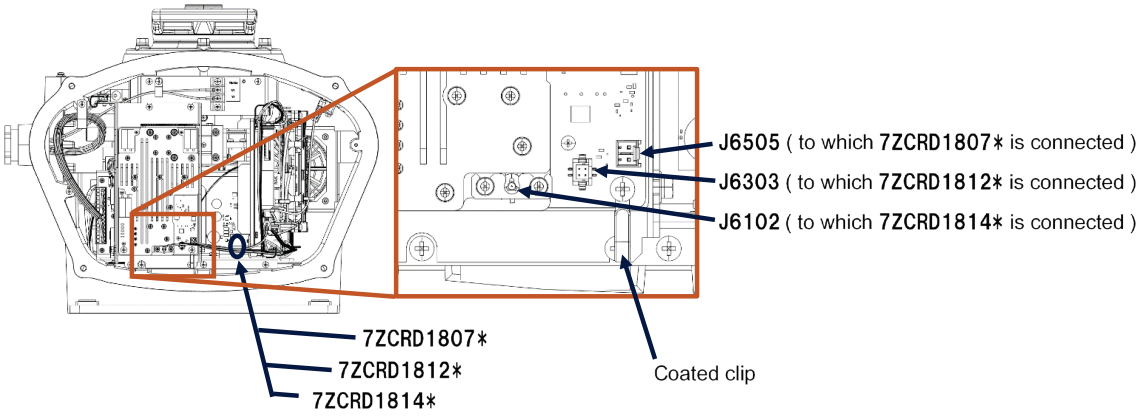
Step 3: Remove the starboard side cover.

Loosen the four dropout prevention hex bolts (M8) on the starboard sides of the scanner unit and remove the cover.

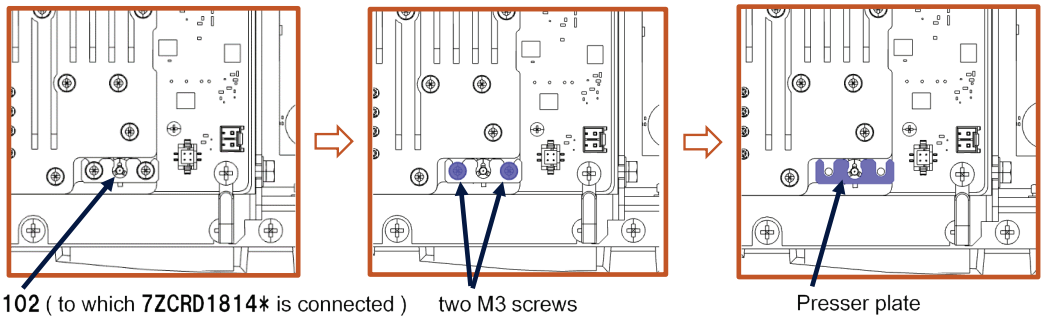
❗ Place the removed cover in a safe place.
Also, be careful not to allow dust to adhere to the packing.

Step 4: Remove the PA circuit CAH-1696.

(1) Untie the coated clip that holds the cables **7ZCRD1807∗**, **7ZCRD1812∗** and **7ZCRD1814∗** together. And then, unplug these cables from the connector **J6505**, **J6303** and **J6102**.



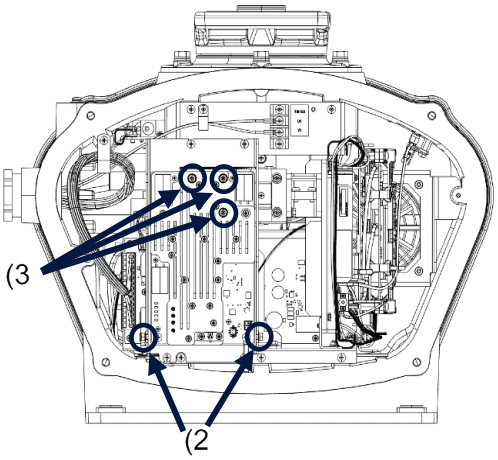
To remove the **7ZCRD1814∗** from the **J6102**, it is necessary to remove the two M3 screws and remove the presser plate.



When removing the **7ZCRD1814∗** from **J6102**, be sure to hold the base of the cable and remove it in the direction perpendicular to the connector.

(2) Loosen the two M4 upset bolts.

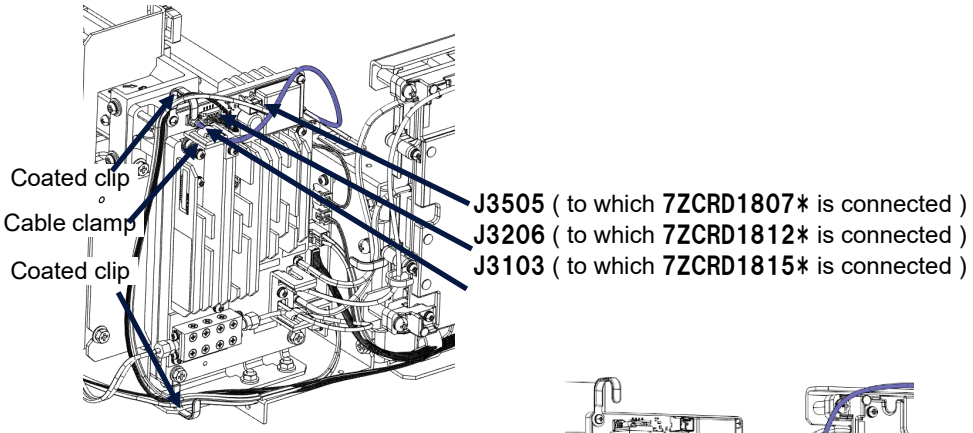
(3) Loosen the three M4 dropout prevention screws and remove the PA circuit CAH-1696



Step 5: Remove the TRX circuit CMN-897.

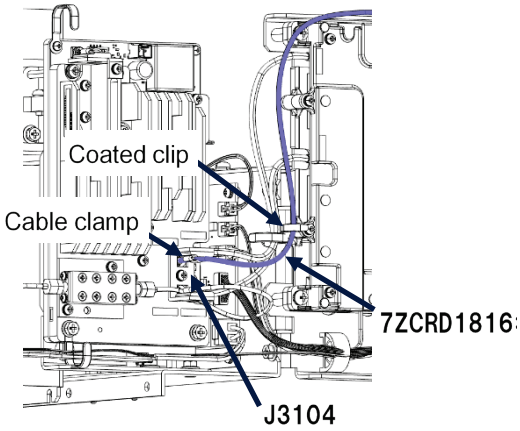
(1) Untie the coated clips and open the cable cramp, and unplug **7ZCRD1815*** from **J3103**, **7ZCRD1812*** from **J3206**, and **7ZCRD1807*** from **J3505**.

> When unplugging the **7ZCRD1815*** from **J3103**, open the cable clamp, then be sure to hold the base of the cable and remove it in the direction perpendicular to the connector.



(2) Untie the coated clip and open the cable cramp and unplug the **7ZCRD1816*** from **J3104**.

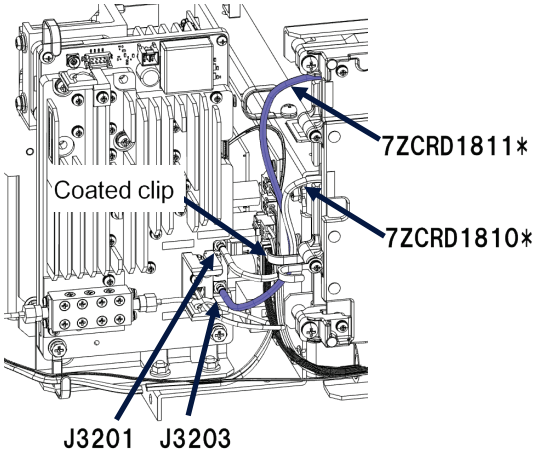
> When unplugging the **7ZCRD1816*** from **J3104**, open the cable clamp, then be sure to hold the base of the cable and remove it in the direction perpendicular to the connector.

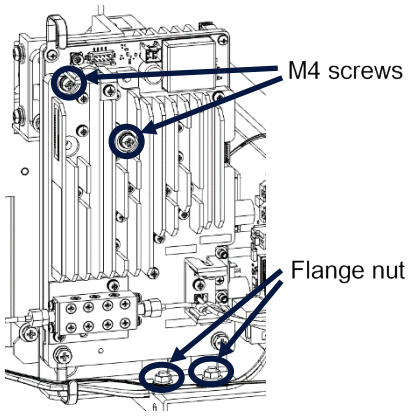


(3) Untie the coated clip and unplug **7ZCRC1810*** from **J3201** and **7ZCRD1811*** from **J3203**.

(4) Loosen the two flange nuts at the bottom of the TRX circuit.

(5) Loosen the two M4 dropout prevention screws on the top of the TRX circuit and remove the TRX circuit.

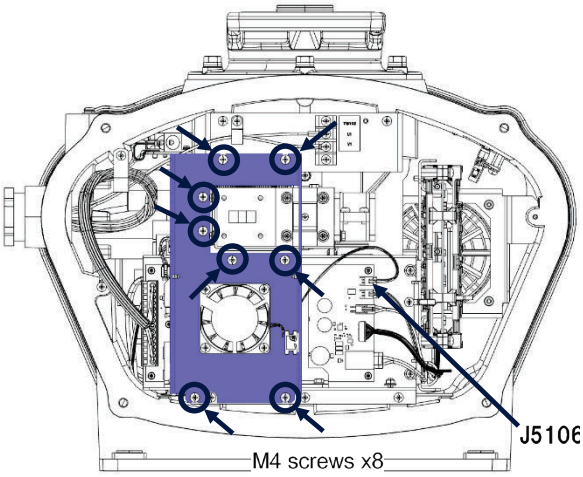




Step 6: Remove the PA mounting plate.

(1) Unplug the PS IF circuit connector **J5106**.

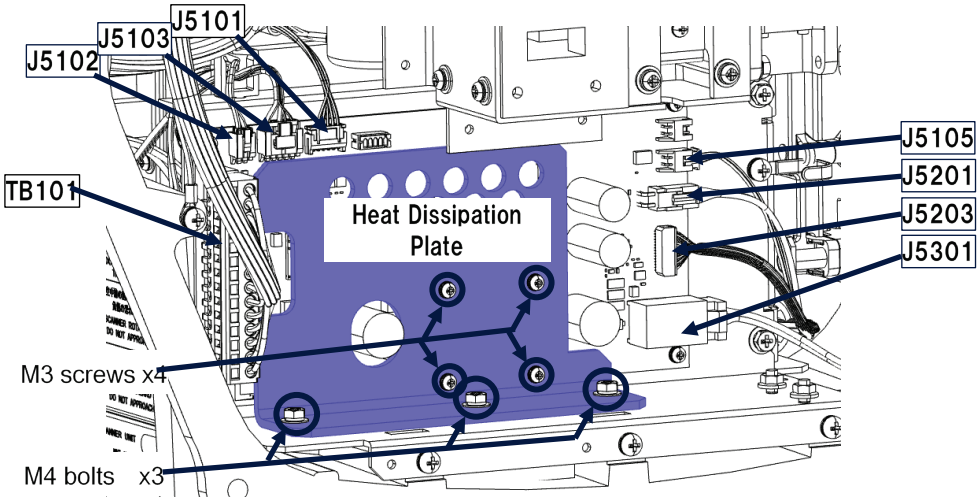
(2) Remove the eight M4 screws and take out the PA mounting plate.



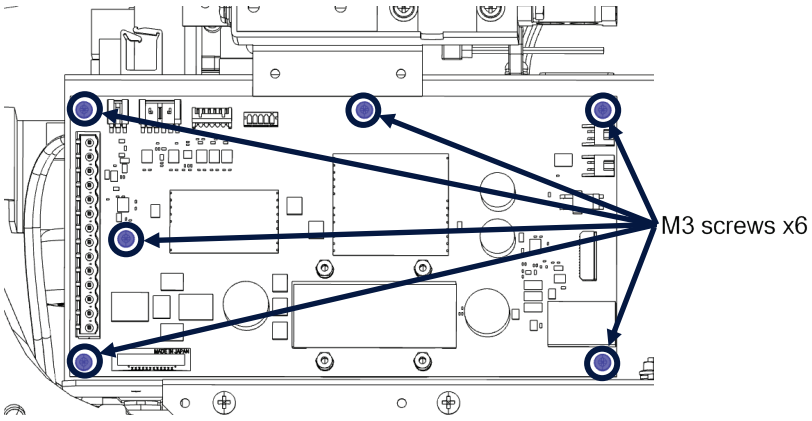
Step 7: Remove the PS IF circuit CMP-503.

(1) Remove the four M3 screws and the three M4 bolts. And remove the Heat Dissipation Plate.

(2) Unplug the PS IF circuit connectors, **TB101**, **J5101**, **J5102**, **J5103**, **J5106**, **J5201**, **J5202** and **5303**.



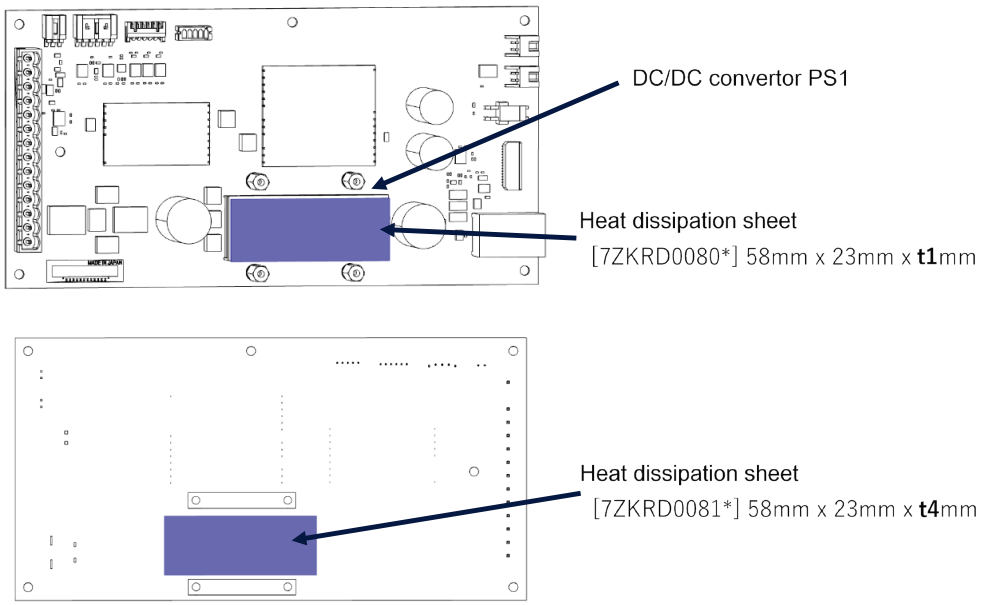
(3) Remove the six M3 screws and remove PS IF circuit.



Step 8: Replace with the new PS IF circuit CMP-503 and connect the cables in the original condition.

Prepare a new PS IF circuit CMP-503 and transplant the heat dissipation sheets. The heat dissipation sheets are attached to the upper surface of the DC / DC converter PS1 in the power supply IF circuit and the back surface of the PS1 board.

After that, reinstall and connect the new PS IF circuit in order of steps 7-(3) to 7-(1).



Step 9: Reinstall the PA mounting plate to its original condition.

Reinstall and connect the PA mounting plate in the order of steps 6-(2) to 6-(1).

Step 10: Reinstall the TRX circuit CMN-897 to its original condition.

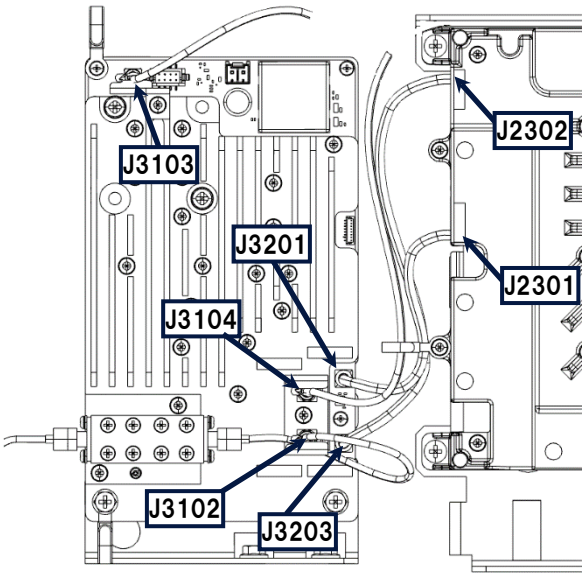
Reinstall and connect the TRX circuit CMN-897 in order of steps 5-(5) to 5-(1)

When tightening the screws, do not fully tighten them from the beginning, but temporarily tighten them once.

※Temporarily tighten the two M4 dropout prevention screws in step 5-(5), and then temporarily tighten the two flange nuts in step 5-(4). After that, fully tighten everything and install it.

J3201 / **7ZCRD1810*** and **J3203** / **7ZCRD1811*** in step 5-(3) are the same connector shape. Be careful not to make a wrong connection.

J3104 / **7ZCRD1816*** in step 5-(2) and **J3103** / **7ZCRD1815*** in step 5-(1) are the same connector shape. Be careful not to make a wrong connection. Also, when connecting, be sure to hold the base of the cable and plug it from the direction perpendicular to the connector.
Also, when connecting, be sure to hold the base of the cable and insert it vertically to the connector.



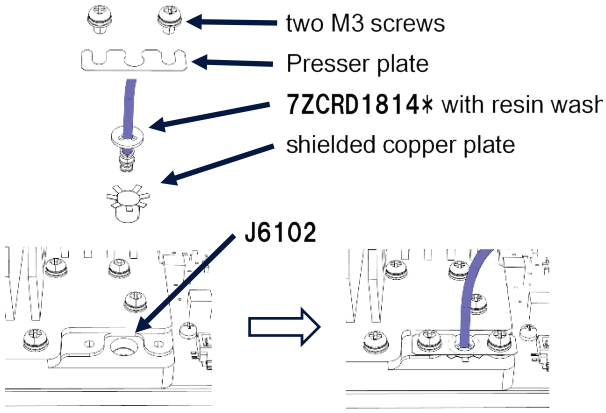
7ZCRD1815*	**J3103**	WG Coax convertor (Center of scanner)
7ZCRD1816*	**J3104**	PM Antenna (Bow side of scanner)
7ZCRD1810*	**J3201**	**J2301**
7ZCRD1811*	**J3203**	**J2302**

Step 11: Reinstall the PA circuit CAH-1696 to its original condition.

Reinstall and connect the PA circuit CAH-1696 in order of steps 4-(3) to 4-1(1)

When tightening the screws and bolts, do not fully tighten them from the beginning, but temporarily tighten them once.
※Temporarily tighten the three M4 screws in step 4-(3), and then temporarily tighten the two M4 bolts in step 4-(2). After that, fully tighten everything and install it.

When connecting the **7ZCRD1814*** to the **J6102**, make sure that a resin washer is attached to the cable side, hold the base of the cable, and insert it vertically into the connector. After connection, fix the resin washer with the presser plate and two M3 screws so that the retaining washer can be pressed.
In addition, **J6102** contains a shielded copper plate. Be sure to put it in without discarding it.



Step 12: Tighten the starboard side cover.

Step 13: Operation check.

Turn on the safety switch and check the following operation.
After turning on the radar power, set to transmit it and check that the normal radar image is displayed.

4.1.9.4 Radar Processor Unit (NDC-4921) Replacement/NKE-1696

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2,#3	
2	Open-end wrench	Width across flats 13mm (for M8 screws) *1 Width across flats 7mm (for M4 screws)	
3	Socket wrench	Width across flats 13mm (for M8 screws) *1	

*1 Either the wrench (adjustable wrench) or socket wrench is mandatory. (mounting/removing the cover, etc.)

⚠ Before beginning work, turn Off the safety switch of the radar antenna.

⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

Step 1: Backup the scanner unit data.

Before starting replacement work, open the service engineer menu on the display unit and back up the scanner unit data (transmission time and motor rotation time).

Step 2: Turn off the radar.

Before starting work, make sure that all radars (or all if multiple radars are equipped) are turned off. It is also recommended to turn off the circuit breaker of the main power supply for safety.

Step 3: Turn off the antenna safety switch.

The safety switch is located on the bottom of the stern side of the scanner unit.

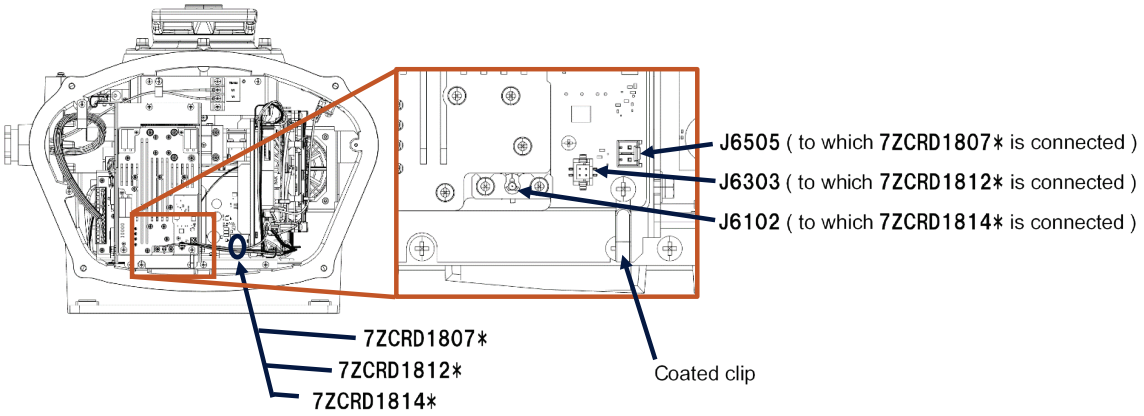
Step 4: Remove the port side and starboard side cover.

Loosen the four dropout prevention hex bolts (M8) on the port side and starboard side of the scanner unit and remove the cover.

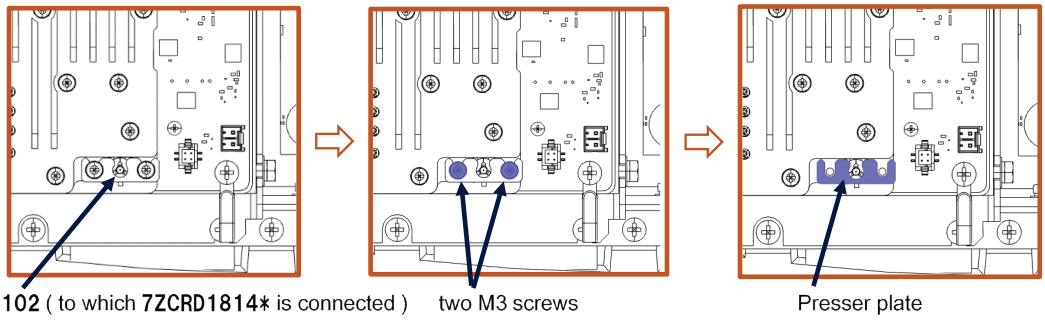
❗ Place the removed cover in a safe place. Also, be careful not to allow dust to adhere to the packing.

Step 5: Unplug the cable 7ZCRD1814* from the connector J6102 at PA circuit.

Untie the coated clip that holds the cables **7ZCRD1807***, **7ZCRD1812*** and **7ZCRD1814*** together. And then, unplug these cables from the connector **J6505**, **J6303** and **J6102**.



To remove the **7ZCRD1814*** from the **J6102**, it is necessary to remove the two M3 screws and remove the presser plate.

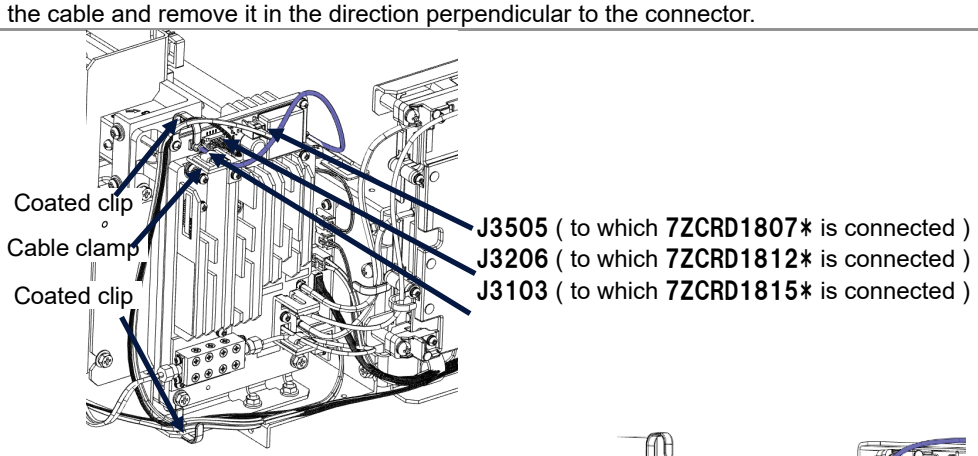


When removing the **7ZCRD1814*** from **J6102**, be sure to hold the base of the cable and remove it in the direction perpendicular to the connector.

Step 6: Remove the TRX circuit CMN-897.

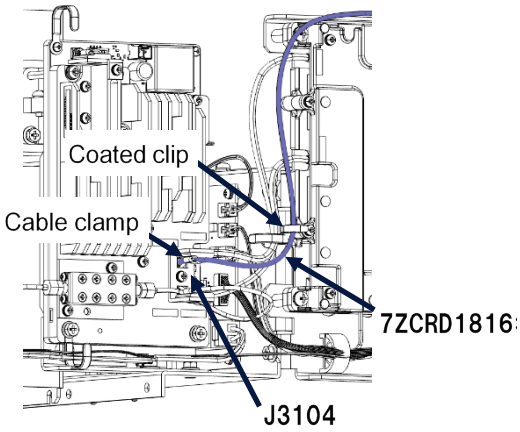
(1) Untie the coated clips and open the cable cramp, and unplug **7ZCRD1815*** from **J3103**, **7ZCRD1812*** from **J3206**, and **7ZCRD1807*** from **J3505**.

> When unplugging the **7ZCRD1815*** from **J3103**, open the cable clamp, then be sure to hold the base of the cable and remove it in the direction perpendicular to the connector.



(2) Untie the coated clip and open the cable cramp and unplug the **7ZCRD1816*** from **J3104**.

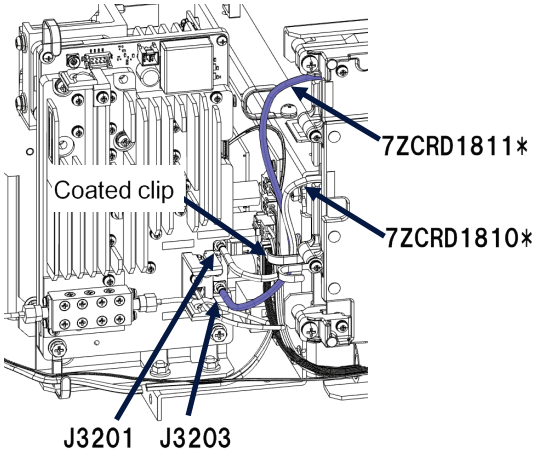
> When unplugging the **7ZCRD1816*** from **J3104**, open the cable clamp, then be sure to hold the base of the cable and remove it in the direction perpendicular to the connector.

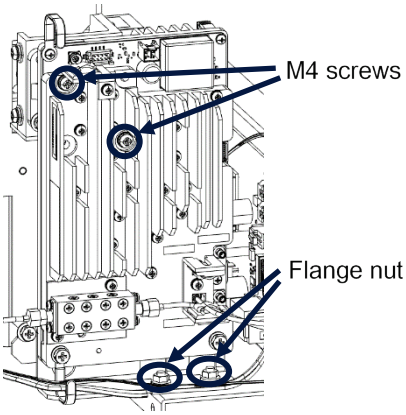


(3) Untie the coated clip and unplug **7ZCRC1810*** from **J3201** and **7ZCRD1811*** from **J3203**.

(4) Loosen the two flange nuts at the bottom of the TRX circuit.

(5) Loosen the two M4 dropout prevention screws on the top of the TRX circuit and remove the TRX circuit.



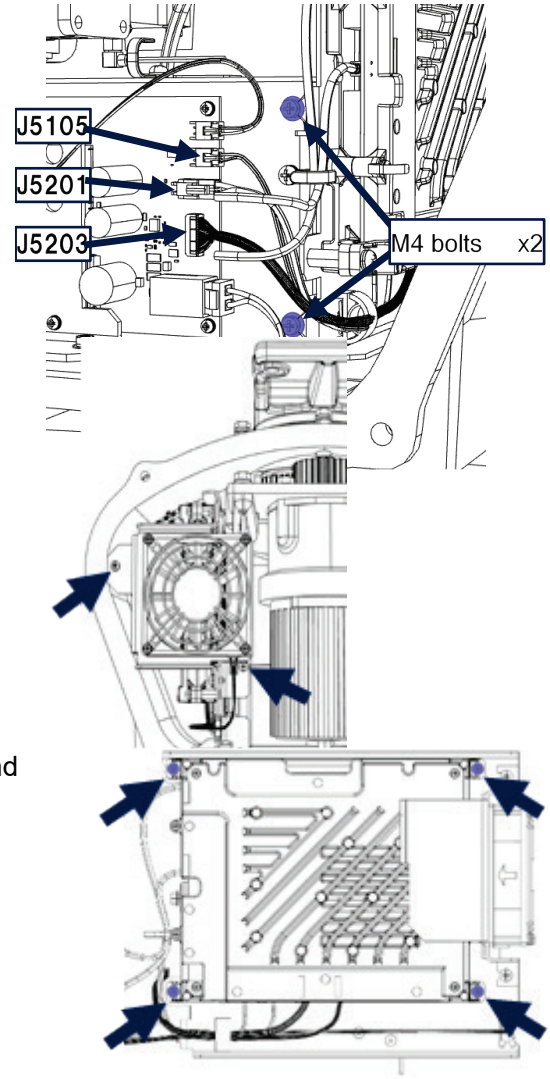


Step 7: Remove the signal processing unit NDC-4921.

[Starboard side]

(1) Unplug the PS IF circuit connectors **J5105**, **J5201**, and **J5203**.

(2) Loosen the two M4 upset bolts.



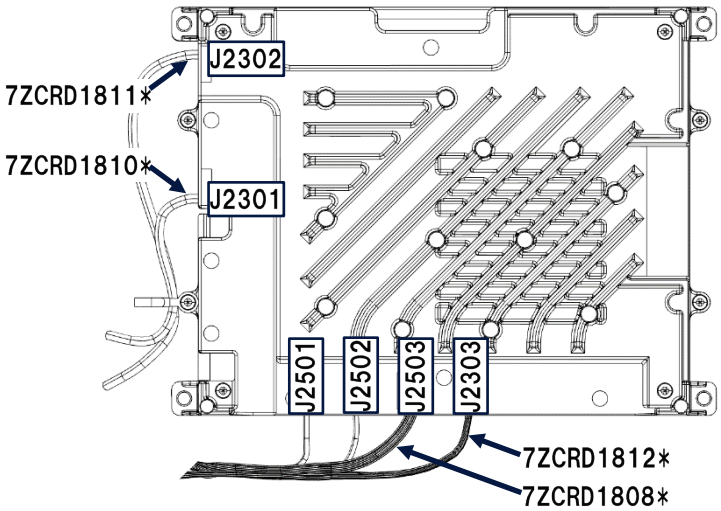
[Port side]

(3) Remove the three M4 screws

(4) Pull out the signal processing unit together with the fixing plate, remove the four M4 screws, and take out it.the signal processing unit.

Step 8: Replace with the new signal processing unit NDC-4921and connect the cables in its original condition.

(1) Remove the four cables from the removed unit and connect them to the following connectors of the new unit. Connect **7ZCRD1810∗** to **J2301**, **7ZCRD1811*** to **J2302**, **7ZCRD1812∗** to **J2303**, and **7ZCRD1808∗** to **J2503**.



(2) Install and connect the signal processing unit in the order of steps 7-(4) to 7-(1).

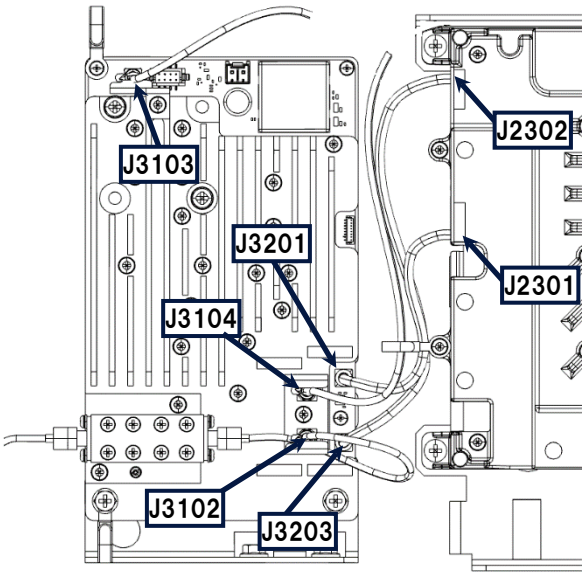
Step 9: Reinstall the TRX circuit to its original condition.

Install and connect the TRX circuit in the order of steps 6- (5) to 6- (1) and step 5.

> When tightening the screws, do not fully tighten them from the beginning, but temporarily tighten them once.
>
> ※Temporarily tighten the two M4 dropout prevention screws in step 6-(5), and then temporarily tighten the two flange nuts in step 6-(4). After that, fully tighten everything and install it.

J3201 / **7ZCRD1810*** and **J3203** / **7ZCRD1811*** in step 6-(3) are the same connector shape. Be careful not to make a wrong connection.

J3104 / **7ZCRD1816*** in step 6-(2) and **J3103** / **7ZCRD1815*** in step 6-(1) are the same connector shape. Be careful not to make a wrong connection. Also, when connecting, be sure to hold the base of the cable and plug it from the direction perpendicular to the connector.
Also, when connecting, be sure to hold the base of the cable and insert it vertically to the connector.



7ZCRD1815*	**J3103**	WG Coax convertor (Center of scanner)
7ZCRD1816*	**J3104**	PM Antenna (Bow side of scanner)
7ZCRD1810*	**J3201**	**J2301**
7ZCRD1811*	**J3203**	**J2302**

When connecting the **7ZCRD1814*** to the **J6102**, make sure that a resin washer is attached to the cable side, hold the base of the cable, and insert it vertically into the connector. After connection, fix the resin washer with the presser plate and two M3 screws so that the retaining washer can be pressed.
In addition, **J6102** contains a shielded copper plate. Be sure to put it in without discarding it.

Step 10: Tighten the port and starboard side cover.

Step 11: Operation check.

Turn on the safety switch and check the following operation.

(1) Turn on the radar power, open the serviceman menu, restore the antenna time, and check that the data is correctly taken over before and after the replacement of the signal processing unit. (Check the transmission time and motor rotation time.)

(2) Set to transmit it and check that the normal radar image is displayed.

(3) Check the direction and distance of the radar image, and make adjustments if necessary.

(4) Make initial adjustments to the performance monitor.

4.1.9.5 Motor Replacement/NKE-1696

See the section for NKE-1125.

4.1.9.6 Motor Driver Circuit (CBD-2400) Replacement/NKE-1696

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2,#3	
2	Open-end wrench*1	Width across flats 13mm (for M8 screws)	
3	Socket wrench*1	Width across flats 13mm (for M8 screws)	

*1 Either the wrench (adjustable wrench) or socket wrench is mandatory. (mounting/removing the cover, etc.)

⚠ Before beginning work, turn Off the safety switch of the radar antenna.

⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

Step 1: Turn off the radar.

Before starting work, make sure that all radars (or all if multiple radars are equipped) are turned off. It is also recommended to turn off the circuit breaker of the main power supply for safety.

Step 2: Turn off the antenna safety switch.

The safety switch is located on the bottom of the stern side of the scanner unit.

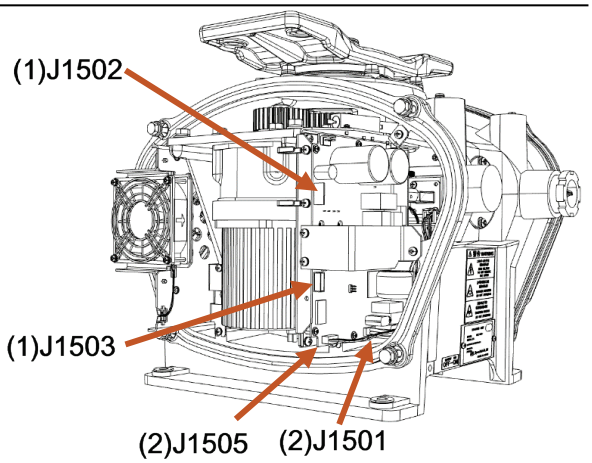
Step 3: Remove the port side cover.

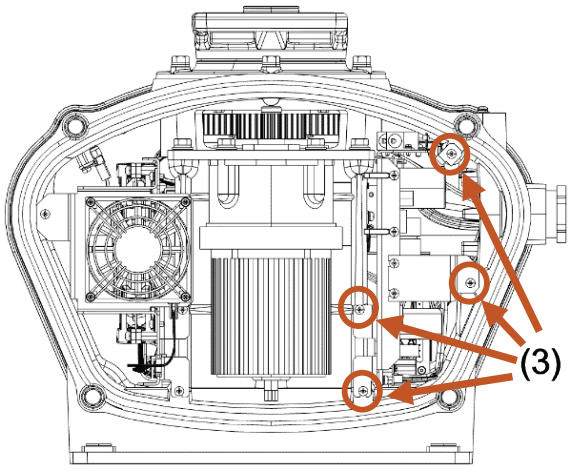
Loosen the four dropout prevention hex bolts (M8) on the port sides of the scanner unit and remove the cover.

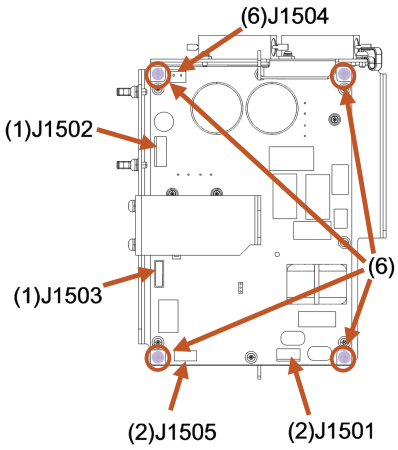
❗	Place the removed cover in a safe place. Also, be careful not to allow dust to adhere to the packing.

Step 4: Remove the motor driver circuit CBD-2400

(1) Unplug the two motor cables from the connectors J1502 and J1503.
(2) Unplug the cable 7ZCRD1817* from the connector J1505.
(3) Remove the four M4 screws.
(4) Lightly pull out the motor driver circuit together with the baseplate, and unplug the cable 7ZCRD1805* from the connector J1501.
(5) Remove the motor driver curcuit with the baseplate from the scanner unit.
(6) Remove the four M4 screws, and unplug the cable 7ZCRD1314* from the connector J1504.

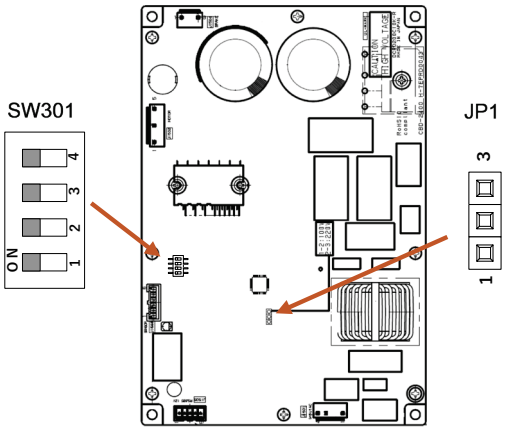






Step 5: Replace with the new motor driver circuit CBD-2400 and connect the cables in its original condition.

(1) Prepare a new motor driver circuit and set all SW301 to ON.
Also, set JP1 to a short circuit between 1-2 when the power supply is AC100-115V, and set JP1 to a short circuit between 2-3 when the power supply is AC220-240V.
(2) Follow steps 4-(6) to 4-1(1) in that order to install the motor driver circuit.



Step 6: Tighten the port side cover.

Step 7: Operation check.

Turn on the safety switch and check the following operation.

After turning on the radar power, set to transmit it and check that the normal radar image is displayed.

4.1.9.7 Encoder (CHT-85A) Replacement/NKE-1696

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2,#3	
2	Open-end wrench*1	Width across flats 13mm (for M8 screws) Width across flats 10mm (for M6 screws) Width across flats 7mm (for M4 screws)	
3	Socket wrench*1	Width across flats 13mm (for M8 screws) Width across flats 10mm (for M6 screws) Width across flats 7mm (for M4 screws)	

*1 Either the wrench (adjustable wrench) or socket wrench is mandatory. (mounting/removing the cover, etc.)

⚠ Before beginning work, turn Off the safety switch of the radar antenna.

⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

Step 1: Turn off the radar.

Before starting work, make sure that all radars (or all if multiple radars are equipped) are turned off. It is also recommended to turn off the circuit breaker of the main power supply for safety.

Step 2: Turn off the antenna safety switch.

The safety switch is located on the bottom of the stern side of the scanner unit.

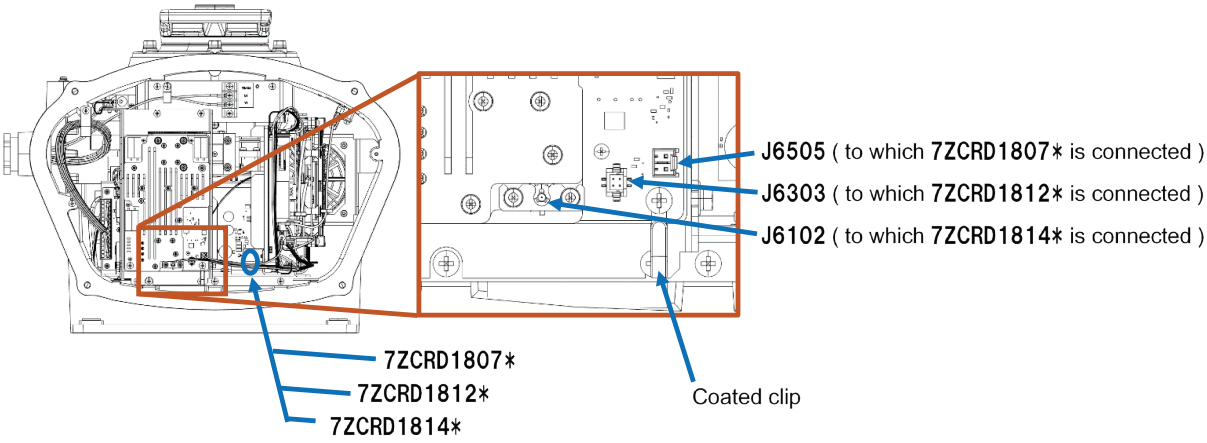
Step 3: Remove the starboard side cover.

Loosen the four dropout prevention hex bolts (M8) on the starboard sides of the scanner unit and remove the cover.

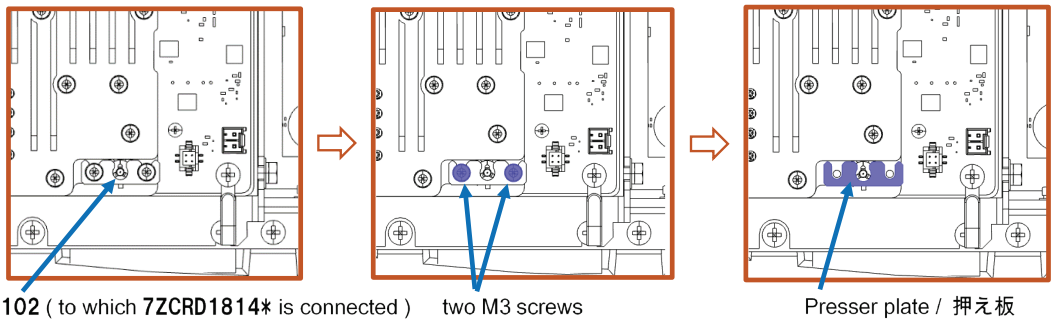
> Place the removed cover in a safe place.
> Also, be careful not to allow dust to adhere to the packing.

Step 4: Remove the PA circuit CAH-1696.

(1) Untie the coated clip that holds the cables **7ZCRD1807*****, **7ZCRD1812*** and **7ZCRD1814*** together. And then, unplug these cables from the connector **J6505**, **J6303** and **J6102**.



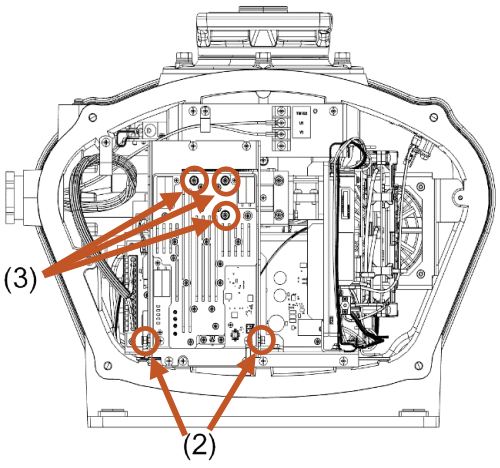
> To remove the **7ZCRD1814*** from the **J6102**, it is necessary to remove the two M3 screws and remove the presser plate.



> When removing the **7ZCRD1814*** from **J6102**, be sure to hold the base of the cable and remove it in the direction perpendicular to the connector.

(2) Loosen the two M4 upset bolts.

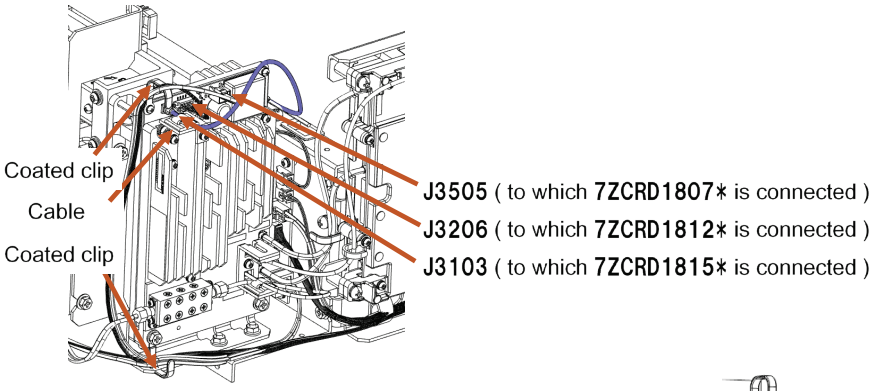
(3) Loosen the three M4 dropout prevention screws and remove the PA circuit CAH-1696



Step 5: Remove the TRX circuit CMN-897.

(1) Untie the coated clips and open the cable cramp, and unplug **7ZCRD1815*** from **J3103**, **7ZCRD1812*** from **J3206**, and **7ZCRD1807*** from **J3505**.

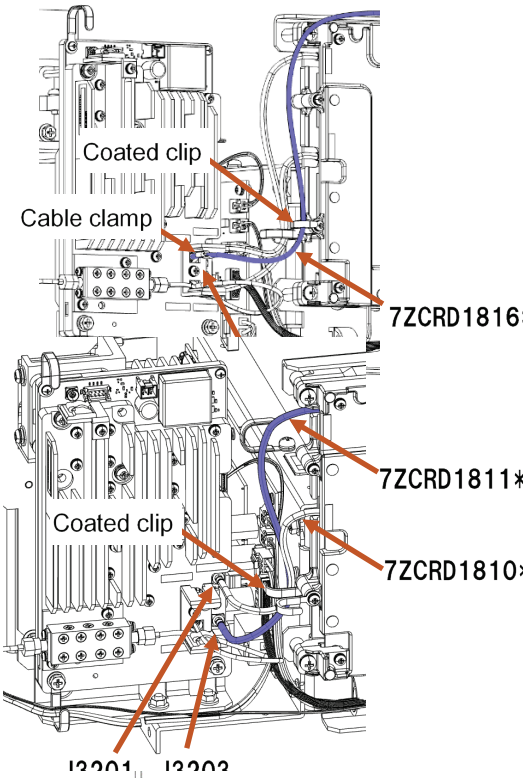
> When unplugging the **7ZCRD1815*** from **J3103**, open the cable clamp, then be sure to hold the base of the cable and remove it in the direction perpendicular to the connector.



(2) Untie the coated clip and open the cable cramp and unplug the **7ZCRD1816*** from **J3104**.

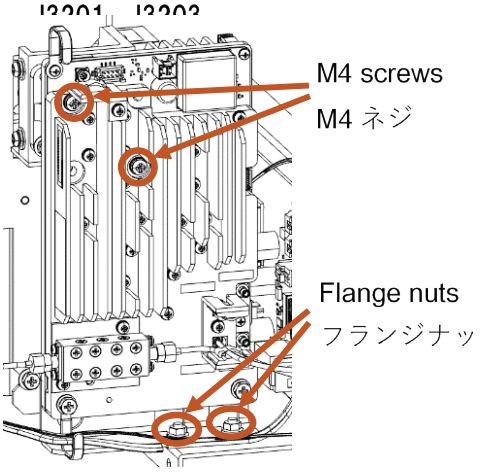
> When unplugging the **7ZCRD1816*** from **J3104**, open the cable clamp, then be sure to hold the base of the cable and remove it in the direction perpendicular to the connector.

(3) Untie the coated clip and unplug **7ZCRC1810*** from **J3201** and **7ZCRD1811*** from **J3203**.



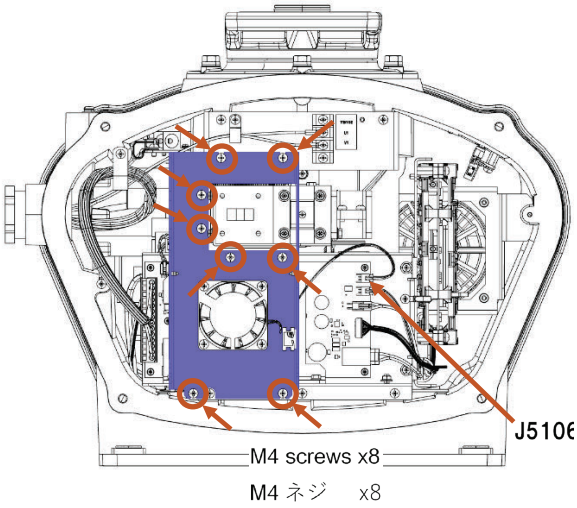
(4) Loosen the two flange nuts at the bottom of the TRX circuit.

(5) Loosen the two M4 dropout prevention screws on the top of the TRX circuit and remove the TRX circuit CMN-897.



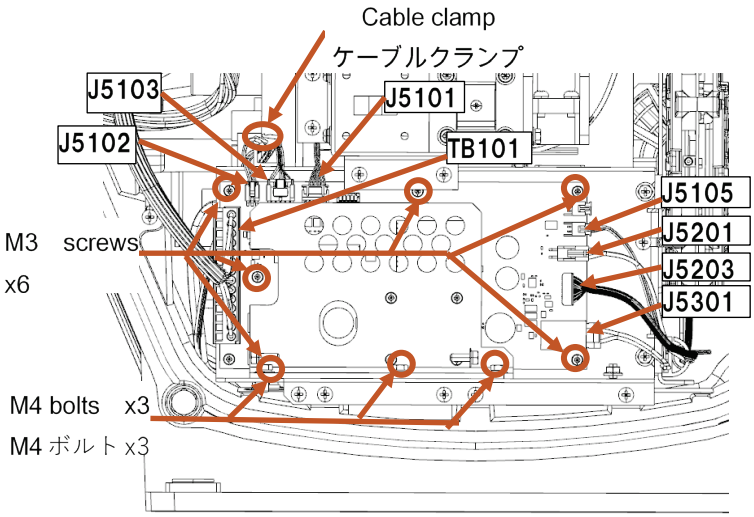
Step 6: Remove the PA mounting plate.

(1) Unplug the PS IF circuit connector **J5106**.
(2) Remove the eight M4 screws and take out the PA mounting plate.



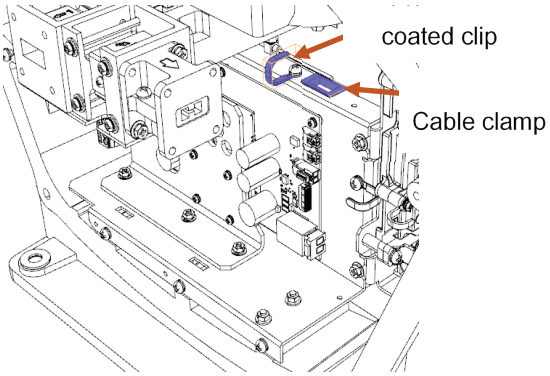
Step 7: Remove the PS IF circuit CMP-503.

(1) Open the cable cramp and unplug the PS IF circuit connectors, **TB101**, **J5101**, **J5102**, **J5103**, **J5106**, **J5201**, **J5202** and **5303**.
(2) Remove the six M3 screws and the three M4 bolts.
(3) Remove the PS IF circuit CMP-503

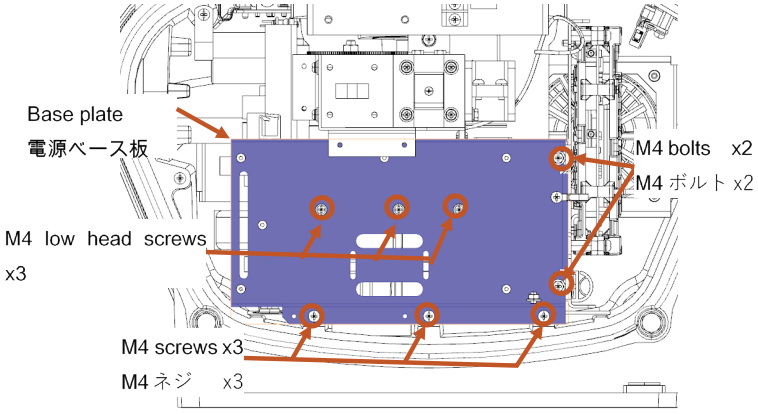


Step 8: Remove the base plate.

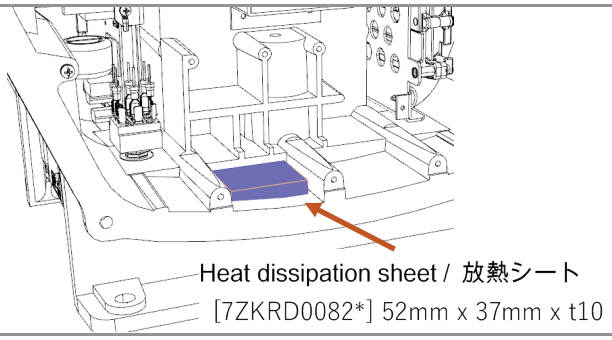
(1) Loosen the coated clip from 7ZCRD1815*.
(2) Open the cable cramp from 7ZCRD1804*.



(3) Remove the three M4 screws,the two M4 bolts and the three M4 low head screws.
(4) Remove the base plate.

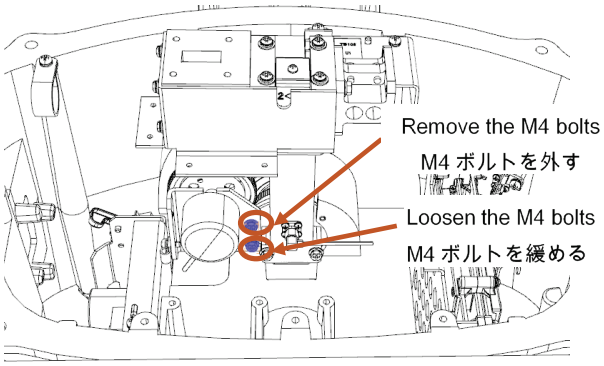


Place the Heat dissipation sheet in a safe place.
Also, be careful not to allow dust to adhere to Heat dissipation sheet .

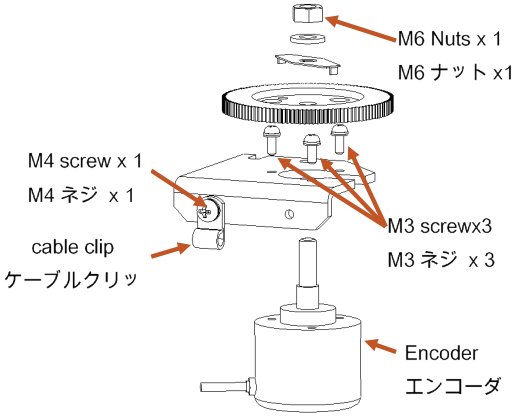


Step 9: Remove encoder CHT-85A.

(1) Remove the outer M4 bolts and loosen the inner M4 bolts.
(2) Remove the encoder.



(3) Disconnect the encoder cable from the cable clip, remove the M6 nut and three M3 screws.

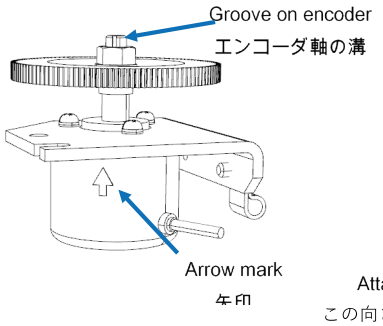


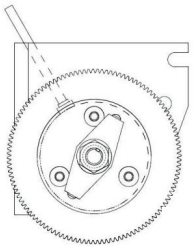
Step 10: Reinstall the encoder CHT-85A to its original condition.

Prepare a new encoder and replace the encoder. reinstall and connect the new encoder in order of steps 9-(3) to 9-(1).

Manually rotate the radar antenna so that the front of the antenna with the sticker is facing the bow.

The arrow mark on the body with the direction of the groove on the shaft.
* Use the hexagonal M6 nut that is provided in the accessories.





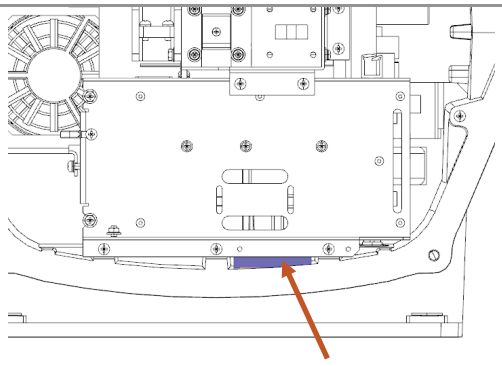
Attach the encoder to the fixing bracket in this orientation
この向きでエンコーダを固定ブラケットに取り付けてください。

Wrap the encorder cable 3 times so that its diameter is approximately 4 cm, and clip the outer 2 turns.

Step 11: Reinstall base plate to its original condition.

Reinstall base plate in the order of steps 8-(4) to 8-(1)

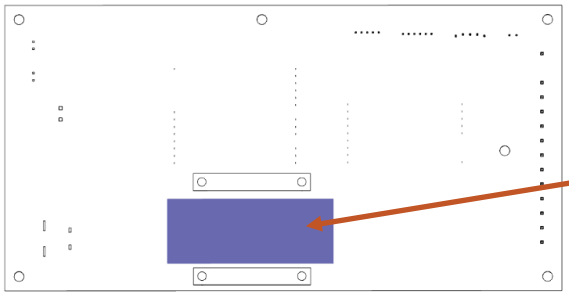
Base plate is installed in close contact with the heat dissipation sheet.



Heat dissipation sheet / 放熱シート
[7ZKRD0082*] 52mm x 37mm x t10

Step 12: PS IF circuit CMP-503 and connect the cables in the original condition.

The heat dissipation sheet is attached to the back of the board of the DC/DC converter PS1 in the power IF circuit. After that, reinstall and connect the PS IF circuit in order of steps 7-(3) to 7-(1).



Heat dissipation sheet / 放熱シート
[7ZKRD0081*] 58mm x 23mm x t4mm

Step 13: Reinstall the PA mounting plate to its original condition.

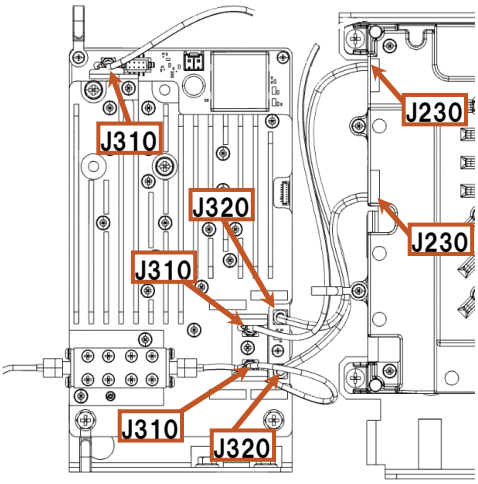
Reinstall and connect the PA mounting plate in the order of steps 6-(2) to 6-(1).

Step 14: Reinstall the TRX circuit CMN-897 to its original condition.

Reinstall and connect the TRX circuit CMN-897 in order of steps 5-(5) to 5-(1)

- When tightening the screws, do not fully tighten them from the beginning, but temporarily tighten them once.
  ※Temporarily tighten the two M4 dropout prevention screws in step 5-(5), and then temporarily tighten the two flange nuts in step 5-(4). After that, fully tighten everything and install it.

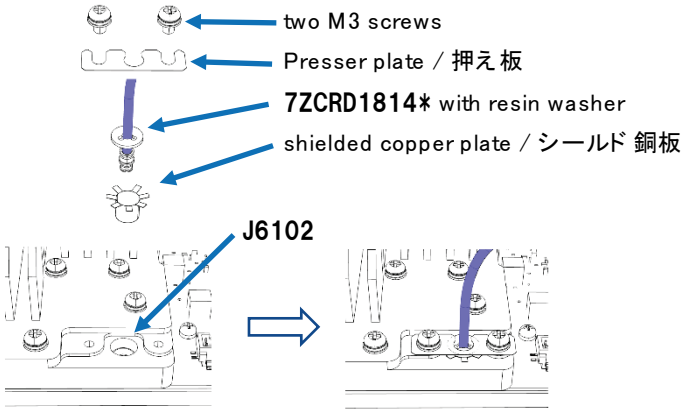
- **J3201** / **7ZCRD1810*** and **J3203** / **7ZCRD1811*** in step 5-(3) are the same connector shape. Be careful not to make a wrong connection.
- **J3104** / **7ZCRD1816*** in step 5-(2) and **J3103** / **7ZCRD1815*** in step 5-(1) are the same connector shape. Be careful not to make a wrong connection. Also, when connecting, be sure to hold the base of the cable and plug it from the direction perpendicular to the connector.
  Also, when connecting, be sure to hold the base of the cable and insert it vertically to the connector.



7ZCRD1815*	J3103	WG Coax convertor (Center of scanner)
7ZCRD1816*	J3104	PM Antenna (Bow side of scanner)
7ZCRD1810*	J3201	J2301
7ZCRD1811*	J3203	J2302

Step 15: Reinstall the PA circuit CAH-1696 to its original condition.

Reinstall and connect the PA circuit CAH-1696 in order of steps 4-(3) to 4-1(1)

When tightening the screws and bolts, do not fully tighten them from the beginning, but temporarily tighten them once. ※Temporarily tighten the three M4 screws in step 4-(3), and then temporarily tighten the two M4 bolts in step 4-(2). After that, fully tighten everything and install it.
When connecting the **7ZCRD1814*** to the **J6102**, make sure that a resin washer is attached to the cable side, hold the base of the cable, and insert it vertically into the connector. After connection, fix the resin washer with the presser plate and two M3 screws so that the retaining washer can be pressed. In addition, **J6102** contains a shielded copper plate. Be sure to put it in without discarding it. 

Step 16: Tighten the starboard side cover.

Step 17: Operation check.

Turn on the safety switch and check the following operation.

After turning on the radar power, set to transmit it and check that the normal radar image is displayed.

4.1.9.8 Fan for Processor Replacement/NKE-1696

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2,#3	
2	Open-end wrench	Width across flats 13mm (for M8 screws) *1 Width across flats 7mm (for M4 screws)	
3	Socket wrench	Width across flats 13mm (for M8 screws) *1	

*1 Either the wrench (adjustable wrench) or socket wrench is mandatory. (mounting/removing the cover, etc.)

⚠ Before beginning work, turn Off the safety switch of the radar antenna.

⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

Step 1: Turn off the radar.

Before starting work, make sure that all radars (or all if multiple radars are equipped) are turned off. It is also recommended to turn off the circuit breaker of the main power supply for safety.

Step 2: Turn off the antenna safety switch.

The safety switch is located on the bottom of the stern side of the scanner unit.

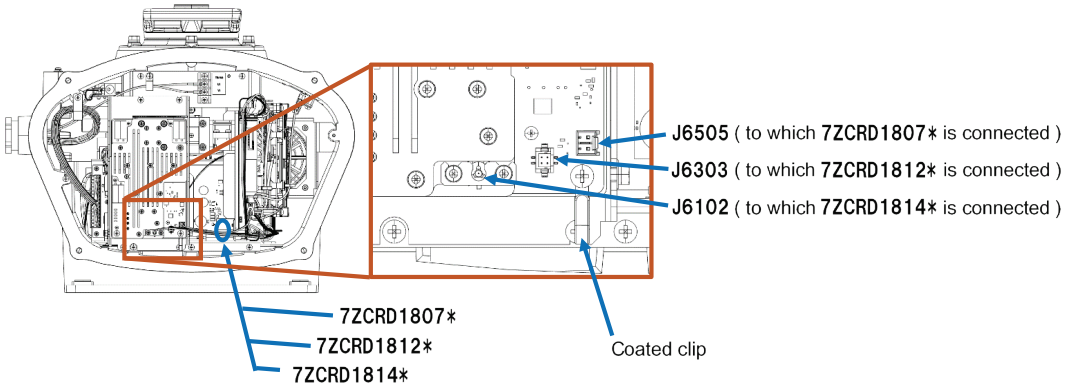
Step 3: Remove the port and starboard side covers.

Loosen the four dropout prevention hex bolts (M8) on the port and starboard sides of the scanner unit and remove the covers.

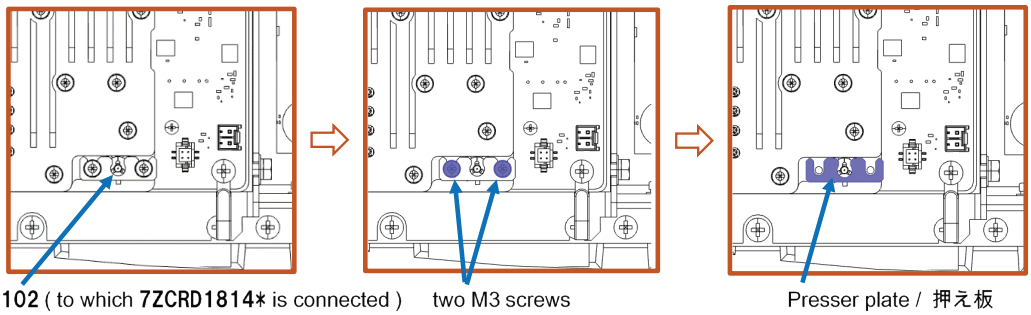
❗ Place the removed cover in a safe place.
Also, be careful not to allow dust to adhere to the packing.

Step 4: Unplug the cable 7ZCRD1814* from the connector J6102 at PA circuit.

Untie the coated clip that holds the cables **7ZCRD1807***, **7ZCRD1812*** and **7ZCRD1814*** together. And then, unplug these cables from the connector **J6505**, **J6303** and **J6102**.



To remove the **7ZCRD1814*** from the **J6102**, it is necessary to remove the two M3 screws and remove the presser plate.

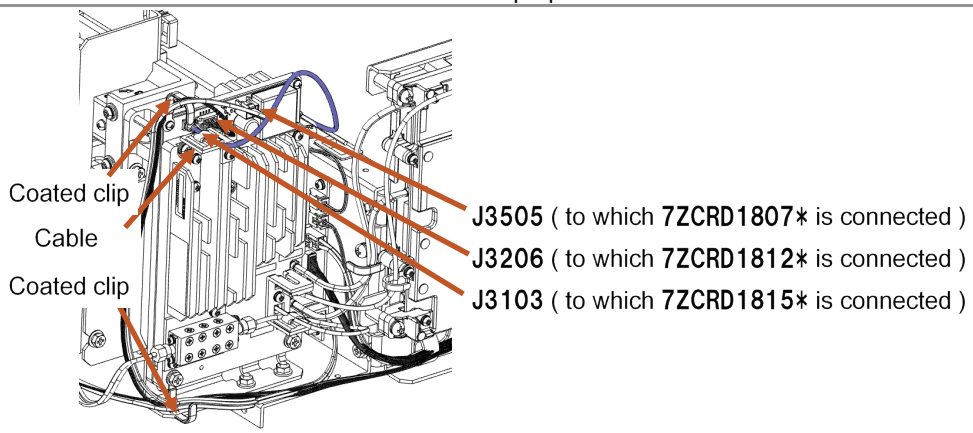


When removing the **7ZCRD1814*** from **J6102**, be sure to hold the base of the cable and remove it in the direction perpendicular to the connector.

Step 5: Remove the TRX circuit CMN-897.

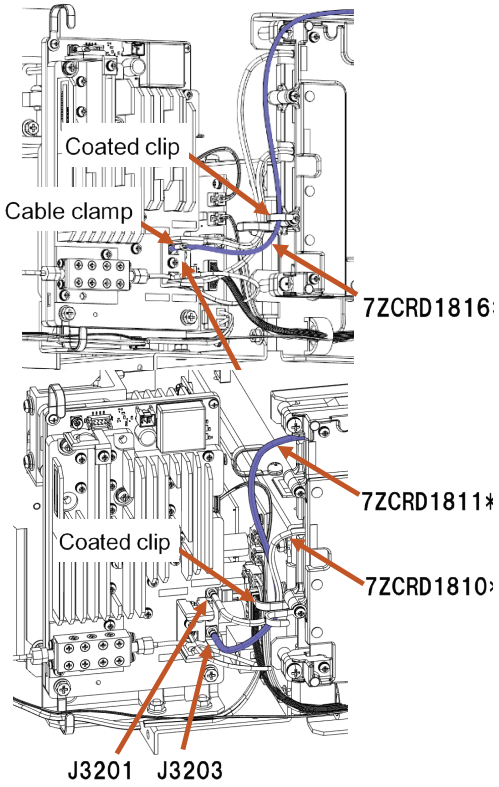
(1) Untie the coated clips and open the cable cramp, and unplug **7ZCRD1815*** from **J3103**, **7ZCRD1812*** from **J3206**, and **7ZCRD1807*** from **J3505**.

> ! When unplugging the **7ZCRD1815*** from **J3103**, open the cable clamp, then be sure to hold the base of the cable and remove it in the direction perpendicular to the connector.



(2) Untie the coated clip and open the cable cramp and unplug the **7ZCRD1816*** from **J3104**.

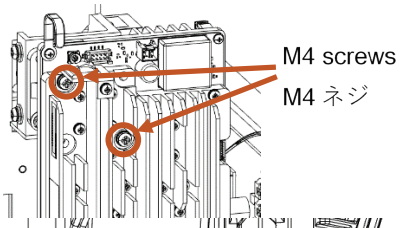
> ! When unplugging the **7ZCRD1816*** from **J3104**, open the cable clamp, then be sure to hold the base of the cable and remove it in the direction perpendicular to the connector.



(3) Untie the coated clip and unplug **7ZCRC1810*** from **J3201** and **7ZCRD1811*** from **J3203**.

(4) Loosen the two flange nuts at the bottom of the TRX circuit.

(5) Loosen the two M4 dropout prevention screws on the top of the TRX circuit and remove the TRX circuit CMN-897.

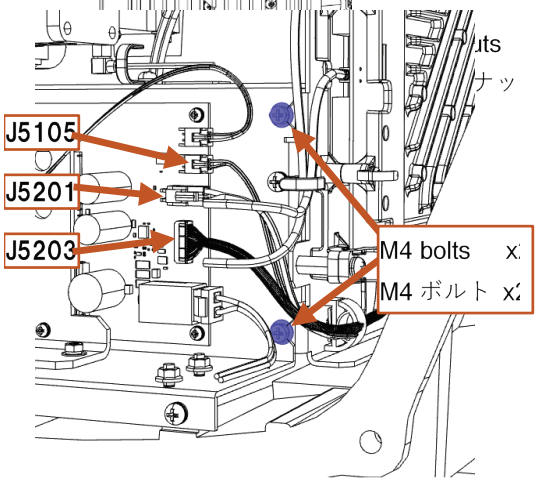


Step 6: Remove the signal processing unit NDC-4921.

[Starboard side]

(1) Unplug the PS IF circuit connectors **J5105**, **J5201**, and **J5203**.

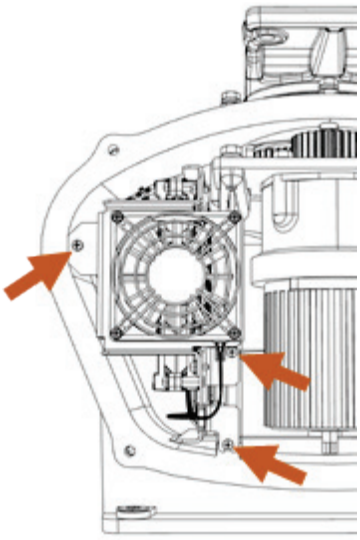
(2) Loosen the two M4 upset bolts.



[Port side]

(3) Remove the three M4 screws

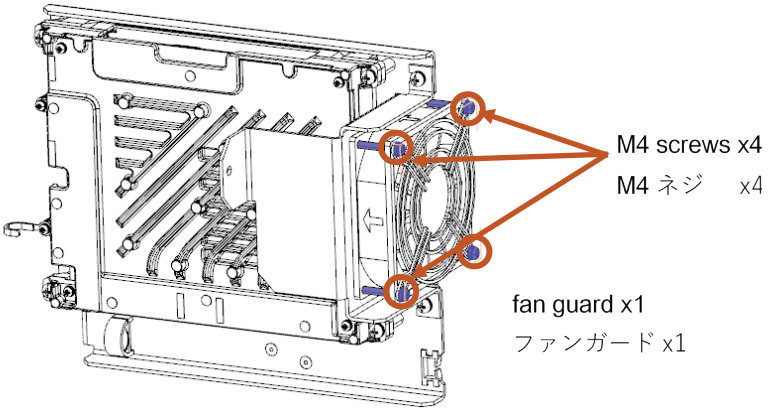
(4) Pull out the signal processing unit together with the fixing plate



Step 7: Replace with the new 90 mm fan and connect the cables in its original condition.

(1)Remove the four M4 screws and remove the 90mm fan and fan guard.

(2) Install the new 90 mm fan.



> Pay attention to the airflow direction of the fan.
> Install the fan with the arrow indication pointing toward the processing unit.

Step 8: Reinstall the processing unit NDC-4921 to its original condition.

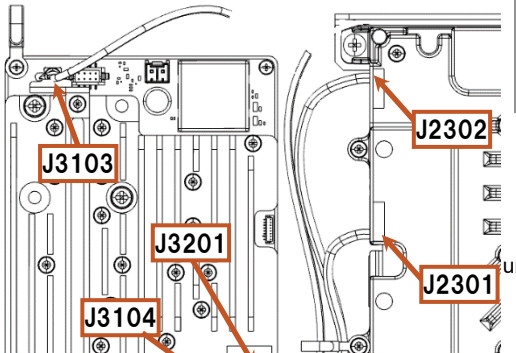
Install and connect the signal processing unit in the order of steps 6-(4) to 6-(1).

Step 9: Reinstall the TRX circuit to its original condition.

Install and connect the TRX circuit in the order of steps 5- (5) to 5- (1) and step 4.

> When tightening the screws, do not fully tighten them from the beginning, but temporarily tighten them once.
> ※Temporarily tighten the two M4 dropout prevention screws in step 5-(5), and then temporarily tighten the two flange nuts in step 5-(4). After that, fully tighten everything and install it.

> **J3201 / 7ZCRD1810∗** and **J3203 / 7ZCRD1811∗** in step 5-(3) are the same connector shape. Be careful not to make a wrong connection.

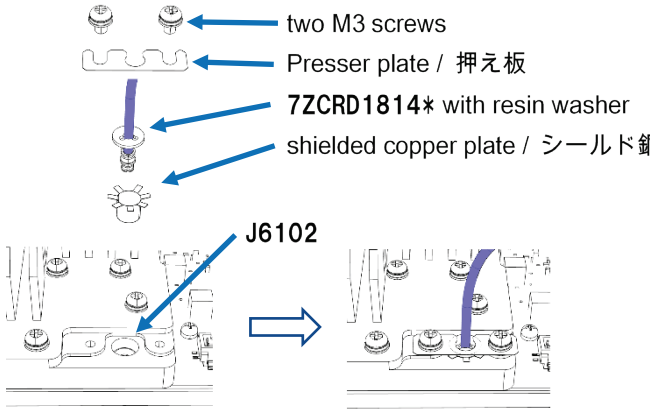


ure

J3104 / **7ZCRD1816∗** in step 5-(2) and **J3103** / **7ZCRD1815∗** in step 5-(1) are the same connector shape. Be careful not to make a wrong connection. Also, when connecting, be sure to hold the base of the cable and plug it from the direction perpendicular to the connector.
Also, when connecting, be sure to hold the base of the cable and insert it vertically to the connector.

7ZCRD1815∗	**J3103**	WG Coax convertor (Center of scanner)
7ZCRD1816∗	**J3104**	PM Antenna (Bow side of scanner)
7ZCRD1810∗	**J3201**	**J2301**
7ZCRD1811∗	**J3203**	**J2302**

When connecting the **7ZCRD1814∗** to the **J6102**, make sure that a resin washer is attached to the cable side, hold the base of the cable, and insert it vertically into the connector. After connection, fix the resin washer with the presser plate and two M3 screws so that the retaining washer can be pressed.
In addition, **J6102** contains a shielded copper plate. Be sure to put it in without discarding it.



Step 10: Tighten the port and starboard side cover.

Step 11: Operation check.

Turn on the safety switch and check the following operation.
After turning on the radar power, set to transmit it and check that the normal radar image is displayed.

4.1.9.9 Fan for Amplifier Replacement/NKE-1696

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2,#3	
2	Open-end wrench*1	Width across flats 13mm (for M8 screws) Width across flats 7mm (for M4 screws)	
3	Socket wrench*1	Width across flats 13mm (for M8 screws) Width across flats 7mm (for M4 screws)	

*1 Either the wrench (adjustable wrench) or socket wrench is mandatory. (mounting/removing the cover, etc.)

⚠ Before beginning work, turn Off the safety switch of the radar antenna.

⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

Step 1: Turn off the radar.

Before starting work, make sure that all radars (or all if multiple radars are equipped) are turned off. It is also recommended to turn off the circuit breaker of the main power supply for safety.

Step 2: Turn off the antenna safety switch.

The safety switch is located on the bottom of the stern side of the scanner unit.

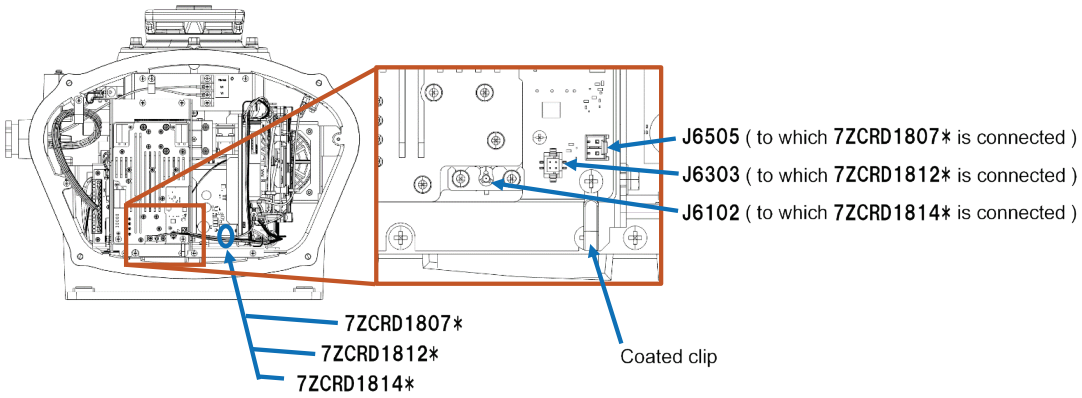
Step 3: Remove the starboard side cover.

Loosen the four dropout prevention hex bolts (M8) on the starboard sides of the scanner unit and remove the cover.

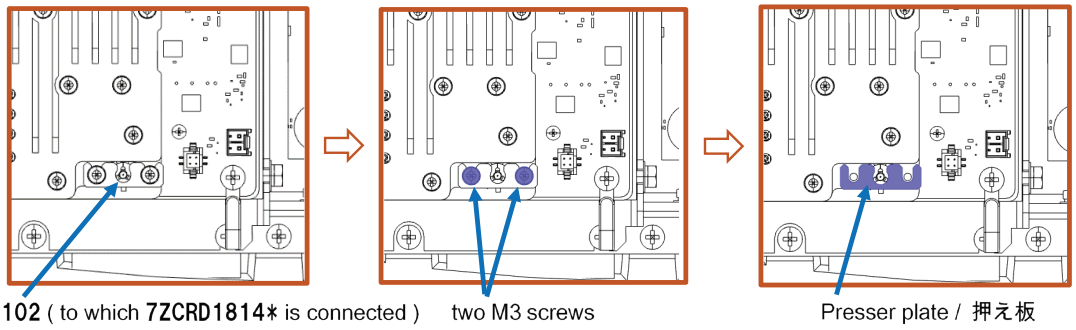
❗ Place the removed cover in a safe place.
Also, be careful not to allow dust to adhere to the packing.

Step 4: Remove the PA circuit CAH-1696.

(1) Untie the coated clip that holds the cables **7ZCRD1807∗**, **7ZCRD1812∗** and **7ZCRD1814∗** together. And then, unplug these cables from the connector **J6505**, **J6303** and **J6102**.



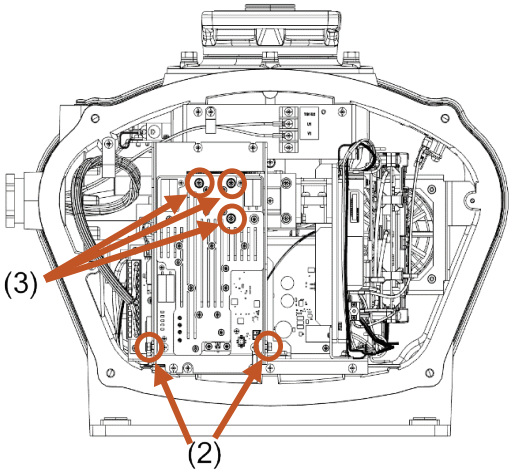
To remove the **7ZCRD1814∗** from the **J6102**, it is necessary to remove the two M3 screws and remove the presser plate.



When removing the **7ZCRD1814∗** from **J6102**, be sure to hold the base of the cable and remove it in the direction perpendicular to the connector.

(2) Loosen the two M4 upset bolts.

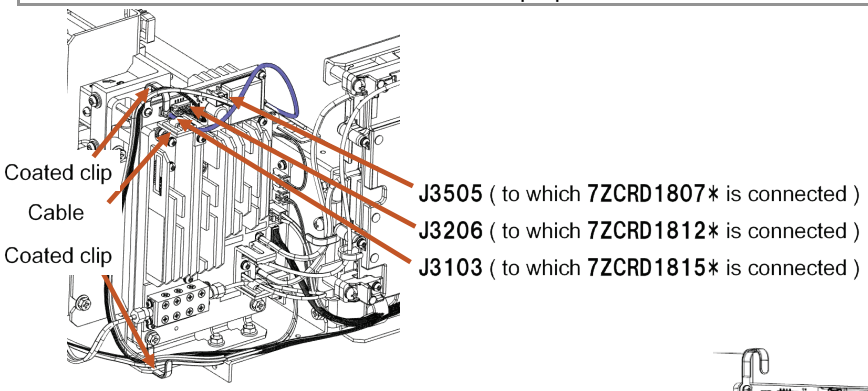
(3) Loosen the three M4 dropout prevention screws and remove the PA circuit CAH-1696



Step 5: Remove the TRX circuit CMN-897.

(1) Untie the coated clips and open the cable cramp, and unplug **7ZCRD1815*** from **J3103**, **7ZCRD1812*** from **J3206**, and **7ZCRD1807*** from **J3505**.

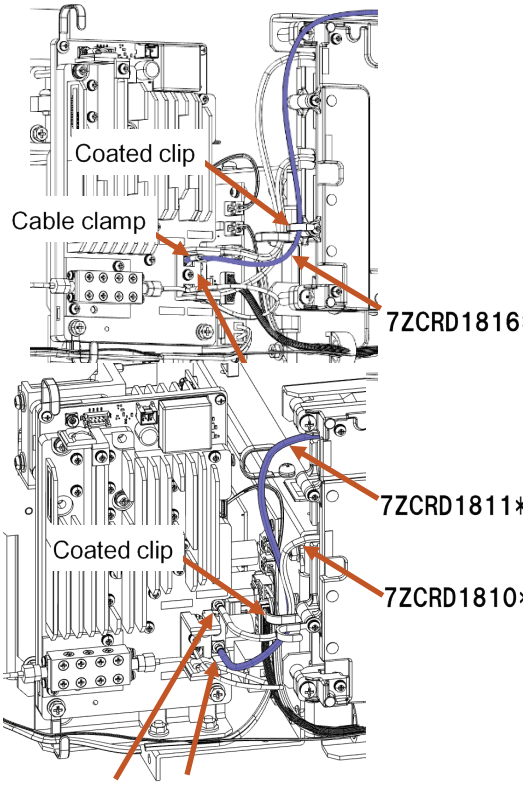
> ! When unplugging the **7ZCRD1815*** from **J3103**, open the cable clamp, then be sure to hold the base of the cable and remove it in the direction perpendicular to the connector.



(2) Untie the coated clip and open the cable cramp and unplug the **7ZCRD1816*** from **J3104**.

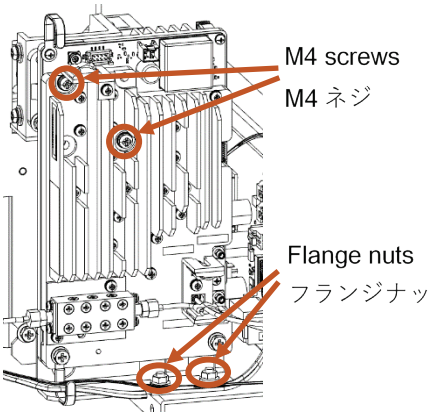
> ! When unplugging the **7ZCRD1816*** from **J3104**, open the cable clamp, then be sure to hold the base of the cable and remove it in the direction perpendicular to the connector.

(3) Untie the coated clip and unplug **7ZCRC1810*** from **J3201** and **7ZCRD1811*** from **J3203**.



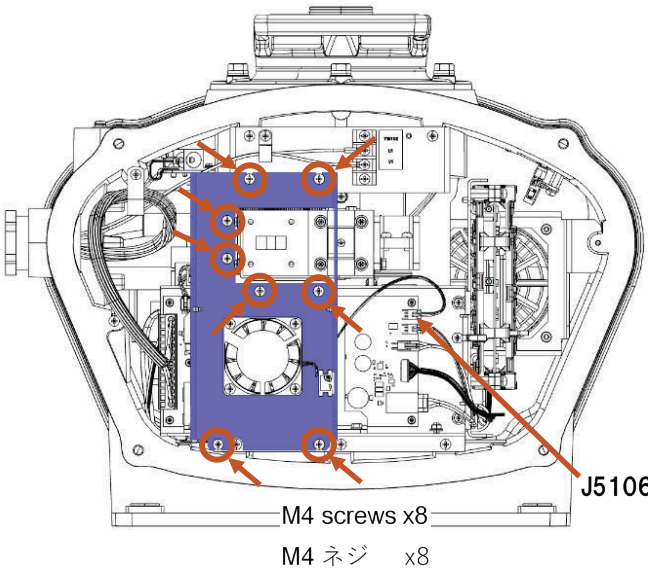
(4) Loosen the two flange nuts at the bottom of the TRX circuit.

(5) Loosen the two M4 dropout prevention screws on the top of the TRX circuit and remove the TRX circuit CMN-897.



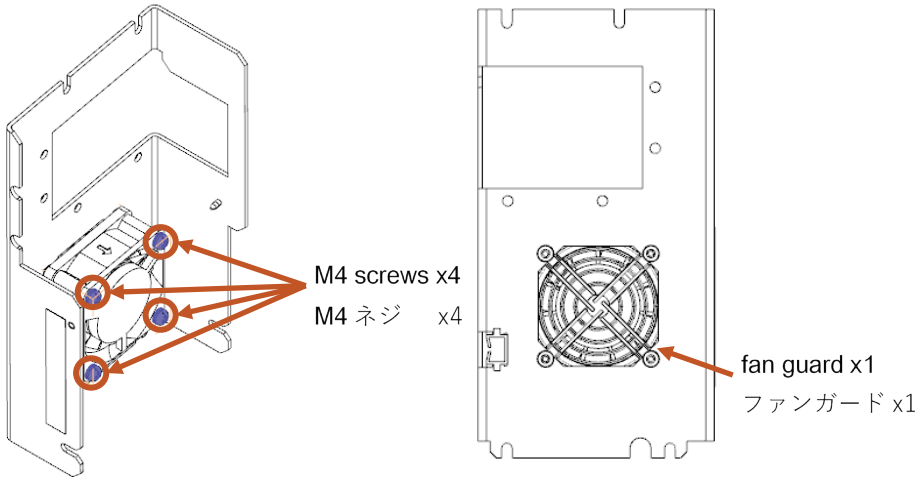
Step 6: Remove the PA mounting plate.

(1) Unplug the PS IF circuit connector **J5106**.
(2) Remove the eight M4 screws and take out the PA mounting plate.



Step 7: Replace the new 60mm fan.

(1)Remove the four M4 screws and remove the 60mm fan and fan guard.
(2) Install the new 60 mm fan.



Pay attention to the airflow direction of the fan.
Install the fan with the arrow indication pointing toward the PA circuit.

Step 8: Reinstall the PA mounting plate to its original condition.

Reinstall and connect the PA mounting plate in the order of steps 6-(2) to 6-(1).

Step 9: Reinstall the TRX circuit CMN-897 to its original condition.

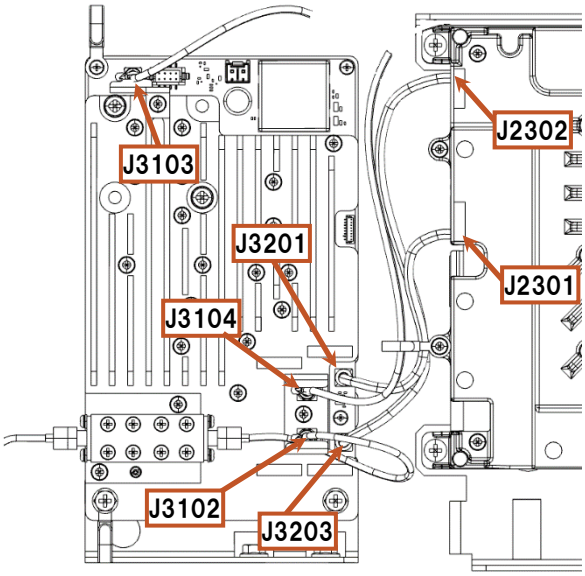
Reinstall and connect the TRX circuit CMN-897 in order of steps 5-(5) to 5-(1)

When tightening the screws, do not fully tighten them from the beginning, but temporarily tighten them once.

※Temporarily tighten the two M4 dropout prevention screws in step 5-(5), and then temporarily tighten the two flange nuts in step 5-(4). After that, fully tighten everything and install it.

J3201 / **7ZCRD1810*** and **J3203** / **7ZCRD1811*** in step 5-(3) are the same connector shape. Be careful not to make a wrong connection.

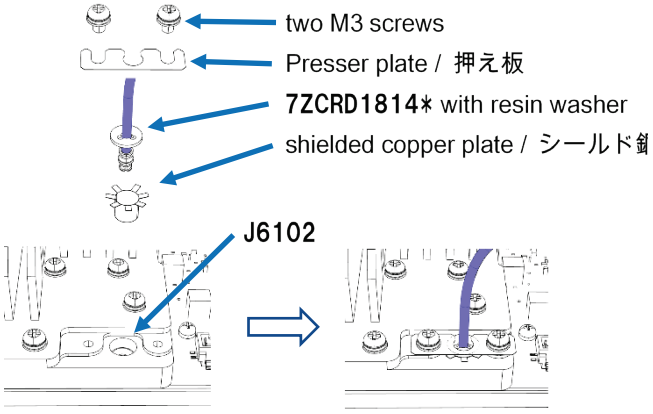
J3104 / **7ZCRD1816*** in step 5-(2) and **J3103** / **7ZCRD1815*** in step 5-(1) are the same connector shape. Be careful not to make a wrong connection. Also, when connecting, be sure to hold the base of the cable and plug it from the direction perpendicular to the connector.
Also, when connecting, be sure to hold the base of the cable and insert it vertically to the connector.



7ZCRD1815*	J3103	WG Coax convertor (Center of scanner)
7ZCRD1816*	J3104	PM Antenna (Bow side of scanner)
7ZCRD1810*	J3201	J2301
7ZCRD1811*	J3203	J2302

Step 10: Reinstall the PA circuit CAH-1696 to its original condition.

Reinstall and connect the PA circuit CAH-1696 in order of steps 4-(3) to 4-1(1)

!	When tightening the screws and bolts, do not fully tighten them from the beginning, but temporarily tighten them once. ※Temporarily tighten the three M4 screws in step 4-(3), and then temporarily tighten the two M4 bolts in step 4-(2). After that, fully tighten everything and install it.
!	When connecting the **7ZCRD1814*** to the **J6102**, make sure that a resin washer is attached to the cable side, hold the base of the cable, and insert it vertically into the connector. After connection, fix the resin washer with the presser plate and two M3 screws so that the retaining washer can be pressed. In addition, **J6102** contains a shielded copper plate. Be sure to put it in without discarding it. 

Step 11: Tighten the starboard side cover.

Step 12: Operation check.

Turn on the safety switch and check the following operation.

After turning on the radar power, set to transmit it and check that the normal radar image is displayed.

4.2 Replacement Procedures for Transmitter-receiver Unit

Precautions

Follow the precautions below and take care to avoid injury while replacing parts.

⚠CAUTION	
	Before you begin the replacement work, check that the power sources for all of the radar units (if more than one unit is in use) are turned off. As a safety precaution, shut off the main power circuit breaker.
	Use gloves when working, and take care to avoid injury. In addition, in the interest of safety be careful not to drop tools or parts.
	Where possible, perform the replacement work when the vessel is in still waters, such as in a harbor.

4.2.1 NTG-3225 Transmitter-receiver Unit

4.2.1.1 Magnetron Replacement/NTG-3225

⚠CAUTION	
	When replacing magnetrons, make sure to shut off the main power and let the equipment stand for more than 5 minutes to discharge the high-voltage circuit. Failure may result in electric shock.
	Make sure to take off your watch when your hand must get close to the magnetron. Failure may result in damage to the watch since the magnetron is a strong magnet.

Cautions on handling the magnetrons that have been stored for a long period of time

Since the magnetrons that have been stored for a long period of time may become unstable at the start of the use due to the occurrence of spark, etc., apply aging by using the following procedure.

1 Extend the preheat period. (Standby: **20 to 30 minutes**)

2 Start from the short pulse range and shift to the long pulse range sequentially.

If the operation becomes unstable during this period, return to Standby immediately, maintain the status for 5 to 10 minutes and start operation again. Repeat this procedure

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

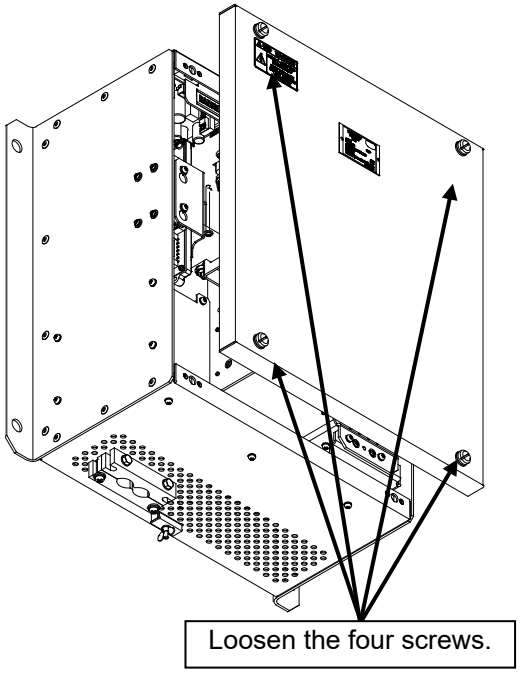
No	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver(shielded)	Size #2	

⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

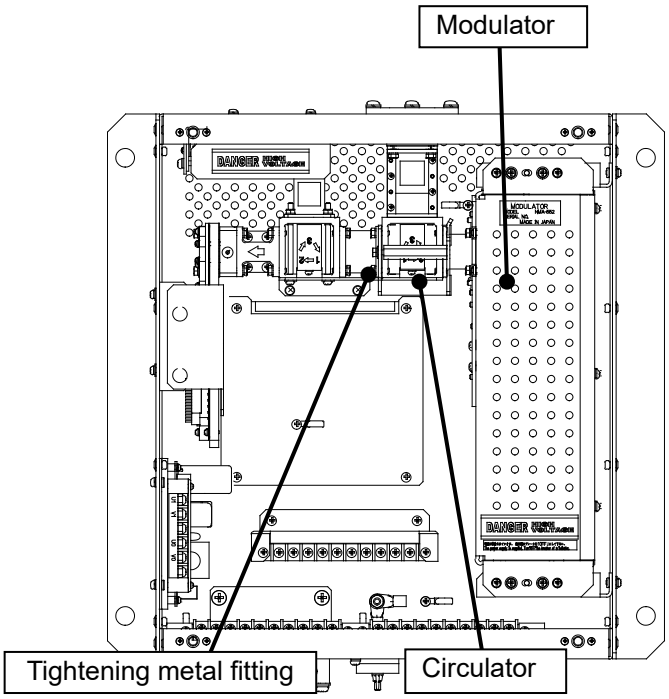
Step 1 Remove the cover.

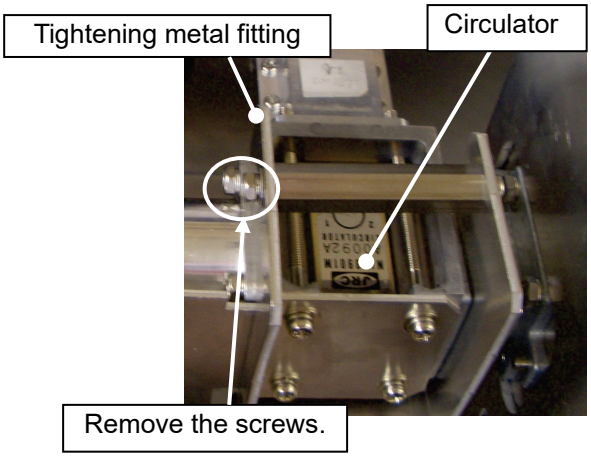
Loosen the four screws and remove the cover. The screws are slotted captive screws. Use a flat head screwdriver.



Step 2　　Remove the tightening metal fitting.

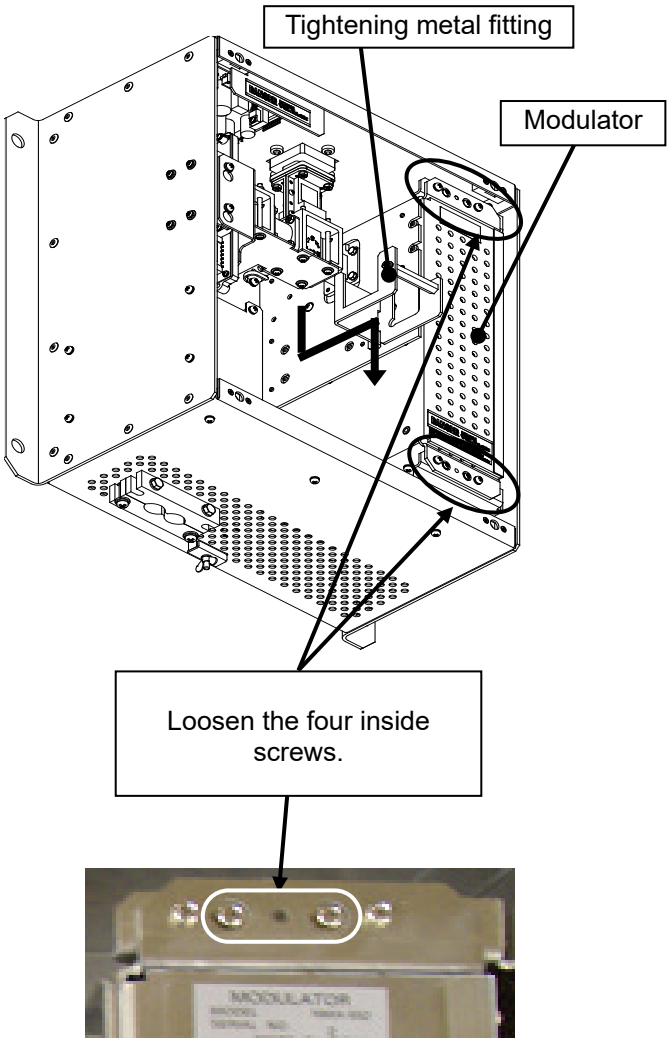
Loosen the upset head bolt (one M4 bolt), and slide the tightening metal fitting, located between the modulator and the circulator, to remove it. The magnetron is installed within the modulator.





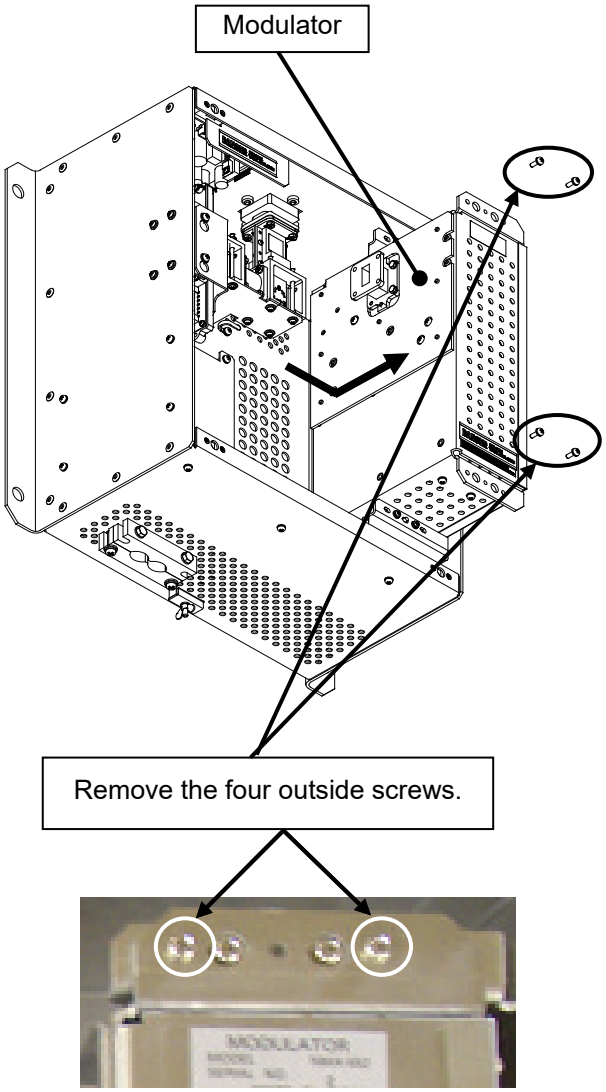
Step 3 Remove the screws of the modulation unit and slide the unit.

Loosen the inside screws of the modulator (four M4 screws). Removing the outside screws makes it possible to slide the modulator.



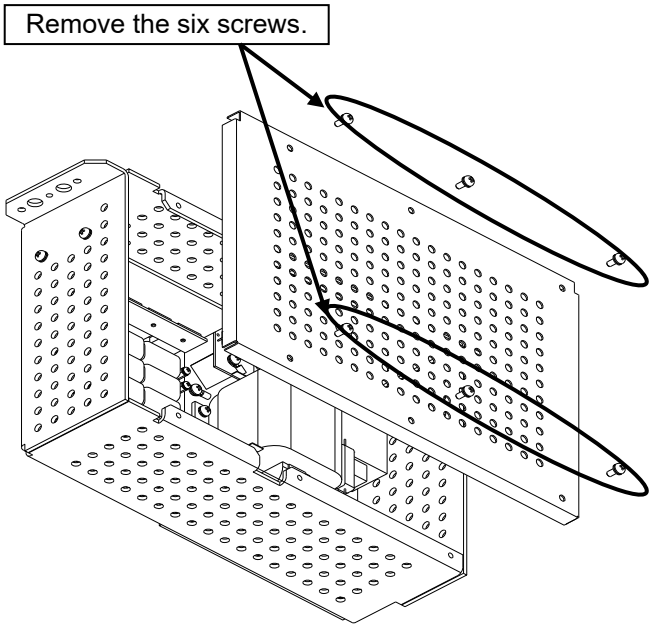
Step 4 Remove the modulation unit.

Remove the cables connected to the modulator and the screws on the outside of the modulator (four M4 screws) and slide the modulator to the right to remove it.



Step 5 Remove the modulation unit cover.

Remove the screws (six M4 screws) and take off the modulator cover.



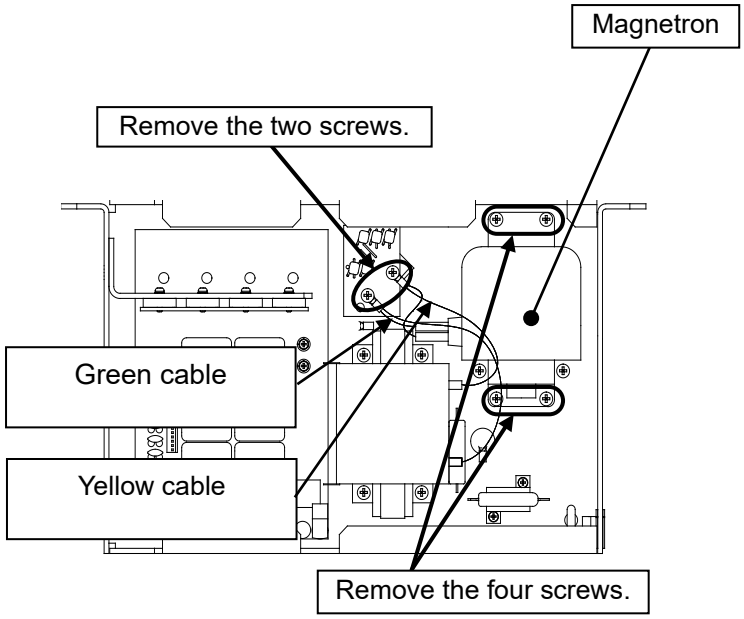
Step 6 Replace the magnetron cover.

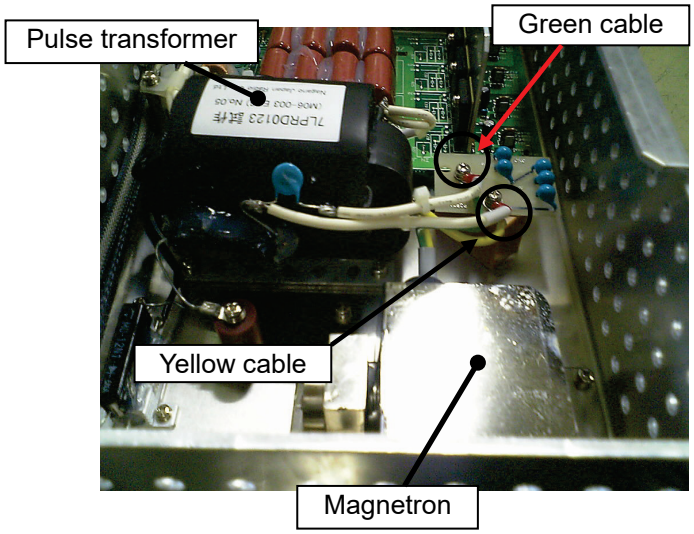
Remove the screws holding the cables (two M4 screws) and the screws holding the magnetron (four M4 screws) and remove the metal fitting and the magnetron.

Be careful to attach the colored cables (yellow and green) to the correct connections on the replacement magnetron. After having replaced the magnetron, reassemble the unit by following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws and connect the cables.

⚠ Use a shielded screwdriver because the contact of the metal tool with the magnetron causes deterioration of its performance.

⚠ Make sure that the magnetron leads (yellow and green) do not contact and are pulled away from other parts or the casing. Contact may cause them to discharge.





Step 7 Operation check

After completing the replacement work, turn On the safety switch and check operation by following the procedure below.

(1) Turn On the radar and allow sufficient preheating time (20 to 30 minutes in the STBY mode).

(2) Start transmission on a short pulse range and change the range to the long pulse range. Open the service engineer menu and provisionally adjust the tuning.

⚠ **Check the magnetron current on the test menu during the time and if operation becomes unstable, bring the radar unit back to STBY mode and restart transmission after allowing for an interval of 5 to 10 minutes.**

(3) After transmitting on a long range for about fifteen minutes, return to the service engineer menu and adjust the tuning. Perform the adjustment in the service engineer menu until the tuning display bar on the display unit reaches the 8th calibration mark. With the service engineer menu open, also make sure the magnetron current is shown between the 6th and 9th calibration markings.

(4) Finally, initialize the transmission time in the service engineer menu.

This completes magnetron replacement.

4.2.1.2 Modulator Circuit Board (CPA-264) Replacement/NTG-3225

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

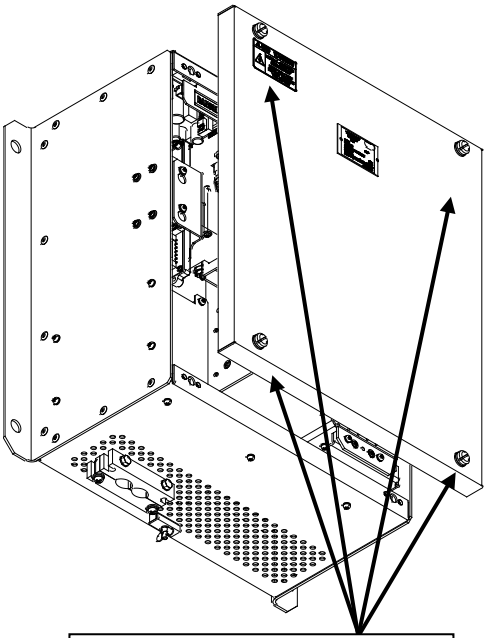
No	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver	Size #2	

⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

Step 1 Remove the cover.

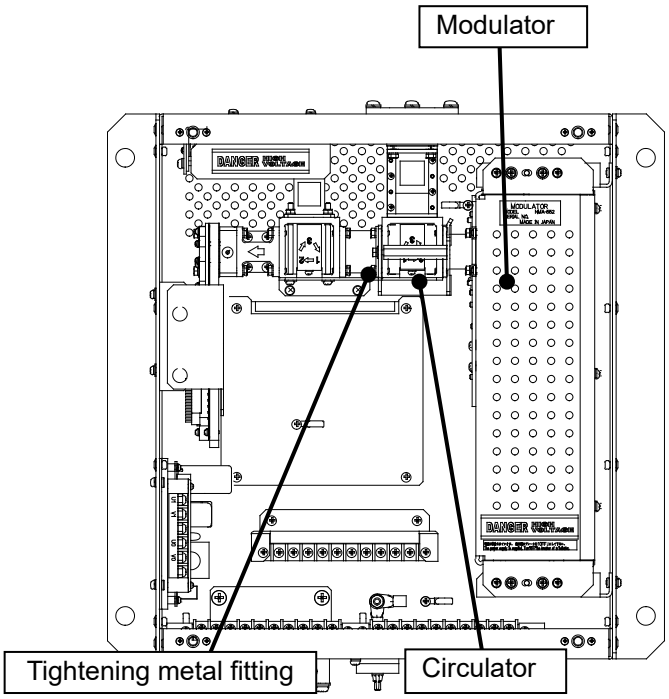
Loosen the four screws and remove the cover. The screws are slotted captive screws. Use a flat head screwdriver.

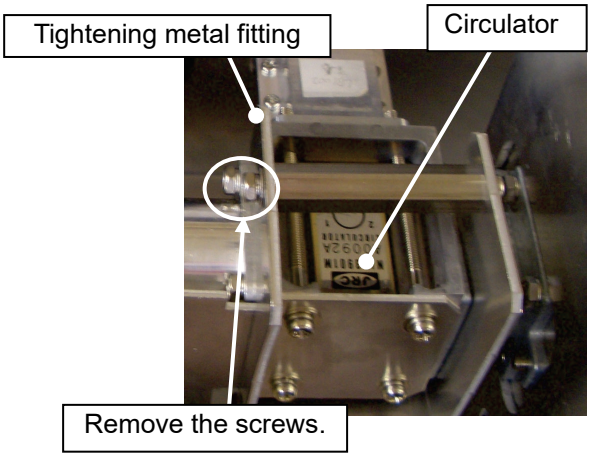


Loosen the four screws.

Step 2 Remove the tightening metal fitting.

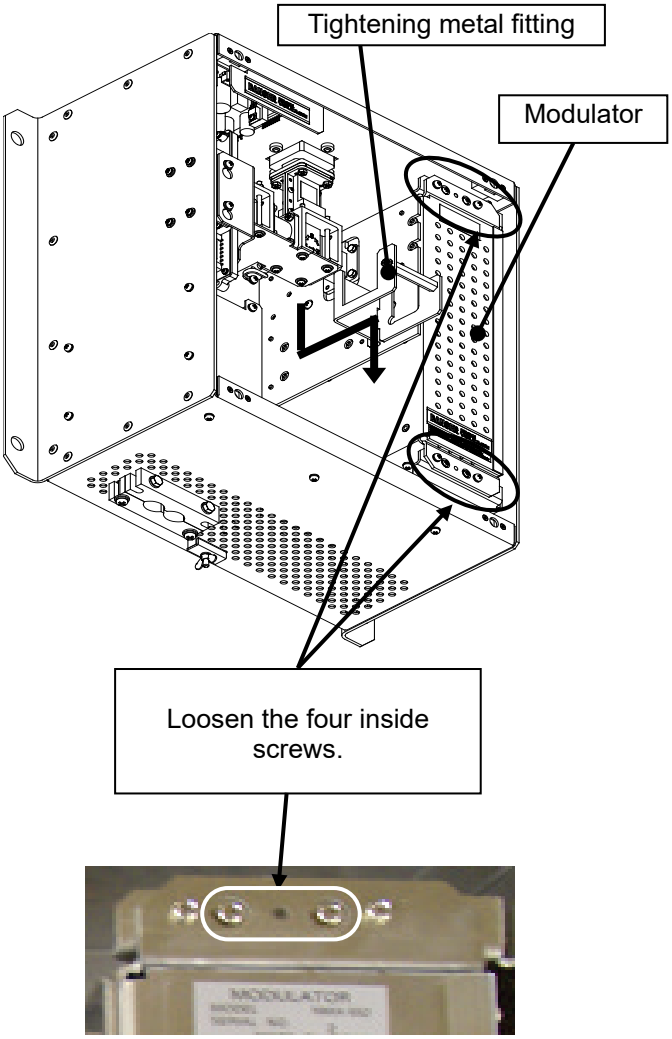
Loosen the upset head bolt (one M4 bolt), and slide the tightening metal fitting, located between the modulator and the circulator, to remove it. The magnetron is installed within the modulator.





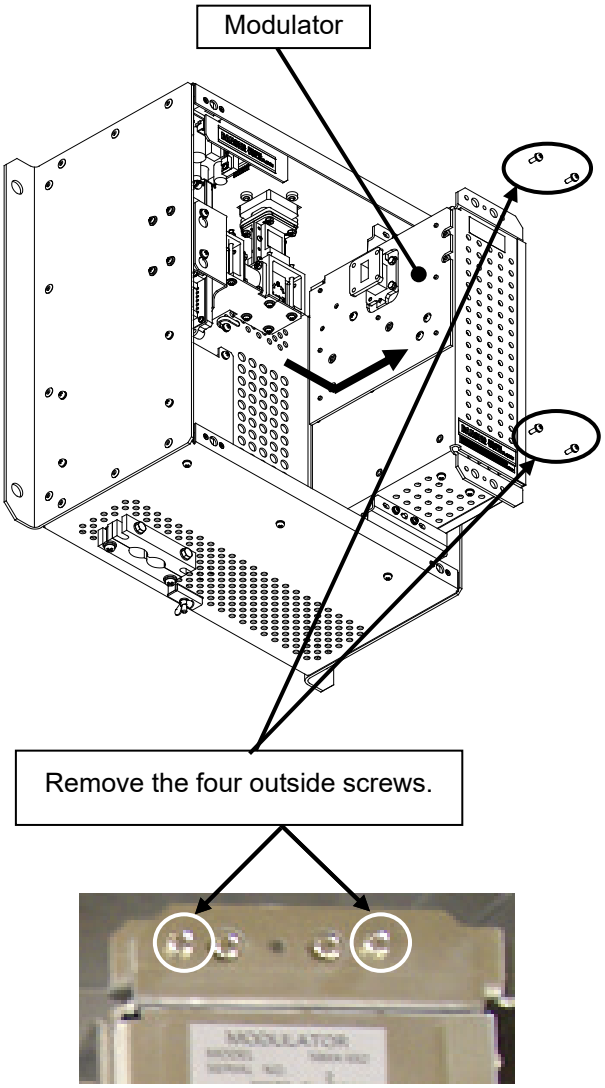
Step 3 Remove the screws of the modulation unit and slide the unit.

Loosen the inside screws of the modulator (four M4 screws). Removing the outside screws makes it possible to slide the modulator.



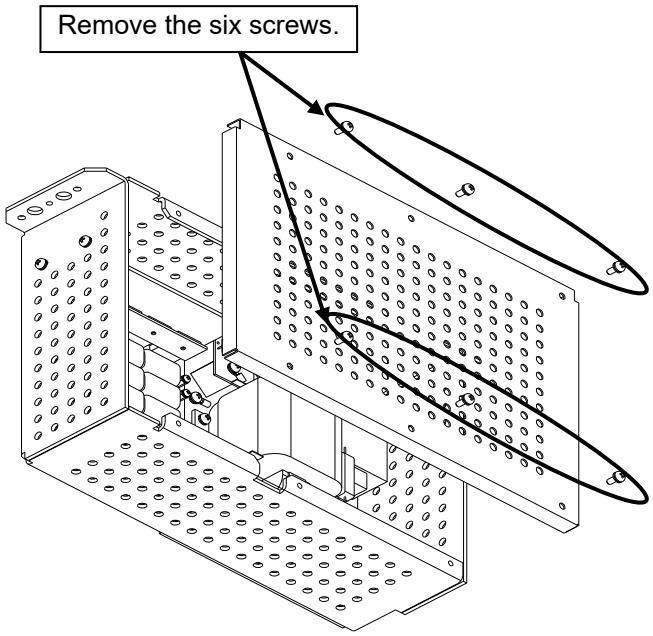
Step 4 Remove the modulation unit.

Remove the cables connected to the modulator and the screws on the outside of the modulator (four M4 screws) and slide the modulator to the right to remove it.



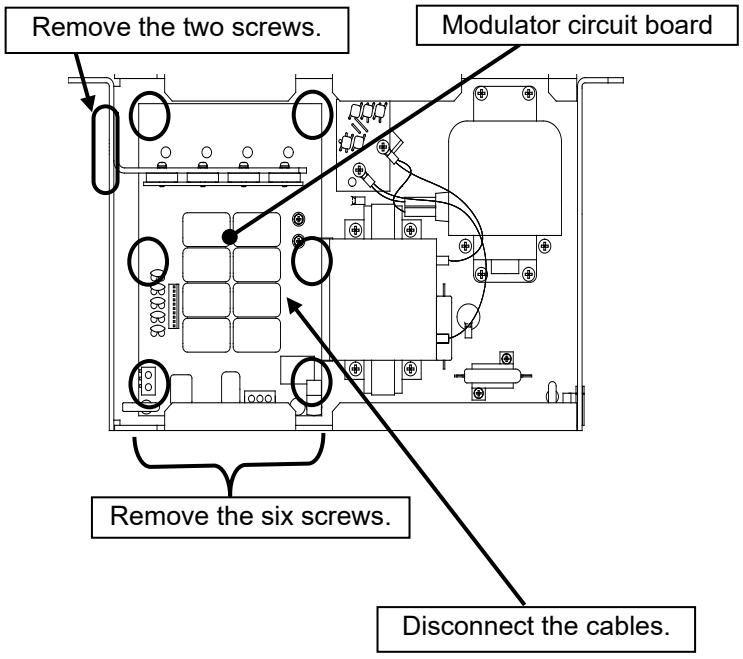
Step 5 Remove the modulation unit cover.

Remove the screws (six M4 screws) and take off the modulator cover.



Step 6 Replace the modulator circuit board.

Remove all the cables connected to the modulator circuit board and remove the screws holding the modulator circuit board (six M4 screws) and the screws holding the heat radiation plate (two M4 screws) and remove the modulator circuit board. After having replaced the modulator circuit board, reassemble the unit following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 7 Operation check

After having completed the replacement, check operation by following the procedure below.

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error.
Transmit the radar wave in long pulse range mode and open the service engineer menu to check that the magnetron current stands between the 5th and 7th calibration markings.

This completes modulator circuit board replacement.

4.2.1.3 Modulator (NMA-552) Replacement/NTG-3225

See Section, "Magnetron replacement/NTG-3225".

4.2.1.4 Power Supply Circuit Board (CBD-1682A) Replacement/NTG-3225

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

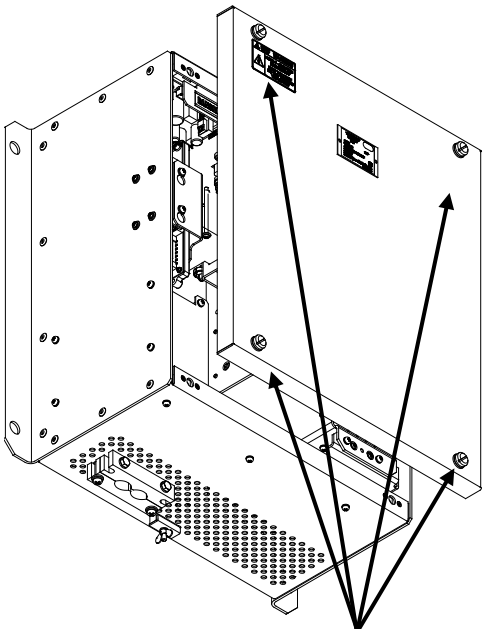
No	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver	Size #2	

⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

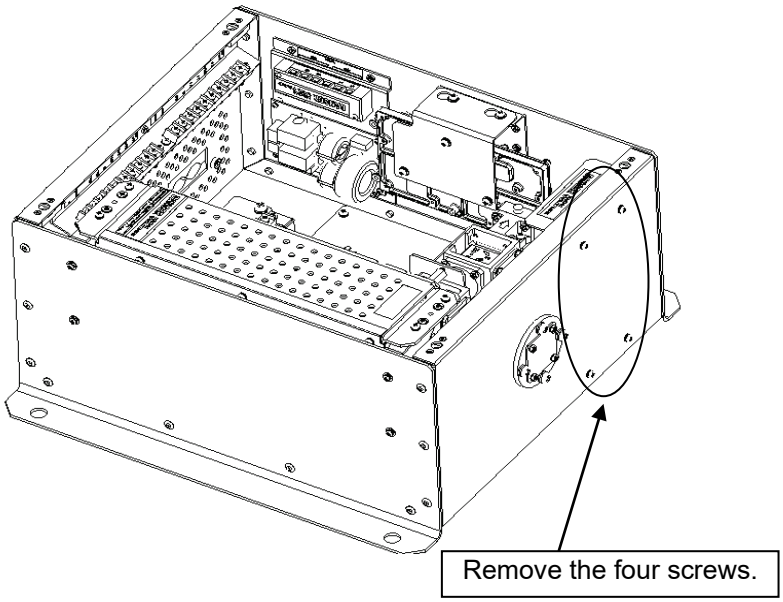
Step 1 Remove the cover.

Loosen the four screws and remove the cover. The screws are slotted captive screws. Use a flat head screwdriver.



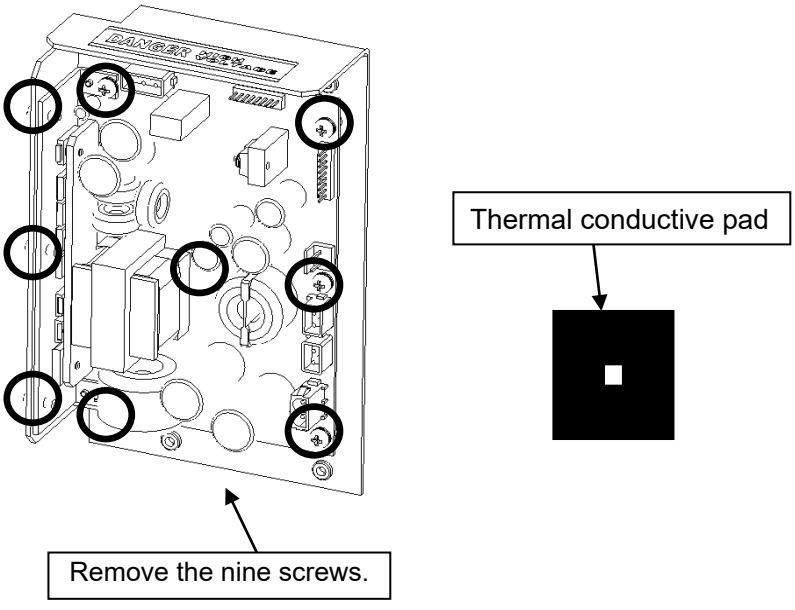
Step 2 Remove the power supply circuit board.

After having removed all the cables connected to the power supply circuit board, remove the fixing screws (four M4 screws) and remove the power supply circuit board with the attached heat radiation plate.



Step 3 Replace the power supply circuit board

Remove the fixing screws (nine M4 screws) and remove the power supply circuit board from the heat radiation plate. If the thermal conductive pad on the heat radiation plate is torn, replace it with the sheet that comes with the replacement power supply circuit board. After having replaced the power supply circuit board, reassemble the unit by following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 4 Operation check

After having completed the replacement, turn On the safety switch and check operation by following the procedure below.

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image is correctly displayed.

This completes power supply circuit board replacement.

4.2.1.5 T/R Control Circuit Board (CMC-1205R) Replacement

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver	Size #2	
3	Socket wrench*1	Width across flats 13 mm (for M7 screws)	

⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

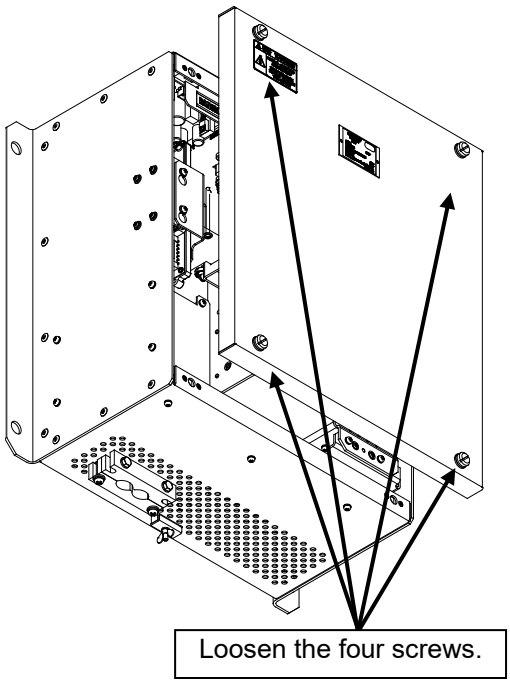
Step 1 Back up the scanner unit data.

Before beginning the replacement procedure, open the service engineer menu of the radar display unit and back up the scanner unit data (transmission time and motor rotation time).

⚠ Unless backing up this data, it will not be possible to maintain continuity in scanner data such as the magnetron usage time.

Step 2 Remove the cover.

Loosen the four screws and remove the cover. The screws are slotted captive screws. Use a flat head screwdriver.

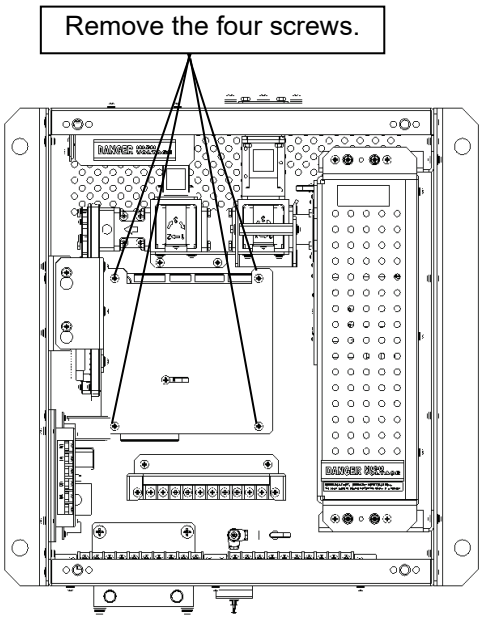


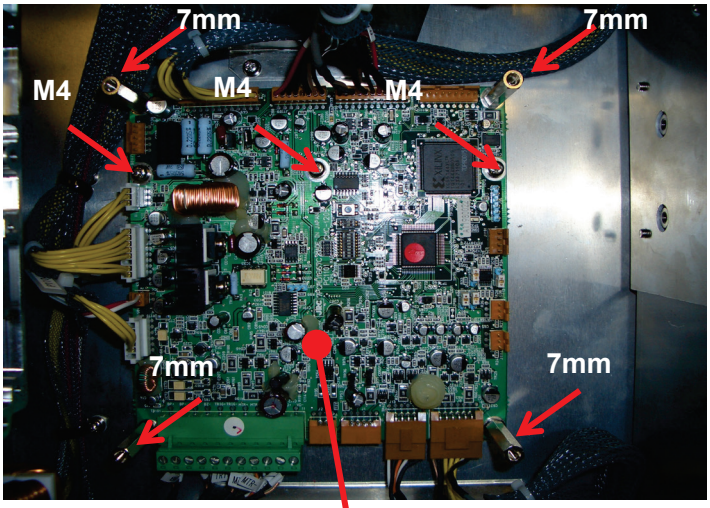
Step 3 Remove the cover of the T/R control circuit and replace the circuit.

Remove the T/R control circuit board cover (Four M4 screws). Remove the cables connected to the T/R control circuit board and then remove the supports (four 7 mm supports) and the screws (three M4 screws) and replace the T/R control circuit board.

⚠ Set the DIP switch and jumper pins of the T/R control circuit board to suit the NTG-3225.

After replacing the T/R control circuit board, assemble the unit in the reverse order of the disassembly procedure. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.





Step 4 Operation check

After completing the replacement work, turn On the safety switch and check operation by following the procedure below.

(1) Turn On the radar, open the service engineer menu, restore the scanner unit times, and make sure that the data has been correctly continued before/after the T/R control circuit board replacement (check the transmission time and the motor rotation time).

(2) Begin transmission once the countdown is complete and check that the radar image is correctly displayed.

This completes T/R control circuit board replacement.

4.2.1.6 Relay Filter Circuit (CSC-656) Replacement/NTG-3225

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

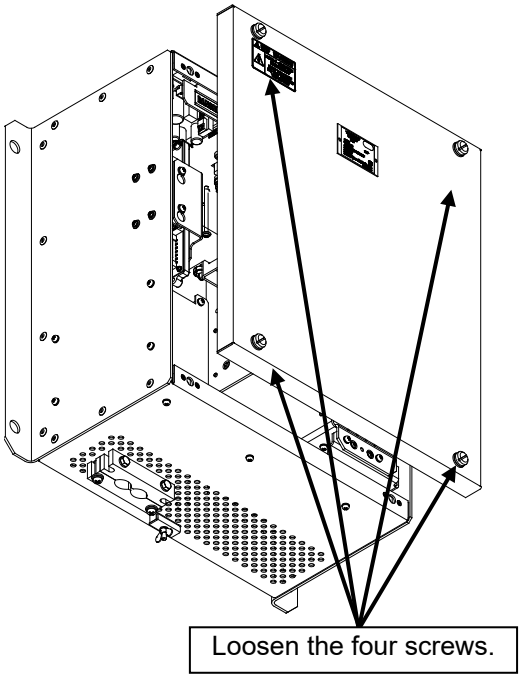
No	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver	Size #2	

⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

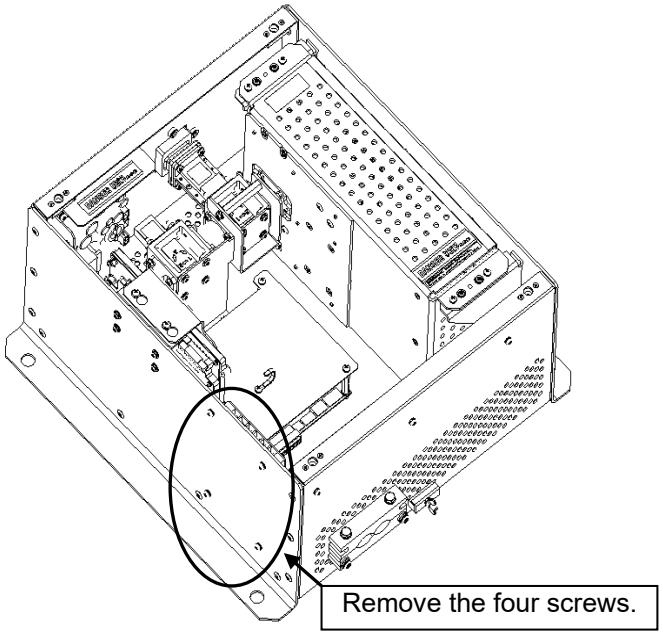
Step 1 Remove the cover.

Loosen the four screws and remove the cover. The screws are slotted captive screws. Use a flat head screwdriver.



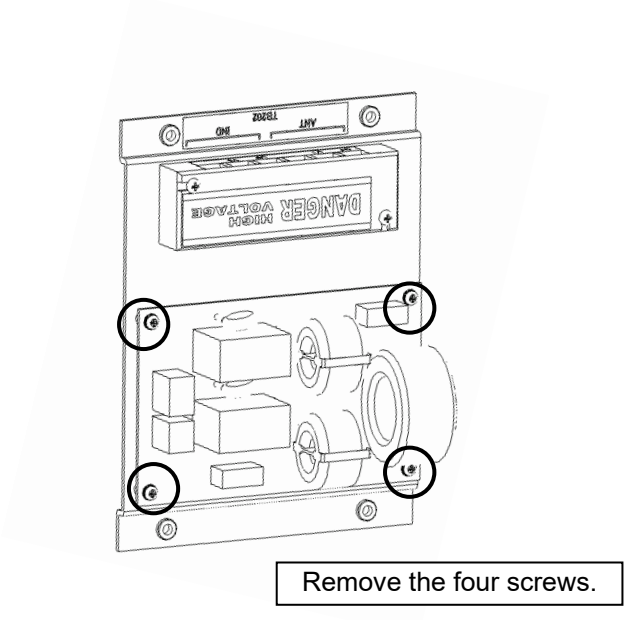
Step 2 Remove the relay filter circuit board.

After having removed all the cables connected to the relay filter circuit board, remove the fixing screws (four M4 screws) and remove the relay filter circuit board together with the metal fitting.



Step 3 Replace the relay filter circuit board.

Remove the screws holding the relay filter circuit board in place (four M4 screws) and replace the relay filter circuit on the metal fitting. After having replaced the relay filter circuit board, reassemble the unit following the disassembly procedure in the reverse order. Do not forget to tighten the screws and connect the cables.



Step 4 Operation check

After completing the replacement work, turn On the safety switch and check operation by following the procedure below.

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error.

This completes relay filter circuit board replacement.

4.2.1.7 Receiver (NRG-162A) Replacement/NTG-3225

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

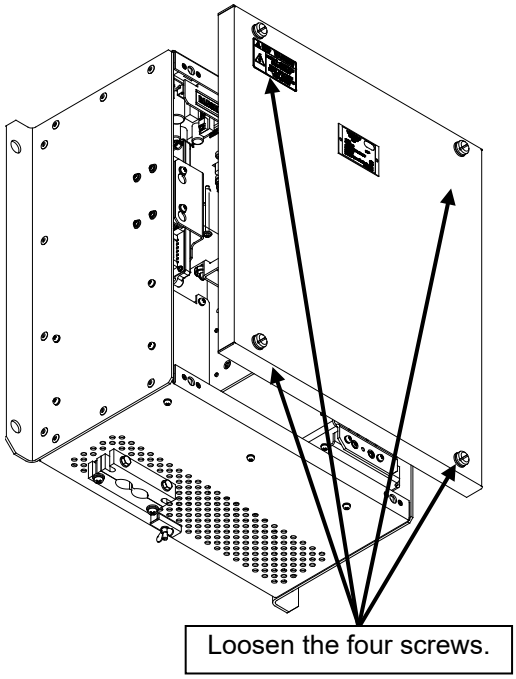
No	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver	Size #2	
3	Open-end wrench	Width across flats 7 mm (for M4 screws)	

⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

Step 1 Remove the cover.

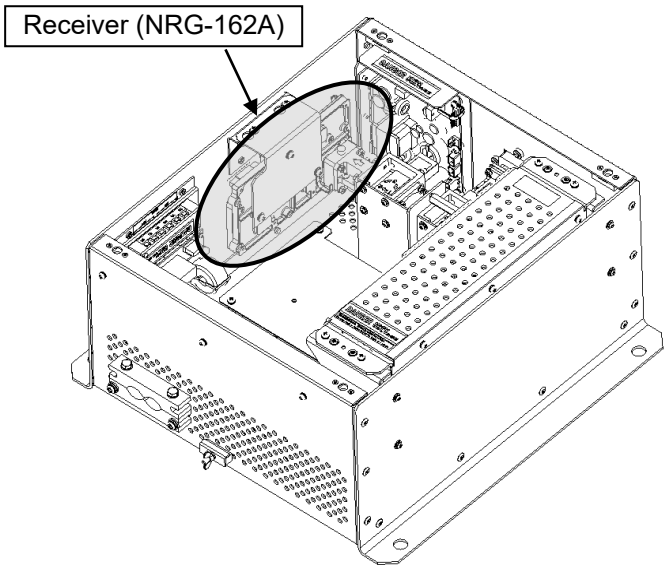
Loosen the four screws and remove the cover. The screws are slotted captive screws. Use a flat head screwdriver.

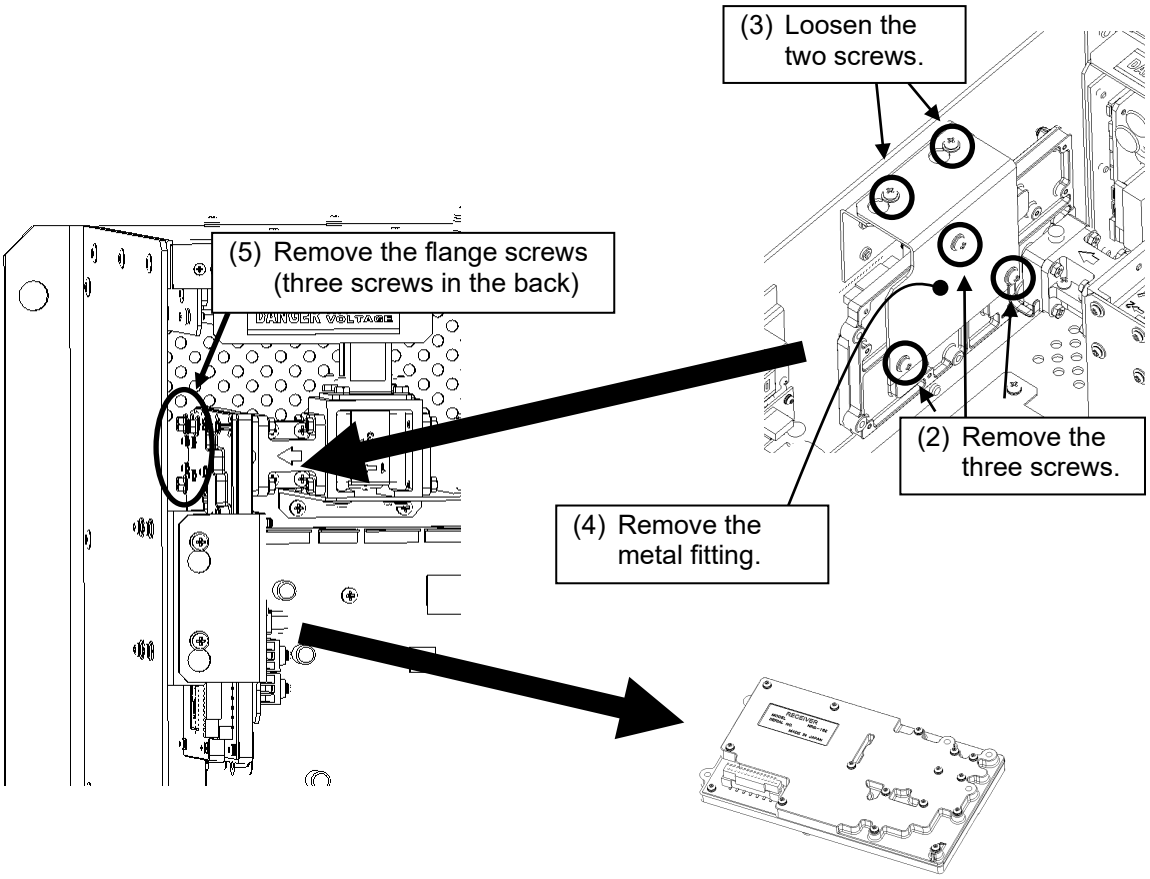


Step 2 Replace the receiving unit.

Replace the receiving unit according to the following procedure.

(1) Remove the cable connected to the receiver. (One cable)
(2) Remove the screws holding the metal fitting for the receiver. (Three screws)
(3) Loosen the screws on the metal fitting holding the receiver. (Two screws)
(4) Remove the metal fitting. (One fitting)
(5) Remove the screws on the receiver flange. (Three screws in the back)





After having replaced the receiver, reassemble the unit by following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.

Step 3 Operation check

After having completed the replacement, turn On the safety switch and check operation by following the procedure below.

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error. Transmit the radar wave in the long range mode and open the service engineer menu to perform tuning adjustment. With the service engineer menu open, also make sure the magnetron current is shown between the 8th and 10th calibration markings.

This completes receiving unit replacement.

4.2.2 NTG-3230 Scanner Unit

4.2.2.1 Magnetron Replacement/NTG-3230

⚠CAUTION	
	When replacing magnetrons, make sure to shut off the main power and let the equipment stand for more than 5 minutes to discharge the high-voltage circuit. Failure may result in electric shock.
	Make sure to take off your watch when your hand must get close to the magnetron. Failure may result in damage to the watch since the magnetron is a strong magnet.

Cautions on handling the magnetrons that have been stored for a long period of time

Since the magnetrons that have been stored for a long period of time may become unstable at the start of the use due to the occurrence of spark, etc., apply aging by using the following procedure.

1 Extend the preheat period. (Standby: **20 to 30 minutes**)

2 Start from the short pulse range and shift to the long pulse range sequentially.

If the operation becomes unstable during this period, return to Standby immediately, maintain the status for 5 to 10 minutes and start operation again. Repeat this procedure

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

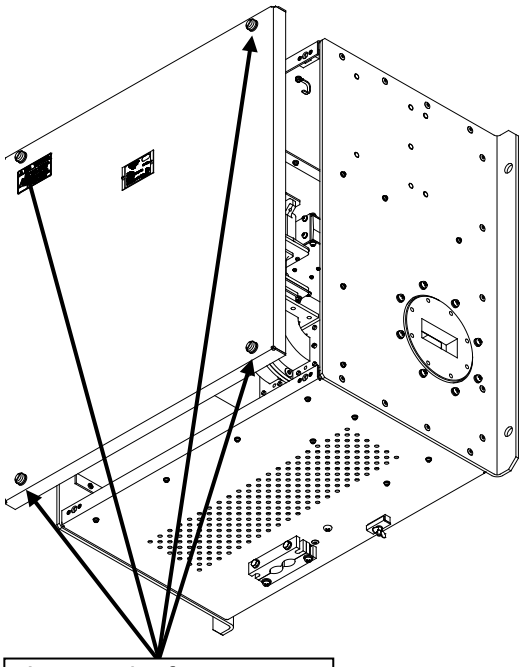
No	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver(shielded)	Size #2, Size #3	

⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

Step 1 Remove the cover.

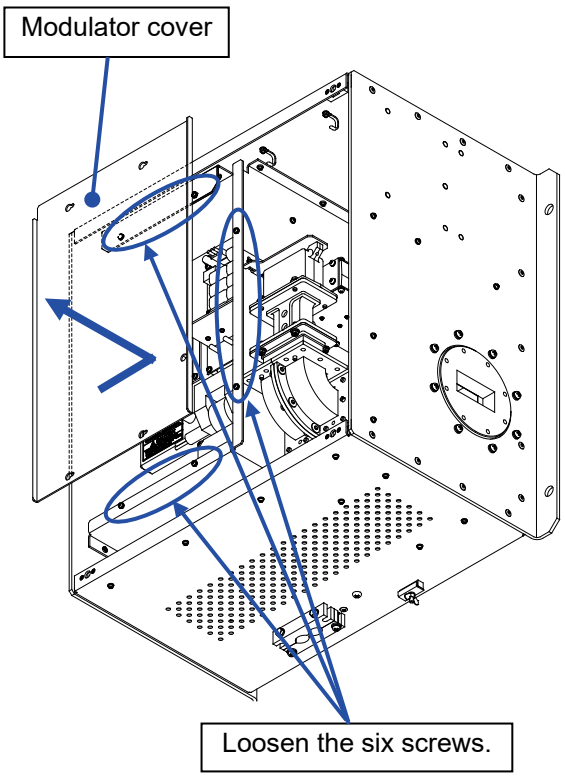
Loosen the four screws and remove the cover. The screws are slotted captive screws. Use a flat head screwdriver.



Loosen the four screws.

Step 2 Remove the modulation unit cover.

Remove the screws (six M4 screws) and slide the modulator cover to the right to remove it.



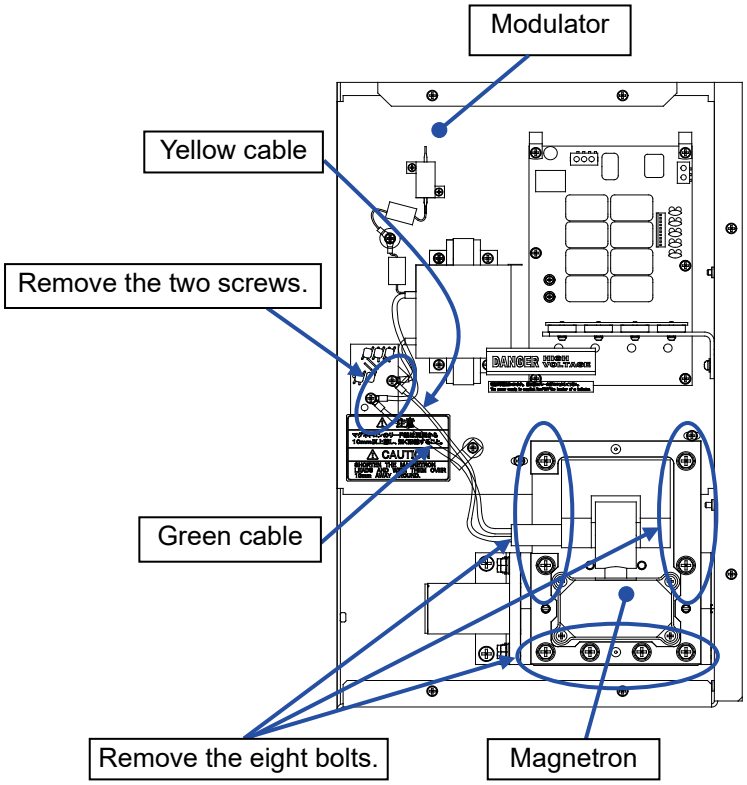
Step 3 Replace the magnetron cover.

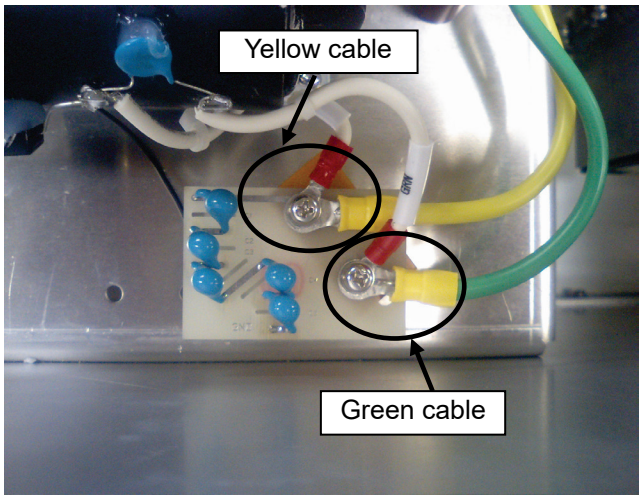
Remove the screws holding the cables (two M4 screws) and the bolts holding the magnetron (eight M6 screws) and remove the metal fitting and the magnetron.

Be careful to attach the colored cables (yellow and green) to the correct connections on the replacement magnetron. After having replaced the magnetron, reassemble the unit by following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws and connect the cables.

⚠ Use a shielded screwdriver because the contact of the metal tool with the magnetron causes deterioration of its performance.

⚠ Make sure that the magnetron leads (yellow and green) do not contact and are pulled away from other parts or the casing. Contact may cause them to discharge.


Modulator
Yellow cable
Remove the two screws.
Green cable
Remove the eight bolts.
Magnetron


Yellow cable
Green cable

Step 4 Operation check

After completing the replacement work, turn On the safety switch and check operation by following the procedure below.

(1) Turn On the radar and allow sufficient preheating time (20 to 30 minutes in the STBY mode).

(2) Start transmission on a short pulse range and change the range to the long pulse range. Open the service engineer menu and provisionally adjust the tuning.

⚠ **Check the magnetron current on the test menu during the time and if operation becomes unstable, bring the radar unit back to STBY mode and restart transmission after allowing for an interval of 5 to 10 minutes.**

(3) After transmitting on a long range for about fifteen minutes, return to the service engineer menu and adjust the tuning. Perform the adjustment in the service engineer menu until the tuning display bar on the display unit reaches the 8th calibration mark. With the service engineer menu open, also make sure the magnetron current is shown between the 6th and 9th calibration markings.

(4) Finally, initialize the transmission time in the service engineer menu.

This completes magnetron replacement.

4.2.2.2 Modulator Circuit Board (CPA-264) Replacement/NTG-3230

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

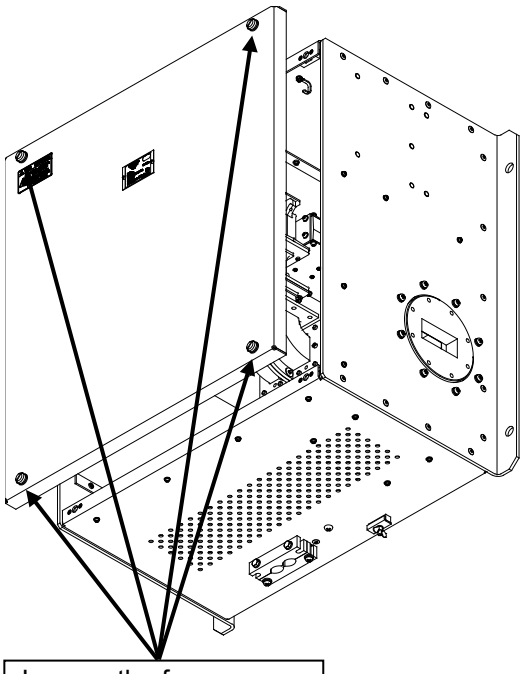
No	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver(shielded)	Size #2	

⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

Step 1 Remove the cover.

Loosen the four screws and remove the cover. The screws are slotted captive screws. Use a flat head screwdriver.

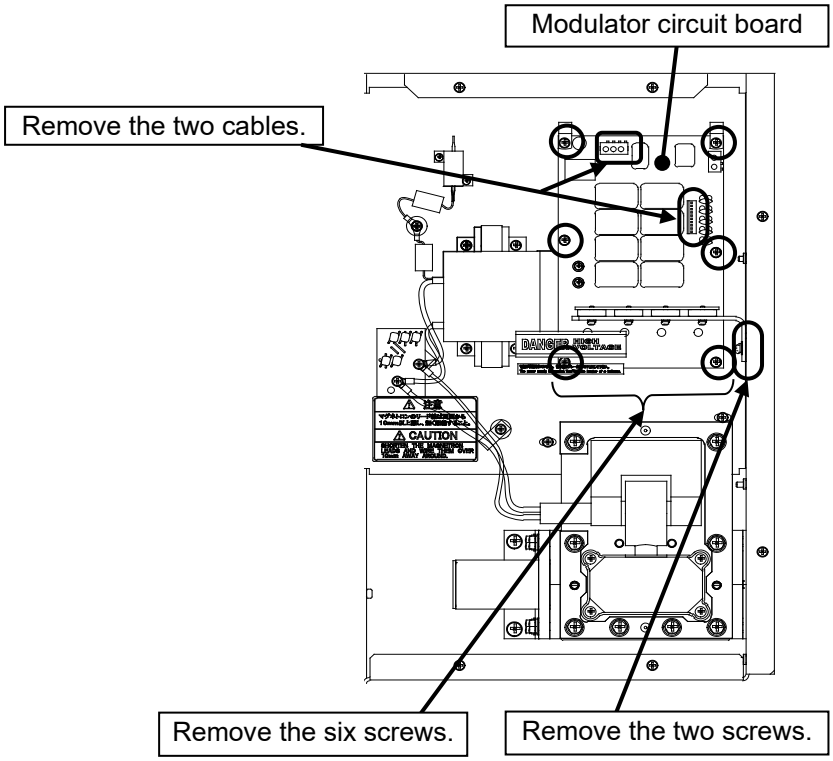


Loosen the four screws.

Step 2 Replace the modulator circuit board.

Remove all the cables connected to the modulator circuit board and remove the screws holding the modulator circuit board (six M4 screws) and the screws holding the heat radiation plate (two M4 screws) and remove the modulator circuit board.

After having replaced the modulator circuit board, reassemble the unit by following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 3 Operation check

After having completed the replacement, check operation by following the procedure below.

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error.

Transmit the radar wave in long pulse range mode and open the service engineer menu to check that the magnetron current stands between the 5th and 7th calibration markings.

This completes modulator circuit board replacement.

4.2.2.3 Modulator (NMA-553) Replacement/NTG-3230

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver	Size #2	
3	Open-end wrench	Width across flats 7 mm (for M4 screws)	

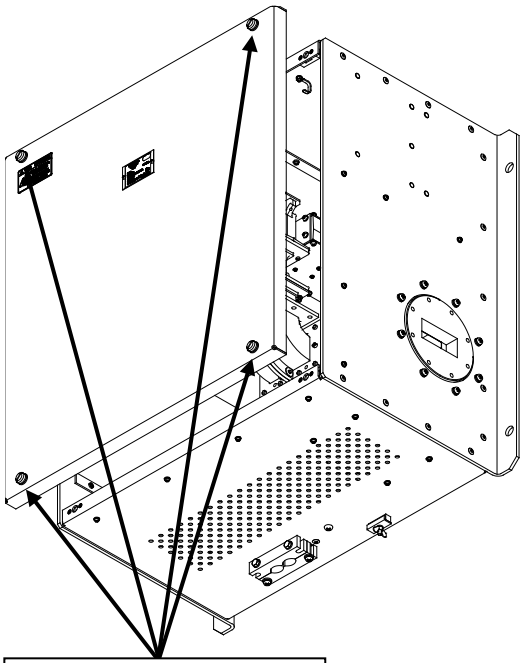
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

Step 1 Remove the cover.

Loosen the four screws and remove the cover. The screws are slotted captive screws.

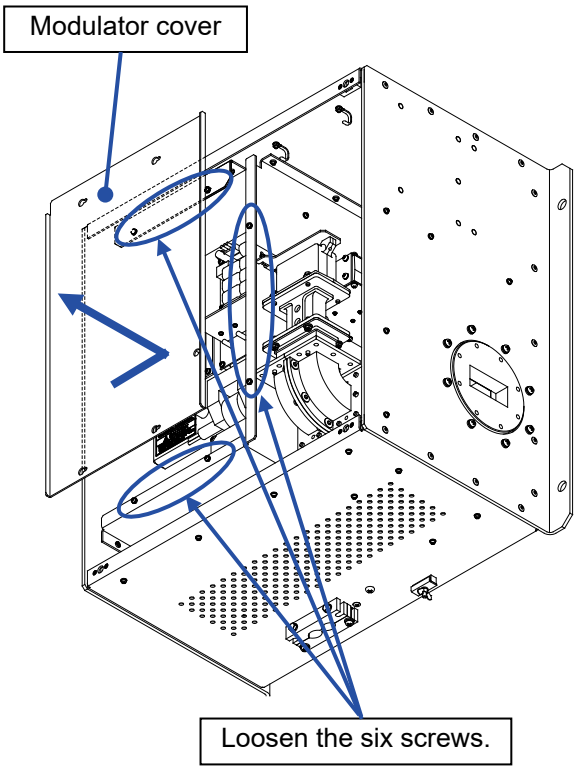
Use a flat head screwdriver.



Loosen the four screws.

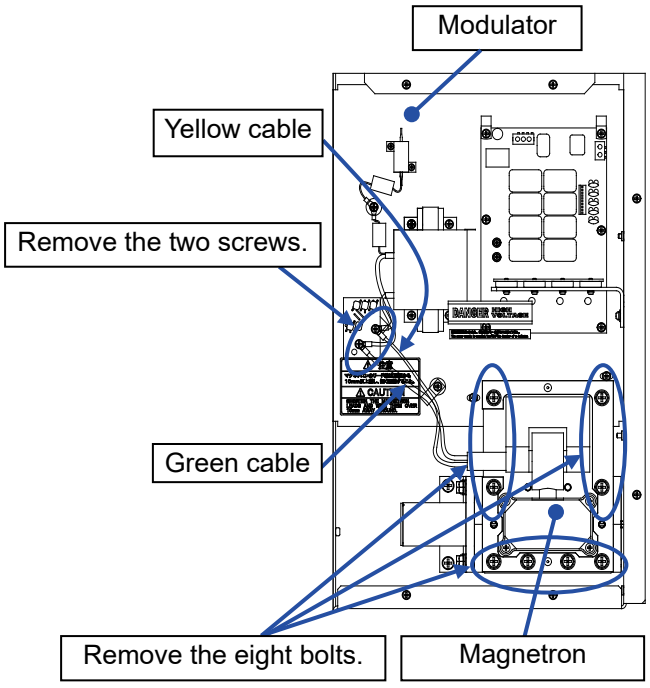
Step 2 Remove the modulation unit cover.

Remove the screws (six M4 screws) and slide the modulator cover to the right to remove it.



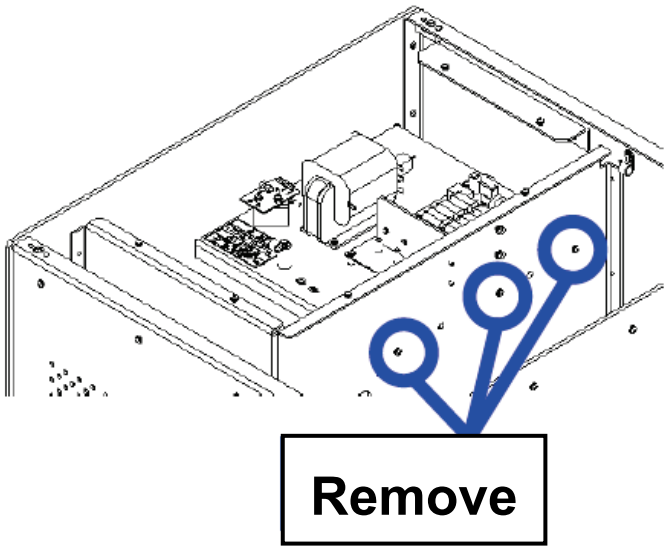
Step 3 Replace the magnetron cover.

Remove the screws holding the cables (two M4 screws) and the bolts holding the magnetron (eight M6 screws) and remove the metal fitting and the magnetron.

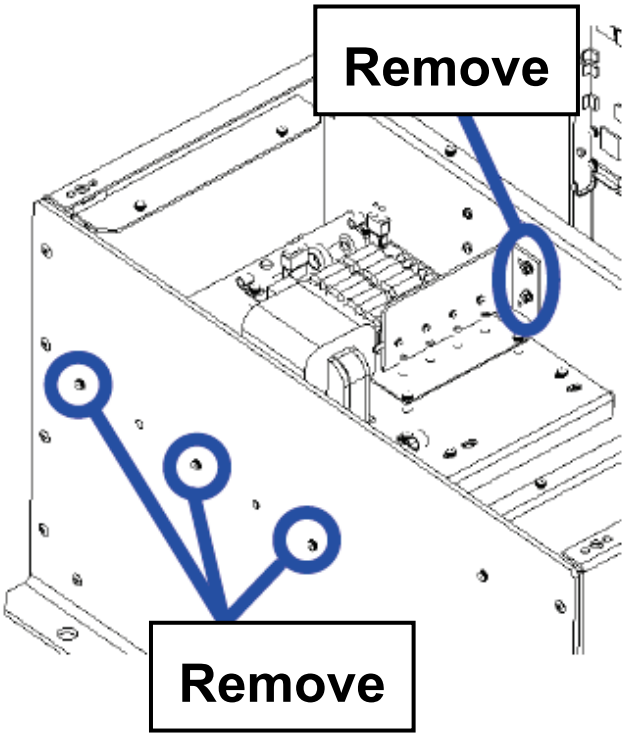


Step 4 Replace the modulation unit.

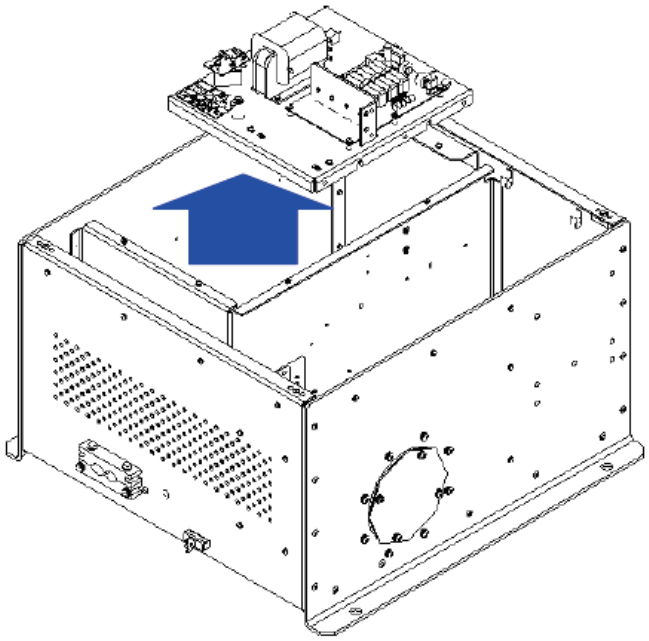
Remove all the cables that are connected to the modulation circuit and remove the three screws (M4) that hold the modulation unit.



Remove the three screws (M4) that hold the modulation unit outside of the transmitter-receiver unit and the two bolts inside of the modulation unit.



Remove the modulation unit together with the plate and replace the modulation unit. After replacing the modulation unit, reassemble the unit following the disassemble procedure in the reverse order. Make sure that there are no omissions of magnetron installation, bolt tightening, and cable connection.



Step 5 Operation check

After having completed the replacement, check operation by following the procedure below.

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error.
Transmit the radar wave in long pulse range mode and open the service engineer menu to check that the magnetron current stands between the 5th and 7th calibration markings.

This completes modulation unit replacement.

4.2.2.4 Power Supply Circuit Board (CBD-1682A) Replacement/NTG-3230

[Required Tools]

The tools shown in the following table are required for replacement work.

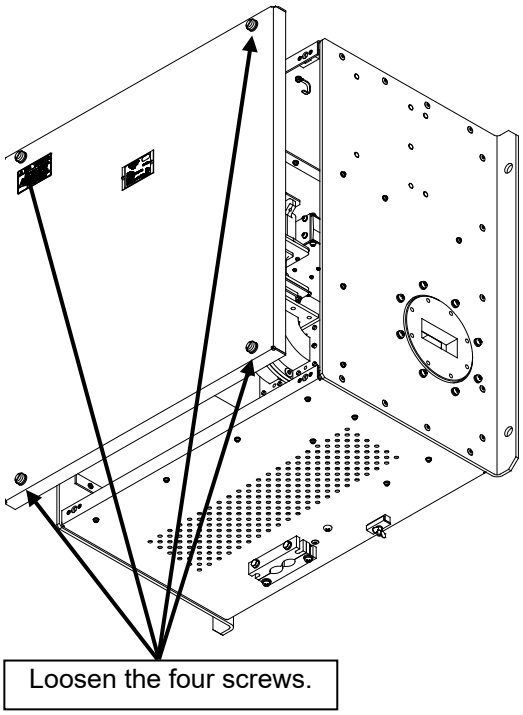
Table Required Tools

No	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver(shielded)	Size #2	

⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

Step 1 Remove the cover.

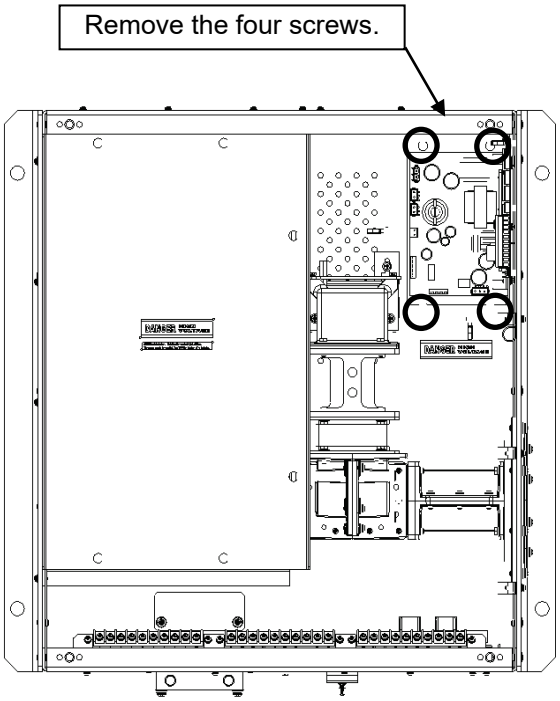
Loosen the four screws and remove the cover. The screws are slotted captive screws. Use a flat head screwdriver.



Loosen the four screws.

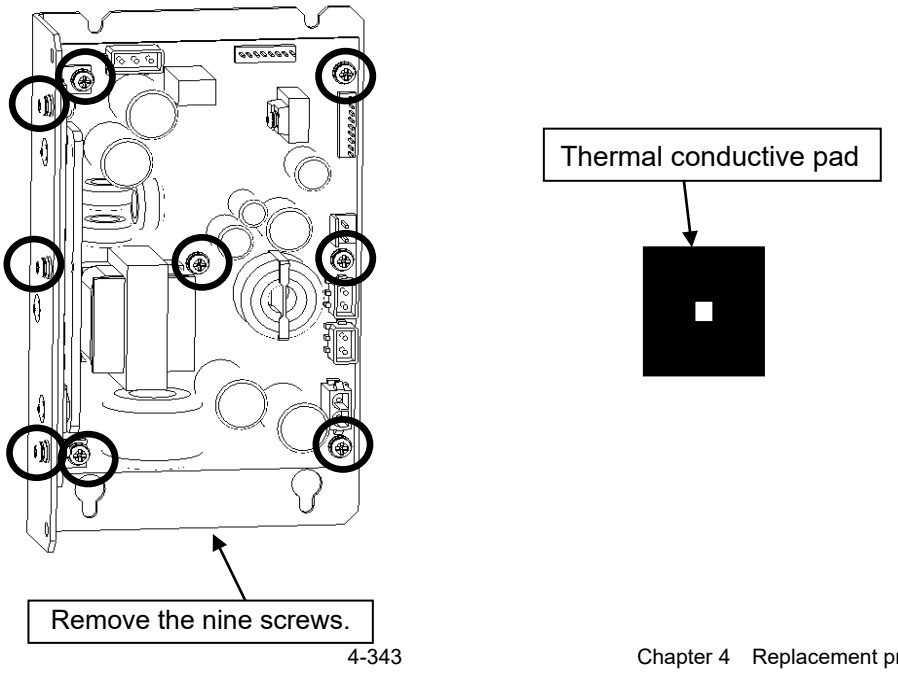
Step 2 Remove the power supply circuit board.

After having removed all the cables connected to the power supply circuit board, remove the fixing screws (four M4 screws) and remove the power supply circuit board with the attached heat radiation plate.



Step 3 Replace the power supply circuit board

Remove the fixing screws (nine M4 screws) and remove the power supply circuit board from the heat radiation plate. If the thermal conductive pad on the heat radiation plate is torn, replace it with the sheet that comes with the replacement power supply circuit board. After having replaced the power supply circuit board, reassemble the unit by following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 4 Operation check

After having completed the replacement, turn On the safety switch and check operation by following the procedure below.

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image is correctly displayed.

This completes power supply circuit board replacement.

4.2.2.5 T/R Control Circuit Board (CMC-1205R) Replacement/NTG-3230

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver(shielded)	Size #2	

⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

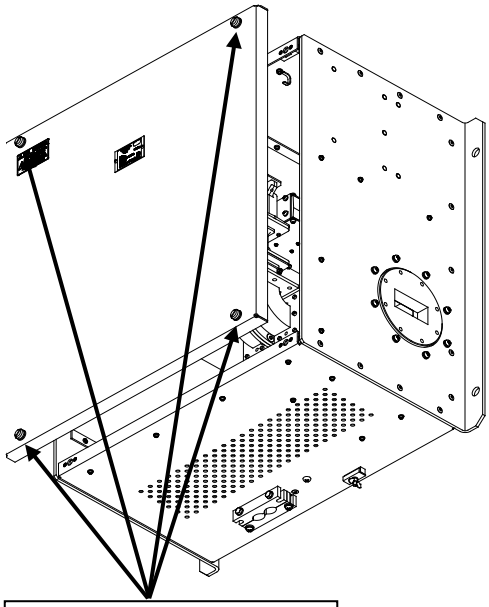
Step 1 Back up the scanner unit data.

Before beginning the replacement procedure, open the service engineer menu of the radar display unit and back up the scanner unit data (transmission time and motor rotation time).

⚠ If you do not back up this data, it will not be possible to maintain continuity in scanner data such as the magnetron usage time

Step 2 Remove the cover.

Loosen the four screws and remove the cover. The screws are slotted captive screws. Use a flat head screwdriver.

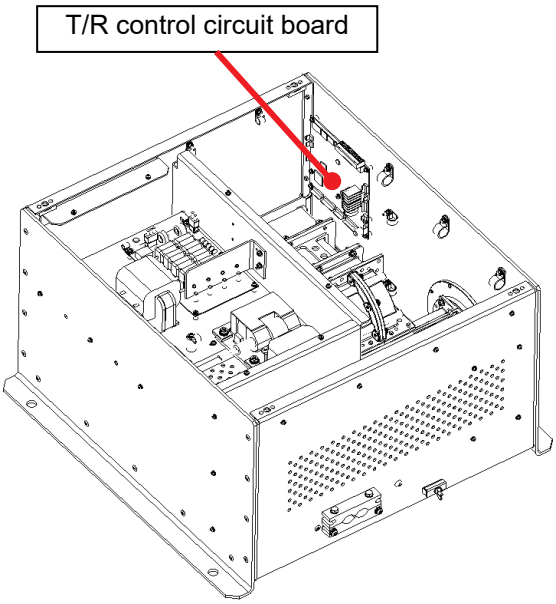


Step 3 Replace the T/R control circuit board.

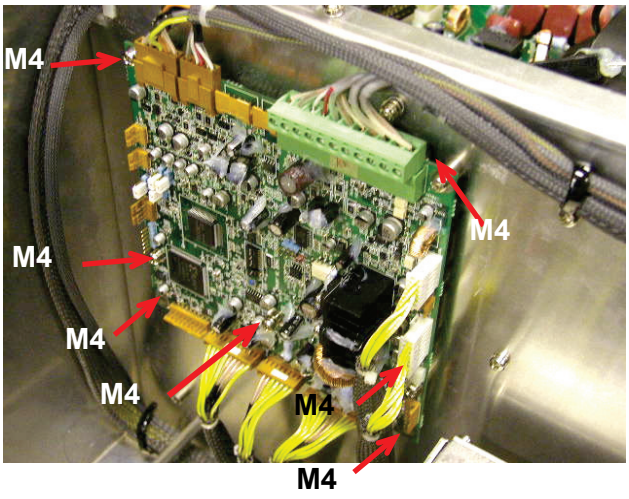
Remove the cables connected to the T/R control circuit board and the screws (seven M4 screws) and replace the T/R control circuit board.

⚠ Set the DIP switch and jumper pins of the T/R control circuit board to suit the NTG-3230.

After replacing the T/R control circuit board, assemble the unit in the reverse order of the disassembly procedure. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Remove the seven screws.



Step 4 Operation check

After completing the replacement work, turn On the safety switch and check operation by following the procedure below.

(1) Turn On the radar, open the service engineer menu, restore the scanner unit times, and make sure that the data has been correctly continued before/after the T/R control circuit board replacement (check the transmission time and the motor rotation time).

(2) Begin transmission once the countdown is complete and check that the radar image is correctly displayed.

This completes T/R control circuit board replacement.

4.2.2.6 Relay Filter Circuit Board (CSC-656) Replacement/NTG-3230

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

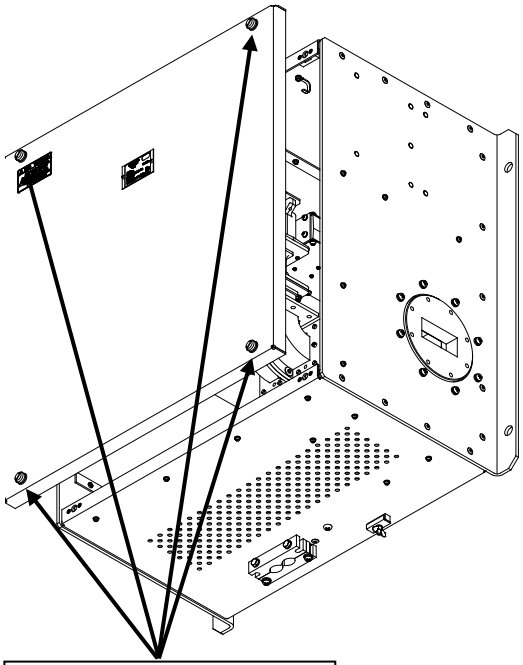
No	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver(shielded)	Size #2	

⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

Step 1 Remove the cover.

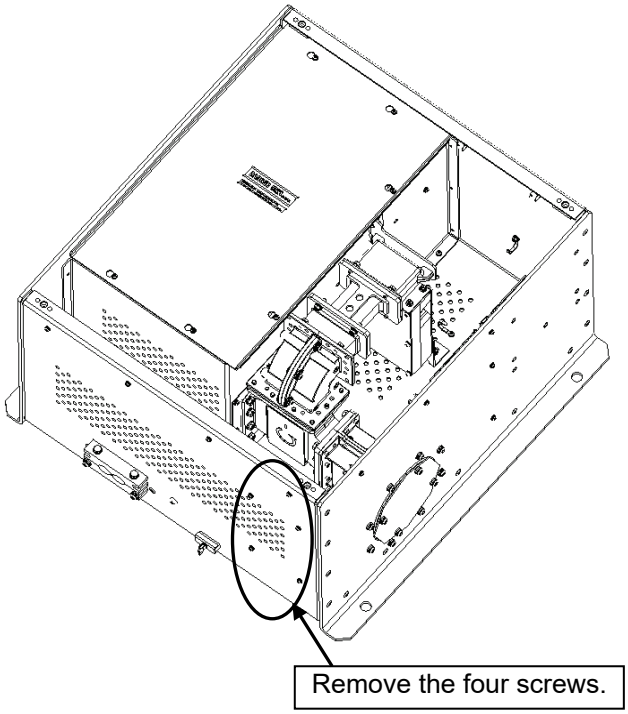
Loosen the four screws and remove the cover. The screws are slotted captive screws. Use a flat head screwdriver.



Loosen the four screws.

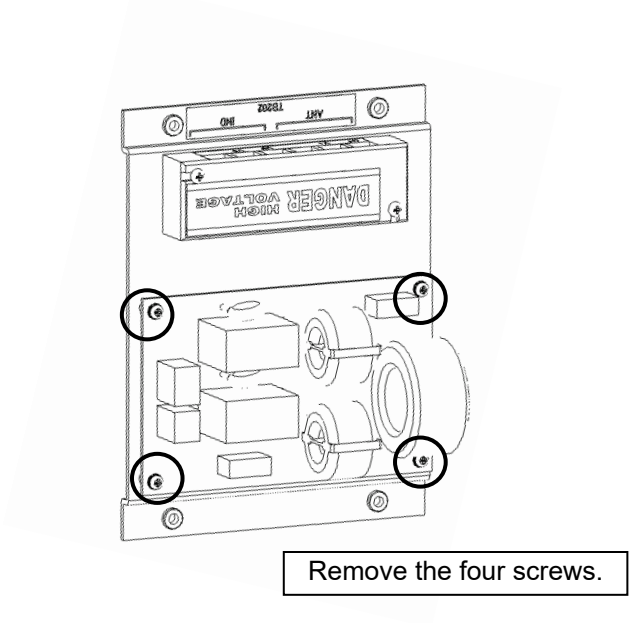
Step 2 Remove the relay filter circuit board.

After having removed all the cables connected to the relay filter circuit board, remove the fixing screws (four M4 screws) and remove the relay filter circuit board together with the metal fitting.



Step 3 Remove the relay filter circuit board.

Remove the screws holding the relay filter circuit board in place (four M4 screws) and replace the relay filter circuit board on the metal fitting. After having replaced the relay filter circuit board, reassemble the unit following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 4 Operation check

After completing the replacement work, turn On the safety switch and check operation by following the procedure below.

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error.

This completes relay filter circuit board replacement.

4.2.2.7 Receiver (NRG-229) Replacement/NTG-3230

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver	Size #2, Size #3	
3	Open-end wrench	Width across flats 17 mm (for M10 screws)	

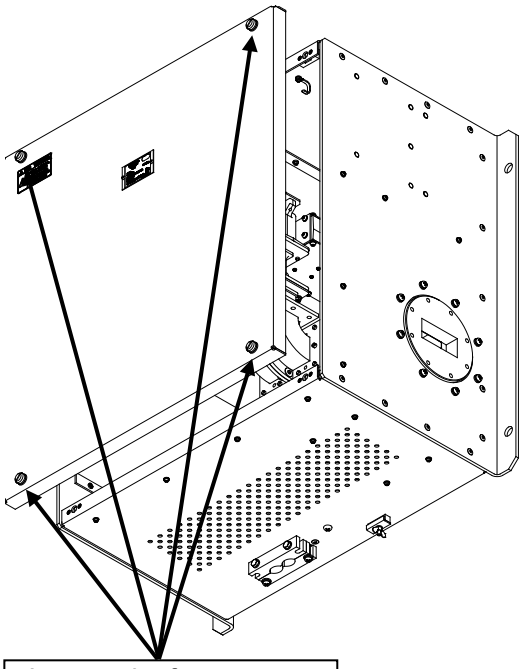
⚠ Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

⚠ Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

Step 1 Remove the cover.

Loosen the four screws and remove the cover. The screws are slotted captive screws.

Use a flat head screwdriver.

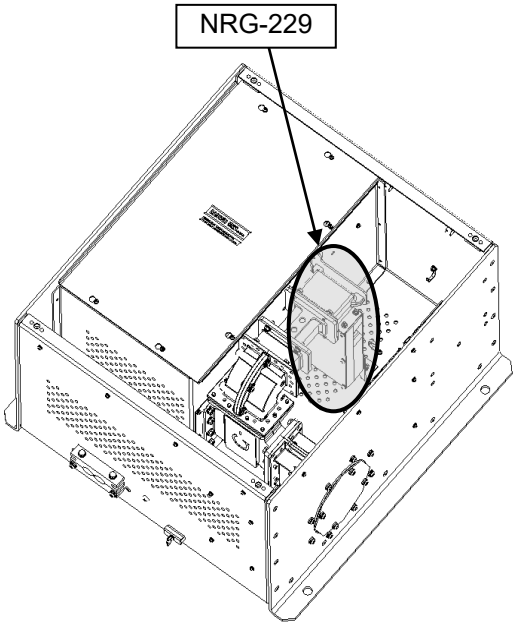


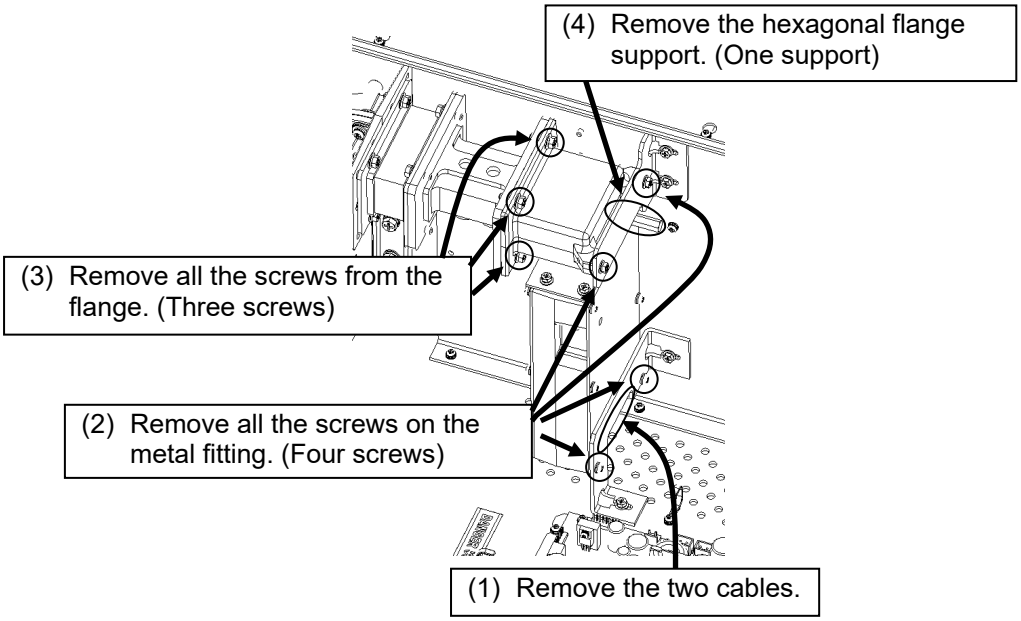
Loosen the four screws.

Step 2 Replace the receiving unit.

Replace the receiver unit according to the following procedure.

(1) Remove the cables connected to the receiver. (Two cables)
(2) Remove all the screws on the metal fitting. (Four screws)
(3) Remove all the screws from the flange. (Three screws)
(4) Remove the hexagonal flange support. (One support)
(5) After having replaced the receiver, reassemble the unit by following the disassembly procedure in the reverse order.
Do not forget to tighten the bolts or screws, and do not forget to reconnect the cables.





Step 3 Operation check

After having completed the replacement, turn On the safety switch and check operation by following the procedure below.

(1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error. Transmit the radar wave in the long range mode and open the service engineer menu to perform tuning adjustment. With the service engineer menu open, also make sure the magnetron current is shown between the 8th and 10th calibration markings.

This completes receiving unit replacement.

4.3 Replacement Procedures for Display Unit

Precautions

Replace the parts by strictly following the precautions below.

⚠CAUTION	
	Before conducting parts replacement work, always be sure that the power to all the Display units (in case a multiple number of Display Units are installed) is OFF. Furthermore, turn OFF the circuit breaker of the main power supply to assure safety.
	While in work, be sure to wear gloves to prevent injury.
	Conduct work in a less quaking condition as mus as possible, such as at a port.
	Before conducting inspection and parts replacement, be sure to always turn OFF the main power supply. Not turning OFF the main power supply may lead to electric shock and failure.
	When replacing the LCD, be sure to do it with at least two persons. If only one person does this work, he/she may drop the LCD, resulting in injury.
	After the main power supply is turned OFF, high voltage remains temporarily, so never touch the inverter circuit of the LCD with bear hands. Doing so may cause electric shock.

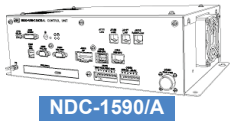
Checking Each Type of Unit

JMR-9200 Series/JAN-9201/JAN-9202

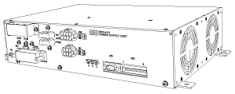
● Standard equipments

● Standalone type

● NCM-928 Control Unit



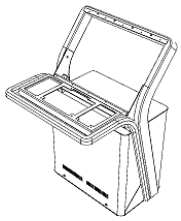
NDC-1590/A
CENTRAL CONTROL UNIT
(CCU)



NBD-913
POWER SUPPLY UNIT
(PSU)



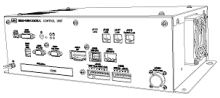
NCE-5605
TRACKBALL OPERATION UNIT
(TOPU)



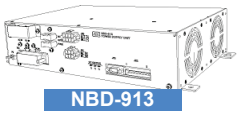
CWA-246
26inch DISPLAY UNIT MOUNT KIT

● Desktop type

● NCM-928 Control Unit



NDC-1590/A
CENTRAL CONTROL UNIT
(CCU)



NBD-913
POWER SUPPLY UNIT
(PSU)



NCE-5605
TRACKBALL OPERATION UNIT
(TOPU)

CWB-1595
26inch Desktop Frame

CWB-1596
OPU Desktop Frame

● Desktop type cable
CML-901-F
DISPLAY UNIT
INTERCONNECTION(F)

● Select equipment



NCE-5625
KEYBOARD OPERATION UNIT
(KOPU)

or



CWB-1593
LARGE TRAY



NWZ-208
26inch MONITOR UNIT
(26 inch MNU)

or

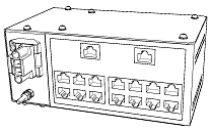


NWZ-208-TP
26inch TOUCH PANEL
MONITOR UNIT
(26 inch T.P. MNU)

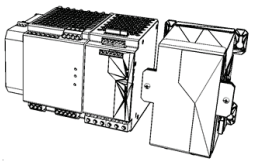
● Option equipment



NQE-1143
JUNCTION BOX
(JB)



NQA-2443/A
SENSOR LAN SWITCH UNIT



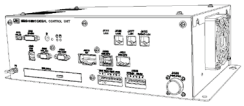
- **QUINT-PS/1AC/24DC/20**
- **QUINT-BAT/24DC/3.4AH**
- **QUINT-DC-UPS/24DC/20**
  or QUINT-UPS/24DC/24DC/20
- **ME-MAX-NEF/QUINT20**

UPS

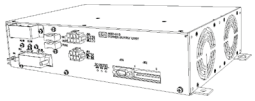
●Standard equipment

●Stand alone type

●NCM-928 Control Unit



NDC-1590/A
CENTRAL CONTROL UNIT
(CCU)



NBD-913
POWER SUPPLY UNIT
(PSU)



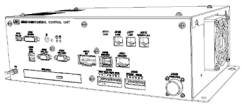
NCE-5605
TRACKBALL OPERATION UNIT
(TOPU)



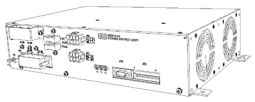
CWA-245
19inch DISPLAY UNIT MOUNT KIT

●Desktop type

●NCM-928 Control Unit



NDC-1590/A
CENTRAL CONTROL UNIT
(CCU)



NBD-913
POWER SUPPLY UNIT
(PSU)



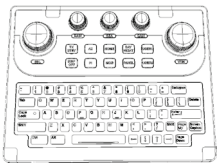
NCE-5605
TRACKBALL OPERATION UNIT
(TOPU)

CWB-1594
or
CWB-1659
19inch Desktop Frame

CWB-1596
OPU Desktop Frame

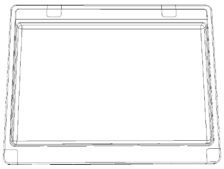
●Desktop type Cable
CML-901-F
DISPLAY UNIT INTERCONNECTION(F)

●Select equipment

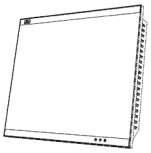


NCE-5625
KEYBOARD OPERATION UNIT
(KOPU)

or

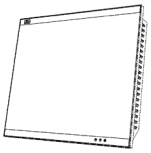


CWB-1593
LARGE TRAY



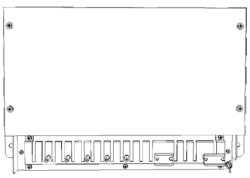
NWZ-207
or
NWZ-214
19inch MONITOR UNIT
(19 inch MNU)

or

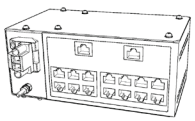


NWZ-207-TP
19inch TOUCH PANEL
MONITOR UNIT
(19 inch T.P. MNU)

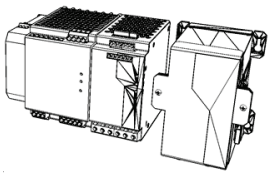
●Option equipment



NQE-1143
JUNCTION BOX
(JB)



NQA-2443/A
SENSOR LAN SWITCH UNIT



- **QUINT-PS/1AC/24DC/20**
- **QUINT-BAT/24DC/3.4AH**
- **QUINT-DC-UPS/24DC/20**
  or QUINT-UPS/24DC/24DC/20
- **ME-MAX-NEF/QUINT20**

UPS

Checking Various Types of Interface Boards

The NQE-1143 junction box (JB) consists of interface boards in accordance with its suffix. There are the following types of interface boards.

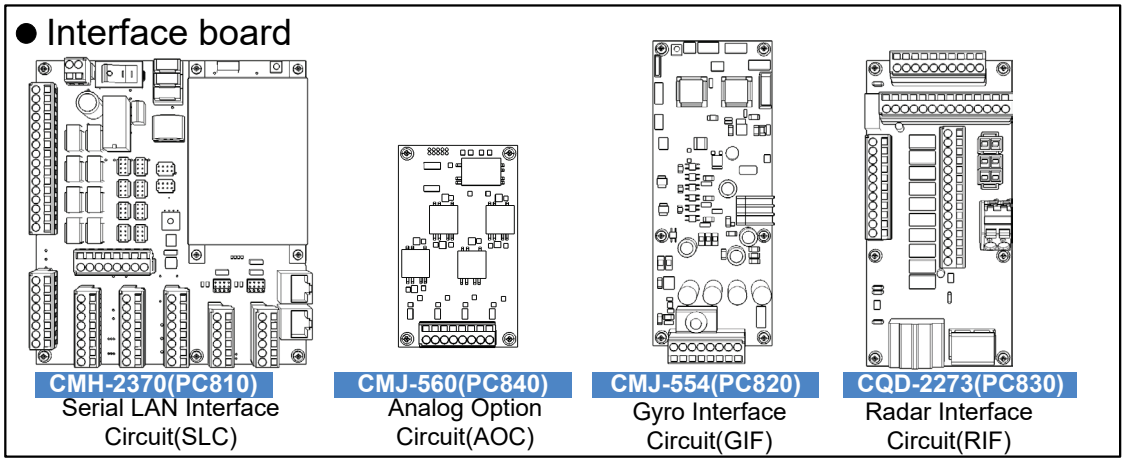


Fig. 1 External Views of Interface Boards

Table -1 Definitions of Leg Numbers of the Junction Board Model Names

Suffix	SLC	AOC	GIF	RIF	SLC#2
-R				✓	
-S	✓				
-SR	✓			✓	
-SS	✓				✓
-GR			✓	✓	
-SAR	✓	✓		✓	
-SA	✓	✓			
-SGR	✓		✓	✓	
-SAGR	✓	✓	✓	✓	
-SG	✓		✓		
-SAG	✓	✓	✓		
-SAS	✓	✓			✓

Thus, if the model name of the junction box is "NQE-1143-SAGR," it indicates that the junction box consists of a serial LAN interface circuit (SLC), an analog option circuit (AOC), a gyro interface circuit (GIF), and a radar interface (RIF).

4.3.1 26 Inch Monitor Unit: MNU NWZ-208

4.3.1.1 Replacing the 26 Inch MNU: NWZ-208

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Flat head screwdriver	2 mm, 6 mm	
2	Phillips screwdriver	Size #2, Size #3	
3	Diagonal pliers	—	
4	Cable-tie *1	—	

*1 A number of cable-ties may be required.

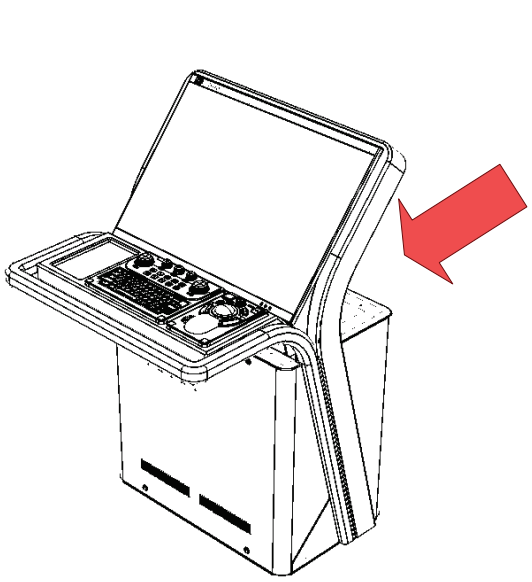
⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

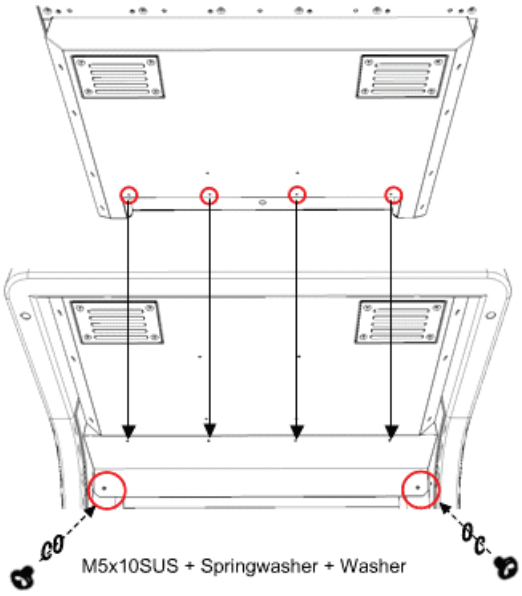
⚠ Do not lose the screws as they will be needed again.

⚠ To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand.

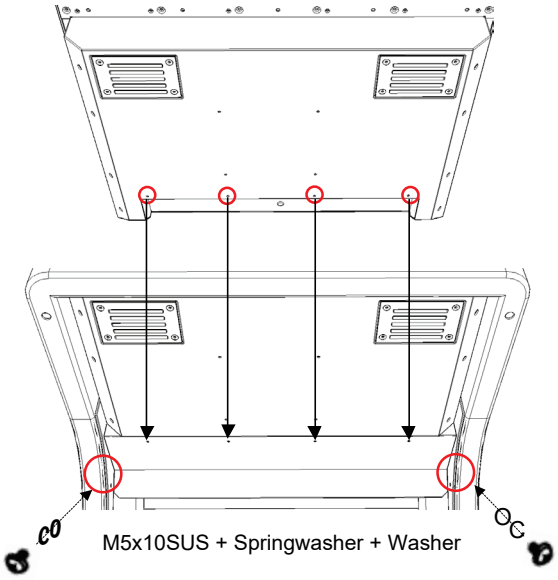
Step 1 Remove the back cover of the monitor.

Remove the screws (M5: 2 locations, M3: 4 locations) on the back of the monitor and then remove the back cover.



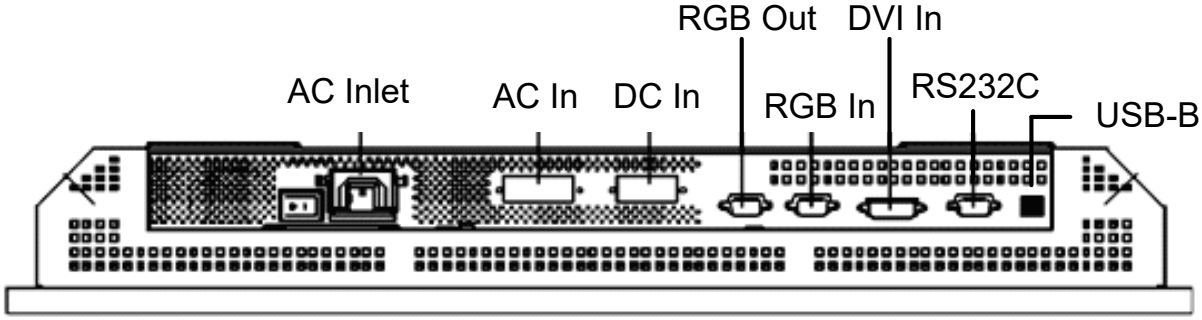


In 2020 later



Step 2 Remove all the cables.

Remove the DVI cables and the DC power cable on the back of the monitor. Remove the USB cable if the monitor uses one.



⚠CAUTION

Before conducting Unit replacement work, always be sure that every cable-tie that fastens the cable has been removed.

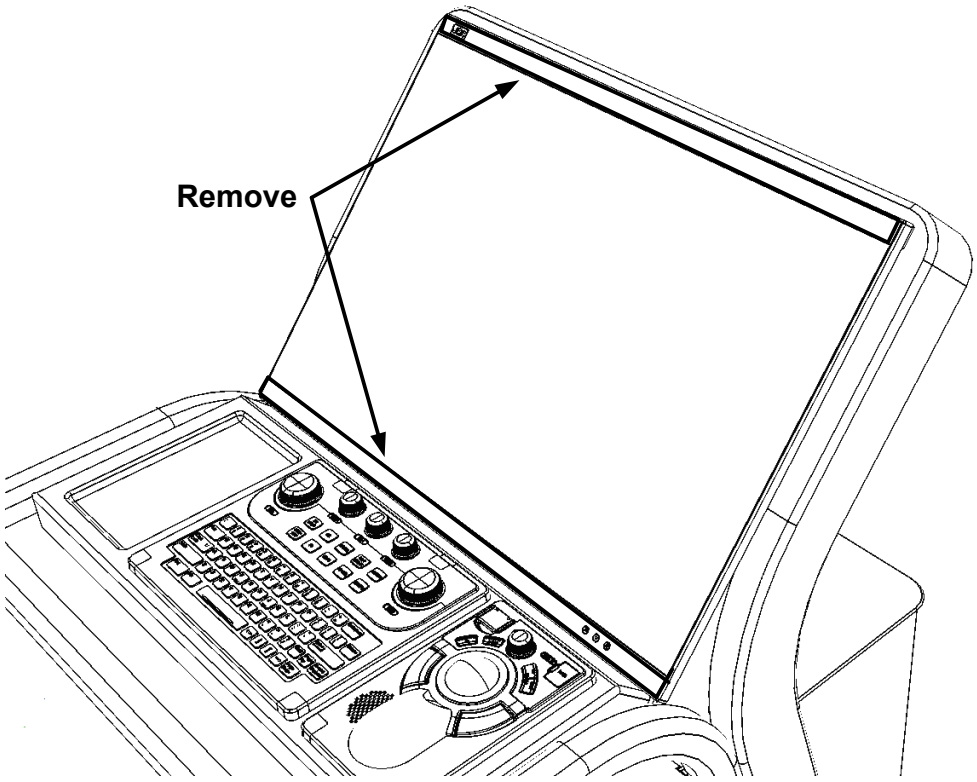
Replacement work without the above may lead Unit/cable breakage.

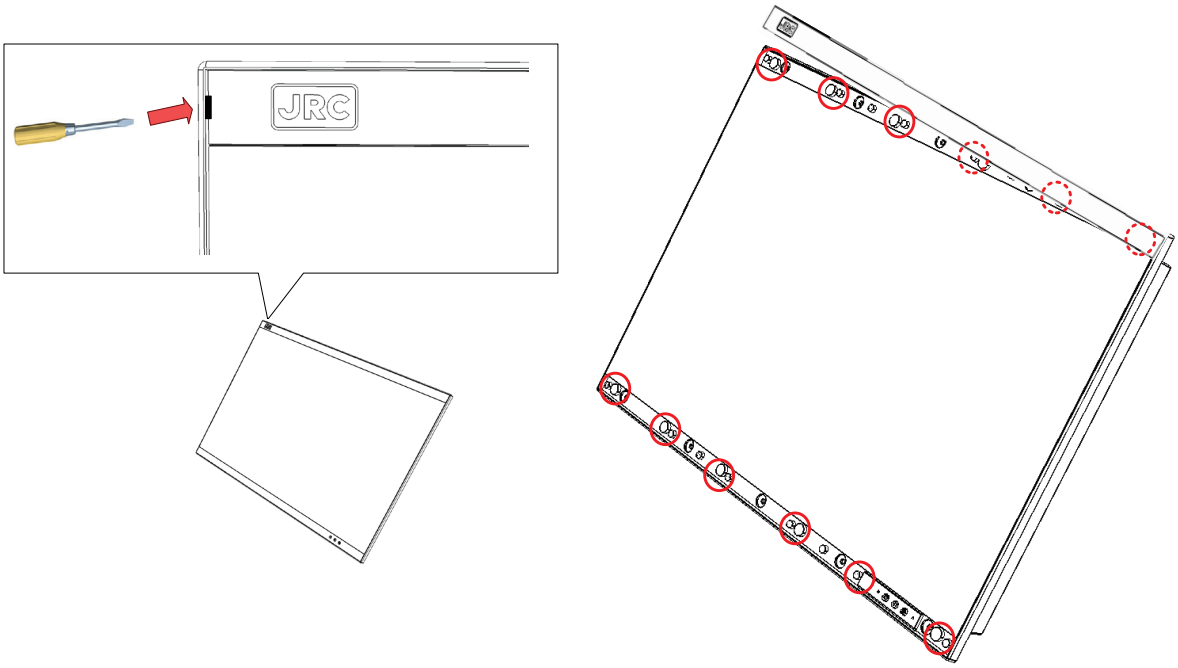
Step 3 Remove the top and bottom screw covers of the monitor.

Using a 2 mm flat head screwdriver, remove the top and bottom screw covers of the monitor.

The top and bottom screw covers are fastened with a total of six stoppers. Insert a flat head screwdriver into the driver insertion mouths at both edges and remove each cover by raising the cover from the edges little by little. If you try to remove the covers by force, it may damage the monitor or break the screw covers, so be careful.

⚠ Do not damage the screw covers while removing them. Hold down each screw cover near the stoppers, slowly apply force in the vertical direction to eliminate flexure as much as possible, and then remove the cover.





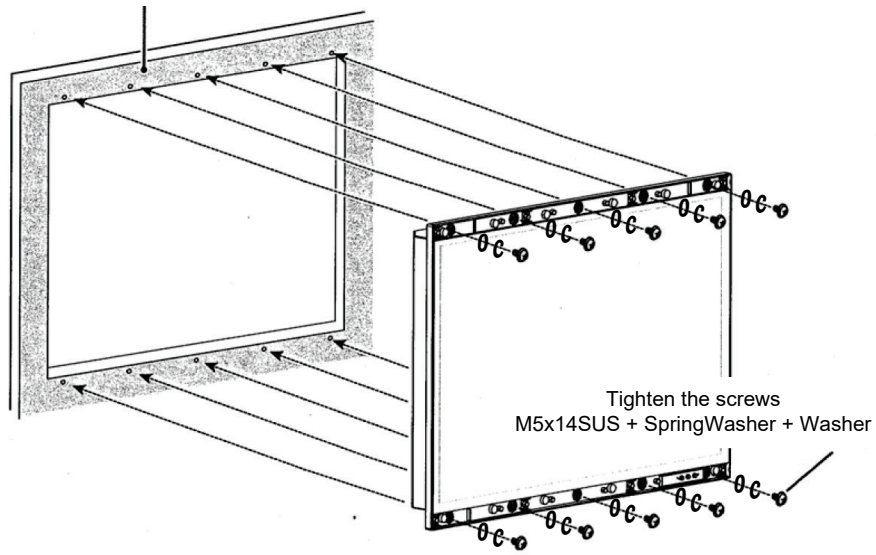
Step 4 Change the monitor.

Remove the screws that fasten the monitor and change the monitor.

26 inch: M5 at 10 locations

After replacing the monitor, assemble to the original condition by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.

Display Unit Mount Kit



Step 5 Check operation.

After monitor replacement is completed, turn ON the circuit breaker for the power supply of the display unit and check the operation as follows.

(1) Turn ON the power to the display unit and make sure that screen display is normal. Adjust brightness and make sure that brightness changes.

(2) Referring to "7.2.2 Checking the Condition of the Screen [Monitor Test]," check the screen display to make sure that there is no problem.

This completes monitor replacement.

4.3.1.2 Replacing the 26 Inch MNU Replacement FAN Kit: 7ZYNA4005

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

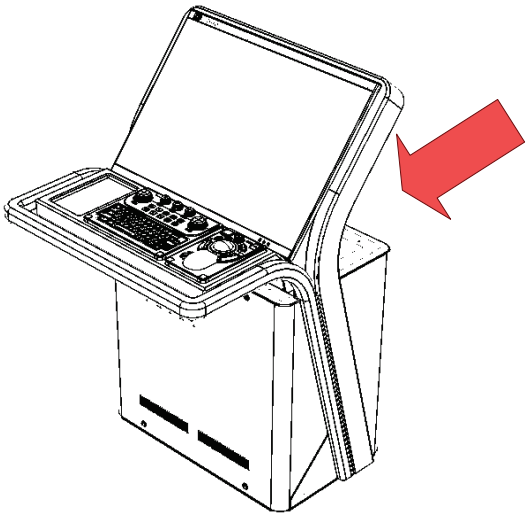
No.	Name	Size	Appearance
1	Phillips screwdriver	Size #2	

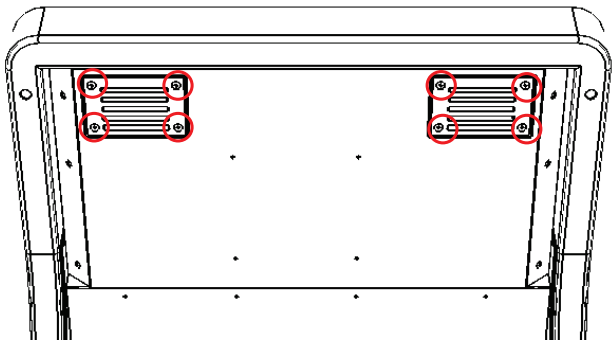
⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

Step 1 Remove the two fan covers on the back of the monitor.

Remove the two fan covers on the back of the 26 inch monitor (M3: total of 8 locations).



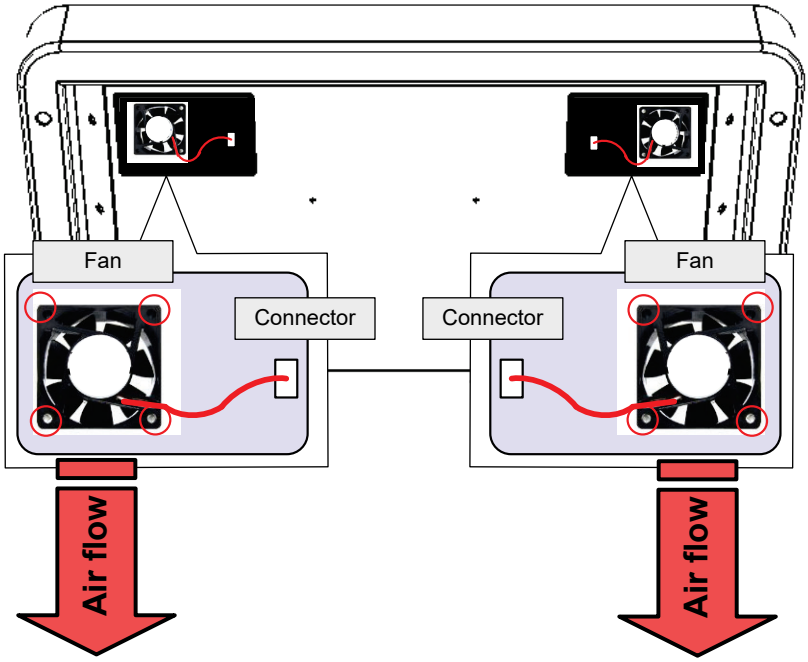


Step 2 Change the fans.

Disconnect the connectors of the fans. Remove the screws (M3: 4 locations) that fasten each fan and change the fans. Install the fans so that the air flows to the exhaust direction (coming out of the monitor).

⚠ Be careful with the fan mounting direction. Be sure to install the fans so that the air flows out of the the monitor.

⚠ Have enough clearance to prevent the cables from being caught in the blades of the fans.



After replacing the fans, assemble to the original condition by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.

Step 3 Check operation.

After monitor fan replacement is completed, turn ON the circuit breaker for the power supply of the display unit and check the operation as follows.

(3) Turn ON the power to the display unit and make sure that screen display is normal. Adjust brightness and make sure that brightness changes.
(4) Check that the fan error " LCD (FAN #n)" does not occur.
(5) Referring to "7.2.2 Checking the Condition of the Screen [Monitor Test]," check the screen display to make sure that there is no problem.

This completes monitor fan replacement.

4.3.2 19 Inch Monitor Unit: MNU NWZ-207

4.3.2.1 Replacing the 19 Inch MNU: NWZ-207

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Flat head screwdriver	2 mm, 6 mm	
2	Phillips screwdriver	Size #1, Size #2	
3	Diagonal pliers	—	
4	Cable-tie *1	—	

*1 A number of cable-ties may be required.

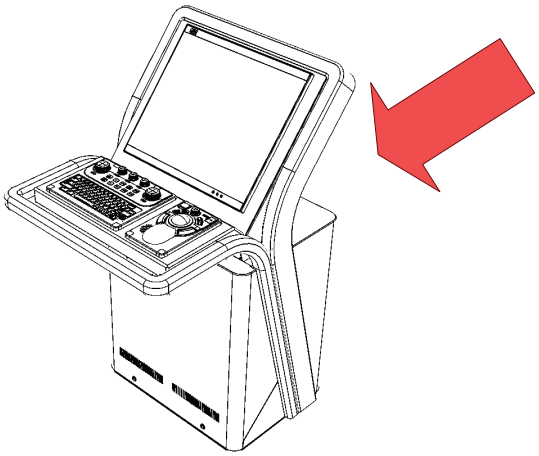
⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

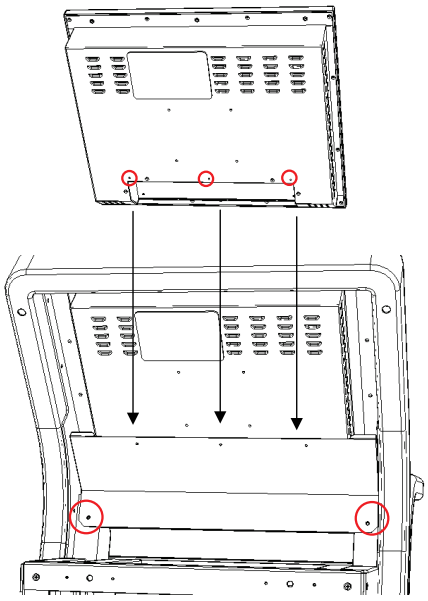
⚠ Do not lose the screws as they will be needed again.

⚠ To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand.

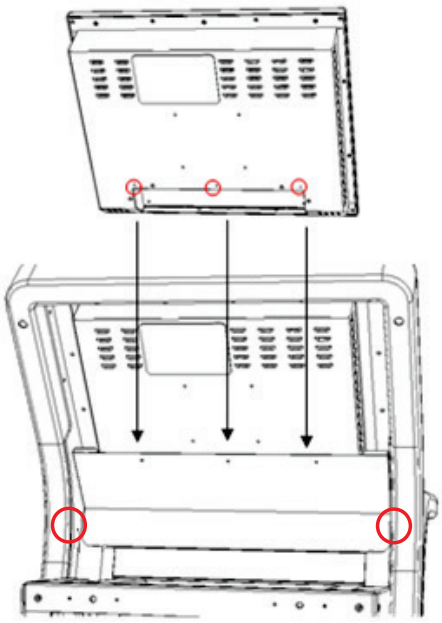
Step 1 Remove the back cover of the monitor.

Remove the screws (M5: 2 locations, M3: 3 locations) on the back of the monitor and then remove the back cover.



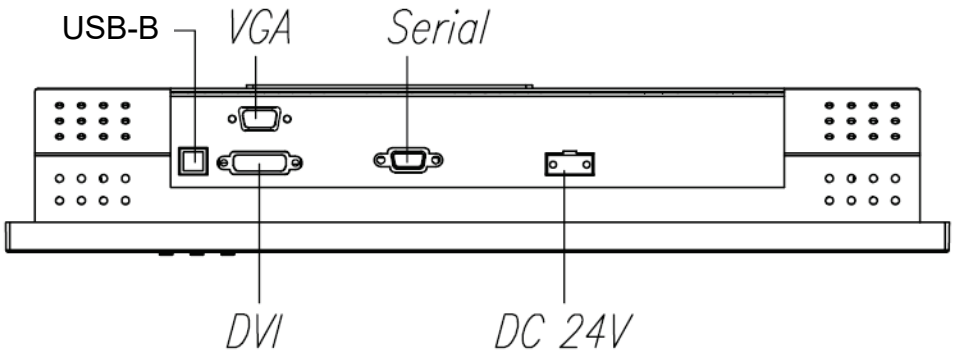


In 2020 later



Step 2 Remove all the cables.

Remove the DVI cables and the DC power cable on the back of the monitor. Remove the USB cable if the monitor uses one.



⚠CAUTION

Before conducting Unit replacement work, always be sure that every cable-tie that fastens the cable has been removed.

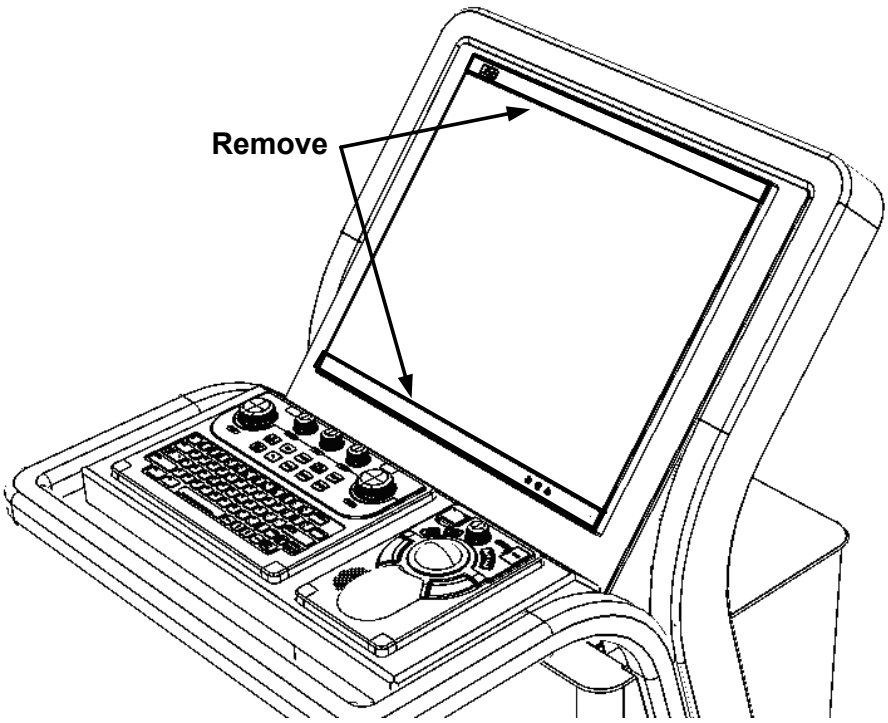
Replacement work without the above may lead Unit/cable breakage.

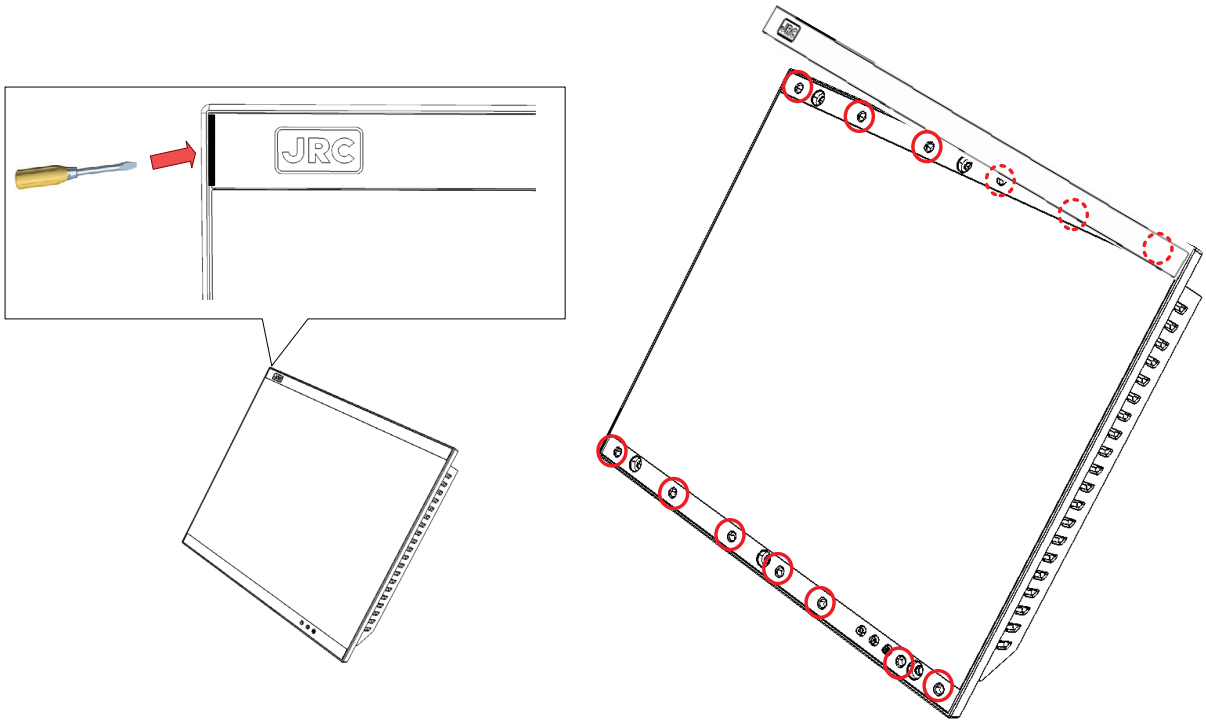
Step 3 Remove the top and bottom screw covers of the monitor.

Using a 4 mm width flat head screwdriver, remove the top and bottom screw covers of the monitor.

The top and bottom screw covers are fastened with six stoppers and seven stoppers, respectively. Insert a flat head screwdriver into the driver insertion slots at both edges and remove each cover by raising the cover from the edges little by little. If you try to remove the covers by force, it may damage the monitor or break the screw covers, so be careful.

⚠ Do not damage the screw covers while removing them. Hold down each screw cover near the stoppers, slowly apply force in the vertical direction to eliminate flexure as much as possible, and then remove the cover



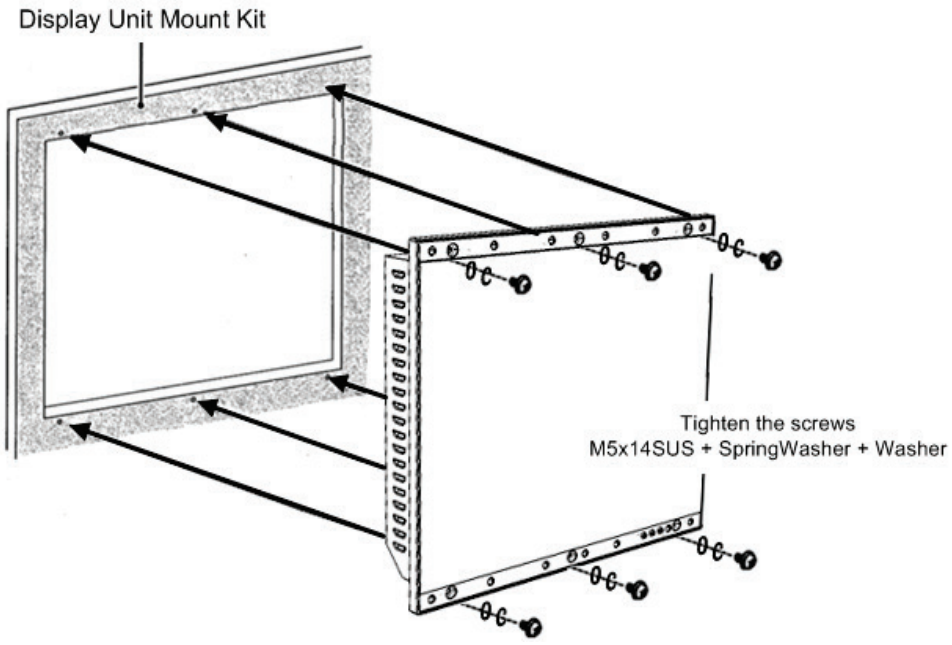


Step 4 Change the monitor.

Remove the screws that fasten the monitor and change the monitor.

19 inch: M5 at 6 locations

After replacing the monitor, assemble to the original condition by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.



Step 5 Check operation.

After monitor replacement is completed, turn ON the circuit breaker for the power supply of the display unit and check the operation as follows.

(1) Turn ON the power to the display unit and make sure that screen display is normal. Adjust brightness and make sure that brightness changes.
(2) Referring to "7.2.2 Checking the Condition of the Screen [Monitor Test]," check the screen display to make sure that there is no problem.

This completes monitor replacement.

4.3.2.2 Replacing the 19 Inch MNU Replacement FAN Kit: 7ZYNA4004

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

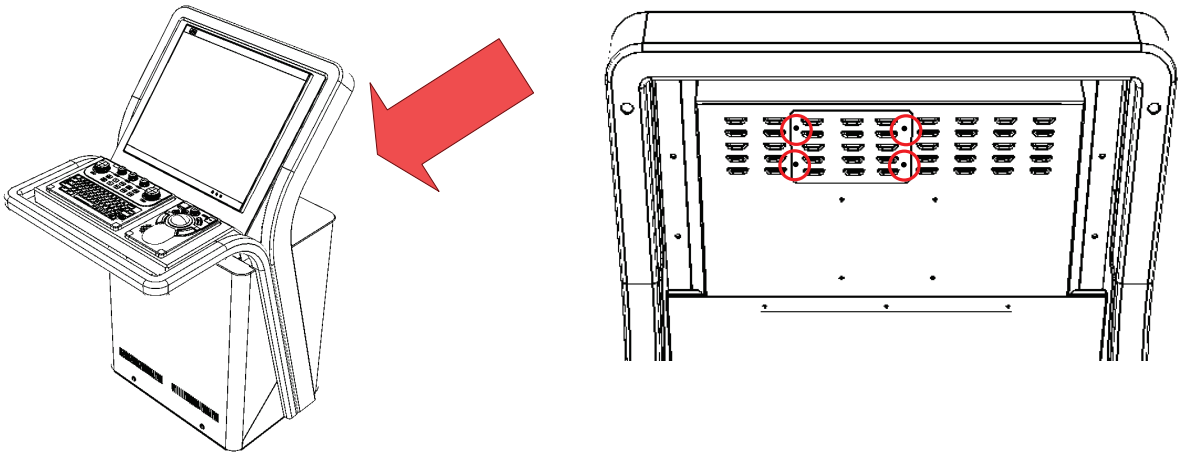
No.	Name	Size	Appearance
1	Phillips screwdriver	Size #1, Size #2	

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

Step 1 Remove the fan cover on the back of the monitor.

Remove the fan cover on the back of the 19 inch monitor (M3: total of 4 locations).

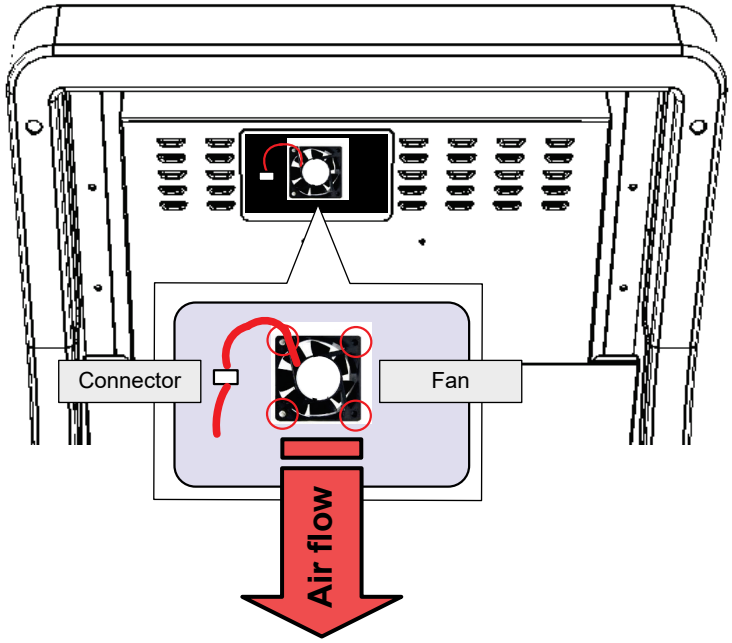


Step 2 Change the fan.

Disconnect the connector of the fan. Remove the screws (M4: 4 locations) that fasten the fan and change the fan. Install the fan so that the air flows to the exhaust direction (coming out of the monitor).

⚠ Be careful with the fan mounting direction. Be sure to install the fan so that the air flows out of the monitor.

⚠ Have enough clearance to prevent the cables from being caught in the blades of the fan.



After replacing the fans, assemble to the original condition by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.

Step 3 Checking operation

After monitor fan replacement is completed, turn ON the circuit breaker for the power supply of the display unit and check the operation as follows.

(1) Turn ON the power to the display unit and make sure that screen display is normal. Adjust brightness and make sure that brightness changes.
(2) Check that the fan error "LCD (FAN #n)" does not occur.
(3) Referring to "7.2.2 Checking the Condition of the Screen [Monitor Test]," check the screen display to make sure that there is no problem.

This completes monitor fan replacement.

4.3.3 19 Inch Monitor Unit: MNU NWZ-214

4.3.3.1 Replacing the 19 Inch MNU: NWZ-214

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2	
2	Flat head screwdriver	2mm, 6mm	

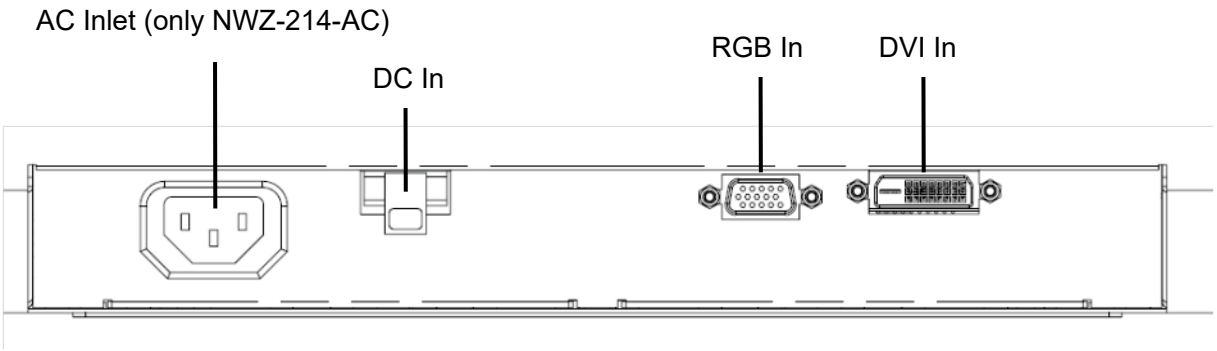
⚠ Before conducting replacement work, turn Off the main power supply of the display unit.

⚠ Do not lose the screws as they will be used again.

⚠ To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand. During removal, if the excess length of the cable is short, the unit and cable may be damaged.

Step 1 Remove all the cables.

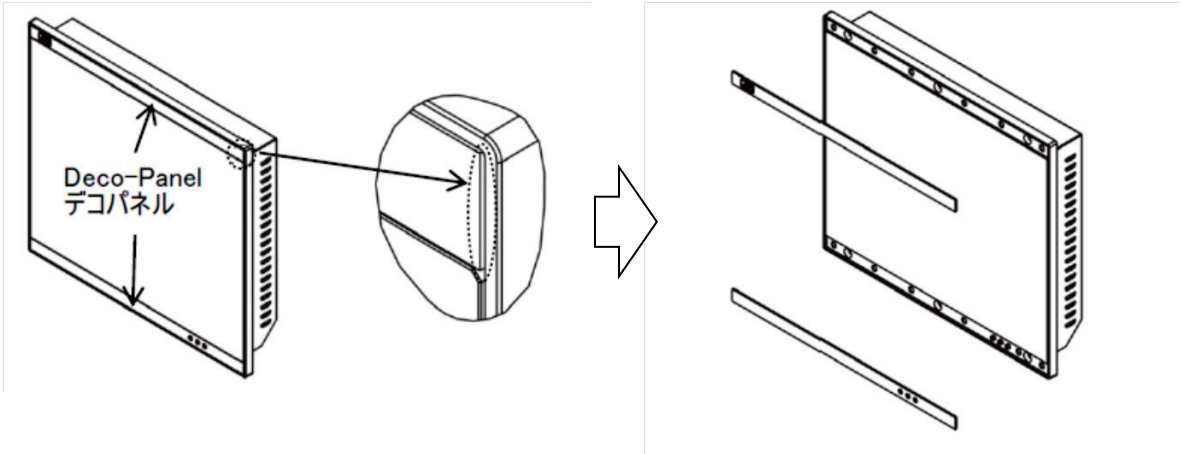
Remove all cables such as DVI cable and power cable from the rear face of the monitor.



Step 2 Remove the Deco-Panels.

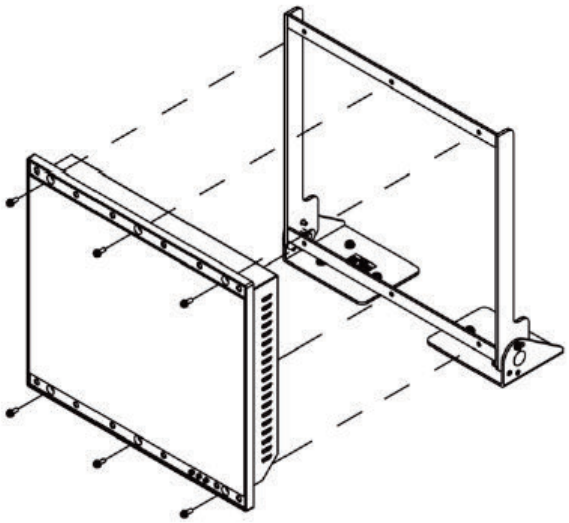
Using a flat head screwdriver, remove the top and bottom Deco-Panels of the monitor. The Deco-Panels are fastened with six top and bottom stoppers. Insert the flat head screwdriver into the driver insertion port at both edges and remove each Deco-Panel while raising the panel from the edges little by little. Be aware that an attempt made to remove the panels by force may damage the unit or break the Deco-Panels.

⚠ Remove the Deco-Panels carefully not to damage them. Hold down each Deco-Panel near the stoppers, slowly apply force in the vertical direction while eliminating flexure as much as possible, and then remove the panel.



Step 3 Remove the monitor.

Remove screws (M5 at six locations) that fasten the monitor, and remove the monitor.



Step 4 Change the monitor.

Replace the monitor, and follow steps 3 to 1 to assemble the monitor unit.

Step 5 Operation check

After monitor replacement is completed, turn ON the main power supply of the display unit and check the operation as follows.

(1) Turn ON the power to the display unit and make sure that screen display is normal. Adjust brightness and make sure that brightness changes.

(2) Referring to "7.2.2 Checking the Condition of the Screen [Monitor Test]," check the screen display to make sure that there is no problem.

(3) Referring to “4.4.4.1 Clearing operation time of Workstation,” reset the use time for the LCD and LCD fan.

This completes monitor replacement.

4.3.3.2 Replacing the 19 Inch MNU Replacement FAN Kit: 7BFRD0008

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2	

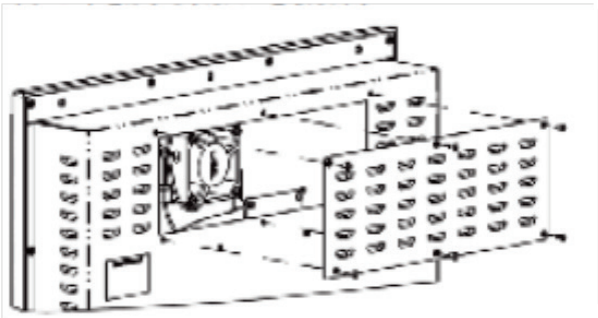
⚠ Before conducting replacement work, turn Off the main power supply of the display unit.

⚠ Do not lose the screws as they will be used again.

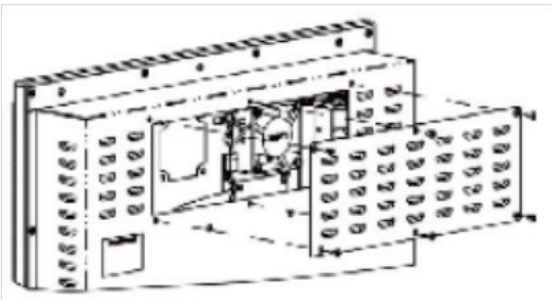
⚠ To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand. During removal, if the excess length of the cable is short, the unit and cable may be damaged.

Step 1 Remove the rear cover of the monitor.

Remove the rear screws (M3 at six locations) of the 19-inch monitor, and remove the rear fan cover of the monitor.



NWZ-214 (DC MODEL)

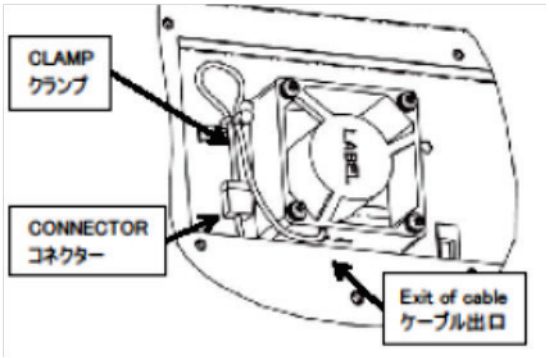


NWZ-214-AC (AC-DC MODEL)

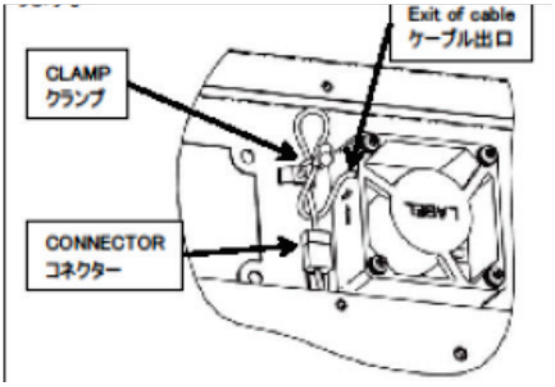
Step2 Remove all the cables.

Remove the cable from the clamp, and remove the connector.

⚠ The fan mounting orientation varies between the DC model and AC-DC model.



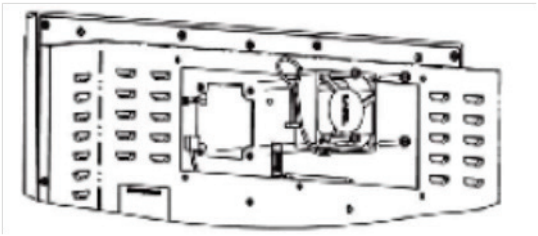
NWZ-214 (DC MODEL)



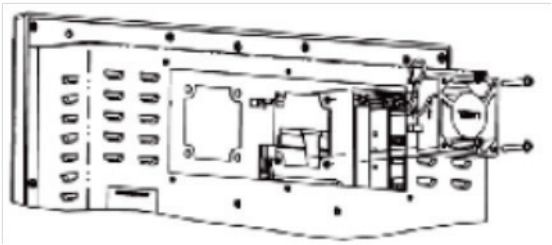
NWZ-214-AC (AC-DC MODEL)

Step 3 Remove the fan.

Remove screws (M3 at four locations), and remove the fan.



NWZ-214 (DC MODEL)



NWZ-214-AC (AC-DC MODEL)

Step 4 Replace and assemble the fan.

Replace the fan, and follow steps 3 to 1 to assemble the fan.

Step 5 Operation check

After fan replacement is completed, turn ON the main power supply of the display unit and check the operation as follows.

(1) Turn ON the power to the display unit and make sure that screen display is normal. Adjust brightness and make sure that brightness changes.

(2) Referring to "7.2.2 Checking the Condition of the Screen [Monitor Test]," check the screen display to make sure that there is no problem.

(3) Referring to “4.4.4.1 Clearing operation time of Workstation,” reset the use time for the LCD fan.

This completes monitor replacement.

4.3.4 Central Control Unit: CCU NDC-1590/A

4.3.4.1 Confirming of type name (NDC-1590 / NDC-1590A)

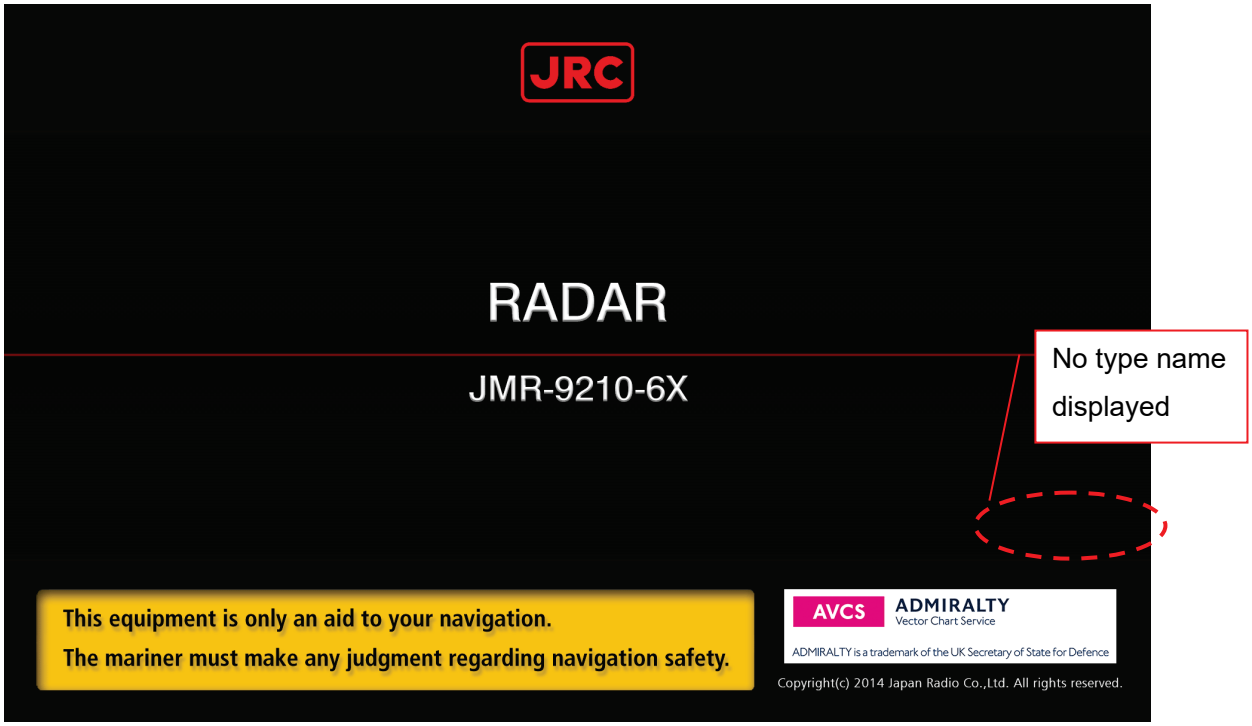
Confirming of type name before turning on the power

Remove the CCU cover. And check the type name on the front of the CCU.

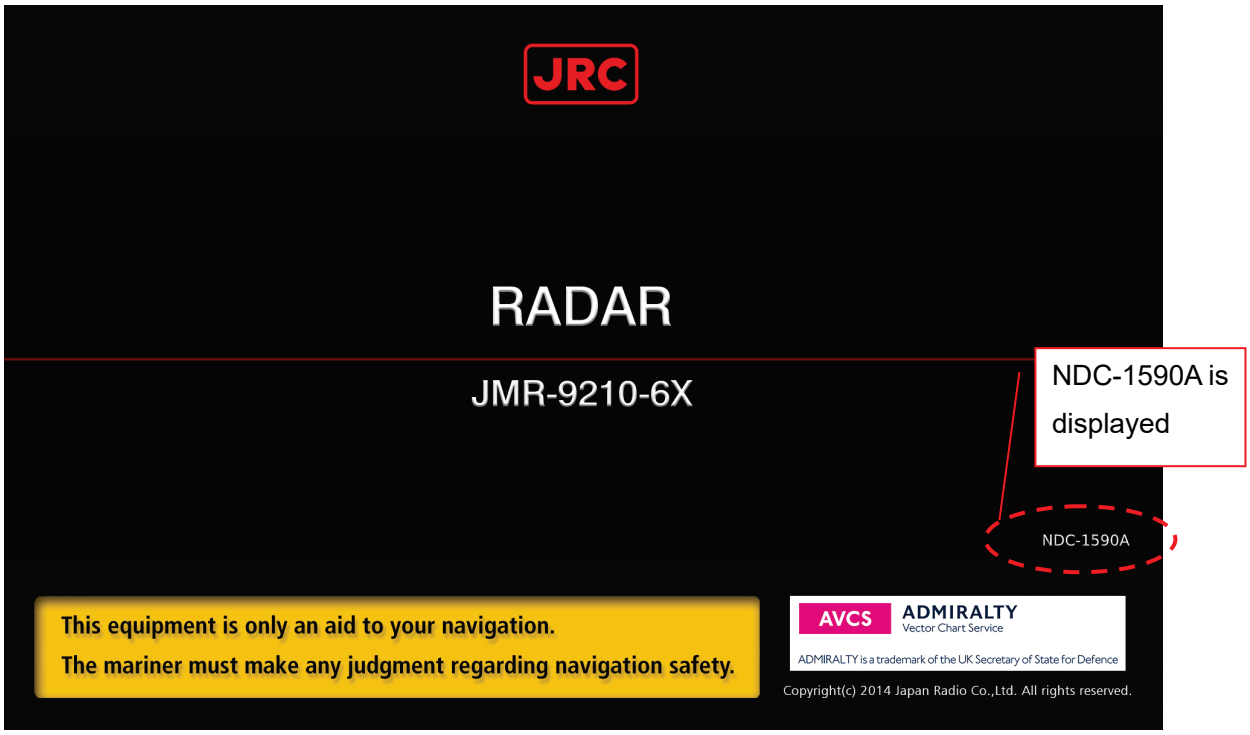


Confirming of type name during start up

After press the [POWER] button, check whether NDC-1590A of type name is displayed on the startup screen.



Startup screen of NDC-1590



Startup screen of NDC-1590A

Confirming of type name after startup

Check the system information dialog whether NDC-1590A of type name is displayed by using the following procedure.

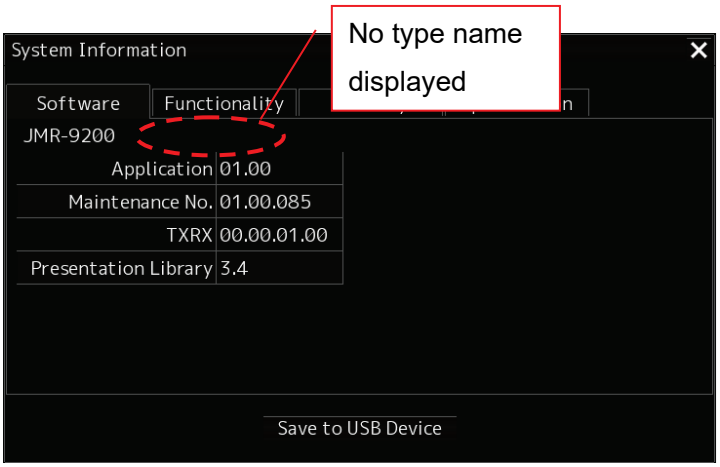
1 Click on the [Menu] button on the left Tool Bar.

The menu is displayed.

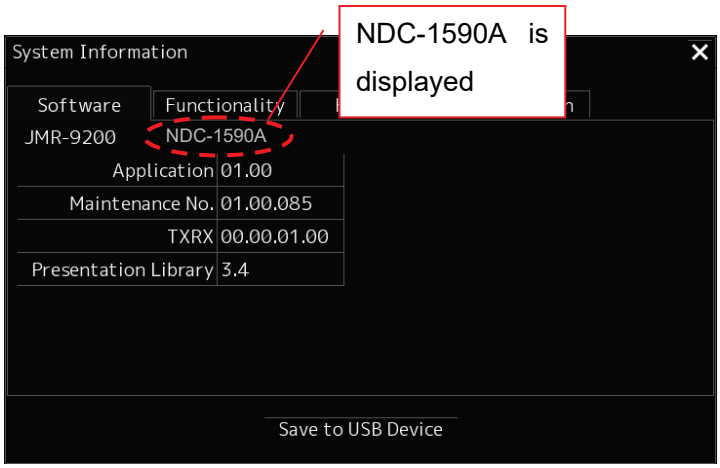
2 Click on the [Maintenance] - [System Information] button on the menu.

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.



System Information dislog of NDC-1590



System Information dislog of NDC-1590A

4.3.4.2 Cleaning the Vents of the CCU

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver	Size #2	
3	Diagonal pliers	—	
4	Cable-tie *1	—	
5	Soft dry cloth	—	—

*1 A number of cable-ties may be required.

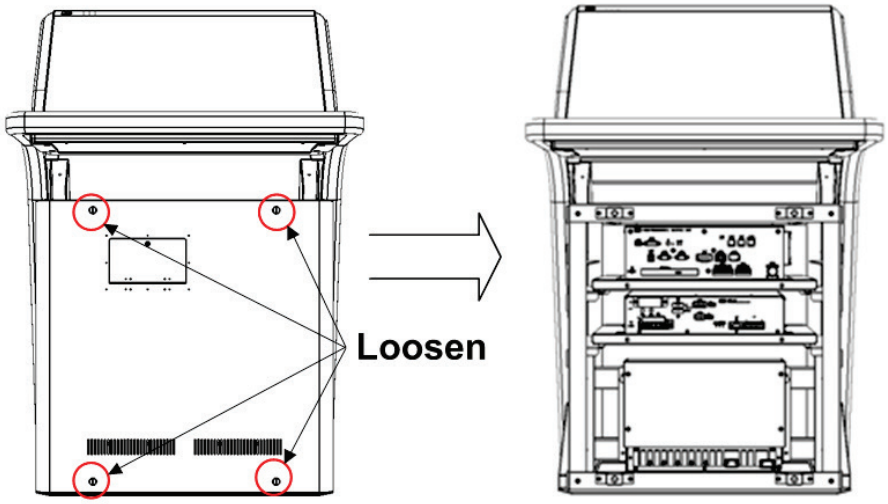
⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

⚠ To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand.

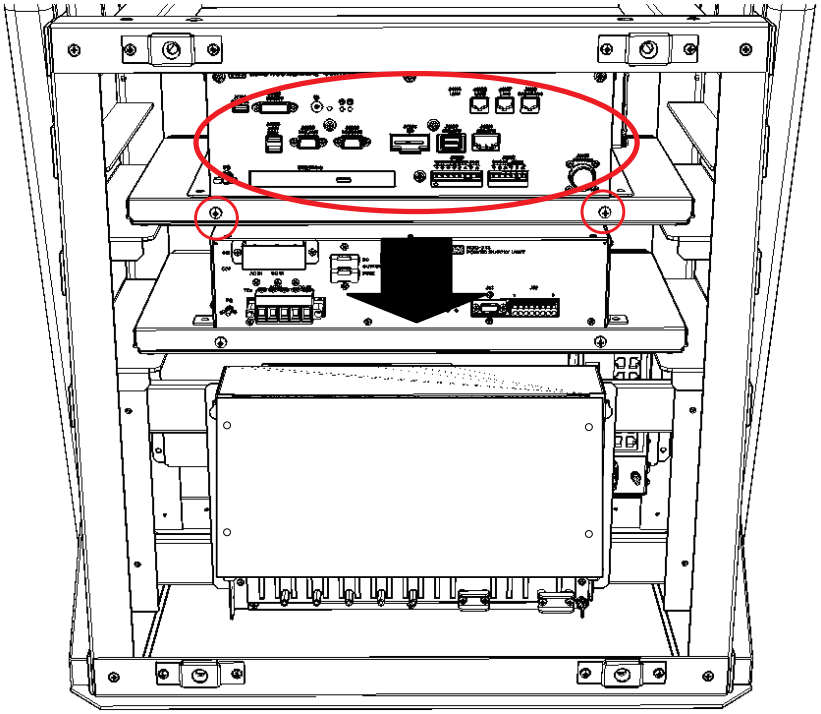
Step 1 Remove the front cover of the display unit mount kit.

Loosen the screws that fasten the front cover of the display unit mount kit with a flat head screwdriver and then take out the front cover.



Step 2 Remove the CCU from the display unit mount kit.

Remove all the cables being connected to the front of the CCU. Remove the screws (M5: 2 locations) of the mounting plate that fasten the CCU, pull out the CCU together with the mounting plate, and then remove it from the display unit mount kit.



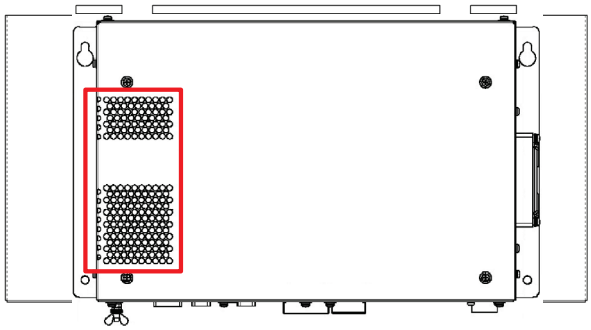
⚠CAUTION

Before conducting Unit replacement work, always be sure that every cable-tie that fastens the cable has been removed.

Replacement work without the above may lead Unit/cable breakage.

Step 3 Clean the vents in the upper part of the CCU.

Clean the vents in the upper part of the CCU with a soft dry cloth. After cleaning the vents, reinstall the CCU by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.



Step 4 Checking operation

After cleaning is completed, turn ON the circuit breaker for the power supply of the display unit and check the operation as follows.

(1) Turn ON the display unit and start the MFD application. Check that there is no problem in its operation and processing.

This completes the cleaning of the vents of the CCU.

4.3.4.3 Replacing with the CCU Repair Kit: NZC-1590/A

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver	Size #2	
3	Diagonal pliers	—	
4	Cable-tie *1	—	
5	USB flash drive *2	1 GB or more	

*1 A number of cable-ties may be required.

*2 Do not use Flash drives which are password protected or encrypted.

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

⚠ To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand.

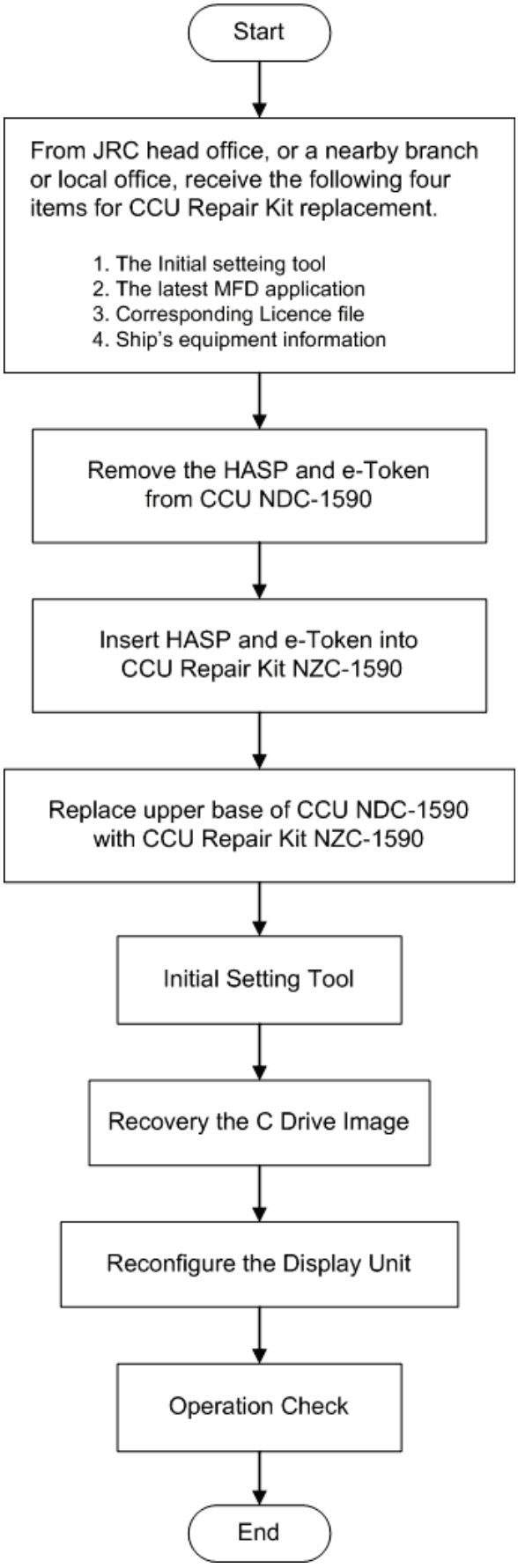
⚠ Since “The Initial Setting Tool” is an auto-run application, be sure that connect your USB flash drive before turning on the power.

⚠ For the details that how to obtain the data files for CCU Repair Kit replacement, please contact our head office or a nearby branch or local office beforehand.

⚠ When equipment is Ocean Explorer INS, there are dangers of losing user data due to synchronization. Refer to "Installation manual 6.12 INS Bootup procedure after CCU/SSD Exchange" and replace it.

[The flowchart of CCU Repair Kit replacement work]

The flowchart of CCU Repair Kit replacement work is shown below.



Step 1 From nearby JRC sales department, receive the data files for CCU Repair Kit replacement.

From JRC head office, or a nearby branch or local office, receive the following four items for replacement.

1. The Initial setteing tool
2. The latest MFD application
3. Corresponding Licence file
4. Ship's equipment information

These data files must be saved into your USB flash drive, and brought to the ship at the replacement work.

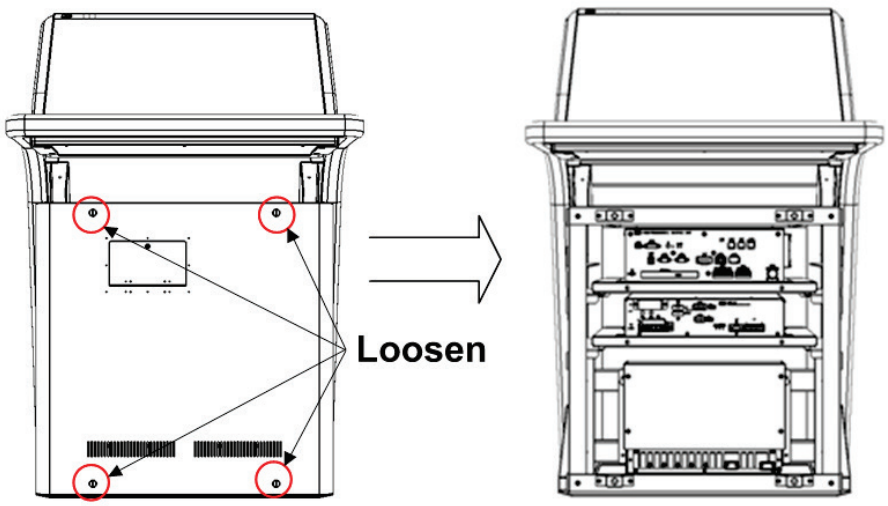
⚠ For the details that how to obtain those data files for CCU replacement, please contact our head office or a nearby branch or local office beforehand.

⚠ The USB flash drives which are password protected or encrypted are not available in this work.

Step 2 Turn off the Display Unit and remove the front cover of the display unit mount kit.

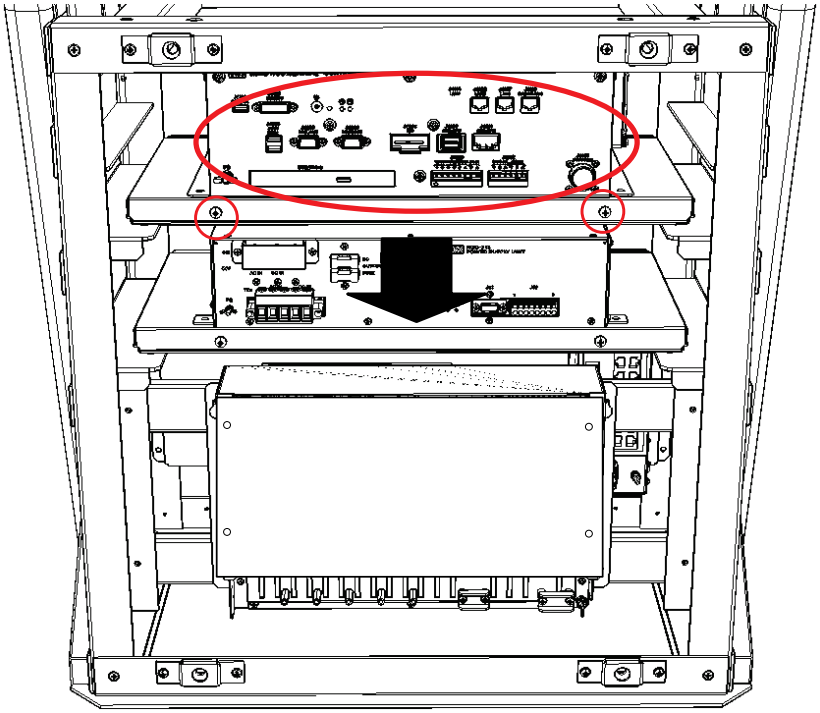
Turn off the Display Unit.

Loosen the screws that fasten the front cover of the display unit mount kit with a flat head screwdriver and then take out the front cover.



Step 3 Remove the CCU from the display unit mount kit.

Remove all the cables being connected to the front of the CCU. Remove the screws (M5: 2 locations) of the mounting plate that fasten the CCU, pull out the CCU together with the mounting plate, and then remove it from the display unit mount kit.



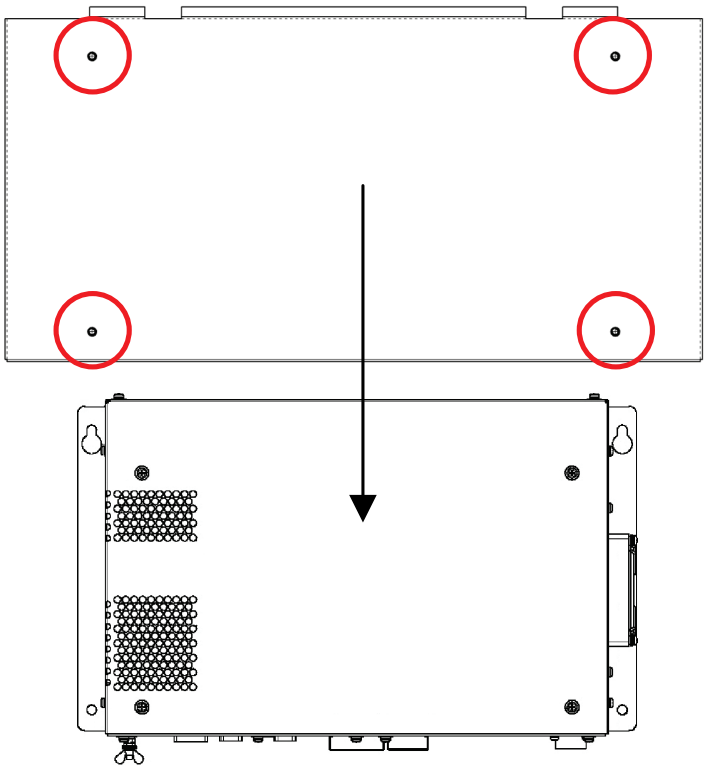
⚠CAUTION

Before conducting Unit replacement work, always be sure that every cable-tie that fastens the cable has been removed.

Replacement work without the above may lead Unit/cable breakage.

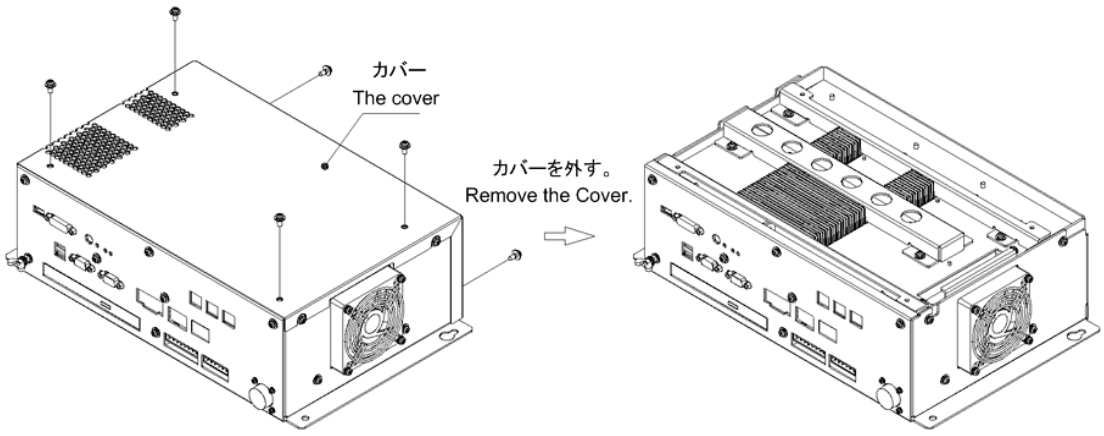
Step 4 Remove the CCU from the mounting plate.

Remove the screws (M4: 4 locations) of the mounting plate and pull out the CCU from the mounting plate.



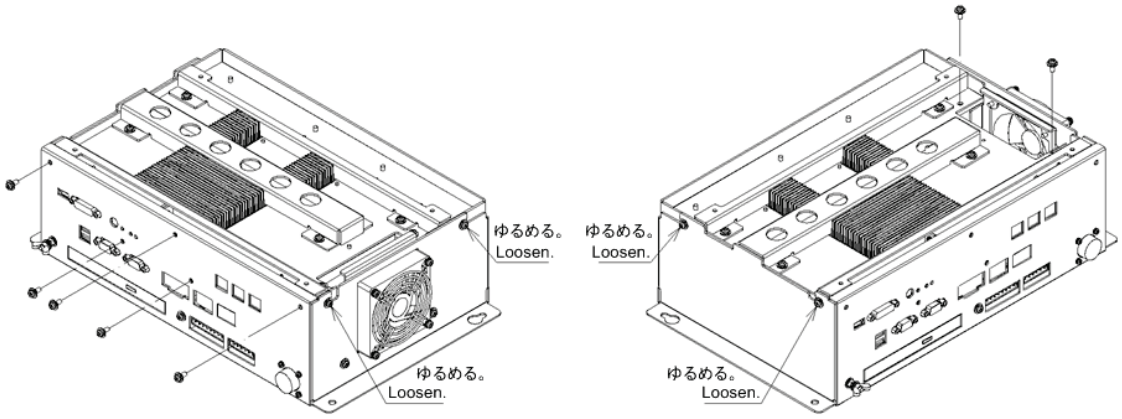
Step 5 Remove the CCU cover.

Remove the screws (M4: 6 locations) that fasten the CCU cover and then take it out.



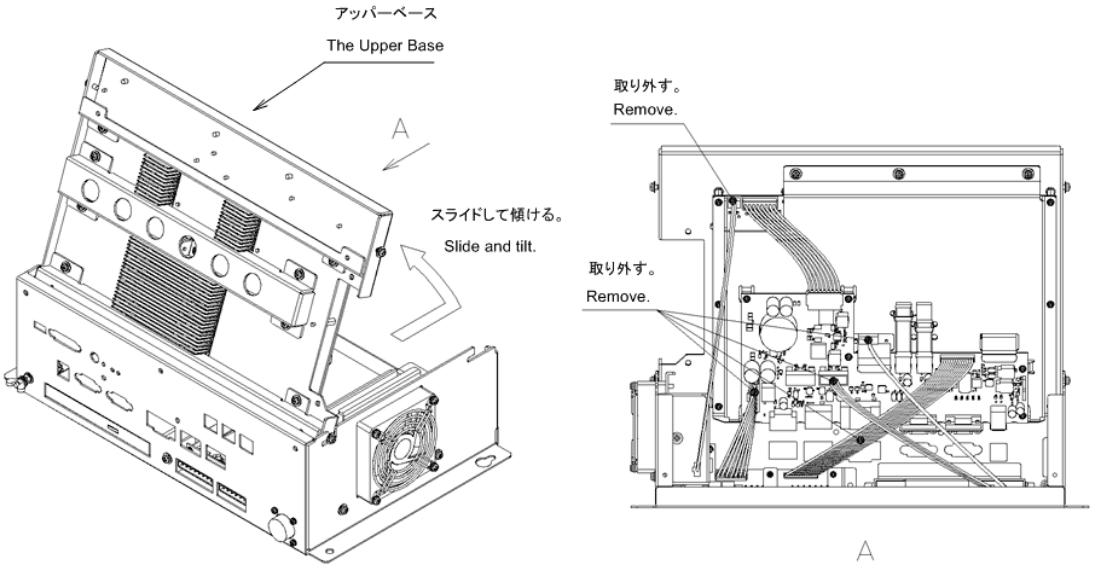
Step 6 Remove the screws that fasten the upper base.

Remove the screws (M4: 7 locations) that fasten the upper base. Loosen the screws (M4: 4 locations) of both ends.



Step 7 Remove the upper base.

Slide the upper base to tilt and disconnect the cables. Then, remove the upper base.



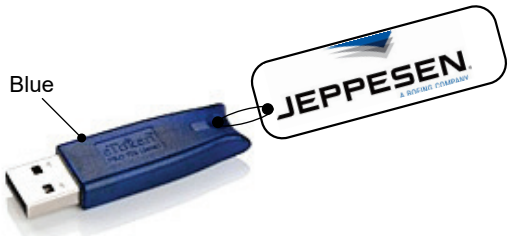
Step 8 Insert HASP and eToken.

Remove the HASP and the eToken being connected to the upper base of the NDC-1590 and insert them into the corresponding connectors on the upper base of the NZC-1590 CCU Repair Kit. Then, fasten them with cable-ties.

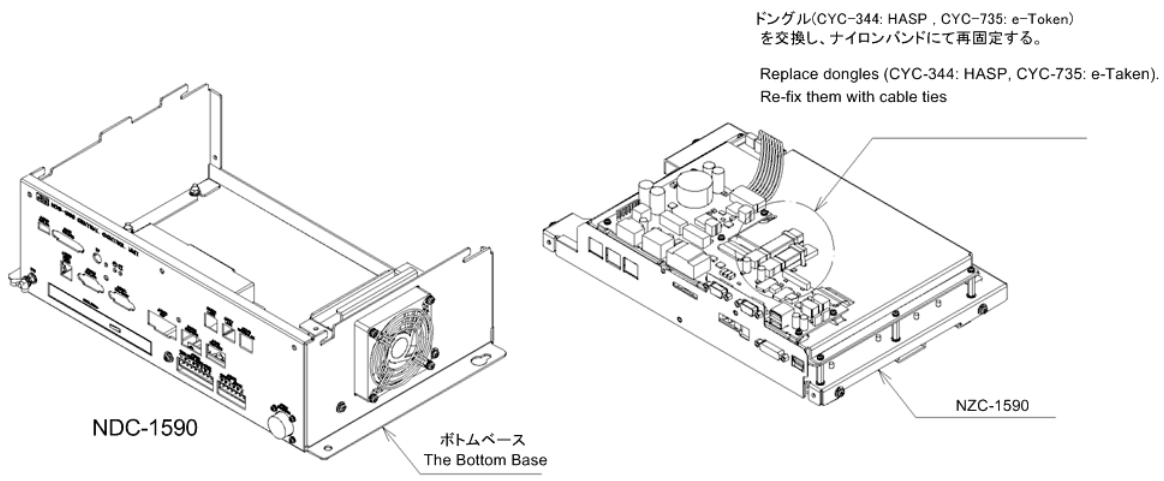
The color of the HASP is green. The color of the eToken is blue with a JEPPESEN company tag which is written the System ID.



CYC-344 HASP



CYC-735 eToken

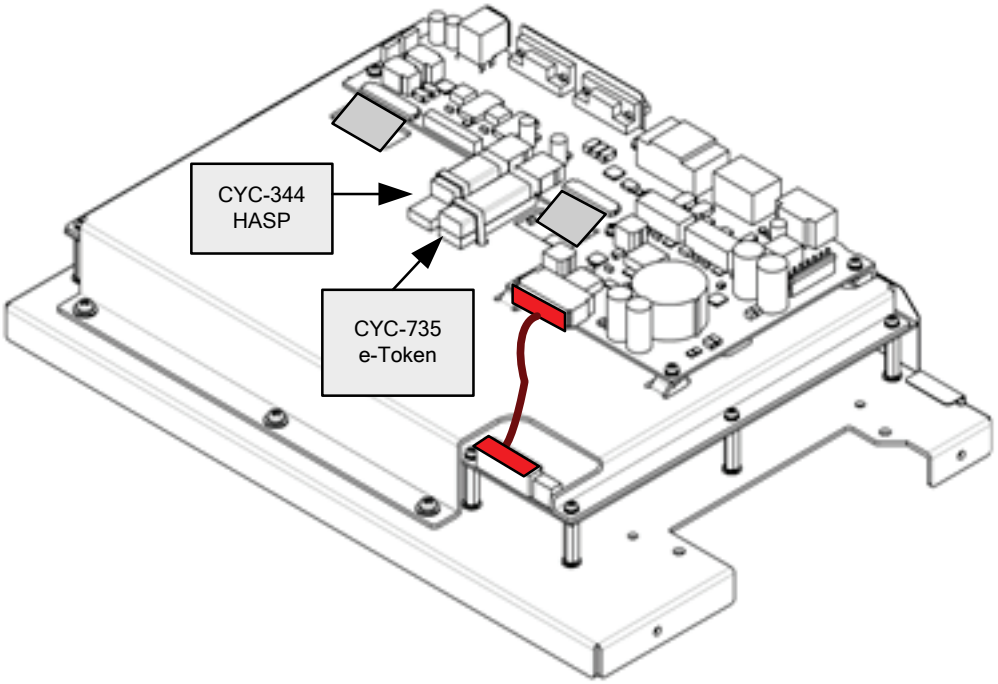


⚠ Insert both the HASP and the eToken securely all the way to the roots. When fastening them, be sure to fasten securely so that there is no looseness.

⚠ Be aware not to insert the HASP and the eToken into wrong connectors.

⚠ The appearance of eToken and HASP may change without notice.

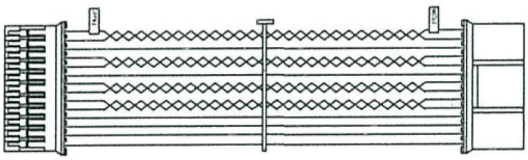
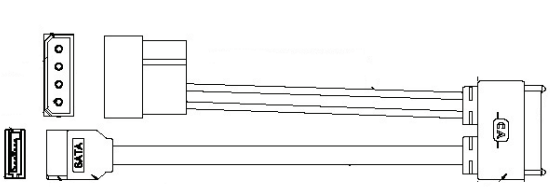
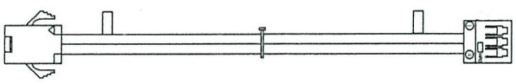
⚠ If only the HASP connected to the upper base of NDC-1590, Remove the HASP and insert HASP into the corresponding connectors on the upper base of the NZC-1590 CCU Repair Kit.

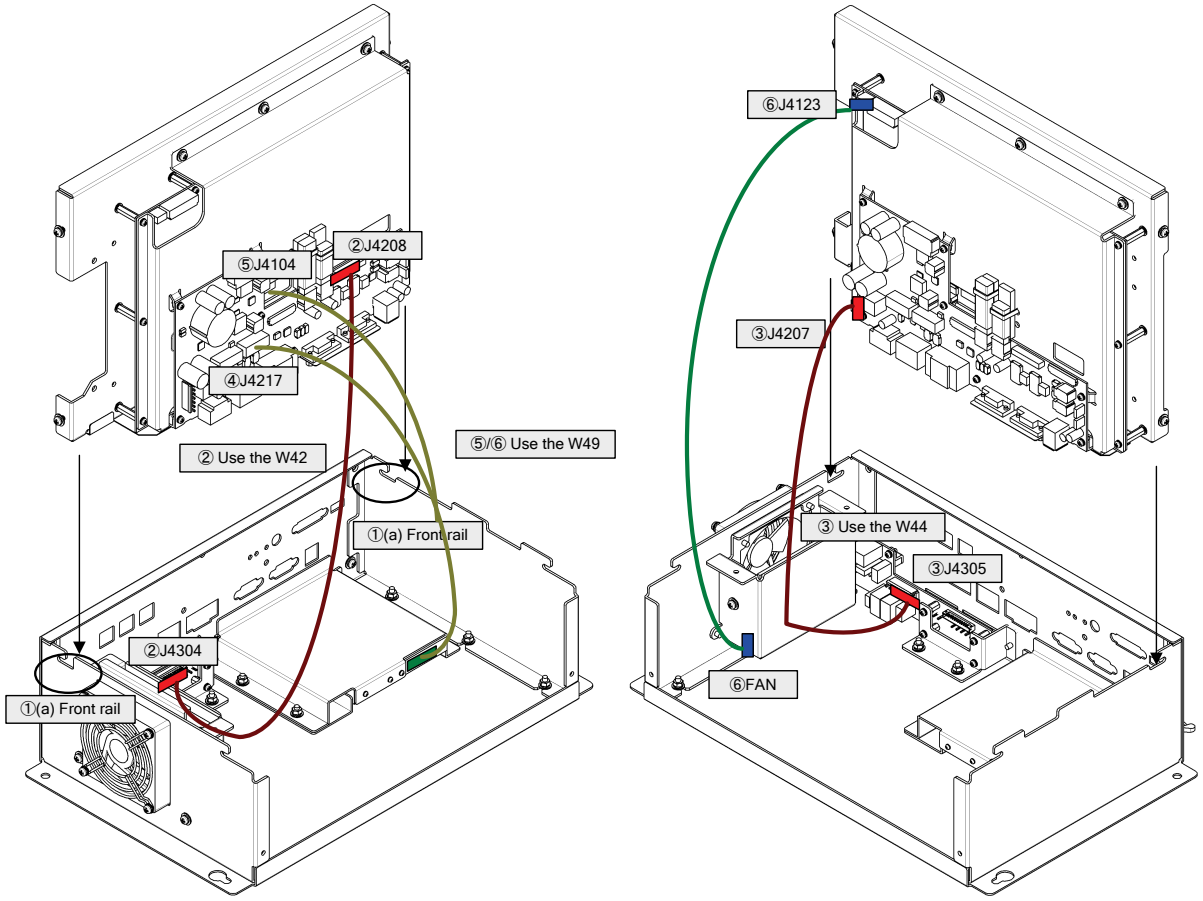


Step 9 Replace with the CCU Repair Kit NZC-1590.

When the insert of the HASP and the eToken are completed, insert the NZC-1590 into the bottom base by repeating the same procedure in the reverse order. Then, install the cover also in the reverse order.

⚠ Be careful not to forget to insert the cable connectors.

No.	From	To	Wire	Appearance
1	CMH-2406 J4208	CQD-2286 J4304	W42	
2	CMH-2406 J4207	CQD-2286 J4305	W44	
3	CMH-2406 J4217	DVD drive	DVD drive power	
4	CDC-1410/A J4104		DVD drive SATA	
5	CDC-1410/A J4123	FAN	W45	

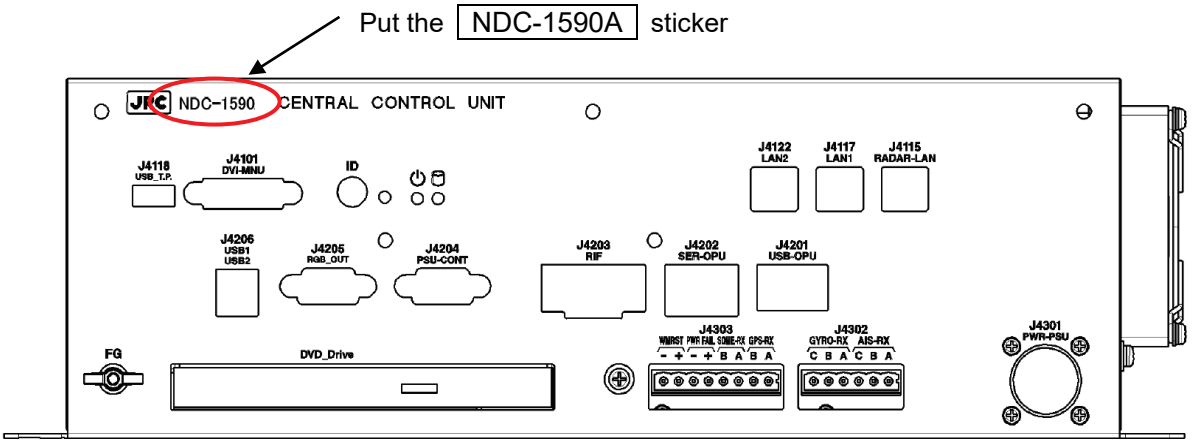


Step 10 Put the sticker to front of CCU (NZC-1590A)

Put the NDC-1590A sticker included in NZC-1590A to front of CCU.

If the model name on the front of the CCU is already NDC-1590A, it is not necessary to put the sticker.

Please throw the sticker away.



Step 11 Return the assembly into the display unit mount kit.

Reinstall the NZC-1590 into the display unit mount kit by repeating the same procedure in the reverse order.

⚠ Be careful not to forget to insert the cable connectors.

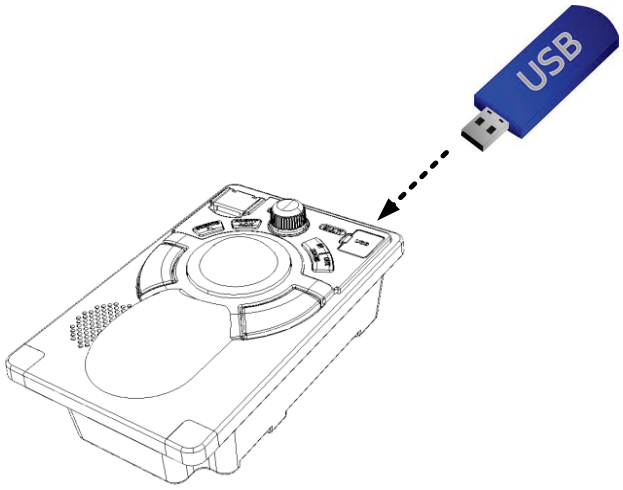
Step 12 Check that Display unit is booting up correctly.

After CCU Repair Kit replacement is completed, turn ON the circuit breaker for the power supply of the display unit to start up the Display unit.

Check that the Display unit boots up correctly. And then, turn off it again.

Step 13 Run the Initial setting tool .

Connect your USB flash drive that contains the Initial setting tool and then start up the Display Unit.



The Initial setting tool will launch automatically. Carry out initial setting for the Display unit by referring “4.3.3.3 Initial Setting”.

After initial setting is completed, turn OFF the Display unit and disconnect your USB flash drive.

Step 14 Recover the C Drive Image.

In order to apply the eToken ID information to OS registry, recover the C Drive Image. Perform system recovery by referring **“Field Service Manual 5.3 Recovering the C Drive Image”.**

Step 15 Reconfigure the Display unit

Reconfigure the Display Unit. Set it up in accordance with the Licence file which the CCU had. (RADAR / ECDIS / CONNING / AMS / MFD)

- RADAR : Perform step 15-1, 15-2, 15-3, 15-5 and 15-7.
- CHART RADAR : Perform step 15-1, 15-2, 15-3, 15-5 and 15-7.
- ECDIS : Perform step 15-1, 15-2, 15-4, 15-5 and 15-7.
- CONNING : Perform step 15-1, 15-2 and 15-5.
- AMS : Perform step 15-1, 15-2 and 15-6.
- MFD : Perform all corresponding reconfigure steps by referring the Licence installed.

  For how to check the Licences installed, refer

  - Instruction Manual 21.1.3.2 Checking the enable/disable statuses of the functions that have been installed

15-1. Update the MFD application. (All Licence)

Update the MFD application to the latest version by referring the following:

- Field Service Manual 5.1 Updating the Software

15-2. Setup Own Task Station, Network, Serial port, System function, Contact output, etc. of the CCU. (All licence)

Installation settings consist of Common setting items and Equipment-specific setting items. Common setting items can be synchronized with the system automatically via SLC.

Equipment-specific setting items cannot be synchronized with the system, therefore they need to setup manually.

15-2-1. Common setting items

Confirm that SLC is already started up and LAN connection is available.

Start the display unit, click [Menu] – [Code Input] button and input password “0009”. When selected [Menu] – [Service] – [Installation], the common setting items are synchronized with the system automatically.

For the details of common setting items, refer to "Installation Manual 4.43 List of Common Setting Items".

⚠ In order to synchronize common setting items, make sure that SLC is already started up and LAN connection is available, before starting the display unit.

15-2-2. Equipment-specific setting items

- Settings for Own Task Station

  Own Task Station setting is placed on the upper side of [System Configuration] - [Subsystem Installation] dialog.

  Set up Own Task Station number. And make sure that Own Task Station number is same as Device Installation settings as below.



⚠ Do not set a duplicated Task Station number and a duplicated IP Address. Otherwise, unintended operation is performed, e.g. sensor data cannot be received.

- Settings for Serial port on CCU
  Serial port settings on CCU is placed on the upper side of [System Configuration] - [Serial Port] dialog. Select serial sensor connected with CCU.

- Settings for Contact output on CCU
  Contact output settings on CCU is placed on the upper side of [System Configuration] - [Contact] dialog. Select contact output function assigned to CCU.

- Settings for Data output
  [System Configuration] - [Data Output] dialog is Equipment-specific setting item. Select the output data.

- Settings for Alert
  [Setting] - [Alert] dialog is Equipment-specific setting item. When the system assigned watch alarm to CCU and/or SLC, the items need to set up.

- Settings for AC Power Failure
  [Setting] - [AC Power Failure] dialog is Equipment-specific setting item. Set up to same as other display unit settings.

- Settings for VDR
  [Setting] - [VDR] dialog is Equipment-specific setting item. When the systems connected with the JRC – VDR, the items need to set up. Set up to Delay Time that delays the timing of output each task station, e.g. 3 sec.

For more information, refer as follows.

- Installation information at the time of commissioning, which is described in the installation check list
- Installation Manual 4.4 Subsystem Installation
- Installation Manual 4.6 Setting up a Serial Port
- Installation Manual 4.7 System Function
- Installation Manual 4.8 Setting Contacts (Contact Input/Output)
- Installation Manual 4.11 Setting Data Output
- Installation Manual 4.12 Network Setting
- Installation Manual 4.15 Setting Alert
- Installation Manual 4.16 Operation Setting at AC Power Failure (Insufficient AC power supply)
- Installation Manual 4.18 Setting VDR

15-3. Initial setup for RADAR. (RADAR Licence)

Set up the RADAR by reffering the followings:

- Installation information at the time of commissioning, which is described in the installation check list
- Installation Manual 4.11 Setting Data Output
- Installation Manual 4.17 Setting Interswitch
- Installation Manual 4.33 Tune Adjustment
- Installation Manual 4.34 Bearing Adjustment
- Installation Manual 4.35 Range Adjustment
- Installation Manual 4.36 Master/Slave Radar Operation Mode
- Installation Manual 4.37 Setting an Antenna Height
- Installation Manual 4.38 Tune Peak Adjustment
- Installation Manual 4.39 Setting a Tune Indicator (tuning indicator level)
- Installation Manual 4.40 Setting Output BP (Radar Antenna Bearing Pulse Output)
- Installation Manual 4.41 Performance Monitor Adjustment
- Installation Manual 4.42 Setting Sector Blank (RADAR Screen Only)
- Installation Manual 4.43 Setting TNI Blank
- Installation Manual 4.44 Setting Input BP Count
- Installation Manual 4.45 Setting Output BP Count
- Installation Manual 4.46 Echo Noise Level Adjustment
- Installation Manual 4.47 TT (Target Tracking) Function Adjustment (RADAR Screen Only)
- Installation Manual 4.48 Adjusting MBS
- Installation Manual 4.51 RADAR Adjustment (RADAR Screen Only)

15-4. Re-install electronic charts. (ECDIS Licence)

Re-install the electronic charts for ECDIS by referring the followings:

- Installation information at the time of commissioning, which is described in the installation check list
- Additional Manual for Chart Installation 2.1 Importing ENC S-57/S-63 Charts, AVCS Charts and AIO Data
- Additional Manual for Chart Installation 3.2 Importing ARCS Charts
- Additional Manual for Chart Installation 4.3 Importing C-MAP Ed.3

15-5. Reconfigure the CONNING Display. (CONNING Licence)

Set up the Conning Display by referring the followings:

- Installation information at the time of commissioning, which is described in the installation check list
- Conning Display Instruction Manual

15-6. Reconfigure the BAMS. (AMS Licence)

Set up the BAMS by referring the followings:

- Installation information at the time of commissioning, which is described in the installation check list
- BAMS Instruction Manual

15-7. Setup for optional Licence.

To set up TCS optional Licence, refer the followings: (ECDIS)

- Installation information at the time of commissioning, which is described in the installation check list
- Installation Manual 4.12 Redundancy Setting
- Installation Manual 4.18 Setting Autosail (Automatic Sailing System)

To set up RADAR Overlay optional Licence, refer the followings: (ECDIS)

- Installation information at the time of commissioning, which is described in the installation check list
- Installation Manual 4.4 Subsystem Installation

To set up Chart optional Licence, refer the followings: (RADAR)

- Installation information at the time of commissioning, which is described in the installation check list
- Additional Manual for Chart Installation 2.1 Importing ENC S-57/S-63 Charts, AVCS Charts and AIO Data
- Additional Manual for Chart Installation 4.3 Importing C-MAP Ed.3

⚠ ARCS charts are not available in CHART RADAR.

Step 15 Check operation.

After reconfigure is completed, check the operation as follows.

(1) Start the MFD application. Check that there is no problem in its operation and processing.

(2) Conduct the operational inspection as described in "7.2 Operational Inspection" in Chapter 7, Troubleshooting.

This completes CCU Repair Kit replacement.

4.3.4.4 Replacing with the CCU: NDC-1590/A

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver	Size #2	
3	Diagonal pliers	—	
4	Cable-tie *1	—	
5	USB flash drive *2	1 GB or more	

*1 A number of cable-ties may be required.

*2 Do not use Flash drives which are password protected or encrypted.

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

⚠ To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand.

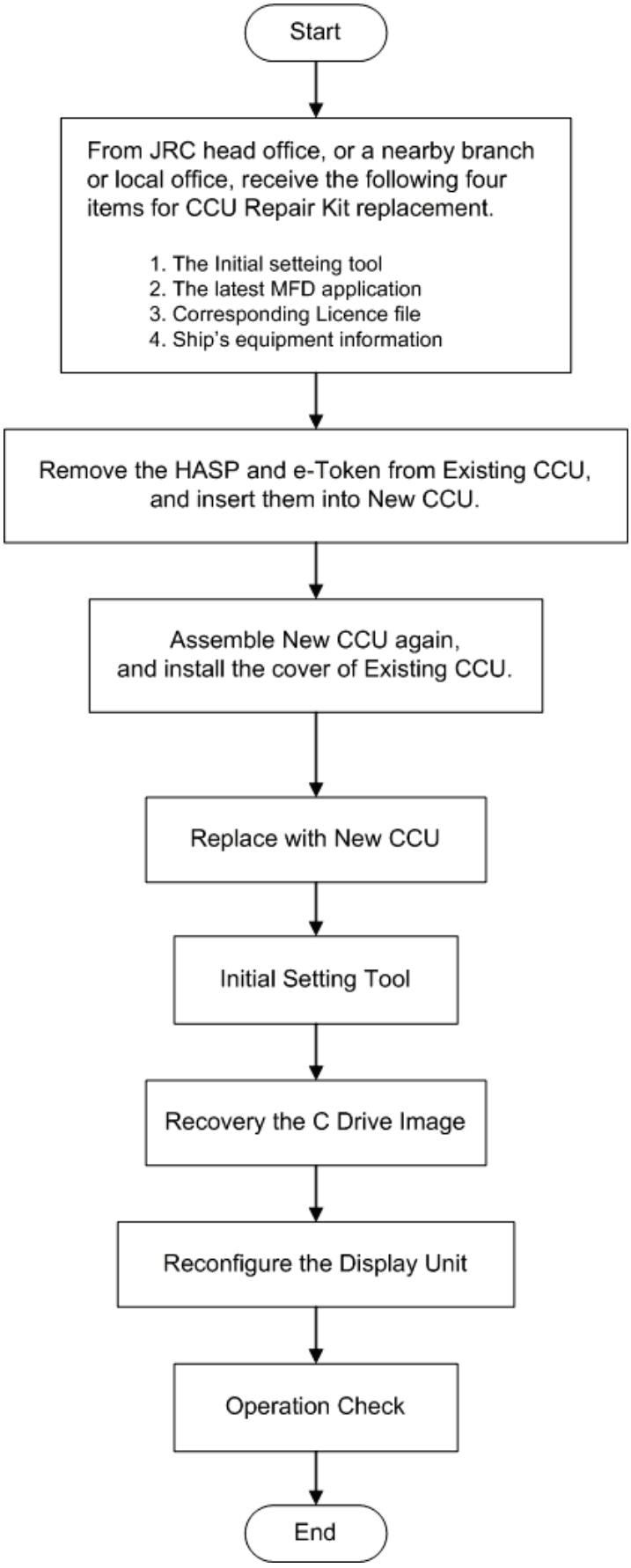
⚠ Since “The Initial Setting Tool” is an auto-run application, be sure that connect your USB flash drive before turning on the power.

⚠ For the details that how to obtain the data files for CCU replacement, please contact our head office or a nearby branch or local office beforehand.

⚠ When equipment is Ocean Explorer INS, there are dangers of losing user data due to synchronization. Refer to "Installation manual 6.12 INS Bootup procedure after CCU/SSD Exchange" and replace it.

[The flowchart of CCU replacement work]

The flowchart of CCU replacement work is shown below.



Step 1 From nearby JRC sales department, receive the data files for CCU replacement.

From JRC head office, or a nearby branch or local office, receive the following four items for replacement.

1. The Initial setteing tool
2. The latest MFD application
3. Corresponding Licence file
4. Ship's equipment information

These data files must be saved into your USB flash drive, and brought to the ship at the replacement work.

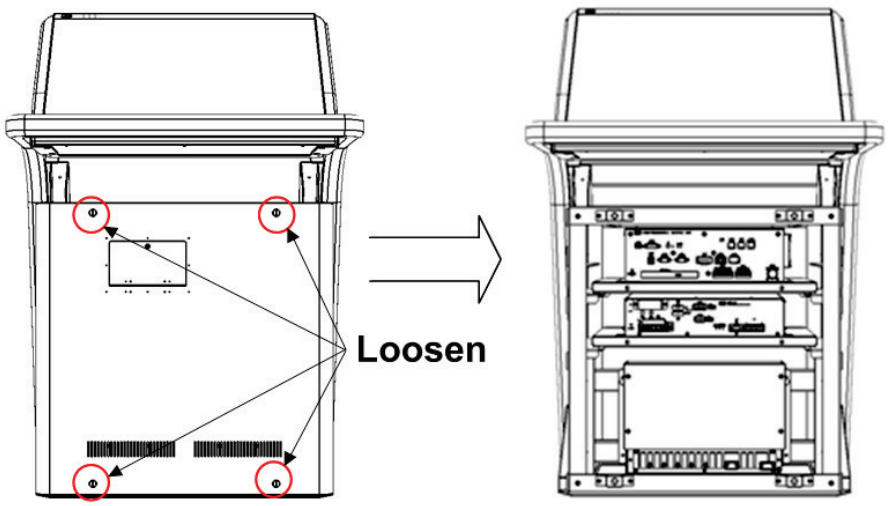
⚠ For the details that how to obtain those data files for CCU replacement, please contact our head office or a nearby branch or local office beforehand.

⚠ The USB flash drives which are password protected or encrypted are not available in this work.

Step 2 Turn off the Display Unit and remove the front cover of the display unit mount kit.

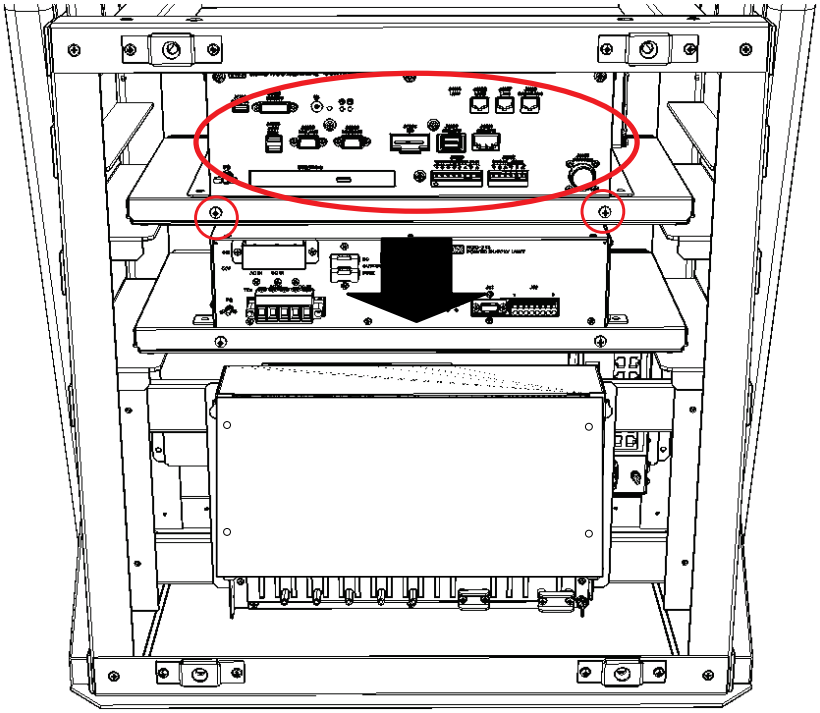
Turn off the Display Unit.

Loosen the screws that fasten the front cover of the display unit mount kit with a flat head screwdriver and then take out the front cover.



Step 3 Remove the CCU from the display unit mount kit.

Remove all the cables being connected to the front of the CCU. Remove the screws (M5: 2 locations) of the mounting plate that fasten the CCU, pull out the CCU together with the mounting plate, and then remove it from the display unit mount kit.



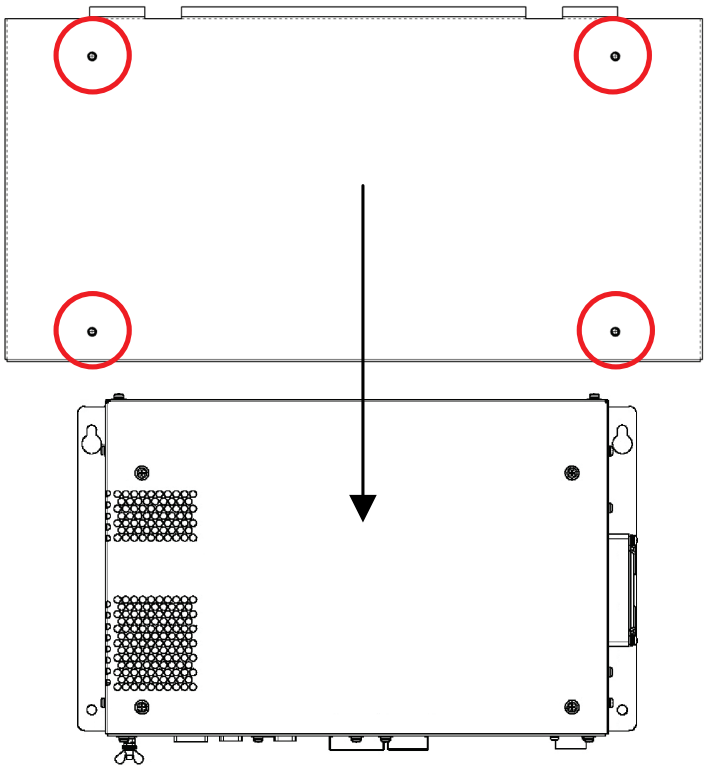
⚠CAUTION

Before conducting Unit replacement work, always be sure that every cable-tie that fastens the cable has been removed.

Replacement work without the above may lead Unit/cable breakage.

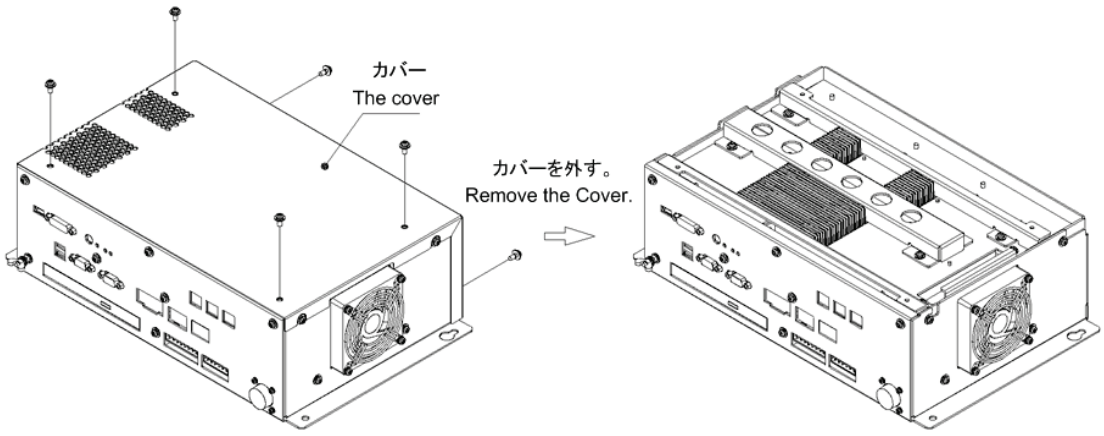
Step 4　　Remove the CCU from the mounting plate.

Remove the screws (M4: 4 locations) of the mounting plate and pull out the CCU from the mounting plate.



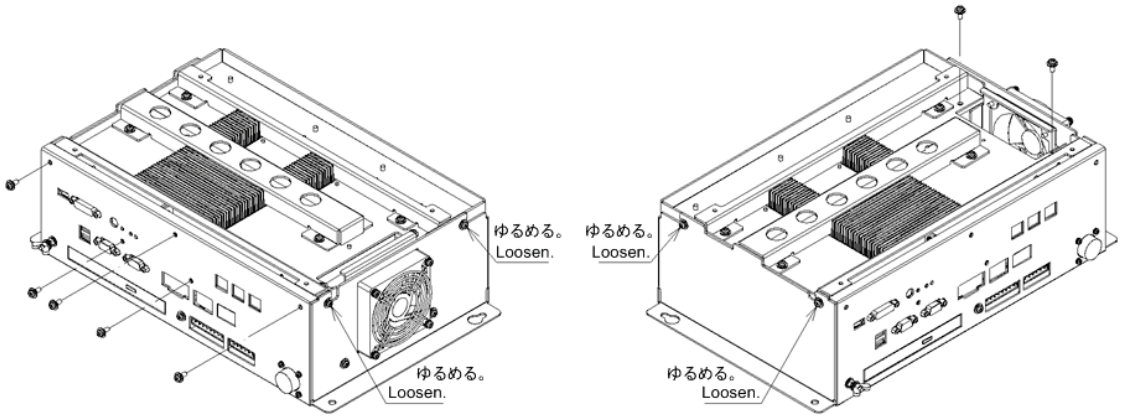
Step 5　　Remove the CCU cover.

Remove the screws (M4: 6 locations) that fasten the CCU cover and then take it out.



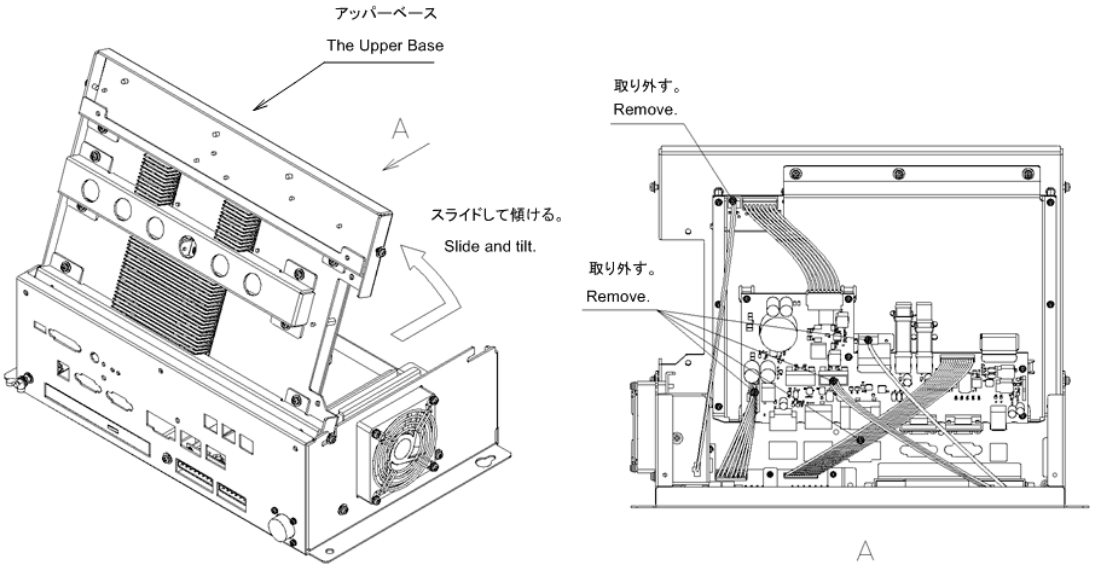
Step 6 Remove the screws that fasten the upper base.

Remove the screws (M4: 7 locations) that fasten the upper base. Loosen the screws (M4: 4 locations) of both ends.



Step 7 Remove the upper base.

Slide the upper base to tilt and disconnect the cables. Then, remove the upper base.



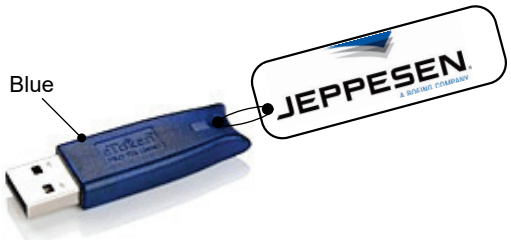
Step 8 Change HASP and eToken.

Replacement the HASP and the eToken being connected to the upper base of Existing CCU and insert them into the corresponding connectors on the upper base of New CCU. Then, fasten them with cable-ties.

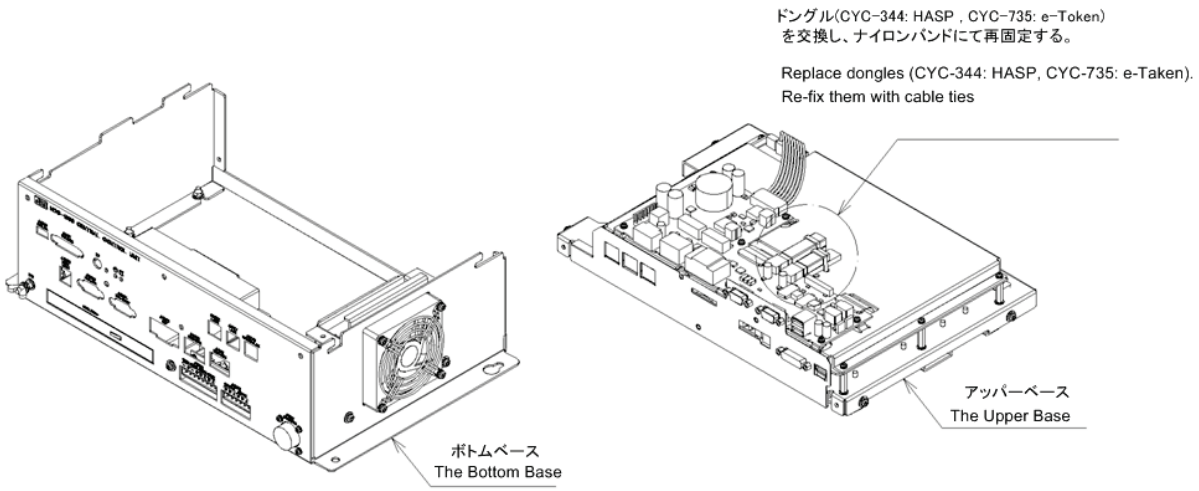
The color of the HASP is green. The color of the eToken is blue with a JEPPESEN company tag which is written the System ID.



CYC-344 HASP



CYC-735 eToken



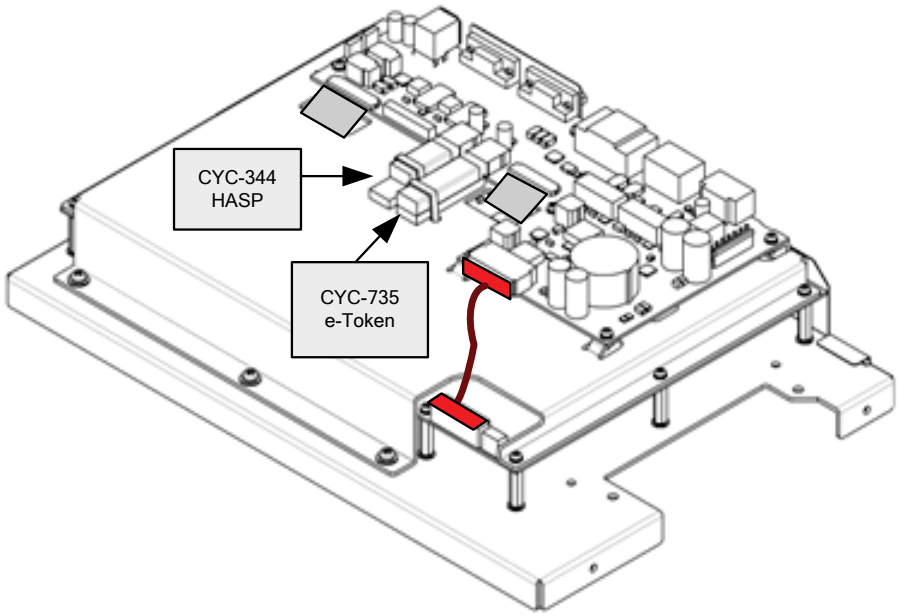
⚠ Be careful not mix up Existing one and New one.

⚠ Insert both the HASP and the eToken securely all the way to the roots. When fastening them, be sure to fasten securely so that there is no looseness.

⚠ Be aware not to insert the HASP and the eToken into wrong connectors.

⚠ The appearance of eToken and HASP may change without notice.

⚠ If only the HASP connected to the upper base of NDC-1590/A, Remove the HASP and insert HASP into the corresponding connectors on the upper base of the NDC-1590A CCU Repair Kit.



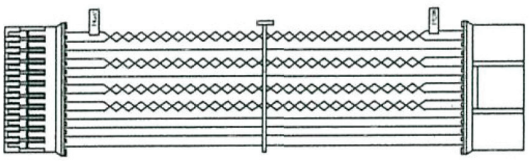
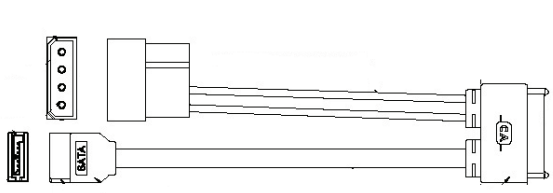
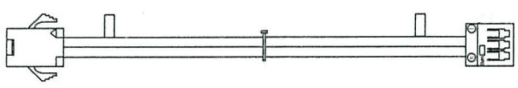
Step 9 Assemble the CCU.

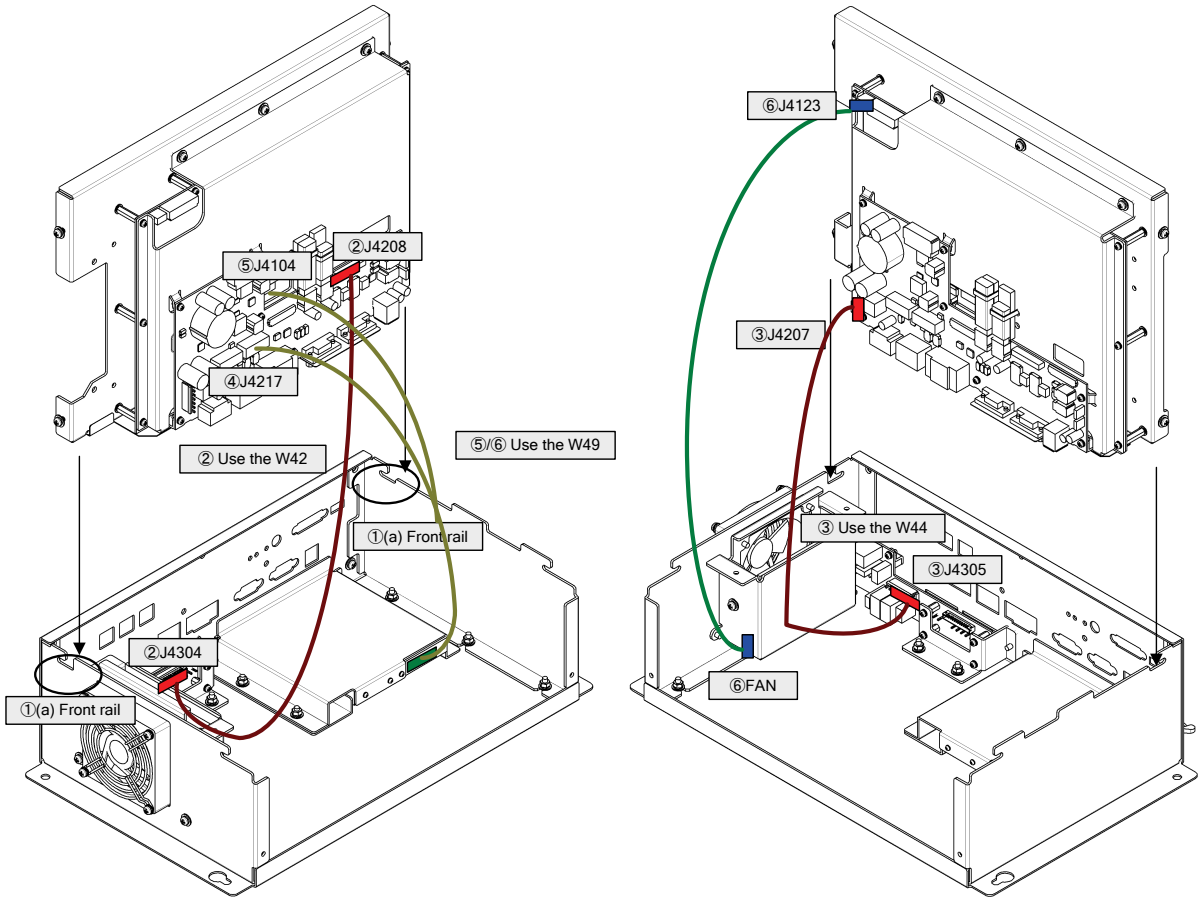
When the replacement of the HASP and the eToken are completed, assemble the CCU by repeating the same procedure in the reverse order. Then, install the cover also in the reverse order.

The cover of Existing CCU install to New CCU.

⚠ Serial number and model name is used for inspection of ship's class. Also serial number is used for maintenance service in JRC. Therefore, the cover of Existing CCU install to New CCU.

⚠ Be careful not to forget to insert the cable connectors.

No.	From	To	Wire	Appearance
1	CMH-2406 J4208	CQD-2286 J4304	W42	
2	CMH-2406 J4207	CQD-2286 J4305	W44	
3	CMH-2406 J4217	DVD drive	DVD drive power	
4	CDC-1410/A J4104		DVD drive SATA	
5	CDC-1410/A J4123	FAN	W45	



Step 10 Return the assembly into the display unit mount kit.

Reinstall the New CCU into the display unit mount kit by repeating the same procedure in the reverse order.

⚠ Be careful not to forget to insert the cable connectors.

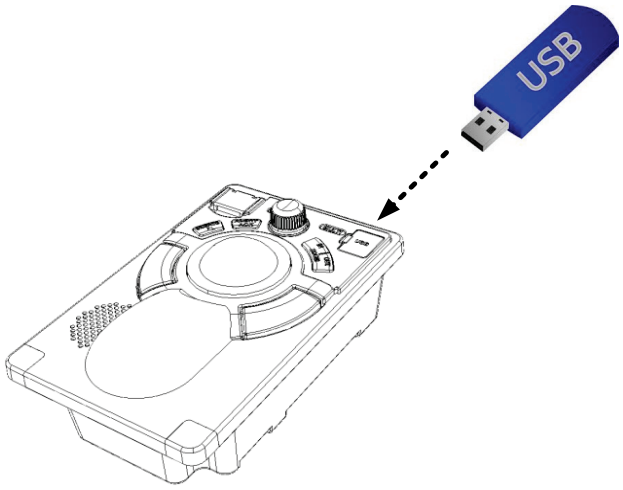
Step 11 Check that Display unit is booting up correctly.

After CCU replacement is completed, turn ON the circuit breaker for the power supply of the display unit to start up the Display unit.

Check that the Display unit boots up correctly. And then, turn off it again.

Step 12 Run the Initial setting tool .

Connect your USB flash drive that contains the Initial setting tool and then start up the Display Unit.



The Initial setting tool will launch automatically. Carry out initial setting for the Display unit by referring “4.3.3.3 Initial Setting”.

After initial setting is completed, turn OFF the Display unit and disconnect your USB flash drive.

Step 13 Recover the C Drive Image.

In order to apply the eToken ID information to OS registry, recover the C Drive Image. Perform system recovery by referring **“Field Service Manual 5.3 Recovering the C Drive Image”.**

Step 14 Reconfigure the Display unit

Reconfigure the Display Unit. Set it up in accordance with the Licence file which the CCU had. (RADAR / ECDIS / CONNING / AMS / MFD)

- RADAR : Perform step 14-1, 14-2, 14-3, 14-5 and 14-7.
- CHART RADAR : Perform step 14-1, 14-2, 14-3, 14-5 and 14-7.
- ECDIS : Perform step 14-1, 14-2, 14-4, 14-5 and 14-7.
- CONNING : Perform step 14-1, 14-2 and 14-5.
- AMS : Perform step 14-1, 14-2 and 14-6.
- MFD : Perform all corresponding reconfigure steps by referring the Licence installed.

  For how to check the Licences installed, refer

  - Instruction Manual 21.1.3.2 Checking the enable/disable statuses of the functions that have been installed

14-1. Update the MFD application. (All Licence)

Update the MFD application to the latest version by referring the following:

- Field Service Manual 5.1 Updating the Software

14-2. Setup Own Task Station, Network, Serial port, Contact output, etc. of the CCU. (All licence)

Installation settings consist of Common setting items and Equipment-specific setting items. Common setting items can be synchronized with the system automatically via SLC.

Equipment-specific setting items cannot be synchronized with the system, therefore they need to setup manually.

14-2-1. Common setting items

Confirm that SLC is already started up and LAN connection is available.

Start the display unit, click [Menu] – [Code Input] button and input password “0009”. When selected [Menu] – [Service] – [Installation], the common setting items are synchronized with the system automatically.

For the details of common setting items, refer to "Installation Manual 4.43 List of Common Setting Items".

⚠ In order to synchronize common setting items, make sure that SLC is already started up and LAN connection is available, before starting the display unit.

14-2-2. Equipment-specific setting items

- Settings for Own Task Station

  Own Task Station setting is placed on the upper side of [System Configuration] - [Subsystem Installation] dialog.

  Set up Own Task Station number. And make sure that Own Task Station number is same as Device Installation settings as below.



⚠ Do not set a duplicated Task Station number and a duplicated IP Address. Otherwise, unintended operation is performed, e.g. sensor data cannot be received.

- Settings for Serial port on CCU
  Serial port settings on CCU is placed on the upper side of [System Configuration] - [Serial Port] dialog. Select serial sensor connected with CCU.

- Settings for Contact output on CCU
  Contact output settings on CCU is placed on the upper side of [System Configuration] - [Contact] dialog. Select contact output function assigned to CCU.

- Settings for Data output
  [System Configuration] - [Data Output] dialog is Equipment-specific setting item. Select the output data.

- Settings for Alert
  [Setting] - [Alert] dialog is Equipment-specific setting item. When the system assigned watch alarm to CCU and/or SLC, the items need to set up.

- Settings for AC Power Failure
  [Setting] - [AC Power Failure] dialog is Equipment-specific setting item. Set up to same as other display unit settings.

- Settings for VDR
  [Setting] - [VDR] dialog is Equipment-specific setting item. When the systems connected with the JRC – VDR, the items need to set up. Set up to Delay Time that delays the timing of output each task station, e.g. 3 sec.

For more information, refer as follows.

- Installation information at the time of commissioning, which is described in the installation check list
- Installation Manual 4.4 Subsystem Installation
- Installation Manual 4.6 Setting up a Serial Port
- Installation Manual 4.7 Setting Contacts (Contact Input/Output)
- Installation Manual 4.10 Setting Data Output
- Installation Manual 4.11 Network Setting
- Installation Manual 4.14 Setting Alert
- Installation Manual 4.15 Operation Setting at AC Power Failure (Insufficient AC power supply)
- Installation Manual 4.17 Setting VDR

14-3. Initial setup for RADAR. (RADAR Licence)

Set up the RADAR by reffering the followings:

- Installation information at the time of commissioning, which is described in the installation check list
- Installation Manual 4.10 Setting Data Output
- Installation Manual 4.16 Setting Interswitch
- Installation Manual 4.21 Tune Adjustment
- Installation Manual 4.22 Bearing Adjustment
- Installation Manual 4.23 Range Adjustment
- Installation Manual 4.24 Master/Slave Radar Operation Mode
- Installation Manual 4.25 Setting an Antenna Height
- Installation Manual 4.26 Tune Peak Adjustment
- Installation Manual 4.27 Setting a Tune Indicator (tuning indicator level)
- Installation Manual 4.28 Setting Output BP (Radar Antenna Bearing Pulse Output)
- Installation Manual 4.29 Performance Monitor Adjustment
- Installation Manual 4.30 Setting Sector Blank (RADAR Screen Only)
- Installation Manual 4.31 Setting TNI Blank
- Installation Manual 4.32 Setting Input BP Count
- Installation Manual 4.33 Setting Output BP Count
- Installation Manual 4.34 Echo Noise Level Adjustment
- Installation Manual 4.35 TT (Target Tracking) Function Adjustment (RADAR Screen Only)
- Installation Manual 4.36 Adjusting MBS
- Installation Manual 4.39 RADAR Adjustment (RADAR Screen Only)

14-4. Re-install electronic charts. (ECDIS Licence)

Re-install the electronic charts for ECDIS by referring the followings:

- Installation information at the time of commissioning, which is described in the installation check list
- Additional Manual for Chart Installation 2.1 Importing ENC S-57/S-63 Charts, AVCS Charts and AIO Data
- Additional Manual for Chart Installation 3.2 Importing ARCS Charts
- Additional Manual for Chart Installation 4.3 Importing C-MAP Ed.3

14-5. Reconfigure the CONNING Display. (CONNING Licence)

Set up the Conning Display by referring the followings:

- Installation information at the time of commissioning, which is described in the installation check list
- Conning Display Instruction Manual

14-6. Reconfigure the BAMS. (AMS Licence)

Set up the BAMS by referring the followings:

- Installation information at the time of commissioning, which is described in the installation check list
- BAMS Instruction Manual

14-7. Setup for optional Licence.

To set up TCS optional Licence, refer the followings: (ECDIS)

- Installation information at the time of commissioning, which is described in the installation check list
- Installation Manual 4.12 Redundancy Setting
- Installation Manual 4.18 Setting Autosail (Automatic Sailing System)

To set up RADAR Overlay optional Licence, refer the followings: (ECDIS)

- Installation information at the time of commissioning, which is described in the installation check list
- Installation Manual 4.4 Subsystem Installation

To set up Chart optional Licence, refer the followings: (RADAR)

- Installation information at the time of commissioning, which is described in the installation check list
- Additional Manual for Chart Installation 2.1 Importing ENC S-57/S-63 Charts, AVCS Charts and AIO Data
- Additional Manual for Chart Installation 4.3 Importing C-MAP Ed.3

⚠ ARCS charts are not available in CHART RADAR.

Step 15 Check operation.

After reconfigure is completed, check the operation as follows.

(1) Start the MFD application. Check that there is no problem in its operation and processing.

(2) Conduct the operational inspection as described in "7.2 Operational Inspection" in Chapter 7, Troubleshooting.

This completes CCU replacement.

4.3.4.5 Initial Setup

Precaution

⚠WARNING	
	Never turn the power off until initial setting is finished. System data may be destroyed and a trouble may occur.
	Never disconnect the USB flash drive until initial setting is finished. If you remove the USB flash drive while initial setting is ongoing, system data may be destroyed and a trouble may occur.
	Before removing the USB flash drive, check for its access lamp and make sure that it is not being accessed. If you remove the USB flash drive when it is accessed, data may be destroyed and a trouble may occur.

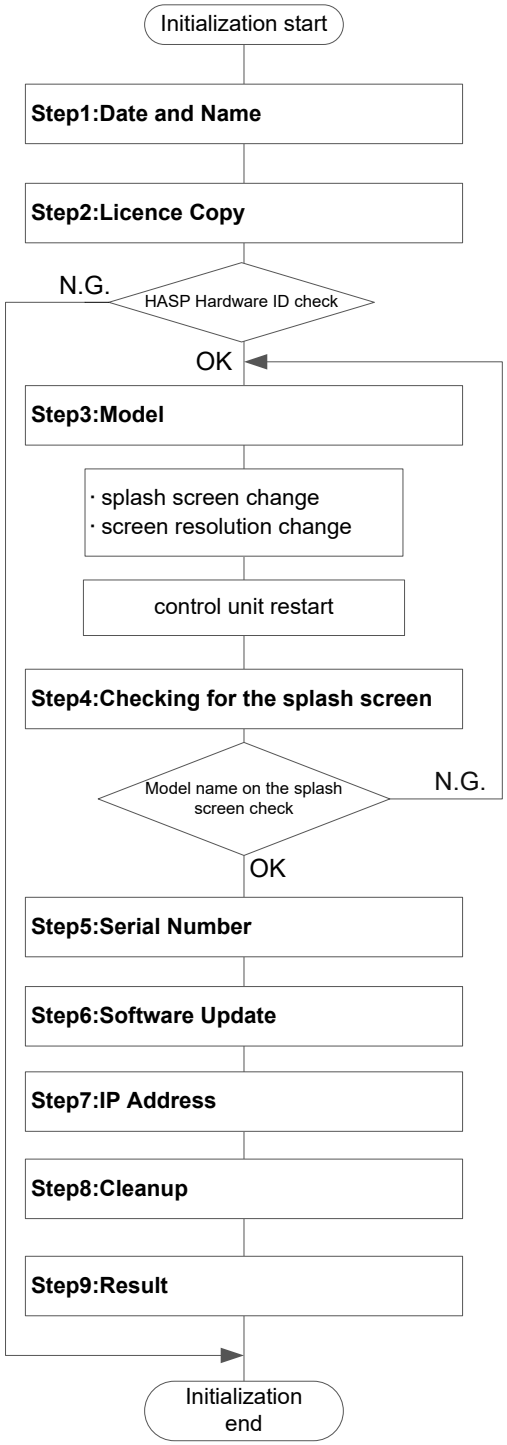
After you have done a replacement of a CCU or CCU Repair Kit, be sure to configure it properly by using "Initial setting tool" along the following steps.

In the initial setting, items below will be set up.

Step 1. Set up the date, name of the operator.
Step 2. Copy the Lisence file.
Step 3. Set up the model name.
Step 4. Checking for the splash screen
Step 5. Set up the serial number
Step 6. Software update
Step 7. Set up an IP address

The flowchart of the Initial setting tool.

The flowchart of the Initial setting tool is shown below.



Launch the Initial setting tool

A USB flash drive which has the Initial setting tool and the Lisence file is required for this work

Table Required Tools

No	Name	Appearance example
1	A USB flash drive which contains the Initial setting tool and the Lisence file *1	

*1 Do not use Flash drives which are password protected or encrypted.

Prepare the following before boarding the ship.

1) Latest software
   Download the latest software from the MS-WEB.

2) Licence file for the CCU to be executed Initial tool
   Request the order of the service to provide Licence file for the CCU to be executed Initialization.

3) Initial tool
   This tool can be downloaded from MS-WEB.

4) Creating a USB memory of the Initial tool
   Copy the tool that was prepared in 3) to the route of the USB memory. When the file that was downloaded is extracted, the file is expanded into the following folder structure.
   [MFD Initial tool]
   (USB Drive)
   - mfd
     - MFD_Initial_Tool
       - Installer
         exe file of the latest MFD software / prepared in 1)
       - Licence
         Folder containing the licence file of the CCU to be executed MFD Initial tool / prepared in 2)
         - licence_copy_completed
       - NameLabel
       - order
       - ReInspection
       - Result
       - Tools
     - MFD_Initial_Tool.exe

tool_setting.ini
fbwflib.dll
EDga.dll

⚠ Create a directory so that a mfd folder is created directly under the USB. The Initial tool does not run normally if the folder structure is incorrect.

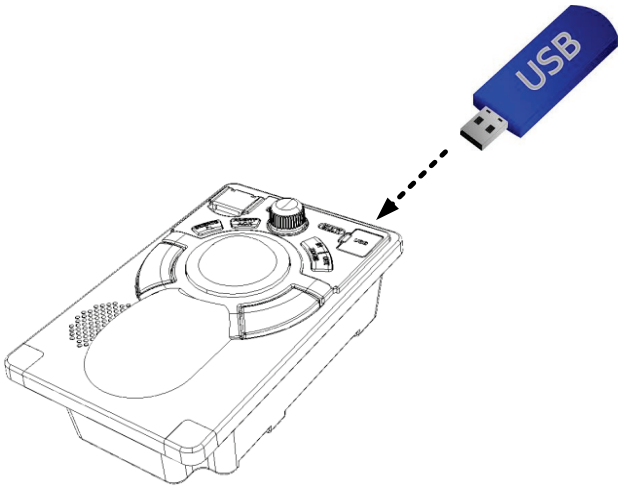
⚠ Before conducting work, always be sure that all of cables, connectors, are connected securely.

⚠ Since “The Initial Setting Tool” is an auto-run application, be sure that connect your USB flash drive before turning on the power.

⚠ For the details that how to obtain “The Initial Setting Tool”, please contact our head office or a nearby branch or local office beforehand.

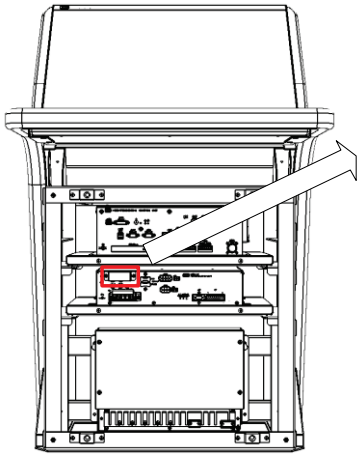
1: Connect your USB flash drive

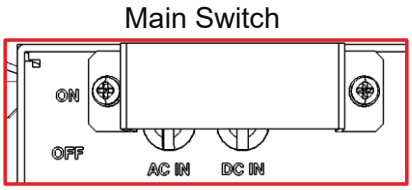
Before you turn on the power of the Display Unit, connect your USB flash drive which contains the Initial setting tool and the Lisence file.

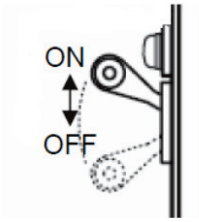


2: Start up the Display Unit

Switch on both AC and DC circuit breakers at the PSU.



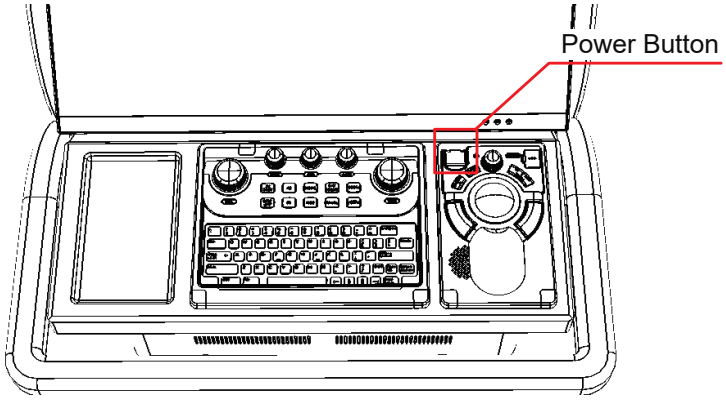




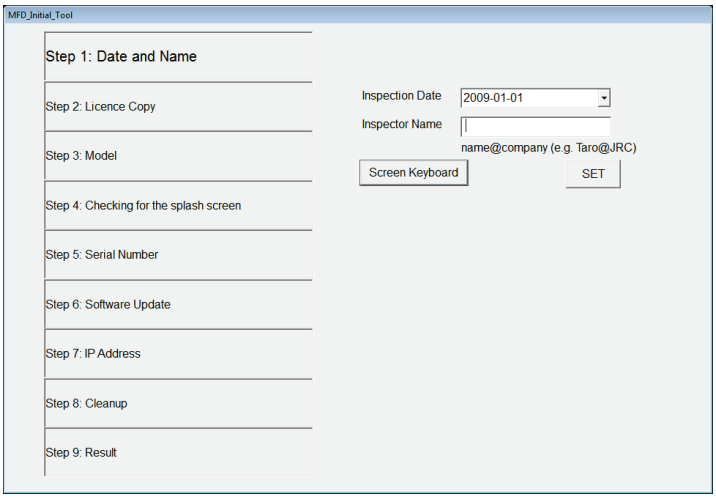
Turn on the main switch.

The system is turned on automatically only after the first time turning on the main switch. And after a few seconds, the system of the power is down and up automatically. This is a normal behavior. Go on to next step.

When the system will not boot up, check the ship's main and the main switch of PSU and press the power button on the trackball operation unit.



After splash screen appears, the Initial setting tool will launch automatically.



3: The Initial setting tool

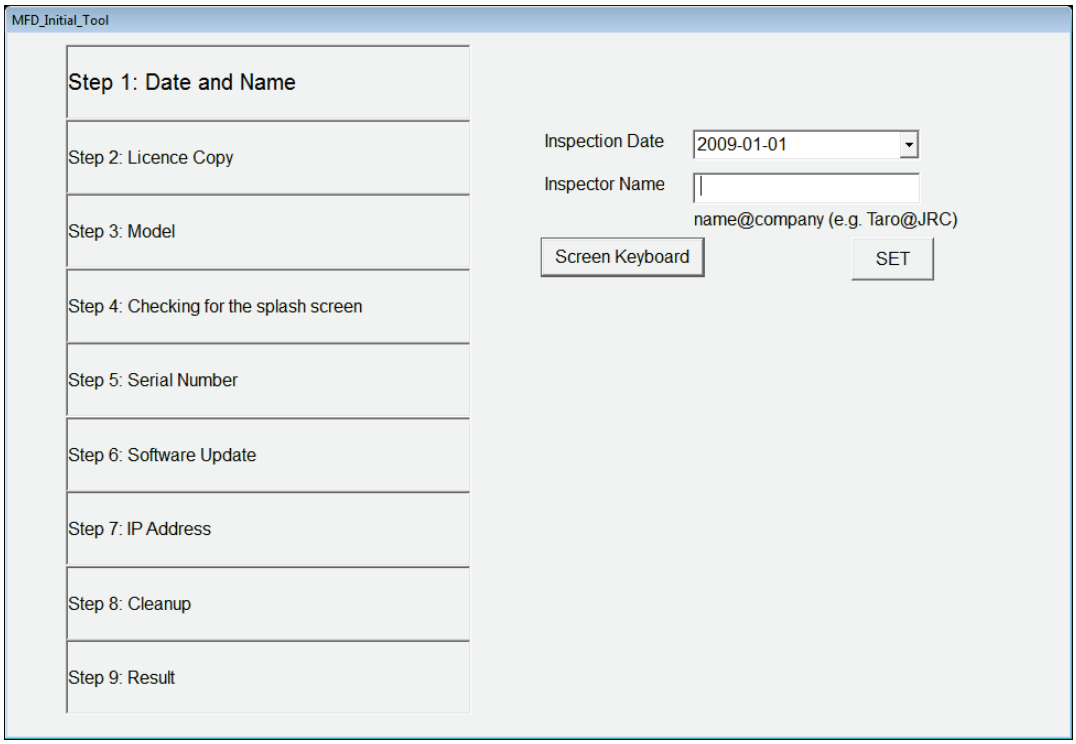
Along the Initial setting tool, setup the Dispay Unit.

Step 1: Date and Name

Enter the Inspection date, inspector name. And then click [SET] button.

FORMAT : name@company

EXAMPLE : Taro@JRC



Step 2: Licence Copy

The Hardware ID of HASP is compared with the Hardware ID in the licence file.

If they match, the licence file is copied over.

HASP: Hardware Against Software Piracy (included in NDC-1590 Central Control Unit)

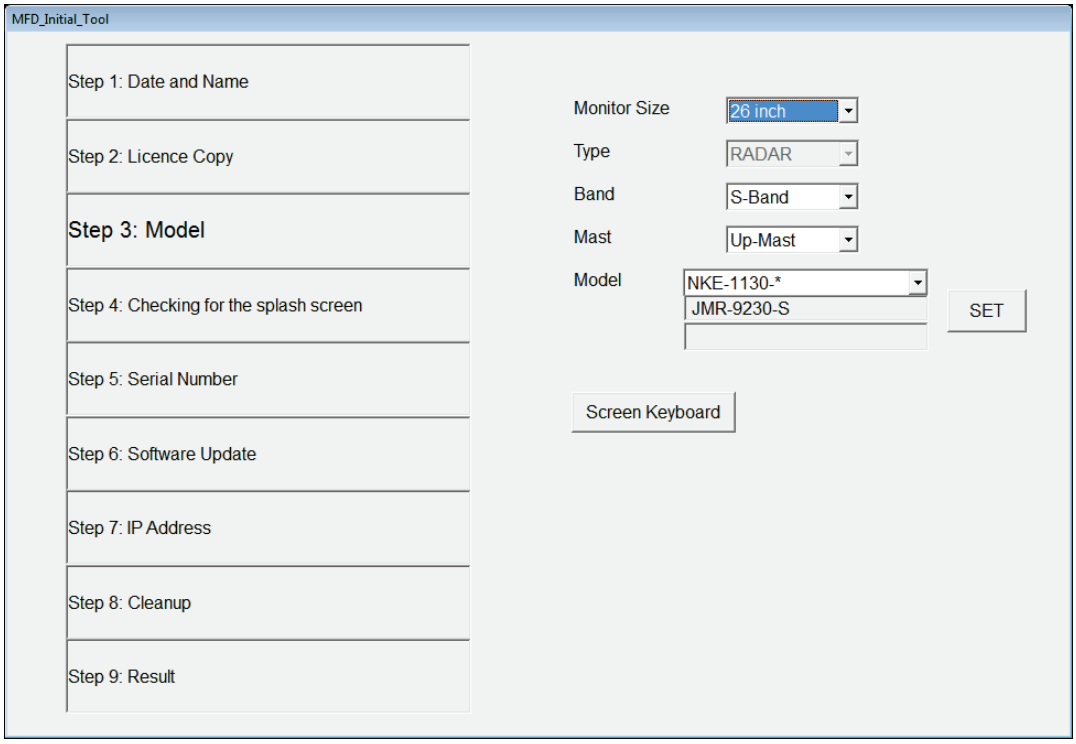
If they mismatch, following dialog is displayed.



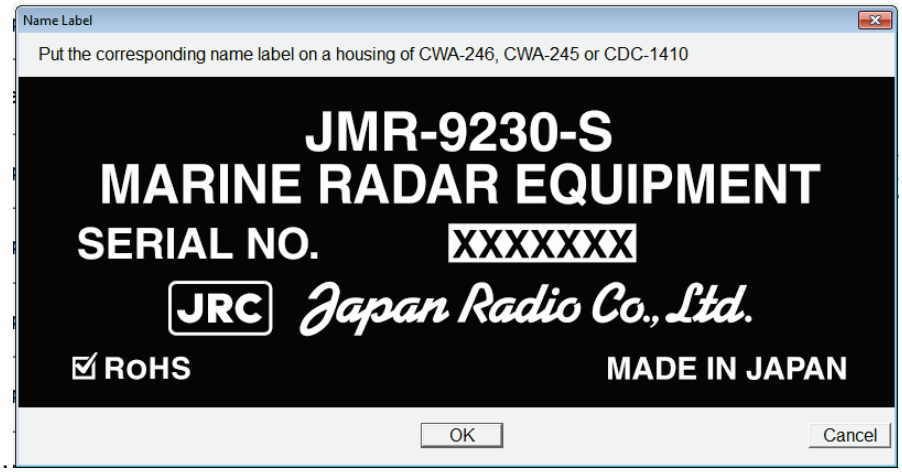
Step 3: Model

Enter the monitor size, model name.

By referring to the descriptions on the Ship Lists, select corresponding item from the drop-down list. Choose a corresponding model name to the general model name label which is affixed on the Display Unit. And then click [SET] button.



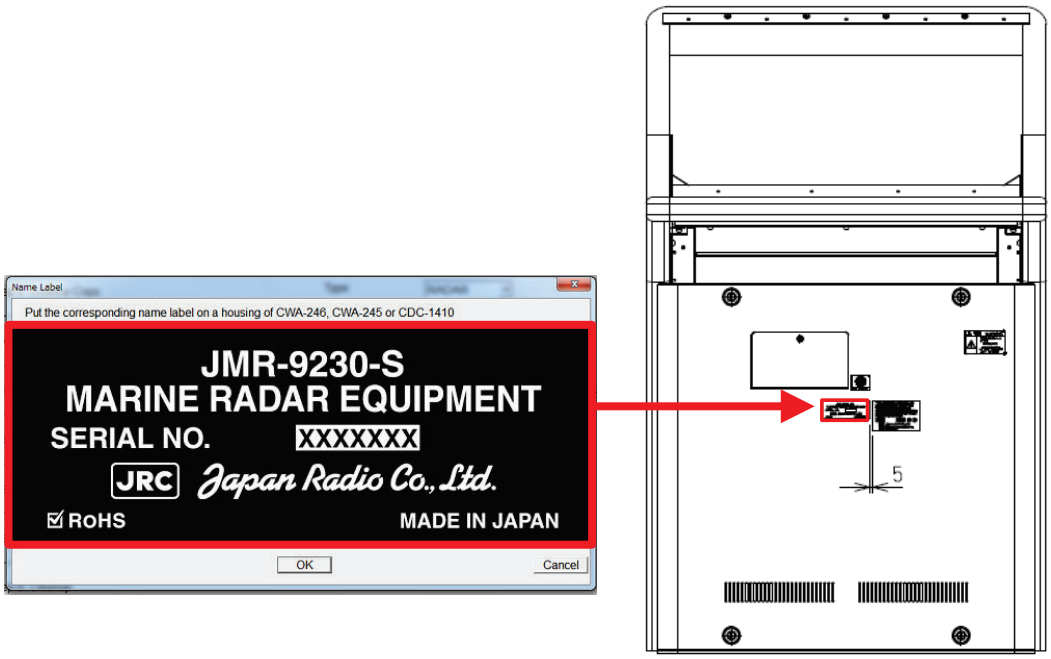
After clicking the [SET] button, the following image will be displayed



Confirm that the image and the label are the same.

a) Stand alone type

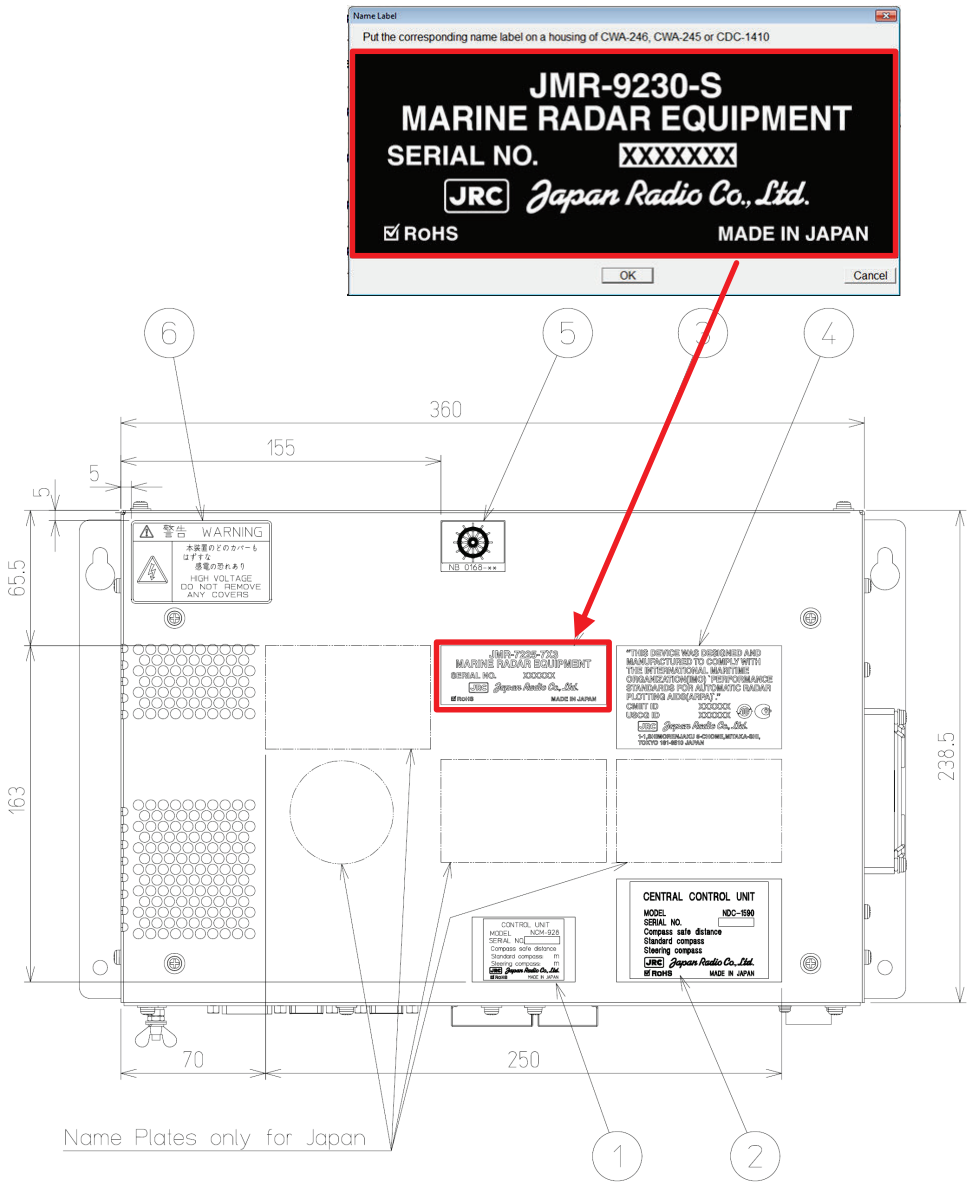
The Name label has been affixed to the front cover of the Display Unit mount kit.



Example：JMR-9230-S label on the Display Unit mount kit

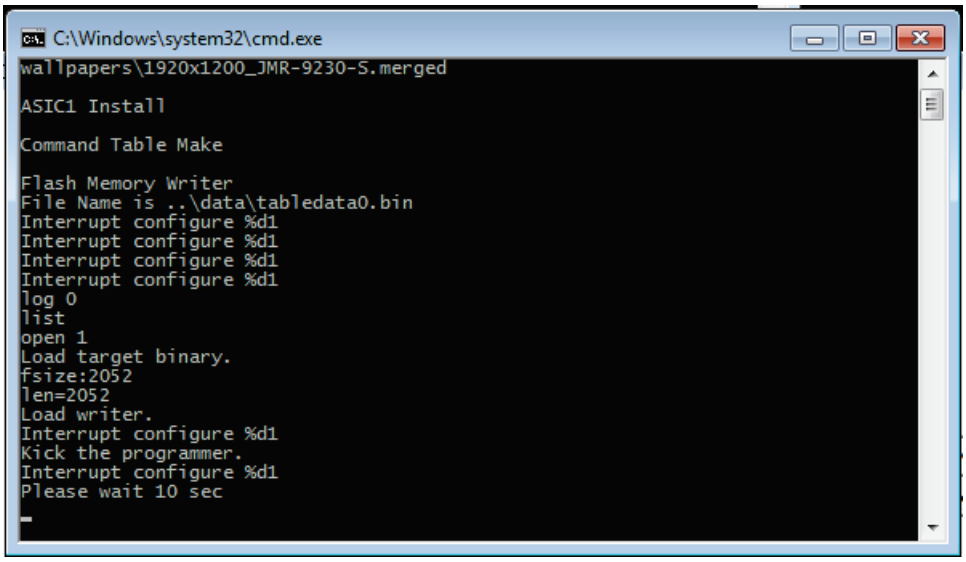
b) Desktop type or flush mount type

The Name label has been affixed to the top side of NDC-1590 :CCU.

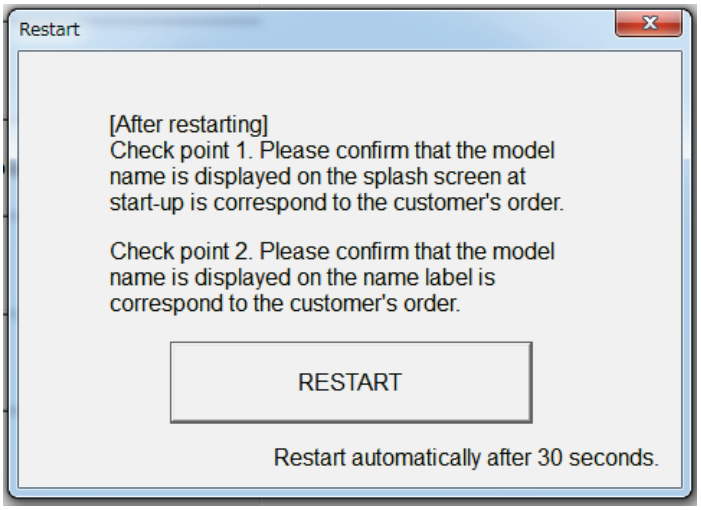


Example：JMR-9230-S label on NDC-1590: CCU

After confirming that the image corresponds to the label, click [OK] button. The following screen will be displayed and start-up screen will be changed automatically. It will take a few minutes to process. Please press any key because it is a key input required at the end.



Then the following screen is displayed. Make sure that the model name that appears during a restart and model name selected in step 3 matches.

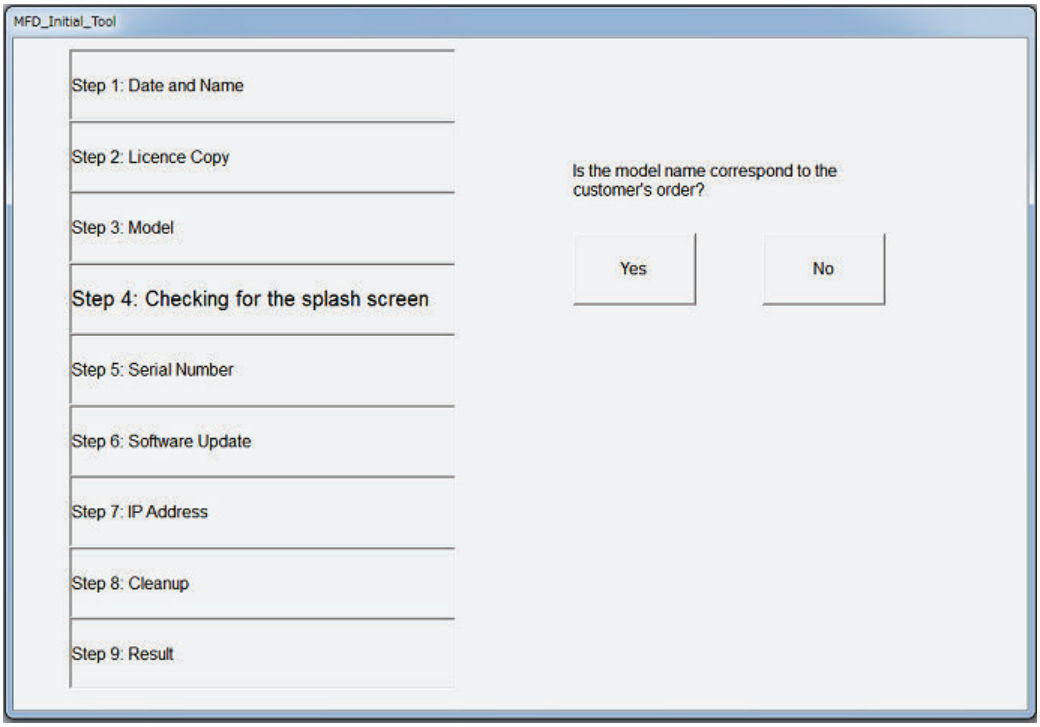


Restart by clicking the [RESTART] button. Or restart automatically after 30 seconds.

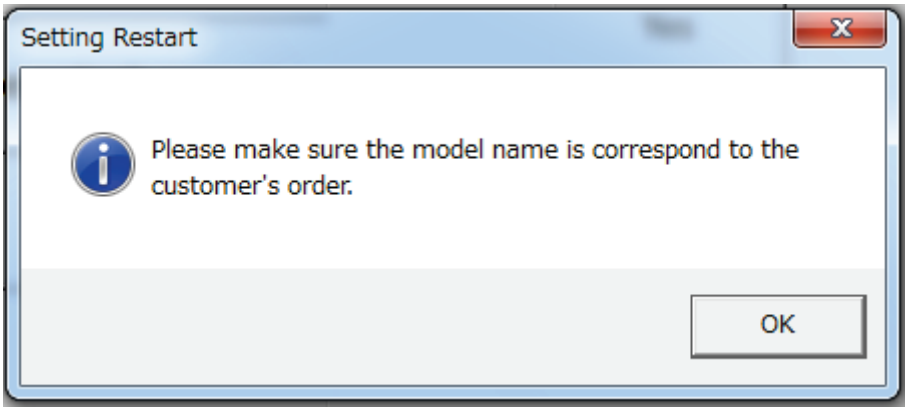
Step 4: Checking for the splash screen

Confirm that the Model name displayed on the splash screen and the Name Label pasted in step 3 are match.

● Matched: Click [YES] button and proceed to the next step.



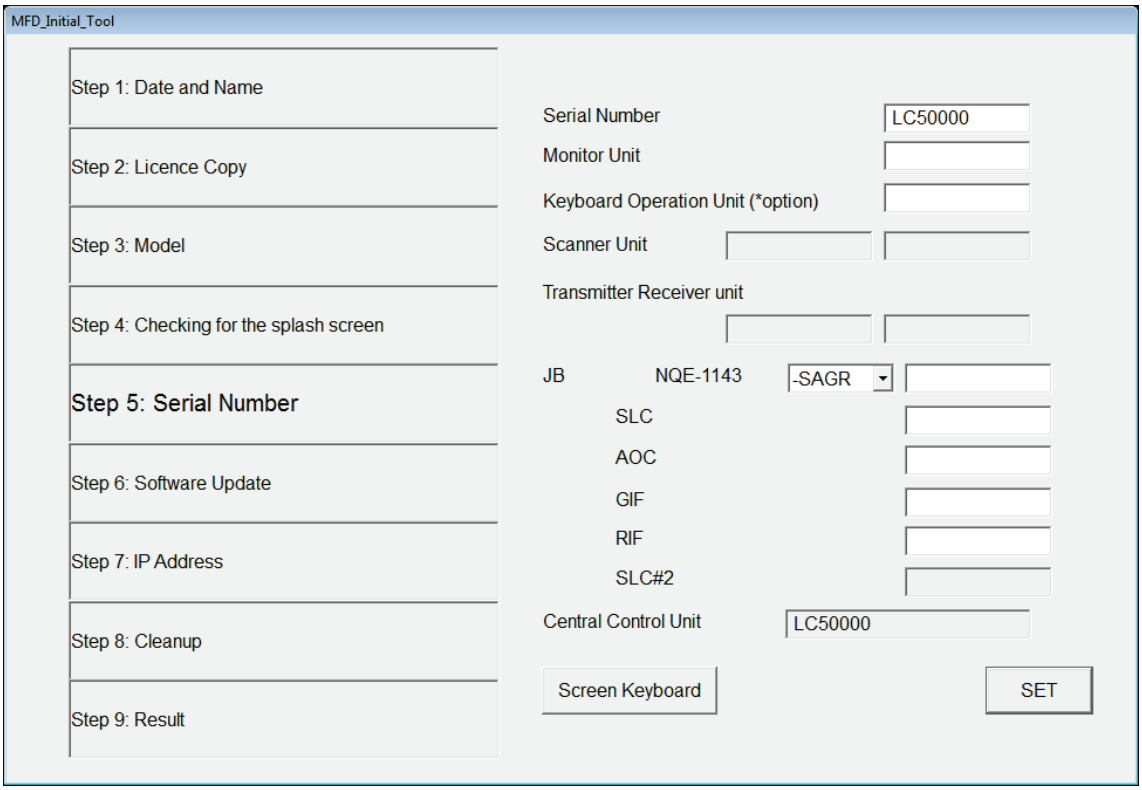
● Mismatched: Click [NO] button. Initialization tool will return to the screen of step3. Please check the equipment information again.



Step 5: Serial Number

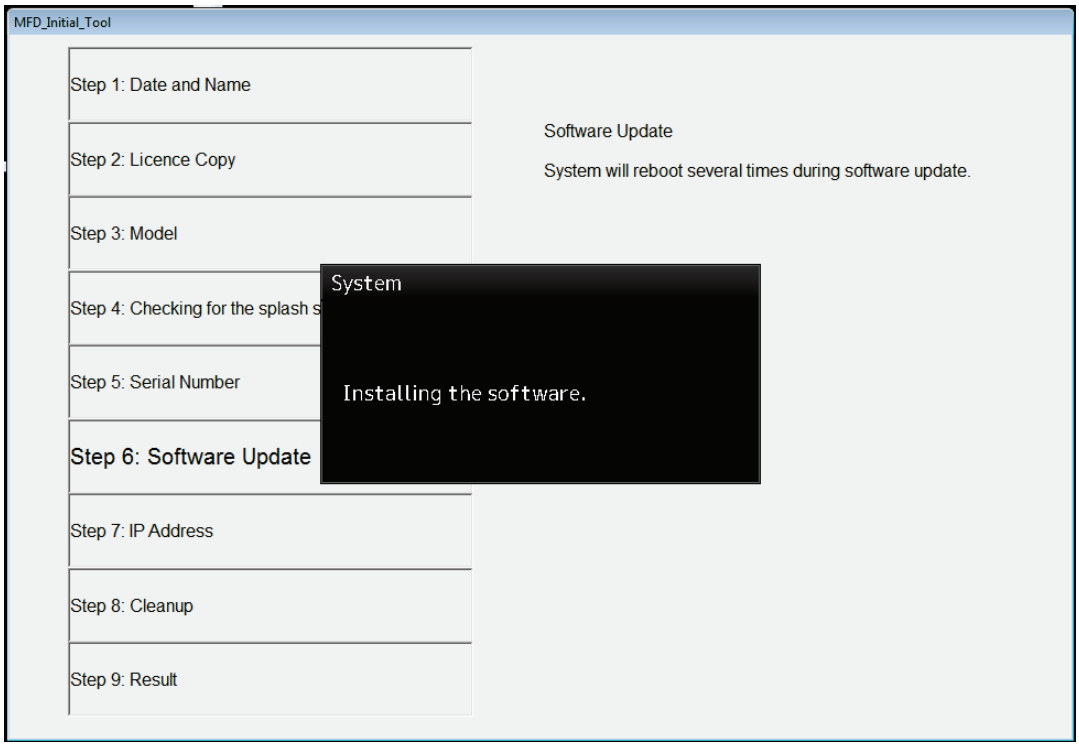
Enter the serial number of each unit. And then click the [SET] button.

- Please make sure that the serial number which you now entered corresponds the number which is written in the Ship's List.
- When setting the desktop type or flush mount type, may not enter the serial number of the monitor.
-When input the JB (Junction box) serial number , enter the barcode number and suffix of JB.
- May not enter the serial number of SLC, AOC, GIF, RIF, SLC#2.



Step 6: Software Update

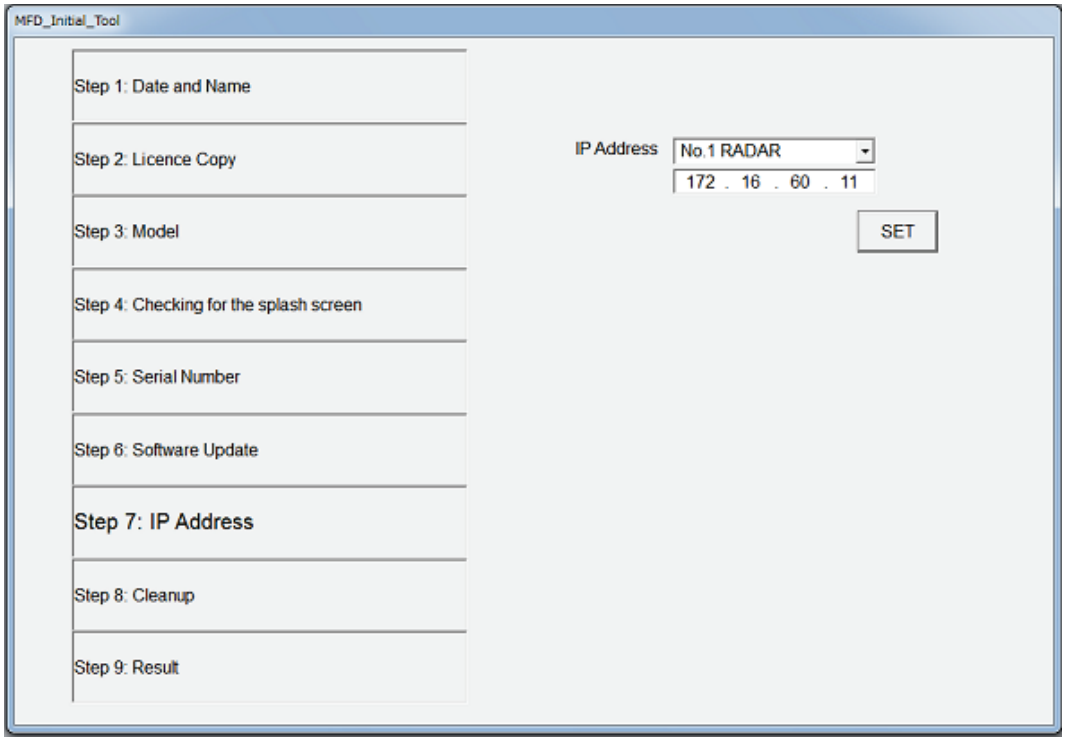
Software Update takes several minutes. Furthermore, The Display Unit will restart several times during the software update. This is normal behavior.



 # Software Update will be skipped if the software version which has been installed already is the latest.

Step 7: IP Address

By referring the Ship's List, enter the IP address. Then click the [SET] button.

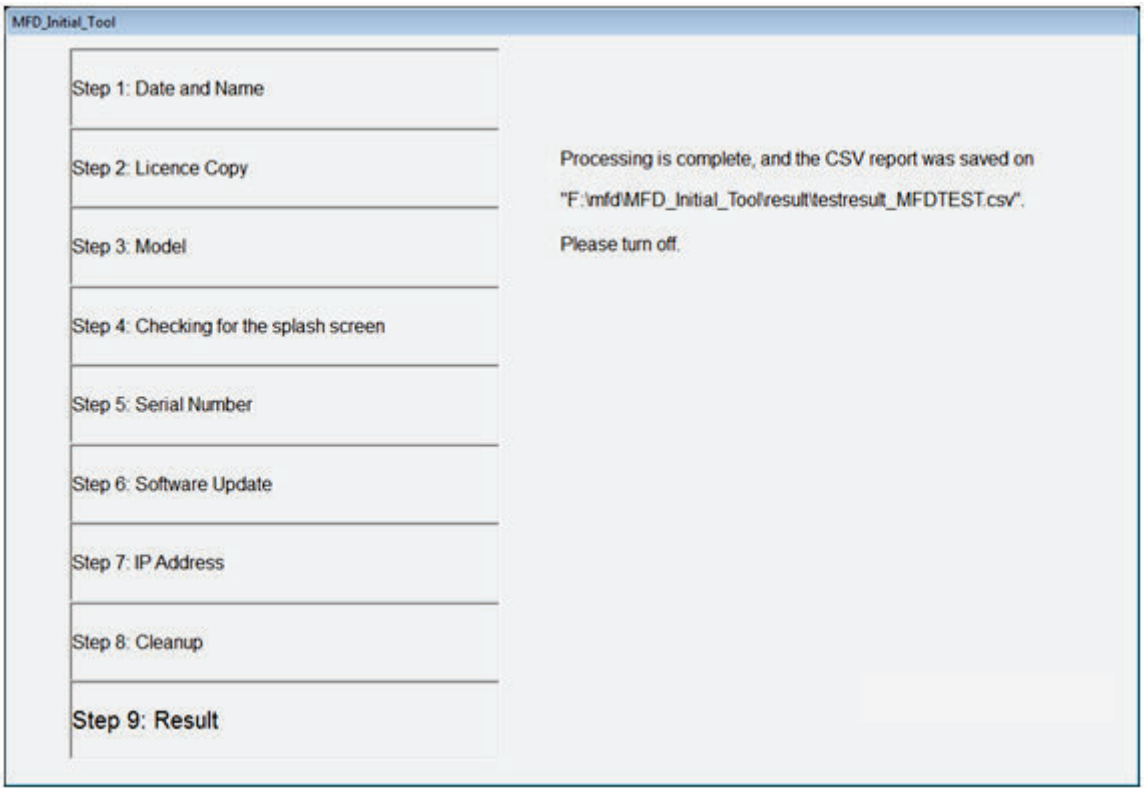


Step 8: Cleanup

The tool deletes unnecessary files automatically.

Step 9: Result

Click [FINISH] button. The resulting CSV file will be output.



This concludes the initial setting.

4.3.4.6 Replacing the DVD Drive: CDD-754

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver	Size #2	
3	Diagonal pliers	—	
4	Cable-tie *1	—	

*1 A number of cable-ties may be required.

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

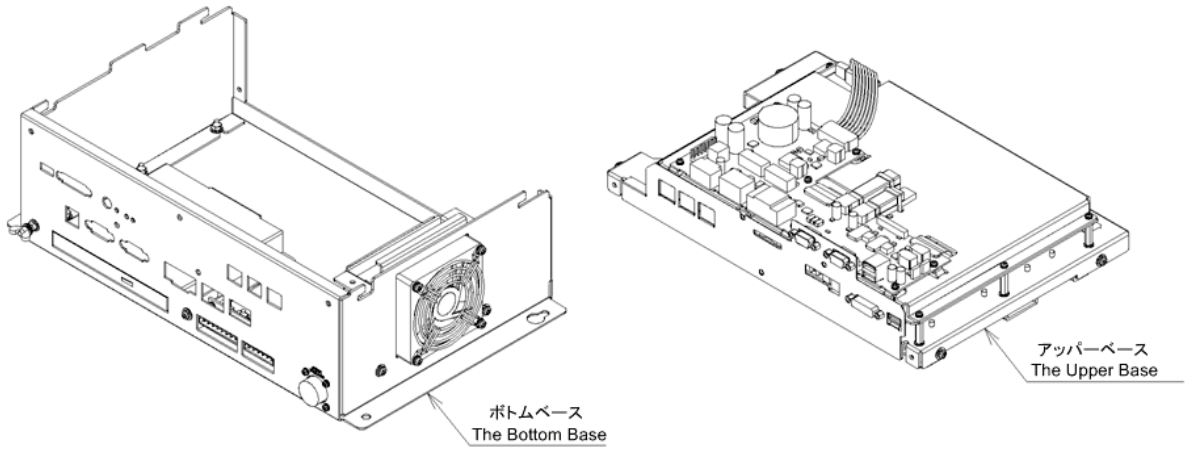
⚠ To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand.

Step 1 Remove the CCU.

Remove the CCU from the display unit mount kit. For more information about the removal procedure, refer to "Replacing with the CCU Repair Kit: NZC-1590."

Step 2 Remove the CCU cover and pull out the upper base.

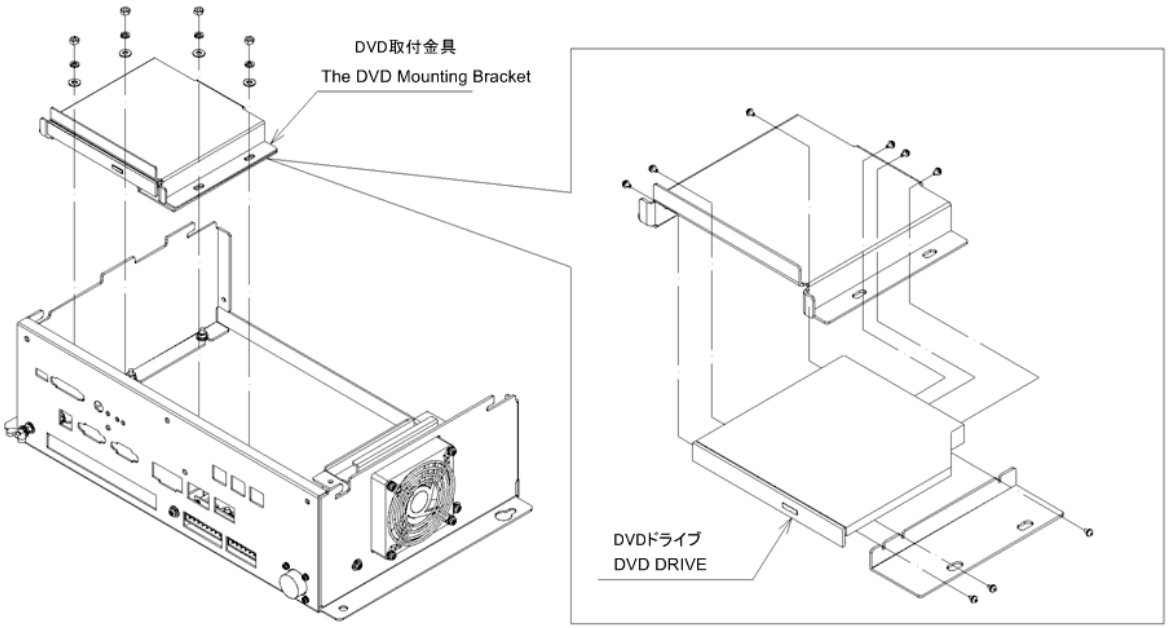
Remove the CCU cover and pull out the upper base. For more information about how to remove the cover and how to take out the upper base, refer to "Replacing with the CCU Repair Kit: NZC-1590."



Step 3 Change the DVD Drive.

Remove the mounting brackets of the DVD drive and change the DVD drive.

After replacing the DVD drive, assemble to the original condition by repeating the same procedure in the reverse order. For more information about the cable installation destinations, refer to "Replacing with the CCU Repair Kit: NZC-1590."



Step 4 Check operation.

After DVD drive replacement is completed, turn ON the circuit breaker for the power supply of the display unit and check the operation as follows.

(1) Turn ON the display unit and start the Display Unit application. Insert DVD-ROM into the DVD drive and check that there is no problem in reading the DVD-ROM.

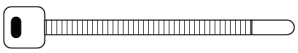
This completes DVD drive replacement.

4.3.4.7 Replacing with the CCU Replacement FAN Kit: 7ZYNA4006

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver	Size #2	
3	Diagonal pliers	—	
4	Cable-tie *1	—	

*1 A number of cable-ties may be required.

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

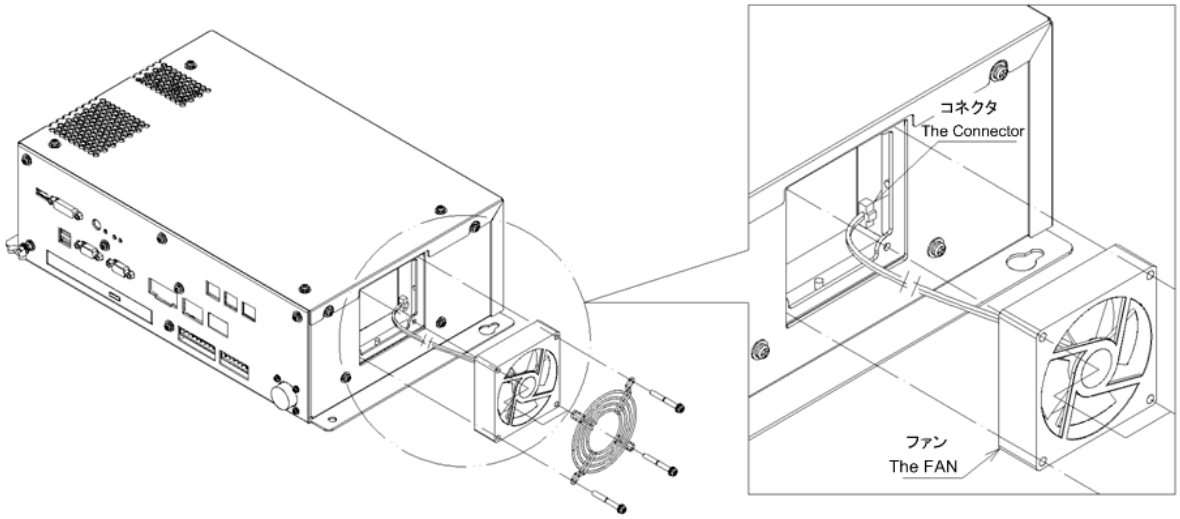
⚠ To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand.

Step 1 Remove the CCU.

Remove the CCU from the display unit mount kit. For more information about the removal procedure, refer to "Replacing with the CCU Repair Kit: NZC-1590."

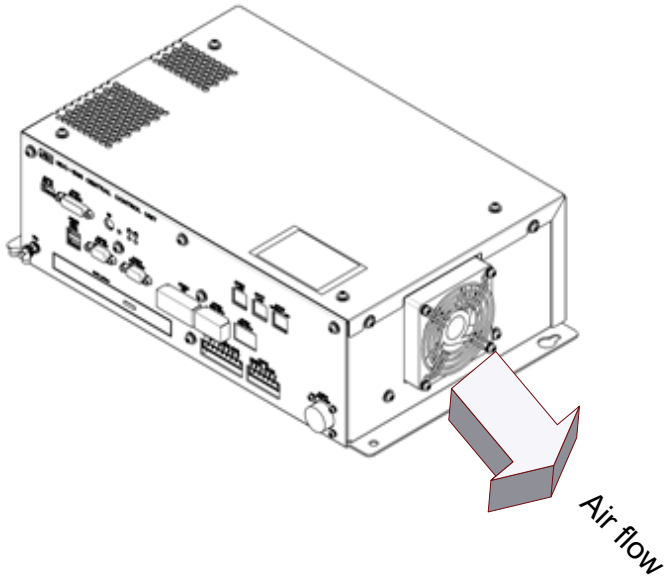
Step 2　　Change the fan.

Remove the screws (M4: 4 locations) that fasten the fan. Pull out the fan and disconnect the connector.

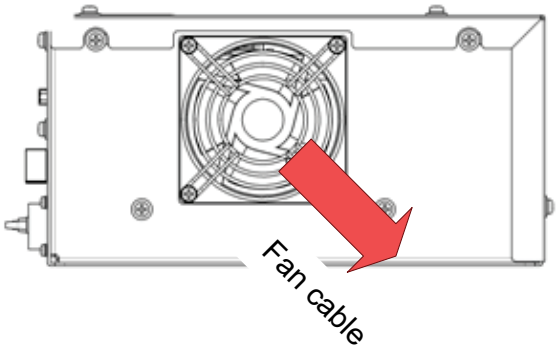


⚠ Be careful with the fan mounting direction.

Install the fan so that the air flows to the exhaust direction.



Install a new fan in such a way that the fan cable comes out from the lower right when viewed from the front.



⚠ Have enough clearance to prevent the cables from being caught in the blades of the fan.

After fan replacement is completed, reinstall the CCU into the display unit mount kit by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.

Step 3 Check operation.

After fan replacement is completed, turn ON the circuit breaker for the power supply of the display unit and check the operation as follows.

(1) Turn ON the display unit and start the MFD application. Check that there is no problem in its operation and processing.
(2) Check that the fan alarm "CCU (Fan)" does not occur.

This completes fan replacement.

4.3.4.8 Replacing HASP CYC-344

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver	Size #2	
3	Diagonal pliers	—	
4	Cable-tie *1	—	
5	USB flash drive *2	1 GB or more	

*1 A number of cable-ties may be required.

*2 Do not use Flash drives which are password protected or encrypted.

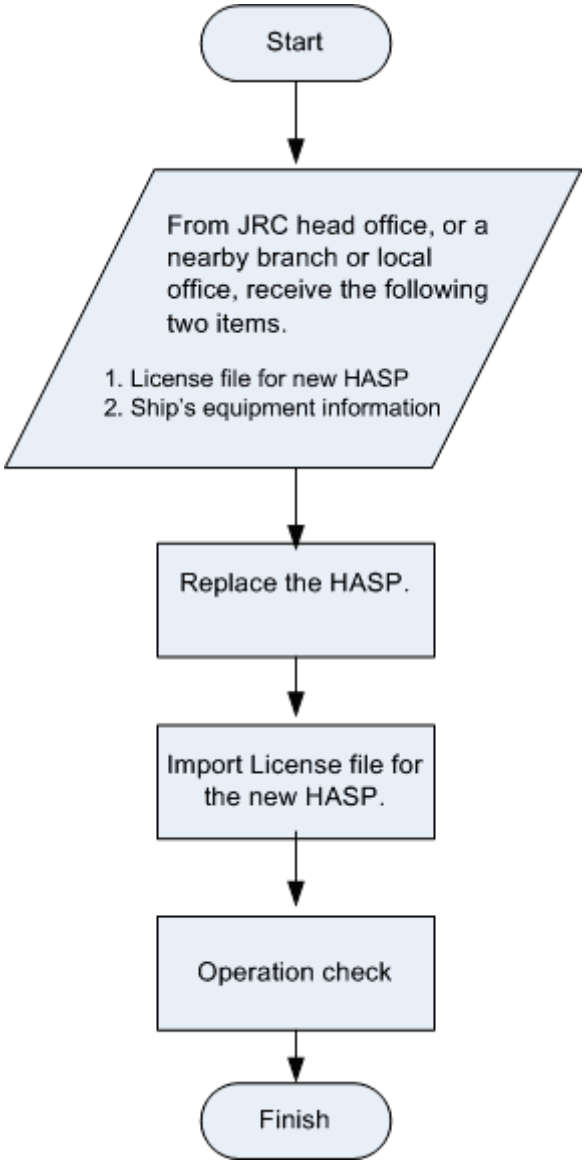
⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

⚠ To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand.

⚠ For the details that how to obtain the data files for HASP replacement, please contact our head office or a nearby branch or local office beforehand.

[The flowchart of HASP replacement work]



Step 1 From nearby JRC sales department, receive the data files for HASP replacement.

From JRC head office, or a nearby branch or local office, receive the following four items for HASP replacement.

1. Licence file for new HASP
2. Ship's equipment information

These data files must be saved into your USB flash drive, and brought to the ship at the replacement work.

⚠ For the details that how to obtain those data files for HASP replacement, please contact our head office or a nearby branch or local office beforehand.

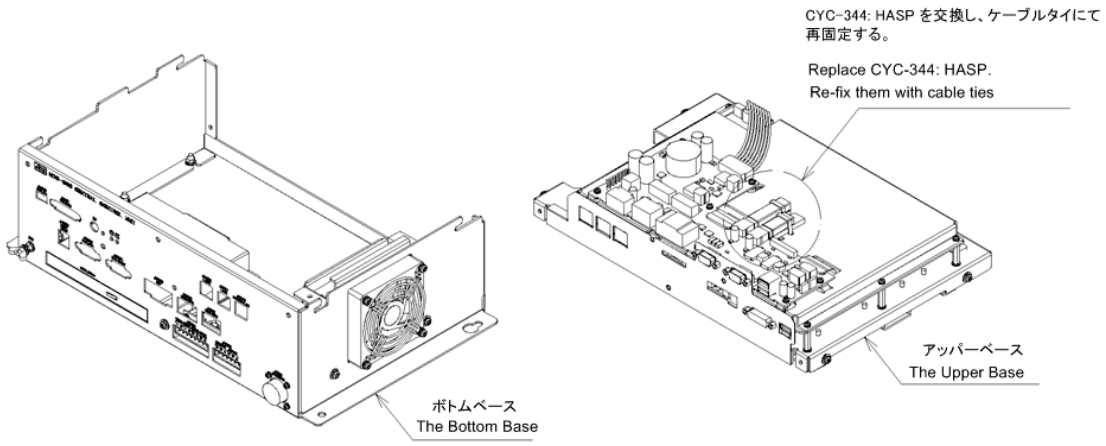
⚠ The USB flash drives which are password protected or encrypted are not available in this work.

Step 2 Detach the CCU

Detach the CCU from Display Unit Mount kit. For further information, see **"Field Service Manual 4.3.3.2 Replacing with the CCU Repair Kit: NZC-1590".**

Step 3 Remove the upper base of CCU.

Remove the upper base of CCU. For further information, **"Field Service Manual 4.3.3.2 Replacing with the CCU Repair Kit: NZC-1590".**



Step 4 Replace the HASP.

Disconnect and replace the HASP being connected to the upper base of the NDC-1590.
The color of HASP is green.

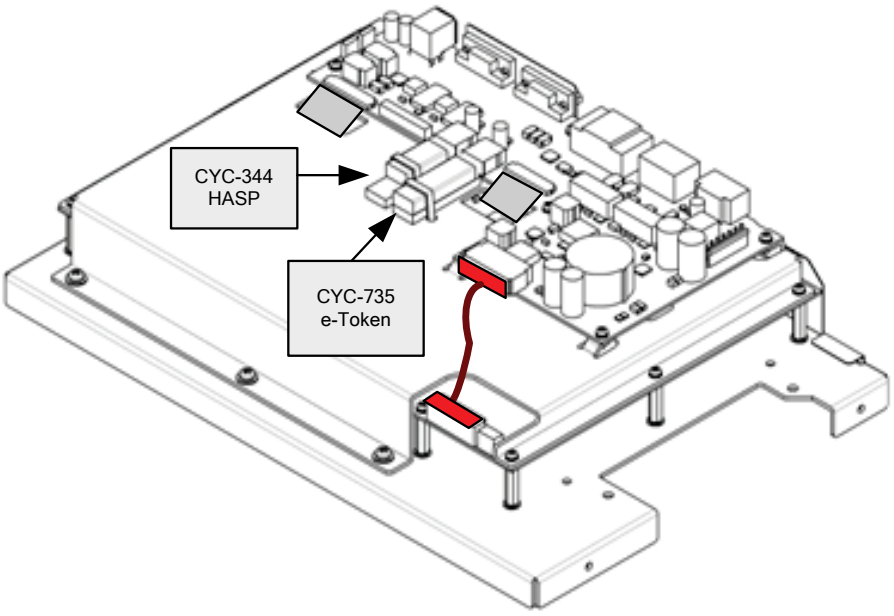


CYC-344 HASP

⚠ Be careful not to mistake HASP for eToken. The color of the eToken is blue with a JEPPESEN company tag.

⚠ The appearance of HASP and eToken may change without notice.

Since the HASP has been fixed by cable-ties, cut them before disconnecting it.
After replacement is completed, fasten the new HASP again with cable-ties.



⚠ Insert the HASP securely all the way to the roots. When fastening it, be sure to fasten securely so that there is no looseness.

When the replacement of the HASP is completed, assemble the CCU by repeating the same procedure in the reverse order. For further information, see **"Field Service Manual 4.3.3.2 Replacing with the CCU Repair Kit: NZC-1590".**

After assembling the CCU is completed, reinstall it into the display unit mount kit by repeating the same procedure in the reverse order.

⚠ Be careful not to forget to insert the cable connectors.

Step 5 Check that Display unit is booting up correctly.

Turn ON the circuit breaker for the power supply of the display unit to start up the Display unit. Check that the Display unit boots up correctly.

Step 6 Import the new Licence file

Connect your USB flash drive which contains the new License file into the Display Unit.

Enter the password 9380 on the task menu to import the new Licence file. For further information, see **"Field Service Manual 7.5.4.6 9380 – Launch the Licence Import Tool".**

Step 7 Re-install the electronic charts for ECDIS / CHART RADAR.

If the License file imported to the Display Unit has either:

- ECDIS licence
- RADAR with Chart optional licence, or
- MFD which has ECDIS licence,

re-install the ENC electronic charts and S-63 Cell Permit by reffering the followings:

- Installation information at the time of commissioning, which is described in the installation check list
- Additional Manual for Chart Installation 2.1 Importing ENC S-57/S-63 Charts, AVCS Charts and AIO Data

⚠ When you replace a HASP, ENC charts that have been using on the Display Unit will become unavailable because of the User Permit / Cell Permit change.

Step 8　Check operation.

After licence file re-importing is completed, check the operation as follows.

(1) Start the MFD application. Check that there is no problem in its operation and processing.

(2) Conduct the operational inspection as described in **"Field Service Manual 7.2 Operational Inspection"**.

(3) Confirm that there is no problem in display of the electronic charts if you re-installed them.

This completes HASP replacement.

4.3.4.9 Replacing eToken CYC-735

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver	Size #2	
3	Diagonal pliers	—	
4	Cable-tie *1	—	

*1 A number of cable-ties may be required.

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

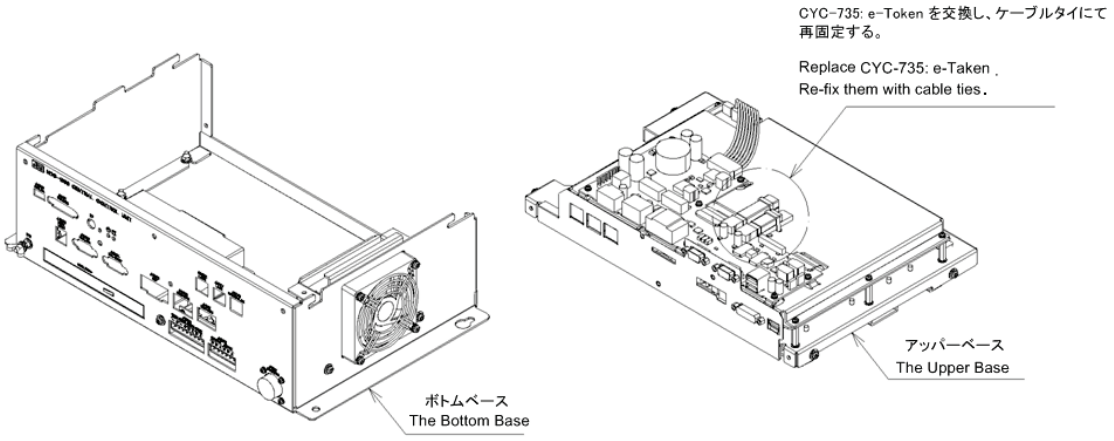
⚠ To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand.

Step 1 Detach the CCU

Detach the CCU from Display Unit Mount kit. For further information, see **"Field Service Manual 4.3.3.2 Replacing with the CCU Repair Kit: NZC-1590".**

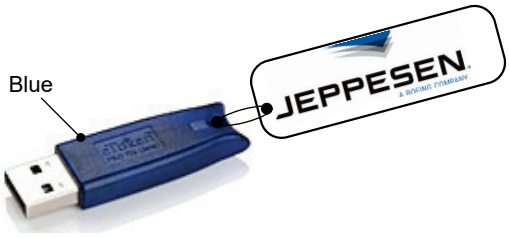
Step 2 Remove the upper base of CCU.

Remove the upper base of CCU. For further information, **"Field Service Manual 4.3.3.2 Replacing with the CCU Repair Kit: NZC-1590".**



Step 3 Replace the eToken.

Disconnect and replace the eToken being connected to the upper base of the NDC-1590. The color of the eToken is blue with a JEPPESEN company tag which is written the System ID.

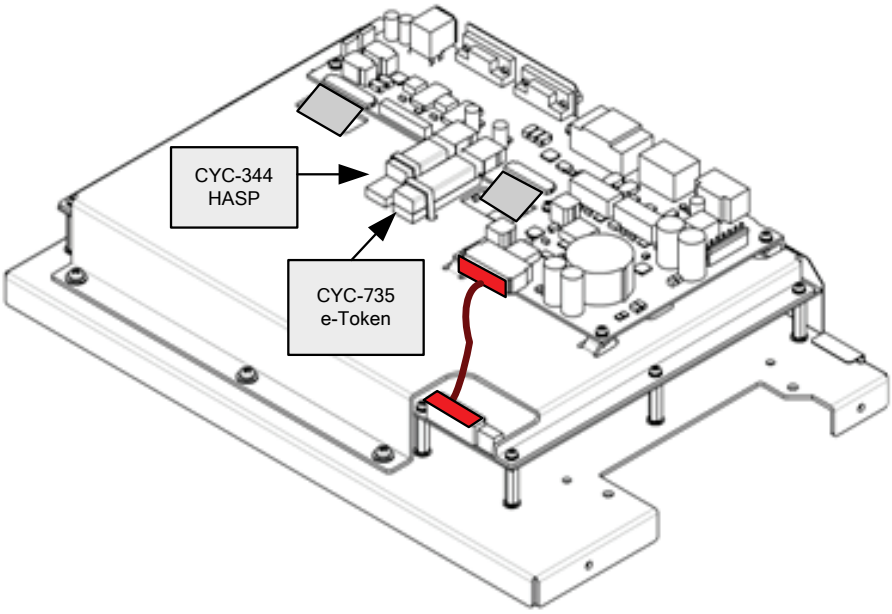


CYC-735 eToken

⚠ Be careful not to mistake eToken for HASP. The color of HASP is green.

⚠ The appearance of eToken and HASP may change without notice.

Since the eToken has been fixed by cable-ties, cut them before disconnecting it. After replacement is completed, fasten the new eToken again with cable-ties.



⚠ Insert the eToken securely all the way to the roots. When fastening it, be sure to fasten securely so that there is no looseness.

When the replacement of the eToken is completed, assemble the CCU by repeating the same procedure in the reverse order. For further information, see **"Field Service Manual 4.3.3.2 Replacing with the CCU Repair Kit: NZC-1590".**

After assembling the CCU is completed, reinstall it into the display unit mount kit by repeating the same procedure in the reverse order.

⚠ Be careful not to forget to insert the cable connectors.

Step 4 Check that Display unit is booting up correctly.

Turn ON the circuit breaker for the power supply of the display unit to start up the Display unit. Check that the Display unit boots up correctly.

Step 5 Recover the C Drive Image.

In order to apply the new eToken ID information to OS registry, recover the C Drive Image. Perform system recovery by referring **"Field Service Manual 5.3 Recovering the C Drive Image".**

Step 6 Re-install C-MAP charts.

Re-install the electronic charts by referring the followings:

- Installation information at the time of commissioning, which is described in the installation check list
- Additional Manual for Chart Installation 4.3 Importing C-MAP Ed.3

⚠ When you replace an eToken, C-map charts that have been using on the Display Unit will become unavailable.

Step 7 Check operation.

After chart re-importing is completed, check the operation as follows.

(1) Start the MFD application. Check that there is no problem in its operation and processing.

(2) Conduct the operational inspection as described in **"Field Service Manual 7.2 Operational Inspection"**.

(3) Confirm that there are no errors on the electronic chart display.

This completes eToken replacement.

4.3.4.10 Replacing with D drive SSD CDD-753/A

【 Required Tools 】

The tools shown in the following table are required for replacement work.

Table Required Tools

No	Name	Size	Appearance
1	Flat head screwdriver	For 6mm	
2	Phillips screwdriver	For Size #2	
3	Precision Phillips screwdriver※1	For M1.4	
4	Socket driver	5mm	
4	Diagonal pliers	—	
5	Cable-tie※2	—	

※1 Precision driver is required for removing SSD

※2 A number of cable-ties may be required.

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

⚠ To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand.

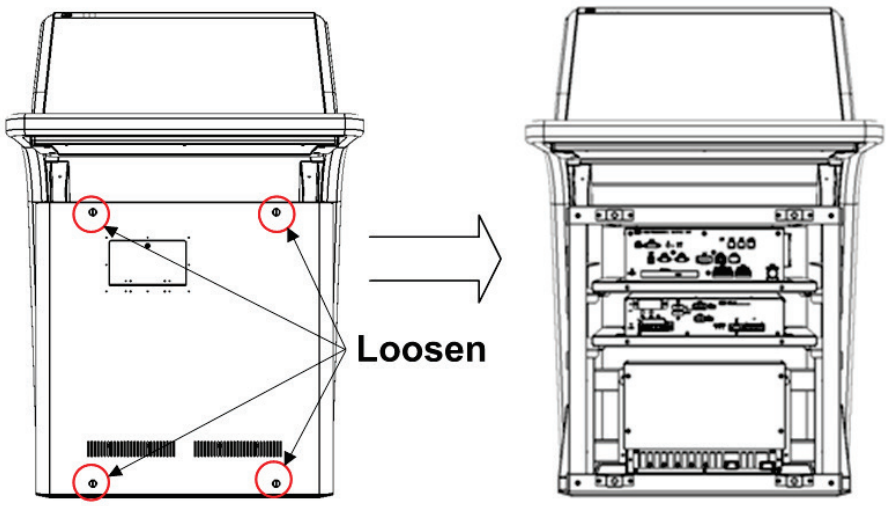
⚠ The SSD used for restoration once can't be used for restoration of other NDC-1590 CCU.

⚠ CDD-753 can't be used for NDC-1590A. (CDD-753A can be used for NDC-1590/A.)

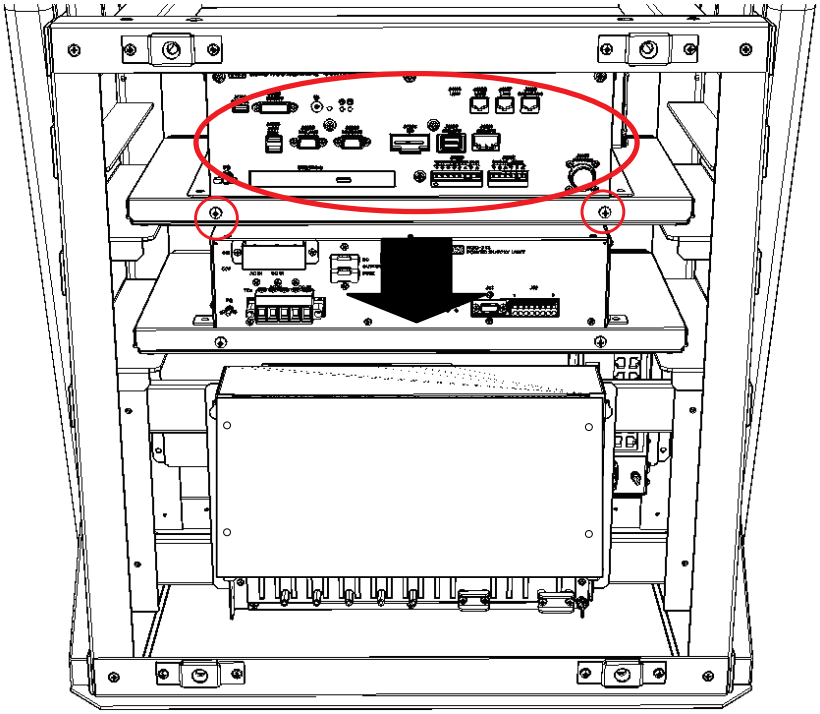
Step1 Remove the NDC-1590 CCU

Standalone Type

Loosen the screws that fasten the front cover of the display unit mount kit with a flat head screwdriver and take out the front cover. Then turn off the breaker of Display Unit



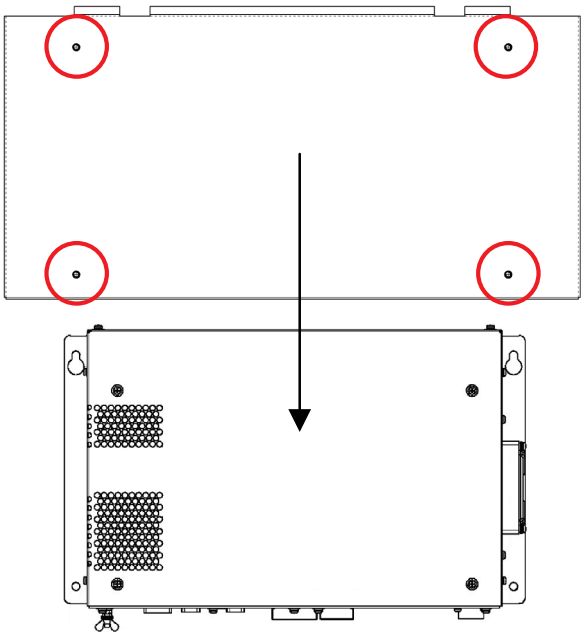
Remove all the cables being connected to the front of the CCU. Remove the screws (M5: 2 locations) of the mounting plate that fasten the CCU, pull out the CCU together with the mounting plate, and then remove it from the display unit mount kit.



⚠CAUTION

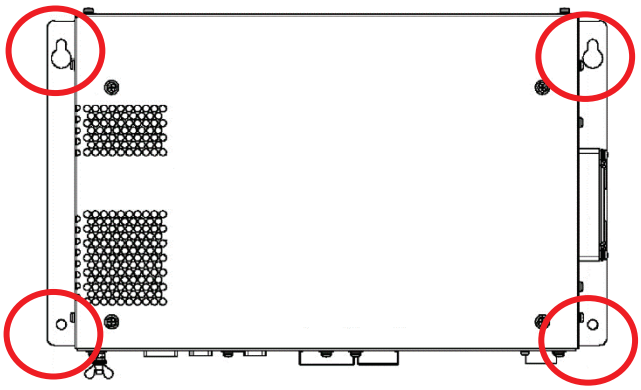
Before conducting Unit replacement work, always be sure that every cable-tie that fastens the cable has been removed.
Replacement work without the above may lead Unit/cable breakage.

Remove the screws (M4: 4 locations) of the mounting plate and pull out the CCU from the mounting plate.



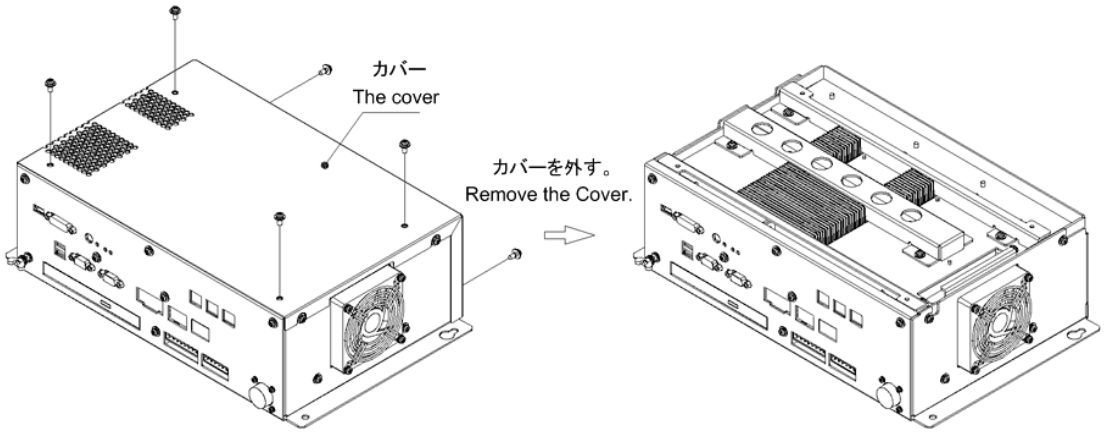
Flash Mount Type

Remove all the cables being connected to the front of the CCU. Then remove the screws (M4: 4 locations) and pull out the CCU from the mounting place.



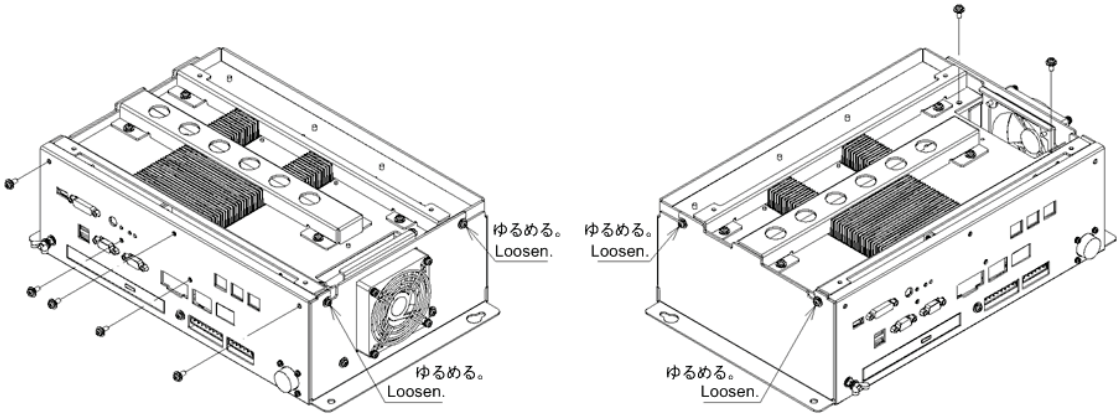
Step2 Remove the CCU cover.

Remove the screws (M4: 6 locations) that fasten the CCU cover and then take it out.



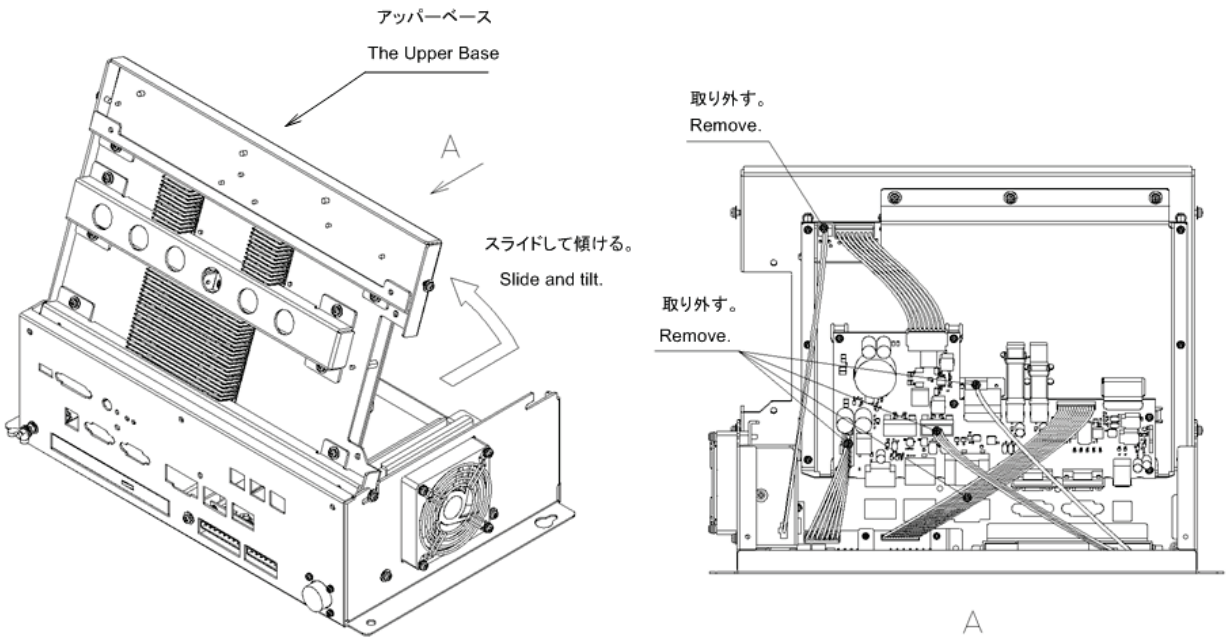
Step3 Remove the screws that fasten the upper base.

Remove the screws (M4: 7 locations) that fasten the upper base. Loosen the screws (M4: 4locations) of both ends.



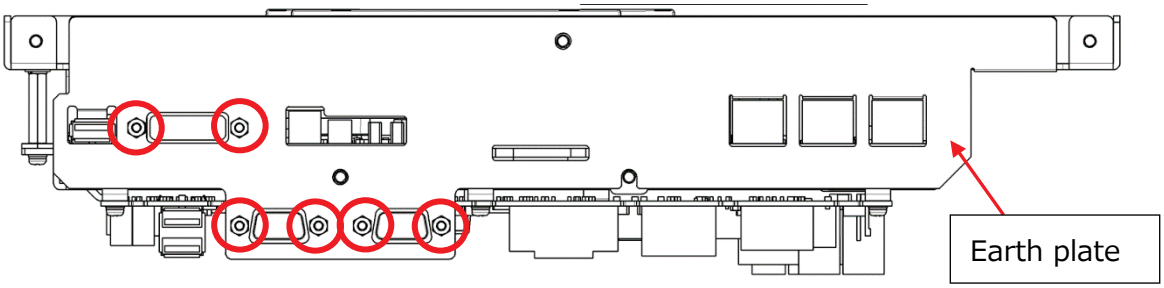
Step4 Remove the upper base.

Slide the upper base to tilt and disconnect the cables. Then, remove the upper base.



Step5 Remove the earth plate of upper base front part

Remove the hex screws (6locations) attached to DVI connector and D-sub connector by using the socket driver. Then remove the earth plate of upper base front part.



Step6 Remove the CMH-2406 CIF mounting plate

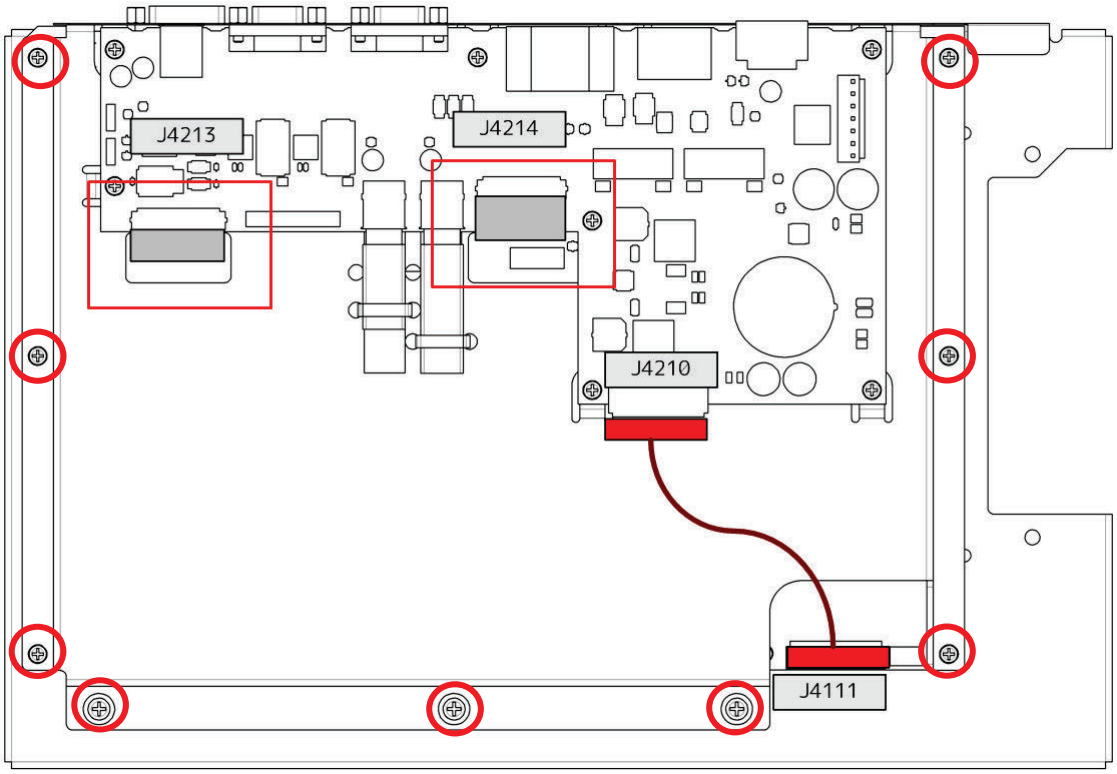
Remove the following 3 cables connected to the CIF CMH-2406.

J4213: FFC Cable *Refer to the careful points of FFC-Connector Operating.

J4214: FFC Cable *Refer to the careful points of FFC-Connector Operating.

J4210: W41 Cable

Remove 9 screws (M3: 6locations, M4: 3locations) of the CMH-2406 CIF mounting plate. Then remove the mounting plate.

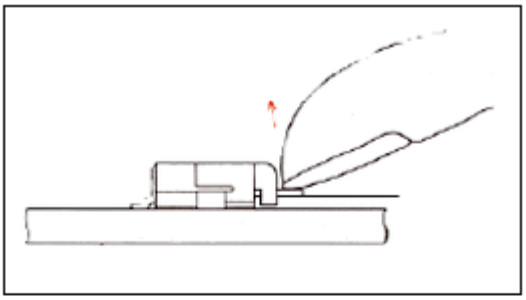


⚠CAUTION

It is necessary to unlock the connector when removing the FFC cable. Opening the lock of the connector with a strong force cause a damage, please open the lock of connector with care and remove FFC cable.

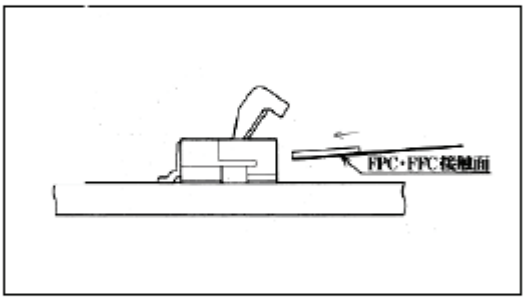
*The careful points of FFC-Connector Operating.

①



Lift up the lock lever using thumb or index finger. (Don't add the power by force.)

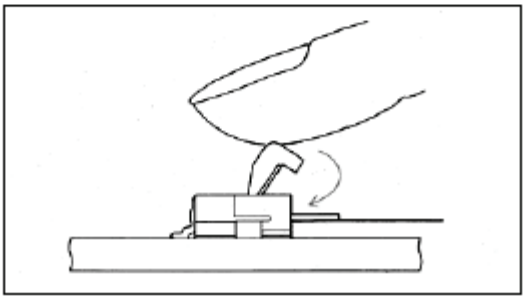
②



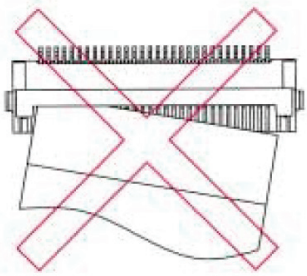
Don't draw the lock lever up more than necessary.When the lock lever is drawn up more than necessary, a hook part of the connector body is damaged.

Fully insert the FFC parallel to mounting surface, with the exposed conductive traces facing down.

③



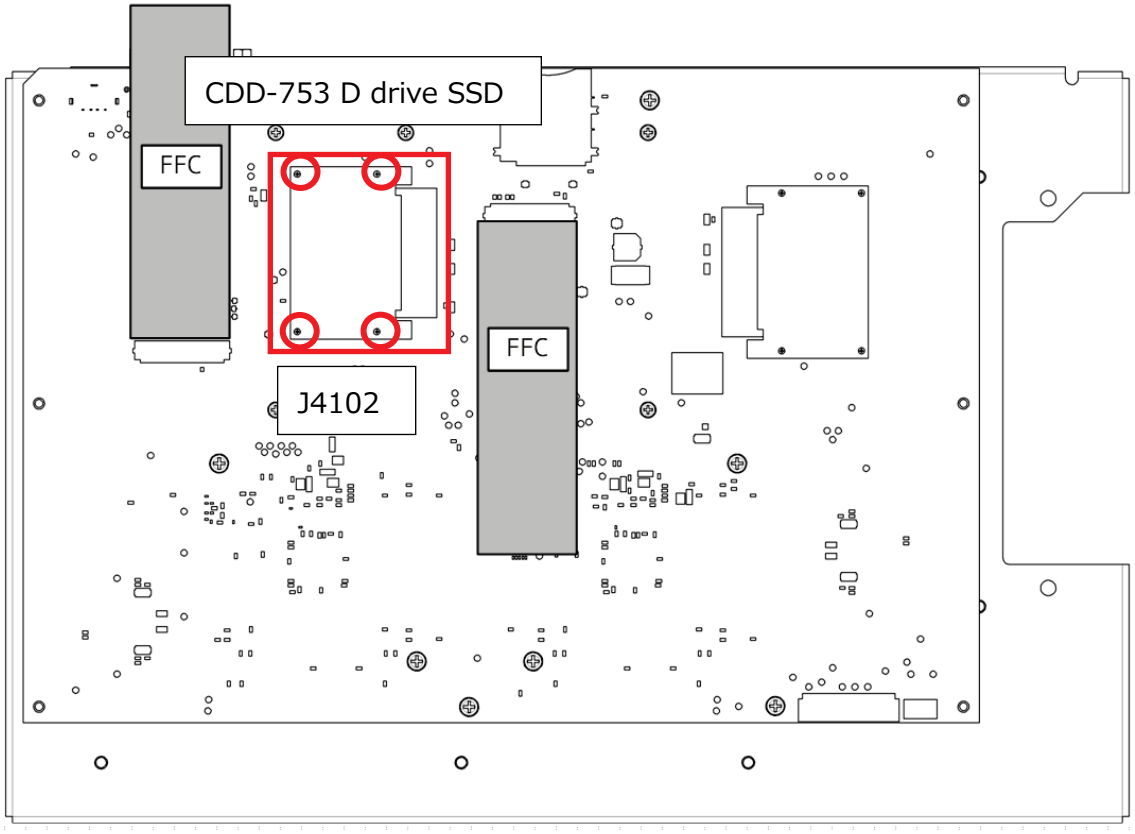
Rotate down the lock lever until firmly closed.



Partial insertion of the FFC, offset insertion, and diagonal insertion will result in an unfavorable engagement of the lock lever in which the lock lever is raised. To correct this, first remove the FFC and then reinsert it. Forcing the lock will damage the connector.

Step7 Replace the CDD-753 SSD

Remove the screws (M1.4: 4 places) fixing the SSD by using a precision Phillips screwdriver. Then remove the SSD from J4102 connector and replace.



⚠CAUTION
Mounting screw M1.4 for SSD is very small, therefore be careful not to lose it.
When connecting the SSD, adjust according to the four screw holes position. （When inserting the SSD all the way, screw holes may not fit.）

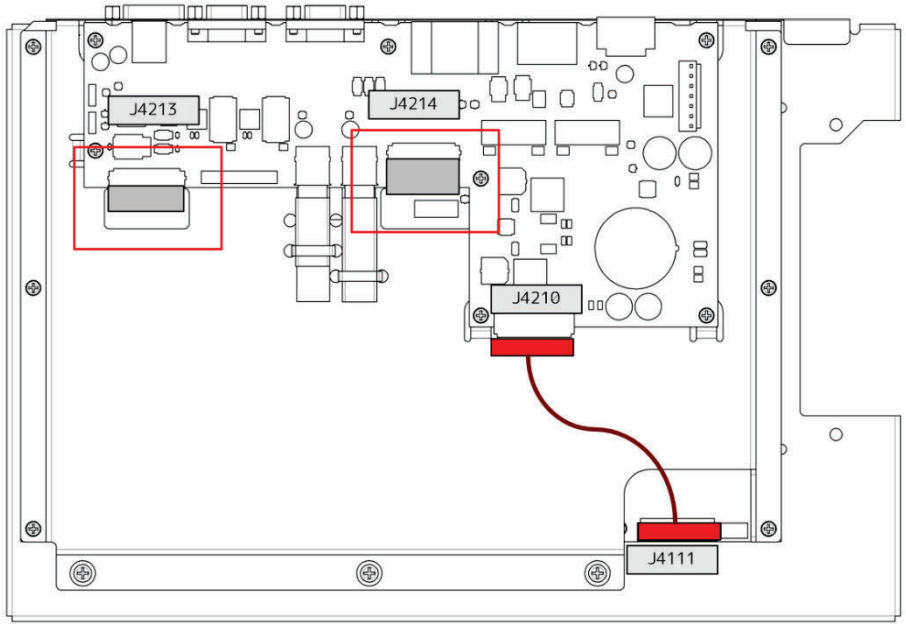
Step8　Assemble the CCU.

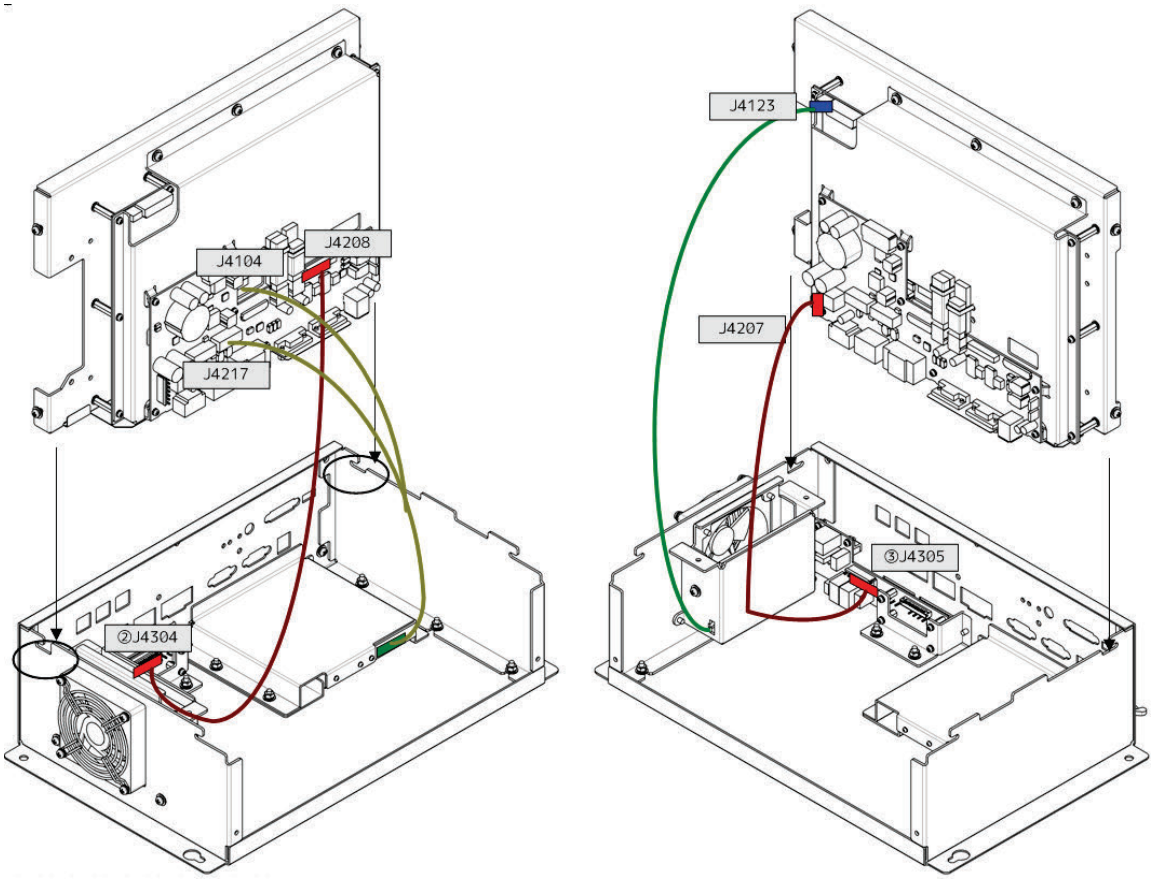
After replacing SSD, assemble the CCU by repeating the same procedure in the reverse order. Then, install the cover also in the reverse order.

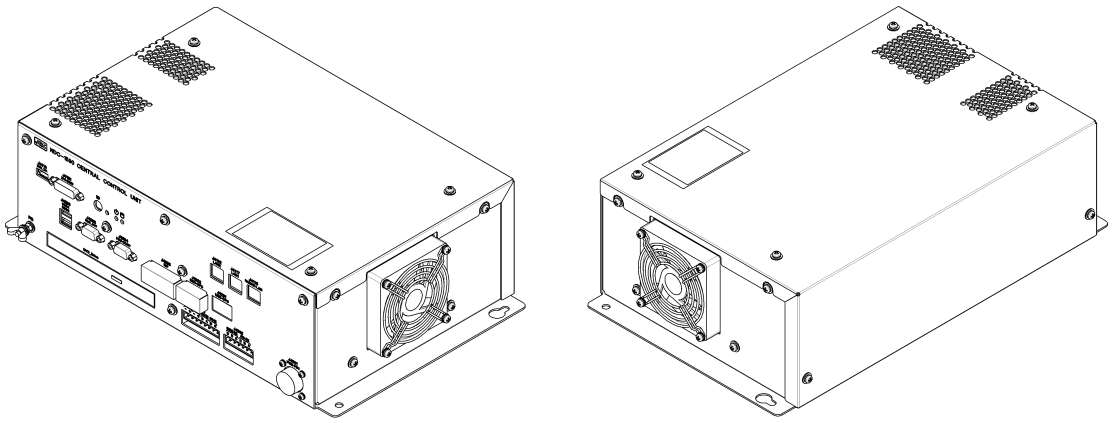
⚠ Be careful not to forget to insert the cable connectors.

Be careful not to insert the FFC cable at an angle.

Be careful not to damage the lock of the FFC connector with a strong force.







Step9　Reinstall CCU

Reinstall the CCU by repeating the same procedure in the reverse order.

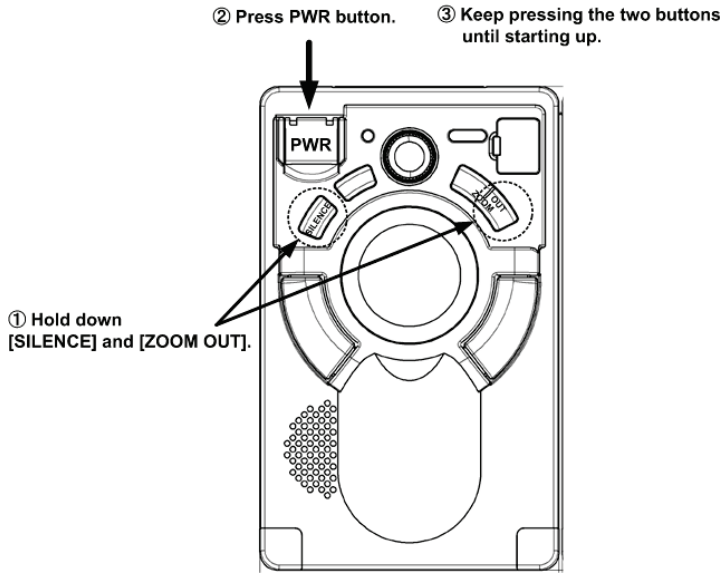
⚠ Be careful not to forget to insert the cable connectors.

Step10 Setting after replacing SSD.

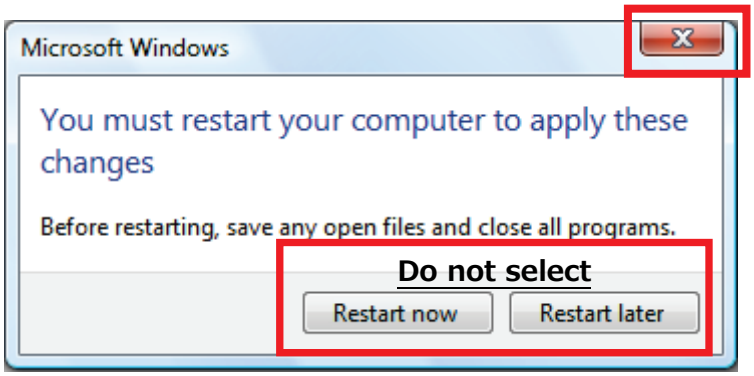
After replacing SSD, start up in recovery mode once. Software does not operate even if system normally starts up after replacing SSD.

Procedure of executing Recovery mode

1. Enter the power to this equipment while simultaneously holding down the [SILENCE] key and [ZOOM OUT] keys.



⚠CAUTION



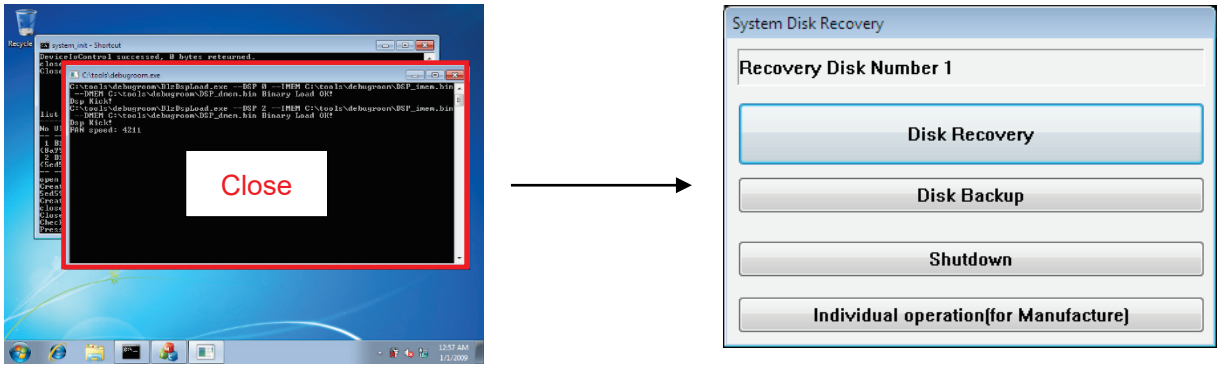
The Windows system may display a dialog of requesting restart by replacing the SSD until the recovery is completed.

When dialog is displayed, please push the x button to close the dialog. Recovery will not be completed normally when restarting by this dialog.

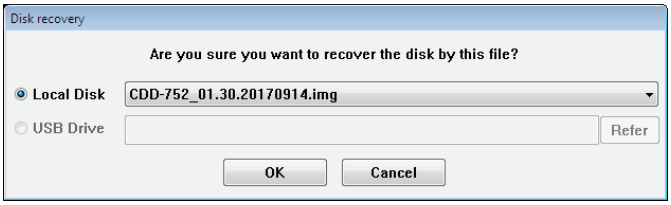
Recovery fails

When you restart by dialog during recovery mode and recovery failed, please repeat the recovery mode from the beginning by step10 of 1.

2. When startup is completed, following screen is displayed. Close debugroom.exe window. Then the System Disk Recovery dialog is displayed.



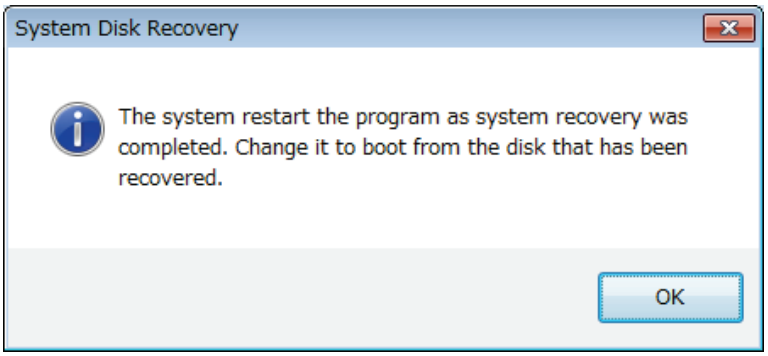
3. Click on the [Disk Recovery] button, following dialog is displayed. (The version of the .img file is an example)



4. ［Click on the [OK] button, then image file write back starts.

⚠CAUTION
Do not perform any other operations until write back finishes. Doing other operations may cause image write back to fail.

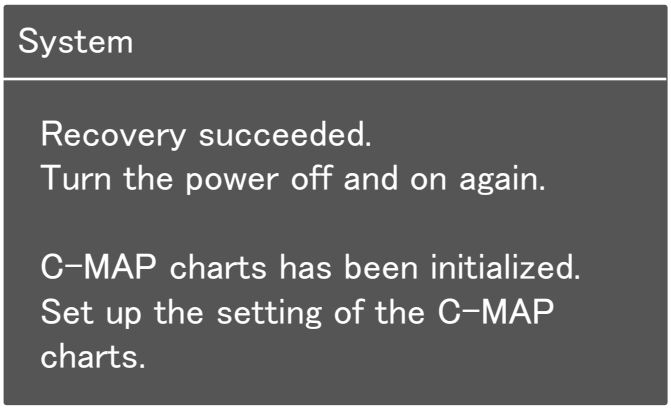
5. When write back is completed, the following message is displayed.



6. After rebooting, the system starts up as recovery mode. Do not operate until recovery is completed.



7. When recovery is completed, the following screen is displayed. Turn off the power of the display unit.



8. Turn on the power again. The MFD software starts up.

The procedure has been completed.

Please refer to "Supplement: About data of recovery after SSD replacing" for data to be restored and data not to be restored. Chart data, Help files will be restored by re-importing.

Supplement: About data of recovery after SSD replacing

After replacing SSD, software will operate in the state of following table by recovery.

Item		State
MFD Software version		The software works with the version that was used until now. However, if MFD software (V01.00.720) in the replacing SSD is newer than the version used until now, it will be restored with the version (V01.00.720).
Software license		Recovered with used license
Installation setting		Recovered with saved installation setting
Setting value of user menu		Not be recovered
Data	Chart Data	Not be recovered. Reimporting chart is needed.
	Chart import log	Not be recovered
	Route file	Not be recovered
	User Chart	Not be recovered
	My Port List	Not be recovered
	Playback data	Not be recovered
	Track Data	Not be recovered
	Log book data	Not be recovered
	Alert history	Not be recovered
	Screen Shot	Not be recovered
	AIS/Navtex message	Not be recovered
	Help file	Not be recovered. Reimporting Help file is needed.
	ISW setting	Not be recovered. Resetting is needed

About data that is not restored, if user have saved data by using the Data Backup function, each data can be restore by using the Data Restore function.

Please refer to the chapter 5.2 of the Field service manual for the detailed procedures.

However, data of old software version may not be restored because data format (Chart data, logbook, alert history) is different from new software version.

When you want to use the software version that has been used until now, carry out the rollback function after the recovery function.

4.3.5 Trackball Operation Unit: TOPU NCE-5605

4.3.5.1 Replacing the TOPU: NCE-5605

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver	Size #2	
3	Diagonal pliers	—	
4	Cable-tie *1	—	

*1 A number of cable-ties may be required.

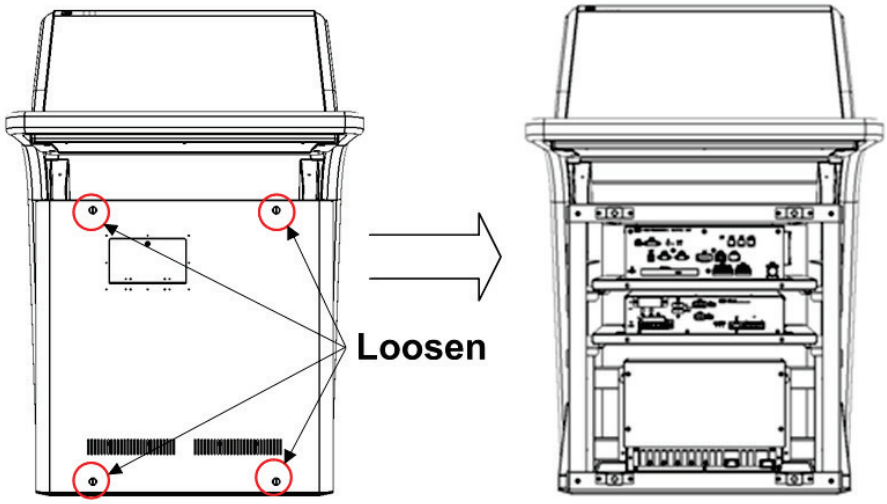
⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

⚠ To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand.

Step 1 Remove the front cover of the display unit mount kit.

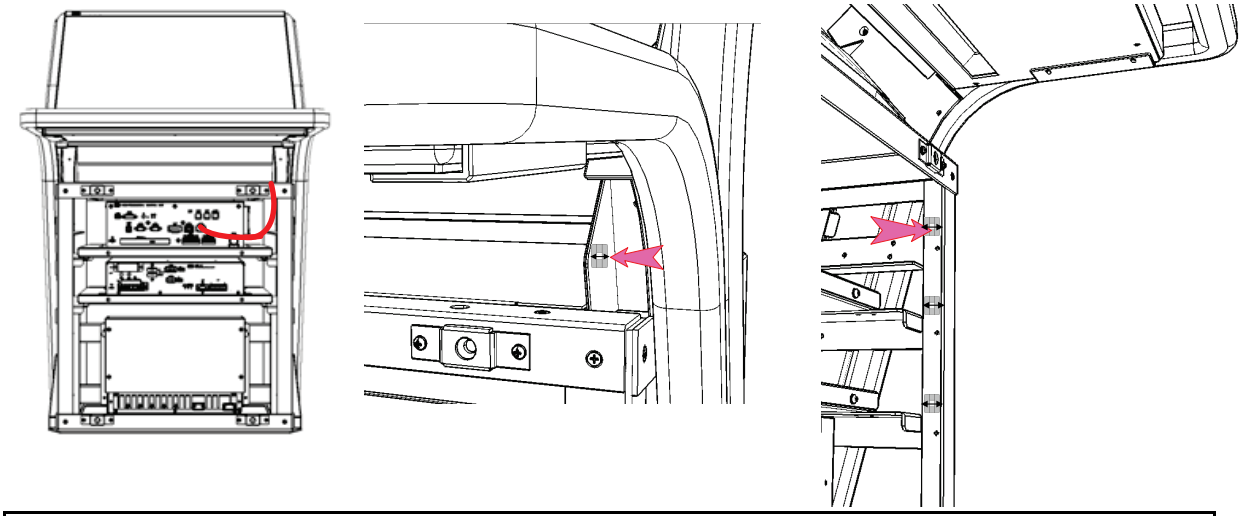
Loosen the screws that fasten the front cover of the display unit mount kit with a flat head screwdriver and then take out the front cover.



Step 2 Cut off the cable-tie that fastens the TOPU cable.

Cut off the cable-tie that fastens the TOPU cable (W61).

Examples for Stand-alone type are shown below.



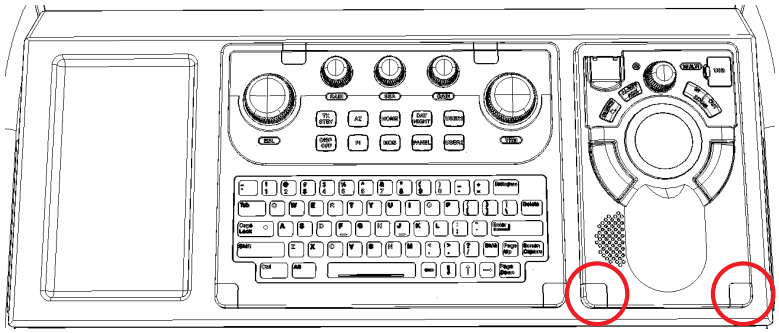
⚠CAUTION

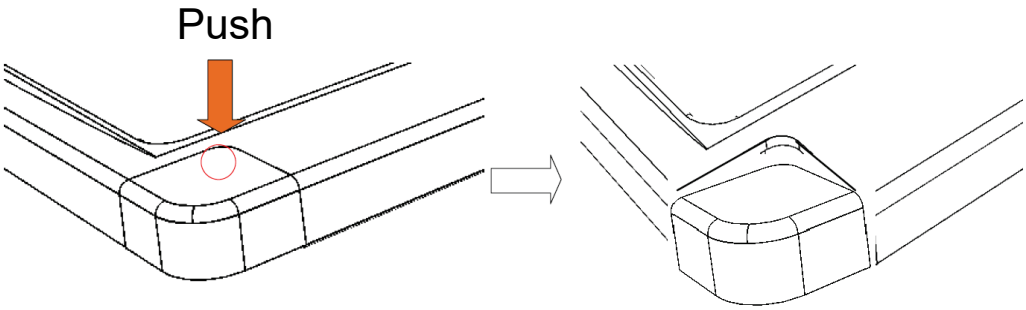
Before conducting Unit replacement work, always be sure that every cable-tie that fastens the cable has been removed.

Replacement work without the above may lead Unit/cable breakage.

Step 3 Remove the screws of the TOPU.

Remove the two screw covers at the bottom right and left of the trackball. The screw covers can come off by pushing them down inward. Remove the screws (M4: 2 locations) inside the screw covers that fasten the TOPU.





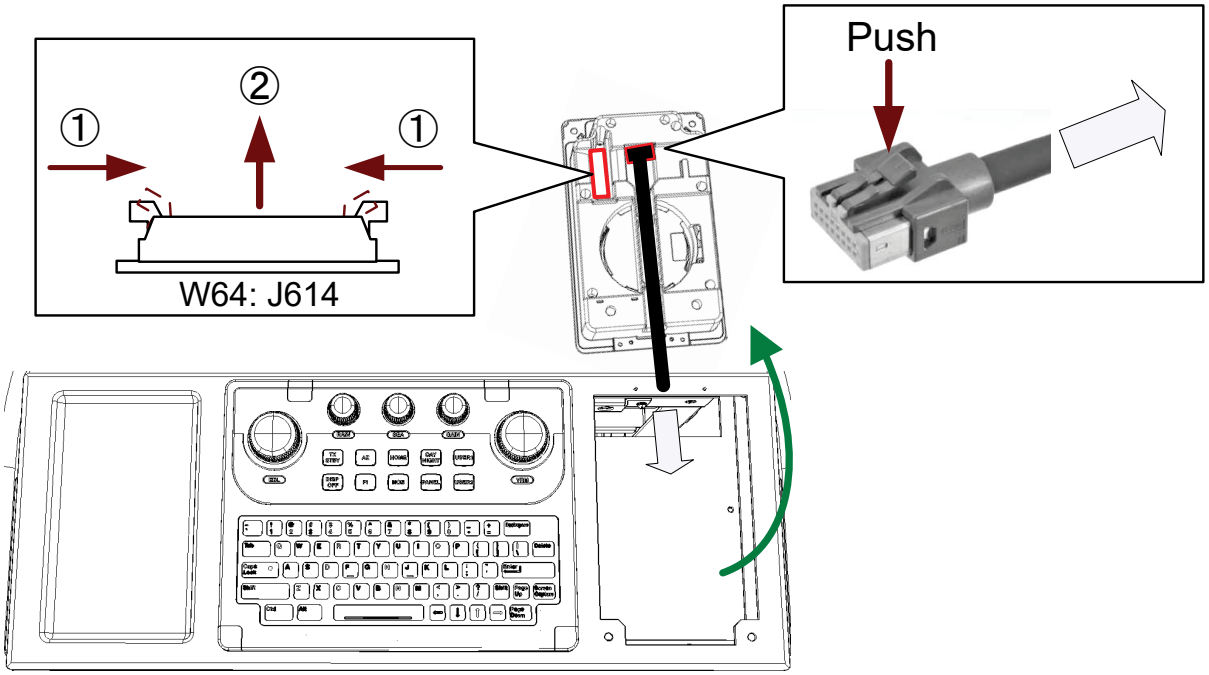
Step 4 Change the TOPU.

Flip over the TOPU and remove the rear cable (W6: J601). J601 can be released by pulling it out while holding down the center tab. It is difficult that pulling out J601 without pressing the tab enough. If it would not be released, reinsert it once and try again.

⚠ If you try to pull out the cable before pressing the center tab, the connector may become difficult to be released. In that case, push the connector itself to insertion direction once, and then pull it out while holding down the center tab again.

If a keyboard operation unit (KOPU) is mounted, also remove the KOPU cable (W64: J614). J614 can be released by pushing the both ends of the connector. Remove the TOPU from the mounting frame and change it.

After replacing the TOPU, assemble to the original condition by repeating the same procedure in the reverse order. Apply new cable-ties to the cables from where cable-ties were cut off. Please make sure to tighten all the screws and connect all the cables back in place.



Step 5 Check operation.

After the replacement of the TOPU is completed, turn ON the circuit breaker for the power supply of the display unit and check the operation as follows.

(1) By referring to "7.2.3 Checking the Operation of the Operation Unit [Key Test]," check that all the buttons and knobs of the TOPU respond normally.
(2) By referring to "7.2.4 Checking Alert Sound [Sound Test]," check the alert sound volume.
(3) By referring to "7.2.5 Testing LED Brightness [Light Test]," check the brightness of the LEDs.

This completes the replacement of the TOPU.

4.3.5.2 Cleaning the Trackball: CCK-1060

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size
1	Dry/Moist soft cloth (Lint-free)	—
2	Swab	—

⚠ Clean carefully the trackball operation unit in accordance with this procedure in order not to scratch the lens.

⚠ If you do not have the swab, please use lint-free cloth, moistened with water, instead.

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

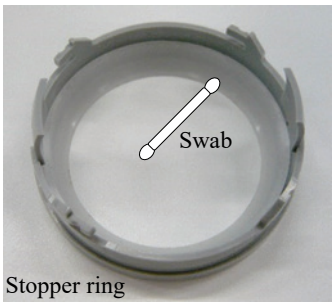
Step 1 Turn stopper ring in the direction of the triangle marks (counterclockwise), then remove the stopper ring together with the ball.

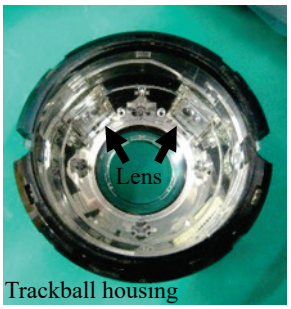


Step 2 Clean the ball with a moist lint-free cloth, then wipe the ball with a dry soft cloth carefully.

⚠ Never use thinner, alcohol, benzine, alkaline detergents and bleach. Using them will cause malfunction.

Step 3 Clean the inside of the stopper ring and the trackball housing, and the lends 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.





Step 4 After cleaning them, reinstall the ball and the stopper ring. Don't forget to tighten the stopper ring.Clean the inside.

Step 5 Check operation.

After trackball cleaning is completed, turn ON the circuit breaker for the power supply of the display unit and check the operation as follows.

(1) Check that the trackball moves normally.

This completes the cleaning of the trackball.

4.3.5.3 Replacing the Trackball: CCK-1060

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Phillips screwdriver	Size #2	
2	Diagonal pliers	—	
3	Cable-tie *1	—	

*1 A number of cable-ties may be required.

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

⚠ To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand.

Step 1 Remove the screws of the TOPU and take out.

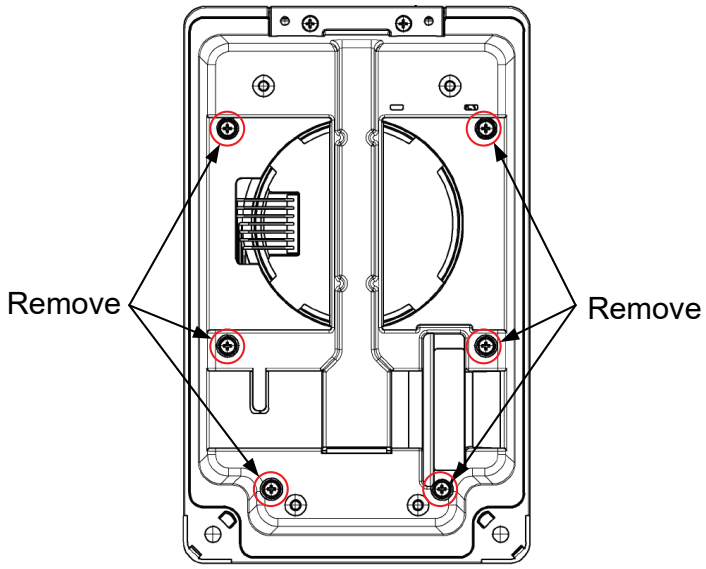
Remove the screws (M4: 2 locations) inside the two screw covers at the bottom right and left of the trackball, and take out the TOPU from the mounting frame. For details, please refer to the "Replacing the TOPU: NCE-5605."

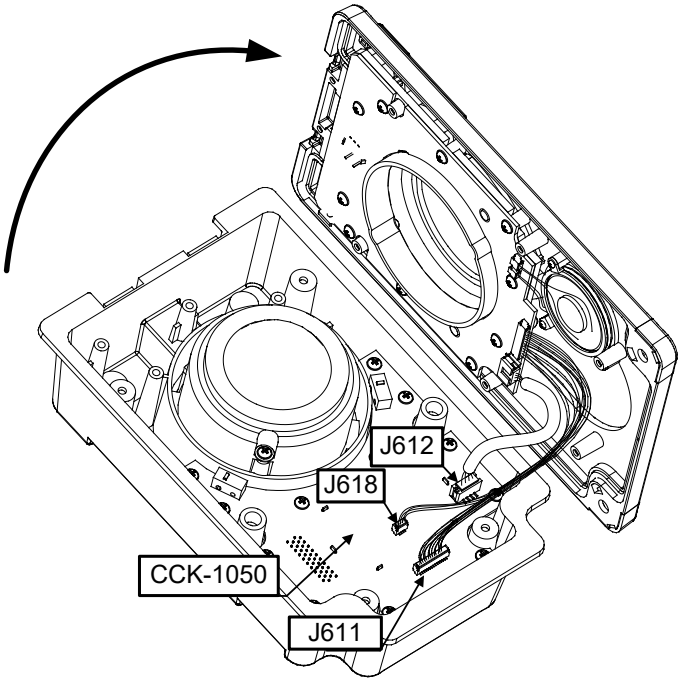
Step 2 Remove the front panel of the TOPU.

Remove the screws (M3: 6 locations) on the rear of the TOPU and take out the front panel. Pull out the three connectors from the operation circuit A (CCK-1050) and then remove the front panel.

W65: J611 and J618

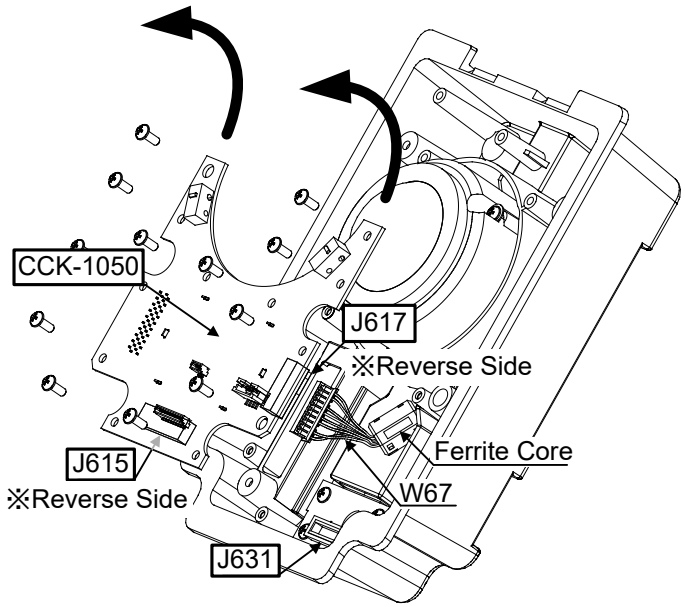
W66: J612





Step 3 Remove the Operaition Circuit A: CCK-1050

Remove the screws (M3: 12 locations) that fasten the CCK-1050. Float it from rear case by hooking its edge. Pull out the W67 from the J617, and then remove it.



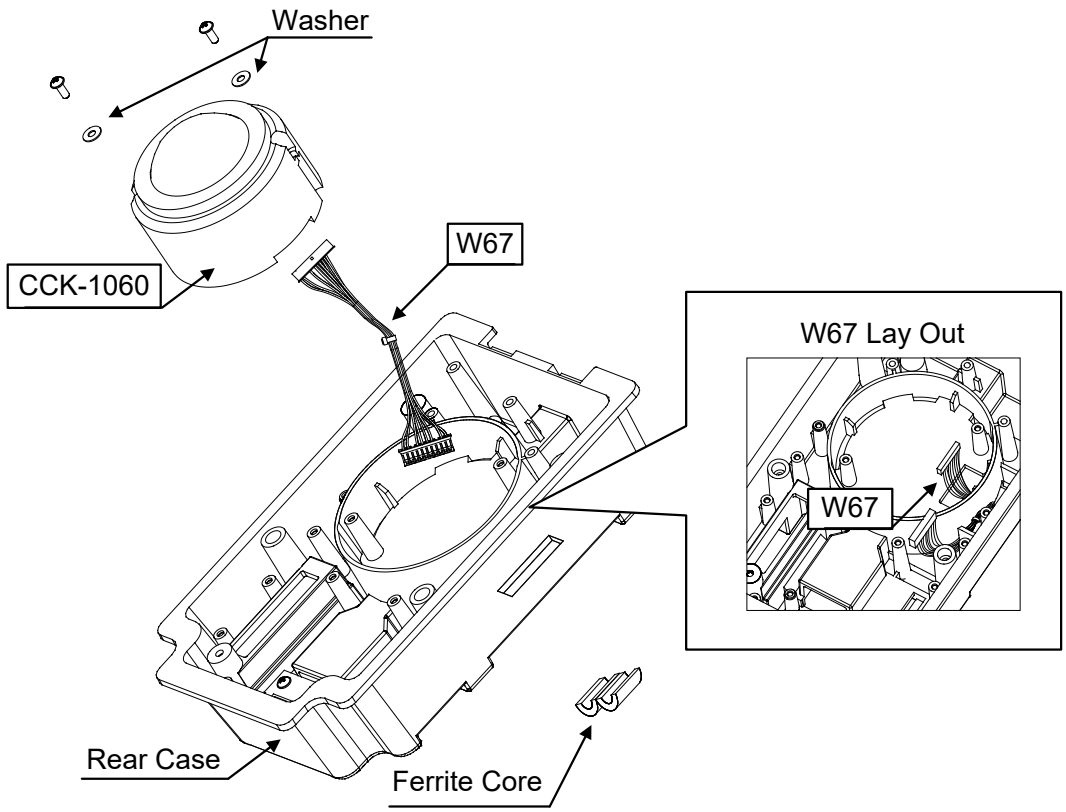
Step 4 Change the trackball: CCK-1060.

Open the ferrite core which has been attached to the W67 firstly.

Remove the screws (M3: 2 locations) that fasten the trackball.

Float the trackball. Then remove it together with W67.

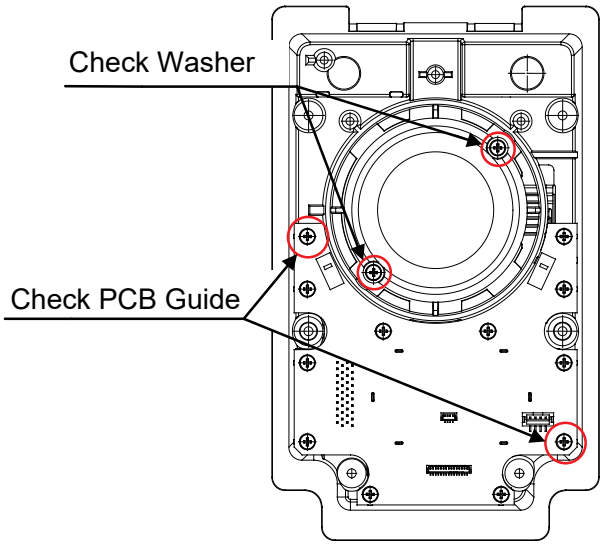
Disconnect the W67 from the trackball, and change it to new one.



When closing the front panel, be sure not to catch the cables in between.

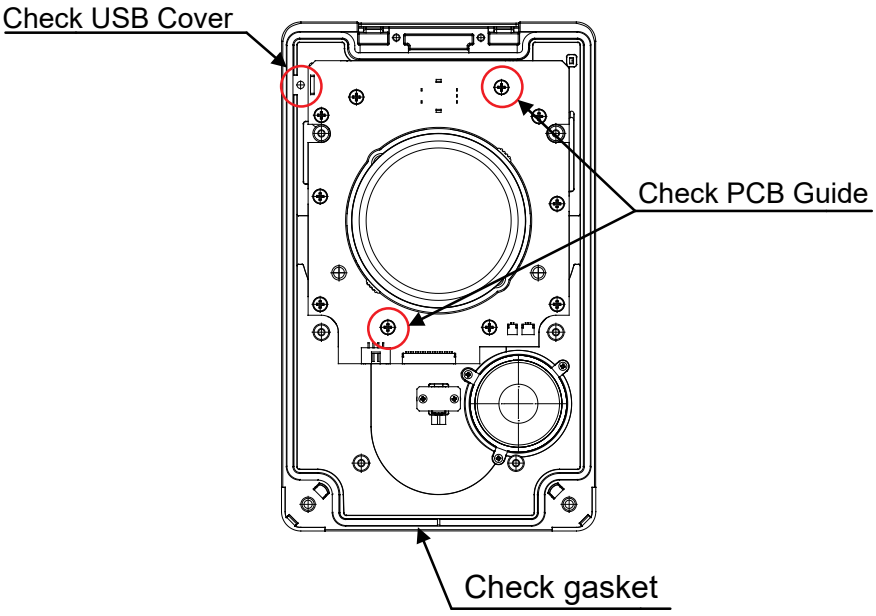
Please check the following points when you rebuild the rear case.

1) Do not forget to put washers on the screws when you install CCK-1060 to the rear case.
   If you try to tighten the screws without washers, CCK-1060 may be damaged.
2) Adjust the position of CCK-1060 at the middle roughly before you tighten the screws.
3) Be sure that each guide pole of CCK-1050 fits into each guide hole on the rear case when you install it.



Please check the following points when you rebuild the front panel.

1) Be sure that the USB cover fits into the guide pin on the front panel.
2) Be sure that the waterproof packing fits into the groove of the front panel.



After replacing the trackball, assemble the TOPU to the original condition by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.

Step 5 Check operation.

After the replacement of the trackball is completed, turn ON the circuit breaker for the power supply of the display unit and check the operation as follows.

(1) By referring to "7.2.3 Checking the Operation of the Operation Unit [Key Test]," check that all the buttons and knobs of the TOPU respond normally.

(2) By referring to "7.2.4 Checking Alert Sound [Sound Test]," check the alert sound volume.

(3) By referring to "7.2.5 Testing LED Brightness [Light Test]," check the brightness of the LEDs.

This completes the replacement of the trackball.

4.3.5.4 Replacing the Operation Circuit A: CCK-1050

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Phillips screwdriver	Size #2	
2	Diagonal pliers	—	
3	Cable-tie *1	—	

*1 A number of cable-ties may be required.

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

⚠ To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand.

Step 1 Remove the screws of the TOPU and take out.

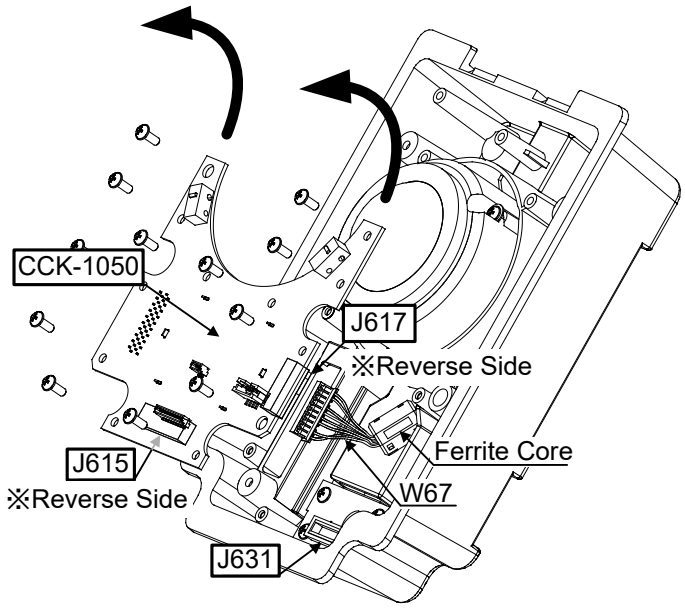
Remove the screws (M4: 2 locations) inside the two screw covers at the bottom right and left of the trackball, and take out the TOPU from the mounting frame. For details, please refer to the "4.3.5.1 Replacing the TOPU: NCE-5605."

Step 2 Remove the front panel of the TOPU.

Remove the screws (M3: 6 locations) on the rear of the TOPU and take out the front panel. For details, please refer to the "4.3.5.3 Replacing the Trackball: CCK-1060."

Step 3 Change the operation circuit A: CCK-1050.

Remove the screws (M3: 12 locations) that fasten the CCK-1050. Float it from rear case by hooking its edge. Pull out the W67 from the J617, and then change it.



After replacing the CCK-1050, assemble to the original condition by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.

⚠ When closing the front panel, be sure not to catch the cables in between.

Step 4 Check operation.

After the replacement of the operation circuit A is completed, turn ON the circuit breaker for the power supply of the display unit and check the operation as follows.

(1) By referring to "7.2.3 Checking the Operation of the Operation Unit [Key Test]," check that all the buttons and knobs of the TOPU respond normally.
(2) By referring to "7.2.4 Checking Alert Sound [Sound Test]," check the alert sound volume.
(3) By referring to "7.2.5 Testing LED Brightness [Light Test]," check the brightness of the LEDs.

This completes the replacement of the operation circuit A.

4.3.5.5 Replacing the Operation Circuit SW: CCK-1069

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Phillips screwdriver	Size #2	
2	Diagonal pliers	—	
3	Cable-tie *1	—	

*1 A number of cable-ties may be required.

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

⚠ To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand.

Step 1 Remove the TOPU.

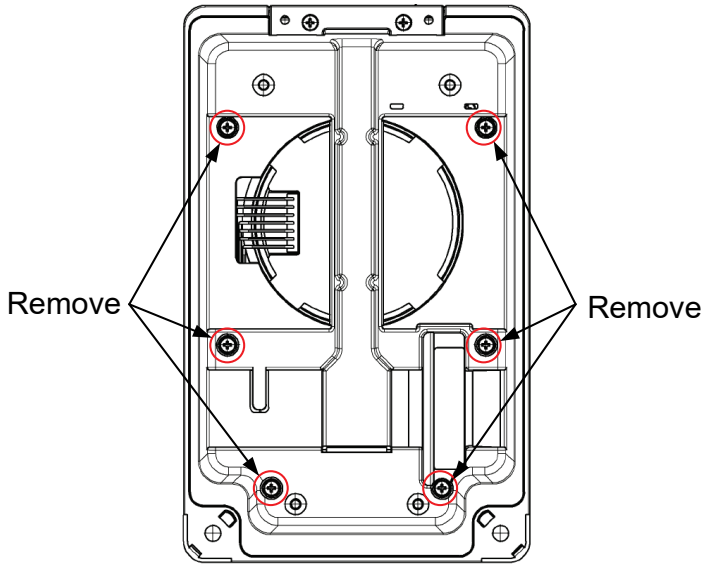
Remove the screws (M4: 2 locations) inside the two screw covers at the bottom right and left of the trackball, and take out the TOPU from the mounting frame. For details, please refer to the "Replacing the TOPU: NCE-5605."

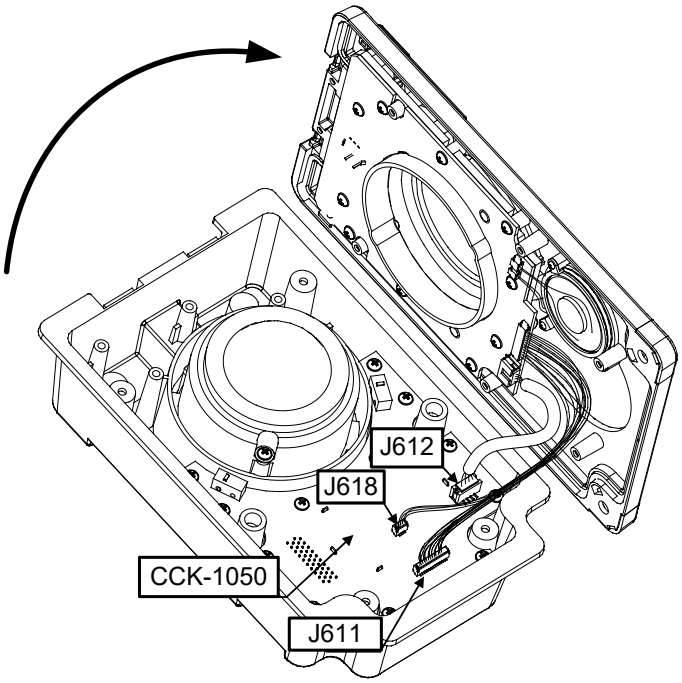
Step 2 Remove the front panel.

Remove the screws (M3: 6 locations) on the rear of the TOPU and take out the front panel. Pull out the two connectors from the operation circuit SW (CCK-1069) and then remove the front panel.

W65: J621

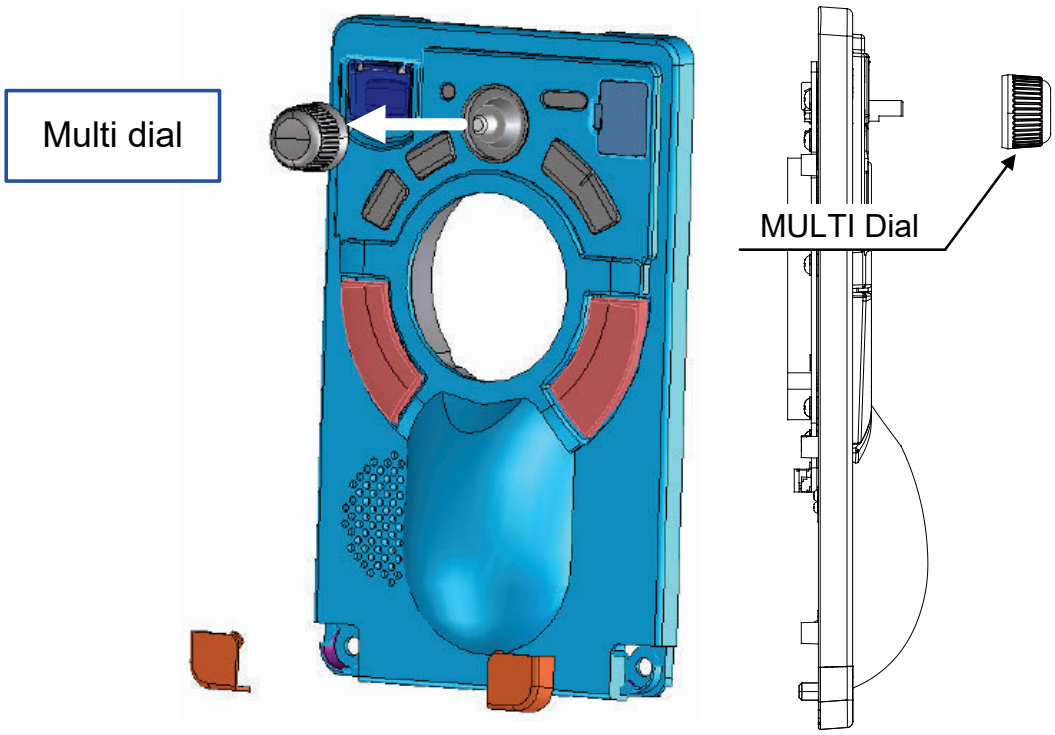
W66: J622





Step 3 Remove the knob of the multi dial.

Remove the knob of the multi dial. The knob can be removed by pulling it out.



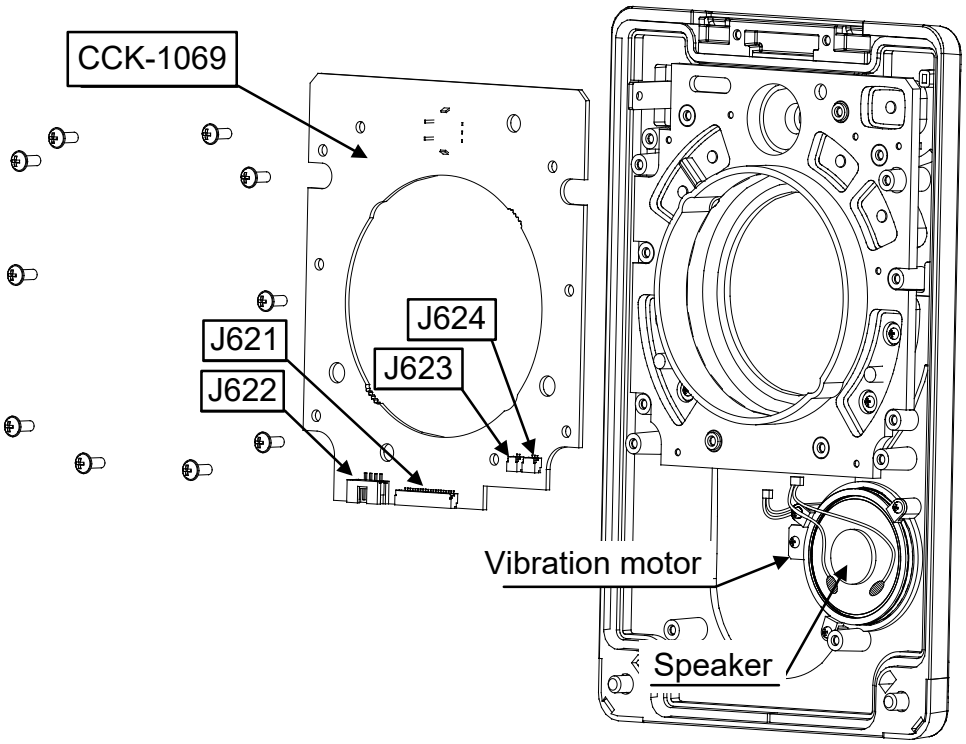
Step 4 Change the operation circuit SW: CCK-1069.

Disconnect the two connectors (J623 & J624) from the CCK-1069. They are for the speaker and the vibration mortor.

Disconnect W65, W65 from J621, J622 respectively.

Remove the screws (M3: 10 locations) that fasten the CCK-1069 and take it out.

After replacing it, assemble to the original condition by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.

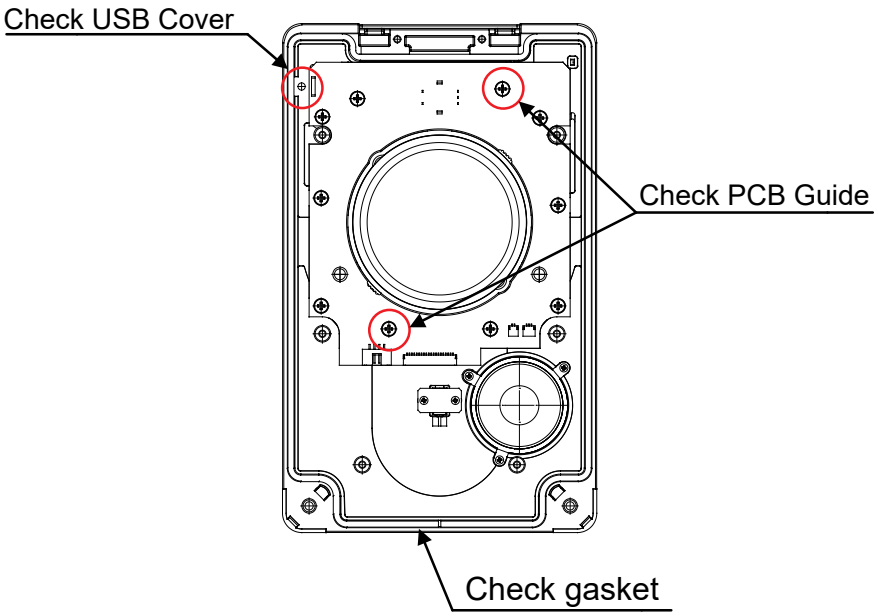


When closing the front panel, be sure not to catch the cables in between.

Please check the following points when you rebuild the front panel.

1) Be sure that each guide pole of CCK-1069 fits into each guide hole on the front panel when you install it.
2) Be sure that the USB cover fits into the guide pin on the front panel.
3) Be sure that the waterproof packing fits into the groove of the front pane

l.



Step 5 Check operation.

After the replacement of the operation circuit SW is completed, turn ON the circuit breaker for the power supply of the display unit and check the operation as follows.

(1) By referring to "7.2.3 Checking the Operation of the Operation Unit [Key Test]," check that all the buttons and knobs of the TOPU respond normally.

(2) By referring to "7.2.4 Checking Alert Sound [Sound Test]," check the alert sound volume.

(3) By referring to "7.2.5 Testing LED Brightness [Light Test]," check the brightness of the LEDs.

This completes the replacement of the operation circuit SW.

4.3.5.6 Replacing the Operation Circuit CN: CCK-1070

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Phillips screwdriver	Size #2	
2	Diagonal pliers	—	
3	Cable-tie *1	—	

*1 A number of cable-ties may be required.

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

⚠ To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand.

Step 1 Remove the screws of the TOPU and take out.

Remove the screws (M4: 2 locations) inside the two screw covers at the bottom right and left of the trackball, and take out the TOPU from the mounting frame. For details, please refer to the "Replacing the TOPU: NCE-5605."

Step 2 Remove the front panel of the TOPU.

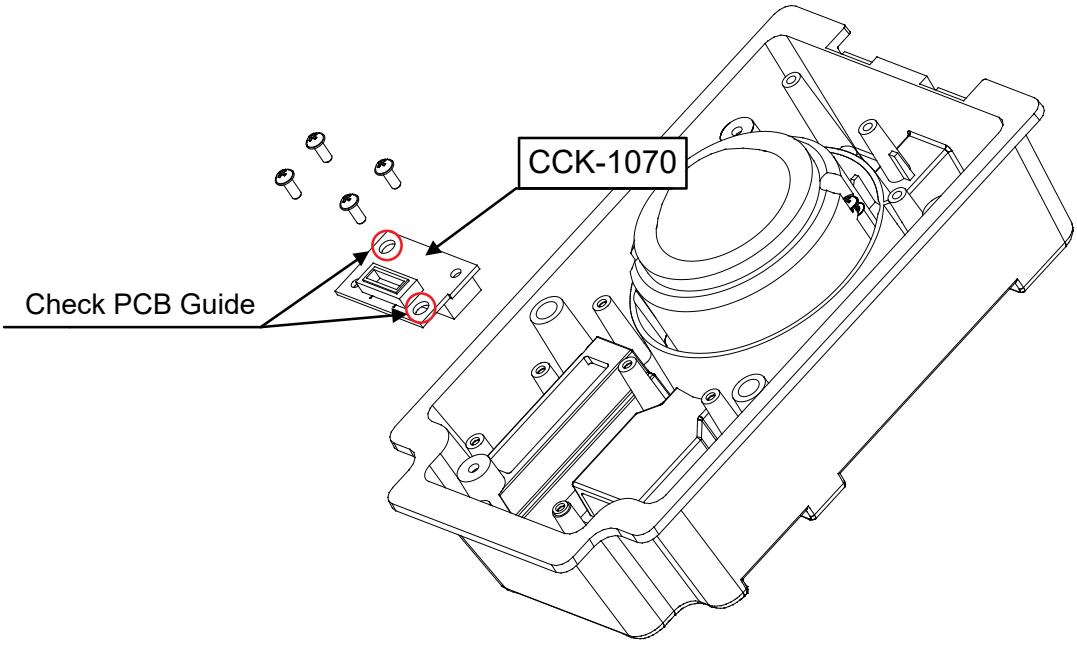
Remove the screws (M3: 6 locations) on the rear of the TOPU and take out the front panel. For details, please refer to the " Replacing the Trackball: CCK-1060."

Step 3 Remove the operation circuit A.

Remove the screws (M3: 12 locations) that fasten the operation circuit A. Remove the J617 and the J631, and change the operation circuit A. For details, please refer to the "Replacing the Operation Circuit A: CCK-1050"

Step 4 Change the operation circuit CN: CCK-1070.

Remove the screws (M3: 4 locations) that fasten the CCK-1070. After replacing it, assemble to the original condition by repeating the same procedure in the reverse order. Fit the guide holes of CCK-1070 into the guide poles on the rear case.Please make sure to tighten all the screws and connect all the cables back in place.



⚠ When closing the front panel, be sure not to catch the cables in between.

Step 5 Check operation.

After the replacement of the operation circuit CN is completed, turn ON the circuit breaker for the power supply of the display unit and check the operation as follows.

(1) By referring to "7.2.3 Checking the Operation of the Operation Unit [Key Test]," check that all the buttons and knobs of the TOPU respond normally.
(2) By referring to "7.2.4 Checking Alert Sound [Sound Test]," check the alert sound volume.
(3) By referring to "7.2.5 Testing LED Brightness [Light Test]," check the brightness of the LEDs.

This completes the replacement of the operation circuit CN.

4.3.6 Keyboard Operation Unit: KOPU NCE-5625

4.3.6.1 Replacing the Keyboard Operation Unit: KOPU NCE-5625

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

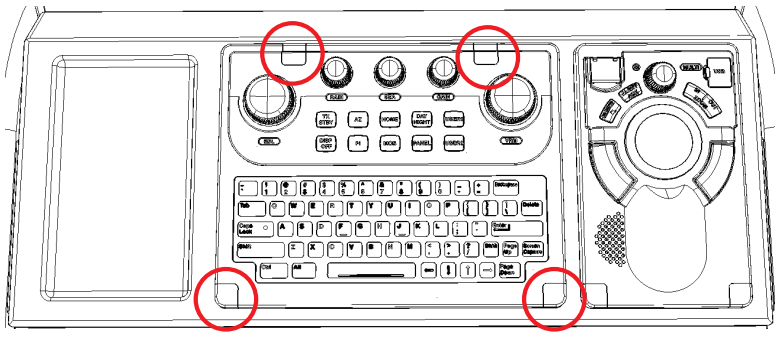
No.	Name	Size	Appearance
1	Phillips screwdriver	Size #2	

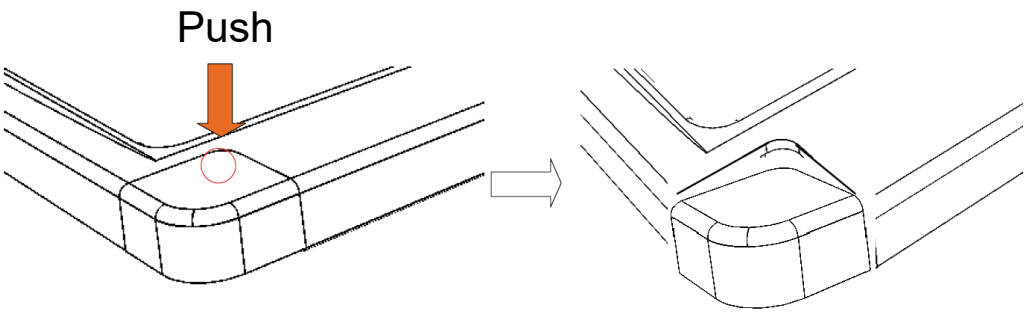
⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

Step 1 Remove the screws of the KOPU.

Remove the four screw covers at the top and bottom of the KOPU. The screw covers can come off by pushing them down inward. Remove the screws (M4: 4 locations) inside the screw covers that fasten the TOPU.

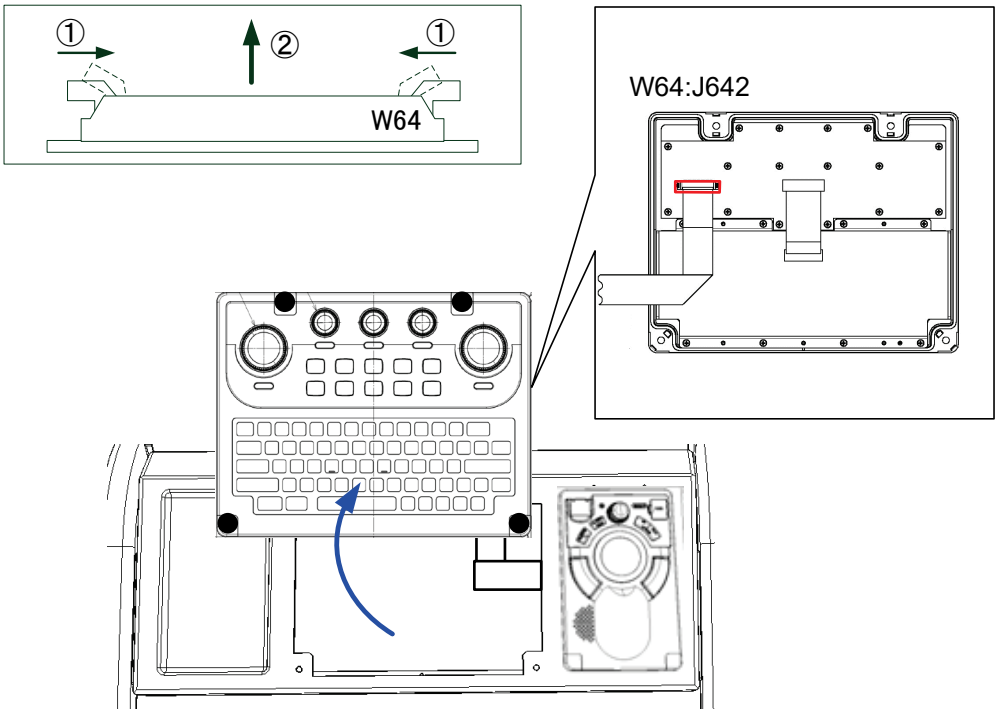




Step 2 Change the KOPU.

Float the KOPU from the mounting frame. While keeping it afloat, remove the rear cable (W64: J642). The cable can be removed by pushing the both ends of the connector. Remove the KOPU from the mounting frame and change it.

After replacing the KOPU, assemble to the original condition by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.



Step 3 Check operation.

After the replacement of the KOPU is completed, turn ON the circuit breaker for the power supply of the display unit and check the operation as follows.

(1) Check that a keyboard open error has not occurred.
(2) By referring to "7.2.3 Checking the Operation of the Operation Unit [Key Test]," check that all the buttons and knobs of the KOPU respond normally.
(3) By referring to "7.2.5 Testing LED Brightness [Light Test]," check the brightness of the LEDs.

This completes KOPU replacement.

4.3.6.2 Replacing the Operation Circuit B: CCK-1059

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Phillips screwdriver	Size #2	

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

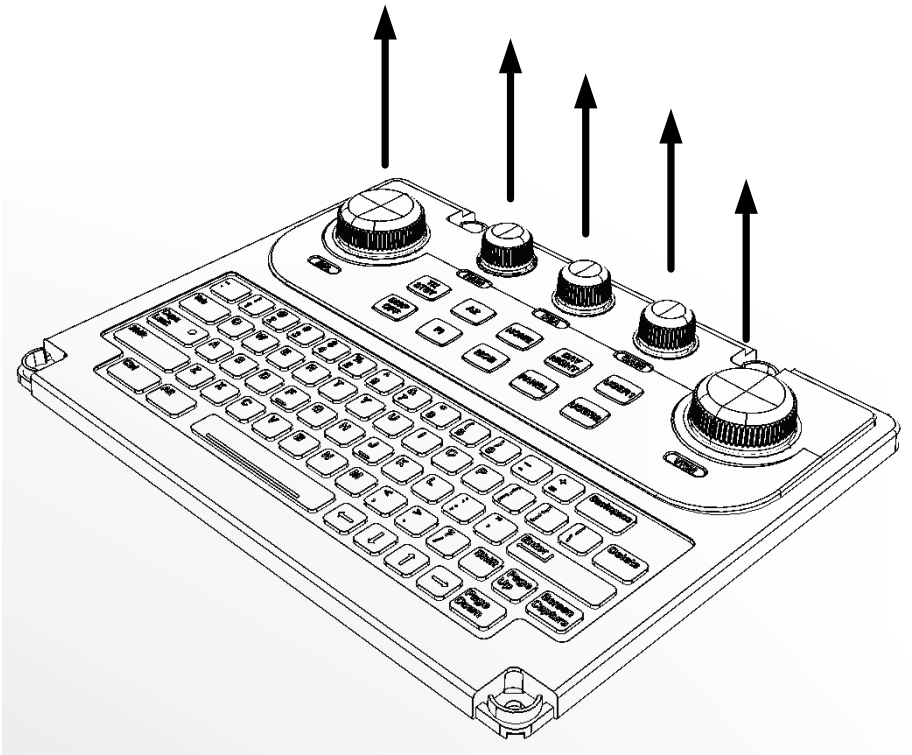
⚠ Do not lose the screws as they will be needed again.

Step 1 Remove the screws of the KOPU and take out.

Remove the screws (M4: 4 locations) inside the four screw covers at the top and bottom of the KOPU, and take out it from the mounting frame. For details, please refer to the "Replacing the Keyboard Operation Unit: KOPU NCE-5625."

Step 2 Remove the knobs of all the dials of the KOPU.

Remove the knobs of all the dials (EBL, RAIN, SEA, GAIN & VRM) of the KOPU. The knobs can be removed by pulling them out upward.



Step 3　　Change the operation circuit B: CCK-1059.

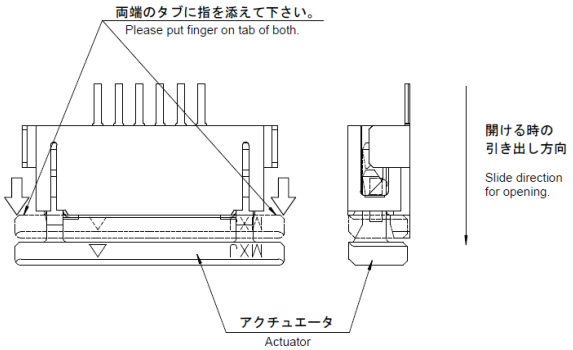
Disconnect the FPC that connects between the CCK-1059 and the keyboard. FPC can be released by sliding the actuator of J641 horizontally.

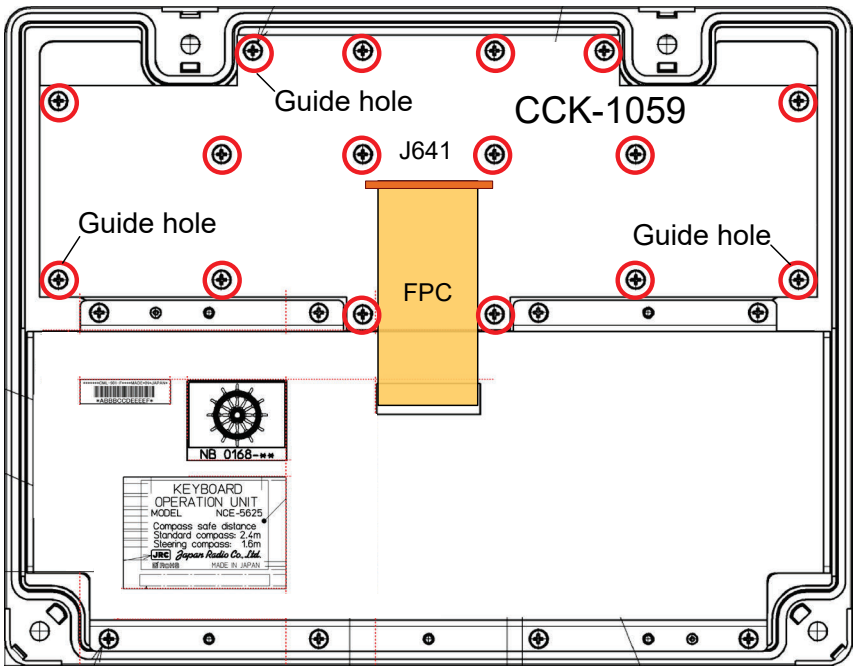
Remove the screws (M3: 16 locations) that fasten the CCK-1059 and change it. After replacing the operation circuit B, assemble to the original condition by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.

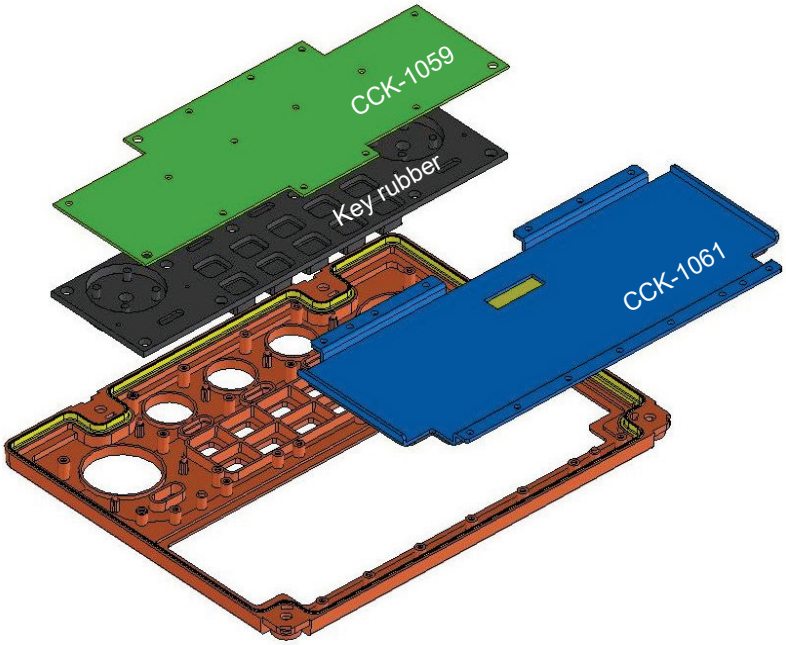
⚠ When mounting the operation circuit B, fit it into the guide hole. Be sure to place the key rubber in the correct position as it is easy to be displaced.

⚠ Exercise caution when handling the FPC as it is very fragile.

⚠ When installing the FPC, be careful not to insert them slanted or bend them.







Step 4 Check operation.

After the replacement of the operation circuit B is completed, turn ON the circuit breaker for the power supply of the display unit and check the operation as follows.

(1) Check that a keyboard open error has not occurred.
(2) By referring to "7.2.3 Checking the Operation of the Operation Unit [Key Test]," check that all the buttons and knobs of the KOPU respond normally.
(3) By referring to "7.2.5 Testing LED Brightness [Light Test]," check the brightness of the LEDs.

This completes the replacement of the operation circuit B.

4.3.6.3 Replacing the Keyboard: CCK-1061

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Phillips screwdriver	Size #2	

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

Step 1 Remove the screws of the KOPU and take out.

Remove the screws (M4: 4 locations) inside the four screw covers at the top and bottom of the KOPU, and take out the KOPU from the mounting frame. For details, please refer to the "Replacing the Keyboard Operation Unit: KOPU NCE-5625."

Step 2 Change the keyboard: CCK-1061.

Disconnect the FPC that connects between the operation circuit B and the keyboard: CCK-1061. FPC can be released by sliding the actuator of J641 horizontally.

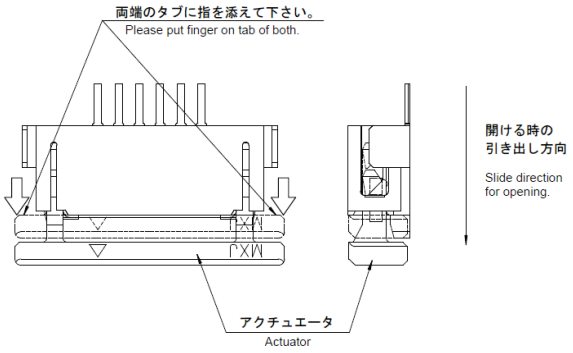
Remove the screws (M3: 13 locations) that fasten the CCK-1061 and change it.

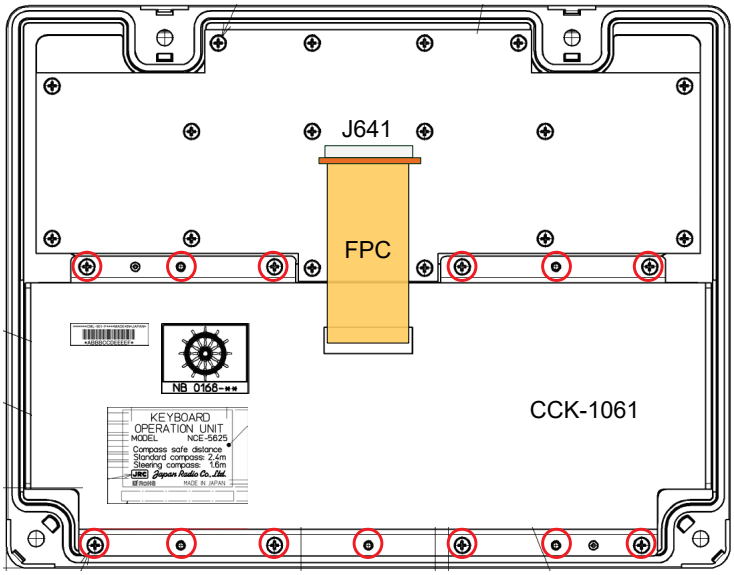
After replacing the CCK-1061, assemble to the original condition by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.

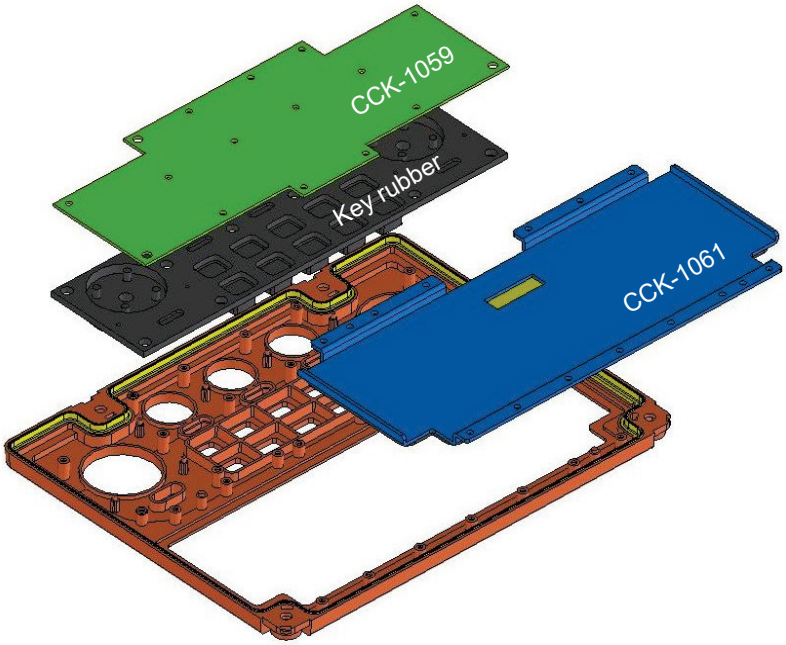
⚠ When mounting the new keyboard, be careful so that the waterproof packing dos not get into the inside of the keyboard.

⚠ Exercise caution when handling the FPC as it is very fragile.

⚠ When installing the FPC, be careful not to insert them slanted or bend them.


両端のタブに指を添えて下さい。
Please put finger on tab of both.
開ける時の
引き出し方向
Slide direction
for opening.
アクチュエータ
Actuator


J641
FPC
CCK-1061
NB 0168-
KEYBOARD
OPERATION UNIT
MODEL NCE-5625
Compass safe distance
Standard compass 2.4m
Steering compass 1.6m
Japan Radio Co.,Ltd.
MADE IN JAPAN


CCK-1059
Key rubber
CCK-1061

Step 3 Check operation.

After the replacement of the keyboard is completed, turn ON the circuit breaker for the power supply of the display unit and check the operation as follows.

(1) Check that a keyboard open error has not occurred.
(2) By referring to "7.2.3 Checking the Operation of the Operation Unit [Key Test]," check that all the buttons and knobs of the KOPU respond normally.
(3) By referring to "7.2.5 Testing LED Brightness [Light Test]," check the brightness of the LEDs.

This completes keyboard replacement.

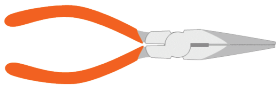
4.3.7 Power Supply Unit: PSU NBD-913

4.3.7.1 Replacing the Fuses of the Power Supply Unit: PSU NBD-913

[Required Tools]

The tools shown in the following table are required for replacement work.

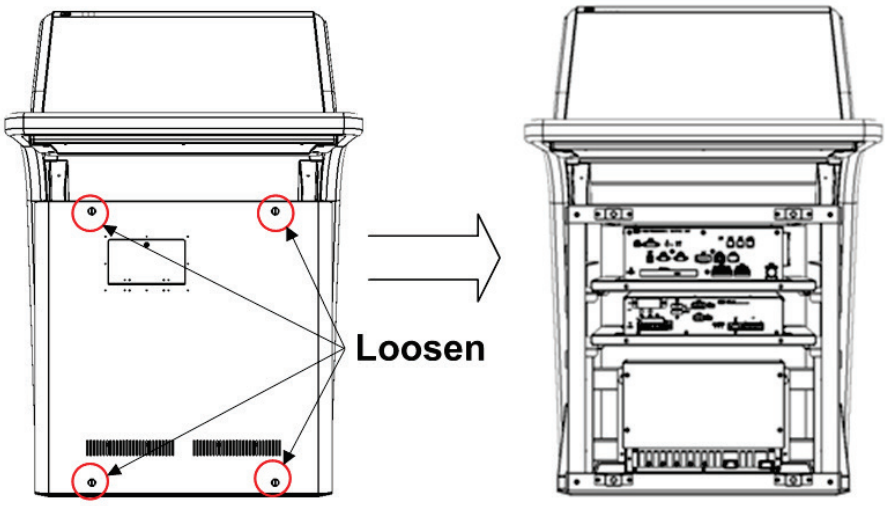
Table Required Tools

No.	Name	Size	Appearance
1	Needle-nose pliers	6 inch	

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

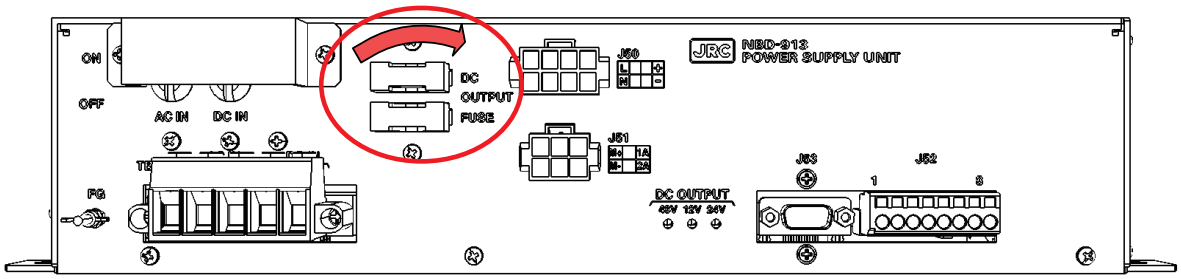
Step 1 Remove the front cover of the display unit mount kit.

Loosen the screws that fasten the front cover of the display unit mount kit with a flat head screwdriver and then take out the front cover.



Step 2 Open the fuse covers.

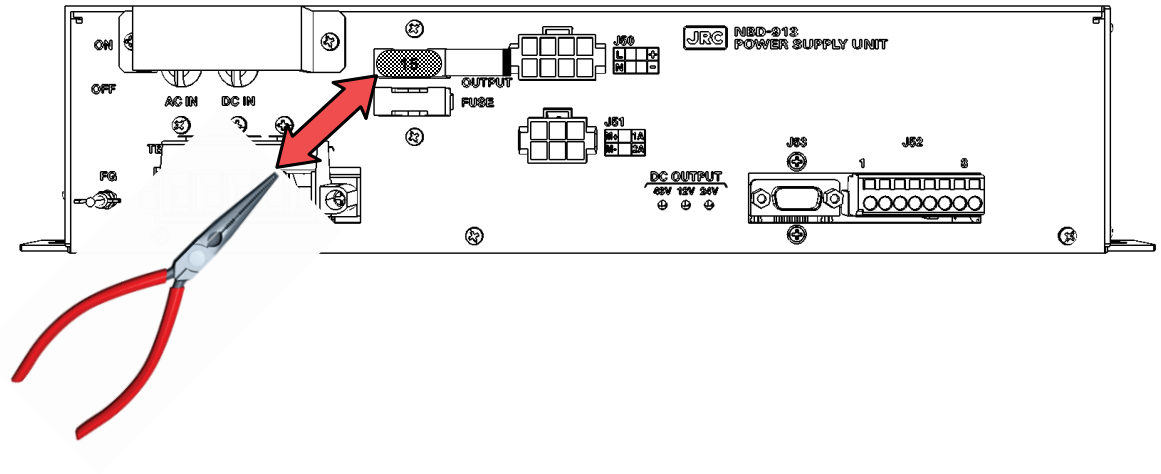
Open the fuse covers on the front of the PSU. The fuse covers open from left to right when viewed from the front.



Step 3 Change the fuses.

Using a pair of 6 inch needle-nose pliers, change the fuses. The fuses are blade fuses. After replacing the fuses, assemble to the original condition by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and set all the switches back in place.

Name	Unit Name	Location of Use	Q'ty	Use	Model Name (Code)
Blade Fuse (Auto Fuse)	NBD-913	NBD-913	2	DC32V 15A	1015 (5ZFCK00008)



Step 4 Check operation.

After the replacement of the PSU fuses is completed, turn ON the circuit breaker for the power supply of the display unit and check the operation as follows.

(1) Start [RADAR] on the Task menu and check that 24VDC is output to the scanner unit.
(2) Perform transmission after the completion of scanner unit preheating and check that normal radar images are displayed.

This completes PSU fuse replacement.

4.3.7.2 Replacing the Power Supply Unit: PSU NBD-913

⚠WARNING

AC and DC power supplies have been fed to PSU. Before replacement work, be sure to turn OFF the applicable power circuit breaker.
Not following this instruction will cause electric shock and/or malfunction.

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver	Size #2	
3	Diagonal pliers	—	
4	Cable-tie *1	—	

*1 A number of cable-ties may be required.

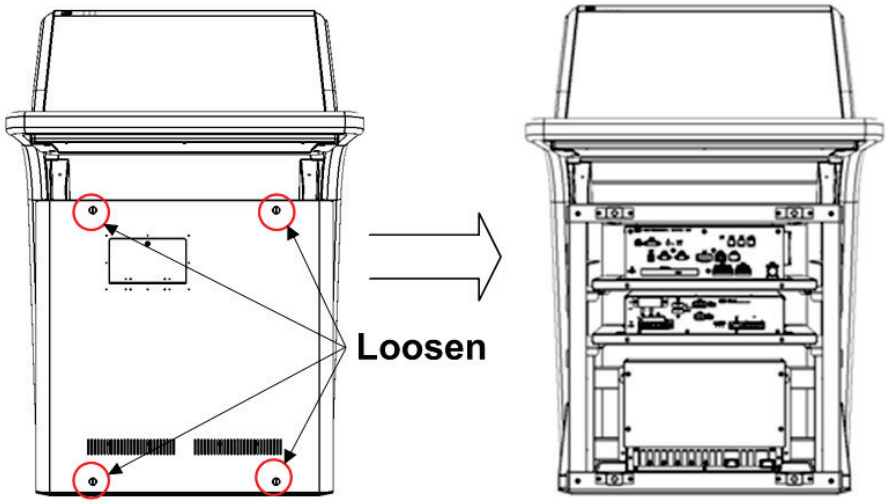
⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

⚠ To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand.

Step 1 Remove the front cover of the display unit mount kit.

Loosen the screws that fasten the front cover of the display unit mount kit with a flat head screwdriver and then take out the front cover.

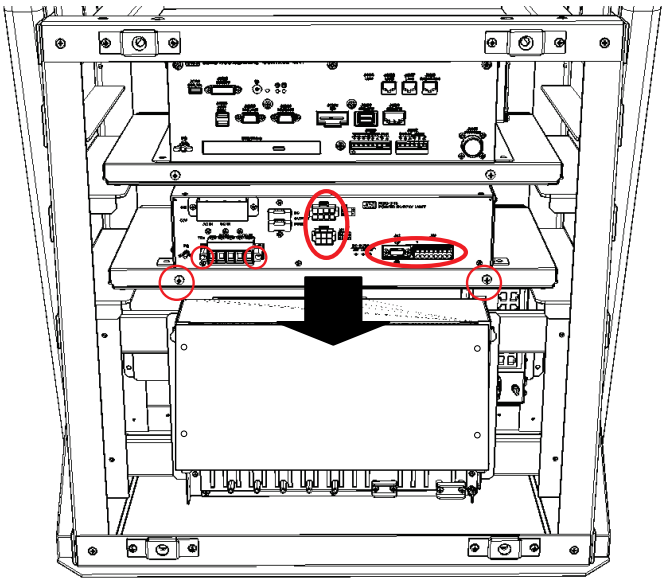


Step 2 Remove the PSU from the display unit mount kit.

Remove all the connectors being connected to the front of the PSU. Loosen the two screws of the TB1 on the right and left of the front and remove it together with the wires. The J50 and the J51 can be removed by pulling them out while holding down the tabs at the top center.

Remove the screws (M5: 2 locations) of the mounting plate that fasten the PSU, pull out the CCU together with the mounting plate, and then remove it from the display unit mount kit.

⚠ To secure safety, turn OFF the main power circuit breakers of AC and DC power supplies before replacement work.



⚠CAUTION

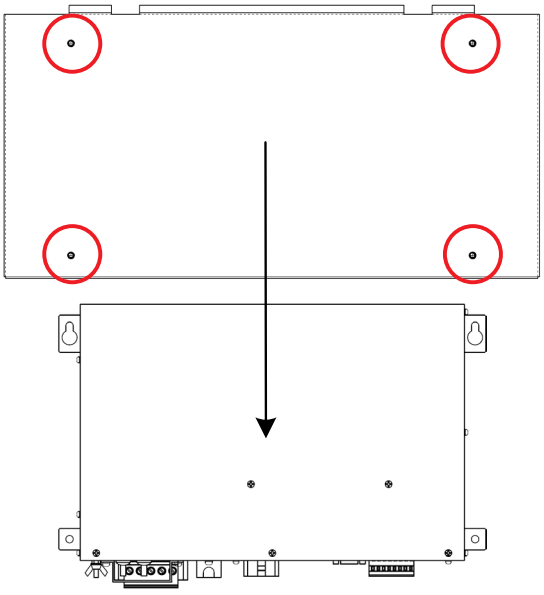
Before conducting Unit replacement work, always be sure that every cable-tie that fastens the cable has been removed.

Replacement work without the above may lead Unit/cable breakage.

Step 3 Change the PSU.

Remove the screws (M4: 4 locations) of the mounting plate and pull out the PSU from the mounting plate.

After replacing the PSU, assemble to the original condition by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and set all the switches back in place.



Step 4 Check operation.

After PSU replacement is completed, turn ON the circuit breaker for the power supply of the display unit and check the operation as follows.

(1) Turn ON the power to the display unit, make sure that screen display is normal, and there are no abnormalities in operation and processing.

(2) If a scanner unit is being connected, start [RADAR] on the Task menu, perform transmission, and check that normal radar images are displayed.

This completes PSU replacement.

4.3.7.3 Replacing the PSU Replacement FAN Kit: 7ZYNA4007

⚠WARNING

AC and DC power supplies have been fed to PSU. Before replacement work, be sure to turn OFF the applicable power circuit breaker.
Not following this instruction will cause electric shock and/or malfunction.

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver	Size #2	
3	Diagonal pliers	—	
4	Cable-tie *1	—	

*1 A number of cable-ties may be required.

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

⚠ To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand.

Step 1 Remove the PSU.

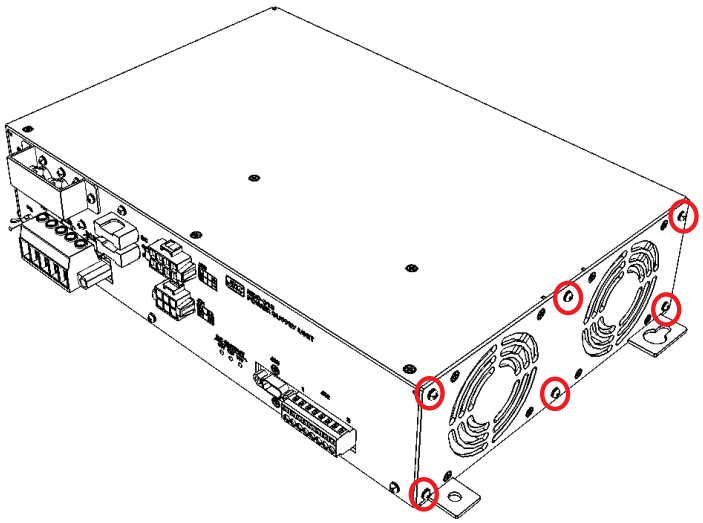
Remove the front cover of the display unit mount kit and the mounting plate of the PSU, and then pull out the PSU. For more information about the removal procedure, refer to "4.3.7.2 Replacing the Power Supply Unit: PSU NBD-913."

Step 2 Remove the PSU from the mounting plate.

Remove the screws (M4: 4 locations) of the mounting plate and pull out the PSU from the mounting plate. For more information about the removal procedure, refer to "4.3.7.2 Replacing the Power Supply Unit: PSU NBD-913."

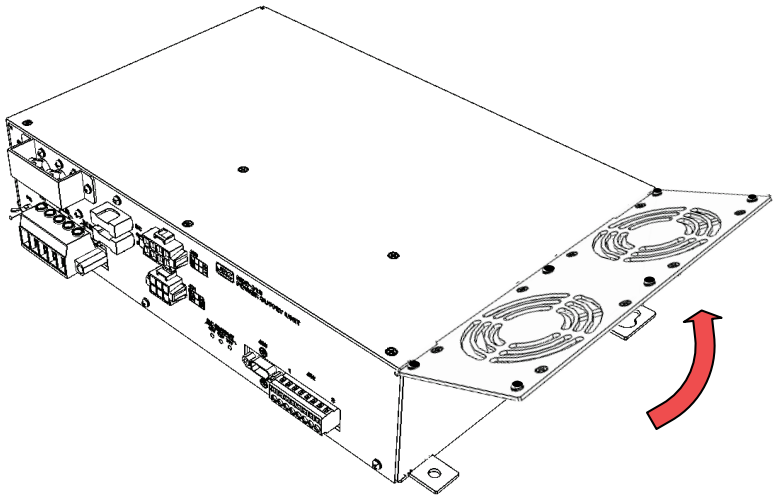
Step 3 Remove the PSU side plates.

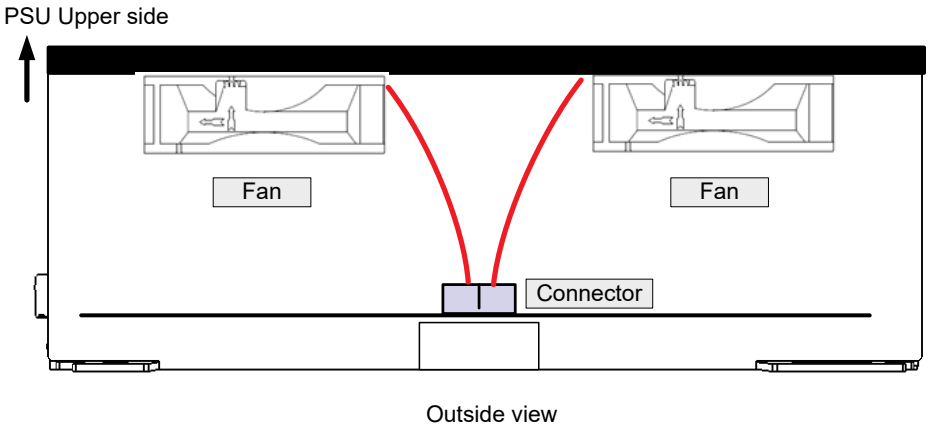
Remove the side plate covering the fans of the PSU (M3: 6 locations).



Step 4 Disconnect the connector of the fans.

Lift the side plate covering the fans of the PSU. Disconnect the connector of the fans inside the PSU.





Outside view

Step 5 Change the fans.

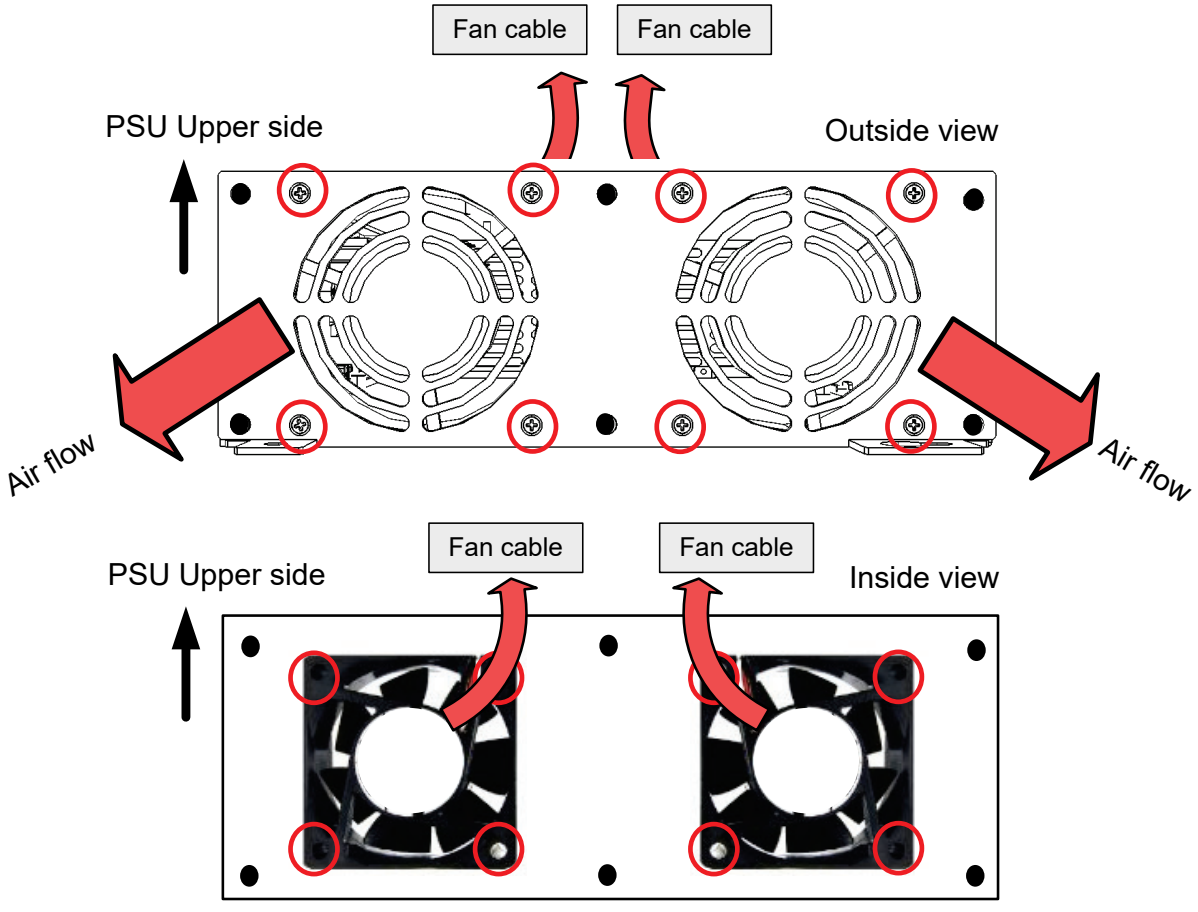
Remove the screws (M4: 8 locations) that fasten the fans. Change the fans. Install the fans in order to satisfy the following directions:

Fan cables: Upper center

Wind flow: Outward

⚠ Be careful with the fan mounting direction.

⚠ Have enough clearance to prevent the cables from being caught in the blades of the fans.



After replacing the fans, assemble to the original condition by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.

Step 6 Check operation.

After PSU fan replacement is completed, turn ON the circuit breaker for the main power supply and the circuit breaker for the power supply of the display unit, and check the operation as follows.

(1) Turn ON the power to the display unit, make sure that screen display is normal, and there are no abnormalities in operation and processing.
(2) Check that the fan alarm "POWER (Fan)" does not occur.

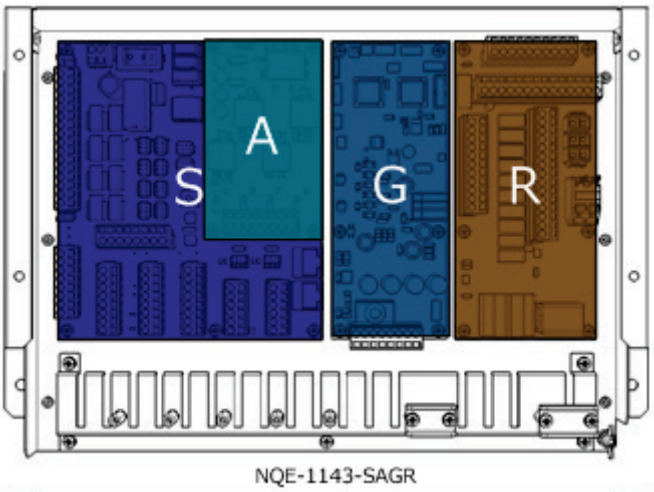
This completes PSU fan replacement.

4.3.8 Junction Box: JB NQE-1143

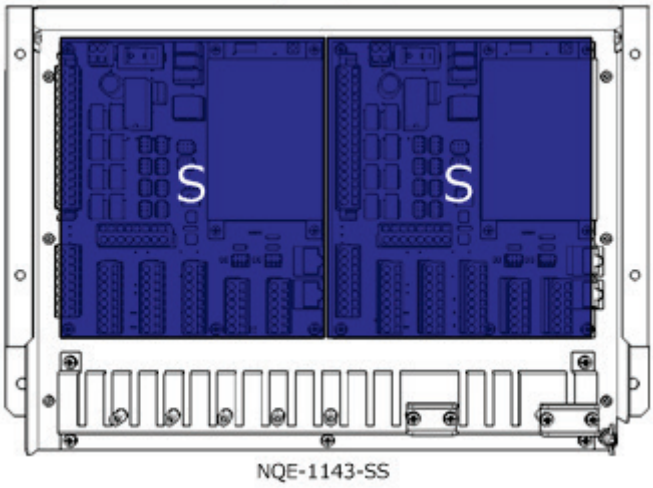
4.3.8.1 Checking the Installation State

There are the following combinations of the circuits incorporated into the NQE-1143 junction box (JB). Before starting replacement work, check the installation state inside the JB.

Suffix	SLC	AOC	GIF	RIF	SLC#2
-R				✓	
-S	✓				
-SR	✓			✓	
-SS	✓				✓
-GR			✓	✓	
-SAR	✓	✓		✓	
-SA	✓	✓			
-SGR	✓		✓	✓	
-SAGR	✓	✓	✓	✓	
-SG	✓		✓		
-SAG	✓	✓	✓		
-SAS	✓	✓			✓



NQE-1143-SAGR



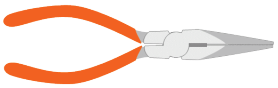
NQE-1143-SS

4.3.8.2 Replacing the Fuses of the Serial LAN Interface Circuit: SLC CMH-2370

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver	Size #2	
3	Needle-nose pliers	6 inch	

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

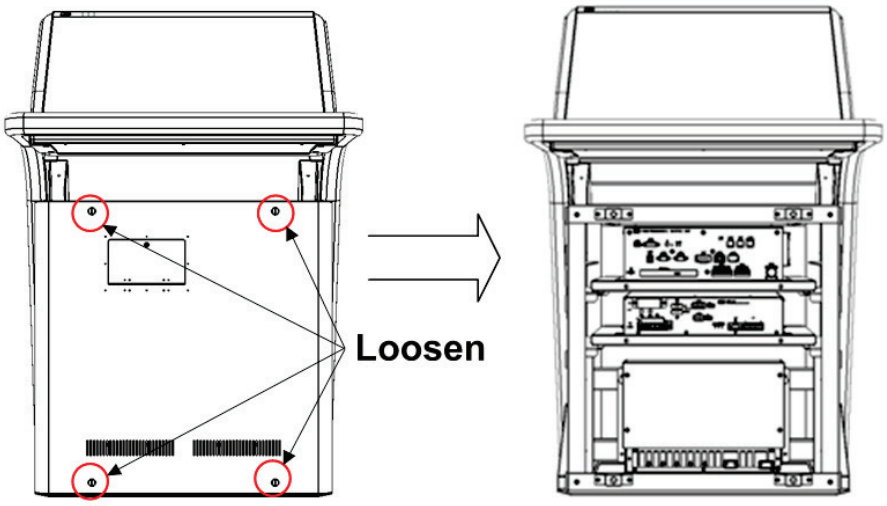
⚠ Do not lose the screws as they will be needed again.

⚠ A DC power supply has fed to SLC.

Before replacement work, be sure to turn OFF the DC power circuit breaker.

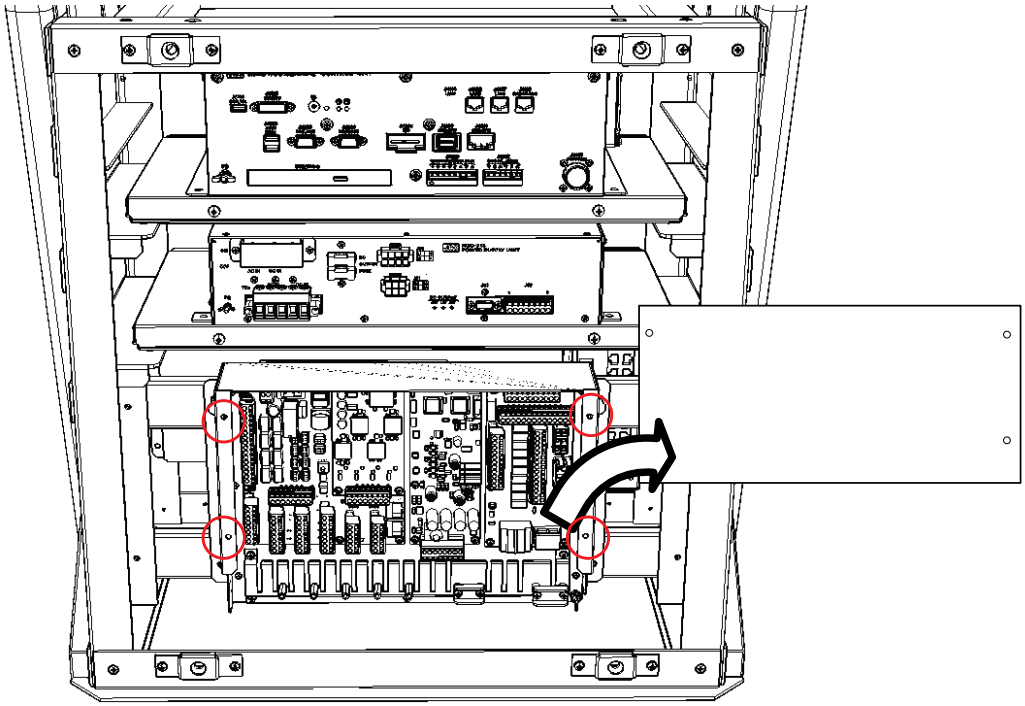
Step 1 Remove the front cover of the display unit mount kit.

Loosen the screws that fasten the front cover of the display unit mount kit with a flat head screwdriver and then take out the front cover.



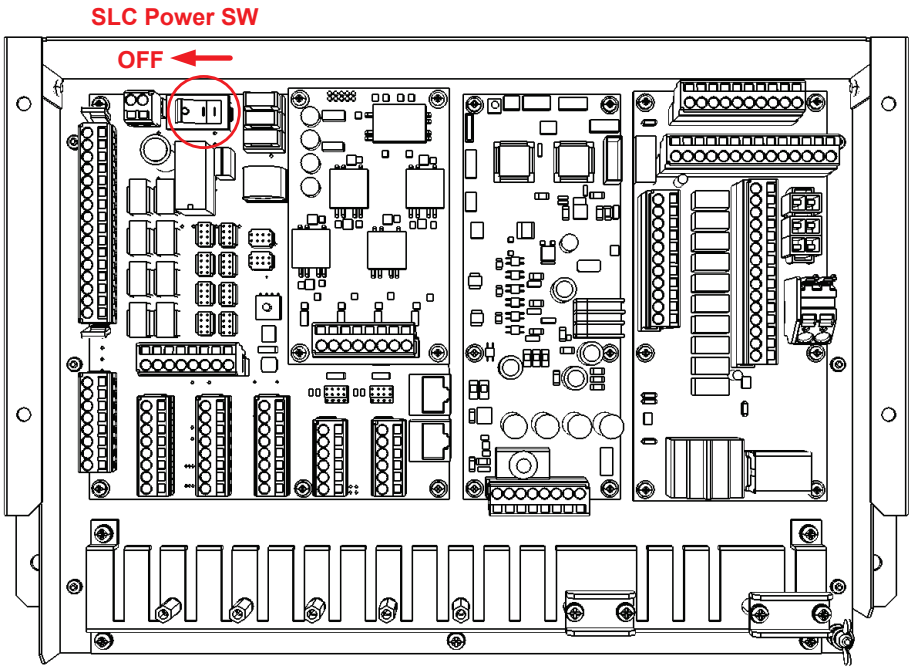
Step 2 Remove the lid of the JB.

Remove the screws (M4: 4 locations) that fasten the lid of the JB and then take it out.



Step 3 Turn OFF the power switch of the SLC.

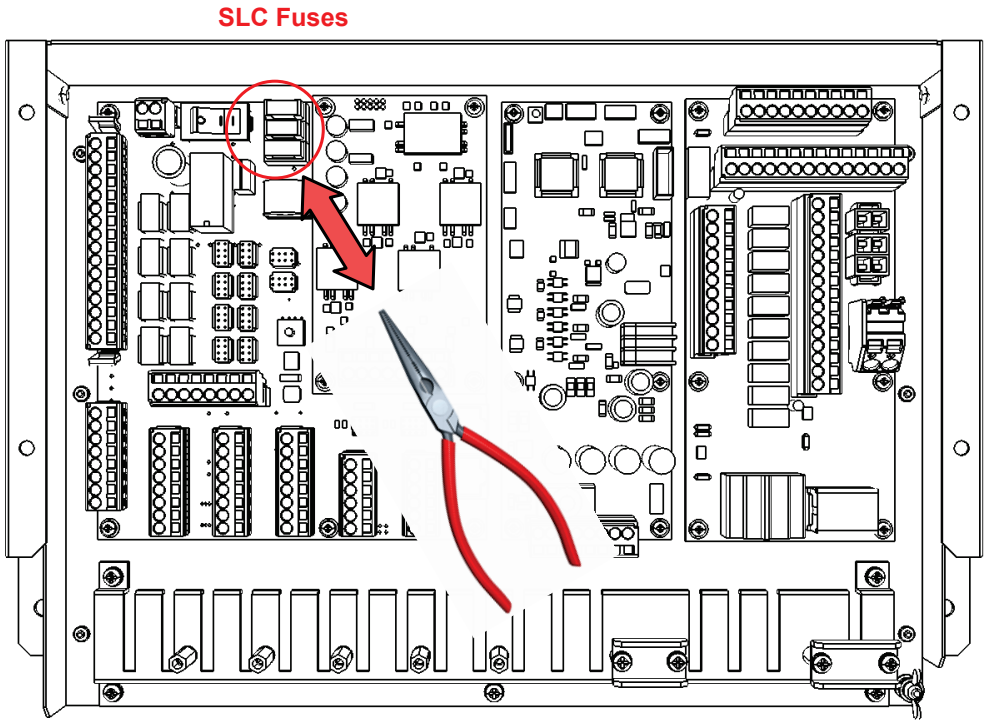
Turn OFF the power S1 switch of the SLC.



Step 4 Change the fuses.

Using a pair of 6 inch needle-nose pliers, change the fuses. The fuses are blade fuses. After replacing the fuses, assemble to the original condition by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and set all the switches back in place.

Name	Unit Name	Location of Use	Q'ty	Use	Model Name (Code)
Blade (mini) Fuse (Auto Fuse)	NQE-1143	CMH-2370	1	DC32V 15A	1215(5ZFCK00017)
Blade (mini) Fuse (Auto Fuse)			2	DC32V 3A	1203(5ZFCK00016)



Step 5 Check operation.

After the replacement of the SLC fuses is completed, turn ON the circuit breaker for the power supply of the display unit and check the operation as follows.

(1) Check that the 24V buzzer being connected to the SLC functions.

This completes SLC fuse replacement.

4.3.8.3 Replacing the Serial LAN Interface Circuit: SLC CMH-2370

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Flat head screwdriver	2 mm, 6 mm	
2	Phillips screwdriver	Size #1, Size #2	
3	Nut driver*1	5.5 mm	

∗1 Required when an Analog Option Circuit (AOC) is installed.

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

⚠ A DC power supply has fed to SLC.

Before replacement work, be sure to turn OFF the DC power circuit breaker.

Step 1 Remove the front cover of the display unit mount kit and the lid of the JB.

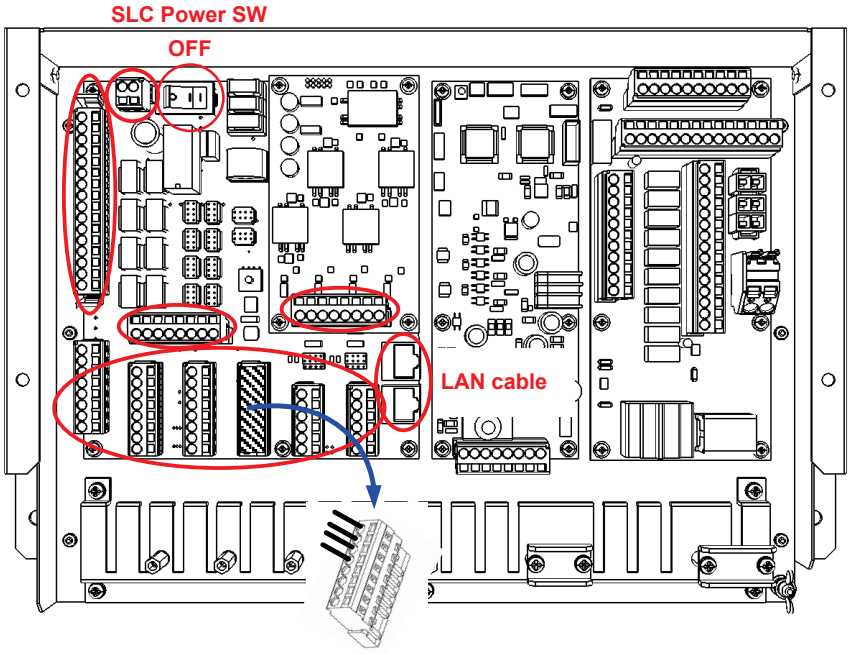
Remove the front cover of the display unit mount kit and the lid of the JB. For more information about the removal procedure, refer to "Replacing the Fuses of the Serial LAN Interface Circuit: SLC CMH-2370."

Step 2 Turn OFF the power switch of the SLC and remove the wires together with the two-piece terminal block.

Turn OFF the power S1 switch of the SLC.

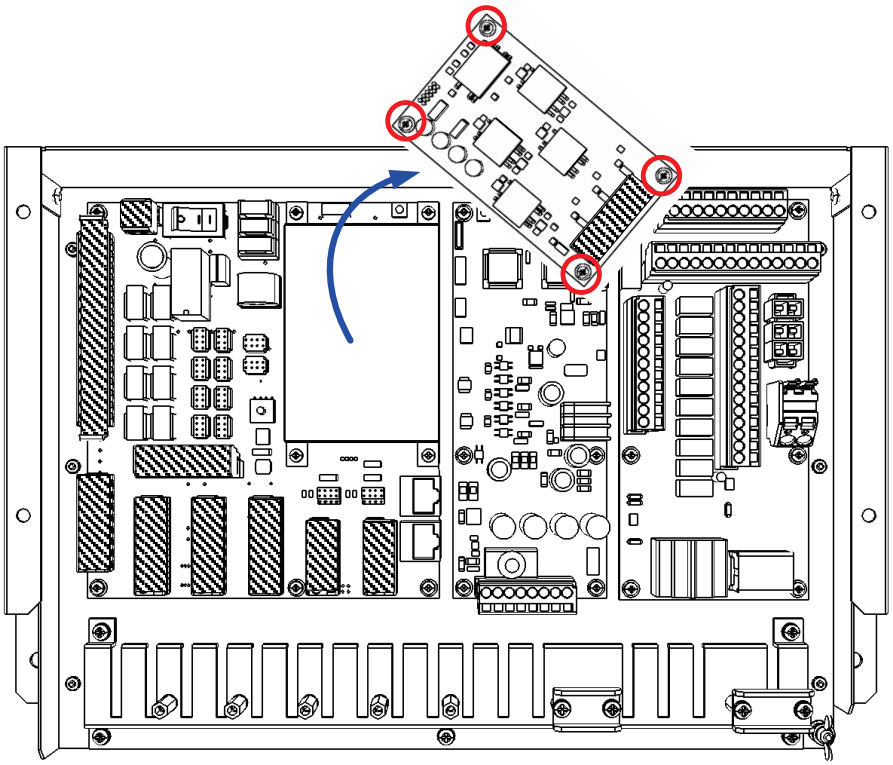
Disconnect the Ethernet cables.

Remove the two-piece terminal block together with wires if wires are connected to it. They can be removed by pulling them out.



Step 3 Remove the AOC (if installed)

If an AOC is installed, remove the screws at four corners (M3: 4 locations) that fasten the AOC and then take out it.



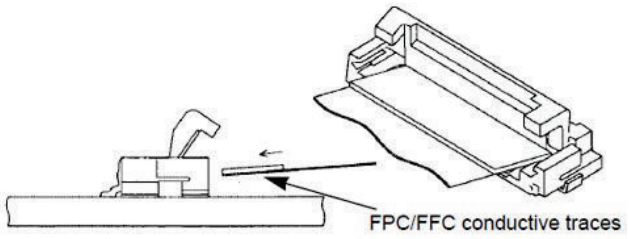
Step 4 Remove the FFC on the GIF side and then remove the SLC.

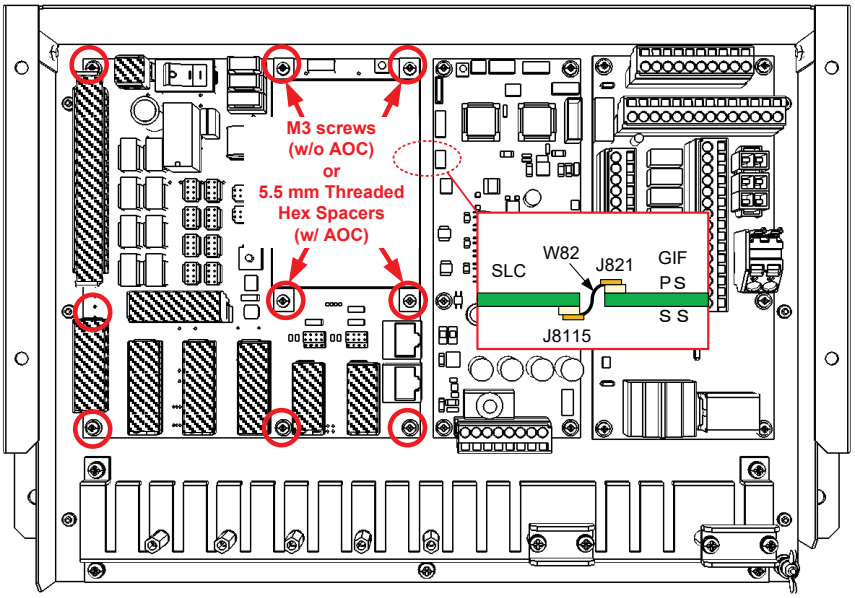
If a GIF is installed, turn OFF the S1 switch of the GIF, open the J821 of the GIF, and then remove the FFC (W82). For more information about the S1 switch of the GIF, refer to "Replacing the Fuses of the Gyro Interface Circuit: GIF CMJ-554."

Remove the screws that fasten the SLC and take it out.

- If an AOC is not installed : M3 × 9 locations
- If an AOC is installed : M3 × 5 locations
  : 5.5 mm threaded hex spacer x 4 locations

⚠ Exercise caution when handling the FFCs as they are very fragile.





Step 5 Set up the switches/jumper pins of new SLC and replace.

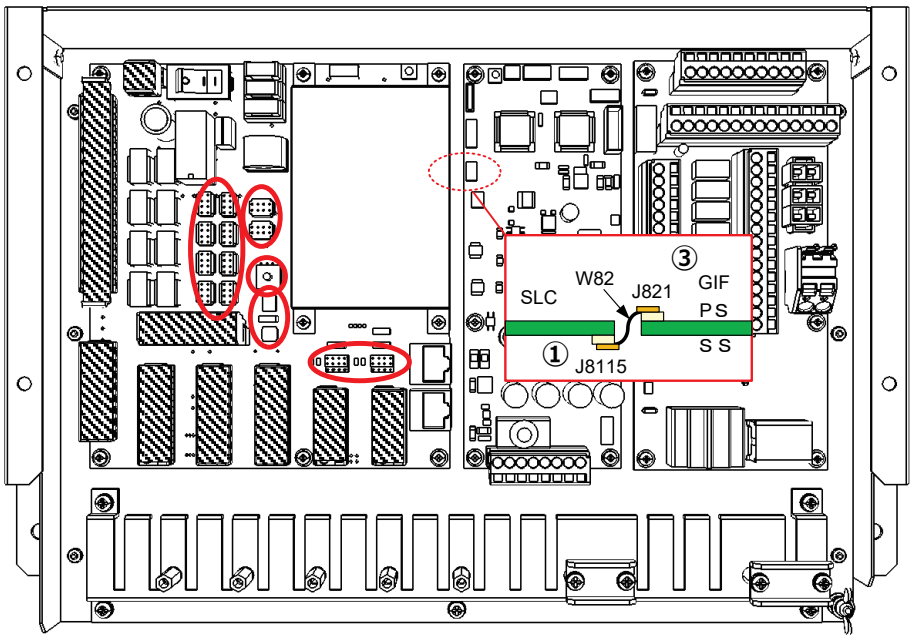
Set up the switches and jumper pins of the new SLC by referring following informations.

- Ship's List
- Chapter 2.5 "DIP-SW and Jumper Pin Settings"
- SLC you just removed.

Next, connect the FFC W82 to the J8115 on the back of the SLC first, and then assemble the new SLC according to the SLC replacement procedure in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.

⚠ Exercise caution when handling the FFCs as they are very fragile.

⚠ When installing the FFCs, be careful not to insert them slanted or bend them.



⚠ To reconnect the cables and the two-piece terminal blocks, connect them to the same locations as before removing them.

Step 6 Teke over SLC serial port settings

After the replacement of the SLC is completed, turn ON the power switch of the SLC and the circuit breaker for the power supply of the display unit. Setting information of the SLC which is to be replaced have been stored at the CCU. Take over those information to the new SLC from the CCU by conducting the following steps.

6-1. Click [Menu] -> [Service] -> [Installation] to open the Installation window.

6-2. Select [System Configuration] in the 1st Classification pane and [Subsystem Installation] in the 2nd Classification pane.

6-3. On left below of Edit/Result pane, click to unmark the check box of the Junction box that has the replaced SLC once, then mark it again. The setting information will be loaded into the new SLC from the CCU.

For further information, see **“Installation Manual 4.4 Subsystem Installation”.**

Step 7 Check operation.

Check the operation as follows.

(1) Check that a cable open error has not occurred.

(2) Check that the values of the sensor being connected to the SLC are displayed on the screen.

(3) Check that the 24V buzzer functions correctly if it is being connected to the SLC.

(4) Check that the contact input can be read correctly if contact signal input is being connected to the SLC.

(5) Check that the contact output functions correctly if contact signal output is being connected to the SLC.

This completes SLC replacement.

4.3.8.4 Replacing the Analog Option Circuit: AOC CMJ-560

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver	Size #2	

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

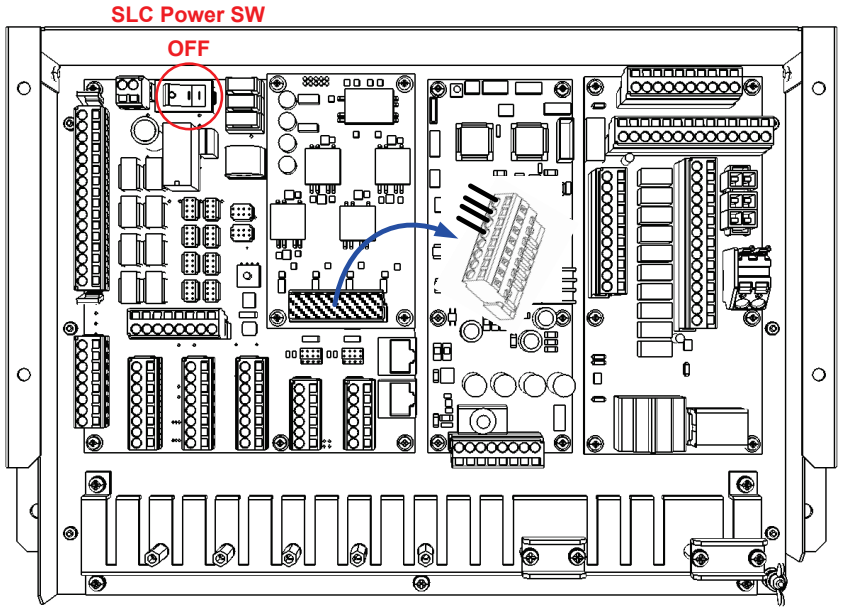
⚠ The power to the AOC is supplied from the SLC. A DC power supply has fed to SLC. Before replacement work, be sure to turn OFF the DC power circuit breaker.

Step 1 Remove the front cover of the display unit mount kit and the lid of the JB.

Remove the front cover of the display unit mount kit and the lid of the JB. For more information about the removal procedure, refer to "Replacing the Fuses of the Serial LAN Interface Circuit: SLC CMH-2370."

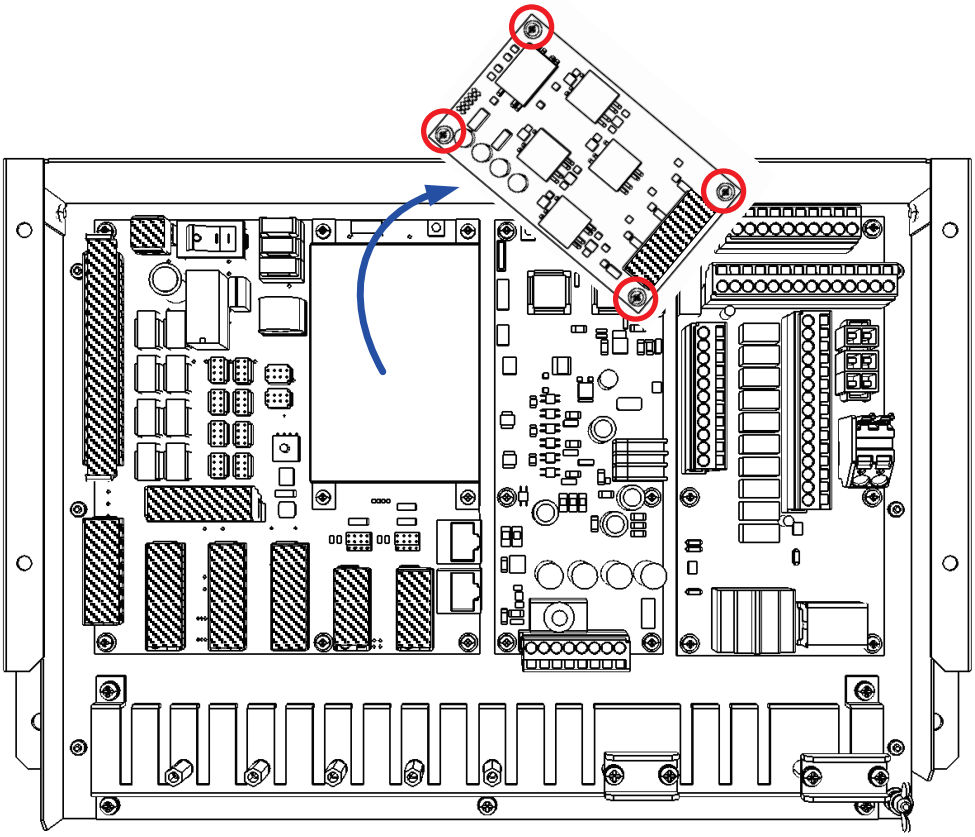
Step 2 Turn OFF the power switch of the SLC and remove the wires together with the two-piece terminal block.

Turn OFF the power S1 switch of the SLC. Remove the wires of the AOC together with the two-piece terminal block. The terminal block can be removed by pulling it out.



Step 3 Remove the AOC.

Remove the screws at four corners (M3: 4 locations) that fasten the AOC and then take out the AOC.

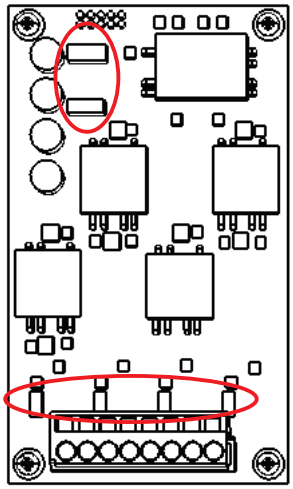


Step 4 Set up the new AOC and replace.

Set up the switches and jumper pins of the new AOC by referring following informations.

- Ship's List
- Chapter 2.5 "DIP-SW and Jumper Pin Settings"
- AOC you just removed.

Next, assemble the new AOC by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.



⚠ When mounting the new AOC, be sure to insert the TB841 in the correct position as it is easy to be displaced.

Step 5 Check operation.

After the replacement of the AOC is completed, turn ON the power switch of the SLC and the circuit breaker for the power supply of the display unit, and check the operation as follows.

(1) Check that the values of the sensor being connected to the AOC are displayed on the screen.

- The sensor values may deviate due to circuit board replacement; in such a case, please adjust the values by referring to "4.8 A/D (Analog/Digital Settings)" in the Installation Manuals.
- Also, to change the sensor wiring (connection channel change) from the time before the replacement of the AOC, reset by referring to "4.8 A/D (Analog/Digital Settings)" in the "JMR-7200/9200 series, Installation Manuals.

This completes AOC replacement.

4.3.8.5 Replacing the Fuses of the Gyro Interface Circuit: GIF CMJ-554

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Flat head screwdriver	4 mm, 6 mm	
2	Phillips screwdriver	Size #2	

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

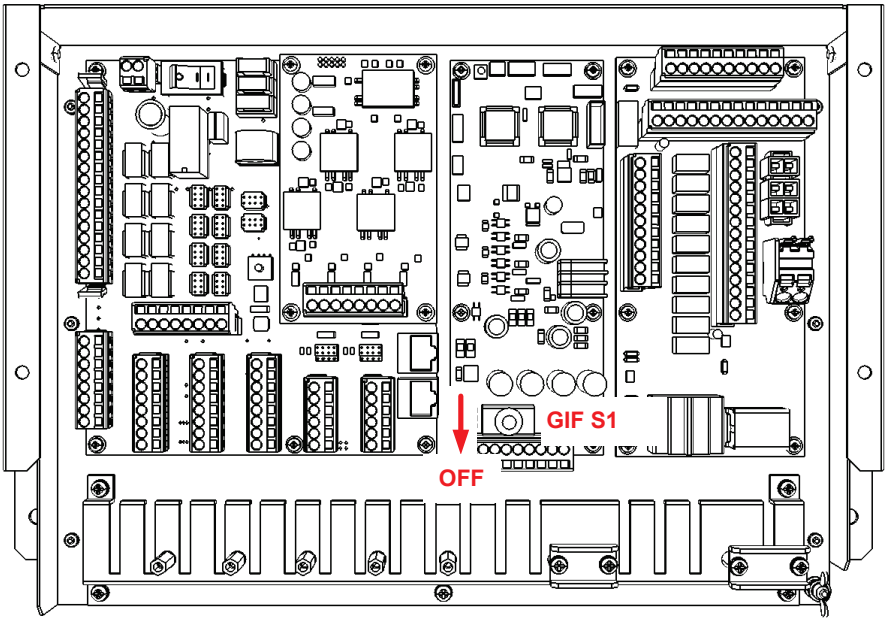
⚠ The GIF uses the gyro compass signal as its power source.
Before changing the fuses of the GIF, be sure to turn OFF the S1 switch of the GIF.

Step 1 Remove the front cover of the display unit mount kit and the lid of the JB.

Remove the front cover of the display unit mount kit and the lid of the JB. For more information about the removal procedure, refer to "Replacing the Fuses of the Serial LAN Interface Circuit: SLC CMH-2370."

Step 2 Turn OFF the S1 switch of the GIF.

Turn OFF the S1 switch in the lower part of the GIF. Signals from the gyro compass are blocked.



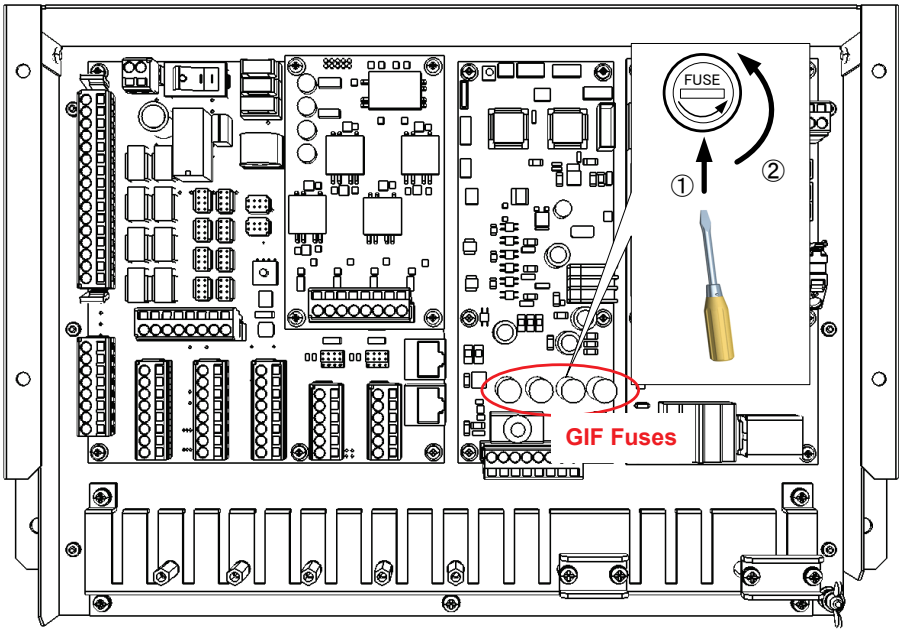
Step 3 Change the fuses.

Open the fuse holders and change the fuses. Each of the fuse holders can be opened by slowly turning the holder head counterclockwise while pushing it down. The fuses are glass tube fuses. After replacing the fuses, assemble to the original condition by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and set all the switches back in place.

⚠ If any of the fuse holders cannot be opened because it is too tight, push a 6 mm tip width flat head screwdriver against the groove on the fuse holder head and rotate it slowly counterclockwise.

⚠ When closing the fuse holders, do not use a flat head screwdriver, however.
Using a flat head screwdriver may lead to damage to the fuse holders.

Name	Unit Name	Location of Use	Q'ty	Use	Model Name (Code)
Glass Fuse	NQE-1143	CMJ-554	4	250V 0.5A	MF51NR250V0.5A (5ZFGD00019)



Step 4 Check operation.

After the replacement of the GIF fuses is completed, turn ON the S1 switch of the GIF and the circuit breaker for the power supply of the display unit, and check the operation as follows.

(1) Check that true bearing values are displayed on the screen.

This completes GIF fuse replacement.

4.3.8.6 Replacing the Gyro Interface Circuit: GIF CMJ-554

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Flat head screwdriver	2 mm, 6 mm	
2	Phillips screwdriver	Size #2	

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

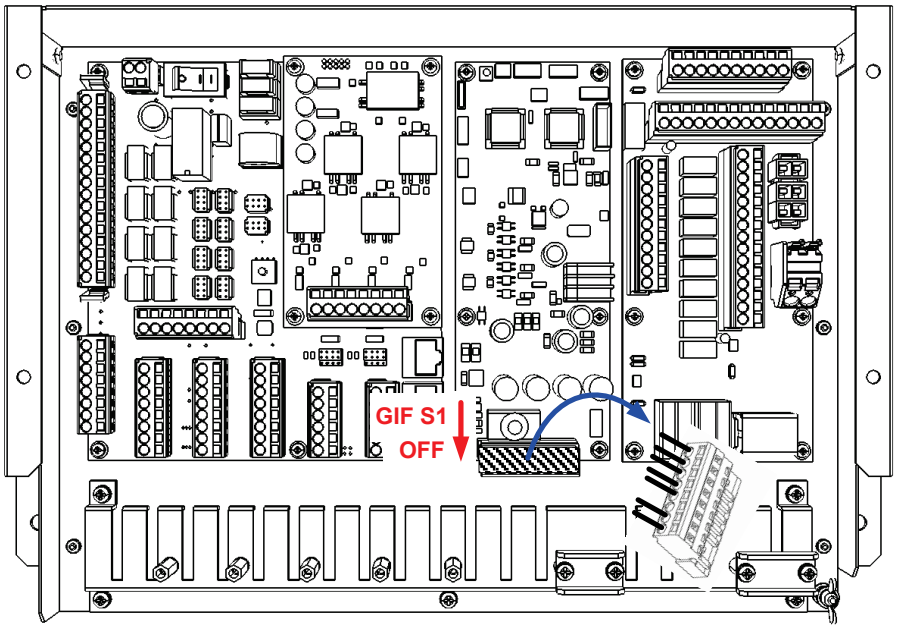
⚠ The GIF uses the gyro compass signal as its power source.
Before changing the GIF, be sure to turn OFF the S1 switch of the GIF.

Step 1 Remove the front cover of the display unit mount kit and the lid of the JB.

Remove the front cover of the display unit mount kit and the lid of the JB. For more information about the removal procedure, refer to "Replacing the Fuses of the Serial LAN Interface Circuit: SLC CMH-2370."

Step 2 Turn OFF the S1 switch of the GIF and remove the wires together with the two-piece terminal block.

Turn OFF the S1 switch in the lower part of the GIF. Signals from the gyro compass are blocked.
Remove the wired two-piece terminal block J823.

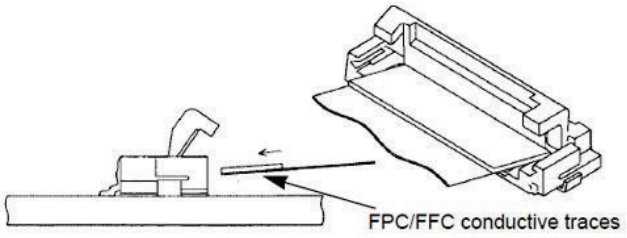


Step 3 Remove the GIF.

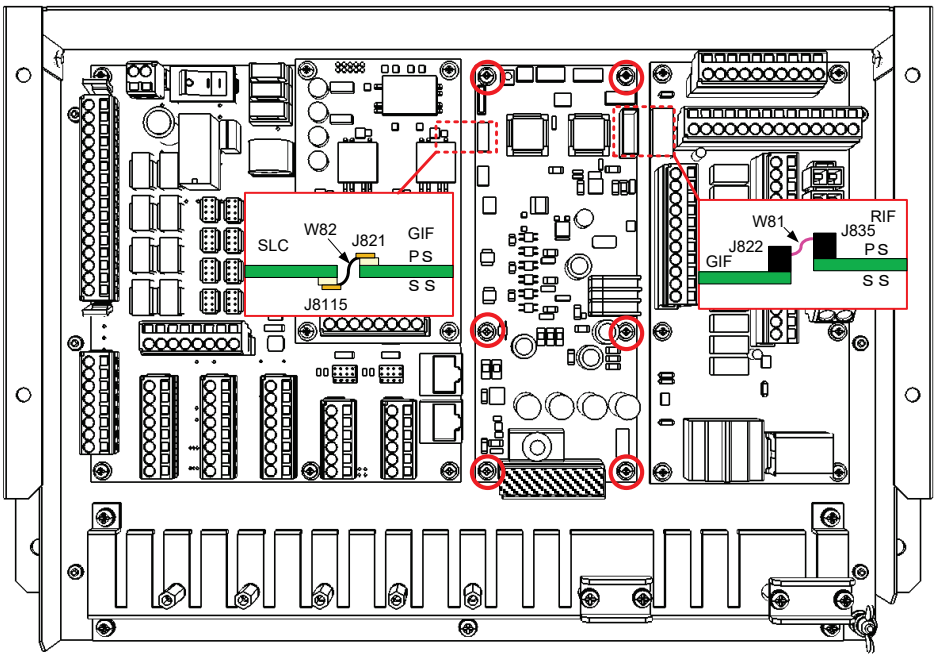
If an SLC is installed, disconnect the FFC (W82: J821) that connects with the SLC.

If an RIF is installed, disconnect the cable (W81: J822) that connects with the RIF.

⚠ Exercise caution when handling the FFCs as they are very fragile.



Remove the screws (M3: 6 locations) that fasten the GIF and then take out the GIF from the JB.



Step 4 Set up the new GIF and replace..

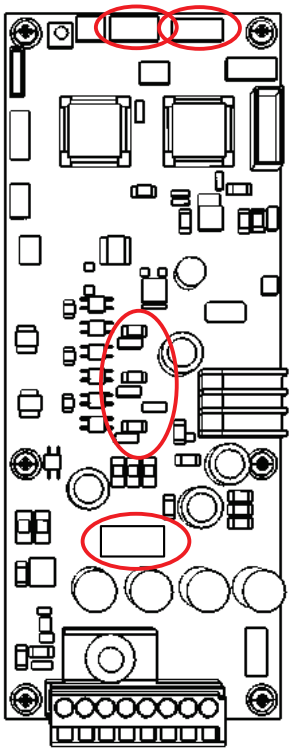
Set up the switches and jumper pins of the new GIF by referring following informations.

- Ship's List
- Chapter 2.5 "DIP-SW and Jumper Pin Settings"
- GIF you just removed.

Next, assemble the new GIF by repeating the removal work in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.

⚠ Exercise caution when handling the FFCs as they are very fragile.

⚠ When installing the FFCs, be careful not to insert them slanted or bend them.



Step 5 Check operation.

After the replacement of the GIF is completed, turn ON the S1 switch of the GIF and the circuit breaker for the power supply of the display unit, and check the operation as follows.

(1) Check that a cable open error has not occurred.

(2) Check that true bearing values are displayed on the screen.

This completes GIF replacement.

4.3.8.7 Replacing the Radar interface circuit: RIF CQD-2273

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Flat head screwdriver	2 mm, 4 mm*1, 6 mm	
2	Phillips screwdriver	Size #2	
3	Diagonal pliers	—	
4	Cable-tie *2	—	

*1 Use for TB840 on the RIF if NKE-2254-6HS or NKE-2103-6/-6H type scanner unit has been installed.

*2 A number of cable-ties may be required.

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Before replacement work, be sure that all the LEDs on the front of the PSU NBD-913 are unlit. Charged electricity may still remain in the internal capacitor.

⚠ Do not lose the screws as they will be needed again.

⚠ To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand.

Step 1 Remove the front cover of the display unit mount kit and the lid of the JB.

Remove the front cover of the display unit mount kit and the lid of the JB. For more information about the removal procedure, refer to "Replacing the Fuses of the Serial LAN Interface Circuit: SLC CMH-2370."

Step 2 Remove the wires of the RIF.

Remove the wires of the RIF according to the following order.

2-1 • Tow-piece terminal blocks (J832, J833, J834, J836)

2-2 • Terminal block (TB838 ANT side or TB840)

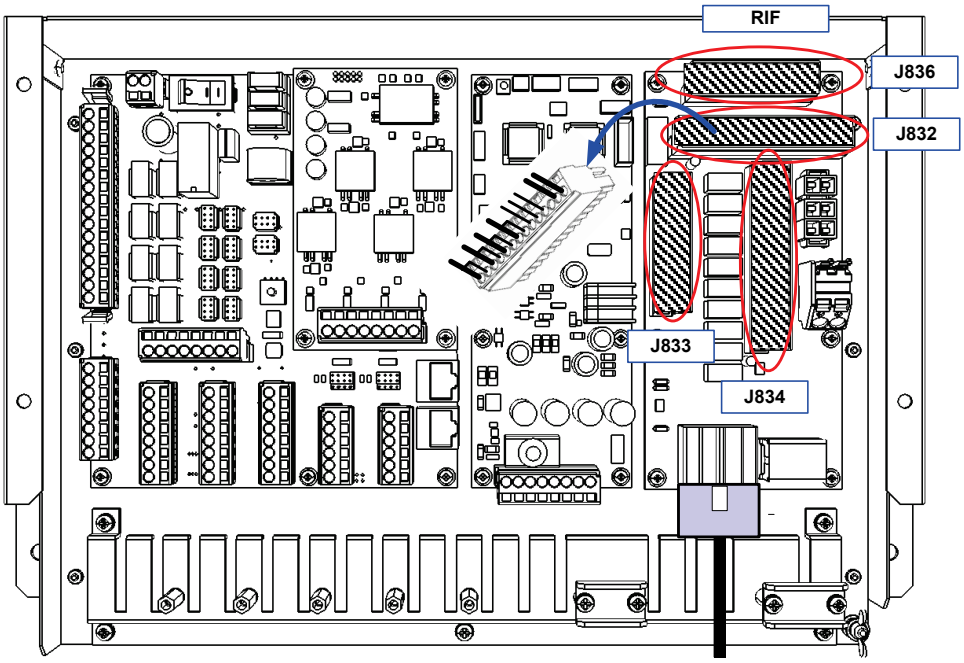
2-3 • Interconnections (J831, J837 or J839, TB838 PSU side)

2-4 • GIF cable (J835: only if a GIF has been installed)

2-1 Remove the two-piece terminal blocks.

Remove the two-piece terminal blocks together with wires if wires are connected to them. They can be removed by pulling them out.

Tow-piece terminal blocks: J832, J833, J834, J836



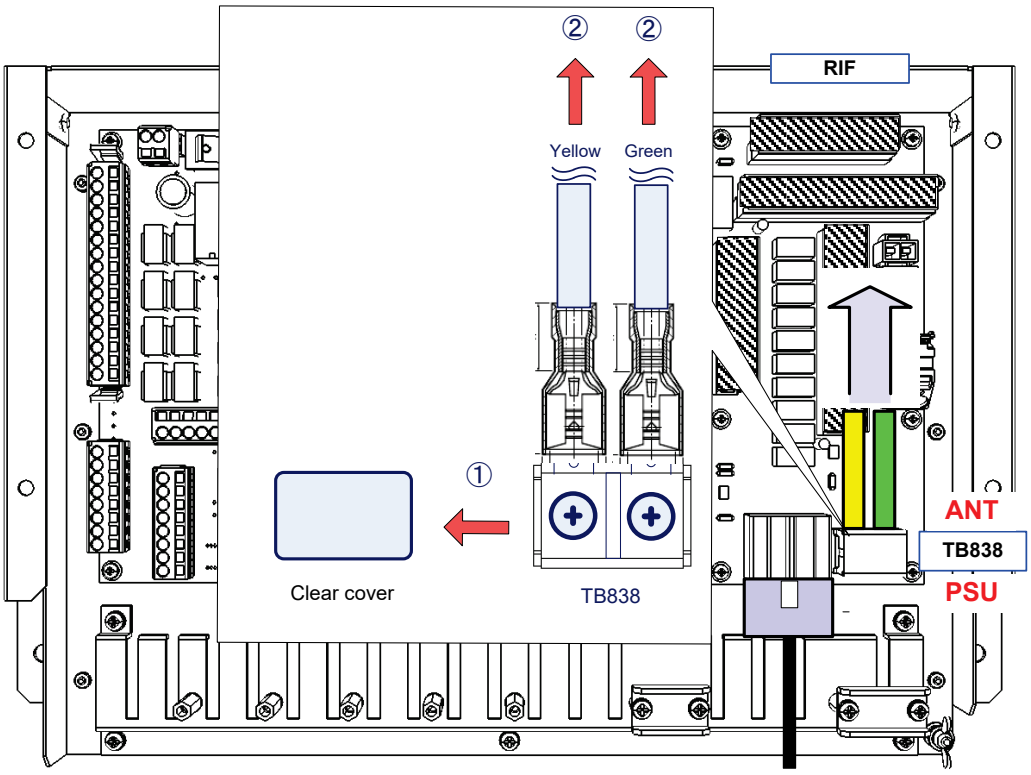
2-2 Remove the wiring from the terminal blocks.

There are two types of terminal board wiring depending on the scanner unit installed.

If the 2695110056 cable has been used, disconnect the yellow and green cables being connected to the TB838 ANT side. The y can be removed by pulling them out.

Scanner units and transmitter-receiver units which installed with 2695110056 cable are:

NKE-1130	(JMR-9230-S, JMR-7230-S)
NKE-1125	(JMR-9225-6X/9X, JMR-7225-6X/9X)
NTG-3230	(JMR-9230-S3, JMR-7230-S3)
NTG-3225	(JMR-9225-7X3/9X3, JMR-7225-7X3/9X3)
NKE-1632	(JMR-9272-S, JMR-7272-S)
NKE-2632/-H	(JMR-9282-S/SH, JMR-7282-S/SH)

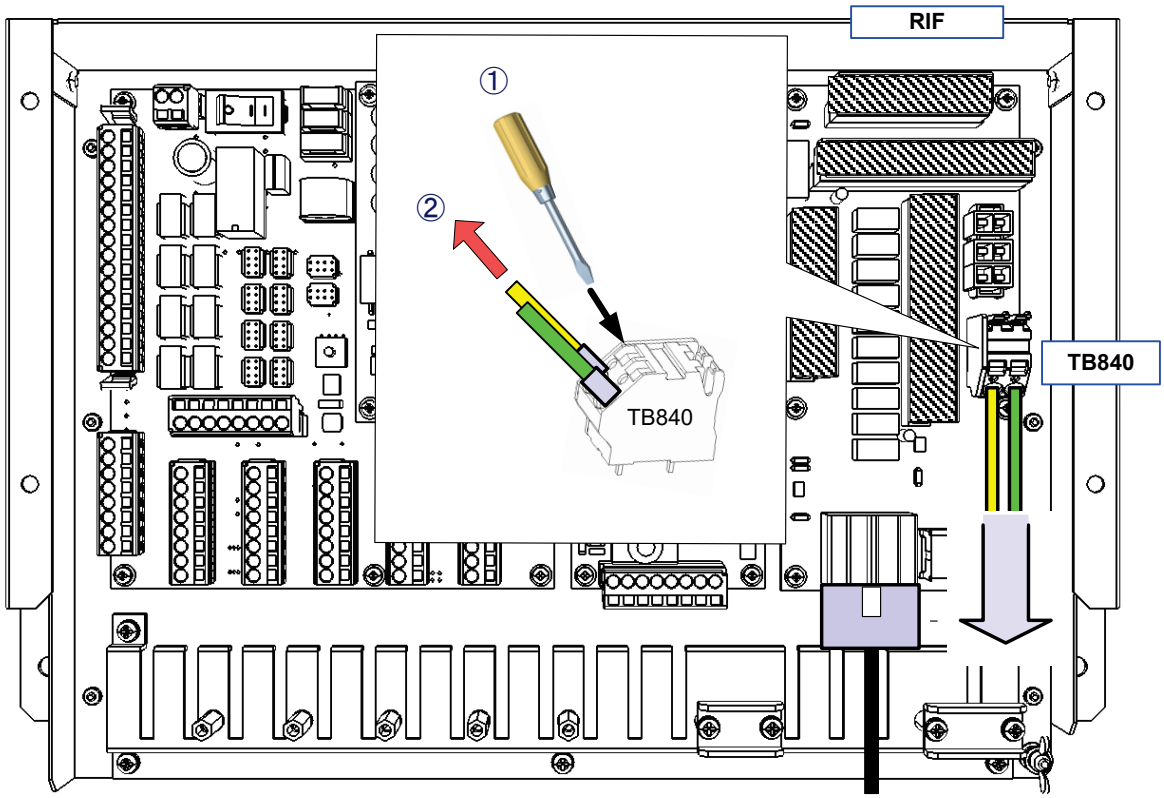


If the CFQ-6912 cable has been used, disconnect the cables being connected to the TB840. They can be released by inserting a 4 mm width flat head screwdriver into the driver slots above the cable slots.

Scanner units which installed with CFQ-6912 cable are:

NKE-2254-6HS (JMR-9225-6XH, JMR-7225-6XH)

NKE-2103-6/6HS (JMR-9210-6X/6XH, JMR-7210-6X/6XH)



2-3 Remove the internal wiring

There are two types of internal wirng depending on the scanner unit installed.

If the W851 or W852 cable has been installed, remove the following terminal blocks, connector and screw.

TB838: Loosen the screws (M4) and remove the crimp terminal with "U" stamp seal of W851/W852.

TB838: Loosen the screws (M4) and remove the crimp terminal with "V" stamp seal of W851/W852.

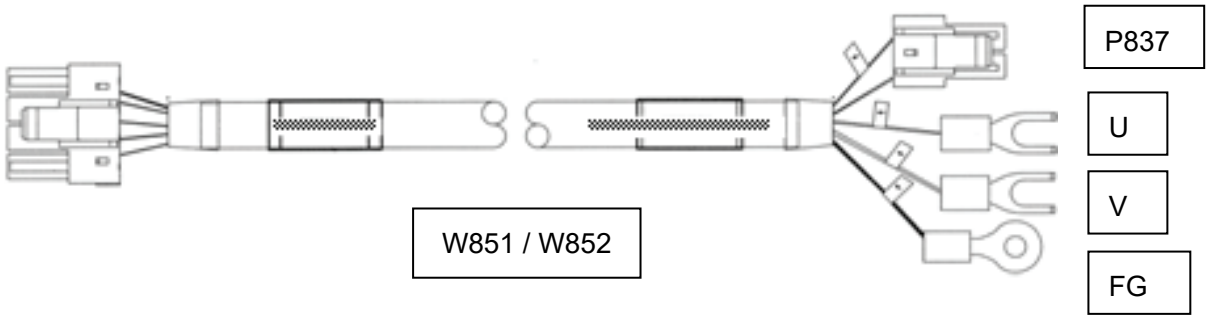
J837: Using a flat head screwdriver, hold down the tab of the connector with a “P837” stamp seal of W851/W852 and pull it out.

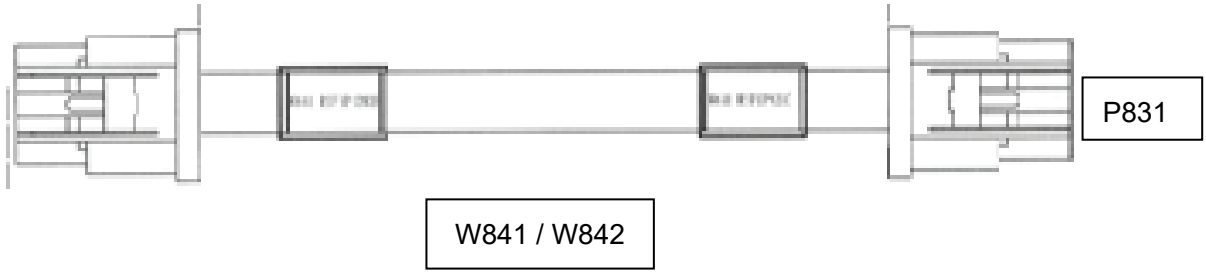
Screw at the lower right of the RIF board: Remove the screw (M3) and then disconnect the crimp terminal with “FG” stamp seal of W851/W852.

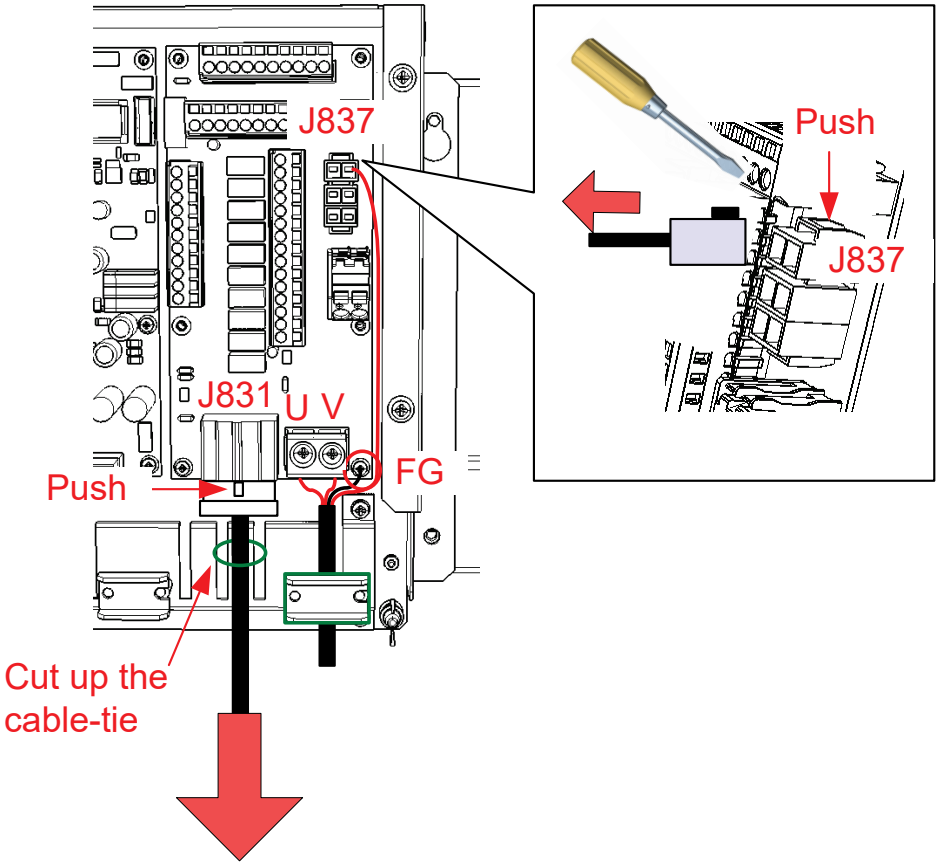
Next, disconnect the connection cable with the CCU, either the W841 or the W842, from the J831. The W841/W842 cable can be disconnected by cutting off the cable-tie that fastens the J841/J842 cable to the cable clamp of the JB first and pulling out the W841/W842 cable while pressing down the tab of the P831 connector next.

Scanner units and transmitter-receiver units using the W851/W852 cable:

NKE-1130	(JMR-9230-S, JMR-7230-S)
NKE-1125	(JMR-9225-6X/9X, JMR-7225-6X/9X)
NTG-3230	(JMR-9230-S3, JMR-7230-S3)
NTG-3225	(JMR-9225-7X3/9X3, JMR-7225-7X3/9X3)
NKE-1632	(JMR-9272-S, JMR-7272-S)
NKE-2632/-H	(JMR-9282-S/SH, JMR-7282-S/SH)







⚠CAUTION

Before conducting Unit replacement work, always be sure that every cable-tie that fastens the cable has been removed.

Replacement work without the above may lead Unit/cable breakage.

If the W853 or W854 cable has been installed, remove the following connector and screw.

J839: Using a flat head screwdriver, hold down the tab of the connector with a “P839” stamp seal of W853/W854 and pull it out.

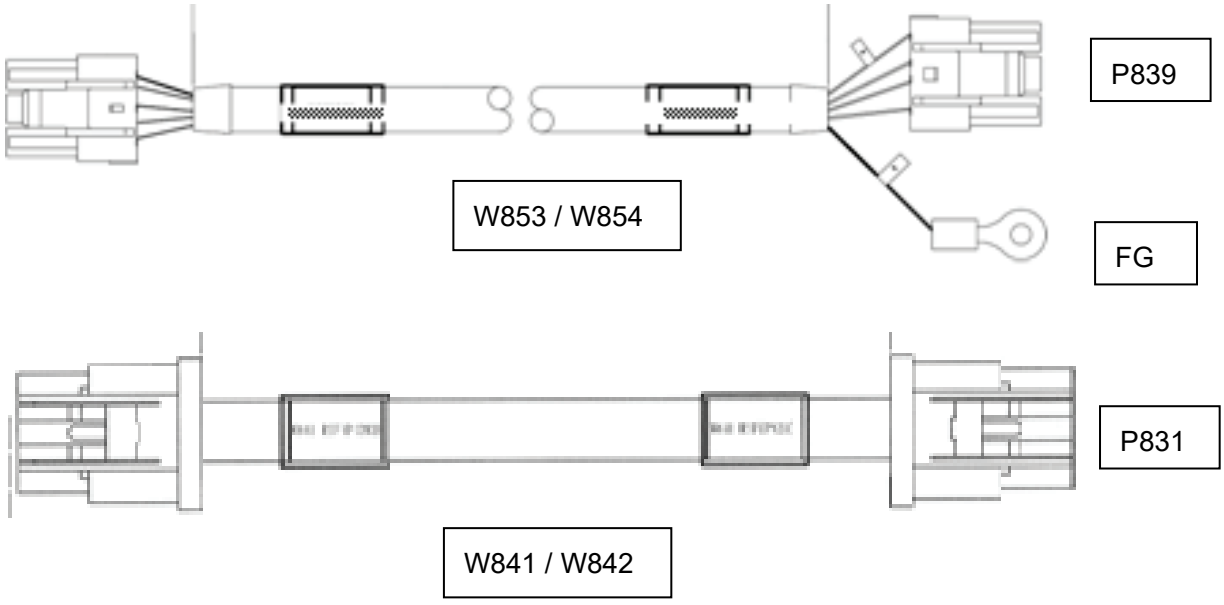
Screw at the lower right of the RIF board: Remove the screw (M3) and then disconnect the crimp terminal with “FG” stamp seal of W853/W854.

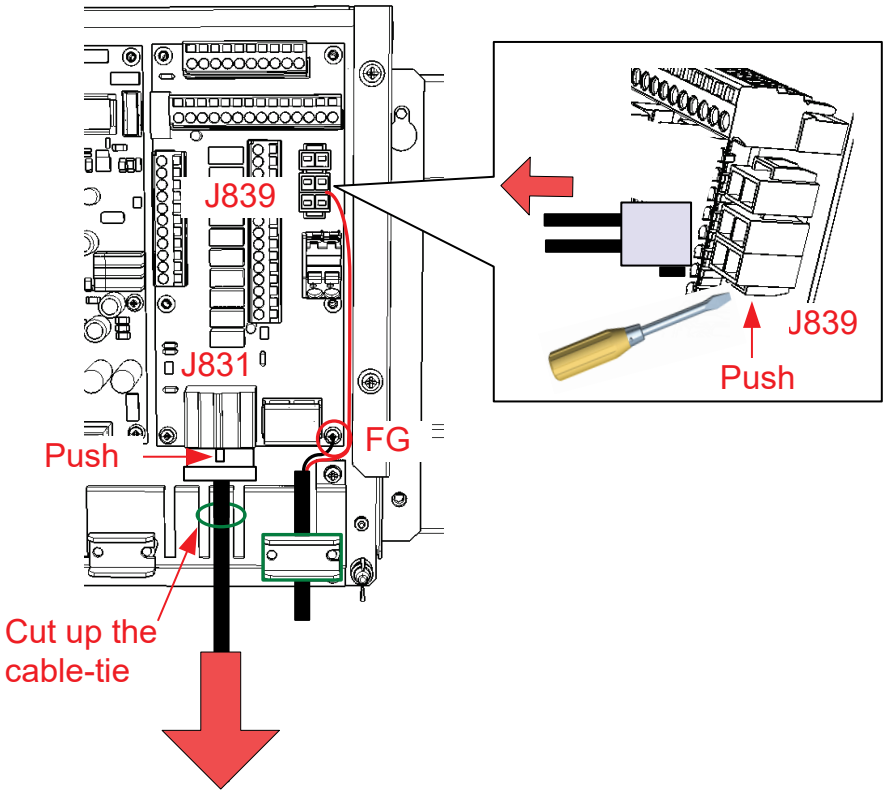
Next, disconnect the connection cable with the CCU, either the W841 or the W842, from the J831 connector. The W841/W842 cable can be disconnected by cutting off the cable-tie that fastens the W841/W842 cable to the cable clamp of the JB first and pulling out the W841/W842 cable while pressing down the tab of the P831 connector next.

Scanner units using the W853/W854 cable:

NKE-2254-6HS (JMR-9225-6XH, JMR-7225-6XH)

NKE-2103-6/6HS (JMR-9210-6X/6XH, JMR-7210-6X/6XH)





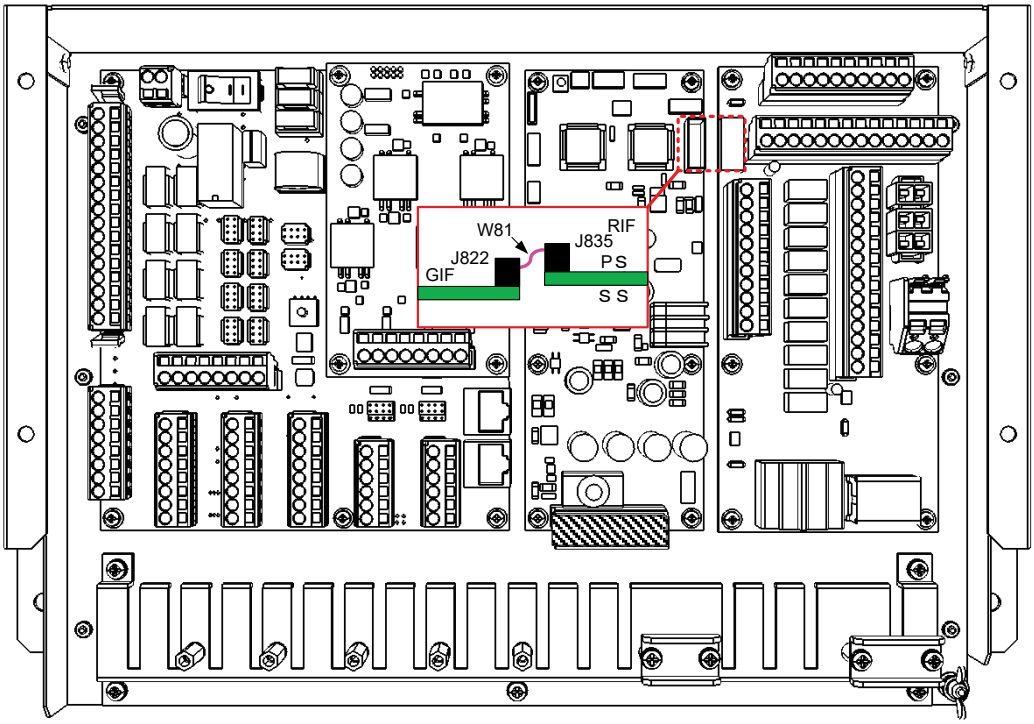
⚠CAUTION

Before conducting Unit replacement work, always be sure that every cable-tie that fastens the cable has been removed.

Replacement work without the above may lead Unit/cable breakage.

2-4 Disconnect the GIF cable.

If a GIF is installed, turn OFF the S1 switch of the GIF and then remove the connection cable with the GIF (W81: J835). For more information about the S1 switch of the GIF, refer to "Replacing the Fuses of the Gyro Interface Circuit: GIF CMJ-554."



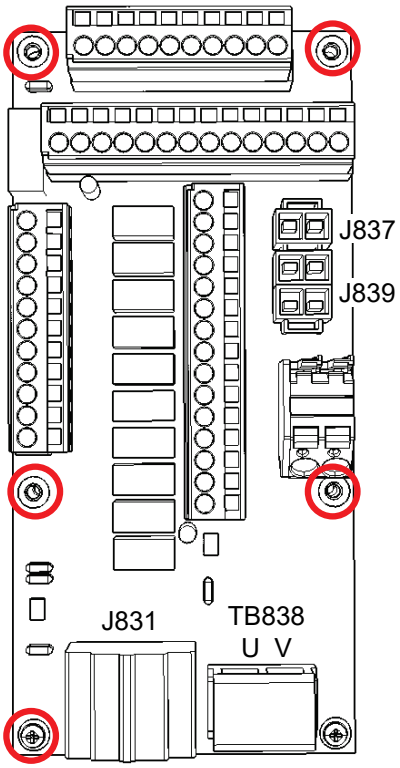
Step 3 Change the RIF.

Remove the remaining screws (M3: 5 locations) that fasten the RIF and change the RIF. After replacing the RIF, assemble to the original condition by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.

⚠ Securely install the clear cover of the TB838 to prevent it from dropping.

⚠ Be careful not to forget to fasten the J841/J842 connector to the cable clamp of the JB with a cable-tie

.



CQD-2273 RIF

Step 4 Check operation.

After the replacement of the RIF is completed, turn ON the circuit breaker for the power supply of the display unit and check the operation as follows.

(1) Check that a cable open error has not occurred.

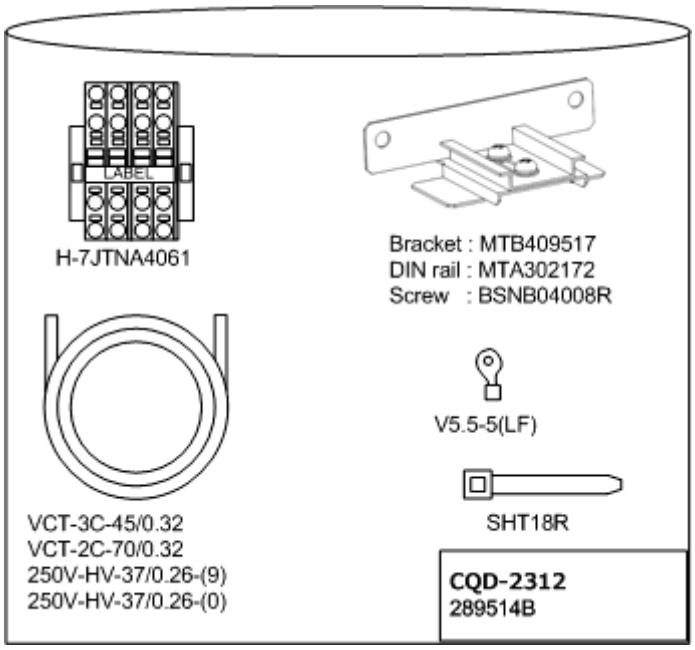
(2) Start [RADAR] on the Task menu, perform transmission, and check that normal radar images are displayed.

This completes RIF replacement.

4.3.9 Relay Terminal Block: CQD-2312

4.3.9.1 Packing List

Relay Terminal Block CQD-2312 is composed of the following.



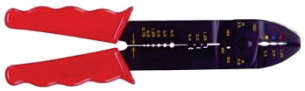
Name	Code	Remark
Relay terminal block	H-7JTNA4061	-
DIN rail bracket assy.	Bracket : MTB409517 DIN rail : MTA302172 Screws : BSNB04008R	-
2-core cabtyre cable	VCT-2C-70/0.32	Length : 900mm Cross section : 5.5 mm2
3-core cabtyre cable	VCT-3C-45/0.32	Length : 1200mm Cross section : 3.5 mm2
White PVC coated wire	250V-HV-37/0.26-(9)	Length : 4000mm Cross section : 2.0 mm2
Black PVC coated wire	250V-HV-37/0.26-(0)	Length : 4000mm Cross section : 2.0 mm2
Insulated ring terminal	V5.5-5(LF)	-
Cable-tie	SHT18R	-

4.3.9.2 Wire processing

【Required Tools】

The tools shown in the following table are required for replacement work.

Table Required Tools

No	Name	Size	Appearance
1	Knife	—	
2	Ruler *1	—	
3	Crimping tool	For Insulated ring terminal (Yellow, 5.5sq)	

*1 Either a ruler or a tape measure is mandatory.

⚠ Be careful not to hurt yourself during wire processing.

The following table shows the list of cutting / stripping length. They shall be processed within tolerance of +/- 10%.

Table. List of cutting / stripping length for Relay terminal block CQD-2312

Destination			Name and Length	Relay terminal block		
For	Insulation strip length [mm]	Sheath strip length [mm]	Name / Cutting Length [mm]	Sheath strip length [mm]	Insulation strip length [mm]	Relay terminal block
PSU AC IN	12	150	VCT-2C 5.5sq / 550	100	12	AC
PSU DC IN	12	-	White PVC Black PVC / 700	-	12	DC
UPS AC IN	8	100	VCT-3C 3.5sq / 1000	200	12	AC
UPS DC OUT	8	-	White PVC Black PVC / 900	-	12	DC
26” Sensor LAN DC IN	8	-	White PVC Black PVC / 1200	-	12	DC
19” Sensor LAN DC IN	8	-	White PVC Black PVC / 500	-	12	DC
SLC #1 DC IN	8	-	White PVC Black PVC / 700	-	12	DC

* Tolerance: +/- 10%

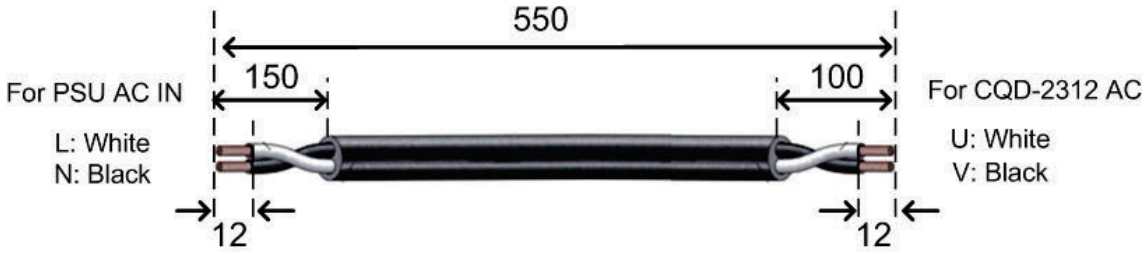
Wiring between PSU AC IN and CQD-2312 AC

Cut and strip the 2-core cabtyre cable off as follows.

Table. List of cutting / stripping length of the cable between PSU AC IN and CQD-2312 AC

Destination			Name and Length	Relay terminal block		
For	Insulation strip length [mm]	Sheath strip length [mm]	Name / Cutting length [mm]	Sheath strip length [mm]	Insulation strip length [mm]	Relay terminal block
PSU AC IN	12	150	VCT-2C 5.5sq / 550	100	12	AC

* Tolerance: +/- 10%



Wiring between UPS AC IN and CQD-2312 AC

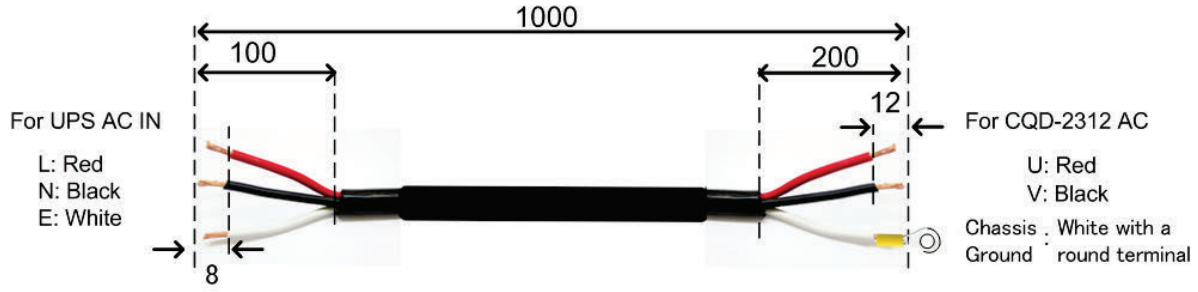
Cut and strip the 2-core cabtyre cable off as follows.

Crimp the ring terminal to the conductor with white insulation of CQD-2312 side.

Table. List of cutting / stripping length of wires between UPS AC IN and CQD-2312 AC

Destination			Name and Length	Relay terminal block		
For	**Insulation strip length [mm]**	**Sheath strip length [mm]**	**Name / Cutting Length [mm]**	**Sheath strip length [mm]**	**Insulation strip length [mm]**	**Relay terminal block**
UPS AC IN	8	100	VCT-3C 3.5sq / 1000	200	12	AC

* Tolerance: +/- 10%



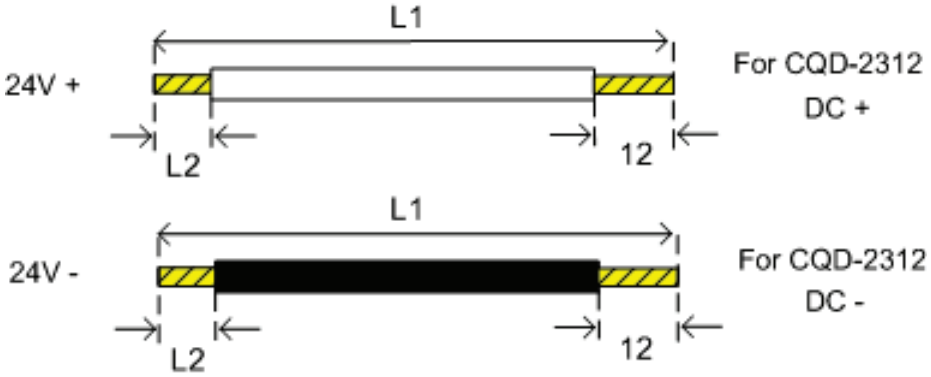
Wiring between each unit and CQD-2312 DC

Cut and strip off each white / black PVC coated wire for DC power. For cutting length L1 and Insulation strip length of each Unit L2, refer the table below.

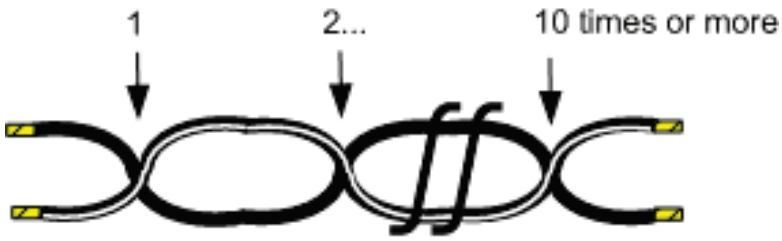
Table. List of cutting / stripping length of wires between Units and CQD-2312 DC

Destination		**Name and Length**	**Relay terminal block**	
For	Insulation strip length L2 [mm]	Name / Cutting length L1 [mm]	Insulation strip length [mm]	Relay terminal block
PSU DC IN	12	White PVC Black PVC / 700	12	DC
UPS DC OUT	8	White PVC Black PVC / 900	12	DC
26” Sensor LAN DC IN	8	White PVC Black PVC / 1200	12	DC
19” Sensor LAN DC IN	8	White PVC Black PVC / 500	12	DC
SLC #1 DC IN	8	White PVC Black PVC / 700	12	DC

* Tolerance: +/- 10%



The each wire pair shall be twisted at least ten times for the sake of common mode noise reduction.



This completes wire processing.

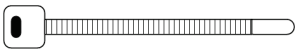
4.3.9.3 Replacing the Relay Terminal Block: CQD-2312

⚠WARNING	
	AC and DC power supplies have been connected to the Relay terminal block. Before replacement work, be sure to turn OFF the applicable power circuit breaker. Not following this instruction will cause electric shock and/or malfunction.
	When UPS has been connected to the Relay terminal block, be sure to set the "Bat-Select" rotary switch at "Service" on the UPS controller. Furthermore, be sure to eject the fuse of the UPS battery. Not following this instruction will cause electric shock and/or malfunction.

【Required Tools】

The tools shown in the following table are required for replacement work.

Table Required Tools

No	Name	Size	Appearance
1	Flat head screwdriver	3mm, 4mm, 6mm	
2	Phillips screwdriver	Size #2	
3	Diagonal pliers	—	
4	Cable-tie *1	—	

*1 A number of cable-ties may be required.

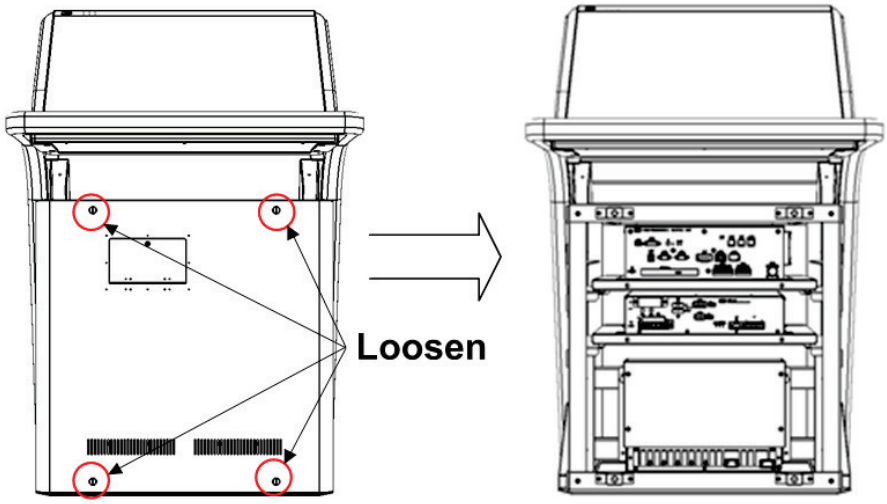
 Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

 Do not lose the screws as they will be needed again.

 To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand.

Step 1　　Remove the front cover of the display unit mount kit.

Loosen the screws that fasten the front cover of the display unit mount kit with a flat head screwdriver and then take out the front cover.

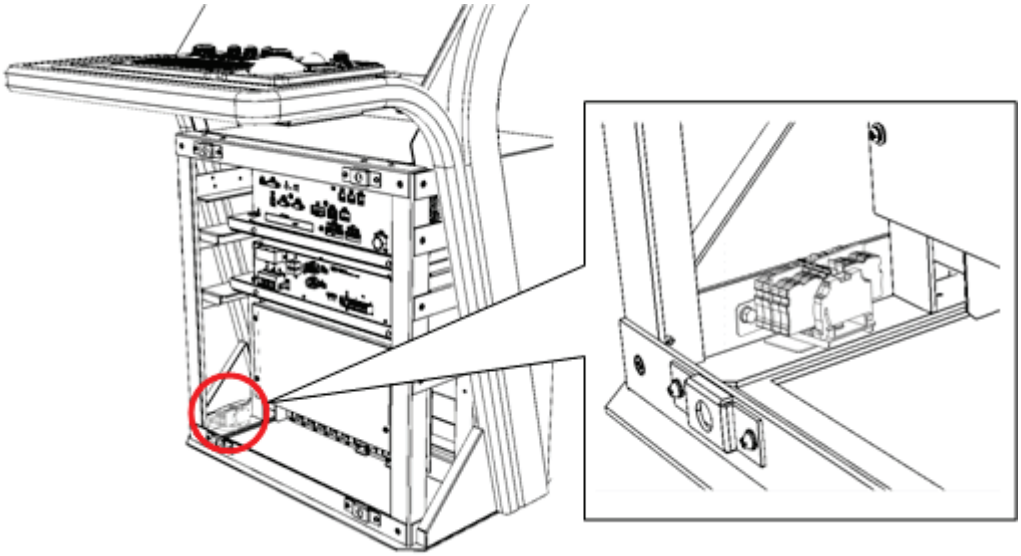


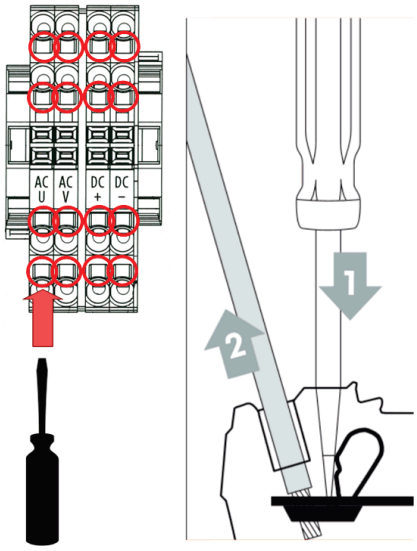
Step 2　Stop the UPS. (If it has been installed)

If the UPS has been installed, disable its operation. To stop the UPS opetaion, first, remove the Junction box and then set the “Bat-select” rotaly-swich to “Service”. Last, eject the blade fuse from the battery. For further information, see **“4.3.10 Replacing the UPS”.**

Step 3　Disconnect all cables / wires from CQD-2312

Disconnect all cables / wires from Relay terminal block: CQD-2312.They can be released by inserting a 3 mm width flat head screwdriver into the driver slots above the cable slots.

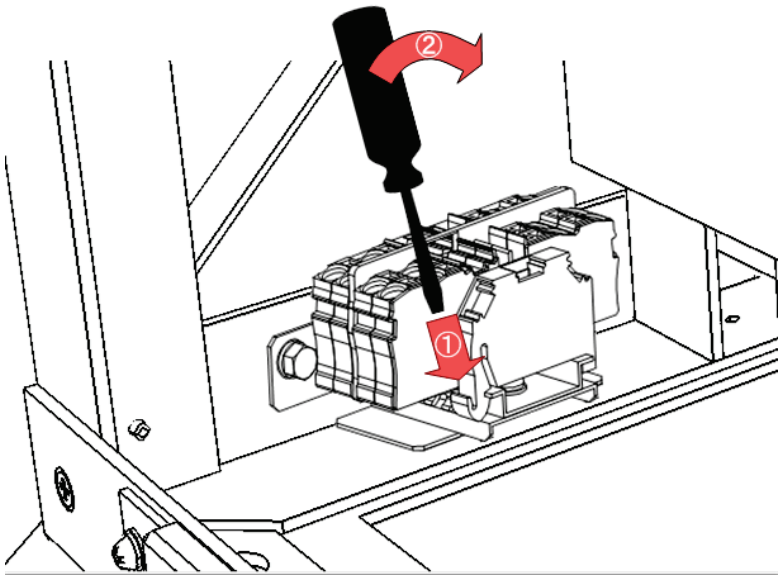




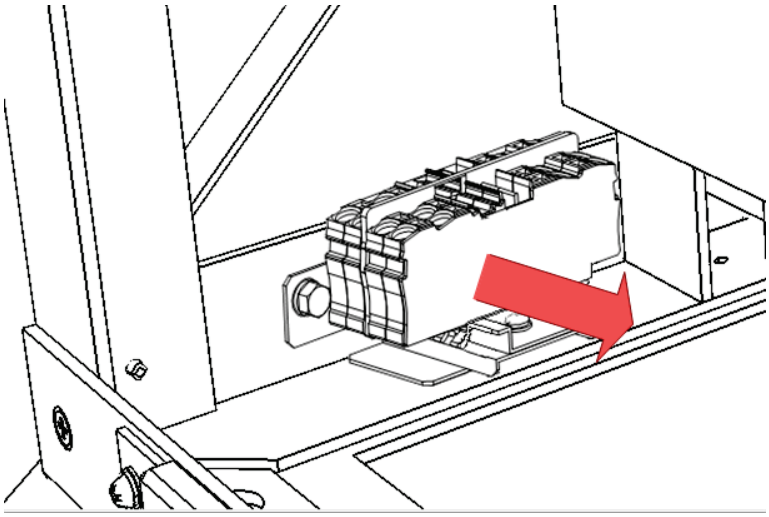
⚠ When UPS has been connected to the Relay terminal block, be sure to set the "Bat-Select" rotary switch at "Service" on the UPS controller. Furthermore, be sure to eject the fuse of the UPS battery.
Not following this instruction will cause electric shock and/or malfunction.

Step 4　Dismount the terminal block from DIN rail bracket

At first, dismount the right-side endplate. It can be removed from the DIN rail using the principle of leverage, by inserting a 3 mm width flat head screwdriver into its groove.



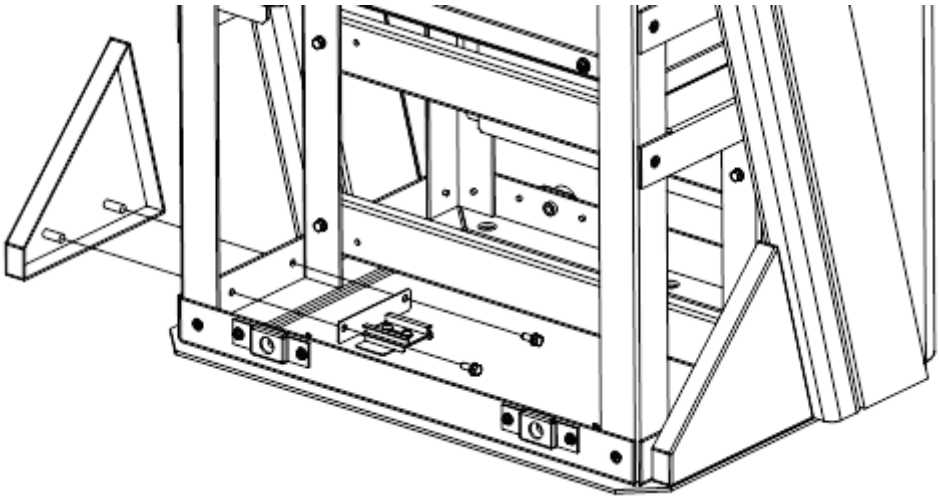
Next, dismount the terminal block. It can be removed by sliding itself along the DIN rail.

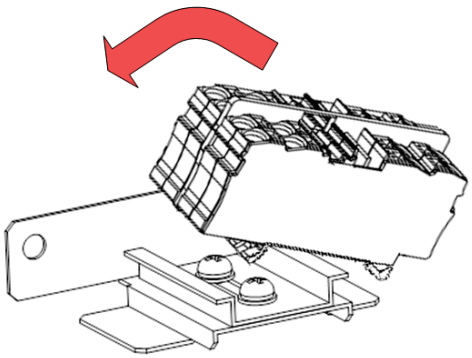


Dismount the left-side endplate by using a flat head screwdriver as well

Step 5　Remove the DIN rail bracket and Change to New CQD-2312

Remove the screws that fasten the DIN rail bracket (M4: 2 locations) and then change it to New CQD-2312.





After replacing the relay terminal block, assemble to the original condition by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.

⚠ Cables / wires must be connected to the same slot as before replacement.

⚠ Be aware not to make reverse connection of DC+ and DC-.

⚠ When UPS has been installed, make sure that the rotary switch of UPS is being set at the same position as before replacement. Do not forget inserting the fuse into UPS battery.

Step 6 Check operation.

After the replacement of the Relay terminal block is completed, turn ON the circuit breaker for the main power supply and for the power supply of the display unit. Check the operation as follows.

(1) Turn ON the power to the display unit, make sure that screen display is normal, and there are no abnormalities in operation and processing.

(2) If a scanner unit is being connected, start [RADAR] on the Task menu, perform transmission, and check that normal radar images are displayed.

This completes Relay terminal block replacement.

4.3.10 Sensor LAN Switch Unit: NQA-2443/A

4.3.10.1 Replacing the Sensor LAN Switch Unit: NQA-2443 in 26 inch display unit mount kit

⚠WARNING

A DC power supply has fed to sensor LAN switch unit. Before replacement work, be sure to turn OFF the DC power circuit breaker.
Not following this instruction will cause electric shock and/or malfunction.

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Flat head screwdriver	2 mm, 3mm, 4 mm, 6 mm	
2	Phillips screwdriver	Size #2	
3	Phillips stubby screwdriver	Size #2	
4	Diagonal pliers	—	
5	Cable-tie *1	—	

*1 A number of cable-ties may be required.

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

⚠ To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand.

Step 1 Remove the front cover of the display unit mount kit and the lid of the JB.

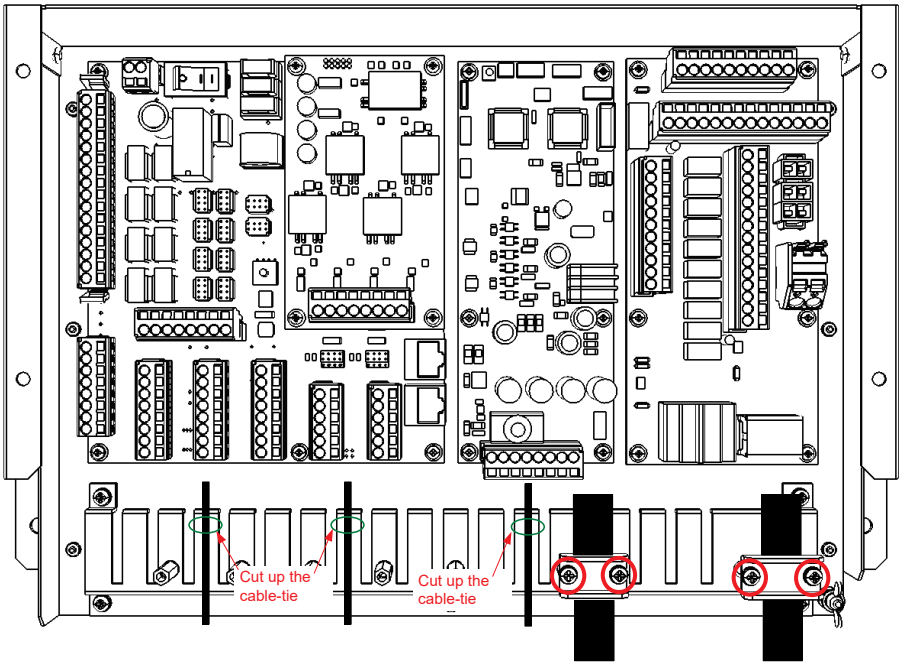
Remove the front cover of the display unit mount kit and the lid of the JB. For more information about the removal procedure, refer to "Replacing the Fuses of the Serial LAN Interface Circuit: SLC CMH-2370."

If an SLC is installed, turn OFF the power S1 switch of the SLC. For more information about the S1 switch of the SLC, refer to "Replacing the Fuses of the Serial LAN Interface Circuit: SLC CMH-2370."

If a GIF has been installed, turn OFF the power S1 switch of the GIF. For more information about the S1 switch of the GIF, refer to "Replacing the Fuses of the Gyro Interface Circuit: GIF CMJ-554."

Step 2 Remove all the cable-ties and cable retainers.

Disconnect all the cables that are fastened to the cable clamps of the JB. To disconnect the bottom right cables in the JB that are fastened with cable retainers, remove the screws (M4: 2 locations each) of the cable retainers. To disconnect the cables that are fastened with cable-ties, cut off all the cable-ties.



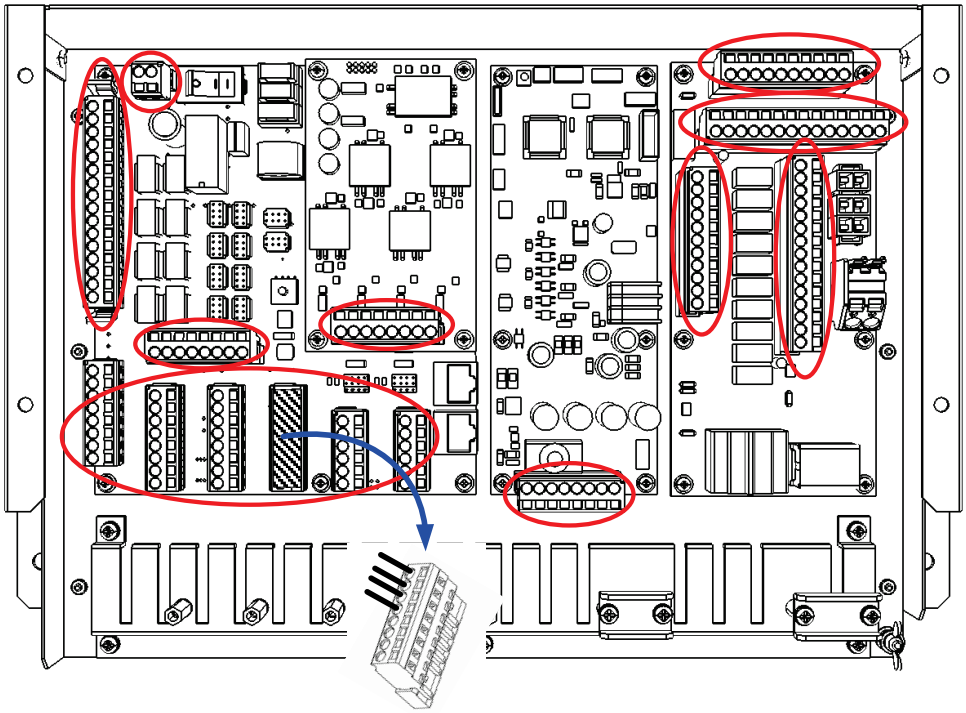
⚠CAUTION

Before conducting Unit replacement work, always be sure that every cable-tie that fastens the cable has been removed.

Replacement work without the above may lead Unit/cable breakage.

Step 3 Remove the two-piece terminal blocks on the internal circuits of the JB.

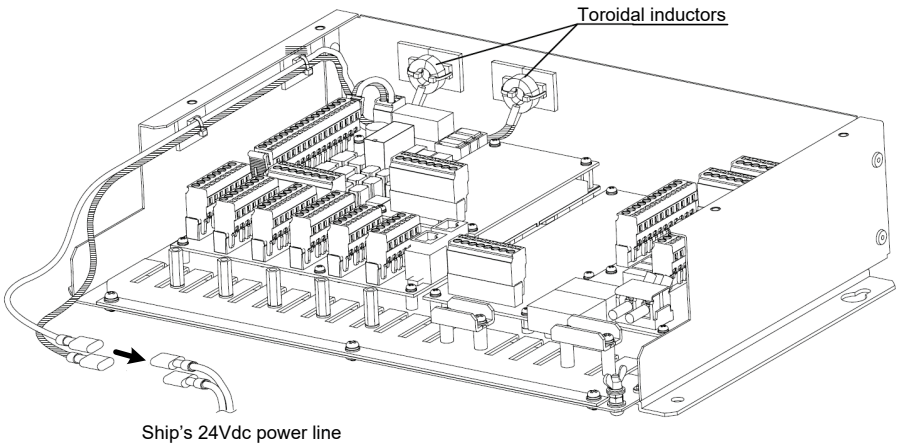
Among the two-piece terminal blocks on the internal circuits (SLC, AOC, GIF & RIF) in the JB, remove the terminal blocks together with wires if wires are being connected. The terminal blocks can be removed by pulling them out.



Step 4 Remove the internal wiring.

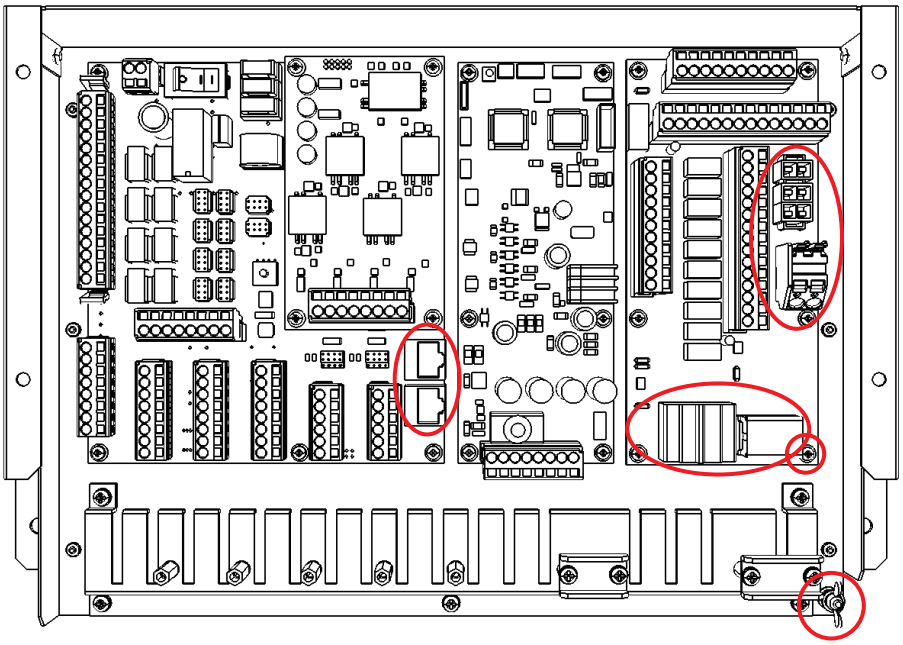
If an SLC has been installed, disconnect the Ethernet cables from the J8111 and J8112 connectors.

Furthermore, if the toroidal inductors have been installed, disconnect their crimp terminal with ship's 24Vdc power line.



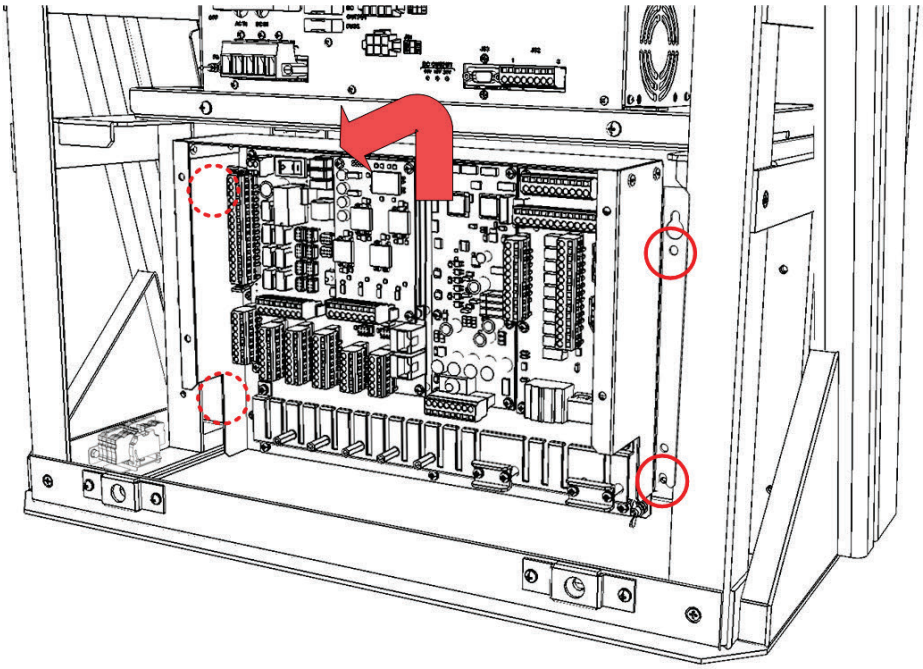
If an RIF has been installed, refer to the "4.3.8.7 Replacing the Radar interface circuit: RIF CQD-2273" and disconnect all the cables for interconnection that are being connected to the RIF.

Remove the wing screw at the right bottom corner of the JB and disconnect the ground cable.



Step 5 Remove the JB.

Among the screws (M5: 4 locations) that fasten the JB to the display unit mount kit, loosen the upper two screws, remove the lower two screws, and then take out the JB.



Step 6 Remove the Relay terminal block: CQD-2312

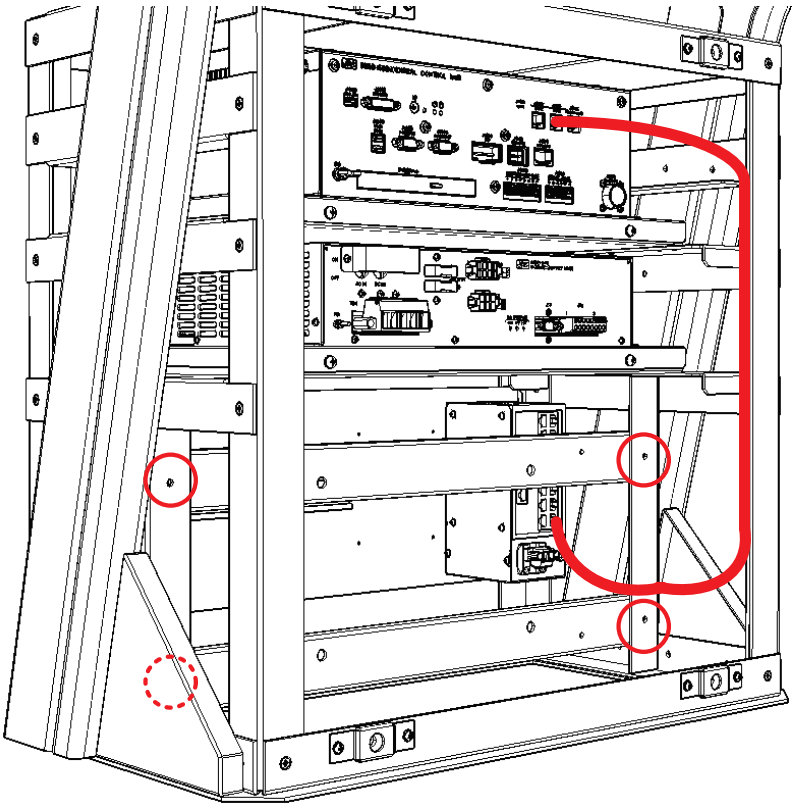
Disconnect all cables / wires from Relay terminal block by using a 3 mm width flat head screwdriver. Then, dismount the Relay terminal block from the DIN rail. For the details of dismounting, refer to the " Replacing the Relay Terminal Block: CQD-2312".

⚠ AC and DC power supplies have been connected to the Relay terminal block. Before replacement work, be sure to turn OFF the applicable power circuit breaker.
Not following this instruction will cause electric shock and/or malfunction.

⚠ When UPS has been connected to the Relay terminal block, be sure to set the "Bat-Select" rotary switch at "Service" on the UPS controller. Furthermore, be sure to eject the fuse of the UPS battery.
Not following this instruction will cause electric shock and/or malfunction.

Step 7 Remove the two metal planks.

Using a Phillips stubby screwdriver, remove the screws (M5: total of 4 locations) that fasten the two top and bottom metal planks and take out both of them.

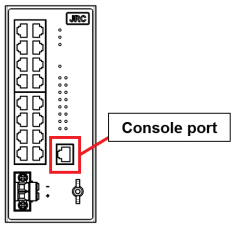


Step 8 Disconnect the sensor LAN switch unit cables.

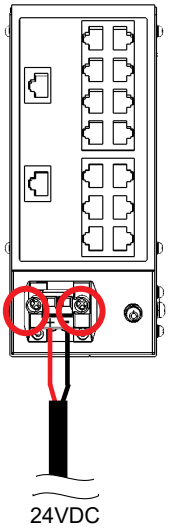
Disconnect all the LAN cables being connected to the sensor LAN switch unit.

⚠ Use the same LAN cable connection ports after replacement.

⚠ For NQA-2443A, do not use the console port on the Sensor LAN Switch Unit.



Remove the screw (M4: 2 locations) from the power supply port terminal block of the sensor LAN switch unit and take out the power cable together with the terminal block.



If a UPS is installed, remove the fuse of the UPS battery first, and then disconnect the power connector of the UPS. The power connector of the UPS can be removed using the principle of leverage, by inserting a 2 mm width flat head screwdriver into the groove at the root of the terminal block in the upper part of the input filter ME-NAX-NEF/QUINT20. For more information, refer to "4.3.11.1 Replacing the UPS Input Filter: ME-NAX-NEF/QUINT20."

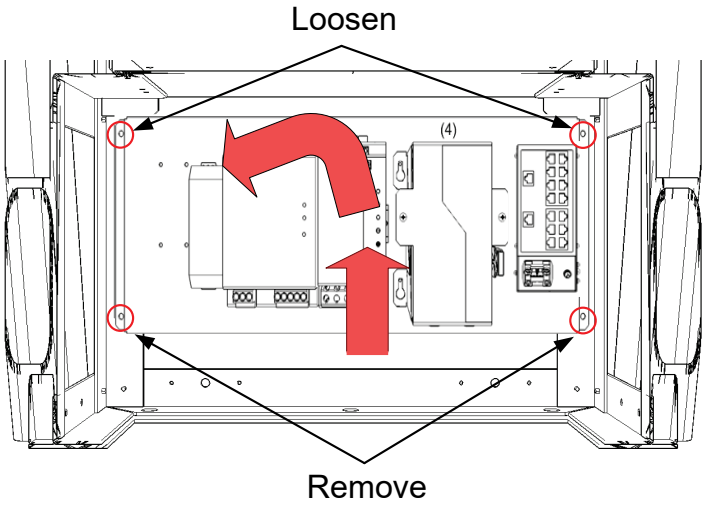
⚠WARNING
An AC power supply has been fed to UPS. Before replacement work, be sure to turn OFF the circuit breaker of the main power line. Not following this instruction will cause electric shock and/or malfunction.

Step 9 Remove the rear panel.

Among the screws (M5: 4 locations) that fasten the rear panel, loosen the upper two screws, remove the lower two screws, and then take out the rear panel together with the sensor LAN switch unit.

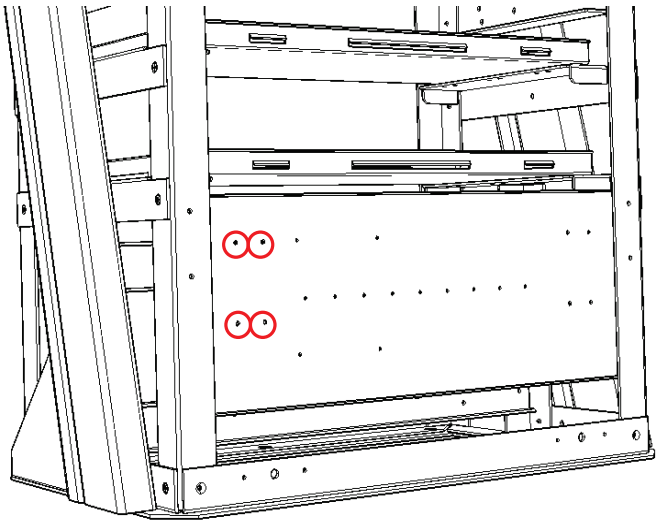
⚠ If a UPS is installed, the weight of the rear panel increases to 10 kg or more.

Be careful not to catch your hands while removing the rear panel.



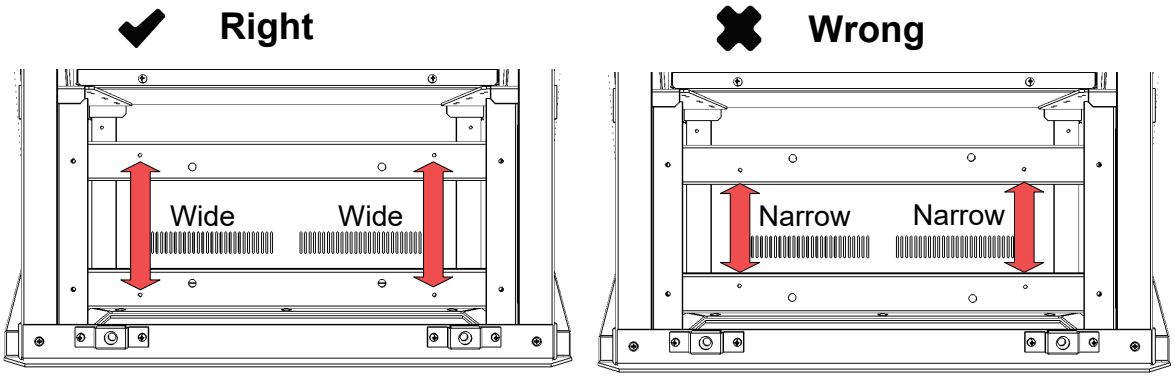
Step 10 Change the sensor LAN switch unit.

Remove the screws (M3: 4 locations on the back of the rear panel) that fasten the sensor LAN switch unit onto the rear panel and change the sensor LAN switch unit. After replacing the sensor LAN switch unit, assemble to the original condition by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.



⚠ Connect the Eithernet cables to the same connection ports after replacement.

When reinstalling the two metal planks, be careful with vertical direction.



To reconnect the cables and the two-piece terminal blocks, connect them to the same locations as before removing them.

Step 11 Check operation.

After the replacement of the sensor LAN switch unit is completed, turn ON the circuit breaker for the power supply of the display unit and check the operation as follows.

(1) Check that the values of the sensor being connected are displayed on the screen.

This completes sensor LAN switch unit replacement.

4.3.10.2 Replacing the Sensor LAN Switch Unit: NQA-2443 in 19 inch display unit mount kit

⚠WARNING

A DC power supply has been fed to the sensor LAN switch unit. Before replacement work, be sure to turn OFF the DC power circuit breaker. Not following this instruction will cause electric shock and/or malfunction.

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Flat head screwdriver	2 mm, 4 mm, 6 mm	
2	Phillips screwdriver	Size #2	
3	Phillips stubby screwdriver	Size #2	
4	Diagonal pliers	—	
5	Cable-tie *1	—	

*1 A number of cable-ties may be required.

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

⚠ To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand.

Step 1 Remove the JB from the display unit mount kit.

Remove the JB from the display unit mount kit. For more information about the JB removal procedure, refer to "4.3.10.1 Replacing the Sensor LAN Switch Unit: NQA-2443."

Step 2 Remove the Relay terminal block: CQD-2312

Disconnect all cables / wires from Relay terminal block by using a 3 mm width flat head screwdriver. Then, dismount the Relay terminal block from the DIN rail. For the details of dismounting, refer to the " Replacing the Relay Terminal Block: CQD-2312".

⚠ AC and DC power supplies have been connected to the Relay terminal block. Before replacement work, be sure to turn OFF the applicable power circuit breaker.
Not following this instruction will cause electric shock and/or malfunction.

⚠ When UPS has been connected to the Relay terminal block, be sure to set the "Bat-Select" rotary switch at "Service" on the UPS controller. Furthermore, be sure to eject the fuse of the UPS battery.
Not following this instruction will cause electric shock and/or malfunction.

Step 3 Remove the two metal planks.

Remove the screws (M5: total of 4 locations) that fasten the two top and bottom metal planks and take out both of them. For more information, refer to "4.3.10.1 Replacing the Sensor LAN Switch Unit: NQA-2443."

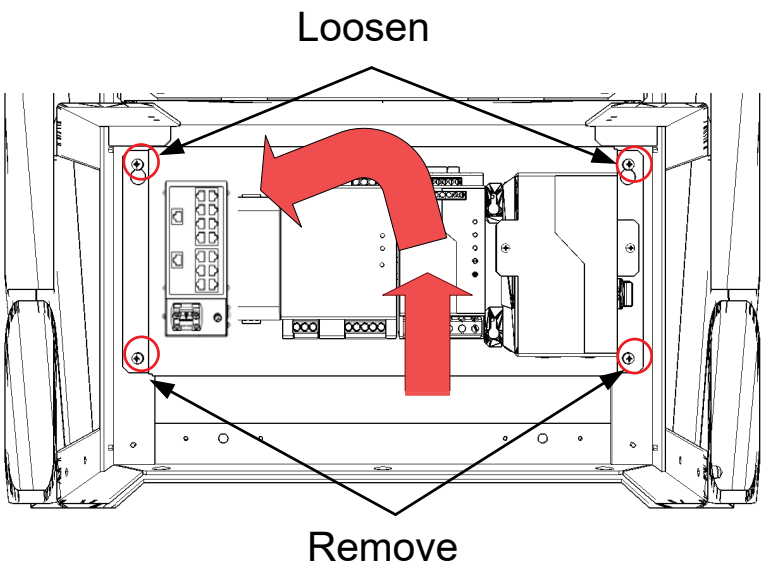
Step 4 Disconnect the sensor LAN switch unit cables and the UPS power supply cables.

Disconnect the sensor LAN switch unit cables. If a UPS is installed, remove the fuse of the UPS first, and then take out the power line together with the terminal block. For more information, refer to "4.3.10.1 Replacing the Sensor LAN Switch Unit: NQA-2443."

Step 5 Remove the rear panel.

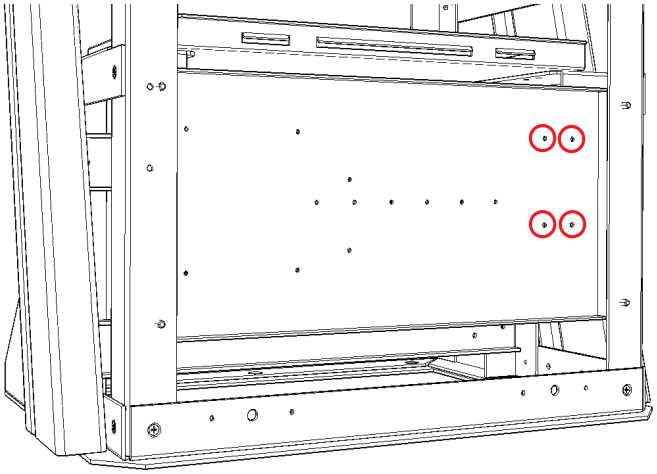
Among the screws (M5: 4 locations) that fasten the rear panel, loosen the upper two screws, remove the lower two screws, and then take out the rear panel together with the sensor LAN switch unit.

⚠ If a UPS is installed, the weight of the rear panel increases to 10 kg or more.
Be careful not to catch your hands while removing the rear panel.



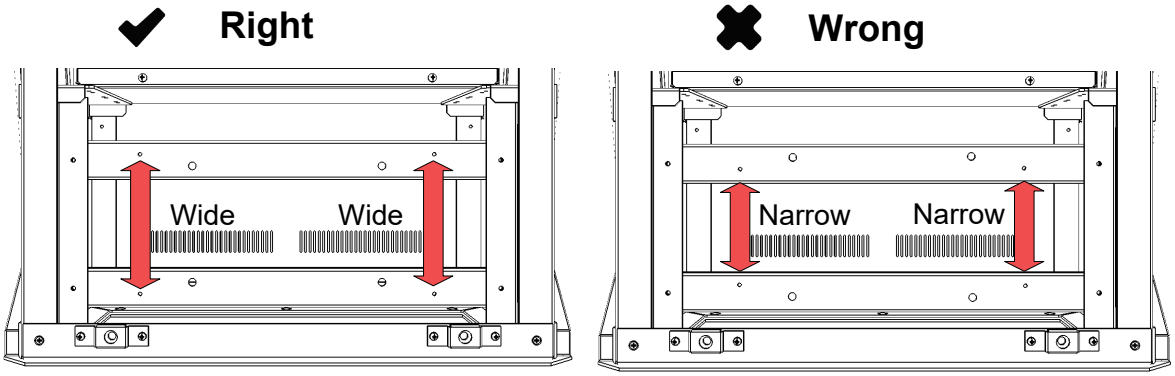
Step 6 Change the sensor LAN switch unit.

Remove the screws (M3: 4 locations on the back of the rear panel) that fasten the sensor LAN switch unit onto the rear panel and change the sensor LAN switch unit. After replacing the sensor LAN switch unit, assemble to the original condition by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.



⚠ Connect the LAN cables to the same connection ports after replacement.

⚠ When reinstalling the two metal planks, be careful with vertical direction.



⚠ To reconnect the cables and the two-piece terminal blocks, connect them to the same locations as before removing them.

Step 7 Check operation.

After the replacement of the sensor LAN switch unit is completed, turn ON the circuit breaker for the power supply of the display unit and check the operation as follows.

(1) Check that the values of the sensor being connected are displayed on the screen.

This completes sensor LAN switch unit replacement.

4.3.11 Replacing the UPS

The UPS consists of the following four devices.

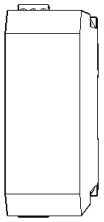
Input filter : ME-NAX-NEF/QUINT20

AC-DC converter : QUINT-PS/1AC/24DC/20

UPS controller : QUINT-DC-UPS/24DC/20 or QUINT-UPS/24DC/24DC/20

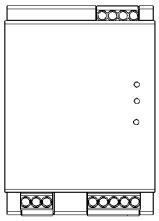
Battery : QUINT-BAT/24DC/3.4AH

(1)



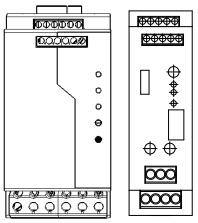
ME-MAX-NEF/QUINT20

(2)



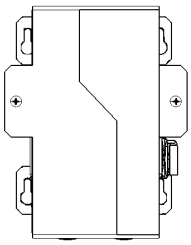
QUINT-PS/ 1AC/24DC/20

(3)

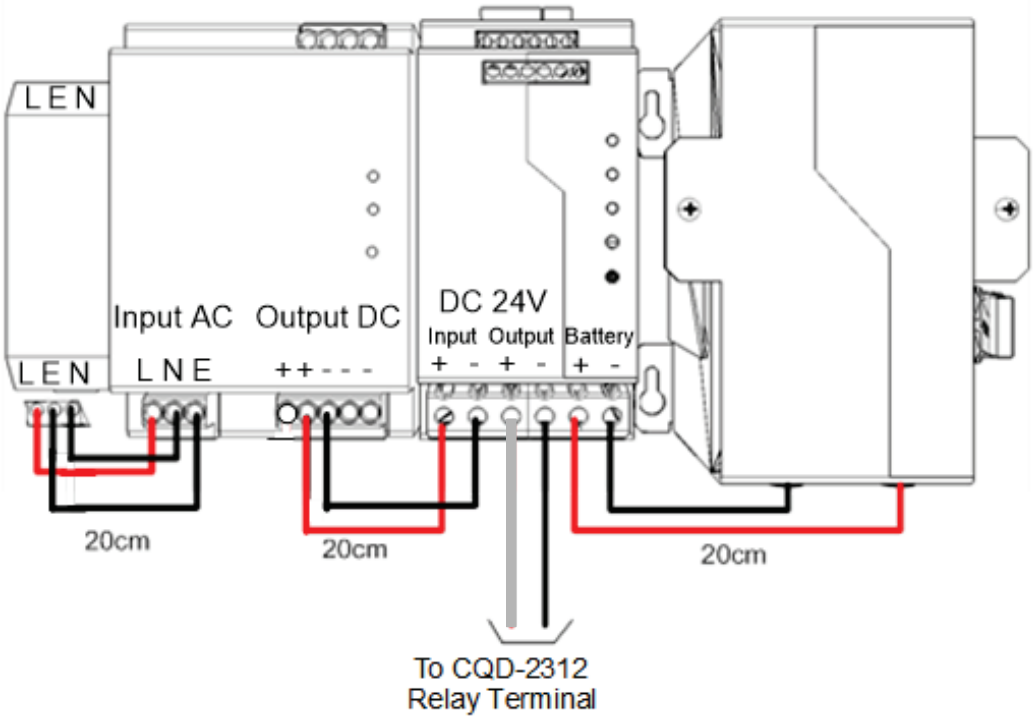


QUINT-DC-UPS/24DC/20
or
QUINT-UPS/24DC/24DC/20

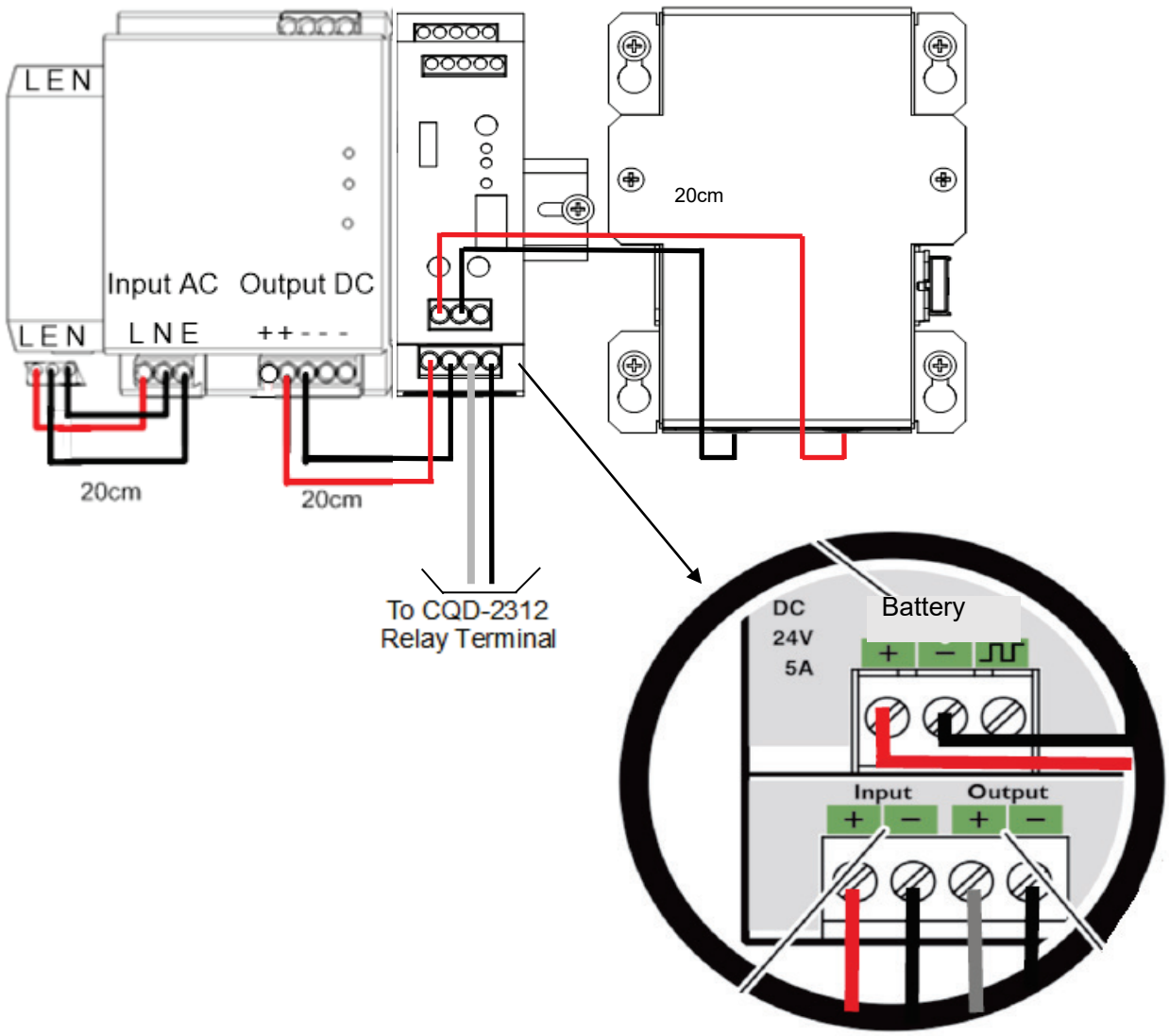
(4)



QUINT-BAT/24DC/ 3.4AH



QUINT-DC-UPS/24DC/20 in case



QUINT-UPS/24DC/24DC/20 in case

4.3.11.1 Replacing the UPS Input Filter: ME-NAX-NEF/QUINT20

⚠WARNING	
❗	An AC power supply has been fed to UPS. Before replacement work, be sure to turn OFF the circuit breaker of the main power line. Not following this instruction will cause electric shock and/or malfunction.
❗	Before starting UPS replacement work, be sure to remove the fuse of the UPS battery. Not following this instruction will cause electric shock and/or malfunction.

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Flat head screwdriver	2 mm, 4 mm, 6 mm	
2	Phillips screwdriver	Size #2	
3	Phillips stubby screwdriver	Size #2	
4	Diagonal pliers	—	
5	Cable-tie *1	—	

*1 A number of cable-ties may be required.

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

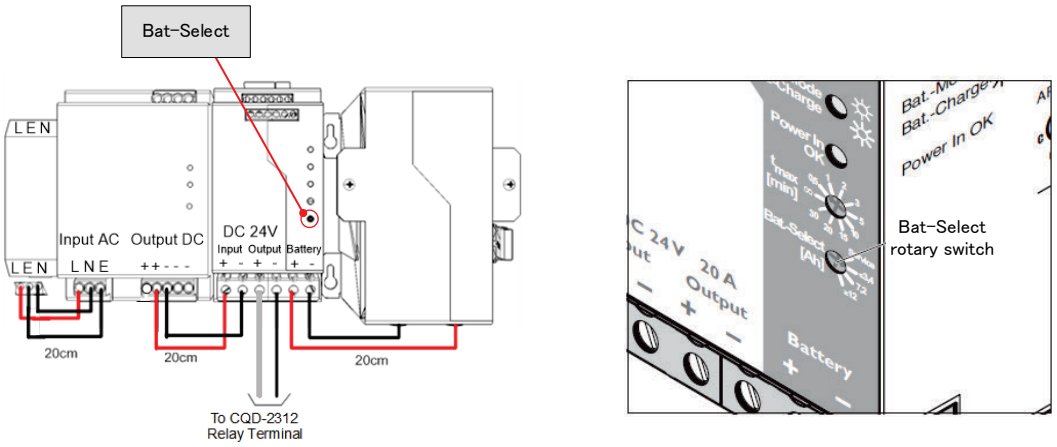
⚠ To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand.

Step 1 Remove the JB from the display unit mount kit.

Remove the JB from the display unit mount kit. For more information about the JB removal procedure, refer to "4.3.10.1 Replacing the Sensor LAN Switch Unit: NQA-2443."

Step 2 Set "Bat-Select" of the UPS controller QUINT-DC-UPS/24DC/20 at "Service."

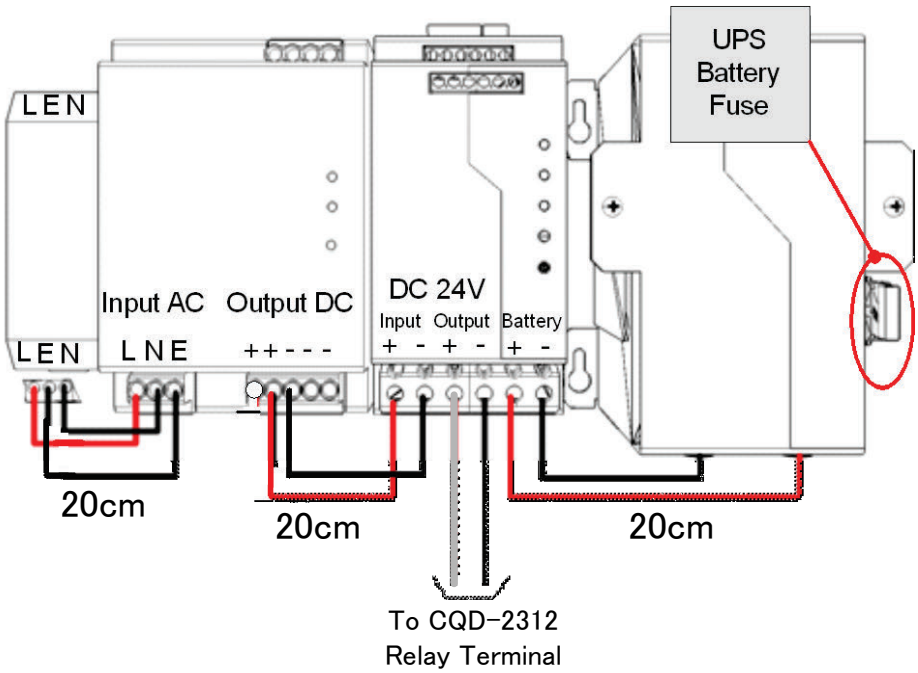
Set the "Bat-Select" rotary switch of the UPS controller at "Service."



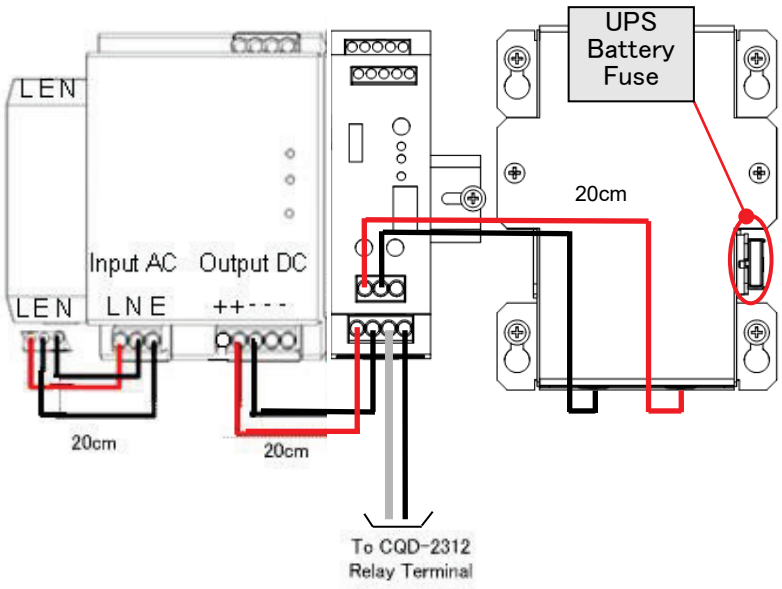
For QUINT-UPS/24DC/24DC/20, there is no need to switch settings.

Step 3 Remove the blade fuse of the UPS battery QUINT-BAT/24DC/3.4AH.

Remove the fuse of the UPS battery. After removing the fuse, leave it for at least 5 min until the electricity charged in the internal capacitor is discharged.



QUINT-DC-UPS/24DC/20 in case



QUINT-UPS/24DC/24DC/20 in case

Step 4 Remove the Relay terminal block: CQD-2312

Disconnect all cables / wires from Relay terminal block by using a 3 mm width flat head screwdriver. Then, dismount the Relay terminal block from the DIN rail. For the details of dismounting, refer to the " Replacing the Relay Terminal Block: CQD-2312".

⚠ AC and DC power supplies have been connected to the Relay terminal block. Before replacement work, be sure to turn OFF the applicable power circuit breaker.
Not following this instruction will cause electric shock and/or malfunction.

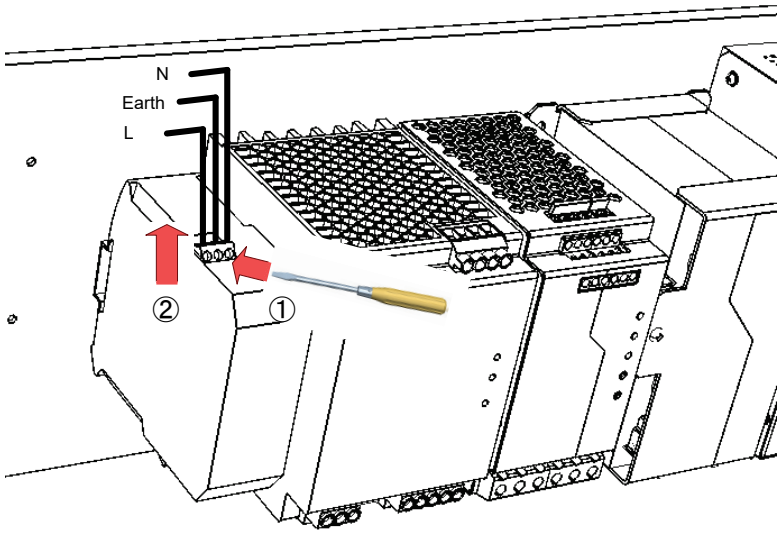
Step 5 Remove the two metal planks.

Remove the screws (M5: total of 4 locations) that fasten the two top and bottom metal planks and take out both of them. For more information, refer to "4.3.10.1 Replacing the Sensor LAN Switch Unit: NQA-2443."

Step 6 Remove the power wiring of the UPS.

Disconnect the power connector of the UPS. The power connector of the UPS can be removed using the principle of leverage, by inserting a 2 mm width flat head screwdriver into the groove at the root of the terminal block in the upper part of the input filter ME-NAX-NEF/QUINT20.

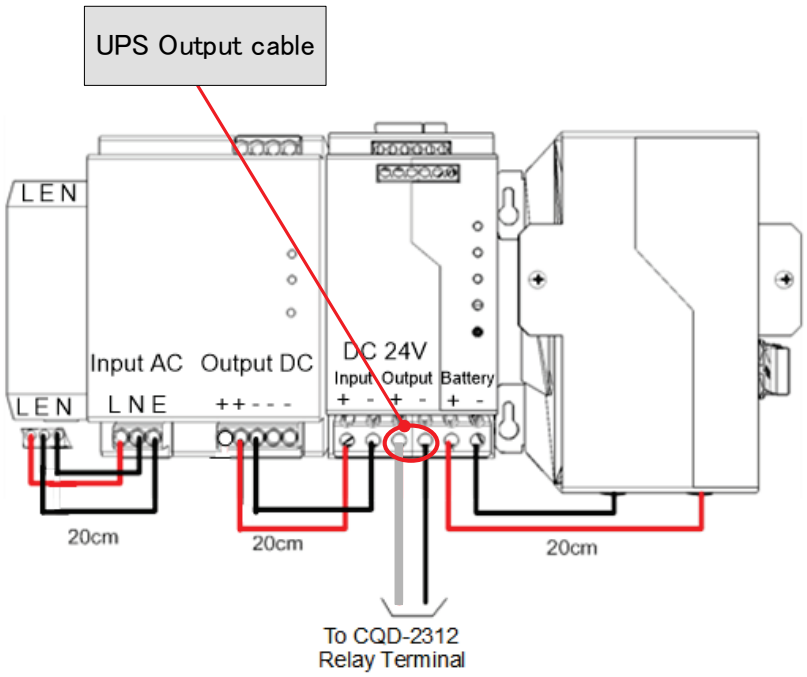
⚠ An AC power supply is connected to the UPS. Before starting replacement work, turn OFF the circuit breaker of the AC power supply.



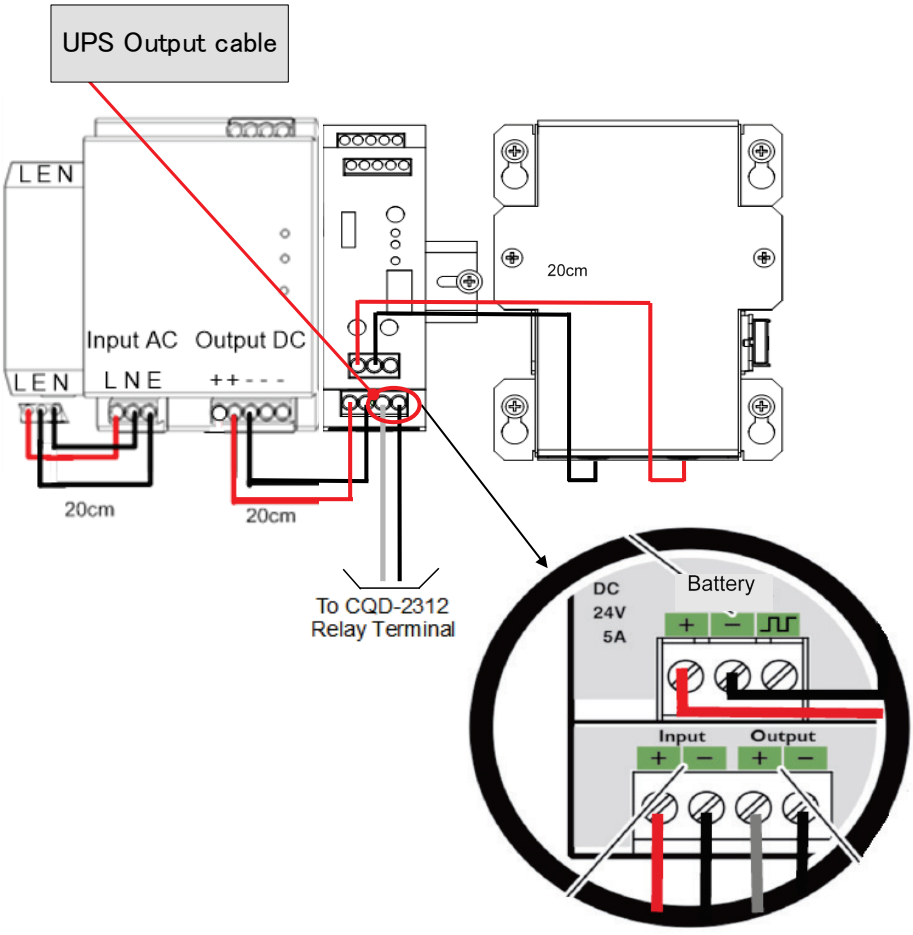
If a sensor LAN switch unit is installed, disconnect the wiring of the sensor LAN switch unit. For more information, refer to "4.3.10.1 Replacing the Sensor LAN Switch Unit: NQA-2443."

Step 7 Remove the UPS output cables.

Using a 4 mm width flat head screwdriver, disconnect the output cables at the bottom of the UPS controller. The output cables are fastened using a European-style terminal block.



QUINT-DC-UPS/24DC/20in case



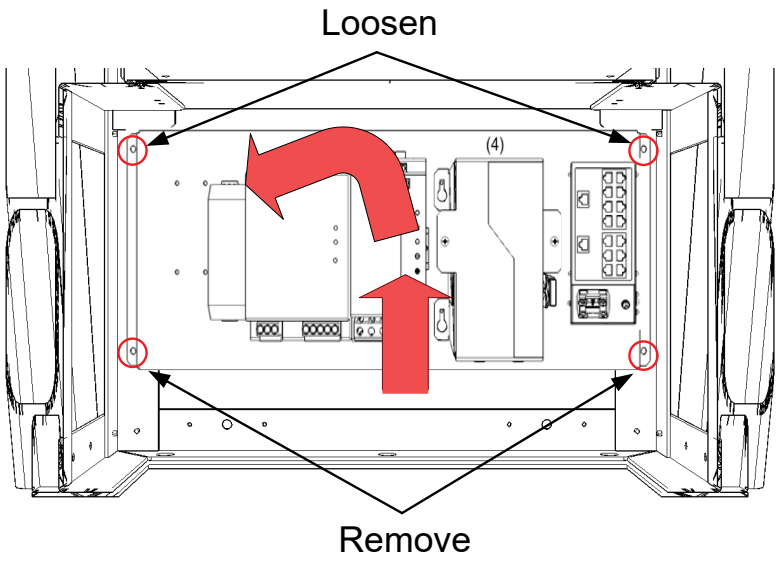
QUINT-UPS/24DC/24DC/20 in case

Step 8 Remove the rear panel.

Among the screws (M5: 4 locations) that fasten the rear panel, loosen the upper two screws, remove the lower two screws, and then take out the rear panel.

⚠ If a UPS is installed, the weight of the rear panel increases to 10 kg or more.

Be careful not to catch your hands while removing the rear panel.



⚠CAUTION

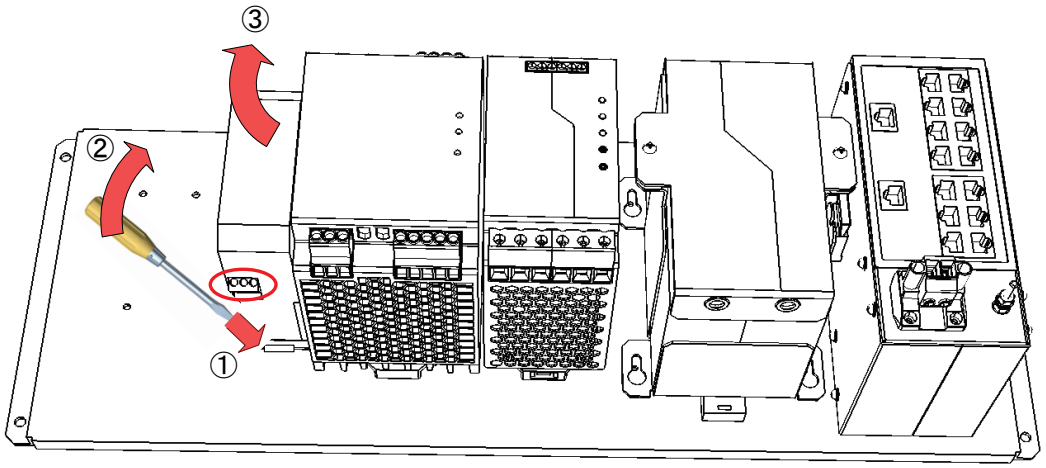
Before conducting Unit replacement work, always be sure that every cable-tie that fastens the cable has been removed.

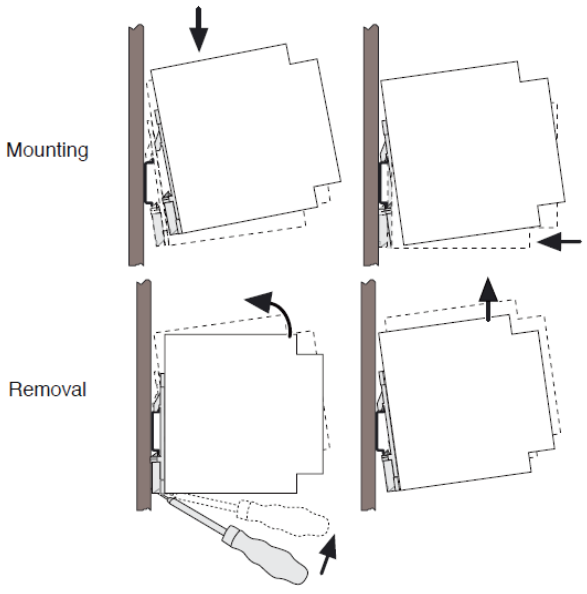
Replacement work without the above may lead Unit/cable breakage.

Step 9 Change the USP Input Filter: ME-NAX-NEF/QUINT20

Loosen the European-style terminal blocks in the lower part of the UPS input filter ME-NAX-NEF/QUINT20 and disconnect the cables.

The UPS input filter is fastened to the DIN rail. The UPS input filter can be removed from the DIN rail using the principle of leverage, by inserting a 6 mm width flat head screwdriver into the groove of the metal fixture in the lower part of the UPS input filter.





Step 10 Put back the rear panel and check for LED lighting.

After replacing the UPS input filter, assemble to the original condition by repeating the same procedure in the reverse order. Put back the wiring and perform setting in the following sequence.

(i) UPS output cable

(ii) UPS power cable

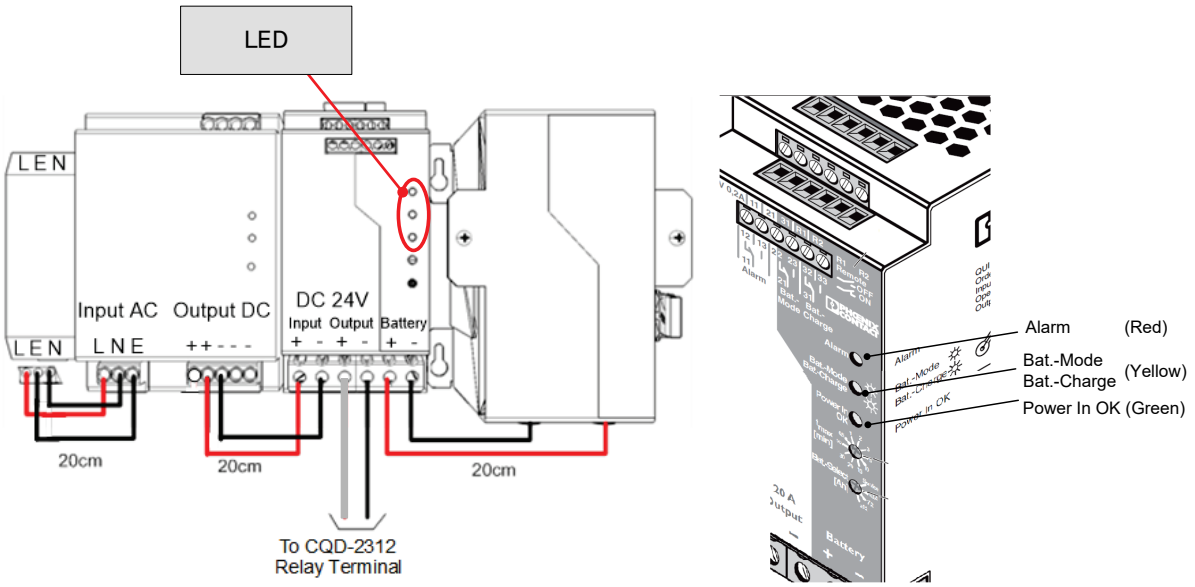
(iii) UPS battery blade fuse

(iv) Setting "Bat-Select" to "3.4" on the UPS controller

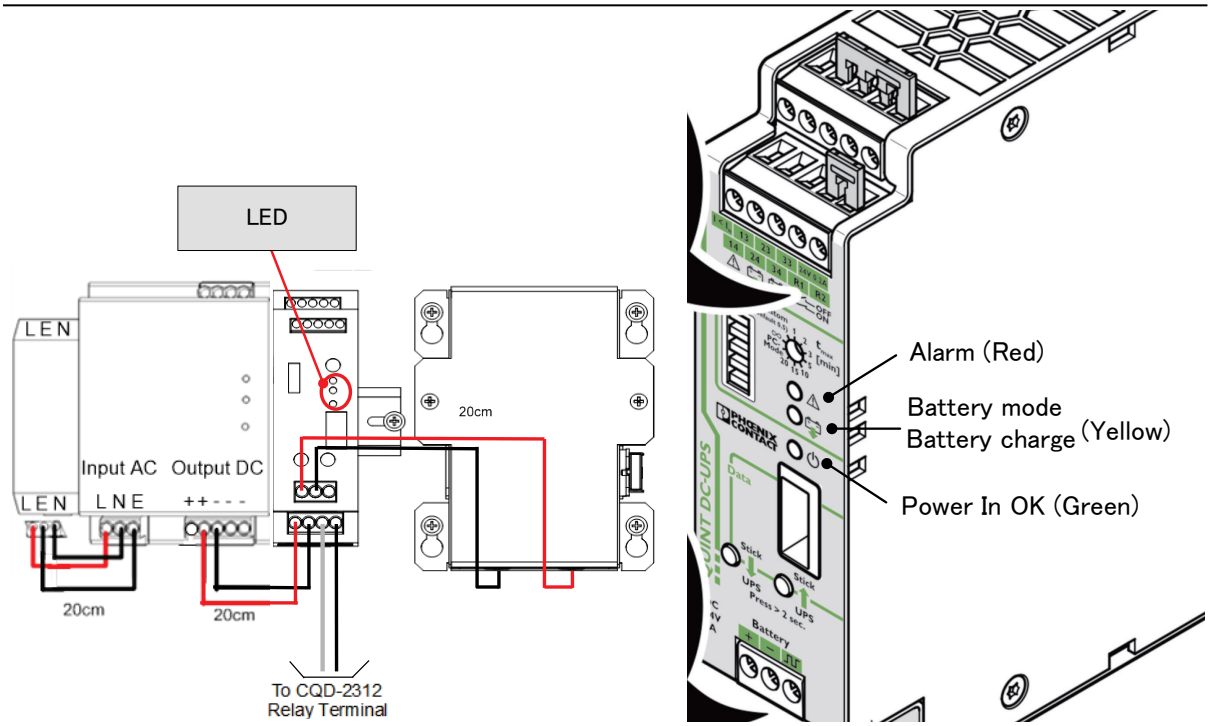
⚠ Make sure that the ground cable of the European-style terminal block in the upper part of the input filter is connected with the ground of the ship.

While maintaining the OFF state of the circuit breaker for the power supply of the display unit, turn ON the circuit breaker of the main power line and check that the LEDs of the UPS controller turn ON/OFF as follows.

LED	Color	ON/OFF Status
Alerm	Red	OFF
Bat.-Mode Bat.-Charge	Yellow	Flashing or OFF
Power In OK	Green	ON



QUINT-DC-UPS/24DC/20 in case

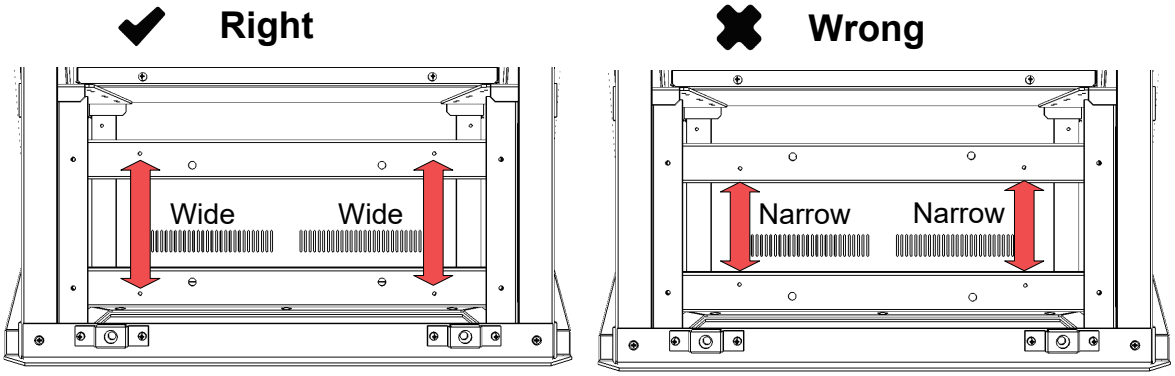


QUINT-UPS/24DC/24DC/20 in case

Step 11 Put back all other cables and covers.

Turn OFF the circuit breaker of the main power line again. Put all the remaining cables and covers back in place by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.

⚠ When reinstalling the two metal planks, be careful with vertical direction.



⚠ To reconnect the cables and the two-piece terminal blocks, connect them to the same locations as before removing them.

This completes the replacement of the UPS input filter.

4.3.11.2 Replacing the UPS AC-DC Converter: QUINT-PS/1AC/24DC/20

⚠WARNING	
❗	An AC power supply has been fed to UPS. Before replacement work, be sure to turn OFF the circuit breaker of the main power line. Not following this instruction will cause electric shock and/or malfunction.
❗	Before starting UPS replacement work, be sure to remove the fuse of the UPS battery. Not following this instruction will cause electric shock and/or malfunction.

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Flat head screwdriver	2 mm, 4 mm, 6 mm	
2	Phillips screwdriver	Size #2	
3	Phillips stubby screwdriver	Size #2	
4	Diagonal pliers	—	
5	Cable-tie *1	—	

*1 A number of cable-ties may be required.

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

⚠ To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand.

Step 1 Remove the JB from the display unit mount kit.

Remove the JB from the display unit mount kit. For more information about the JB removal procedure, refer to "4.3.10.1 Replacing the Sensor LAN Switch Unit: NQA-2443."

Step 2 Set "Bat-Select" of the UPS controller QUINT-DC-UPS/24DC/20 at "Service."

Set the "Bat-Select" rotary switch of the UPS controller at "Service." For more information, refer to "4.3.11.1 Replacing the UPS Input Filter: ME-NAX-NEF/QUINT20." For QUINT-UPS/24DC/24DC/20, there is no need to switch settings.

Step 3 Remove the blade fuse of the UPS battery QUINT-BAT/24DC/3.4AH.

Remove the fuse of the UPS battery. After removing the fuse, leave it for at least 5 min until the electricity charged in the internal capacitor is discharged. For more information, refer to "4.3.11.1 Replacing the UPS Input Filter: ME-NAX-NEF/QUINT20."

Step 4 Remove the Relay terminal block: CQD-2312

Disconnect all cables / wires from Relay terminal block by using a 3 mm width flat head screwdriver. Then, dismount the Relay terminal block from the DIN rail. For the details of dismounting, refer to the " Replacing the Relay Terminal Block: CQD-2312".

⚠ AC and DC power supplies have been connected to the Relay terminal block. Before replacement work, be sure to turn OFF the applicable power circuit breaker.
Not following this instruction will cause electric shock and/or malfunction.

Step 5 Remove the two metal planks.

Remove the screws (M5: total of 4 locations) that fasten the two top and bottom metal planks and take out both of them. For more information, refer to "4.3.10.1 Replacing the Sensor LAN Switch Unit: NQA-2443."

Step 6 Remove the power wiring of the UPS.

Disconnect the power connector of the UPS. The power connector of the UPS can be removed using the principle of leverage, by inserting a 2 mm width flat head screwdriver into the groove at the root of the terminal block in the upper part of the input filter ME-NAX-NEF/QUINT20. For more information, refer to "4.3.11.1 Replacing the UPS Input Filter: ME-NAX-NEF/QUINT20."

⚠ An AC power supply has been connected to the UPS. Before starting replacement work, turn OFF the circuit breaker of the AC power supply.

If a sensor LAN switch unit is installed, disconnect the wiring of the sensor LAN switch unit. For more information, refer to "4.3.10.1 Replacing the Sensor LAN Switch Unit: NQA-2443."

Step 7 Remove the UPS output cables.

Using a 4 mm width flat head screwdriver, disconnect the output cables at the bottom of the UPS controller. The output cables are fastened using an European-style terminal block. For more information, refer to "4.3.11.1 Replacing the UPS Input Filter: ME-NAX-NEF/QUINT20."

Step 8 Remove the rear panel.

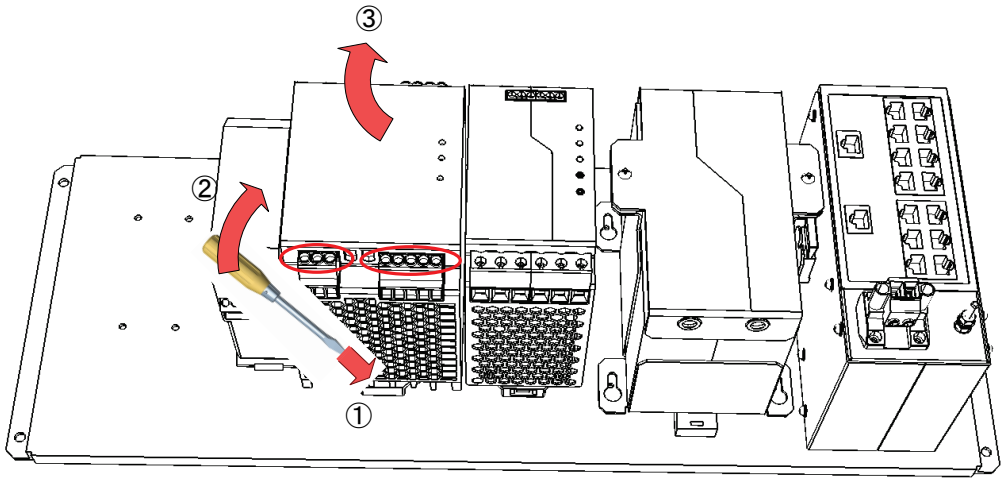
Remove the screws (M5: 4 locations) that fasten the rear panel and take out the rear panel together with the UPS. For more information, refer to "4.3.11.1 Replacing the UPS Input Filter: ME-NAX-NEF/QUINT20."

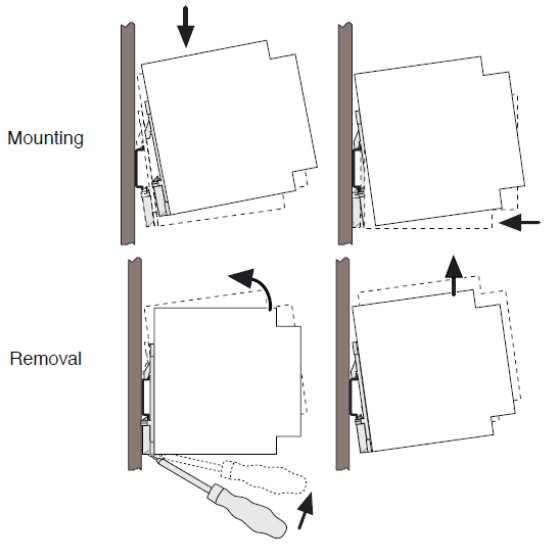
⚠ If a UPS has been installed, the weight of the rear panel increases to 10 kg or more.
Be careful not to catch your hands while removing the rear panel.

Step 9 Change the UPS AC-DC converter: QUINT-PS/1AC/24DC/20.

Loosen the European-style terminal blocks in the lower part of the UPS AC-DC converter QUINT-PS/1AC/24DC/20 and disconnect the cables.

After disconnecting the cables, remove the UPS AC-DC converter. The UPS AC-DC converter is fastened to the DIN rail. The UPS AC-DC converter can be removed from the DIN rail using the principle of leverage, by inserting a 6 mm width flat head screwdriver into the groove of the metal fixture in the lower part of the UPS AC-DC converter.





Step 10 Put back the rear panel and check for LED lighting.

After replacing the UPS input filter, assemble to the original condition by repeating the same procedure in the reverse order. Put back the wiring and perform setting in the following sequence.

(i) UPS output cable

(ii) Ups power cable

(iii) UPS battery blade fuse

(iv) Set the "Bat-Select" rotary switch of the UPS controller at "3.4."

While maintaining the OFF state of the circuit breaker for the power supply of the display unit, turn ON the circuit breaker of the main power line and check that the LEDs of the UPS controller turn ON/OFF as follows. For more information, refer to "4.3.11.1 Replacing the UPS Input Filter: ME-NAX-NEF/QUINT20."

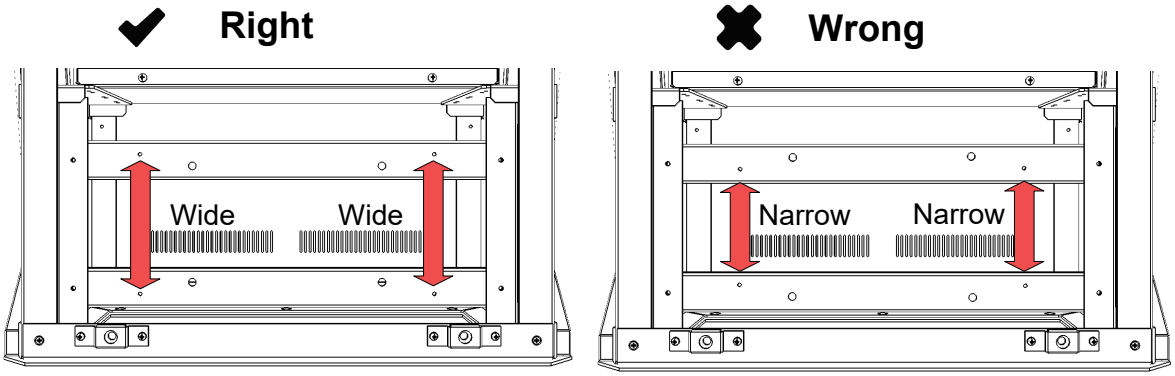
LED	Color	ON/OFF Status
Alerm	Red	OFF
Bat.-Mode Bat.-Charge	Yellow	Flashing or OFF
Power In OK	Green	ON

⚠ Make sure that the ground cable of the European-style terminal block in the upper part of the input filter is connected with the ground of the ship.

Step 11 Put back all other cables and covers.

Turn OFF the circuit breaker of the main power line again. Put all the remaining cables and covers back in place by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.

⚠ When reinstalling the two metal planks, be careful with vertical direction.



To reconnect the cables and the two-piece terminal blocks, connect them to the same locations as before removing them.

This completes the replacement of the UPS AC-DC conveter.

4.3.11.3 Replacing the UPS Controller: QUINT-DC-UPS/24DC/20

⚠WARNING	
❗	An AC power supply has fed to the UPS. Before replacement work, be sure to turn OFF the circuit breaker of the main power line. Not following this instruction will cause electric shock and/or malfunction.
❗	Before starting UPS replacement work, be sure to remove the fuse of the UPS battery. Not following this instruction will cause electric shock and/or malfunction.
❗	Before replacing the UPS controller, be sure to set the "Bat-Select" rotary switch of the UPS controller at "Service." Not following this instruction will cause electric shock and/or malfunction.

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Flat head screwdriver	2 mm, 4 mm, 6 mm	
2	Phillips screwdriver	Size #2	
3	Phillips stubby screwdriver	Size #2	

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

⚠ An AC power supply has been connected to the UPS. Before starting replacement work, turn OFF the circuit breaker of the main power supply.

Step 1 Remove the JB from the display unit mount kit.

Remove the JB from the display unit mount kit. For more information about the JB removal procedure, refer to "4.3.10.1 Replacing the Sensor LAN Switch Unit: NQA-2443."

Step 2 Set "Bat-Select" of the UPS controller QUINT-DC-UPS/24DC/20 at "Service."

Set the "Bat-Select" rotary switch of the UPS controller at "Service." For more information, refer to "4.3.11.1 Replacing the UPS Input Filter: ME-NAX-NEF/QUINT20." For QUINT-UPS/24DC/24DC/20, there is no need to switch settings.

Step 3 Remove the blade fuse of the UPS battery QUINT-BAT/24DC/3.4AH.

Remove the fuse of the UPS battery. After removing the fuse, leave it for at least 5 min until the electricity charged in the internal capacitor is discharged. For more information, refer to "4.3.11.1 Replacing the UPS Input Filter: ME-NAX-NEF/QUINT20."

Step 4 Remove the Relay terminal block: CQD-2312

Disconnect all cables / wires from Relay terminal block by using a 3 mm width flat head screwdriver. Then, dismount the Relay terminal block from the DIN rail. For the details of dismounting, refer to the " Replacing the Relay Terminal Block: CQD-2312".

⚠ AC and DC power supplies have been connected to the Relay terminal block. Before replacement work, be sure to turn OFF the applicable power circuit breaker.
Not following this instruction will cause electric shock and/or malfunction.

Step 5 Remove the two metal planks.

Remove the screws (M5: total of 4 locations) that fasten the two top and bottom metal planks and take out both of them. For more information, refer to "4.3.10.1 Replacing the Sensor LAN Switch Unit: NQA-2443."

Step 6 Remove the power wiring of the UPS.

Disconnect the power connector of the UPS. The power connector of the UPS can be removed using the principle of leverage, by inserting a 2 mm width flat head screwdriver into the groove at the root of the terminal block in the upper part of the input filter ME-NAX-NEF/QUINT20. For more information, refer to "4.3.11.1 Replacing the UPS Input Filter: ME-NAX-NEF/QUINT20."

⚠ An AC power supply has been connected to the UPS. Before starting replacement work, turn OFF the circuit breaker of the main power supply.

If a sensor LAN switch unit is installed, disconnect the wiring of the sensor LAN switch unit. For more information, refer to "4.3.10.1 Replacing the Sensor LAN Switch Unit: NQA-2443."

Step 7 Remove the UPS output cables.

Using a 4 mm width flat head screwdriver, disconnect the output cables at the bottom of the UPS controller. The output cables are fastened using a European-style terminal block. For more information, refer to "4.3.11.1 Replacing the UPS Input Filter: ME-NAX-NEF/QUINT20."

Step 8 Remove the rear panel.

Remove the screws (M5: 4 locations) that fasten the rear panel and take out the rear panel together with the UPS. For more information, refer to "4.3.11.1 Replacing the UPS Input Filter: ME-NAX-NEF/QUINT20."

⚠ If a UPS has been installed, the weight of the rear panel increases to 10 kg or more.

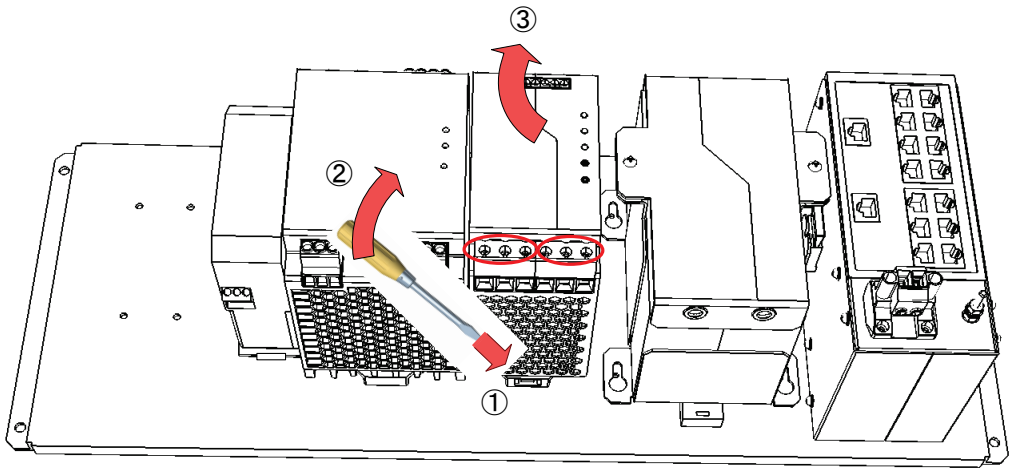
Be careful not to catch your hands while removing the rear panel.

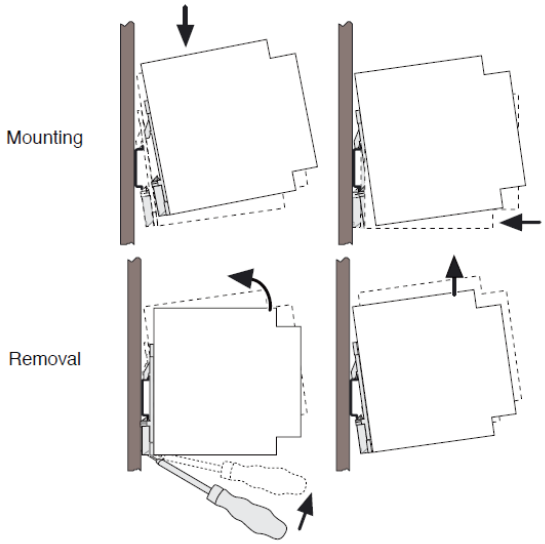
Step 9 Change the UPS controller: QUINT-DC-UPS/24DC/20.

Loosen the European-style terminal blocks in the lower part of the UPS controller QUINT-DC-UPS/24DC/20 and disconnect the cables.

After disconnecting the cables, change the UPS controller. The UPS controller is fastened to the DIN rail. The UPS controller can be removed from the DIN rail using the principle of leverage, by inserting a 6mm width flat head screwdriver into the groove of the metal fixture in the lower part of the UPS controller.

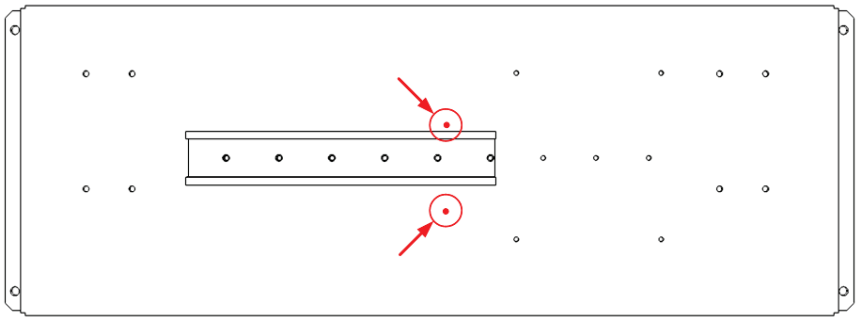
When installing a new UPS controller, be sure to set the "Bat-Select" rotary switch of the UPS controller at "Service."





⚠ When removing the cables of the UPS battery, be sure to leave the battery for at least 5 min after removing the fuse. Not doing so may cause electric shock.

⚠ Remove two screws shown in figure below if they interfere with attachment of the UPS controller.



Step 10 Put back the rear panel and check for LED lighting.

After replacing the UPS input filter, assemble to the original condition by repeating the same procedure in the reverse order. Put back the wiring and perform setting in the following sequence.

(i) UPS output cable
(ii) UPS power cable
(iii) UPS battery blade fuse
(iv) Set the "Bat-Select" rotary switch of the new UPS controller at "3.4."

While maintaining the OFF state of the circuit breaker for the power supply of the display unit, turn ON the circuit breaker of the main power line and check that the LEDs of the UPS controller turn ON/OFF as follows. For more information, refer to "4.3.11.1 Replacing the UPS Input Filter: ME-NAX-NEF/QUINT20."

LED	Color	ON/OFF Status
Alerm	Red	OFF
Bat.-Mode Bat.-Charge	Yellow	Flashing or OFF
Power In OK	Green	ON

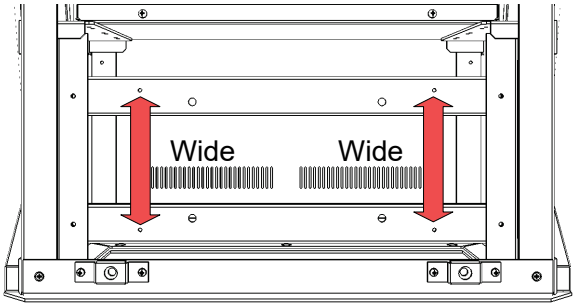
⚠ Make sure that the ground cable of the European-style terminal block in the upper part of the input filter is connected with the ground of the ship.

Step 11 Put back all other cables and covers.

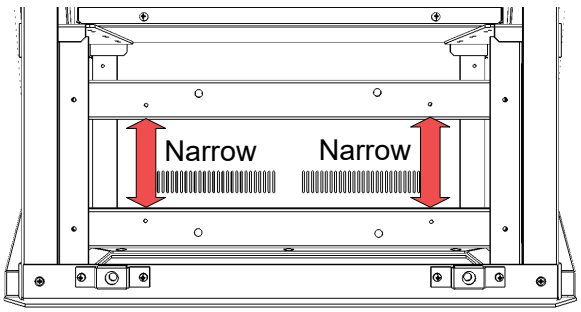
Turn OFF the circuit breaker of the main power line again. Put all the remaining cables and covers back in place by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.

⚠ When reinstalling the two metal planks, be careful with vertical direction.

✔ **Right**



✖ **Wrong**



⚠ To reconnect the cables and the two-piece terminal blocks, connect them to the same locations as before removing them.

This completes the replacement of the UPS controller.

4.3.11.4 Replacing the UPS Battery: QUINT-BAT/24DC/3.4AH

⚠ DANGER	
	Never handle the battery as stated below. Not following this instruction will cause liquid leak, heat generation, fire, explosion, damage, burn or other damage or injury. ● Short circuit between the positive and negative terminals ● Use other than designated ● Disassembly, modification and disposal ● Use beyond the expiration date
⚠WARNING	
	An AC power supply has fed to UPS. Before replacement work, be sure to turn OFF the circuit breaker of the main power line. Not following this instruction will cause electric shock and/or malfunction.
	Before starting UPS replacement work, be sure to remove the fuse of the UPS battery. Not following this instruction will cause electric shock and/or malfunction.
	Before replacing the UPS battery, be sure to set the "Bat-Select" rotary switch of the UPS controller at "Service." Not following this instruction will cause electric shock and/or malfunction.
⚠CAUTION	
	When disposing of used batteries, follow the regulations and/or rules of the local regulatory authority which has control over the location of disposal.

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No.	Name	Size	Appearance
1	Flat head screwdriver	2 mm, 4 mm, 6 mm	
2	Phillips screwdriver	Size #2	
3	Phillips stubby screwdriver	Size #2	

⚠ Before conducting replacement work, turn OFF the circuit breaker for the power supply of the display unit.

⚠ Do not lose the screws as they will be needed again.

Step 1 Remove the JB from the display unit mount kit.

Remove the JB from the display unit mount kit. For more information about the JB removal procedure, refer to "4.3.10.1 Replacing the Sensor LAN Switch Unit: NQA-2443."

Step 2 Set "Bat-Select" of the UPS controller QUINT-DC-UPS/24DC/20 at "Service."

Set the "Bat-Select" rotary switch of the UPS controller at "Service." For more information, refer to "4.3.11.1 Replacing the UPS Input Filter: ME-NAX-NEF/QUINT20." For QUINT-UPS/24DC/24DC/20, there is no need to switch settings.

Step 3 Remove the blade fuse of the UPS battery QUINT-BAT/24DC/3.4AH.

Remove the fuse of the UPS battery. After removing the fuse, leave it for at least 5 min until the electricity charged in the internal capacitor is discharged. For more information, refer to "4.3.11.1 Replacing the UPS Input Filter: ME-NAX-NEF/QUINT20."

Step 4 Remove the Relay terminal block: CQD-2312

Disconnect all cables / wires from Relay terminal block by using a 3 mm width flat head screwdriver. Then, dismount the Relay terminal block from the DIN rail. For the details of dismounting, refer to the " Replacing the Relay Terminal Block: CQD-2312".

⚠ AC and DC power supplies have been connected to the Relay terminal block. Before replacement work, be sure to turn OFF the applicable power circuit breaker.
Not following this instruction will cause electric shock and/or malfunction.

Step 5 Remove the two metal planks.

Remove the screws (M5: total of 4 locations) that fasten the two top and bottom metal planks and take out both of them. For more information, refer to "4.3.10.1 Replacing the Sensor LAN Switch Unit: NQA-2443."

Step 6 Remove the power wiring of the UPS.

Disconnect the power connector of the UPS. The power connector of the UPS can be removed using the principle of leverage, by inserting a 2 mm width flat head screwdriver into the groove at the root of the terminal block in the upper part of the input filter ME-NAX-NEF/QUINT20. For more information, refer to "4.3.11.1 Replacing the UPS Input Filter: ME-NAX-NEF/QUINT20."



An AC power supply has been fed to the UPS. Before starting replacement work, turn OFF the circuit breaker of the main power supply.

If a sensor LAN switch unit has been installed, disconnect the wiring of the sensor LAN switch unit. For more information, refer to "4.3.10.1 Replacing the Sensor LAN Switch Unit: NQA-2443."

Step 7 Remove the UPS output cables.

Using a 4 mm width flat head screwdriver, disconnect the output cables at the bottom of the UPS controller. The output cables are fastened using an European-style terminal block. For more information, refer to "4.3.11.1 Replacing the UPS Input Filter: ME-NAX-NEF/QUINT20."

Step 8 Remove the rear panel.

Remove the screws (M5: 4 locations) that fasten the rear panel and take out the rear panel together with the UPS. For more information, refer to "4.3.11.1 Replacing the UPS Input Filter: ME-NAX-NEF/QUINT20."



If a UPS has been installed, the weight of the rear panel increases to 10kg or more.

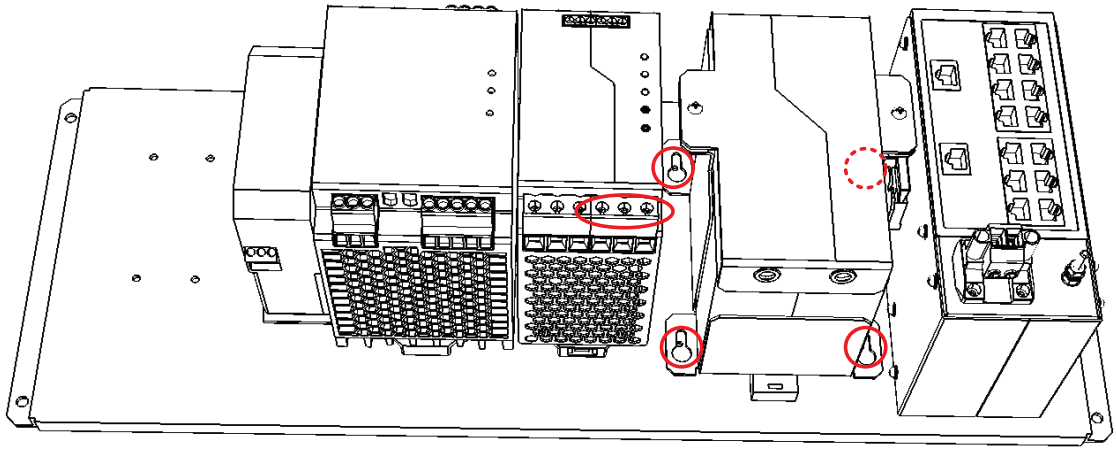
Be careful not to catch your hands while removing the rear panel.

Step 9 Change the UPS Battery: QUINT-BAT/24DC/3.4AH.

The UPS battery QUINT-BAT/24DC/3.4AH is connected with the UPS controller QUIT-DC-UPS/24DC/20. Loosen the European-style terminal block in the lower part of the UPS controller and disconnect the cables.

After removing the cables, remove the screws (M4: 4 locations) that fasten the UPS battery QUINT-DC-UPS/24DC/20.

Before installing a new UPS battery, be sure to remove the fuse of the UPS battery.



⚠ Before removing the cables of the UPS battery, leave it for at least 5 min after removing its fuse.
Not doing so may cause electric shock.

⚠ Be sure to remove the fuse of a new UPS battery before installing it.
Not doing so may cause electric shock.

Step 10 Put back the rear panel and check for LED lighting.

After replacing the UPS input filter, assemble to the original condition by repeating the same procedure in the reverse order. Put back the wiring and perform setting in the following sequence.

(i) UPS output cable
(ii) UPS power cable
(iii) UPS battery blade fuse
(iv) Set the "Bat-Select" rotary switch of the UPS controller at "3.4."

While maintaining the OFF state of the circuit breaker for the power supply of the display unit, turn ON the circuit breaker of the main power line and check that the LEDs of the UPS controller turn ON/OFF as follows. For more information, refer to "4.3.11.1 Replacing the UPS Input Filter: ME-NAX-NEF/QUINT20."

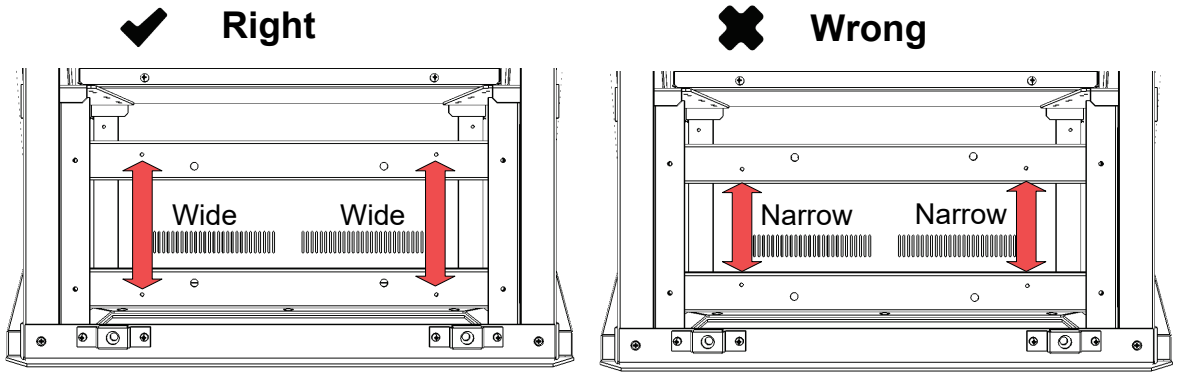
LED	Color	ON/OFF Status
Alerm	Red	OFF
Bat.-Mode Bat.-Charge	Yellow	Flashing or OFF
Power In OK	Green	ON

⚠ Make sure that the ground cable of the European-style terminal block in the upper part of the input filter is connected with the ground of the ship.

Step 11 Put back all other cables and covers.

Turn OFF the circuit breaker of the main power line again. Put all the remaining cables and covers back in place by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.

⚠ When reinstalling the two metal planks, be careful with vertical direction.



⚠ To reconnect the cables and the two-piece terminal blocks, connect them to the same locations as before removing them.

Step 12 Reset the usage time.

(1) Reset the usage time of the UPS. For the reset method, please refer to " 4.4.4.1 Clearing operation time of Workstation" in the Instruction Manual.

Step 13 Dispose of the used UPS battery.

When disposing of used batteries, follow the regulations and/or rules of the local regulatory authority which has control over the location of disposal.

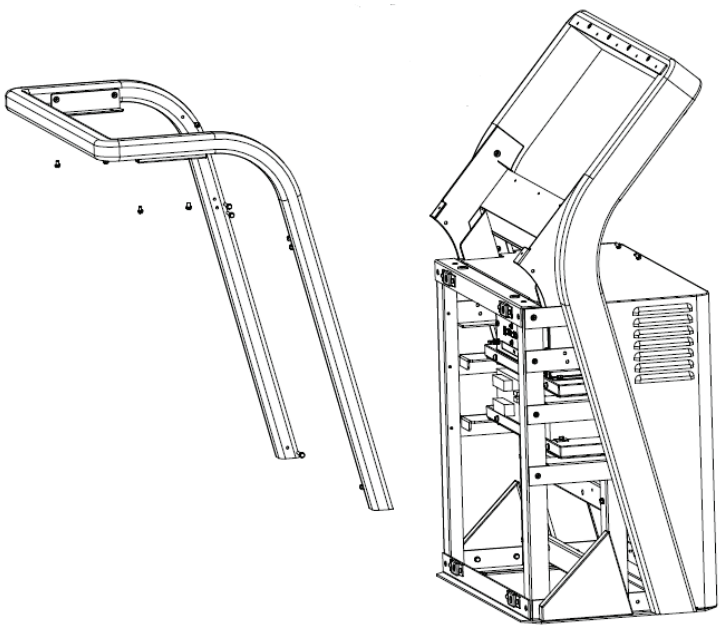
This completes the replacement of the UPS battery.

4.3.12 Detaching the front frame of the Display unit mount kit.

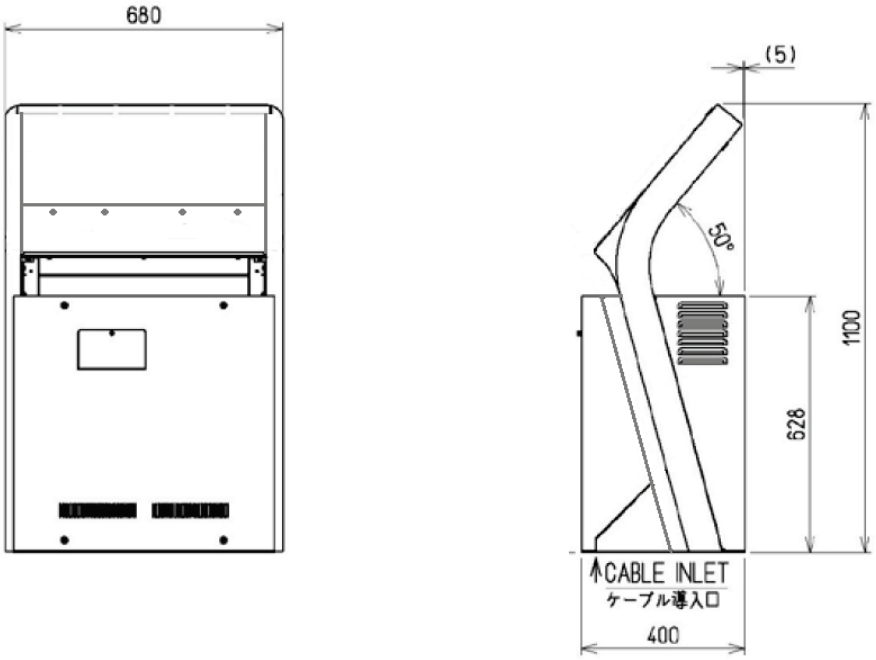
4.3.12.1 Precaution

⚠WARNING	
❗	Do not disassemble the front frame except under unavoidable circumstances for the sake of the ship's structure. It may lead to unexpected accidents.
❗	Be sure to do it with at least two persons. If only one person does this work, he/she may lead to unexpected accidents.

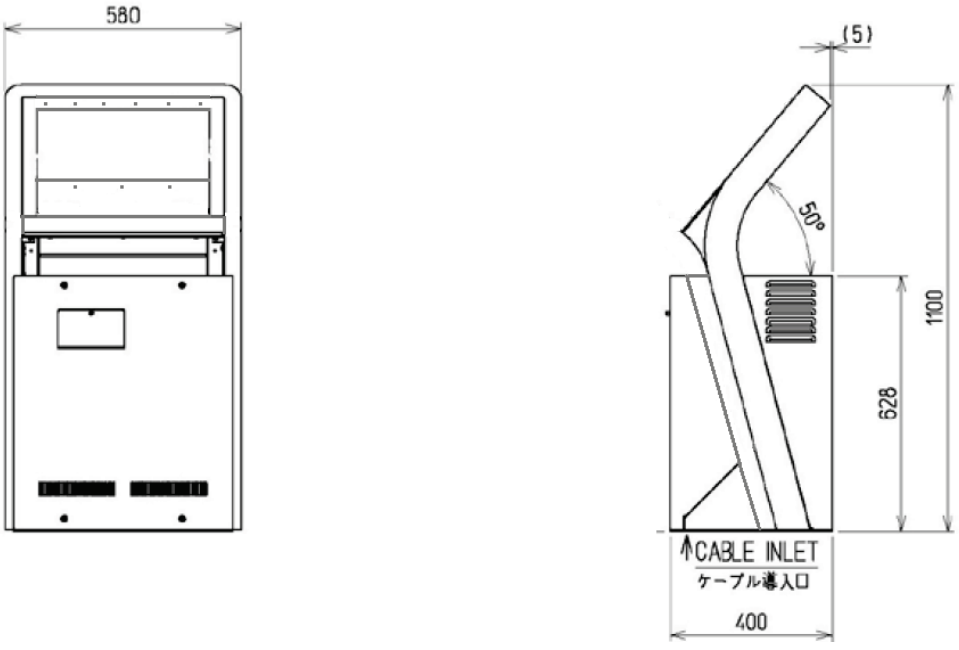
You can pull out the front frame of the Display Unit mount kit if the door of the bridge is too narrow for the stand alone Display Unit.



4.3.12.2 Dimension diagrams of the Display Unit mount kit without a front frame



Dimension diagrams of CWA-246: 26” Display Unit mount kit without a front frame



Dimension diagrams of CWA-245: 19” Display Unit mount kit without a front frame

4.3.12.3 Detaching the front frame of the Display Unit mount kit

【 Required Tools 】

The tools shown in the following table are required for this work

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2	
2	Phillips stubby screwdriver	Size #2	
3	Diagonal pliers	—	
4	Cable-tie *1	—	

*1 A number of cable-ties may be required.

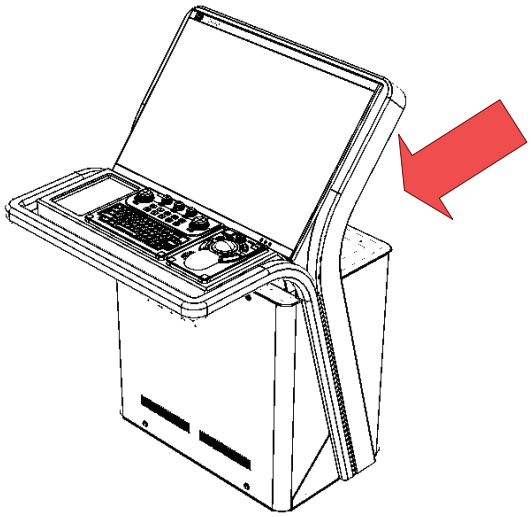
⚠ Do not lose the screws as they will be needed again

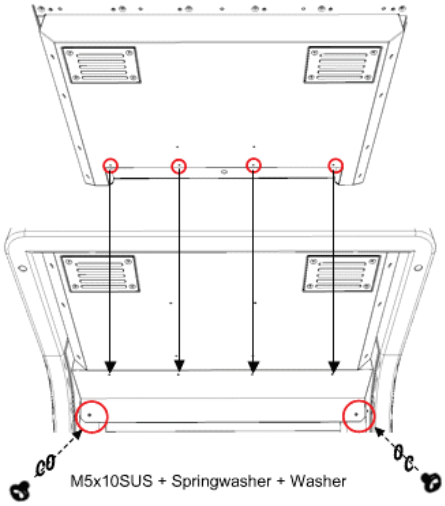
⚠ Do not detach the front frame except under unavoidable circumstances for the sake of the ship's structure. It may lead to unexpected accidents.

⚠ To prevent damage to the Unit during the replacement work, cut off cable-ties that fasten the cable of the unit beforehand.

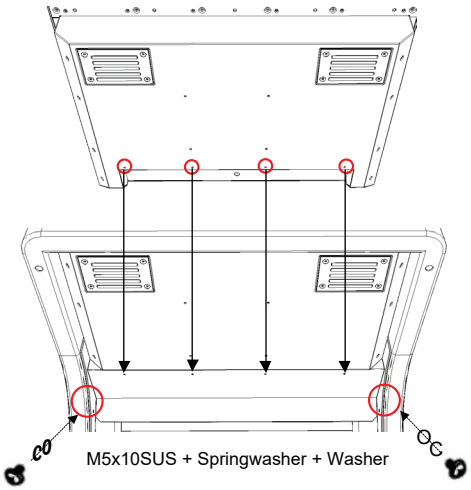
Step 1 Remove the monitor

Remove the monitor from the Display Unit mount kit by referring Chapter 4.



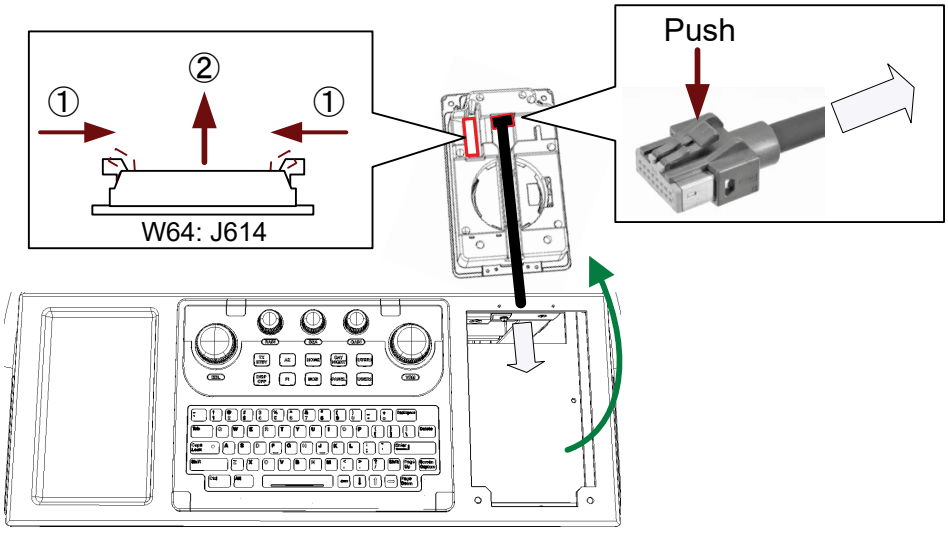


In 2020 later



Step 2 Remove the Trackball Operation Unit

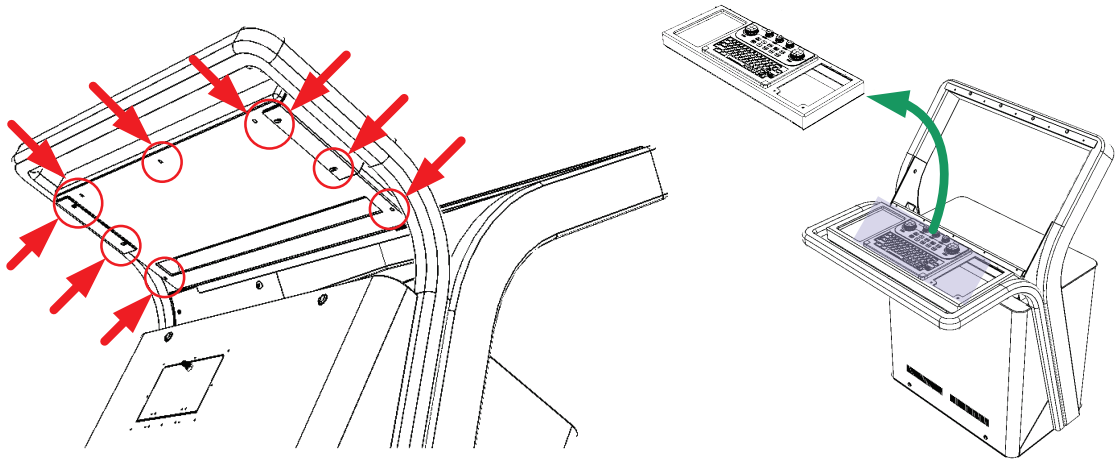
Remove the Trackball Operation Unit from the Display Unit mount kit by referring Chapter 4.



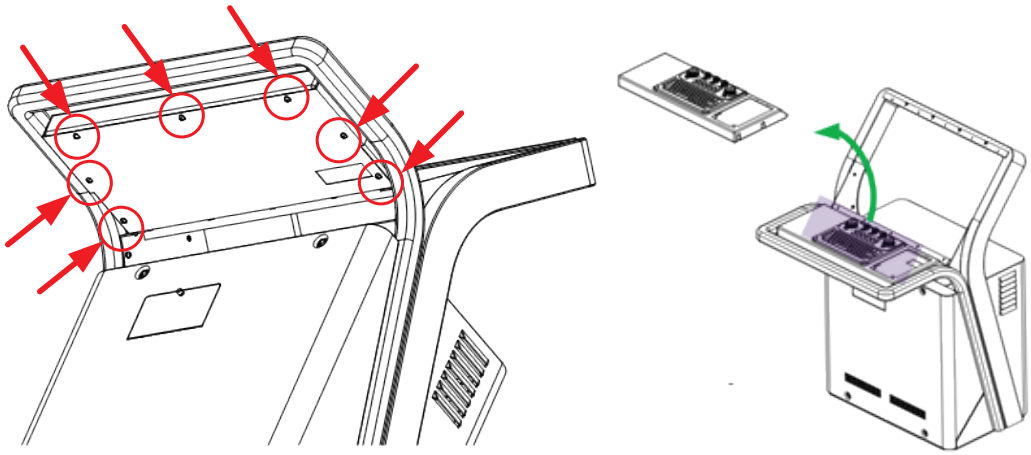
⚠ It is not necessary to remove Keyboard OPU. (If it has been installed.)

Step 3 Remove Operation Unit frame

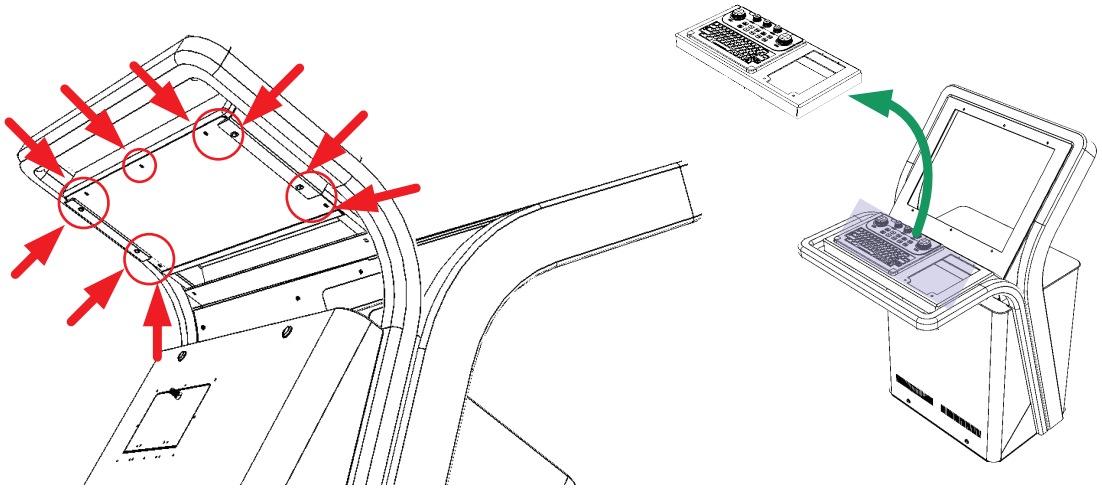
Remove the screws (M4: 9 locations) that fasten the Operation Unit frame and then take out it.



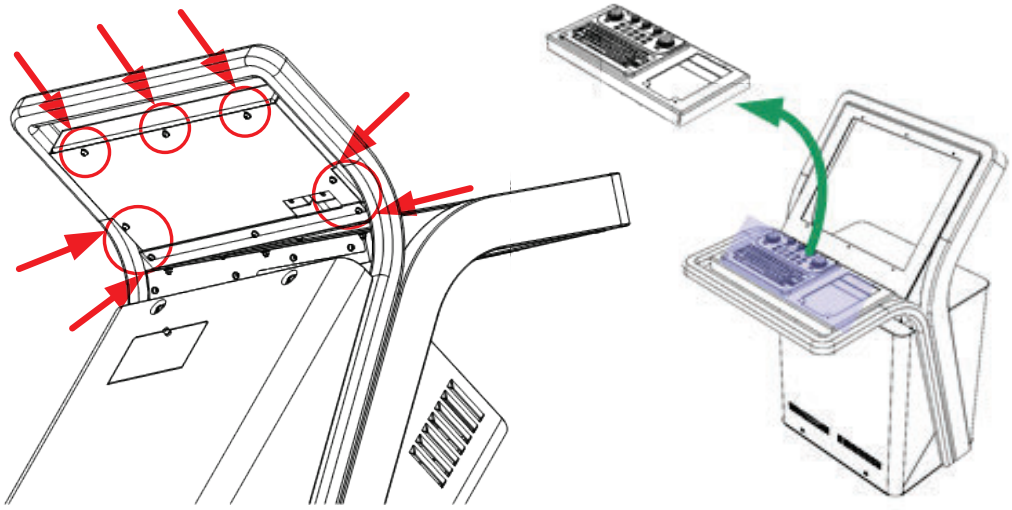
In 2020 later



Taking out the OPU frame from 26” Display Unit mount kit



In 2020 later

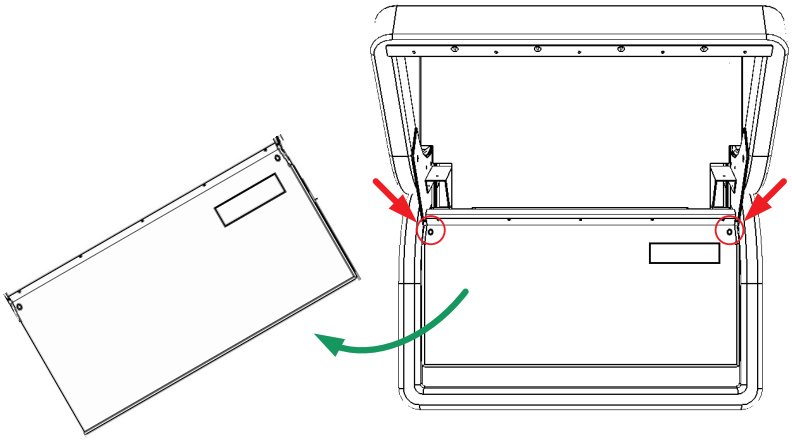


Taking out the OPU frame from 19” Display Unit mount kit

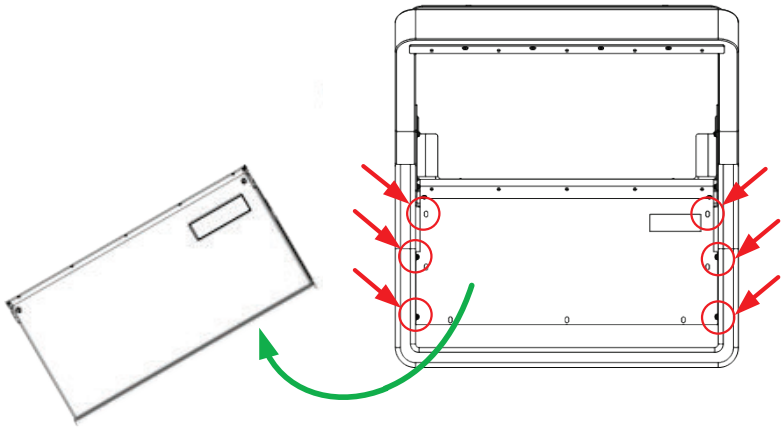
Step 4 Remove the bottom sheet metal

Remove the bottom sheet metal of OPU frame.

In the 26” Display Unit mount kit, Remove the screws (M3: 2 locations) that fasten the sheet metal and then take out it.



In 2020 later

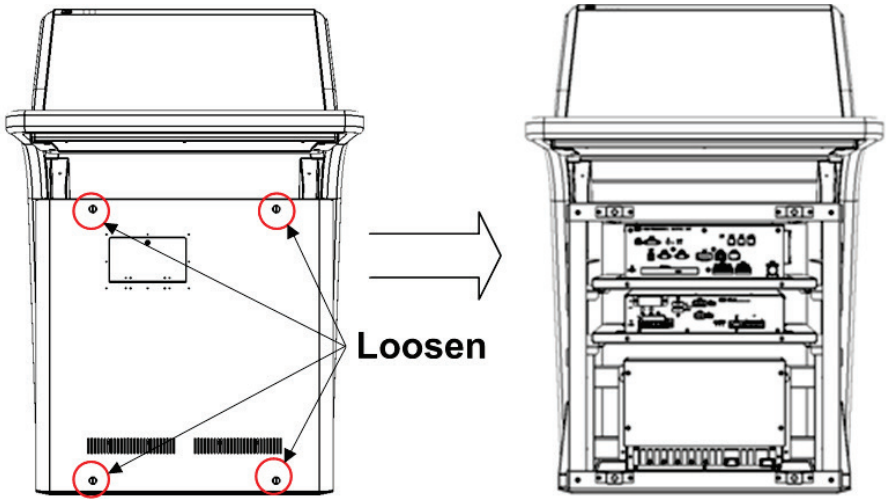


Taking out the OPU sheet metal from 26” Display Unit mount kit

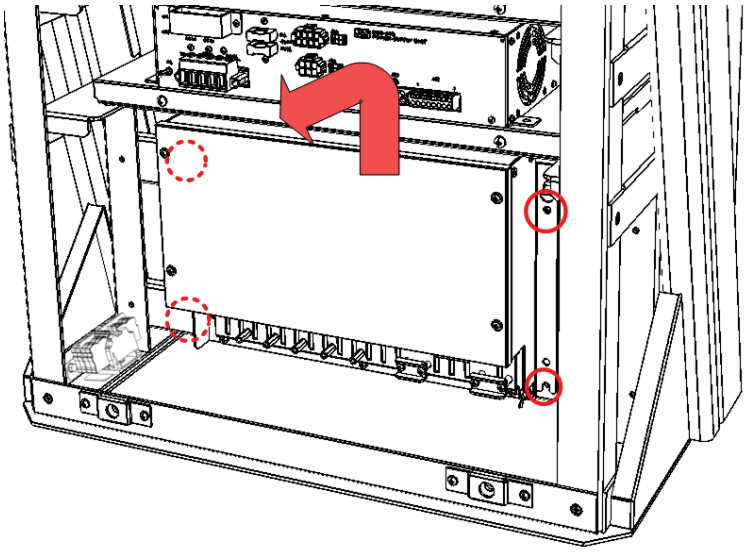
In the 19” Display Unit mount kit, you can remove the sheet metal and OPU frame together.

Step 5　Remove the front cover and the Junction Box

Remove the front cover from the Display Unit mount kit by referring Chapter 4.

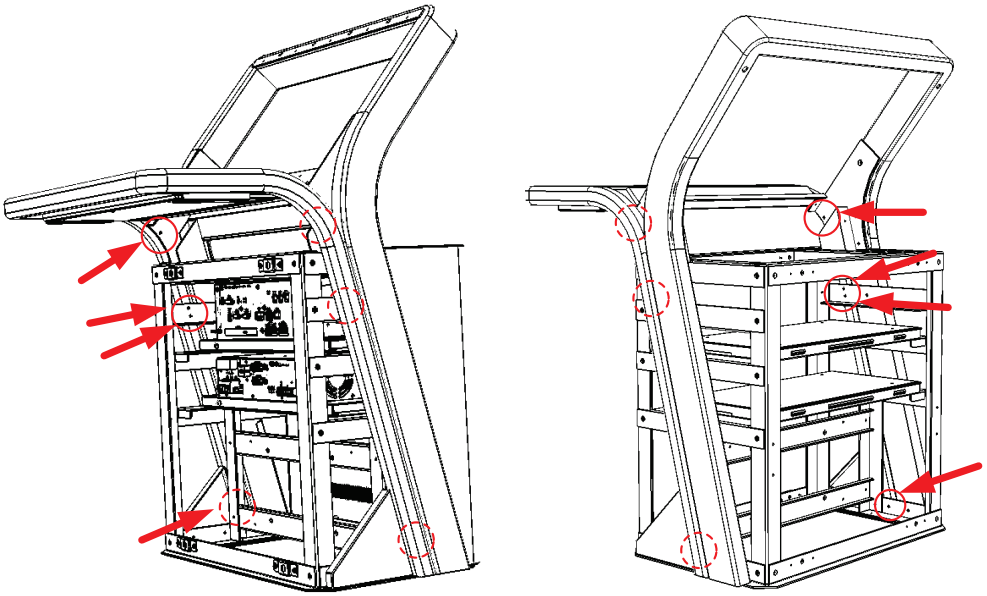


If the Junction box has been installed, remove it as well.

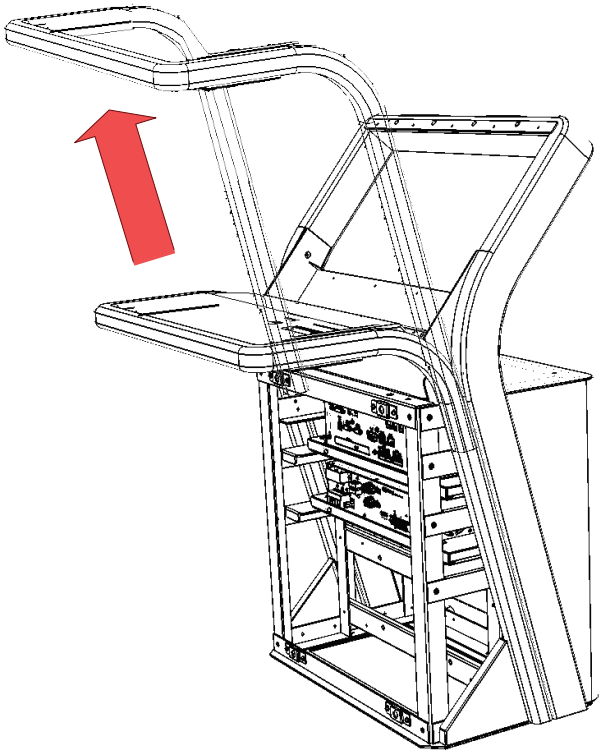


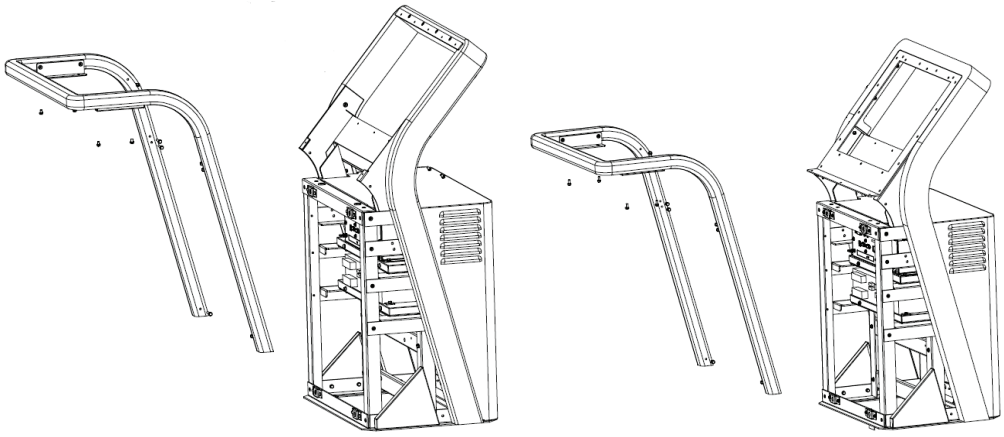
Step 6　Remove the front frame

Using a Phillips stubby screwdriver, remove the M4 screws that fasten the front frame. They are 4 locations in one side, 8 locations in total.



Pull up the front frame slowly in the obliquely upward direction along its line and take away.





After carrying in the stand alone Display Unit is completed, assemble to the original condition by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.

This completes carrying in the stand alone Display Unit into the bridge that has a narrow door by detaching its front frame.

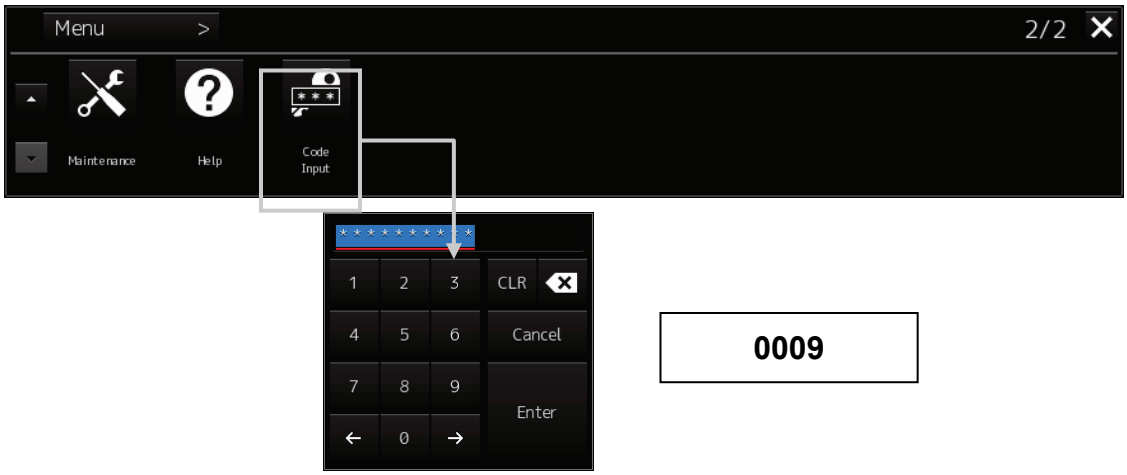
4.4 Setting up after replacements

Whenever you have done the replacement of the components in Scanner Unit or in Display Unit, set up the system as follows.

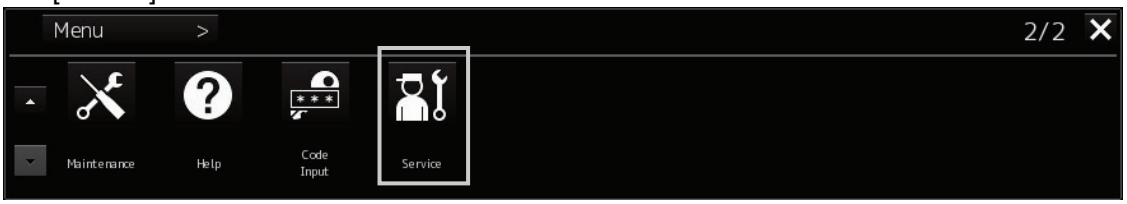
4.4.1. To display the Service menu for Engineers:

Service menu for Engineers appears when you enter the password 0009 on Code Input dialog. For futher information, see “Chapter 7 Troubleshooting”.

Enter 0009 in Password.



The [Service] button is added to the menu.



4.4.2. 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.

4.4.3. Setting up anfter replacing Scanner Units

Use the "RADAR" dialog to maintain the radar.

4.4.3.1 Displaying the "RADAR" dialog

When you select [RADAR] in the Classification pane, the RADAR dialog is displayed in the Edit/Result pane.



4.4.3.2 Changing the operation mode of the safety switch

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	• No radiant section's rotation and transmission • PPI screen in the transmitting state • Maintains the transmitting state without generating BP or BZ alarm
Standby	• No radiant section's rotation and transmission • PPI screen standby
TX-On	• No radiant section's rotation, with transmission • PPI screen in the transmitting state • Maintains the transmitting state without generating BP or BZ alarm

4.4.3.3 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.

4.4.3.4 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

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

Click the [Display Unit To TXRX] button (transmission from the display to the radar antenna).

The total transmission time and total motor ration 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.

4.4.3.5 To set up or adjust radar antennas

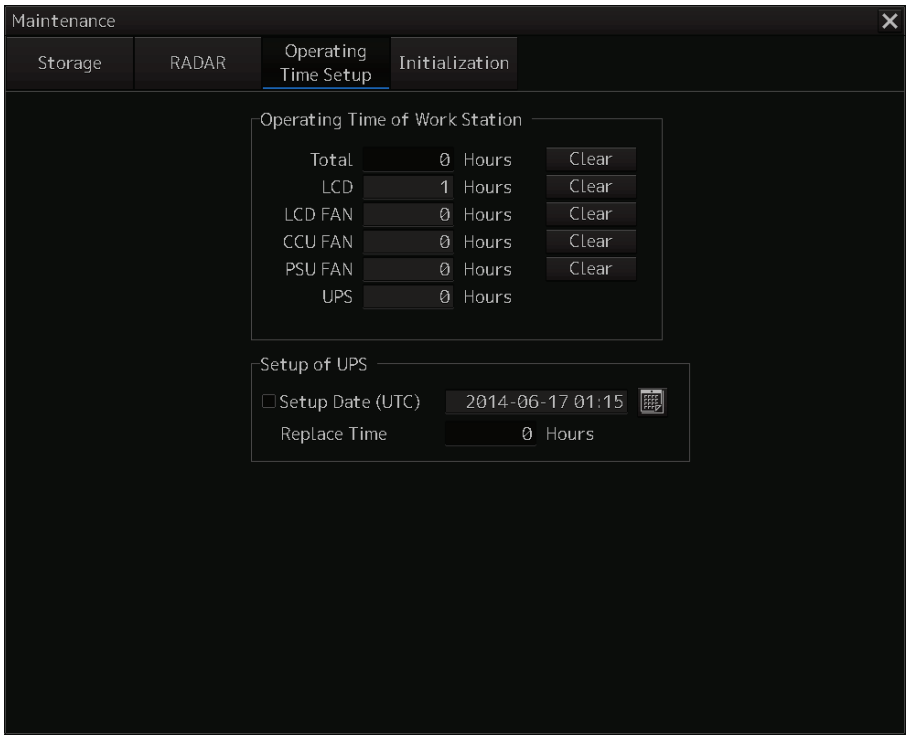
To set up or adjust following items, please refer “JMR-920xx/72xx, JAN-920x/720x Instruction manual chapter 4”.

- Tune adjustment
- Bearing adjustment
- Distance adjustment
- Radar antenna height adjustment
- Tuning bar peak value adjustment
- Performance monitor
- Sector blank
- TT function
- MBS adjustment
- CCRP

4.4.4. Setting up anfter replacing Display Units

4.4.4.1 Clearing operation time of Workstation

Open the service menu for Engineers by entering password 0009 at [Menu] -> [Code Input]. Click [Maintenance] -> [Operation Time Setup] tab.



Clearing the total operation time of a Workstation

1. Click on the [Clear] button next of Total.

Clearing the operation time of a LCD

1. Click on the [Clear] button next of LCD.

Clearing the operation time of a LCD Fan

1. Click on the [Clear] button next of LCD FAN.

Clearing the operation time of a CCU Fan

1. Click on the [Clear] button next of CCU FAN.

Clearing the operation time of a CCU

1. Click on the [Clear] button next of CCU.

Clearing the operation time of a PSU FAN

1. Click on the [Clear] button next of PSU FAN.

Clearing the operation time of a UPS

1. Click the calendar picker button in order to enter the date of UPS replacement.
   The check box on the left of ”Setup Date (UTC) ” will be reset.
2. Select it again, and the operation time of a UPS will return to 0.

5. Software Update

Chapter 5. Software Update

5.1 Updating the Software

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.

Required Item

The following item is required to update the MFD software.

Table Required Item

No.	Name	Model Name
1	CD/DVD or USB memory containing software update data *1	—

*1 Do not use Flash drives which are password protected or encrypted.

⚠WARNING



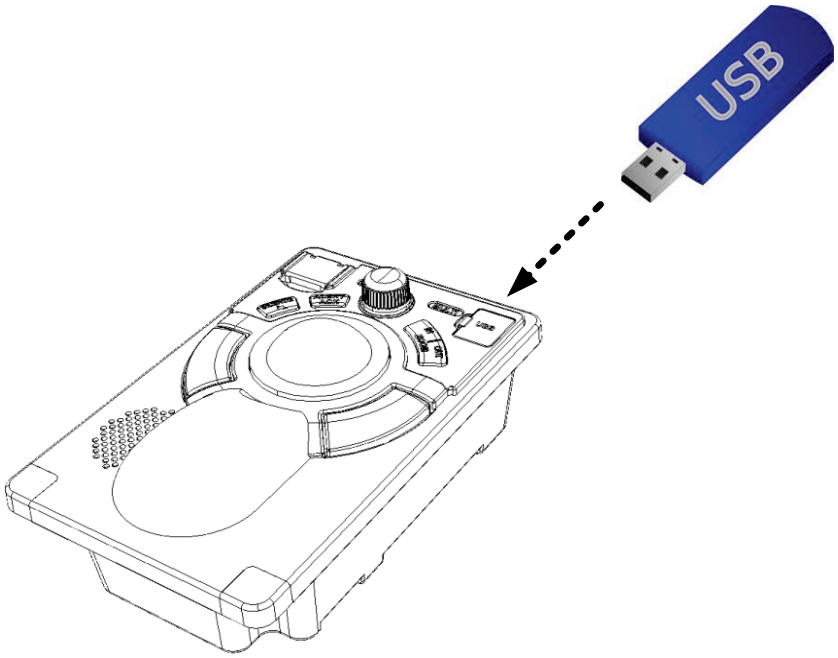
When you want to use a USB flash memory to read or write a file, make sure in advance that the USB flash memory is not affected by a computer virus. If the display unit is infected with a virus, other equipment will also be infected, with the result that a trouble will occur.



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.

Procedure

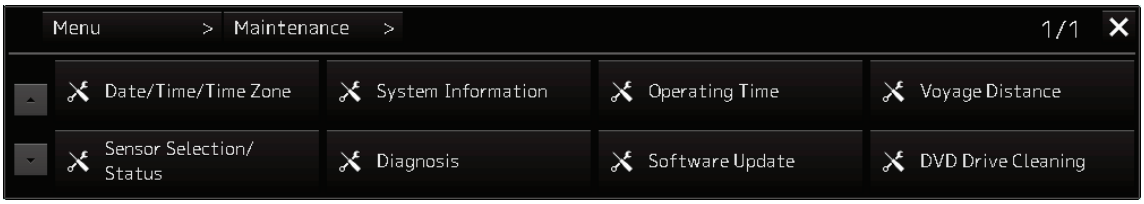
1. **Set the CD/DVD or USB flash memory containing the update data.**



2. **Click on the [Menu] button on the left toolbar.**

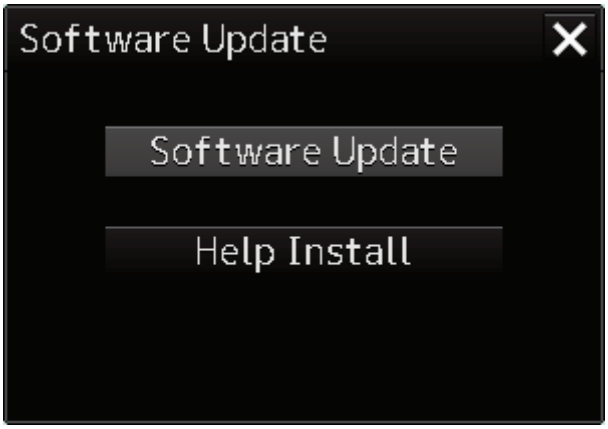
The menu is displayed.

3. **Click on [Maintenance] - [Software Update] - [Software Update] on the menu.**

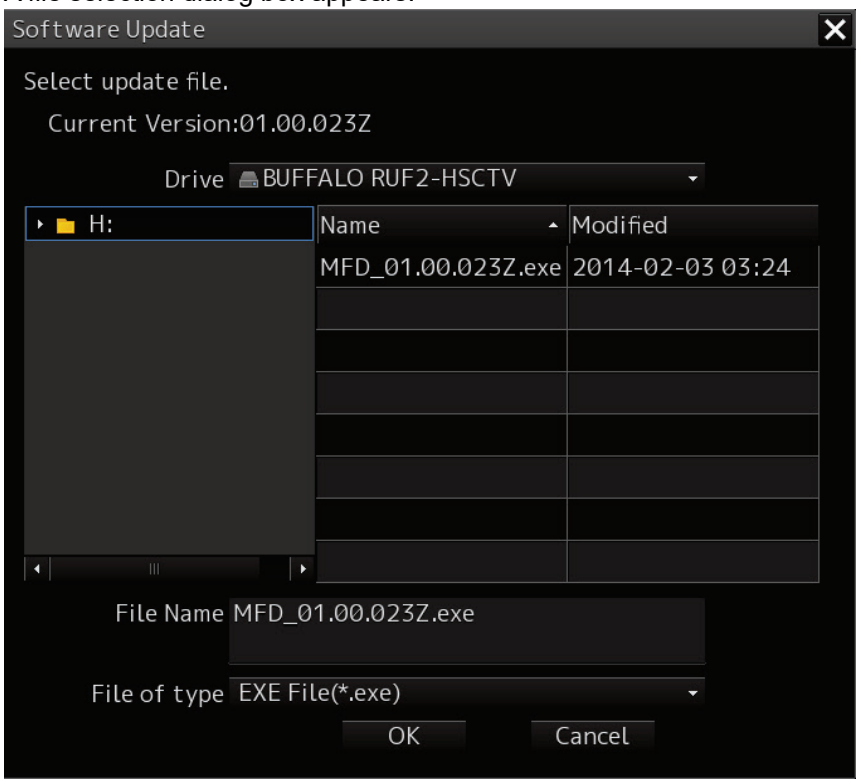


The "Software Update" dialog box appears.

4. **Click on the [Software Update] button.**



A file selection dialog box appears.



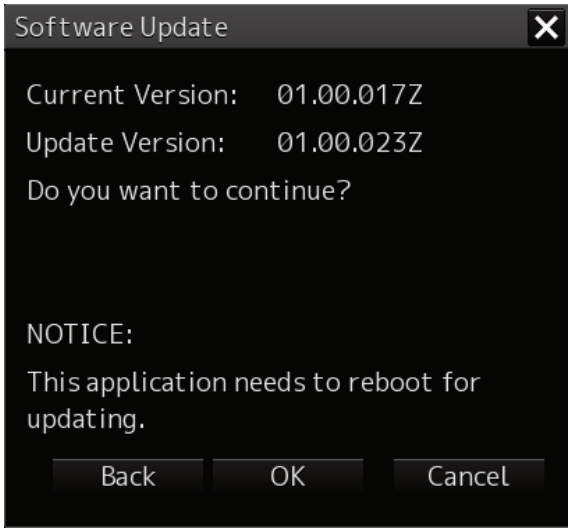
5. **From the [Drive] combo box, select the drive you want to store updated data.**

6. **From the file list, select the file MFD_Setup.exe.**

MFD_xx.xx.xxxx.exe is displayed in [File name].

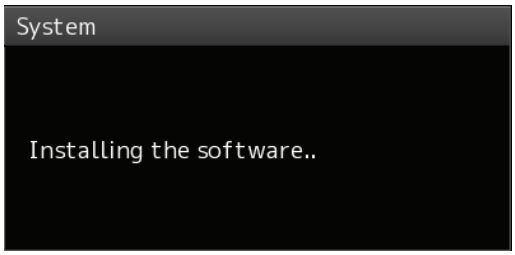
7. **Click on the [OK] button.**

The update content confirmation dialog box appears.



8. **Confirm the contents and click on [OK].**

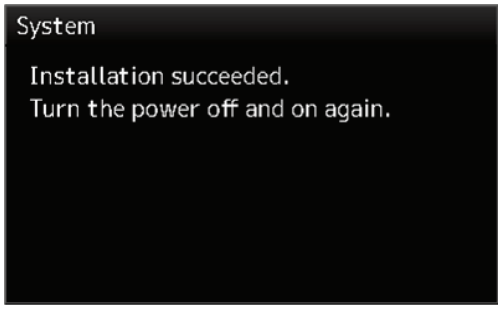
Installation of the update is started and the following message is displayed.



Wait for a while until the installation completes.

> **Note**
> This equipment may restart during installation.

When installation is completed, the following message is displayed.



9. **Turn off the power of this equipment.**

10. **Restart this equipment.**

11. **Start MFD, and confirm that the software version number has been updated in the [Software] tab by selecting [Maintenance] - [System Information].**

5.2 Backing Up/Recovering Data

⚠CAUTION	
	Do not turn off the power during Backup/Restore. Otherwise, a function may fail, and an accident may occur.
	Do not do the backup operation of data while sailing. The radar application should be ended to begin the data backup. It becomes impossible to observe using radar and this may lead to accidents.
	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.

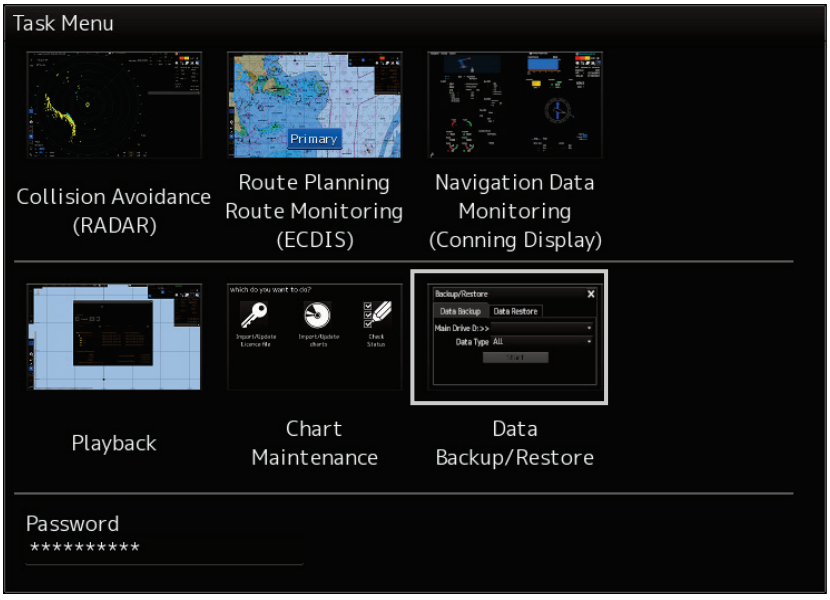
5.2.1 Backing Up Data

For the maintenance of your data, please back up your data periodically according to the following procedure.
Connect a USB memory stick or other external storage medium for data backup.

1. **Press the Power ON button on the operation unit.**

The Power button illuminates. After a while, the task menu is displayed.

2. **Click on the [Data Backup/Restore] button on the task menu.**



The "Backup/Restore" dialog box appears.

3. Click on the [Data Backup] tab



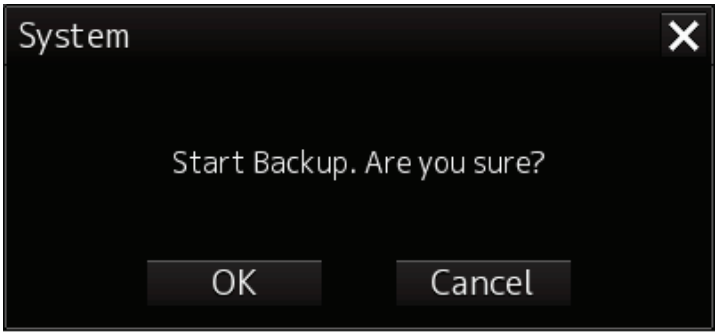
4. Select the backup destination of your data from the drive selection combo box.

5. In the [Data Type] combo box, select the type of the data you are backing up.

All:	Backs up all of the user data.
Except Charts:	Backs up the user data excluding chart data.

6. Click on the [Start] button.

The following confirmation dialog box appears.



7. Click on the [OK] button.

Copying of data to the backup destination you selected in the drive selection combo box starts.

Note
Do not perform any other operations until backup finishes. Doing other operations may cause the backup operation to fail.

5.2.2 Restoring Backup Data

To restore backup data to this equipment, perform the following procedure.
Connect a USB memory stick or other external storage medium containing backup data.

1. **Press the [Power] button on the operation panel.**

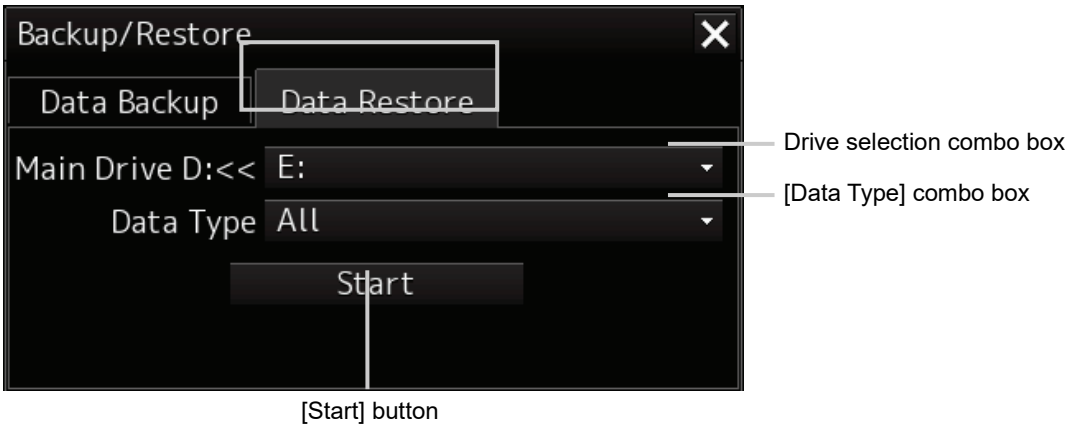
The [Power] button illuminates. After a while, the task menu is displayed.

2. **Click on the [Data Backup/Restore] button on the task menu.**



The "Backup/Restore" dialog box appears.

3. **Click on the [Data Restore] tab**



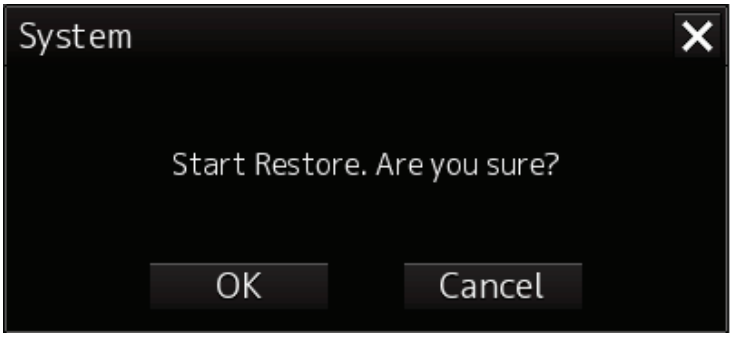
4. **Select the drive in which backup data is stored from the drive selection combo box.**

5. **In the [Data Type] combo box, select the type of the data you are restoring.**

All:	Restores all of the user data.
Except Charts:	Restores the user data excluding chart data.

Click on the [Start] button.

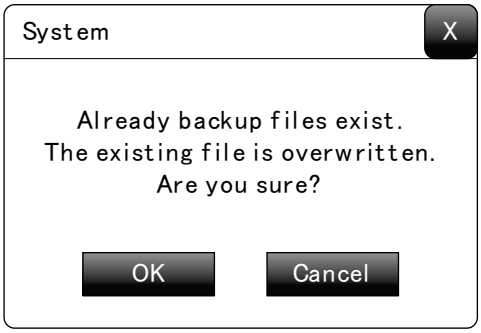
The following confirmation dialog box appears.



6. Click on the [OK] button

Restoration of data from the drive you selected in the drive selection combo box starts.

If data already exists on the SSD, an overwrite confirmation dialog box appears.



To start restoring data, click on the [OK] button.

Note

Do not perform any other operations until restoration finishes. Doing other operations may cause the restoration operation to fail.

Memo

If there is no compatibility between the data you attempted to restore and this equipment, the following dialog box appears and restoration will not be performed.



Click on the [OK] button and cancel data restoration.

5.3 Recovering the C Drive Image

⚠CAUTION	
	Do not turn off the power during Backup/Restore. Otherwise, a function may fail, and an accident may occur.
	Do not do the backup operation of data while sailing. The radar application should be ended to begin the data backup. It becomes impossible to observe using radar and this may lead to accidents.
	Whenever you try to perform disk image recovery, always make sure that the backup power is fed to the PSU of the Display Unit. Unexpected shutdown during recovery may cause a system malfunction.

The operating system (OS) of this equipment runs on the C drive.
The entire content of the C drive is saved in the D drive C in its image.
In case the operation of the OS on the C drive becomes unstable, the image of the C drive can be written back from the D drive.

Note
Once the image of the C drive is written back, the information concerning C-MAP is cleared.
After image write back is performed, re-register the C-MAP database and license, and perform update as necessary.

The flow of C drive image write back is as follows.

Start the OS on the D drive to start this equipment.
「5.3.1 Starting the OS on the D Drive to Start This Equipment」

↓

Execute the recovery SSD tool.
「5.3.2 Executing the SSD Recovery Tool」

↓

Start the OS on the C drive to start this equipment.
「5.3.3 Starting the OS on the C Drive to Start This Equipment (Automatic Recovery of Software)」

↓

Set C-MAP again.
「5.3.4 Setting C-MAP Again」

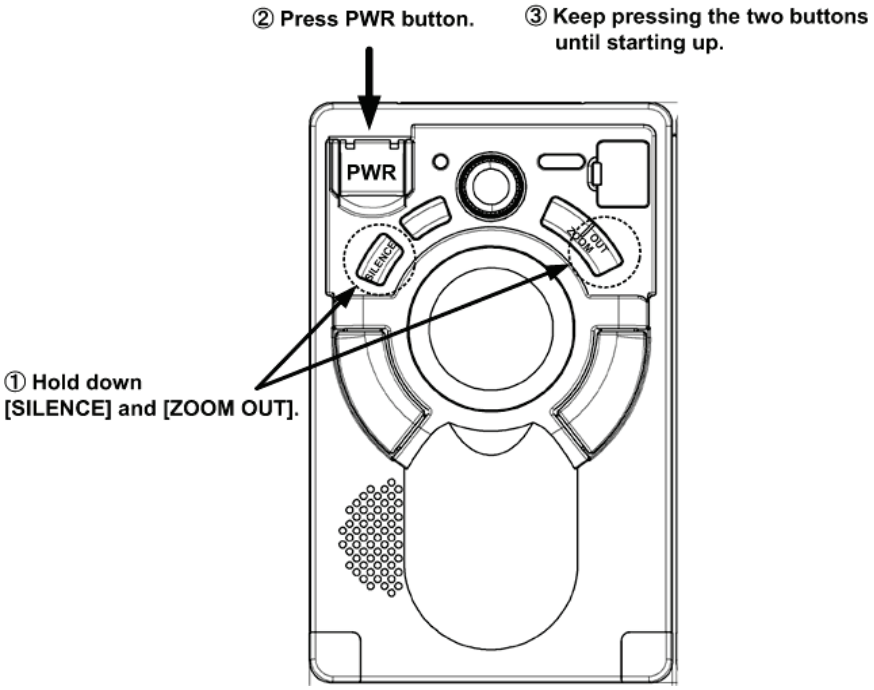
↓

End recovery.

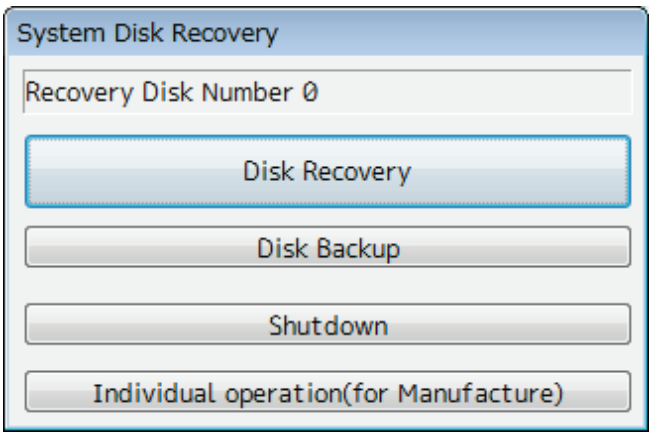
5.3.1 Starting the OS on the D Drive to Start This Equipment

Start the OS on the D drive to start this equipment according to the following procedure.

1. **Enter the power to this equipment while simultaneously holding down the [SILENCE] key and [ZOOM OUT] keys.**



When startup is completed, the following message is displayed.



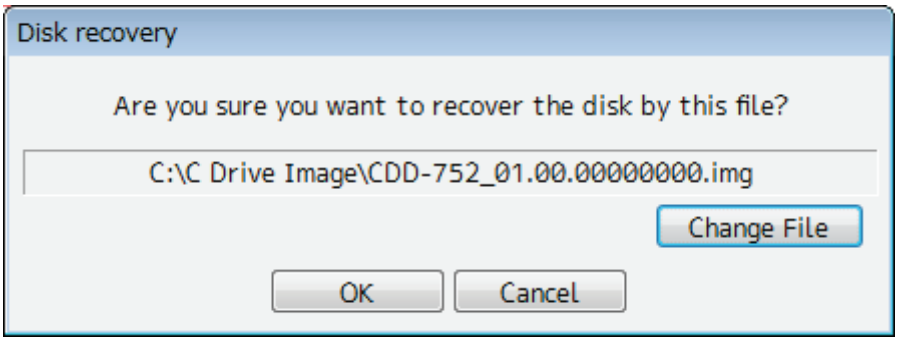
The recovery SSD tool can be executed in this state.

5.3.2 Executing the SSD Recovery Tool

Execute the SSD recovery tool to write back the C drive image.

1. **Click on the [Disk Recovery] button in the dialog box that appears after starting from the D drive.**

   The following dialog box appears.



2. **Select the image file you want to write back to the C drive.**

   Normally, select the image file that is displayed in the dialog box.

   To specify another image file, click on the [Change File] button and then select the desired image file from the file list that appears.

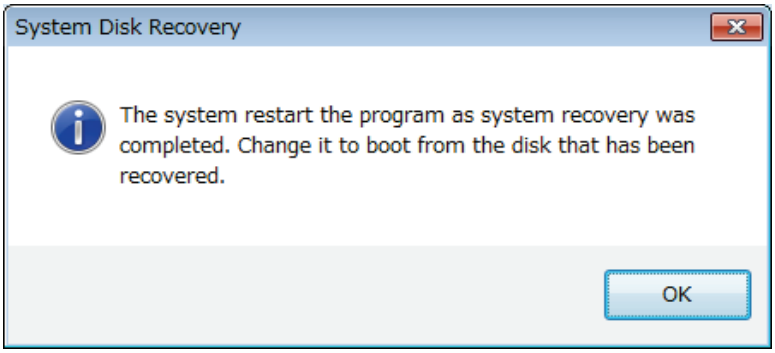
> **Note**
>
> Because the equipment has been started from the D drive, the regular C drive is displayed as the D drive and the regular D drive is displayed as the C drive. So please be careful with this when selecting an image file.

3. **Click on the [OK] button.**

   Image file write back starts.

> **Caution**
>
> Do not perform any other operations until write back finishes. Doing other operations may cause image write back to fail.

When write back is completed, the following message is displayed.



5.3.3 Starting the OS on the C Drive to Start This Equipment (Automatic Recovery of Software)

Start the OS written back to the C drive to start this equipment.

1. **Click on the [OK] button in the dialog box that appears when write back finishes.**

As the OS starts from the C drive, the applications and the various settings of the OS on the C drive automatically recover.

The following dialog box appears during recovery operation.

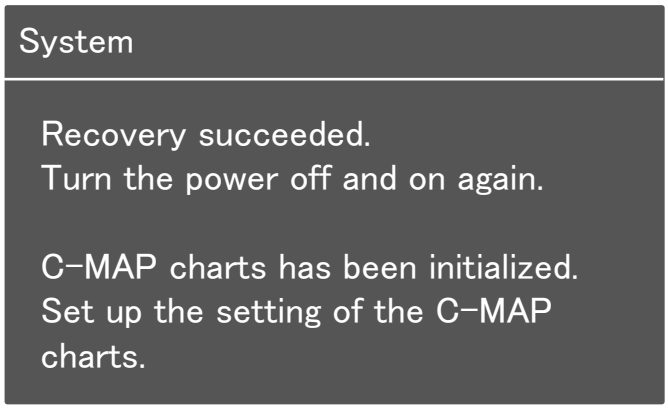


Caution

This equipment restarts during recovery operation. Do not perform any other operations until recovery finishes.

Doing so may cause recovery to fail, leading to accidents.

When recovery is completed, the following messages are displayed.



2. **Press the [Power] button on the operation panel to turn OFF the power to this equipment.**

5.3.4 Setting C-MAP Again

Start this equipment again and perform settings associated with C-MAP.

Register the database and license again.

Also, perform update as necessary.

For further information, see “Additional Manual for Chart Installation 4.3 Importing C-MAP Ed.3”.

5.4 Initialize the MFD folder of D drive

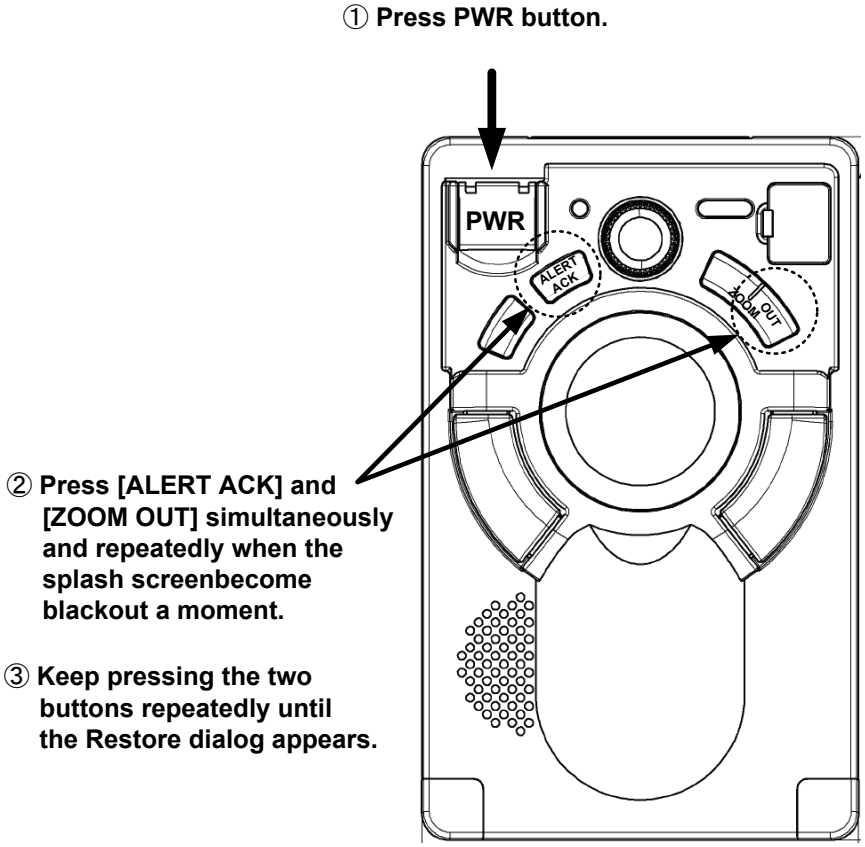
This section explains the initialization function of the MFD folder of D drive by special key operation.
The MFD folder of D drive can be initialized by the following procedure.

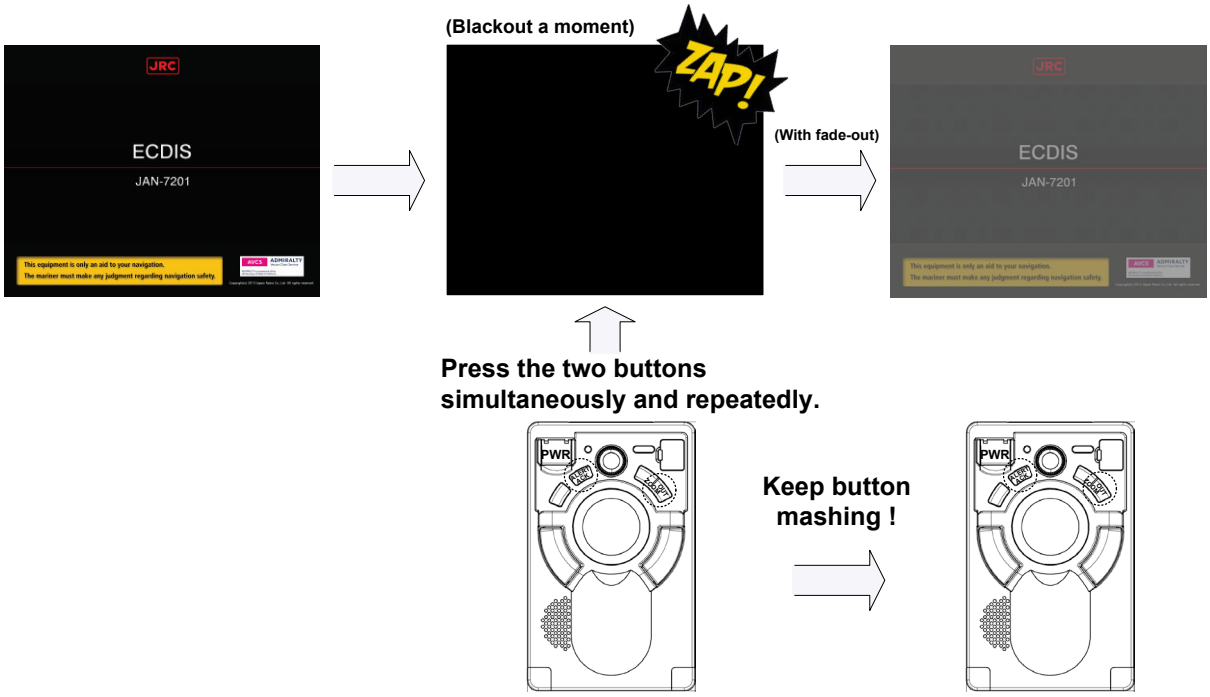
Caution
When initializing the MFD folder of drive D, the user data is deleted and the user set value is reset.

1. **Turn on the Display Unit power.**

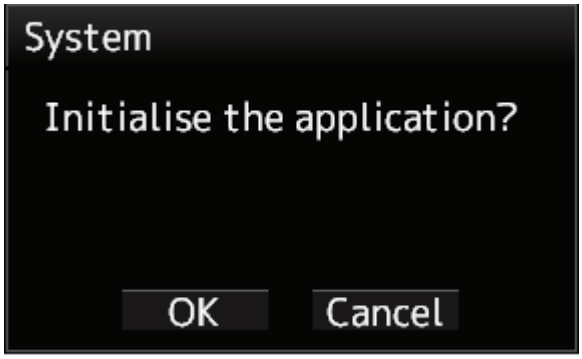
The splash screen will appear.

2. **Press [ALERT ACK] and [ZOOM IN] buttons simultaneously and repeatedly when the splash screen become blackout a moment.**
Keep pressing the two buttons repeatedly until the System dialog appears.

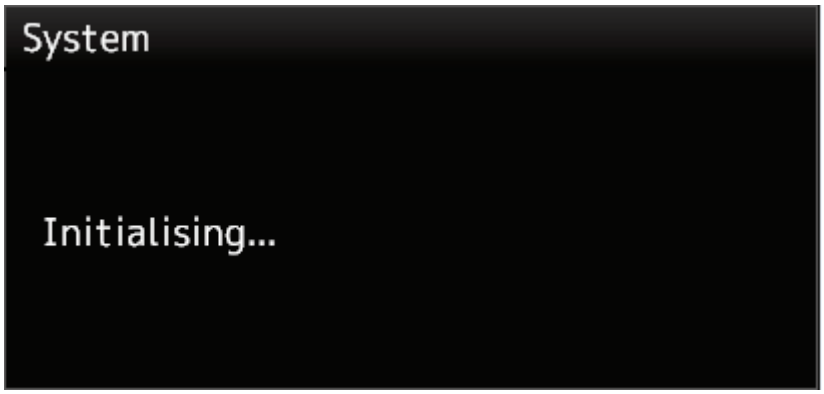




3. **System dialog appears.**



Confirm the contents and click [OK]. Initialization will start and the following message will be displayed.



When the initialization is completed, the unit will restart automatically.
This concludes the initialization of the MFD folder of D drive.

5.5 Rollback of the Software

⚠CAUTION	
	Do not turn off the power during Rollback. Otherwise, a function may fail, and an accident may occur.
	Do not do the rollback operation of data while sailing. The radar application should be ended to begin the data backup. It becomes impossible to observe using radar and this may lead to accidents.
	Whenever you try to perform rollback, always make sure that the backup power is fed to the PSU of the Display Unit. Unexpected shutdown during rollback may cause a system malfunction.

By rollback operation, you can downgrade MFD software version to the previous version.

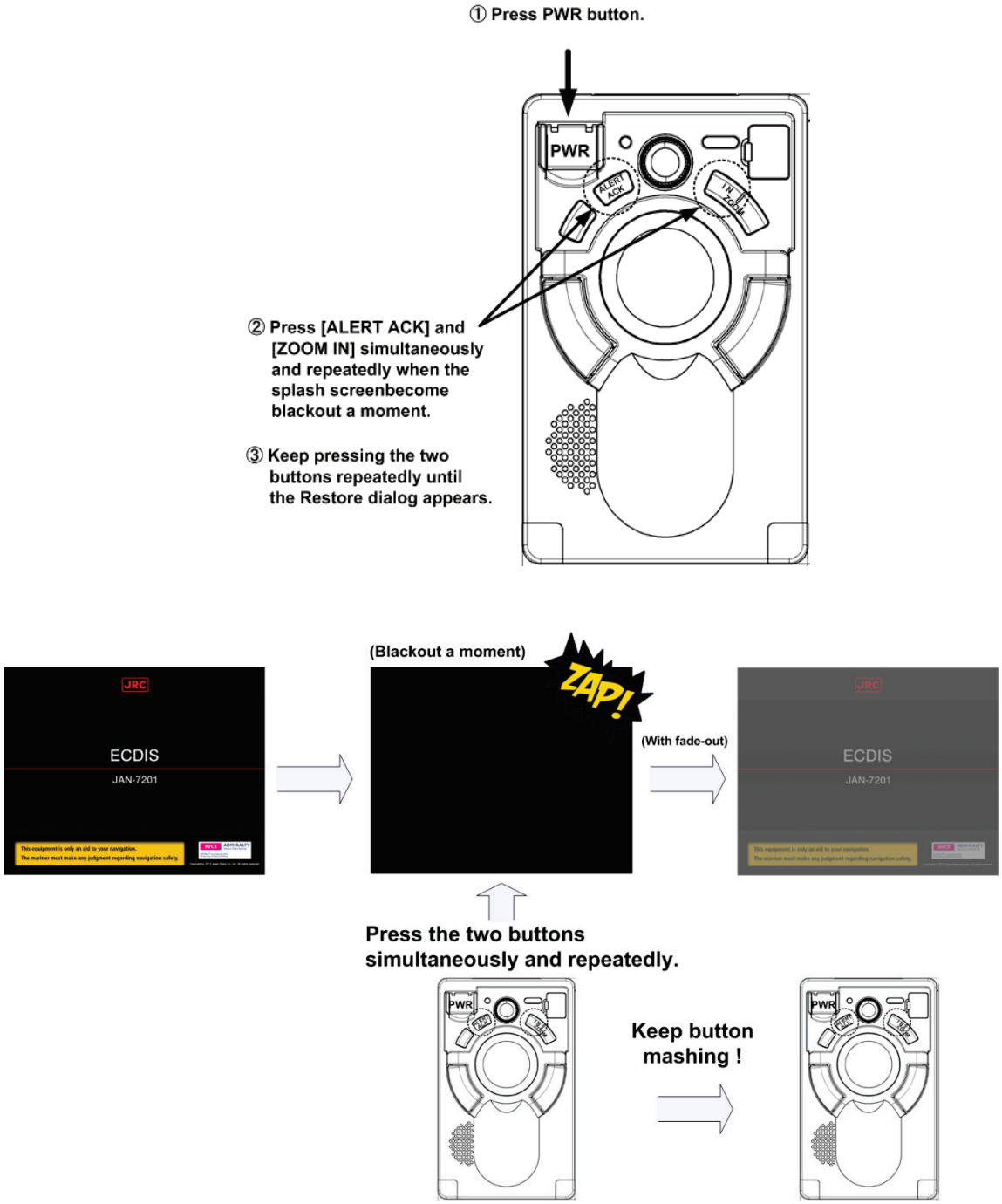
⚠ The software version you can downgrade is until the version you have updated just before. You cannot downgrade the software version to the second or more versions from the latest install version.

⚠ If the software of the Display Unit have never updated ever, you cannot downgrade it.

1. <u>Turn on the Display Unit power.</u>

The splash screen will appear.

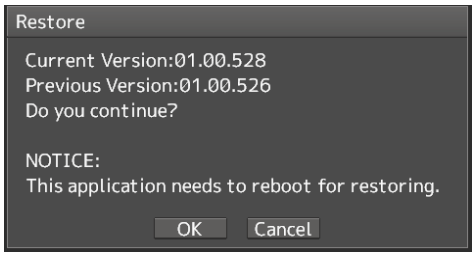
2. **Press [ALERT ACK] and [ZOOM IN] buttons simultaneously and repeatedly when the splash screen become blackout a moment.**
Keep pressing the two buttons repeatedly until the Restore dialog appears.



Note

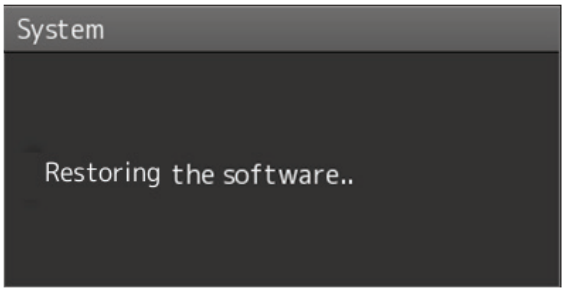
If you try to press the two buttons at the same time of its booting up, the MFD application would not start up correctly because of freeze at the splash screen.
In that case, turn OFF the power by pressing the PWR button on the TOPU, and then turn ON it again.

3. <u>Restore dialog appears.</u>



Confirm the contents and click [OK]. Rollback will start and the following message will be displayed.

Note
If you perform a rollback, Following user data of the latest version will be erased.
Certificate, Connection setting for ISW, Portlist, Personal settings, Route, User chart, Total distance



Wait for a while until the rollback completes.

Note
This equipment may restart during installation.

When rollback is completed, the following message is displayed.



4. **Turn off the power of this equipment.**

5. **Restart this equipment.**

6. **Start MFD, and confirm that the software version number has been updated in the [Software] tab by selecting [Maintenance] - [System Information].**

5.6 Update of Firmware

⚠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 display unit 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.
⚠CAUTION	
	Do not turn off the power during firmware updating. Otherwise, a function may fail, and an accident may occur.
	Do not do the firmware updating operation of data while sailing. The radar application should be ended to begin the data backup. It becomes impossible to observe using radar and this may lead to accidents.
	Whenever you try to CCU or TOPU firmware updating, always make sure that the backup power is fed to the PSU of the Display Unit. Unexpected shutdown during updating may cause a system malfunction.

This section describes the procedures for CCU, TOPU, and SLC/ALC firmware updating.

5.5.1 Update the CCU firmware

Note
When firmware 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.

The following item is required to update the CCU Firmware.

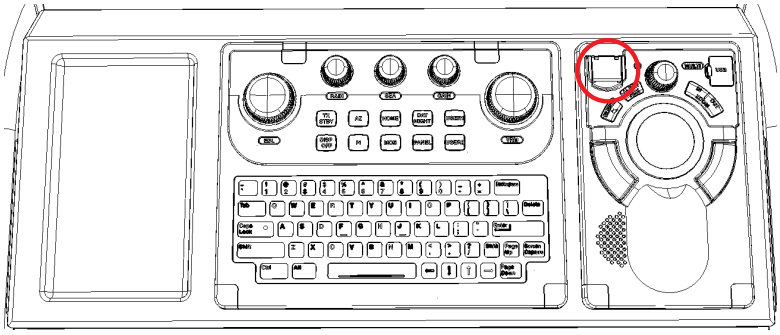
Table Required Item

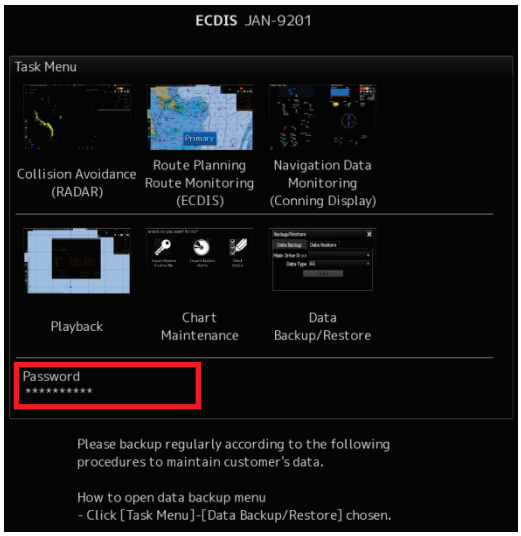
No.	Name	Model Name
1	USB flash drive containing CCU Firmware update Tool and data *1	—

*1 Do not use Flash drives which are password protected or encrypted

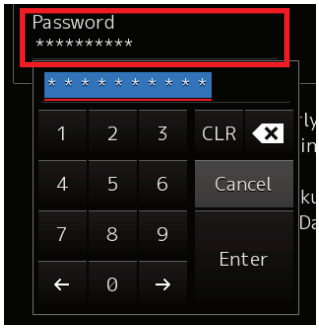
1. Turn the power ON and activate the maintenance tool

(1) Apply power to the Display Unit by using the PWR switch of the trackball operation unit. The Task selection screen will be displayed.



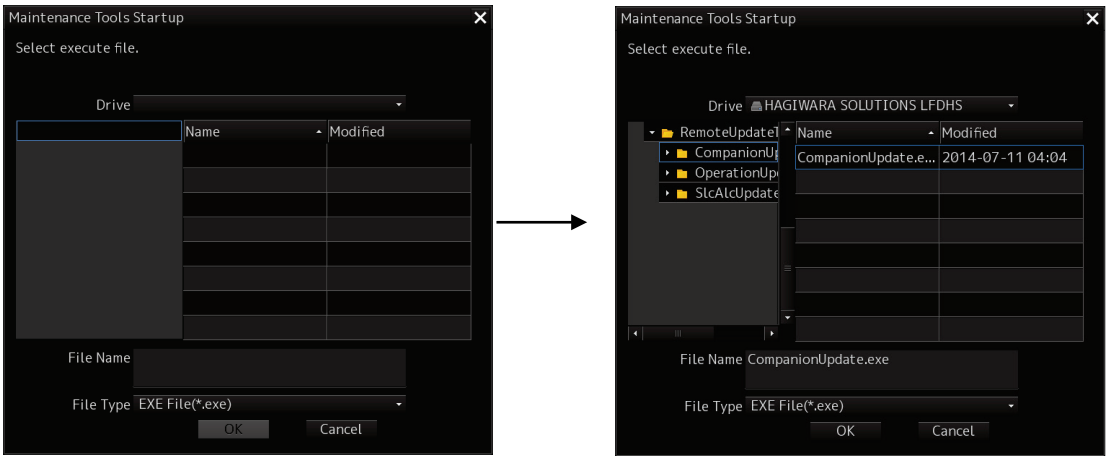


(2) Position the cursor on the Password window and left-click on it. The Password input screen is displayed. Enter **"1074"**.



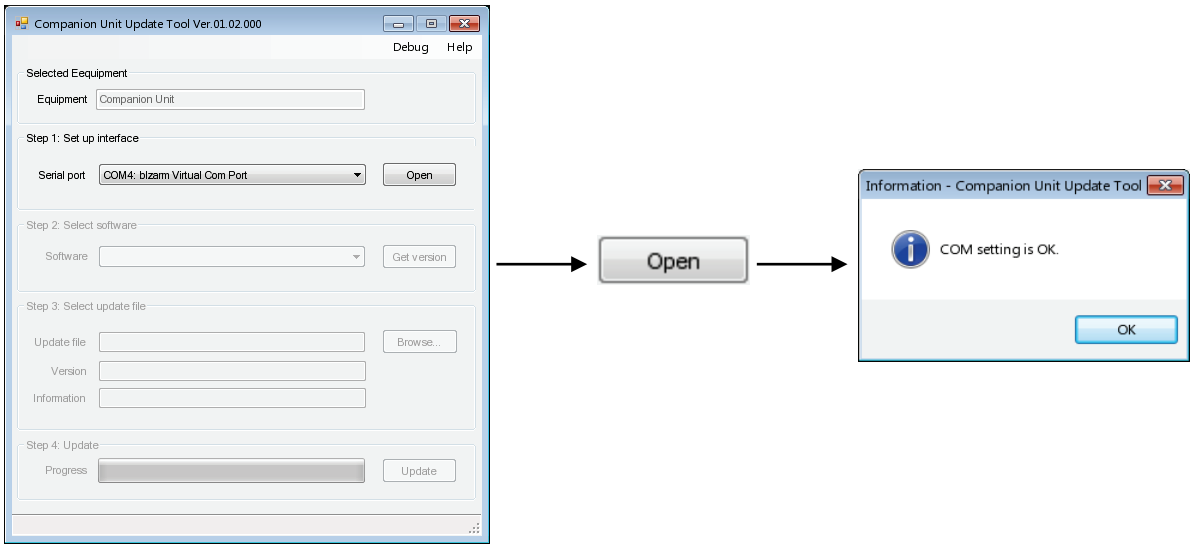
2. Updating the CCU Firmware by using the remote update tool

(1) The maintenance tool is activated. Connect the USB flash drive containing the CCU Firmware remote update tool to the USB port of the trackball operation unit.

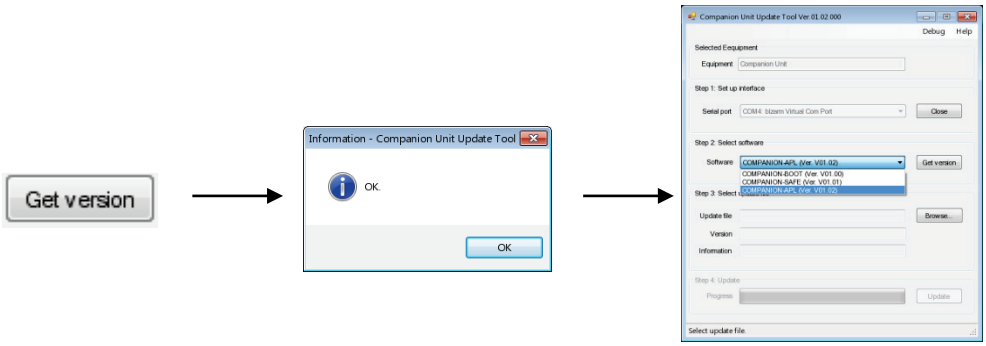


(2) Select **CompanionUpdate.exe** and press OK. The remote update tool is activated.

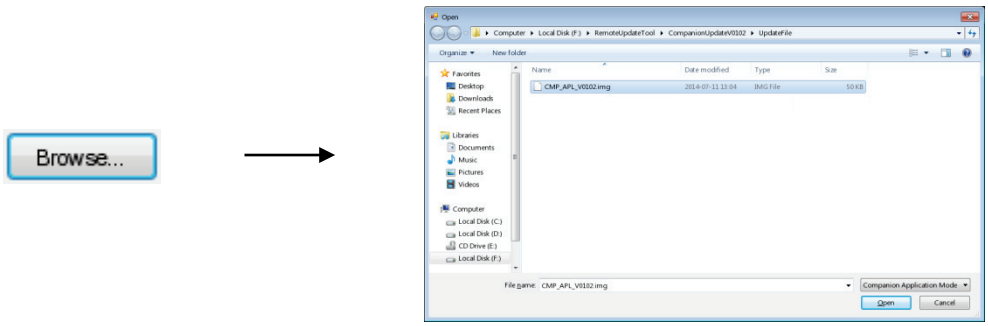
(3) Check the COM port in the **Step1 Setup Interface** item.
Check that **COM4:blzam Virtual Com Port** is selected. Do not select any other COM port.
After checking, press the Open button.



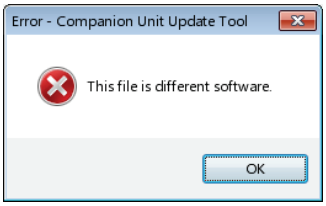
(4) Press the **"Get Version"** button in the **Step2 Select Softwar**e item. Subsequently, select **COMPANION-APL (Ver.01.****)** from the tab. (**: Firmware version)



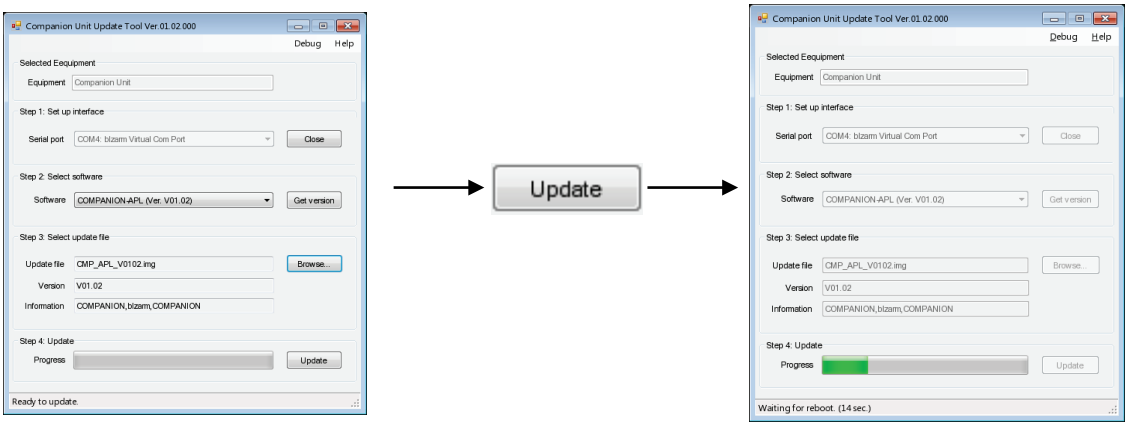
(5) Press the **"Browse…"** button in the **Step3 Select update file** item. When the Explorer screen is displayed, select the latest CMP firmware file (CMP_APL_***.img).



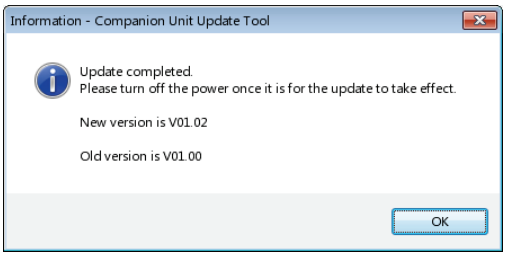
When the Firmware type and the update file do not match, an error occurs.

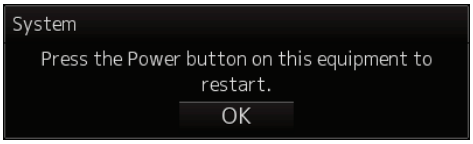


(6) After the file is selected, the **"Update"** button is enabled in the **Step4 Update** item. Start Update by pressing the button.



(7) When Update is finished normally, the Update completion window is displayed. When the **OK** button is pressed, the remote update tool is terminated and processing returns to the Task screen. When the restart confirmation screen is displayed, restart.





3. Confirming the updating version

After updating, confirm the firmware version in maintenance menu.

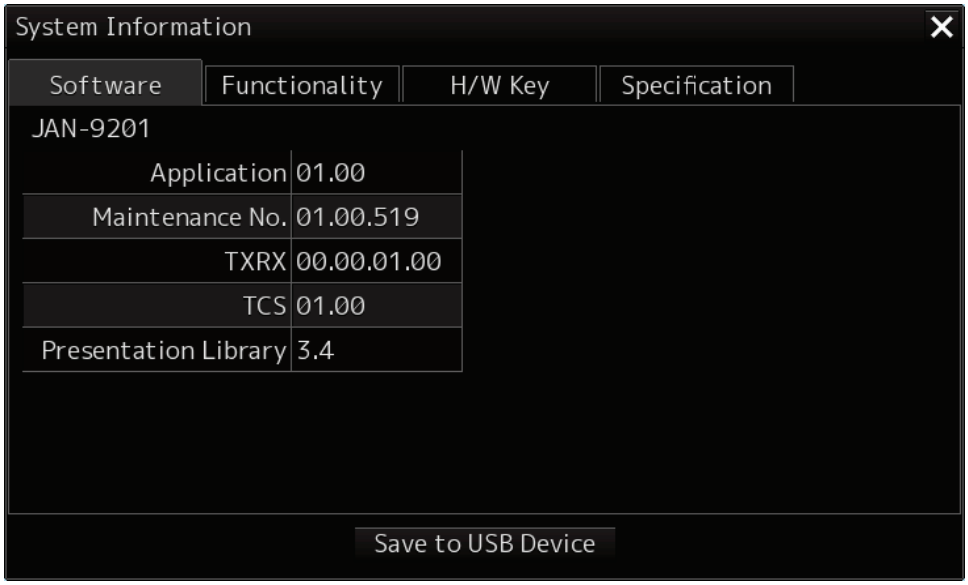
(1) Click on the [Menu] button on the left toolbar.
The menu is displayed.

(2) Click on the [Maintenance] - [System Information] button on the menu.

The [System Information] dialog box appears.

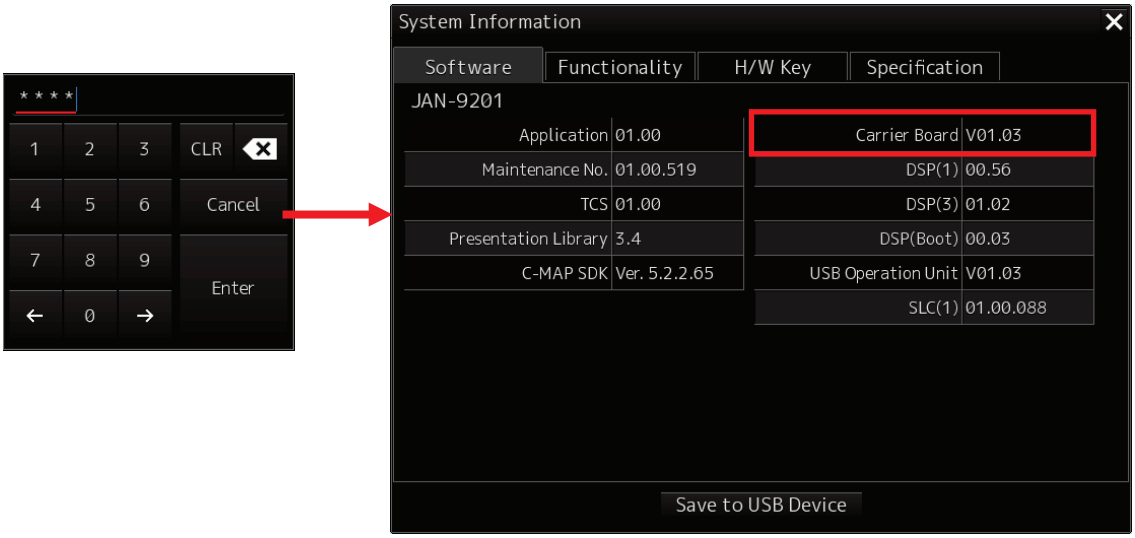
Click on the [Software] tab.

(3) The software information is displayed.



Click on this list and code input dialog is displayed.

Enter **"0000"** and additional software information is displayed.



(4) Confirm updating firmware version.

Confirm that the version number displayed at **"Carrier Board"** equals to the CMP firmware file.

5.5.2 Update the TOPU firmware

Note

When firmware 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.

Note

In TOPU update, do NOT use the USB port on TOPU. It will be reset during the firmware update sequence. The port will become unavailable and the updating will be failure.

The following items are required to update the TOPU Firmware.

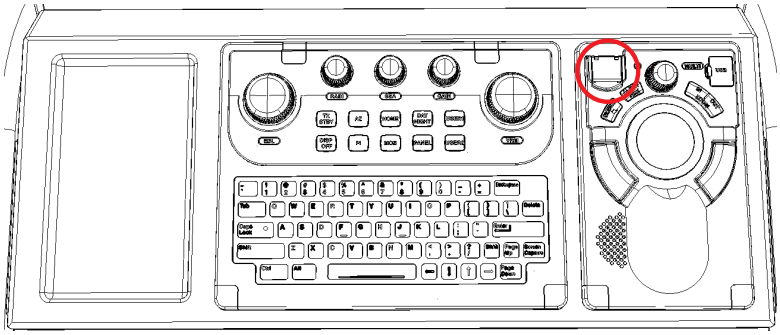
Table Required Item

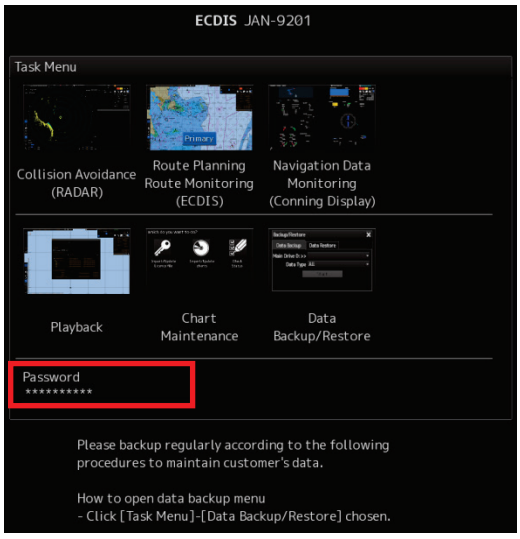
No	Name	Size	External Appearance
1	Flat head screwdriver	6 mm	
2	USB flash drive containing TOPU firmware update Tool and data *1	-	-

*1 Do not use Flash drives which are password protected or encrypted

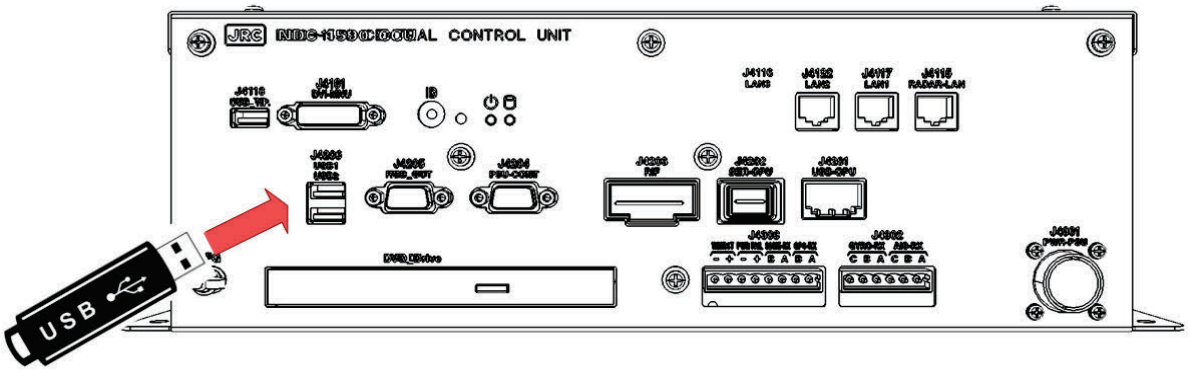
4. Supplying the power and activating the maintenance tool

(1) Supply the power to the Display Unit by using the PWR switch of the trackball operation unit.
The Task selection screen is displayed.

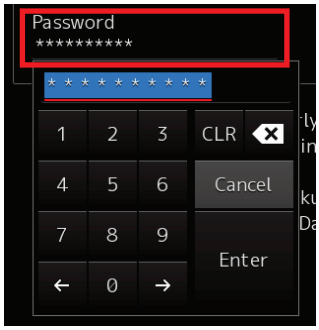




(2) Connect the USB flash drive containing the TOPU Firmware remote update tool to the USB port of the CCU.



(3) Position the cursor on the Password window and left-click on it. The password input screen is displayed. Enter **"1074"**.



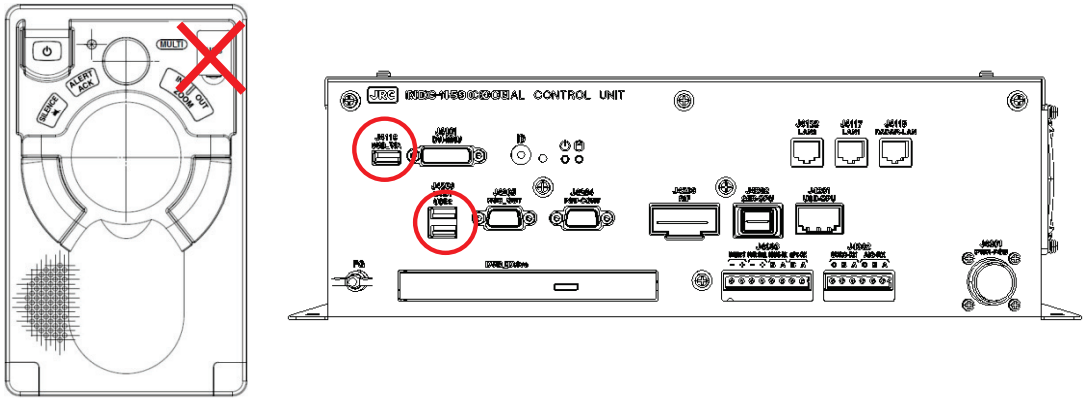
5. TOPU Firmware updating by using the remote update tool

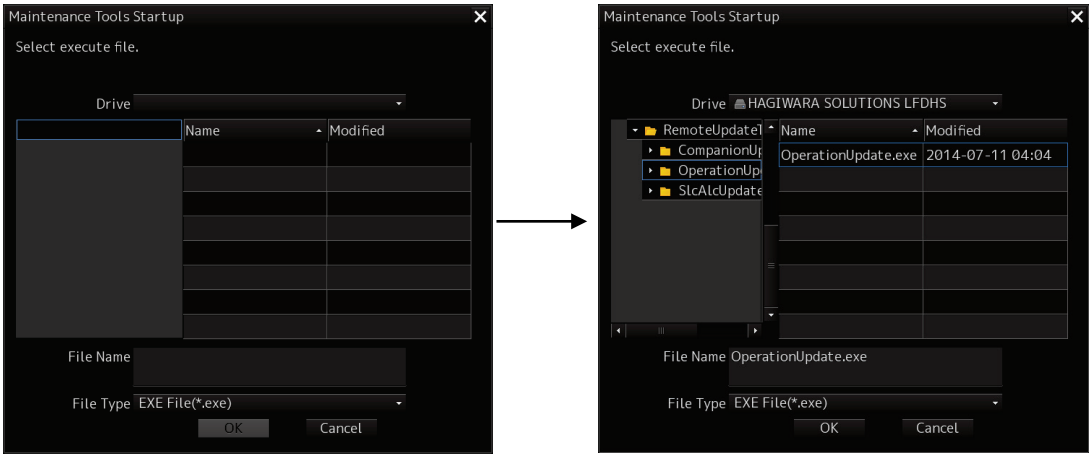
(1) The maintenance tool is activated.

⚠ CAUTION!!

In TOPU firmware update, do NOT use the USB port of TOPU. Otherwise, the TOPU operation unit is reset during updating, making update impossible.

Use USB Ports of CCU.

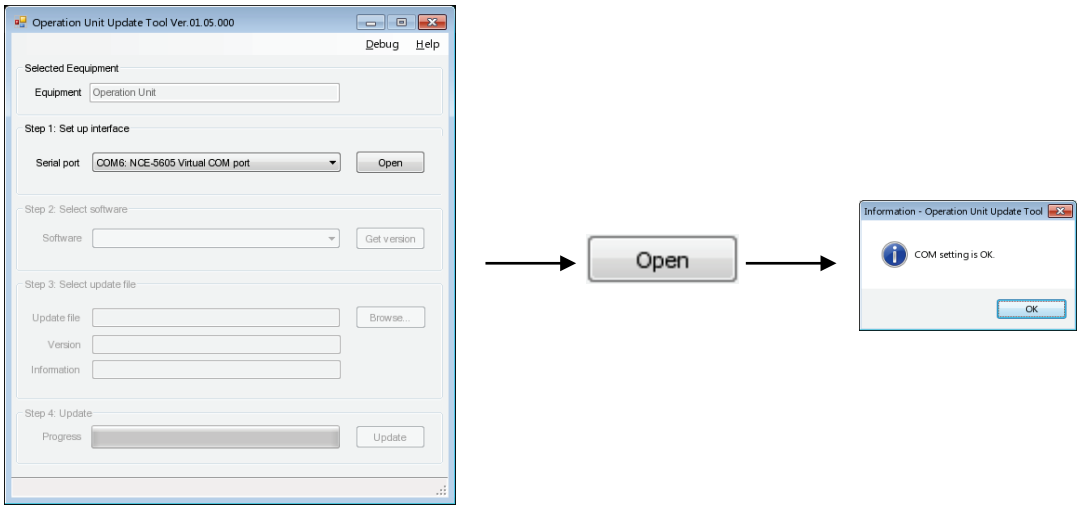




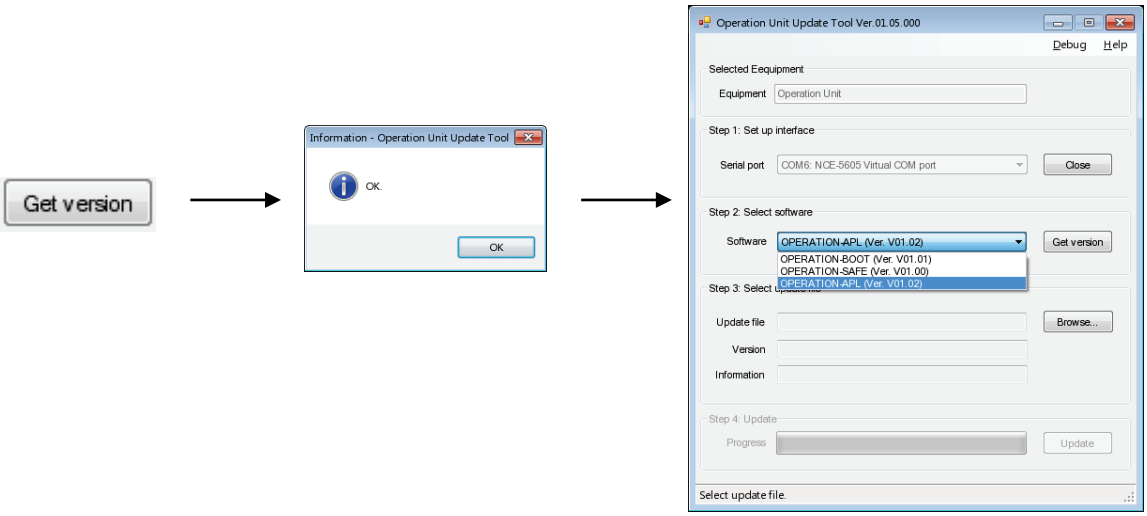
(2) Select **OperationUpdate.exe** and press OK. The remote update tool is activated.

(3) Check the COM port in the **Step1 Setup Interface** item.

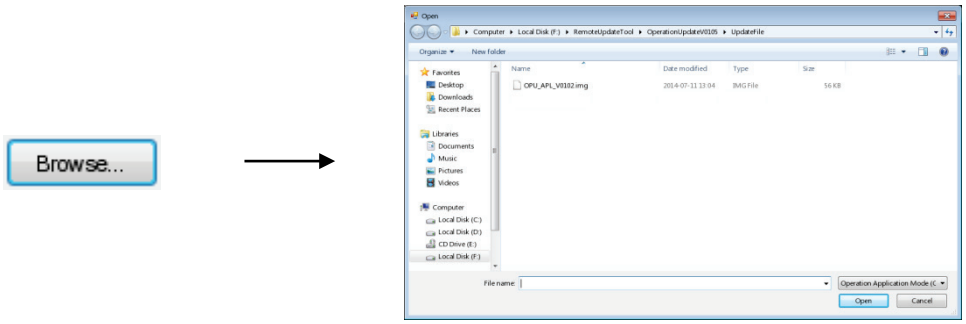
Check that **COM6:NCE-5605 Virtual COM Port** is selected. Do not select any other COM port. After checking, press the **Open** button.



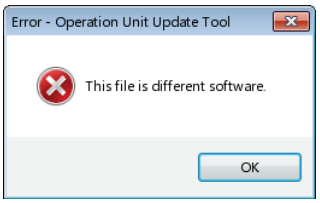
(4) Press the **"Get Version"** button in the **Step2 Select Software** item. Subsequently, select OPERATION-APL (Ver.V01.**) from the tab. (**: Firmware version)



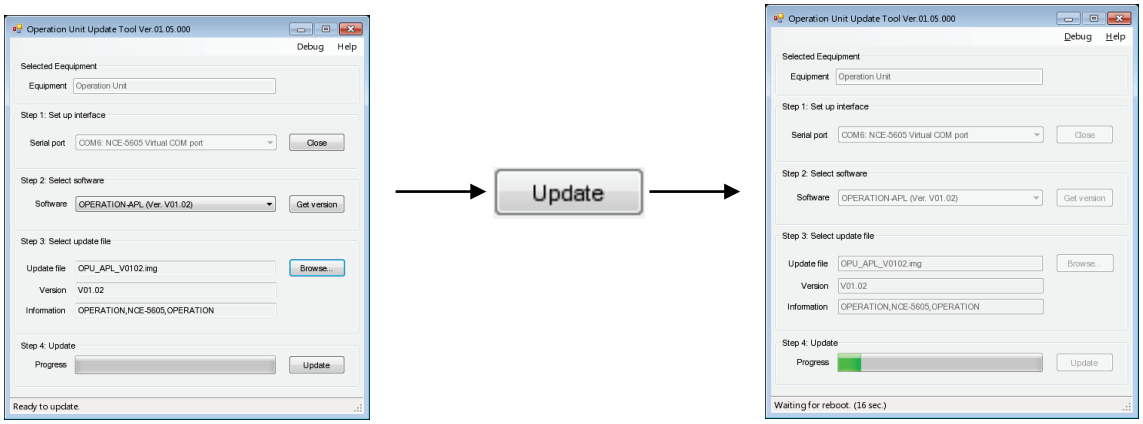
(5) Press the **"Browse…"** button in the **Step3 Select update file** item. When the Explorer screen is displayed, select the latest TOPU CMP firmware file (OPU_APL_***.img).



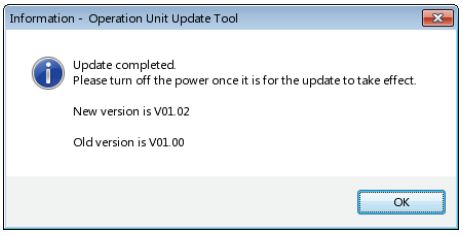
When the Firmware type and the update file do not match, an error occurs.

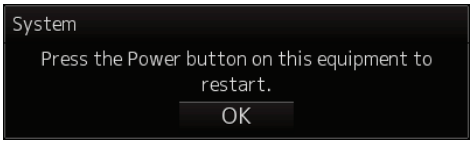


(6) After the file is selected, the **"Update"** button is enabled in the **Step4 Update** item. Start Update by pressing the button.



(7) When Update is finished normally, the Update completion window is displayed. When the **OK** button is pressed, the remote update tool is updated and processing returns to the Task screen. When the restart confirmation screen is displayed, restart.





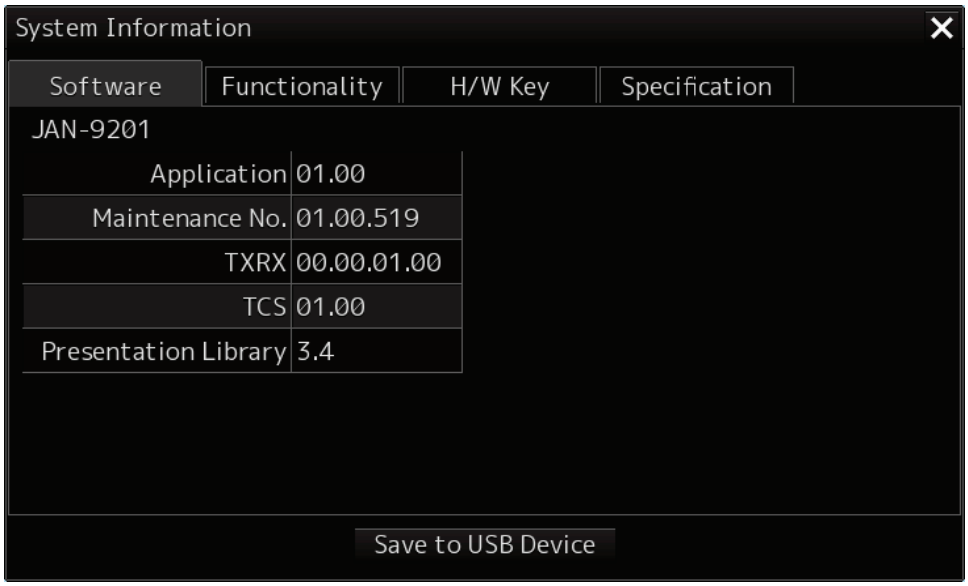
6. Confirming the updating version

After updating, confirm the firmware version in maintenance menu.

(1) Click on the [Menu] button on the left toolbar.
The menu is displayed.

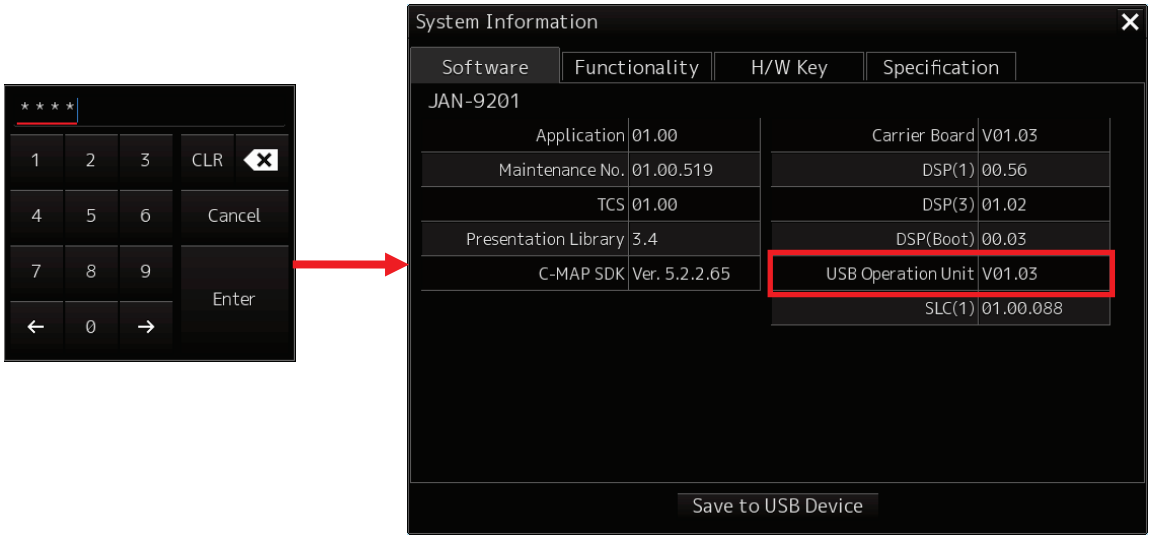
(2) Click on the [Maintenance] - [System Information] button on the menu.
The [System Information] dialog box appears.
Click on the [Software] tab.

(3) The software information is displayed.



Click on this list and code input dialog is displayed.

Input **"0000"** and additional software information is displayed.



(4) Confirm updating firmware version.

Confirm that the version number displayed at **"USB Operation Unit"** equals to the TOPU CMP firmware file.

5.5.3 Update the SLC/ALC firmware

Update the firmware of SLC/ALC that have been installed to the latest version.

The items shown in the following table are required for updating work.

Table Required Tools

No	Name	Size	Appearance
1	Flat head screwdriver	6 mm	
2	Phillips screwdriver	Size #2	
3	USB flash drive containing SLC firmware update Tool and data *1	-	-

*1 Do not use Flash drives which are password protected or encrypted

⚠ Do not lose the screws as they will be used again.

Note

When firmware 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.

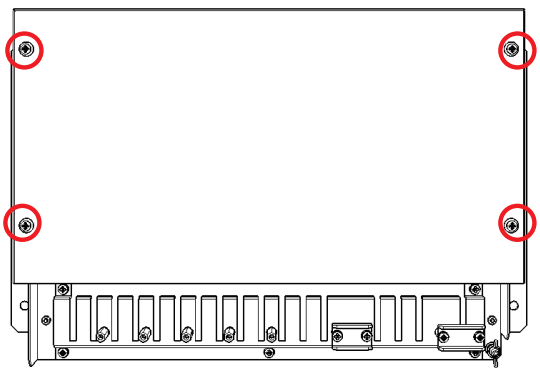
1. Prior confirmation

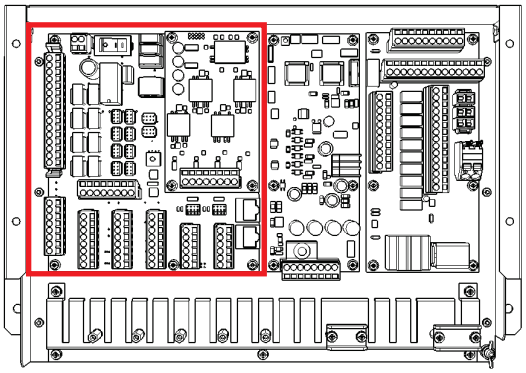
Confirm the following contents before the update.

(1) Number of SLCs/ALCs that are installed on this ship

Check the JB on this ship and check the number of SLCs/ALCs that have been installed. Firmware updating must be carried out for all the SLCs/ALCs.

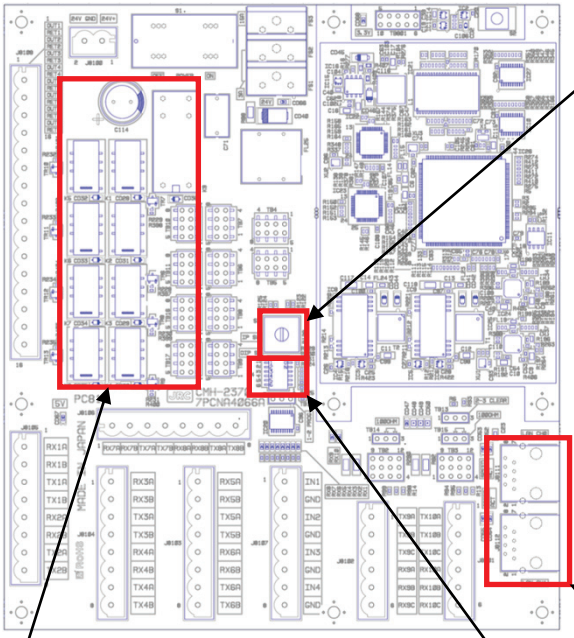
Open the cover (fixed by four screws) of each JB and check that SLC or ALC have been installed.





(2) Confirming the setting of SLC/ALC S3 rotary switch

Check the setting of S3 rotary switch of SLC/ALC. If there is an SLC with the same switch setting in each of the MAIN network and SUB network, the firmware cannot be updated correctly.



SLC/ALC S3 rotary switch

SW setting	Mode
0	No.1 SLC
1	No.2 SLC
2	No.3 SLC
3	No.4 SLC
4	No.5 SLC
5	No.6 SLC
6	No.7 SLC
7	No.8 SLC
8	No.9 SLC
9	No.10 SLC
A	No.11 SLC
B	No.12 SLC
C	No.1 ALC
D	No.2 ALC
E	No.3 ALC
F	No.4 ALC

MAIN/SUB network identification seal

SLC No. identification seal

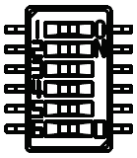
SLC/ALC identification seal

LAN connector

J8111: For Main

J8112: For Sub

Main/Sub network setting



SW1	LAN Setting (for SLC)	OFF	Main LAN
		ON	Sub LAN
SW2	LAN Type	OFF	IEC61162-450
		ON	JRC
SW3	Set Always OFF		
SW4	Set Always OFF		
SW5	Set Always OFF		
SW6	Set Always OFF		

(3) Confirming network connection

By using the network connection from Display Unit, update the SLC firmware.

Check the network connection in advance.

Check that Display Unit, NQA-2443 Sensor LAN Unit (referred to as the Sensor LAN Unit henceforth), and SLC/ALC are all turned on.

SLC that is connected to MAIN LAN:

Check that ***CCU LAN1 - Sensor LAN unit for Main - SLC J8111*** are connected through the Ethernet Cable.

SLC that is connected to SUB LAN:

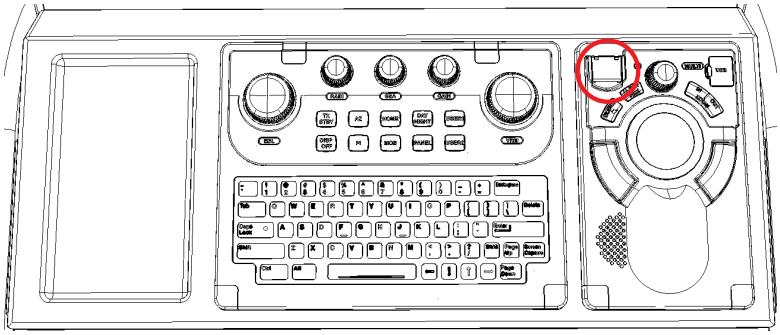
Check that ***CCU LAN2 - Sensor LAN unit for Sub - SLC J8112*** are connected through the Ethernet cable.

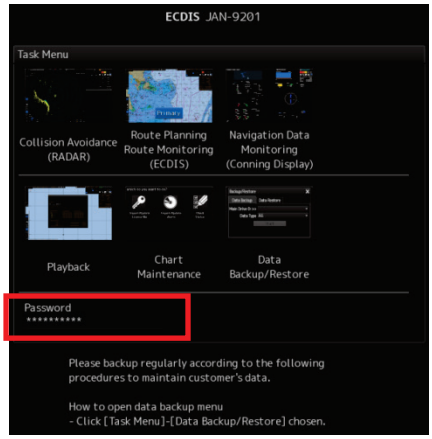
2. Supplying the power and activating the maintenance tool

Check that Display Unit, Sensor LAN Unit, and SLC are all turned on. For Display Unit, check also that the breaker of NBD-913 is turned ON.

Update can be performed from any Display units as long as they are connected to SLC through the network.

(1) Turn on the power of Display Unit by using the PWR switch of the trackball operation unit. The Task selection screen will be displayed.

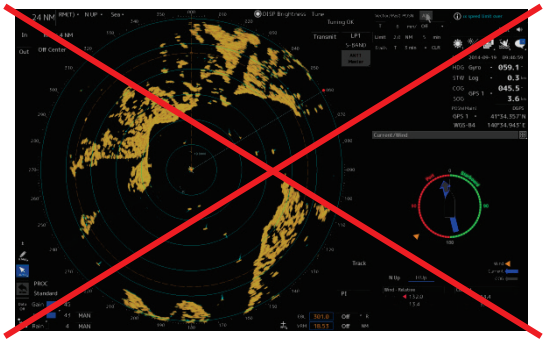




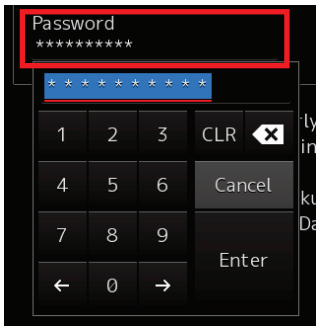
⚠ CAUTION!!

Whenever you begin update the SLC firmware, make sure that the other Display Unit on the network does not run the Task applications (RADAR, ECDIS…etc.). Other Display Units must be set Task select Screen during the updating.



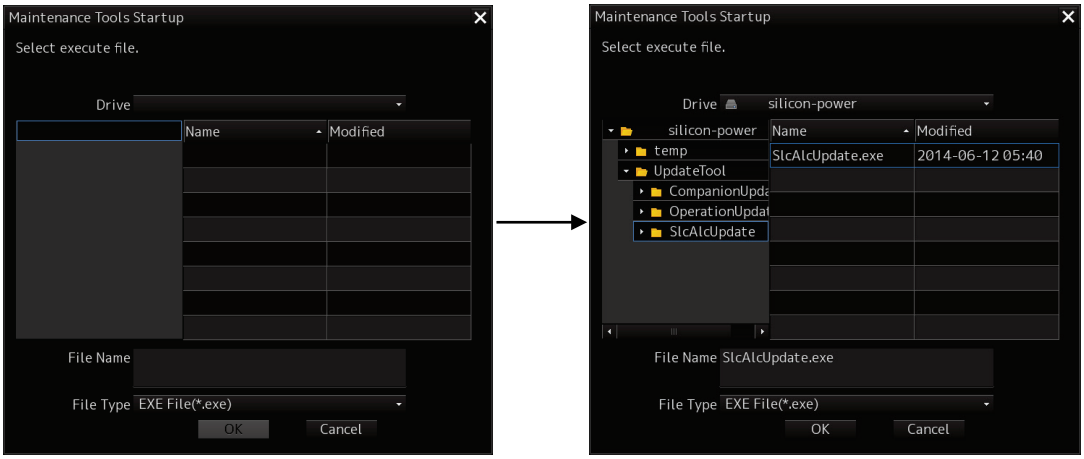


(2) Position the cursor on the Password window and left-click on it. The Password input screen is displayed. Enter **"1074"**.



3. Updating SLC/ALC firmware by using the remote update tool

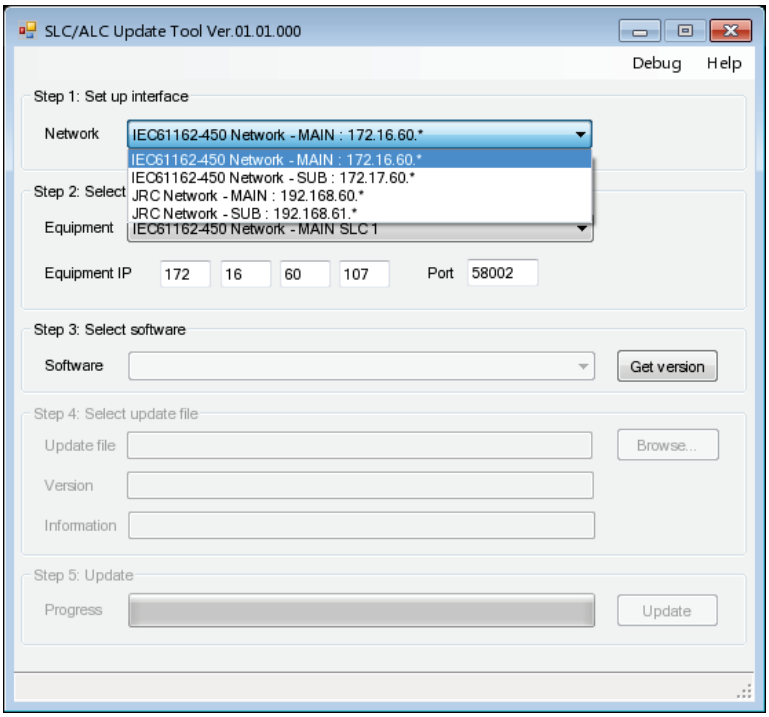
(1) The maintenance tool is activated. Connect the USB flash drive containing the SLC/ALC remote update tool to the USB port of the trackball operation unit.



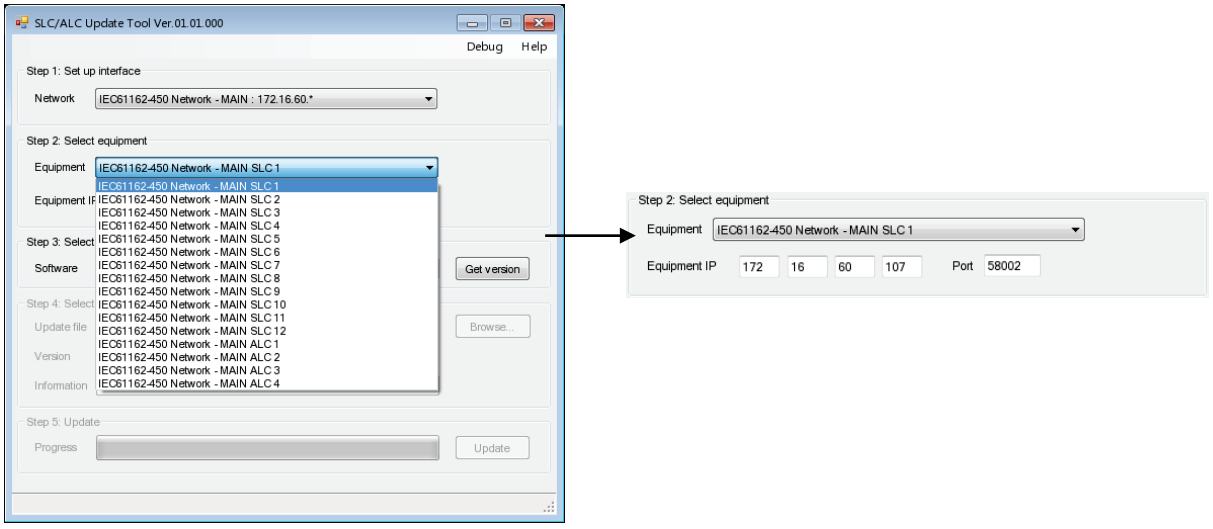
(2) Select SlcAlcUpdate.exe and press OK. The remote update tool is activated.

(3) Select a network in the Step1 Setup Interface item.

SLC that is connected to MAIN LAN: IEC61162-450 Network-MAIN:172.16.60.*
SLC that is connected to SUB LAN: IEC61162-450 Network-SUB :172.17.60.*



(4) In **Equipment** of **Step2 Select equipment**, select the SLC for which firmware update is to be performed. The IP address of the selected SLC is automatically input in **Equipment IP**. Do not change the port.

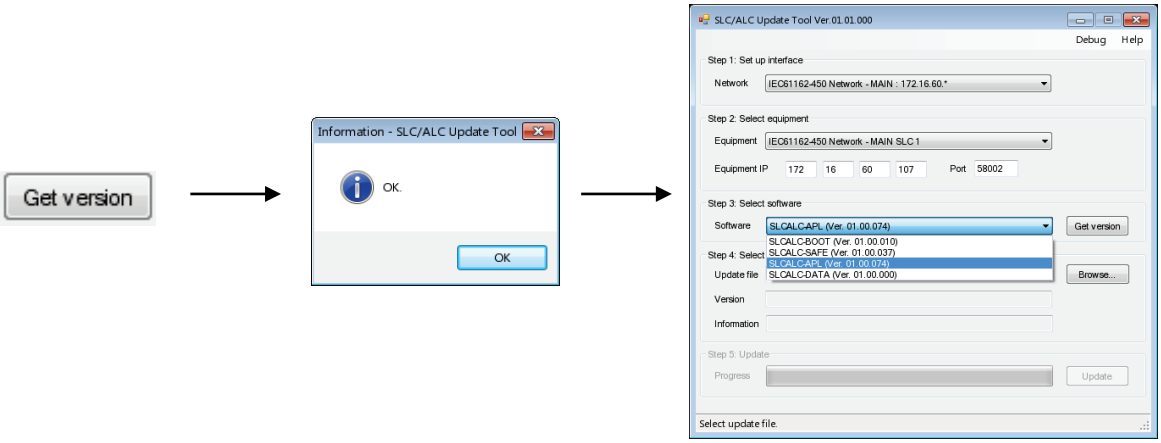


Use the No.* seal of SLC as the numeric digits of SLC*. For instance, No.2 SLC=SCL2.

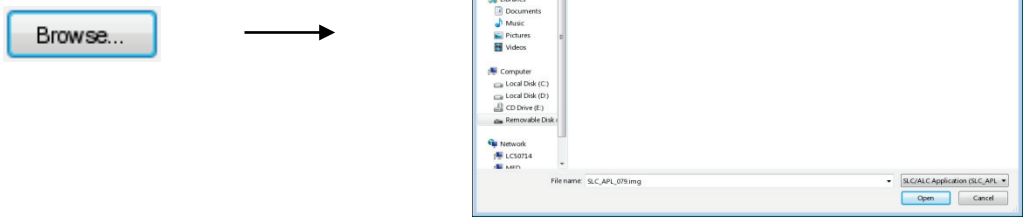
The following table shows the list of IP addresses of SLC/ALC for confirmation.

S3 Position	Operation mode	No.	Main LAN	Sub LAN
0	SLC	SLC1	172.16.60.107	172.17.60.107
1		SLC2	172.16.60.108	172.17.60.108
2		SLC3	172.16.60.109	172.17.60.109
3		SLC4	172.16.60.110	172.17.60.110
4		SLC5	172.16.60.111	172.17.60.111
5		SLC6	172.16.60.112	172.17.60.112
6		SLC7	172.16.60.113	172.17.60.113
7		SLC8	172.16.60.114	172.17.60.114
8		SLC9	172.16.60.115	172.17.60.115
9		SLC10	172.16.60.116	172.17.60.116
A		SLC11	172.16.60.117	172.17.60.117
B		SLC12	172.16.60.119	172.17.60.118
C	ALC	ALC1	172.16.60.118	172.17.60.119
D		ALC2	172.16.60.120	172.17.60.120
E		ALC3	172.16.60.121	172.17.60.121
F		ALC4	172.16.60.122	172.17.60.122

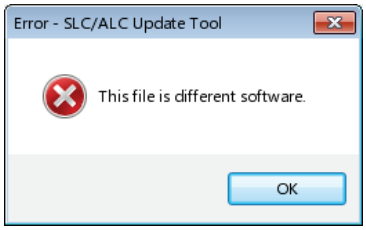
(5) Press the **"Get Version"** button on the **Step3 Select Software** item. Subsequently, select SLC/ALC-APL (Ver.01.00.**) from the tab. (**: Firmware version)



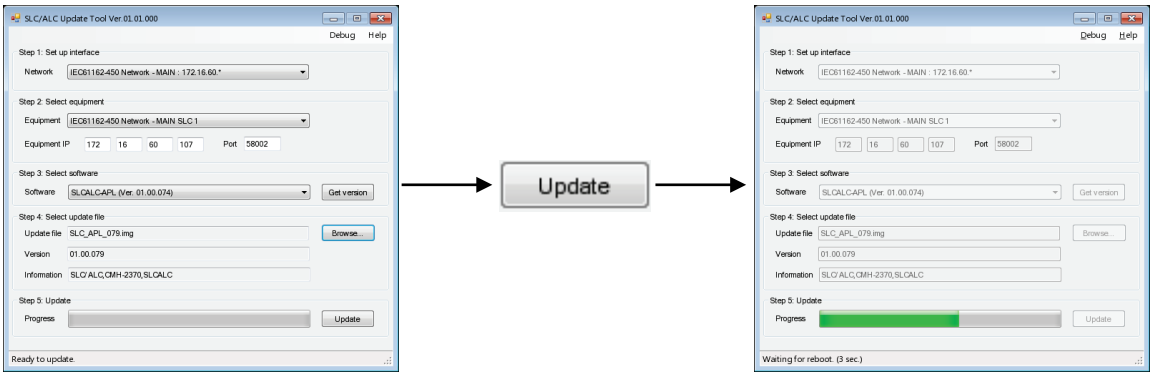
(6) Press the **"Browse…"** button in the **Step4 Select update file** item. When the Explorer screen is activated, select the latest SLC/ALC firmware file (SLC _APL_***.img).



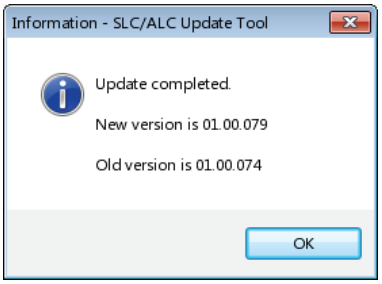
When the firmware type and update file do not match, an error occurs.

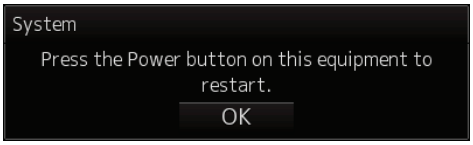


(7) After the file is selected, the **"Update"** button is enabled in the **Step5 Update** item. Start Update by pressing the button.



(8) When Update is finished normally, the Update completion window is displayed. When the **OK** button is pressed, the remote update tool is terminated and processing returns to the Task screen. When the activation confirmation screen is displayed, restart.





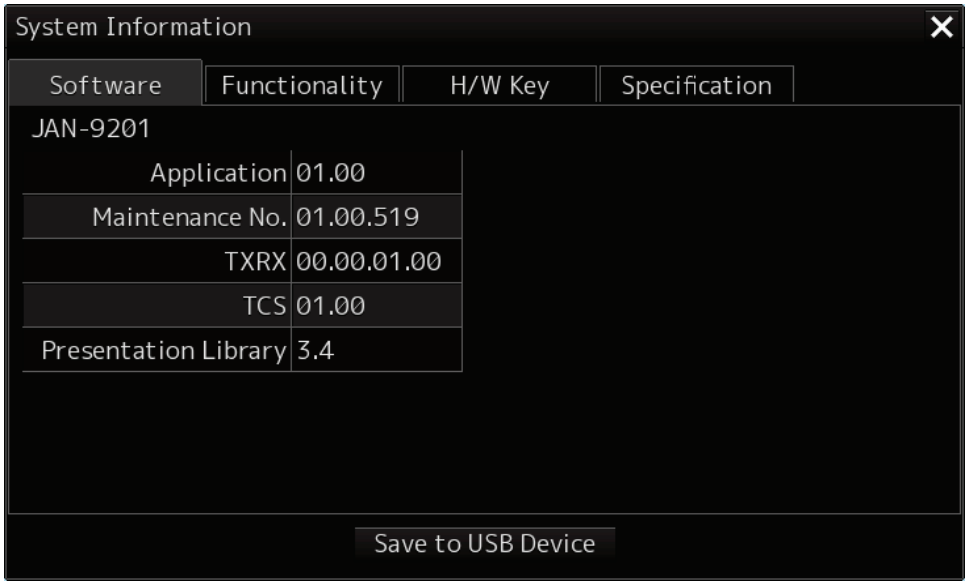
4. Confirming the update version

After updating, confirm the firmware version in maintenance menu.

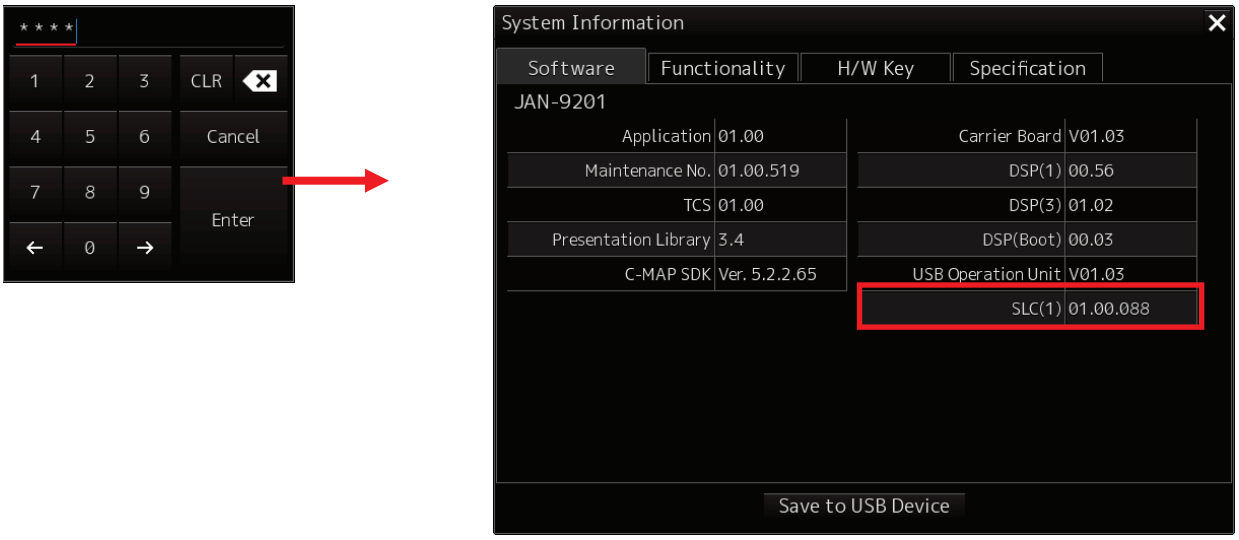
(1) Click on the [Menu] button on the left toolbar.
The menu is displayed.

(2) Click on the [Maintenance] - [System Information] button on the menu.
The [System Information] dialog box appears.
Click on the [Software] tab.

(3) The software information is displayed.



Click on this list and code input dialog is displayed.
Enter **"0000"** and additional software information is displayed.



(4) Confirm updating software version.

Confirm that the version number displayed at **"SLC(n)"** equals to the SLC/ALC firmware file.

6. Connection to External Navigation Equipment

Chapter 6. Connection to and Settings of External Navigation Equipment

6.1 Connection with Radar Options

6.1.1 Interswitch Unit

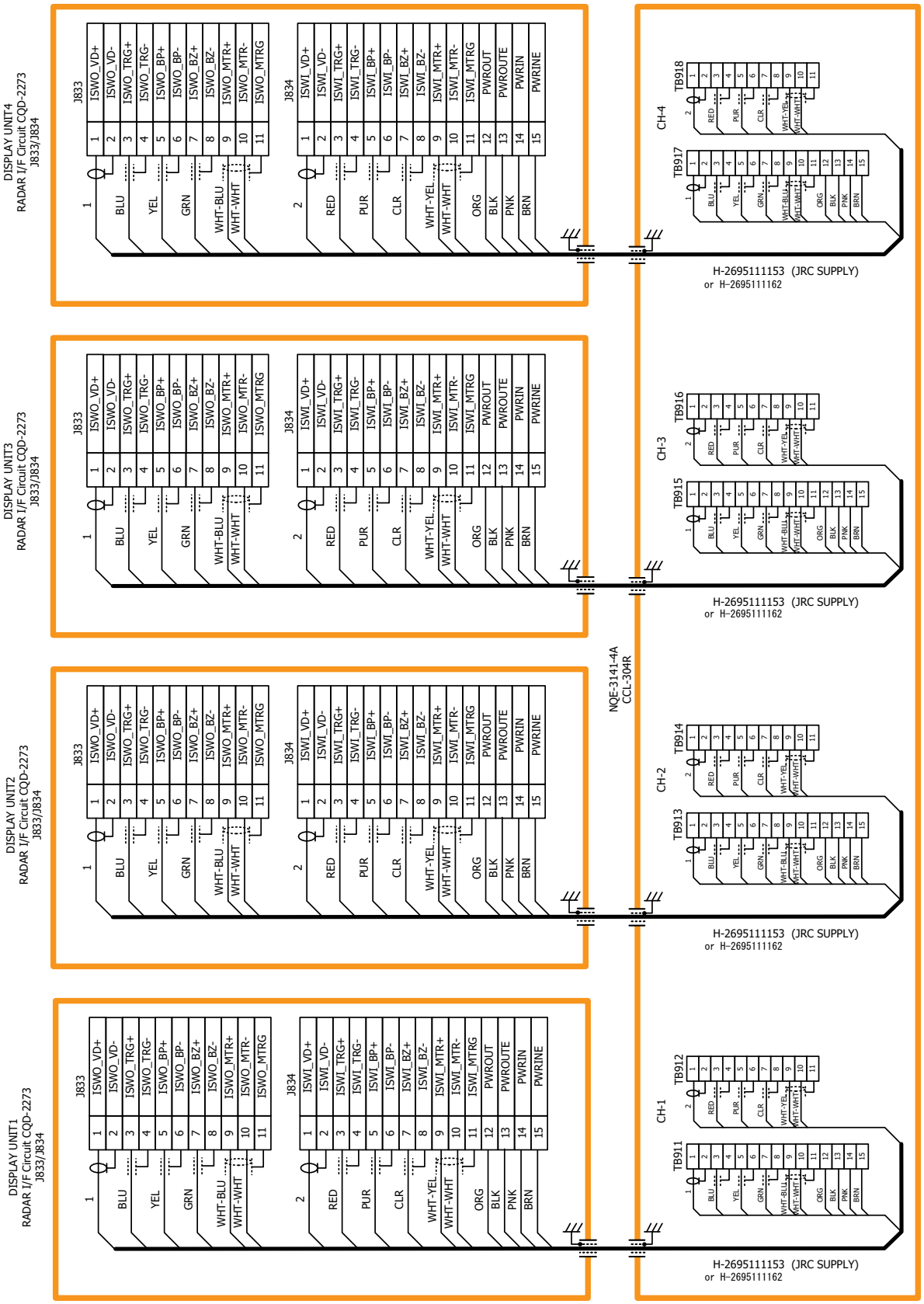
6.1.1.1 Checking the Installation Status

For information about checking the installation status of the interswitch unit, please refer to Chapter 5 in the "JMR-92XX/72XX JAN-92XX/72XX Installation Manual."

6.1.1.2 Setting the Interswitch Unit

For information about checking the installation status of the interswitch unit, please refer to Chapter 5 in the "JMR-92XX/72XX JAN-92XX/72XX Installation Manual."

6.1.1.3 Interconnection Diagram



6.1.2 Power Control Unit

The NQE-3167 power control unit is used when a scanner unit and a transmitter-receiver unit are installed away from the bridge, such as at the foremast.

In the case of a dual scanner unit, the maximum cable length between the display unit and the scanner unit is "65 m." In the case of a triple scanner unit, the maximum cable length between the display unit and the scanner unit is "35 m."

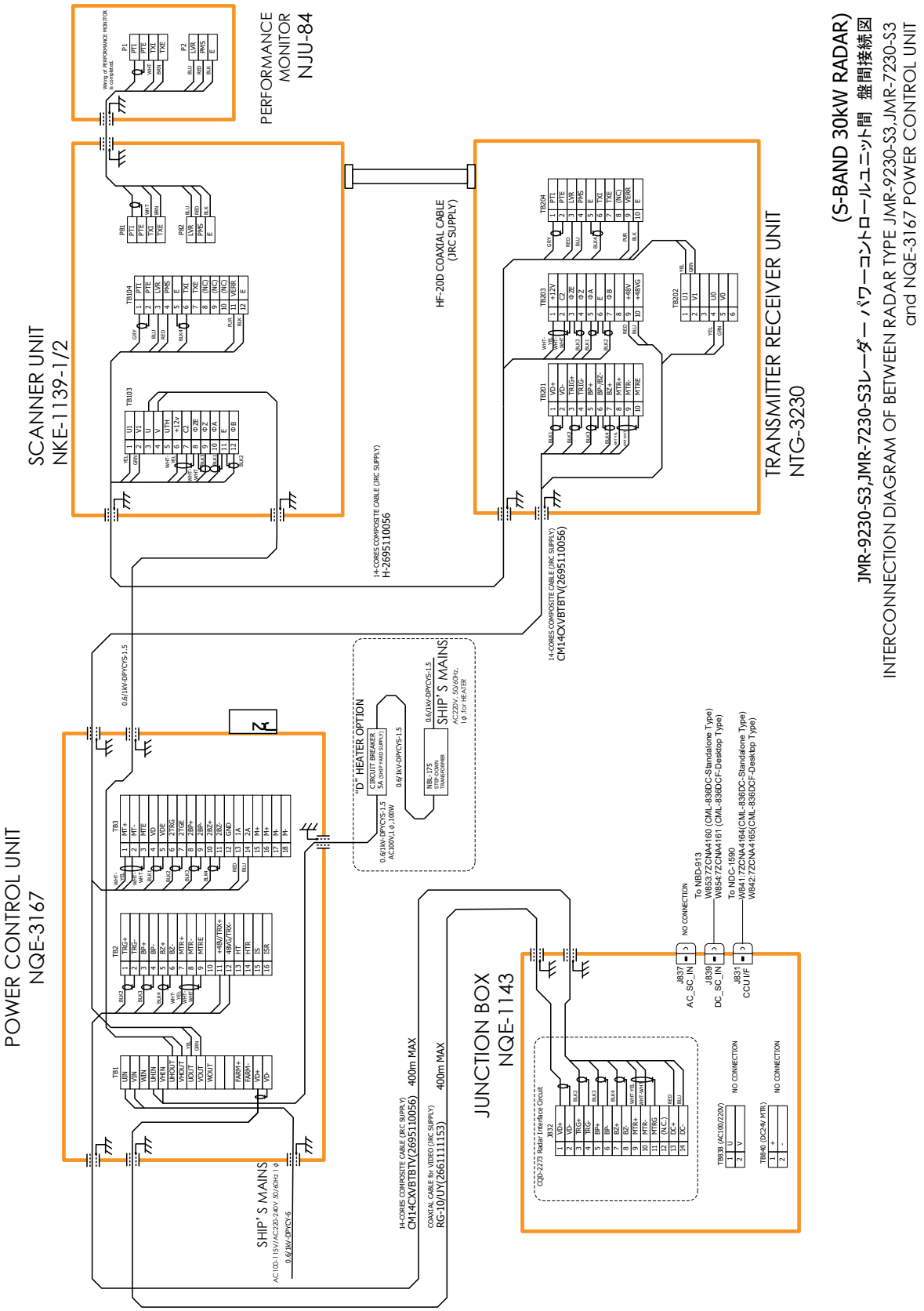
By using the NQE-3167 power control unit, it is possible to extend the maximum cable length between the display unit and the scanner unit (transmitter-receiver unit) up to "465 m."

Maximum cable length between the scanner unit and the transmitter-receiver unit	30 m
Maximum cable length between the transmitter-receiver unit and the power control unit	35 m
Maximum cable length between the display unit and the power control unit	400 m

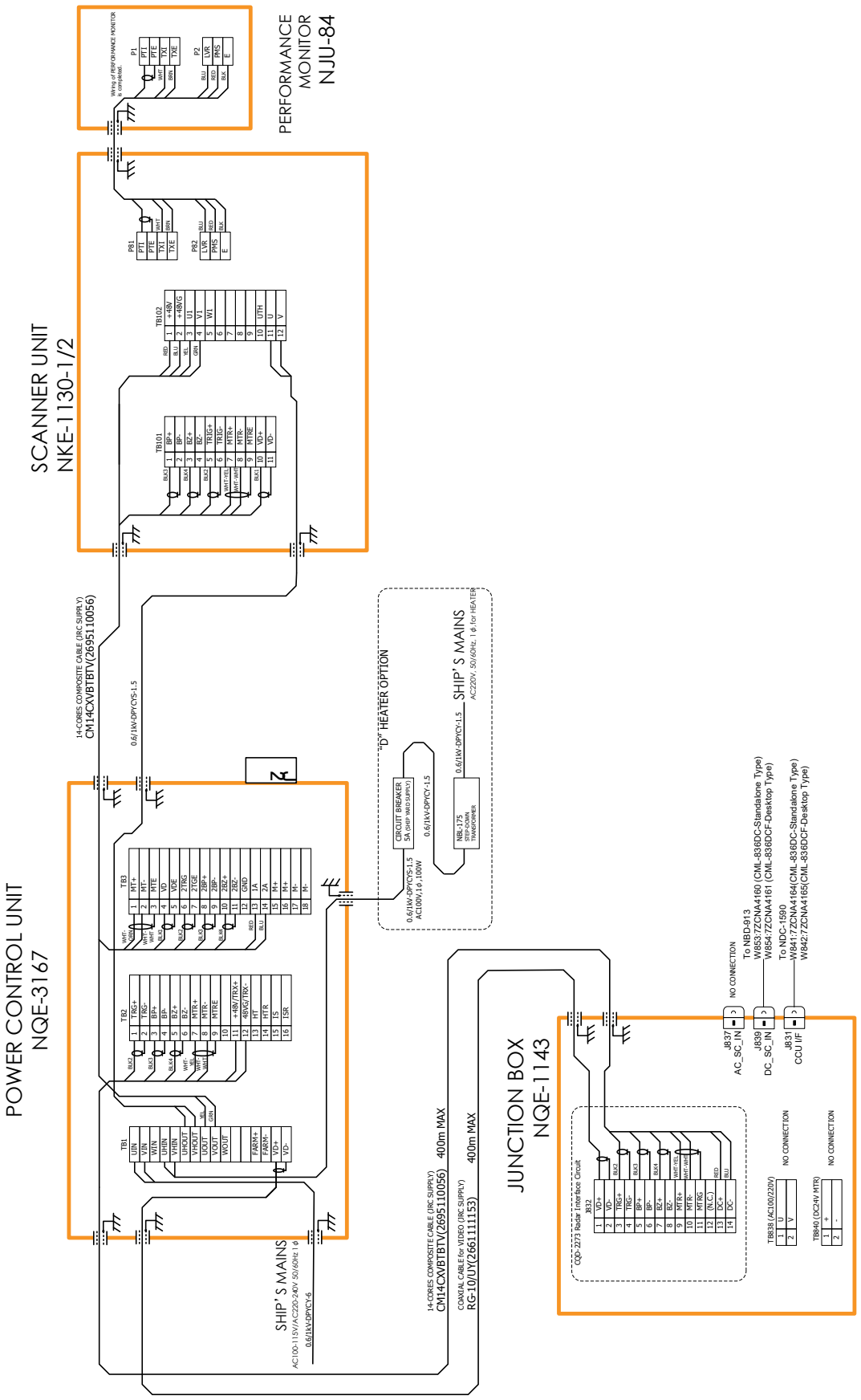
6.1.2.1 Checking the Installation Status

For information about checking the installation status of the interswitch unit, please refer to Chapter 5 in the "JMR-92XX/72XX JAN-92XX/72XX Installation Manual."

6.1.2.2 Interconnection Diagram for JMR-9230-S3, JMR-7230-S3

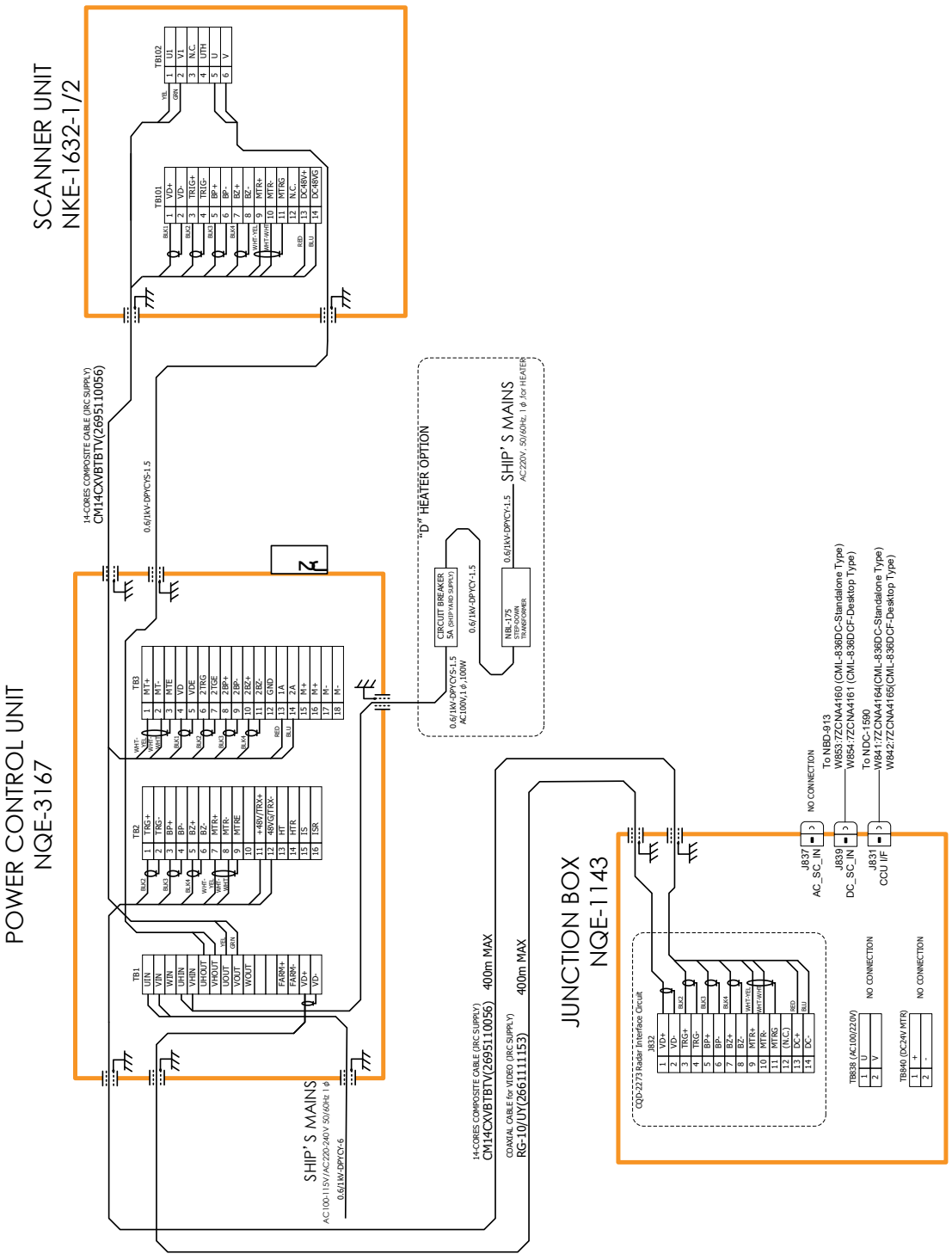


6.1.2.3 Interconnection Diagram for JMR-9230-S, JMR-7230-S

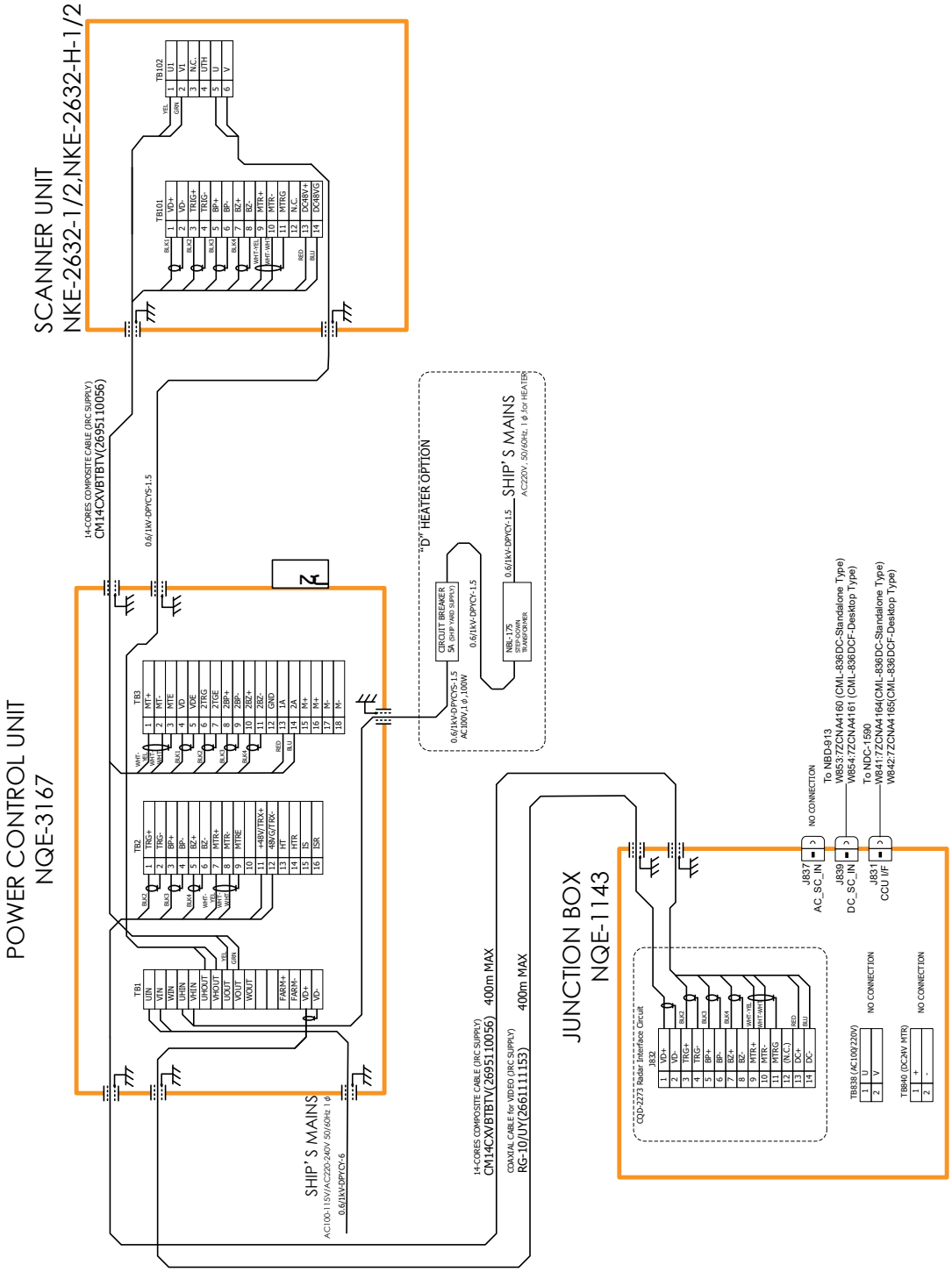


(S-BAND 30kW RADAR)
JMR-9230-S,JMR-7230-Sレーダー パワーコントロールユニット間 盤間接続図
INTERCONNECTION DIAGRAM OF BETWEEN RADAR TYPE JMR-9230-S,JMR-7230-S
and NQE-3167 POWER CONTROL UNIT

6.1.2.4 Interconnection Diagram for JMR-9272-S, JMR-7272-S

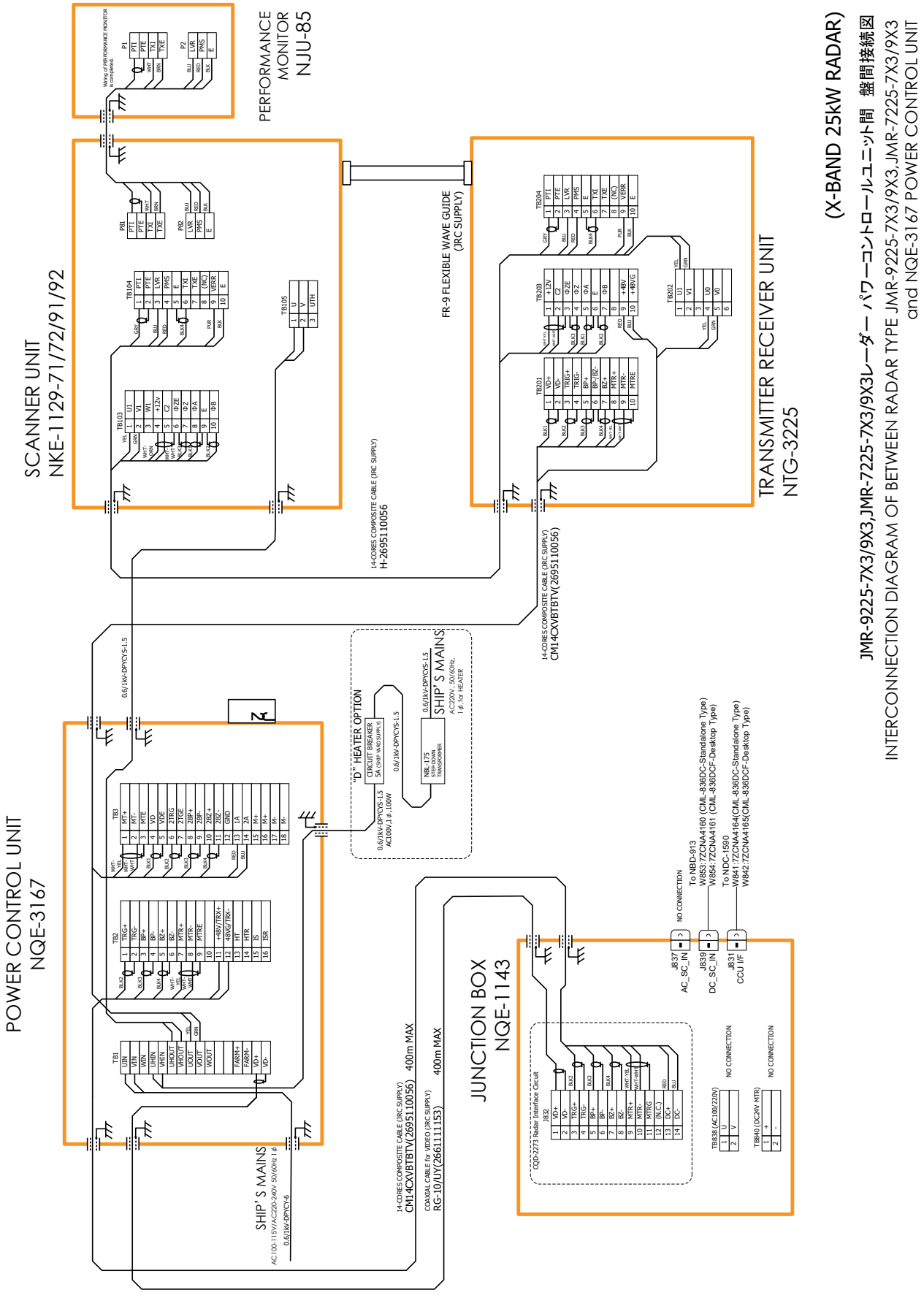


6.1.2.5 Interconnection Diagram for JMR-9282-S/SH, JMR-7282-S/SH



(S-BAND 250kW Solid State RADAR)
JMR-9282-S/SH,JMR-7282-S/SHレーダー、パワーコントロールユニット間 盤間接続図
INTERCONNECTION DIAGRAM OF BETWEEN RADAR TYPE JMR-9282-S/SH,JMR-7282-S/SH
and NQE-3167 POWER CONTROL UNIT

6.1.2.6 Interconnection Diagram for JMR-9225-7X3/9X3, JMR-7225-7X3/9X3

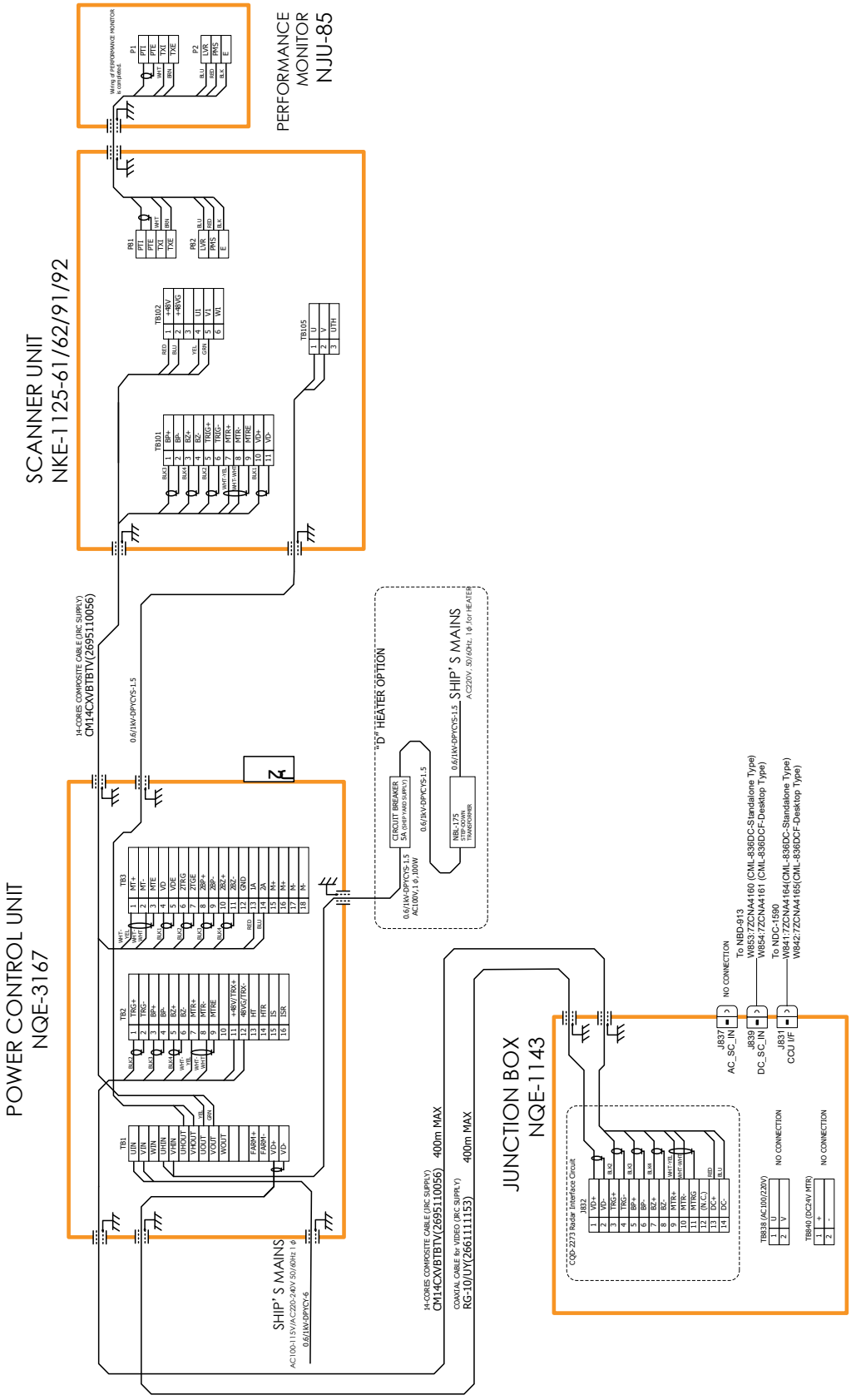


(X-BAND 25kW RADAR)

JMR-9225-7X3/9X3,JMR-7225-7X3/9X3レーダー パワーコントロールユニット間 盤間接続図

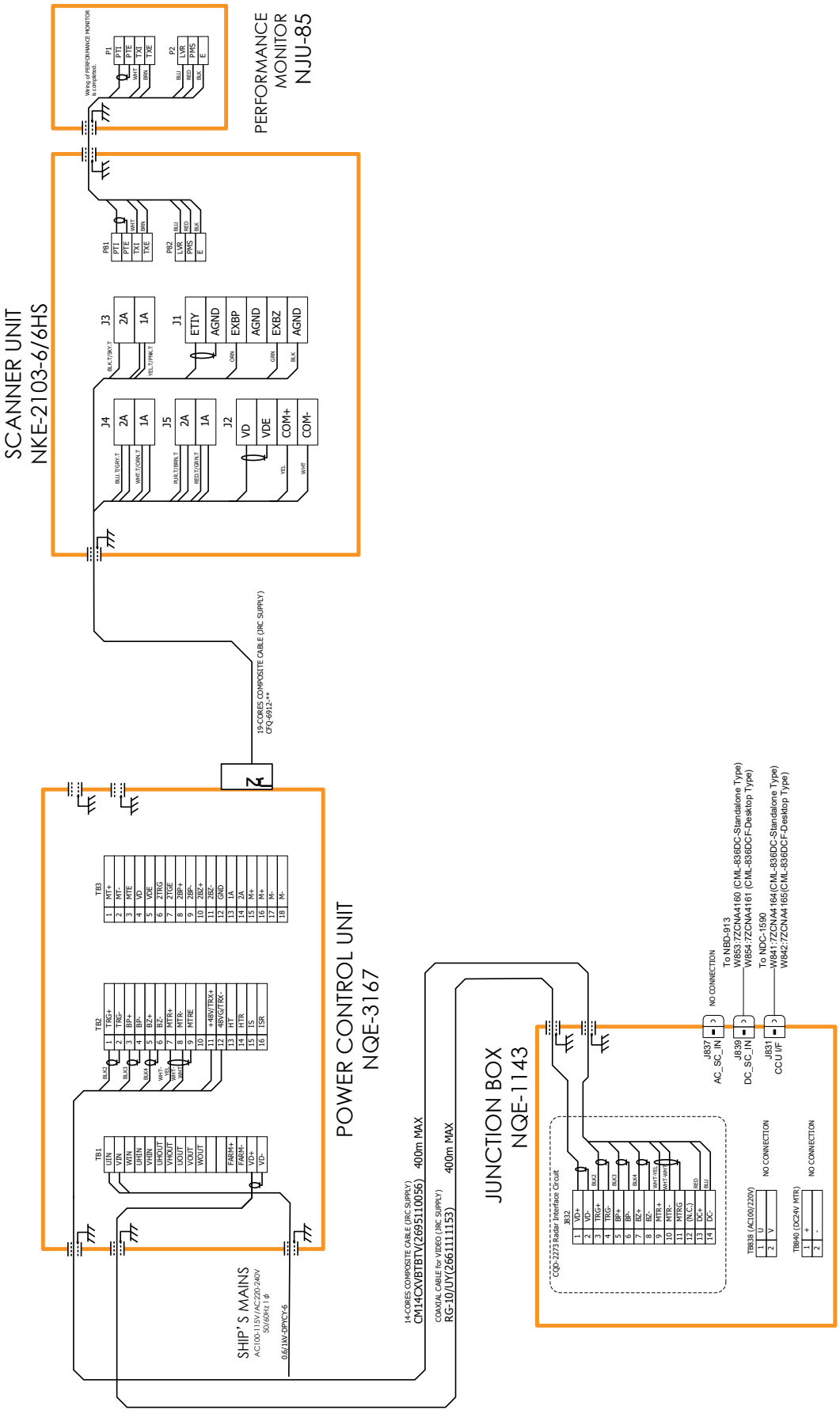
INTERCONNECTION DIAGRAM OF BETWEEN RADAR TYPE JMR-9225-7X3/9X3, JMR-7225-7X3/9X3 and NQE-3167 POWER CONTROL UNIT

6.1.2.7 Interconnection Diagram for JMR-9225-6X/9X, JMR-7225-6X/9X



(X-BAND 25kW RADAR)
JMR-9225-6X/9X,JMR-7225-6X/9Xレーダー、パワーコントロールユニット間 盤間接続図
INTERCONNECTION DIAGRAM OF BETWEEN RADAR TYPE JMR-9225-6X/9X,JMR-7225-6X/9X and NQE-3167 POWER CONTROL UNIT

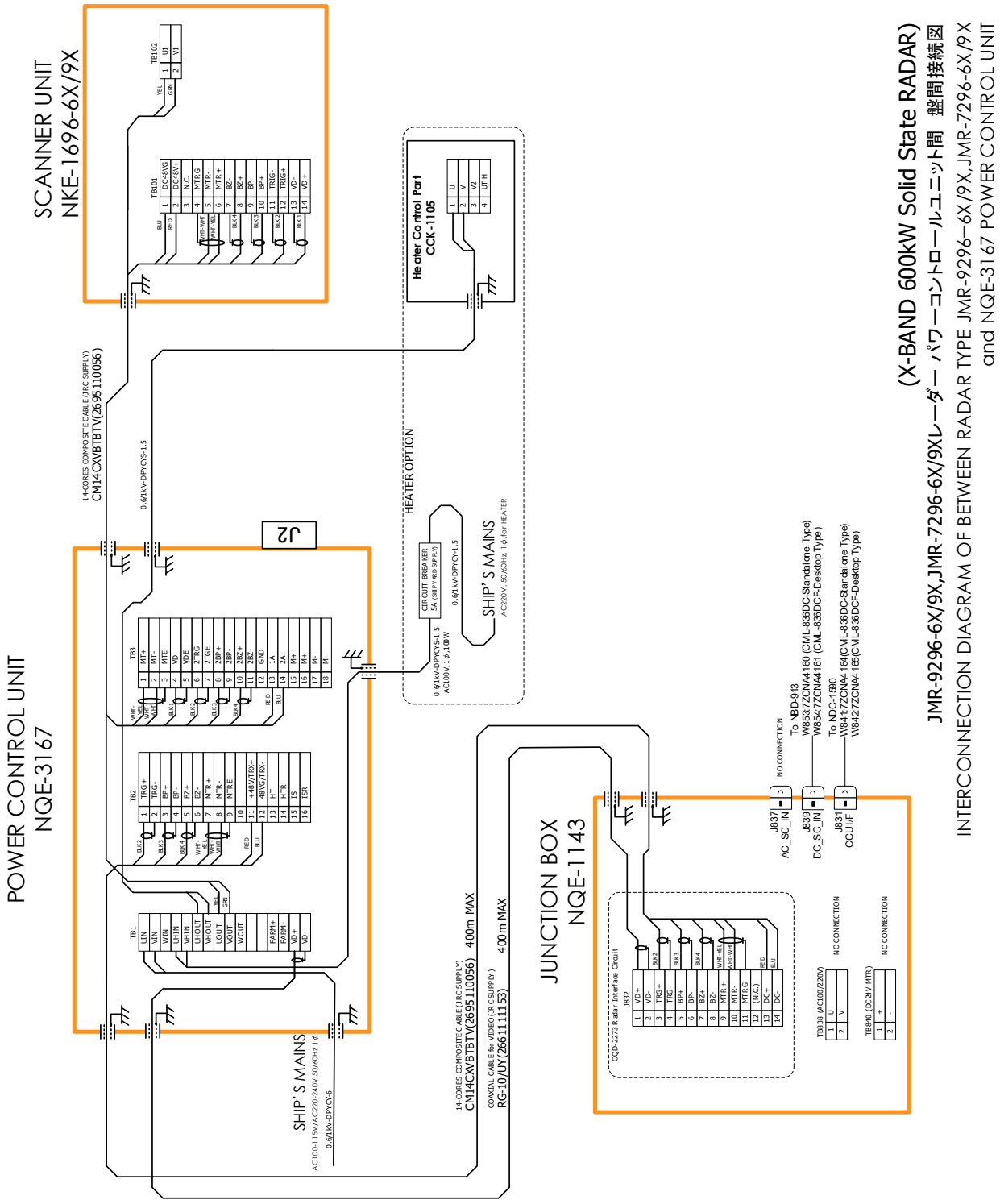
6.1.2.8 Interconnection Diagram for JMR-9210-6X/6XH, JMR-7210-6X/6XH



JMR-9210-6X/6XH,JMR-7210-6X/6XHレーダー パワーコントロールユニット間 盤間接続図 (X-BAND 10kW RADAR)

INTERCONNECTION DIAGRAM OF BETWEEN RADAR TYPE JMR-9210-6X/6XH,JMR-7210-6X/6XH and NQE-3167 POWER CONTROL UNIT

6.1.2.9 Interconnection Diagram for JMR-9296-6X/9X, JMR-7296-6X/9X



6.2 Connection with VDR

6.2.1 Checking the Installation Status

The following two types of connection methods are available for connection with the voyage data recorder (VDR).

1. Connection via LAN (IEC61162-450).
2. Connection through analog RGB

Please refer to Chapter 5 in the "JMR-92XX/72XX JAN-92XX/72XX Installation Manual" and check the installation status with the VDR.

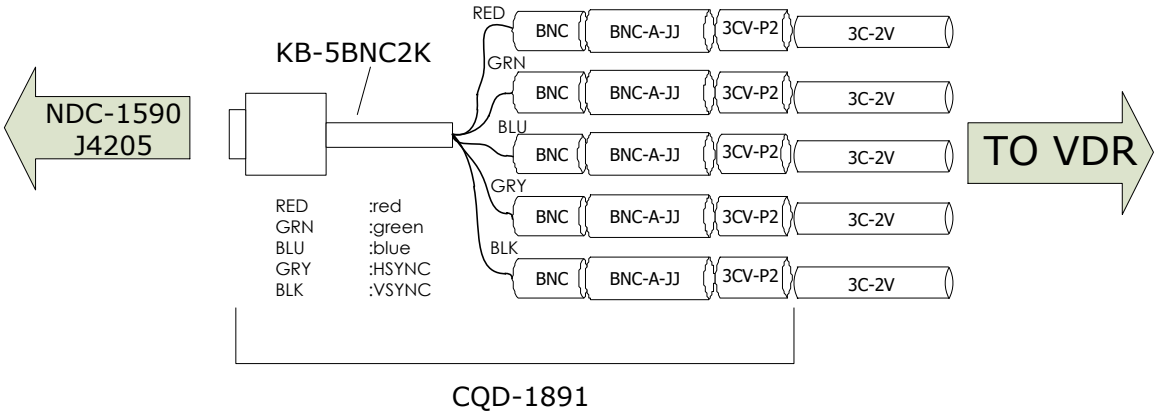
6.2.2 VDR Interface Kit

The VDR interface kit is used to connect the analog RGB signal to the VDR. For the details, refer to Chapter 5 in the "JMR-92XX/72XX JAN-92XX/72XX Installation Manual".

VDR Interface Kit CQD-1891 Packing list:

DSUB15P – BNC cable (KB5BNC2K, 2 meters)	1 pc.
BNC to BNC adapter (BNC-A-JJ)	5 pc.
BNC connector (3CV-P2)	5 pc.

Use a 3C-2V coaxial cable for connection.



6.3 Connection with ECDIS

6.3.1 Checking the Installation Status

Please refer to Chapter 3 in the "JMR-92XX/72XX JAN-92XX/72XX Installation Manual" and check the installation status with the ECDIS.

6.3.2 Connecting with the ECDIS

The video signal of the RADAR is output from the J836 of the CQD-2273 radar interface circuit. The radar interface circuit is mounted in the NQE-1143 JB.

Connect the No.1 ECDIS to J836 EX_OUT (VD+, VD-, TRG+, TRG-, BP+, BP-, BZ+, BZ-).

Target tracking information is output via LAN. Connect the ECDIS to the NQA-2443 Sensor LAN switch. When connecting an ECDIS of the JAN-901B/701B, JAN-901/901M/701 or JAN-2000 model to the JMR-9200/7200 Series RADAR, perform output settings of the IEC61162-1 TX terminal of the serial LAN interface circuit (SLC) in the display unit of the RADAR, and then output the target tracking information.

For the details, please refer to Chapter 3 in the "JMR-92XX/72XX JAN-92XX/72XX Installation Manual"

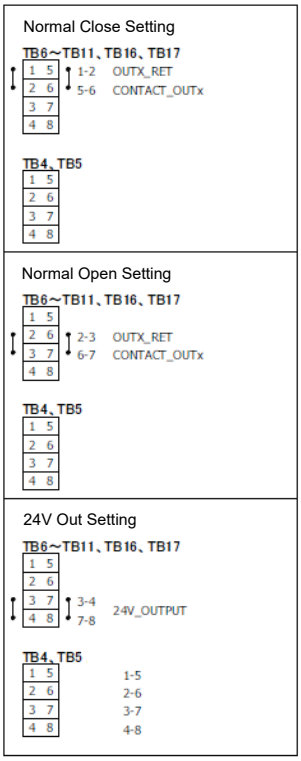
6.4 Connection with BNWAS

The display unit of this product has the function to input/output the various contact signals for the Bridge Navigational Watch Alarm System (BNWAS*). Connect necessary signals by referring to the table below.

All signals are preset at normally open when shipped from the factory.

Terminal Block	Signal Name	IN/OUT	Description	Remarks
CMH-2370 SLC J8108	SYS ALM	OUT	The system alarm status is output.	Set to normally closed with a jumper.* 1
CMH-2370 SLC J8108	ARPA ALM	OUT	The dangerous ship alarm status is output.	Set to normally closed with a jumper.*
NDC-1590 J4302	PWR FAIL	OUT	The disconnection of the ship's main power supply is detected. It is necessary to connect the backup DC24V power supply of the NBD-913 PSU in advance.	Normally closed
CMH-2370 SLC J8107	SYS ACK	IN	The ACK signal of system alarm is input.	"False" denotes either an open or disconnected state. "True" denotes a closed state.
CMH-2370 SLC J8107	ARPA ACK	IN	The ACK signal of dangerous ship alarm is input.	"False" denotes either an open or disconnected state. "True" denotes a closed state.
CMH-2370 SLC J8108	ACK OUT	OUT	The ACK signal of alarm is output.	Set to normally open with a jumper.* 1
NDC-1590 J4302	WMRS T	OUT	The watch timer reset signal is output.	Normally open

*1 Serial LAN interface circuit jumper settings



(*) BNWAS Bridge Navigation Watch Alarm System

6.5 Subsystem Installation

Use the "Subsystem Installation" dialog to verify and change the subsystem configuration of this equipment.

6.5.1 Displaying the "Subsystem Installation" dialog

1 Display the dialog of the Installation submenu.

2 Select [System Configuration] in the 1st Classification pane and [Subsystem Configuration] in the 2nd Classification pane.

The "Subsystem Installation" dialog is displayed in the Edit/Result pane.



6.5.2 Changing the subsystem configuration

Set the following items in the "Subsystem Installation" dialog.

If the presence/absence of the equipment is set in this dialog, the menu display/hide and configuration contents relating to the equipment change according to the setting contents.

Setting item	Description of setting	Setting value
Own Task Station	Select the Task Station number of the equipment from the combo box. Select from the task stations that were set in Task Stations 1 to 8 of Device Installation.	Task Station 1 ~ Task Station 8
	Select installation/non-installation of the USB OPU (Operation Unit) by using the [USB OPU] check box. When the unit is installed, select the installation contents in the [USB OPU] combo box. **Memo** When OPU is installed, the OPU active/inactive monitoring is performed. When there is no response, the following alert is displayed and OPU is restarted. OPU: OPU-USB(Communication error) Keyboard: OPA-OPB(Communication error)	**Installation/non-installation of the unit** Absent: Clear Present: Select **Installation contents** No keyboard operation unit (optional): Select Trackball. Keyboard operation unit (optional): Select Trackball + Keyboard.
	Select the installation/non-installation of Serial OPU (Operation Unit) by using the [Serial OPU] check box. When OPU is installed, select the installation contents in the [Serial OPU] combo box. **Memo** When OPU is installed, the OPU active/inactive monitoring is performed. When there is no response, the following alert is displayed and OPU is restarted. OPU: OPU-Serial(Communication error) Keyboard: OPA-OPB(Communication error)	**Installation/non-installation** Non-installation: Clear Installation: Select **Installation contents** No keyboard operation unit (optional): Select Trackball. Keyboard operation unit (optional): Select Trackball + Keyboard.
Junction Box	Select installed/not installed of junction boxes 1 to 8 from the [Junction Box 1 ~ 8] check boxes.	Not installed: Clear. Installed: Select.
	In the combo box for selecting a Task Station, select the equipment that is directly connected to Radar I/F or Gyro I/F of the junction box.	Equipment that is assigned to any of Task Stations 1 to 8 of Device Installation
	Select the equipment to be installed in the Junction Box that was selected from [Junction Box 1 ~ 8] check boxes.	None SLC 1 to 8(Main) SLC 1 to 8(Sub) ALC 1 to 8 RIF GIF RIF + GIF
	When SLC is selected from the combo box, select installed/not installed of AOC with the [AOC] check box.	Not installed: Clear. Installed: Select.

Setting item	Description of setting	Setting value
Device Installation	Select installed/not installed of the device by using the check box of each subsystem. For the subsystem that is installed, select the parameters from the combo box. No restrictions are placed on the order of assigning the devices to Taskstation1-Taskstation8. The following shows an example of device assignment to task stations: (Example) Device assignment in ascending order of the values of IP-address 4th octets (Refer to 4.11 "JRC Network IP Address.") 1: No.1 RADAR 2: No.2 RADAR 3: No.1 ECDIS 4: No.2 ECDIS 5: No.1 CON Note: The subsystems that are displayed as disabled will be supported in the future.	Not installed: Clear. Installed: Select. Subsystem Task Station 1~Task Station 8 RADAR 1, 2 *1 VDR(JRC) Primer Heading Sensor 1, 2 Gyro Switch Log 1, 2 GPS 1~4 Ship's Clock Echo Sounder (T/D 1~4) AIS NAVTEX Anemometer1 Water TEMP Meter Current Meter Climate Meter ROT Indicator Autopilot Rudder Engine/Propeller Engine Telegraph Bow Thruster Stem Thruster Azimuth Thruster Generator S-JOY 1 to 5 GPS Selector Log Selector Inmarsat-C 1、2 BNWAS General Equipment(Alert)

(*1) For ECDIS, the communication radar is to be checked.

Table 4-1 Device numbers that can be selected

No.	Device numbers that can be selected		No.	Device numbers that can be selected
1	None		12	No.3 ECDIS
2	No.1 RADAR		13	No.4 ECDIS
3	No.2 RADAR		14	No.1 CON
4	No.3 RADAR		15	No.2 CON
5	No.4 RADAR		16	No.1 CON (Wing)
6	No.5 RADAR		17	No.2 CON (Wing)
7	No.6 RADAR		18	No.1 CON (Remote)
8	No.7 RADAR		19	No.2 CON (Remote)
9	No.8 RADAR		20	No.1 RPS
10	No.1 ECDIS		21	No.2 RPS

11	No.2 ECDIS			

Note

- Do not select the same Task Station number of Own Task Station among multiple devices. If the same Task Station number is selected among multiple devices, unintended operation is performed.
- When performing radar overlay without installing interswitch, do not forget to check Device Installation systems RADAR1 and RADAR2 (when two radar systems are available). When interswitch is installed and available for use, radar overlay can be performed regardless of the setting of RADAR1 and RADAR2. For the setting of interswitch, refer to "4.16 Setting Interswitch".

Setting example

The following diagram shows the setting example of [Own Task Station] and [Device Installation] when the subsystem is configured as follows:

No.1 RADAR (S band radar) as Task Station 1

No.2 RADAR (X band radar) as Task Station 2

No.1 ECDIS as Task Station 3

No.2 ECDIS as Task Station 4

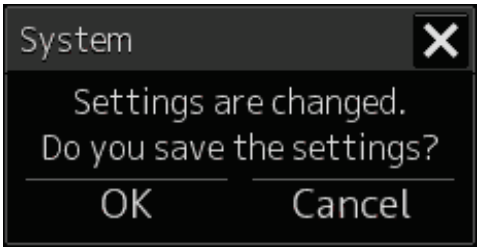
Conning as Task Station 5



6.5.3 Saving subsystem configuration changes

1 Click on the [Set] button in the "Subsystem Installation" dialog.

A dialog is displayed prompting confirmation of saving the configuration changes.



2 To save the changes, click on the [OK] button. To cancel the changes, click on the [Cancel] button.

6.5.4 SYNC Manually

When the SYNC Manually at the bottom left of the screen that is displayed by selecting Service Menu/Installation is clicked on, the equipment setting for SLC/ALC is written. When more than one CCUs are installed, the CCU for which SYNC Manually is clicked on is set as the synchronization source.



6.6 Setting Up a Serial Port

Use the "Serial Port" dialog to verify the setting of the serial port of this equipment and perform the initial setting. The status of ISW/MTR and Serial OPU can also be monitored.

6.6.1 Displaying the "Serial Port" dialog.

1. **Display the dialog of the Installation submenu.**

2. **Select [System Configuration] in the 1st Classification pane and [Serial Port] in the 2nd Classification pane.**
   The "Serial Port" dialog is displayed in the Edit/Result pane.



Tab name
SLC1～4(M)/
SLC1～4(S)/
ALC1～4

Is displayed only if the SLC1 ~ 4 (S). Refer to "For making SLC(Main) and SLC(Sub) the same setup".

[Diagnosis] lamp light colors

The [Diagnosis] lamp displays the diagnosis result as to whether the sentence regarding each serial port is received and the status of ISW/MTR and Serial OPU.

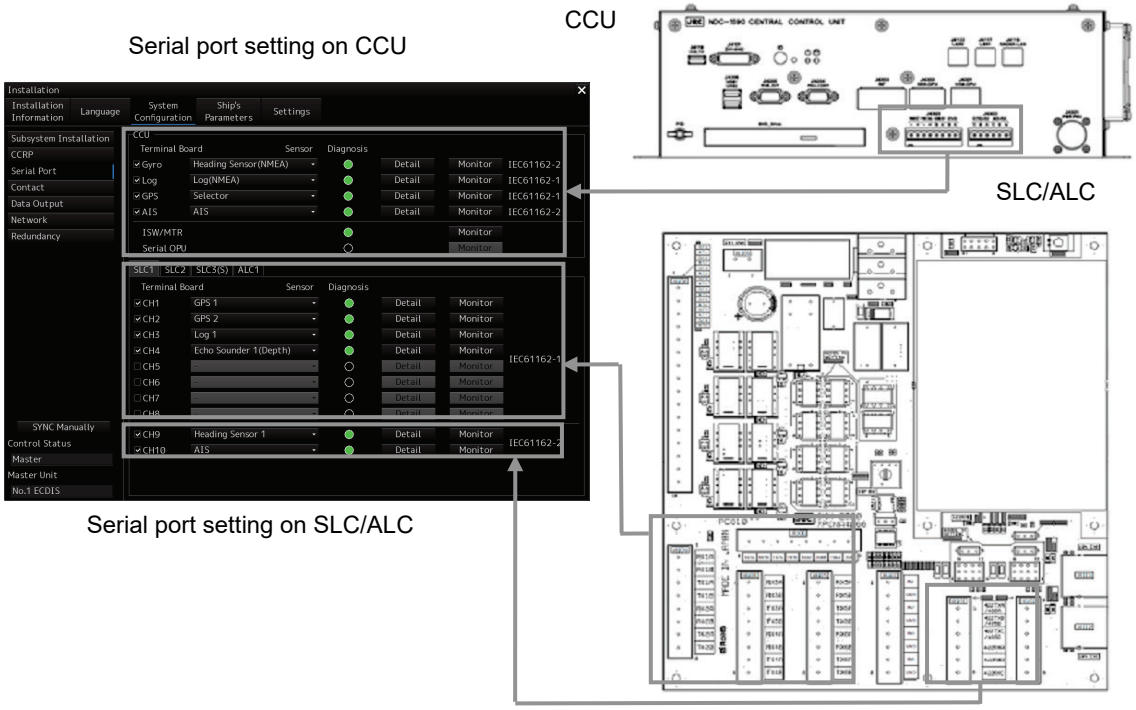
Lit in red: Data not received.
Lit in green: Data is receiving.
Lit in orange: In diagnosis (before decision).
No color: Serial port is disabled.

Note

- When the RADAR slave mode is active, the [Diagnosis] lamp of ISW/MTR is disabled.
- When the [Serial OPU] check box is set to Off after selecting [Service]-[Installation]-[System Configuration]-[Subsystem Installation], the [Diagnosis] lamp of serial OPU is disabled.

6.6.2 Setting a serial port

In the "Serial Port" dialog, allocate the sensor to be connected for the serial port on CCU and the serial port on SLC(Main/Sub)/ALC.



[Setting a serial port on CCU]

Setting Item	Description of Setting	Setting Value
Gyro	1. Select the check box and enable the serial port for the Gyro. 2. Select the sensor to be connected to the Gyro serial port from the [Sensor] combo box. When no sensor is selected, select [-].	To enable: Select. To disable: Clear. The sensors that can be selected vary according to the subsystem installation status. Refer to "Table 4-2 Sensors that can be selected on the Task Station".
LOG	1. Select the check box and enable the serial port for the LOG. 2. Select the sensor to be connected to the LOG serial port from the [Sensor] combo box. When no sensor is selected, select [-].	
GPS	1. Select the check box and enable the serial port for the GPS. 2. Select a sensor to be connected to the serial port for the GPS from the [Sensor] combo box. When no sensor is selected, select [-].	
AIS	1. Select the check box and enable the serial port for the AIS. 2. Select a sensor to be connected to the serial port for the AIS from the [Sensor] combo box. When no sensor is selected, select [-].	

Table 4-2 Sensors that can be selected on CCU

Serial port	Sensor name	Devices required as the subsystem (set to "installed" in the "Subsystem Installation" dialog)
Gyro	Heading Sensor(NMEA)	Heading Sensor 1
	Heading Sensor(Gyro I/F)	
LOG	Log(NMEA)	Log 1
	Log(Gyro I/F) *1	
	Selector	Log Selector
GPS	GPS 1	GPS 1
	GPS 2	GPS 2
	GPS 3	GPS 3
	GPS 4	GPS 4
	Selector	GPS Selector
AIS	AIS	AIS

(*1) Can be selected only when "Heading Sensor (Gyro I/F)" is selected for the Gyro port.
When "Log(Gyro I/F)" is selected, log data is acquired together with the Heading Sensor data from the Gyro port and communication is not performed through the LOG port. Therefore, the Diagnosis lamp, the Detail button, and the Monitor button are disabled.

[Setting serial ports on the SLC/ALC that is installed]

Setting Item	Description of Setting	Setting Value
CH1 to CH8 (IEC-61162-1)	1. Click on any of SLC1(M) to SLC4(M), SLC1(S) to SLC4(S) and ALC1 to ALC4 tabs. 2. Enable the serial port of the channel by selecting the check box. 3. Select the sensor to be connected to the channel from the [Sensor] combo box. When no sensor is selected, select [-].	To enable: Select. To disable: Clear. The sensors that can be selected vary according to the subsystem installation status. Refer to "Table 4-3 Sensors that can be selected on SLC/ALC".
CH9/CH10 (IEC-61162-2)	1. Click on any of SLC1(M) to SLC4(M), SLC1(S) to SLC4(S) and ALC1 to ALC4 tabs. 2. Enable the serial port of the channel by selecting the check box. 3. Select the sensor to be connected to the channel from the [Sensor] combo box. When no sensor is selected, select [-].	
Gyro I/F	Items are displayed only for SLC + "GIF" "RIF+GIF" in Gyro I/F. 1. Click on any of SLC1(M) to SLC4(M) and SLC1(S) to SLC4(S) tabs. 2. Enable the serial port of the channel by selecting the check box. 3. Select the sensor (Gyro and Log) to be connected to the channel from the [Sensor] combo box. When no sensor is selected, select [-].	To enable: Select. To disable: Clear. Sensors that can be selected: Gyro: Heading Sensor 1/2 Log: Log 1/2 * The sensors that can be selected vary according to the subsystem installation status.

Table 4-3 Sensors that can be selected on the SLC/ALC

Sensor name	Devices required as the subsystem (set to "installed" in the "Subsystem Installation" dialog)
Heading Sensor 1	Heading Sensor 1
Heading Sensor 2	Heading Sensor 2
Log 1	Log 1
Log 2	Log 2
GPS 1	GPS 1
GPS 2	GPS 2
GPS 3	GPS 3
GPS 4	GPS 4
Ship's Clock	Ship's Clock
Echo Sounder1(Depth)	Echo Sounder1(Depth)
AIS	AIS
NAVTEX	NAVTEX
Anemometer(Wind)	Anemometer(Wind)
Water Temperature Meter	Water Temperature Meter
Current Meter	Current Meter
Climate Meter	Climate Meter
ROT Indicator *1	ROT Indicator
Autopilot	Autopilot
Rudder	Rudder
Engine/Propeller	Engine/Propeller
Engine Telegraph	Engine Telegraph
Thruster	Thruster
Azimuth Thruster	Azimuth Thruster
RADAR1(TT RX)	RADAR1
RADAR2(TT RX)	RADAR2
Gyro Switch	Gyro Switch
Other than sensors	
Alert(to CAM) *2	
Alert(from Subsystem) *2	
Alert(to BNWAS) *2	
IAS(NMEA) *2	
DSC *2	
NAV/Alert	NAV/Alert
— *3	

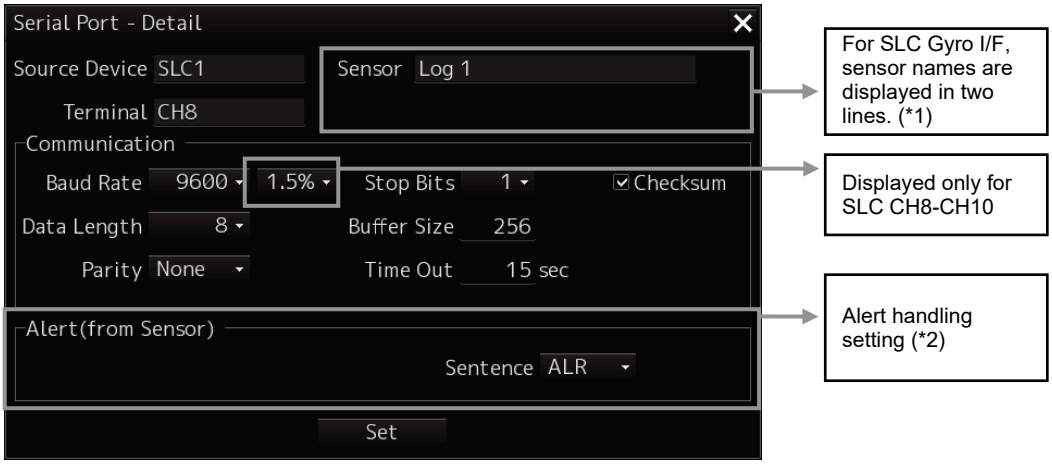
(*1) TRI (Turn Rate Indicator): Indicates a device that transmits ROT.

(*2) Used for alert handling. For details, refer to "4.8 CAM Configuration and Setting".

(*3) In the case of the port used for a data output, it is used.
Refer to "4.10 Setting Data Output".
[port settings for data output]
[CHx] check box : Select to enable.
[Sensor] combo box : "—"

6.6.3 To change the communication settings of the Serial Port

1. Click the [Detail] button of the enabled serial port and display the [Detail] dialog.

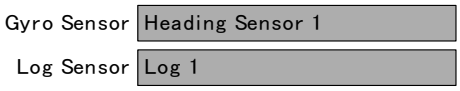


(*1) Sensor name display pattern

[For sensor other than SLC Gyro I/F]



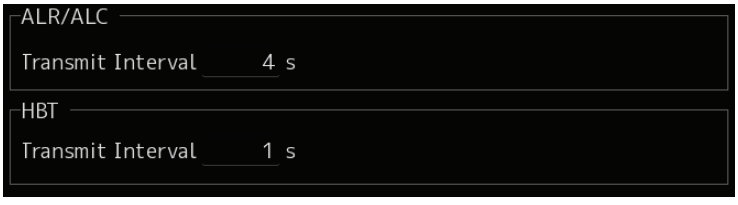
[For SLC Gyro I/F]



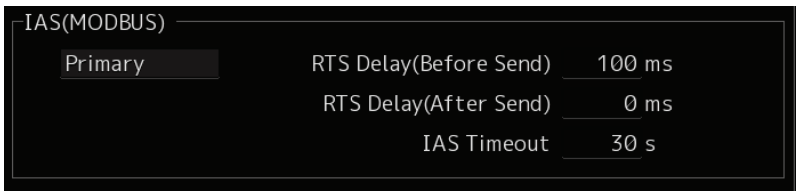
(*2) Display pattern of alert handling setting

[Various sensors (*1)]

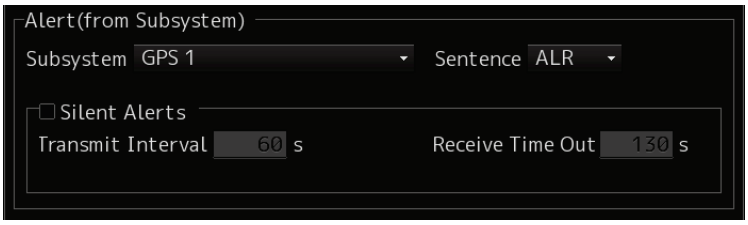
(*1) Other than "Alert(from Subsystem / to CAM / to BNWAS)", and "DSC"



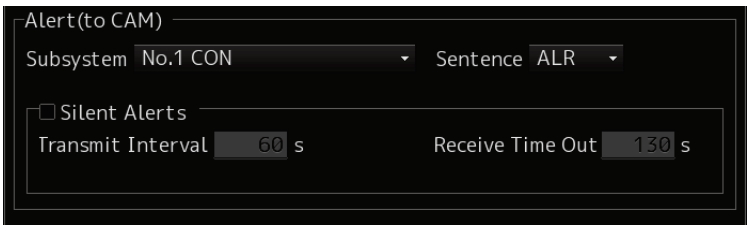
[When the sensor is " IAS(MODBUS)"]



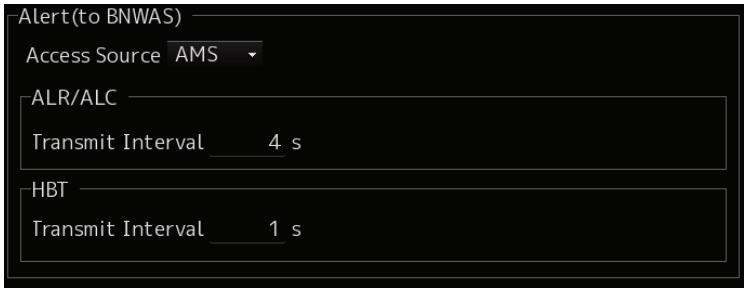
[When the sensor is "Alert(from Subsystem)"]



[When the sensor is "Alert(to CAM)"]



[When the sensor is " Alert(to BNWAS)"]



[When the sensor is "DSC", or "- (not selected)"]

No display

2. 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 corresponding serial port from the combo box. In the [Detail] dialog 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 "Table 4-4 Selectable baud rates").
[Baud Rate] addition ratio combo box	The combo box is displayed in the [Detail] dialog of AIS, GYRO *1, and CH8 to CH10. The addition ratio (%) for adjusting the baud rate can be changed in the combo box. The baud rate that is used for communication is the value obtained by adding the addition ratio set here to the value that is set in the [Baud Rate] combo box. Example) 4800 × (1 + 1.5/100) = 4872 Addition ratio <Adjustment method> At first, use 1.5% as the addition ratio. If data cannot be received, decrease it in decrements of 0.5%. (*1) Only when selection of a sensor is other than "Heading Sensor 1/2(Gyro I/F)".	0.0% to 3.0% (Can be set in the unit of 0.5%)
Data Length	Select the data length of the corresponding serial	5/6/7/8

	port from the combo box.	
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 in the box.	0 to 10240 bytes
Time Out	Enter the time-out duration of the corresponding serial port on the box.	0 to 999sec
Checksum	Select the check box and enable the checksum of the sentence of the corresponding serial port.	To enable: Select. To disable: Clear.
Subsystem	This item is displayed only when "Alert(from Subsystem)" or "Alert(to CAM)" is selected as the sensor. Select a device for alert handling. For details, refer to "4.8 CAM Configuration and Setting."	Subsystem installed (task station and sensor)/BNWAS
Primary/Secondary	Displayed only when "IAS(MODBUS)" is selected for the sensor. Set Primary/Secondary for the input from IAS.	Primary / Secondary
Sentence	Set the type of alert sentence. If "-" is selected, no alert checks are made.	-/ALR/ALF * The selection of "-" indicates that the type of alert sentence is unselected; it can be selected only for general sensors (e.g., GPS and Log).
Access Source	Displayed only when "Alert(to BNWAS)" is selected for the sensor. Select the equipment that communicates with BNWAS. When the system configuration does not contain CAM, select TCS. In other cases, select AMS.	AMS/TCS

Table Selectable baud rates

Serial port	Baud rate
Serial port on CCU	
Gyro (when Heading Sensor (NMEA) is selected)	4800/38400
Gyro (when Heading Sensor (Gyro I/F) is selected)	Fixed to 38400
Log (when Log (NMEA) is selected)	Fixed to 4800
GPS	Fixed to 4800
AIS	Fixed to 38400
Selector	Fixed to 4800
Serial port on SLC/ALC	
CH1-8	2400/4800/9600
CH9/10	2400/4800/9600/19200/38400
Gyro I/F	Fixed to 38400

Note

- In the case of the serial port which assigned "IAS (NMEA)", carry out network transmission setting of Primary(connects to SLCx(Main)), and Secondary (connects toSLCx(Sub)) to the same setup.

6.6.4 Checking the communication status

The communication status can be displayed in order to see if serial port communication is being performed normally.

[Line Monitor] and [Packet Monitor] are available to display the communication status.

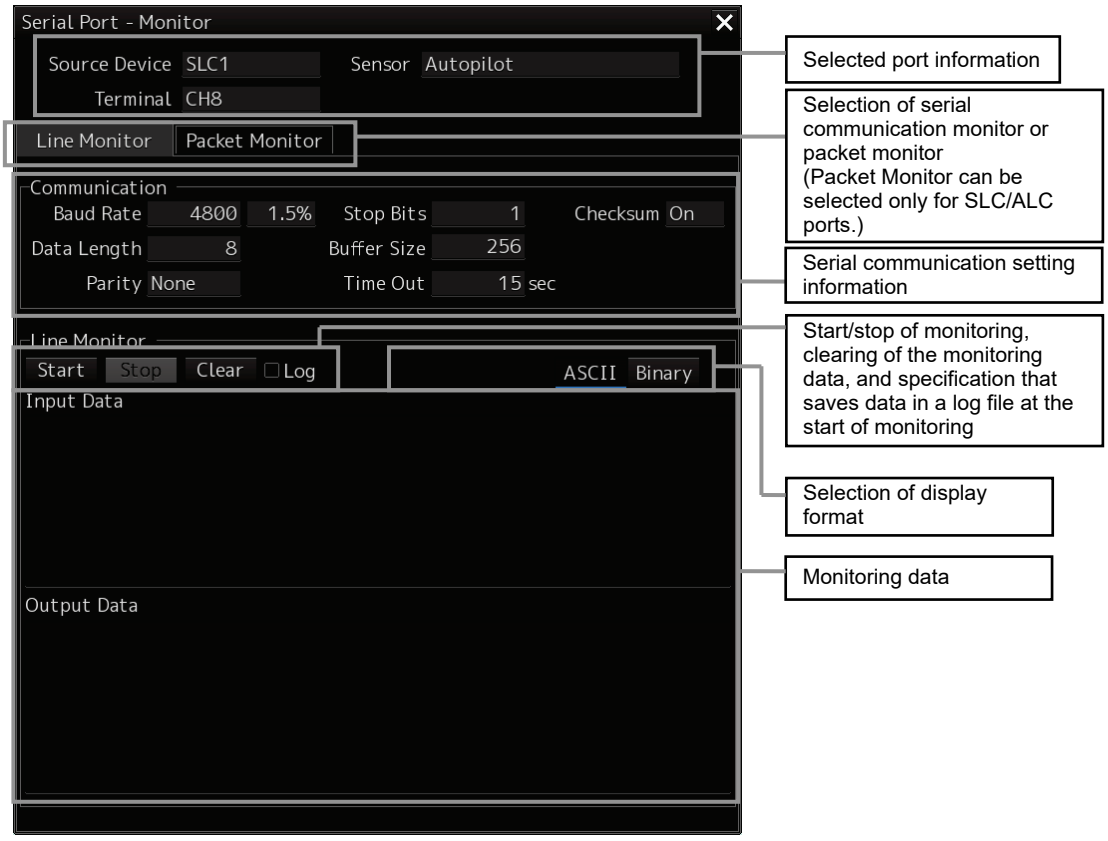
Line Monitor:	Displays the serial port communication data.
Packet Monitor:	Displays the LAN communication status between the SLC/ALC and this equipment. (Only for SLC/ALC serial ports)

Memo

- For the sentence format, refer to "6.7 External input/output sentence format in Installation manual."
- When communication statuses are displayed on multiple equipment units through one port, and any of the equipment unit stopped monitoring, monitoring has stopped by all the equipment units. In this case, restart monitoring.

Line Monitor

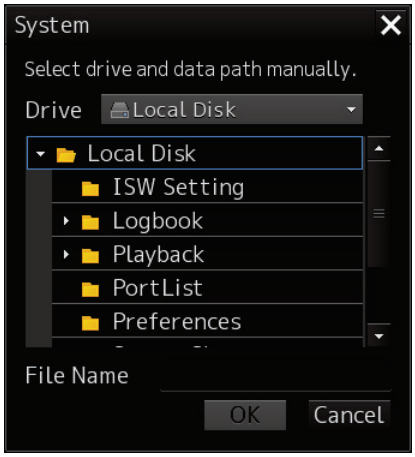
1. Click on the [Monitor] button of the enabled serial port to display the "Monitor" dialog box.



2. Click on the [Start] button to start monitoring.

Monitoring will be started. If communication is being performed, the communication data is displayed in the [Input Data] and [Output Data] areas.

To save the monitoring data in a log file, select the [Log] check box, and then click on the [Start] button. A dialog box is displayed for selecting the file to be saved.



Enter the file name and click on the [OK] button. Monitoring will be started.

Memo

Data saved in a log file is limited to 5MB. When the data size has reached the limit, the save processing is stopped automatically.

To change the data display format, select [ASCII] or [Binary], and then click on the [Start] button. The data display format currently displayed can also be changed after monitoring is complete.

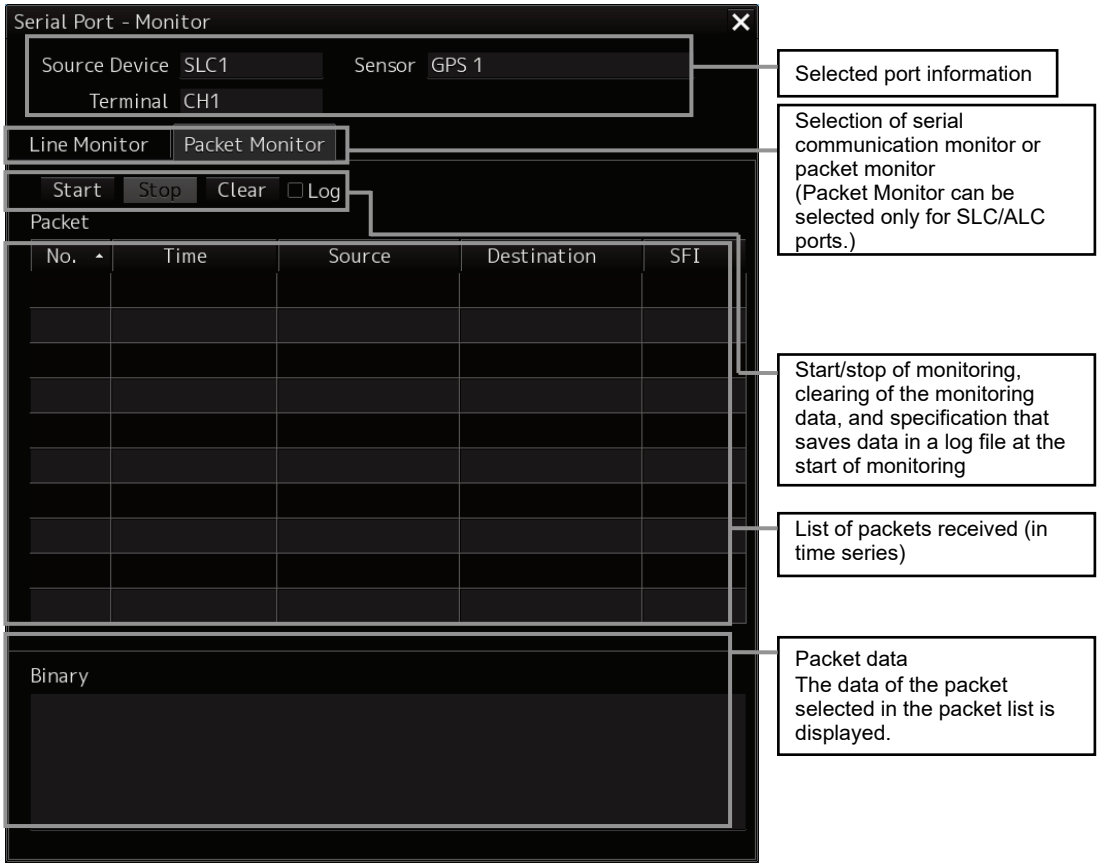
<Monitoring data display example>



3. Click on the [Stop] button to stop monitoring.

Packet Monitor

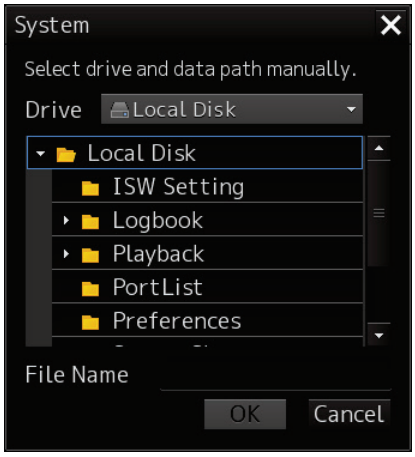
1. Click on the [Monitor] button of the enabled serial port to display the "Monitor" dialog box, and click on the [Packet Monitor] tab.



2. Click on the [Start] button to start monitoring.

Monitoring will be started. If communication is being performed, the packets received are displayed in the packet list.

To save the monitoring data in a log file, select the [Log] check box, and then click on the [Start] button. A dialog box is displayed for selecting the file to be saved.

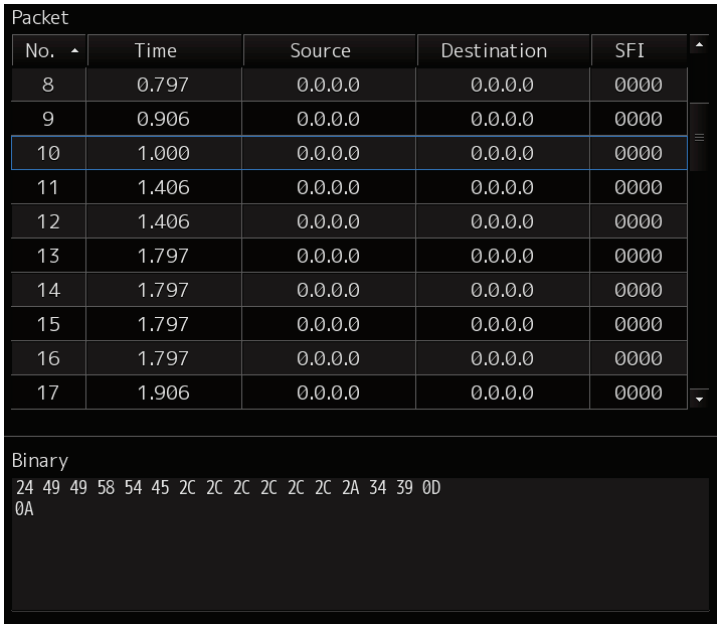


Enter the file name and click on the [OK] button. Monitoring will be started.

Memo

Data saved in a log file is limited to 5MB. When the data size has reached the limit, the save processing is stopped automatically.

<Monitoring data display example>



3. Click on the [Stop] button to stop monitoring.

6.7 System Function

Use the [System Function] dialog to verify the setting of the system function of this equipment and perform the initial setting.

Displaying the [System Function] dialog

1 Display the dialog of the Installation submenu.

2 Select [System Configuration] in the 1st Classification pane and [System Function] in the 2nd Classification pane.
The [System Function] dialog is displayed in the Edit/Result pane.



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.

Setting a system function

Equipment connected to the SLC / ALC serial port or CCU

There is no need to set system function. System function of Equipment connected to the SLC / ALC serial port or CCU are registered or deleted automatically by serial port setting on [Serial Port] dialog. These system function cannot add or edit or delete in the [System Function] dialog.

The registered system functions are shown below.

Equipment	System Function	TalkerID Mnemonic	Cluster	Transmission Group (Control/Data)	Transmission Group (Alert) Transmit	Transmission Group (Alert) Receive
Heading Sensor 1	Heading	HE	Nav	SATD	SATD	CAM1
Heading Sensor 2	Heading	HE	Nav	SATD	SATD	CAM1
Gyro Switch	Heading	HE	Nav	SATD	SATD	CAM1
Log 1	Log	VD	Nav	NAVD	NAVD	CAM1
Log 2	Log	VD	Nav	NAVD	NAVD	CAM1
GPS 1	GPS	GP	Nav	NAVD	NAVD	CAM1
GPS 2	GPS	GP	Nav	NAVD	NAVD	CAM1
GPS 3	GPS	GP	Nav	NAVD	NAVD	CAM1
GPS 4	GPS	GP	Nav	NAVD	NAVD	CAM1
Ship's Clock	Clock	ZA	Nav	TIME	TIME	CAM1
Echo Sounder1(T/D 1, T/D2)	Depth	SD	Nav	NAVD	NAVD	CAM1
Echo Sounder2(T/D 3)	Depth	SD	Nav	NAVD	NAVD	CAM1
AIS	AIS	AI	Nav	TGTD	TGTD	CAM1
NAVTEX *1	NAVTEX	CR	Nav	RCOM	RCOM	CAM1
Anemometer 1	Weather	WI	Nav	NAVD	NAVD	CAM1
Water TEMP Meter	Weather	WI	Nav	NAVD	NAVD	CAM1
Current Meter	Weather	WI	Nav	NAVD	NAVD	CAM1
Climate Meter	Weather	WI	Nav	NAVD	NAVD	CAM1
ROT Indicator	TRI	TI	Nav	SATD	SATD	CAM1
Autopilot	Autopilot	AG	Nav	NAVD	NAVD	CAM1
Rudder	Rudder	SG	Nav	MISC	MISC	CAM1
Engine/Propeller	Engine/Propeller	ER	Nav	MISC	MISC	CAM1
Engine Telegraph	Engine Telegraph	ER	Nav	MISC	MISC	CAM1
Thruster	Thruster	ER	Nav	MISC	MISC	CAM1
Azimuth Thruster	Azimuth Thruster	ER	Nav	MISC	MISC	CAM1
Generator	Generator	ER	Nav	MISC	MISC	CAM1
S-JOY/Joystick 1～5	S-JOY/Joystick	SG	Nav	MISC	-	-
BNWASGeneral Equipment(Alert)1～10BNWAS	BNWAS	BN	Nav	-	VDRD	CAM1
General Equipment(Alert)1～10	General 1～10	U0	Nav	-	MISC	CAM1
GPS Buoy	GPS	GP	Nav	NAVD	-	-
Plotter	GPS	GP	Nav	NAVD	-	-
DSC	DSC	U1	Nav	-	MISC	CAM1
IAS*1	IAS	JE	Nav	MISC	MISC	CAM1
RADAR1	RADAR	RA	Nav	TGTD	-	-
RADAR2	RADAR	RA	Nav	TGTD	-	-
VDR	VDR	VR	Nav	MISC	MISC	CAM1
Alert(to CAM)*2	CAM	CA	Nav	CAM1	CAM1	CAM1
(Alert(from Subsystem))*3	(Alert(from Subsystem)) *3	*3	Nav	-	*3	CAM1
NAV/Alert	NAV/Alert	ER	Nav	MISC	-	-
SLC x (Main)	SNGF	SI	Nav	MISC	MISC	CAM1
SLC x (Sub)	SNGF	SI	Nav	MISC	MISC	CAM1
ALC x	SNGF	SI	Nav	MISC	MISC	CAM1

*1 Only NMEA is supported.

*2 Alert(to CAM) is setting for connecting to an external CAM by serial signal.

*3 The same setting as the equipment set in subsystem is registered.

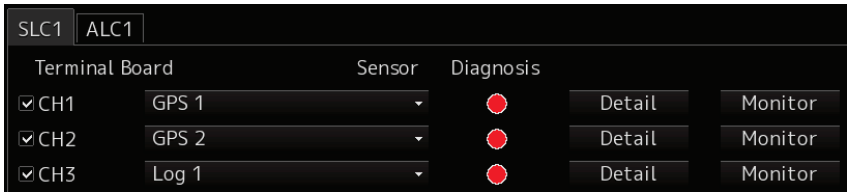
TalkerID Instance No is shown in the following table.

SLC/ALC	Main	Sub
SLC1	0000+yy	0050+yy
SLC2	0100+yy	0150+yy
SLC3	0200+yy	0250+yy
SLC4	0300+yy	0350+yy
SLC5	0400+yy	0450+yy
SLC6	0500+yy	0550+yy
SLC7	0600+yy	0650+yy
SLC8	0700+yy	0750+yy
SLC9	0800+yy	0850+yy
SLC10	0900+yy	0950+yy
SLC11	1000+yy	1500+yy
SLC12	1100+yy	1150+yy
ALC1	1200+yy	1250+yy
ALC2	1300+yy	1350+yy
ALC3	1400+yy	1450+yy
ALC4	1500+yy	1550+yy

yy	Description
01	Serial Ch.1
02	Serial Ch.2
03	Serial Ch.3
04	Serial Ch.4
05	Serial Ch.5
06	Serial Ch.6
07	Serial Ch.7
08	Serial Ch.8
09	Serial Ch.9
10	Serial Ch.10
11	Serial Ch.11
12	Serial Ch.12
13	SLC / ALC body

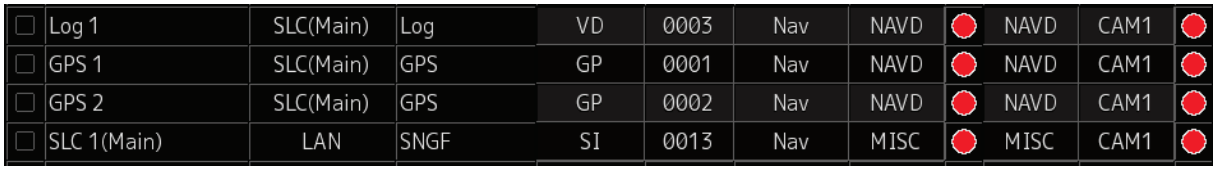
For example1)

SLC1(Main) setting on [Serial Port] dialog.



Equipment	Channel No.
GPS1	1
GPS2	2
Log1	3

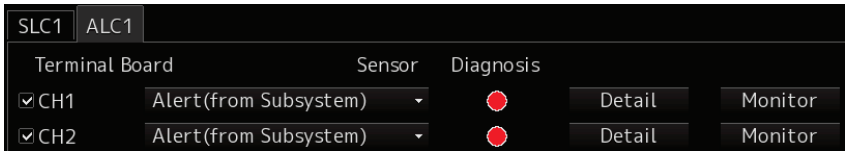
System function is registered as follows.



Equipment	System Function	TalkerID Mnemonic	TalkerID Instance No	Cluster	Transmission Group (Control/Data)	Transmission Group (Alert) Transmit	Transmission Group (Alert) Receive
GPS 1	GPS	GP	0001	Nav	NAVD	NAVD	CAM1
GPS 2	GPS	GP	0002	Nav	NAVD	NAVD	CAM1
Log 1	Log	VD	0003	Nav	NAVD	NAVD	CAM1
SLC1(Main)	SNGF	SI	0013	Nav	MISC	MISC	CAM1

For example2)

ALC1 setting on [Serial Port] dialog.

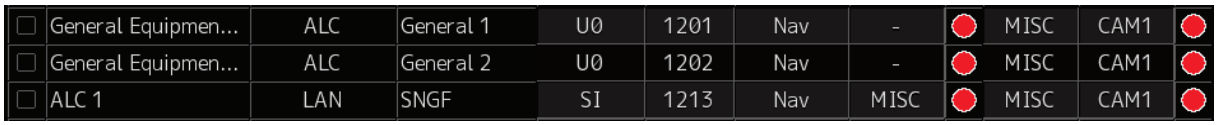


Equipment	Channel No.
General Equipment1	1
General Equipment2	2





System function is registered as follows.



Equipment	System Function	TalkerID Mnemonic	TalkerID Instance No	Cluster	Transmission Group (Control/Data)	Transmission Group (Alert) Transmit	Transmission Group (Alert) Receive
General Equipment1	General1	U0	1201	Nav	-	MISC	CAM1
General Equipment2	General2	U0	1202	Nav	-	MISC	CAM1
ALC1	SNGF	SI	1213	Nav	MISC	MISC	CAM1

Note:

Due to different in transmission protocol, A system function of NAVTEX(NAVTEX FORMAT) and IAS(MODBUS) will be not registered even if serial port is selected on [Serial Port] dialog.

Equipment connected to the LAN

Set the each setting according to the transmission specifications of the equipment connected to the LAN.

To set the new equipment, refer to **“Add a system function (New equipment)”**.

To set the new connection for existing equipment, refer to **“Add a system function (Existing equipment)”**.

Equipment of task station

If the task station needs multiple functions, set the system functions refer to **"Add a system function (Existing equipment)"**. There is no need to set the system function if the task station doesn't need multiple function.

Note:

-Function is RADAR, ECDIS, TCS, CONNING, and AMS(CAM).

-System function of primary function is registered automatically by device installation setting on the [Subsystem Installation] dialog. Then, TaskID Instance No is specified by Task Station No.

Equipment	System Function	TalkerID Mnemonic	TalkerID Instance No	Transmission Group (Control/Data)	Transmission Group (Alert) Transmit	Transmission Group (Alert) Receive
No.x RADAR	RADAR	RA	000x	TGTD	TGTD	CAM1
No.x ECDIS	ECDIS	EI	000x	NAVD	NAVD	CAM1
No.x CONNING	CONNING	II	000x	MISC	MISC	CAM1
No.x CONNING(Wing)	CONNING	II	000y*	MISC	MISC	CAM1
No.x CONNING(Remote)	CONNING	II	000z*	MISC	MISC	CAM1
No.x RPS	RPS	EI	000x	NAVD	NAVD	CAM1

*y=x+2, z=x+4

- Equipment name of system function is registered as No.x CON, when No.x CON, No.x CON (Wing) or No.x CON (Remote) is selected by device installation setting.

-System function of TCS is registered automatically to the selected task station by redundancy setting on the [Redundancy] dialog.

-System function of AMS is not registered even if redundancy is selected on the [Redundancy] dialog. Make sure to add a system function on the [System Function] dialog.

-Talker ID for multiple functions will be registered as follows.

Equipment	Talker ID				
	ECDIS	TCS	RADAR	CONNING	AMS
No.1 ECDIS	EI0001 (Primary function)	TC0011	RA0011	II0011	CA0011
No.2 ECDIS	EI0002 (Primary function)	TC0012	RA0012	II0012	CA0012
No.3 ECDIS	EI0003 (Primary function)	TC0013	RA0013	II0013	CA0013
No.4 ECDIS	EI0004 (Primary function)	TC0014	RA0014	II0014	CA0014
No.1 RPS	EI0005	-	-	-	-
No.2 RPS	EI0006	-	-	-	-
No.1 RADAR	EI0021	-	RA0001 (Primary function)	II0021	CA0021
No.2 RADAR	EI0022	-	RA0002 (Primary function)	II0022	CA0022
No.3 RADAR	EI0023	-	RA0003	II0023	CA0023

			(Primary function)		
No.4 RADAR	EI0024	-	RA0004 (Primary function)	II0024	CA0024
No.5 RADAR	EI0025	-	RA0005 (Primary function)	II0025	CA0025
No.6 RADAR	EI0026	-	RA0006 (Primary function)	II0026	CA0026
No.7 RADAR	EI0027	-	RA0007 (Primary function)	II0027	CA0027
No.8 RADAR	EI0028	-	RA0008 (Primary function)	II0028	CA0028
No.1 CONNING	EI0031	-	RA0031	II0001 (Primary function)	CA0031
No.2 CONNING	EI0032	-	RA0032	II0002 (Primary function)	CA0032
No.1 CONNING(Wing)	EI0033	-	RA0033	II0003 (Primary function)	CA0033
No.2 CONNING(Wing)	EI0034	-	RA0034	II0004 (Primary function)	CA0034
No.1 CONNING(Remote)	EI0035	-	RA0035	II0005 (Primary function)	CA0035
No.2 CONNING(Remote)	EI0036	-	RA0036	II0006 (Primary function)	CA0036

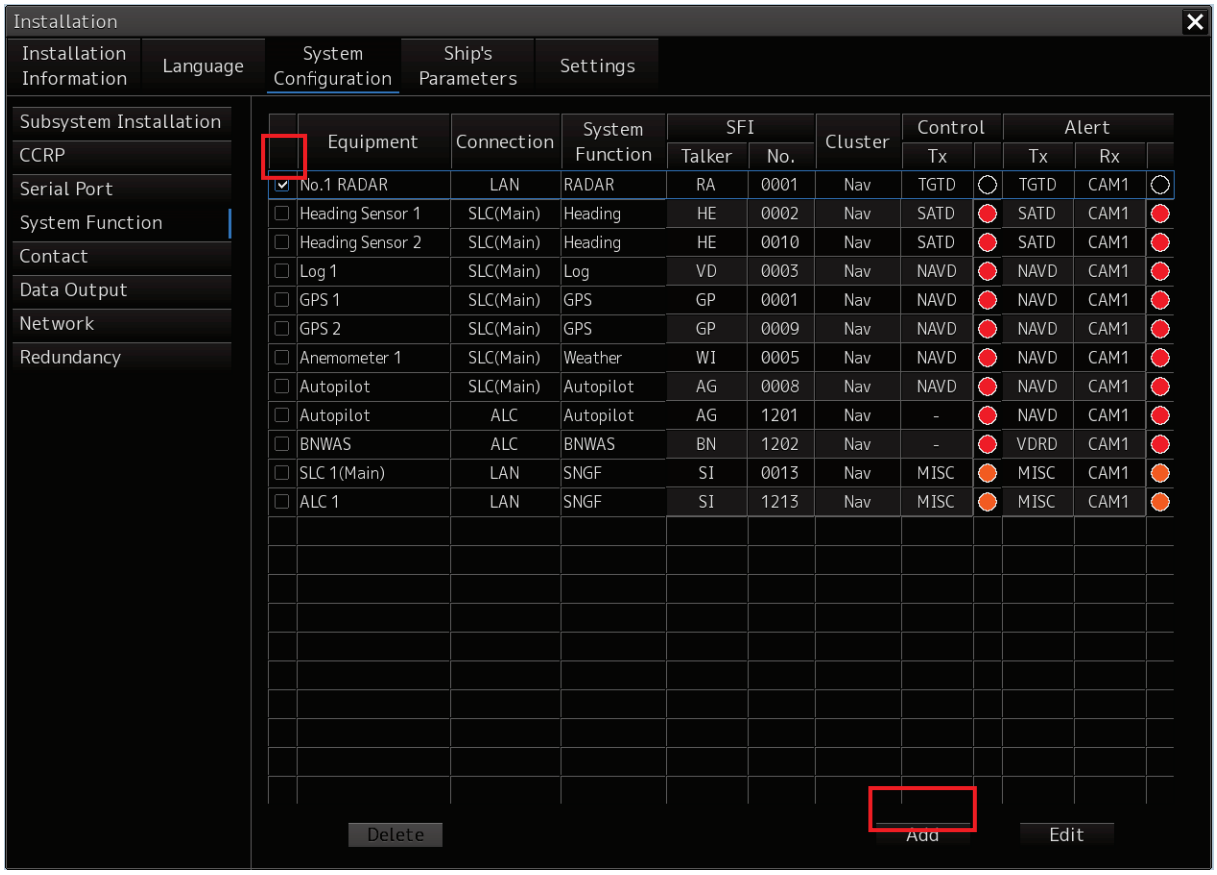
- If JRC's AMS needs to be connected to RADAR, ECDIS, and CONNING manufactured by another company's, set General Equipment (Alert) in [Device installation].

When connecting with a serial signal, set Alert (from Subsystem) for the serial port. System functions are registered automatically. When connecting via LAN, set the system function according to the SFI settings of RADAR, ECDIS, and CONNING manufactured by another company's.

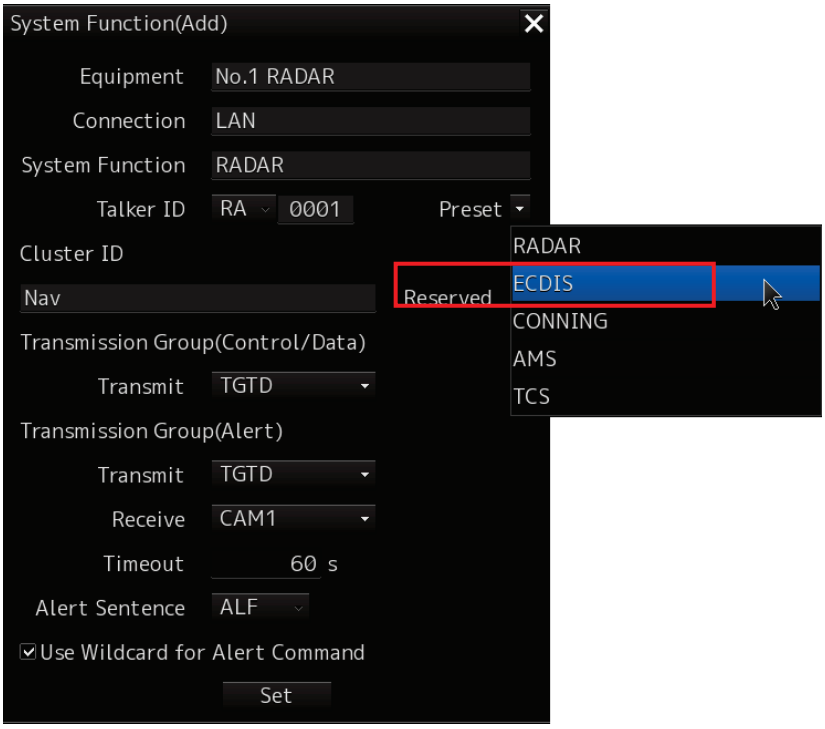
For example1)

If the task station (primary function: RADAR) needs ECDIS and CONNING function, add the system function of ECDIS and CONNING.

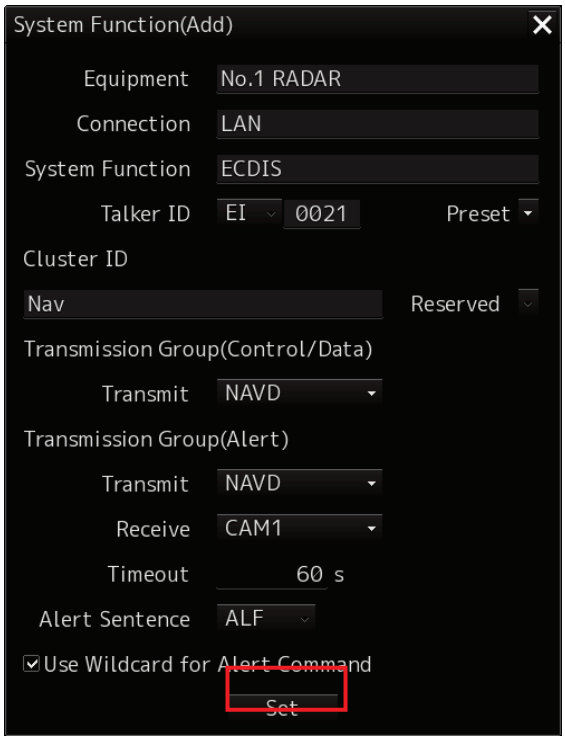
1. Check the checkbox of RADAR and click the [Add] button.



2. Select ECDIS on the preset combo box.



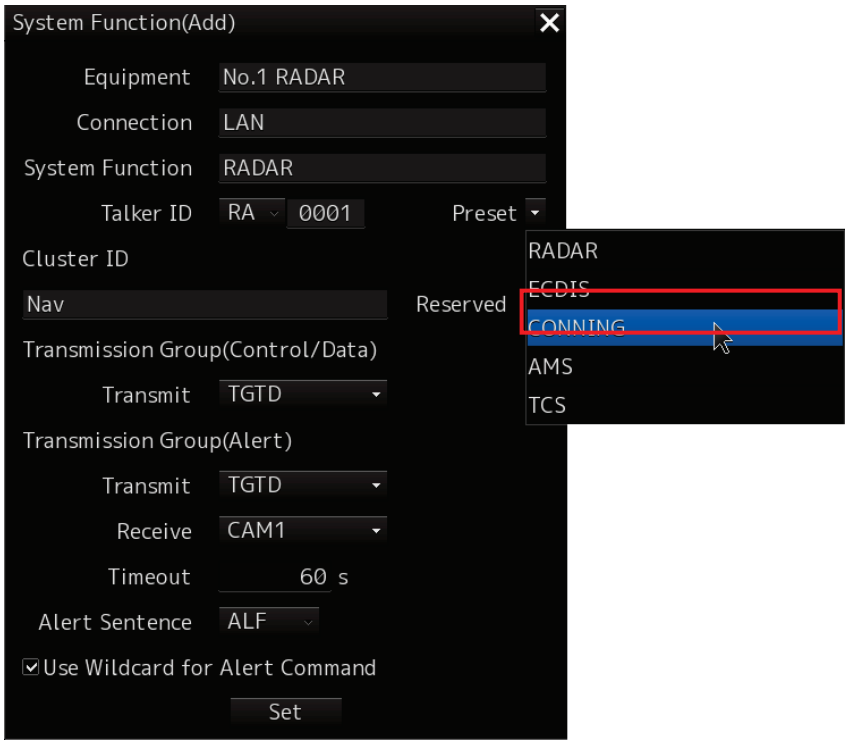
3. Click the [Set] button.



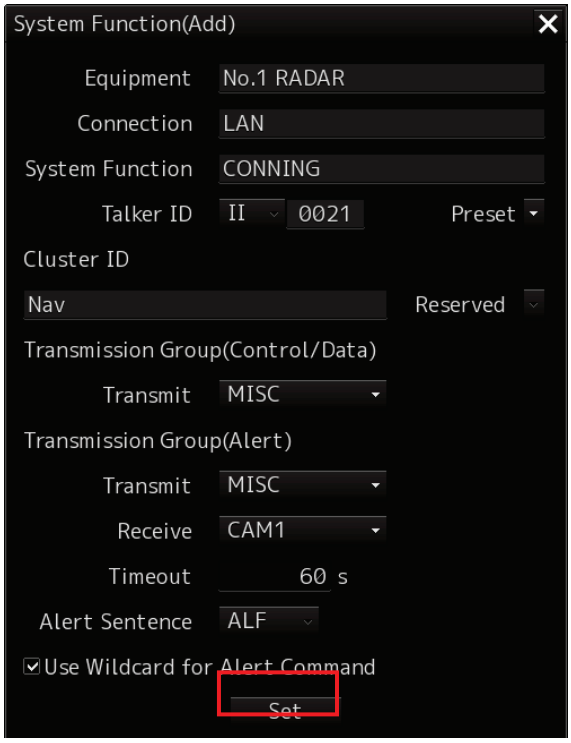
4. ECDIS system functions are added. Click the [Add] button again.



5. Select CONNING on the preset combo box.



6. Click the [Set] button.



7. CONNING system functions are added.

☑	No.1 RADAR	LAN	RADAR	RA	0001	Nav	TGTD	◯	TGTD	CAM1	◯
☐	No.1 RADAR	LAN	ECDIS	EI	0021	Nav	NAVD	◯	NAVD	CAM1	◯
☐	No.1 RADAR	LAN	CONNING	II	0021	Nav	MISC	◯	MISC	CAM1	◯

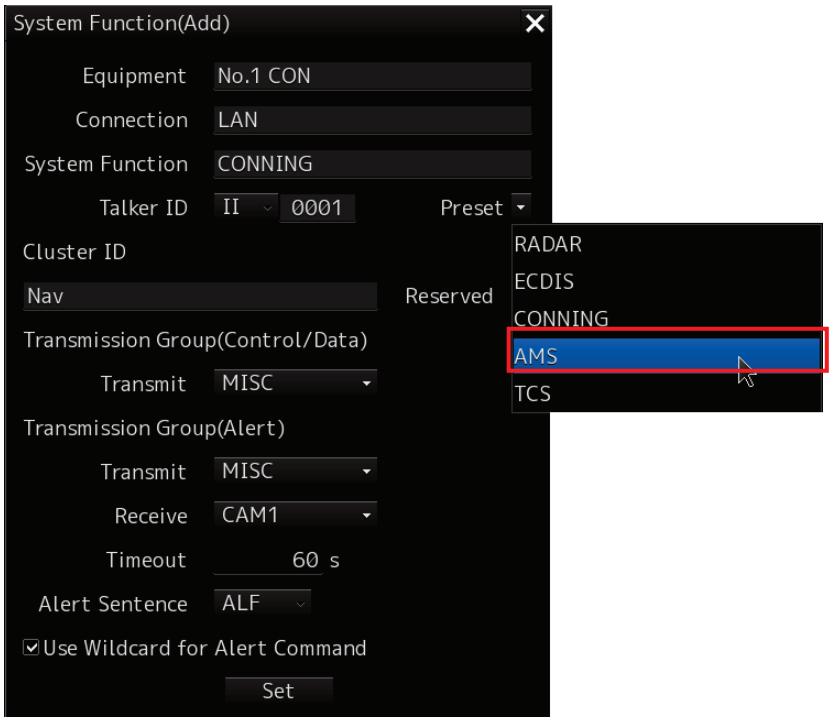
For example2)

If the task station (primary function: CONNING) needs AMS function, add the system function of AMS(CAM).

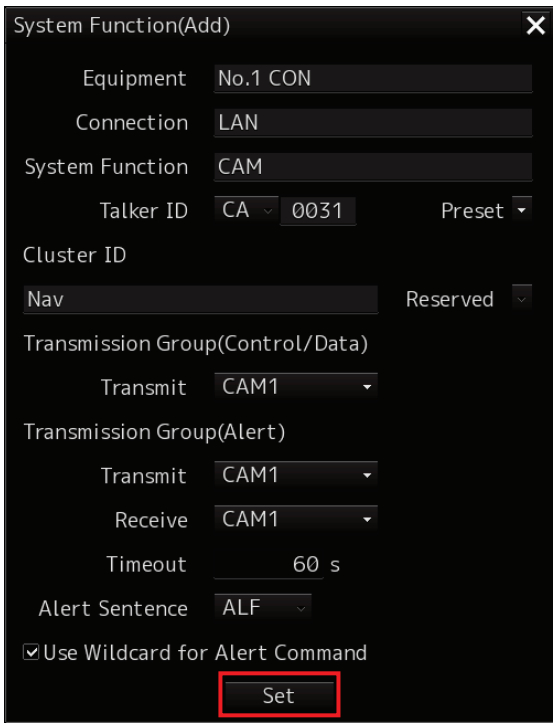
1. Check the checkbox of CONNING and click the [Add] button.



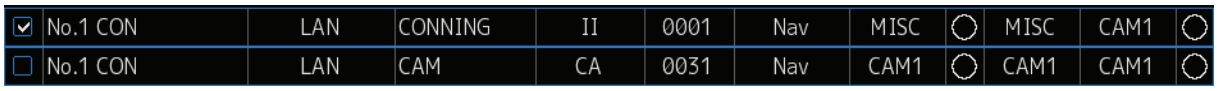
2. Select AMS on the preset combo box.



3. Click the [Set] button.



4. CAM system functions are added.



For example3)

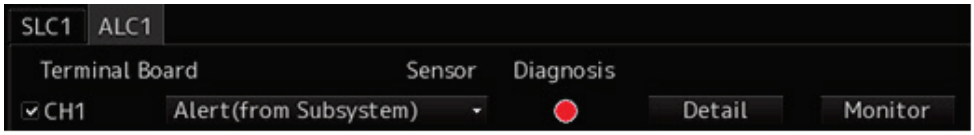
When JRC's AMS needs to be connected to RADAR manufactured by another company's, set as follows.

1. In the [Device Installation] of the [Subsystem Installation] dialog, check General Equipment (Alert) and select 1 for the number of connections.



2-1. When connecting with a serial signal

Set Alert (from Subsystem) for the connection channel in the [Serial Port] dialog.



Press the Detail button and set the following.

Subsystem: General Equipment1

Sentence: ALF

HBT: Check

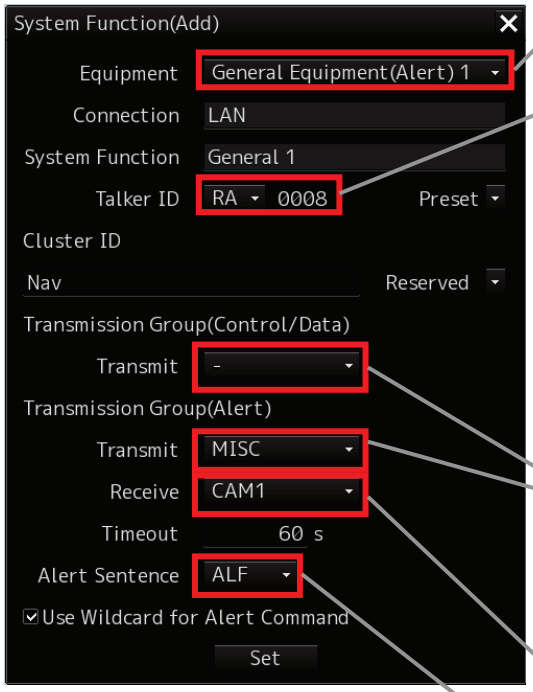


System function is registered as follows.



2-2. When connecting via LAN

Press the [Add] button in the [System Function] dialog and set the following.



Equipment:General Equipment1

Talker ID (Mnemonic and Instance No): Set according to the settings of the connected device.
* It is not possible to set the same mnemonic and instance number combination that is already registered in [System Function]. In that case, change the mnemonic and instance number settings of the connected device to a combination of the mnemonic and instance number that is not registered in [System Function].

Transmit: Set according to the settings of the connected device. For the combination of the IP address and port number of the transmission group setting name, refer to * 4 of " Add a system function (New equipment)".

Receive: CAM1

Alert Sentence: ALF

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[*1] on the combo box. 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[*6]	Mnemonic	Select the Mnemonic[*2] 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 The Instance No of Talker ID vary depending on the equipment.
Cluster ID		Enter the Cluster ID[*3]. It can also be set by selecting Equipment on the Reserved combo box. 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[*6] (Control/Data)		Select the Transmission Group[*4] for Control/Data.	The Transmission Group (Control/Data) vary depending on the equipment.
Transmission Group (Alert)	Transmit[*6]	Select the Transmission Group[*4] of Transmit for Alert.	The Transmission Group (Alert) vary depending on the equipment. [*5]
	Receive[*6]	Select the Transmission Group[*4] of Receive for Alert.	CAM1[*5]
	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) 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
AMS	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

Equipment	System Function	TalkerID Mnemonic	TalkerID Instance No	Transmission Group (Control/Data)	Transmission Group (Alert) Transmit	Transmission Group (Alert) Receive
General Equipment(Alert) 3	General 3	U0	0003	-	MISC	CAM1
General Equipment(Alert) 4	General 4	U0	0004	-	MISC	CAM1
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	-	-

Add a system function (Existing equipment)

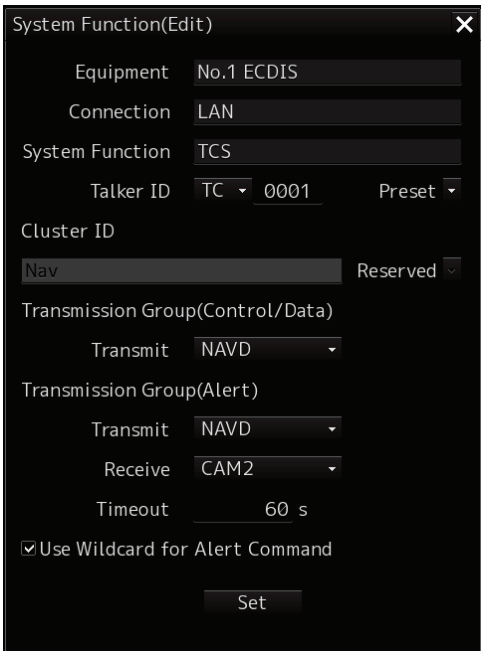
Select the check box and Click the [Add] button and display the [System Function (Add)] dialog.



Perform the settings referring to **Add a system function (New equipment)**. Equipment can not be changed on the [Detail] dialog.

Edit a system function

Select the check box and click the [Edit] button and display the [System Function (Edit)] dialog.



Perform the settings referring to **Add a system function (New equipment)**. Cluster ID can not be changed on the [Edit] dialog.

Delete a system function

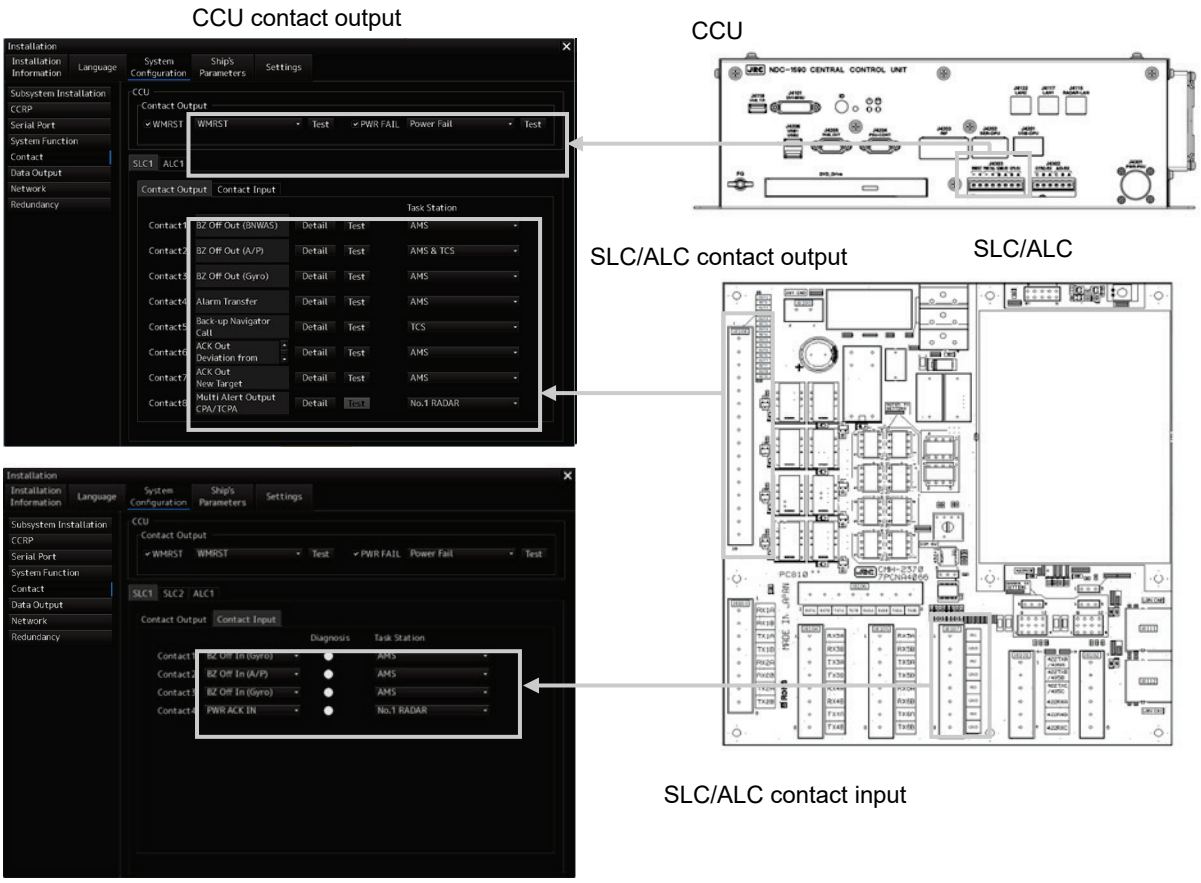
Select the check box and click the [Delete] button. Selected a system function is deleted.

Note:

- The native system function of VDR, No.x RADAR, ECDIS, CON, MFD, RPS can not delete on [System Function] dialog.

6.8 Setting Contacts (Contact Input/Output)

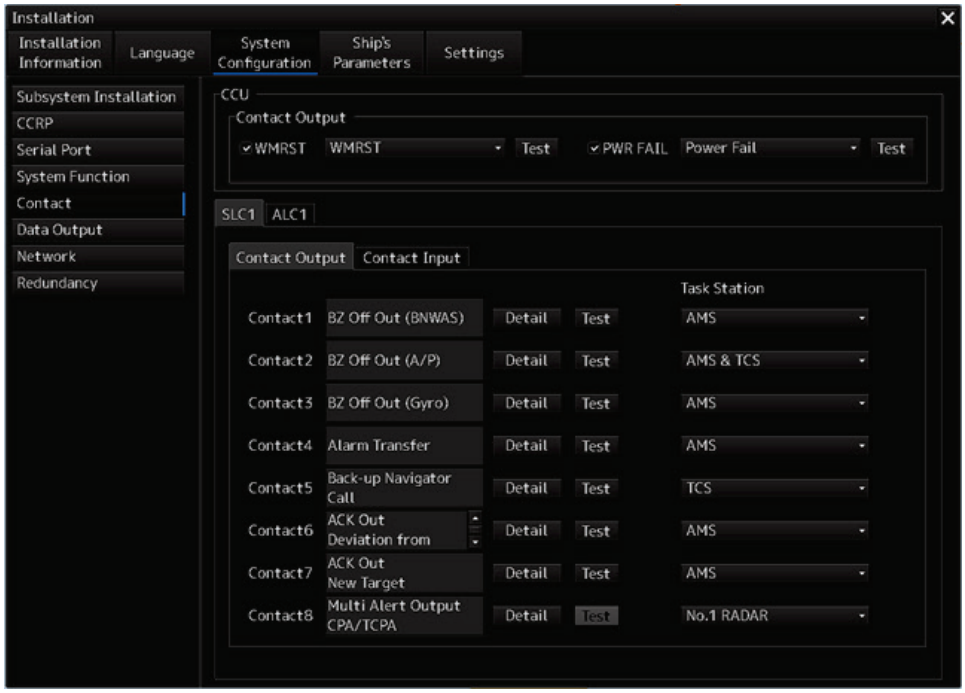
In the "Contact" dialog, functions can be assigned to the input/output of the contacts that belong to CCU and SLC/ALC.

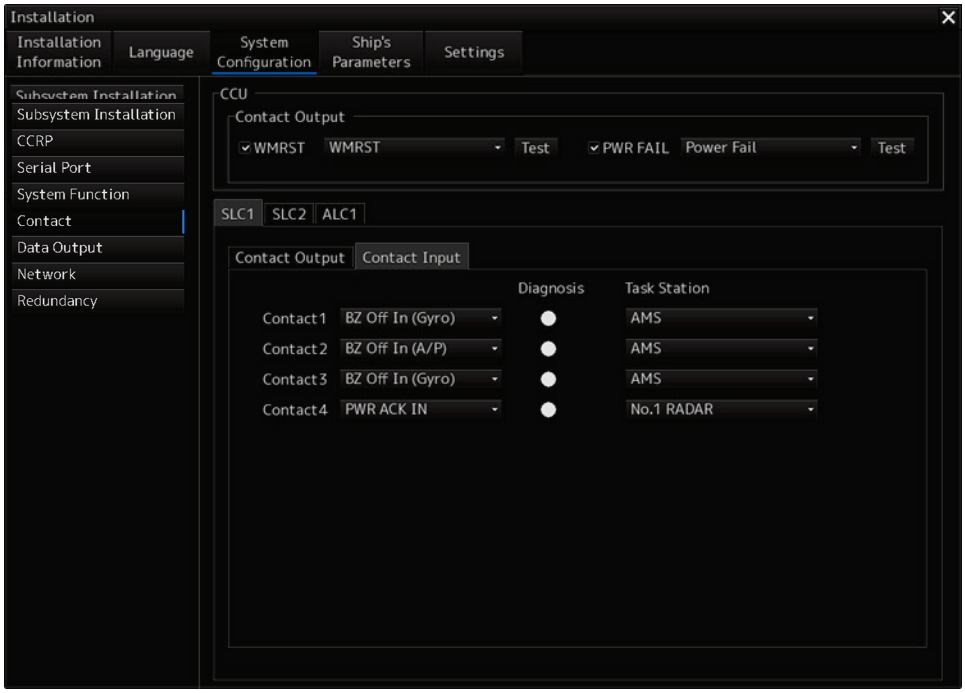


6.8.1 Displaying the "Contact" dialog

1. **Display the dialog of the Installation submenu.**
2. **Select [System Configuration] in the 1st Classification pane and [Contact] in the 2nd Classification pane.**

   The "Contact" dialog is displayed in the Edit/Result pane.





When SLC1(Main) to SLC4(Main), SLC1(Sub) to SLC4(Sub), and ALC1 to ALC4 are selected as "installed" in the "Subsystem Installation" dialog, the functions that are currently assigned to the contact output of Contact 1 to Contact 8 are displayed on the [Contact Output] tab. The functions that are currently assigned to the contact input of Contact 1 to Contact 4 are displayed on the [Contact Input] tab.

6.8.2 Enabling the watch timer reset contact output of the CCU

1. **Select the check box of [WMRST] (watch timer reset).**
2. **Select the function to be assigned:**

- WMRST (BNWAS timer reset)
- Power Fail (Alarm issued if the main AC power supply fails)
- Alarm Transfer (Contact output that is output from CAM to BNWAS to transfer the alarm via BNWAS)
- Back-up Navigator Call (Alarm that is output when Back-up Navigator Call occurs due to non-acknowledgement of Cross Track/ACCA/EOT/Position Monitor/TCS Stop/ECDIS Fail that is necessary for TCS)

6.8.3 Enabling the contact output for PWR FAIL of a CCU

1. **Select the [PWR FAIL] (power fail) check box.**
2. **Select the function to be assigned:**

- Power Fail (Alarm issued if the main AC power supply fails)
- INS System Fail (Alarm to notify that alert notifications cannot be transmitted to BNWAS via the SLC/ALC)
  (For details of INS System Fail, refer to "4.8 CAM Configuration and Setting." in the Installation Manual)
- Back-up Navigator Call (Alarm that is output when Back-up Navigator Call occurs due to non-acknowledgement of Cross Track/ACCA/EOT/Position Monitor/TCS Stop/ECDIS Fail that is necessary for TCS)

6.8.4 Selecting the function to be assigned to each contact input of the SLC/ALC

1. **Select any of the SLC1(M) to SLC4(M), SLC1(S) to SLC4(S), and ALC1 to ALC4 tabs.**
2. **Select the [Contact Input] tab.**
3. **Select the function to be assigned to each contact input from the [Contact 1] to [Contact 4] combo boxes:**
   - BZ Off In (BNWAS) (Buzzer Off input from BNWAS)*1
   - BZ Off In (A/P) (Buzzer Off input from Autopilot) *1
   - BZ Off In (Gyro) (Buzzer Off input from Gyro)
   - PWR ACK IN (PWR ACK input)
   - FWD/AFT Switch (FWD/AFT console switch input)
   - NAV. Mode Switch(Mode of Azimuth Thruster switch input to display information monitoring window)

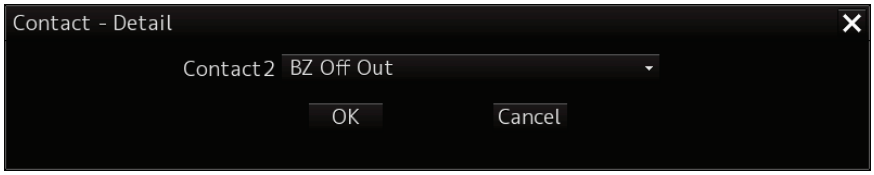
   (*1) Refer to "4.8 CAM Configuration and Setting" in the Installation Manual.

   Active/Inactive of each function is indicated by the diagnosis lamp.
   Lit in green: Active
   Off: Inactive
4. **The task station used by the [Task Station] combo box is chosen to the point of contact which assigned the function.**

In the case of the item referred to at all the task stations, "All" is chosen.

6.8.5 Selecting a function to be assigned to each contact output of SLC/ALC

1. **Select any of the SLC1(M) to SLC4(M), SLC1(S) to SLC4(S), and ALC1 to ALC4 tabs.**
2. **Click on the [Detail] (detail setting) button of any of Contact 1 to Contact 8.**
   The "Contact-Detail" dialog is displayed.

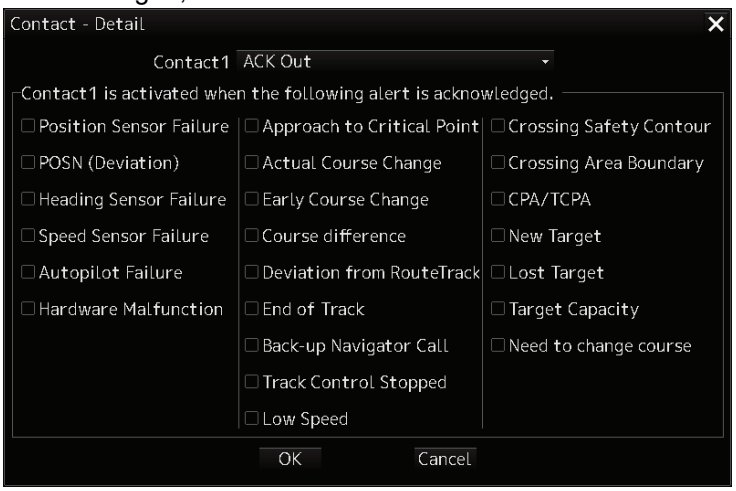


3. **Click on the function to be assigned from the combo box.**
   For the functions that can be assigned, refer to "Table. Contact outputs that can be selected".

Selecting [ACK OUT]

Check boxes are displayed in the "Contact-Detail" dialog box.

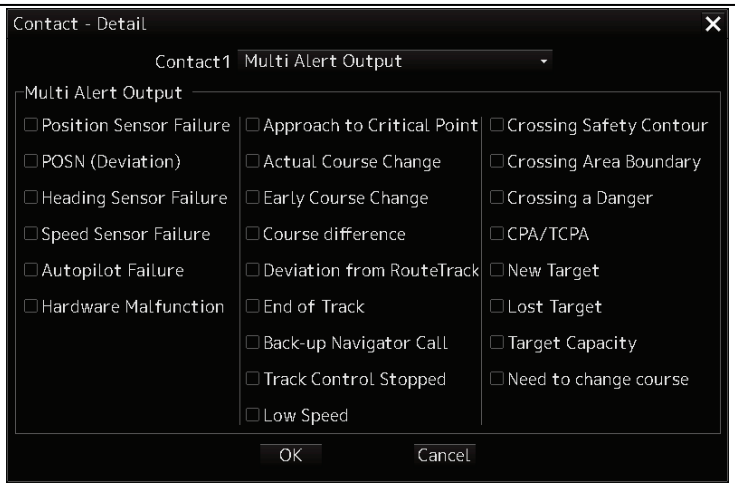
Select the alert to be enabled by clicking on the check box of it. When the selected alert is acknowledged, the contact is activated.



Selecting [Multi Alert Output]

Check boxes are displayed in the "Contact-Detail" dialog box.

Select the alerts to be enabled by clicking on the check box of them. When any of the checked alert occurs, the contact is activated.



4. Click on the [OK] button.

The selected function is assigned to each contact output. To change the function to be assigned or cancel the assignment, click on the [Cancel] button.

5. The task station used by the [Task Station] combo box is chosen to the point of contact which assigned the function.

- Operation in the system with AMS license
  In ACK Out, BZ Off Out (BNWAS), BZ Off Out (Gyro), and BZ Off Out, the setting is fixed to "AMS".
- Operation in the system without AMS license
  For ACK Out, select one of the task stations in the system.
  For BZ Off Out(BNWAS), select from "All" and "TCS".
  For BZ off Out(Gyro), select one of the task stations in the system or "All".
  For BZ Off Out, only "All" can be selected
- Common to each license
  For Timer Reset, "All" can be selected.
  For BZ Off Out(A/P), the setting is fixed to "AMS & TCS".
  For Alarm Transfer, the setting is fixed to "AMS".
  For INS System Fail, the setting is fixed to "All".
  For CPA/TCPA, AZ, Lost Target, Target Capacity and need to change course, select only one task station in the system.

Table. Contact output that can be selected

Contact output that can be selected	Description
ACK Out	ACK output (contact output to be output when all of the enabled alerts are approved)
BZ Off Out (BNWAS)[*1]	Buzzer OFF output for BNWAS (the operation varies according to the license as indicated below.) • Operation in the system with AMS license The contact output is output when silence operation is performed in CAM or Emergency Call is resolved. The contact output is output regardless of with/without alert sound. • Operation in the system without AMS Buzzer sound is output by silence operation on the target task station.
BZ Off Out (A/P)[*1]	Buzzer OFF output for Autopilot
BZ Off Out (Gyro)[*1]	Buzzer OFF output for Gyro Compass
BZ Off Out	Buzzer OFF output (Contact output that is output when the Silence button is pressed on BAM. The contact output can be output even without alarm

	occurrence.)
Alarm Transfer	BNWAS ALARM output (contact output that is output from CAM to BNWAS for transfer of alarm via BNWAS)
INS System Fail	Buzzer OFF output (Contact output that is output when the Silence button is pressed on BAM. The contact output is output also without alarm occurrence.)
Timer Reset	Timer reset notification
Position Sensor Failure	Position sensor failure alarm (automatic sailing)
Position (Deviation)	Position monitor warning (position reliability deterioration)
Heading Sensor Failure	Heading sensor failure alarm (automatic sailing)
Speed Sensor Failure	Speed sensor failure alarm (automatic sailing)
Autopilot Failure	Communication with autopilot failure warning (automatic sailing)
Hardware Malfunction	Hardware failure alert
Software Malfunction	System malfunction alarm
Approach to Critical Point	Approach to critical point warning
Actual Course Change	Course change notification alert
Early Course Change	Early course change alert
Course difference	Course difference (ship's heading departing from the course) warning
Deviation from RouteTrack	Cross Track (Dev EX) alarm
End of track	Final destination arrival alarm
Back-up Navigator Call[*3]	Backup navigator call alarm
Track Control Stopped	TCS stopped
Low Speed	Low speed warning
Crossing Safety Contour	Crossing safety contour alarm
Crossing Area Boundary	Crossing special area boundary warning
Crossing a Danger	Warning for approaching to danger
CPA/TCPA	CPA/TCPA alarm
New Target	Automatic acquisition/automatic activation warning
Lost Target	Target lost warning
Target Capacity	Warning on targets reaching maximum, Warning of reaching 95% of capacity
Need to change course	Alarm for danger of collision with other vessels
Multi Alert Output	Select when outputting multiple alerts from one contact. When this output is selected, the Multi-Alert Output group is displayed.
Remote TX/STBY Switch	Level output to remote switch connected by contact

(*1) Refer to "4.9 CAM Configuration and Setting" in installation manual.

(*2) When [Back-up Navigator Call] is selected as the contact output, [TCS] is added to the options of [Task Station].

6.8.6 Testing each contact output

1. **Select one of the tabs from SLC1(M) to SLC4(M), SLC1(S) to SLC4(S), and ALC1 to ALC4.**
2. **Select the [Contact Output] tab.**
3. **Turn on the light by clicking on the [Test] button of one of Contact1 to Contact8.**
4. **To stop test output, turn off the light by clicking on the [Test] button again.**

6.8.7 Checking the status of each contact input

1. **Select one of the tabs from SLC1(M) to SLC4(M), SLC1(S) to SLC4(S), and ALC1 to ALC4.**
2. **Select the [Contact Input] tab.**
3. **Confirm the display of the Diagnosis lamp.**

   Green lamp display : On (Active) status
   White lamp display : Off (Normal) status

7. Troubleshooting

Chapter 7. Troubleshooting

7.1 Maintenance Functions Executed from the Menu

This section explains maintenance functions that are executed from the menu.

7.1.1 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.

7.1.2 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.



7.1.3 Confirming Software Information

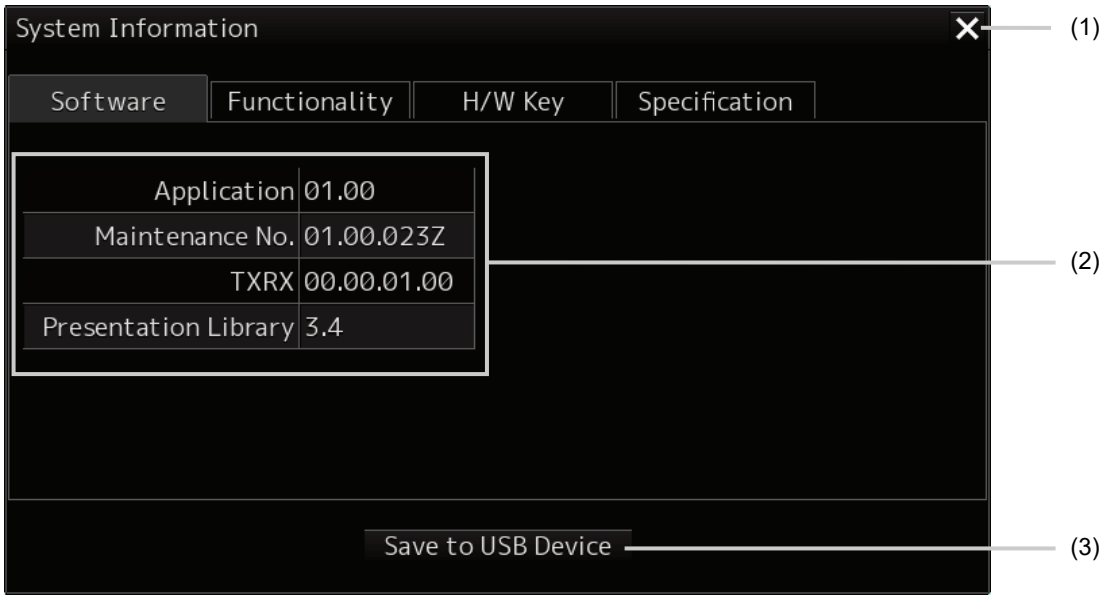
⚠WARNING	
	When you want to use a USB flash memory to read or write a file, make sure in advance that the USB flash memory is not affected by a computer virus. If the display unit is infected with a virus, other equipment will also be infected, with the result that a trouble will occur.
	Before removing 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 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.
Click on the [Software] tab.

3. 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.	8-digit maintenance number
TXRX	Version of the software used for the radar transmitter-receiver unit * This information is displayed when the system is equipped with the RADAR function.
No.1 GPS	Software version of GPS 1 * Displayed when a medium-sized radar equipped with 1 or 2 units of GPS is used.
No.2 GPS	Software version of GPS * Displayed when a medium-sized radar equipped with 2 units of GPS is used.
TCS	Version of the software used for TCS * This information is displayed when the system is equipped with the TCS function.
Presentation Library	Edition of S52 Presentation Library 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.

7.1.4 Checking the Enable/Disable Statuses of the Functions that Have Been Installed

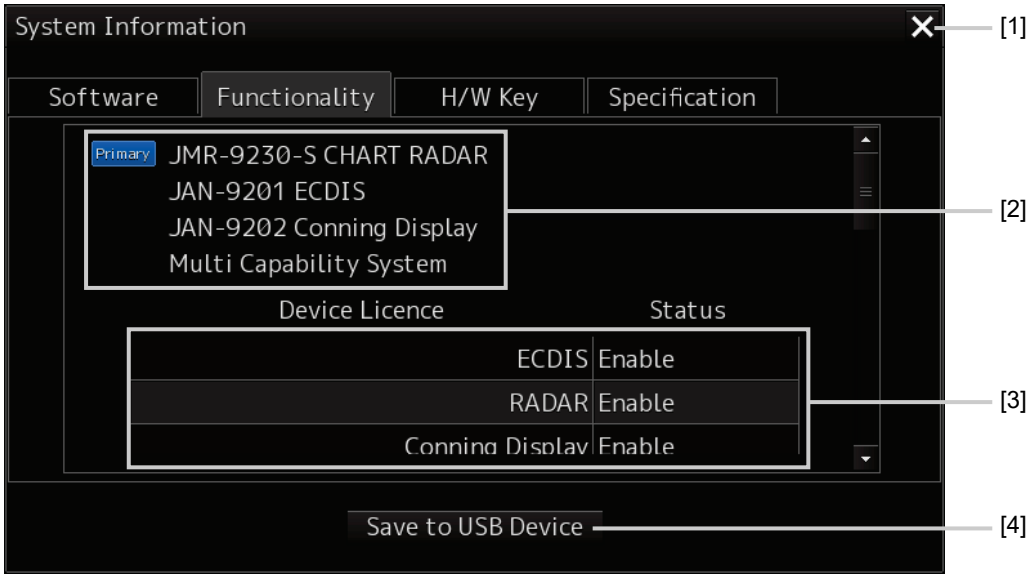
⚠WARNING	
	When you want to use a USB flash memory to read or write a file, make sure in advance that the USB flash memory is not affected by a computer virus. If the display unit is infected with a virus, other equipment will also be infected, with the result that a trouble will occur.
	Before removing 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.

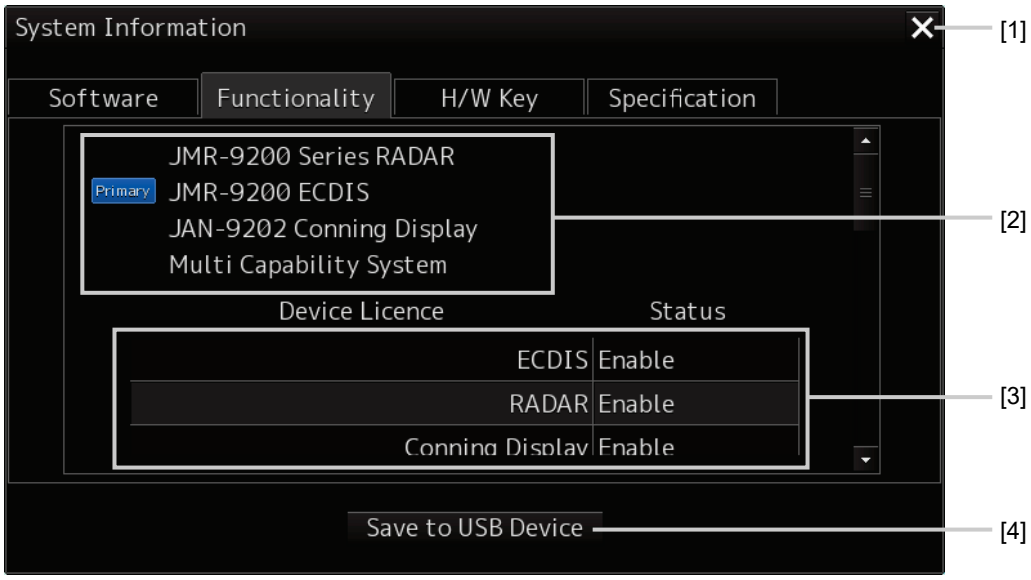
2. **Click on the [Maintenance] - [System Information] button on the menu.**
The [System Information] dialog box appears.

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).

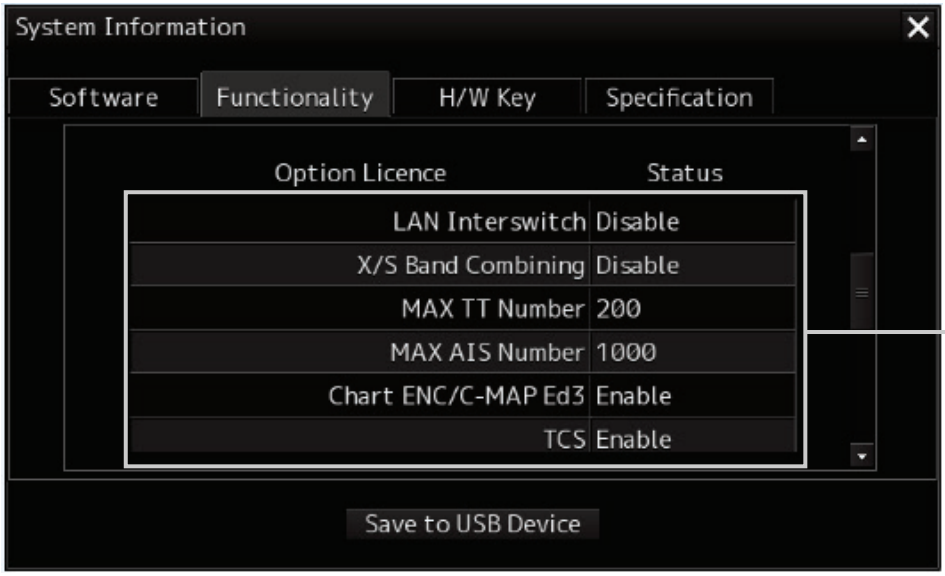
[The system has any one of RADAR, ECDIS, and Conning modes]

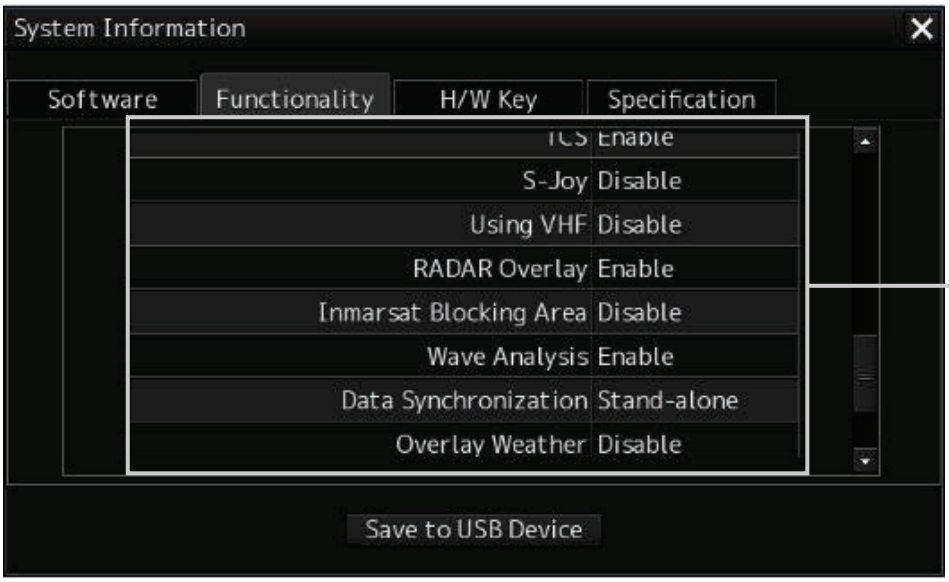


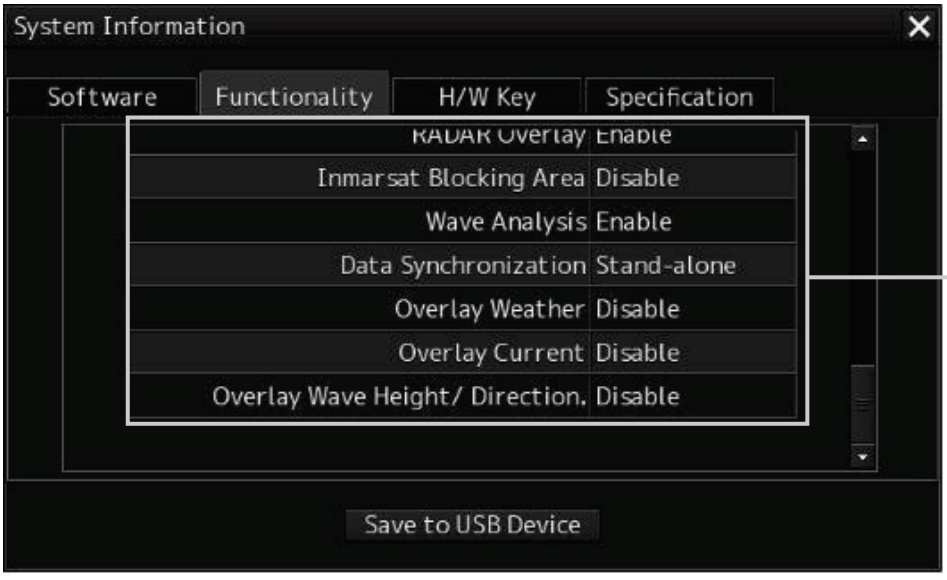
[The system has multiple operation modes and RADAR is the primary task]



[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: JMR-xxxx-x CHART RADAR (for Chart RADAR)

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 License] and [Option License].

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.

7.1.5 Confirming the H/W Key

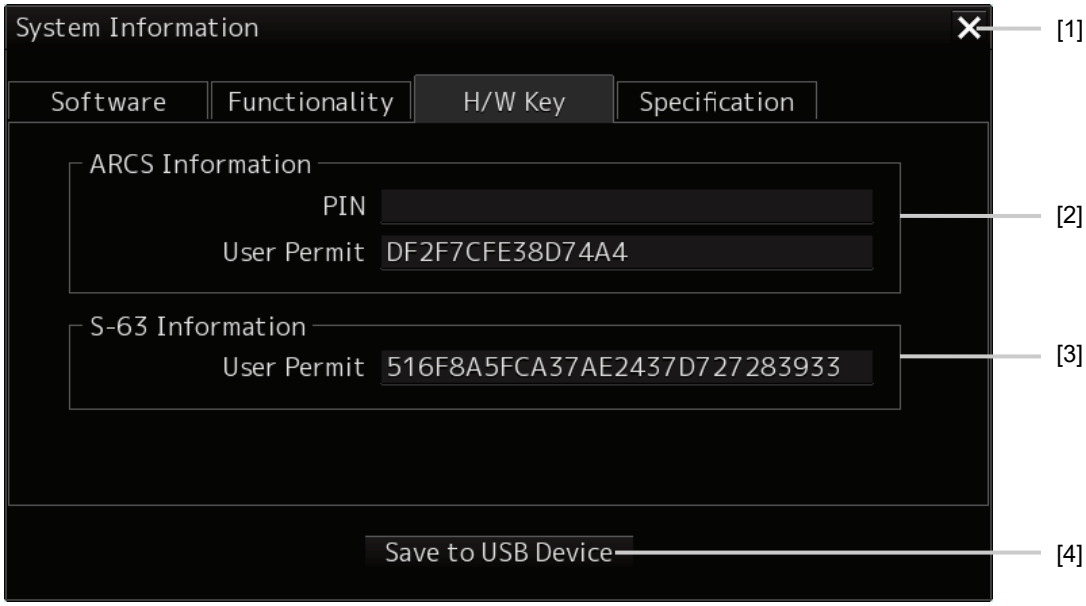
⚠WARNING	
	When you want to use a USB flash memory to read or write a file, make sure in advance that the USB flash memory is not affected by a computer virus. If the display unit is infected with a virus, other equipment will also be infected, with the result that a trouble will occur.
	Before removing 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 information can be displayed.
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] button

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.

7.1.6 Confirming the Compliant Standards for the Equipment

⚠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 display unit 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.

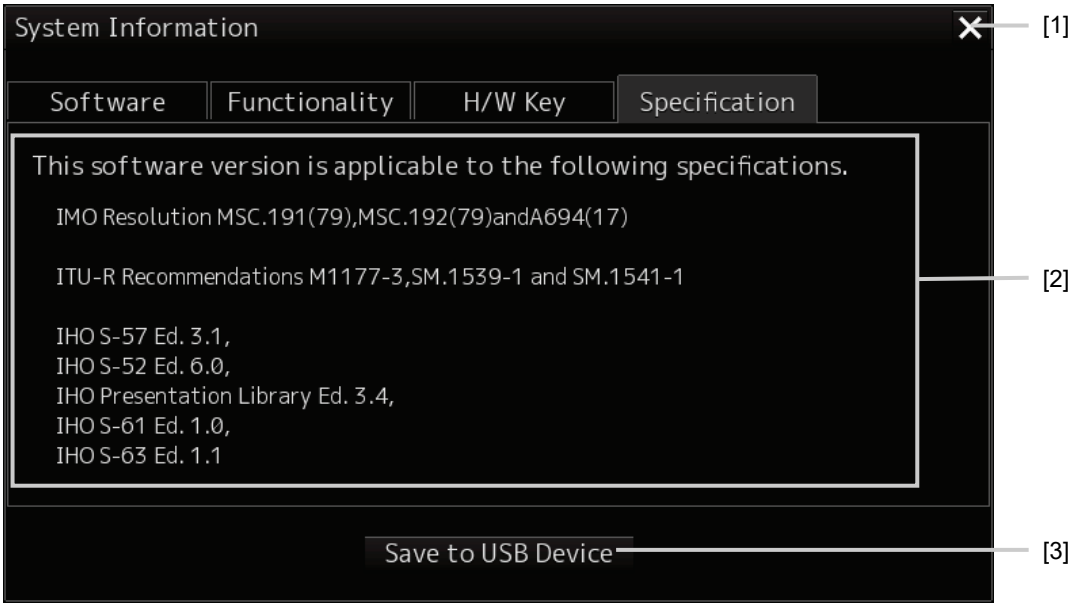
If there is a RADAR or ECDIS equipment license, the standards related to the equipment license are displayed.

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.

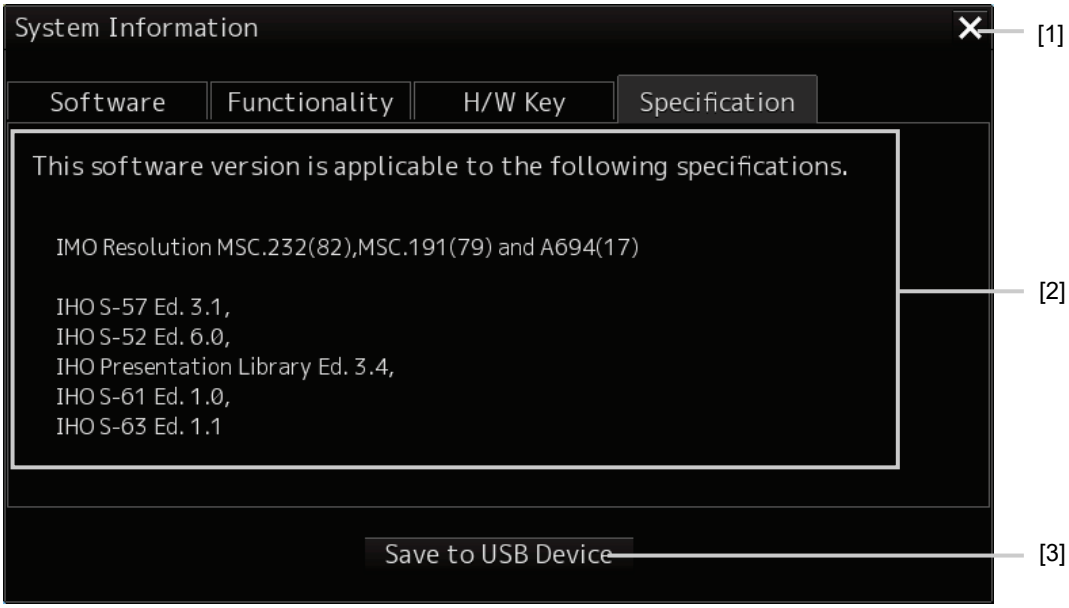
3. **Click on the [Specification] tab.**
The equipment license standard specification information is displayed.

[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
Click on this button to close the "System Information" dialog box.

[2] Equipment license information
The equipment license standard specification information is displayed.

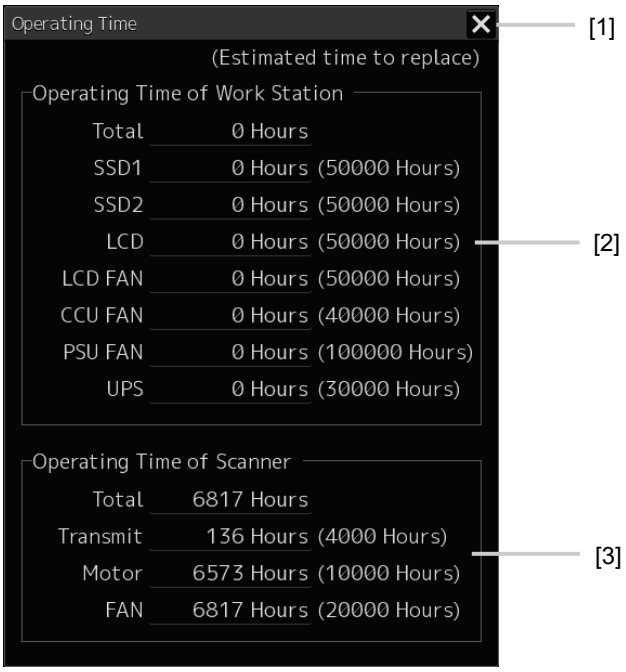
[3] [Save to USB Device] (Saving to USB flash memory) button
Click on this button to save the displayed information in a USB flash memory in the text format.

7.1.7 Confirming the Operating Time

Confirm the operating time of this equipment.

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. The estimated replacement time is indicated in ( ).

[SSD2]: Total operating time of SSD2. The estimated replacement time is indicated in ( ).

[LCD]: Total operating time of LCD. The estimated replacement time is indicated in ( ).

[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 it is installed as an option.

[3] [Operating Time of Scanner]

The total operating time of the scanner unit is displayed.

[Total]: Total operating time of the scanner unit

[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 scanner unit fan.

Memo

[Operation Time of Scanner] is displayed in the RADAR mode only.

Memo

To clear each operating time, see “4.4.4.1 Clearing operation time of Workstation”.

7.1.8 Setting and Confirming the Sensor Source

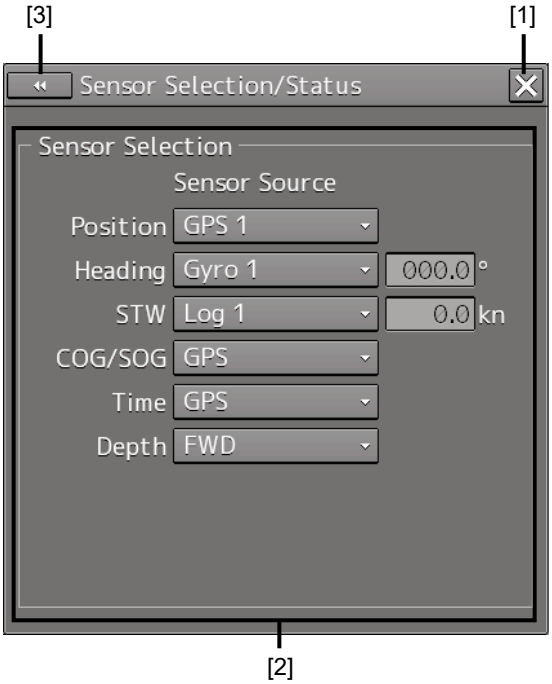
Set and confirm the sensor source.

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

Click on this button to close the "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 ("x" indicates the equipment number)
POSN (Sub)	Select a Secondary Position sensor source from the combo box. *Displayed for ECDIS only.	None, GPS x ("x" indicates the equipment number)
Heading	Select a heading sensor source from the combo box. *The source that can be selected varies depending on the installation. When the sensor source is set to [Manual], the heading value can also be input in the input box. Heading value input range: 0.0-359.9°	MAN, Gyro x ("x" indicates the equipment number)
STW (Speed Through Water)	Select a Speed Through Water sensor source from the combo box. *The source that can be selected varies depending on the installation. When the sensor source is set to [Manual], a Speed Through Water can also be input in the input box. Speed Through Water value input range: 0.0-99.9 kn	MAN, Logx ("x" indicates the equipment number)
COG/SOG (Course Over the Ground/Speed Over the Ground)	Select Course Over the Ground/Speed Over the Ground sensor source from the combo box. *The source that can be selected varies depending on the installation. When GPS is selected for Position, the same GPS is selected automatically.	Log x, GPS
Time (Time correction)	Select a sensor source to be used for time correction of this equipment from the combo box. *The source that can be selected varies depending on the installation.	GPS, Ship Clock
Depth (Water depth)	Select a water depth sensor source from the combo box. *The source that can be selected varies depending on the installation.	FWD

[3] Disclosure button

When clicked, the hidden left pane appears.



When the left pane is displayed

7.2 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.

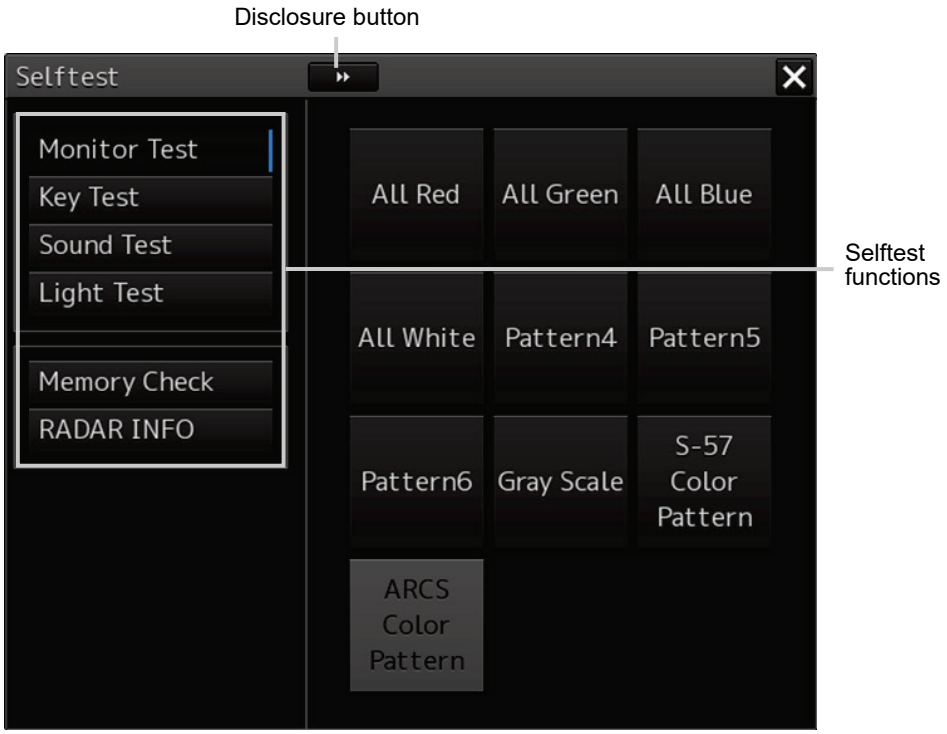
Check List

Equipment	Item to be checked	Criteria	Remarks
Transmitter-receiver unit	Synchronization LED of Receiver	The LED is lit during operation	48 NM range
Display unit	Video and echoes on the screen Sensitivity Brightness Various markers Various numerical indications Lighting	Can be correctly controlled	
	Cleaning the DVD drive	7.2.10 Cleaning the Lens of the DVD Drive	
	Cleaning the Trackball	4.3.4.2 Cleaning the Trackball	
Scanner Unit	Magnetron current	7.2.6 Checking the Magnetron Current Level of the RADAR [Magnetron Curr.]	
	Performance Monitor	7.2.8 Checking the Performance Monitor Status	

7.2.1 Starting Selftest Function

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.



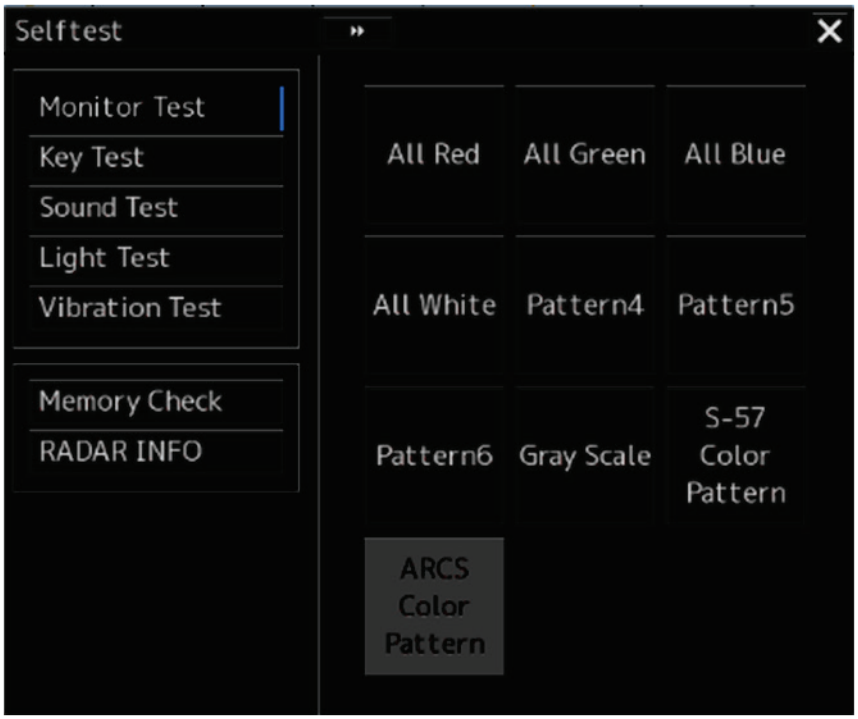
The Selftest functions are displayed in the left pane.
Click on the disclosure button to hide the left pain.

3. **Click on a diagnosis function to be executed.**
The execution dialog of the selected diagnosis function is displayed.

7.2.2 Confirming the screen status [Monitor Test]

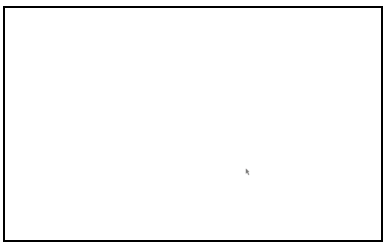
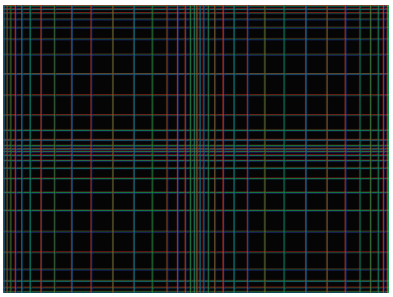
Confirm the screen status.

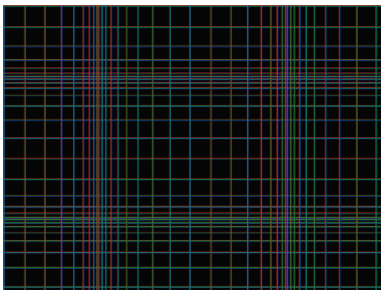
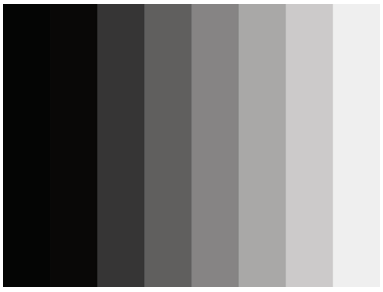
1. **Click on the [Menu] button on the left toolbar.**
   The menu is displayed.
2. **Click on the [Maintenance] - [Selftest] - [Monitor Test] button on the menu.**
   When the color or pattern of the dialog is clicked on, the color or pattern is displayed on the screen.
   Check the screen status with the display status.

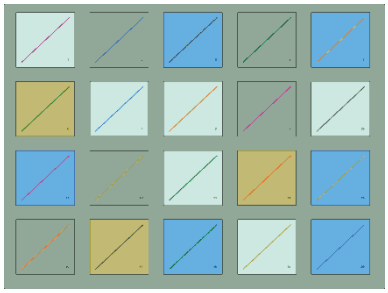
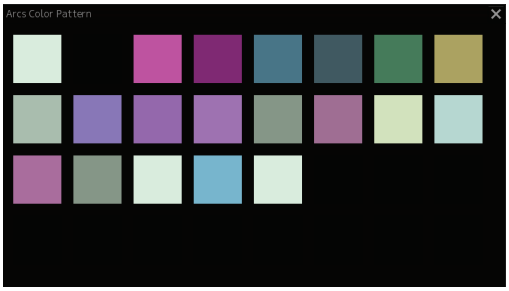


To reset the display, click the button again.

Pattern list

Pattern button name	Display
All Red	 The entire screen is displayed in red.
All Green	 The entire screen is displayed in green.
All Blue	 The entire screen is displayed in blue.
All White	 The entire screen is displayed in white.
Pattern4	 Displays the pattern for checking the communication quality for VDR.

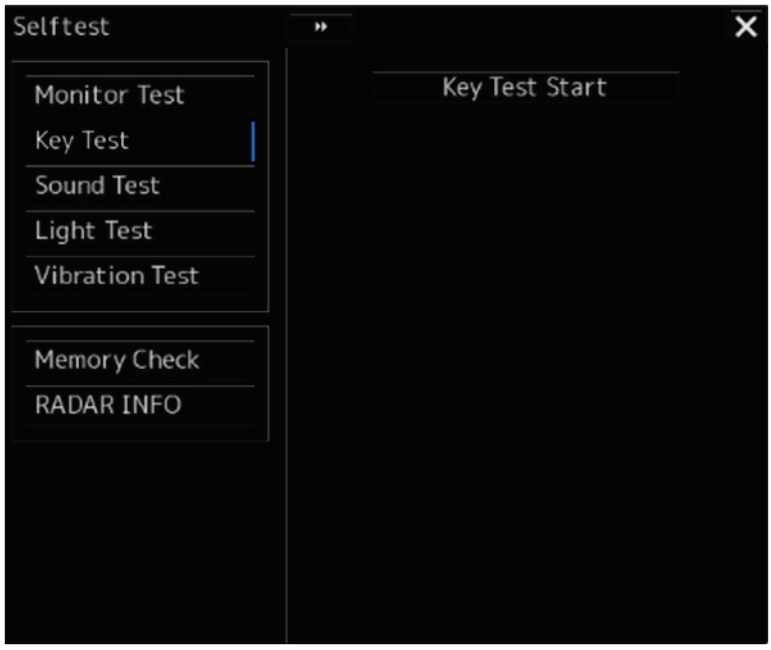
Pattern button name	Display
Pattern5	 Displays the pattern for checking the communication quality for VDR.
Pattern6	 Displays the pattern for checking the communication quality for VDR.
Gray Scale	 Displays the grey scale pattern for checking the monitor brightness adjustment. Grey scale patterns can 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. Use the Day/Night button on the right Toolbar for switching between the day and night mode. For the details of the Day/Night button, refer to “2.2.2 Right toolbar” in MFD instruction manual.

Pattern button name	Display
S-57 Color Pattern	 A color test pattern of the S57 chart is displayed. By identifying the color pattern, the S57 chart display status can be verified. A color pattern can be displayed in Day/Night mode. Use the Day/Night button on the right Toolbar for switching between the day and night mode. For the details of the Day/Night button, refer to "2.2.2 Right toolbar" in MFD instruction manual.
ARCS Color Pattern	The "ARCS Color Pattern" dialog is displayed.  A color test pattern of the ARCS chart is displayed. By identifying the color pattern, the ARCS chart display status can be verified. A color pattern can be displayed in Day/Night mode. Use the Day/Night button on the right Toolbar for switching between the day and night mode. For the details of the Day/Night button, refer to "2.2.2 Right toolbar" in MFD instruction manual.

7.2.3 Confirming the Performance 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 window 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.

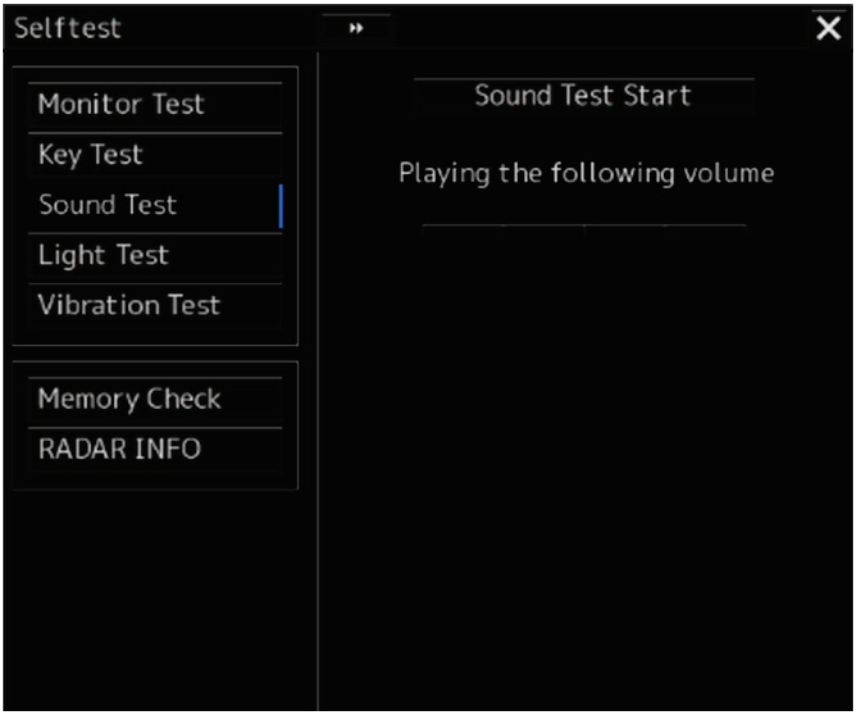
5. **Click on the [Key Test Stop] button after the performance check.**

Returns to the "Selftest" dialog box.

7.2.4 Confirming the Alert Sound [Sound Test]

Confirm the alert sound.

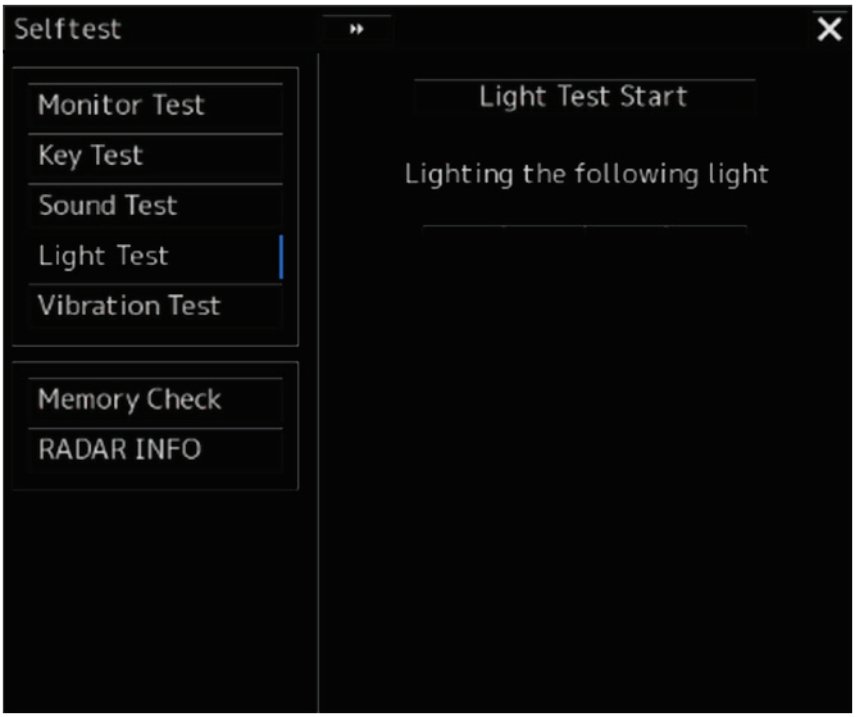
1. **Click on the [Menu] button on the left toolbar.**
   The menu is displayed.
2. **Click on the [Maintenance] - [Selftest] - [Sound Test] button on the menu.**
3. **Click on the [Sound Test Start] button.**
   A sound test starts. All the available beep sound volumes can be tested from 0.



7.2.5 Testing the Brightness of LED [Light Test]

Test the brightness of LED.

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.**
   An LED brightness test starts. All the available brightness levels can be tested by increasing the level from 0.



7.2.6 Checking the Magnetron Current Level of the RADAR [Magnetron Curr.]

This function is used to check the magnetron current level of the radar.

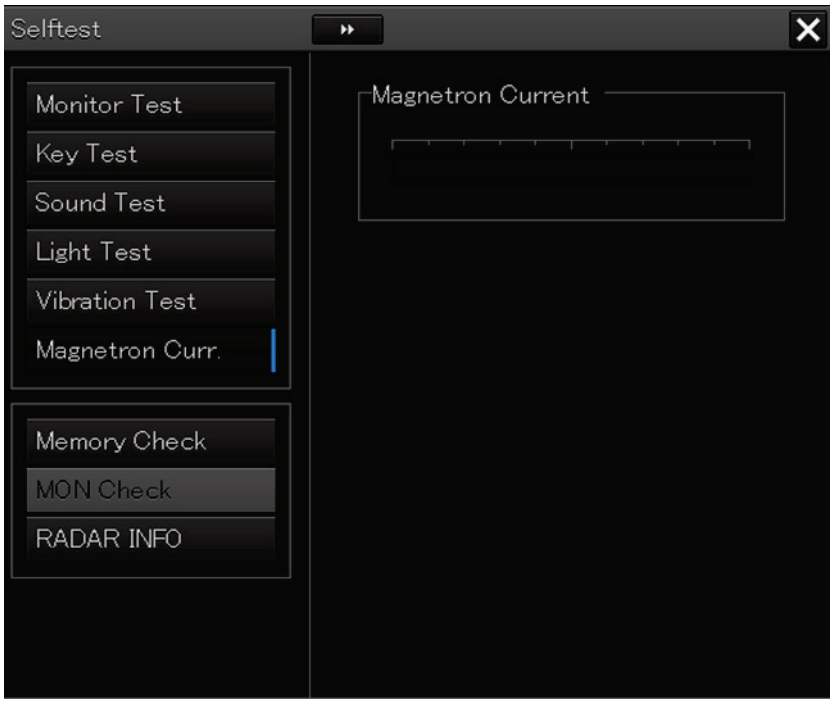
This function is displayed only when the magnetron radar scanner unit is connected.

1. **Click on the [Menu] button on the left toolbar.**

The menu is displayed.

2. **Click on the [Maintenance] - [Selftest] - [Magnetron Current] button on the menu.**

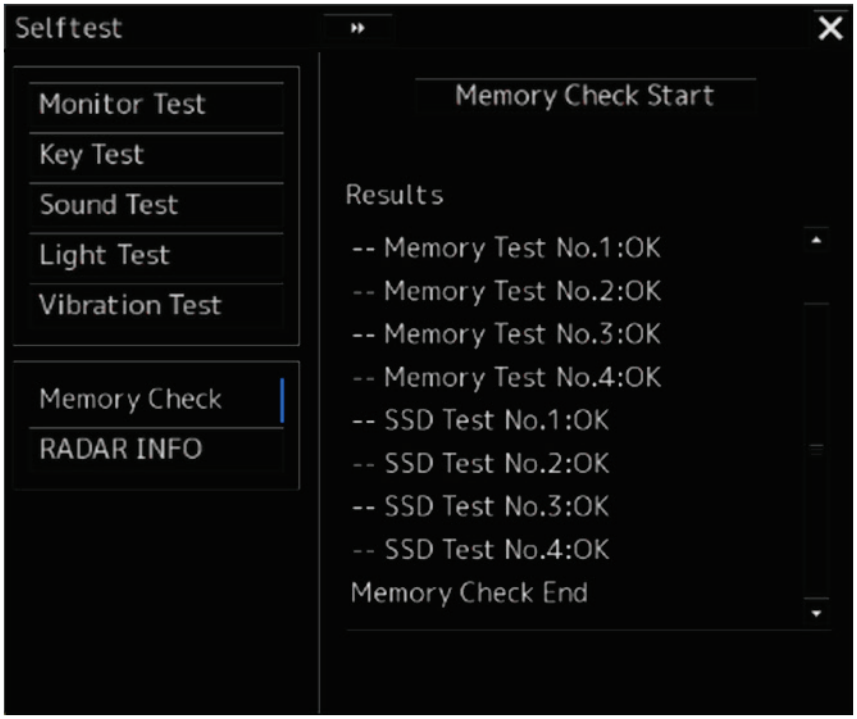
The magnetron current level of the scanner unit is displayed.



7.2.7 Checking the Memory［Memory Check］

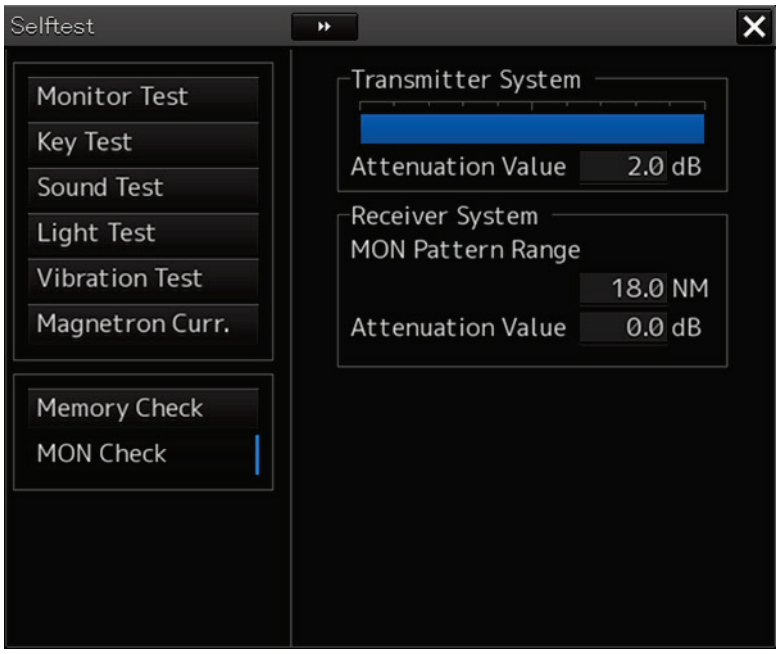
Check the memory.

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.



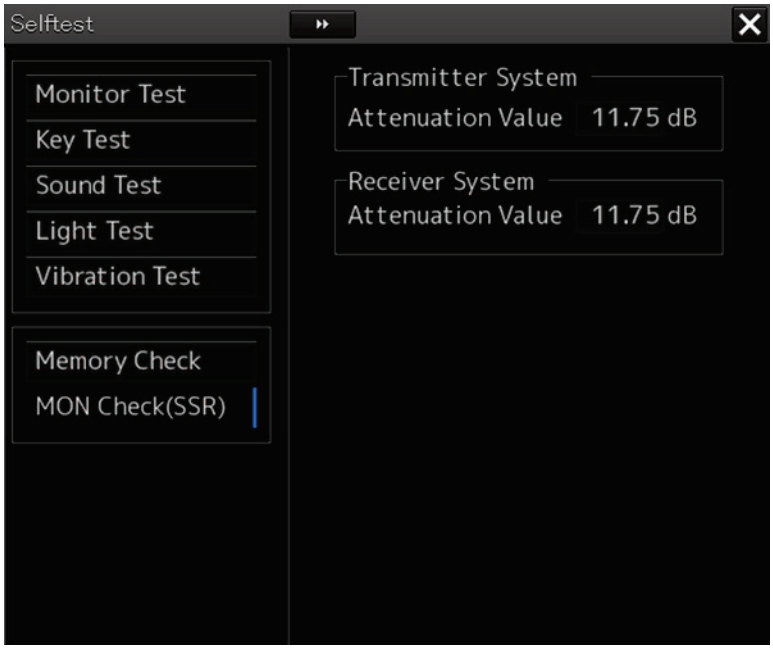
7.2.8 Checking the Performance Monitor Status

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 scanner unit.
When magnetron radar is used, the following dialog box appears.



For the details of this dialog box, refer to "7.2.8.1 MON Check".

When a solid-state radar is used, the following dialog box will be displayed.



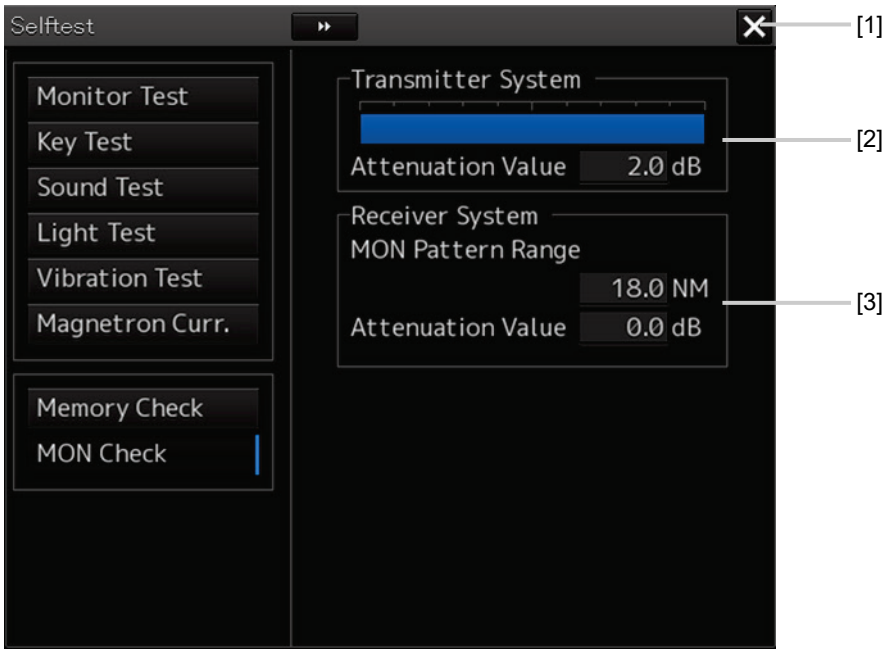
For the details of this dialog box, refer to "7.2.8.3 MON Check (SSR)".
For more information about the adjustment operation while checking the performance monitor, refer to "Adjusting the performance monitor."

7.2.8.1 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 "Selftest" 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.

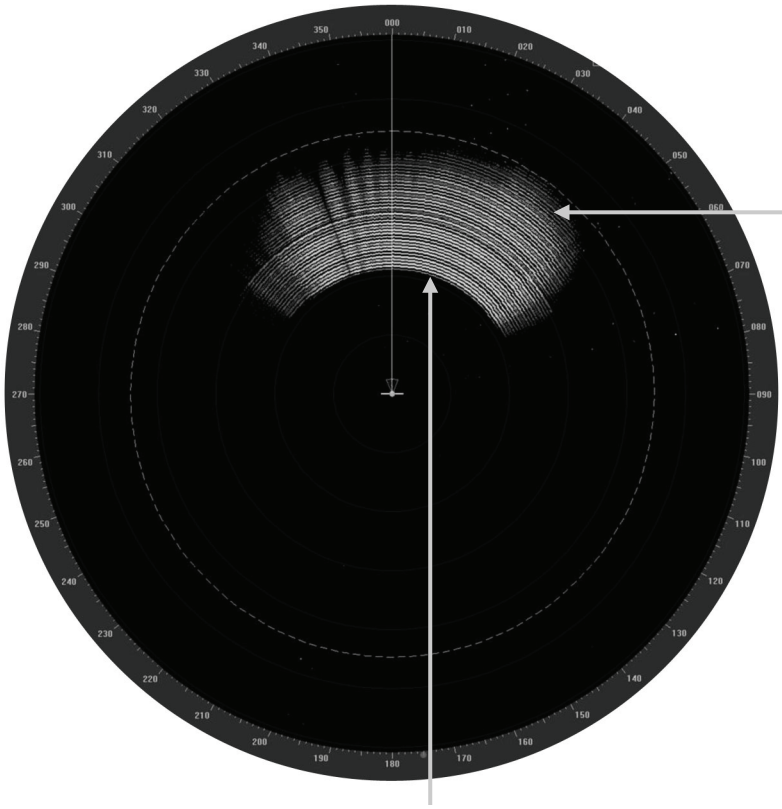
- Attenuation Value

  The amount of attenuation at the radar receiving unit is displayed in a numerical value [dB].

7.2.8.2 Adjustment of the performance monitor

Check the condition of the performance monitor and adjust the performance monitor as necessary.

In the case of equiped with Interswitch Unit function (Option)
To check the performance with the performance monitor, set the Interswitch Unit connection to straight (i.e. No. 1 scanner unit is connected to No. 1 display unit).



1. **Click on the [Menu] button on the left toolbar.**
The menu is displayed.

2. **Click on the [Maintenance] - [Selftest] - [MON Check] or [MON Check (SSR)] button on the menu.**

3. **Turn the [VRM] dial on the KOPU 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 Receiving Unit:
At normal: -2.9 dB to +3.5 dB
At degrading performances: -15.0 dB to -3.0 dB

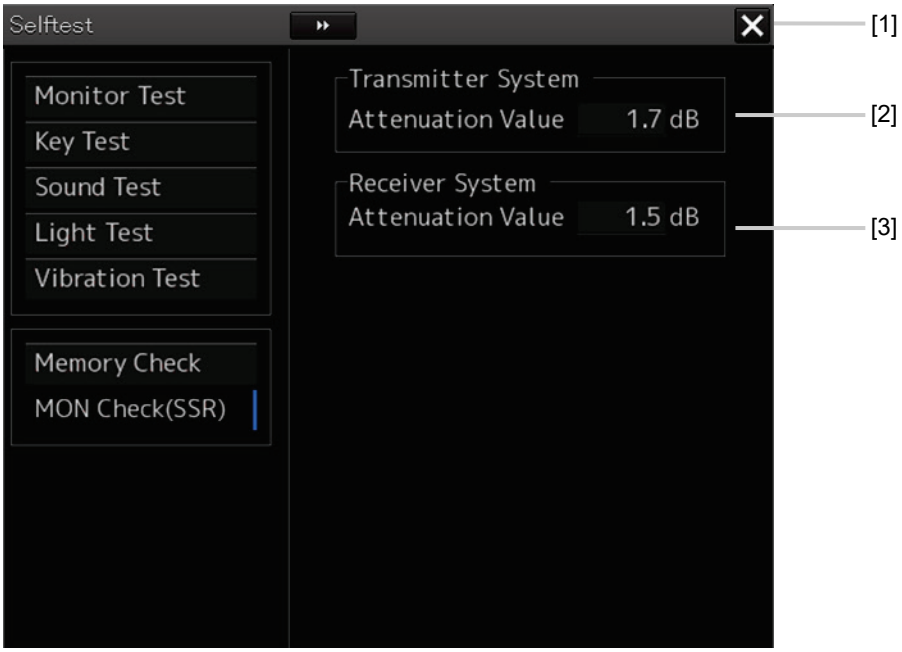
■ The performance monitor pattern n is only visible on the magnetron radar.

- 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 that of the receiver is -3dB or lesser, it indicates that performances of the transmitter/receiving unit are degrading.
  In this case, inspection by the specialized service personnel is required. Contact our dealer, the nearest service representative or JRC sales.

7.2.8.3 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 "Selftest" 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 receiving unit is displayed in a numerical value [dB].

7.2.9 Check the RADAR Information[RADAR INFO]

Check motion of the key on the operation panel.

1. **Click on the [Menu] button on the left tool bar.**
   The menu is displayed.
2. **Click on the [Maintenance]-[Selftest]-[RADAR INFO] button on menu.**
   The items of TIY, BZ and BP is displayed. Check to diplay value in accordance with RADER which is connected at that time or pulse width which is used.



7.2.10 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 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.**



   The supplied lens cleaner CD is ejected.

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.



7.2.11 Cleaning the Trackball

Refer to "4.3.5.2 Cleaning the trackball" of Chapter 4.

7.3 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. 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 circuit breaker at the front of the PSU (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 PSU (NBD-913) is faulty.	Make a request to the distributor for repair.
	The CCU (NDC-1590/A) is faulty.	Make a request to the distributor for repair.
	The CCU (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.
	The MNU (NWZ-208/NWZ-207/ NWZ-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.
	The MNU (NWZ-208/NWZ-207/ NWZ-214) is faulty.	Make a request to the distributor for repair.
The brightness of the monitor cannot be adjusted.	The MNU (NWZ-208/NWZ-207/ NWZ-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 cannot be moved 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 CCU (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 CCU (NDC-1590/A) is faulty.	Make a request to the distributor for repair.
Characters/symbols are not displayed correctly.	The CCU (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 unit is not turned on.	Turn on the power supply for the GPS unit.
	The GPS unit does not perform positioning.	Check the state of the GPS unit.
	The connection with the GPS unit is abnormal.	Check the connection with the GPS unit. If a GPS unit is connected to the SLC, check that the LED of the corresponding port is lit during data reception.
	The power supply for the SLC (CMH-2370) is not turned on. (Case where the GPS unit is connected to the SLC)	Turn on the power supply for the SLC.
	The SLC (CMH-2370) is faulty. (Case where the GPS unit is connected to the SLC)	Make a request to the distributor for repair.
	The internal wiring is faulty.	Make a request to the distributor for repair.
	The CCU (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 unit is not turned on.	Turn on the power supply for the AIS unit.
	The AIS unit does not perform receiving.	Check the state of the AIS unit.
	The connection with the AIS unit is abnormal.	Check the connection with the AIS unit. If an AIS unit is connected to the SLC, check that the LED of the corresponding port is lit during data reception.
	The power supply for the SLC (CMH-2370) is not turned on. (Case where the AIS unit is connected to the SLC)	Turn on the power supply for the SLC.
	The SLC (CMH-2370) is faulty. (Case where the AIS unit is connected to the SLC)	Make a request to the distributor for repair.
	The internal wiring is faulty.	Make a request to the distributor for repair.
	The CCU (NDC-1590/A) is faulty.	Make a request to the distributor for repair.

Symptom	Cause	Action
The azimuth of the Gyro compass is not displayed. 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 is not turned on.	Turn on the power supply for the gyro compass.
	The connection with the gyro compass is abnormal.	Check the connection with the gyro compass. If the gyro compass is connected to the SLC or GIF, check that the corresponding LED is lit during signal reception.
	The power supply for the SLC (CMH-2370) is not turned on. （Case where the gyro compass is connected to the SLC）	Turn on the power supply for the SLC.
	The SLC (CMH-2370) is faulty. （Case where the gyro compass is connected to the SLC）	Make a request to the distributor for repair.
	The GIF (CMJ-554） is not set correctly （Case where the gyro compass is connected to the GIF）	Set the GIF correctly according to the gyro compass.
	The fuse of the GIF (CMJ-554) has blown. （Case where the gyro compass is connected to the GIF)	Replace the fuse of the GIF.
	The GIF (CMJ-554）is faulty. （Case where the gyro compass is connected to the GIF)	Make a request to the distributor for repair.
	The internal wiring is faulty.	Make a request to the distributor for repair.
	The CCU (NDC-1590/A) is faulty.	Make a request to the distributor for repair.

Symptom	Cause	Action
Vessel speed 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 speed log is not turned on.	Turn on the power supply for the speed log.
	The connection with the speed log is abnormal.	Check the connection with the speed log. If the speed log is connected to the SLC or GIF, check that the corresponding LED is lit during signal reception.
	The power supply for the SLC (CMH-2370) is not turned on. (Case where the speed log is connected to the SLC).	Turn on the power supply for the SLC.
	The SLC (CMH-2370) is faulty. (Case where the speed log is connected to the SLC).	Make a request to the distributor for repair.
	The GIF (CMJ-554) is not set correctly. (Case where the speed log is connected to the GIF).	Set the GIF correctly according to the speed log.
	The GIF (CMJ-554) is faulty. (Case where the speed log is connected to the GIF).	Make a request to the distributor for repair.
	The internal wiring is faulty.	Make a request to the distributor for repair.
	The CCU (NDC-1590/A) is faulty.	Make a request to the distributor for repair.

Symptom	Cause	Action
Rudder angles are not displayed. 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. If the rudder angle indicator is connected to the SLC, check that the LED of the corresponding port is lit during data reception.
	The power supply for the SLC (CMH-2370) is not turned on. (Case where the rudder angle indicator is connected to the SLC or the rudder angle indicator is connected to the AOC)	Turn on the power supply for the SLC.
	The SLC (CMH-2370) is faulty. (Case where the rudder angle indicator is connected to the SLC or the rudder angle indicator is connected to the AOC)	Make a request to the distributor for repair.
	The AOC (CMJ-560) is not set correctly. (Case where the rudder angle indicator is connected to the AOC)	Set the AOC correctly according to the rudder angle indicator.
	The AOC (CMJ-560) is faulty. (Case where the rudder angle indicator is connected to the AOC)	Make a request to the distributor for repair.
	The internal wiring is faulty.	Make a request to the distributor for repair.
	The CCU (NDC-1590/A) is faulty.	Make a request to the distributor for repair.

Symptom	Cause	Action
The digital anemometer values (wind direction and speed) are not displayed.	The communication is not set correctly.	Set the communication correctly.
	The power supply for the anemometer is not turned on.	Turn on the power supply for the anemometer.
	The connection with the anemometer is abnormal	Check the connection with the anemometer. Check that the LED of the corresponding port in the SLC is lit during data reception.
	The power supply for the SLC (CMH-2370) is not turned on.	Turn on the power supply for the SLC.
	The SLC (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 CCU (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. Check that the LED of the corresponding port in the SLC is lit during data reception.
	The power supply for the SLC (CMH-2370) is not turned on.	Turn on the power supply for the SLC.
	The SLC (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 CCU (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 abnormal.	Check the connection with the sensor equipment. Check that the LED of the corresponding port in the SLC is lit during data reception.
	The power supply for the SLC (CMH-2370) is not turned on.	Turn on the power supply for the SLC.
	The internal wiring is faulty.	Make a request to the distributor for repair.
	The display unit such as the SLC (CMH-2370), AOC (CMJ-560), and CCU (NDC-1590/A) is faulty.	Make a request to the distributor for repair.
Auto sailing is disabled.	The communication is not set correctly.	Set the communication correctly.
	The Auto sailing function is not operated correctly.	Operate Auto sailing correctly.
	The power supply for the Auto sailing unit is not turned on.	Turn on the power supply for the Auto sailing unit.
	The connection with the Auto sailing unit is faulty.	Check the connection with the Auto sailing unit. Check that the LED of the corresponding port in the SLC is lit during data reception.
	The power supply for the SLC (CMH-2370) is not turned on.	Turn on the power supply for the SLC.
	The SLC (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 CCU (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 SLC (CMH-2370) is not turned on. (Case where contact signal output is acquired from the SLC)	Turn on the power supply for the SLC.
	The SLC (CMH-2370) is faulty. (Case where contact signal output is acquired from the SLC)	Make a request to the distributor for repair.
	The internal wiring is faulty.	Make a request to the distributor for repair.
	The CCU (NDC-1590/A) is faulty.	Make a request to the distributor for repair.
The scanner unit is not recognized	The connection with the scanner unit is abnormal.	Check the connection with the scanner unit.
	Power is not supplied from the PSU to the scanner unit.	Check the power supply wiring between the PSU and the RIF. Check the power supply connection inside of the scanner unit. [Note] For checking wiring inside of the scanner unit, 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.
	Only AC power is supplied to the PSU. (NKE-2254 or NKE-2103 is connected as the scanner unit)	To connect the NKE-2254 or NKE-2103 scanner unit, the DC power supply must be connected to the PSU.
	The RIF (CQD-2273) is not set correctly.	Set the RIF correctly.
	The RIF (CQD-2273) is faulty.	Make a request to the distributor for repair.
	The scanner unit is faulty.	Make a request to the distributor for repair.
	The internal wiring is faulty.	Make a request to the distributor for repair.
	The CCU (NDC-1590/A) is faulty.	Make a request to the distributor for repair.

Symptom	Cause	Action
The power is not supplied to the scanner unit.	The connection with the scanner unit is abnormal.	Check the connection with the scanner unit.
	The connection with the scanner unit is abnormal and overcurrent protection is functioning in the PSU.	Check the connection with the scanner unit and remove the cause of short-circuit.
	DC power is not supplied to the PSU. (NKE-2254 or NKE-2103 is connected as the scanner unit)	To connect the NKE-2254 or NKE-2103 scanner unit, DC power supply must be connected to the PSU.
	The DC24V output fuse is blown out. (NKE-2254 or NKE-2103 is connected as the scanner unit.)	After removing the cause of fuse blow-out, replace the fuse. The fuse is the 15A blade fuse at the front of the PSU (NBD-913).
	The RIF (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 PSU (NBD-913) is abnormal.	Make a request to the distributor for repair.
	The CCU (NDC-1590/A) is faulty.	Make a request to the distributor for repair.
The preheat count down of the scanner unit is not displayed.	The connection with the scanner unit is abnormal.	Check the connection with the scanner unit.
	The safety switch of the scanner unit is set to OFF.	Set the safety switch of the scanner unit to ON. [Note] For operating the safety switch of the scanner unit, 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 scanner unit is connected.	Preheat count-down is not displayed for a solid-state scanner unit.
	The scanner unit is faulty.	Make a request to the distributor for repair.
	The RIF (CQD-2273) is not set correctly.	Set the RIF correctly.
	The RIF (CQD-2273) is faulty.	Make a request to the distributor for repair.

Symptom	Cause	Action
	The internal wiring is faulty.	Make a request to the distributor for repair.
	The CCU (NDC-1590/A) is faulty.	Make a request to the distributor for repair.
The scanner unit does not rotate even if the [Transmit] button is pressed.	The connection with the scanner unit is abnormal.	Check the connection with the scanner unit.
	The safety switch of the scanner unit is set to OFF.	Set the safety switch of the scanner unit to ON. [Note] For operating the safety switch of the scanner unit, 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 PSU to the scanner unit.	Check the power supply wiring between the PSU and the RIF. Check the power supply connection inside of the scanner unit. [Note] For checking the wiring inside of the scanner unit, 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 scanner unit is not set correctly. (NKE-1632, NKE-2632, or NKE-2632-H, or NKE-1696 is connected as the scanner unit.)	Set the motor driver circuit correctly. [Note] 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 rotating part of the scanner unit is frozen.	De-freeze the frozen section by using the neck heater option.

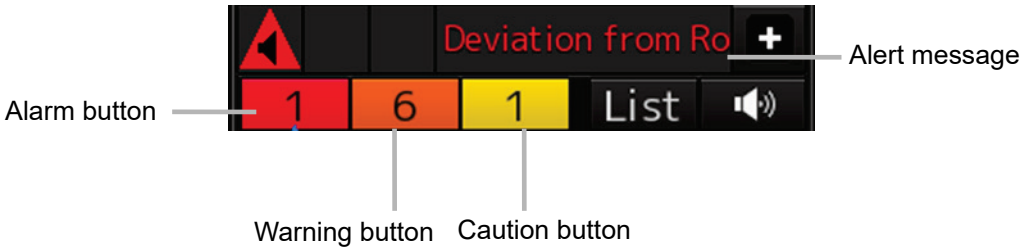
Symptom	Cause	Action
	Strong wind of relative wind velocity exceeding 100 kt (about 51.5 m/s) is blowing.	When strong wind of relative wind velocity exceeding 100 kt is blowing, the scanner unit does not rotate due to the protection function.
	The scanner unit is faulty.	Make a request to the distributor for repair.
	The RIF (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 PSU (NBD-913) is abnormal.	Make a request to the distributor for repair.
	The CCU (NDC-1590/A) is faulty.	Make a request to the distributor for repair.
No radar image is displayed.	The connection with the scanner unit is abnormal.	Check the connection with the scanner unit.
	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. （Case where an scanner unit that uses a magnetron is connected）	Replace the magnetron. [Note] 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 scanner unit is faulty.	Check theperformance monitor, and make a request to the distributor for repair.
	The RIF (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 PSU (NBD-913) is abnormal.	Make a request to the distributor for repair.
	The CCU (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. （Case where a scanner unit that uses a magnetron is connected）	Replace the magnetron. [Note] 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 scanner unit is connected.	Tuning bar is not displayed for a solid-state scanner unit.
The azimuth of the radar image is not displayed correctly.	The azimuth is not set correctly.	Set the azimuth correctly.
	CCRP is not set correctly.	Set CCRP correctly.
	The GPS antenna position is not set correctly.	Set the GPS 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 antenna position is not set correctly.	Set the GPS antenna position correctly.
Interswitch Unit does not function.	Power for the Interswitch Unit is not turned on.	Turn on the power for the Interswitch Unit.
	The connection with the Interswitch Unit is abnormal.	Check the connection with the Interswitch Unit.
	The Interswitch Unit is faulty.	Make a request to the distributor for repair.
	The RIF (CQD-2273) is not set correctly.	Set the RIF correctly.
	The RIF (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 CCU (NDC-1590/A) is faulty.	Make a request to the distributor for repair.
If the power supply is turned off, the trail data is cleared without being stored.	The CCU (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 CCU (NDC-1590/A) is faulty.	Make a request to the distributor for repair.

Symptom	Cause	Action
Radar images cannot be overlaid.	There is no optional license for radar overlay.	Implement an optional license for radar overlay.
	The connection with the scanner unit is abnormal.	Check the connection with the scanner unit.
	The connection with the radar display unit is abnormal.	Check the connection with the radar display unit.
	The RIF (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 PSU (NBD-913) is faulty.	Make a request to the distributor for repair.
	The CCU (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. [Note] 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.

7.4 Alert List

When an alert occurs, alert information is displayed in the alert notification area.



Each of the above buttons shows the number of alerts occurred in the corresponding category

Memo
The buttons of the categories in which no alerts have occurred are not 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 (An alert indicating a state asking sailors to pay immediate attention and take immediate action.)	Alarms	Red	Before alarm acknowledgement: Blinking After alarm acknowledgement: Lighting	3 short audible signals (repetitive)
Warnings (An alert indicating that the state has changed, which although 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 After warning acknowledgement: Lighting	2 short audible signals (repetitive)
Cautions (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	-	

The list of alerts is shown below.

Task	Cause	Priority	Category	Alert ID	Instance	Alert Title
CAM	No.1 Radar(Alert Communication Failed)	C	B	3003	10	Lost RADAR1
CAM	No.2 Radar(Alert Communication Failed)	C	B	3003	11	Lost RADAR2
CAM	No.3 Radar(Alert Communication Failed)	C	B	3003	12	Lost RADAR3
CAM	No.4 Radar(Alert Communication Failed)	C	B	3003	13	Lost RADAR4
CAM	No.5 Radar(Alert Communication Failed)	C	B	3003	14	Lost RADAR5
CAM	No.6 Radar(Alert Communication Failed)	C	B	3003	15	Lost RADAR6
CAM	No.7 Radar(Alert Communication Failed)	C	B	3003	16	Lost RADAR7
CAM	No.8 Radar(Alert Communication Failed)	C	B	3003	17	Lost RADAR8
CAM	No.1 ECDIS(Alert Communication Failed)	C	B	3003	18	Lost ECDIS1
CAM	No.2 ECDIS(Alert Communication Failed)	C	B	3003	19	Lost ECDIS2
CAM	No.3 ECDIS(Alert Communication Failed)	C	B	3003	20	Lost ECDIS3
CAM	No.4 ECDIS(Alert Communication Failed)	C	B	3003	21	Lost ECDIS4
CAM	No.1 Conning(Alert Communication Failed)	C	B	3003	22	Lost CID1
CAM	No.2 Conning(Alert Communication Failed)	C	B	3003	23	Lost CID2
CAM	No.1 Wing-Conning(Alert Communication Failed)	C	B	3003	24	Lost WCID1
CAM	No.2 Wing-Conning(Alert Communication Failed)	C	B	3003	25	Lost WCID2
CAM	No.1 Remote-Conning(Alert Communication Failed)	C	B	3003	26	Lost RCID1
CAM	No.2 Remote-Conning(Alert Communication Failed)	C	B	3003	27	Lost RCID2
CAM	No.1 RPS(Alert Communication Failed)	C	B	3003	28	Lost RPS1
CAM	No.2 RPS(Alert Communication Failed)	C	B	3003	29	Lost RPS2
CAM	Autopilot(Alert Communication Failed)	C	B	3003	30	Lost AP
CAM	Gyro 1(Alert Communication Failed)	C	B	3003	31	Lost GYRO1
CAM	Gyro 2(Alert Communication Failed)	C	B	3003	32	Lost GYRO2
CAM	Gyro(Alert Communication Failed)	C	B	3003	33	Lost GYRO
CAM	Magnetic Compass 1(Alert Communication Failed)	C	B	3003	34	Lost MAG-HDG1
CAM	Magnetic Compass 2(Alert Communication Failed)	C	B	3003	35	Lost MAG-HDG2
CAM	GPS Compass 1(Alert Communication Failed)	C	B	3003	36	Lost SAT-HDG1
CAM	GPS Compass 2(Alert Communication Failed)	C	B	3003	37	Lost SAT-HDG2
CAM	GPS 1(Alert Communication Failed)	C	B	3003	38	Lost GPS1
CAM	GPS 2(Alert Communication Failed)	C	B	3003	39	Lost GPS2
CAM	GPS 3(Alert Communication Failed)	C	B	3003	40	Lost GPS3

Task	Cause	Priority	Category	Alert ID	Instance	Alert Title
CAM	GPS 4(Alert Communication Failed)	C	B	3003	42	Lost GPS4
CAM	Echo Sounder 1(Alert Communication Failed)	C	B	3003	43	Lost ES1
CAM	Echo Sounder 2(Alert Communication Failed)	C	B	3003	44	Lost ES2
CAM	Log 1(Alert Communication Failed)	C	B	3003	45	Lost LOG1
CAM	Log 2(Alert Communication Failed)	C	B	3003	46	Lost LOG2
CAM	AIS(Alert Communication Failed)	C	B	3003	47	Lost AIS
CAM	NAVTEX(Alert Communication Failed)	C	B	3003	48	Lost NAVTEX
CAM	DSC(Alert Communication Failed)	C	B	3003	49	Lost DSC
CAM	BNWAS(Alert Communication Failed)	C	B	3003	50	Lost BNWAS
CAM	VDR(Alert Communication Failed)	C	B	3003	51	Lost VDR
CAM	IAS(Alert Communication Failed)	C	B	3003	52	Lost IAS
CAM	General Equipment1(Alert Communication Failed)	C	B	3003	53	Lost AUX1
CAM	General Equipment2(Alert Communication Failed)	C	B	3003	54	Lost AUX2
CAM	General Equipment3(Alert Communication Failed)	C	B	3003	55	Lost AUX3
CAM	General Equipment4(Alert Communication Failed)	C	B	3003	56	Lost AUX4
CAM	General Equipment5(Alert Communication Failed)	C	B	3003	57	Lost AUX5
CAM	General Equipment6(Alert Communication Failed)	C	B	3003	58	Lost AUX6
CAM	General Equipment7(Alert Communication Failed)	C	B	3003	59	Lost AUX7
CAM	General Equipment8(Alert Communication Failed)	C	B	3003	60	Lost AUX8
CAM	General Equipment9(Alert Communication Failed)	C	B	3003	61	Lost AUX9
CAM	General Equipment10(Alert Communication Failed)	C	B	3003	62	Lost AUX10
CAM	No.1 Radar(Invalid Alert Data)	C	B	3006	10	Invalid RADAR1
CAM	No.2 Radar(Invalid Alert Data)	C	B	3006	11	Invalid RADAR2
CAM	No.3 Radar(Invalid Alert Data)	C	B	3006	12	Invalid RADAR3
CAM	No.4 Radar(Invalid Alert Data)	C	B	3006	13	Invalid RADAR4
CAM	No.5 Radar(Invalid Alert Data)	C	B	3006	14	Invalid RADAR5
CAM	No.6 Radar(Invalid Alert Data)	C	B	3006	15	Invalid RADAR6
CAM	No.7 Radar(Invalid Alert Data)	C	B	3006	16	Invalid RADAR7
CAM	No.8 Radar(Invalid Alert Data)	C	B	3006	17	Invalid RADAR8
CAM	No.1 ECDIS(Invalid Alert Data)	C	B	3006	18	Invalid ECDIS1

Task	Cause	Priority	Category	Alert ID	Instance	Alert Title
CAM	No.2 ECDIS(Invalid Alert Data)	C	B	3006	19	Invaid ECDIS2
CAM	No.3 ECDIS(Invalid Alert Data)	C	B	3006	20	Invalid ECDIS3
CAM	No.4 ECDIS(Invalid Alert Data)	C	B	3006	21	Invaid ECDIS4
CAM	No.1 Conning(Invalid Alert Data)	C	B	3006	22	Invalid CID1
CAM	No.2 Conning(Invalid Alert Data)	C	B	3006	23	Invalid CID2
CAM	No.1 Wing-Conning(Invalid Alert Data)	C	B	3006	24	Invalid WCID1
CAM	No.2 Wing-Conning(Invalid Alert Data)	C	B	3006	25	Invalid WCID2
CAM	No.1 Remote-Conning(Invalid Alert Data)	C	B	3006	26	Invalid RCID1
CAM	No.2 Remote-Conning(Invalid Alert Data)	C	B	3006	27	Invalid RCID2
CAM	No.1 RPS(Invalid Alert Data)	C	B	3006	28	Invalid RPS1
CAM	No.2 RPS(Invalid Alert Data)	C	B	3006	29	Invalid RPS2
CAM	Autopilot(Invalid Alert Data)	C	B	3006	30	Invalid AP
CAM	Gyro 1(Invalid Alert Data)	C	B	3006	31	Invalid GYRO1
CAM	Gyro 2(Invalid Alert Data)	C	B	3006	32	Invaid GYRO2
CAM	Gyro(Invalid Alert Data)	C	B	3006	33	Invalid GYRO1
CAM	Magnetic Compass 1(Invalid Alert Data)	C	B	3006	34	Invalid MAG-HDG1
CAM	Magnetic Compass 2(Invalid Alert Data)	C	B	3006	35	Invalid MAG-HDG2
CAM	GPS Compass 1(Invalid Alert Data)	C	B	3006	36	Invalid SAT-HDG1
CAM	GPS Compass 2(Invalid Alert Data)	C	B	3006	37	Invalid SAT-HDG2
CAM	GPS 1(Invalid Alert Data)	C	B	3006	38	Invaid GPS1
CAM	GPS 2(Invalid Alert Data)	C	B	3006	39	Invalid GPS2
CAM	GPS 3(Invalid Alert Data)	C	B	3006	40	Invalid GPS3
CAM	GPS 4(Invalid Alert Data)	C	B	3006	42	Invalid GPS4
CAM	Echo Sounder 1(Invalid Alert Data)	C	B	3006	43	Invalid ES1
CAM	Echo Sounder 2(Invalid Alert Data)	C	B	3006	44	Invalid ES2
CAM	Log 1(Invalid Alert Data)	C	B	3006	45	Invalid LOG1
CAM	Log 2(Invalid Alert Data)	C	B	3006	46	Invalid LOG2
CAM	AIS(Invalid Alert Data)	C	B	3006	47	Invalid AIS
CAM	NAVTEX(Invalid Alert Data)	C	B	3006	48	Invalid NAVTEX
CAM	DSC(Invalid Alert Data)	C	B	3006	49	Invalid DSC
CAM	BNWAS(Invalid Alert Data)	C	B	3006	50	Invalid BNWAS
CAM	VDR(Invalid Alert Data)	C	B	3006	51	Invalid VDR
CAM	IAS(Invalid Alert Data)	C	B	3006	52	Invalid IAS
CAM	General Equipment1(Invalid Alert Data)	C	B	3006	53	Invalid AUX1
CAM	General Equipment2(Invalid Alert Data)	C	B	3006	54	Invalid AUX2
CAM	General Equipment3(Invalid Alert Data)	C	B	3006	55	Invalid AUX3
CAM	General Equipment4(Invalid Alert Data)	C	B	3006	56	Invalid AUX4
CAM	General Equipment5(Invalid Alert Data)	C	B	3006	57	Invalid AUX5
CAM	General Equipment6(Invalid Alert Data)	C	B	3006	58	Invalid AUX6

Task	Cause	Priority	Category	Alert ID	Instance	Alert Title
CAM	General Equipment7(Invalid Alert Data)	C	B	3006	59	Invalid AUX7
CAM	General Equipment8(Invalid Alert Data)	C	B	3006	60	Invalid AUX8
CAM	General Equipment9(Invalid Alert Data)	C	B	3006	61	Invalid AUX9
CAM	General Equipment10(Invalid Alert Data)	C	B	3006	62	Invalid AUX10
CAM	In Port Mode	C	B	10066	1	In Port Mode
TCS	Early Course Change	A	A	3037	2	ECCA
TCS	Early Course Change	W	A	3038	2	ECCW
TCS	Actual Course Change	W	A	3028	3	ACC
TCS	Wheel Over Line	A	A	3027	3	Wheel Over Line
TCS	POSN(Deviation)	W	A	3012	1	Doubtful POSN
TCS	POSN(Sensor Failure)	A	B	3014	2	Lost POSN
TCS	HDG(Sensor Failure)	A	B	3014	5	Lost HDG
TCS	STW(Sensor Failure)	A	B	3014	8	Lost STW
TCS	Cross Track	A	A	3024	4	Cross Track
TCS	Course difference	W	A	3032	1	CRS Difference
TCS	Arrived at LAST WPT	A	A	3024	3	Last WPT
TCS	End Of Track	W	A	3025	3	End Of Track
TCS	Track Control Stopped (Reboot)	A	B	3007	3	TCS Stopped
TCS	Track Control Stopped	A	B	3007	4	TCS Stopped
TCS	Track Control Stopped	W	B	3008	4	TCS Stopped
TCS	HDG(Unmatched Source)	C	B	3019	1	Unmatched HDG
TCS	POSN(Jump)	C	B	3033	4	POSN Jumped
TCS	POSN(Automatic Changed)	W	B	10156	1	CHG POSN Source
TCS	STW(Automatic Changed)	W	B	10156	2	CHG STW Source
TCS	Change Autopilot steering mode	W	B	10206	1	CHG AP Mode
ECDIS/RADAR	Lost POSN	W	B	3015	1	Lost POSN
ECDIS/RADAR	Lost HDG	W	B	3015	4	Lost HDG
RADAR	Lost STW	W	B	3015	7	Lost STW
ECDIS/RADAR	Lost COG/SOG	W	B	3015	10	Lost COG/SOG
ECDIS/RADAR	Lost POSN	C	B	3016	1	Lost POSN
ECDIS/RADAR	Lost HDG	C	B	3016	4	Lost HDG
RADAR	Lost STW	C	B	3016	7	Lost STW
ECDIS/RADAR	Lost COG/SOG	C	B	3016	10	Lost COG/SOG
ECDIS/RADAR	Crossing Safety Contour	A	A	3031	2	Safety Contour
ECDIS/RADAR	Deviation from Route	A	A	3024	5	DEV from ROUTE
ECDIS/RADAR	Warning Area/Object	W	A	3035	0	Warning Area
ECDIS/RADAR	Warning Symbol	W	A	3035	1	Warning object
ECDIS/RADAR	Traffic Separation Zone	W	A	3035	2	Traffic separate
ECDIS/RADAR	Traffic Crossing	W	A	3035	3	Traffic crossing

Task	Cause	Priority	Category	Alert ID	Instance	Alert Title
ECDIS/RADAR	Traffic Roundabout	W	A	3035	4	Roundabout
ECDIS/RADAR	Traffic Precautionary	W	A	3035	5	Traffic caution
ECDIS/RADAR	Two Way Traffic	W	A	3035	6	Two way traffic
ECDIS/RADAR	Deeper Water Route	W	A	3035	7	Deeper water
ECDIS/RADAR	Recommended Traffic Lane	W	A	3035	8	Recommended lane
ECDIS/RADAR	Inshore Traffic Zone	W	A	3035	9	Inshore traffic
ECDIS/RADAR	Fairway	W	A	3035	10	Fairway
ECDIS/RADAR	Restricted Area	W	A	3035	11	Restricted area
ECDIS/RADAR	Caution Area	W	A	3035	12	Caution area
ECDIS/RADAR	Offshore Production Area	W	A	3035	13	Production area
ECDIS/RADAR	Military Practice Area	W	A	3035	14	Military area
ECDIS/RADAR	Seaplane Landing Area	W	A	3035	15	Seaplane area
ECDIS/RADAR	Submarine Transit Area	W	A	3035	16	Submarine area
ECDIS/RADAR	Ice Area	W	A	3035	17	Ice area
ECDIS/RADAR	Canal	W	A	3035	18	Canal
ECDIS/RADAR	Fishing Ground	W	A	3035	19	Fishing ground
ECDIS/RADAR	Fishing Prohibited	W	A	3035	20	Fishing prohibit
ECDIS/RADAR	Pipeline Area	W	A	3035	21	Pipeline area
ECDIS/RADAR	Cable Area	W	A	3035	22	Cable area
ECDIS/RADAR	Anchorage Area	W	A	3035	23	Anchoragre area
ECDIS/RADAR	Anchorage Prohibited	W	A	3035	24	Anchor prohibit
ECDIS/RADAR	Spoil Ground	W	A	3035	25	Spoil ground
ECDIS/RADAR	Dumping Ground	W	A	3035	26	Dumping ground
ECDIS/RADAR	Dredge Area	W	A	3035	27	Dredge area
ECDIS/RADAR	Cargo Transshipment Area	W	A	3035	28	Cargo transship
ECDIS/RADAR	Incineration Area	W	A	3035	29	Incineration
ECDIS/RADAR	Specially Protected Area	W	A	3035	30	Protected area
ECDIS/RADAR	Sensitive Sea Area	W	A	3035	31	Sensitive sea
ECDIS/RADAR	Archipelagic Sea Lane	W	A	3035	32	Archipelagic sea
ECDIS/RADAR	Marine Farm/Aquaculture	W	A	3035	33	Marine farm
ECDIS/RADAR	Caution Area/Object	C	B	3036	0	Caution Area
ECDIS/RADAR	Caution Symbol	C	B	3036	1	Caution object
ECDIS/RADAR	Traffic Separation Zone	C	B	3036	2	Traffic separate
ECDIS/RADAR	Traffic Crossing	C	B	3036	3	Traffic crossing
ECDIS/RADAR	Traffic Roundabout	C	B	3036	4	Roundabout
ECDIS/RADAR	Traffic Precautionary	C	B	3036	5	Traffic caution
ECDIS/RADAR	Two Way Traffic	C	B	3036	6	Two way traffic
ECDIS/RADAR	Deeper Water Route	C	B	3036	7	Deeper water
ECDIS/RADAR	Recommended Traffic Lane	C	B	3036	8	Recommended lane

Task	Cause	Priority	Category	Alert ID	Instance	Alert Title
ECDIS/RADAR	Inshore Traffic Zone	C	B	3036	9	Inshore traffic
ECDIS/RADAR	Fairway	C	B	3036	10	Fairway
ECDIS/RADAR	Restricted Area	C	B	3036	11	Restricted area
ECDIS/RADAR	Caution Area	C	B	3036	12	Caution area
ECDIS/RADAR	Offshore Production Area	C	B	3036	13	Production area
ECDIS/RADAR	Military Practice Area	C	B	3036	14	Military area
ECDIS/RADAR	Seaplane Landing Area	C	B	3036	15	Seaplane area
ECDIS/RADAR	Submarine Transit Area	C	B	3036	16	Submarine area
ECDIS/RADAR	Canal	C	B	3036	18	Canal
ECDIS/RADAR	Fishing Ground	C	B	3036	19	Fishing ground
ECDIS/RADAR	Fishing Prohibited	C	B	3036	20	Fishing prohibit
ECDIS/RADAR	Pipeline Area	C	B	3036	21	Pipeline area
ECDIS/RADAR	Cable Area	C	B	3036	22	Cable area
ECDIS/RADAR	Anchorage Area	C	B	3036	23	Anchoragre area
ECDIS/RADAR	Anchorage Prohibited	C	B	3036	24	Anchor prohibit
ECDIS/RADAR	Spoil Ground	C	B	3036	25	Spoil ground
ECDIS/RADAR	Dumping Ground	C	B	3036	26	Dumping ground
ECDIS/RADAR	Cargo Transshipment Area	C	B	3036	28	Cargo transship
ECDIS/RADAR	Incineration Area	C	B	3036	29	Incineration
ECDIS/RADAR	Specially Protected Area	C	B	3036	30	Protected area
ECDIS/RADAR	Sensitive Sea Area	C	B	3036	31	Sensitive sea
ECDIS/RADAR	Archipelagic Sea Lane	C	B	3036	32	Archipelagic sea
ECDIS/RADAR	Marine Farm/Aquaculture	C	B	3036	33	Marine farm
ECDIS/RADAR	Arrived at WOL	W	A	3038	3	Arrived at WOL
ECDIS/RADAR	Arrived at WPT	W	A	3038	4	Arrived at WPT
ECDIS	NON-WGS84	W	B	3005	100	NON-WGS84
ECDIS/RADAR	Outside Anchor Watch Area	A	A	3031	3	Outside of ANCH
ECDIS/RADAR	Outside Anchor Watch Area	W	A	3032	3	Outside of ANCH
ECDIS/RADAR	Alarm Area/Object	A	A	3034	0	Alarm Area
ECDIS/RADAR	Alarm Symbol	A	A	3034	1	Alarm object
ECDIS/RADAR	Depth Area	W	A	3035	34	Shallow area
ECDIS/RADAR	Obstruction	W	A	3035	35	Obstruction
ECDIS/RADAR	Under Rater Rock	W	A	3035	36	Under water rock
ECDIS/RADAR	Wreck	W	A	3035	37	Wreck
ECDIS/RADAR	Buoy/Light	W	A	3035	38	Buoy/Light
ECDIS/RADAR	Dangerous Symbol	W	A	3035	39	Dangerous Symbol
ECDIS/RADAR	Spot Sounding	C	B	3036	40	Spot sounding
ECDIS/RADAR	AtoN	C	B	3036	41	AtoN
ECDIS/RADAR	Vertical Clearance	C	B	3036	42	Clearance

Task	Cause	Priority	Category	Alert ID	Instance	Alert Title
ECDIS/RADAR	To Be Avoided	C	B	3036	43	To be avoided
ECDIS	Lost AIS IF	W	B	3002	1	Lost AIS IF
ECDIS/RADAR	Lost JOYSTICK	W	B	3002	4	JOYSTICK Failure
ECDIS	Lost AIS IF	C	B	3003	1	Lost AIS IF
ECDIS	Lost AP	C	B	3003	2	Lost AP
ECDIS	Lost TT1	C	B	3016	13	Lost TT1
ECDIS	Lost TT2	C	B	3016	14	Lost TT2
ECDIS	Lost RADAR Function	C	B	3016	15	Lost RADAR
ECDIS/RADAR	Over 85 Degrees	W	A	3065	2	Over 85 Degrees
ECDIS	Chart Shift	W	B	10175	1	Chart Shift
ECDIS	Chart Shift to WGS84	W	B	10175	2	Shift to WGS84
ECDIS/RADAR	ENC Data Are Available	C	B	10354	1	ENC Available
ECDIS/RADAR	Selected Fix View	C	B	10356	1	Select Fix View
ECDIS/RADAR	Chart license will expire soon(SSE 20)	C	B	10359	1	Chart license
ECDIS	ARCS Security failed	W	B	10360	1	ARCS Security
ECDIS/RADAR	AIS Maximum Capacity	W	A	3042	2	AIS MAX Capacity
RADAR	TT Maximum Capacity	W	A	3042	5	TT MAX Capacity
ECDIS/RADAR	AIS 95% Capacity	C	B	3043	1	AIS 95% Capacity
ECDIS/RADAR	AIS ACT 95% Capacity	C	B	3043	3	AIS ACT 95%
RADAR	TT 95% Capacity	C	B	3043	4	TT 95% Capacity
RADAR	CPA/TCPA(AIS)	A	A	3044	1	CPA/TCPA(AIS)
RADAR	CPA/TCPA(TT)	A	A	3044	2	CPA/TCPA(TT)
RADAR	New AIS Target	W	A	3048	1	New AIS Target
RADAR	New TT Target	W	A	3048	2	New TT Target
RADAR	Lost Reference Target	W	A	3052	3	Lost REF Target
RADAR	Lost AIS Target	W	A	3052	1	Lost AIS Target
RADAR	Lost TT Target	W	A	3052	2	Lost TT Target
RADAR	TT Out of Range	W	A	3052	03nnnn	TT: Out of Range
RADAR	Lost RADAR Function	W	B	3015	15	Lost RADAR
ECDIS/RADAR	Lost Antenna Control	W	B	3002	3	Lost ANT CTRL
RADAR	NON-WGS84	C	B	3006	100	NON-WGS84
RADAR	Antenna Failure	W	B	3062	2	ANT Failure
RADAR	Over 83 Degrees	W	A	3065	3	Over 83 Degrees
RADAR	Antenna Rotating	C	B	10469	1	ANT Rotating
RADAR	Trial	C	B	10475	1	Trial
RADAR	Antenna Safety Switch Off	W	B	10600	1	ANT Safety OFF
RADAR	Antenna Reverse Rotation	W	B	10601	1	ANT Reverse Rot.
RADAR	Emergency Mode	W	B	10950	1	Emergency Mode
ECDIS/RADAR	Delivery Failed to VDR	W	B	3002	100	Delivery to VDR

Task	Cause	Priority	Category	Alert ID	Instance	Alert Title
ECDIS/RADAR	Unexpected Data from VDR	W	B	3002	101	Unexpected VDR
COMMON	AC Power Failure	W	B	3022	1	AC Low Voltage
COMMON	DC Power Failure	C	B	3023	2	DC Low Voltage
COMMON	System Failure	W	B	3062	1	System Failure

7.4.1 List of Alert Icons

The alert icons displayed in the alert notification area are listed below.

No.	Name of alert icon	Functional outline	Alert icon
1	Active – unacknowledged alarm	A flashing red triangle. A symbol of loudspeaker in the middle of the triangle.	
2	Active – silenced alarm	A flashing red triangle. A symbol as in icon number 1 with a prominent diagonal line above it.	
3	Active – acknowledged alarm	A red triangle. An exclamation mark in the middle of the triangle.	
4	Active - responsibility transferred alarm	A red triangle. An arrow pointing towards the right in the middle of the triangle.	
5	Rectified – unacknowledged alarm	A flashing red triangle. A tick mark in the middle of the triangle.	
6	Active - unacknowledged warning	A flashing yellowish orange circle. A symbol of loudspeaker in the middle of the circle.	
7	Active – silenced warning	A flashing yellowish orange circle. A symbol as in icon number 6 with a prominent diagonal line above it.	
8	Active – acknowledged warning	A yellowish orange circle. An exclamation mark in the middle of the circle.	
9	Active - responsibility transferred warning	A yellowish orange circle. An arrow pointing towards the right in the middle of the circle.	
10	Rectified – unacknowledged warning	A flashing yellowish orange circle. A tick mark in the middle of the circle.	
11	Caution	A yellow square. An exclamation mark in the middle of the square.	
a	Aggregation	A plus sign. 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. 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. To be presented together with icons number 6, 7 and 10.	

7.5 Password List

7.5.1 Password List

The list of password is shown below.

Table. Password List

Where to enter	Password	Description
System Information*1	0000	Show the detail of software versions.
Code Input	0	Show the Service menu for Users.
	0009	Show the Service menu for Engineers.
	1501	Show the Utilities menu.
	5763	S57/S63 Auto Select ON. (available in ECDIS)
	9999	Return to Task Menu.
Task Menu	0913	Launch a WEB browser
	1074	Open the file chooser for additional maintenance tools from manufacturer. Choose the tool to run.
	1111	Copy \mfd\INI folder into your USB storage device.
	5254	Open the file chooser for Conning INI file renewal. Choose the file to import.
	5963	Shut down. (Power OFF)
	9380	Launch the Licence Import Tool.
	9999	Quit Task Menu. (Launch Windows Task Manager)

*1 To enter the password on “System Information” window, click software information list. The password input dialog will appear.

7.5.2 Password on System 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 display unit 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.

7.5.2.1 0000 - Show the detail of software versions.

You can confirm the system information. To obtain the detail information of software, enter the password 0000 to the window. Password input dialog will appear by clicking the software information list.

1. **Click on the [Menu] button on the left Toolbar.**

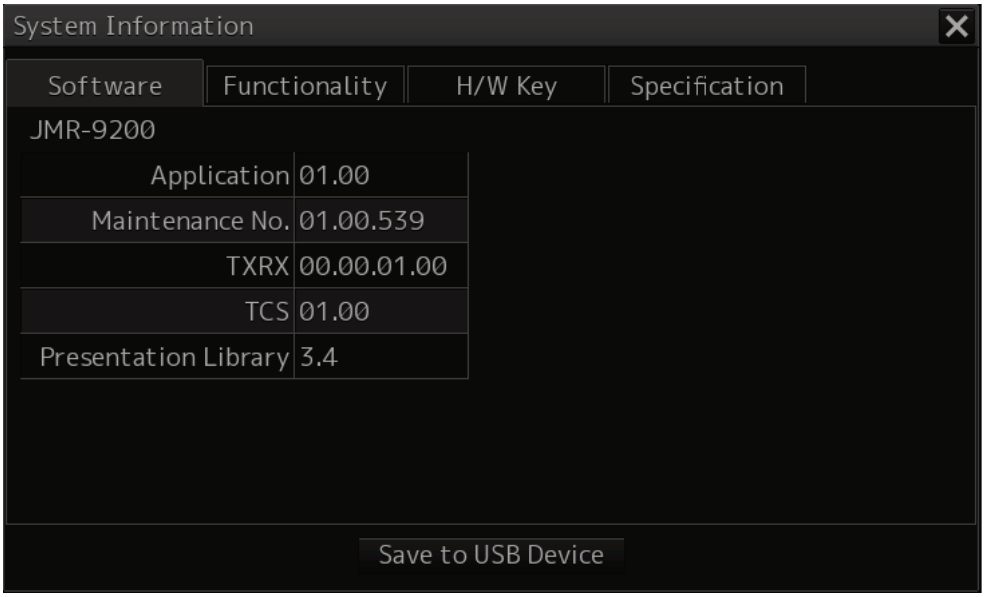
The menu will be displayed.

2. **Click on the [Maintenance] - [System Information] button on the menu.**

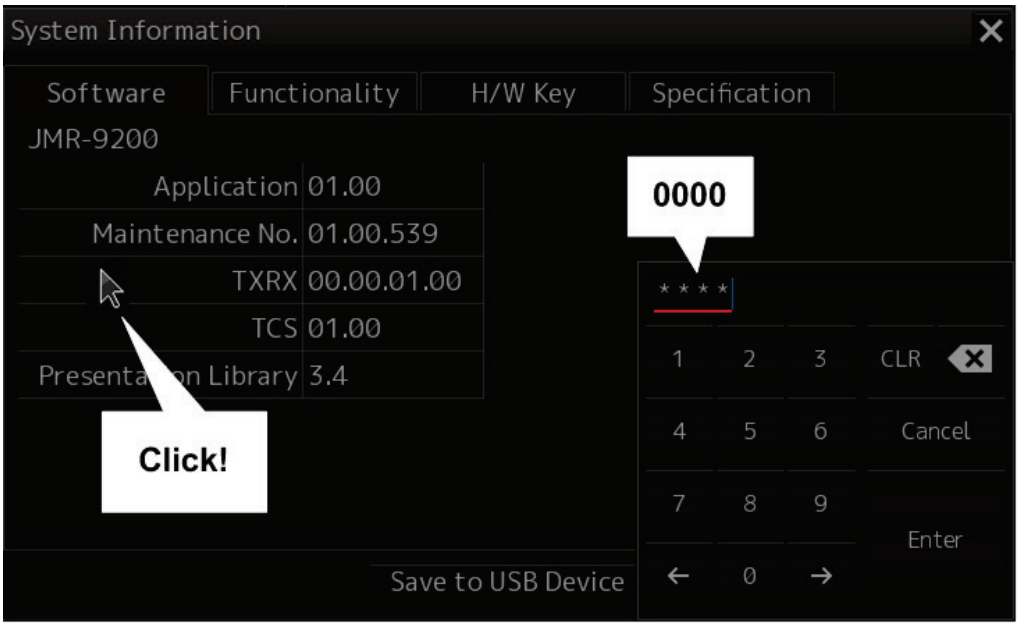
[System Information] dialog box appears.

Click on the [Software] tab.

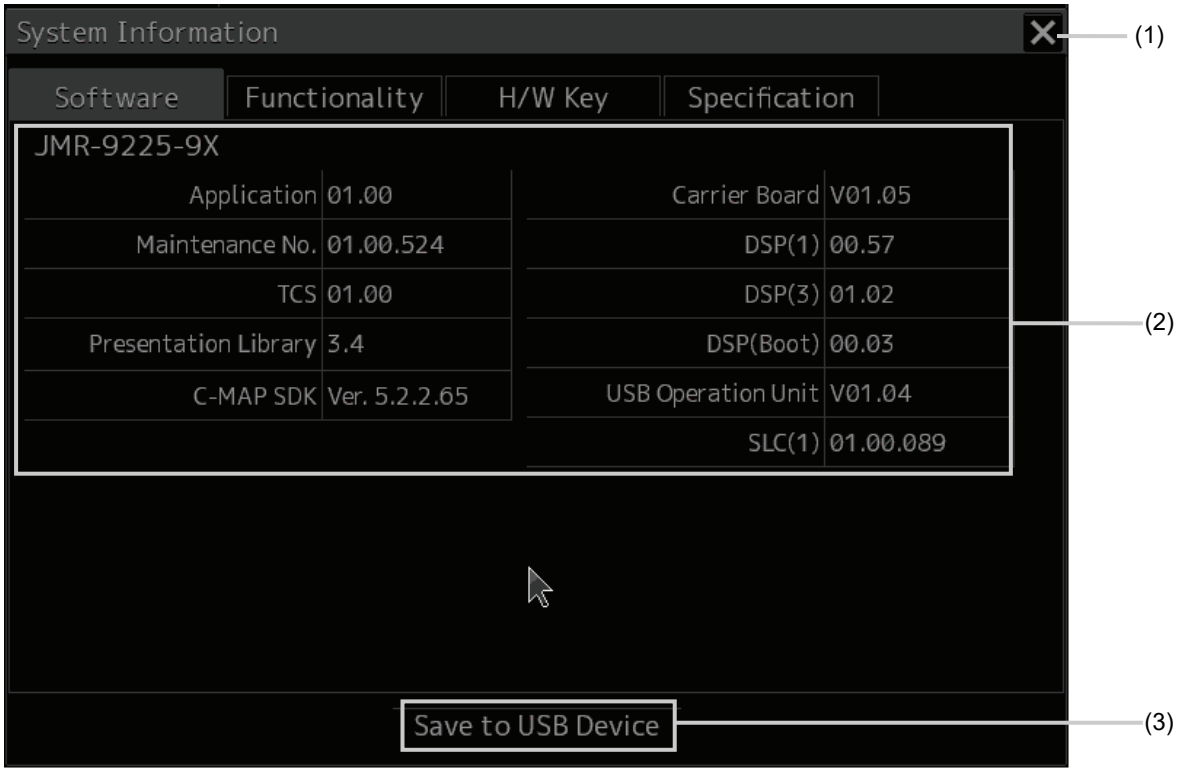
3. Software Information will be displayed.



4. Click on the Software list and enter the password “0000”



5. Details of Software information will be displayed.



(1) [X] button

Details of Software information will be displayed.

(2) Datails of Software Information

Item	Displayed information
Jxx-xxxx	Type and model name of the system
Application	Version of the application software
Maintenance No.	8-digit maintenance number
TXRX	Version of the software used for the radar transmitter-receiver unit * This information is displayed when the system is equipped with the RADAR function.
No.1 GPS	Software version of GPS 1 * Displayed when a medium-sized radar equipped with 1 or 2 units of GPS is used.
No.2 GPS	Software version of GPS 2 * Displayed when a medium-sized radar equipped with 2 units of GPS is used.
TCS	Version of the software used for TCS * This information is displayed when the system is equipped with the TCS function.

Presentation Library	Edition of S52 Presentation Library * Displayed for ECDIS or RADAR (ENC chart display license available) only
C-MAP SDK	Version of the software used for C-MAP SDK * Displayed for ECDIS only
Carrier Board	Software version of Carrier Board.
DSP(n)	Software version of No. n DSP.
DSP(Boot)	Software version of DSP Boot section.
USB Operation Unit	Software version of Trackball Operation Unit.
SLC(n)	Software version of No. n SLC

(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.

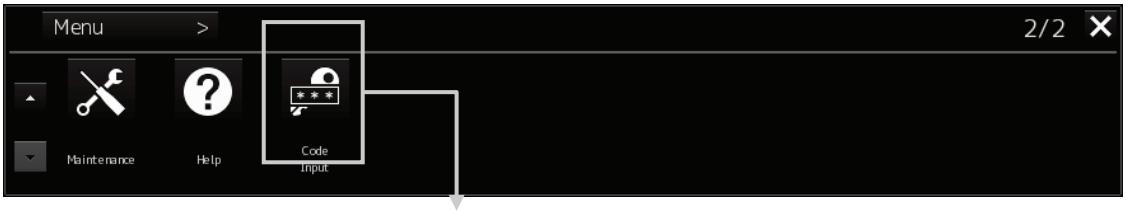
7.5.3 Password on Code Input

⚠CAUTION	
⃠	Never have the equipment adjusted by unauthorized service personnel. If the equipment is set up incorrectly, it may cause unstable operation. Further, an accident or trouble may occur.
⃠	Never make adjustments while sailing. Doing so may adversely affect the radar functions, causing accidents and/or malfunctions.

7.5.3.1 How to enter.

1. **Click on the [MENU] button on the Left Tool Bar.**
   The menu will be displayed.

2. **Change over to the second page of the menu using the page switching button of the menu. Click on the [Code Input] button on the Menu.**





3. **Enter the password.**

   Additional menu will appear in accordance with the password you enter.

7.5.3.2 0 - Service menu for Users / 0009 - Service menu for Engineers.

The Service menu consists of three submenus of Adjustment, Installation and Maintenance. To display it, password 0 or 0009 is required.

This section also describes the differences between those two passwords.

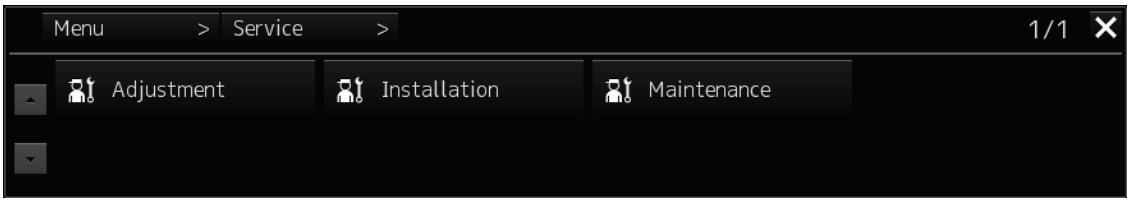
1. **Enter the password 0009 in Code Input**

   The [Service] button will be added at 2nd page of menu.



2. **Click on the [Service] button.**

   The submenu will be displayed.



3. **Display a submenu dialog box by clicking on one of the [Adjustment], [Installation], and [Maintenance] buttons.**

   The contents of each menu will be different in accordance with the password 0 or 0009.

   The list of Service menu is shown below.

1st Category	2nd Category	3rd Category	Password	
			0	0009
Adjustment	Basic Adjustment	Tune Adjustment	YES	YES
		Bearing Adjustment	YES	YES
		Range Adjustment	YES	YES
		Master/Slave	YES	YES
	TXRX	Antenna Height	YES	YES
		Tune Peak Adjustment	**-**	**YES**
		Tune Indicator	YES	YES
		Output BP	YES	YES
	PerformanceMonitor/ PerformanceMonitor (SSR)	Performance Monitor	YES	YES
	Sector Blank	Sector Blank	YES	YES
	TNI Blank	**-**	**-**	**YES**
	Input BP Count	**-**	**-**	**YES**
	Output BP Count	**Output Pulse**	**-**	**YES**
	Echo Noise Level	**-**	**-**	**YES**
	TT	TT	YES	YES
	STC/FTC/MBS	-	YES	YES
	Cable Attenuation	**-**	**-**	**YES**

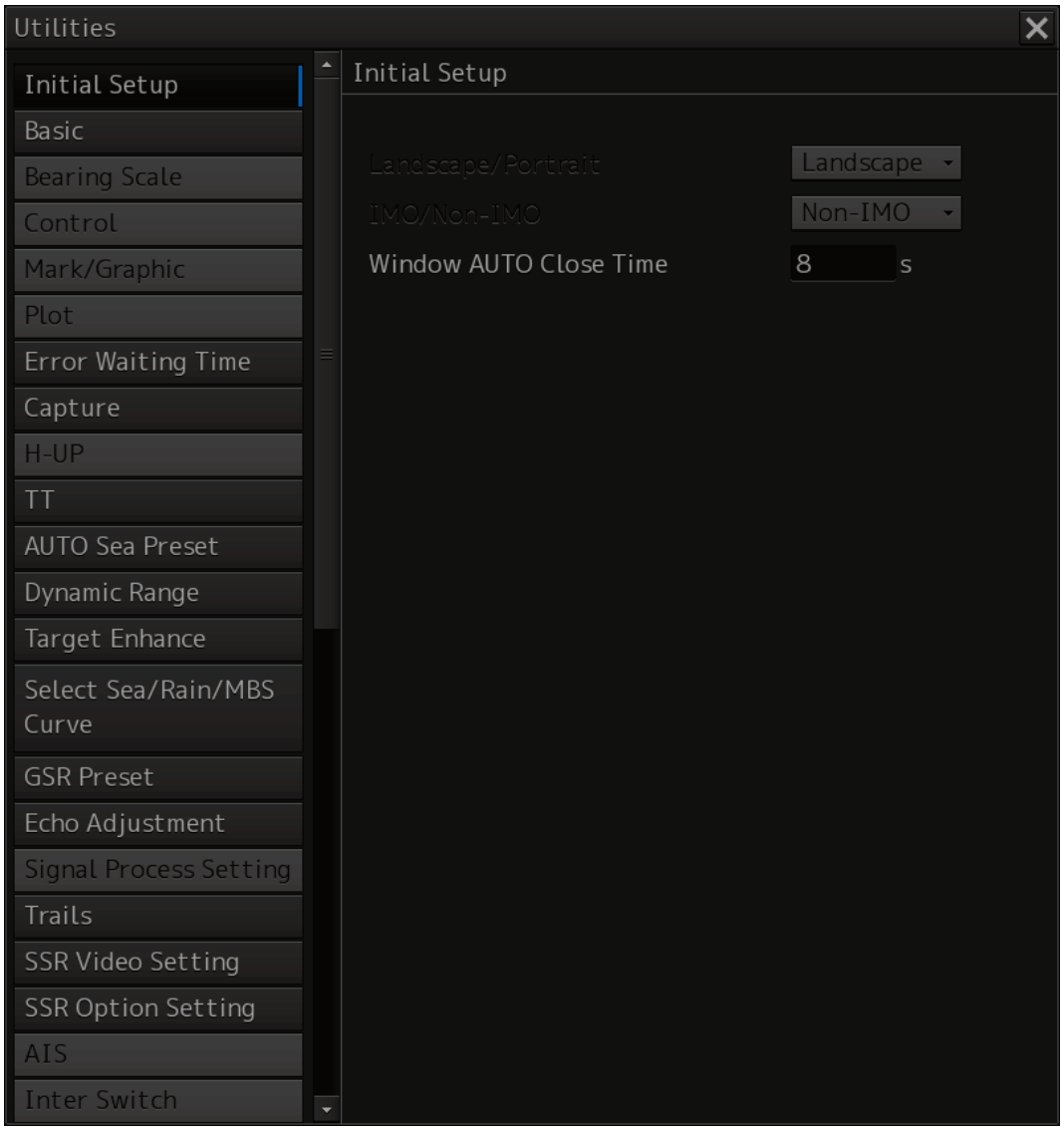
1st Category	2nd Category	3rd Category	Password	
			0	0009
Installation	**Installation Information**	-	-	**YES**
	Language	-	-	**YES**
	System Configuration	**Subsystem Installation**	-	**YES**
		CCRP	YES	YES
		Serial Port	YES	YES
		Contact	-	**YES**
		A/D	-	**YES**
		Data Selection	-	**YES**
		Data Output	-	**YES**
		Network	-	**YES**
	Ship's Parameters	Ship General	YES	YES
	Connection Diagnosis	**LAN communication test**	-	**YES**
		Sensor communication test	-	**YES**
		Data output test	-	**YES**
		Alert communication test	-	**YES**
	Settings	**Alert**	-	**YES**
		AC Power Failure	-	**YES**
		Interswitch	-	**YES**
		VDR	-	**YES**
		TCS	YES	YES
		AFT Operation	-	**YES**

1st Category	2nd Category	3rd Category	Password	
			0	0009
Maintenance	Storage	Management	YES	YES
	RADAR	-	YES	YES
	Operating Time Setup	-	-	**YES**
	Logging	-	-	**YES**
	Initialization	-	YES	YES

7.5.3.3 1501 - Utilities menu.

Password 1501 opens the Utilities menu which is for advanced settings.

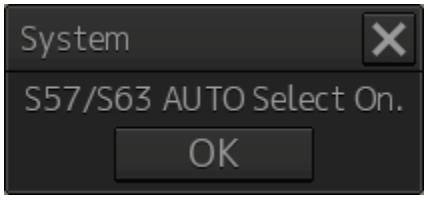
1. **Enter the password 1501 in Code Input.**
2. **Utilities menu will be appear.**



7.5.3.4 5763 - S57/S63 Auto Select ON (available in ECDIS).

Password 5763 enables automatic selection function of ENC S57 chart and S63 chart. This function is available only in ECDIS.

1. **Enter the password 5763 in Code Input.**
2. **S57/S63 Auto Select ON dialog will be appear.**



3. **Click [OK] button to enable S57/S63 automatic selection function.**

7.5.3.5 9999 - Return to Task Menu.

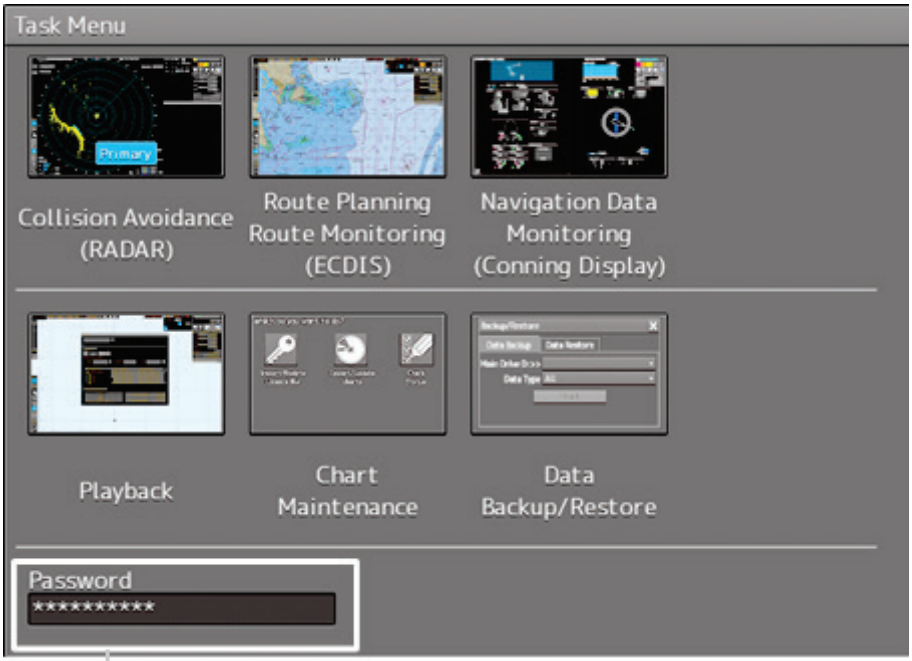
Password 9999 quits the MFD application and you can return to Task menu.

1. **Enter password 9999 in Code Input.**
2. **MFD application will close and return to Task menu automatically.**

7.5.4 Password on Task Menu

⚠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 display unit 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.

On Task Menu, password input section is located on the lower left of the window.



Password input section on Task Menu

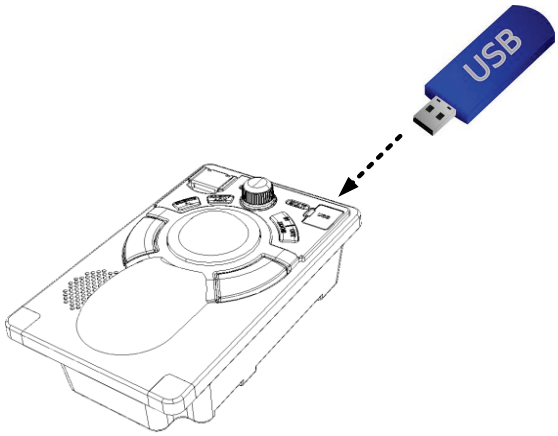
7.5.4.1 0913 - Launch a WEB browser.

Password 0913 on Task Menu launches a WEB browser.

7.5.4.2 1074 - Run the additional maintenance tools from manufacturer.

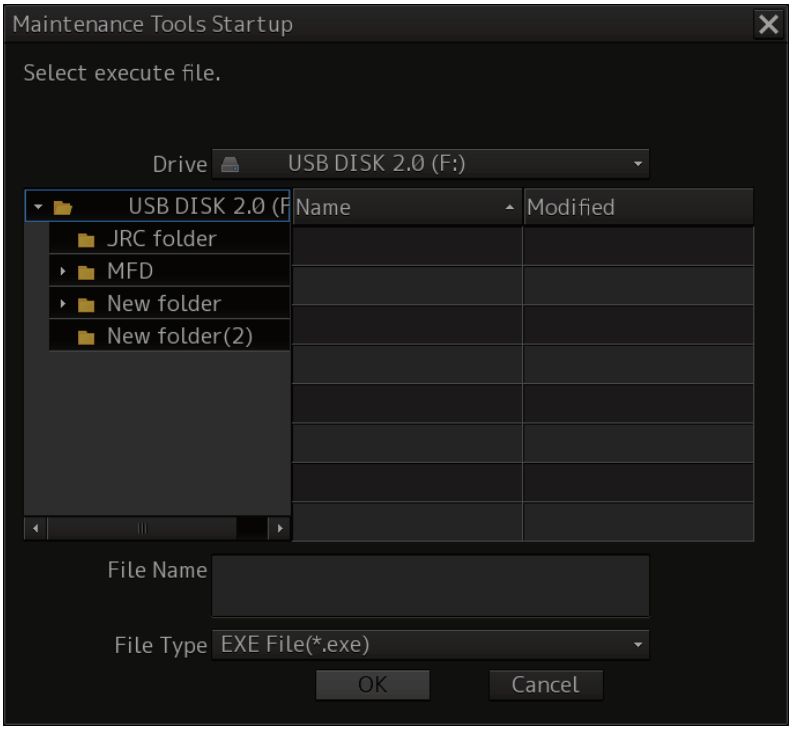
Password 1074 can run the additional maintenance tools (.exe) from manufacturer in your USB storage device.

1. **Connect your USB storage device or CD-ROM which contains the maintenance tools into the Display Unit.**



2. **Enter the Password 1074 on Task Menu.**

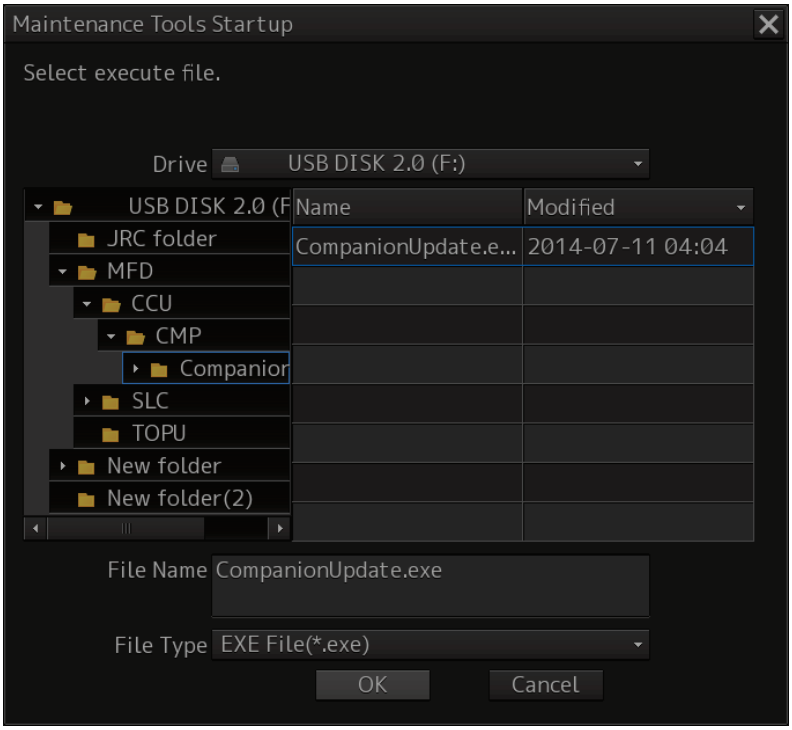
   Maintenance Tools Startup dialog will appear.



3. **Choose the maintenance tool to run.**

   Select the drive which has the maintenance tool to run from the [Drive] combo box.

   Select the name of maintenance tool (.exe) from the [File Name] combo box and click on the [OK] button to run.



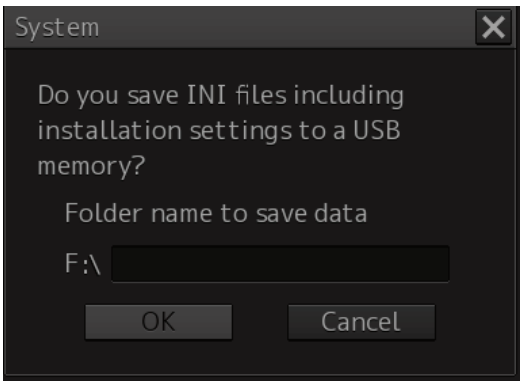
7.5.4.3 1111 - Back up the INI folder.

Password 1111 can back up the INI folder into your USB storage device.

INI folder consists of user configuration information, system configuration information, installation information, and software version information.

1. **Connect your USB storage device into the Display unit**
2. **Enter the Password 1111 on Task Menu**

   System dialog will appear.



3. **Enter the folder name to back up**

   Type an arbitrary folder name and then click on [OK] button.

   That folder will be created into your USB storage device and following folders will be copied in it.

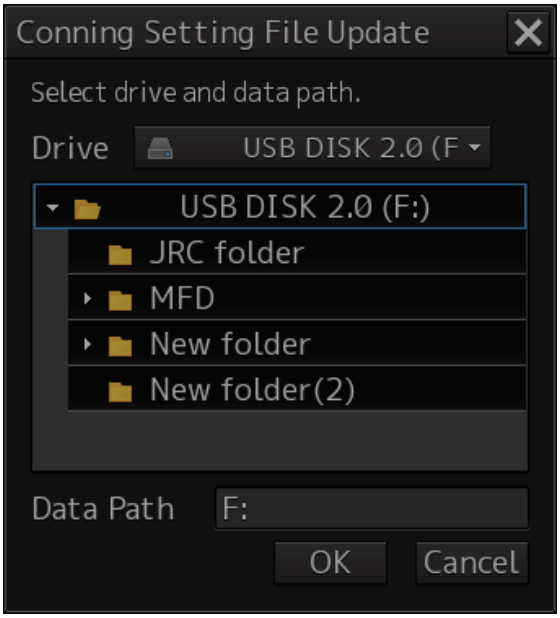
service	folder	has installation information.
system	folder	has system configuration information.
user	folder	has user configuration information.
VERSION.TXT		describes software version.

7.5.4.4 5254 - Renew the INI file of Conning Display INI file.

Password 5254 can change the contents, placement of information of the Conning display by renewing the INI file. The Conning Block in RADAR or in ECDIS will also change by this.

1. **Connect your USB storage device or CD-ROM which contains new INI file for Conning Display into the Display Unit.**
2. **Enter the Password 5254 on the Task Menu.**

   Conning Setting File Update dialog will appear.



3. **Choose the folder which contains the new Conning INI file, and then click on the [OK] button.**

   The new INI file will be loaded, and the Conning Display will be renewal.
4. **Start up Navigation Data Monitoring (Conning Display) to confirm the Conning Display contents**

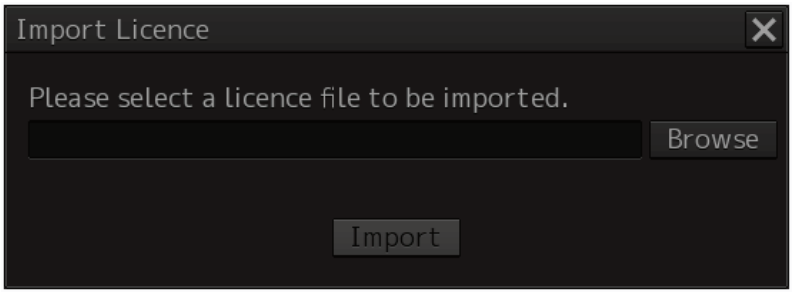
7.5.4.5 5963 - Shut down (Power OFF).

Password 5963 shuts down the Display Unit power.

7.5.4.6 9380 - Launch the Licence Import Tool.

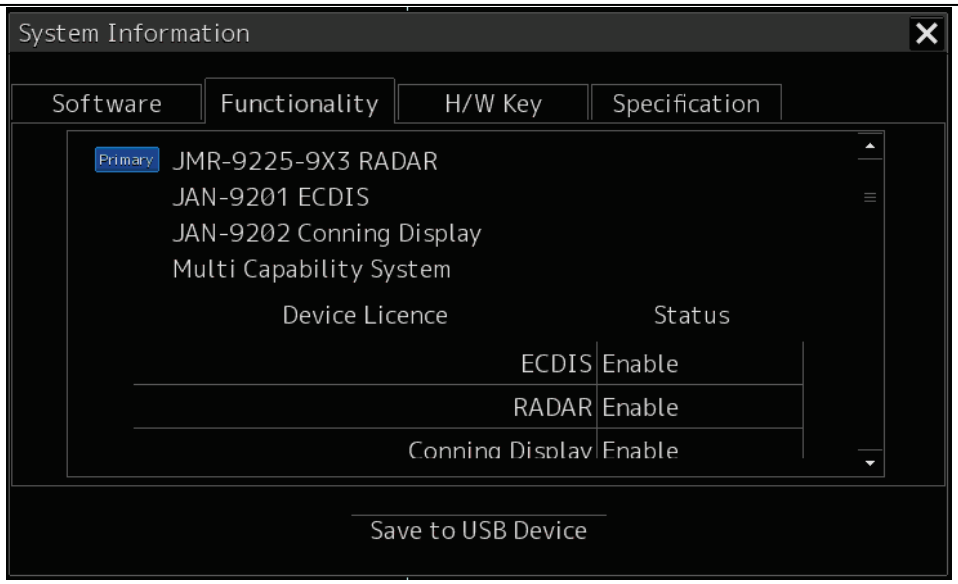
Password 9380 launches the Licence import tool and can import the Licence files.

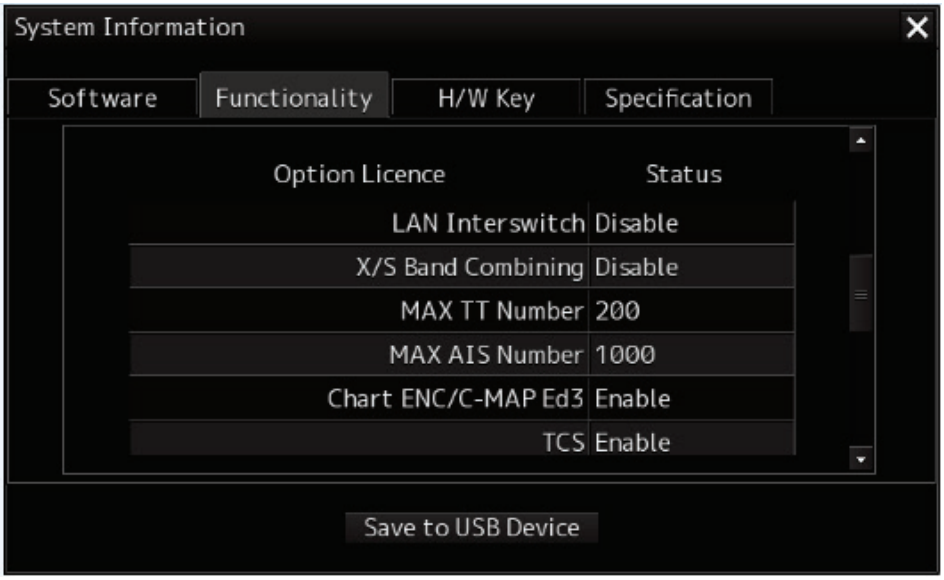
1. **Connect the USB flash memory or CD-ROM in which the license information (.lcn) is stored into the Display Unit**.
2. **Enter the Password 9380 on the Task Menu**
   Import Licence dialog will appear.

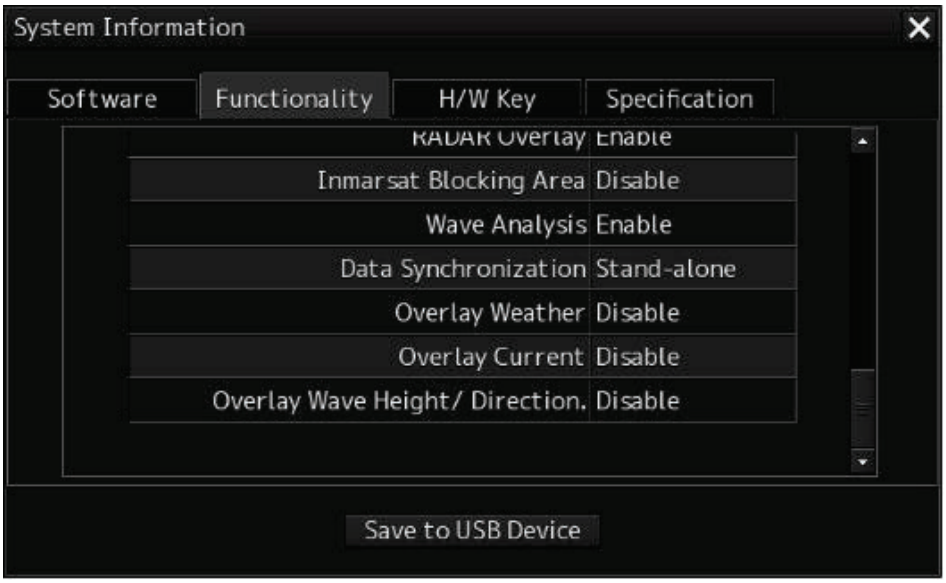


3. **Choose the new Licence file and then click on the [Import] button.**
   Click on the [Browse] button to choose the Licence file (.lcn) to be imported.
   Click on the [Import] button to imported.

4. **Confirm the System Information window.**
   Start up the MFD application (RADAR, ECDIS…).
   Click on the [Menu] - [Maintenance]- [System Information] to display the System Information dialog.
   Click on the Functionality tab, and confirm that the “Status” of the function which corresponding to the Licence file you imported was changed from “Disable” to “Enable”.


System Information
Software
Functionality
H/W Key
Specification
Primary
JMR-9225-9X3 RADAR
JAN-9201 ECDIS
JAN-9202 Conning Display
Multi Capability System
Device Licence
Status
ECDIS
Enable
RADAR
Enable
Conning Display
Enable
Save to USB Device


System Information
Software
Functionality
H/W Key
Specification
Option Licence
Status
LAN Interswitch
Disable
X/S Band Combining
Disable
MAX TT Number
200
MAX AIS Number
1000
Chart ENC/C-MAP Ed3
Enable
TCS
Enable
Save to USB Device


System Information
Software
Functionality
H/W Key
Specification
RADAR Overlay
Enable
Inmarsat Blocking Area
Disable
Wave Analysis
Enable
Data Synchronization
Stand-alone
Overlay Weather
Disable
Overlay Current
Disable
Overlay Wave Height/ Direction.
Disable
Save to USB Device

7.5.4.7 9999 – Quit Task Menu.

Password 9999 on the Task Menu quits Task Menu and launches Windows Task Manager.

7.6 Maintenance INFO List

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. 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. 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. 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. 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, Sub LAN)	Communication with ALC1 cannot be performed via Sub LAN.	Check the condition of ALC1 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.
ALC2(Communication failed, Main LAN)	Communication with ALC2 cannot be performed via Main LAN.	Check the condition of ALC2 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.
ALC2(Communication failed, Sub LAN)	Communication with ALC2 cannot be performed via Sub LAN.	Check the condition of ALC2 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
ALC3(Communication failed, Main LAN)	Communication with ALC3 cannot be performed via Main LAN.	Check the condition of ALC3 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.
ALC3(Communication failed, Sub LAN)	Communication with ALC3 cannot be performed via Sub LAN.	Check the condition of ALC3 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.
ALC4(Communication failed, Main LAN)	Communication with ALC4 cannot be performed via Main LAN.	Check the condition of ALC4 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.
ALC4(Communication failed, Sub LAN)	Communication with ALC4 cannot be performed via Sub LAN.	Check the condition of ALC4 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.
Anemometer(Communication failed, Main LAN)	Communication with Anemometer cannot be performed via Main LAN.	Check the condition of Anemometer 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.
Anemometer(Communication failed, Sub LAN)	Communication with Anemometer cannot be performed via Sub LAN.	Check the condition of Anemometer 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.
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. 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. 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(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.

Message	Explanation	Advice
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.
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. 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. 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. 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. If it cannot be recovered, turn off the device and contact the distributor.

Message	Explanation	Advice
Blizzard1-DSP1(Communication error)	There is an error in communication with DSP.	Restart the power. 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. 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. 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. If it cannot be recovered after three times of restart, turn off the device and contact the distributor.
BNWAS(Communication failed, Main LAN)	Communication with BNWAS cannot be performed via Main LAN.	Check the condition of BNWAS 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.
BNWAS(Communication failed, Sub LAN)	Communication with BNWAS cannot be performed via Sub LAN.	Check the condition of BNWAS 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.
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.
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.

Message	Explanation	Advice
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. 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. If it cannot be recovered after three times of restart, turn off the device and contact the distributor.
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. 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. 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. 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. 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.

Message	Explanation	Advice
CPU High TEMP	The CPU temperature is too high.	Turn off the power of the device and restart after ten minutes. 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. 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(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. 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.
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. 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
DSC(Communication failed, Sub LAN)	Communication with DSC cannot be performed via Sub LAN.	Check the condition of DSC 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.
DSP(Heading Data)	There is an error in the heading data received by DSP.	Restart the power. 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. 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. 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, Sub LAN)	Communication with Echo Sounder cannot be performed via Sub LAN.	Check the condition of Echo Sounder 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.
Echo Sounder 2(Communication failed, Direct)	Communication with Echo Sounder cannot be performed via Serial.	Check the condition of Echo Sounder and Serial. 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 2(Communication failed, Main LAN)	Communication with Echo Sounder cannot be performed via Main LAN.	Check the condition of Echo Sounder 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.
Echo Sounder 2(Communication failed, Sub LAN)	Communication with Echo Sounder cannot be performed via Sub LAN.	Check the condition of Echo Sounder 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
Echo Sounder(Communication failed, Direct)	Communication with Echo Sounder cannot be performed via Serial.	Check the condition of Echo Sounder and Serial. 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, Main LAN)	Communication with Echo Sounder cannot be performed via Main LAN.	Check the condition of Echo Sounder 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.
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. 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.
e-Token(Communication error)	There is an error in communication with e-Token.	Restart the device. 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. 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 Equipment1(Communication Failed, Sub LAN)	Communication with General Equipment1 cannot be performed via Sub LAN.	Check the condition of General Equipment1 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.
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. 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. 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. 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, Sub LAN)	Communication with General Equipment2 cannot be performed via Sub LAN.	Check the condition of General Equipment2 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.
General Equipment3(Communication Failed, Main LAN)	Communication with General Equipment3 cannot be performed via Main LAN.	Check the condition of General Equipment3 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.
General Equipment3(Communication Failed, Sub LAN)	Communication with General Equipment3 cannot be performed via Sub LAN.	Check the condition of General Equipment3 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.
General Equipment4(Communication Failed, Main LAN)	Communication with General Equipment4 cannot be performed via Main LAN.	Check the condition of General Equipment4 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.

Message	Explanation	Advice
General Equipment4(Communication Failed, Sub LAN)	Communication with General Equipment4 cannot be performed via Sub LAN.	Check the condition of General Equipment4 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.
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. 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. 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. 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. 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. 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, Sub LAN)	Communication with General Equipment7 cannot be performed via Sub LAN.	Check the condition of General Equipment7 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.
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. 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 Equipment8(Communication Failed, Sub LAN)	Communication with General Equipment8 cannot be performed via Sub LAN.	Check the condition of General Equipment8 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.
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. 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. 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.
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. If it cannot be recovered after three times of restart, turn off the device and contact the distributor.

Message	Explanation	Advice
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).
GPS 1(Communication Failed, Direct)	Communication with GPS 1 cannot be performed via Serial.	Check the condition of GPS 1 and Serial. 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. 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. 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. 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. 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. 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, Direct)	Communication with GPS 3 cannot be performed via Serial.	Check the condition of GPS 3 and Serial. 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. 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. 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 4(Communication Failed, Direct)	Communication with GPS 4 cannot be performed via Serial.	Check the condition of GPS 4 and Serial. 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. 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. 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 Compass 1(Communication failed, Direct)	Communication with GPS Compass 1 cannot be performed via Serial.	Check the condition of GPS Compass 1 and Serial. 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 Compass 1(Communication failed, Main LAN)	Communication with GPS Compass 1 cannot be performed via Main LAN.	Check the condition of GPS Compass 1 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.
GPS Compass 1(Communication failed, Sub LAN)	Communication with GPS Compass 1 cannot be performed via Sub LAN.	Check the condition of GPS Compass 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.
GPS Compass 2(Communication failed, Direct)	Communication with GPS Compass 2 cannot be performed via Serial.	Check the condition of GPS Compass 2 and Serial. 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 Compass 2(Communication failed, Main LAN)	Communication with GPS Compass 2 cannot be performed via Main LAN.	Check the condition of GPS Compass 2 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.
GPS Compass 2(Communication failed, Sub LAN)	Communication with GPS Compass 2 cannot be performed via Sub LAN.	Check the condition of GPS Compass 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.

Message	Explanation	Advice
GPS Selector(Communication Failed, Direct)	Communication with GPS Selector cannot be performed via Serial.	Check the condition of GPS Selector and Serial. 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, Direct)	Communication with Gyro 1 cannot be performed via Serial.	Check the condition of Gyro 1 and Serial. 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, GIF-Direct)	Communication with Gyro 1 cannot be performed via Serial.	Check the condition of Gyro 1, GIF and Serial. 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, GIF-Main LAN)	Communication with Gyro 1 cannot be performed via Main LAN.	Check the condition of Gyro 1, GIF 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.
Gyro 1(Communication Failed, GIF-Sub LAN)	Communication with Gyro 1 cannot be performed via Sub LAN.	Check the condition of Gyro 1, GIF 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.
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. 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. 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. 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. 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, GIF-Main LAN)	Communication with Gyro 2 cannot be performed via Main LAN.	Check the condition of Gyro 2, GIF 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.
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. 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, Main LAN)	Communication with Gyro 2 cannot be performed via Main LAN.	Check the condition of Gyro 2 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.
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. 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. 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. 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. 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. 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, Main LAN)	Communication with Gyro cannot be performed via Main LAN.	Check the condition of Gyro 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.

Message	Explanation	Advice
Gyro(Communication Failed, Sub LAN)	Communication with Gyro cannot be performed via Sub LAN.	Check the condition of Gyro 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.
HASP(Communication error)	There is an error in communication with HASP.	Restart the power. 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.
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 Primary(Communication Failed, Main LAN)	Communication with IAS cannot be performed via Main LAN.	Check the condition of IAS 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.
IAS Primary(Communication Failed, Sub LAN)	Communication with IAS cannot be performed via Sub LAN.	Check the condition of IAS 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.
IAS Secondary(Communication Failed, Main LAN)	Communication with IAS cannot be performed via Main LAN.	Check the condition of IAS 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.

Message	Explanation	Advice
IAS Secondary(Communication Failed, Sub LAN)	Communication with IAS cannot be performed via Sub LAN.	Check the condition of IAS 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.
IAS(Communication failed, Main LAN)	Communication with IAS cannot be performed via Main LAN.	Check the condition of IAS 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.
IAS(Communication failed, Sub LAN)	Communication with IAS cannot be performed via Sub LAN.	Check the condition of IAS 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.
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. 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. 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. 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. 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. If it cannot be recovered, turn off the device and contact the distributor.
Log 1(Communication failed, Direct)	Communication with Log 1 cannot be performed via Serial.	Check the condition of Log 1 and Serial. 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. 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 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. 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. 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. 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. 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, Direct)	Communication with Log 2 cannot be performed via Serial.	Check the condition of Log 2 and Serial. 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. 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. 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. 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. 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, Sub LAN)	Communication with Log 2 cannot be performed via Sub LAN.	Check the condition of Log 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.
Log Selector(Communication failed, Direct)	Communication with Log Selector cannot be performed via Serial.	Check the condition of Log Selector and Serial. 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. 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. 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. 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. 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, Main LAN)	Communication with Magnetic Compass 2 cannot be performed via Main LAN.	Check the condition of Magnetic Compass 2 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.
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. 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. 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
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. 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.
NAVTEX(Communication failed, Sub LAN)	Communication with NAVTEX cannot be performed via Sub LAN.	Check the condition of NAVTEX 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.
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. 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. 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. 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. 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, Main LAN)	Communication with No.1 RADAR cannot be performed via Main LAN.	Check the condition of No.1 RADAR 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.

Message	Explanation	Advice
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. 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. 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. 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. 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, Sub LAN)	Communication with No.1 RPS cannot be performed via Sub LAN.	Check the condition of No.1 RPS 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.
No.1 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. 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 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. 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 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. 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 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. 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 ECDIS(Communication failed, Main LAN)	Communication with No.2 ECDIS cannot be performed via Main LAN.	Check the condition of No.2 ECDIS 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.
No.2 ECDIS(Communication failed, Sub LAN)	Communication with No.2 ECDIS cannot be performed via Sub LAN.	Check the condition of No.2 ECDIS 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.
No.2 Radar(Communication failed, Main LAN)	Communication with No.2 RADAR cannot be performed via Main LAN.	Check the condition of No.2 RADAR 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.
No.2 Radar(Communication failed, Sub LAN)	Communication with No.2 RADAR cannot be performed via Sub LAN.	Check the condition of No.2 RADAR 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.
No.2 Remote-Conning(Communication failed, Main LAN)	Communication with No.2 Remote-Conning cannot be performed via Main LAN.	Check the condition of No.2 Remote-Conning 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.
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. 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. 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 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. 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. 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. 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.3 ECDIS(Communication failed, Main LAN)	Communication with No.3 ECDIS cannot be performed via Main LAN.	Check the condition of No.3 ECDIS 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.
No.3 ECDIS(Communication failed, Sub LAN)	Communication with No.3 ECDIS cannot be performed via Sub LAN.	Check the condition of No.3 ECDIS 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.
No.3 Radar(Communication failed, Main LAN)	Communication with No.3 RADAR cannot be performed via Main LAN.	Check the condition of No.3 RADAR 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.
No.3 Radar(Communication failed, Sub LAN)	Communication with No.3 RADAR cannot be performed via Sub LAN.	Check the condition of No.3 RADAR 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.
No.4 ECDIS(Communication failed, Main LAN)	Communication with No.4 ECDIS cannot be performed via Main LAN.	Check the condition of No.4 ECDIS 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.

Message	Explanation	Advice
No.4 ECDIS(Communication failed, Sub LAN)	Communication with No.4 ECDIS cannot be performed via Sub LAN.	Check the condition of No.4 ECDIS 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.
No.4 Radar(Communication failed, Main LAN)	Communication with No.4 RADAR cannot be performed via Main LAN.	Check the condition of No.4 RADAR 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.
No.4 Radar(Communication failed, Sub LAN)	Communication with No.4 RADAR cannot be performed via Sub LAN.	Check the condition of No.4 RADAR 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.
OPA-OPB(Communication error)	-	-
OPU-Serial(Communication error)	There is a communication error with the operating portion.	Restart the power. If it cannot be recovered after three times of restart, turn off the device and contact the distributor.
OPU-USB(Communication error)	There is a communication error with the operating portion.	Restart the power. If it cannot be recovered after three times of restart, turn off the device and contact the distributor.
Port Main Propeller(invalid)	There is a format error or a status error of the data.	Check the sensor condition.
Port Main Propeller(not plausible)	There is a range error of the data.	Check the sensor condition.
Port Main Propeller(unavailable)	The data cannot be received.	Check the condition of the sensor and the communication path.
Position(invalid)	There is a format error or a status error of the Position data.	Check the sensor condition. Switch to a sensor in good condition, if available.
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.

Message	Explanation	Advice
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 fun in the power supply unit has been detected.	Restart the power. 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. If it cannot be recovered after three times of restart, turn off the device and contact the distributor.
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. 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. 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. 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. 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. 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. 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. 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. If it cannot be recovered after three times of restart, contact the distributor.
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.

Message	Explanation	Advice
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.
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. 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
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. 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. 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 Time Out	A communication error with S-JOY was detected.	Check S-JOY. 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. 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. 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. 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. 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.
SLC2-1(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.

Message	Explanation	Advice
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.
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.

Message	Explanation	Advice
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.
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.	Confirm that the status is standby and, if the status is transmitting, set the status to standby. After that, set the status to transmitting again. If it cannot be recovered in this transmitting state, visually confirm that the antenna of radar antenna is rotating in a proper way. 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. If it cannot be recovered after the operation above, turn off the device and contact the distributor.
TXRX(Communication error)	There is a communication error with radar antenna.	Confirm that the setting of the instruction machine is Master. 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.
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. If it cannot be recovered after three times of restart, turn off the device and contact the distributor. 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.

Message	Explanation	Advice
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. If it cannot be recovered after three times of restart, turn off the device and contact the distributor. 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. 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. 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. 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. After that, set the status to transmitting again. If it cannot be recovered after repeating the above operation three times, turn off the device and contact the distributor.
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. 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. After that, set the status to transmitting again. 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. 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. Then, after confirming that there is no obstruction in the swing circle of the antenna, set the status to transmitting again. 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. After that, set the status to transmitting again. 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 VBUS LKV)	The supply voltage of the motor in the radar antenna falls short of the rated value.	Restart the power. 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. If it cannot be recovered after three times of restart, turn off the device and contact the distributor.
TXRX(Fan1)	Fan 1 in the radar antenna is abnormal.	Restart the power. 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. 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. 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. 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. 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. After that, set the status to transmitting again. If it cannot be recovered in this transmitting state, visually confirm that the antenna of radar antenna is rotating in a proper way. 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. 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. If it cannot be recovered after three times of restart, turn off the device and contact the distributor.
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. 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. 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.

Message	Explanation	Advice
TXRX(PS)	The power supply circuit in the radar antenna is abnormal.	Restart the power. If it cannot be recovered after three times of restart, turn off the device and contact the distributor.
TXRX(Trigger)	There is possibility that timing reference signals are not normally output from the radar antenna.	Restart the power. 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. 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. 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. 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, Main LAN)	Communication with Water Thermometer cannot be performed via Main LAN.	Check the condition of Water Thermometer 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.
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. 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.

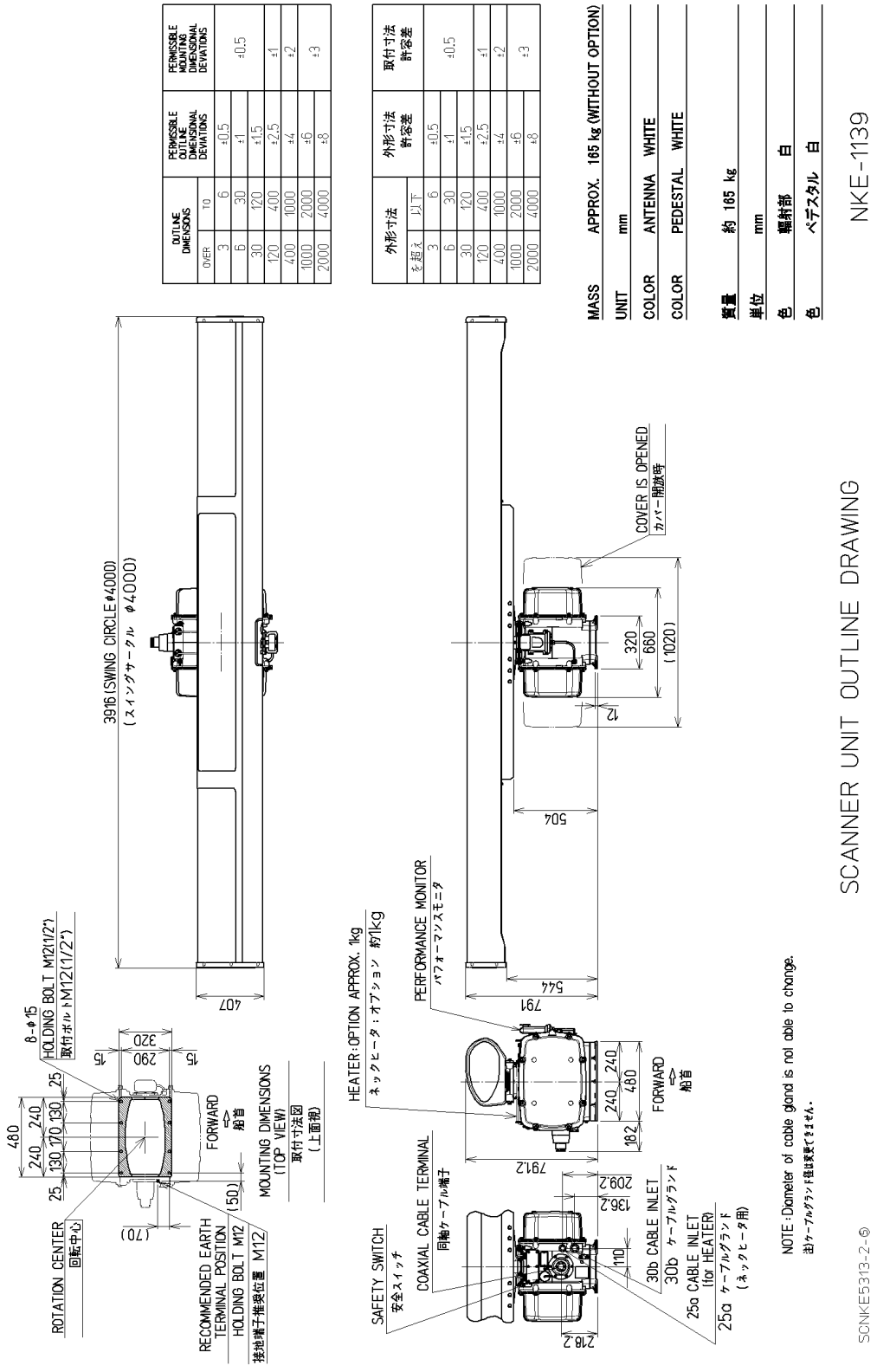


8. Appendix

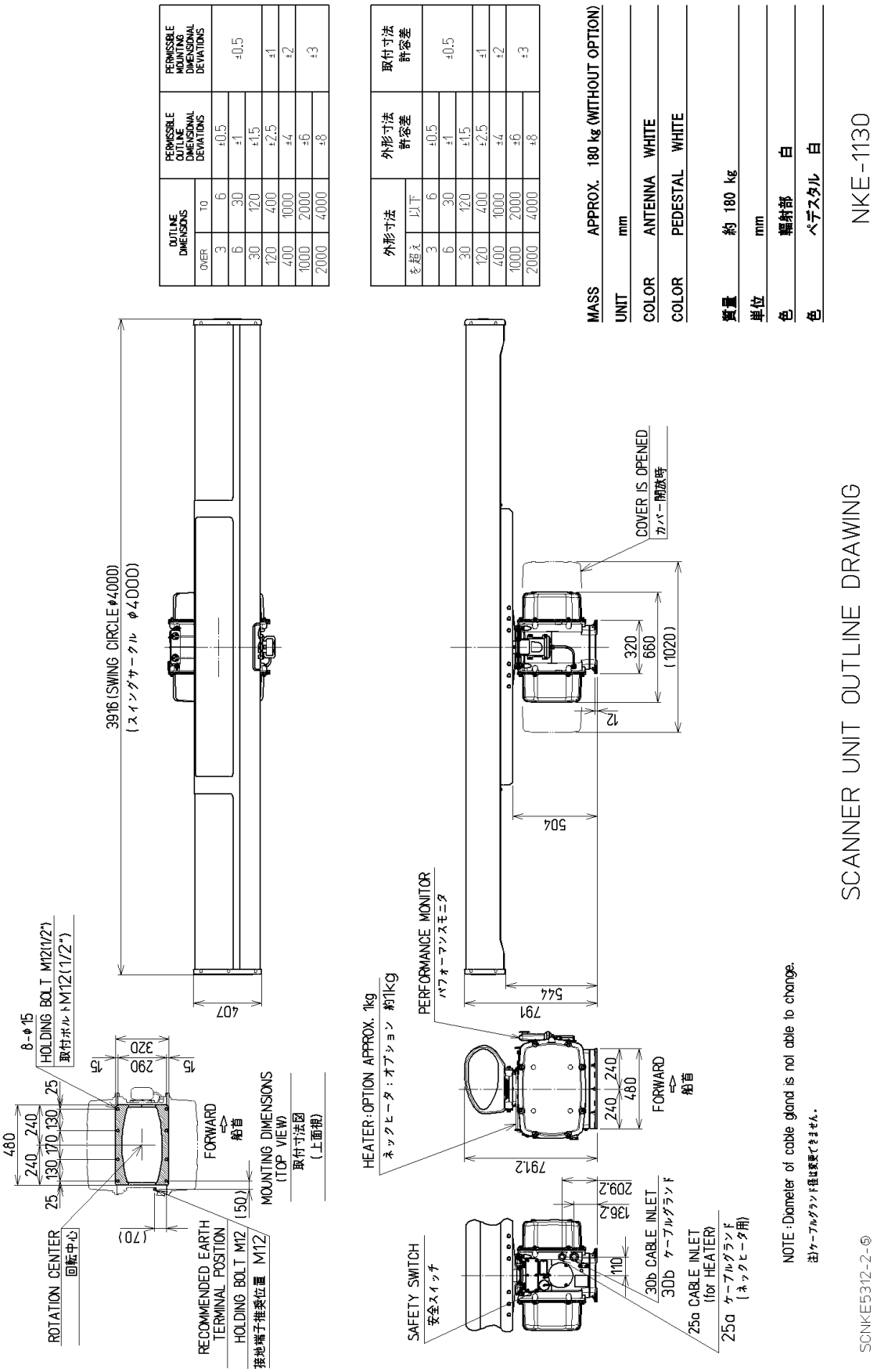
Chapter 8. Appendix

8.1 Outline Drawings

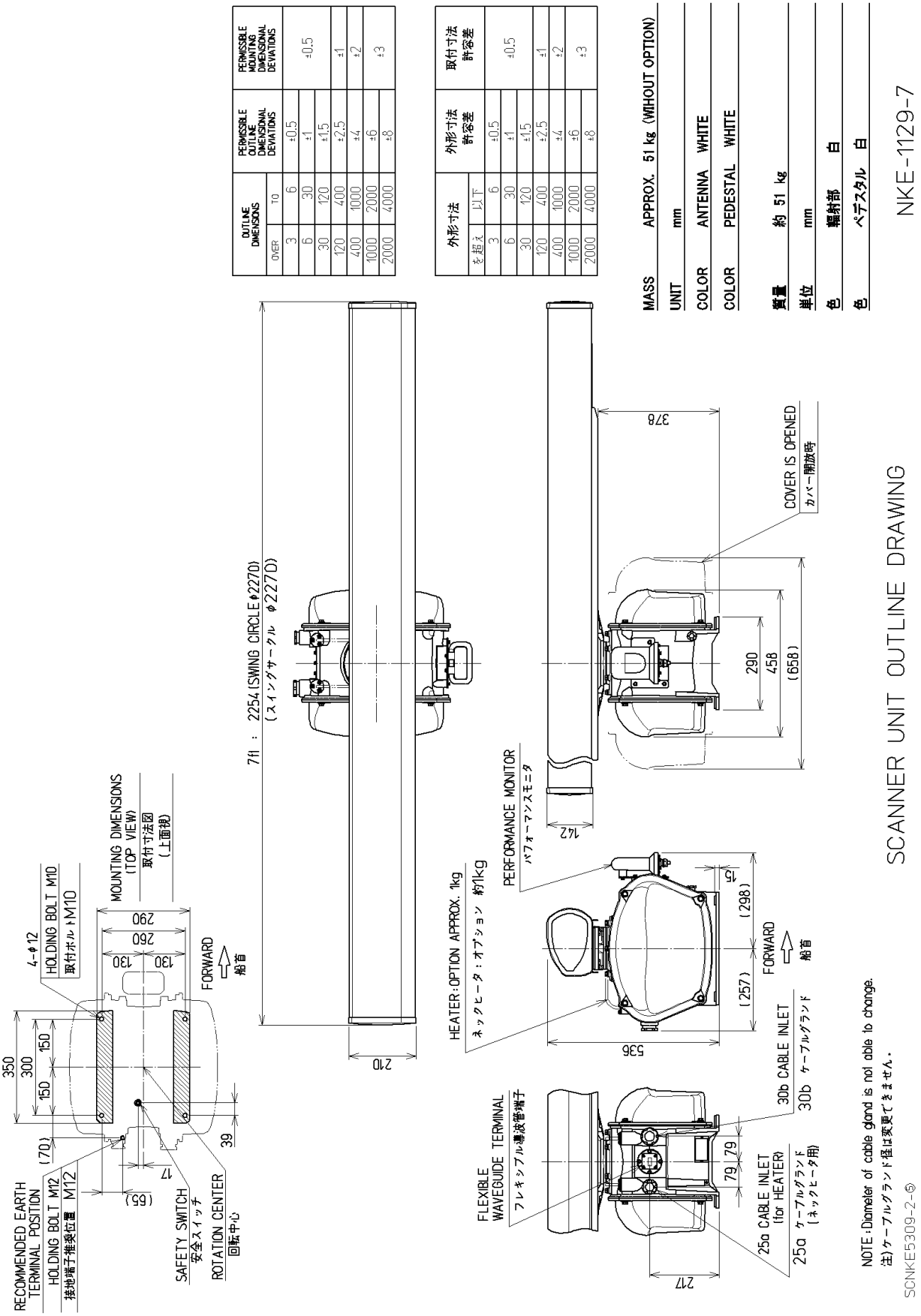
8.1.1 NKE-1139 Scanner Unit Outline Drawings



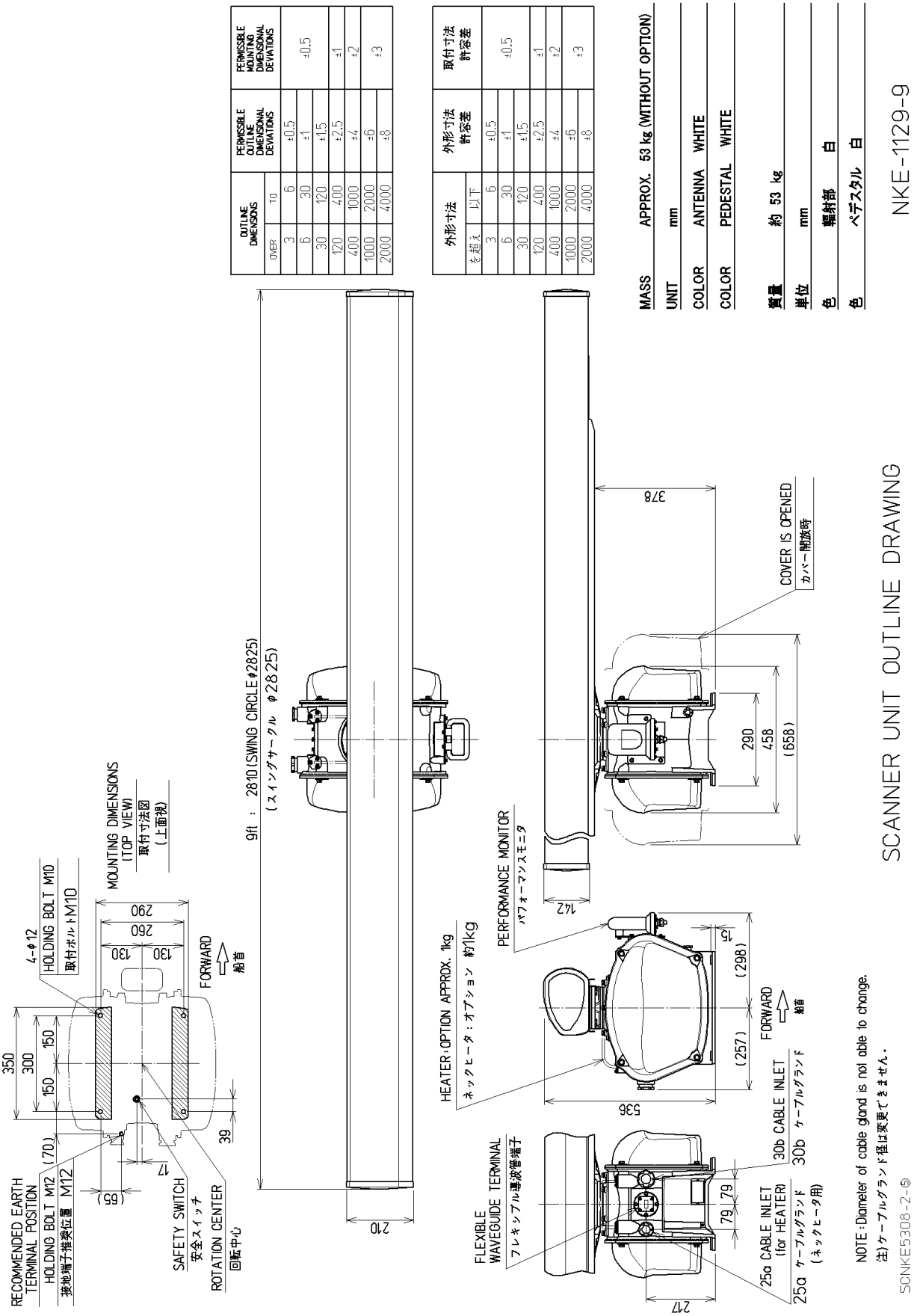
8.1.2 NKE-1130 Scanner Unit Outline Drawings



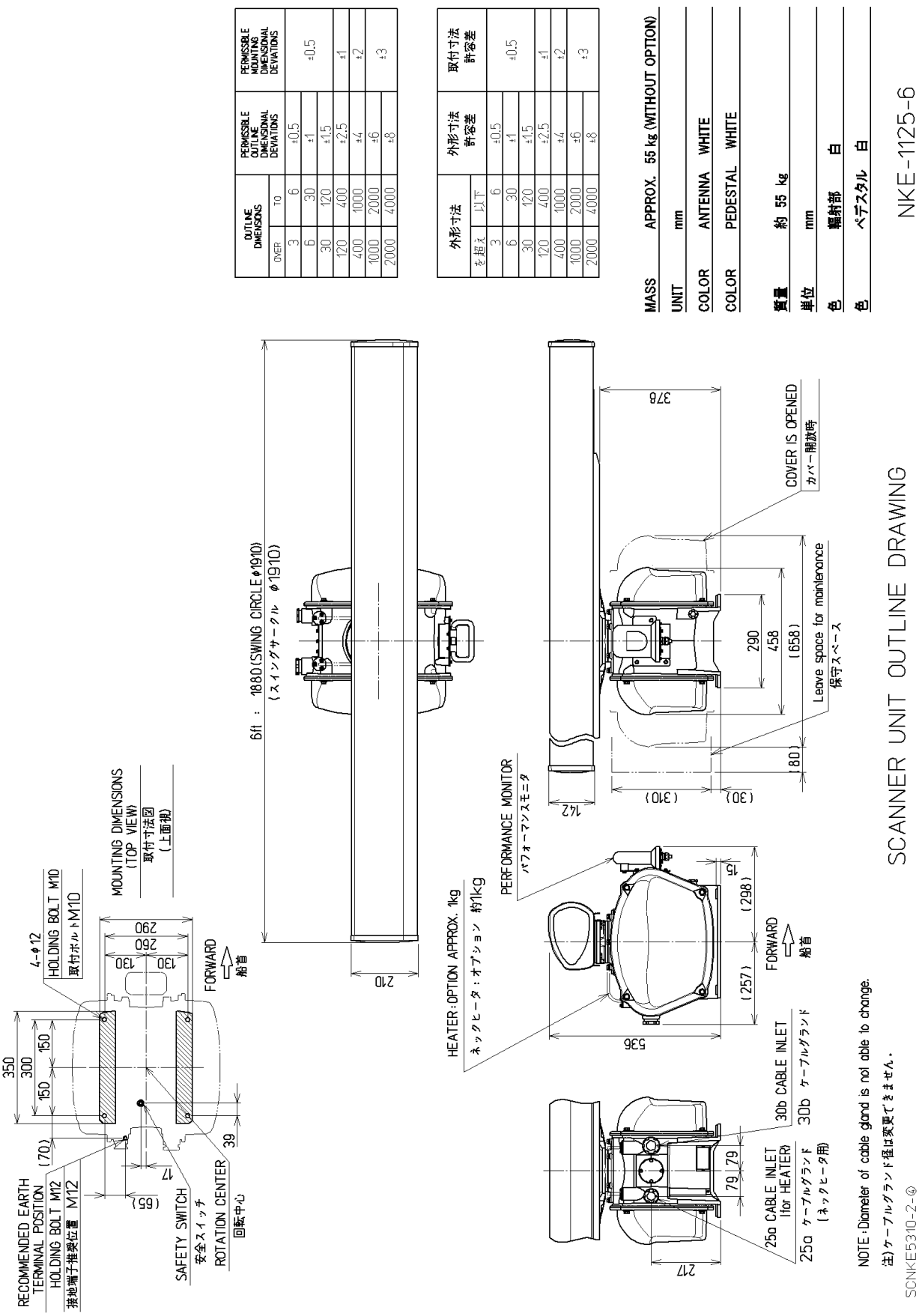
8.1.3 NKE-1129-7 Scanner Unit Outline Drawings



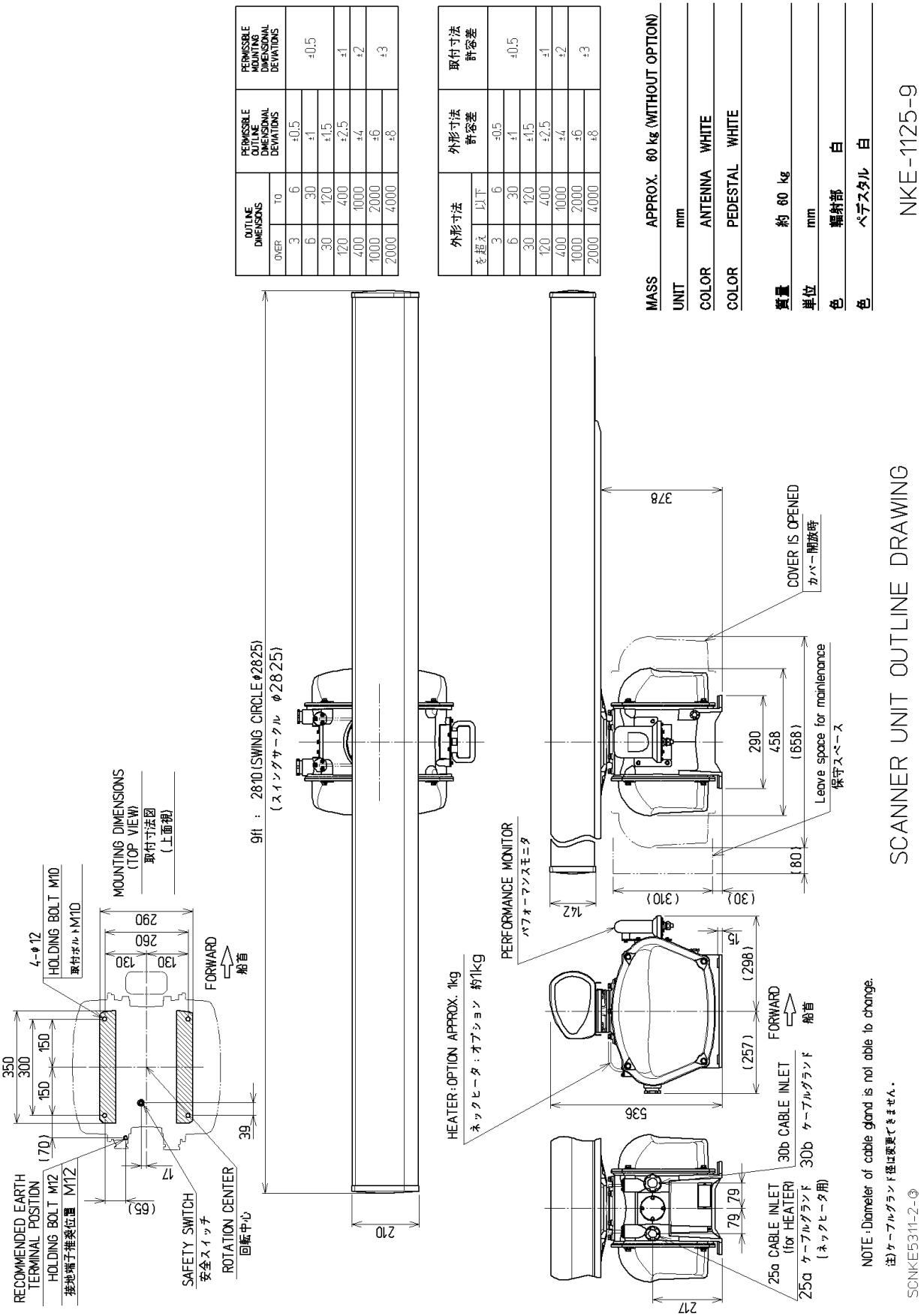
8.1.4 NKE-1129-9 Scanner Unit Outline Drawings



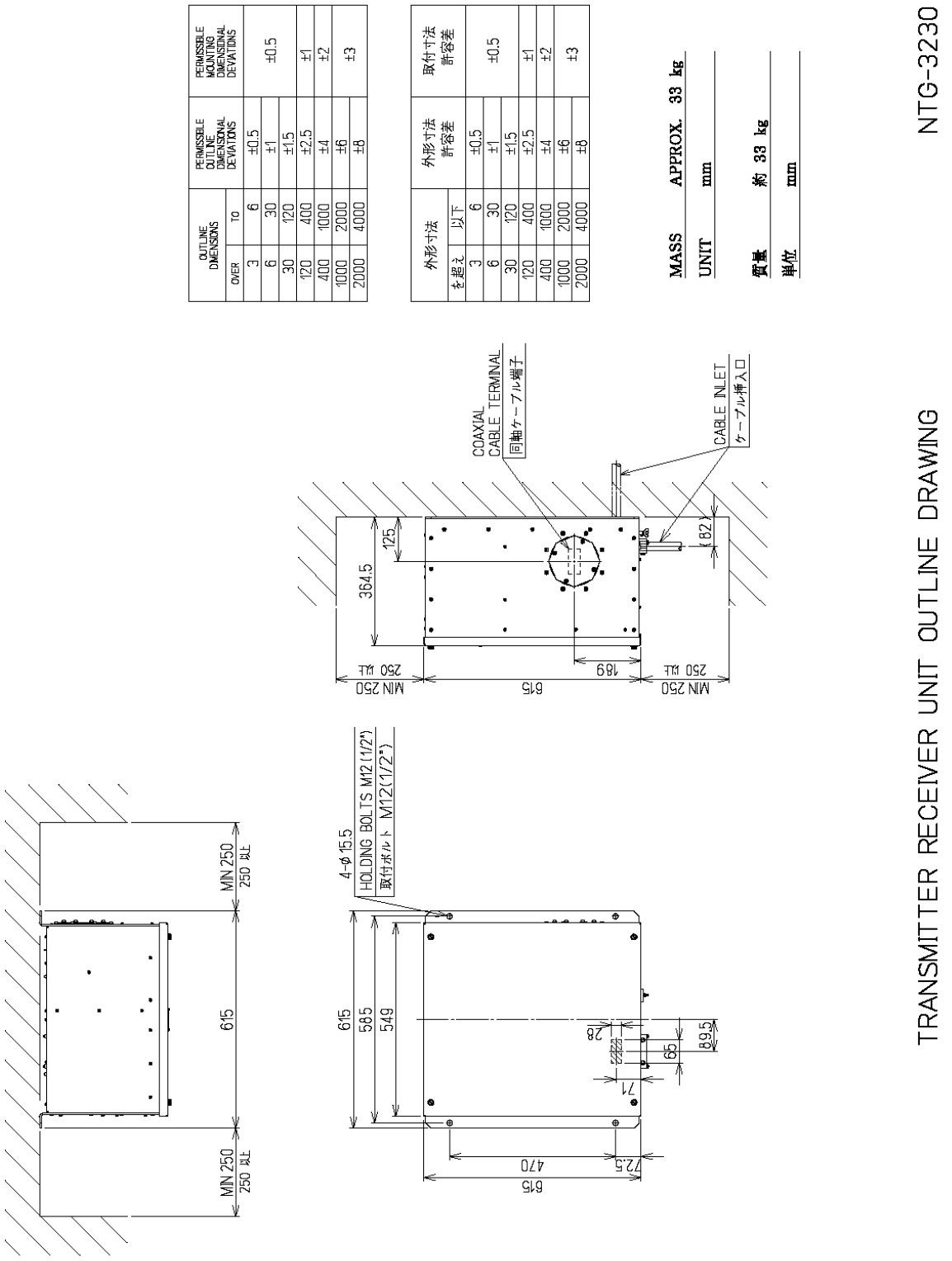
8.1.5 NKE-1125-6 Scanner Unit Outline Drawings



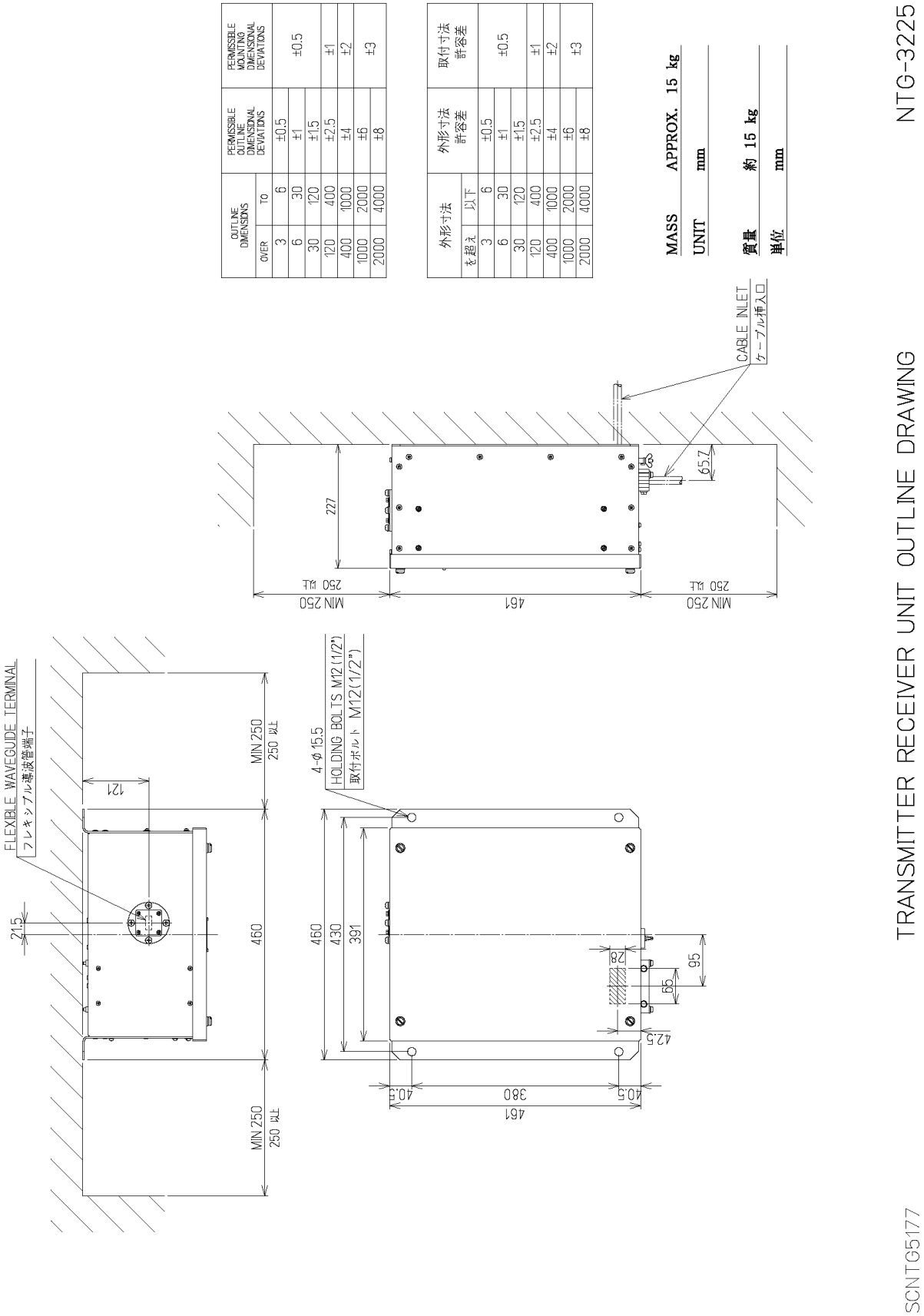
8.1.6 NKE-1125-9 Scanner Unit Outline Drawings



8.1.7 NTG-3230 Transmitter Receiver Unit Outline Drawings



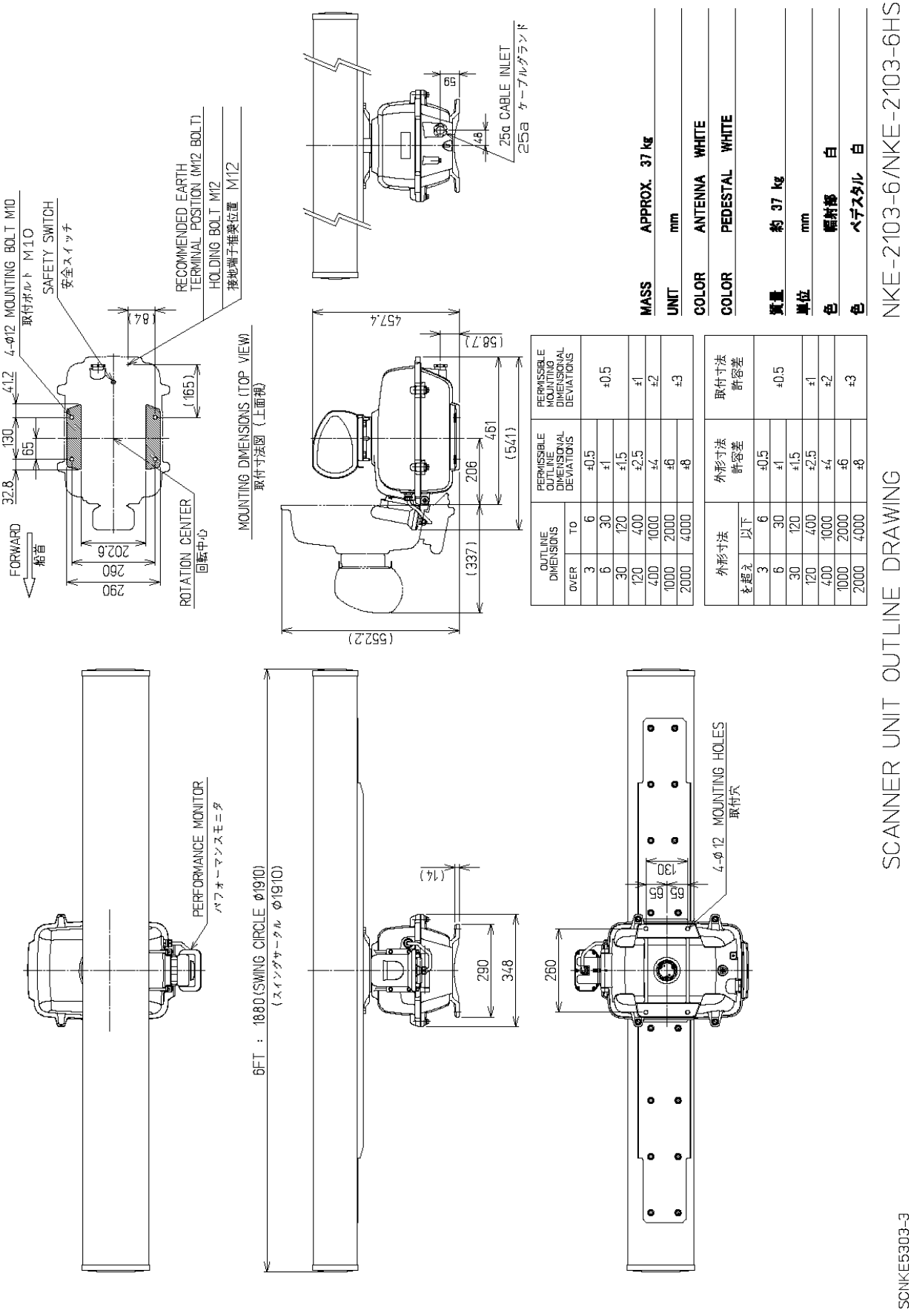
8.1.8 NTG-3225 Transmitter Receiver Outline Drawings



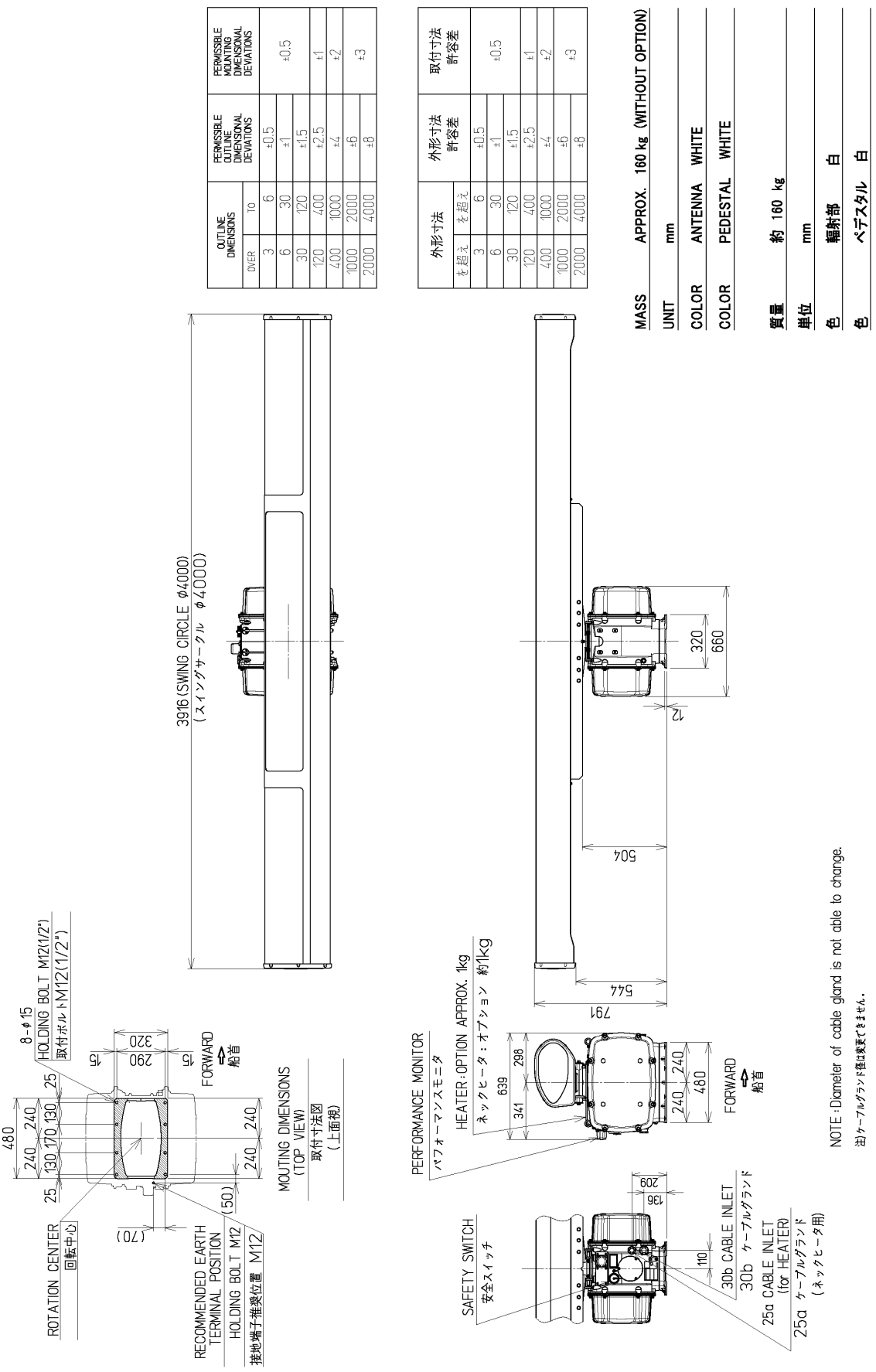
OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
OVER	TO		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	±1
120	400	±2.5	±2
400	1000	±4	
1000	2000	±6	±3
2000	4000	±8	

外形寸法		外形寸法許容差	取付寸法許容差
を超え	以下		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	±1
120	400	±2.5	±2
400	1000	±4	
1000	2000	±6	±3
2000	4000	±8	

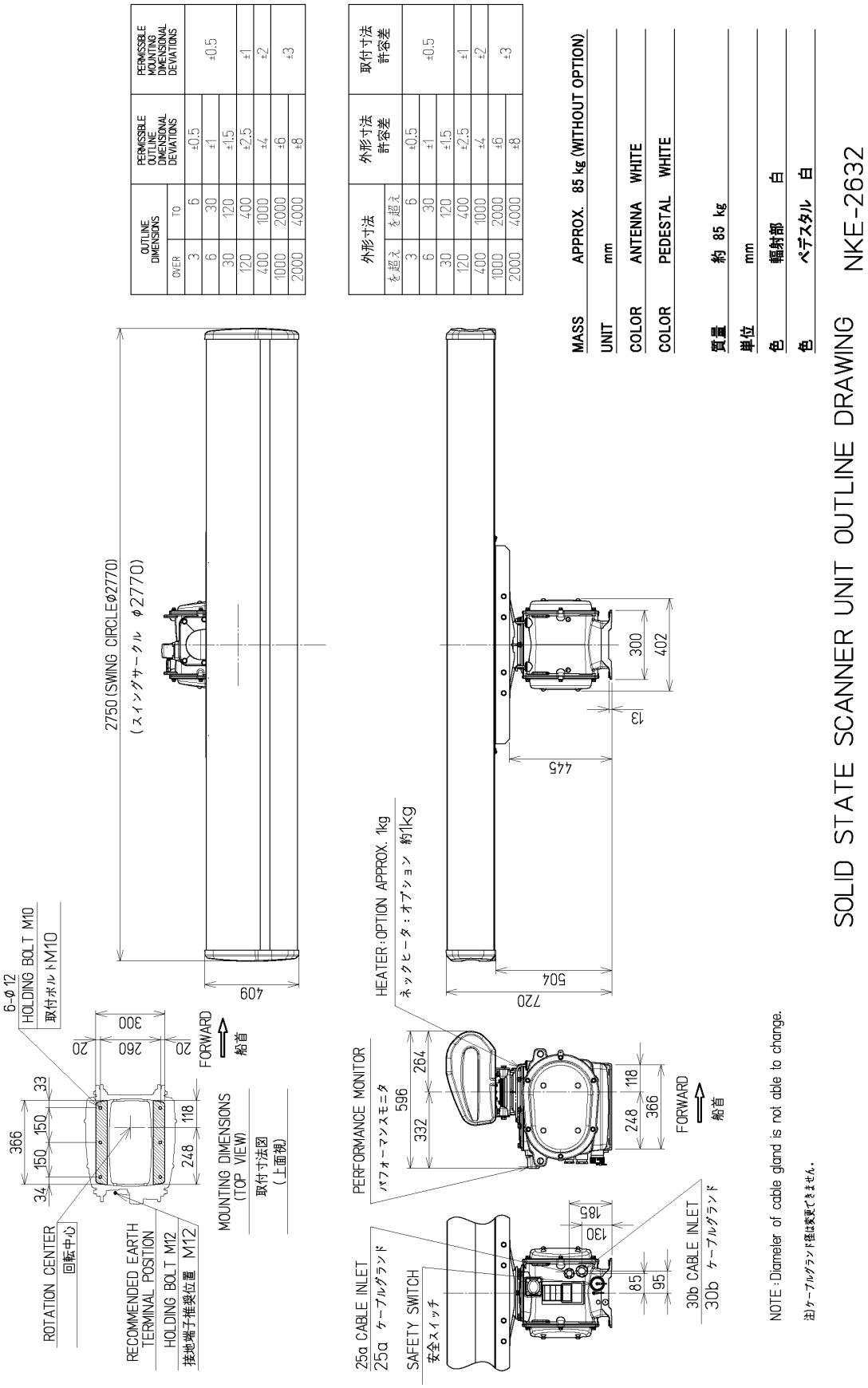
8.1.9 NKE-2103-6/NKE-2103-6HS Scanner Unit Outline Drawings



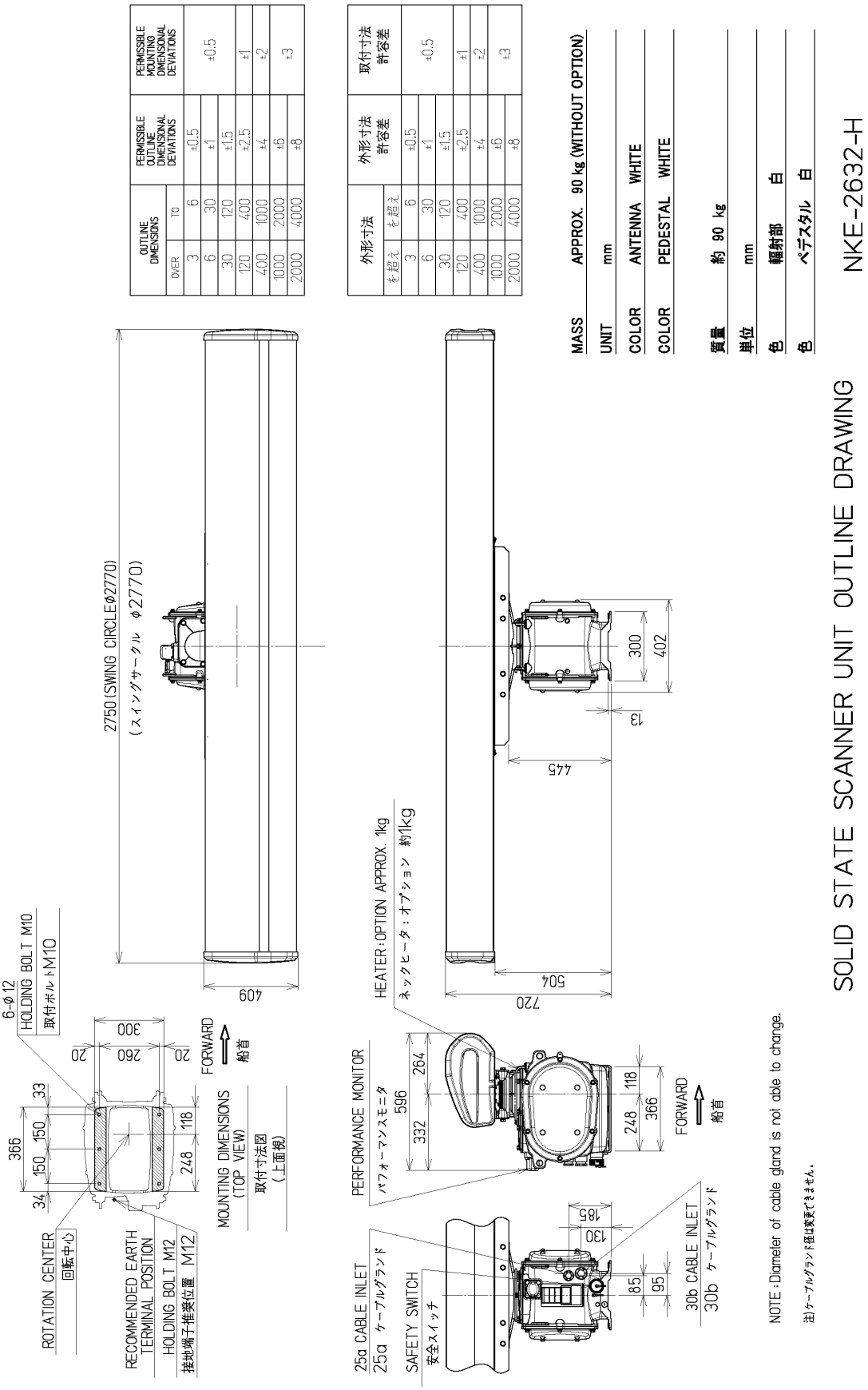
8.1.10 NKE-1632 Scanner Unit Outline Drawings



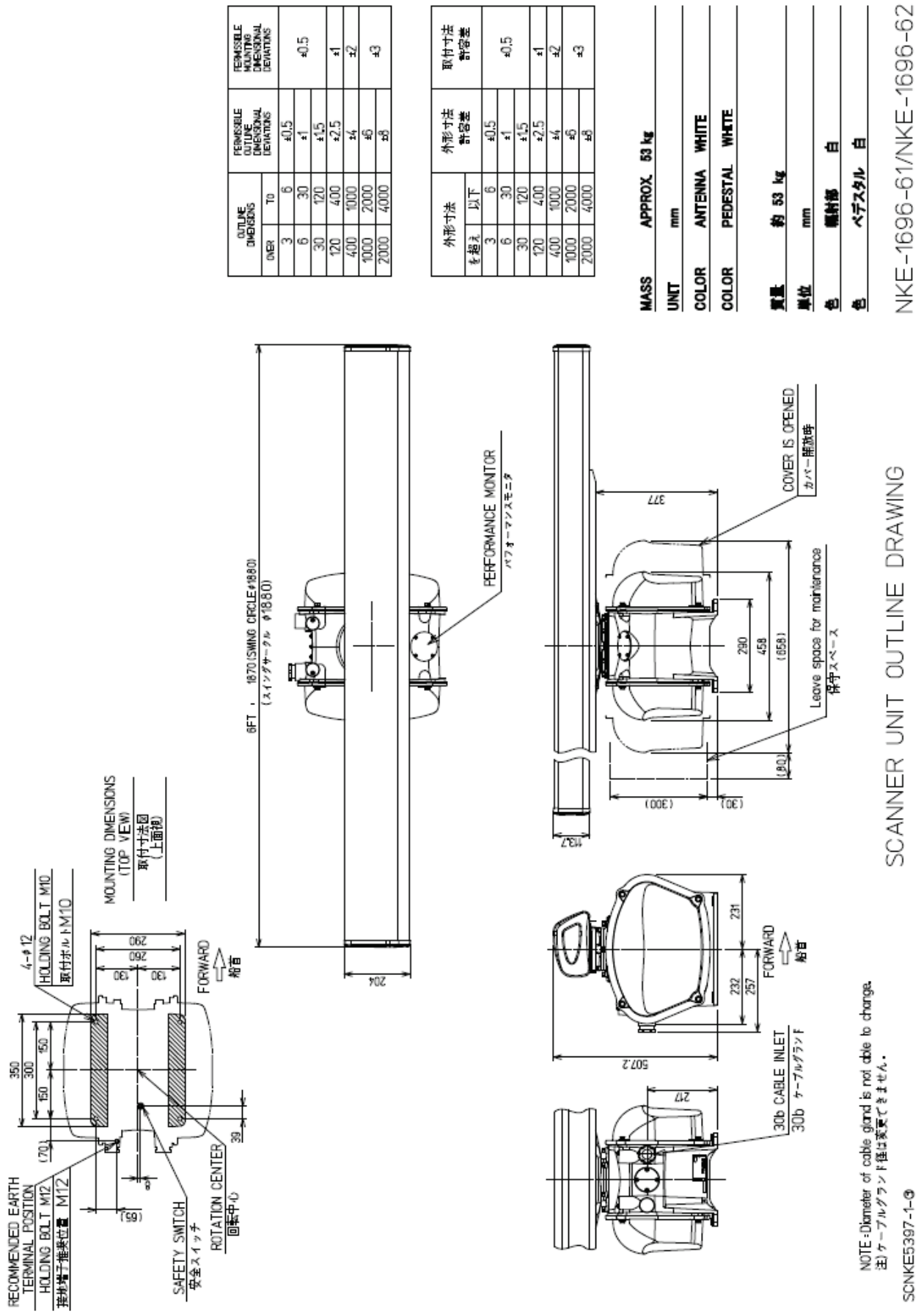
8.1.11 NKE-2632 Scanner Unit Outline Drawings



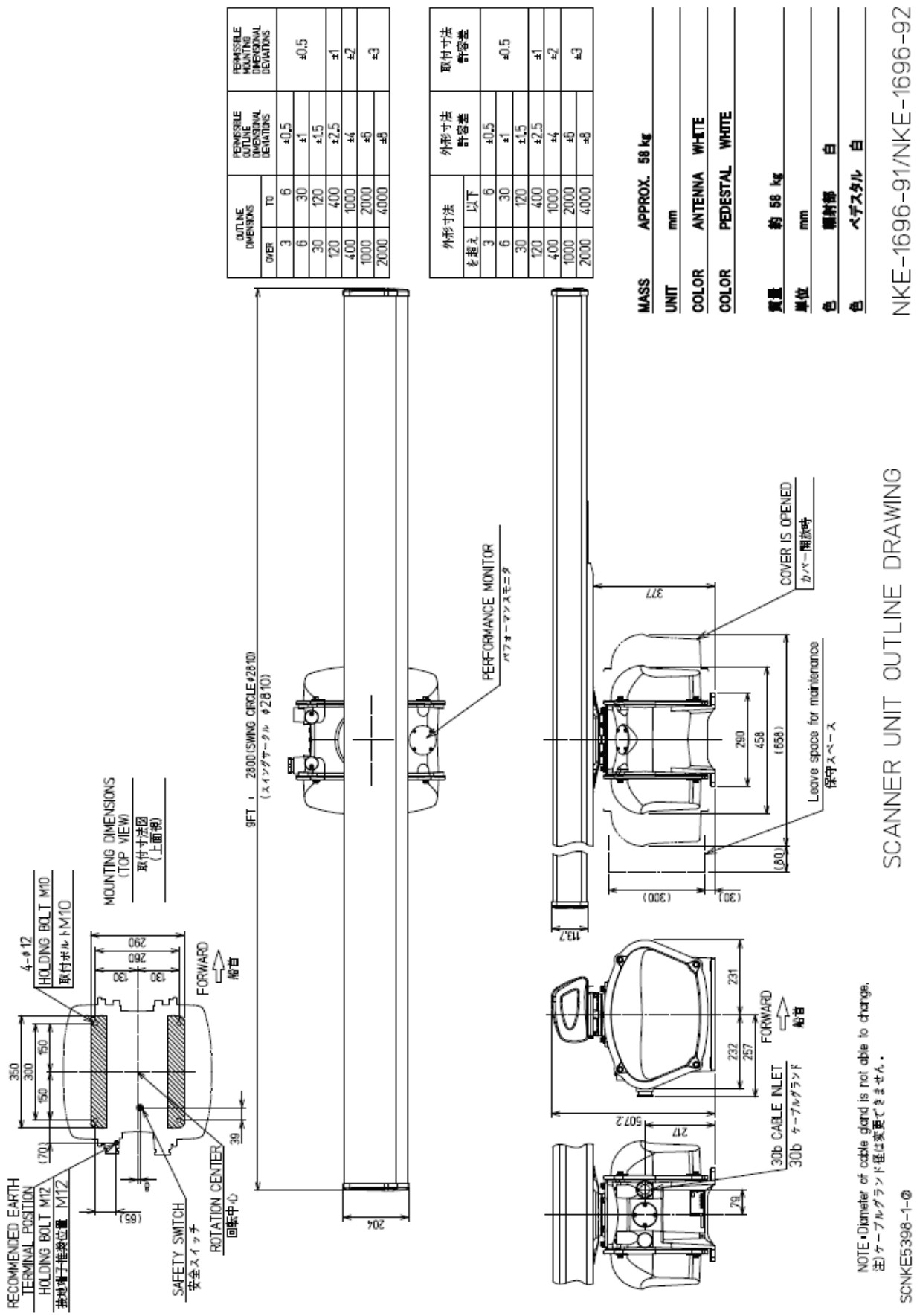
8.1.12 NKE-2632-H Scanner Unit Outline Drawings



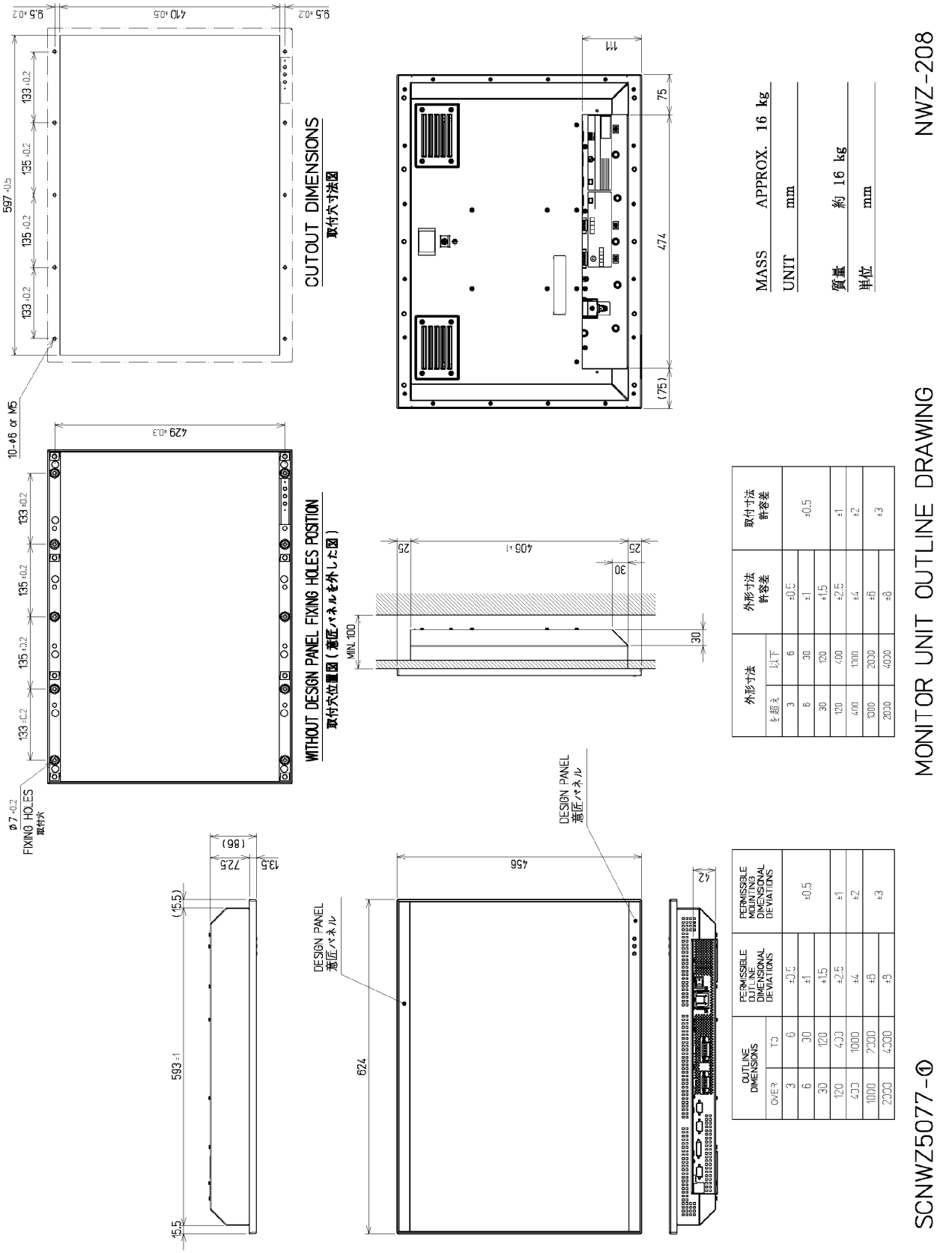
8.1.13 NKE-1696-6 Scanner Unit Outline Drawing



8.1.14 NKE-1696-9 Scanner Unit Outline Drawing



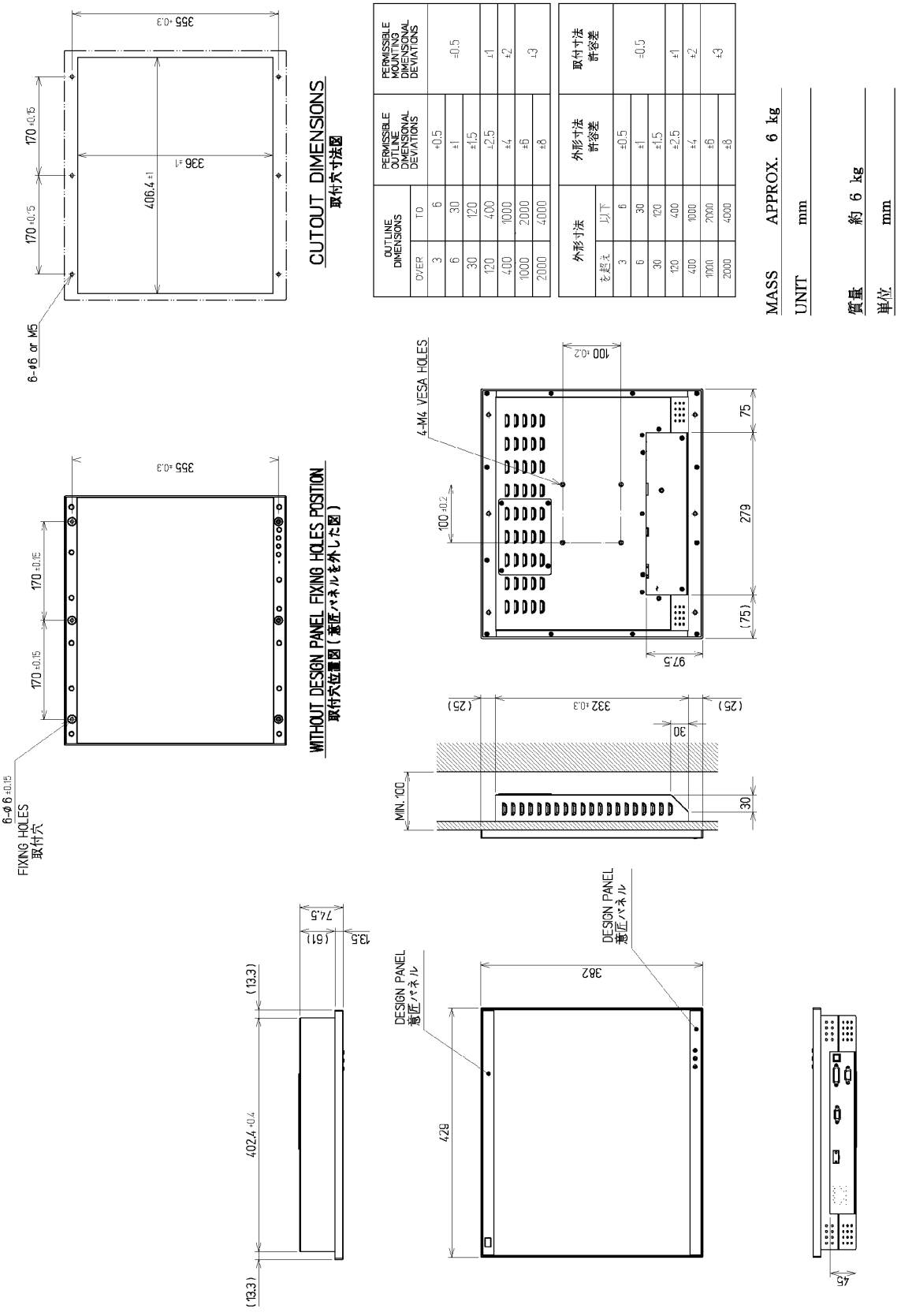
8.1.15 NWZ-208 26-inch Monitor Unit Outline Drawings



外形寸法		外形寸法許容差	取付寸法許容差
を超え	以下		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	

OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
OVER	TO		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	

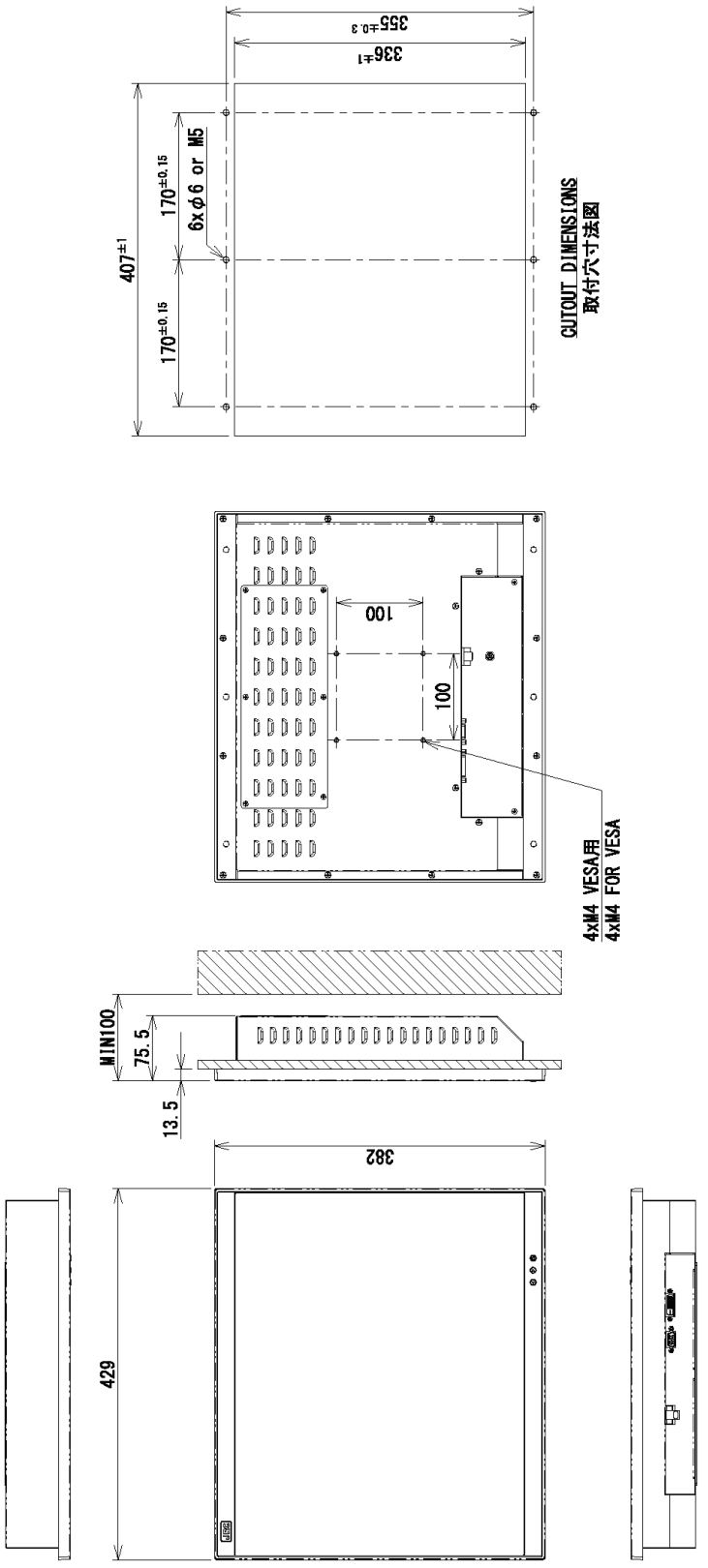
8.1.16 NWZ-207 19-inch Monitor Unit Outline Drawings



OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
OVER	TO		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	

外形寸法		外形寸法許容差	取付寸法許容差
を超え	以下		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	

8.1.17 NWZ-214 19-inch Monitor Unit Outline Drawings



OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS
OVER	TO	
3	6	±0.5
6	30	±1
30	120	±1.5
120	400	±2.5
400	1000	±4
1000	2000	±6
2000	4000	±8

PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
±0.5
±1
±2
±3

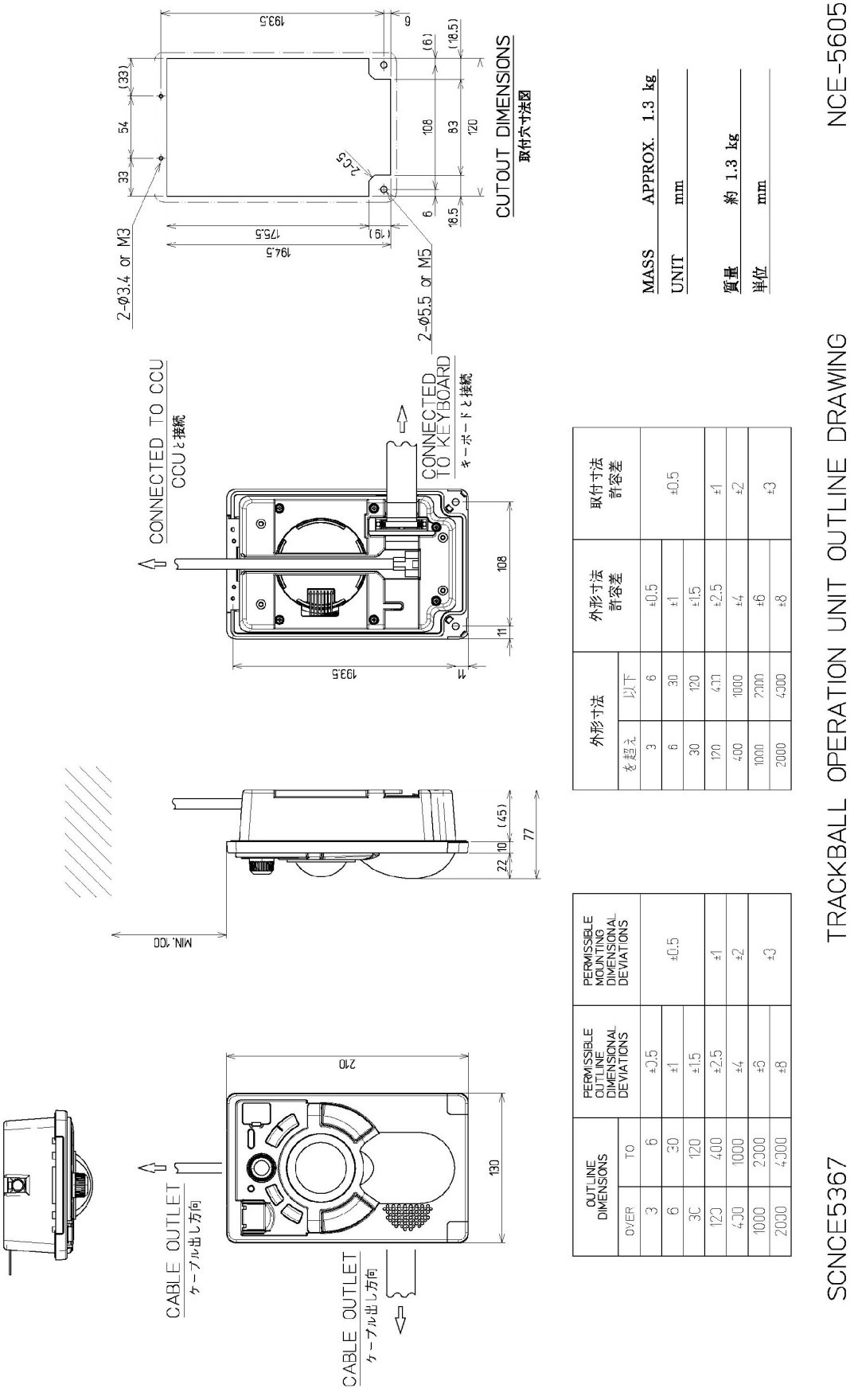
外形寸法		外形寸法許容差	取付寸法許容差
を超え	以下		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	

MASS APPROX. 4.6kg
UNIT mm

質量 約 4.6kg
単位 mm

NWZ-214

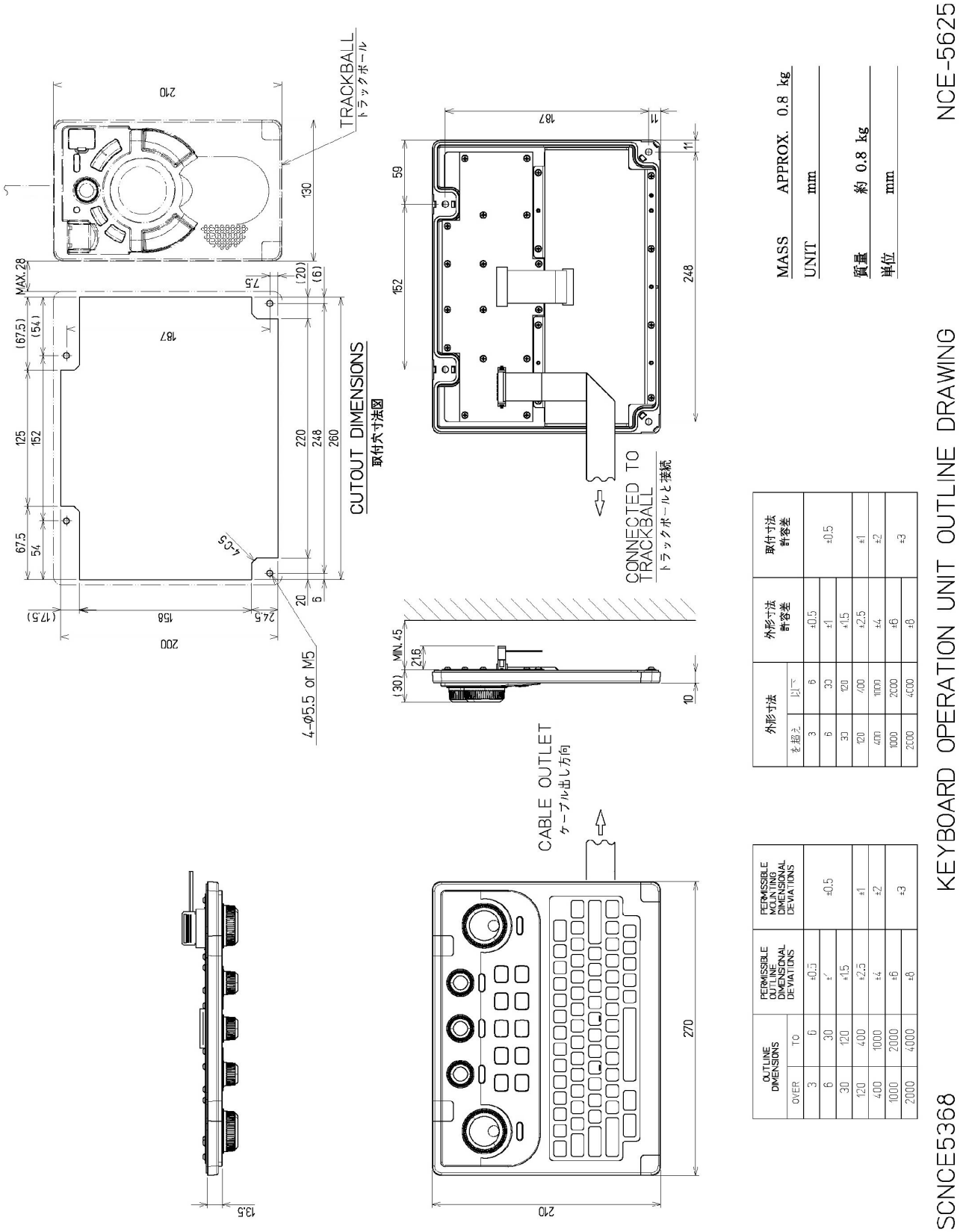
8.1.18 NCE-5605 Trackball Operation Unit Outline Drawings



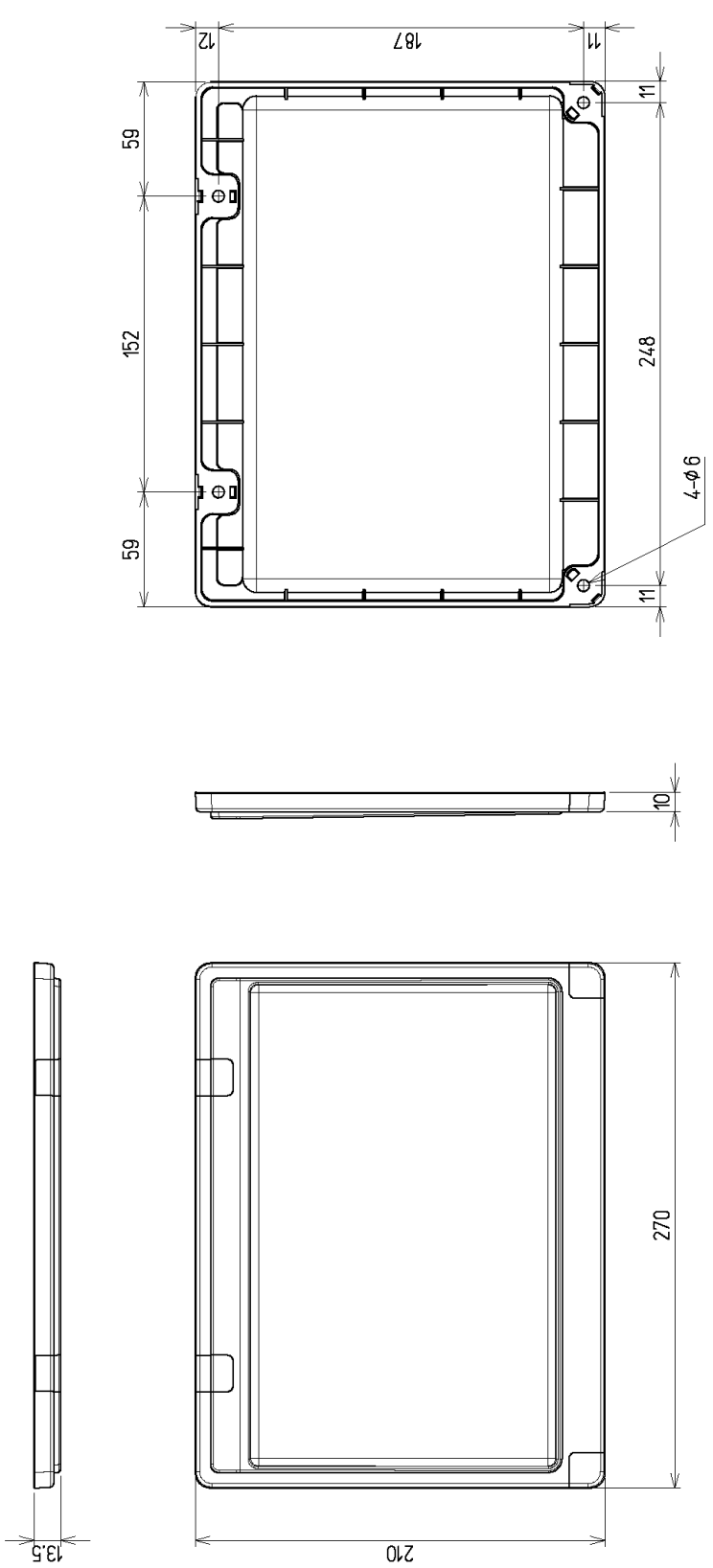
OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
OVER	TO		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	

外形寸法		外形寸法許容差	取付寸法許容差
を超え	以下		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	

8.1.19 NCE-5625 Keyboard Operation Unit Outline Drawings



8.1.20 CWB-1593 Large Tray Outline Drawings



OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
OVER	TO		
3	6	±0.5	±0.5
6	30	±1	±0.5
30	120	±1.5	±0.5
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	±3

外形寸法		外形寸法許容差	取付寸法許容差
を超え	以下		
3	6	±0.5	±0.5
6	30	±1	±0.5
30	120	±1.5	±0.5
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	±3

MASS 0.3 kg

UNIT mm

質量 0.3 kg

単位 mm

CWB-1593

LARGE TRAY OUTLINE DRAWING

SCYW05611

8.1.21 NDC-1590/A Central Controll Unit Outline Drawings

外形寸法		外形寸法許容差	取付寸法許容差
を超え	以下		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	

OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
OVER	TO		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	

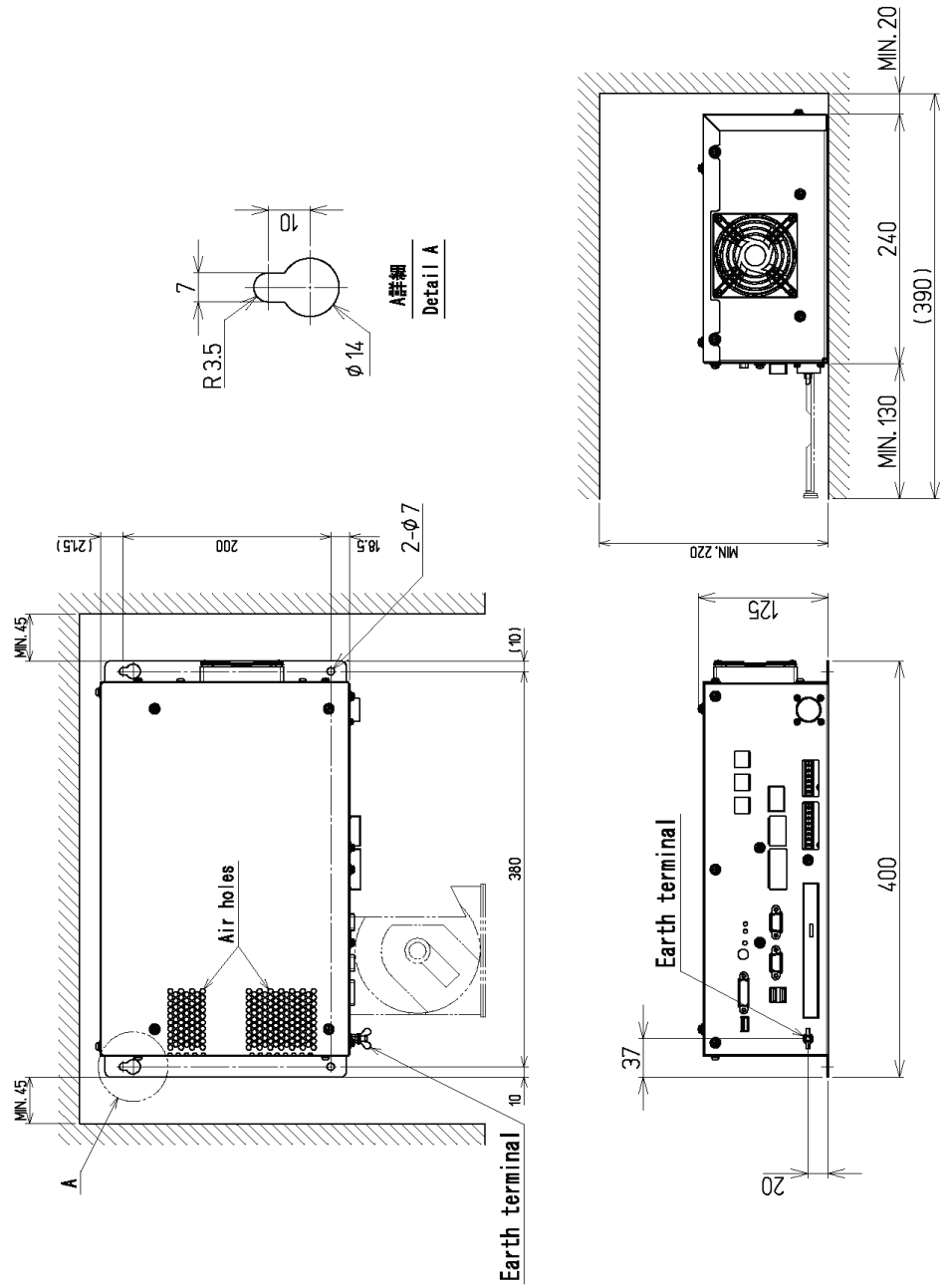
MASS APPROX. 5.6 kg

UNIT mm

質量 約 5.6 kg

単位 mm

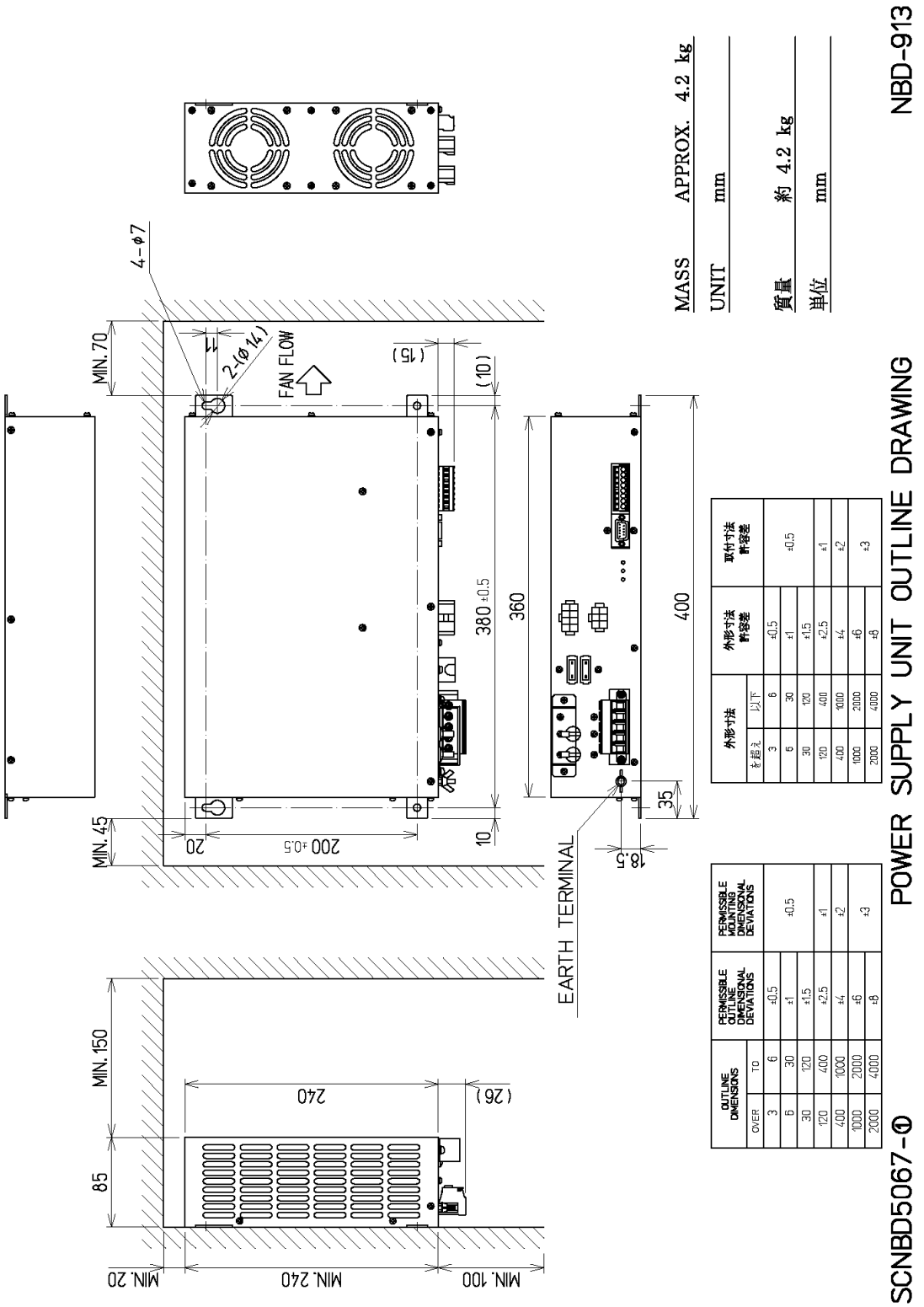
NDC-1590/A



CENTRAL CONTROL UNIT OUTLINE DRAWING

SCNDC5246-①

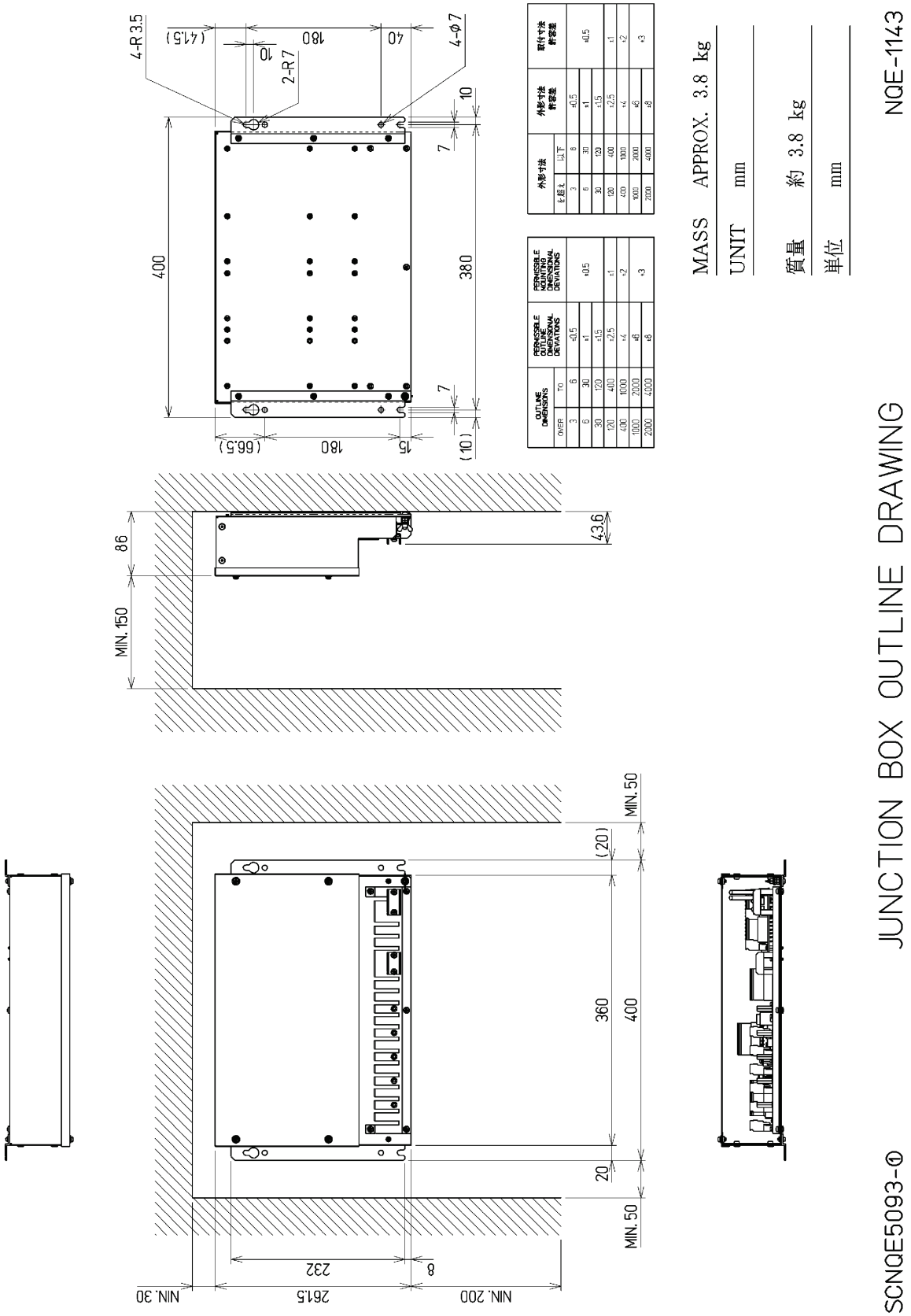
8.1.22 NBD-913 Power Supply Unit Outline Drawings



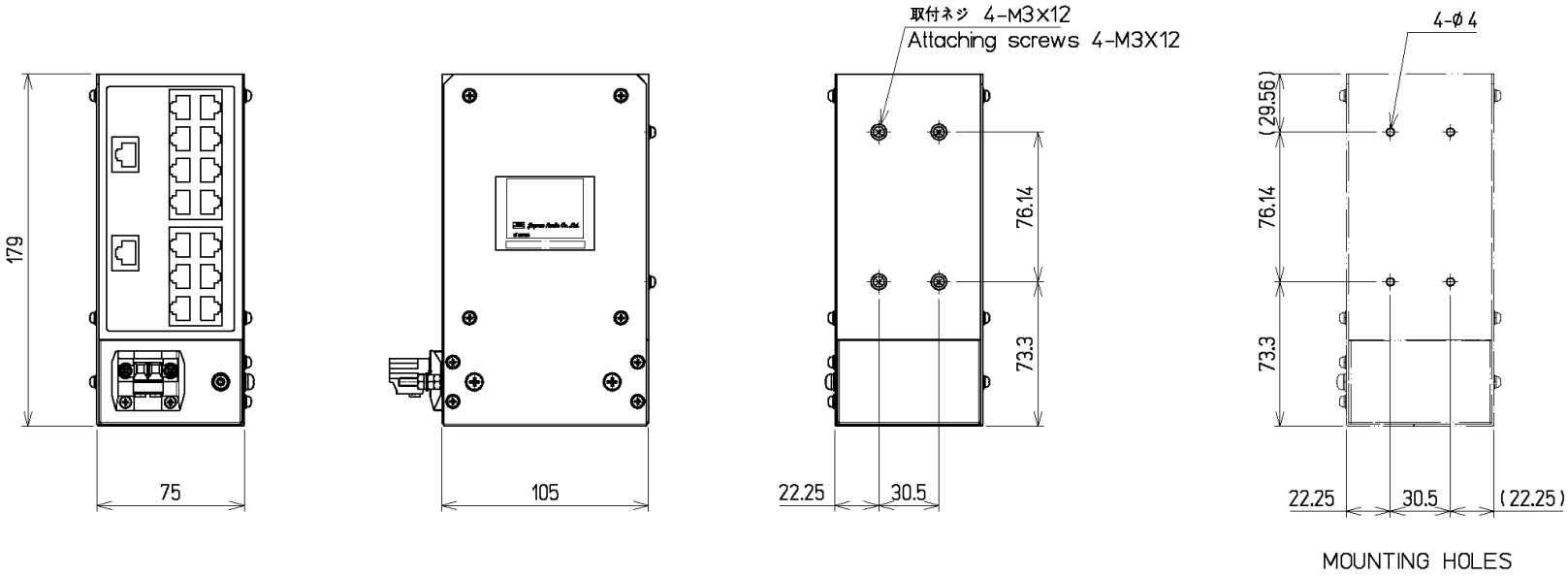
OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
OVER	TO		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	

外形寸法		外形寸法許容差	取付寸法許容差
を超え	以下		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	

8.1.23 NQE-1143 Junction Box Outline Drawings



8.1.24 NQA-2443/A Sensor LAN Switch Unit Outline Drawings

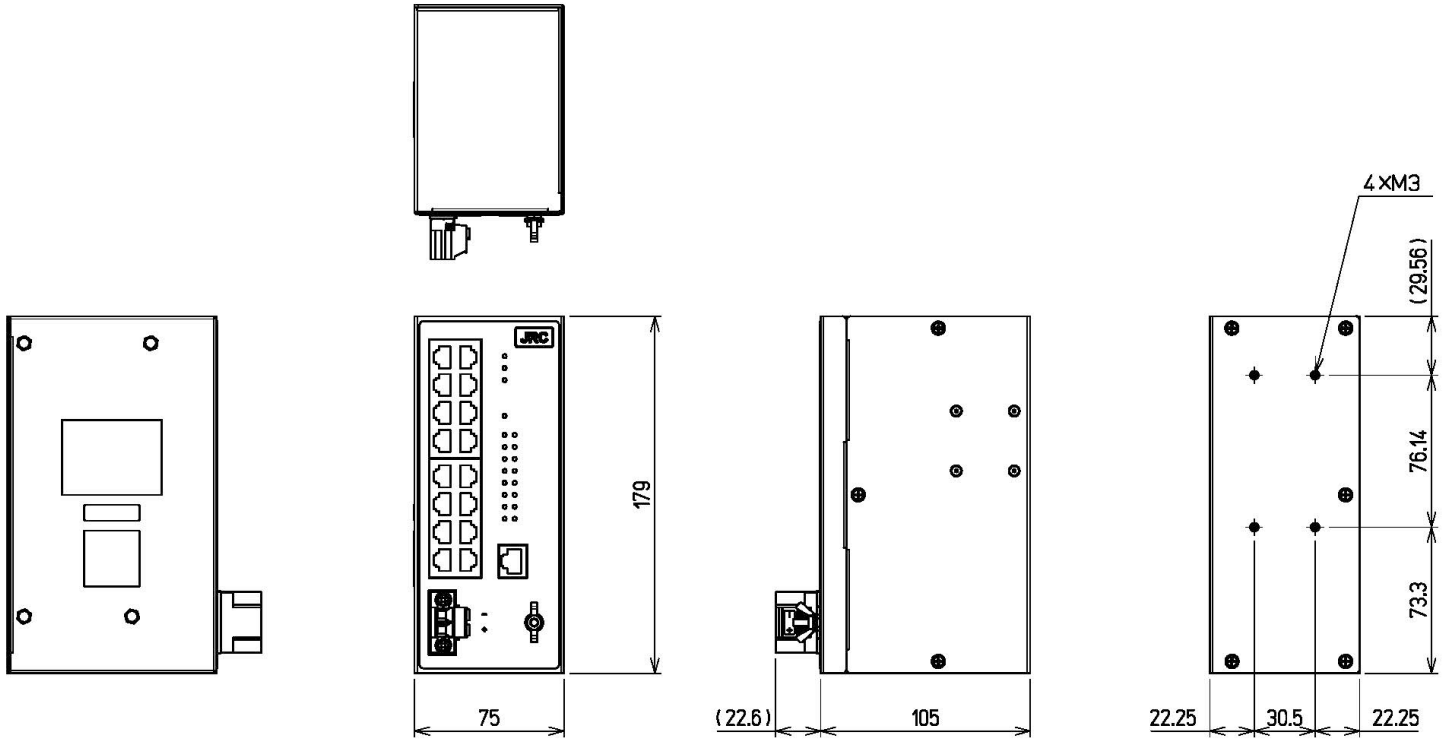


外形寸法		外形寸法 許容差	取付寸法 許容差
を超え	以下		
3	6	±0.5	±0.5
6	30	±1	±0.5
30	120	±1.5	±0.5
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	±3

OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
OVER	TO		
3	6	±0.5	±0.5
6	30	±1	±0.5
30	120	±1.5	±0.5
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	±3

MASS	1.5 kg
UNIT	mm
質量	1.5 kg
単位	mm

SCNQA5173 SENSOR LAN UNIT OUTLINE DRAWING NQA-2443



外形寸法		外形寸法 許容差	取付寸法 許容差
を超え	以下		
3	6	±0.5	±0.5
6	30	±1	±0.5
30	120	±1.5	±0.5
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	±3

OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
OVER	TO		
3	6	±0.5	±0.5
6	30	±1	±0.5
30	120	±1.5	±0.5
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	±3

MASS APPROX. 0.8 kg

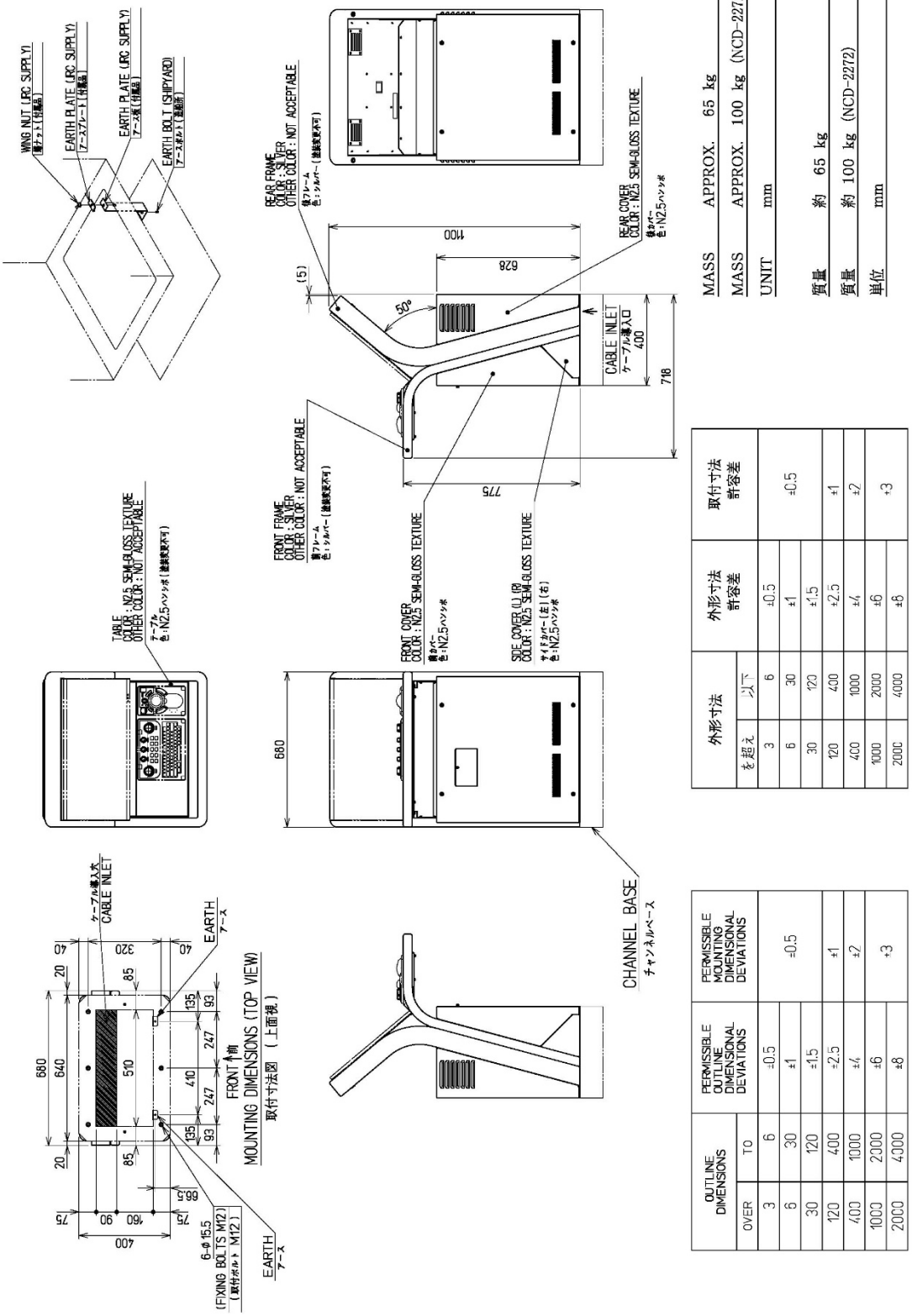
UNIT mm

質量 約 0.8 kg

単位 mm

SCNQA5201 SENSOR LAN UNIT OUTLINE DRAWING NQA-2443A

8.1.25 CWA-246 26-inch Display Unit Mount Kit Outline Drawings

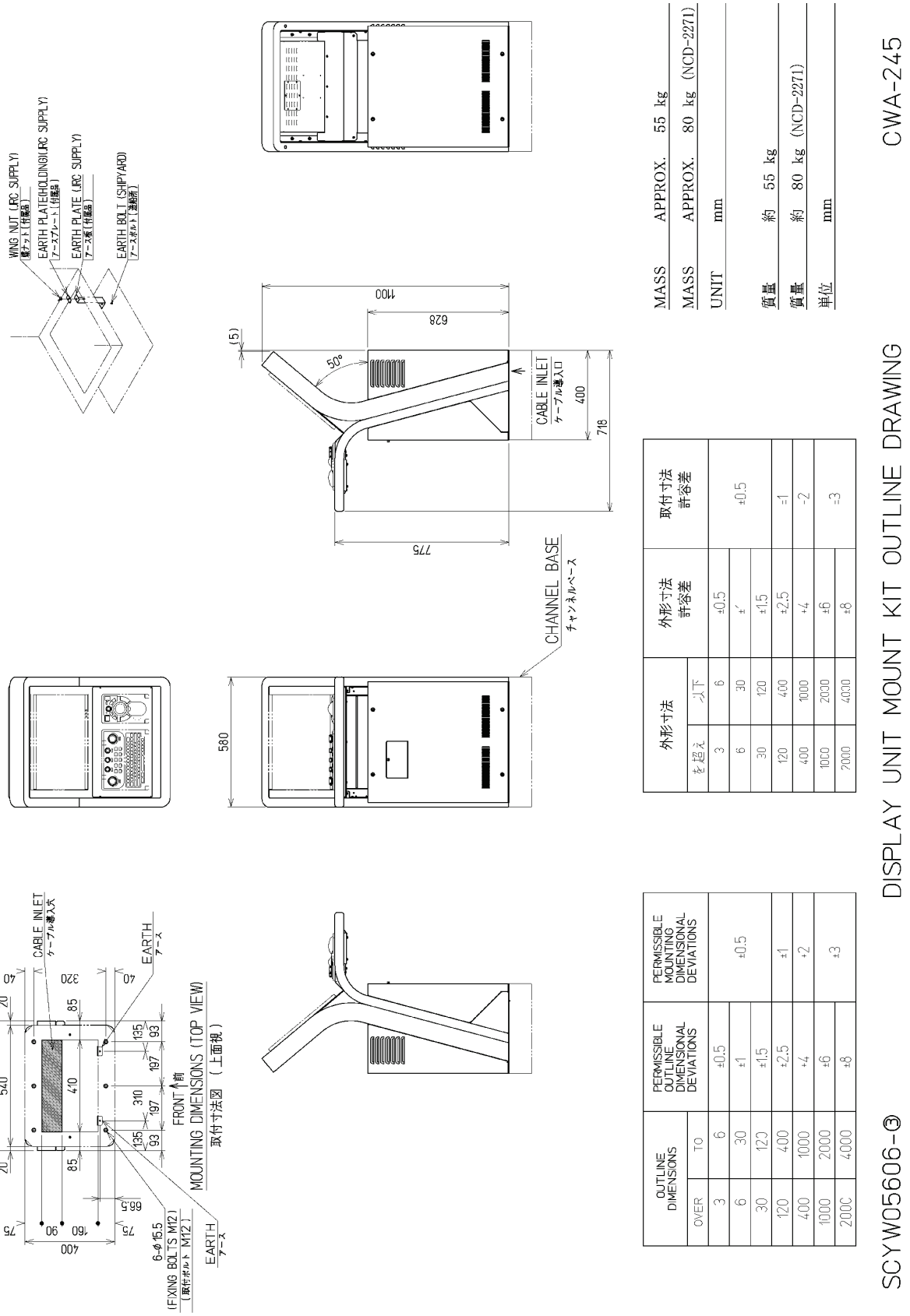


OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
OVER	TO		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	

外形寸法		外形寸法許容差	取付寸法許容差
を超え	以下		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	

(with display, trackball operation unit and keyboard operation unit installed)

8.1.26 CWA-245 19-inch Display Unit Mount Kit Outline Drawings

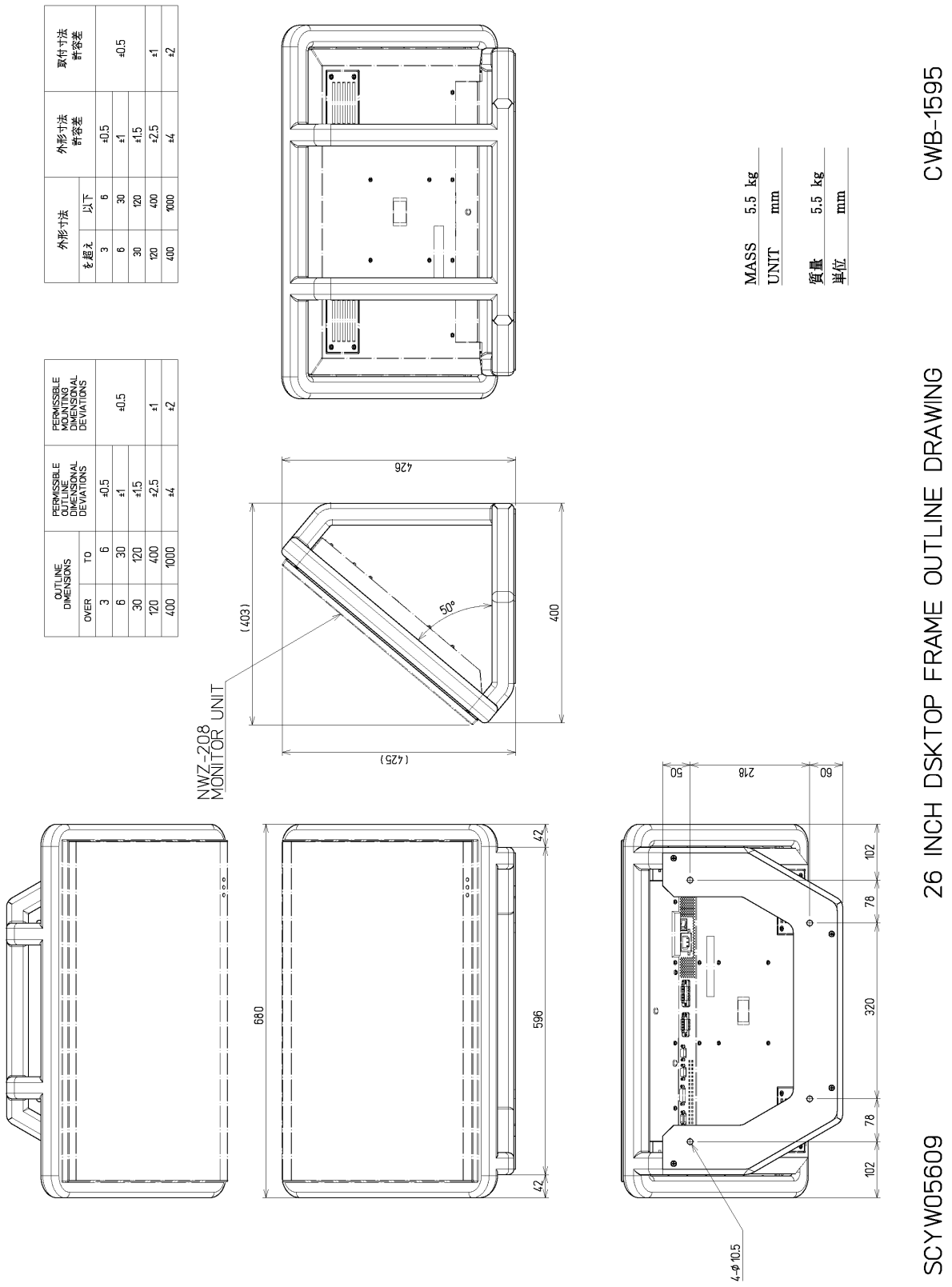


外形寸法		外形寸法許容差	取付寸法許容差
を超え	以下		
3	6	±0.5	±0.5
6	30	±	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	

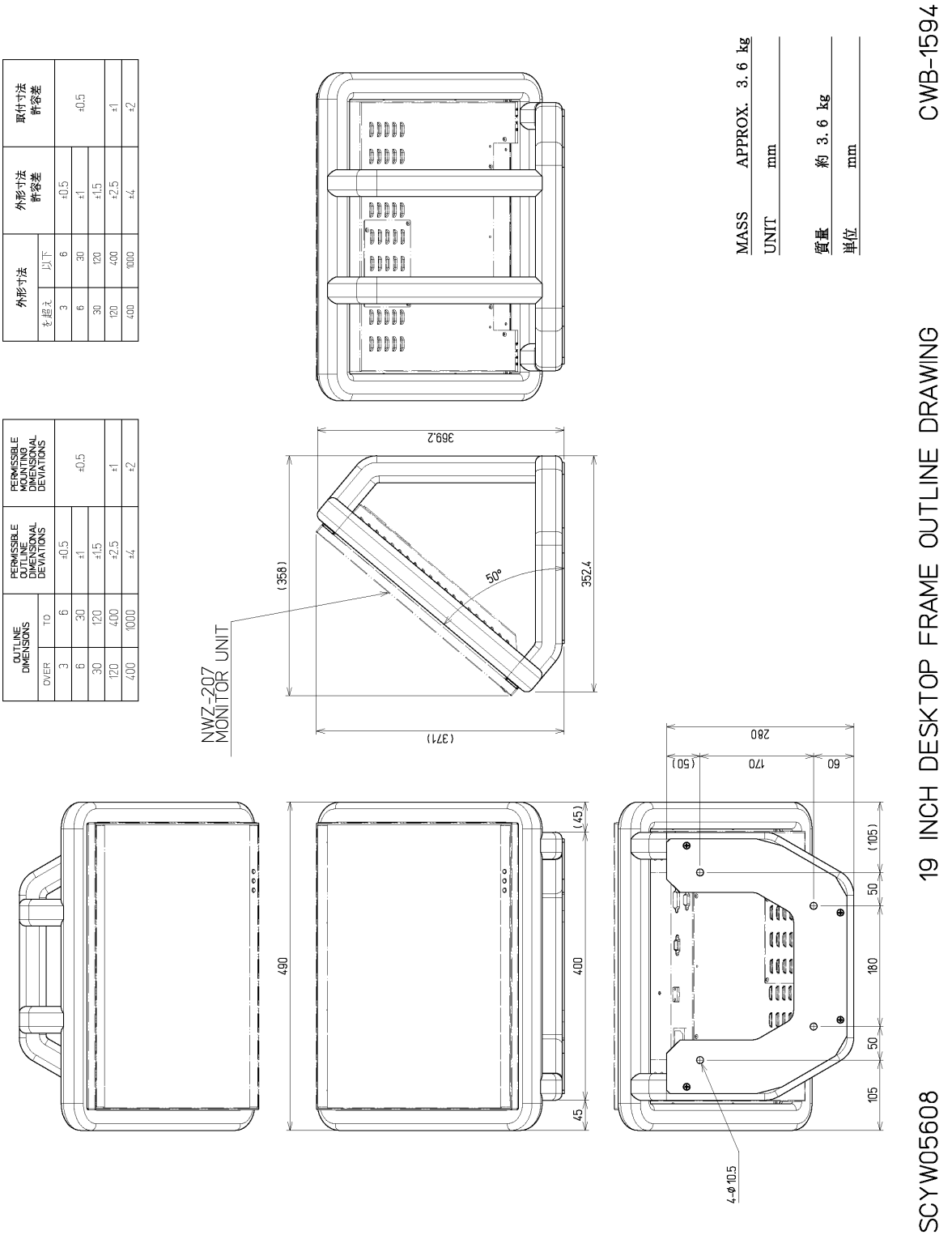
OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
OVER	TO		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	

(with display, trackball operation unit and keyboard operation unit installed)

8.1.27 CWB-1595 26-inch Desktop Frame Outline Drawings



8.1.28 CWB-1594 19-inch Desktop Frame Outline Drawings



OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
OVER	TO		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2

外形寸法		外形寸法許容差	取付寸法許容差
を超え	以下		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2

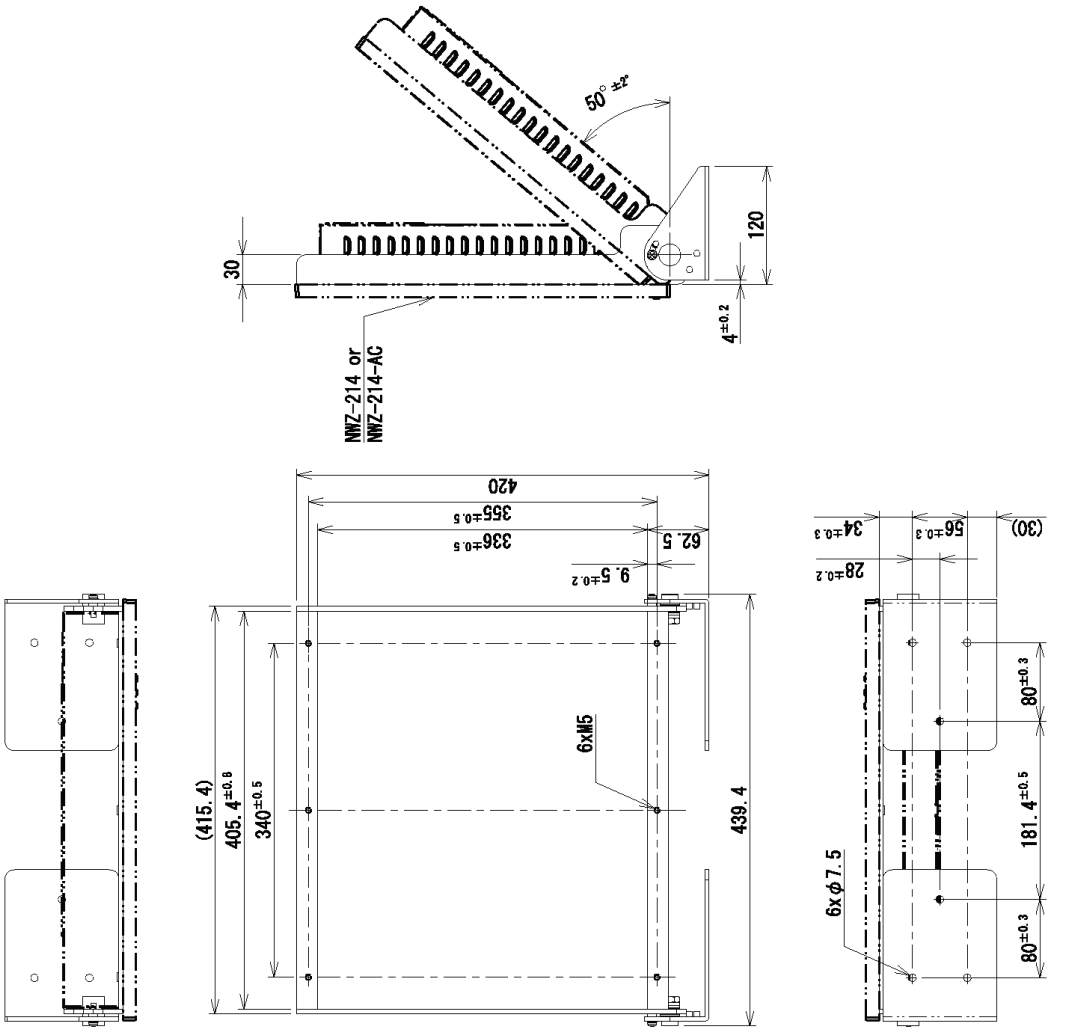
8.1.29 CWB-1659 19-inch Desktop Frame Outline Drawings

OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
OVER	TO		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	±1
120	400	±2.5	±2
400	1000	±4	
1000	2000	±6	±3
2000	4000	±8	

外形寸法		外形寸法許容差	取付寸法許容差
を超え	以下		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	±1
120	400	±2.5	±2
400	1000	±4	
1000	2000	±6	±3
2000	4000	±8	

MASS APPROX. 1.2kg
UNIT mm

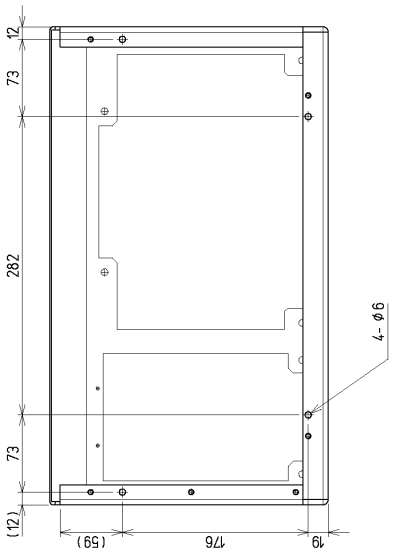
質量 約 1.2kg
単位 mm

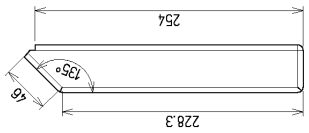


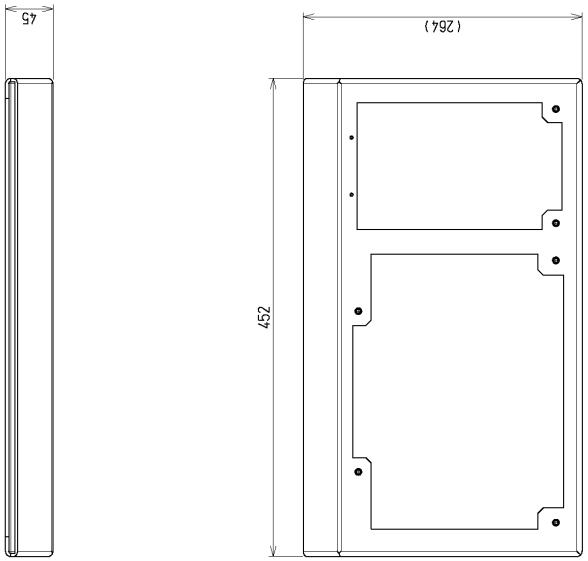
8.1.30 CWB-1596 OPU Desktop Frame Outline Drawings

外形寸法		外形寸法許容差	取付寸法許容差
を超え	以下		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2

OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
OVER	TO		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2







MASS APPROX. 1 kg

UNIT mm

質量 約 1 kg

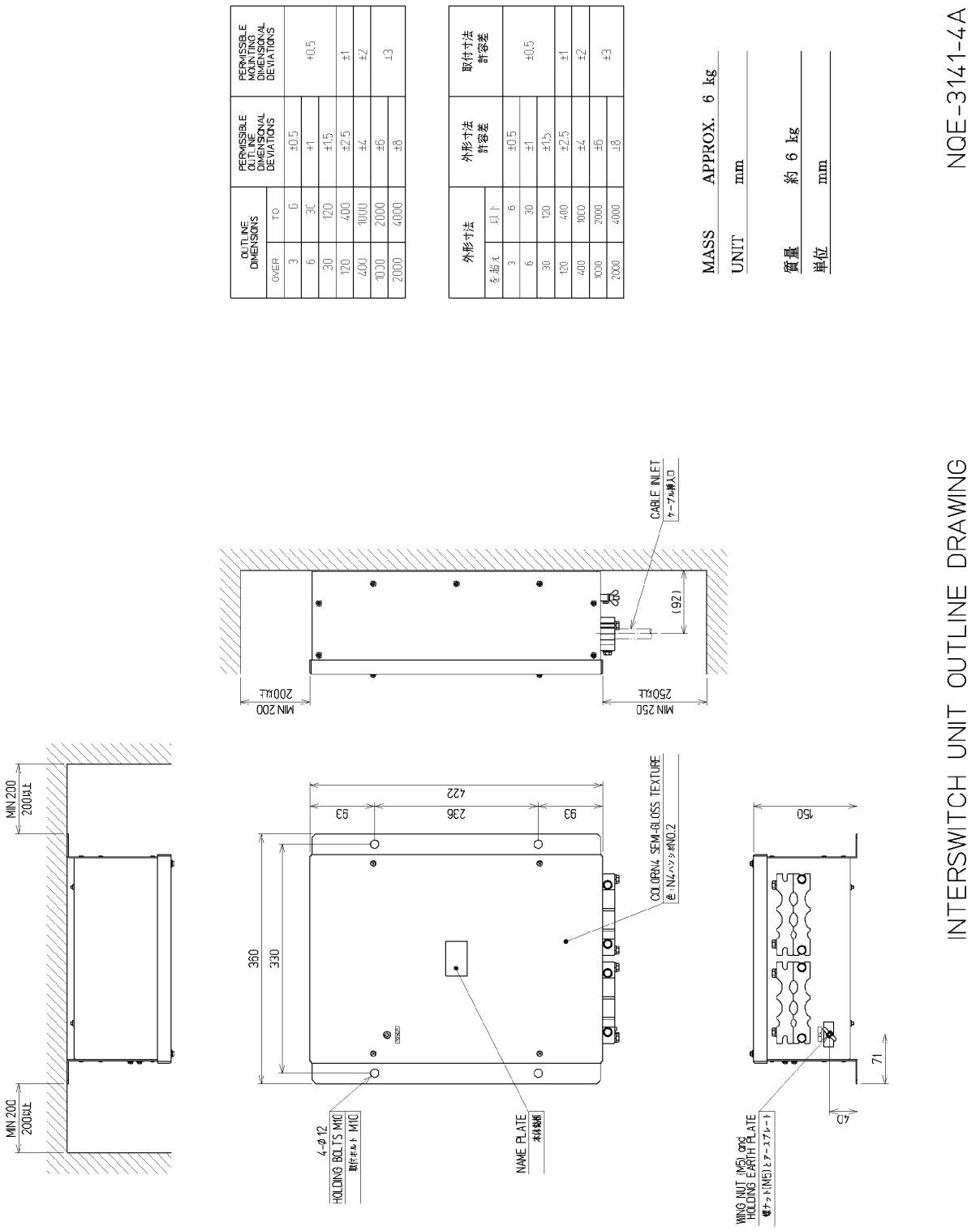
単位 mm

CWB-1596

OPU DESKTOP FRAME

SCYW05610

8.1.31 NQE-3141-4A Interswitch Unit Outline Drawings (Optional)



8.1.32 NQE-3141-8A Interswitch Unit Outline Drawings (Optional)

OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
OVER	1 0		
3	6	±0.5	±0.5
6	3C	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	

外形寸法		外形寸法 許容差	取付寸法 許容差
を超え	以下		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	

MASS APPROX. 12 kg

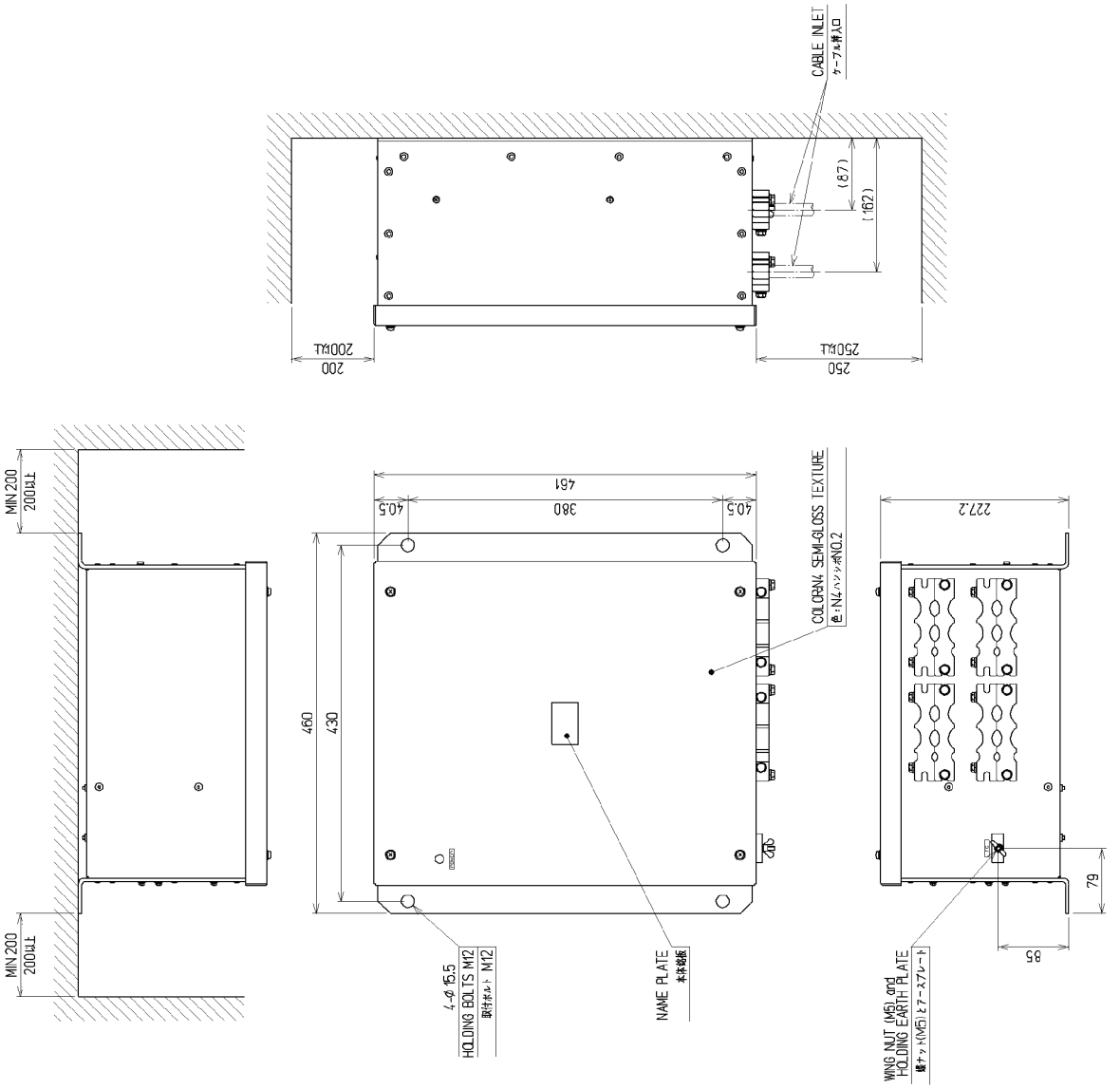
UNIT mm

質量 約 12 kg

単位 mm

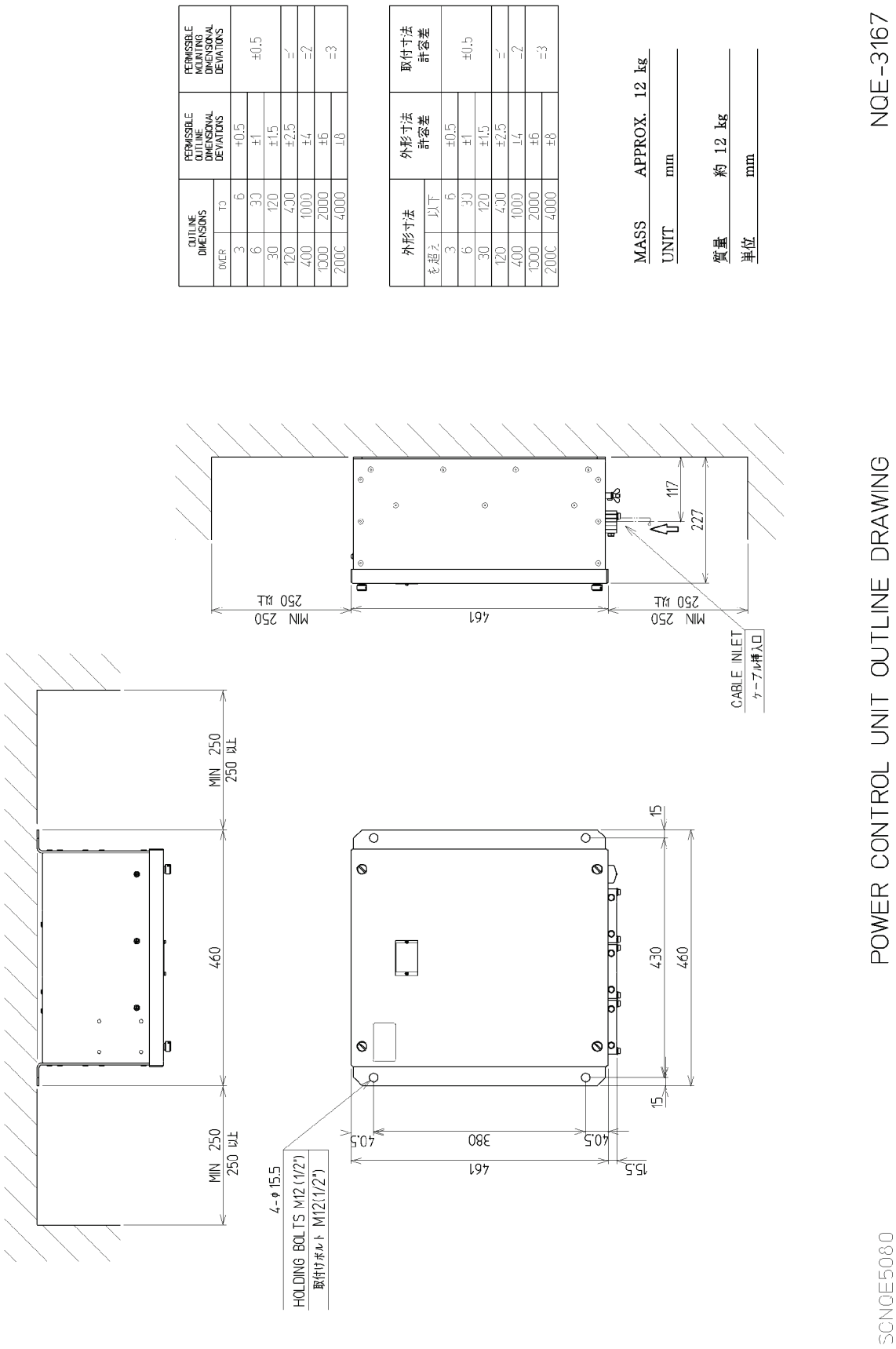
NQE-3141-8A

INTERSWITCH UNIT OUTLINE DRAWING



SCNQE3085

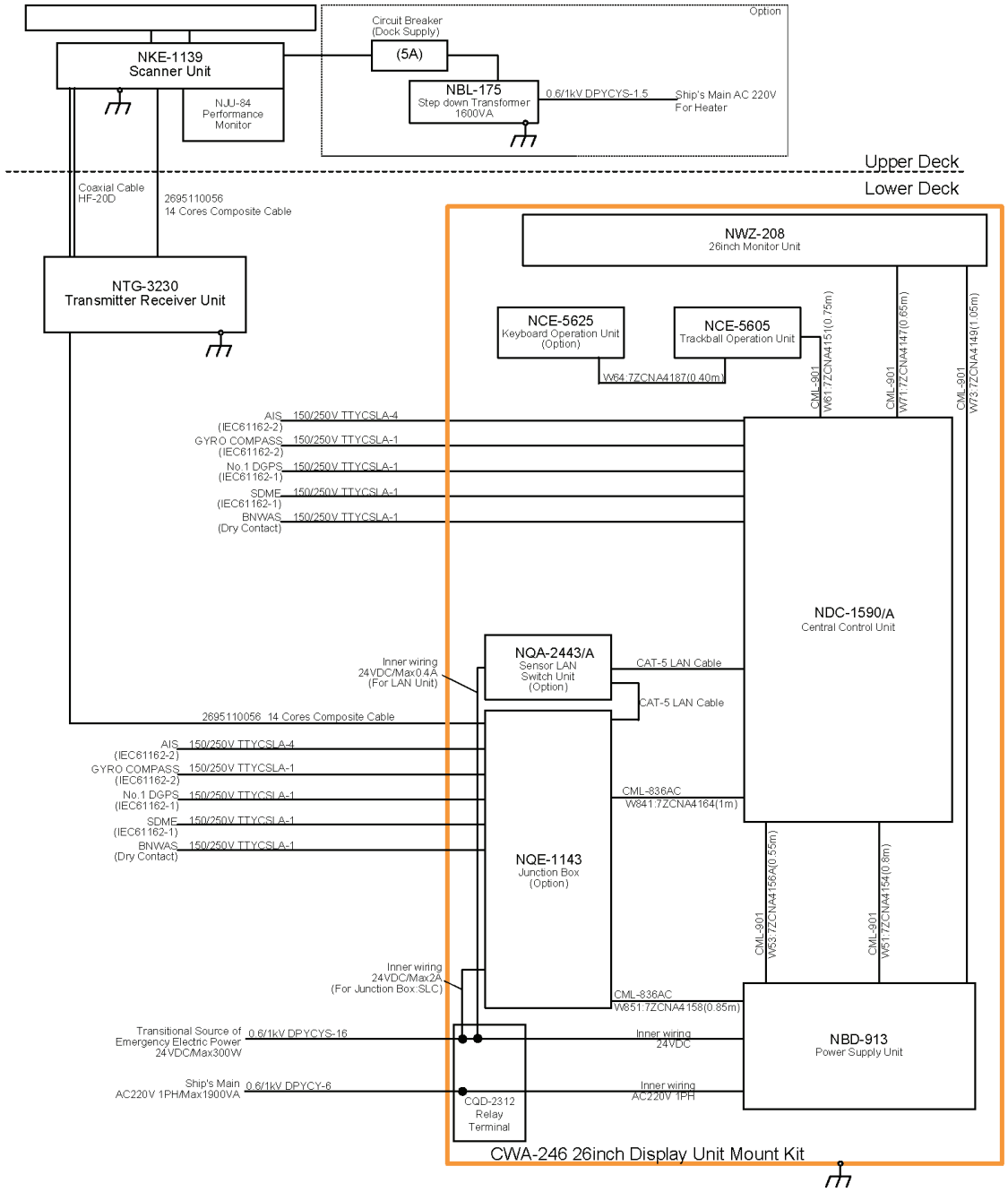
8.1.33 NQE-3167 Power Control Unit Outline Drawings (Optional)



8.2 General System Diagrams

8.2.1 JMR-9230-S3 General System Diagrams

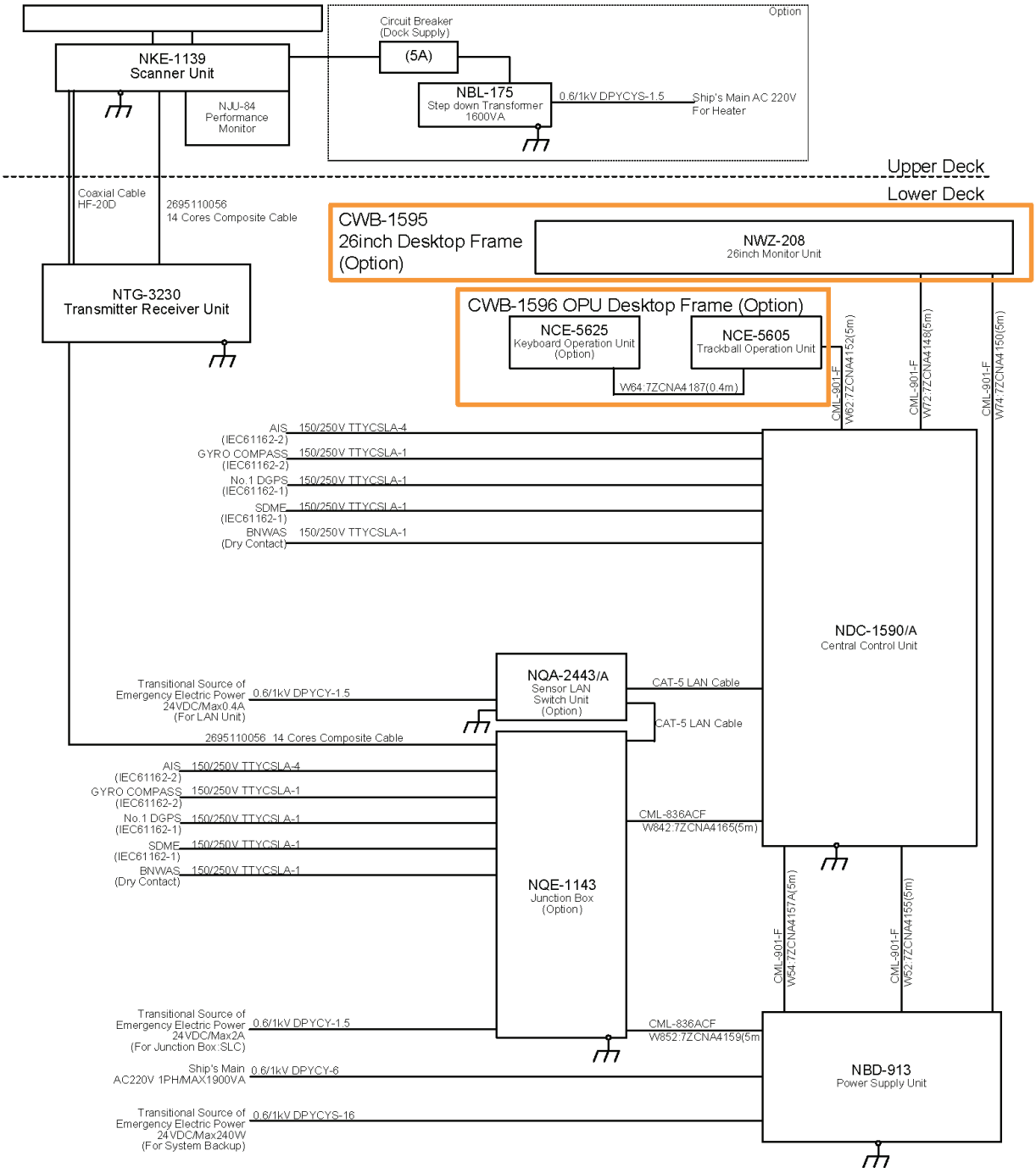
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR
SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9230-S3 RADAR

Desktop type

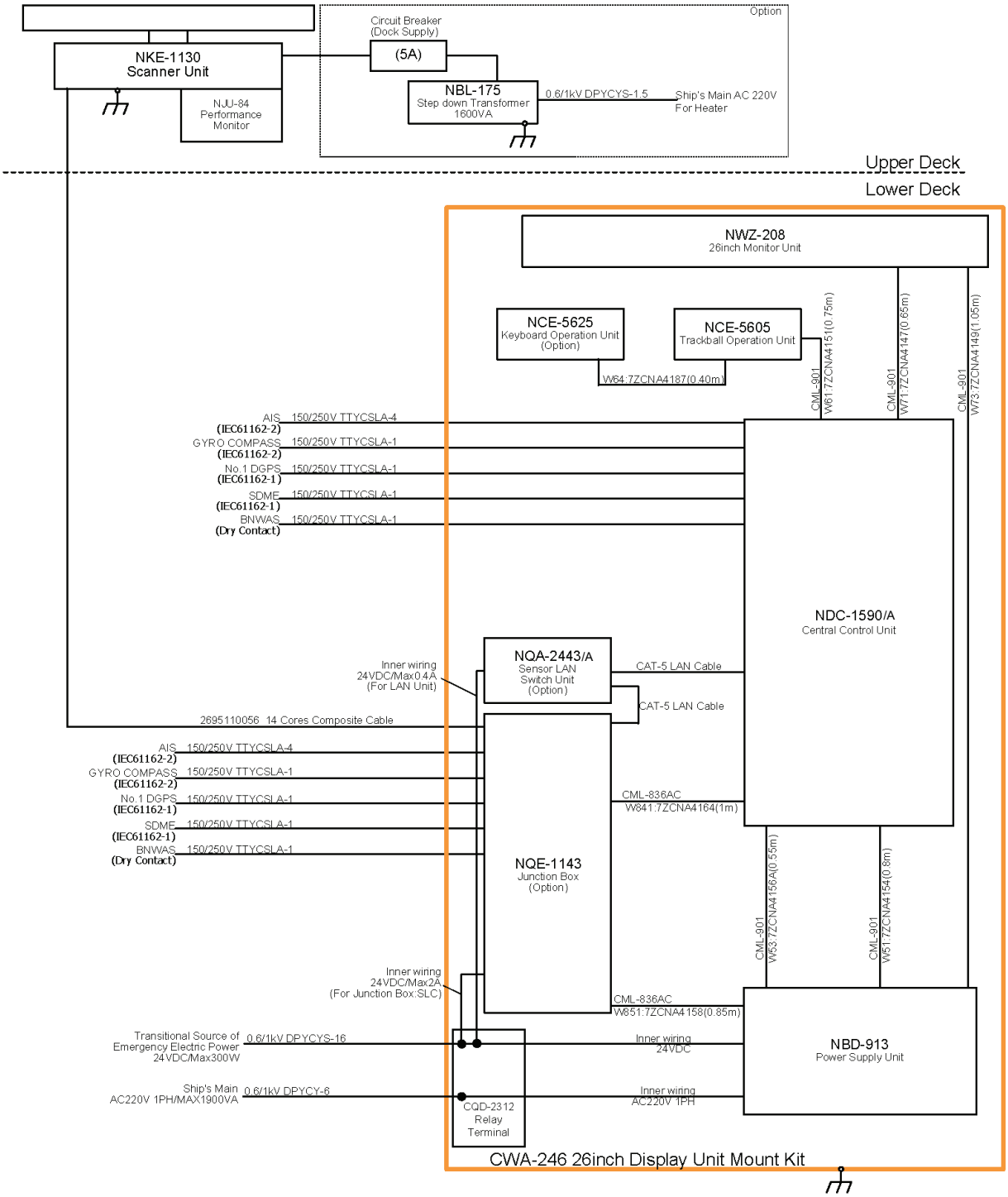


NOTE:ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR
SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9230-S3 RADAR

8.2.2 JMR-9230-S General System Diagrams

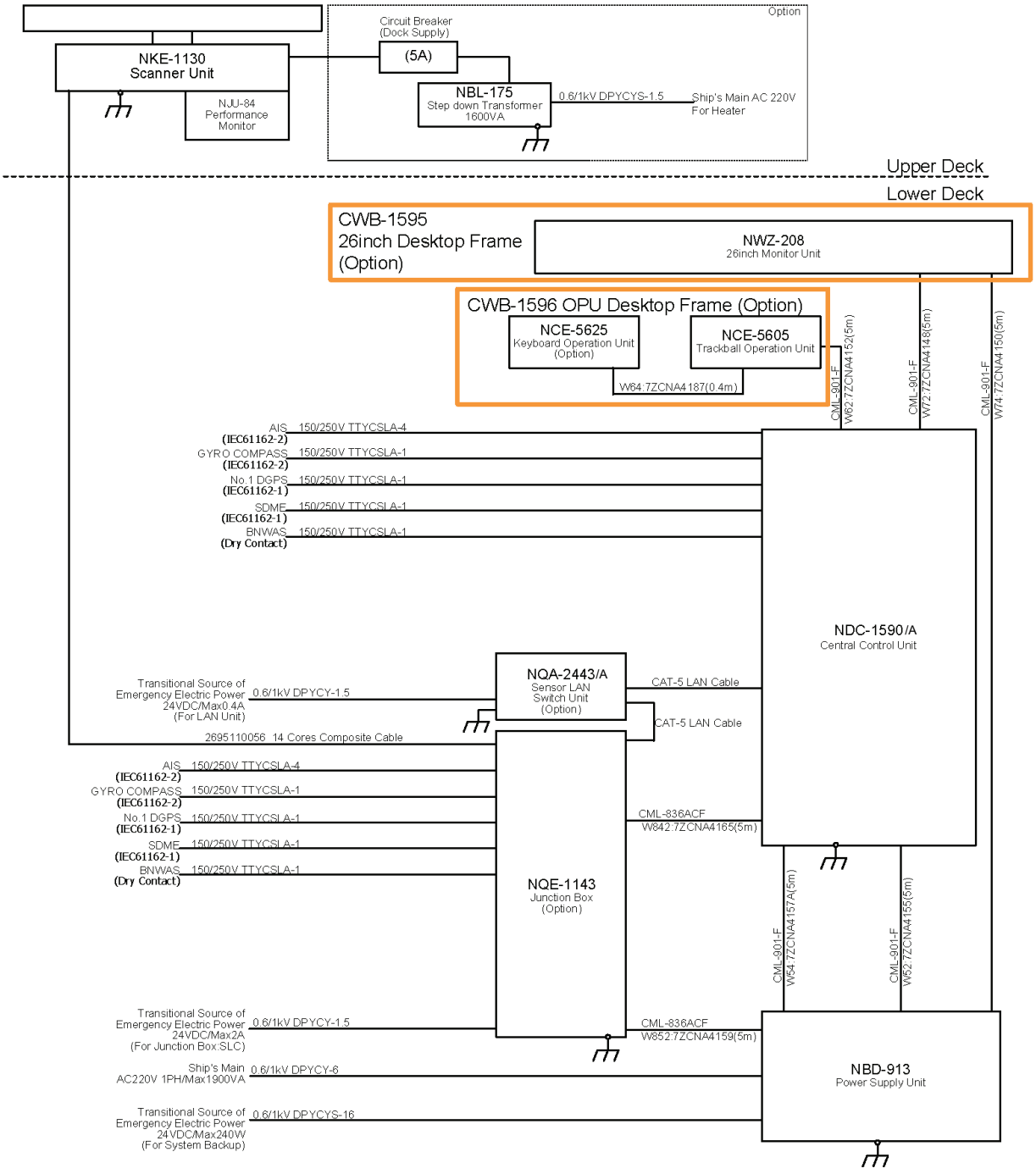
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR
SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9230-S RADAR

Desktop type

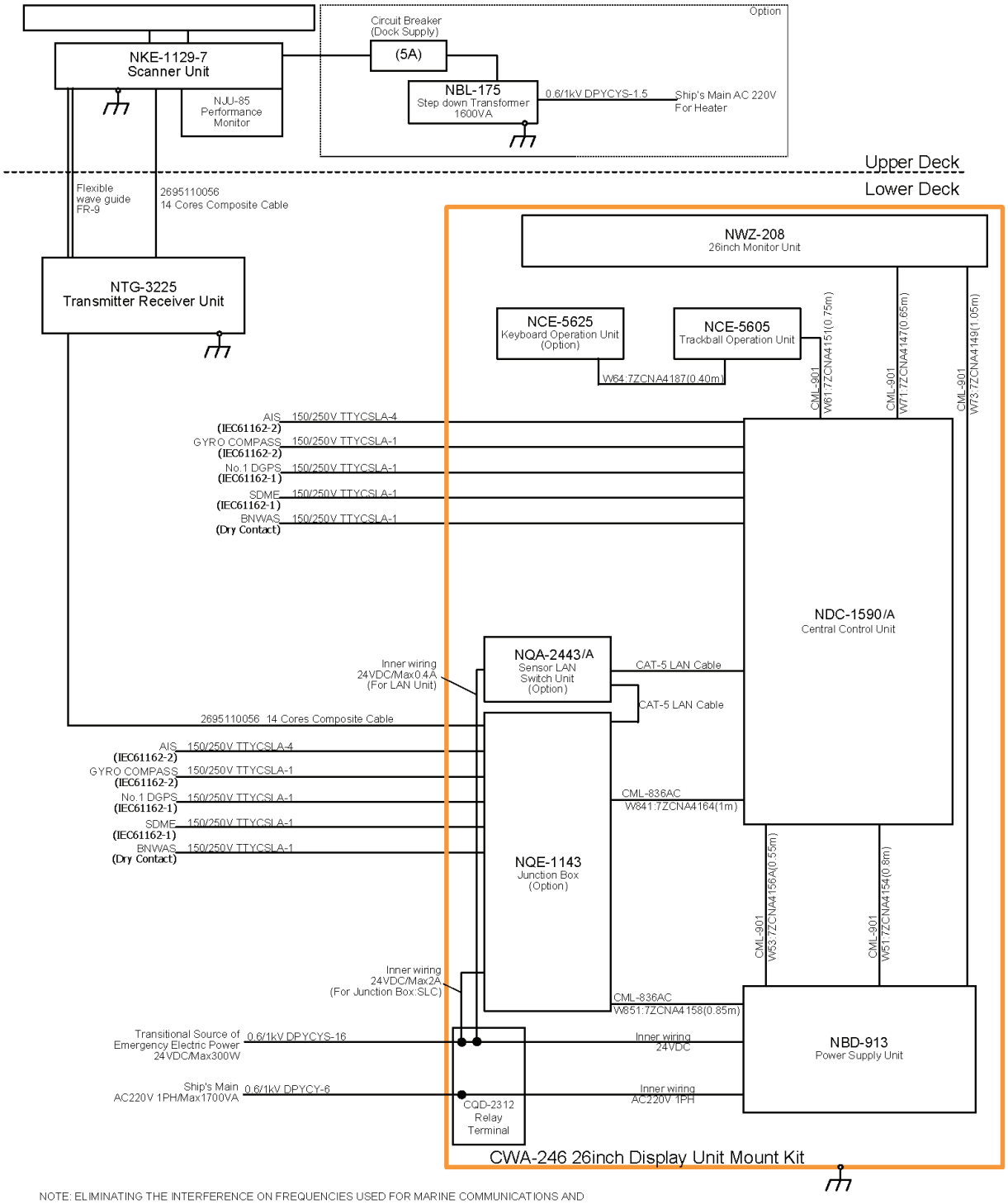


NOTE:ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR
SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9230-S RADAR

8.2.3 JMR-9225-7X3 General System Diagrams

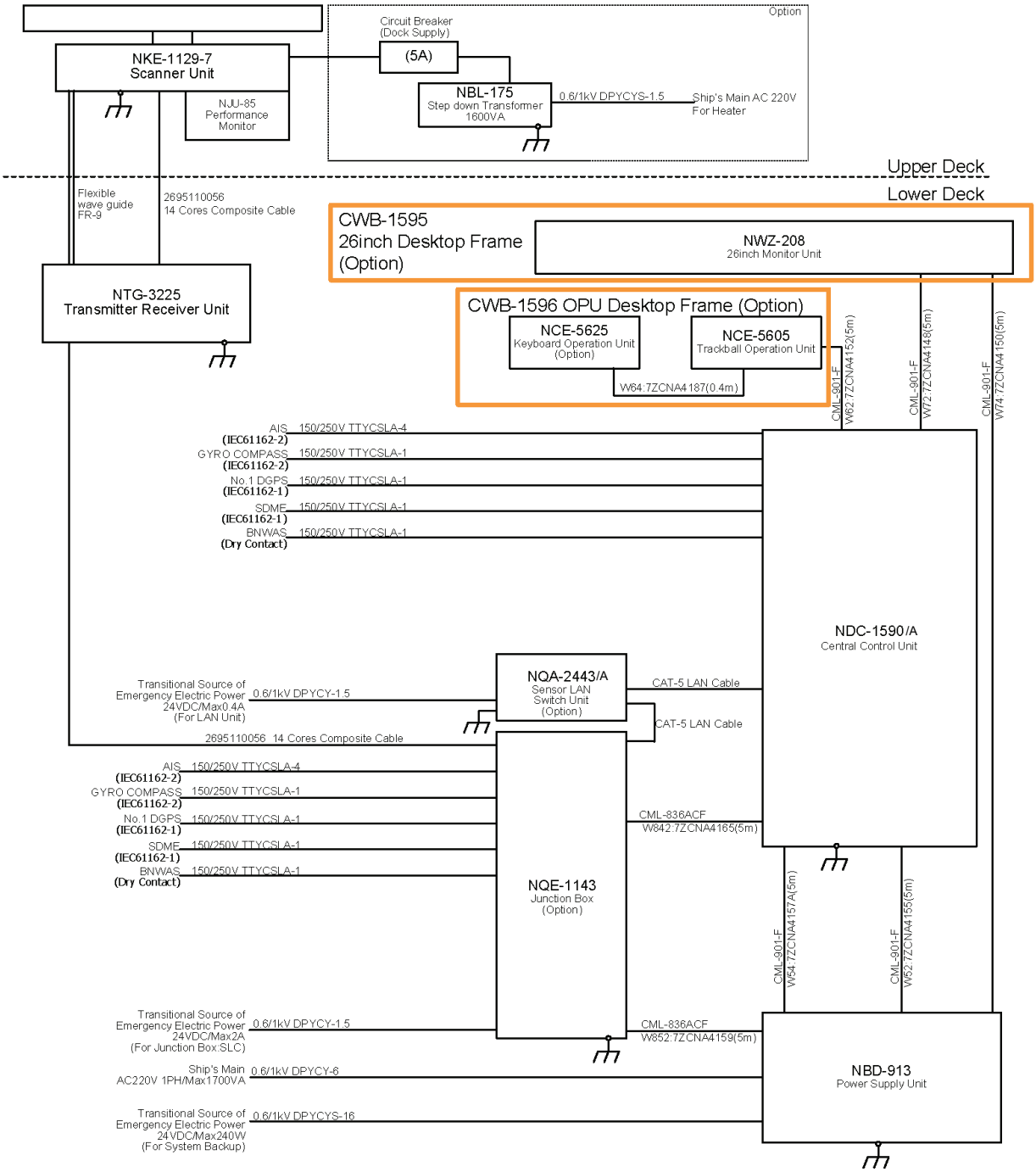
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR
SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9225-7X3 RADAR

Desktop type

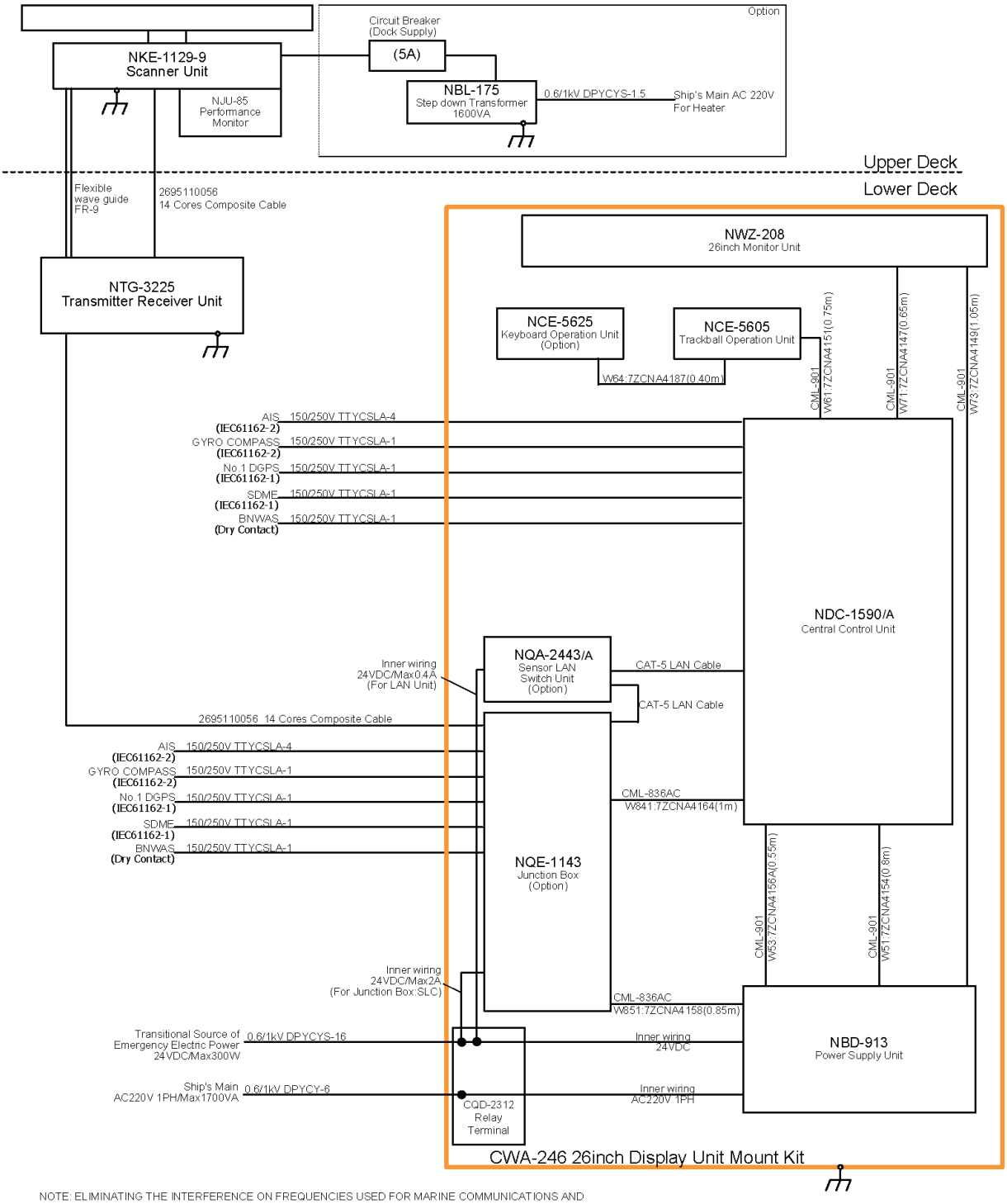


NOTE:ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR
SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9225-7X3 RADAR

8.2.4 JMR-9225-9X3 General System Diagrams

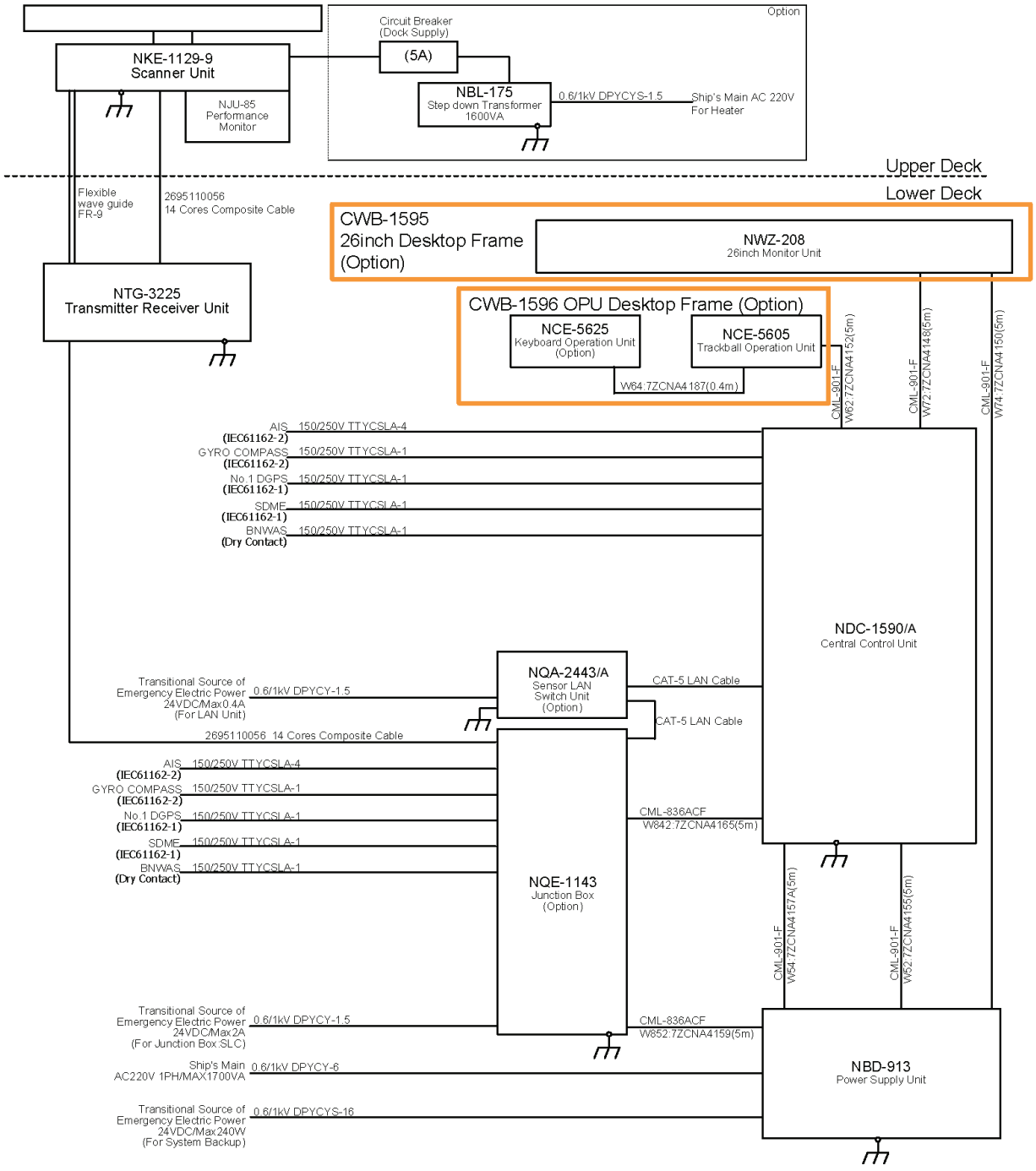
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR
SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9225-9X3 RADAR

Desktop type

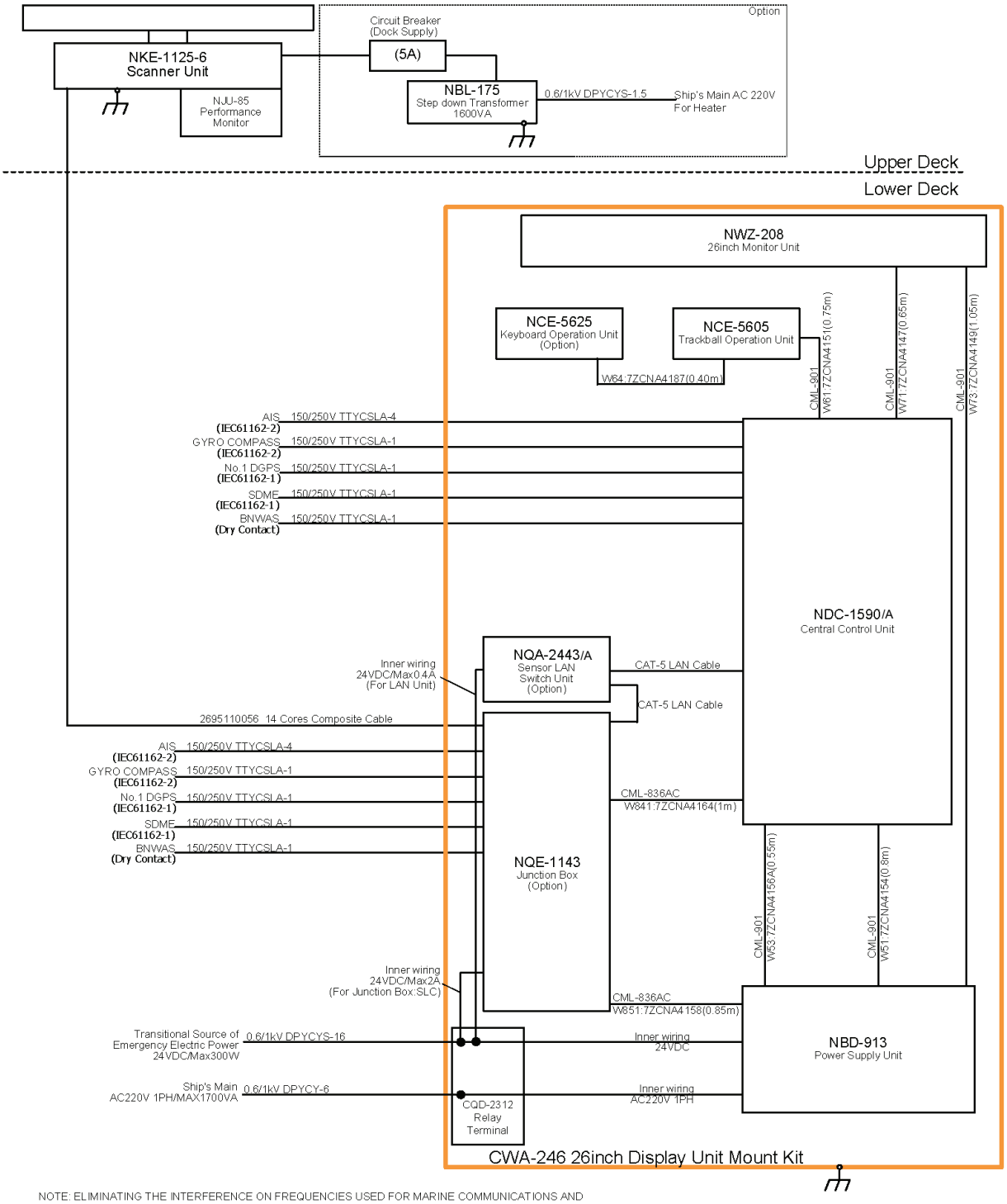


NOTE:ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9225-9X3 RADAR

8.2.5 JMR-9225-6X General System Diagrams

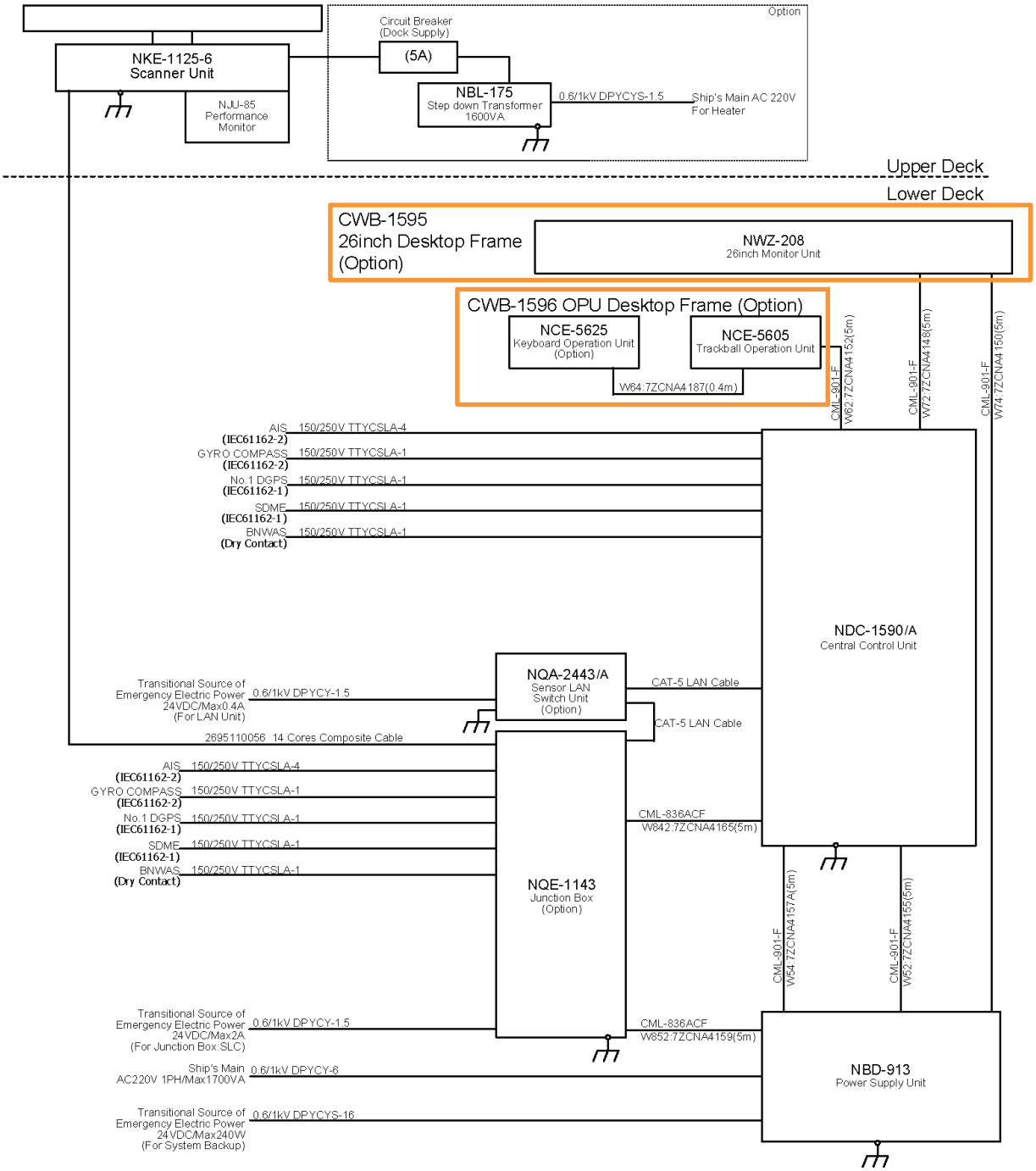
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR
SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9225-6X RADAR

Desktop type

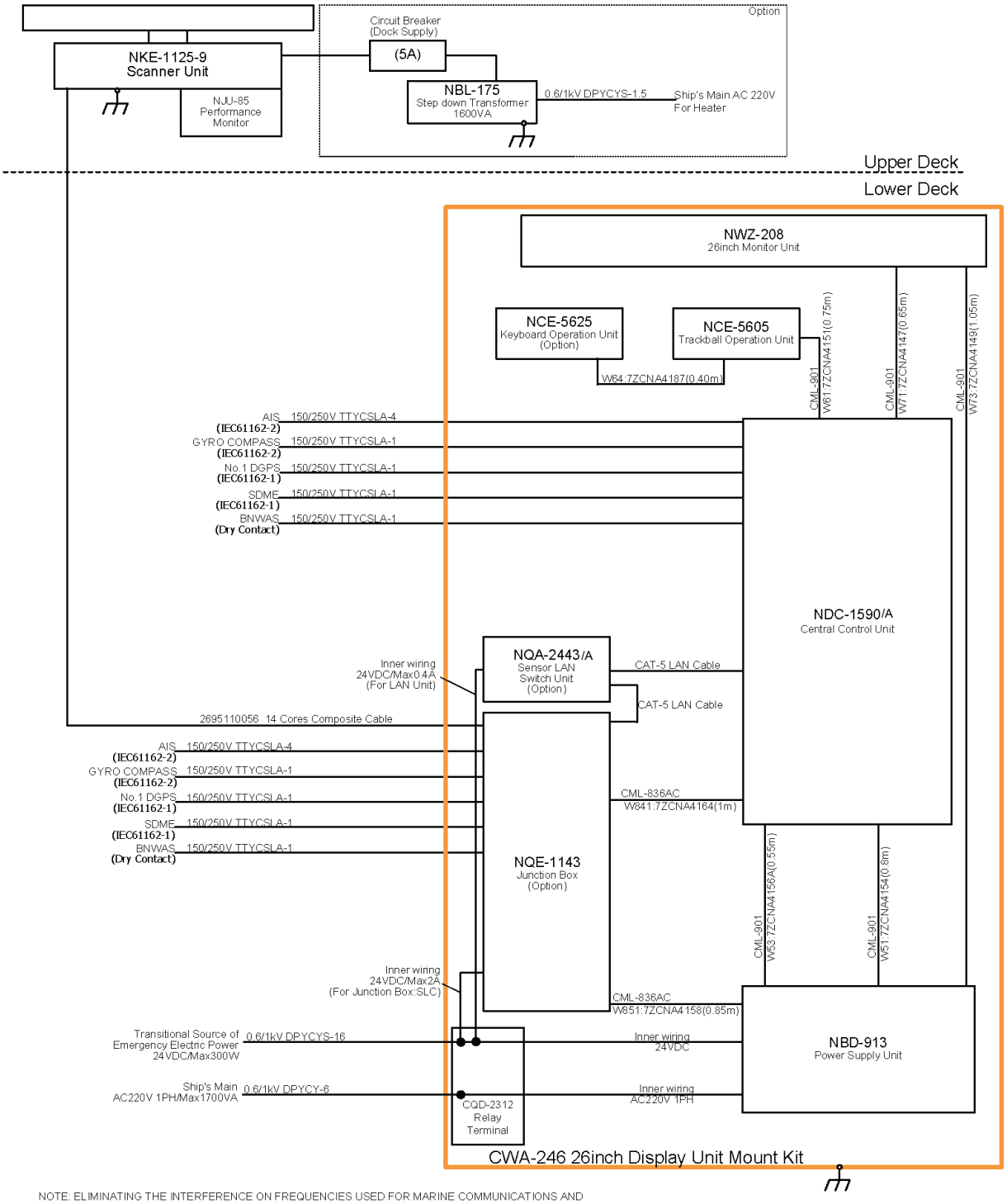


NOTE:ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9225-6X RADAR

8.2.6 JMR-9225-9X General System Diagrams

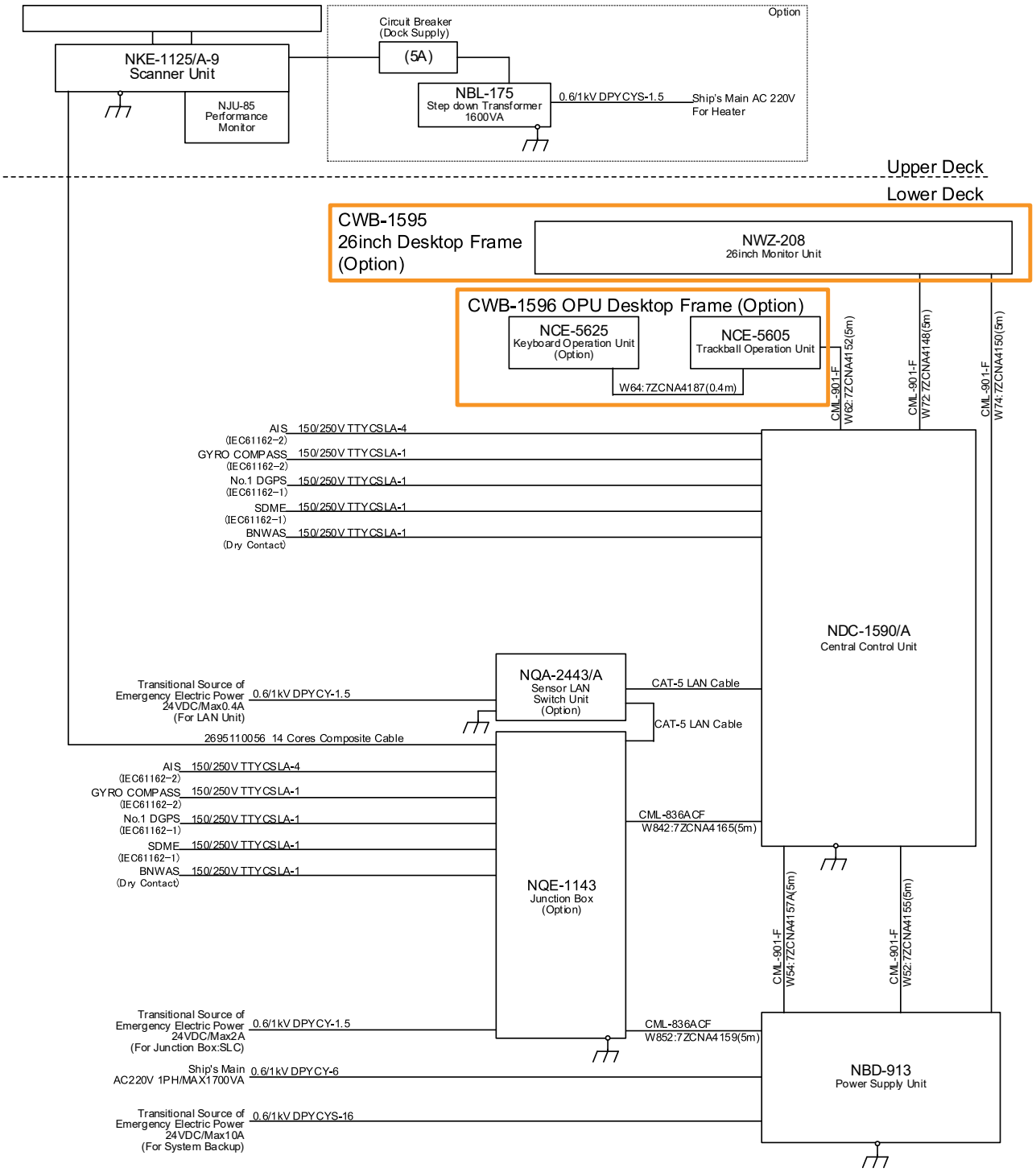
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR
SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9225-9X RADAR

Desktop type

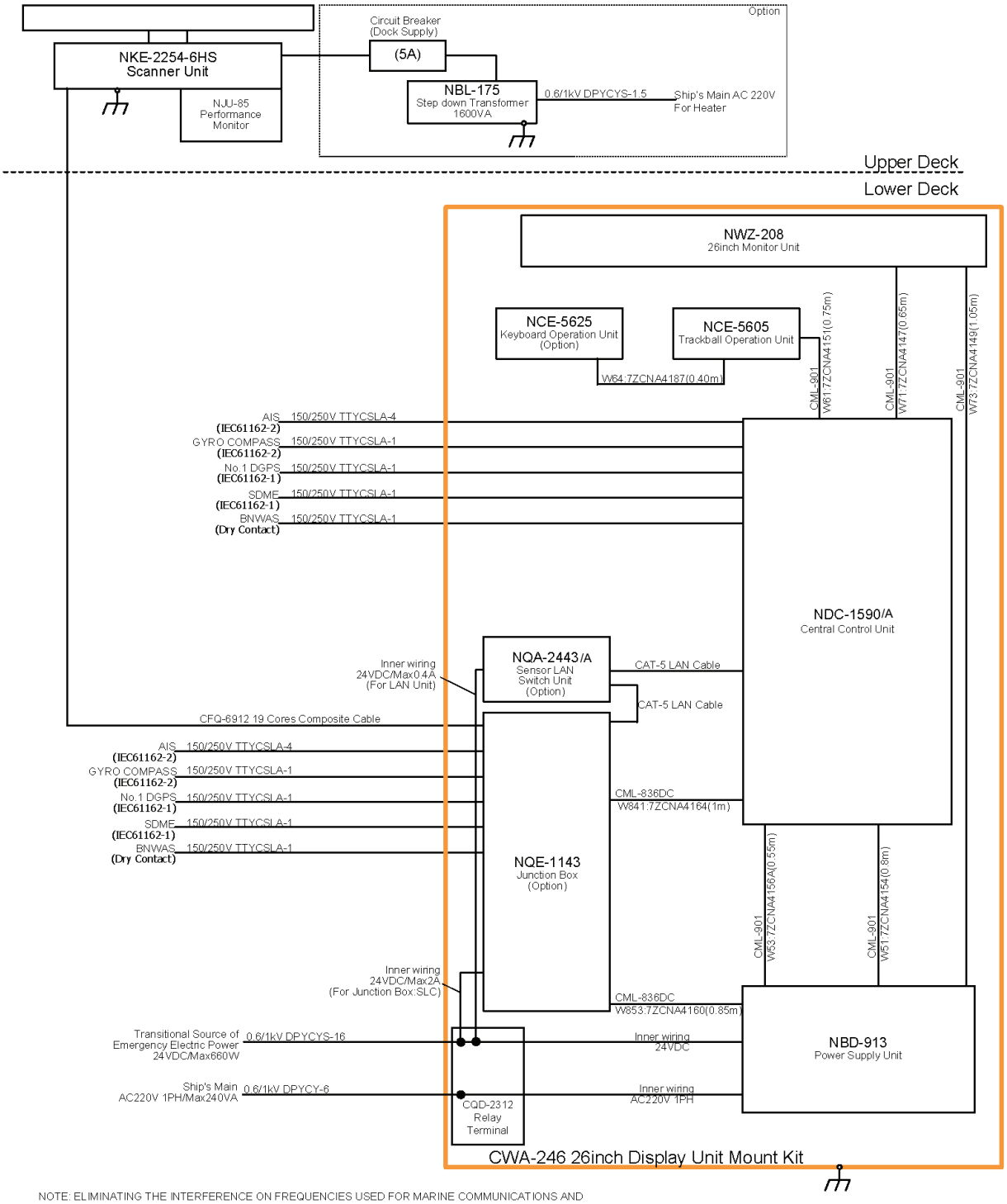


NOTE:ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9225-9X RADAR

8.2.7 JMR-9225-6XH General System Diagrams

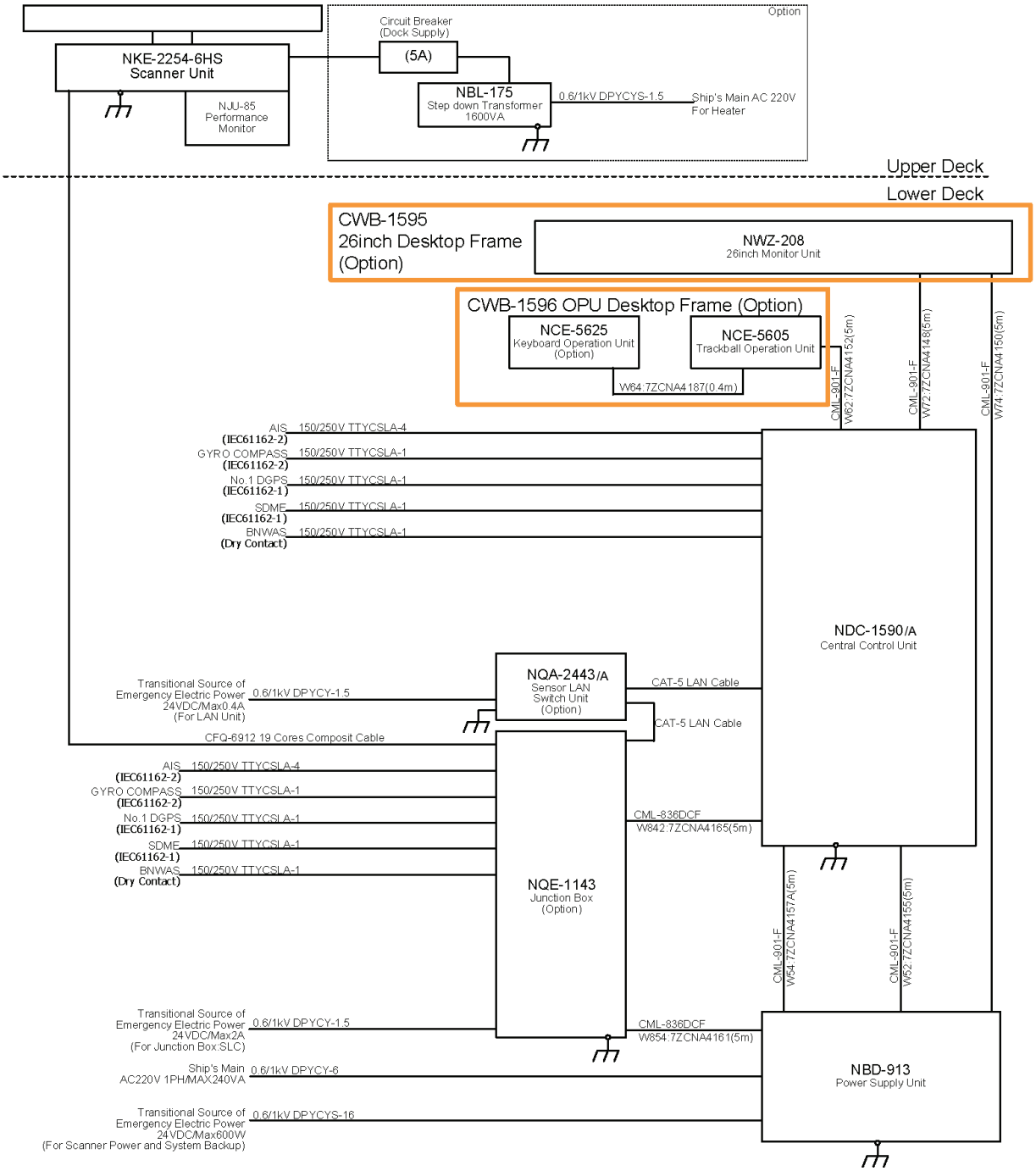
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR
SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9225-6XH RADAR

Desktop type

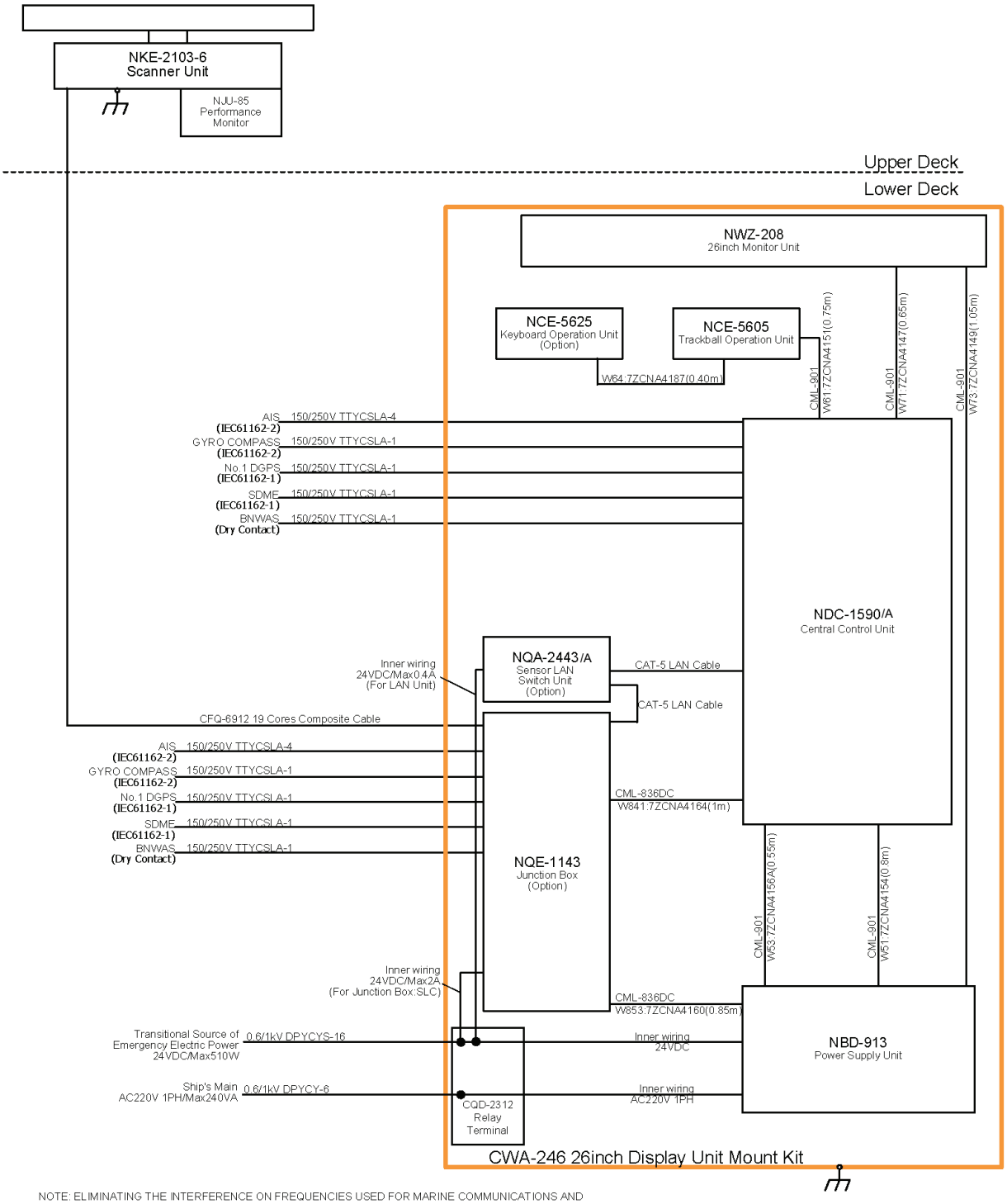


NOTE:ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9225-6XH RADAR

8.2.8 JMR-9210-6X General System Diagrams

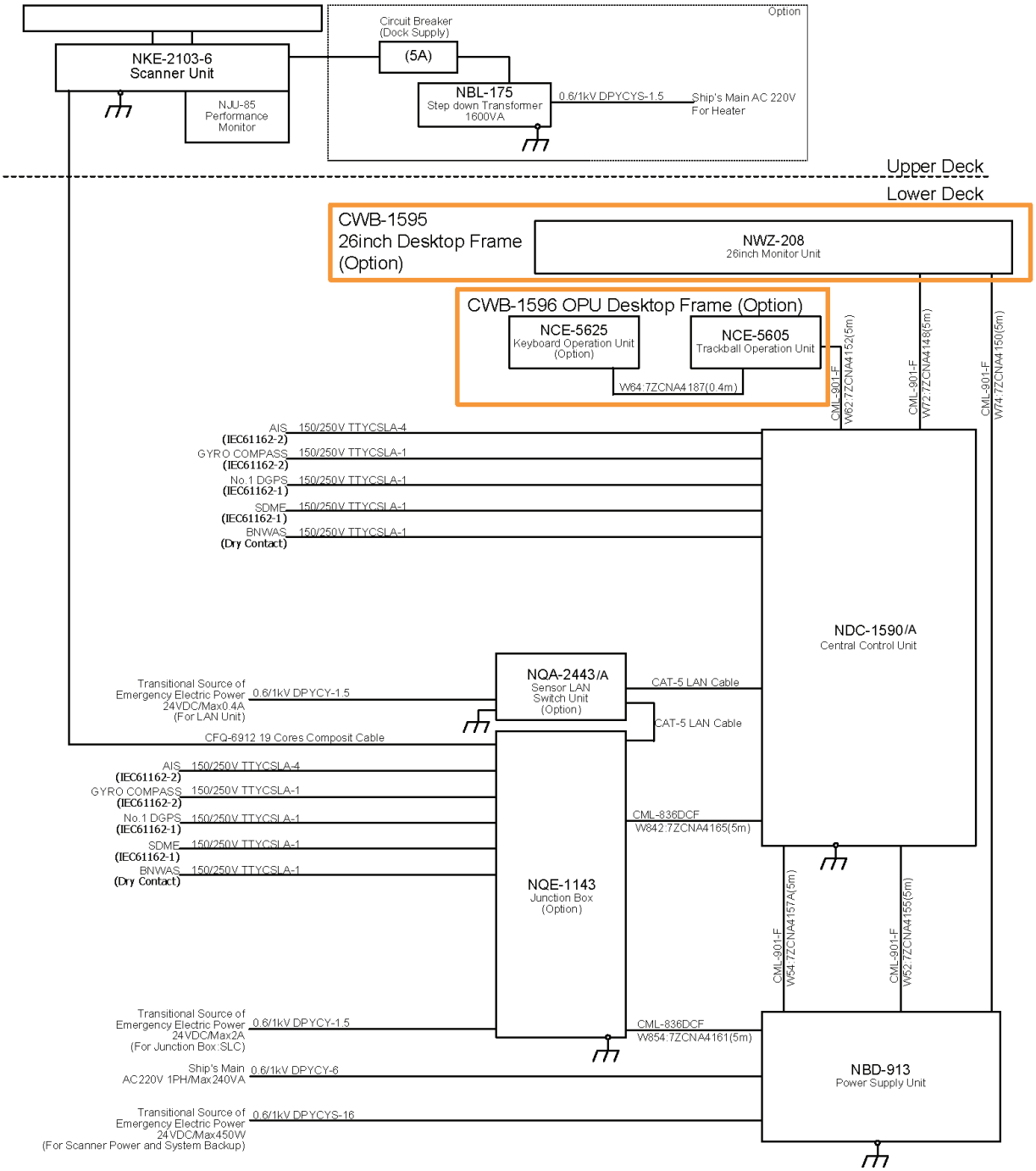
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR
SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9210-6X RADAR

Desktop type

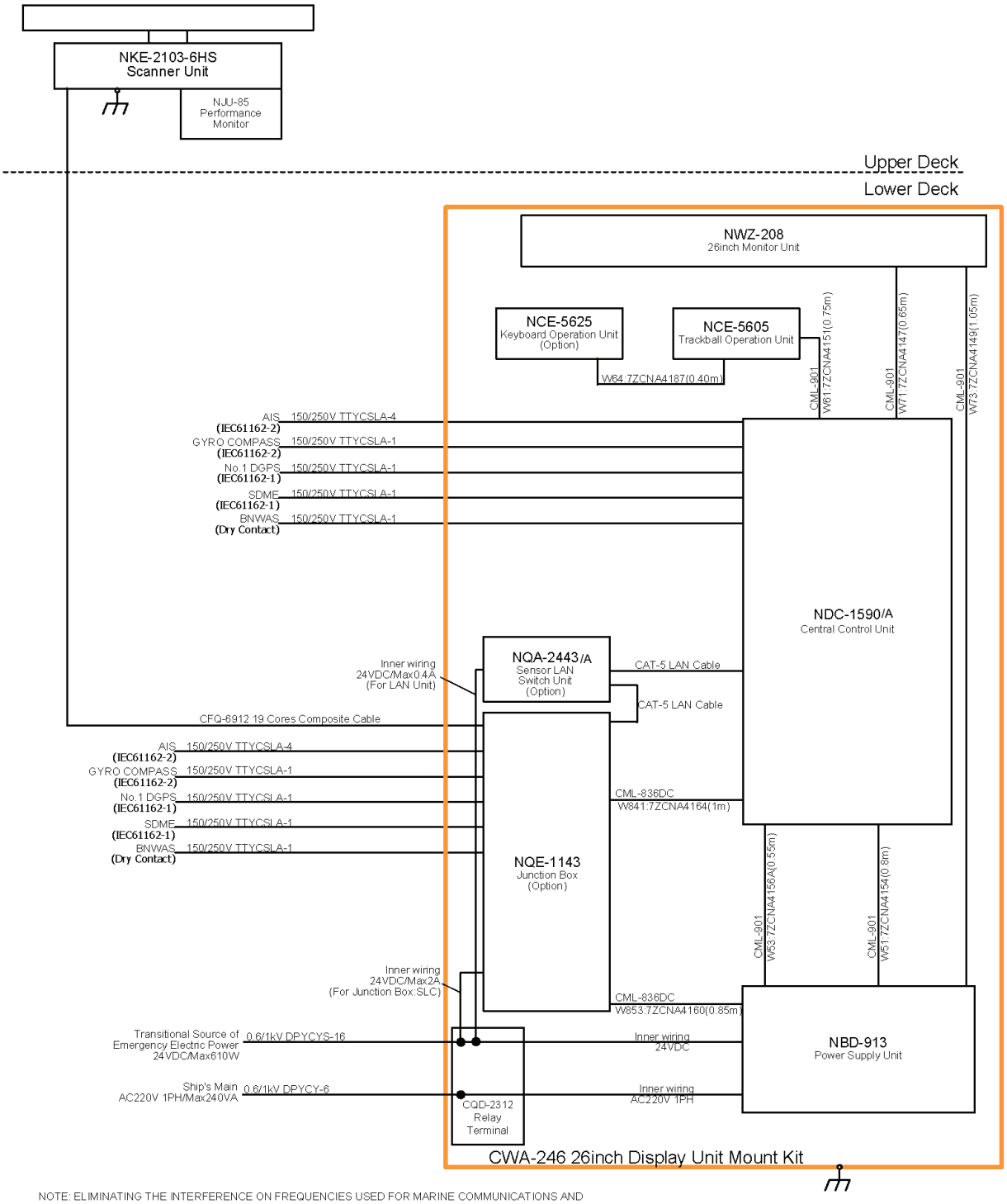


NOTE:ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9210-6X RADAR

8.2.9 JMR-9210-6XH General System Diagrams

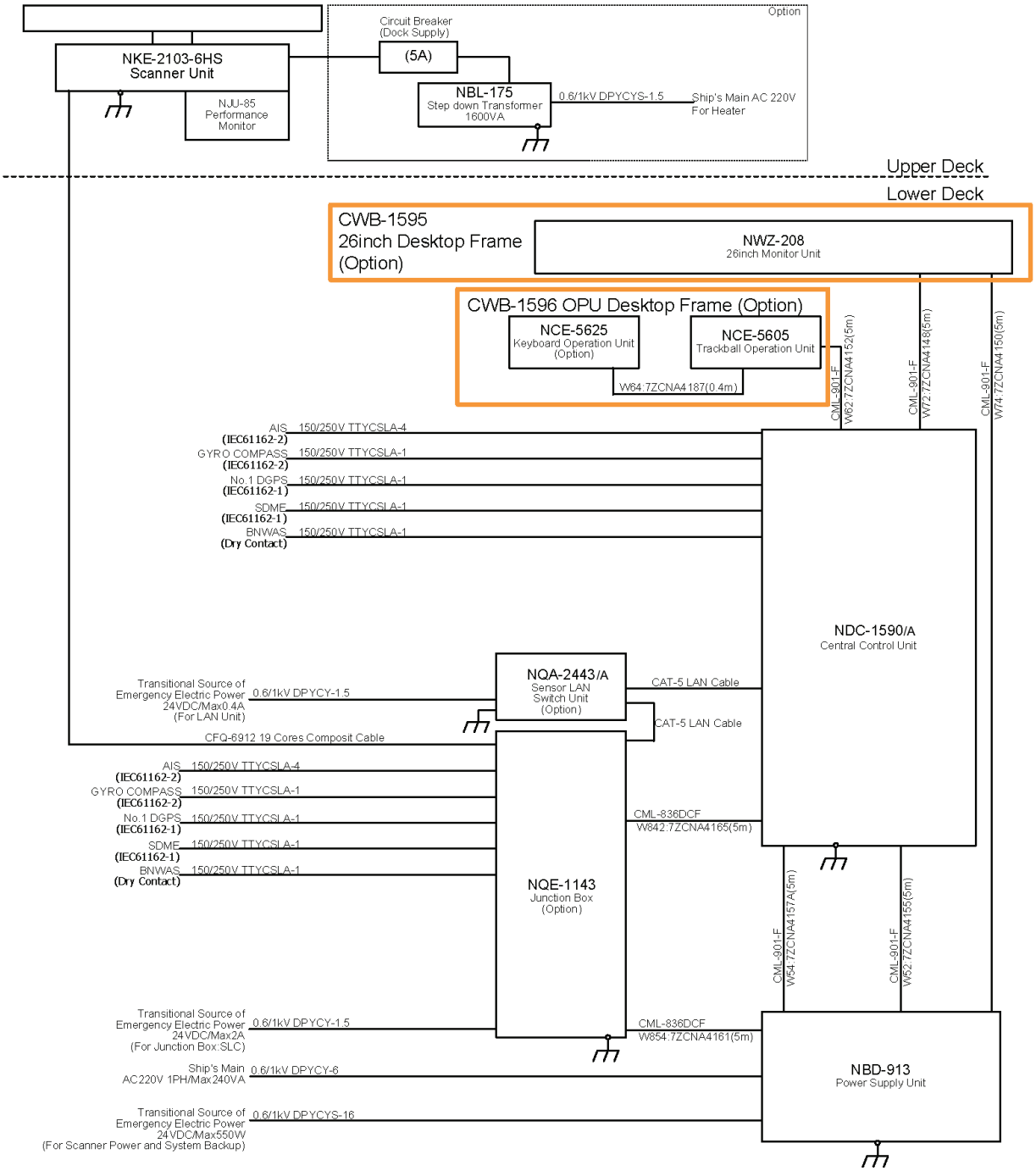
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR
SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9210-6XH RADAR

Desktop type

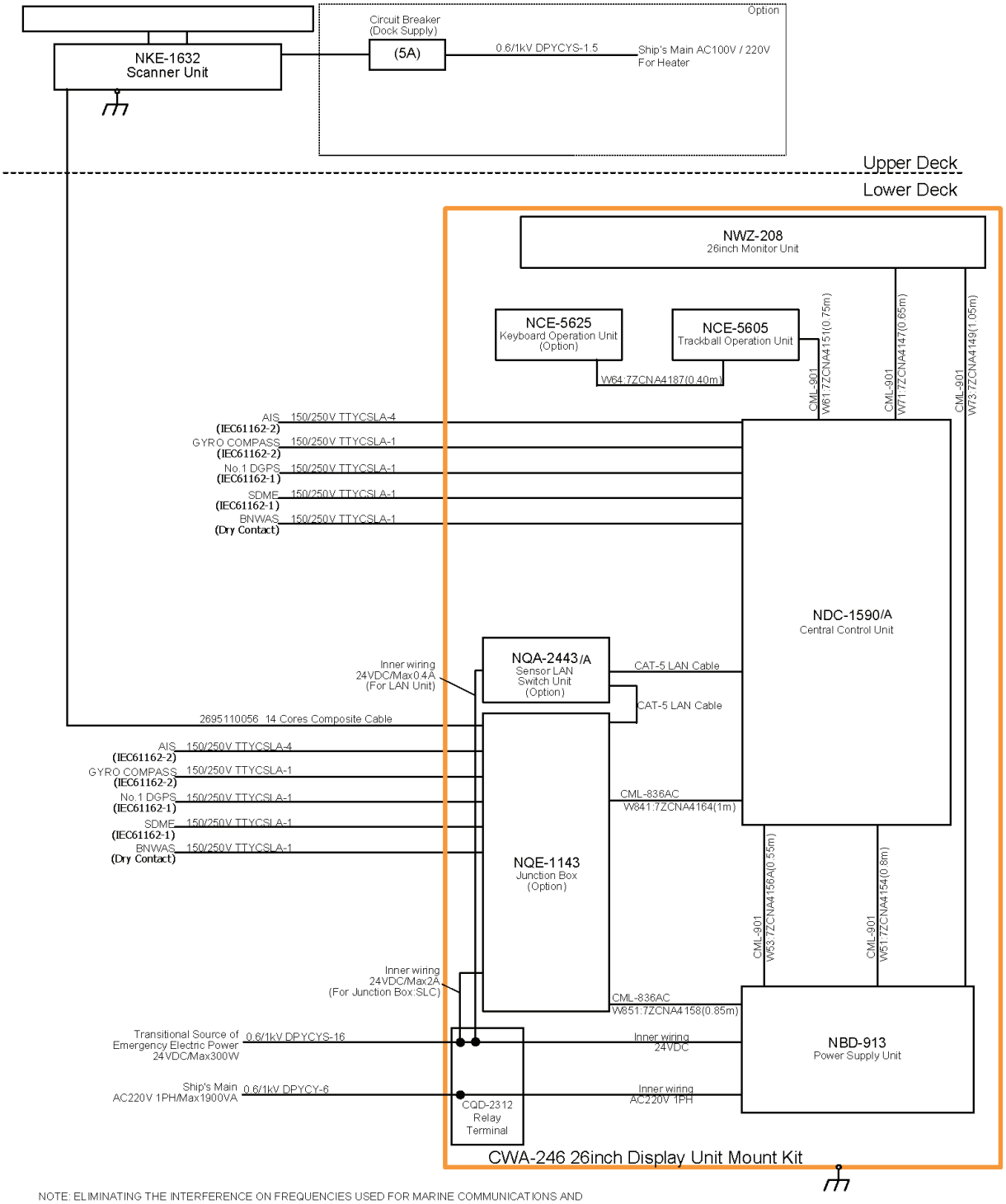


NOTE:ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9210-6XH RADAR

8.2.10 JMR-9272-S General System Diagrams

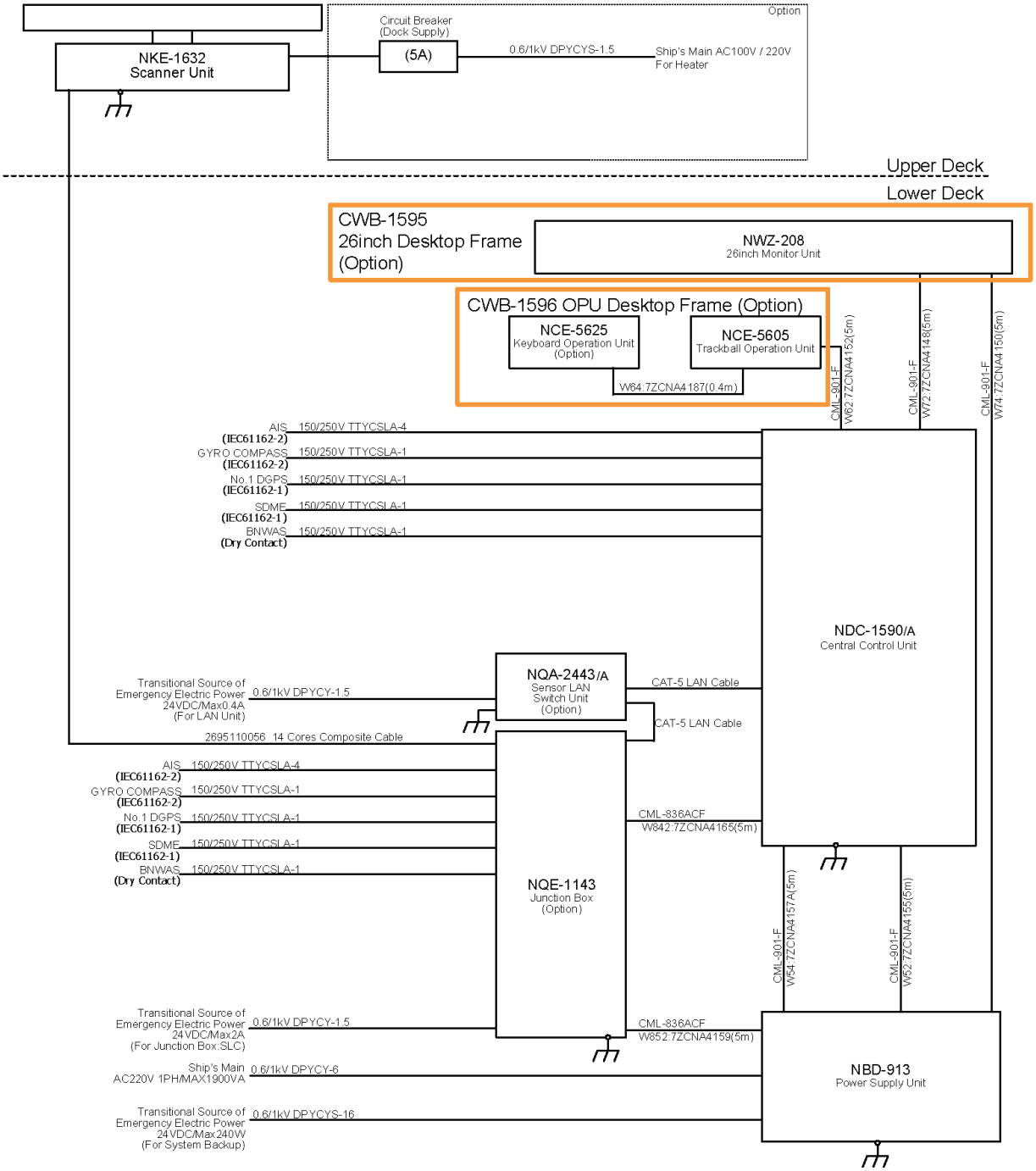
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR
SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9272-S RADAR

Desktop type

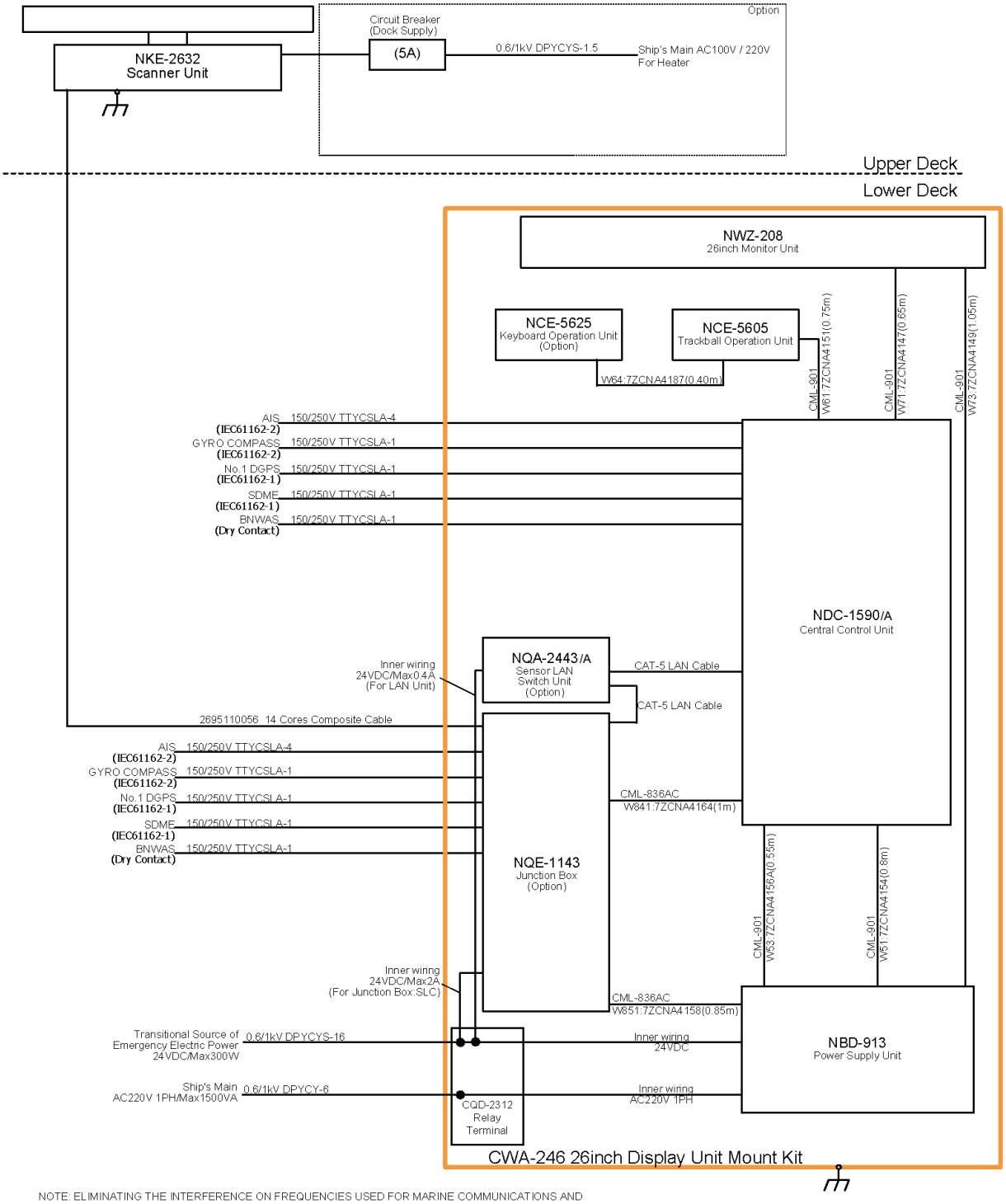


NOTE:ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9272-S RADAR

8.2.11 JMR-9282-S General System Diagrams

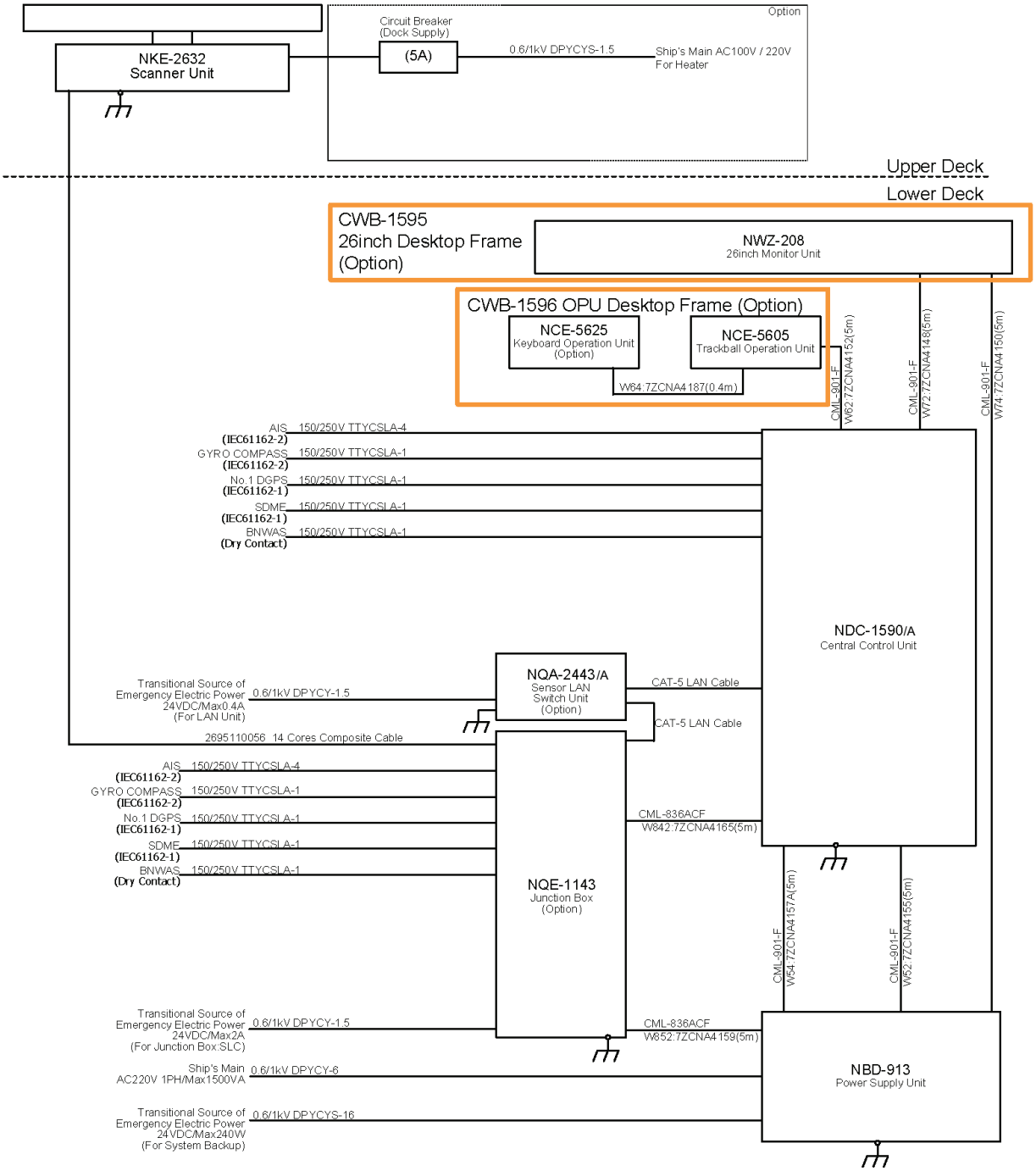
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR
SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9282-S RADAR

Desktop type

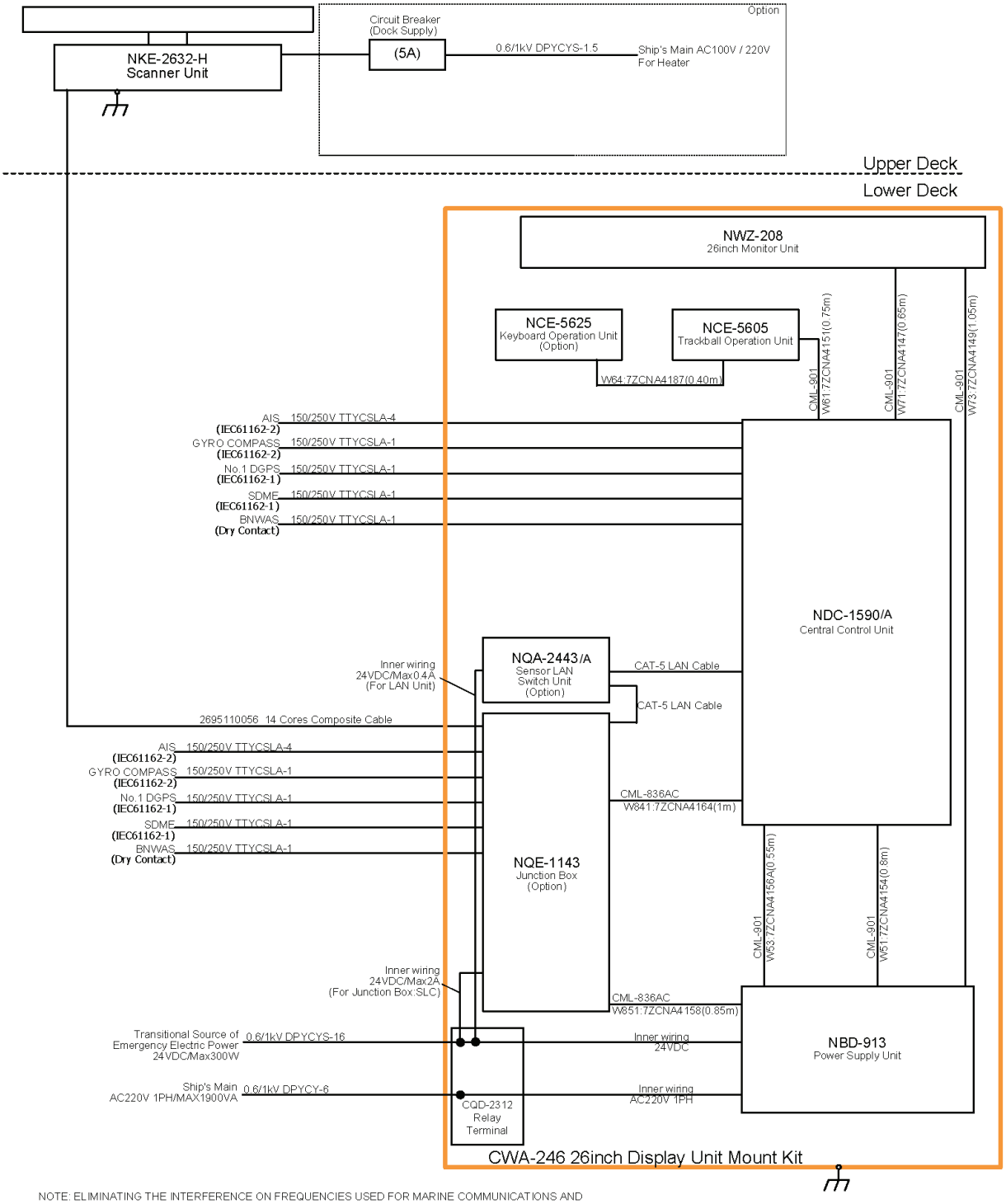


NOTE:ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9282-S RADAR

8.2.12 JMR-9282-SH General System Diagrams

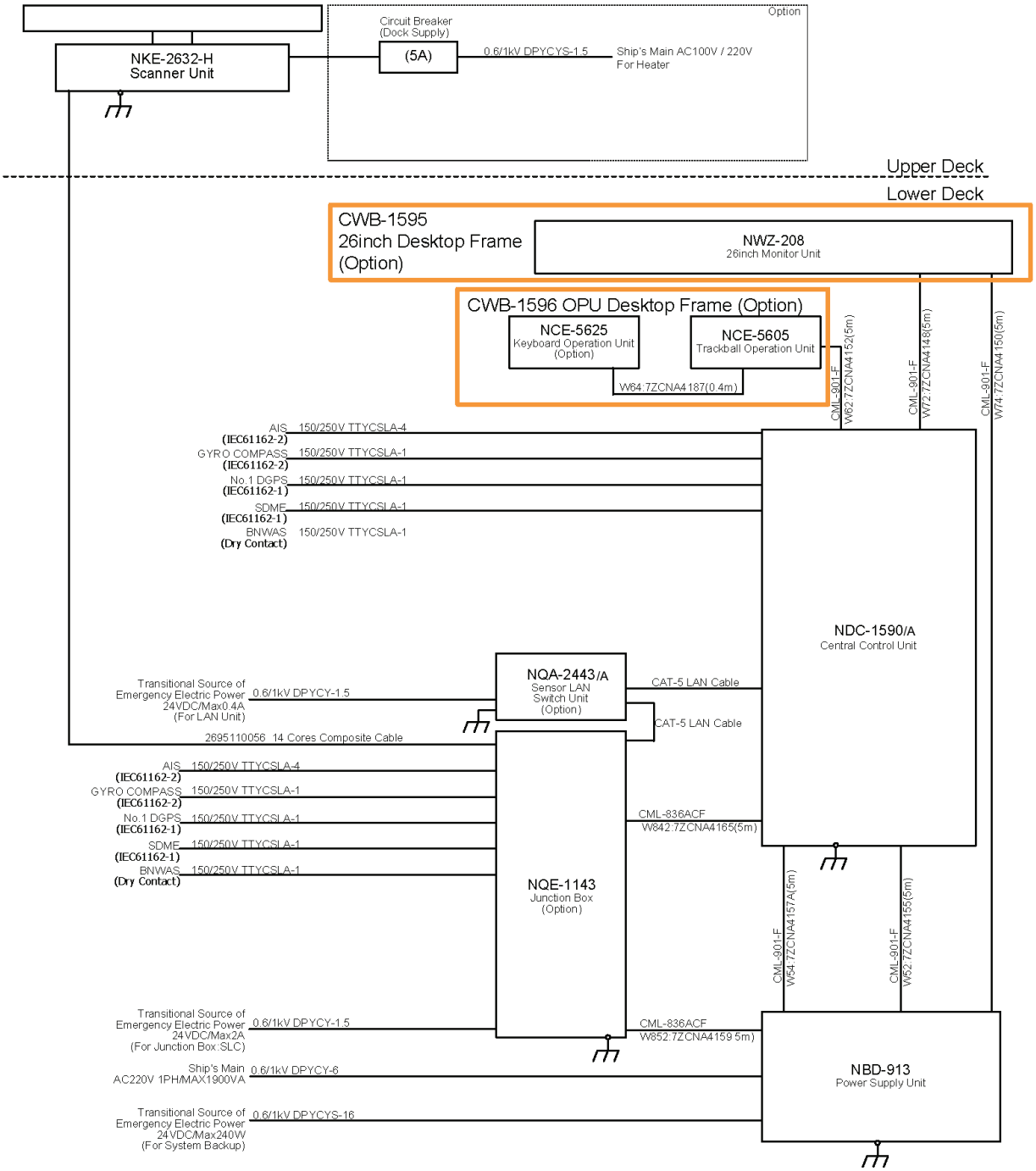
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR
SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9282-SH RADAR

Desktop type

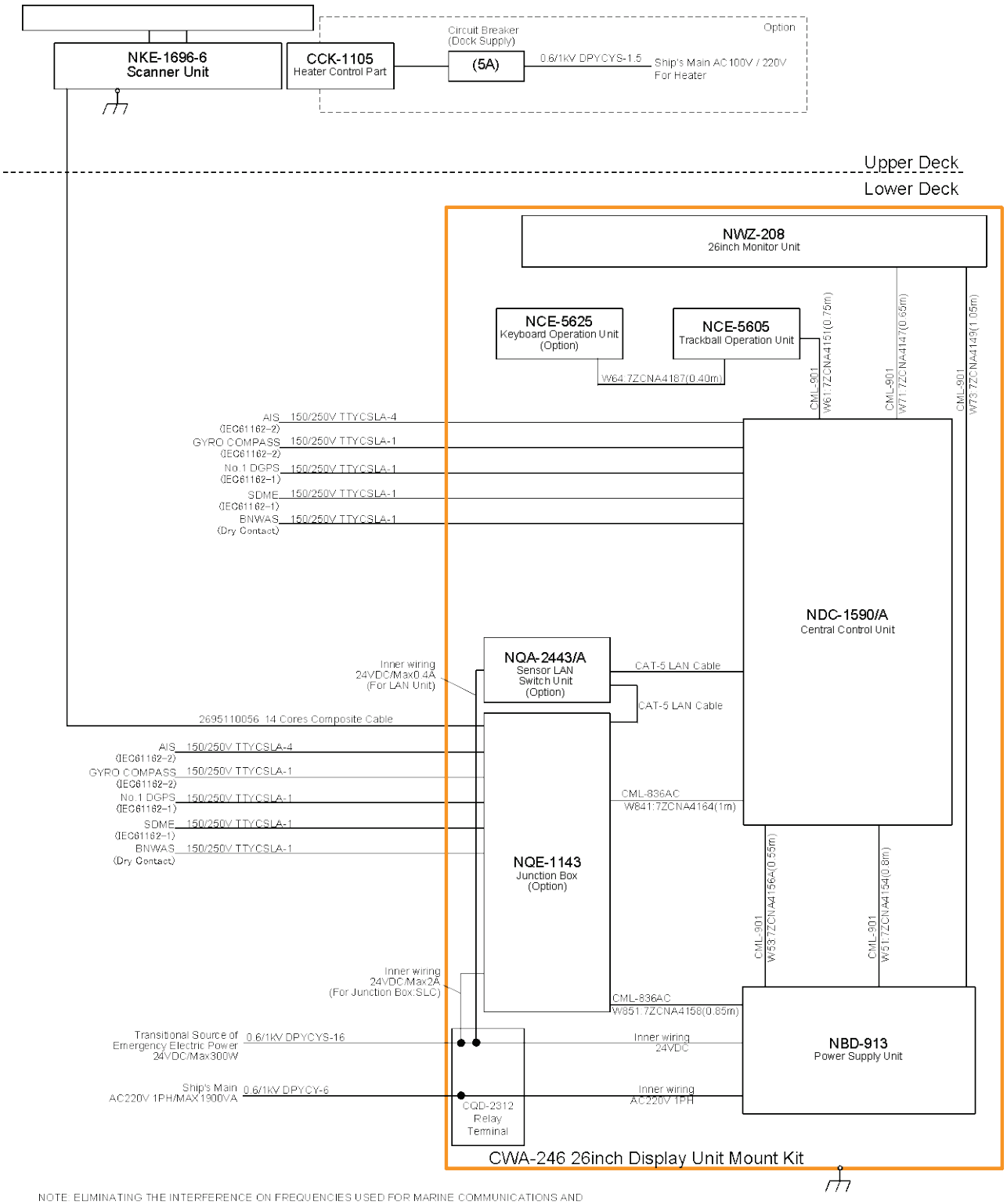


NOTE:ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9282-SH RADAR

8.2.13 JMR-9296-6X General System Diagrams

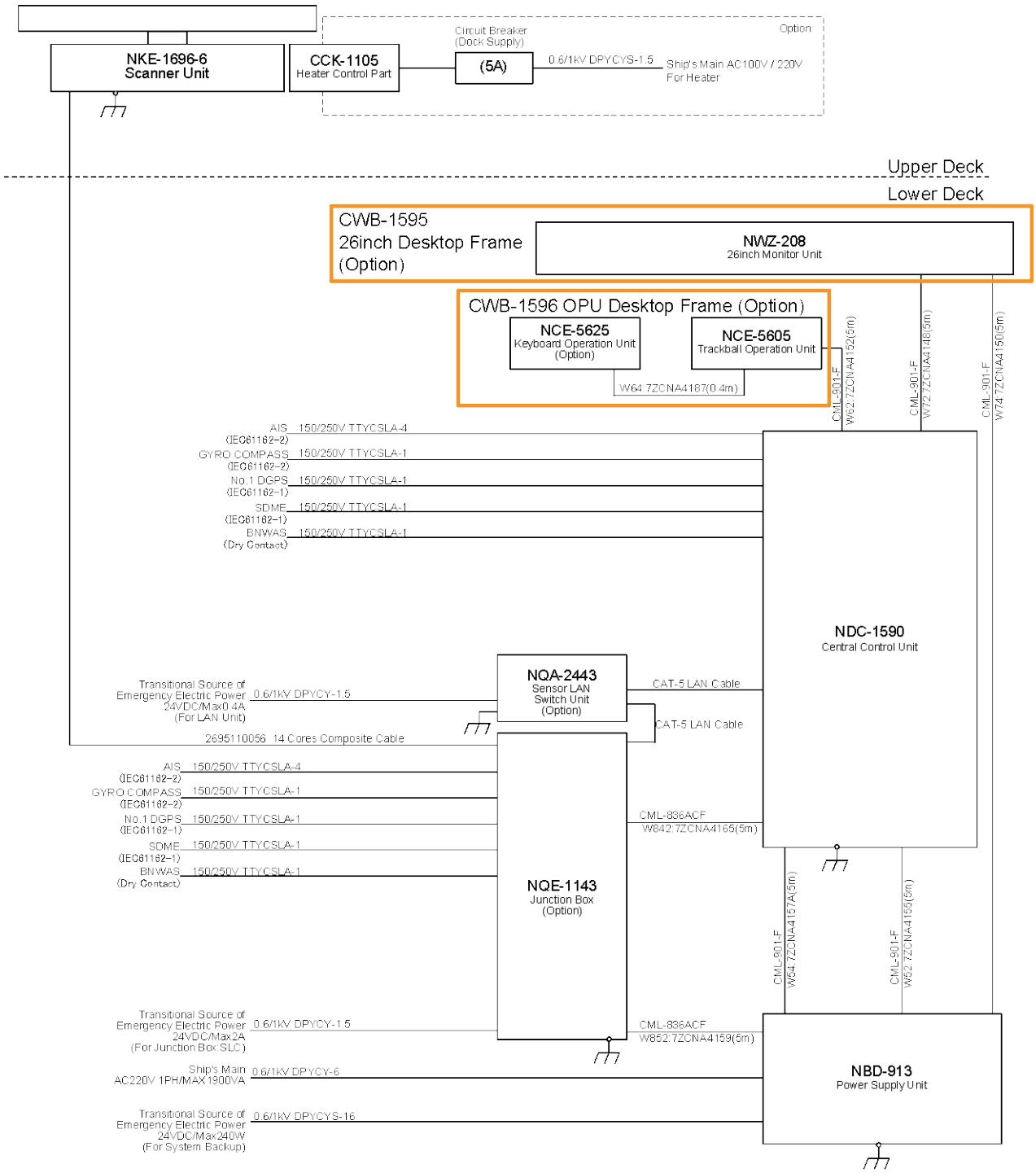
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER etc.)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9296-6X RADAR

Desktop type

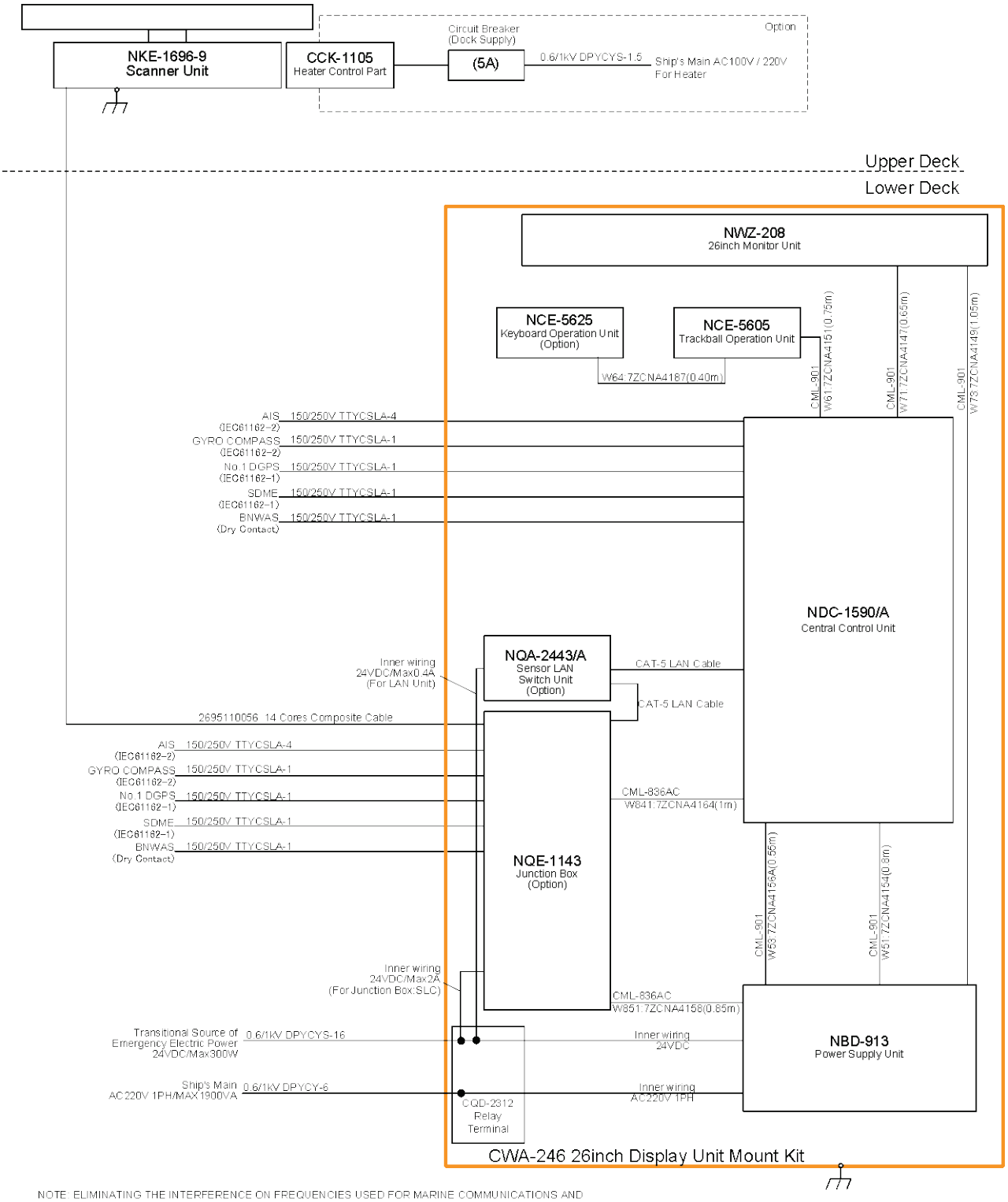


NOTE:ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR
SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9296-6X RADAR

8.2.14 JMR-9296-9X General System Diagrams

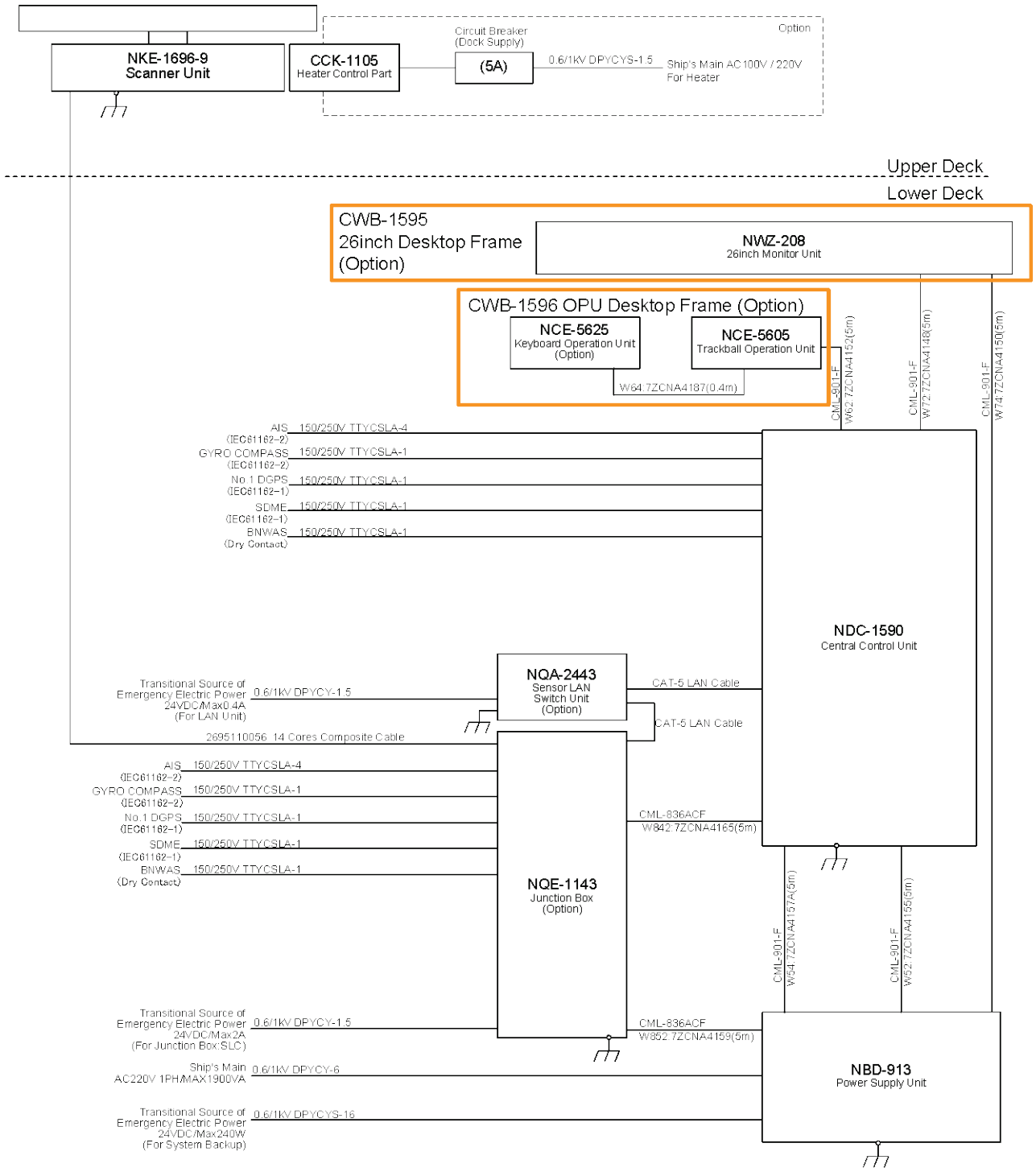
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc.)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR
SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-9296-9X RADAR

Desktop type

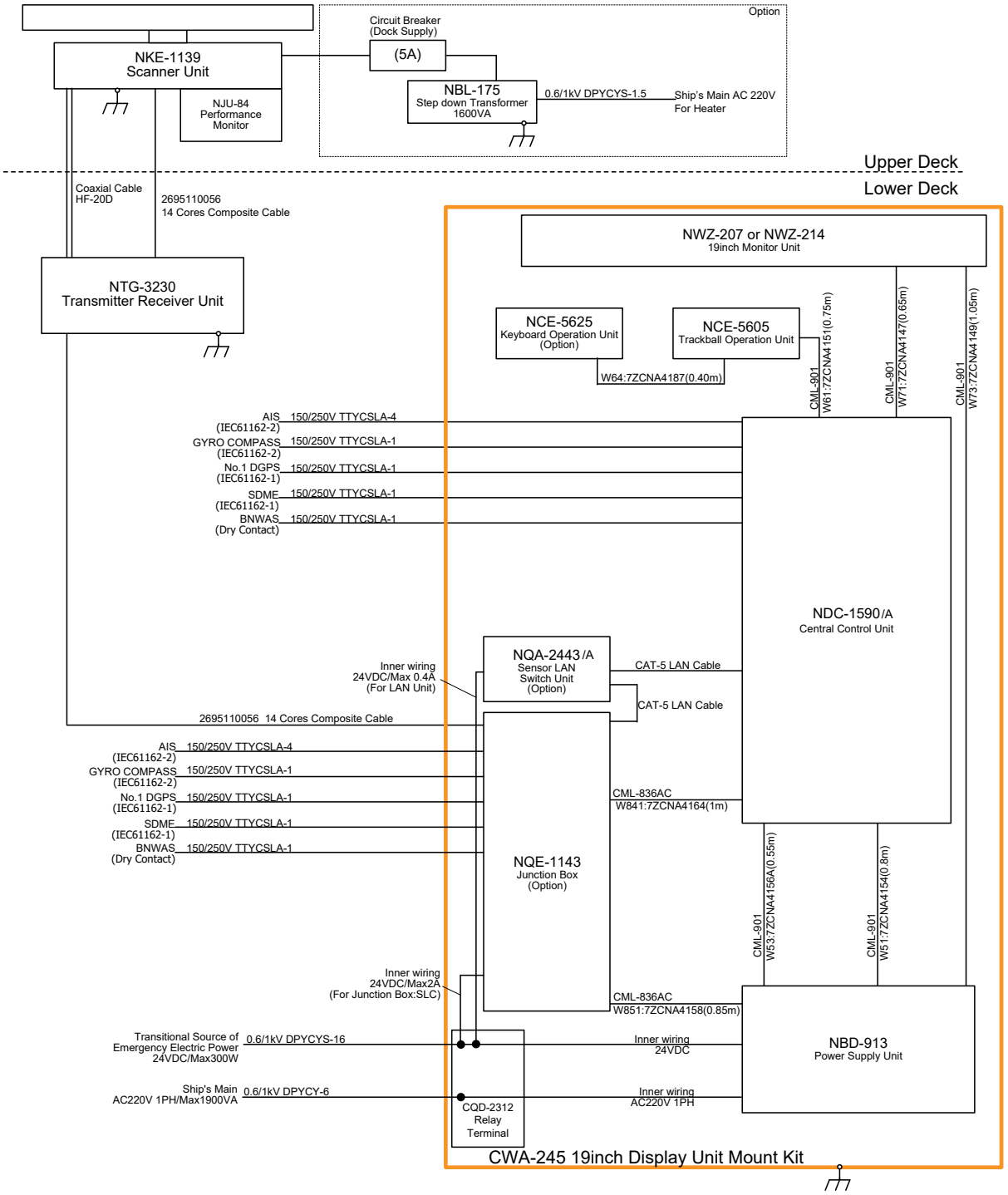


NOTE:ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex.: RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER, etc.)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR
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General System Diagram of JMR-9296-9X RADAR

8.2.15 JMR-7230-S3 General System Diagrams

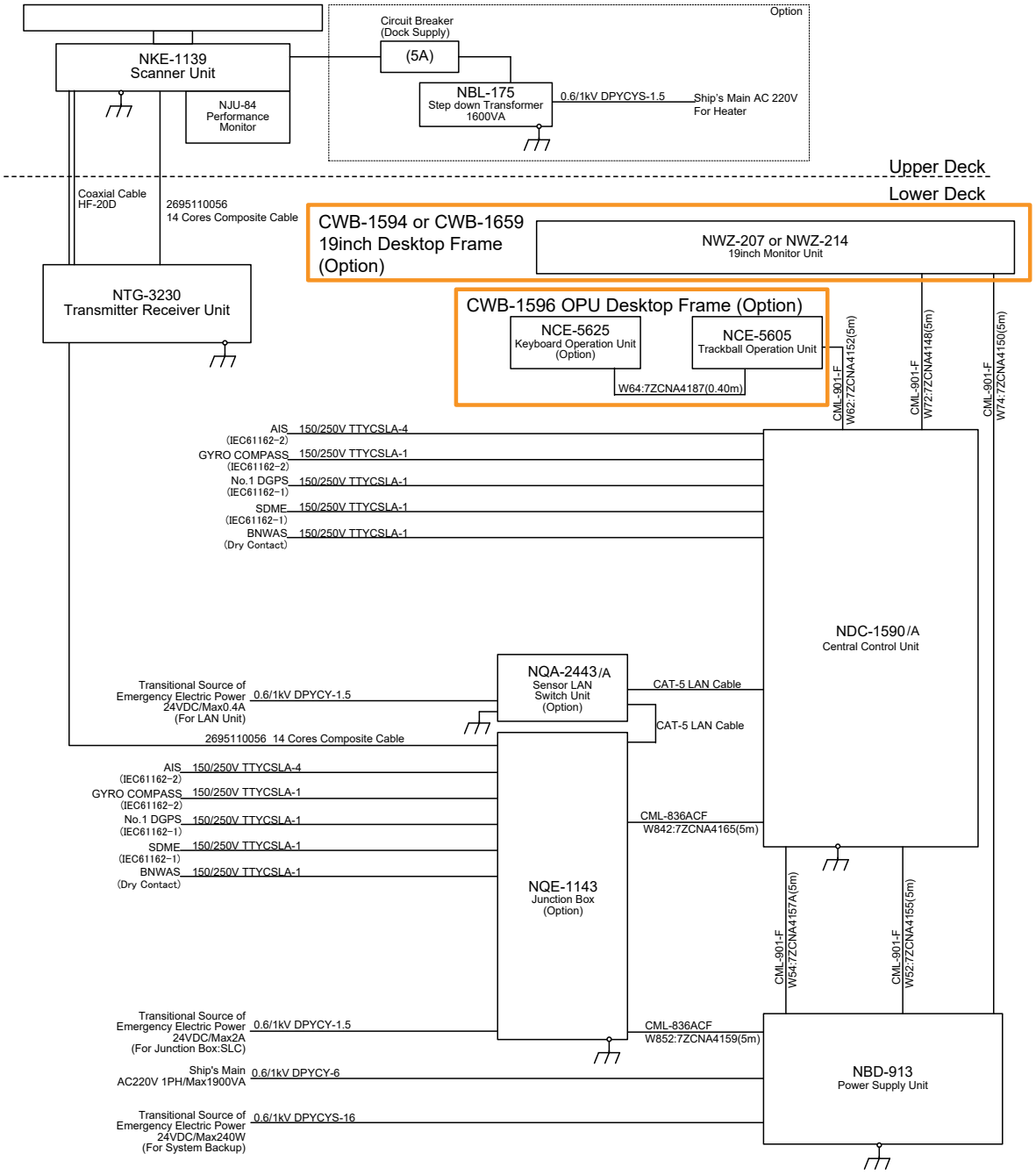
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-7230-S3 RADAR

Desktop type

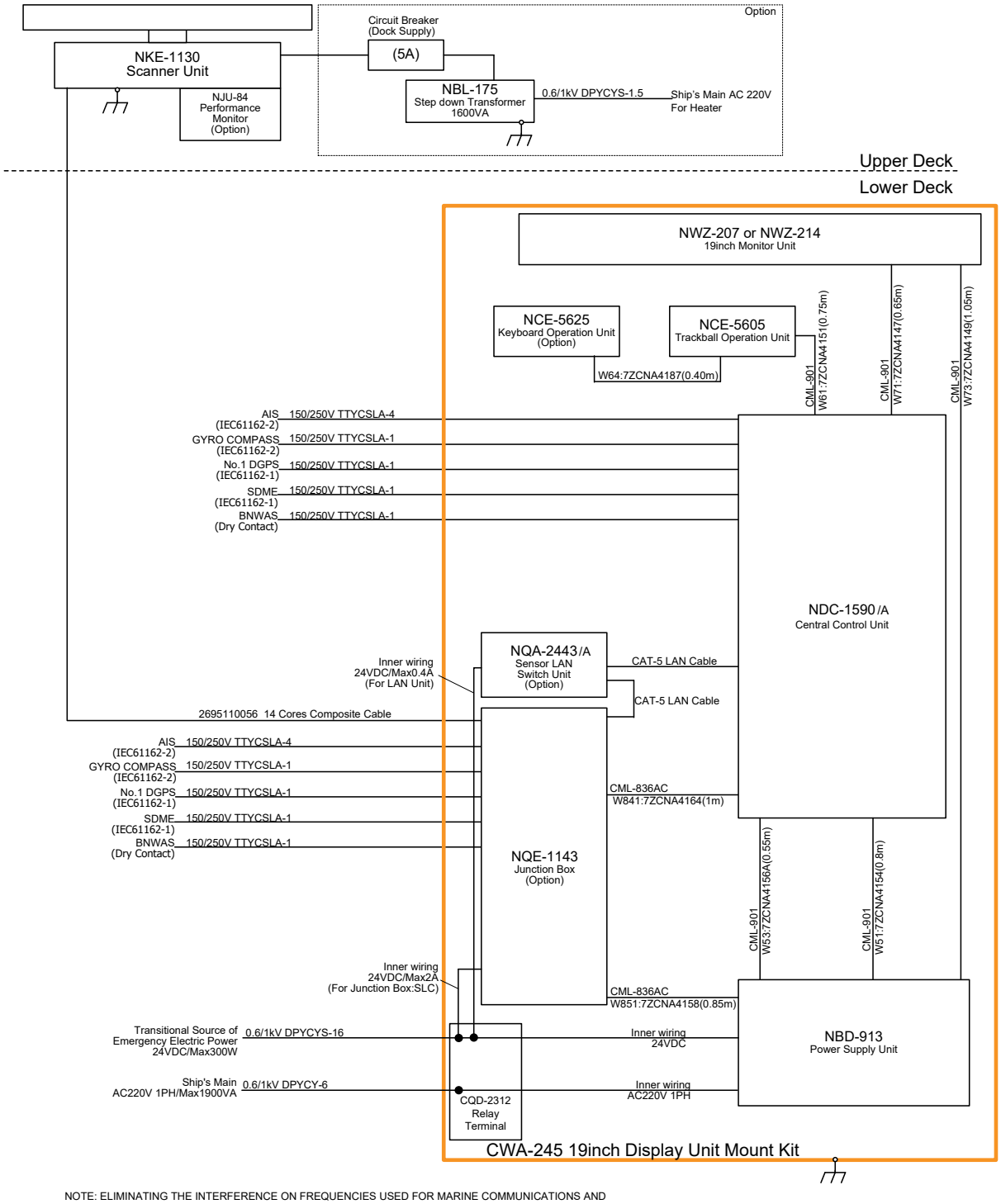


NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-7230-S3 RADAR

8.2.16 JMR-7230-S General System Diagrams

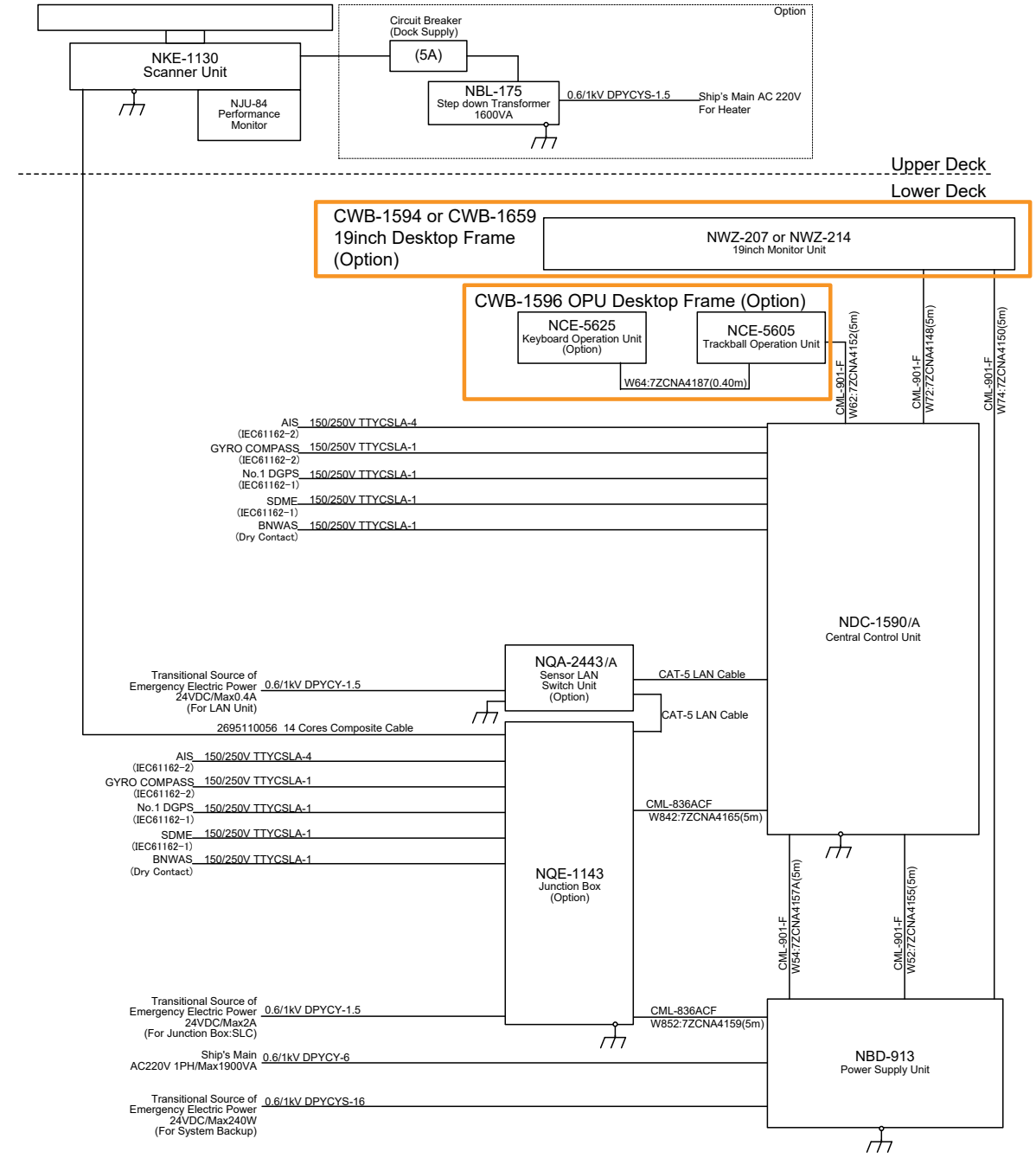
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-7230-S RADAR

Desktop type

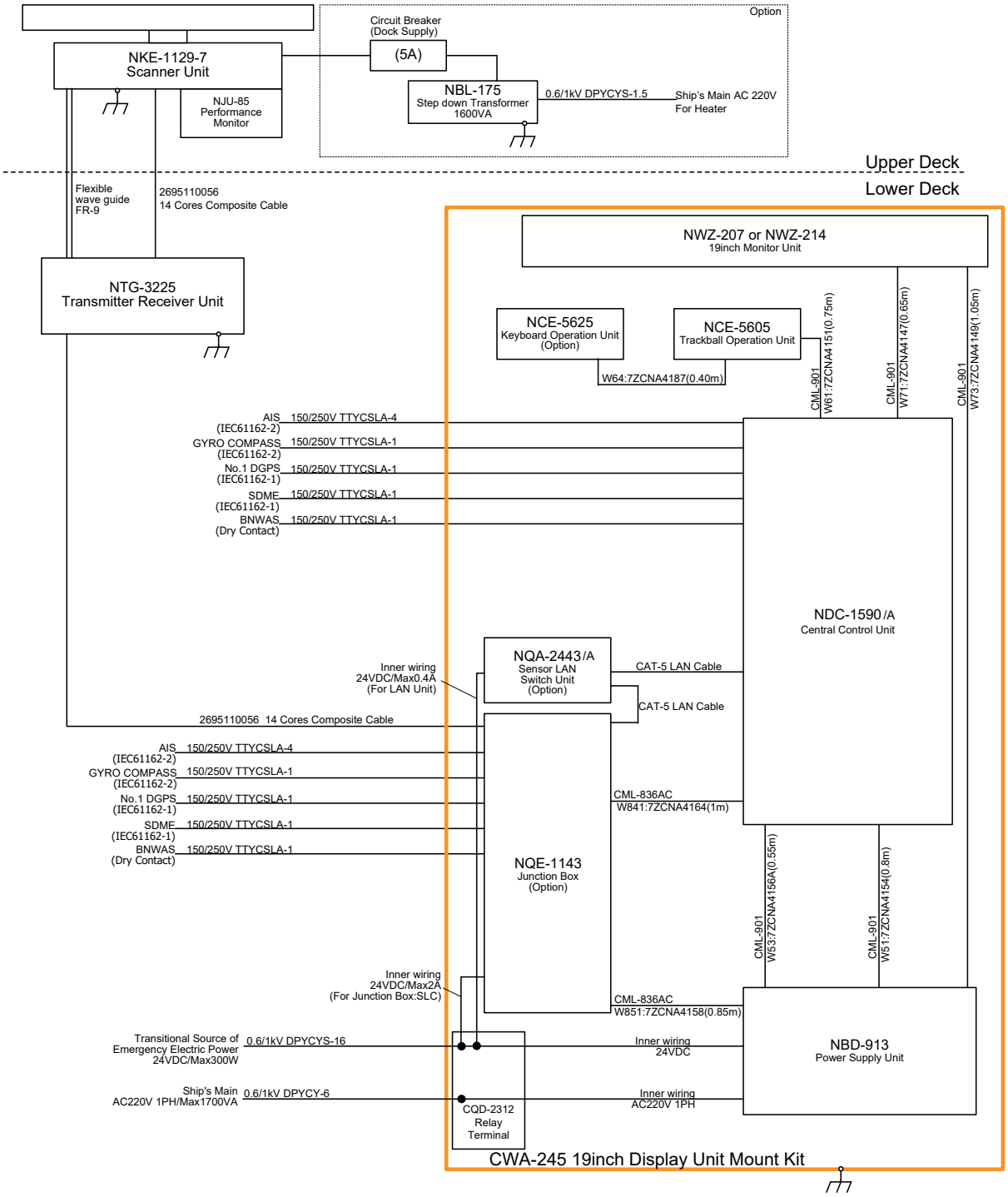


NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-7230-S RADAR

8.2.17 JMR-7225-7X3 General System Diagrams

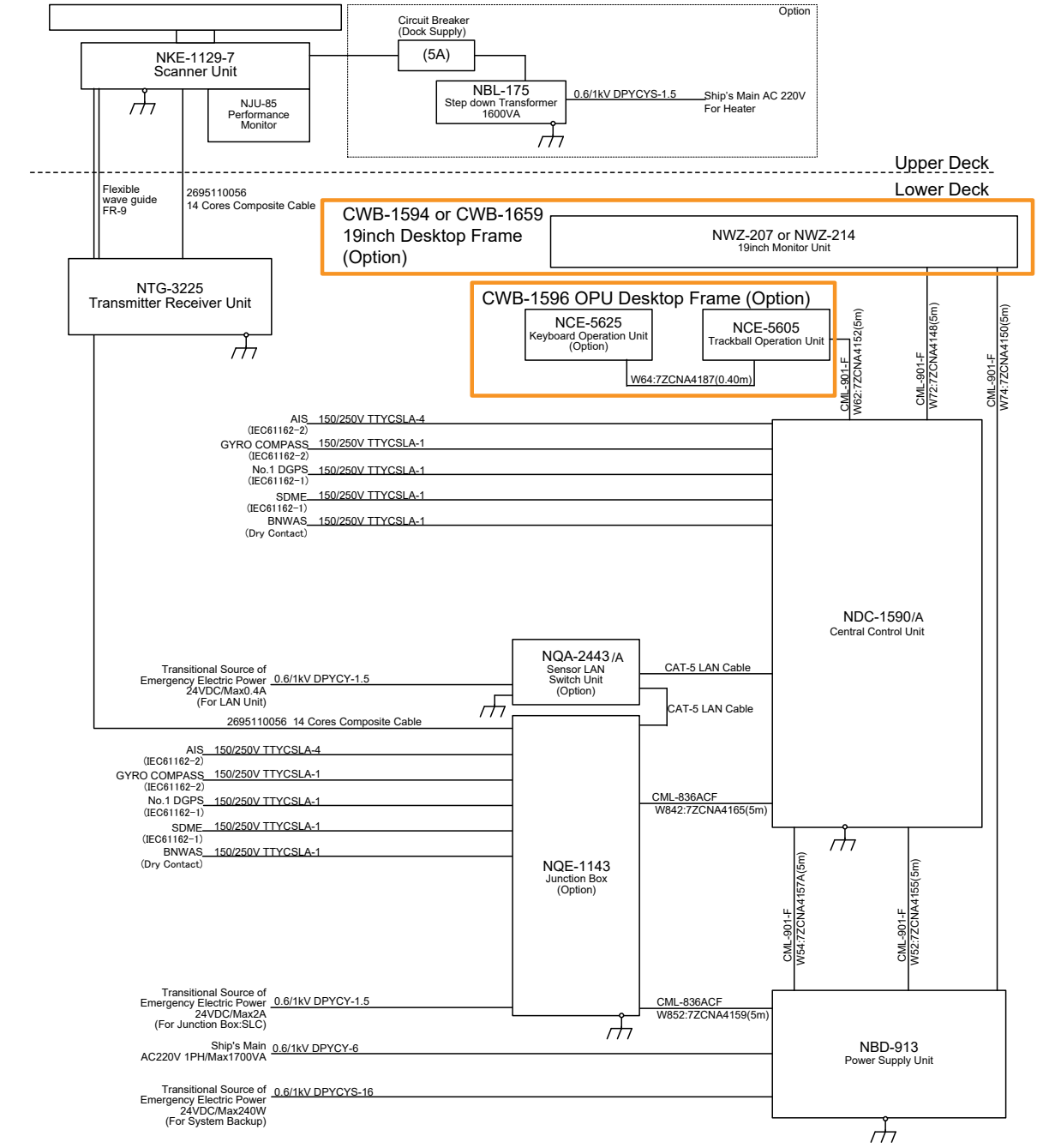
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-7225-7X3 RADAR

Desktop type

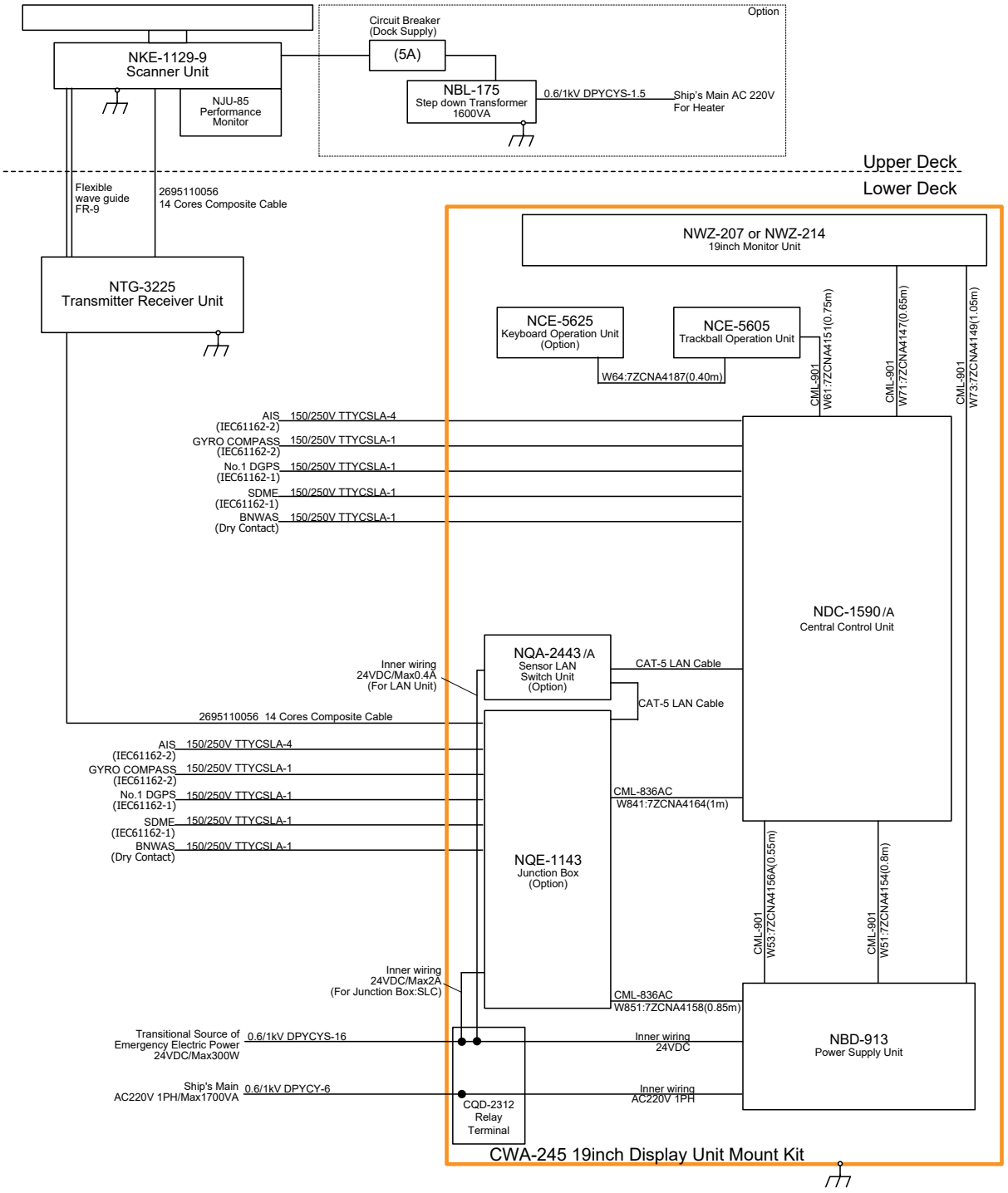


NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
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ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-7225-7X3 RADAR

8.2.18 JMR-7225-9X3 General System Diagrams

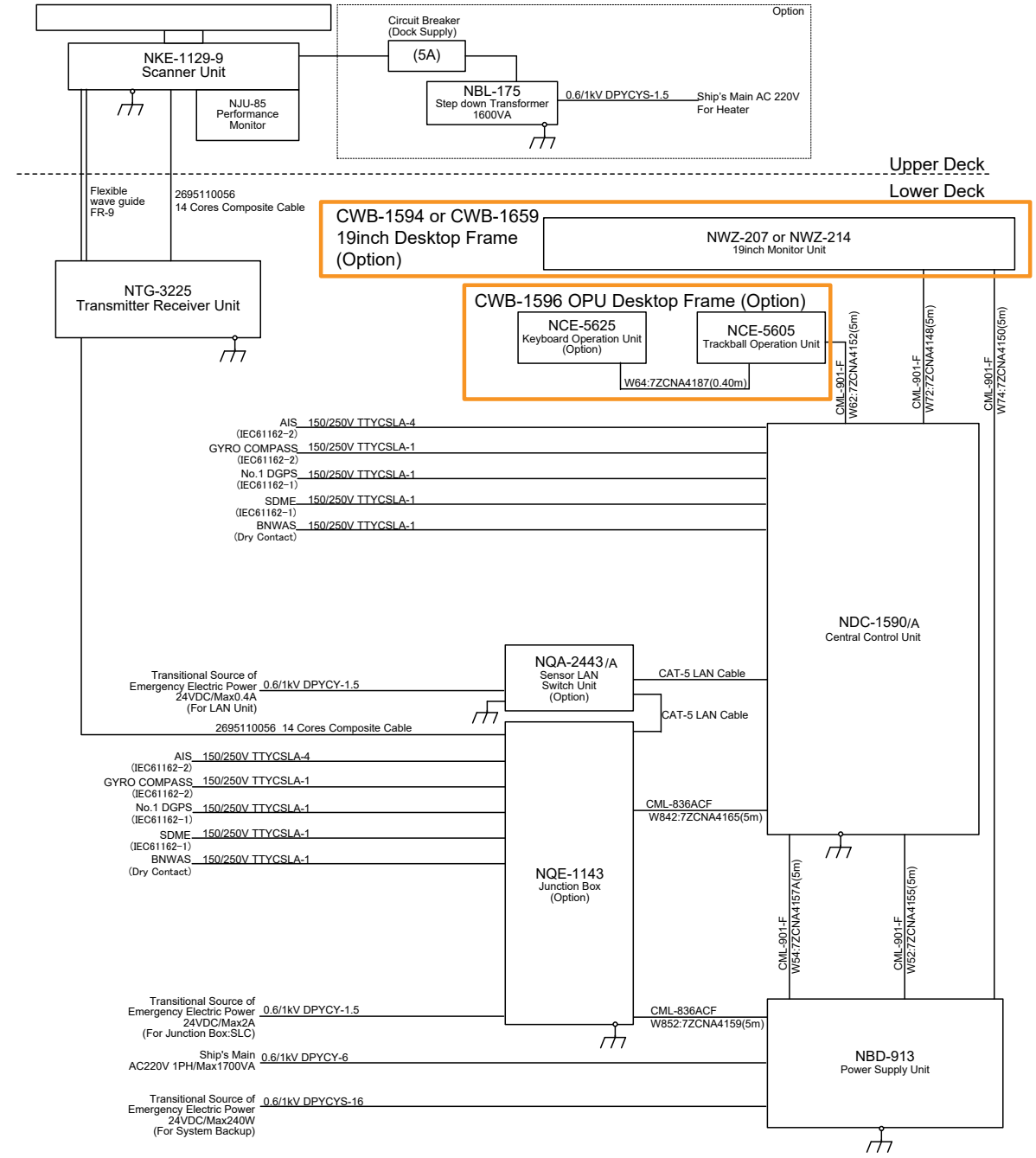
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-7225-9X3 RADAR

Desktop type

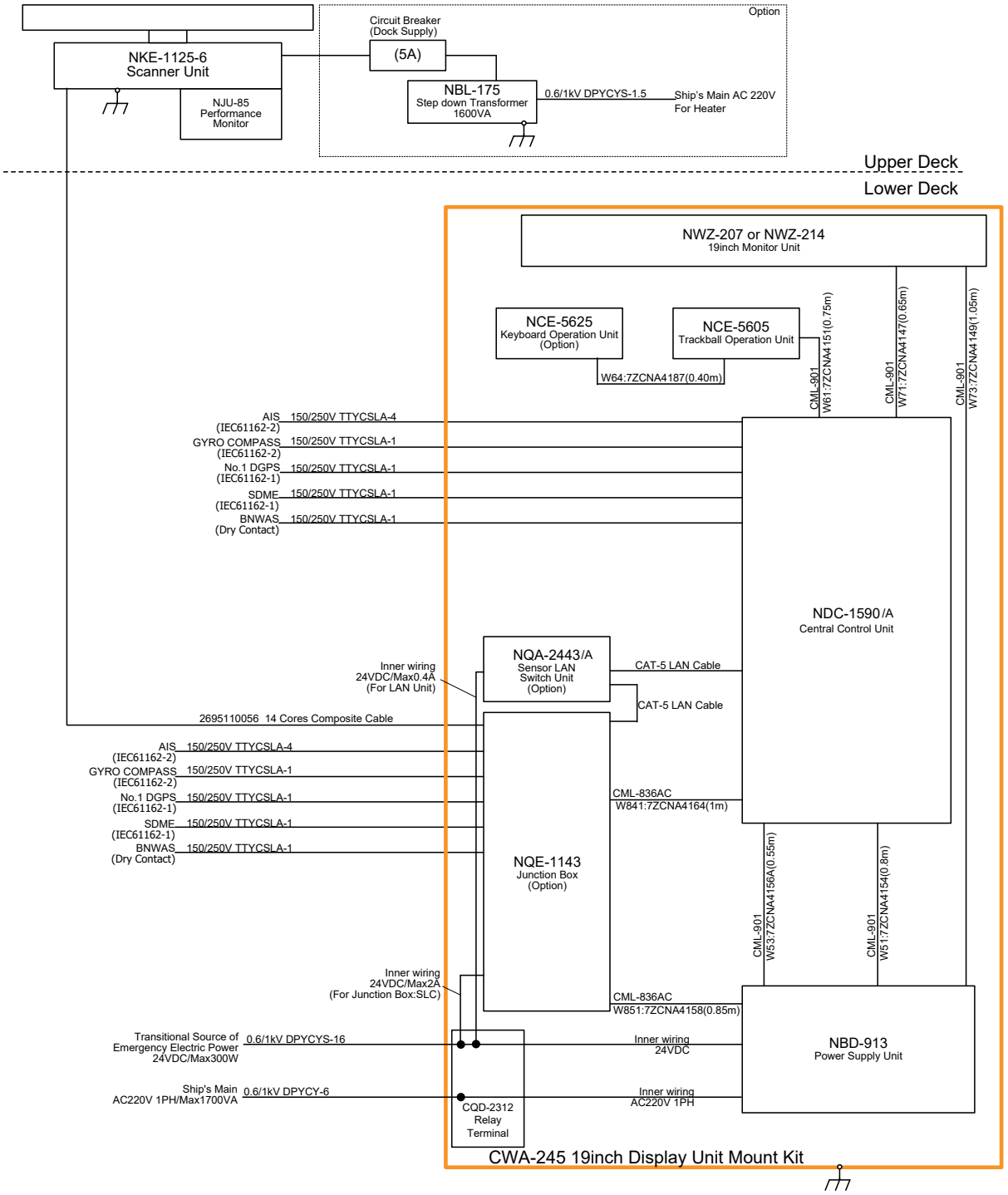


NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-7225-9X3 RADAR

8.2.19 JMR-7225-6X General System Diagrams

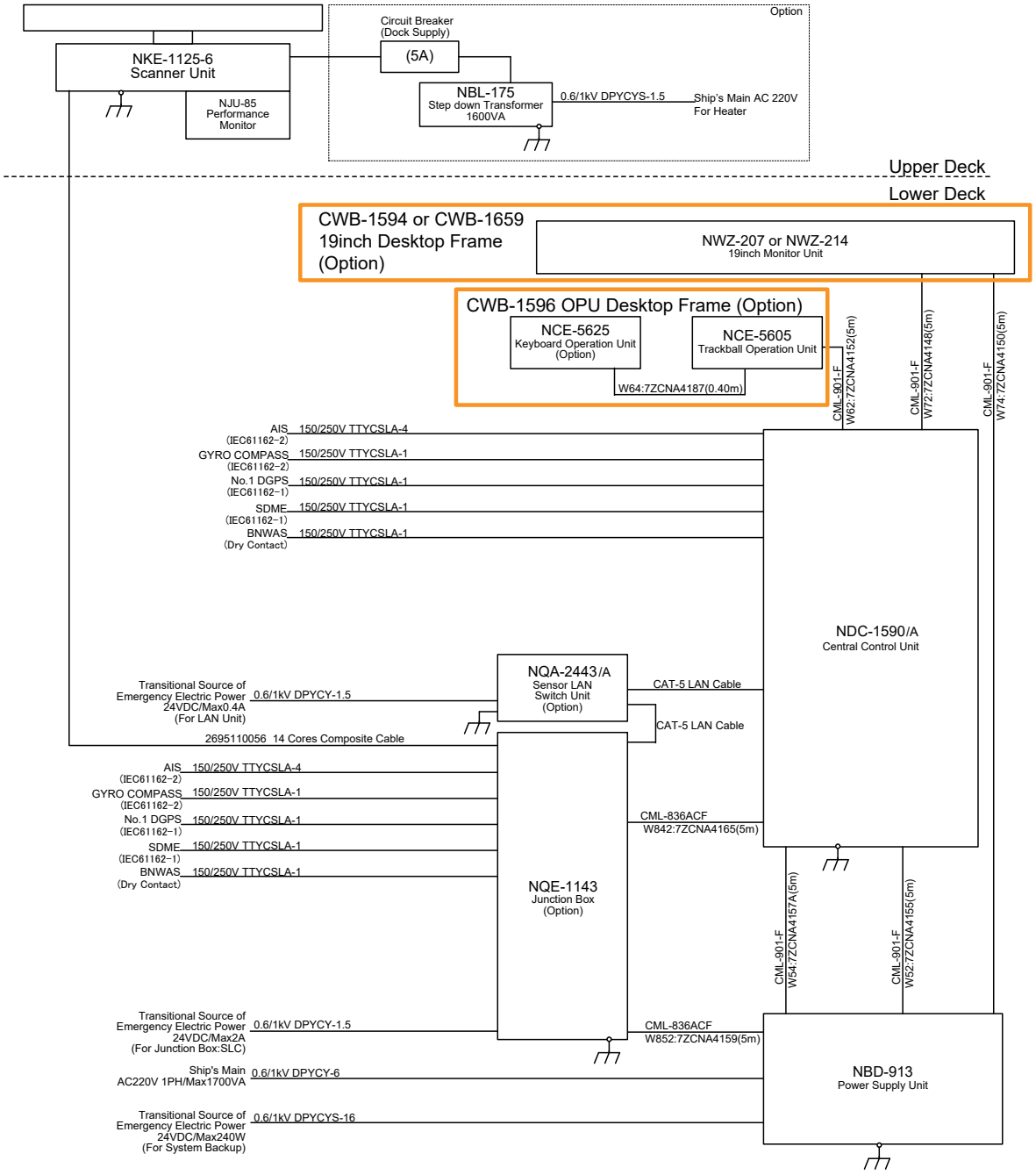
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-7225-6X RADAR

Desktop type

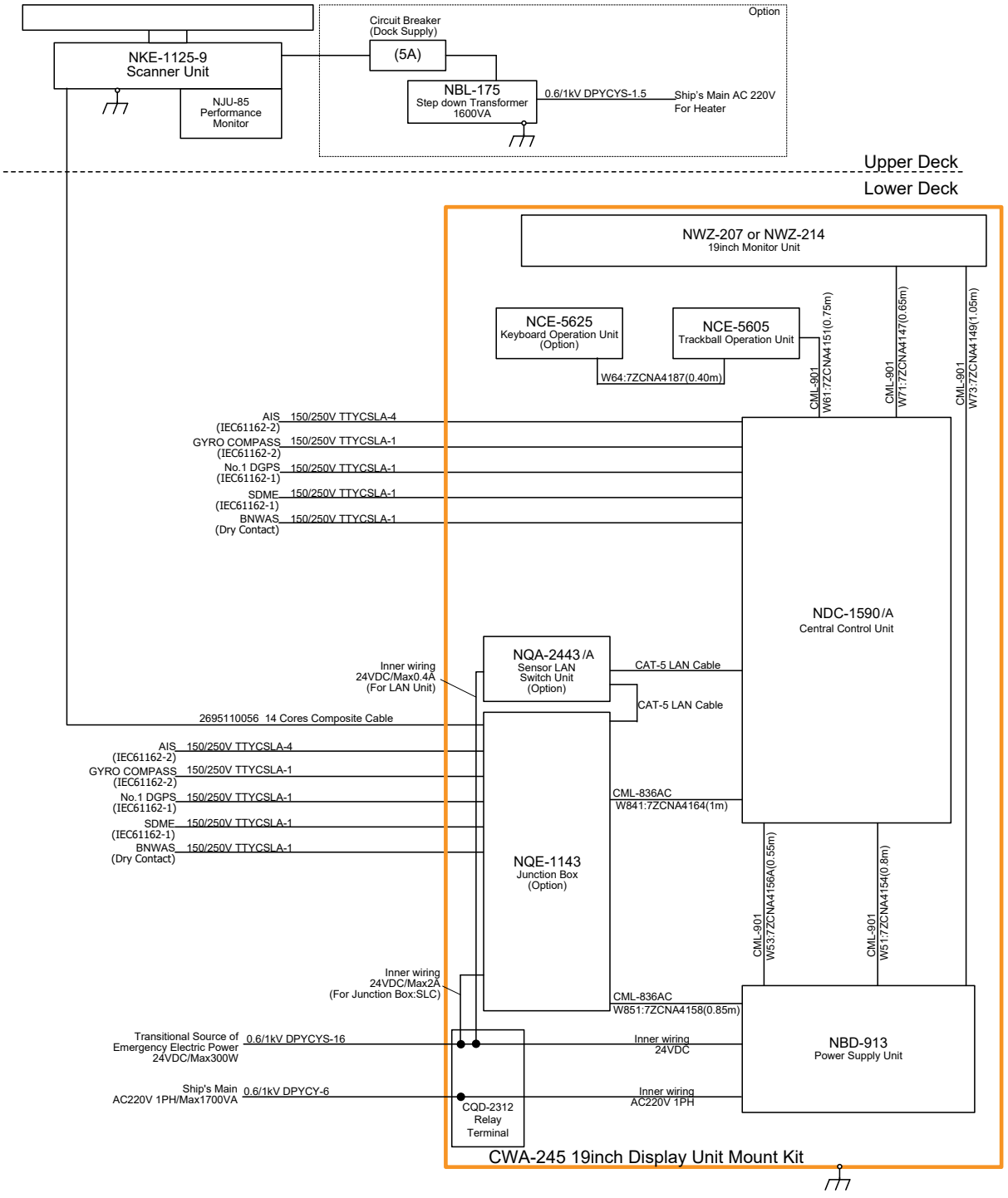


NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
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ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-7225-6X RADAR

8.2.20 JMR-7225-9X General System Diagrams

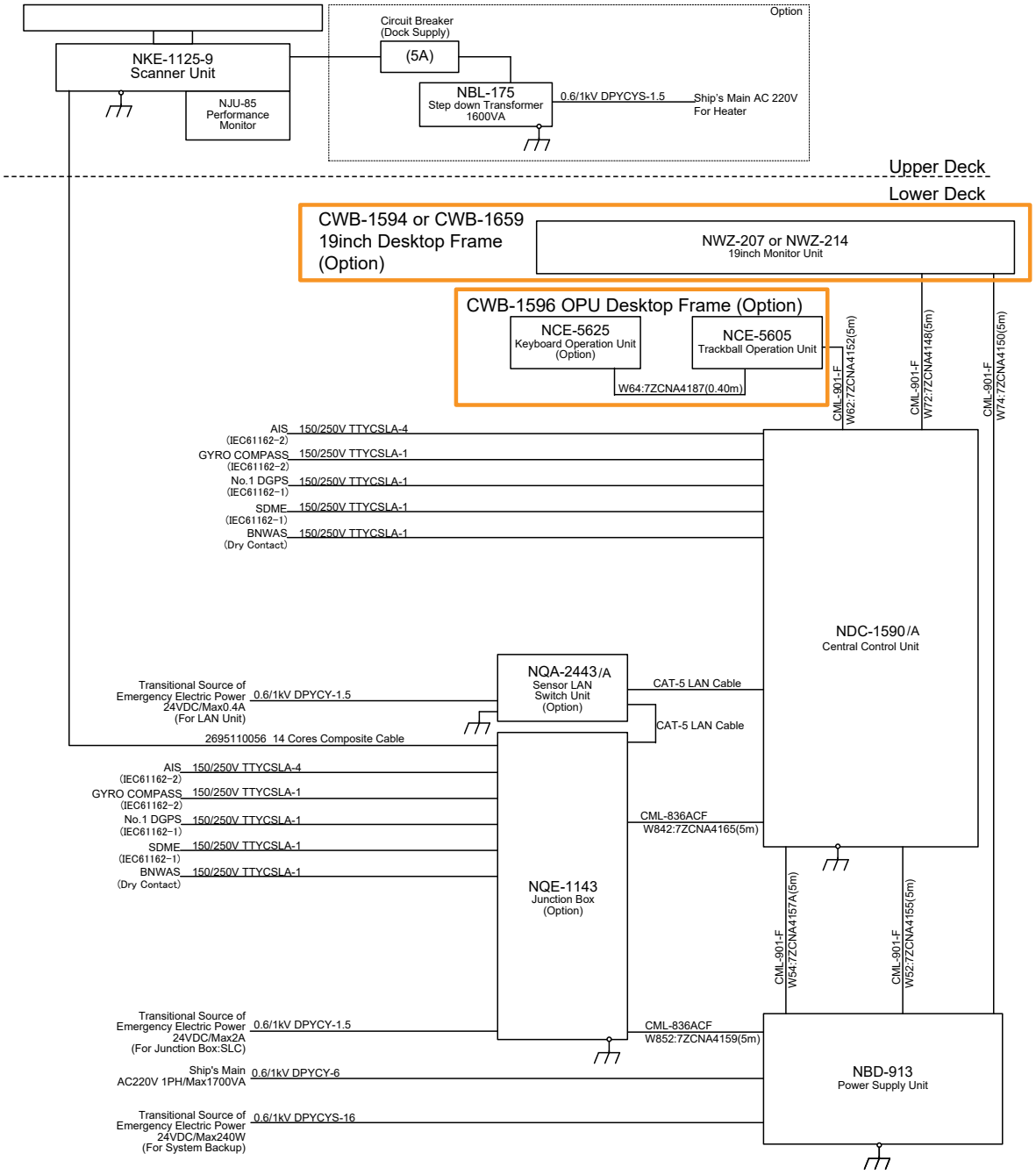
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-7225-9X RADAR

Desktop type

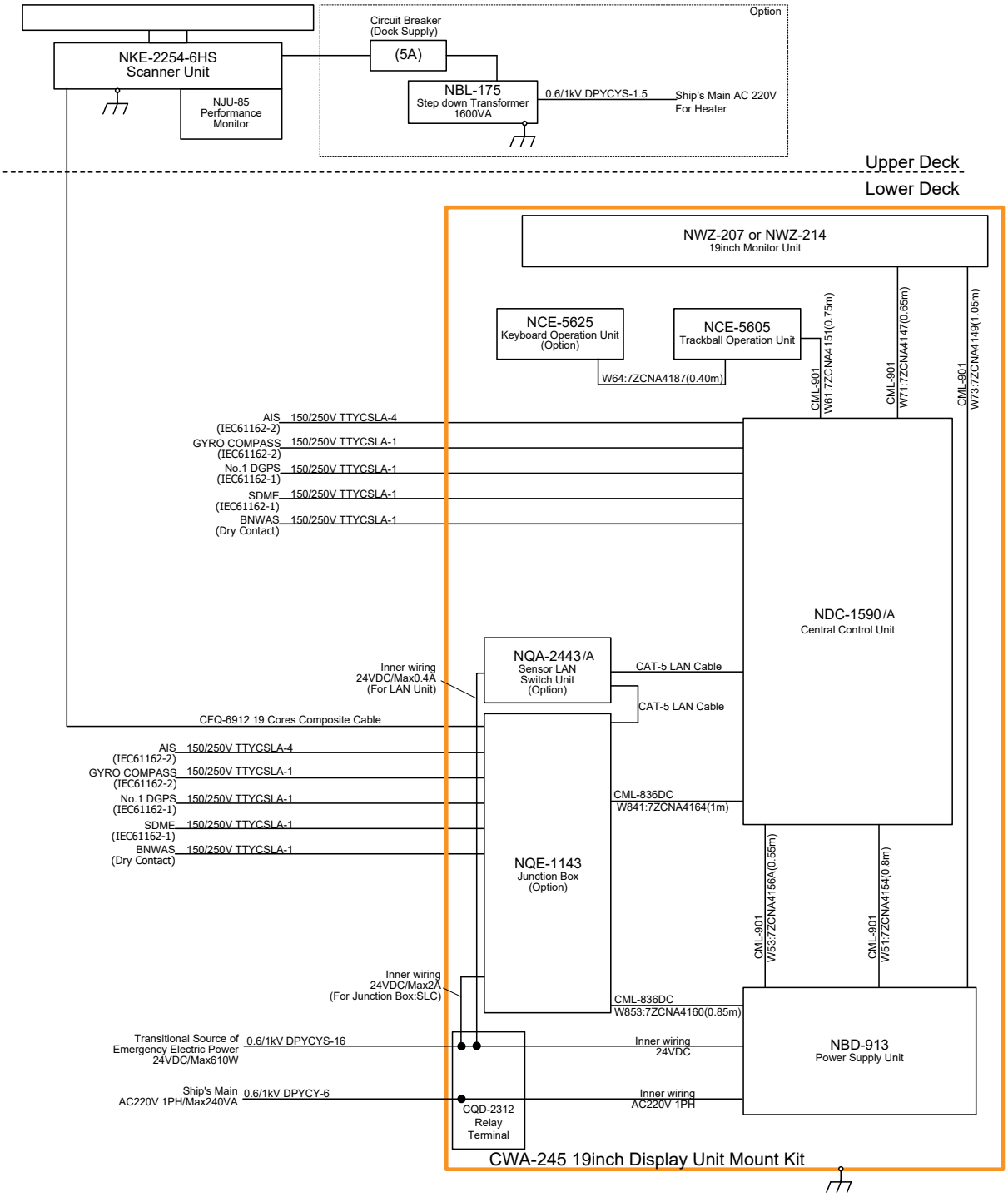


NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
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(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-7225-9X RADAR

8.2.21 JMR-7225-6XH General System Diagrams

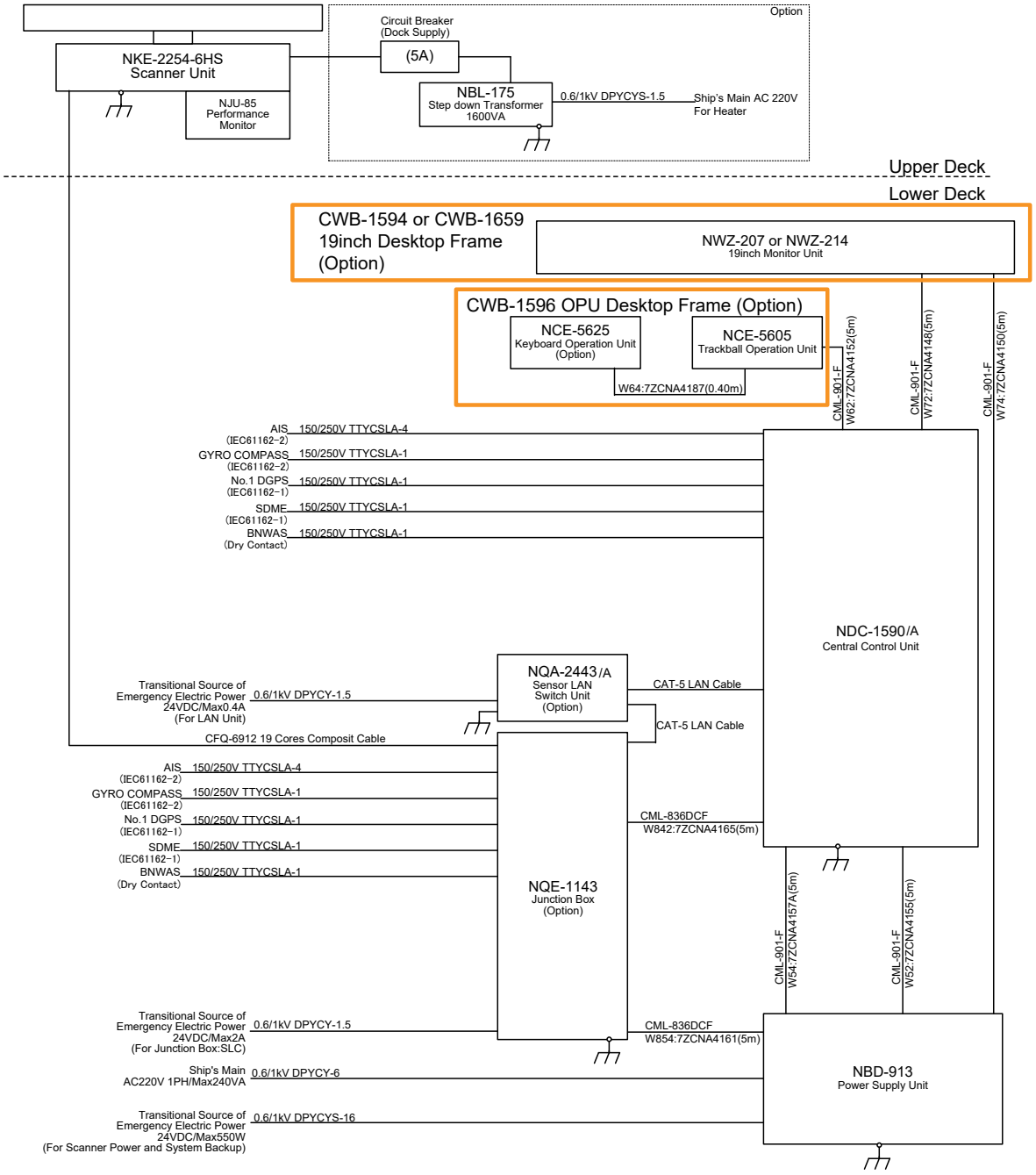
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-7225-6XH RADAR

Desktop type

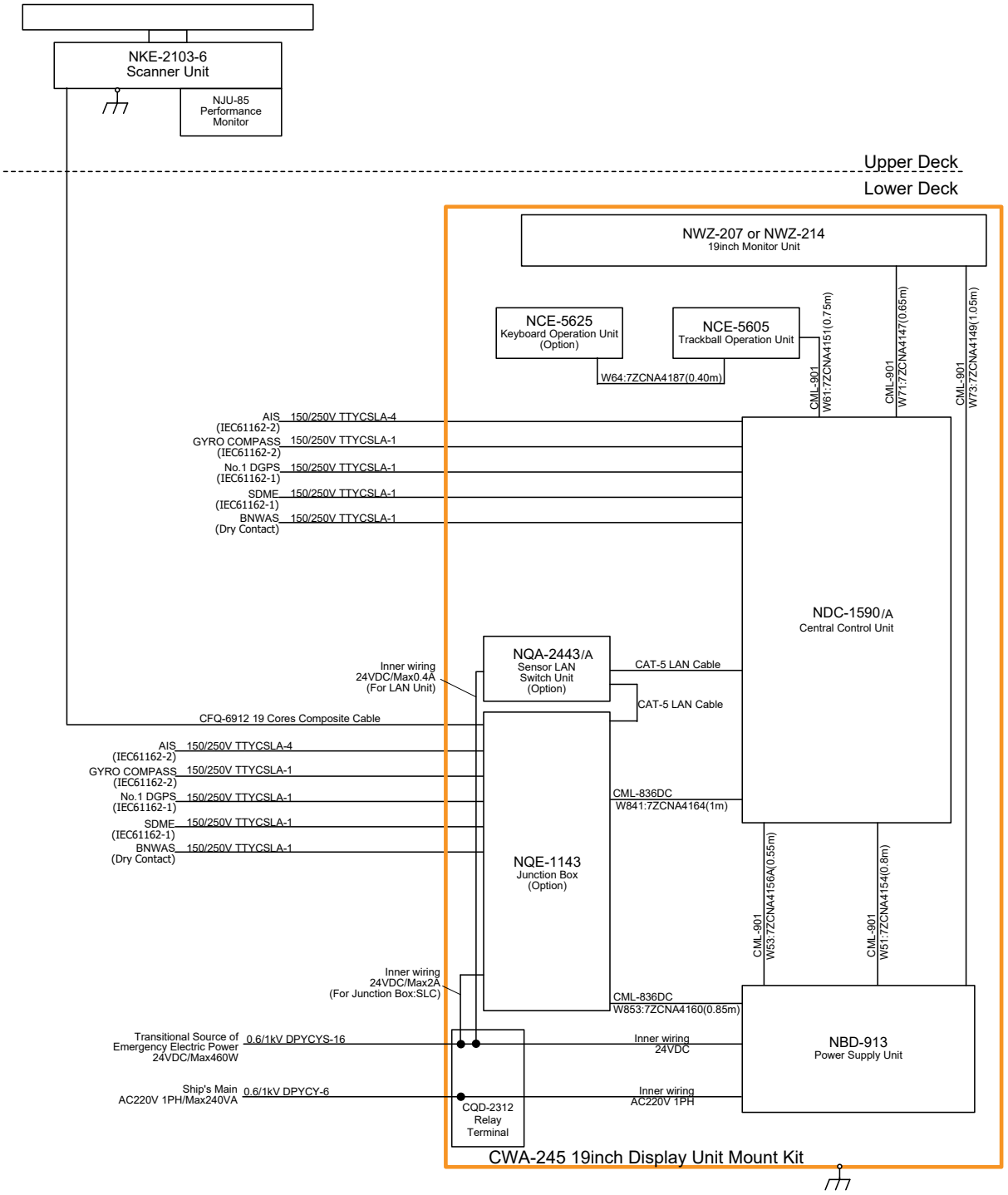


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ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-7225-6XH RADAR

8.2.22 JMR-7210-6X General System Diagrams

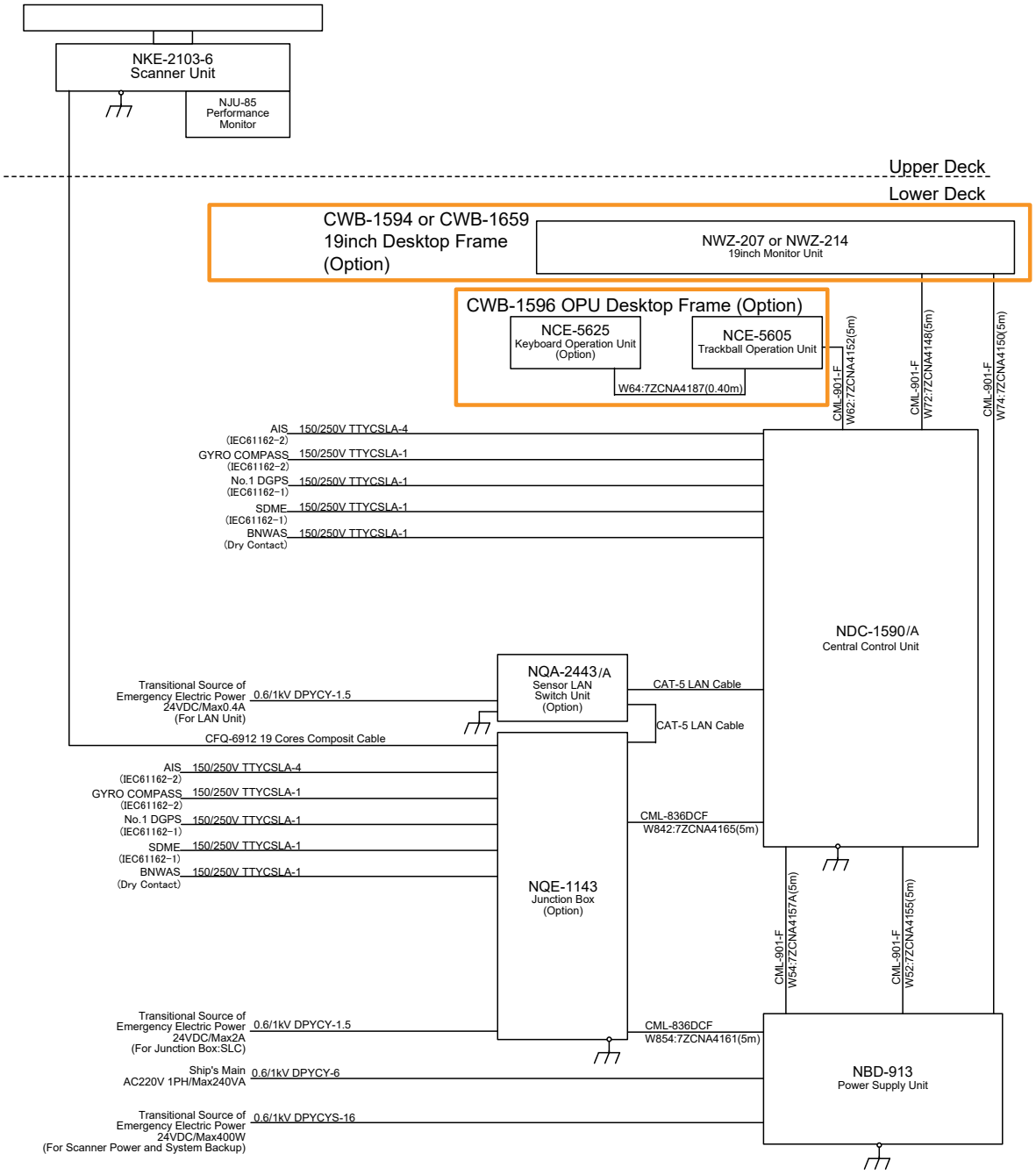
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
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General System Diagram of JMR-7210-6X RADAR

Desktop type

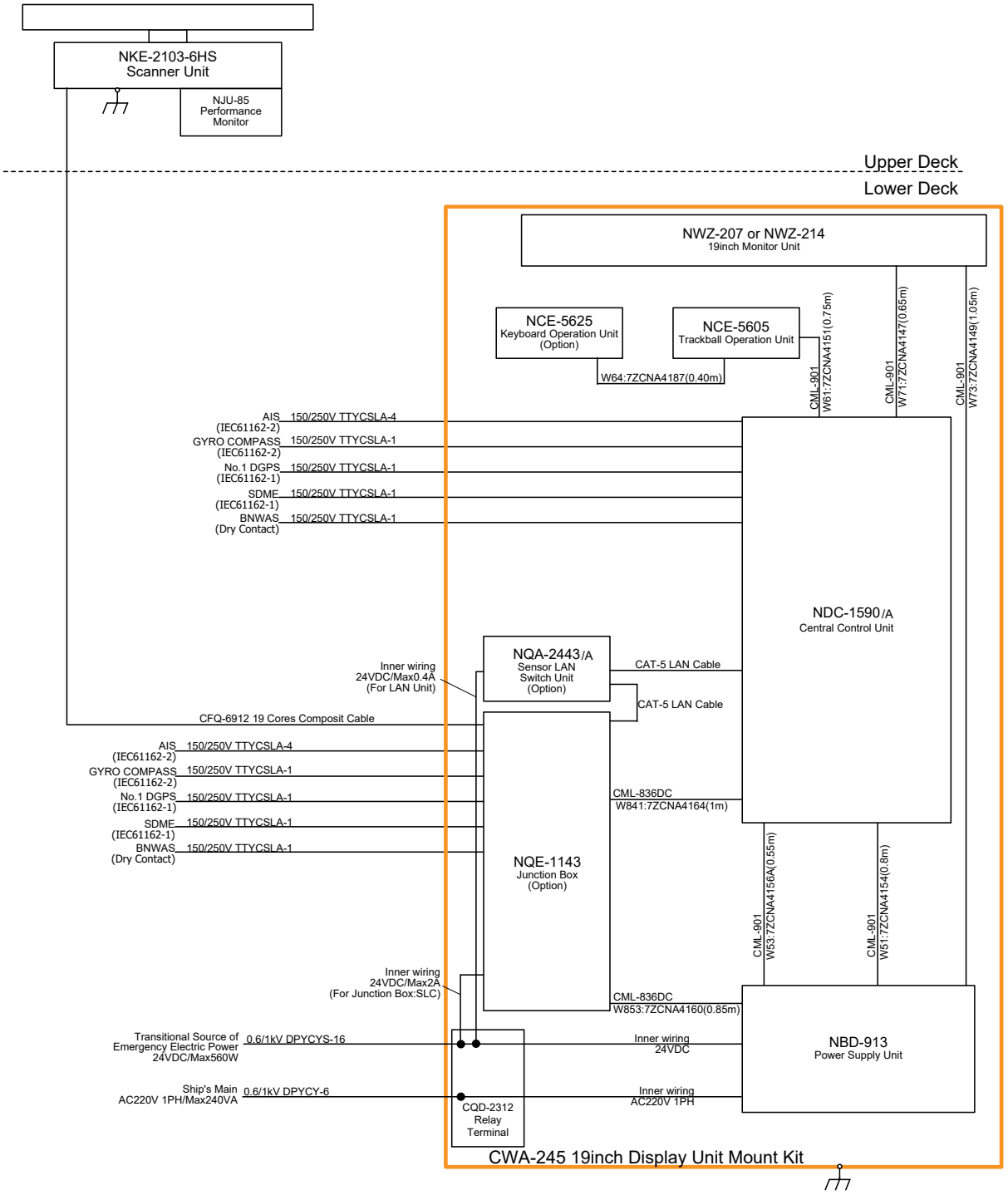


NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
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General System Diagram of JMR-7210-6X RADAR

8.2.23 JMR-7210-6XH General System Diagrams

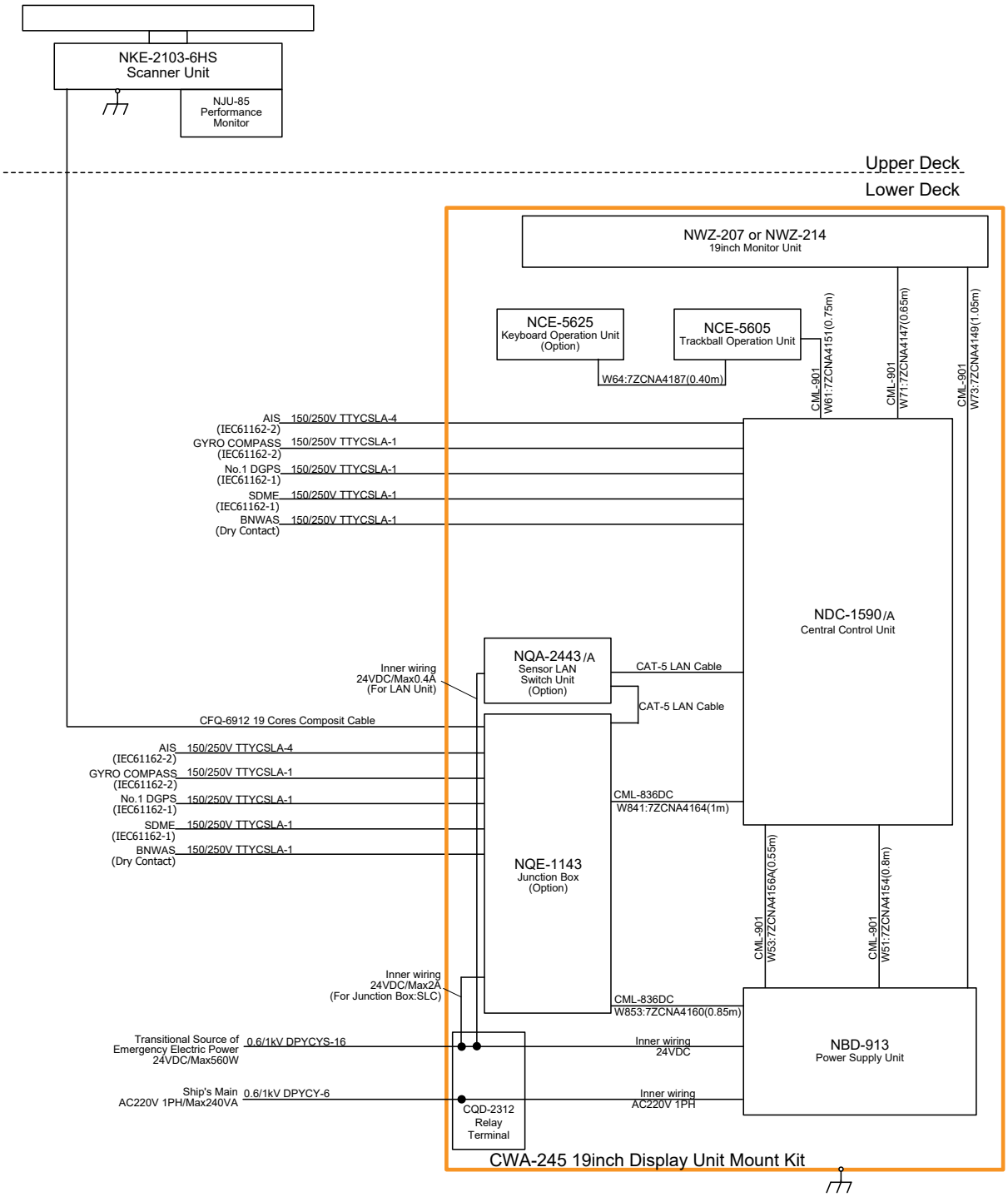
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
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General System Diagram of JMR-7210-6XH RADAR

Desktop type

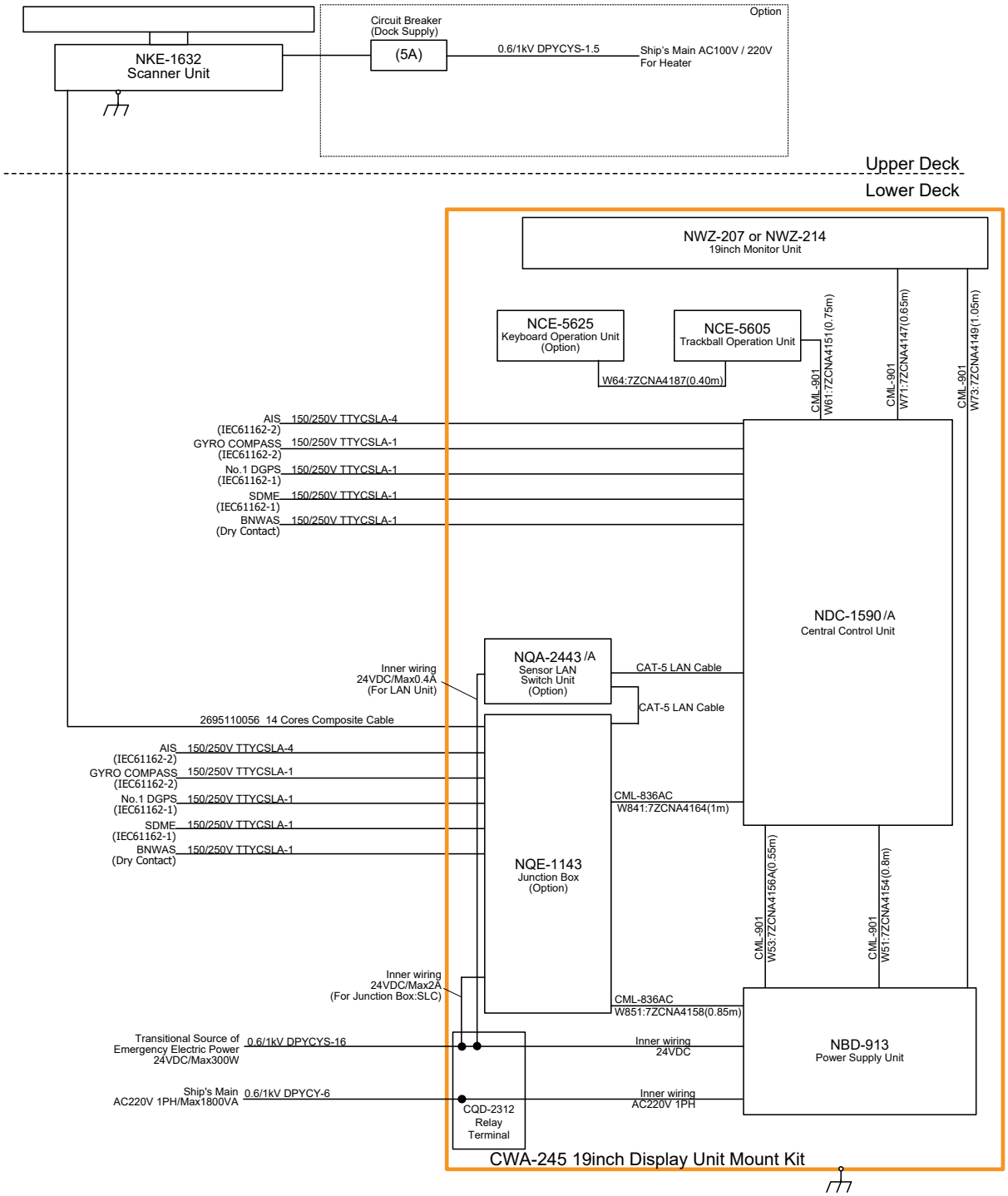


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ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-7210-6XH RADAR

8.2.24 JMR-7272-S General System Diagrams

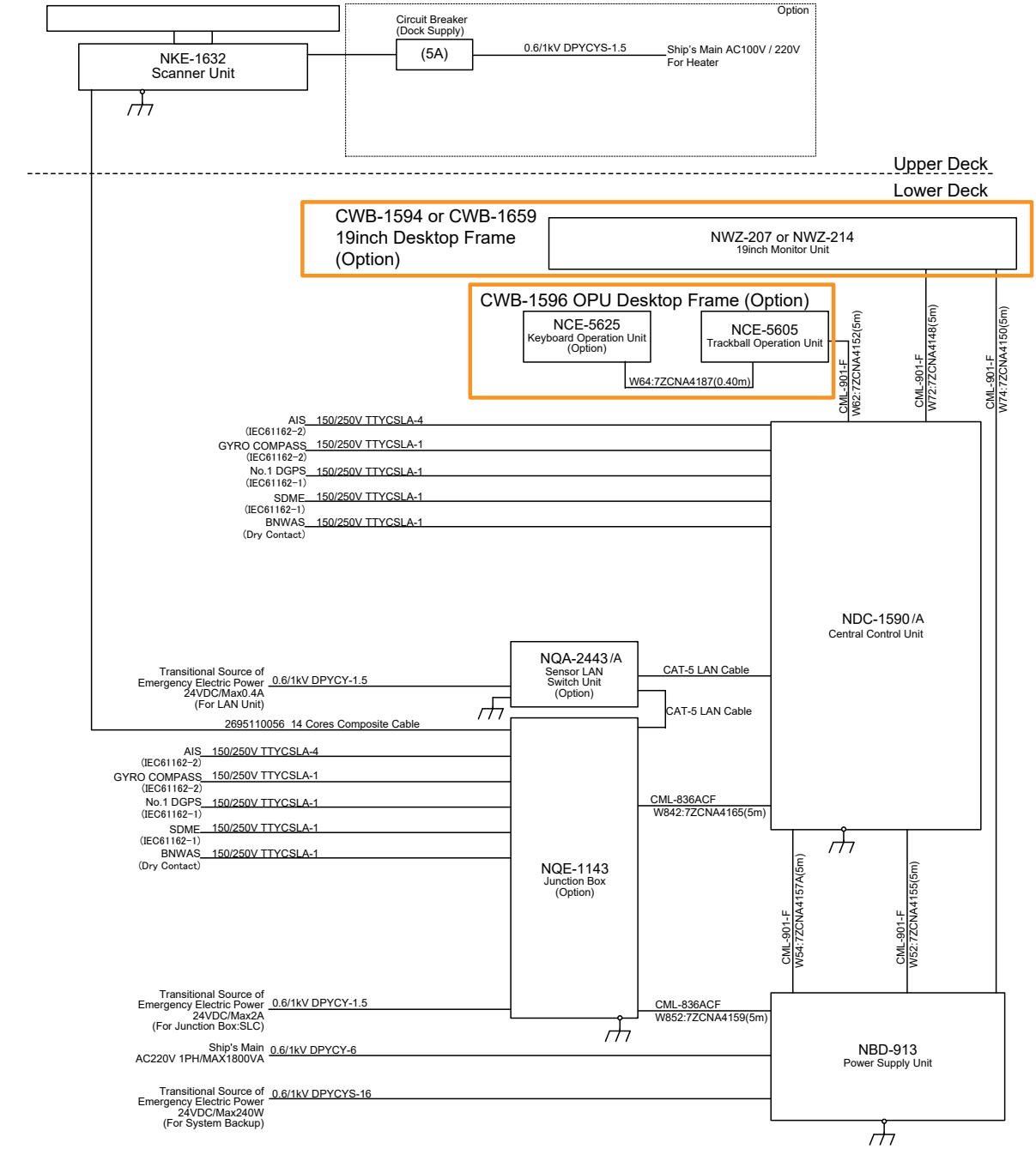
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-7272-S RADAR

Desktop type

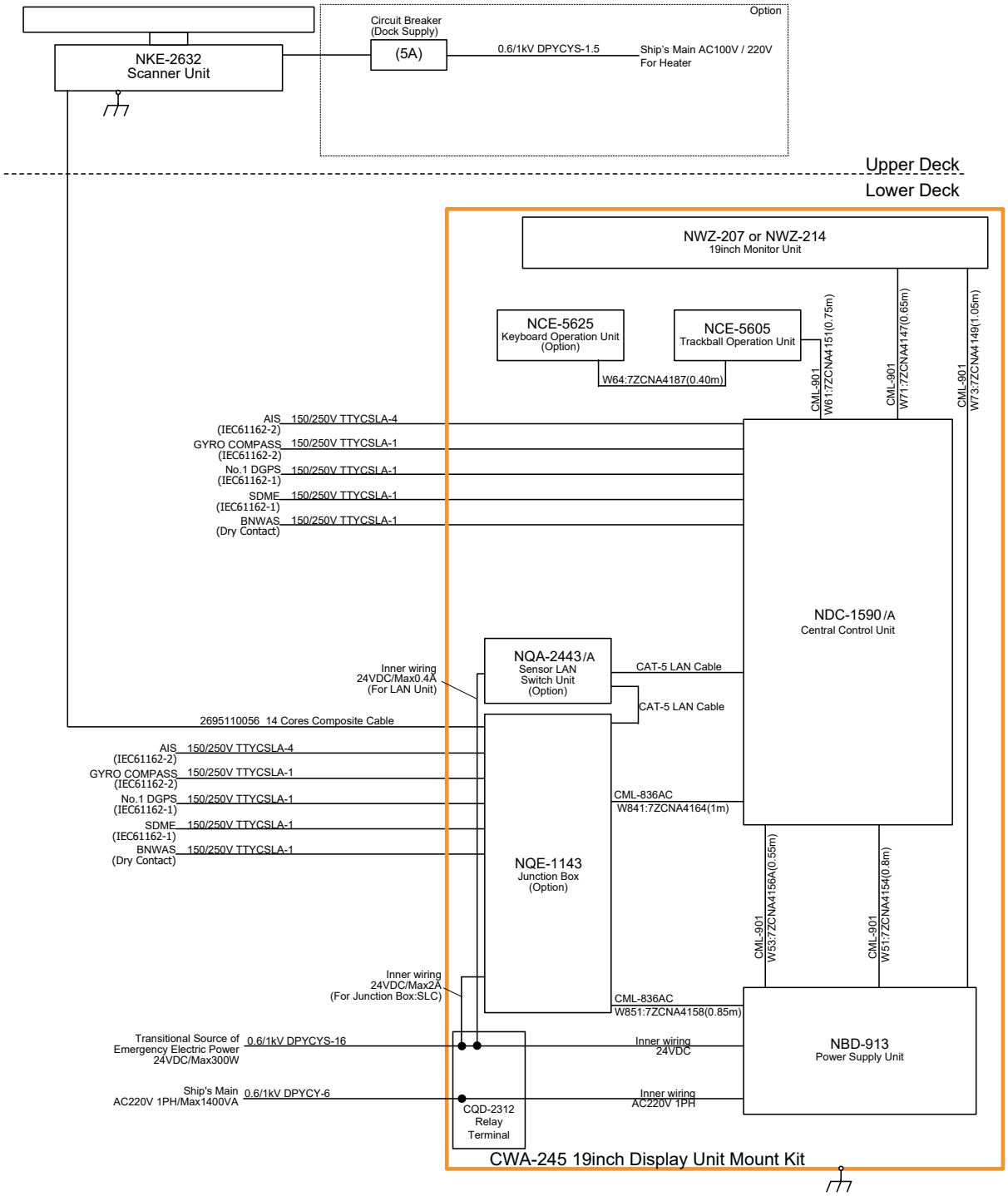


NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-7272-S RADAR

8.2.25 JMR-7282-S General System Diagrams

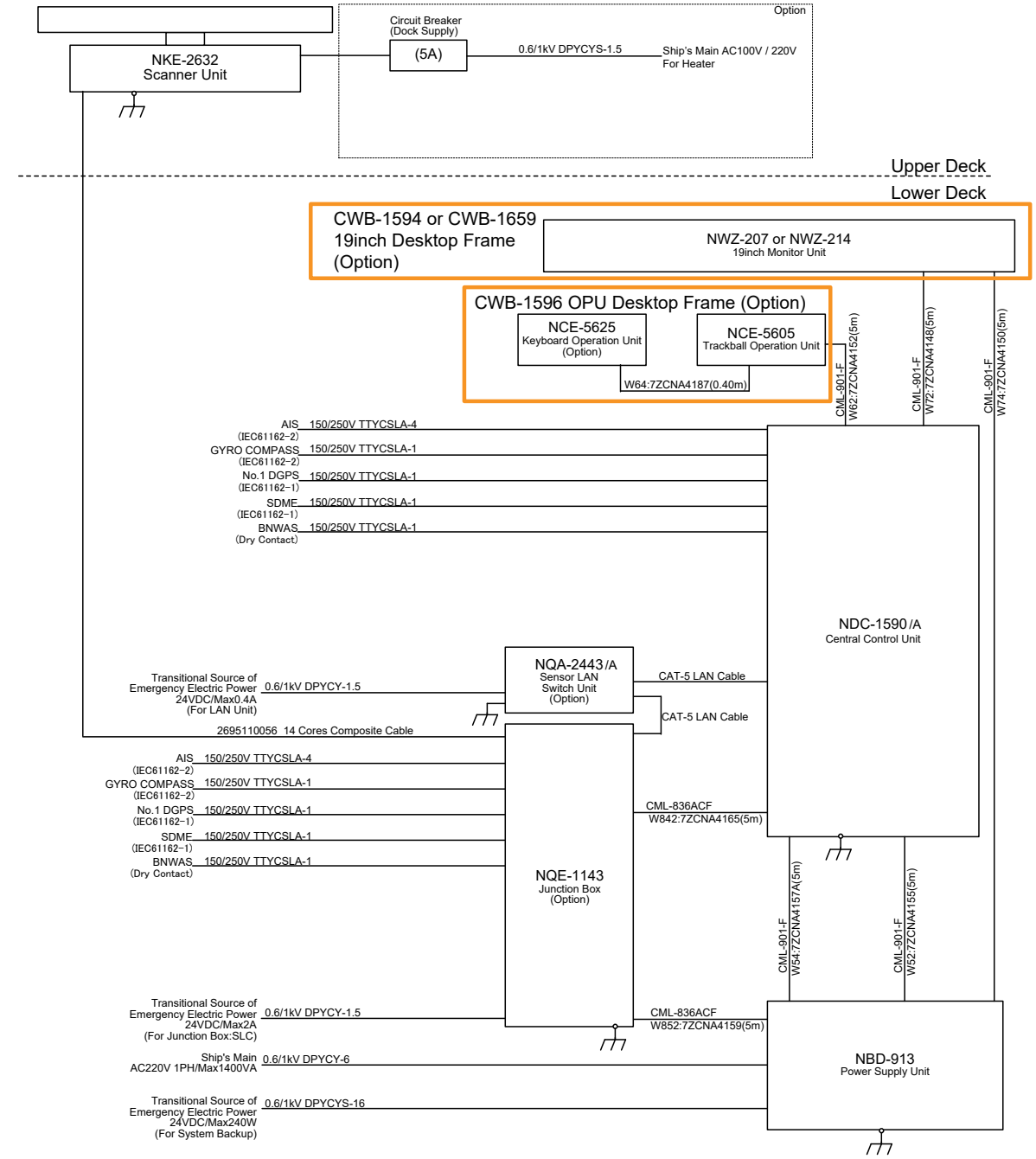
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-7282-S RADAR

Desktop type

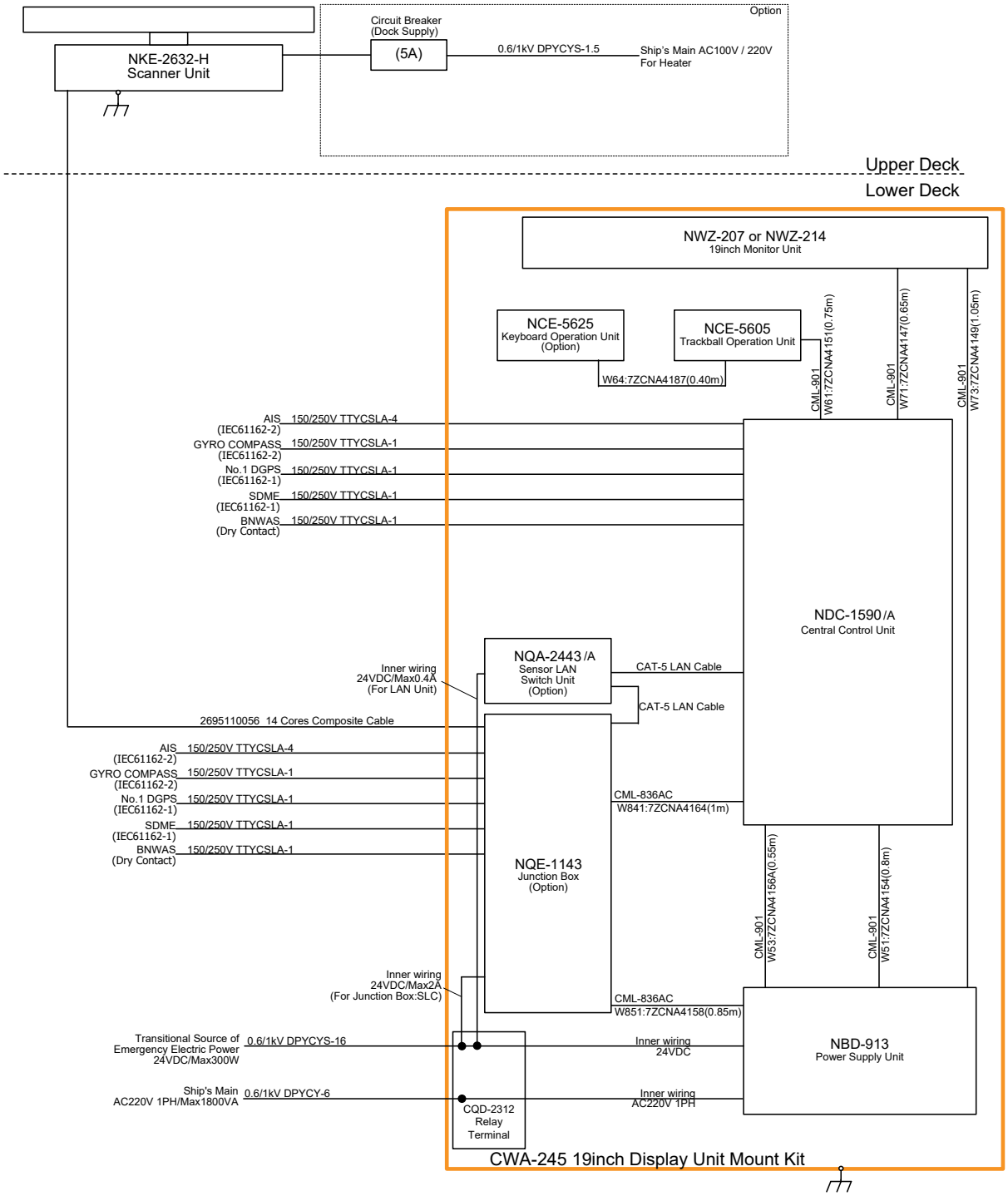


NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-7282-S RADAR

8.2.26 JMR-7282-SH General System Diagrams

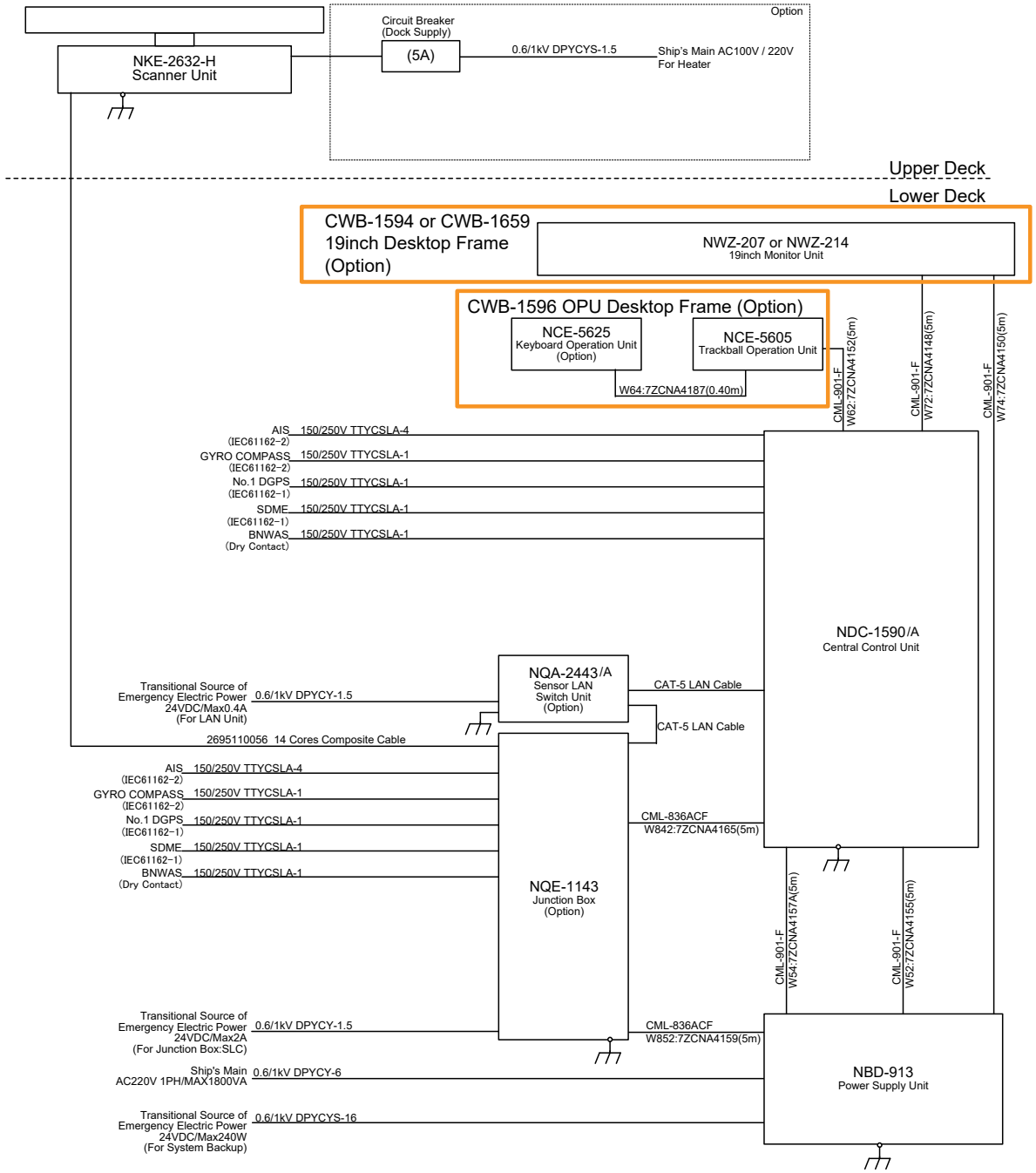
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-7282-SH RADAR

Desktop type

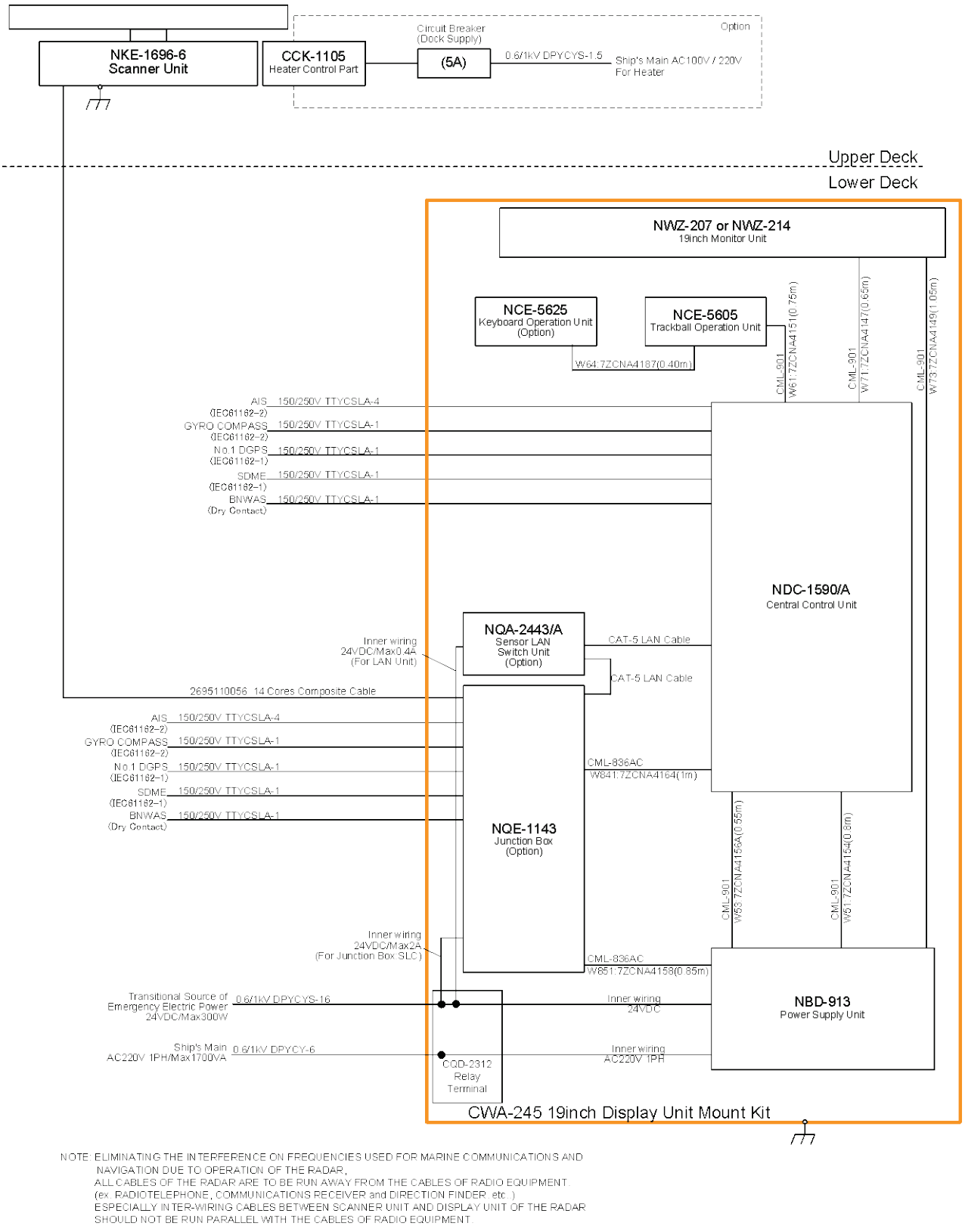


NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-7282-SH RADAR

8.2.27 JMR-7296-6X General System Diagrams

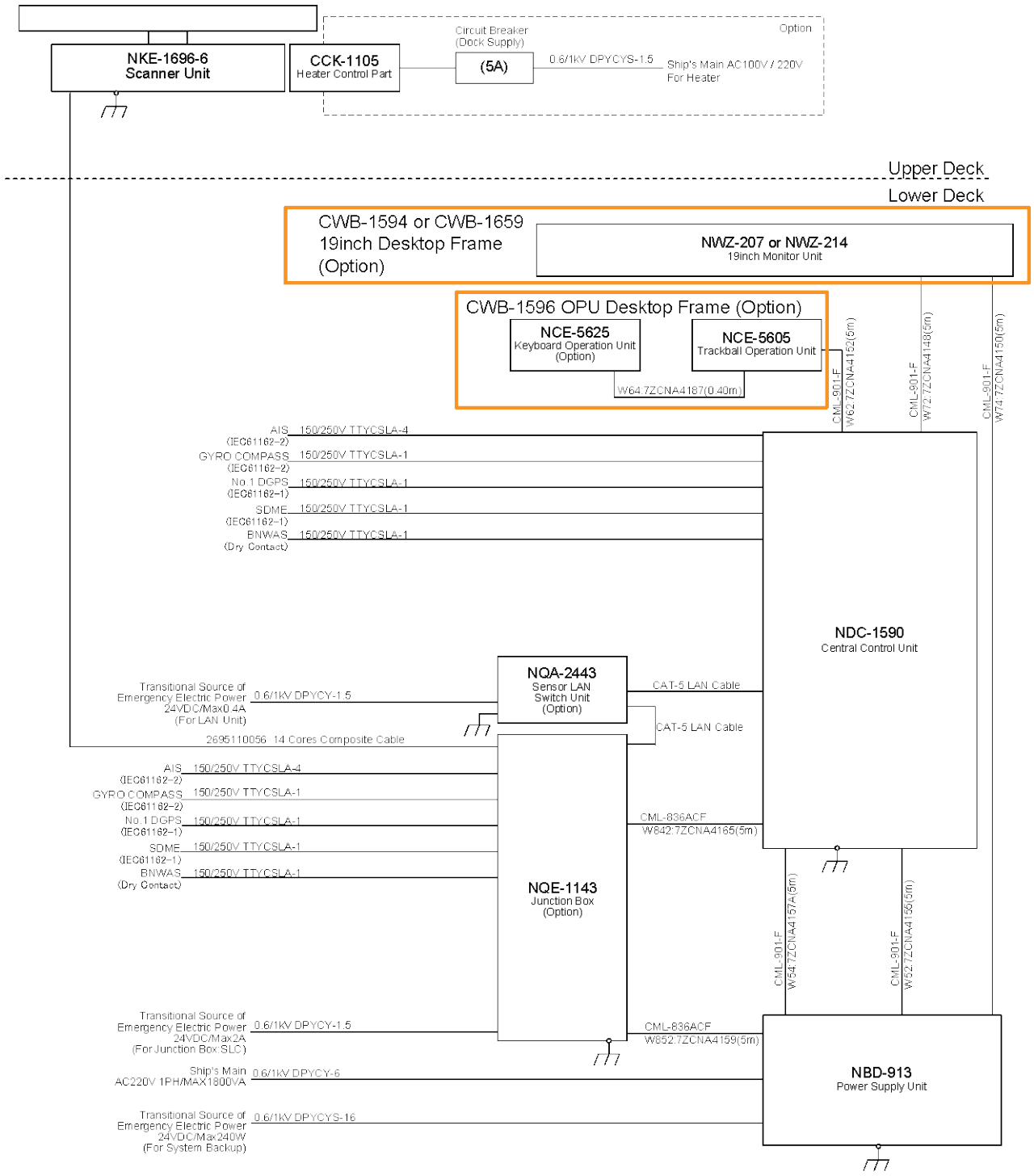
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER etc.)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-7296-6X RADAR

Desktop type

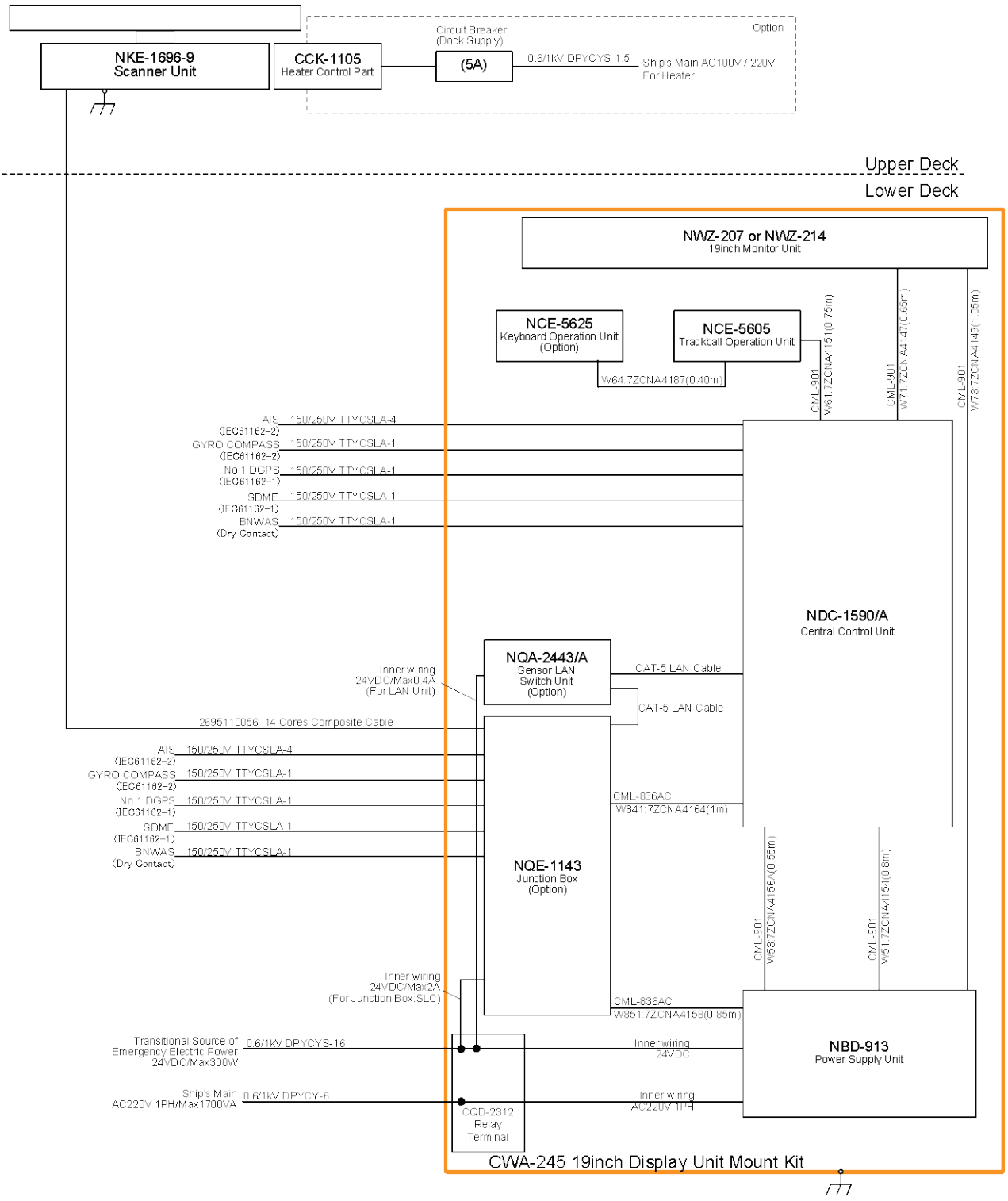


NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc.)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-7296-6X RADAR

8.2.28 JMR-7296-9X General System Diagrams

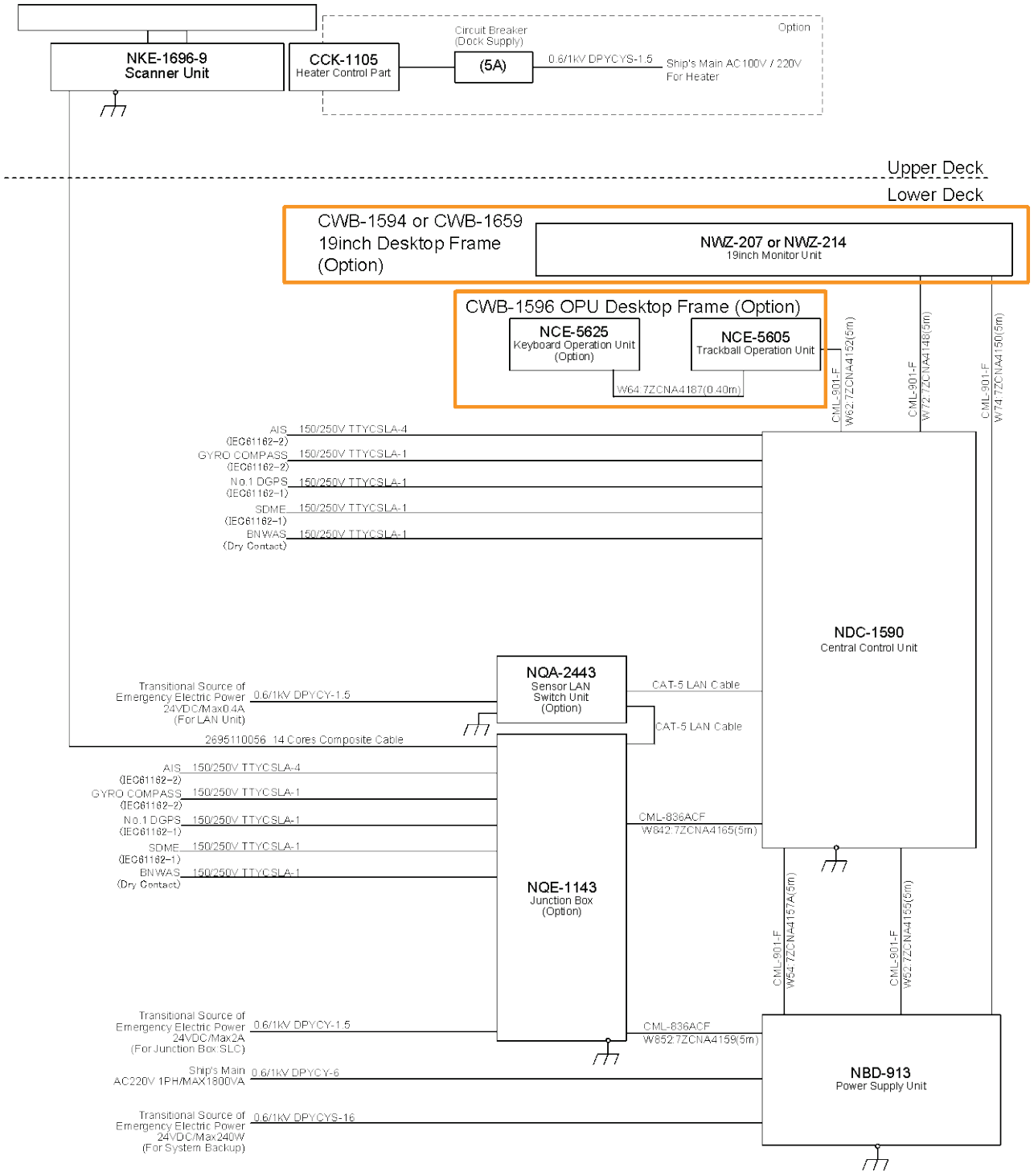
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc.)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-7296-9X RADAR

Desktop type

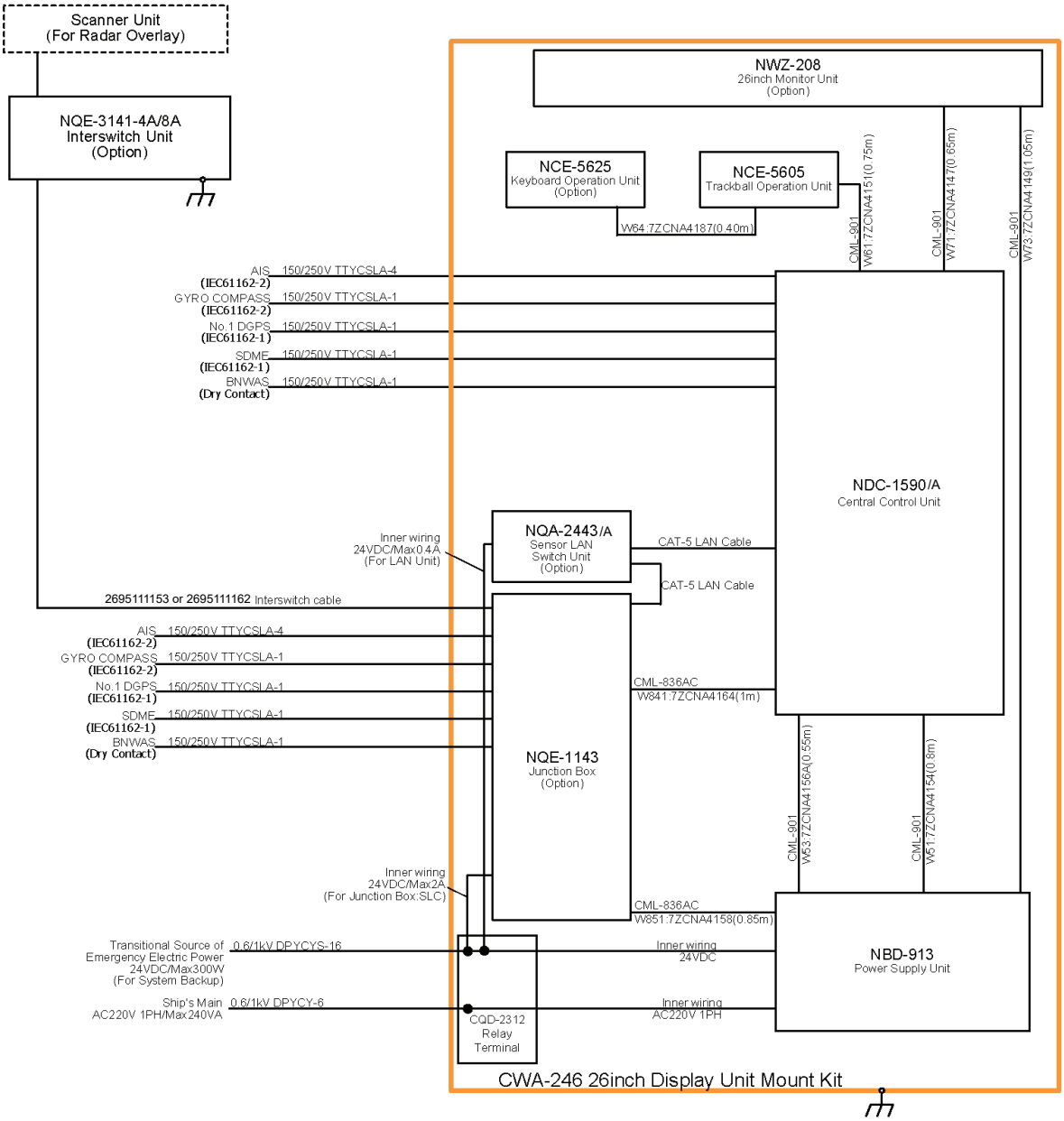


NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER etc.)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR
SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JMR-7296-9X RADAR

8.2.29 JAN-9201 General System Diagrams

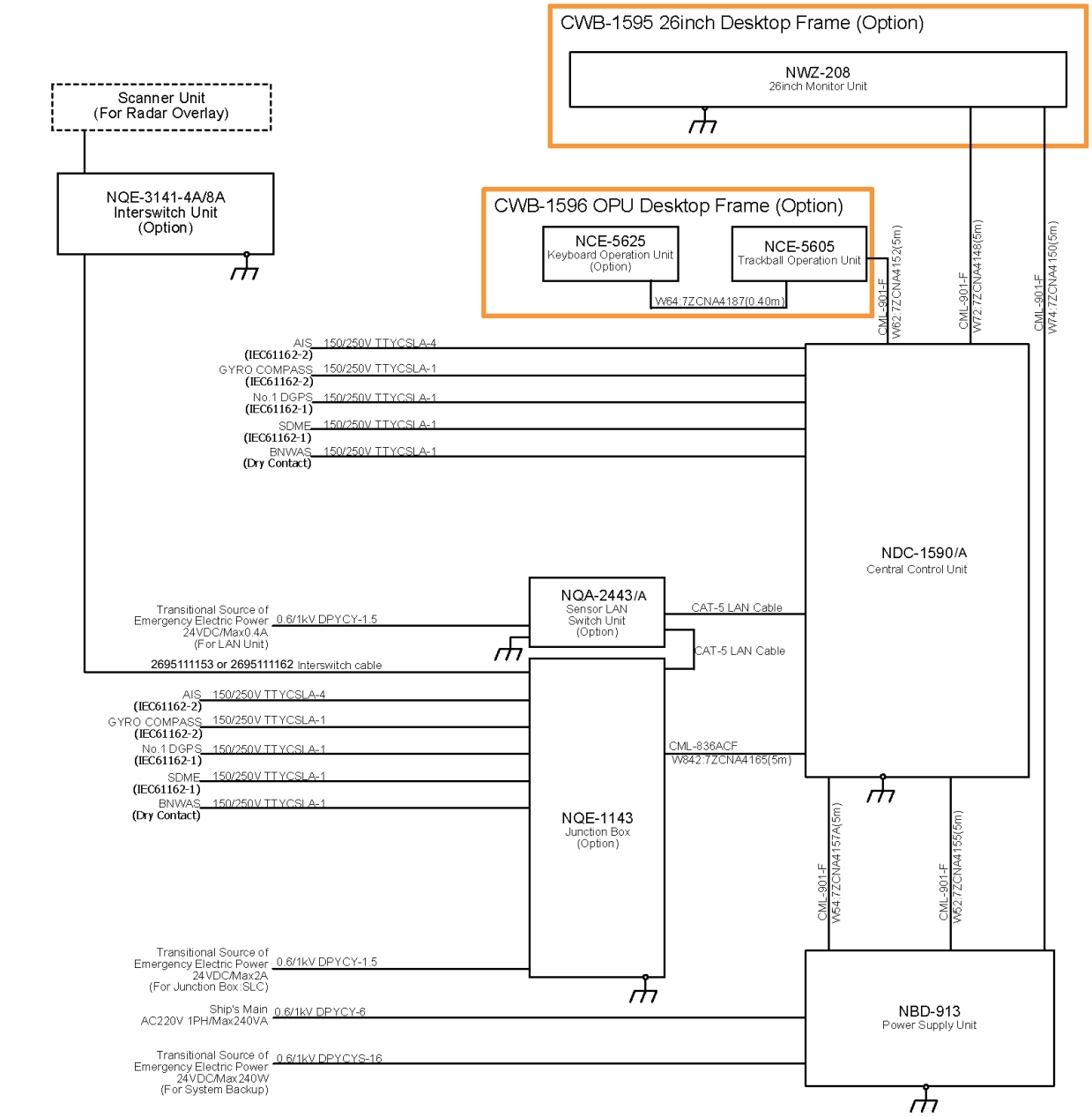
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR
SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JAN-9201 ECDIS

Desktop type

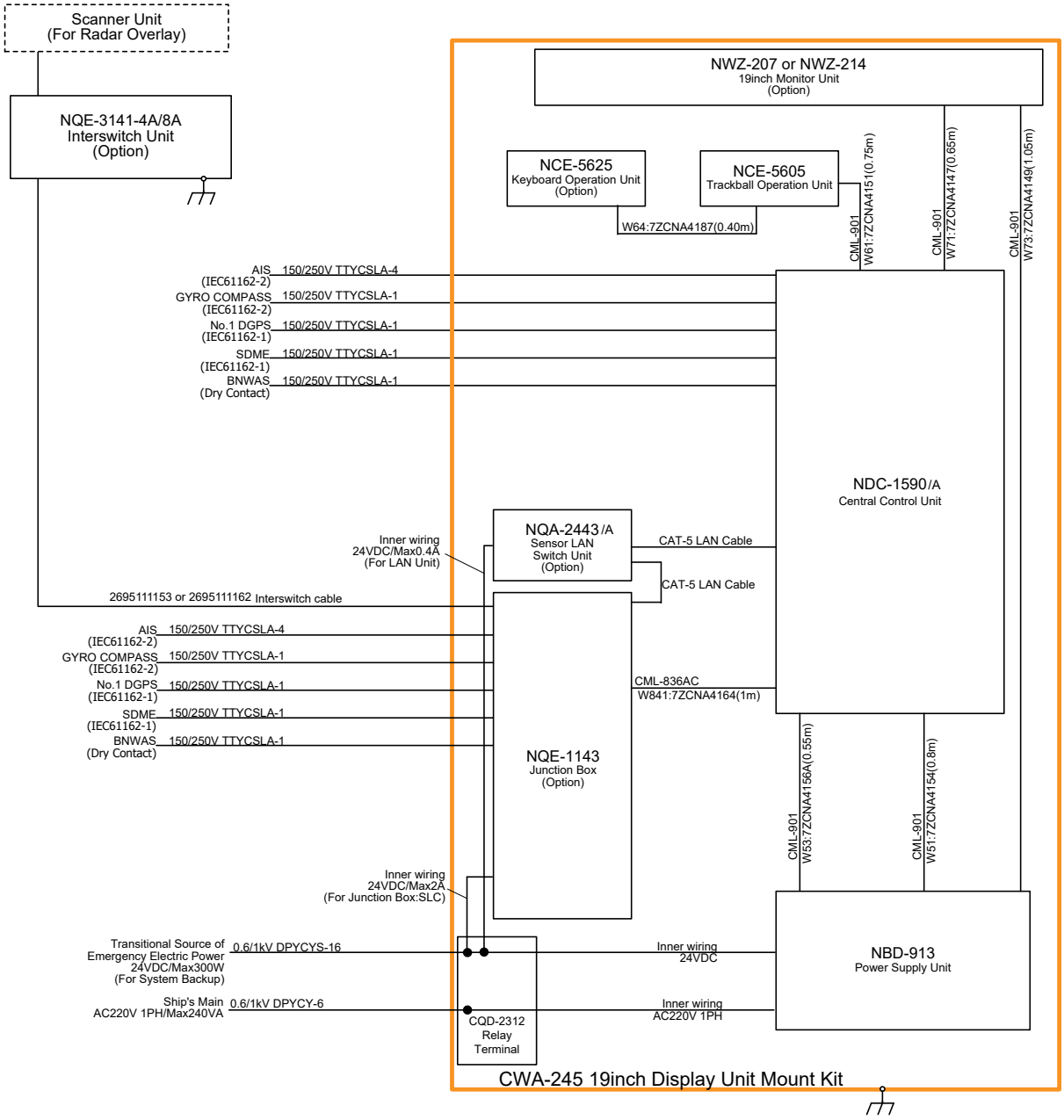


NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR
SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JAN-9201 ECDIS

8.2.30 JAN-7201 General System Diagrams

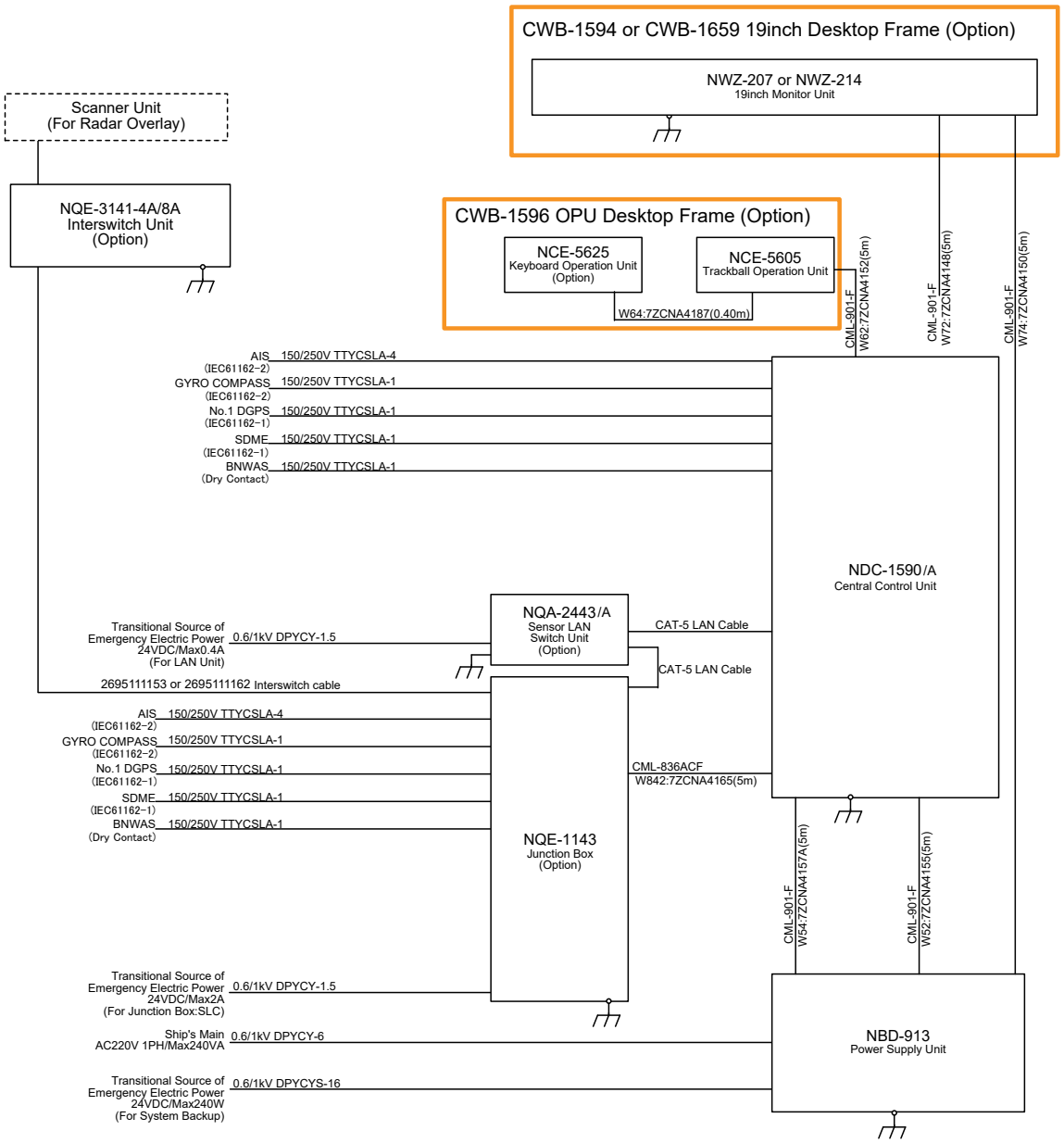
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JAN-7201 ECDIS

Desktop type

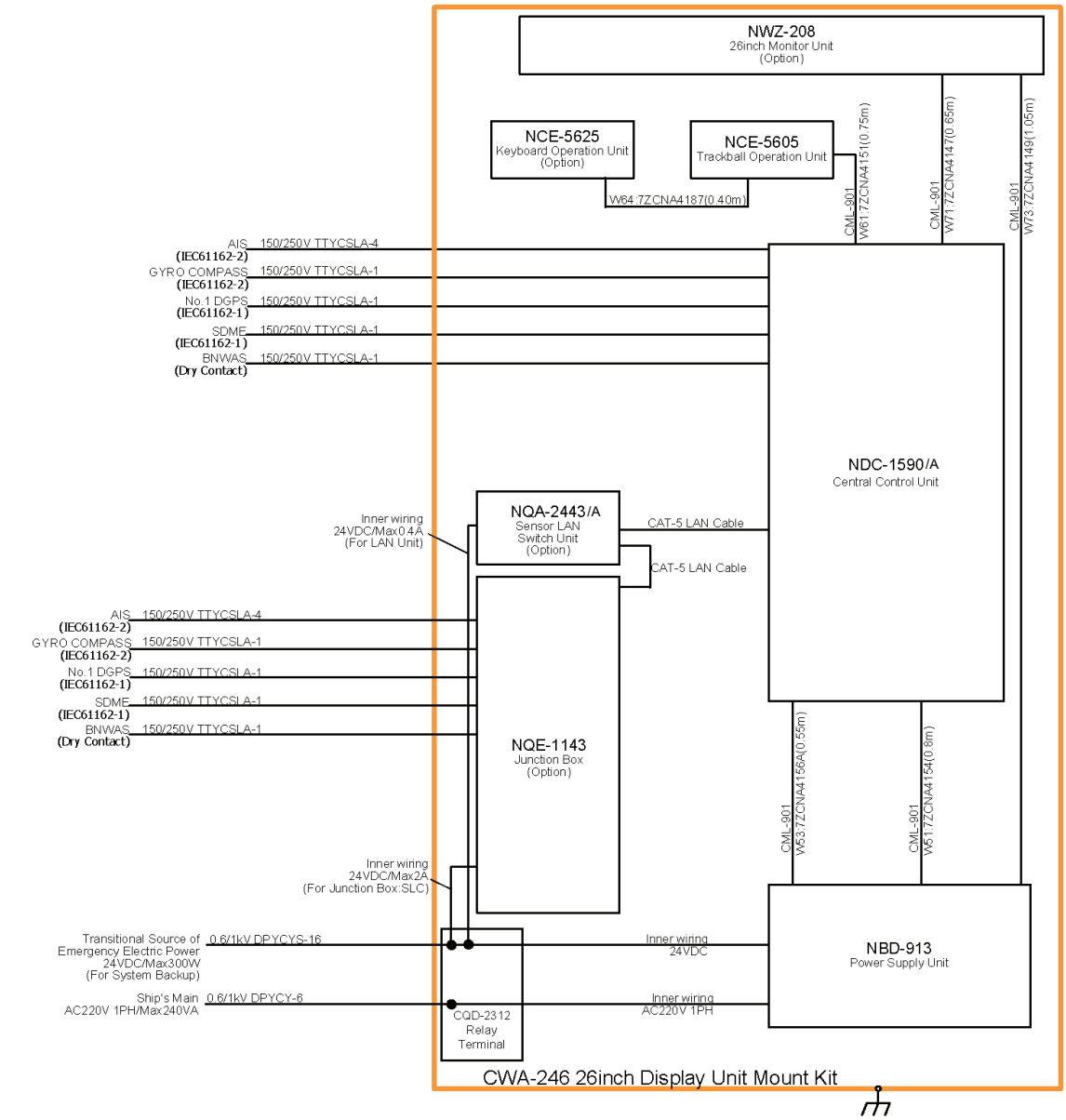


NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JAN-7201 ECDIS

8.2.31 JAN-9202 General System Diagrams

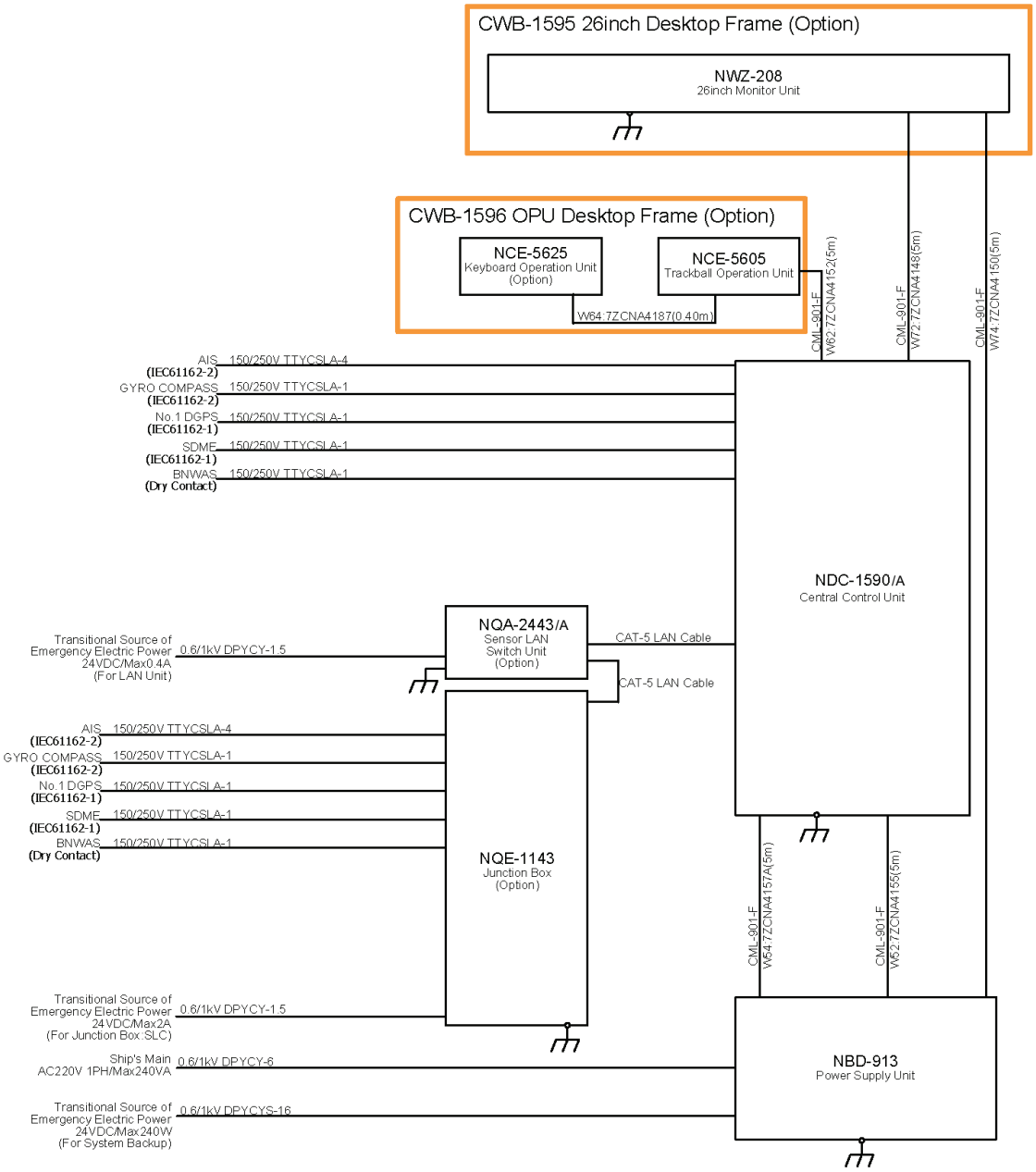
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR
SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JAN-9202 CONNING

Desktop type

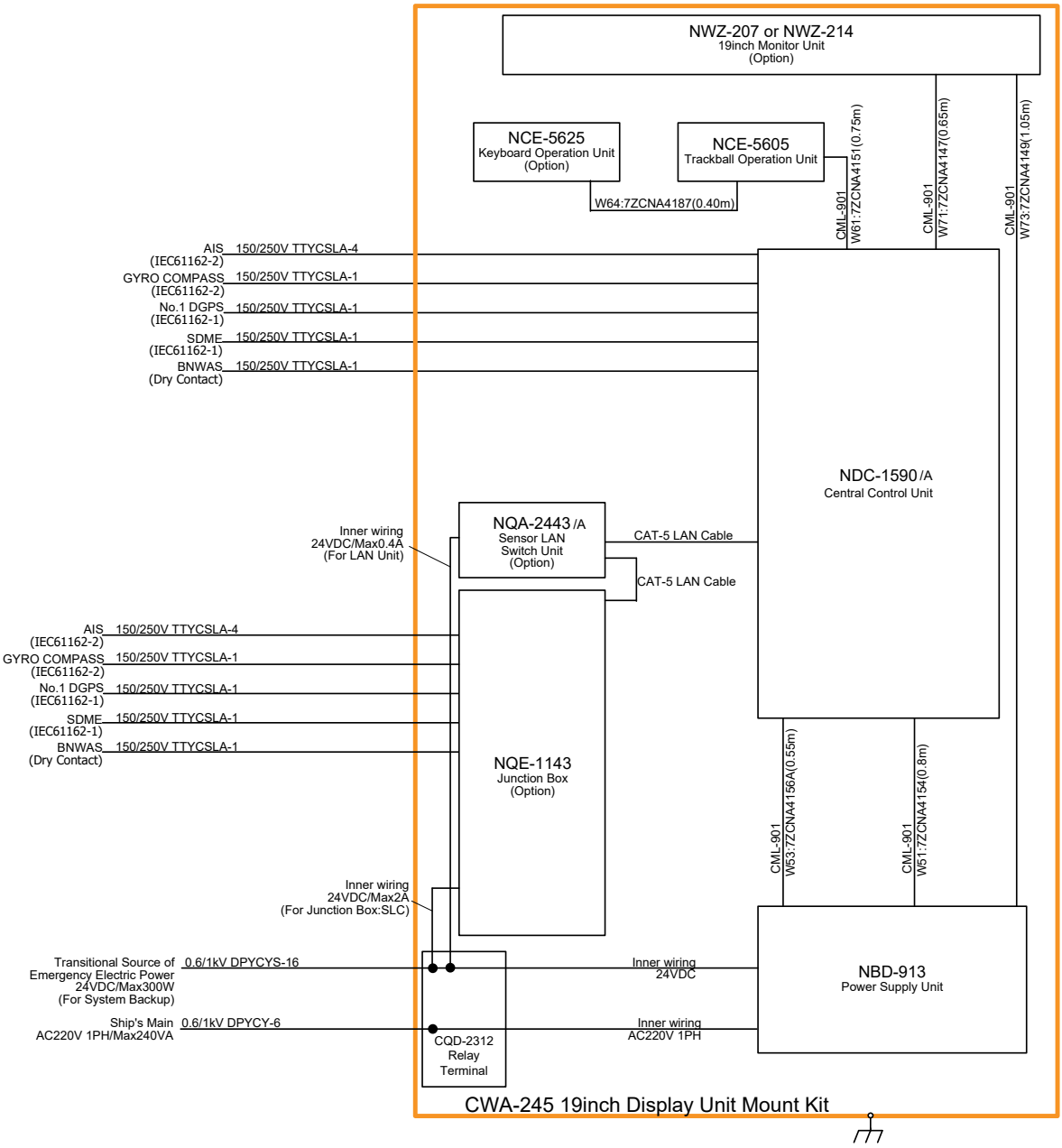


NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR
SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JAN-9202 CONNING

8.2.32 JAN-7202 General System Diagrams

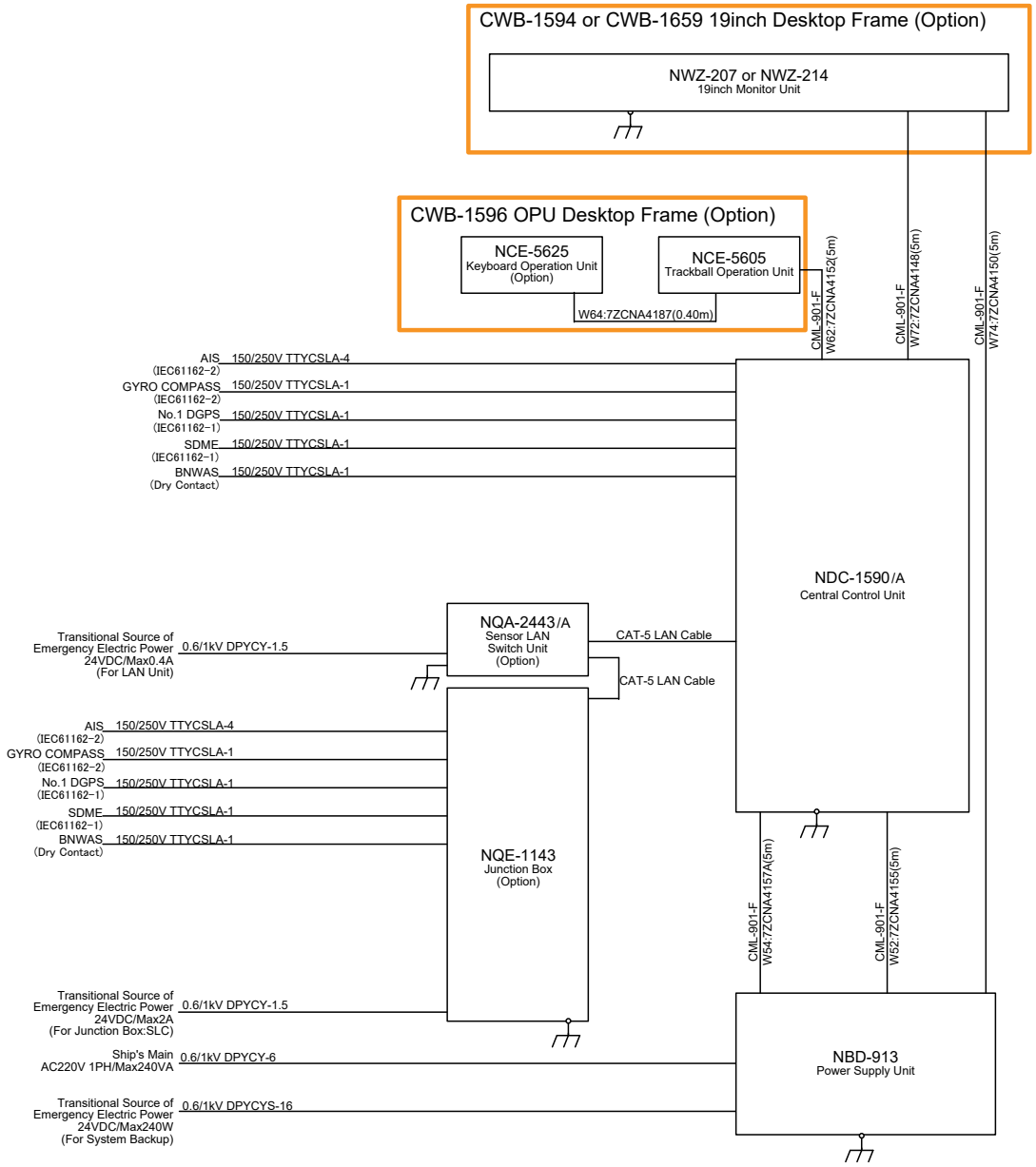
Stand alone type



NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JAN-7202 CONNING

Desktop type



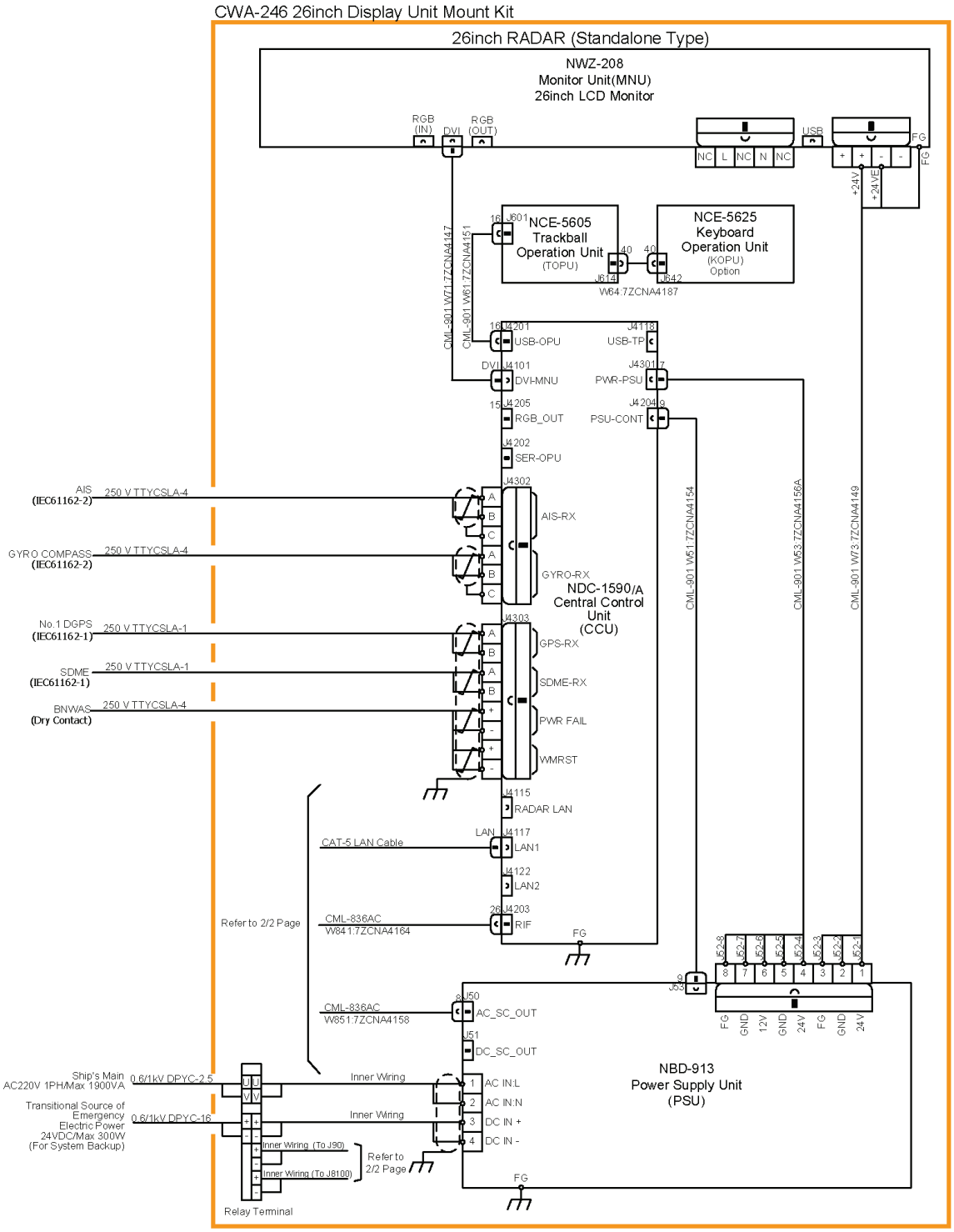
NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

General System Diagram of JAN-7202 CONNING

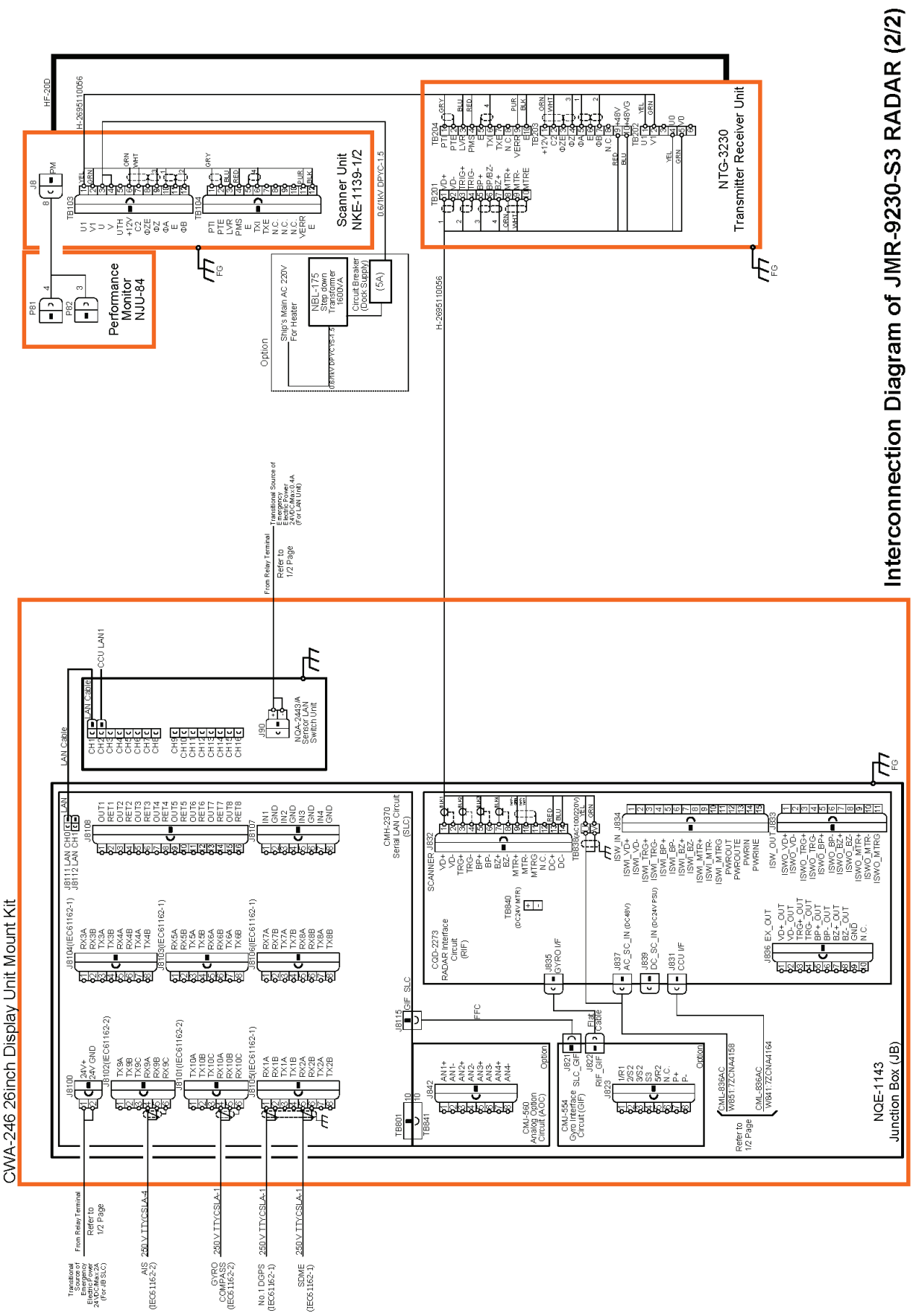
8.3 Interconnection Diagrams

8.3.1 JMR-9230-S3 Interconnection Diagrams

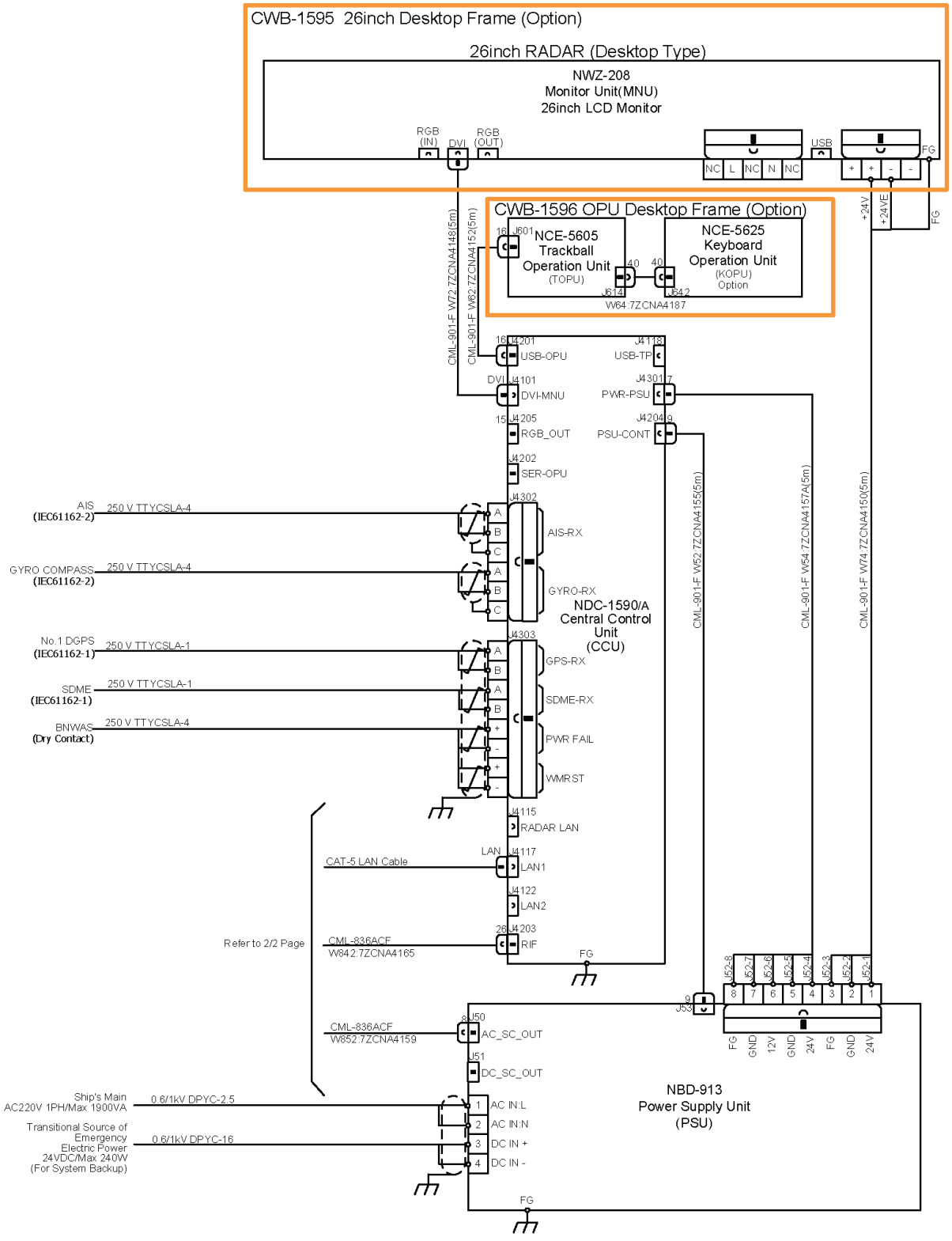
Stand alone type



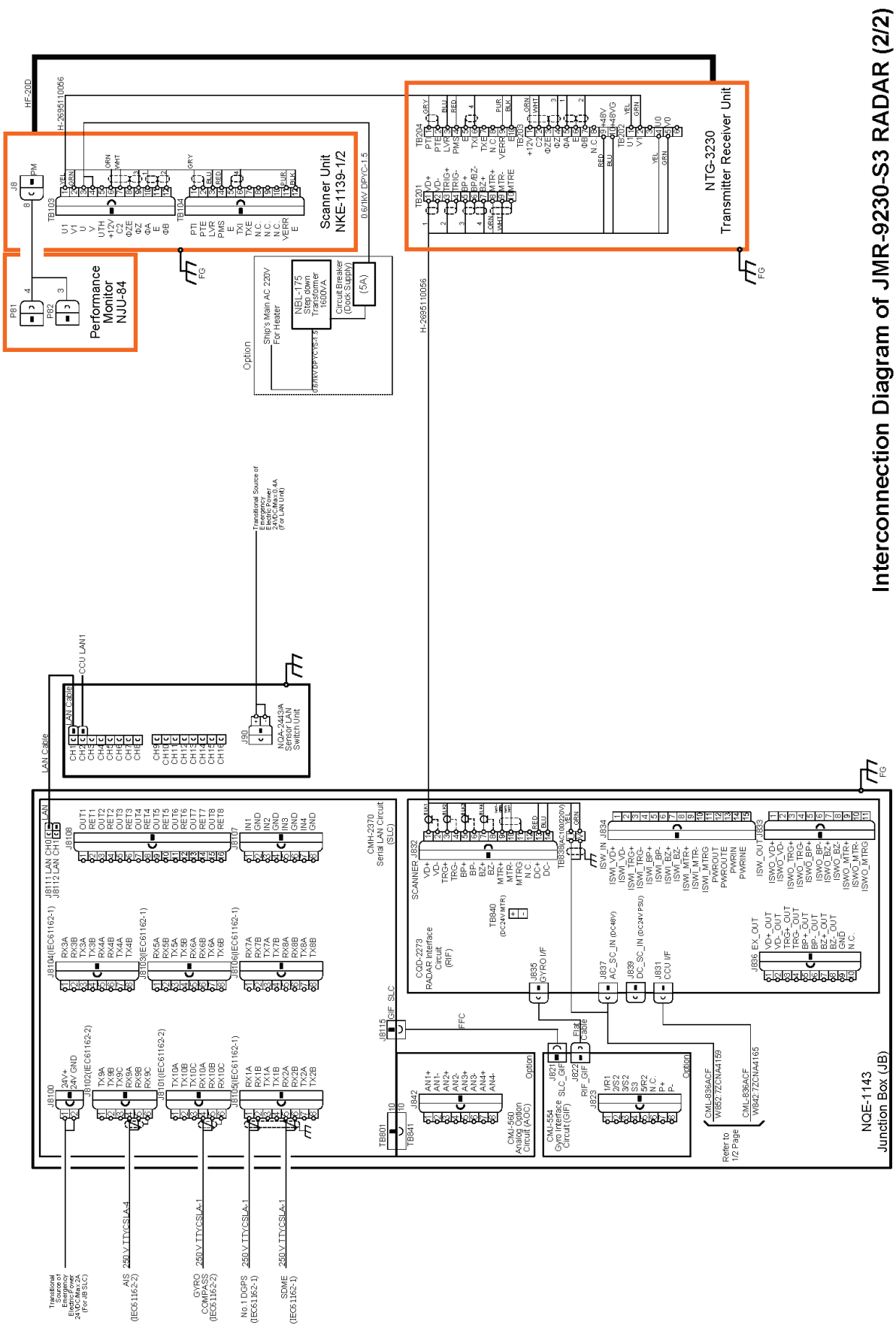
Interconnection Diagram of JMR-9230-S3 RADAR (1/2)


Interconnection Diagram of JMR-9230-S3 RADAR (2/2)
CWA-246 26inch Display Unit Mount Kit
Scanner Unit
NKE-1139-1/2
NTG-3230
Transmitter Receiver Unit
Performance
Monitor
NJU-84
NQE-1143
Junction Box (JB)
NBL-175
Step down
Transformer
1500VA
Circuit Breaker
(Dock Supply)
(5A)
Ship's Main AC 220V
For Heater
Option
HF-20D
H-2695110056
0.6/1kV DPYC-1.5
NQA-2443/A
Sensor LAN
Switch Unit
LAN Cable
CCU LAN1
From Relay Terminal
Refer to
1/2 Page
Transitional Source of
Emergency
Electric Power
24VDC-Max.2A
(For JB SLC)
AIS
(IEC61162-2)
GYRO
COMPASS
(IEC61162-2)
No.1 DGPS
(IEC61162-1)
SDME
(IEC61162-1)
250 V TTYCSLA-4
250 V TTYCSLA-1
250 V TTYCSLA-1
250 V TTYCSLA-1
COD-2273
RADAR Interface
Circuit
(RIF)
CMH-2370
Serial LAN Circuit
(SLC)
CMJ-554
Gyro Interface
Circuit (GIF)
CMJ-560
Analog Option
Circuit (AOC)
CML-836AC
W8617ZCNA4164
CML-836AC
W8617ZCNA4158
Option
Flat
cable
FFC
GIF
SLC
RIF
GIF
SCANNER
GYRO I/F
CCU I/F
AC_SC_IN (DC48V)
DC_SC_IN (DC24V PSU)
EX_OUT
TBB40
(DC24V MTR)
TBB38
AC100/220V)
Refer to
1/2 Page
FG

Desktop type

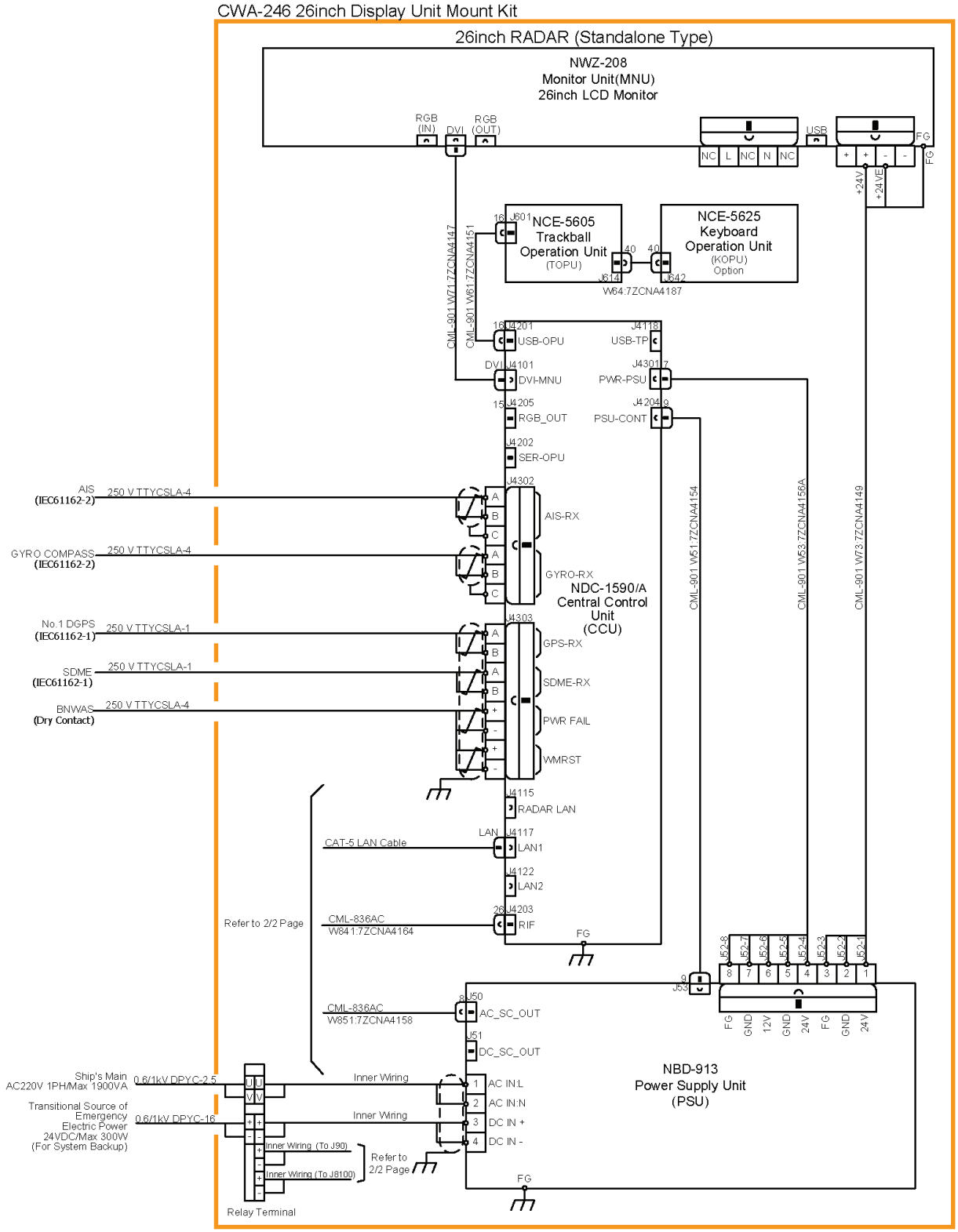


Interconnection Diagram of JMR-9230-S3 RADAR (1/2)

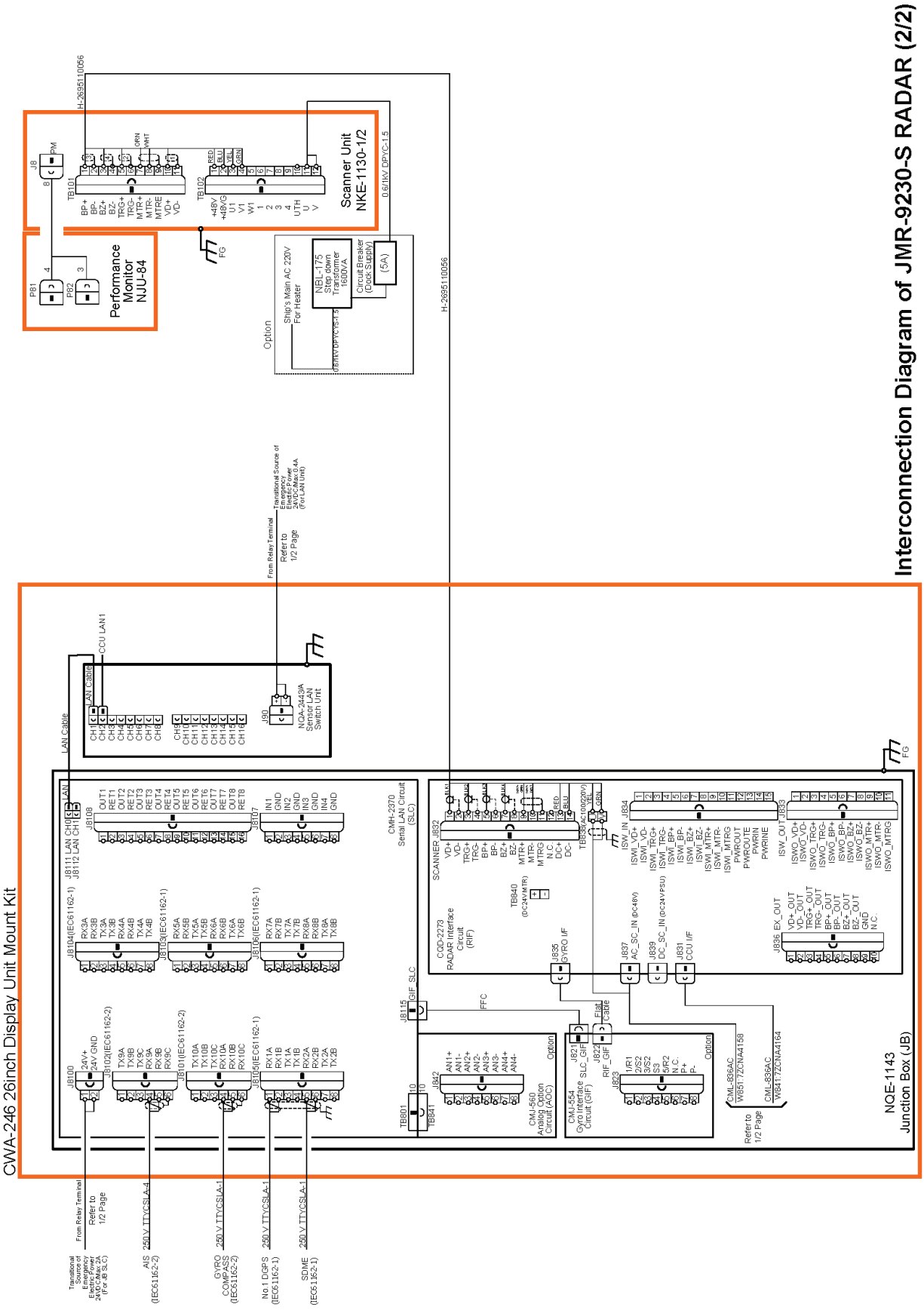

Interconnection Diagram of JMR-9230-S3 RADAR (2/2)
Scanner Unit
NKE-1139-1/2
NTG-3230
Transmitter Receiver Unit
Performance
Monitor
NJU-84
NQE-1143
Junction Box (JB)
NBL-175
Step down
Transformer
Circuit Breaker
(Dock Supply)
Ship's Main AC 220V
For Heater
Option
NQA-2443/A
Sensor LAN
Switch Unit
LAN Cable
CCU LAN1
H-2695110056
HF-20D
COD-2273
RADAR Interface
Circuit
(RIF)
CMH-2370
Serial LAN Circuit
(SLC)
CMJ-554
Gyro Interface
Circuit (GIF)
CMJ-560
Analog Option
Circuit (AOC)
CML-836ACF
W842-7ZCNA4165
Refer to
1/2 Page
FFC
Flat
cable
GIF
SLC
SCANNER
GYRO I/F
AC_SC_IN (0C48V)
DC_SC_IN (0C24V PSU)
CCU I/F
EX_OUT
Transitional Source of Emergency Electric Power 24VDC Max.2A (For JB SLC)
AIS (IEC61162-2)
GYRO COMPASS (IEC61162-2)
No.1 DGPS (IEC61162-1)
SDME (IEC61162-1)
250 V TTYCSLA-4
250 V TTYCSLA-1

8.3.2 JMR-9230-S Interconnection Diagrams

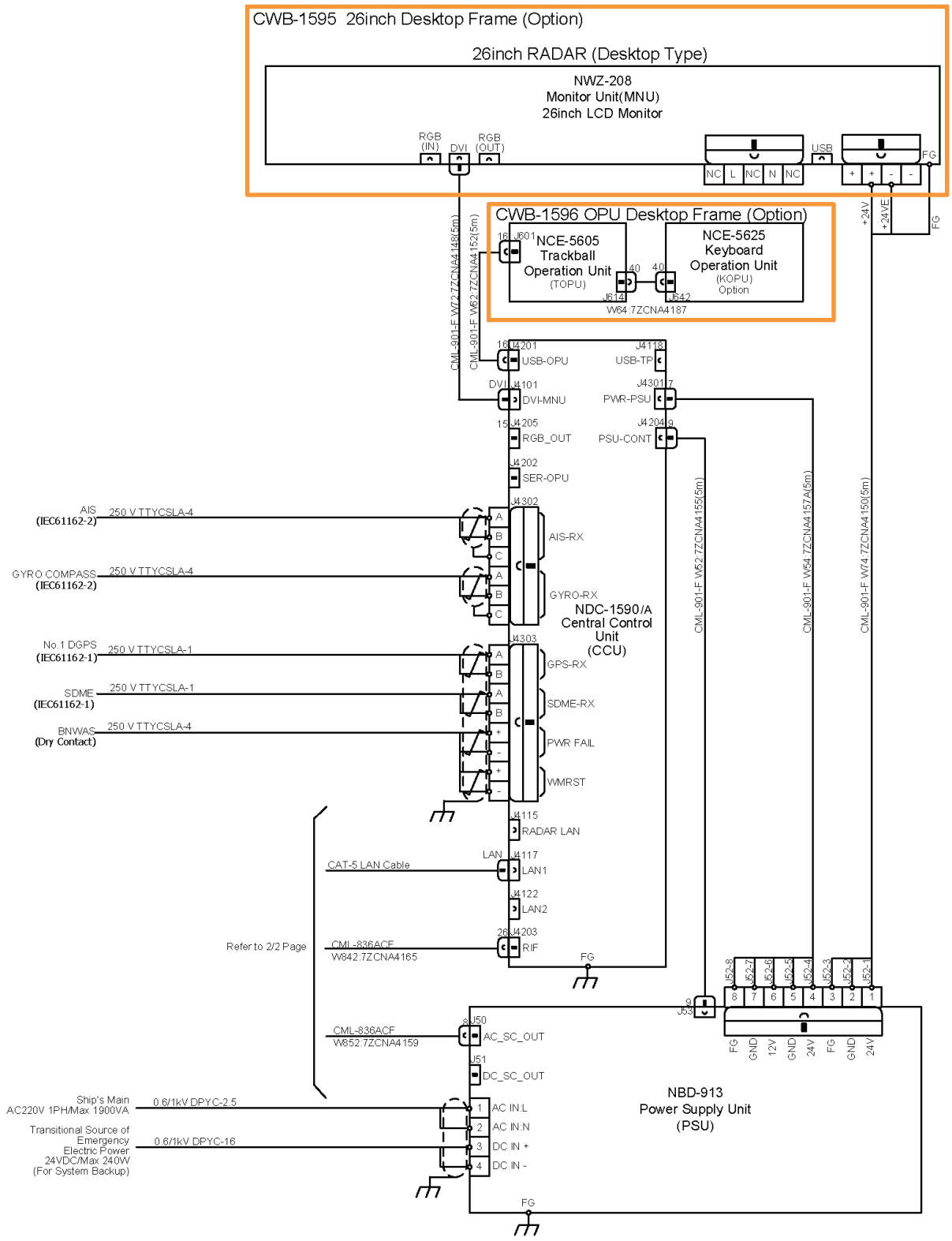
Stand alone type



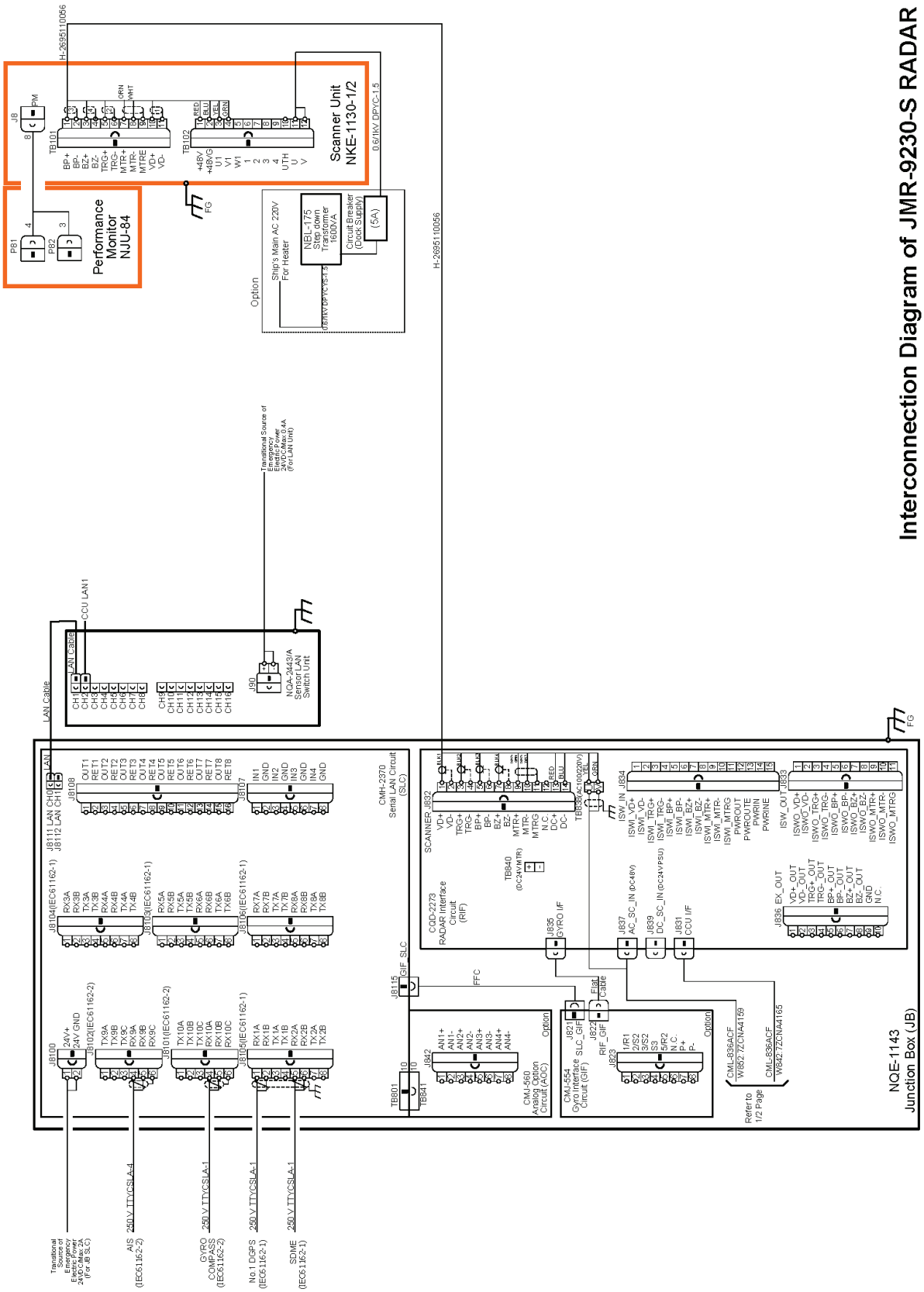
Interconnection Diagram of JMR-9230-S RADAR (1/2)


Interconnection Diagram of JMR-9230-S RADAR (2/2)
CWA-246 26inch Display Unit Mount Kit
Scanner Unit
NKE-1130-1/2
Performance Monitor
NJU-84
Option
Ship's Main AC 220V
For Heater
NBL-175
Step down
Transformer
1500VA
Circuit Breaker
(Dock Supply)
(5A)
0.6/1kV DPYC-1.5
H-2695110056
NQE-1143
Junction Box (JB)
NOA-2443/A
Sensor LAN
Switch Unit
LAN Cable
CCU LAN 1
From Relay Terminal
Refer to
1/2 Page
Transitional Source of Emergency Electric Power
24VDC-Max.0.4A
(For LAN Unit)
COD-2273
RADAR Interface
Circuit
(RIF)
CMH-2370
Serial LAN Circuit
(SLC)
CMJ-554
Gyro Interface
Circuit (GIF)
CMJ-560
Analog Option
Circuit (AOC)
CML-886AC
CML-886AC
Refer to
1/2 Page
AIS
(IEC61162-2)
GYRO
COMPASS
(IEC61162-2)
No.1 DGPS
(IEC61162-1)
SDME
(IEC61162-1)
250 V TTYCSLA-4
250 V TTYCSLA-1
250 V TTYCSLA-1
250 V TTYCSLA-1
FFC
Flat cable
FG

Desktop type

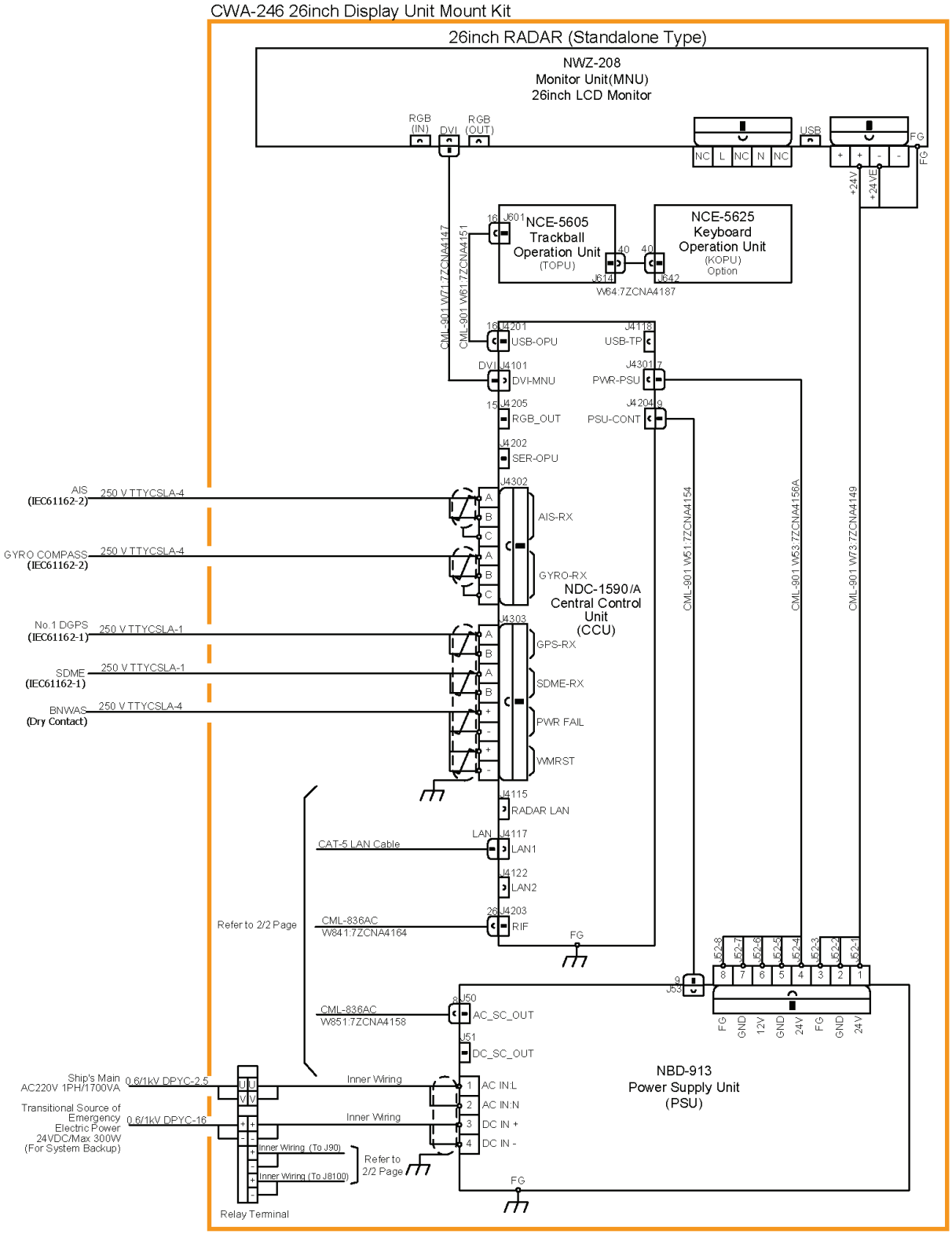


Interconnection Diagram of JMR-9230-S RADAR (1/2)

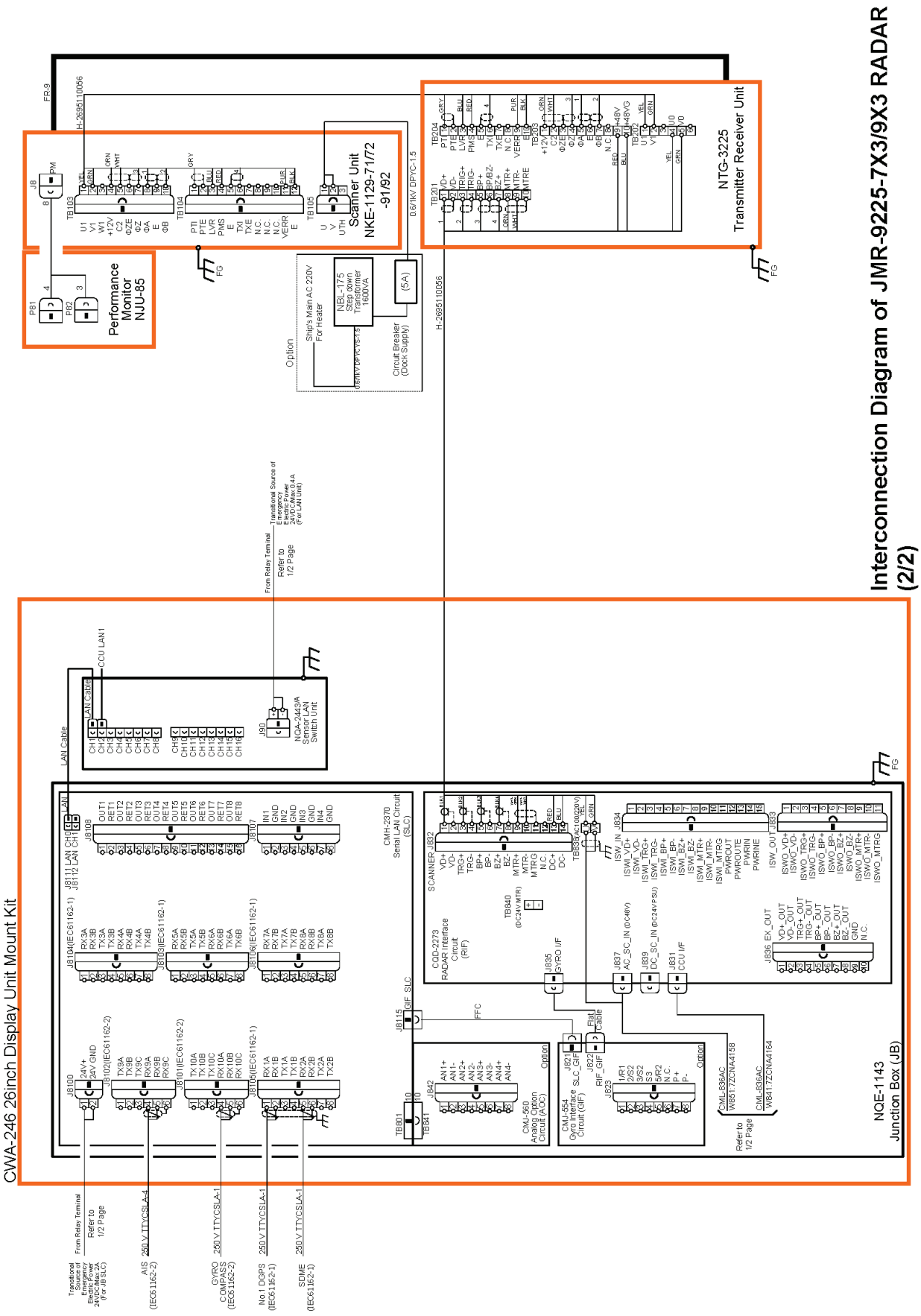

Interconnection Diagram of JMR-9230-S RADAR (2/2)
Scanner Unit
NKE-1130-1/2
Performance Monitor
NJU-84
Option
Ship's Main AC 220V For Heater
NBL-175 Step down Transformer 1500VA
Circuit Breaker (Dock Supply)
(5A)
0.6/1kV DPYC-1.5
H-2695110056
LAN Cable
CCU LAN 1
NQA-2443/A Sensor LAN Switch Unit
Transitional Source of Emergency Electric Power 24VDC-Max.0.4A (For LAN Unit)
NQE-1143
Junction Box (JB)
SCANNER J832
COD-2273 RADAR Interface Circuit (RIF)
CMH-2370 Serial LAN Circuit (SLC)
CMJ-554 Gyro Interface Circuit (GIF)
CMJ-560 Analog Option Circuit (AOC)
Refer to 1/2 Page
Transitional Source of Emergency Electric Power 24VDC-Max.2A (For JB SLC)
AIS (IEC61162-2)
GYRO COMPASS (IEC61162-2)
No.1 DGPS (IEC61162-1)
SDME (IEC61162-1)
250 V TTYCSLA-4
250 V TTYCSLA-1

8.3.3 JMR-9225-7X3/9X3 Interconnection Diagrams

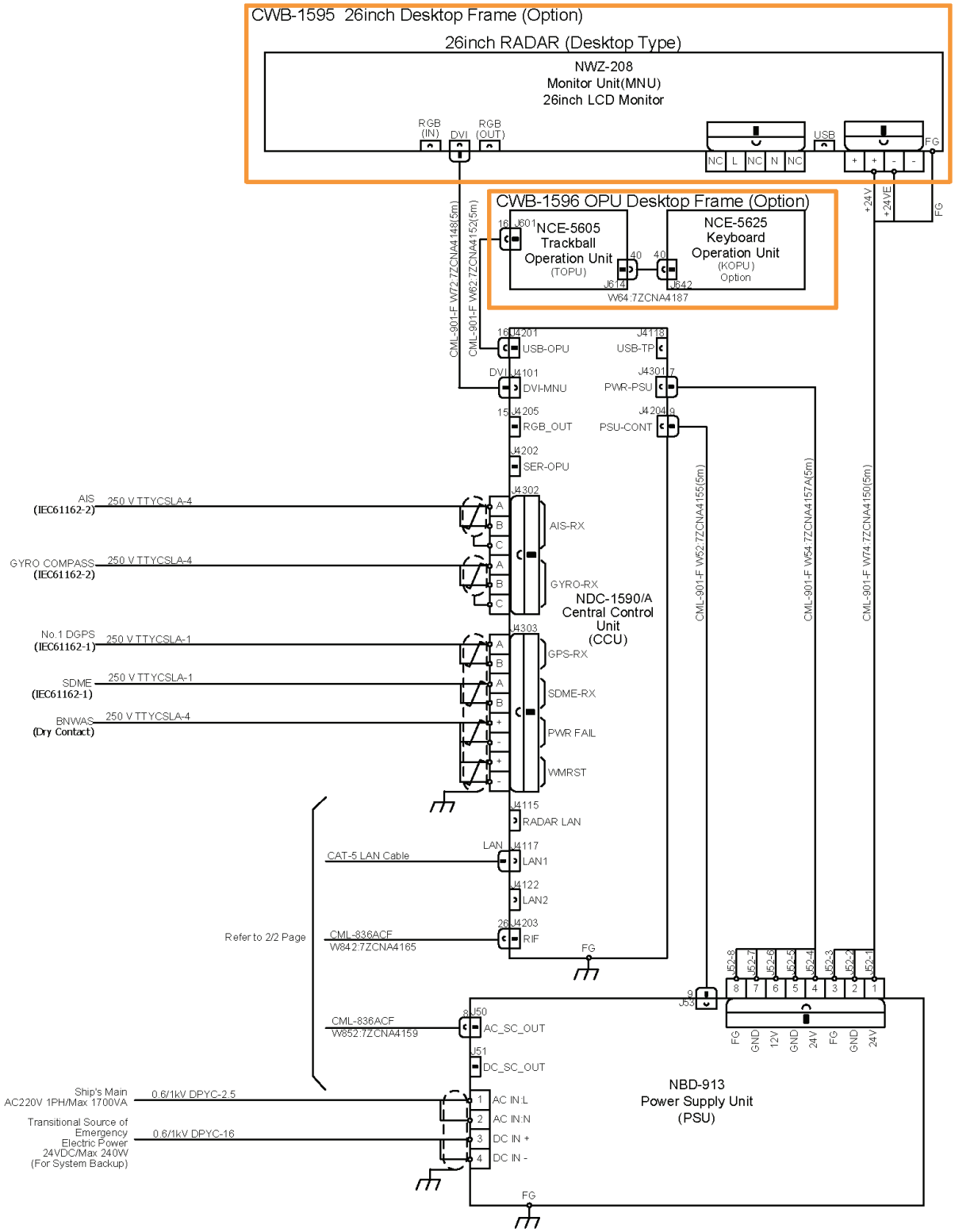
Stand alone type



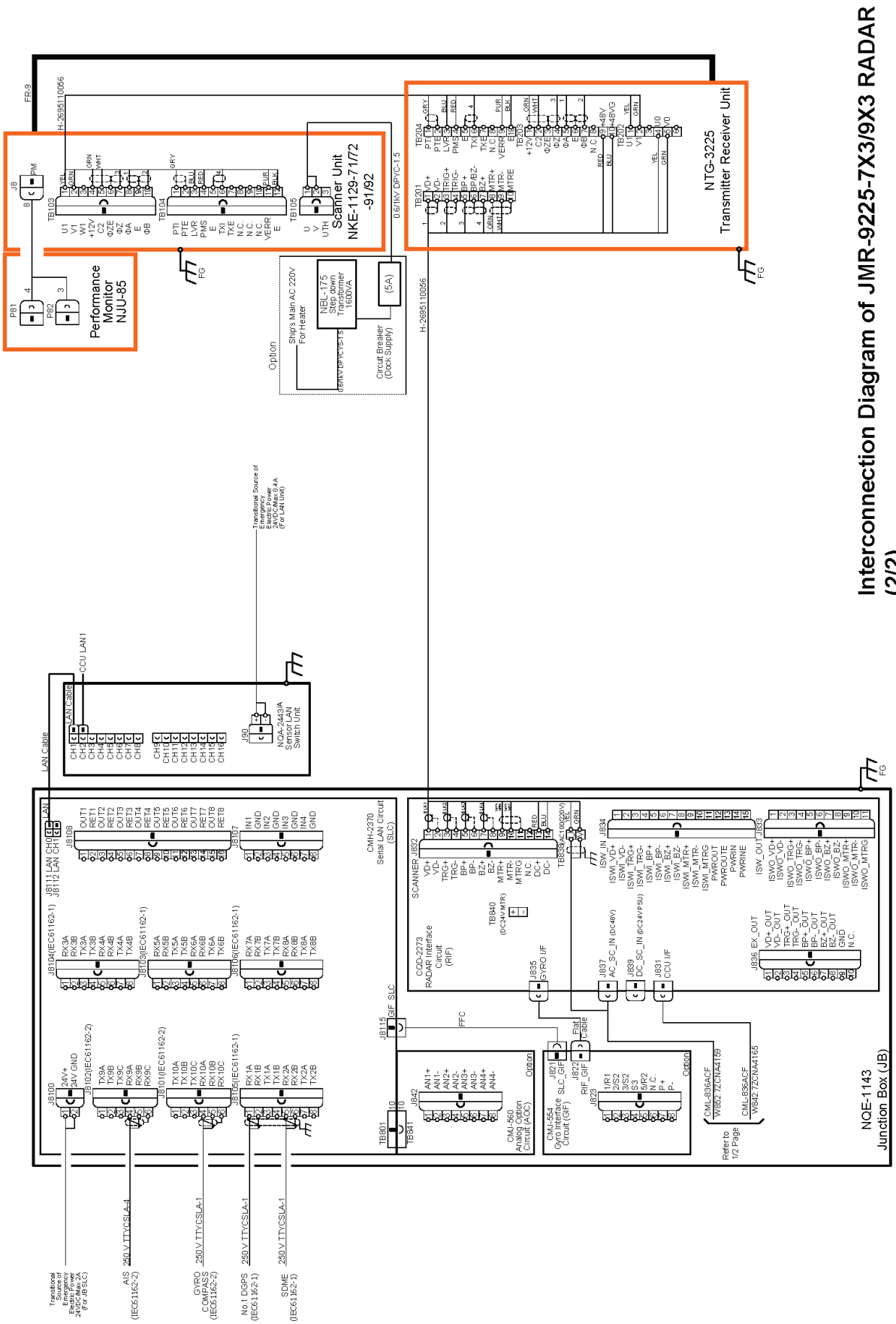
Interconnection Diagram of JMR-9225-7X3/9X3 RADAR (1/2)


Interconnection Diagram of JMR-9225-7X3/9X3 RADAR
(2/2)
CWA-246 26inch Display Unit Mount Kit
NQE-1143
Junction Box (JB)
Performance
Monitor
NJU-85
Scanner Unit
NKE-1129-71/72
-91/92
NTG-3225
Transmitter Receiver Unit
Option
Ship's Main AC 220V
For Heater
NEL-175
Step down
Transformer
1600VA
Circuit Breaker
(Dock Supply)
(5A)
H-2695110056
0.6/1kV DPYC-1.5
FR-9
PB1
PB2
J8
TB103
TB104
TB105
TB201
TB204
TB202
From Relay Terminal
Refer to
1/2 Page
Transitional Source of
Emergency
Electric Power
24VDC-Max.0.4A
(For LAN Unit)
LAN Cable
CCU LAN 1
NQA-2443/A
Sensor LAN
Switch Unit
J90
J8111 LAN CH0
J8112 LAN CH1
J8108
J8107
J8104(IEC61162-1)
J8103(IEC61162-1)
J8106(IEC61162-1)
J8100
J8102(IEC61162-2)
J8101(IEC61162-2)
J8105(IEC61162-1)
CMH-2370
Serial LAN Circuit
(SLC)
SCANNER J832
J834
J833
COD-2273
RADAR Interface
Circuit
(RIF)
TB840
(DC24V MTR)
J835
GYRO I/F
J837
AC_SC_IN (DC48V)
J839
DC_SC_IN (DC24V PSU)
J831
CCU I/F
J836 EX_OUT
J8115
GIF_SLC
FFC
TB801
TB841
J842
CMJ-560
Analog Option
Circuit (AOC)
Option
J821
SLC_GIF
J822
RIF_GIF
CMJ-554
Gyro Interface
Circuit (GIF)
J823
Option
Flat
cable
CML-838AC
W8617ZCNA4158
CML-838AC
W8417ZCNA4164
Refer to
1/2 Page
AIS
(IEC61162-2)
GYRO
COMPASS
(IEC61162-2)
No.1 DGPS
(IEC61162-1)
SDME
(IEC61162-1)
250 V TTYCSLA-4
250 V TTYCSLA-1
250 V TTYCSLA-1
250 V TTYCSLA-1
Transitional
Source of
Emergency
Electric Power
24VDC-Max.2A
(For JB SLC)
From Relay Terminal
Refer to
1/2 Page

Desktop type

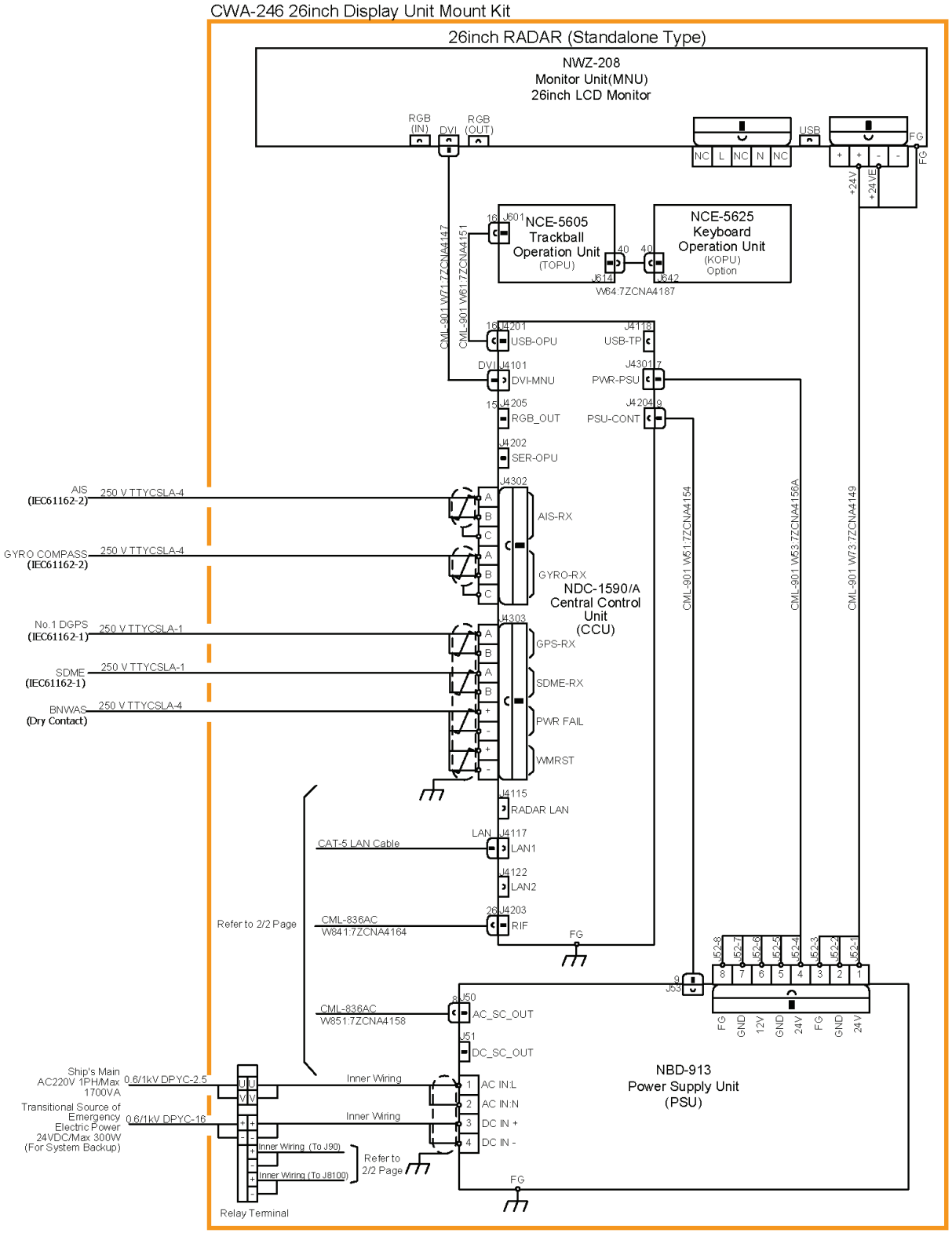


Interconnection Diagram of JMR-9225-7X3/9X3 RADAR (1/2)

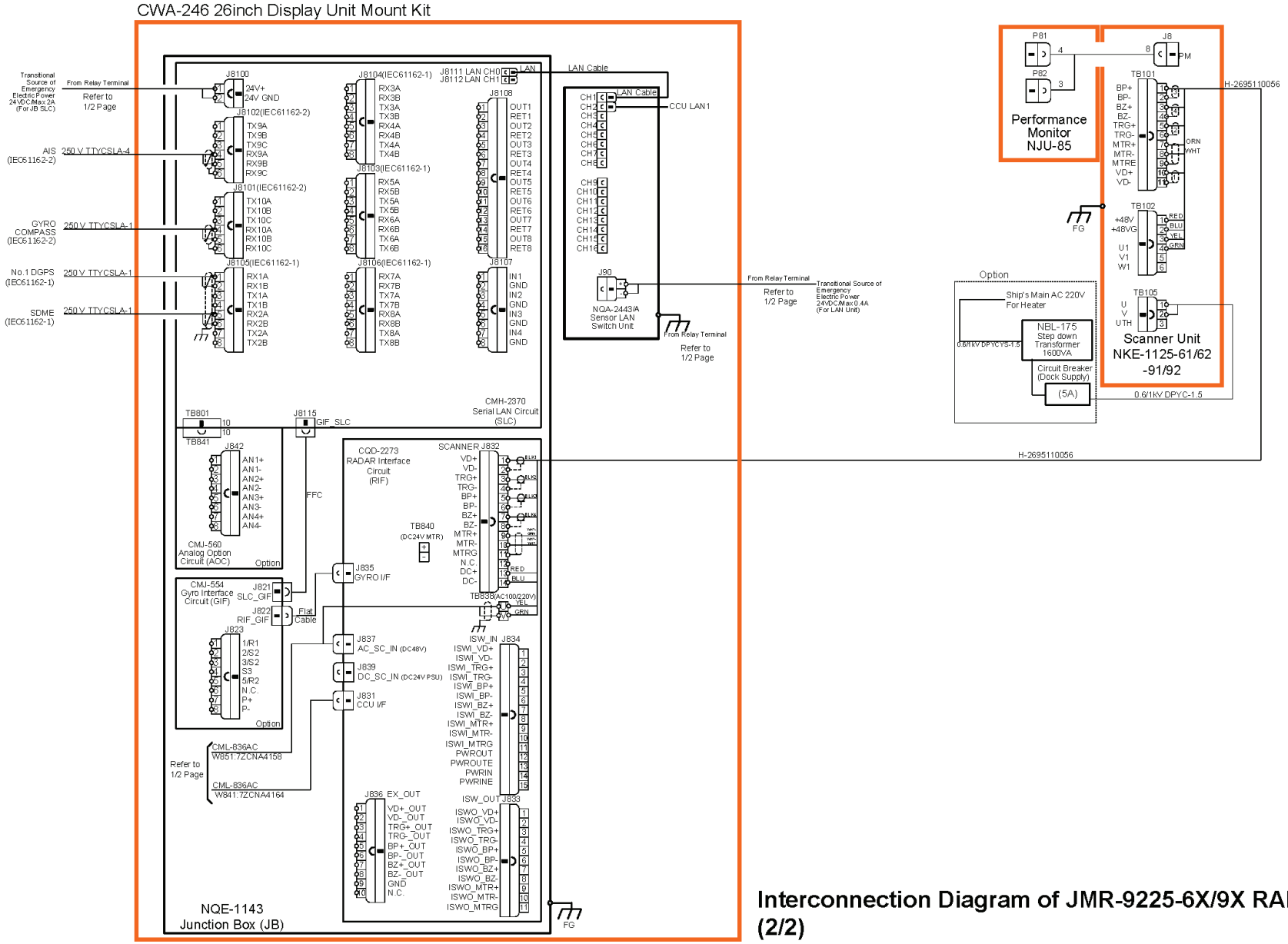

Interconnection Diagram of JMR-9225-7X3/9X3 RADAR
(2/2)
NTG-3225
Transmitter Receiver Unit
Scanner Unit
NKE-1129-71/72
-91/92
Performance
Monitor
NJU-85
NQE-1143
Junction Box (JB)
NQA-2443/A
Sensor LAN
Switch Unit
NBL-175
Step down
Transformer
1600VA
Option
Ship's Main AC 220V
For Heater
Circuit Breaker
(Dock Supply)
(5A)
LAN Cable
CCU LAN 1
COD-2273
RADAR Interface
Circuit
(RIF)
CMH-2370
Serial LAN Circuit
(SLC)
CMJ-554
Gyro Interface
Circuit (GIF)
CMJ-560
Analog Option
Circuit (AOC)
GYRO
COMPASS
(IEC61162-2)
SDME
(IEC61162-1)
No.1 DGPS
(IEC61162-1)
AIS
(IEC61162-2)
250 V TTYCSLA-1
250 V TTYCSLA-4
Refer to
1/2 Page

8.3.4 JMR-9225-6X/9X Interconnection Diagrams

Stand alone type

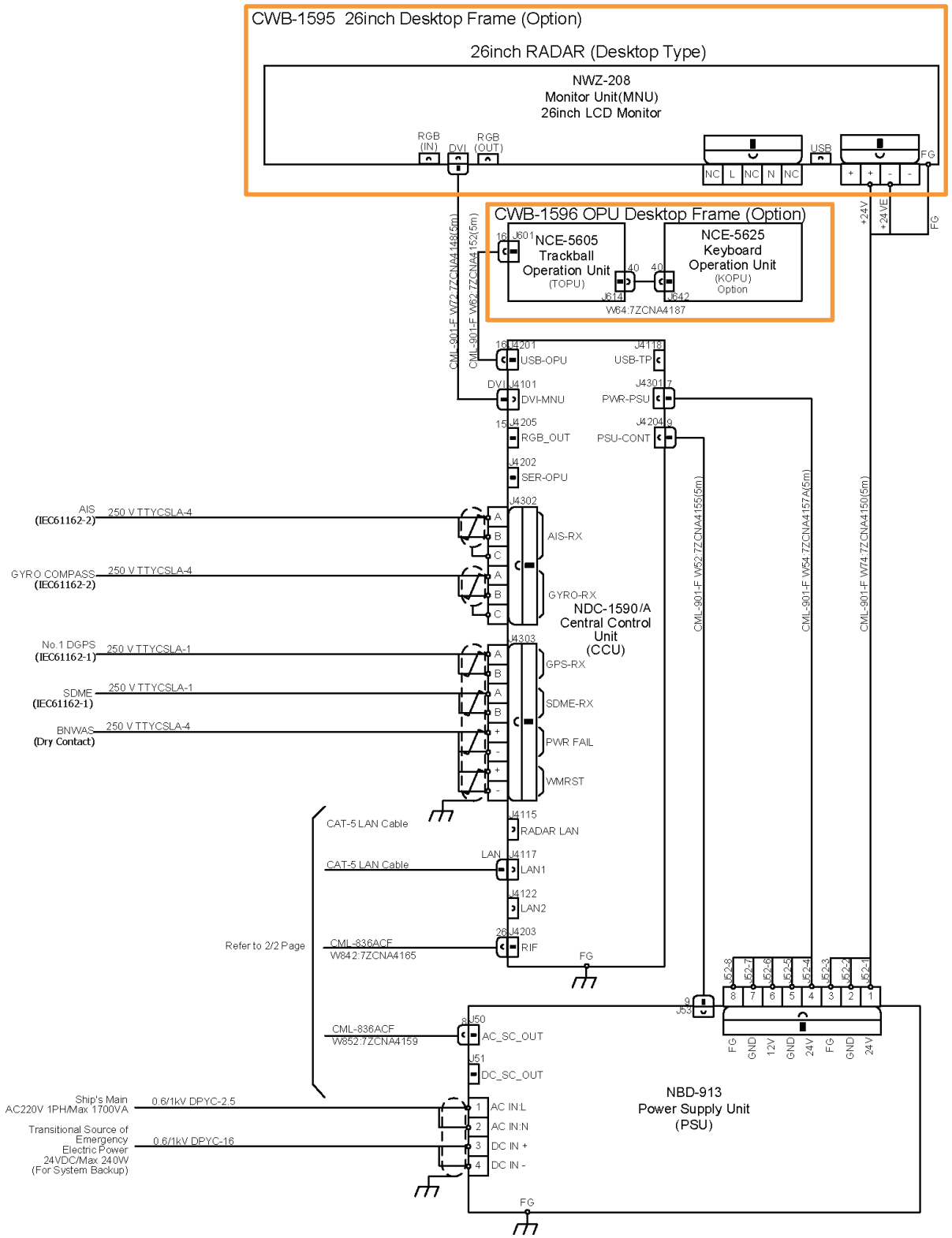


Interconnection Diagram of JMR-9225-6X/9X RADAR (1/2)

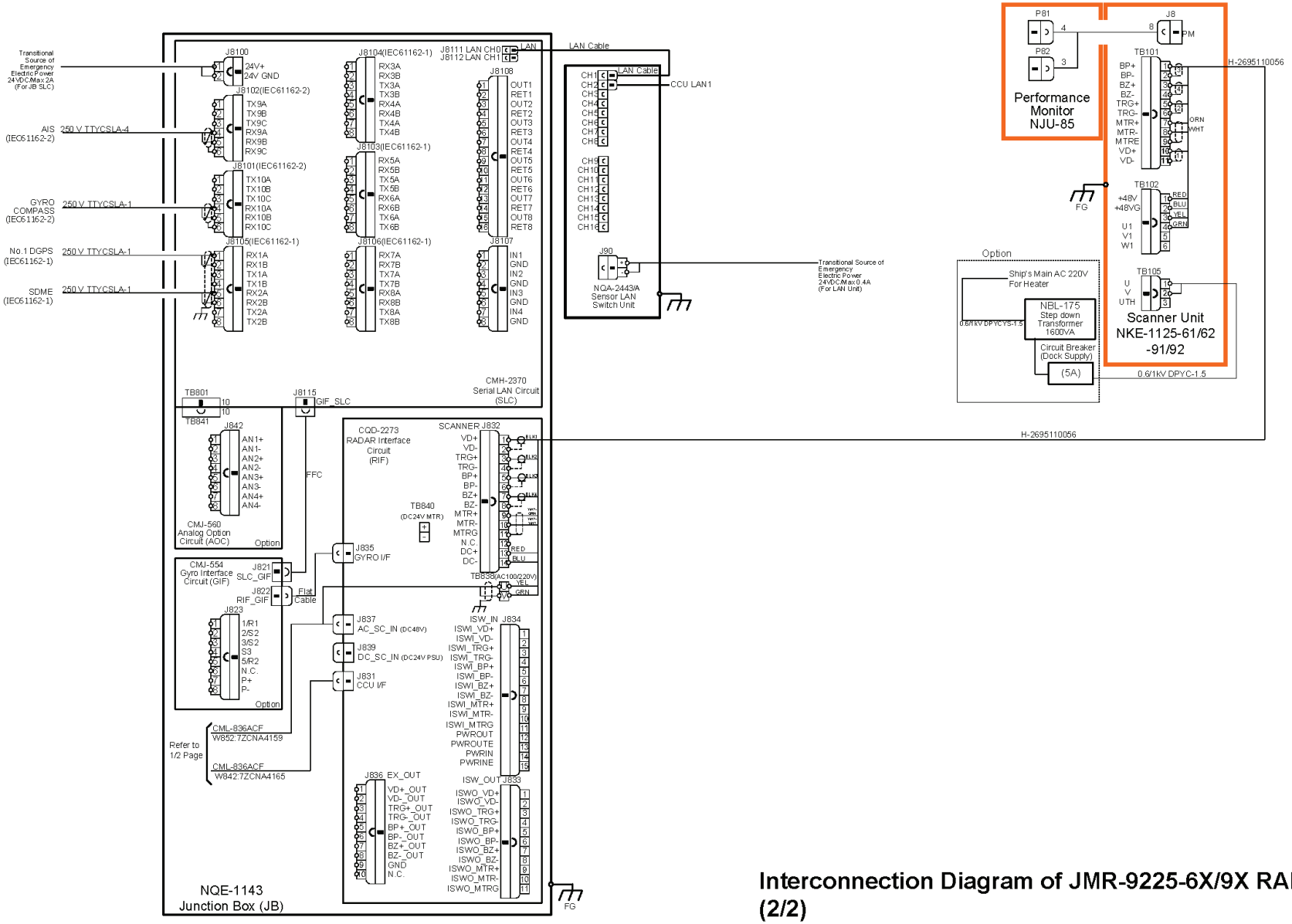


Interconnection Diagram of JMR-9225-6X/9X RADAR (2/2)

Desktop type



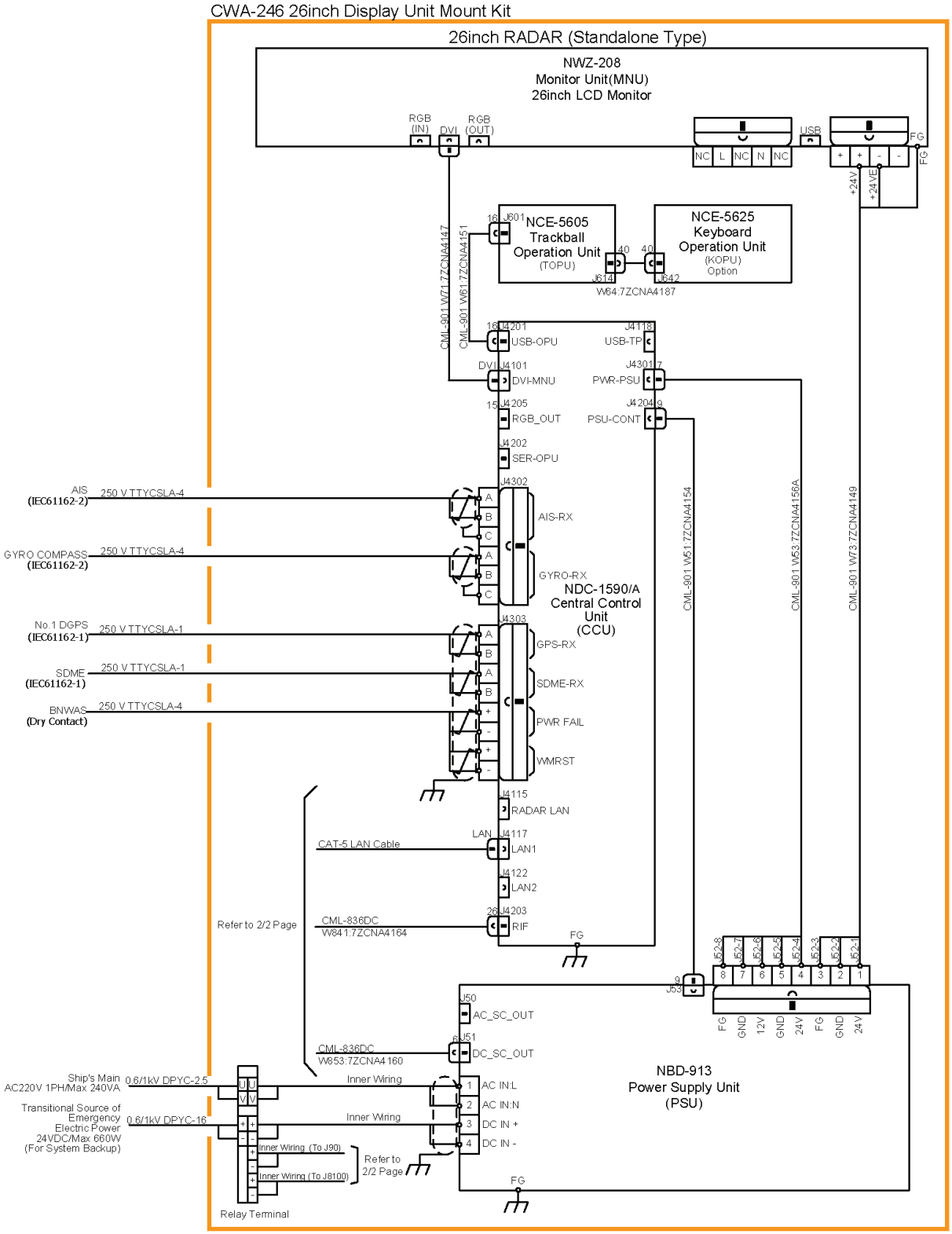
Interconnection Diagram of JMR-9225-6X/9X RADAR (1/2)



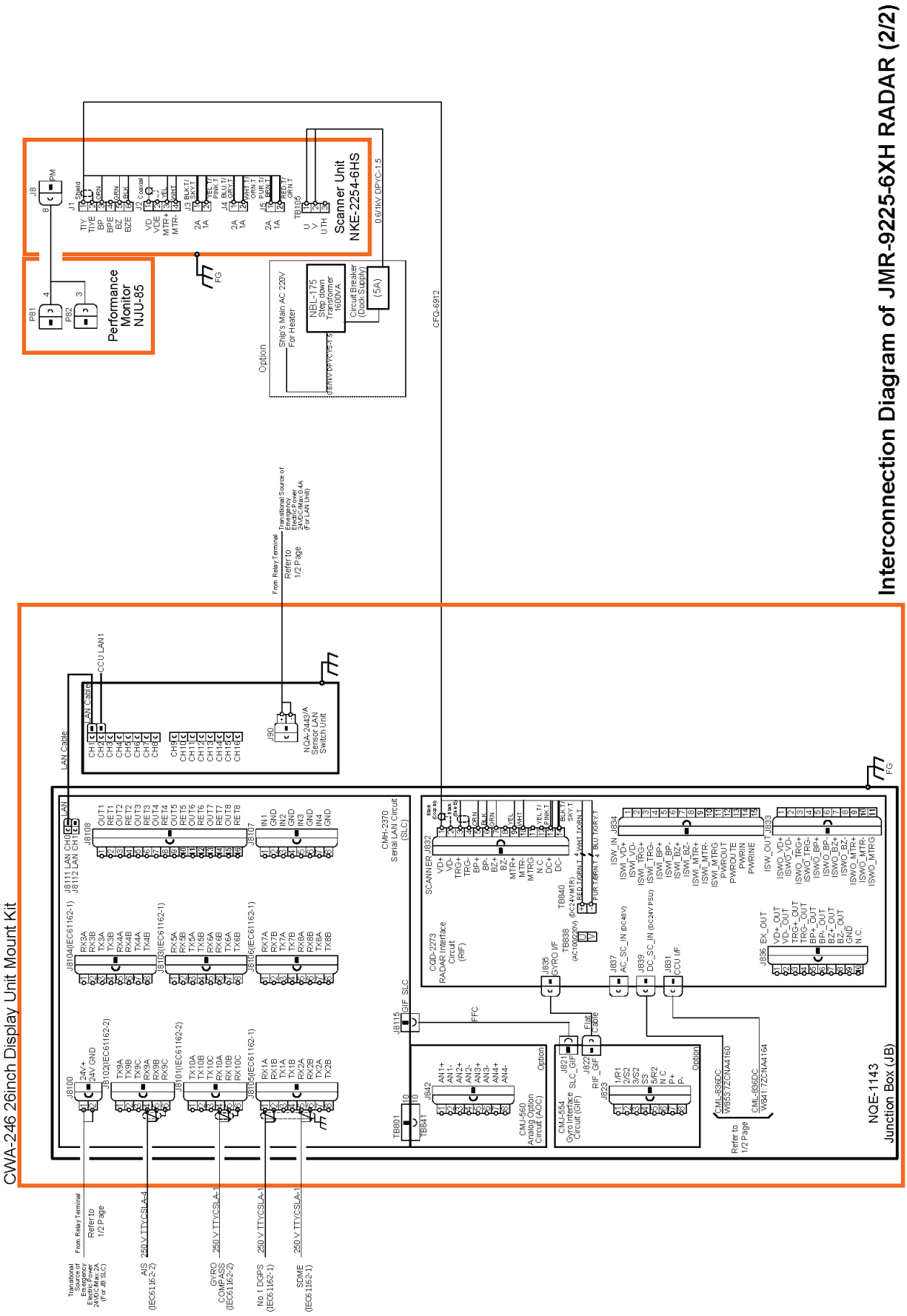
Interconnection Diagram of JMR-9225-6X/9X RADAR (2/2)

8.3.5 JMR-9225-6XH Interconnection Diagrams

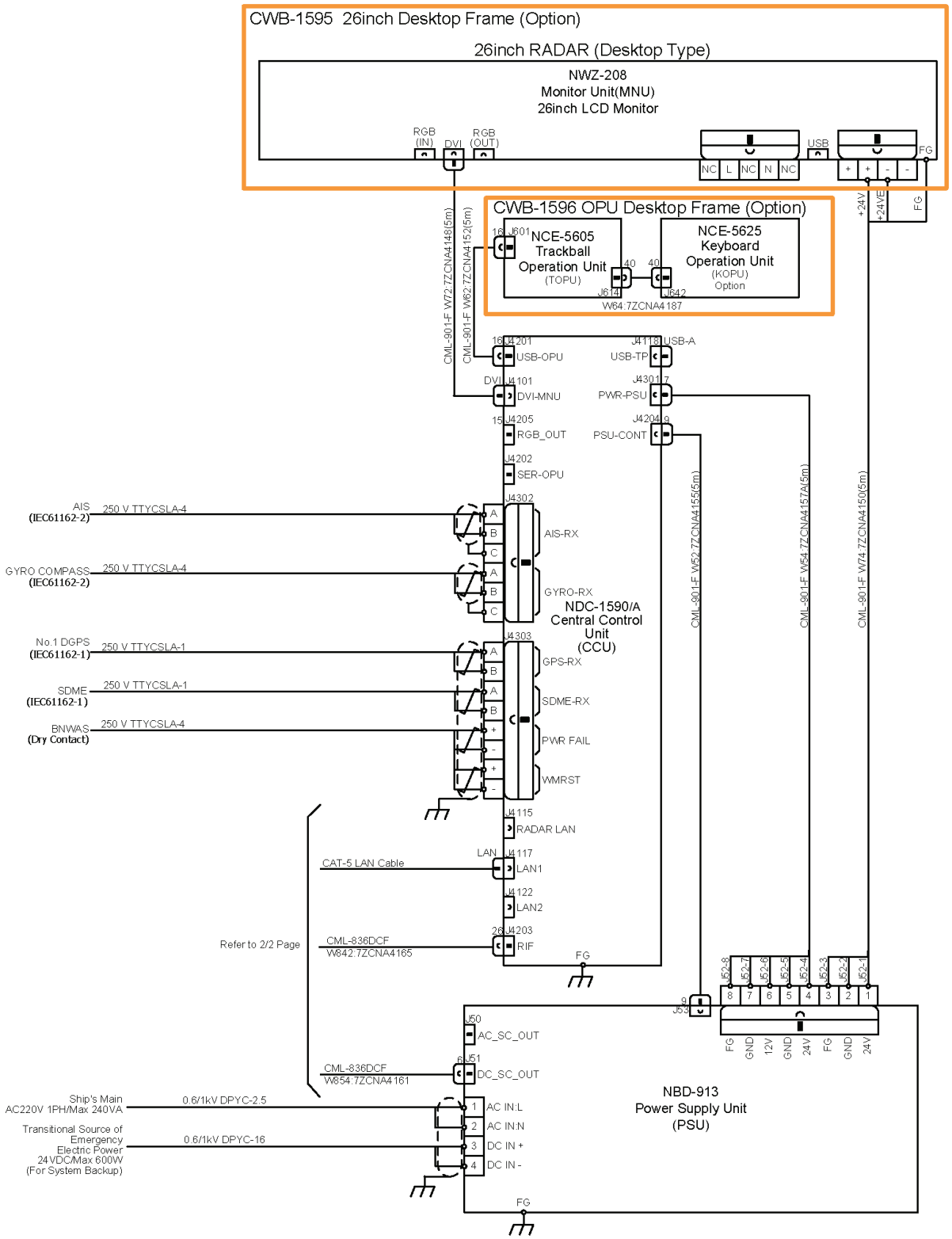
Stand alone type



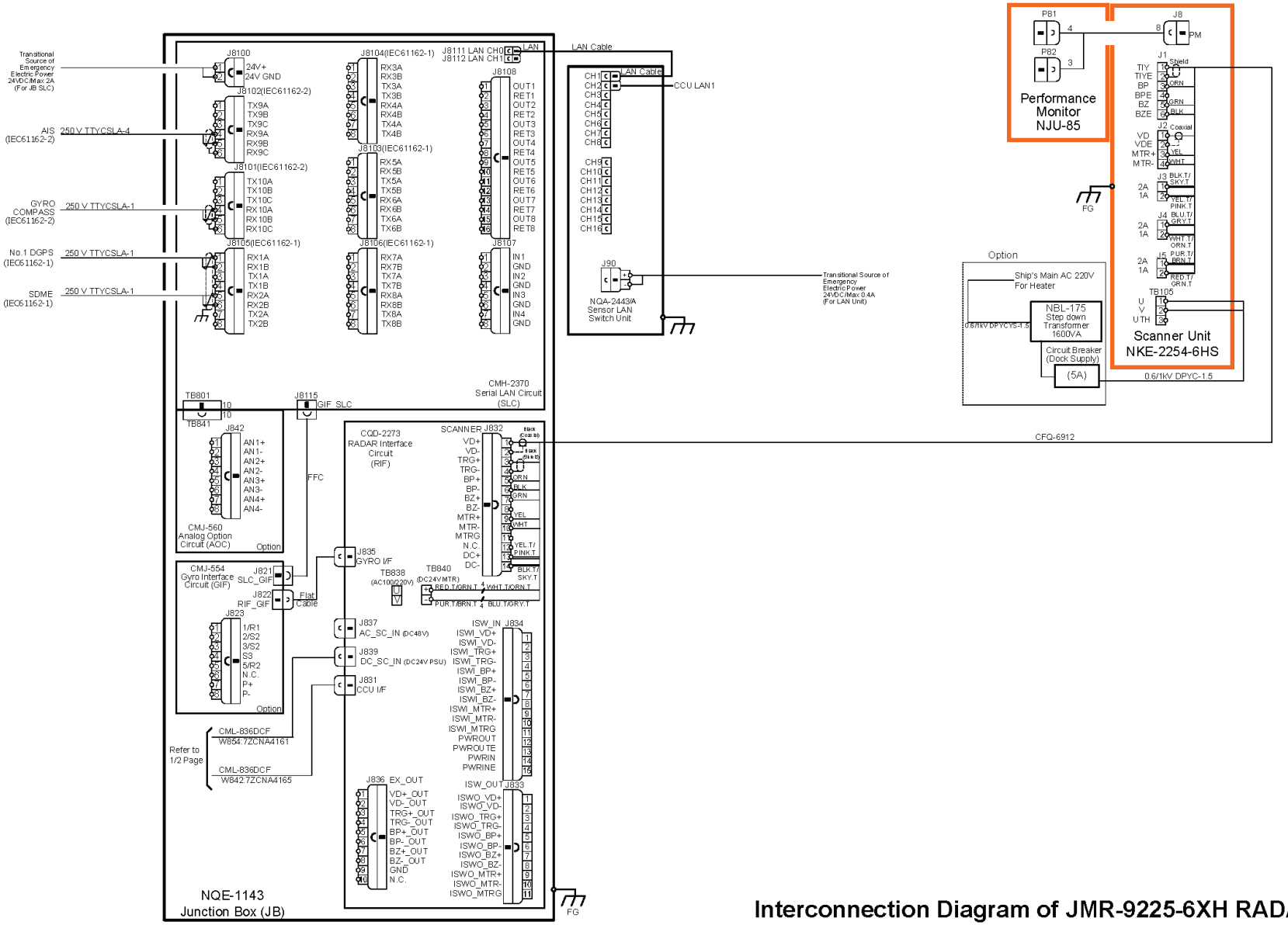
Interconnection Diagram of JMR-9225-6XH RADAR (1/2)


Interconnection Diagram of JMR-9225-6XH RADAR (2/2)
Scanner Unit
NKE-2254-6HS
Performance Monitor
NJU-85
Option
Ship's Main AC 220V
For Heater
NBL-175
Step down
Transformer
1500VA
Circuit Breaker
(Dock Supply)
(5A)
0.6/1kV DPYC-1.5
CFQ-6912
CWA-246 26inch Display Unit Mount Kit
NQE-1143
Junction Box (JB)
LAN Cable
CCU LAN1
NQA-2443/A
Sensor LAN
Switch Unit
From Relay Terminal
Refer to
1/2 Page
Transitional Source of Emergency Electric Power
24VDC Max.2A
(For LAN Wing)
COD-2273
RADAR Interface
Circuit
(RIF)
CMH-2370
Serial LAN Circuit
(SLC)
CMJ-554
Gyro Interface
Circuit (GIF)
CMJ-560
Analog Option
Circuit (AOC)
CML-836DC
CML-836DC
Refer to
1/2 Page
AIS
(IEC61162-2)
GYRO
COMPASS
(IEC61162-2)
NO.1 DGPS
(IEC61162-1)
SDME
(IEC61162-1)
250 V TTYCSLA-4
250 V TTYCSLA-1
250 V TTYCSLA-1
250 V TTYCSLA-1

Desktop type



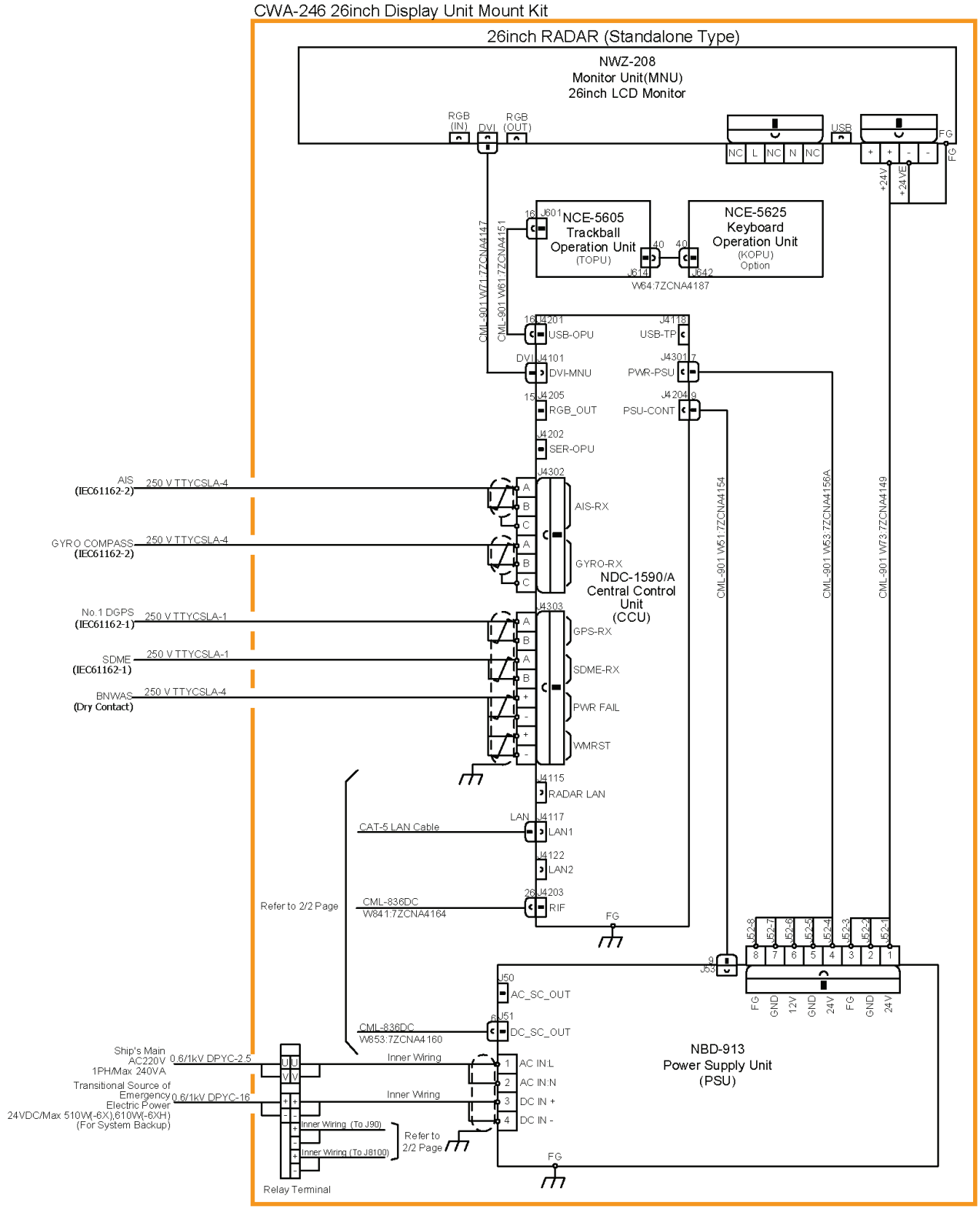
Interconnection Diagram of JMR-9225-6XH RADAR (1/2)



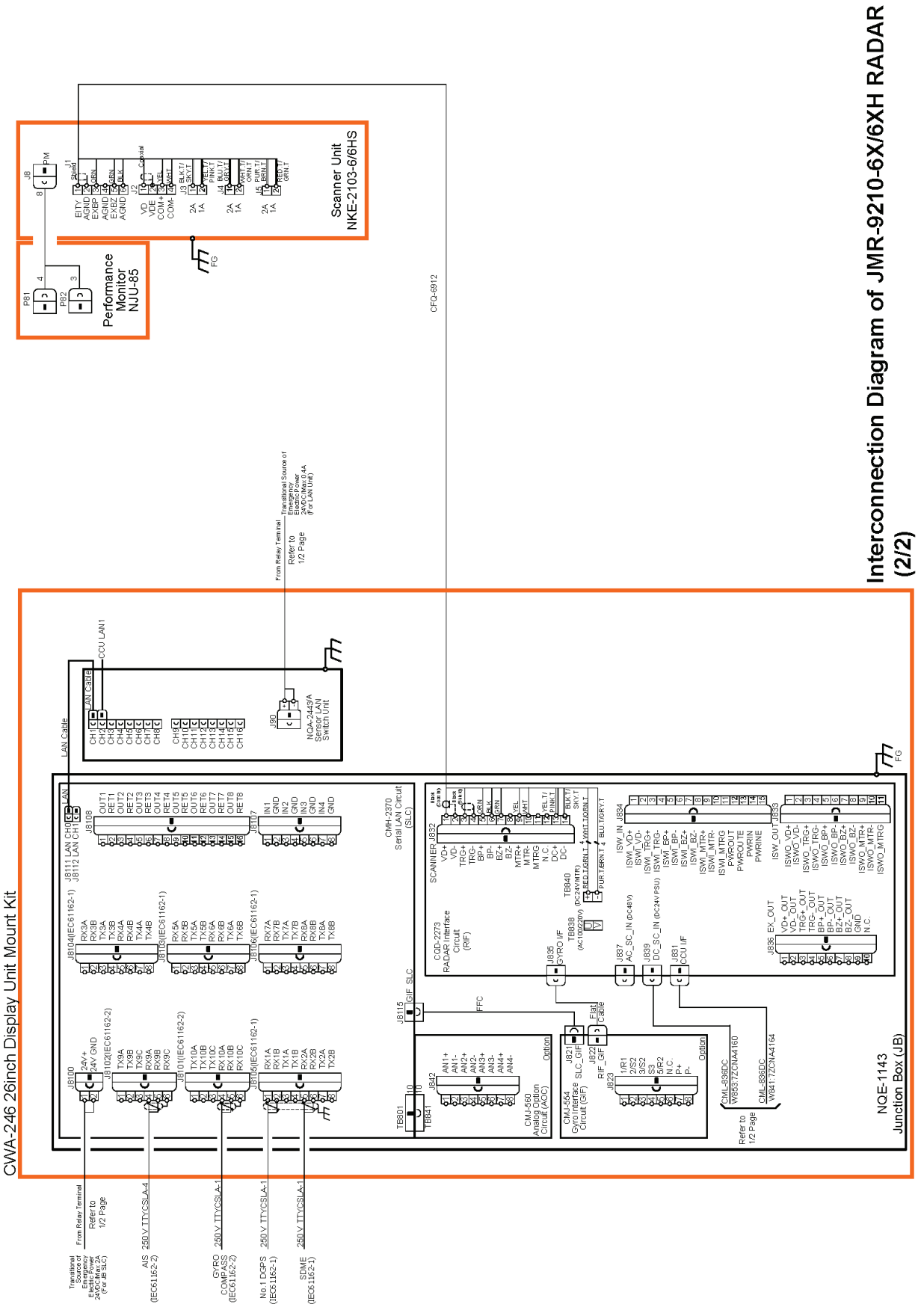
Interconnection Diagram of JMR-9225-6XH RADAR (2/2)

8.3.6 JMR-9210-6X/6XH Interconnection Diagrams

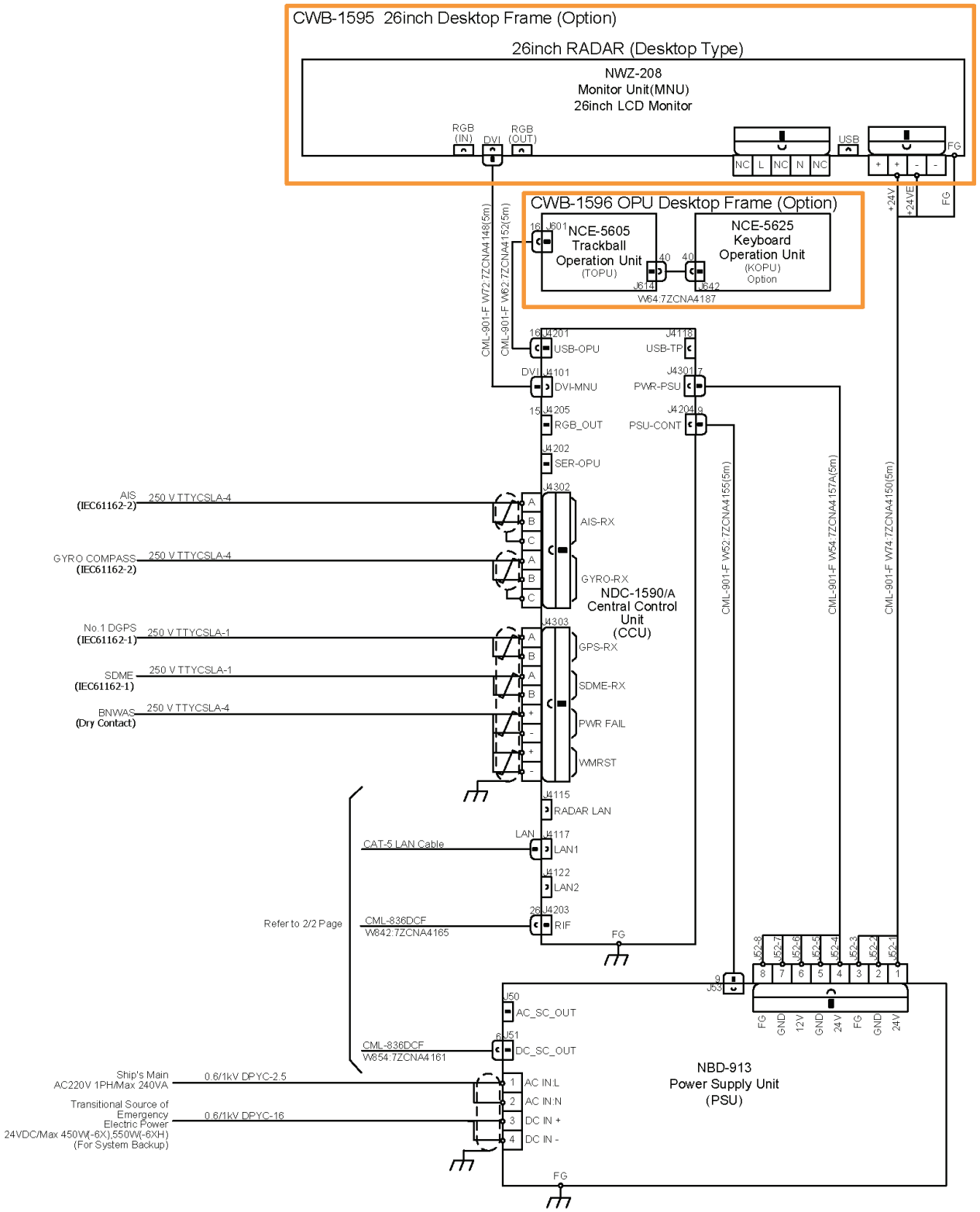
Stand alone type



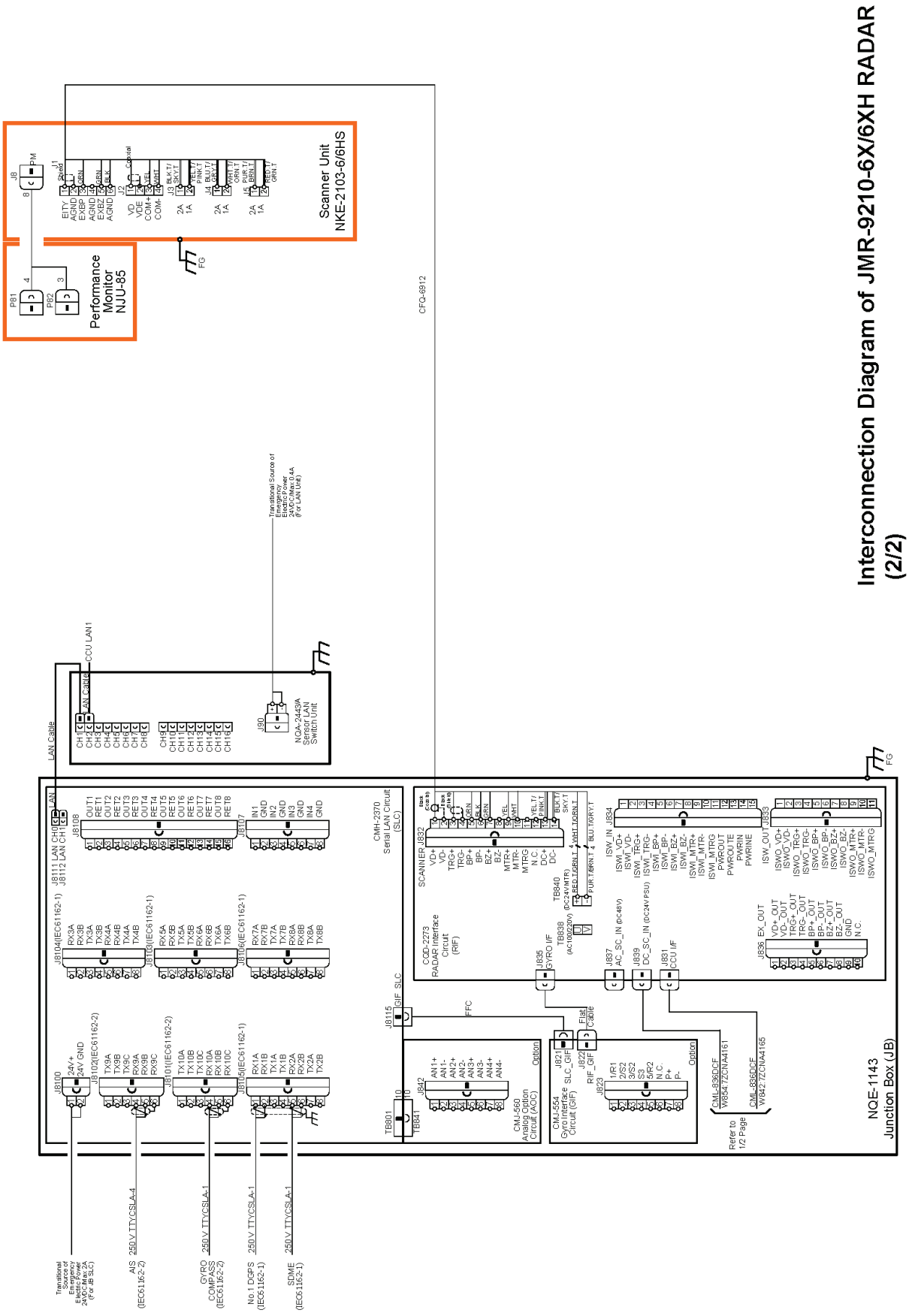
Interconnection Diagram of JMR-9210-6X/6XH RADAR (1/2)


Interconnection Diagram of JMR-9210-6X/6XH RADAR (2/2)
CWA-246 26inch Display Unit Mount Kit
Performance Monitor NJU-85
Scanner Unit NKE-2103-6/6HS
NQE-1143 Junction Box (JB)
NQA-2443/A Sensor LAN Switch Unit
CFQ-6912
CCU LAN1
LAN Cable
From Relay Terminal
Refer to 1/2 Page
Transitional Source of Emergency Electric Power 24VDC Max. 2A (For LAN Unit)
Transitional Source of Emergency Electric Power 24VDC Max. 4A (For AIS SLC)
AIS (IEC61162-2)
GYRO COMPASS (IEC61162-2)
No.1 DGPS (IEC61162-1)
SDME (IEC61162-1)
250V TTYCSLA-4
250V TTYCSLA-1
CMH-2370 Serial LAN Circuit (SLC)
COD-2273 RADAR Interface Circuit (RIF)
CMJ-554 Gyro Interface Circuit (GIF)
CMJ-560 Analog Option Circuit (AOC)
CML-836DC
W5837ZCNA4160
W5841ZCNA4164
FFC
Flat cable
Option

Desktop type

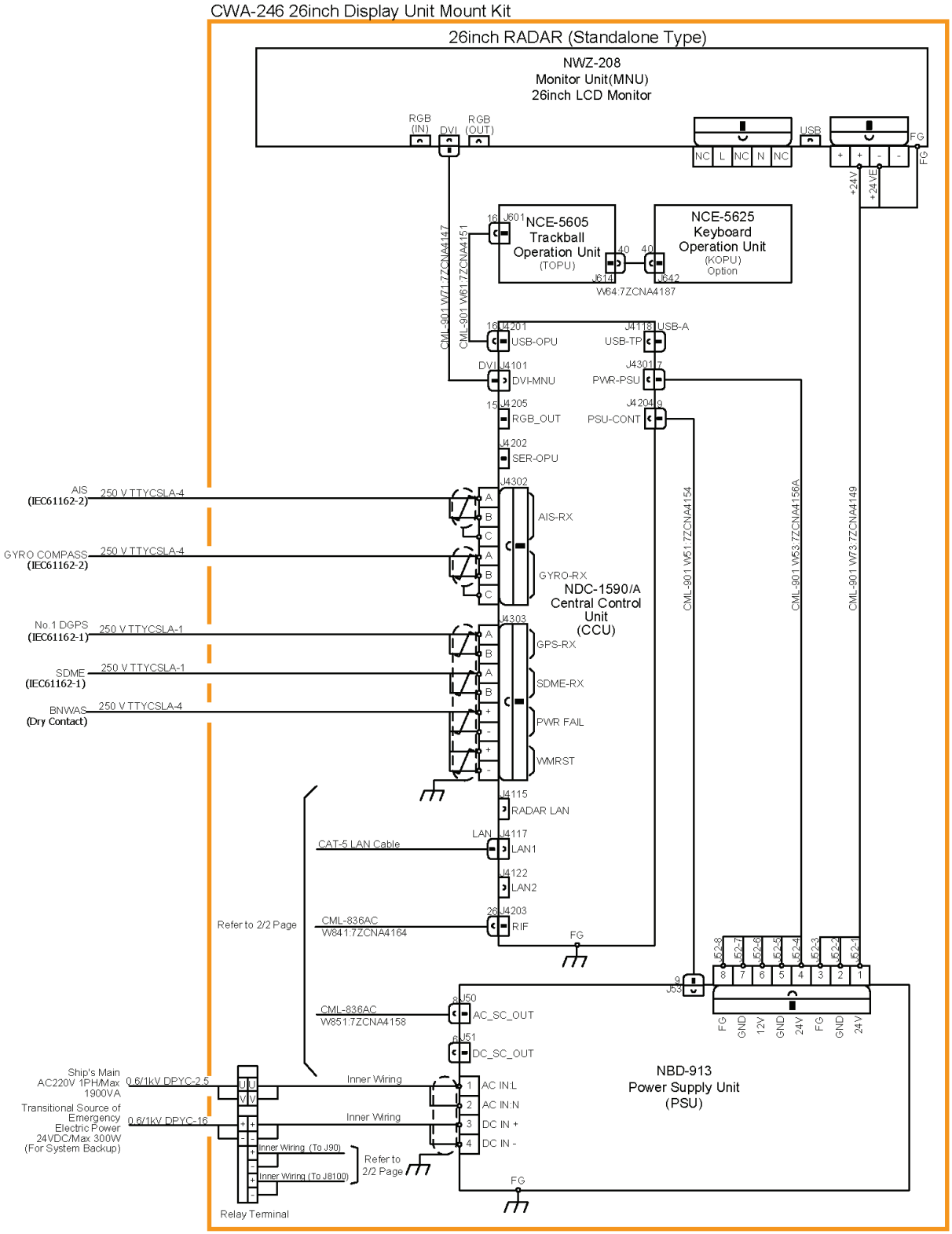


Interconnection Diagram of JMR-9210-6X/6XH RADAR (1/2)

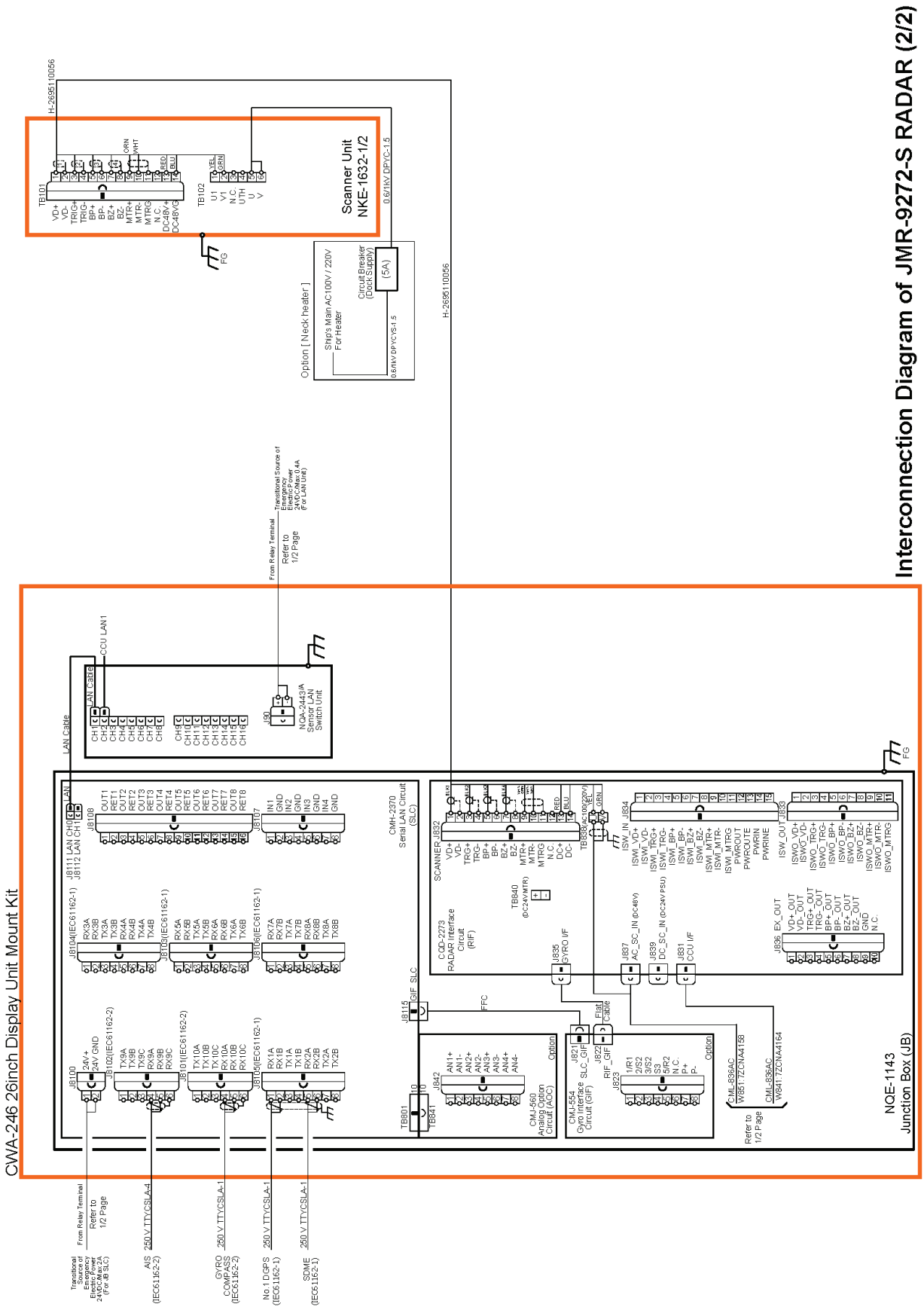

Interconnection Diagram of JMR-9210-6X/6XH RADAR
(2/2)
Scanner Unit
NKE-2103-6/6HS
Performance
Monitor
NJU-85
NQE-1143
Junction Box (JB)
CFQ-6912
LAN Cable
CCU LAN1
NQA-2443/A
Sensor LAN
Switch Unit
SCANNER J832
CMH-2370
Serial LAN Circuit
(SLC)
CQD-2273
RADAR Interface
Circuit
(RIF)
CMJ-560
Analog Option
Circuit (ACC)
CMJ-554
Gyro Interface
Circuit (GIF)
CML-836DCF
CML-836DCF
Refer to
1/2 Page
FFC
Flat
Cable
Option
Option
Transitional
Source of
Emergency
Electrical Power
24VDC 8Aax 2A
(For JB SLC)
AIS
(IEC61162-2)
250 V TTYCSLA-4
GYRO
COMPASS
(IEC61162-2)
250 V TTYCSLA-1
No.1 DGPS
(IEC61162-1)
250 V TTYCSLA-1
SDME
(IEC61162-1)
250 V TTYCSLA-1

8.3.7 JMR-9272-S Interconnection Diagrams

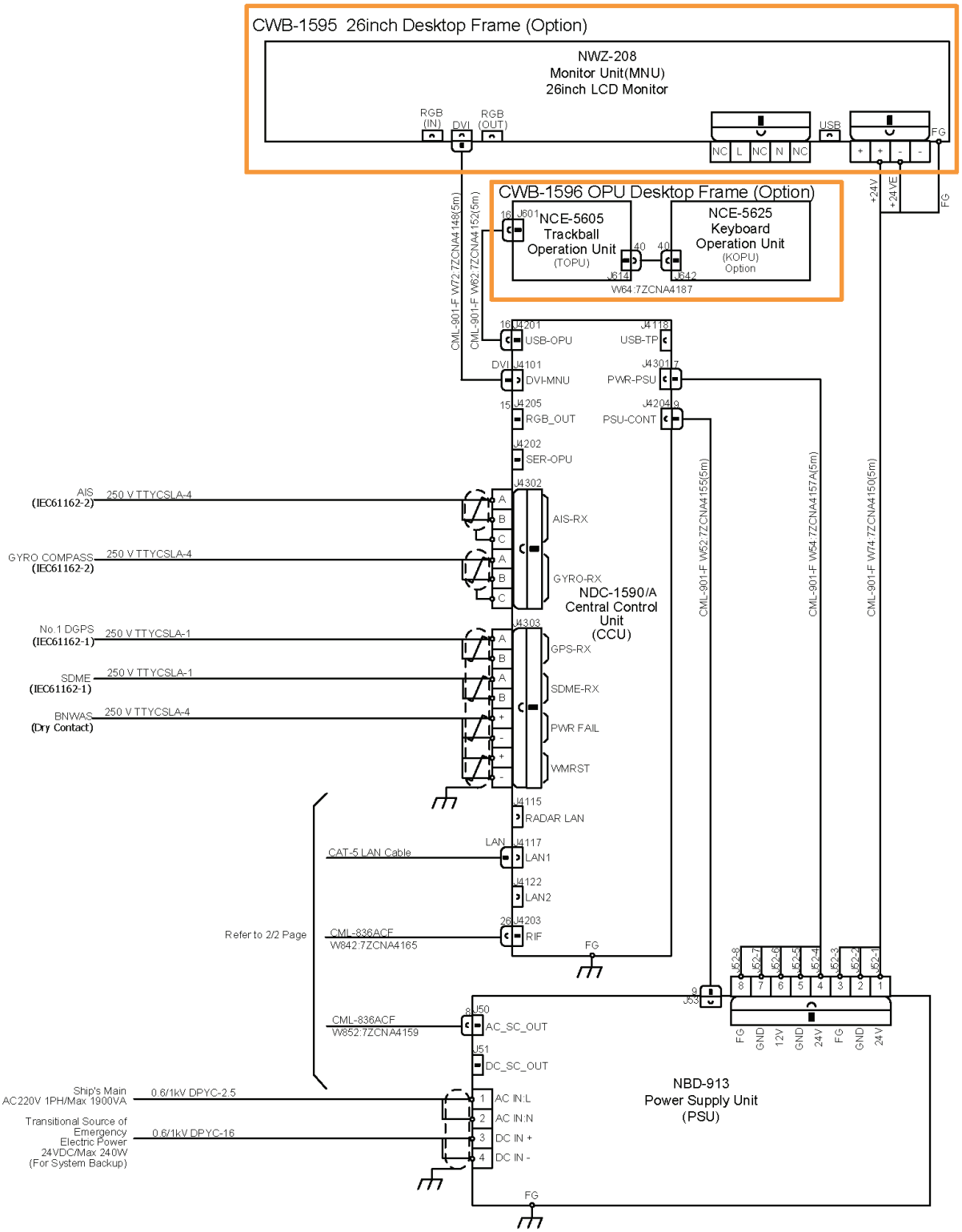
Stand alone type



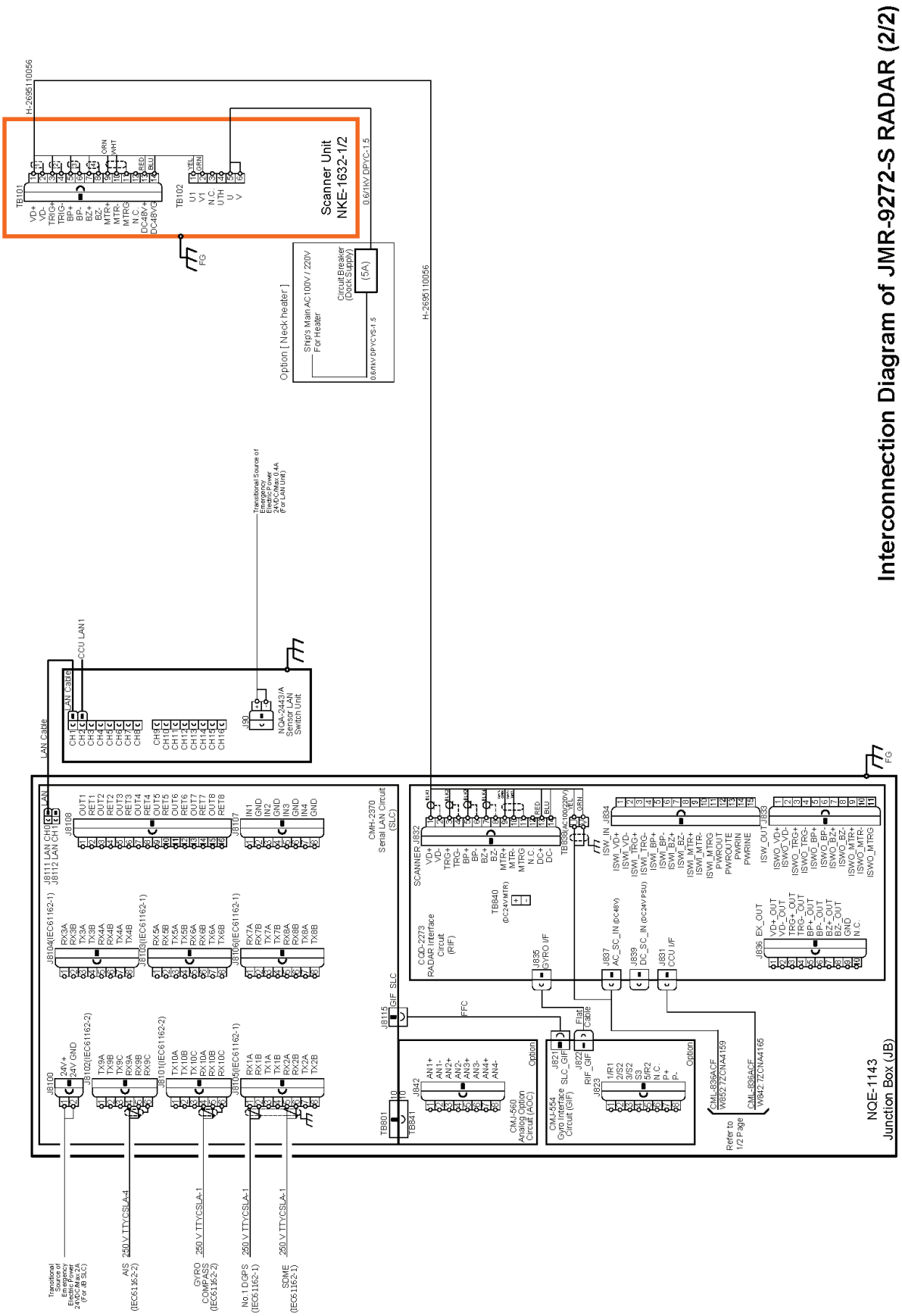
Interconnection Diagram of JMR-9272-S RADAR (1/2)


Interconnection Diagram of JMR-9272-S RADAR (2/2)
CWA-246 26inch Display Unit Mount Kit
Scanner Unit
NKE-1632-1/2
H-2695110056
0.6/1kV DPYCY-1.5
Option [Neck heater]
Ship's Main AC100V / 220V
For Heater
Circuit Breaker
(Dock Supply)
(5A)
0.6/1kV DPYCY-1.5
TB101
TB102
FG
From Relay Terminal
Refer to
1/2 Page
Transitional Source of
Emergency
Electric Power
24VDC 4.4A
(For LAN Unit)
LAN Cable
CCU LAN1
LAN Cable
NQA-2443/A
Sensor LAN
Switch Unit
J90
J8100
J8101(IEC61162-2)
J8102(IEC61162-2)
J8103(IEC61162-1)
J8104(IEC61162-1)
J8105(IEC61162-1)
J8106(IEC61162-1)
J8107
J8108
J8111 LAN CH1
J8112 LAN CH1
CMH-2370
Serial LAN Circuit
(SLC)
SCANNER J832
CQD-2273
RADAR interface
Circuit
(RIF)
TB840
J835
GYRO I/F
J837
AC_SC_IN (DC48V)
J839
DC_SC_IN (DC24V PSU)
J831
CCU I/F
J834
J836
J838
J8115
GIF_SLC
FFC
TB801
J842
CMJ-560
Analog Option
Circuit (AOC)
Option
CMJ-554
Gyro Interface
Circuit (GIF)
J821
SLC_GIF
J822
RIF_GIF
Flat
Cable
J823
Option
CML-836AC
W861.7ZCNA4168
CML-836AC
W841.7ZCNA4164
Refer to
1/2 Page
NQE-1143
Junction Box (JB)
Transitional
Source of
Emergency
Electric Power
24VDC 4.4A
(For JB SLC)
From Relay Terminal
Refer to
1/2 Page
AIS
(IEC61162-2)
250 V TTYCSLA-4
GYRO
COMPASS
(IEC61162-2)
250 V TTYCSLA-1
No.1 DGPS
(IEC61162-1)
250 V TTYCSLA-1
SDME
(IEC61162-1)
250 V TTYCSLA-1

Desktop type

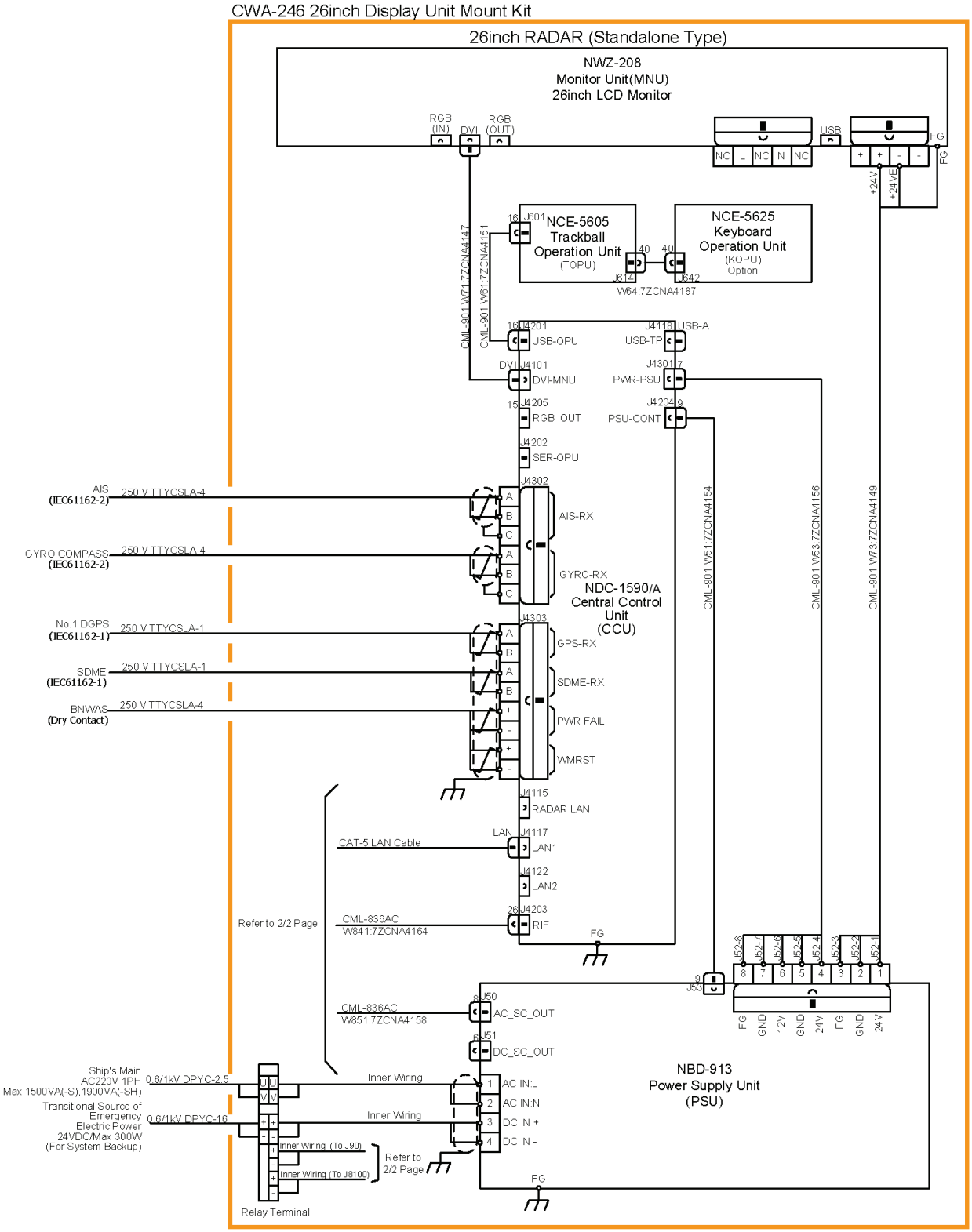


Interconnection Diagram of JMR-9272-S RADAR (1/2)

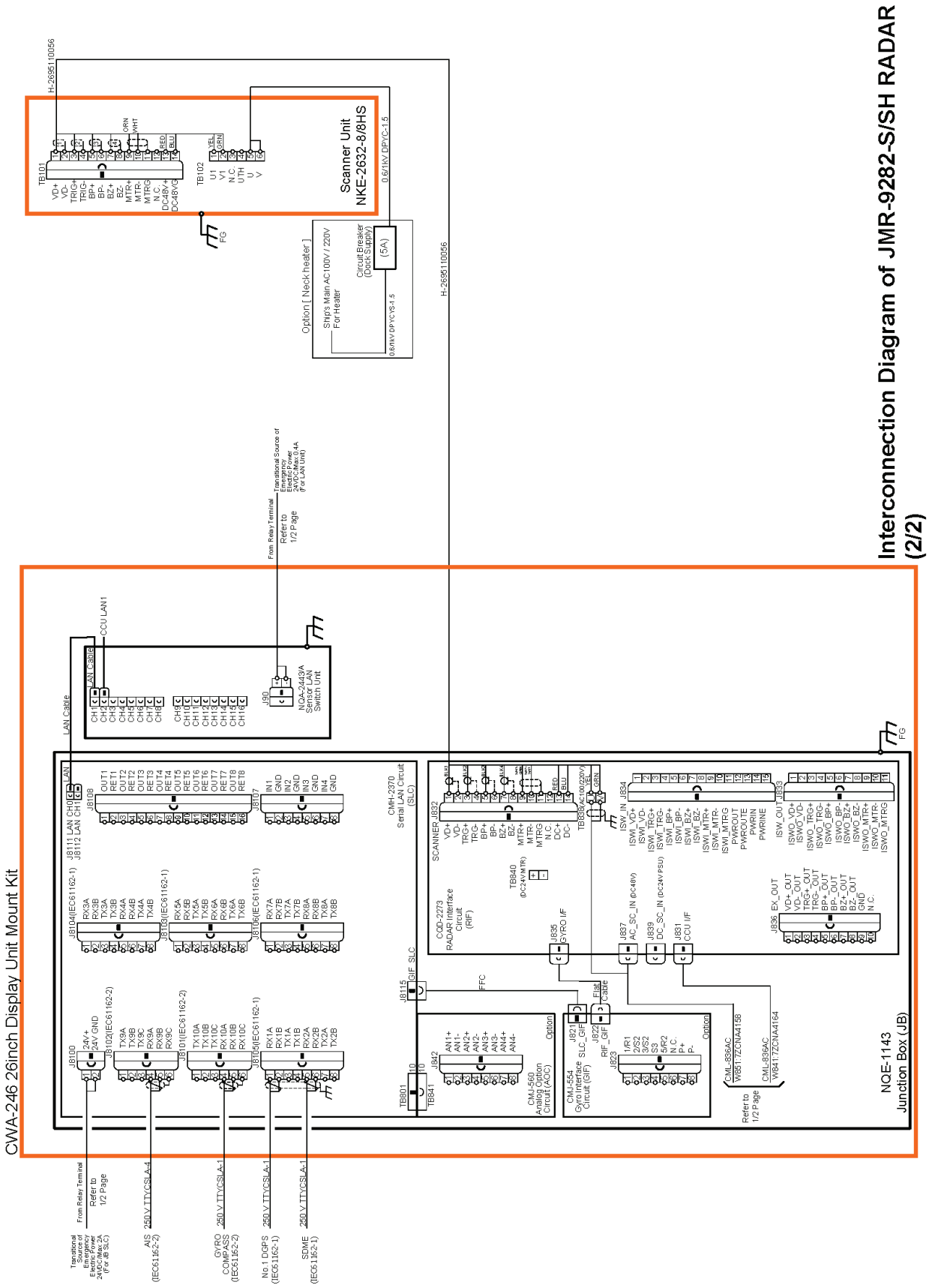

Interconnection Diagram of JMR-9272-S RADAR (2/2)
Scanner Unit
NKE-1632-1/2
H-2695110056
0.6/1kV DPYC-1.5
Option [Neck heater]
Ship's Main AC100V / 220V
For Heater
Circuit Breaker
(Dock Supply)
(5A)
0.6/1kV DPYC-1.5
TB101
TB102
FG
LAN Cable
CCU LAN1
LAN Cable
NQA-2443/A
Sensor LAN
Switch Unit
J90
Transitional Source of Emergency Electric Power 24VDC/4.0A (For LAN Unit)
NQE-1143
Junction Box (JB)
J8100
J8101(IEC61162-2)
J8102(IEC61162-2)
J8103(IEC61162-1)
J8104(IEC61162-1)
J8105(IEC61162-1)
J8106(IEC61162-1)
J8107
J8108
J8111 LAN CH1
J8112 LAN CH1
CMH-2370
Serial LAN Circuit
(SLC)
SCANNER J832
CQD-2273
RADAR interface
Circuit
(RIF)
TB840
J835
GYRO I/F
J837
AC_SC_IN (DC48V)
J839
DC_SC_IN (DC24V PSU)
J831
CCU I/F
J834
J836
J833
J8115
GIF_SLC
FFC
Flat
Cable
J842
CMJ-560
Analog Option
Circuit (AOC)
Option
CMJ-554
Gyro Interface
Circuit (GIF)
J821
SLC_GIF
J822
RIF_GIF
J823
Option
CML-836ACF
W852-7ZCNA4169
CML-836ACF
W842-7ZCNA4166
Refer to
1/2 Page
TB801
TB841
Transitional Source of Emergency Electric Power 24VDC/4.0A (For JB SLC)
AIS
(IEC61162-2)
250 V TTYCSLA-4
GYRO COMPASS
(IEC61162-2)
250 V TTYCSLA-1
No.1 DGPS
(IEC61162-1)
250 V TTYCSLA-1
SDME
(IEC61162-1)
250 V TTYCSLA-1

8.3.8 JMR-9282-S/SH Interconnection Diagrams

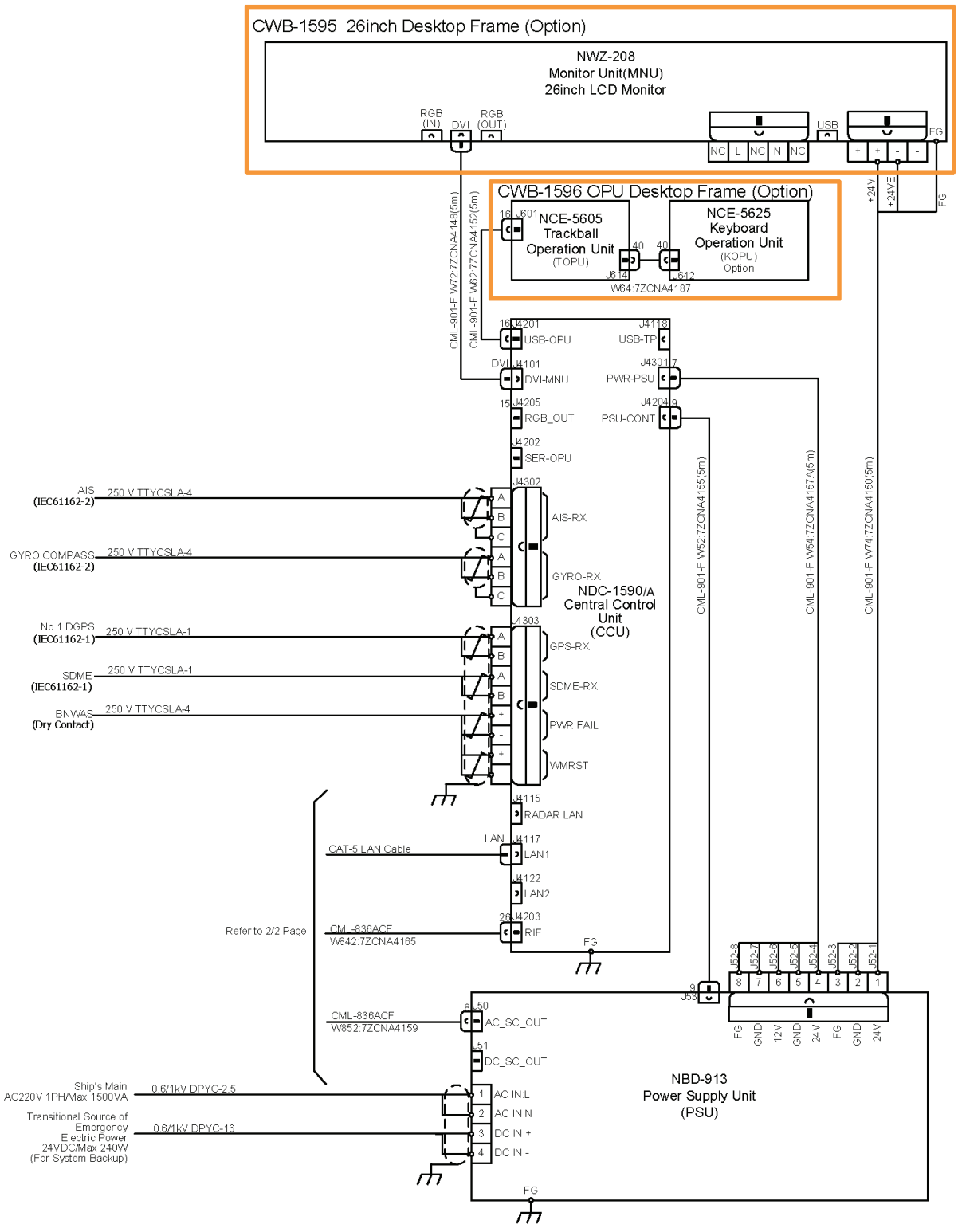
Stand alone type



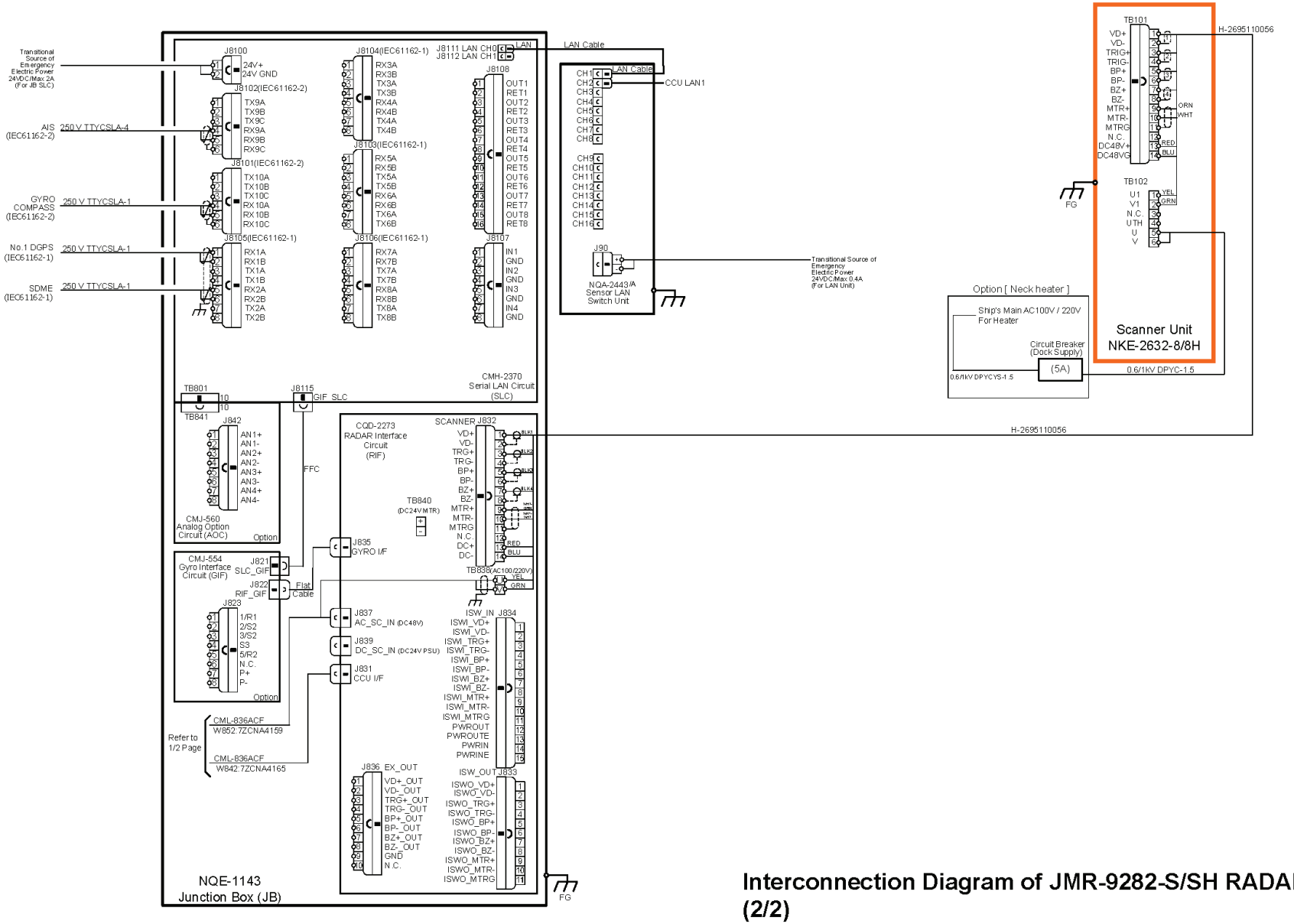
Interconnection Diagram of JMR-9282-S/SH RADAR (1/2)


Interconnection Diagram of JMR-9282-S/SH RADAR (2/2)
CWA-246 26inch Display Unit Mount Kit
Scanner Unit NKE-2632-8/8HS
0.6/1kV DPYC-1.5
H-2695110056
TB101
TB102
FG
Option [Neck heater]
Ship's Main AC100V / 220V For Heater
Circuit Breaker (Dock Supply)
(5A)
0.6/1kV DPYCY-1.5
LAN Cable
CCU LAN1
NQA-2443A Switching HUB Switch Unit
J90
From Relay Terminal
Refer to 1/2 Page
Transitional Source of Emergency Electric Power 24VDC 4A (For LAN Unit)
J8111 LAN CH1
J8112 LAN CH2
J8108
J8107
J8104(IEC61162-1)
J8103(IEC61162-1)
J8106(IEC61162-1)
J8100
J8102(IEC61162-2)
J8101(IEC61162-2)
J8105(IEC61162-1)
CMH-2370 Serial LAN Circuit (SLC)
SCANNER J832
CQD-2273 RADAR Interface Circuit (RIF)
TB840
TB839
J835 GYRO I/F
J837 AC_SC_IN (DC48V)
J839 DC_SC_IN (DC24V/PSU)
J831 CCU I/F
J834
J833
J836
J8115 GIF SLC
FFC
TB801
TB841
J842
CMJ-560 Analog Option Circuit (AOC)
CMJ-554 Gyro Interface Circuit (GIF)
J821 SLC_GIF
J822 Flat Cable
RIF_GIF
J823
CML-836AC W6617ZCNA4156
CML-838AC W6417ZCNA4164
Refer to 1/2 Page
NQE-1143 Junction Box (JB)
Transitional Source of Emergency Electric Power 24VDC 4A (For JB-SLC)
AIS (IEC61162-2)
GYRO COMPASS (IEC61162-2)
No.1 DGPS (IEC61162-1)
SDME (IEC61162-1)
250 V TTYCSLA-4
250 V TTYCSLA-1

Desktop type



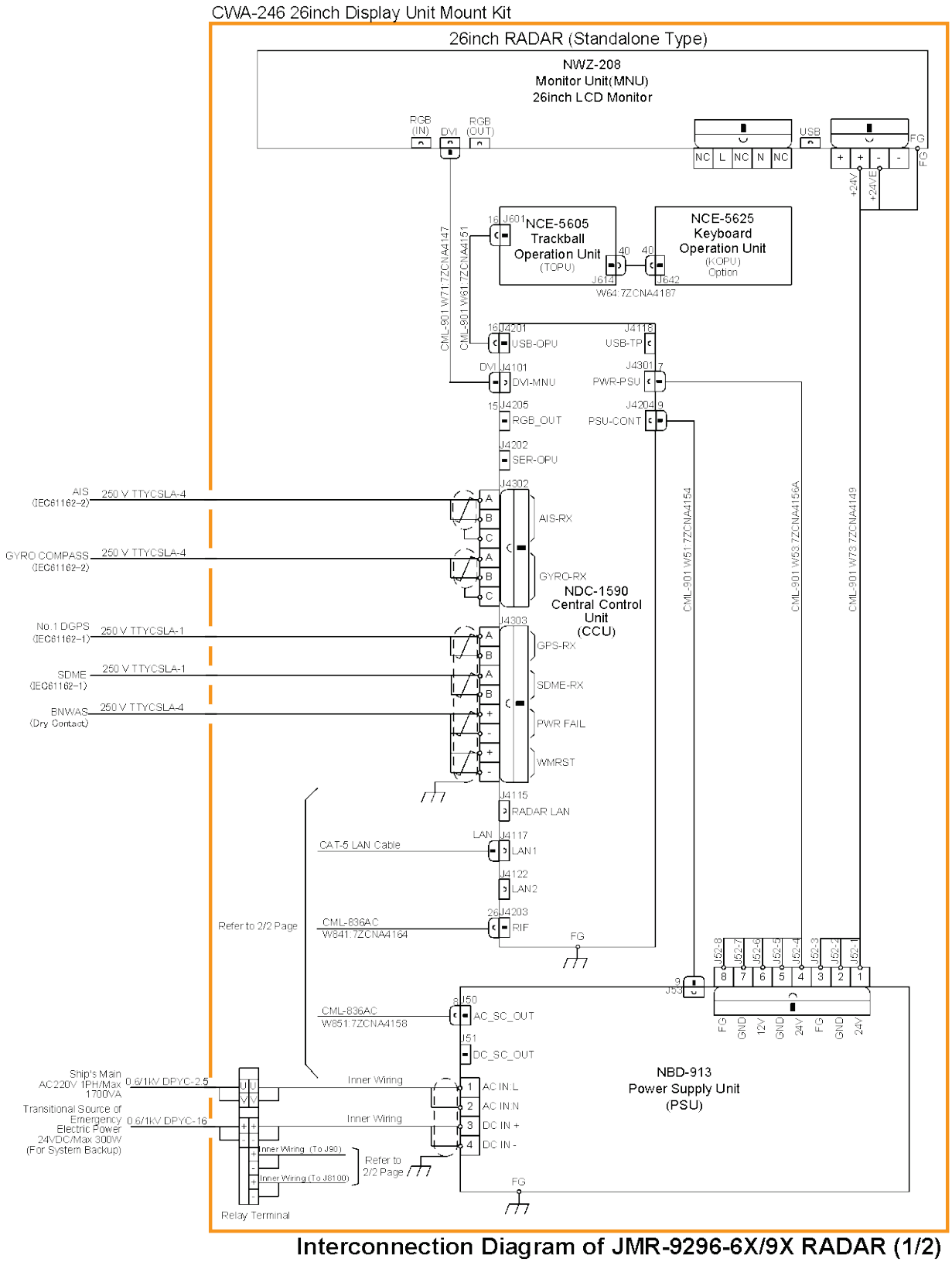
Interconnection Diagram of JMR-9282-S/SH RADAR (1/2)



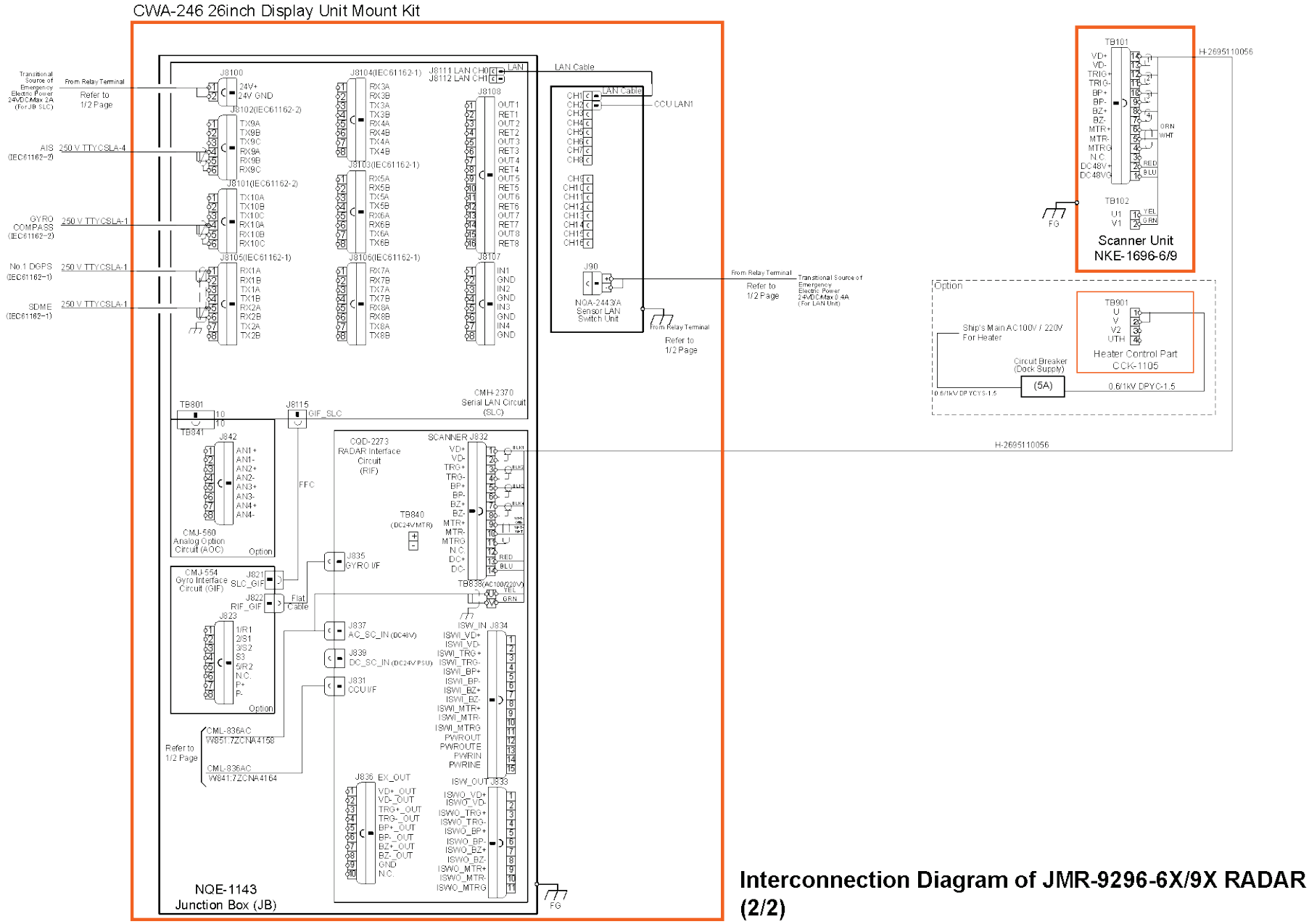
Interconnection Diagram of JMR-9282-S/SH RADAR (2/2)

8.3.9 JMR-9296-6X/9X Interconnection Diagrams

Stand alone type

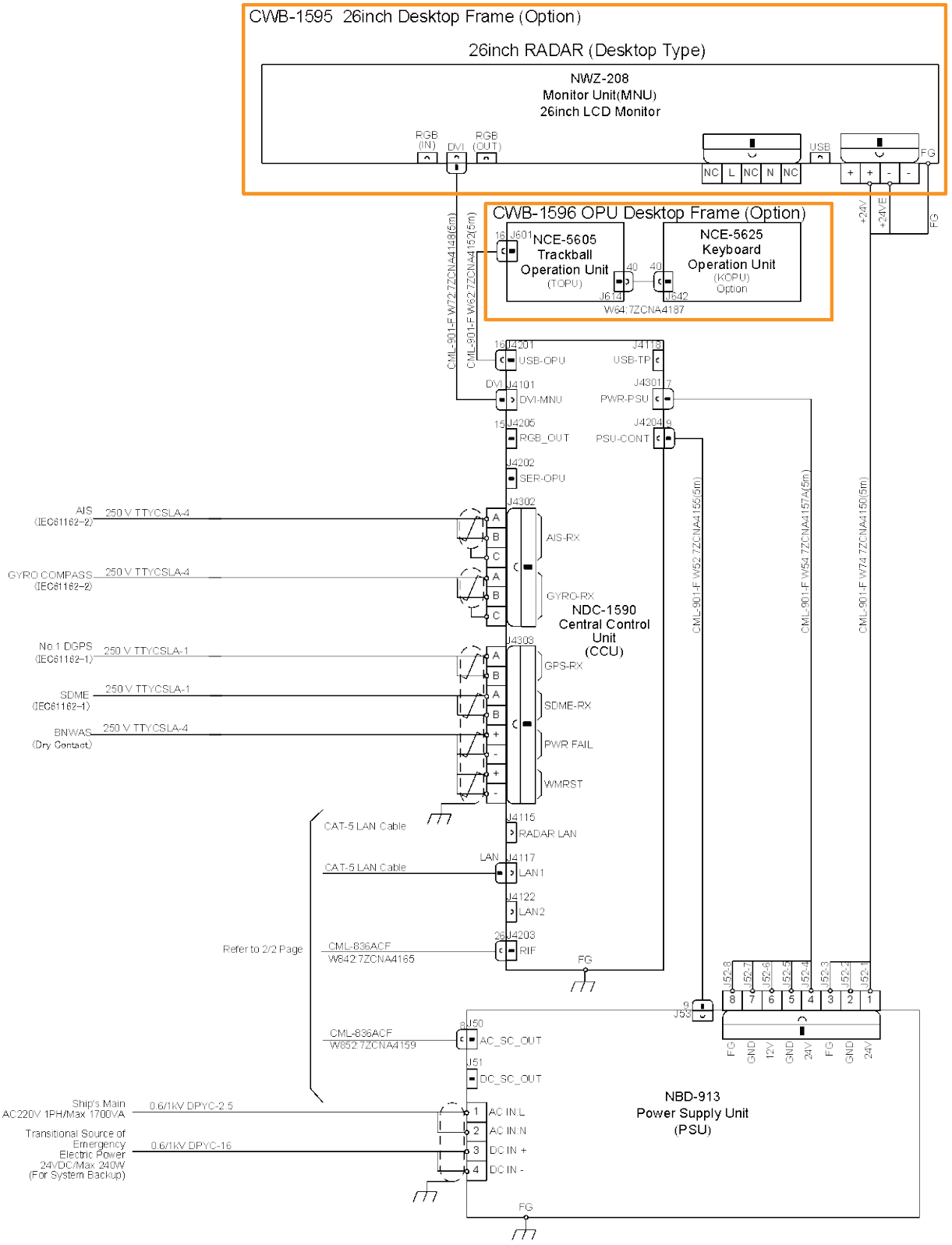


Interconnection Diagram of JMR-9296-6X/9X RADAR (1/2)

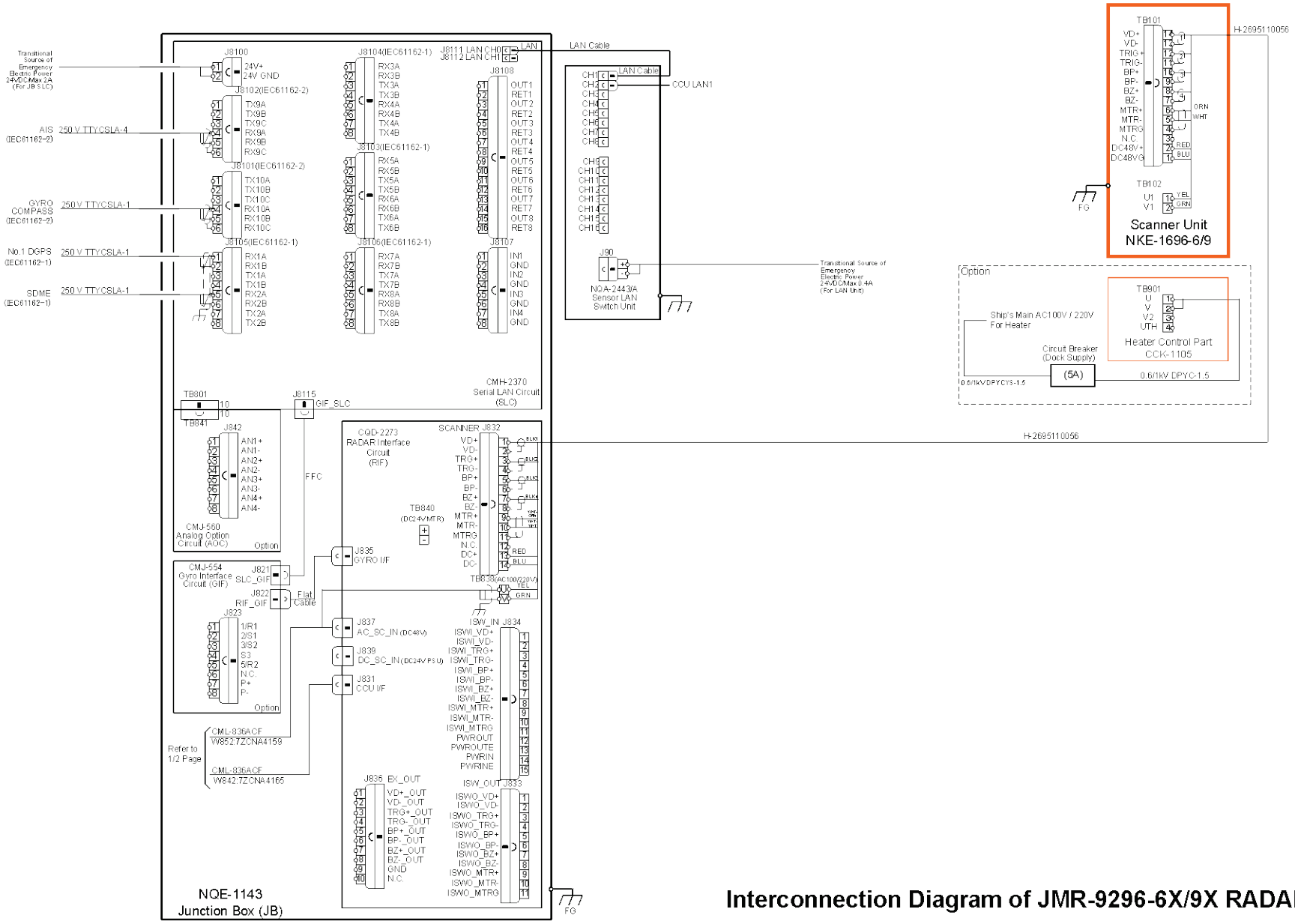


Interconnection Diagram of JMR-9296-6X/9X RADAR (2/2)

Desktop type



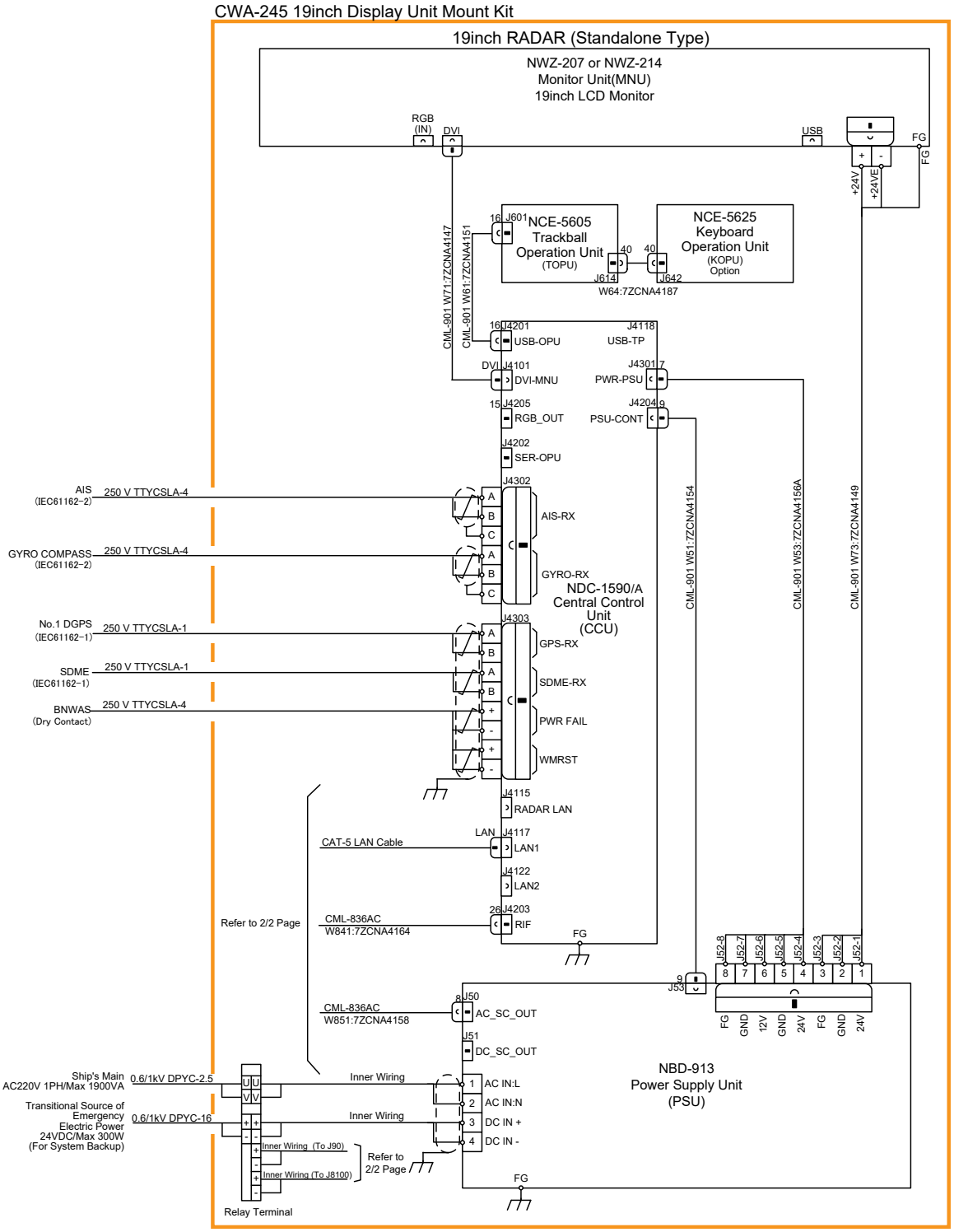
Interconnection Diagram of JMR-9296-6X/9X RADAR (1/2)



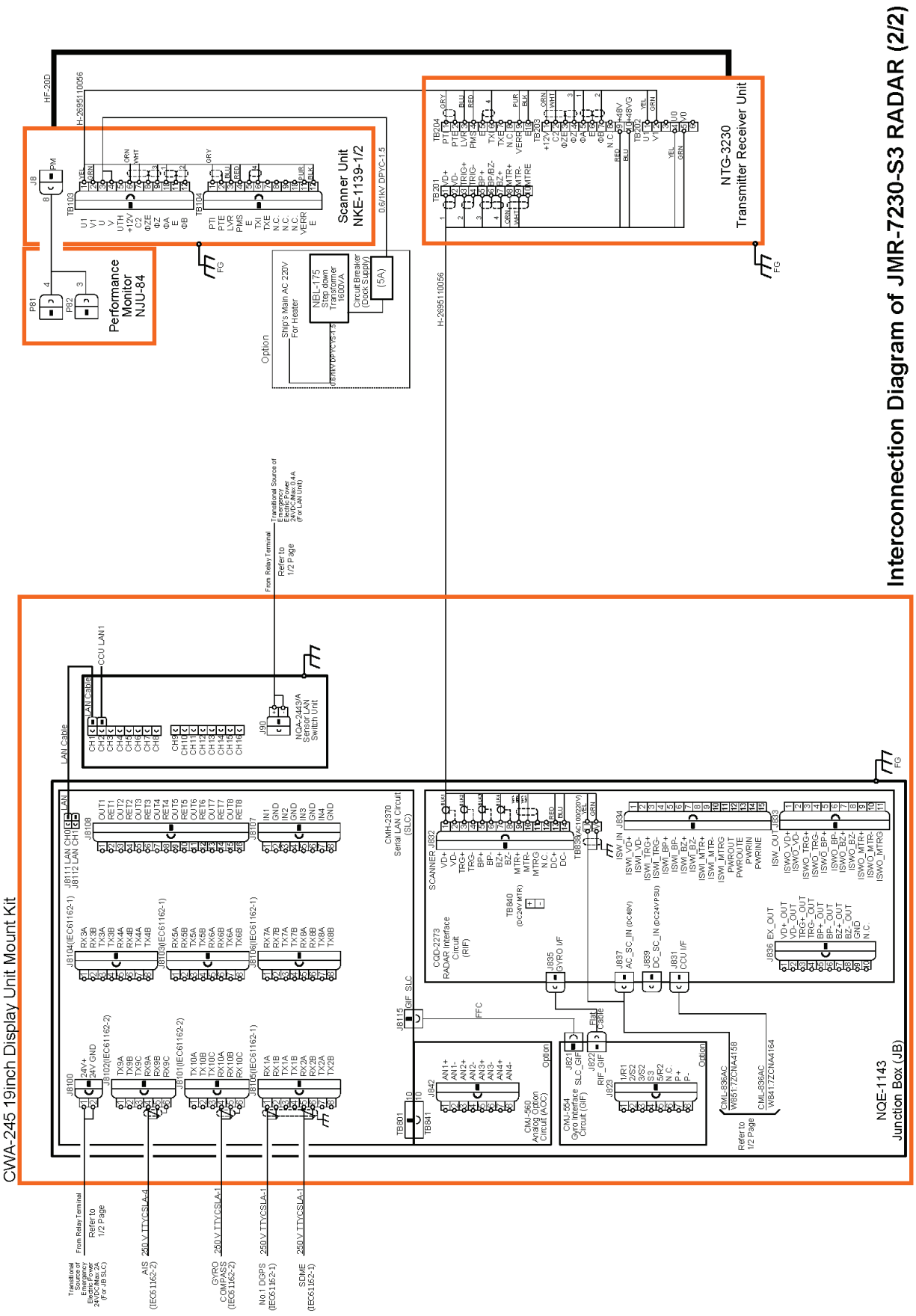
Interconnection Diagram of JMR-9296-6X/9X RADAR (2/2)

8.3.10 JMR-7230-S3 Interconnection Diagrams

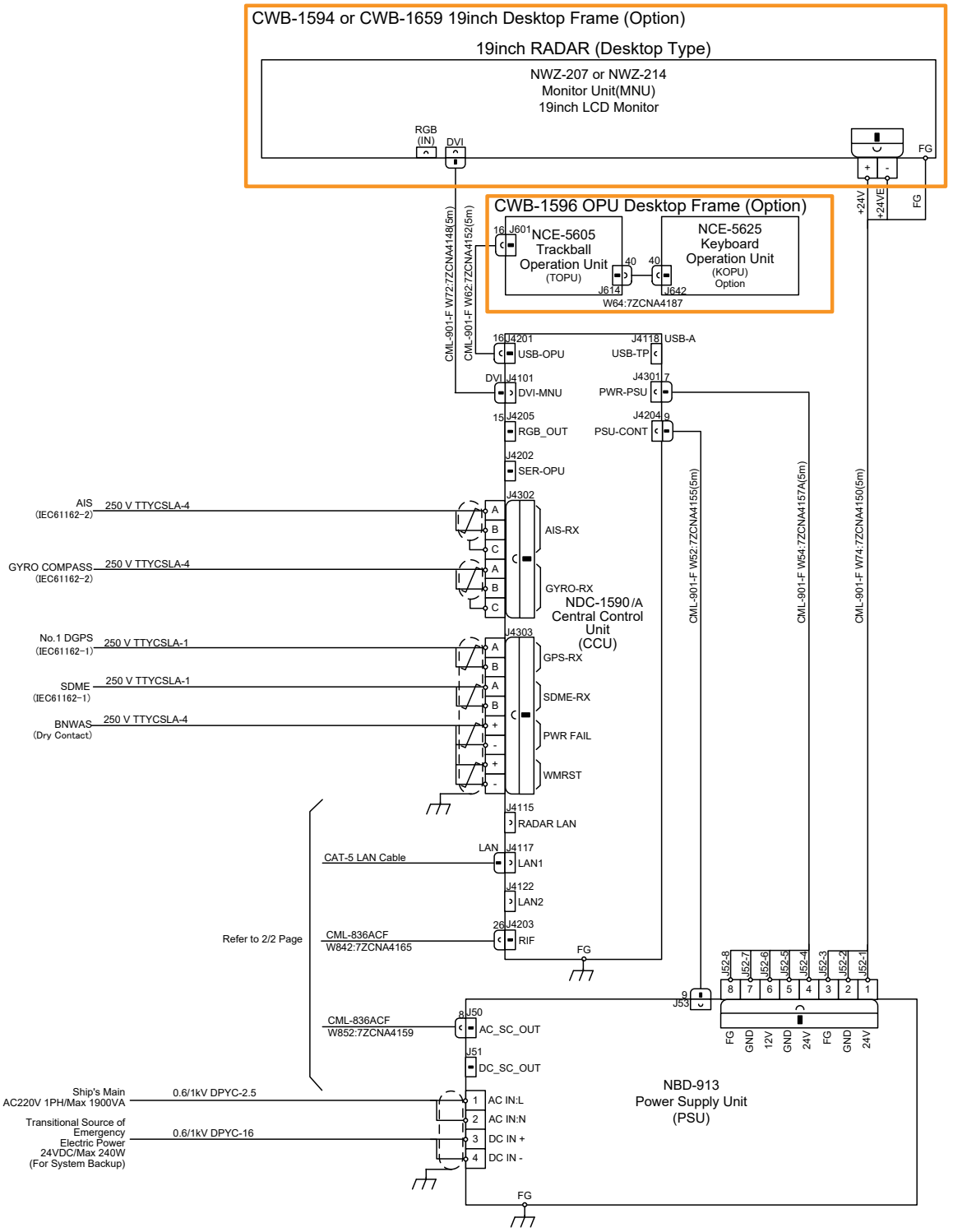
Stand alone type



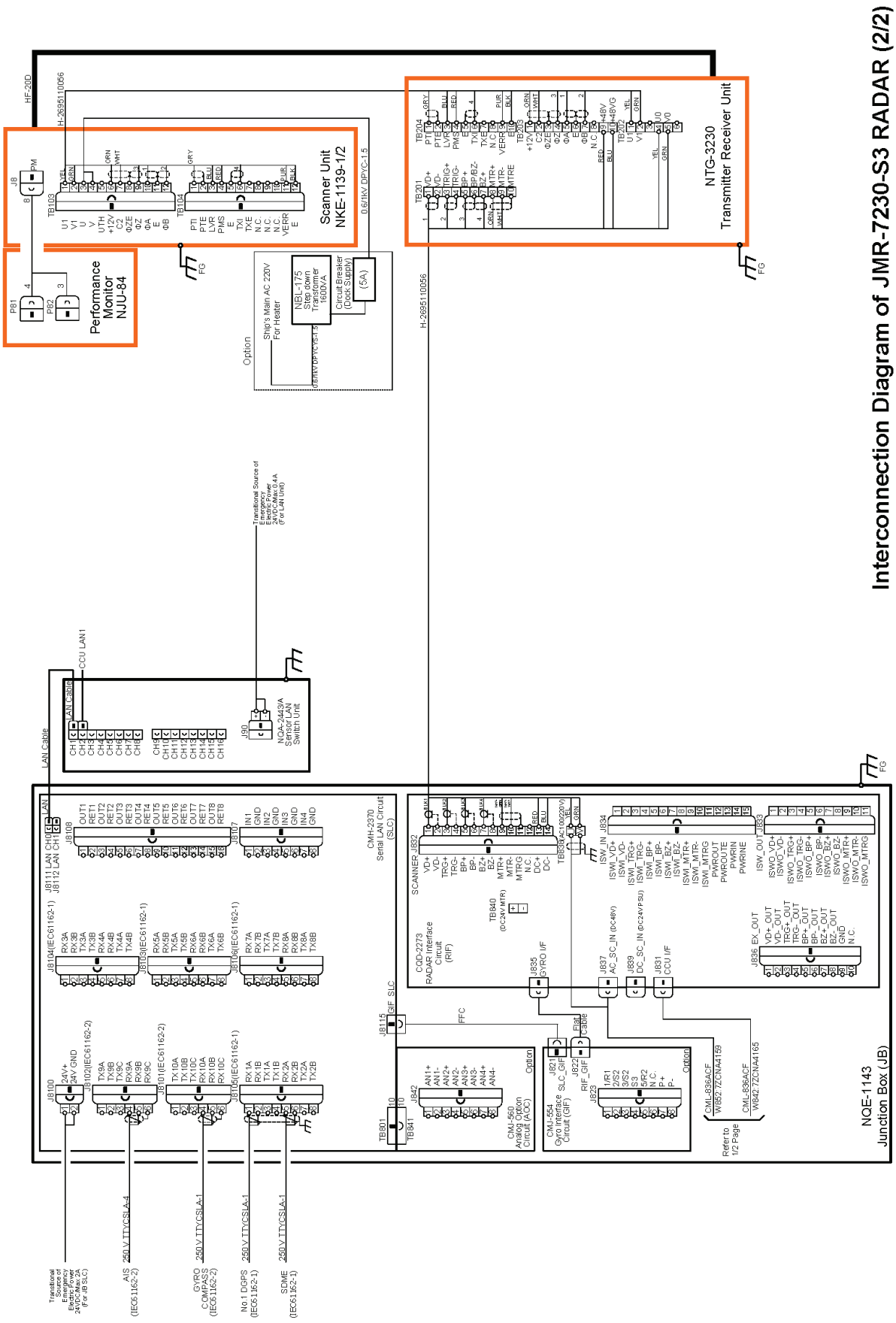
Interconnection Diagram of JMR-7230-S3 RADAR (1/2)


Interconnection Diagram of JMR-7230-S3 RADAR (2/2)
CWA-245 19inch Display Unit Mount Kit
Scanner Unit
NKE-1139-1/2
NTG-3230
Transmitter Receiver Unit
Performance
Monitor
NJU-84
NQE-1143
Junction Box (JB)
NBL-175
Step down
Transformer
1500VA
Circuit Breaker
(Dock Supply)
(5A)
Ship's Main AC 220V
For Heater
Option
HF-20D
H-2695110056
0.6/1kV DPYC-1.5
LAN Cable
CCU LAN1
NQA-2443/A
Sensor LAN
Switch Unit
Refer to
1/2 Page
From Relay Terminal
Transitional Source of
Emergency
Electric Power
24VDC-Max.0.4A
(For LAN Unit)
COD-2273
RADAR Interface
Circuit
(RIF)
CMH-2370
Serial LAN Circuit
(SLC)
CMJ-560
Analog Option
Circuit (AOC)
CMJ-554
Gyro Interface
Circuit (GIF)
CML-836AC
WB517ZCNA4158
CML-836AC
WB417ZCN44164
FFC
Flat
cable
AIS
(IEC61162-2)
GYRO
COMPASS
(IEC61162-2)
No.1 DGPS
(IEC61162-1)
SDME
(IEC61162-1)
250 V TTYCSLA-4
250 V TTYCSLA-1
250 V TTYCSLA-1
250 V TTYCSLA-1

Desktop type

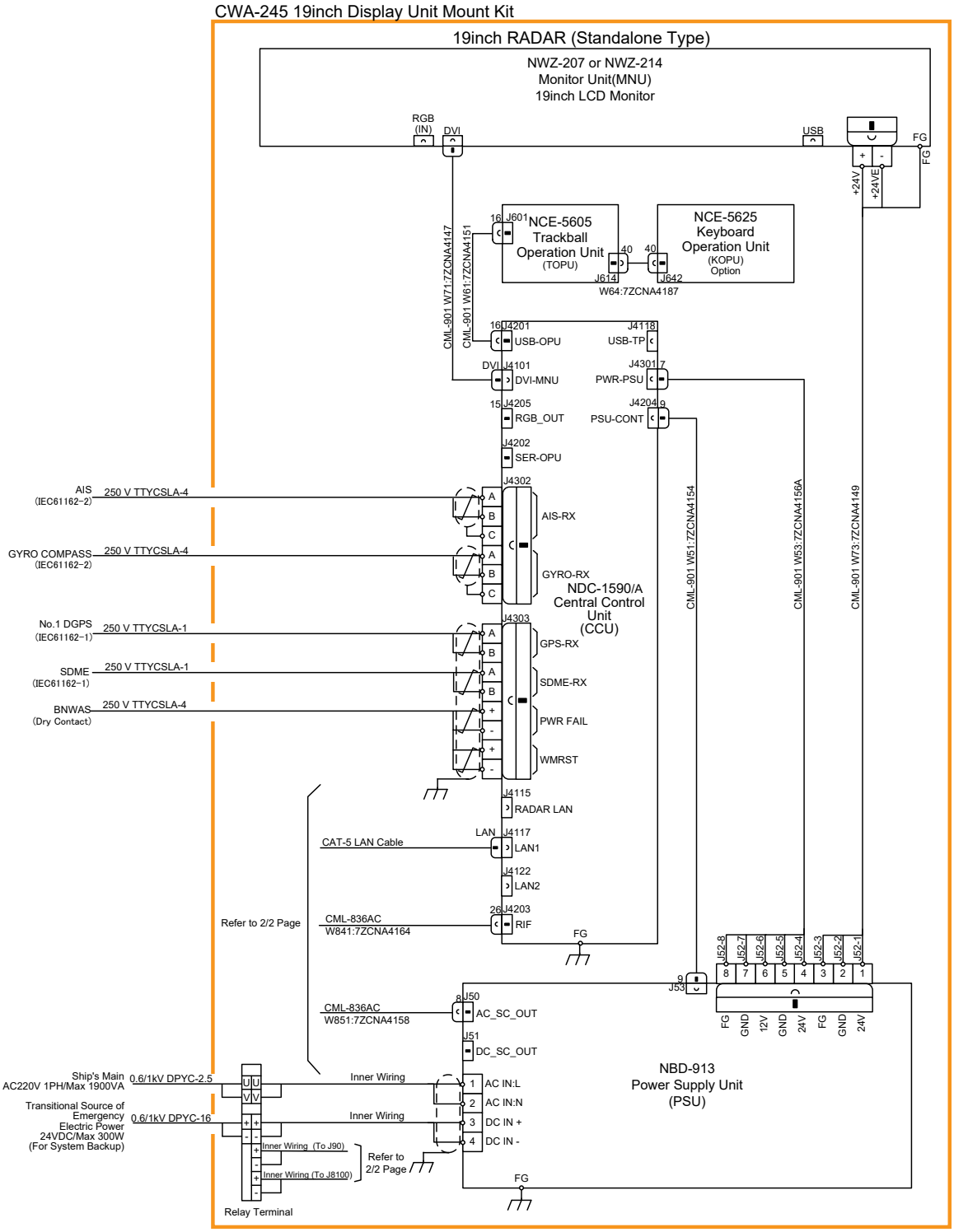


Interconnection Diagram of JMR-7230-S3 RADAR (1/2)

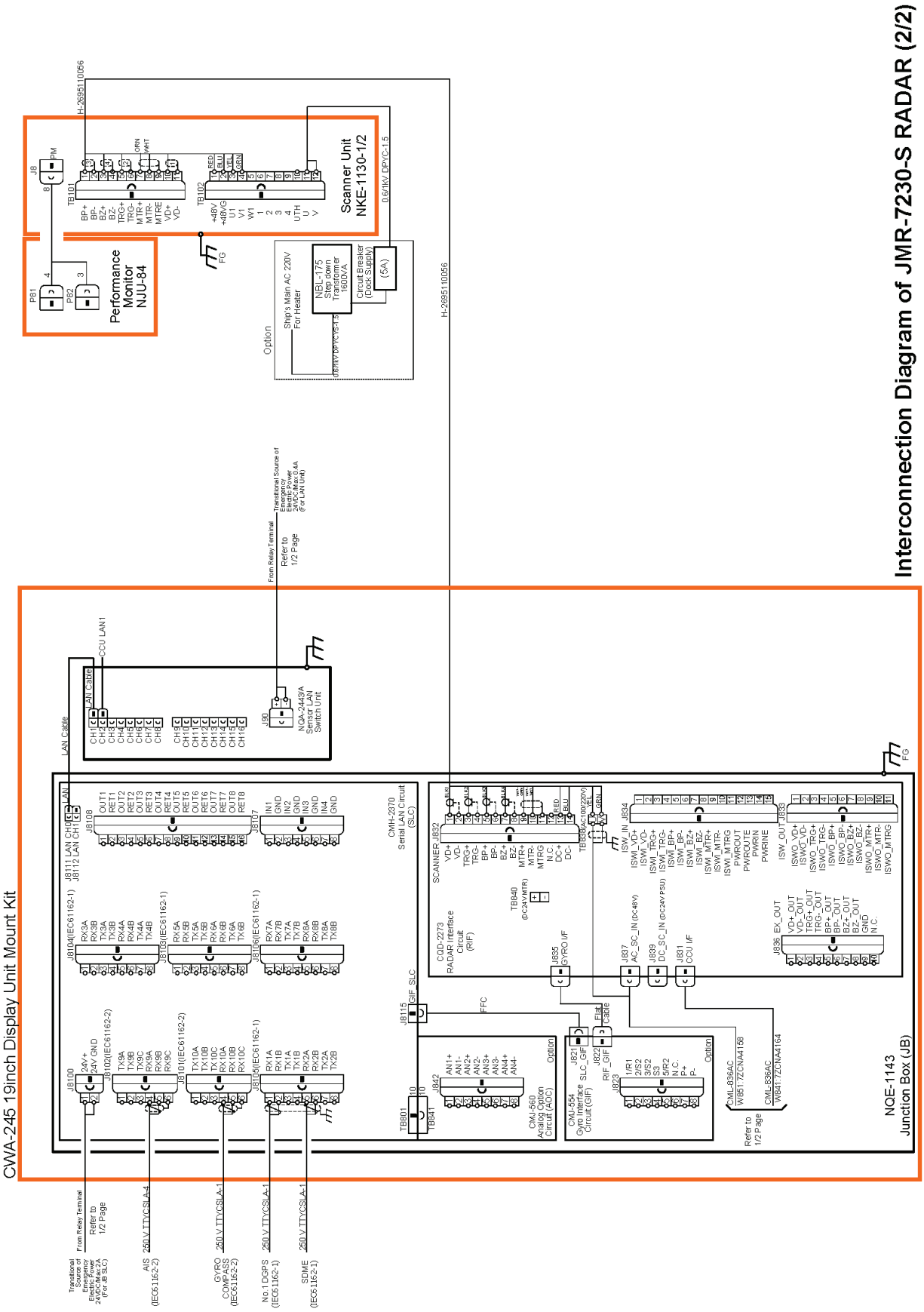

Interconnection Diagram of JMR-7230-S3 RADAR (2/2)
Scanner Unit
NKE-1139-1/2
NTG-3230
Transmitter Receiver Unit
Performance
Monitor
NJU-84
NQE-1143
Junction Box (JB)
NQA-2443/A
Sensor LAN
Switch Unit
CCU LAN1
LAN Cable
HF-20D
H-2695110056
0.6/1kV DPYC-1.5
NBL-175
Step down
Transformer
1500VA
Circuit Breaker
(Dock Supply)
(5A)
Ship's Main AC 220V
For Heater
Option
Transitional Source of
Emergency
Electric Power
24VDC-Max.2A
(For JB SLC)
AIS
(IEC61162-2)
GYRO
COMPASS
(IEC61162-2)
No.1 DGPS
(IEC61162-1)
SDME
(IEC61162-1)
250 V TTYCSLA-4
250 V TTYCSLA-1
250 V TTYCSLA-1
250 V TTYCSLA-1
CMH-2370
Serial LAN Circuit
(SLC)
COD-2273
RADAR Interface
Circuit
(RIF)
CMJ-554
Gyro Interface
Circuit (GIF)
CMJ-560
Analog Option
Circuit (AOC)
CML-836ACF
W852-7ZCNA4159
CML-836ACF
W842-7ZCNA4165
Refer to
1/2 Page
FFC
Flat
cable
SCANNER
ISW_IN
ISW_OUT
ISWO_VD+
ISWO_VD-
ISWO_TRG+
ISWO_TRG-
ISWO_BP+
ISWO_BP-
ISWO_BZ+
ISWO_BZ-
ISWO_MTR+
ISWO_MTR-
ISWO_MTRG
ISWI_VD+
ISWI_VD-
ISWI_TRG+
ISWI_TRG-
ISWI_BP+
ISWI_BP-
ISWI_BZ+
ISWI_BZ-
ISWI_MTR+
ISWI_MTR-
ISWI_MTRG
PWRIN
PWROUT
TB840
(DC24V MTR)
TB838
(AC100/220V)
J8100
J8101(IEC61162-2)
J8102(IEC61162-2)
J8103(IEC61162-1)
J8104(IEC61162-1)
J8105(IEC61162-1)
J8106(IEC61162-1)
J8107
J8108
J8111 LAN CH0
J8112 LAN CH1
J8115
J821
J822
J823
J831
J832
J834
J835
J836
J837
J839
J842
TB801
TB841
TB103
TB104
TB201
TB202
TB203
TB204
PB1
PB2
J8
J90
J10
CH1
CH2
CH3
CH4
CH5
CH6
CH7
CH8
CH9
CH10
CH11
CH12
CH13
CH14
CH15
CH16
IN1
IN2
IN3
IN4
GND
OUT1
OUT2
OUT3
OUT4
OUT5
OUT6
OUT7
OUT8
RET1
RET2
RET3
RET4
RET5
RET6
RET7
RET8
RX1A
RX1B
RX2A
RX2B
TX1A
TX1B
TX2A
TX2B
RX3A
RX3B
TX3A
TX3B
RX4A
RX4B
TX4A
TX4B
RX5A
RX5B
TX5A
TX5B
RX6A
RX6B
TX6A
TX6B
RX7A
RX7B
TX7A
TX7B
RX8A
RX8B
TX8A
TX8B
RX9A
RX9B
TX9A
TX9B
RX10A
RX10B
TX10A
TX10B
24V+
24V GND
AN1+
AN1-
AN2+
AN2-
AN3+
AN3-
AN4+
AN4-
1/R1
2/S2
3/S2
S3
5/R2
N.C.
B+
B-
VD+
VD-
TRG+
TRG-
BP+
BP-
BZ+
BZ-
MTR+
MTR-
MTRG
N.C
DC+
DC-
PTI
PTE
LVR
PMS
TXI
TXE
VERR
E
+12V
C2
ΦZE
ΦZ
ΦA
ΦB
UTH
V1
U1
V
U
GRY
BLU
RED
WHT
ORN
YEL
GRN
PUR
BLK

8.3.11 JMR-7230-S Interconnection Diagrams

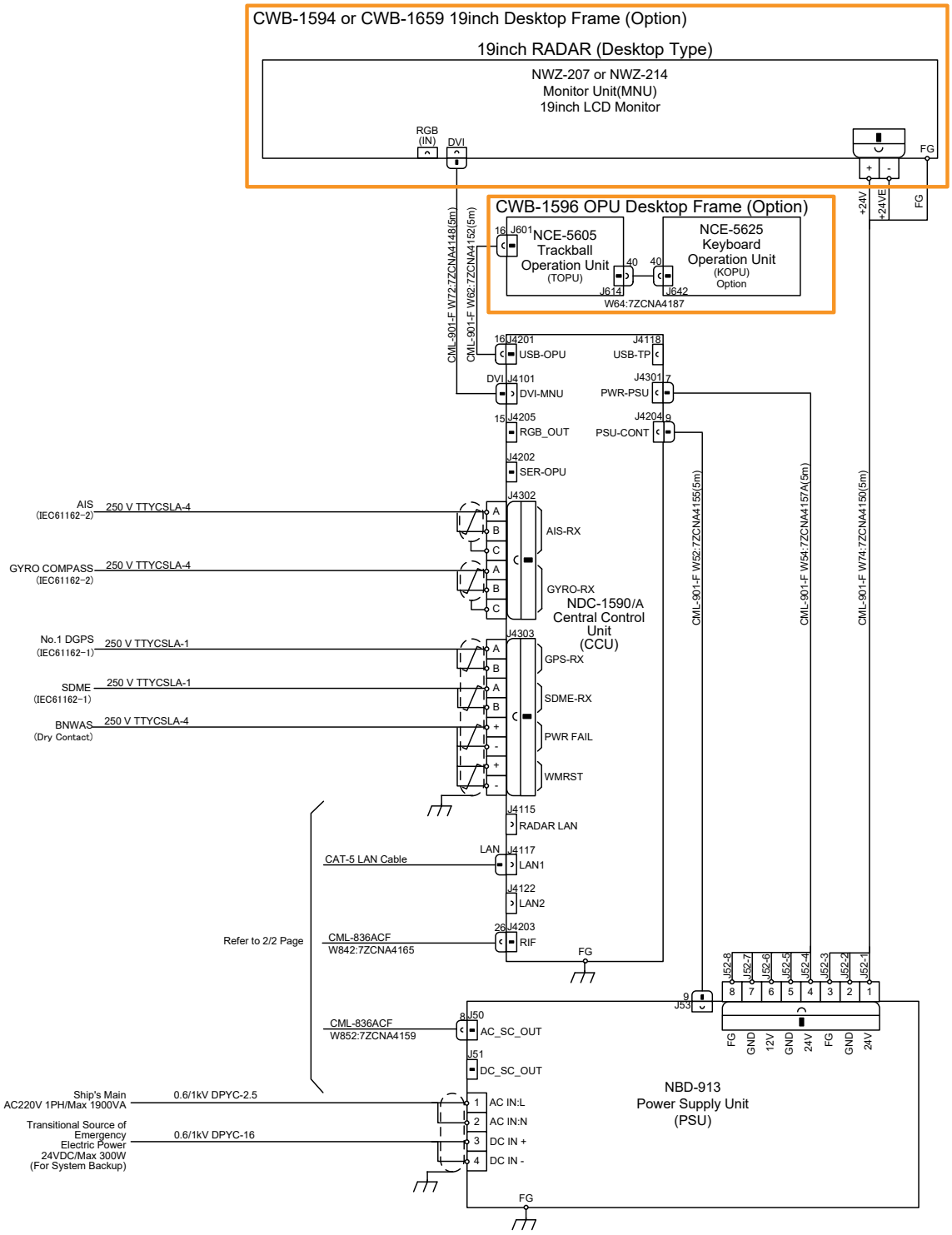
Stand alone type



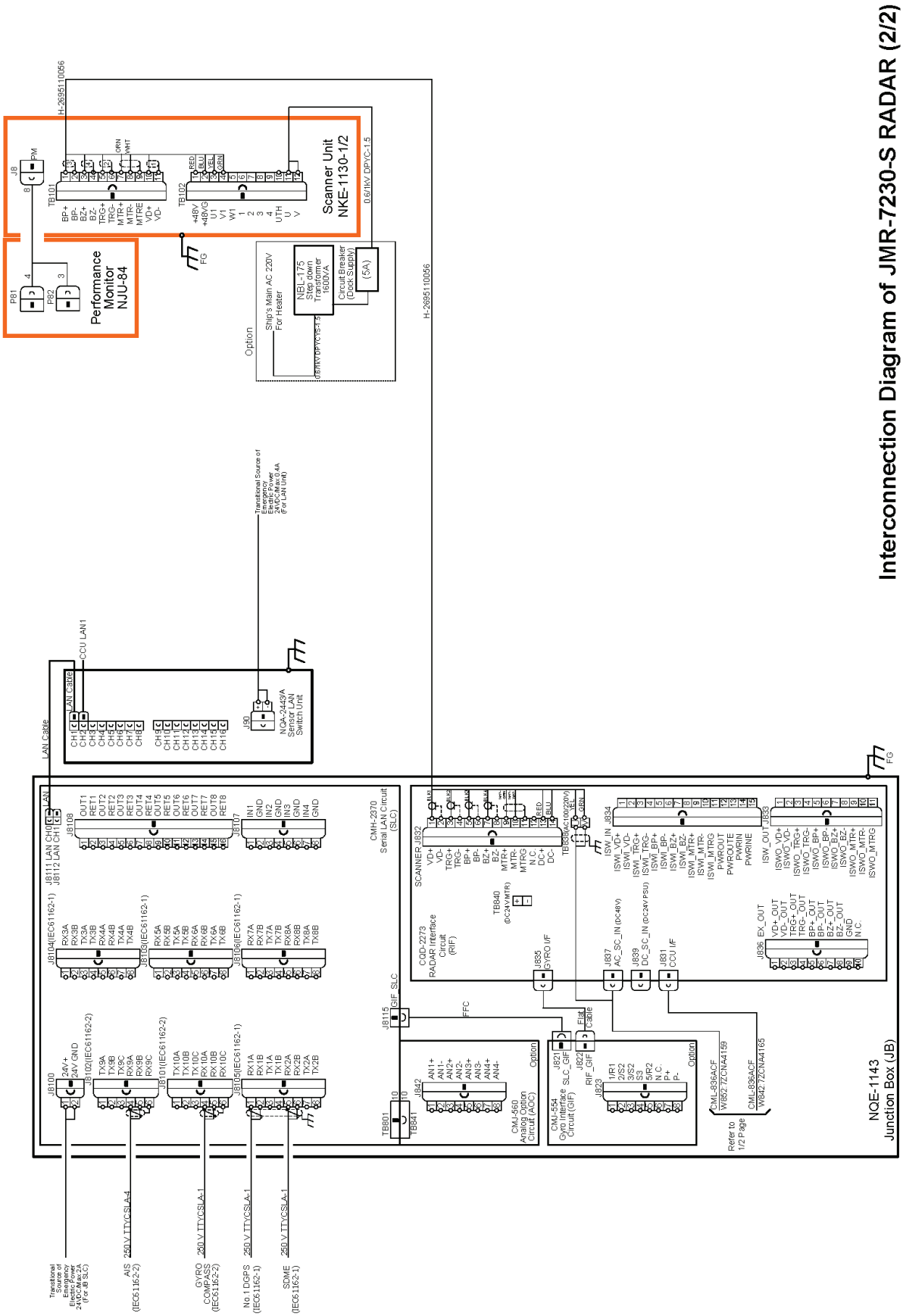
Interconnection Diagram of JMR-7230-S RADAR (1/2)


Interconnection Diagram of JMR-7230-S RADAR (2/2)
CWA-245 19inch Display Unit Mount Kit
NQE-1143
Junction Box (JB)
Scanner Unit
NKE-1130-1/2
Performance
Monitor
NJU-84
NQA-2443/A
Sensor LAN
Switch Unit
CCU LAN1
LAN Cable
NBL-175
Step down
Transformer
1500VA
Circuit Breaker
(Dock Supply)
(5A)
Ship's Main AC 220V
For Heater
Option
H-2695110056
0.6/1KV DPYC-1.5
Refer to
1/2 Page
From Relay Terminal
Transitional Source of
Emergency
Electric Power
24VDC Max 0.4A
(For LAN Unit)
COD-2273
RADAR Interface
Circuit
(RIF)
CMH-2370
Serial LAN Circuit
(SLC)
CMJ-560
Analog Option
Circuit (AOC)
CMJ-554
Gyro Interface
Circuit (GIF)
CML-836AC
W841-7ZCNA4164
AIS
(IEC61162-2)
GYRO
COMPASS
(IEC61162-2)
No 1 DGPS
(IEC61162-1)
SDME
(IEC61162-1)
250 V TTYCSLA-1
250 V TTYCSLA-4

Desktop type

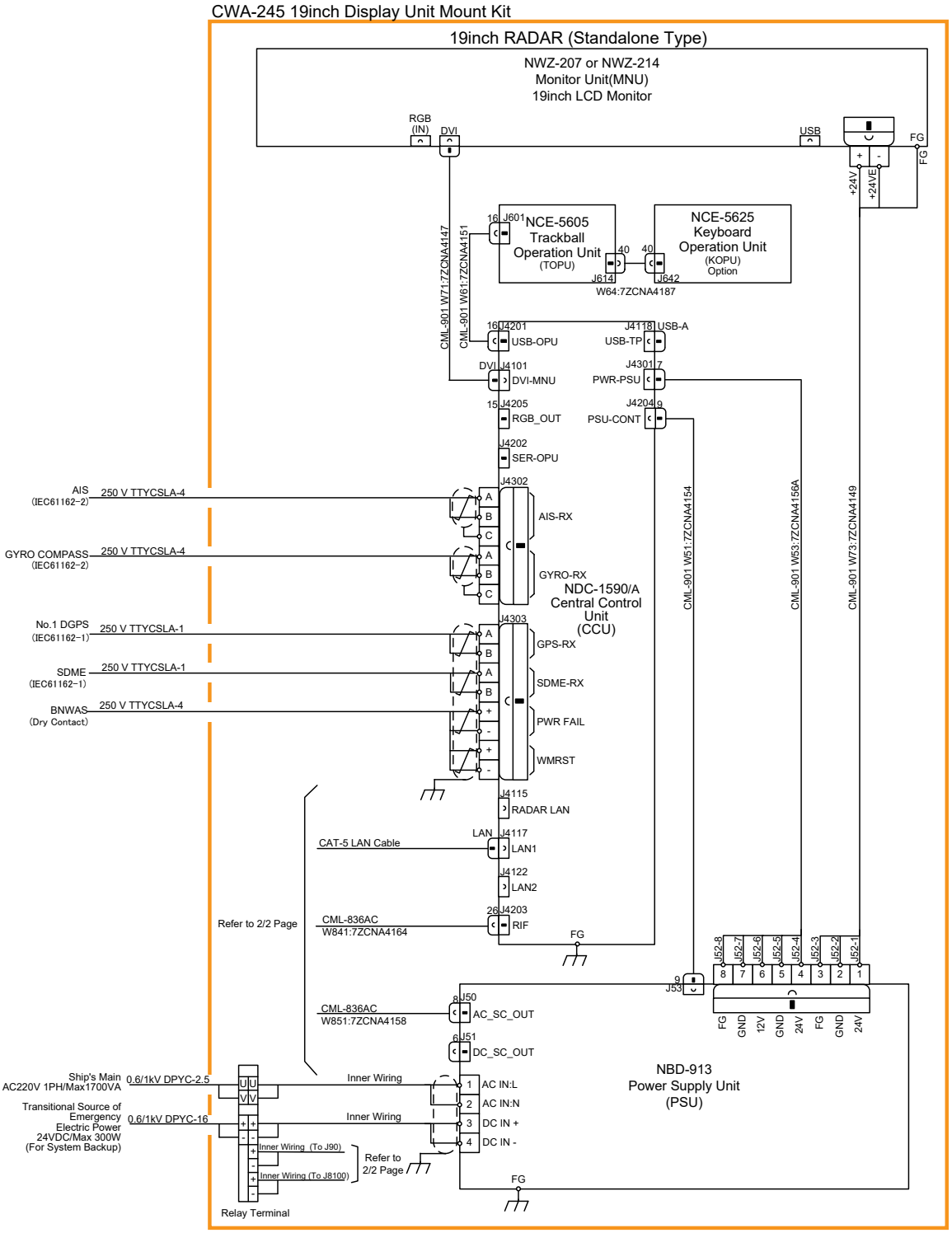


Interconnection Diagram of JMR-7230-S RADAR (1/2)

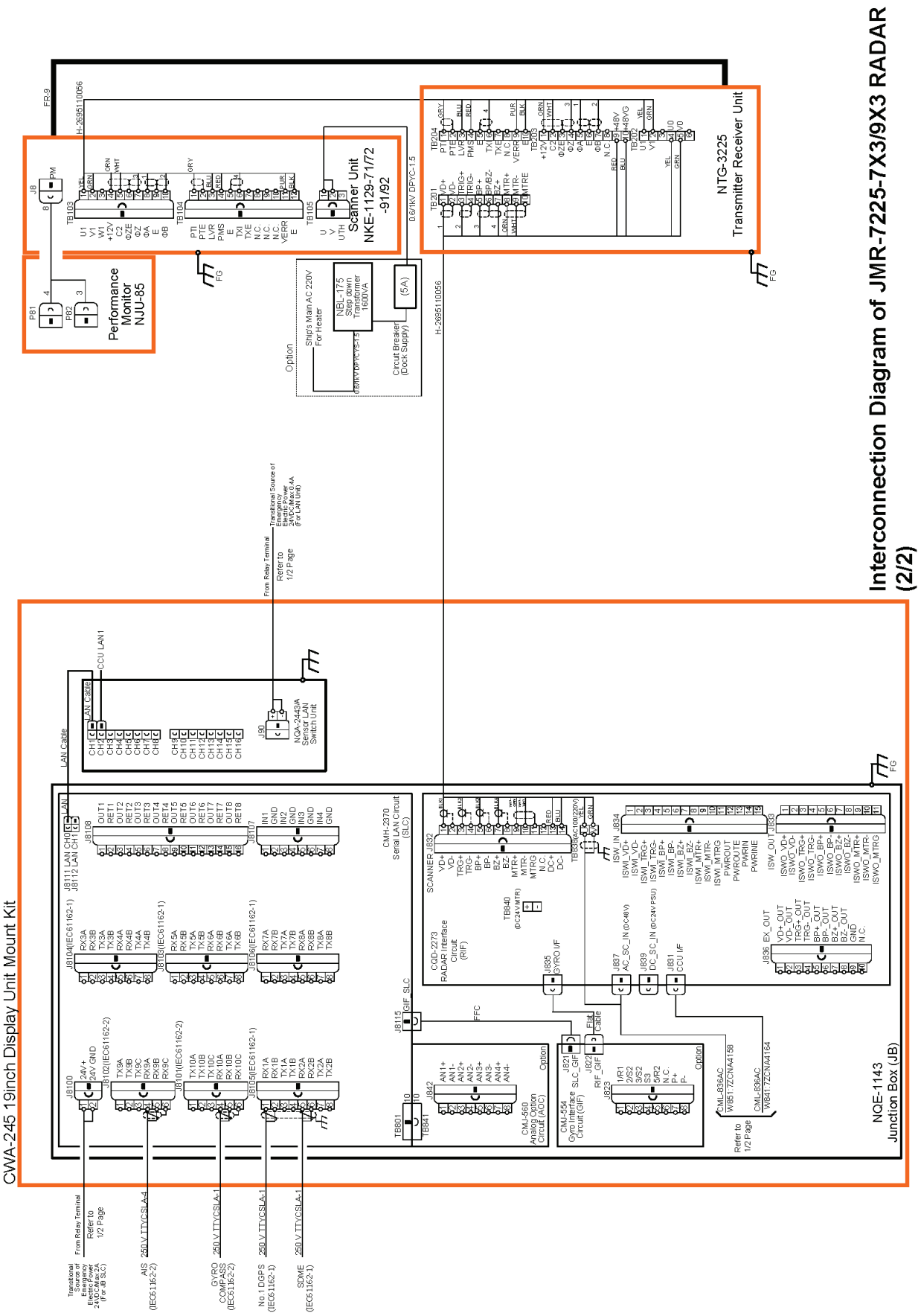

Interconnection Diagram of JMR-7230-S RADAR (2/2)
Scanner Unit
NKE-1130-1/2
Performance Monitor
NJU-84
Ship's Main AC 220V
For Heater
NBL-175
Step down Transformer
1500VA
Circuit Breaker
(Dock Supply)
(5A)
Option
NQE-1143
Junction Box (JB)
CCU LAN1
LAN Cable
NQA-2449/A
Sensor LAN
Switch Unit
CMH-2370
Serial LAN Circuit
(SLC)
COD-2273
RADAR Interface
Circuit
(RIF)
CMJ-560
Analog Option
Circuit (AOC)
CMJ-554
Gyro Interface
Circuit (GIF)
CML-836ACF
W852-7ZCNA4159
CML-836ACF
W840-7ZCNA4165
Refer to
1/2 Page
Transitional Source of Emergency Electric Power
24VDC Max.2A
(For JB SLC)
AIS
(IEC61162-2)
GYRO
COMPASS
(IEC61162-2)
No.1 DGPS
(IEC61162-1)
SDME
(IEC61162-1)
250 V TTYCSLA-4
250 V TTYCSLA-1
250 V TTYCSLA-1
250 V TTYCSLA-1
H-2695110056
0.6/1kV DPYC-1.5
FFC
Flat cable
SCANNER J832
J834
J835
GYRO I/F
J837
AC_SC_IN (DC48V)
J839
DC_SC_IN (DC24V PSU)
J831
CCU I/F
J836
EX_OUT
J833
ISW_OUT
J842
J821
SLC_GIF
J822
RIF_GIF
J823
TB801
TB841
TB840
(DC24V MTR)
TB838
(AC100/220V)
J8100
J8101(IEC61162-2)
J8102(IEC61162-2)
J8103(IEC61162-1)
J8104(IEC61162-1)
J8105(IEC61162-1)
J8106(IEC61162-1)
J8107
J8108
J8111 LAN CH0
J8112 LAN CH1
J8115
GIF_SLC
J90
PB1
PB2
J8
PM
TB101
TB102

8.3.12 JMR-7225-7X3/9X3 Interconnection Diagrams

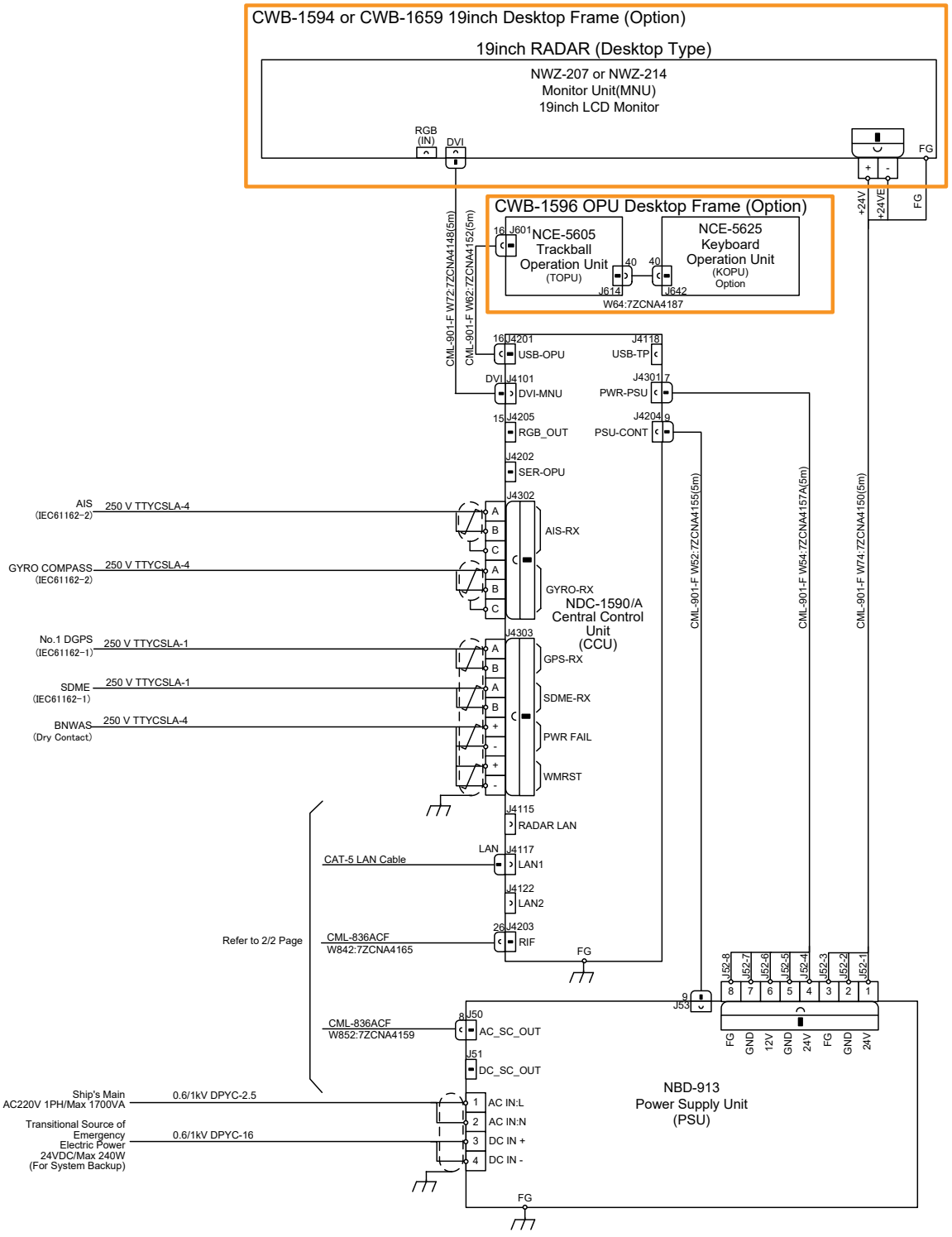
Stand alone type



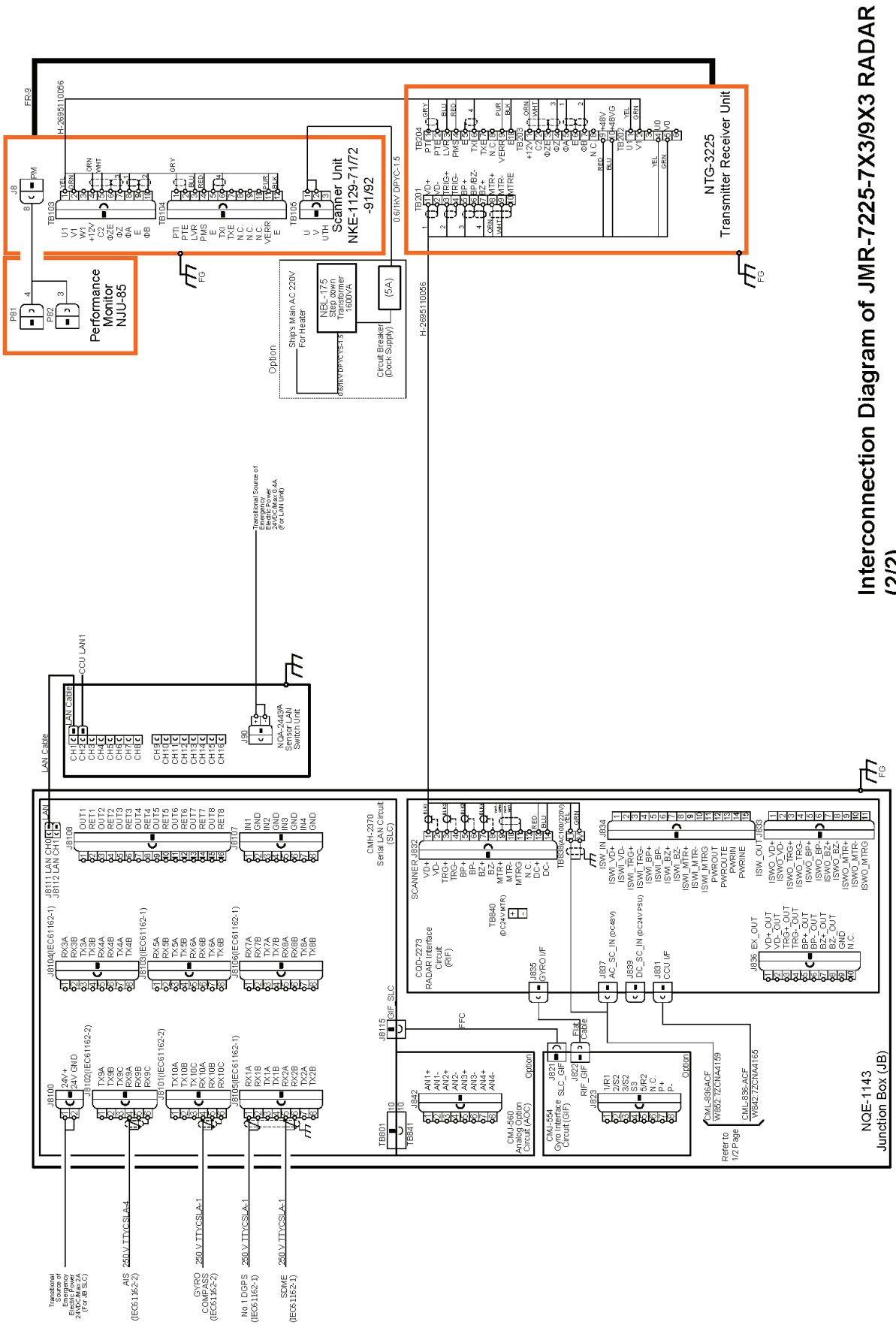
Interconnection Diagram of JMR-7225-7X3/9X3 RADAR (1/2)


Interconnection Diagram of JMR-7225-7X3/9X3 RADAR (2/2)
CWA-245 19inch Display Unit Mount Kit
NQE-1143
Junction Box (JB)
Performance Monitor NJU-85
Scanner Unit NKE-1129-71/72 -91/92
NTG-3225 Transmitter Receiver Unit
NQA-2443/A Sensor LAN Switch Unit
CCU LAN1
LAN Cable
Option
Ship's Main AC 220V For Heater
NEL-175 Step down Transformer 1600VA
Circuit Breaker (Dock Supply)
(5A)
0.6/1kV DPYC-1.5
H-2695110056
FR-9
From Relay Terminal
Refer to 1/2 Page
Transitional Source of Emergency Electric Power 24VDC Max 0.4A (For LAN Unit)
SCANNER J832
CMH-2370 Serial LAN Circuit (SLC)
COD-2273 RADAR Interface Circuit (RIF)
CMJ-560 Analog Option Circuit (AOC)
CMJ-554 Gyro Interface Circuit (GIF)
CML-836AC W841-7ZCNA4164
GYRO I/F
CCU I/F
AIS (IEC61162-2)
GYRO COMPASS (IEC61162-2)
No 1 DGPS (IEC61162-1)
SDME (IEC61162-1)
250 V TTYCSLA-4
250 V TTYCSLA-1

Desktop type

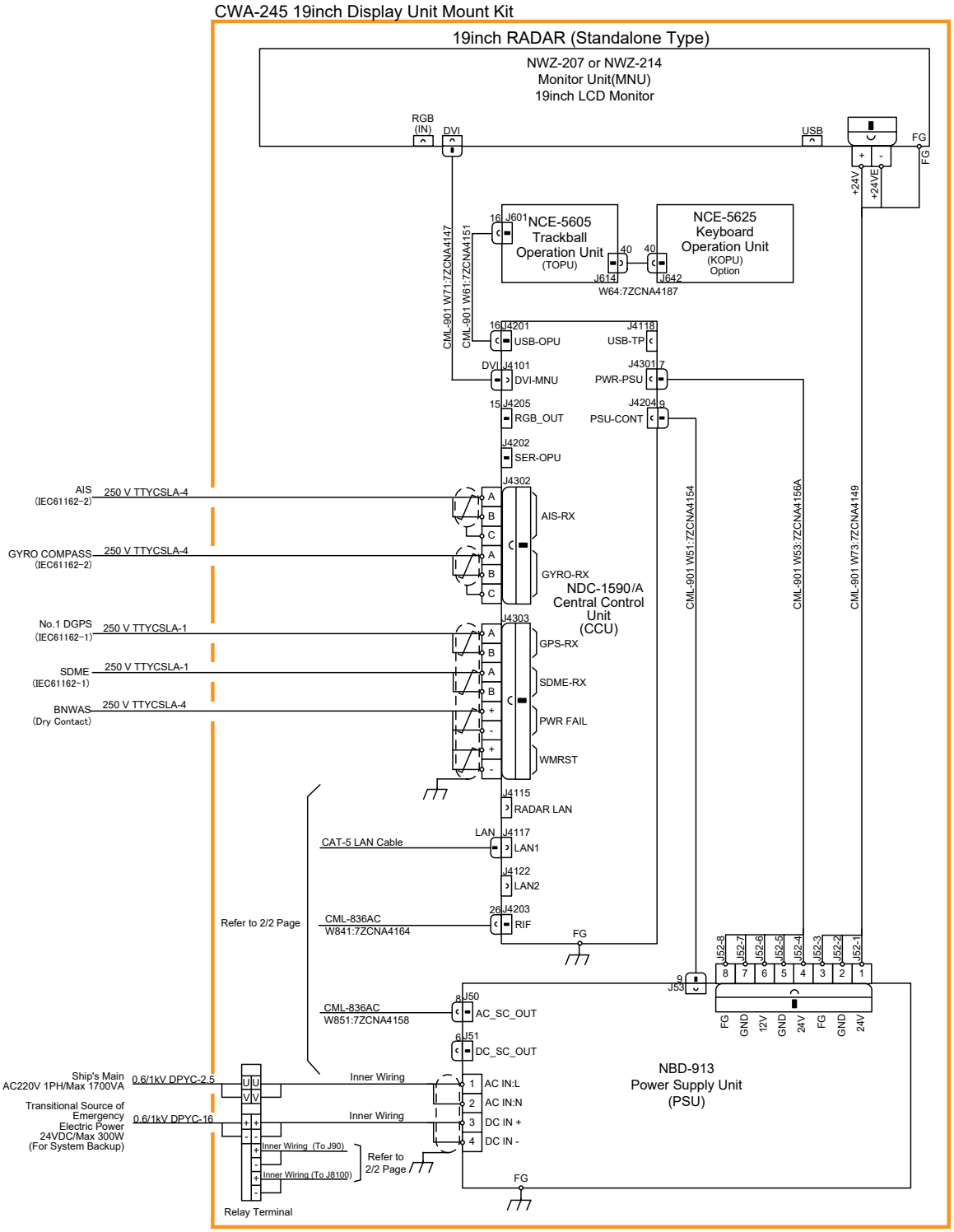


Interconnection Diagram of JMR-7225-7X3/9X3 RADAR (1/2)

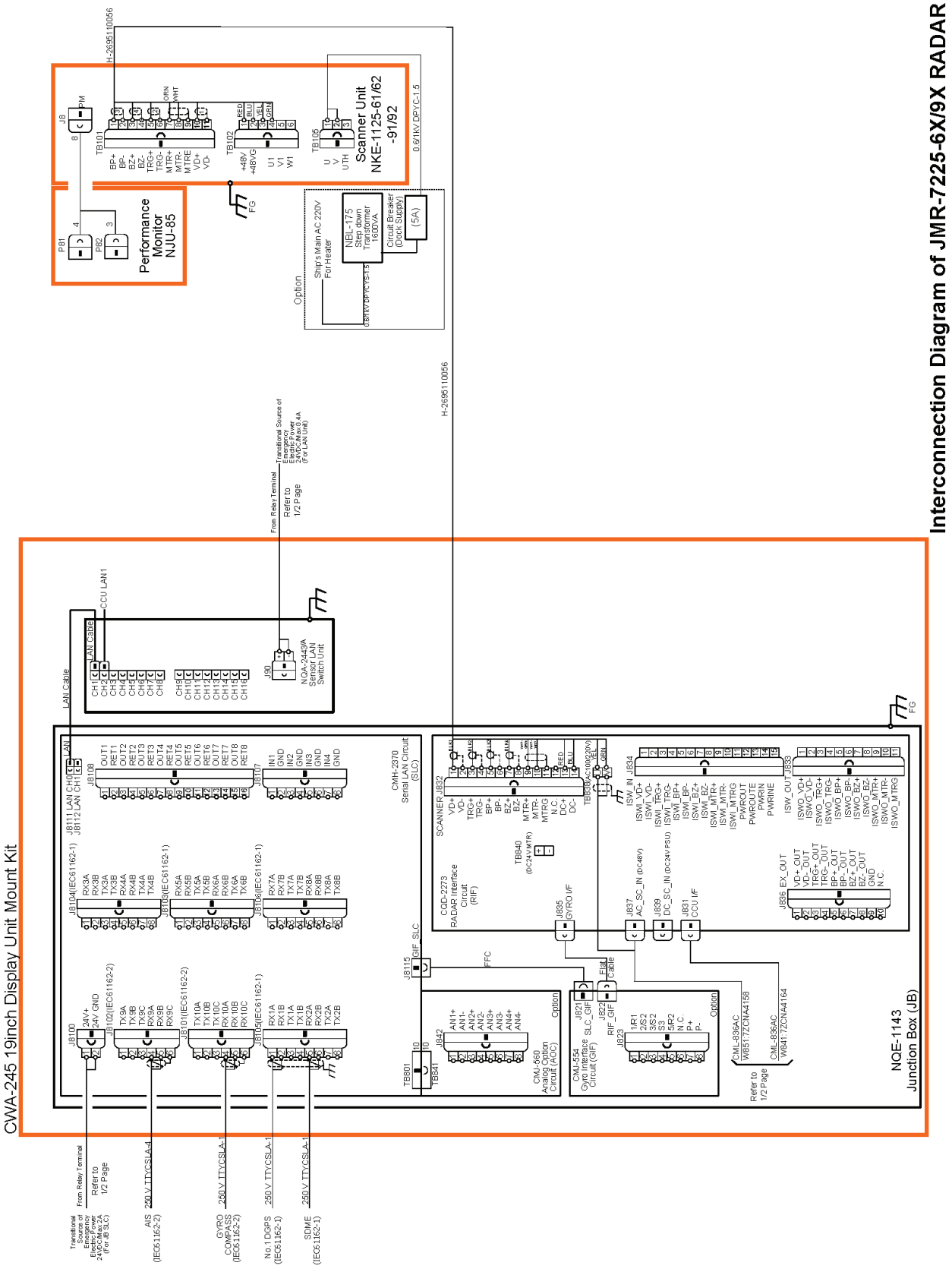

Interconnection Diagram of JMR-7225-7X3/9X3 RADAR
(2/2)
NTG-3225
Transmitter Receiver Unit
Scanner Unit
NKE-1129-71/72
-91/92
Performance
Monitor
NJU-85
NQE-1143
Junction Box (JB)
NQA-2449/A
Sensor LAN
Switch Unit
Option
Ship's Main AC 220V
For Heater
NEL-175
Step down
Transformer
1600VA
(5A)
Circuit Breaker
(Dock Supply)
Transitional Source of Emergency Electric Power 24VDC Max 0.4A (For LAN Unit)
Transitional Source of Emergency Electric Power 24VDC Max 2A (For JB SLC)
AIS (IEC61162-2)
GYRO COMPASS (IEC61162-2)
No 1 DGPS (IEC61162-1)
SDME (IEC61162-1)
250 V TTYCSLA-4
250 V TTYCSLA-1
CCU LAN1
LAN Cable
Refer to 1/2 Page

8.3.13 JMR-7225-6X/9X Interconnection Diagrams

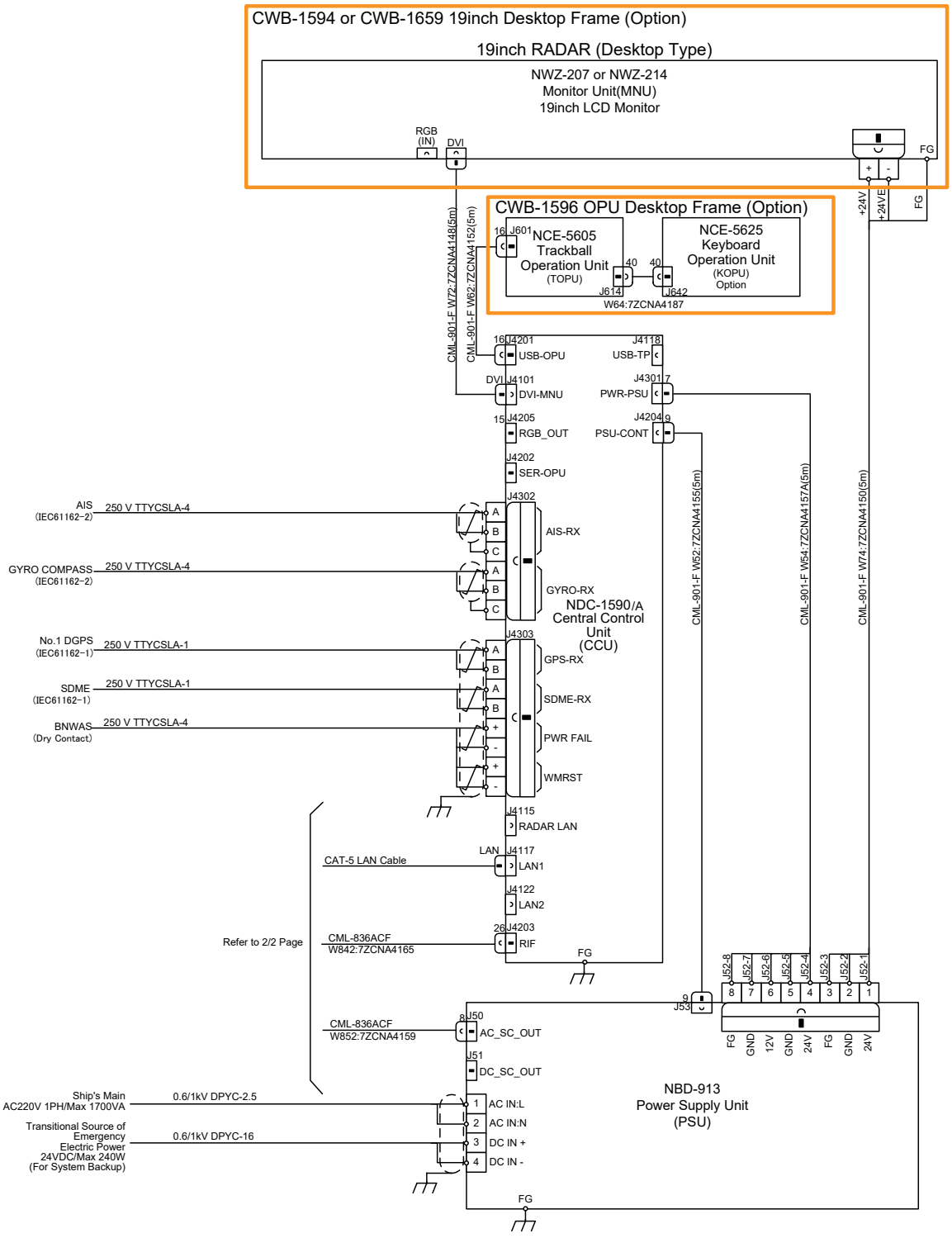
Stand alone type



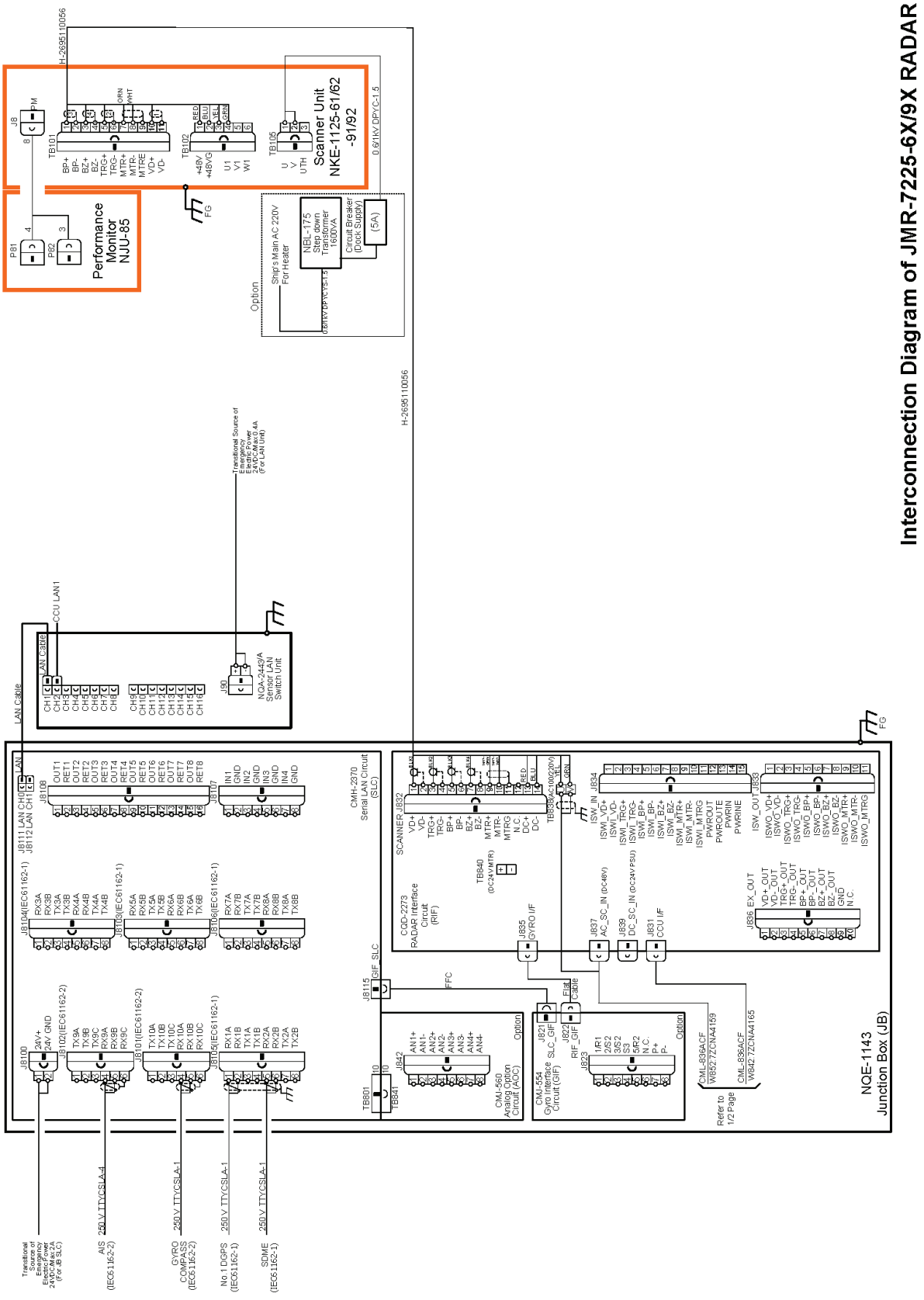
Interconnection Diagram of JMR-7225-6X/9X RADAR (1/2)


Interconnection Diagram of JMR-7225-6X/9X RADAR (2/2)
CWA-245 19inch Display Unit Mount Kit
Scanner Unit
NKE-1125-61/62
-91/92
Performance
Monitor
NJU-85
Option
NBL-175
Step down
Transformer
1600VA
Circuit Breaker
(Dock Suppy)
(5A)
Ship's Main AC 220V
For Heater
NQE-1143
Junction Box (JB)
NQA-2443/A
Sensor LAN
Switch Unit
CCU LAN1
LAN Cable
H-2695110056
From Relay Terminal
Refer to
1/2 Page
Transitional Source of
Emergency
Electric Power
24VDC 4.5A
(For LAN Unit)
SCANNER J832
COD-2273
RADAR Interface
Circuit
(RIF)
CMH-2970
Serial LAN Circuit
(SLC)
CMJ-560
Analog Option
Circuit (AOC)
CML-554
Gyro Interface
Circuit (GIF)
CML-836AC
W6517ZCNA4164
W6417ZCNA4164
AIS
(IEC61162-2)
GYRO
COMPASS
(IEC61162-2)
No.1 DGPS
(IEC61162-1)
SDME
(IEC61162-1)
250V TTYCSLA-4
250V TTYCSLA-1
250V TTYCSLA-1
250V TTYCSLA-1

Desktop type



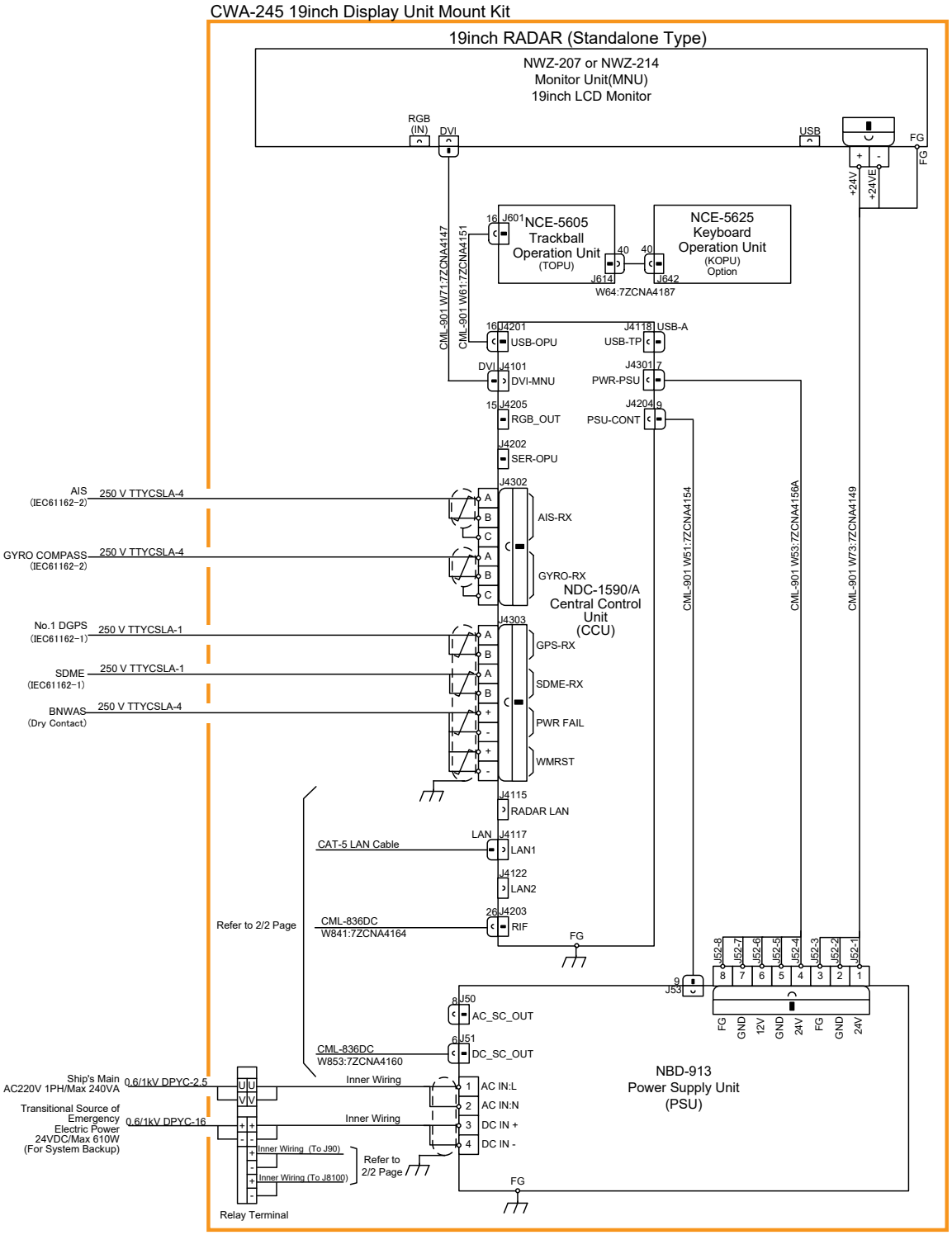
Interconnection Diagram of JMR-7225-6X/9X RADAR (1/2)



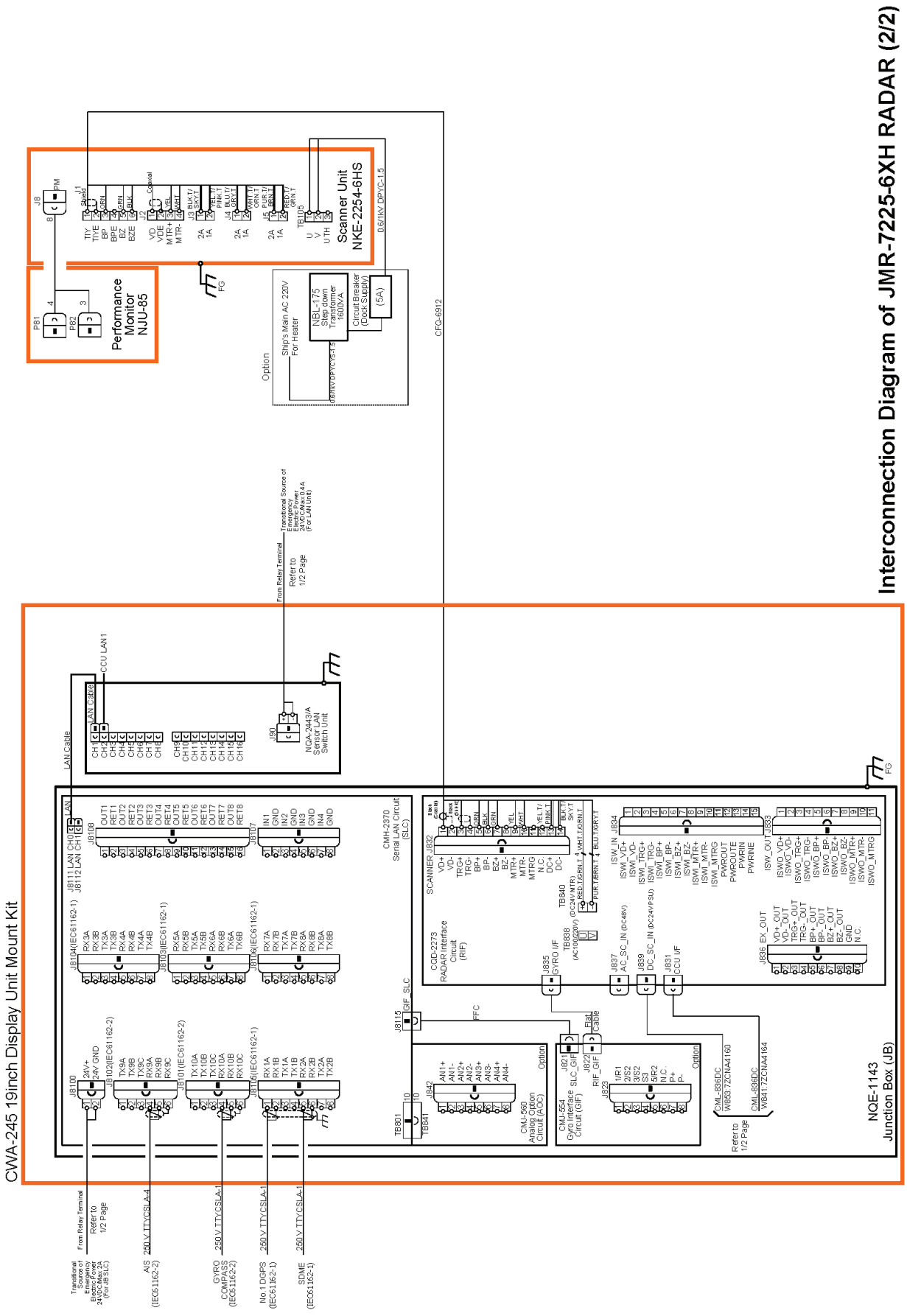
Interconnection Diagram of JMR-7225-6X/9X RADAR (2/2)

8.3.14 JMR-7225-6XH Interconnection Diagrams

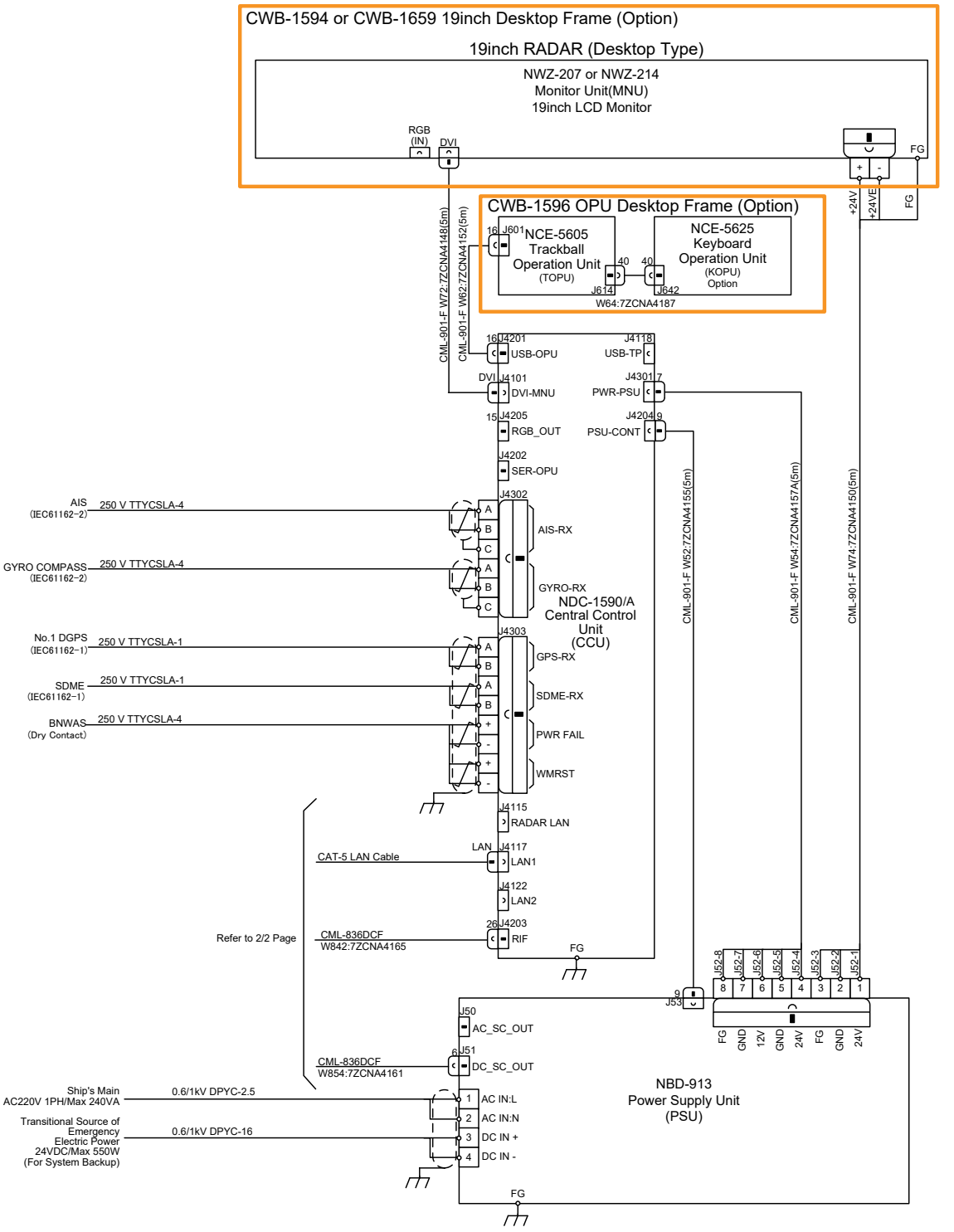
Stand alone type



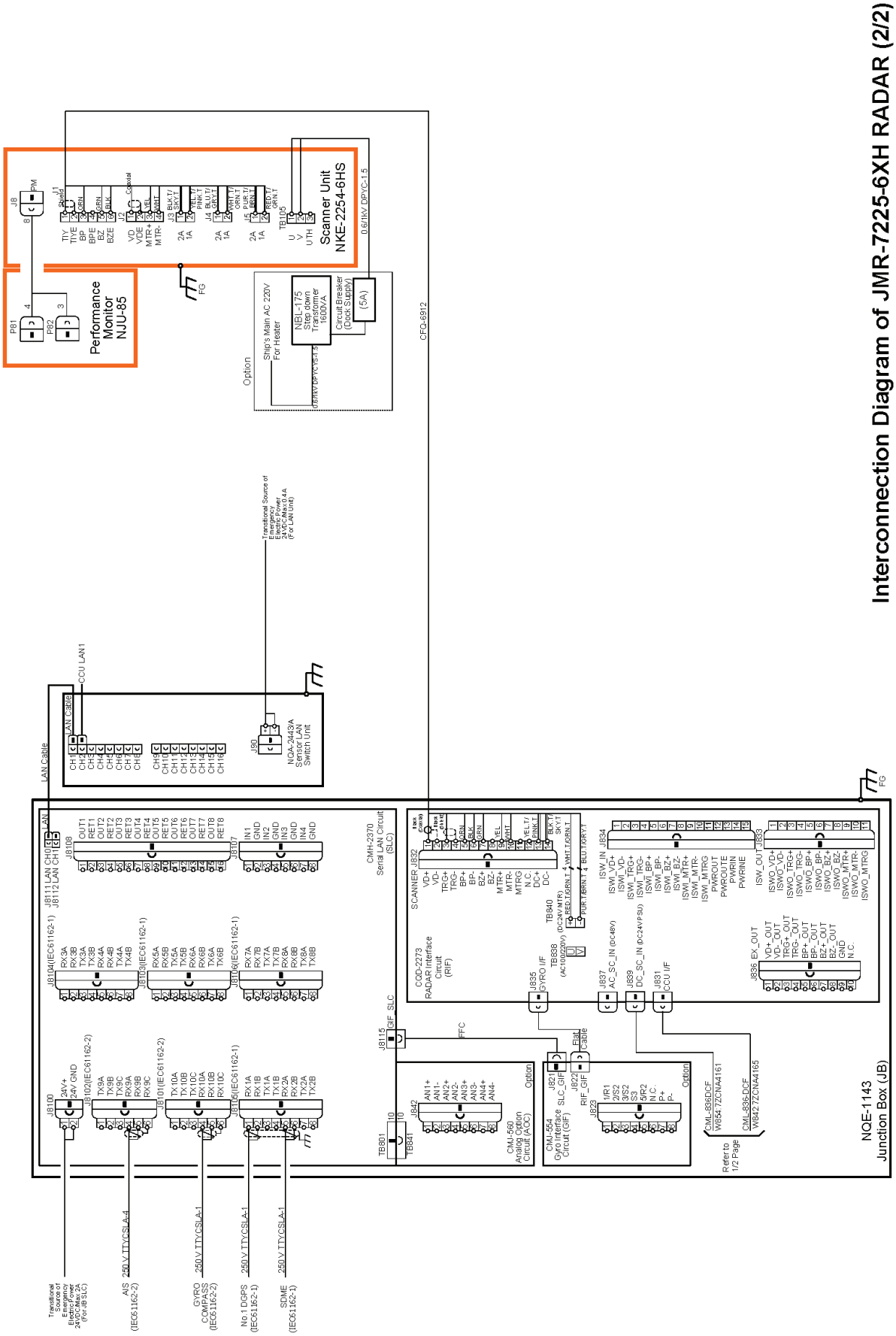
Interconnection Diagram of JMR-7225-6XH RADAR (1/2)


Interconnection Diagram of JMR-7225-6XH RADAR (2/2)
CWA-245 19inch Display Unit Mount Kit
Performance Monitor NJU-85
Scanner Unit NKE-2254-6HS
NQE-1143 Junction Box (JB)
CFQ-6912
Option
Ship's Main AC 220V For Heater
NBL-175 Step down Transformer 1500VA
Circuit Breaker (Dock Supply)
(5A)
NQA-2443/A Stensor LAN Switch Unit
LAN Cable
CCU LAN1
From Relay Terminal
Refer to 1/2 Page
Transitional Source of Emergency Electric Power 24VDC,Max.2A (For LAN Unit)
COD-2273 RADAR Interface Circuit (RIF)
CMH-2370 Serial LAN Circuit (SLC)
CMJ-560 Analog Option Circuit (AOC)
CMJ-554 Gyro Interface Circuit (GIF)
CML-836DC
W843 7ZCNA4160
TB801
TB841
TB840
TB838
GYRO I/F
CCU I/F
AC_SC_IN (DC48V)
DC_SC_IN (DC24V PSU)
AIS (IEC61162-2)
GYRO COMPASS (IEC61162-2)
No.1 DGPS (IEC61162-1)
SDME (IEC61162-1)
250V TTYCSLA-4
250V TTYCSLA-1

Desktop type

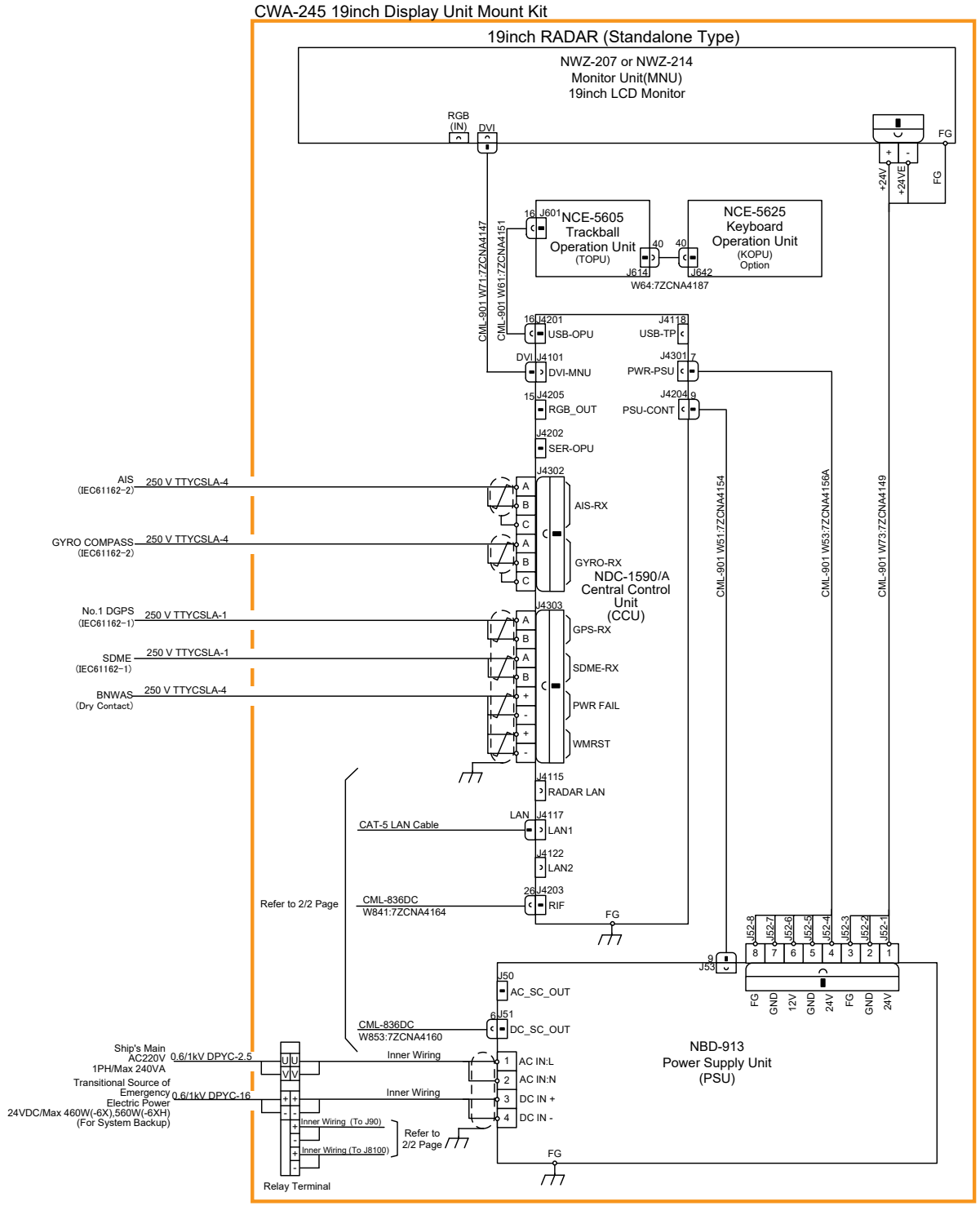


Interconnection Diagram of JMR-7225-6XH RADAR (1/2)

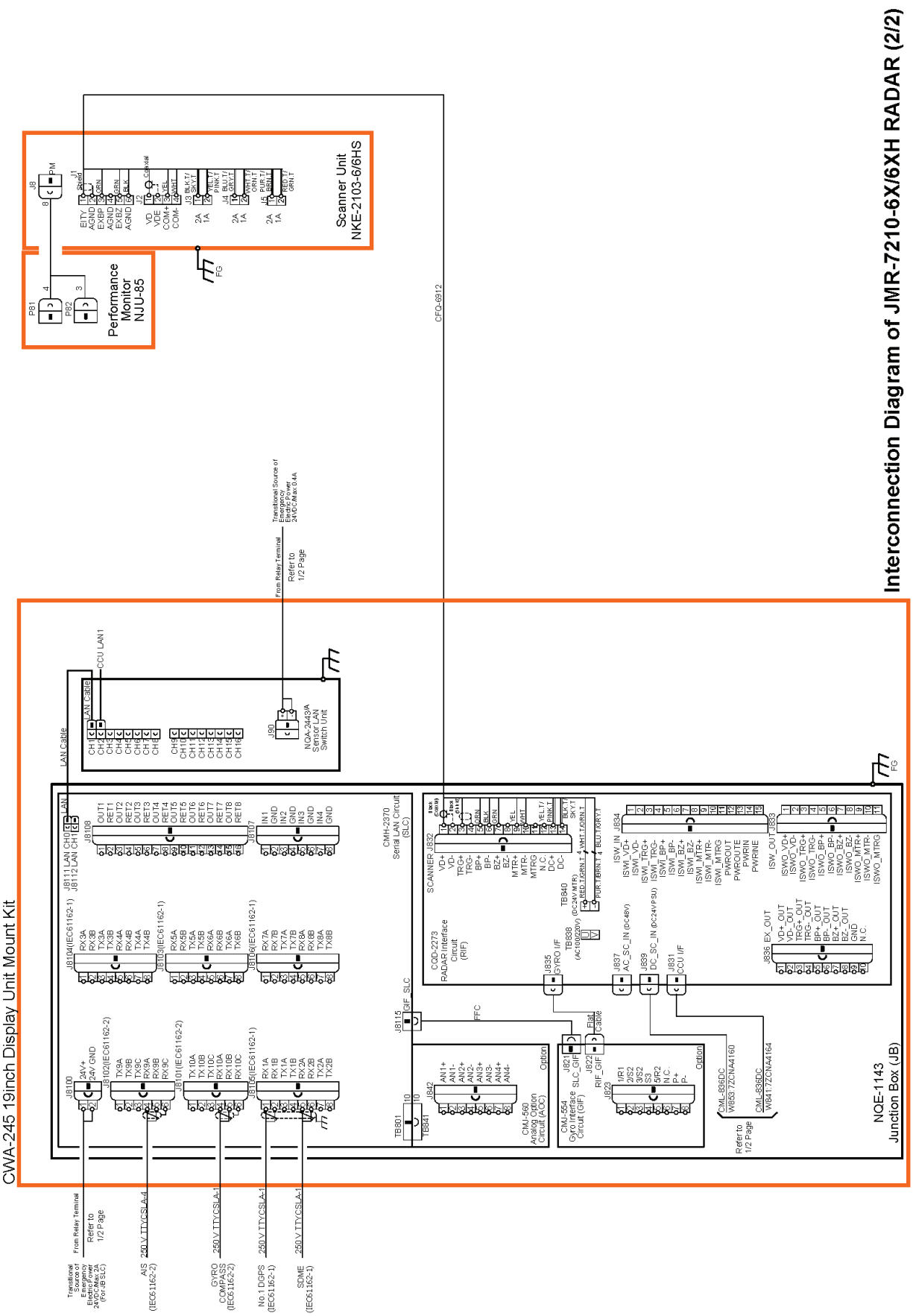

Interconnection Diagram of JMR-7225-6XH RADAR (2/2)
Scanner Unit
NKE-2254-6HS
Performance Monitor
NJU-85
NQE-1143
Junction Box (JB)
CFQ-6912
Option
NBL-175
Step down Transformer
Circuit Breaker (Dock Supply)
(5A)
Ship's Main AC 220V For Heater
NQA-2443A
Sensor LAN Switch Unit
LAN Cable
CCU LAN1
Transitional Source of Emergency Electric Power 24VDC,Max.2A (For LAN Unit)
Transitional Source of Emergency Electric Power 24VDC,Max.2A (For JB SLC)
AIS (IEC61162-2)
GYRO COMPASS (IEC61162-2)
No.1 DGPS (IEC61162-1)
SDME (IEC61162-1)
250V TTYCSLA-4
250V TTYCSLA-1
250V TTYCSLA-1
250V TTYCSLA-1
COD-2273
RADAR Interface Circuit (RIF)
CMH-2370
Serial LAN Circuit (SLC)
CMJ-560
Analog Option Circuit (AOC)
CMJ-554
Gyro Interface Circuit (GIF)
CML-836DCF
W8427ZCNA4161
CML-836DCF
W8427ZCNA4165
Refer to 1/2 Page
FFC
Flat Cable
SLC_GIF
RIF_GIF
SLC
GIF
Option
Performance Monitor NJU-85
PB1
PB2
J8
PM
TTY
TTYE
BP
BPE
BZ
BZE
VD
VDE
MTR+
MTR-
2A
1A
U
V
UTH
Shield
Coaxial
0.6/1kV DPYC-1.5
J8100
J8101(IEC61162-2)
J8102(IEC61162-2)
J8103(IEC61162-1)
J8104(IEC61162-1)
J8105(IEC61162-1)
J8106(IEC61162-1)
J8107
J8108
J8111 LAN CH0
J8112 LAN CH1
J8115
J822 SCANNER
J835 GYRO I/F
J837 AC_SC_IN (DC48V)
J839 DC_SC_IN (DC24V PSU)
J831 CCU I/F
J836 EX_OUT
J833 ISW_OUT
J834 ISW_IN
J842
J821 SLC_GIF
J822 RIF_GIF
J823
TB801
TB841
TB838 (AC100/220V)
TB840 (DC24V MTR)
TB1005
ISWI_VD+
ISWI_VD-
ISWI_TRG+
ISWI_TRG-
ISWI_BP+
ISWI_BP-
ISWI_BZ+
ISWI_BZ-
ISWI_MTR+
ISWI_MTR-
ISWI_MTRG
PWROUT
PWRIN
ISWO_VD+
ISWO_VD-
ISWO_TRG+
ISWO_TRG-
ISWO_BP+
ISWO_BP-
ISWO_BZ+
ISWO_BZ-
ISWO_MTR+
ISWO_MTR-
ISWO_MTRG
VD+
VD-
TRG+
TRG-
BP+
BP-
BZ+
BZ-
MTR+
MTR-
MTRG
N.C.
DC+
DC-
1/R1
2/S2
3/S3
5/R2
N.C.
P+
P-

8.3.15 JMR-7210-6X/6XH Interconnection Diagrams

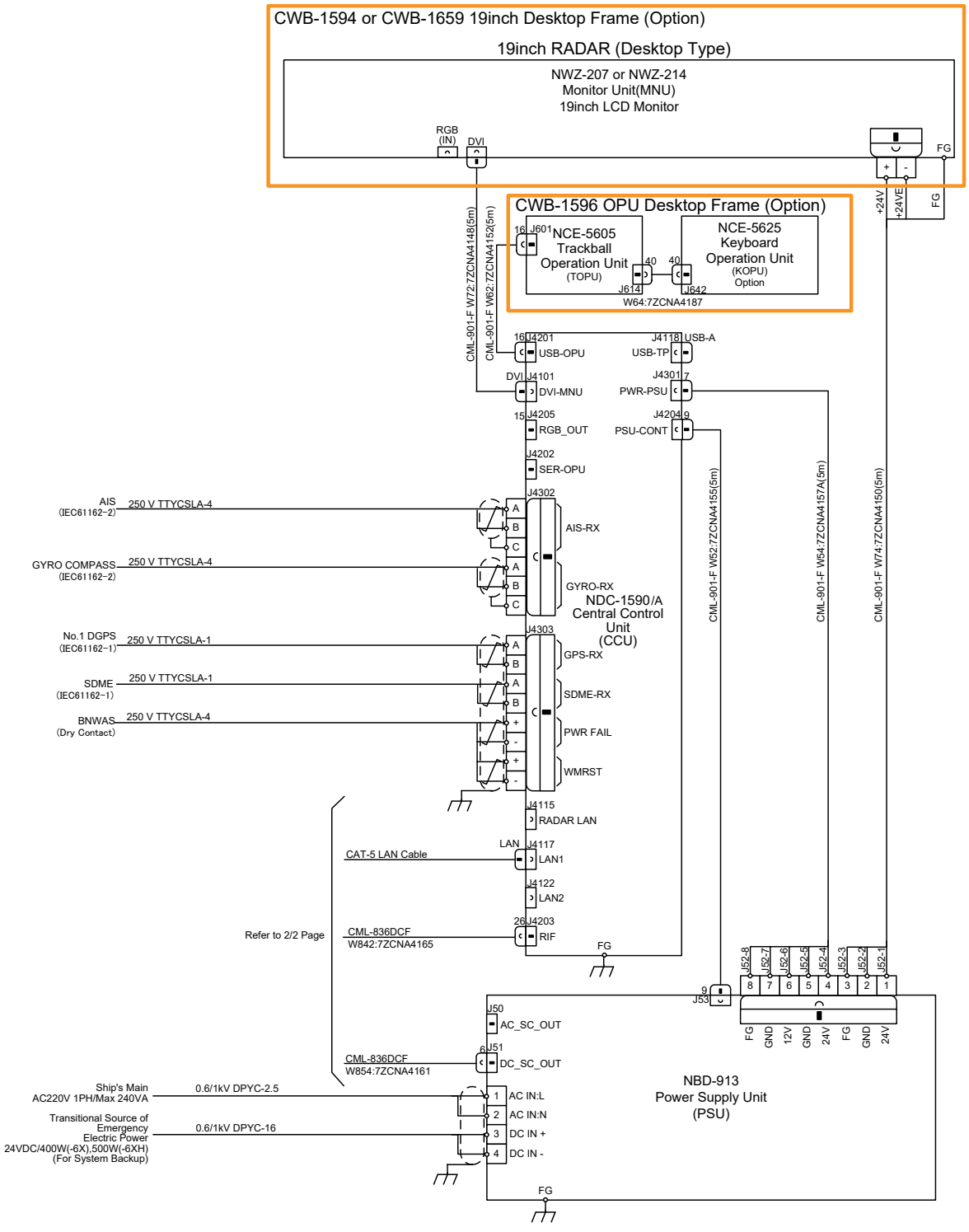
Stand alone type



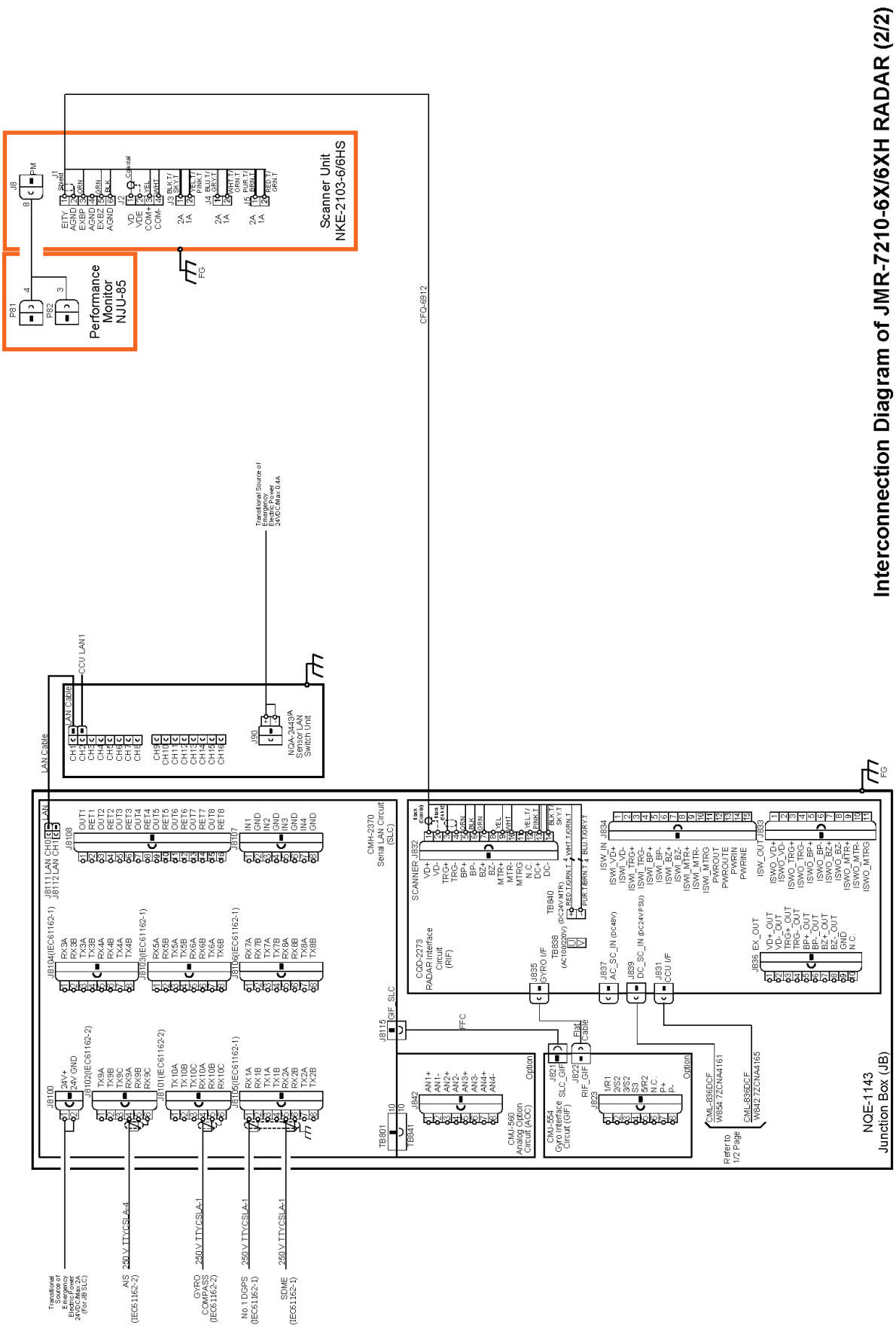
Interconnection Diagram of JMR-7210-6X/6XH RADAR (1/2)


Interconnection Diagram of JMR-7210-6X/6XH RADAR (2/2)
Scanner Unit
NKE-2103-6/6HS
Performance Monitor
NJU-85
CFQ-6912
CWA-245 19inch Display Unit Mount Kit
NQE-1143
Junction Box (JB)
LAN Cable
CCU LAN1
NQA-2443/A
Stensor LAN
Switch Unit
From Relay Terminal
Refer to
1/2 Page
Transitional Source of
Emergency
Electric Power
24VDC/Max 0.4A
CMH-2370
Serial LAN Circuit
(SLC)
COD-2273
RADAR Interface
Circuit
(RIF)
CMJ-560
Analog Option
Circuit (AOC)
CMJ-554
Gyro Interface
Circuit (GIF)
CML-836DC
W843 7ZCNA4160
CML-836DC
W843 7ZCNA4164
AIS
(IEC61162-2)
GYRO
COMPASS
(IEC61162-2)
No.1 DGPS
(IEC61162-1)
SDME
(IEC61162-1)
250 V TTYCSLA-4
250 V TTYCSLA-1
250 V TTYCSLA-1
250 V TTYCSLA-1

Desktop type

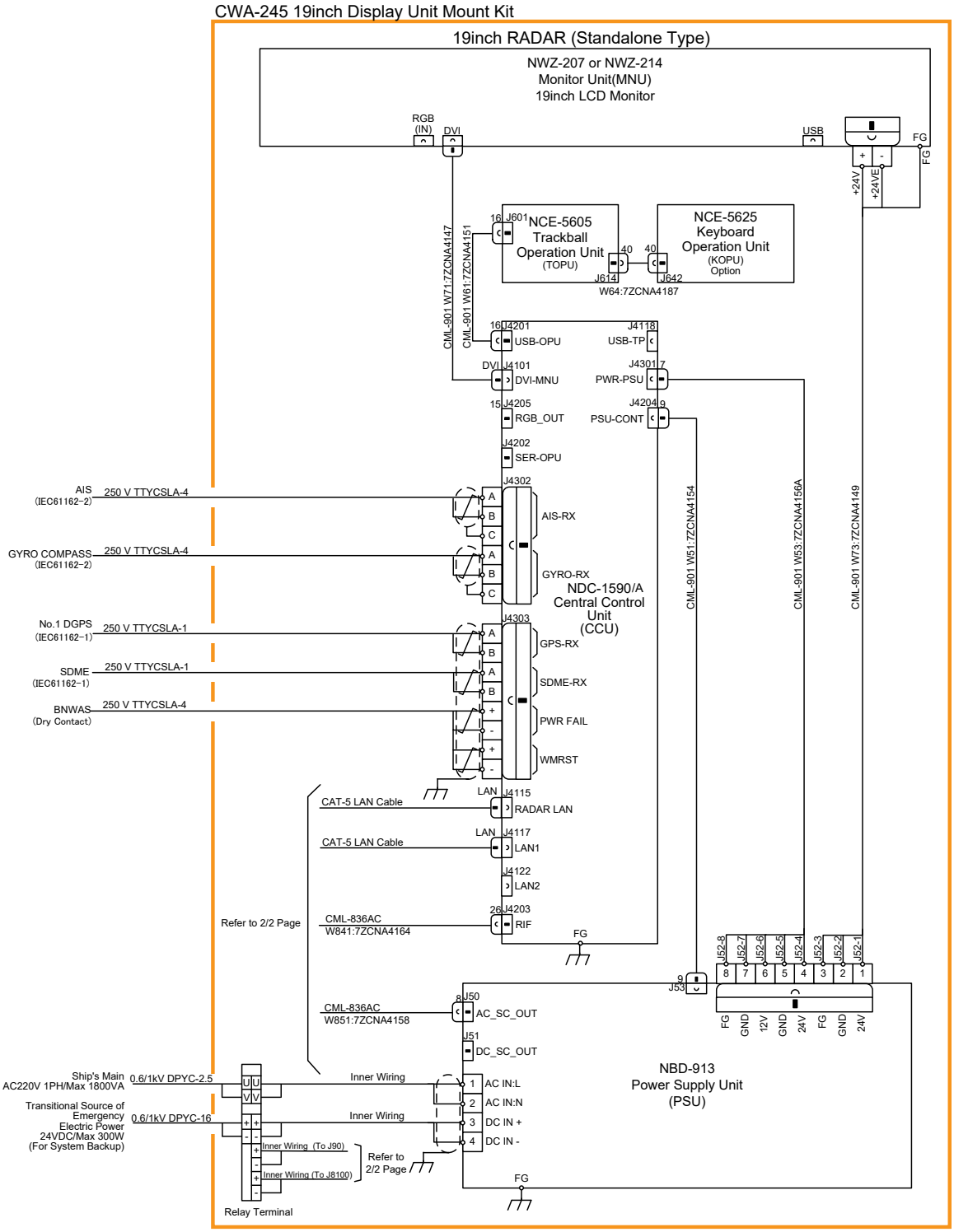


Interconnection Diagram of JMR-7210-6X/6XH RADAR (1/2)

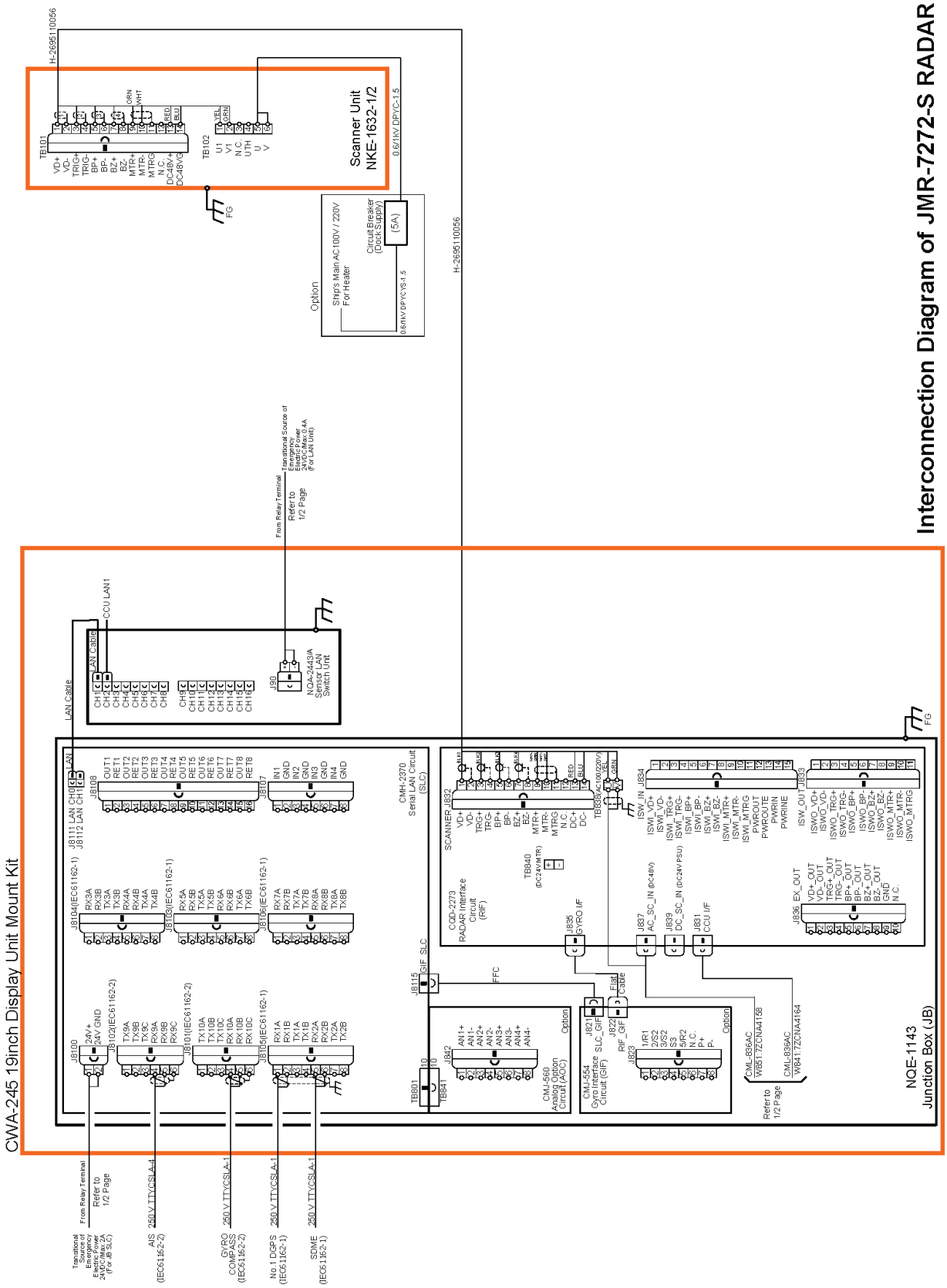

Interconnection Diagram of JMR-7210-6X/6XH RADAR (2/2)
Scanner Unit
NKE-2103-6/6HS
Performance Monitor NJU-85
CFQ-6912
NQE-1143
Junction Box (JB)
LAN Cable
CCU LAN1
NQA-2443/A
Stensor LAN Switch Unit
Transitional Source of Emergency Electric Power 24VDC/Max 0.4A
CMH-2370
Serial LAN Circuit (SLC)
COD-2273
RADAR Interface Circuit (RIF)
CMJ-560
Analog Option Circuit (AOC)
CMJ-554
Gyro Interface Circuit (GIF)
CML-836DCF
W8427ZCNA4161
Refer to 1/2 Page
AIS (IEC61162-2)
GYRO COMPASS (IEC61162-2)
No.1 DGPS (IEC61162-1)
SDME (IEC61162-1)
250V TTYCSLA-4
250V TTYCSLA-1

8.3.16 JMR-7272-S Interconnection Diagrams

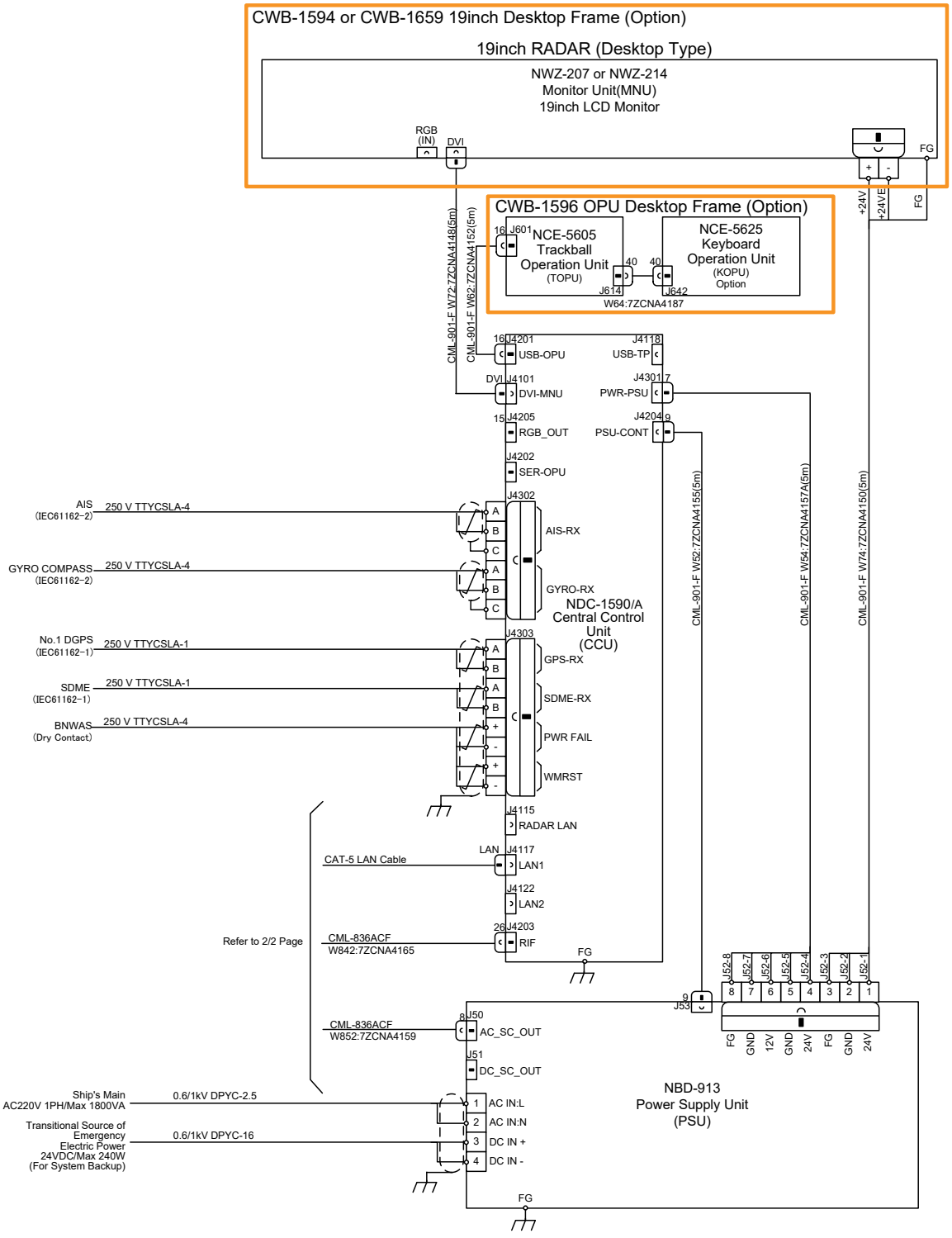
Stand alone type



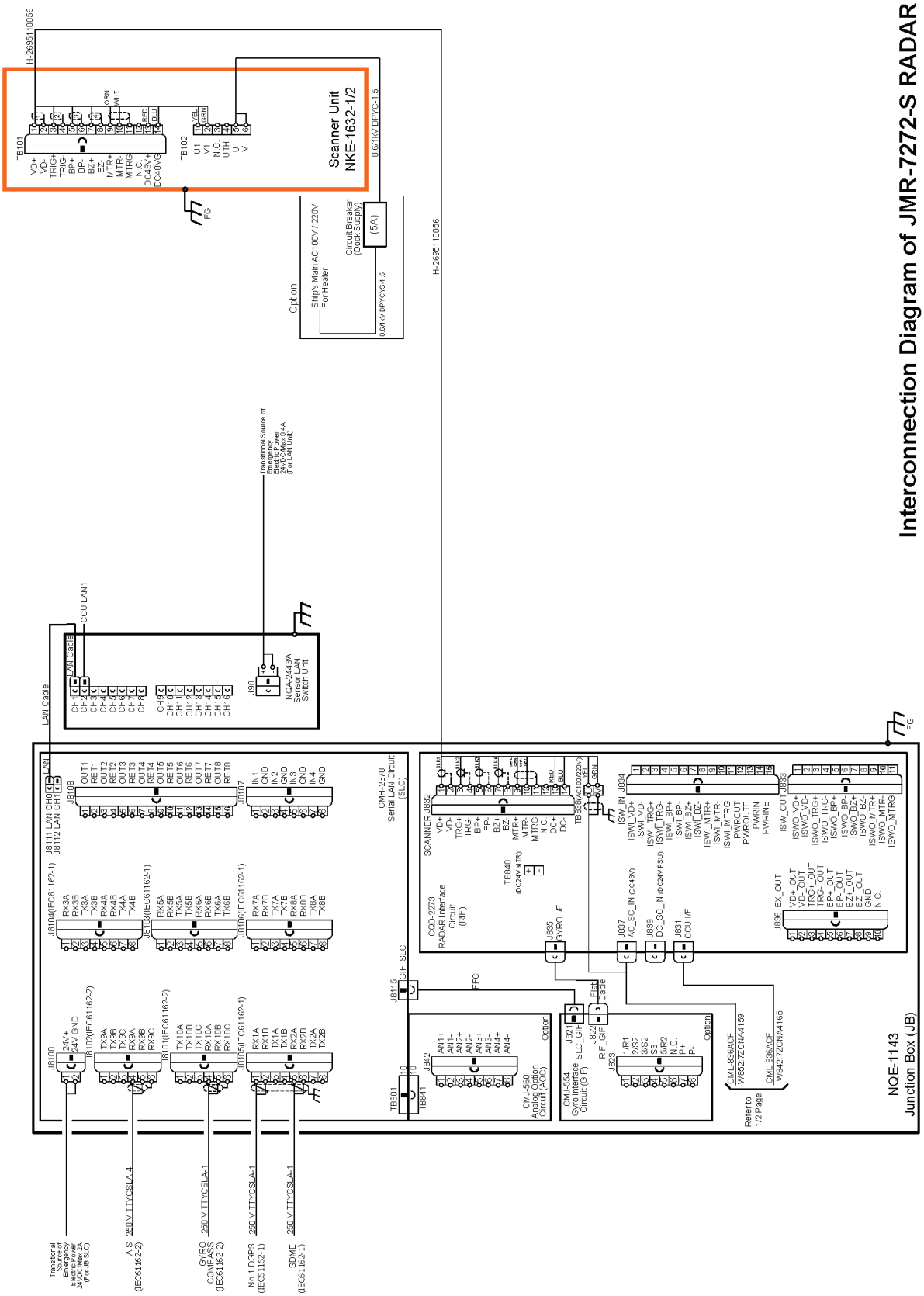
Interconnection Diagram of JMR-7272-S RADAR (1/2)


Interconnection Diagram of JMR-7272-S RADAR (2/2)
CWA-245 19inch Display Unit Mount Kit
Scanner Unit
NKE-1632-1/2
H-2695110056
0.6/1kV DPYCY-1.5
TB101
TB102
Option
Ship's Main AC100V / 220V
For Heater
Circuit Breaker
(Dock Supply)
(5A)
0.6/1kV DPYCY-1.5
FG
From Relay Terminal
Refer to
1/2 Page
Transitional Source of Emergency Electric Power AC100V/200V 4A (For LAN Unit)
LAN Cable
CCU LAN1
NQA-2443/A
Sensor LAN
Switch Unit
J90
J8111 LAN CH1
J8112 LAN CH2
J8108
J8107
J81104(IEC61162-1)
J8103(IEC61162-1)
J8106(IEC61162-1)
J8100
J8102(IEC61162-2)
J8101(IEC61162-2)
J8105(IEC61162-1)
CMH-2370
Serial LAN Circuit
(SLC)
SCANNER J832
CQD-2273
RADAR Interface
Circuit
(RIF)
TB840
(DC24V/MTR)
J835
GYRO I/F
J837
AC_SC_IN (DC48V)
J839
DC_SC_IN (DC24V PSU)
J831
CCU I/F
J834
ISW_IN
J836
ISW_OUT
J8115
GIF_SLC
FFC
Flat
Cable
TB801
TB841
J842
CMJ-560
Analog Option
Circuit (AOC)
Option
CMJ-554
Gyro Interface
Circuit (GIF)
J823
SLC_GIF
J822
RIF_GIF
J823
Option
CML-836AC
W8617ZCNA4168
CML-836AC
W8417ZCNA4164
Refer to
1/2 P age
NQE-1143
Junction Box (JB)
Transitional Source of Emergency Electric Power 24V DC (For JB-SLC)
AIS
(IEC61162-2)
GYRO COMPASS
(IEC61162-2)
No.1 DGPS
(IEC61162-1)
SDME
(IEC61162-1)
250 V TTYCSLA-4
250 V TTYCSLA-1
250 V TTYCSLA-1
250 V TTYCSLA-1

Desktop type

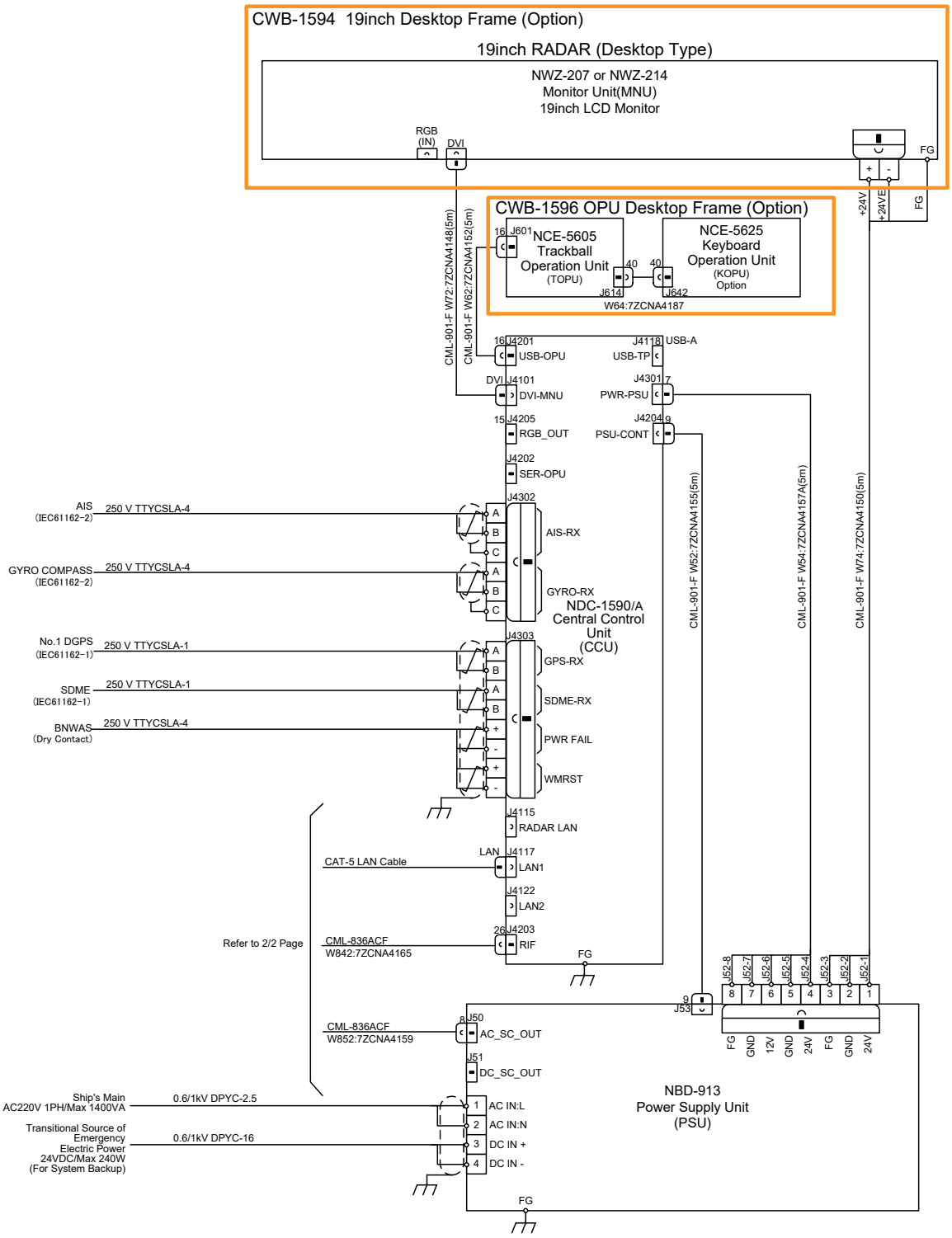


Interconnection Diagram of JMR-7272-S RADAR (1/2)

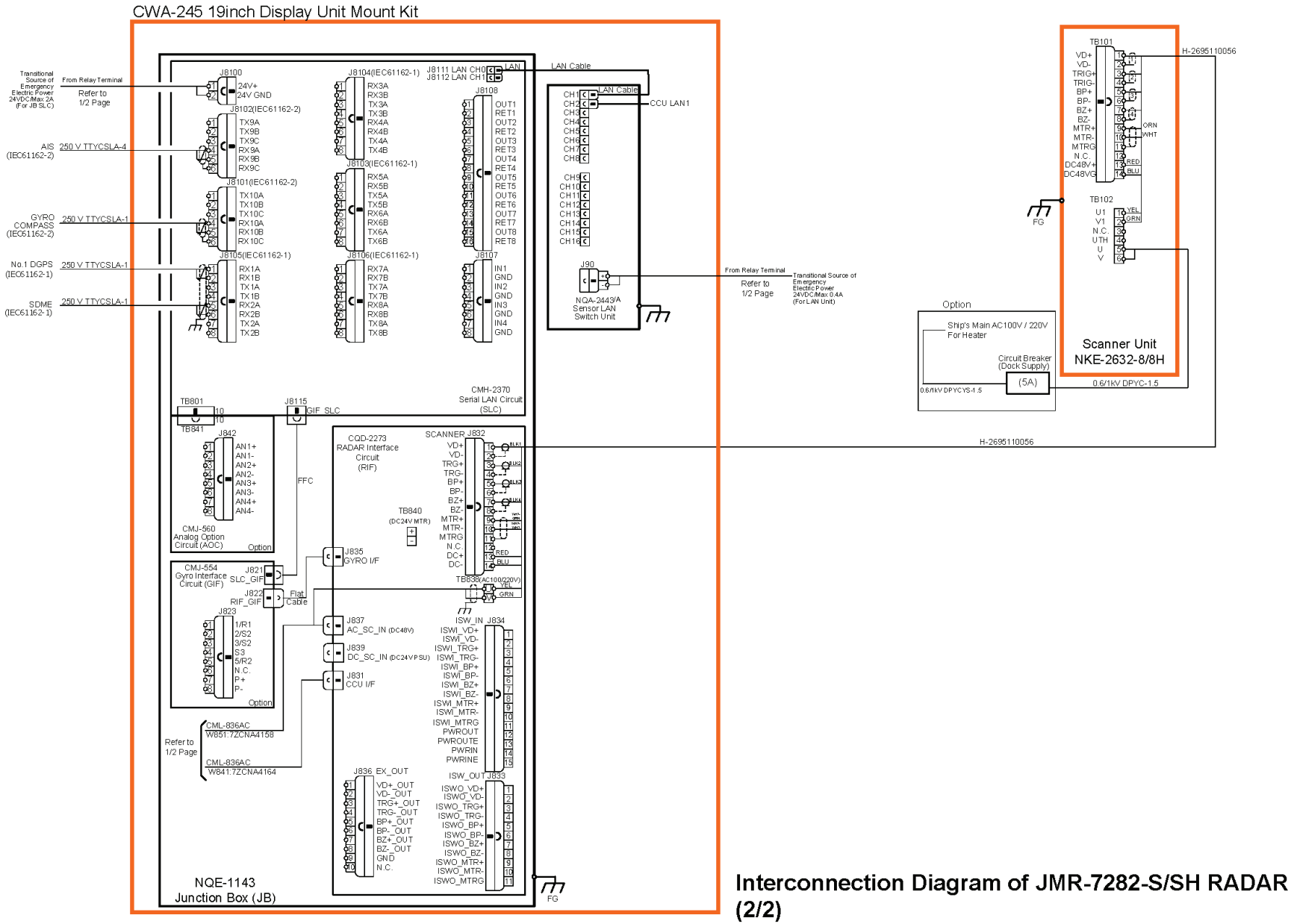

Interconnection Diagram of JMR-7272-S RADAR (2/2)
Scanner Unit
NKE-1632-1/2
H-2695110056
0.6/1kV DPYCY-1.5
Option
Ship's Main AC100V / 220V
For Heater
Circuit Breaker
(Dock Supply)
(5A)
0.6/1kV DPYCY-1.5
H-2695110056
TB101
TB102
FG
Transitional Source of Emergency Electric Power AC100V/200V 4A (For LAN Unit)
LAN Cable
CCU LAN1
LAN Cable
NQA-2449A
Sensor LAN
Switch Unit
J90
J8111 LAN CH1
J8112 LAN CH2
J8108
J8107
CMH-2370
Serial LAN Circuit
(SLC)
J8104(IEC61162-1)
J8103(IEC61162-1)
J8106(IEC61162-1)
J8102(IEC61162-2)
J8101(IEC61162-2)
J8105(IEC61162-1)
J8100
J8115 GIF_SLC
FFC
SCANNER J832
CQD-2273
RADAR Interface
Circuit
(RIF)
TB840
(DC24V/MTR)
TB839
(AC100/220V)
J835
GYRO I/F
J837
AC_SC_IN (DC48V)
J839
DC_SC_IN (DC24V PSU)
J831
CCU I/F
J834
ISW_IN
J836
ISW_OUT
Flat Cable
TB801
J10
TB841
J842
CMJ-560
Antenna Motion
Circuit (AOC)
Option
CMJ-554
Gyro Interface
Circuit (GIF)
J821
SLC_GIF
J822
RIF_GIF
J823
Option
CML-836ACF
W852-7ZCNA4169
CML-836ACF
W842-7ZCNA4165
Refer to
1/2 P.page
NQE-1143
Junction Box (JB)
Transitional Source of Emergency Electric Power AC100V/200V (For JB-S3.C)
AIS
(IEC61162-2)
GYRO COMPASS
(IEC61162-2)
No.1 DGPS
(IEC61162-1)
SDME
(IEC61162-1)
250 V TTYCSLA-4
250 V TTYCSLA-1
250 V TTYCSLA-1
250 V TTYCSLA-1

8.3.17 JMR-7282-S/SH Interconnection Diagrams

Stand alone type

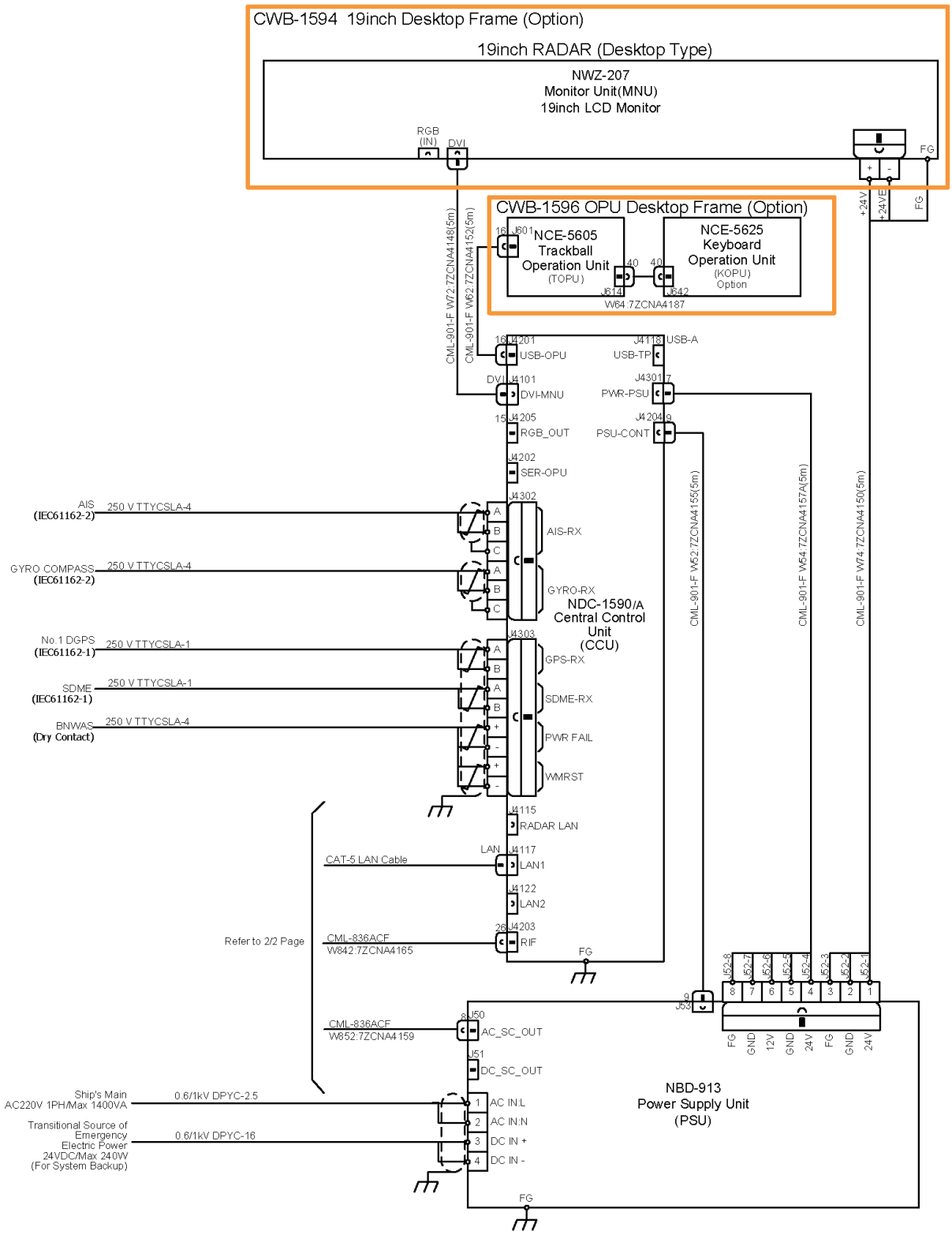


Interconnection Diagram of JMR-7282-S/SH RADAR (1/2)

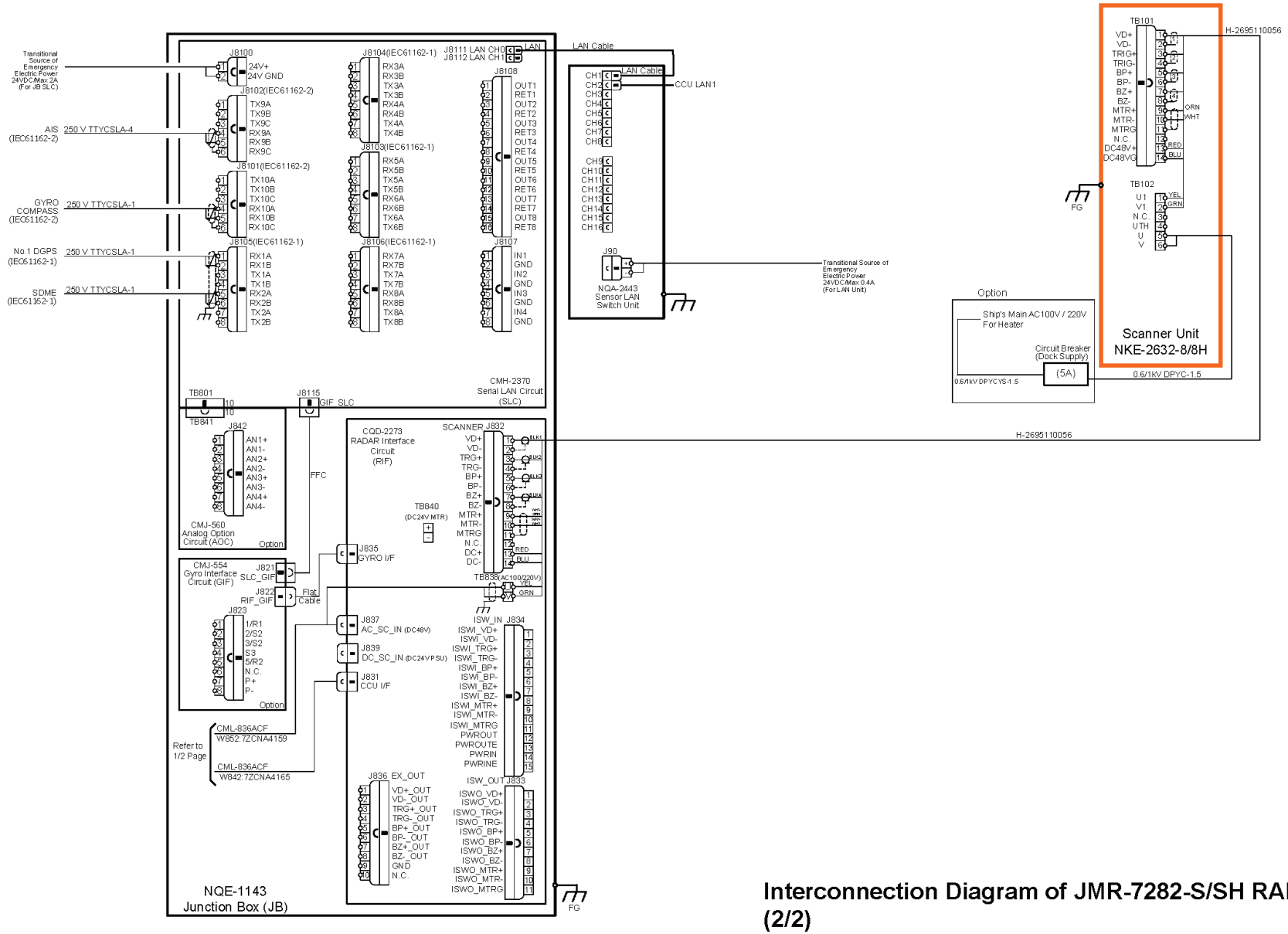


Interconnection Diagram of JMR-7282-S/SH RADAR (2/2)

Desktop type



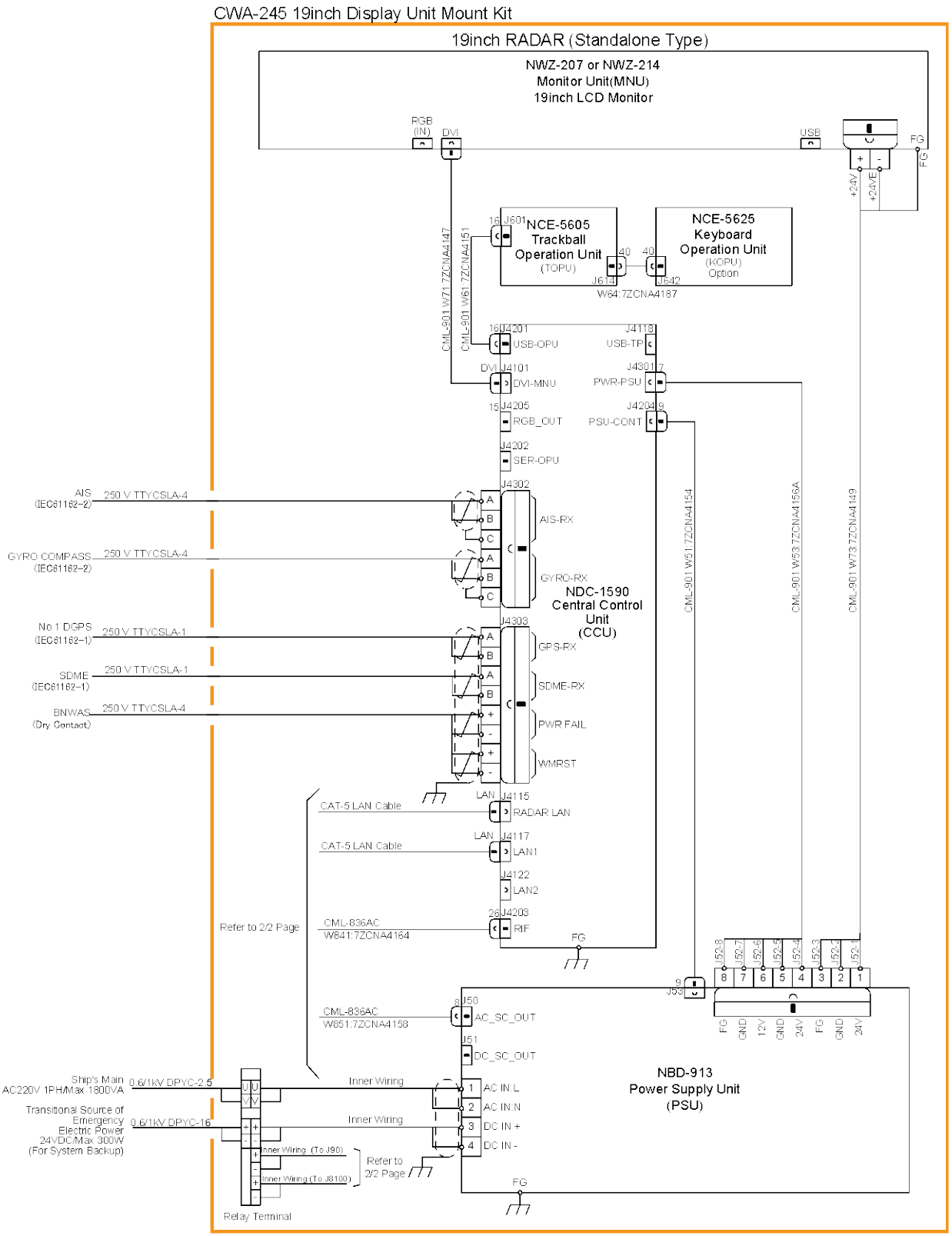
Interconnection Diagram of JMR-7282-S/SH RADAR (1/2)



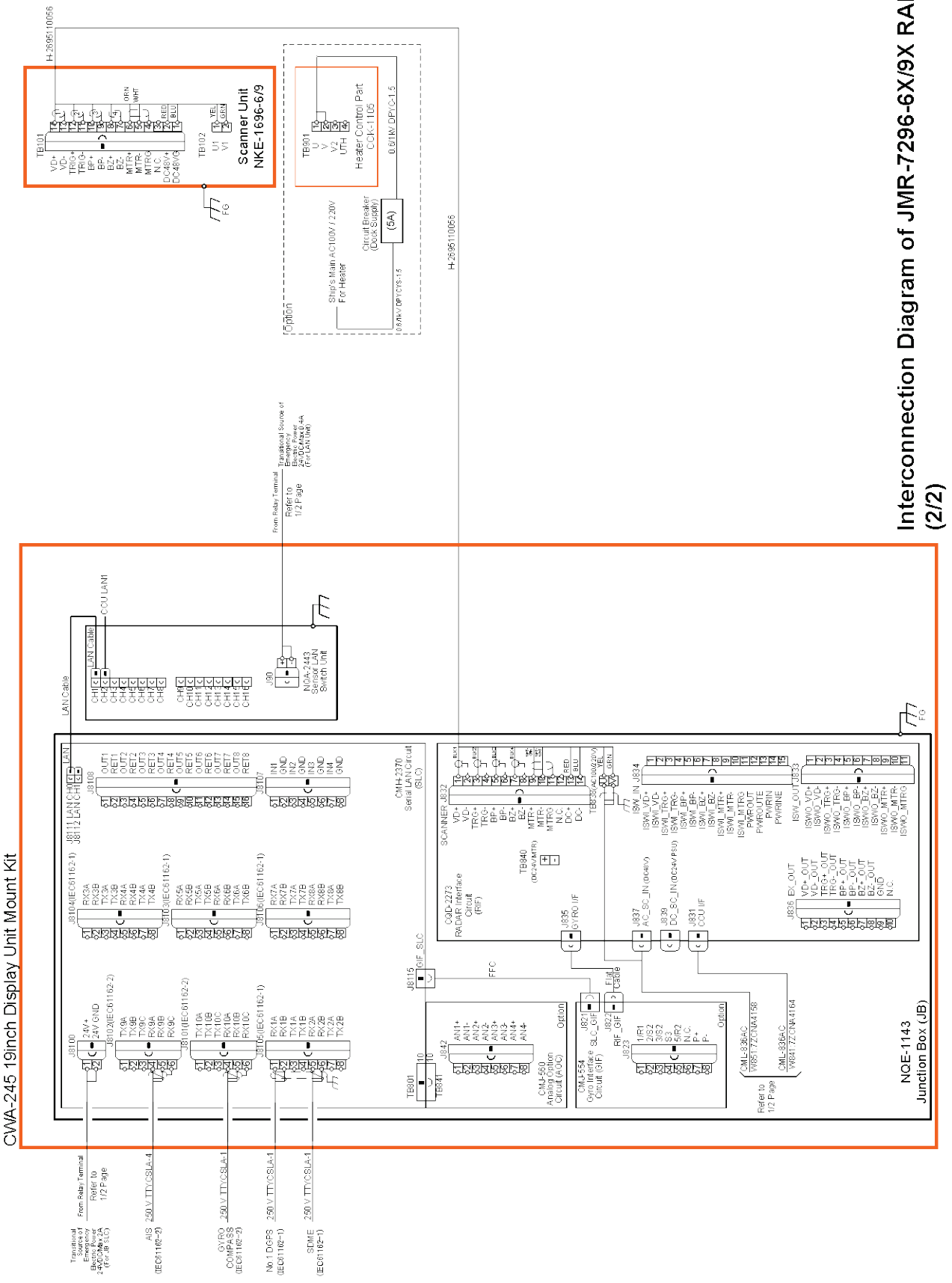
Interconnection Diagram of JMR-7282-S/SH RADAR (2/2)

8.3.18 JMR-7296-6X/9X Interconnection Diagrams

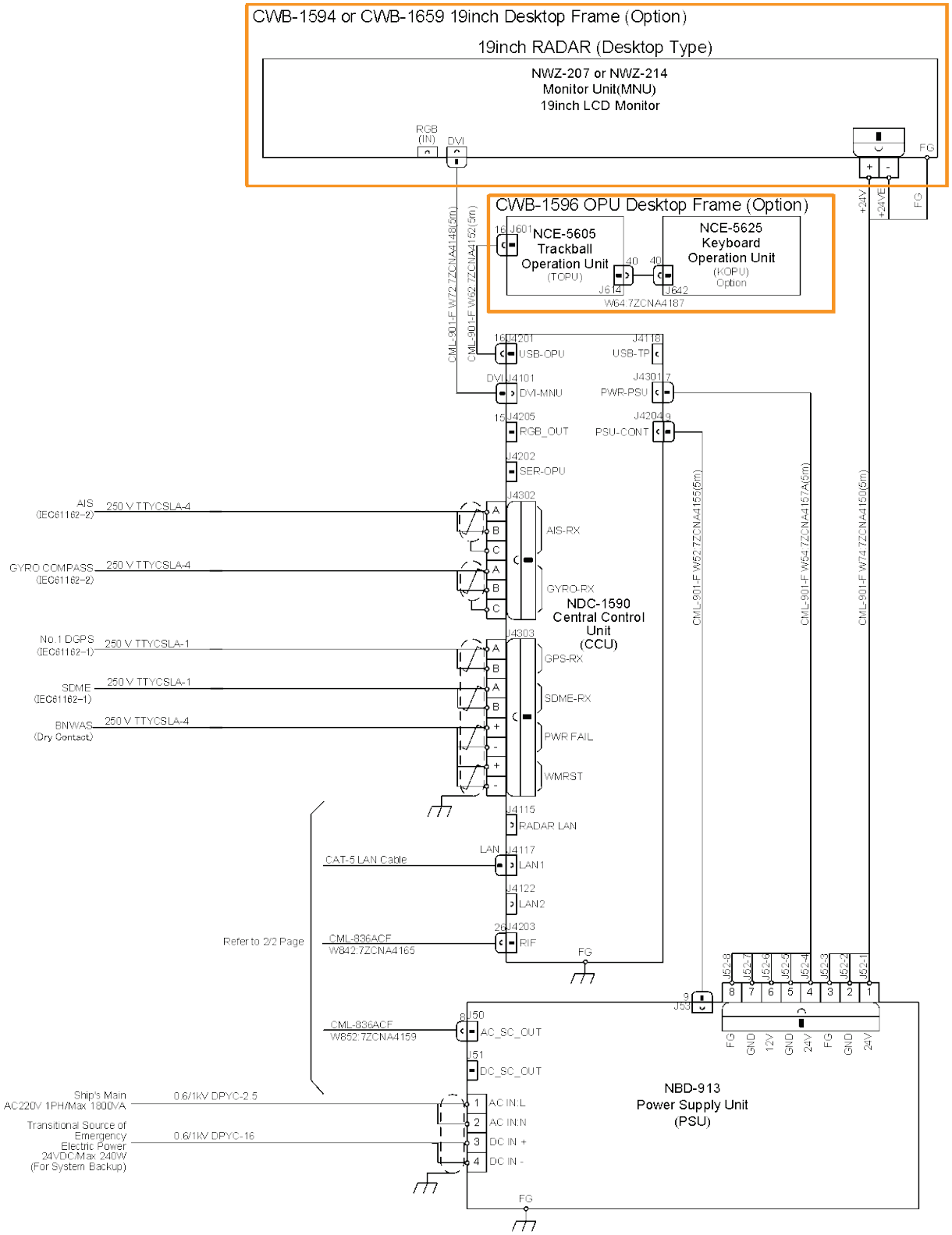
Stand alone type



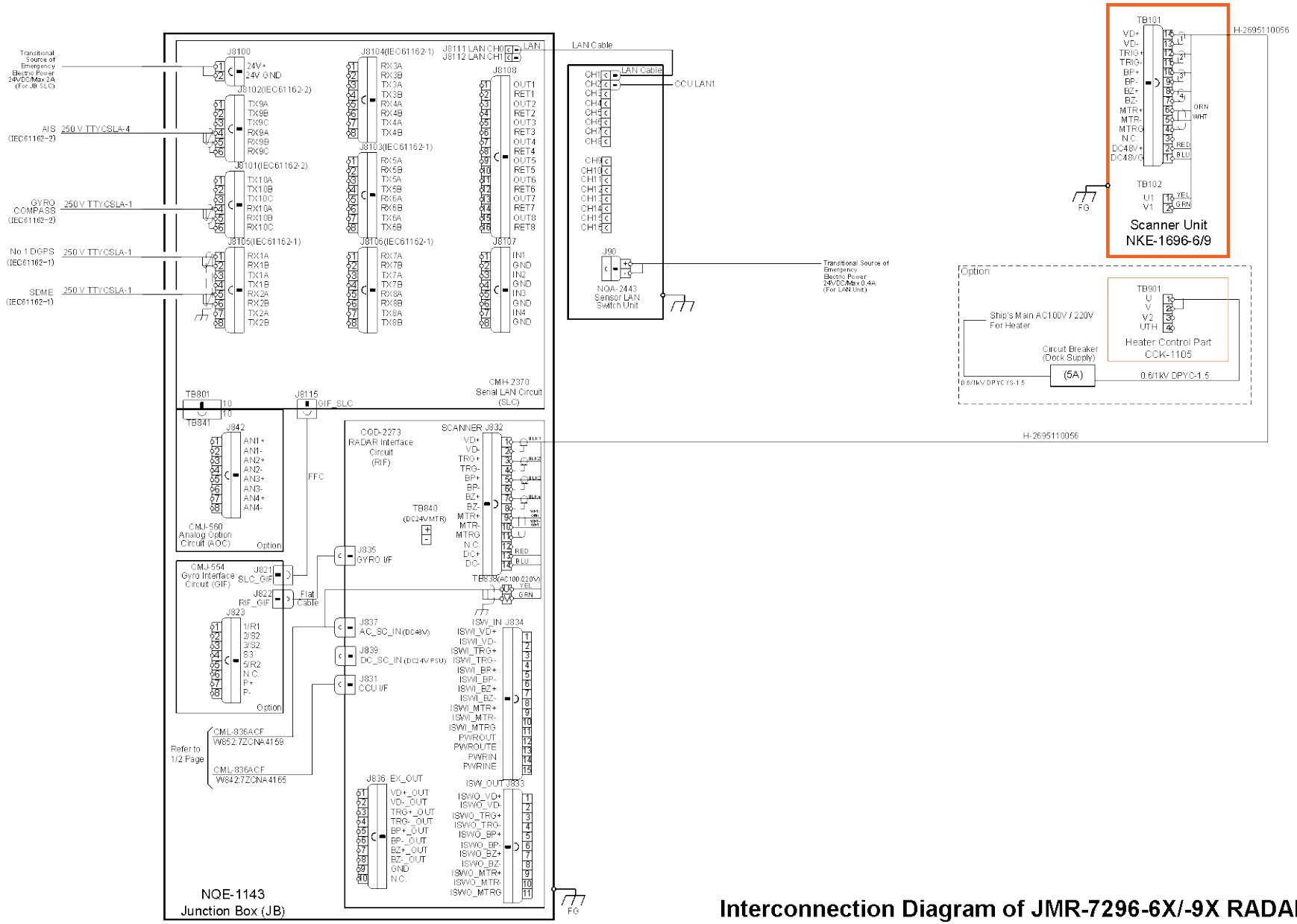
Interconnection Diagram of JMR-7296-6X/9X RADAR (1/2)


Interconnection Diagram of JMR-7296-6X/9X RADAR (2/2)
CWA-245 19inch Display Unit Mount Kit
Scanner Unit NKE-1696-6/9
Heater Control Part CCK-1105
Option
Ship's Main AC100V / 220V For Heater
Circuit Breaker (Dock Supply) (5A)
H-2695110056
NQE-1143 Junction Box (JB)
NQA-2443 Switching HUB
CMH-2370 Serial LAN Circuit (SLC)
CAD-2273 RADAR Interface Circuit (RIF)
CMJ-550 Analog Option Circuit (AOC)
CMJ-554 Gyro Interface Circuit (GIF)
SCANNER J832
GYRO UIF
AC_SC_IN (dockV)
DC_SC_IN (DC24V/PSU)
CCU UIF
EX_OUT
ISW_IN J834
ISW_OUT J833
LAN Cable
FFC
FLM cable
From Relay Terminal
Refer to 1/2 Page
Transitional Source of Emergency Electrical Power 24VDC/Max 2A (For JB Unit)
AIS 250 V TTYCSLA-4 (IEC61162-2)
GYRO COMPASS 250 V TTYCSLA-1 (IEC61162-2)
No.1 DGPS 250 V TTYCSLA-1 (IEC61162-1)
SDME 250 V TTYCSLA-1 (IEC61162-1)

Desktop type



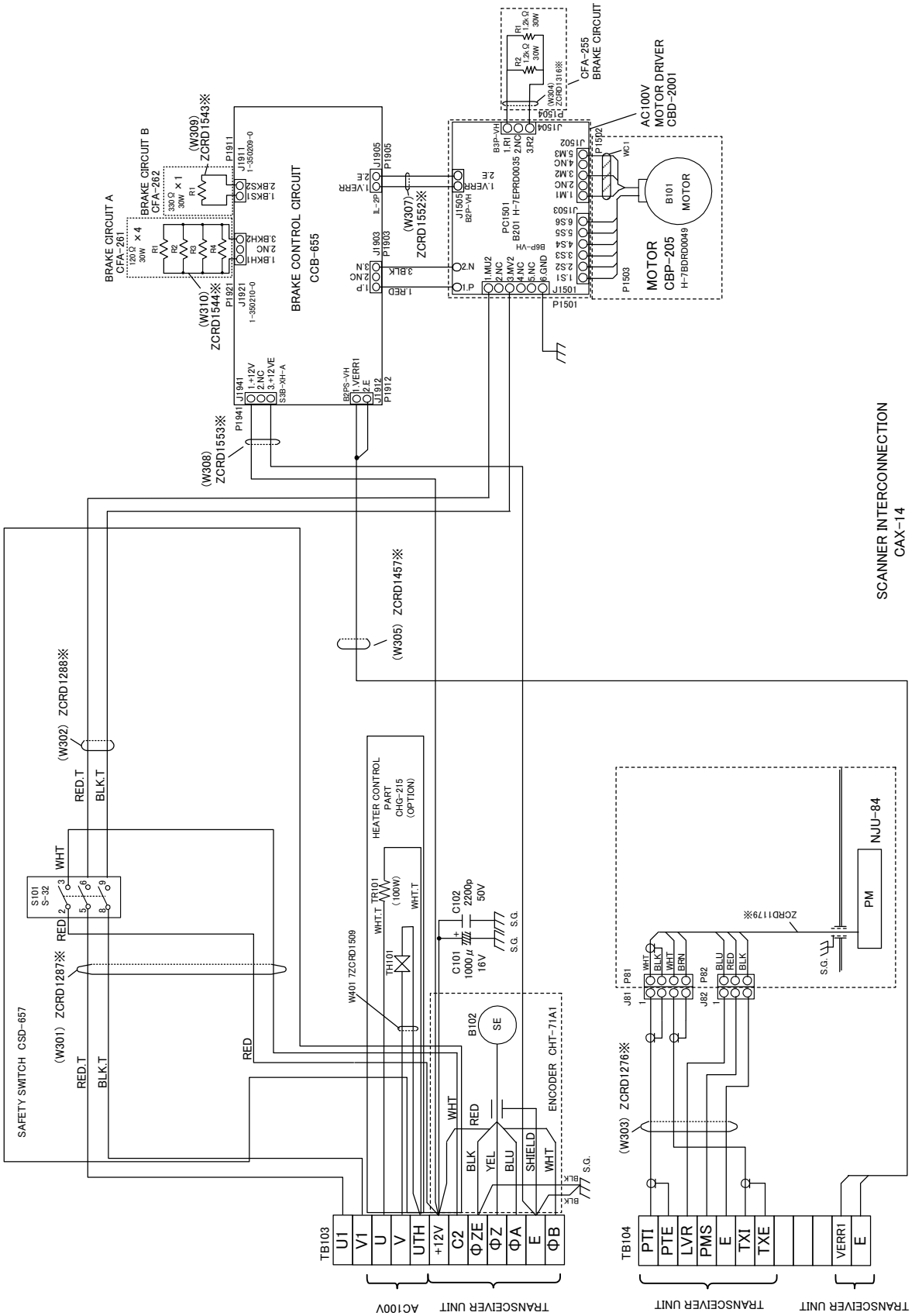
Interconnection Diagram of JMR-7296-6X/9X RADAR (1/2)



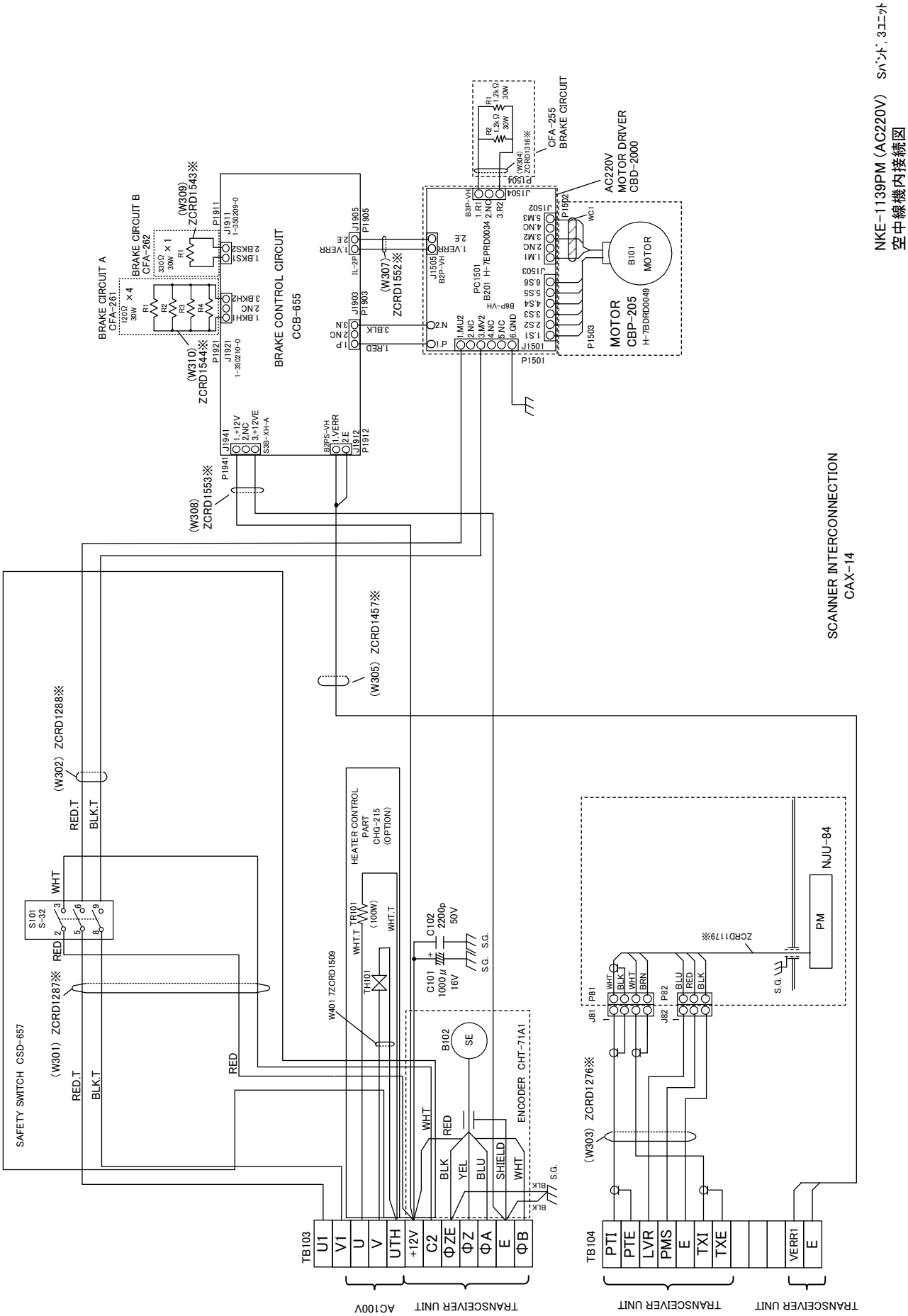
Interconnection Diagram of JMR-7296-6X/-9X RADAR (2/2)

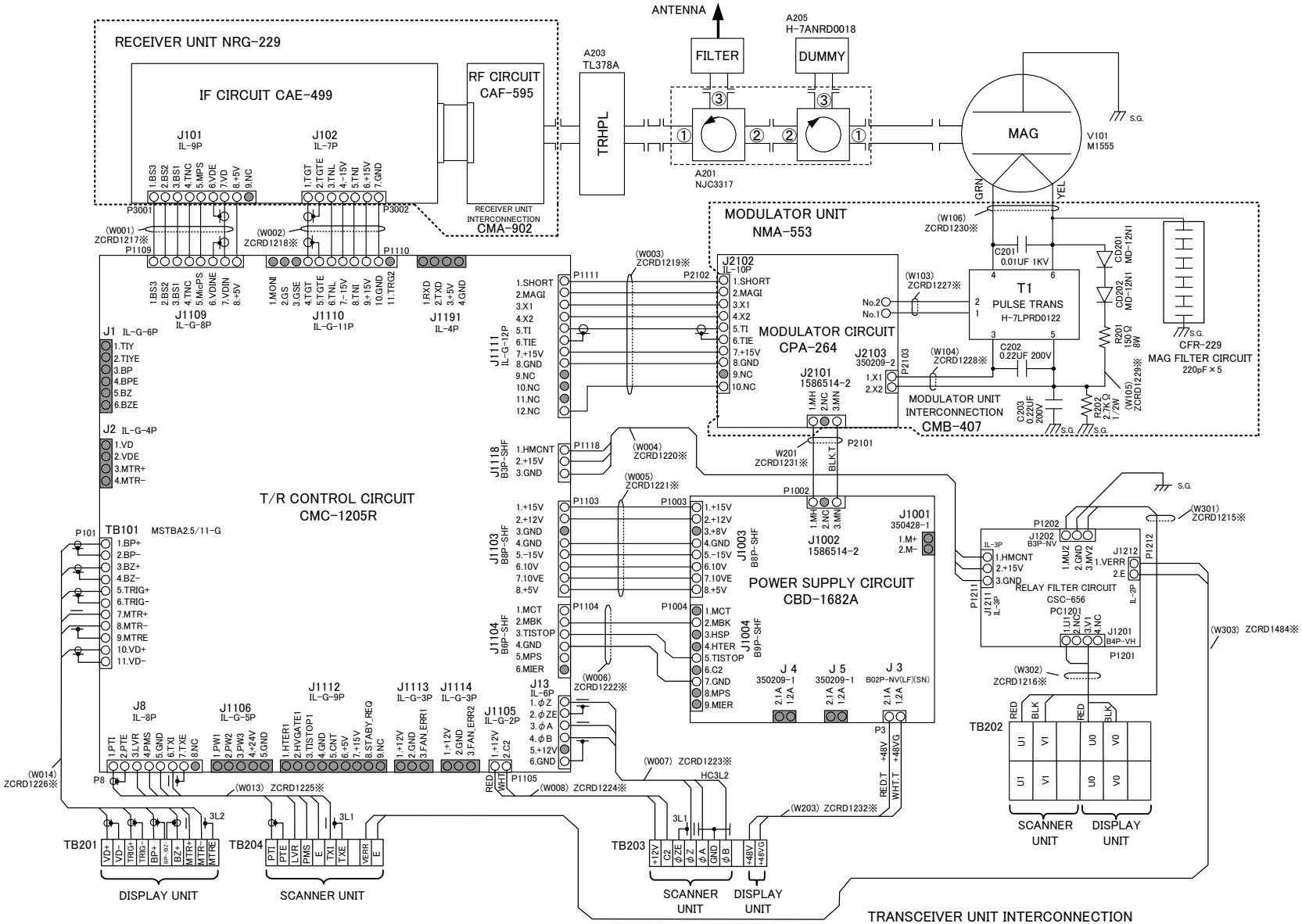
Interconnection Diagrams o f Scanner Unit

8.3.19 NKE-1139 (AC110V)



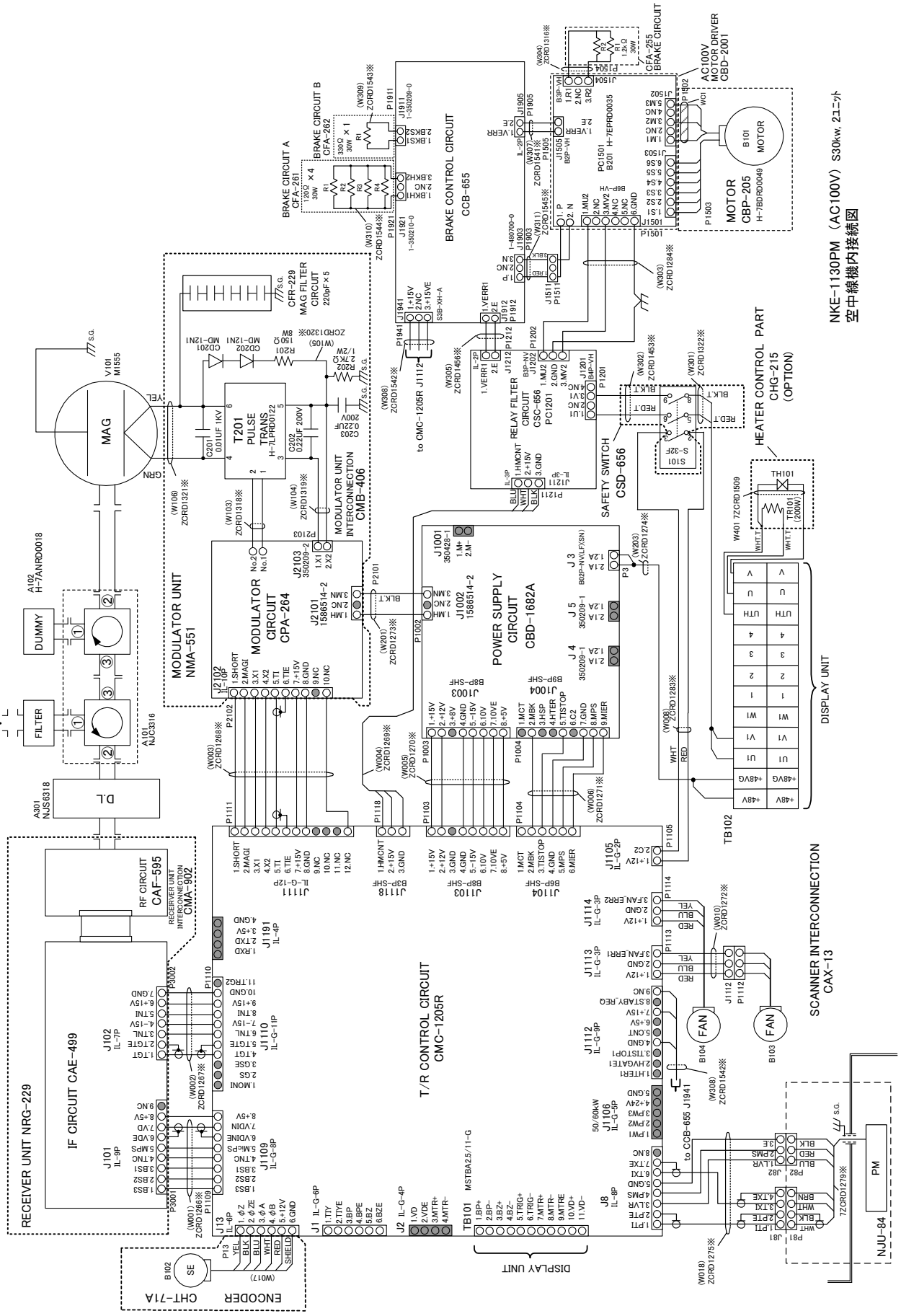
8.3.20 NKE-1139 (AC220V)

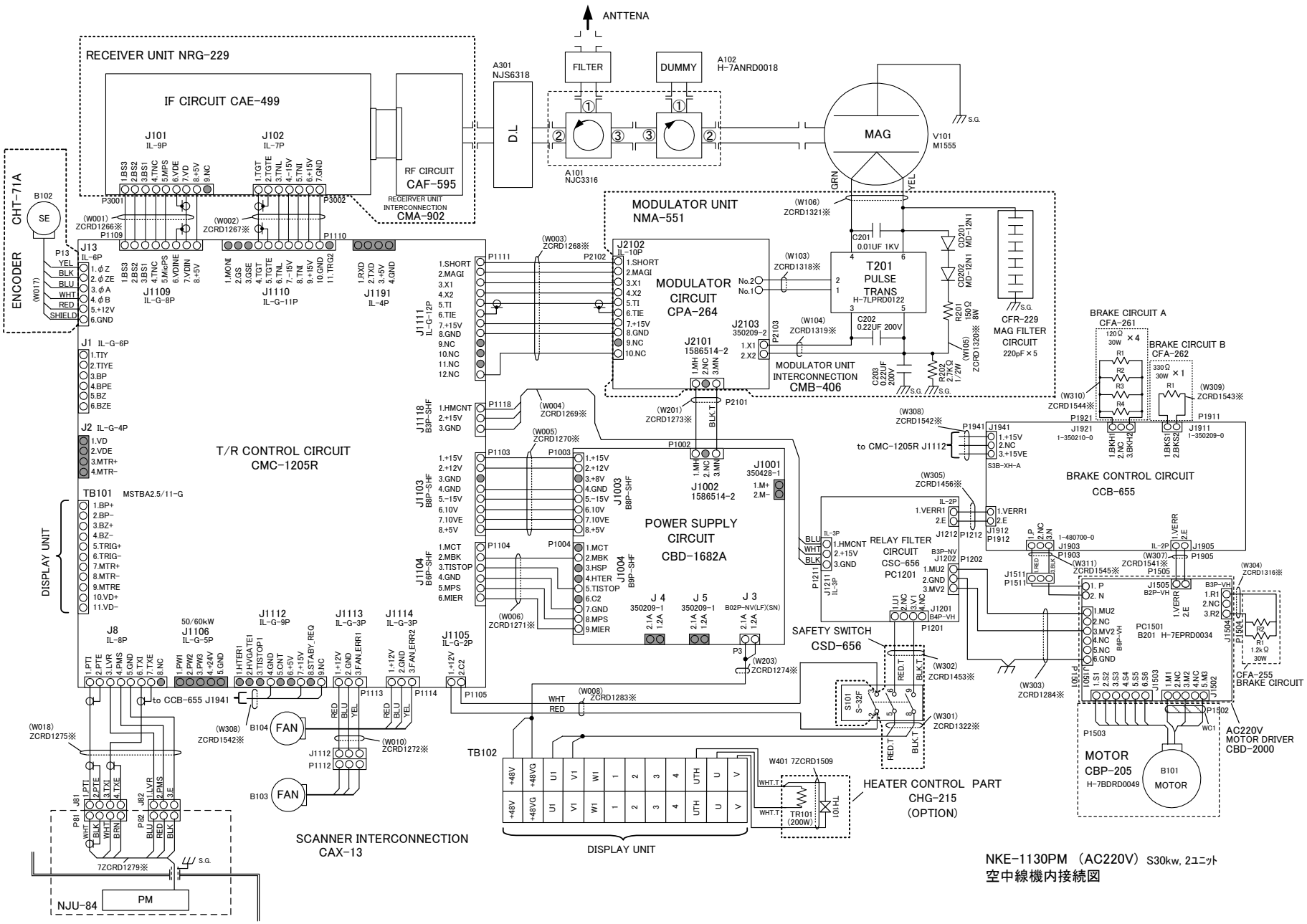




NTG-3230
送受信機機内接続図

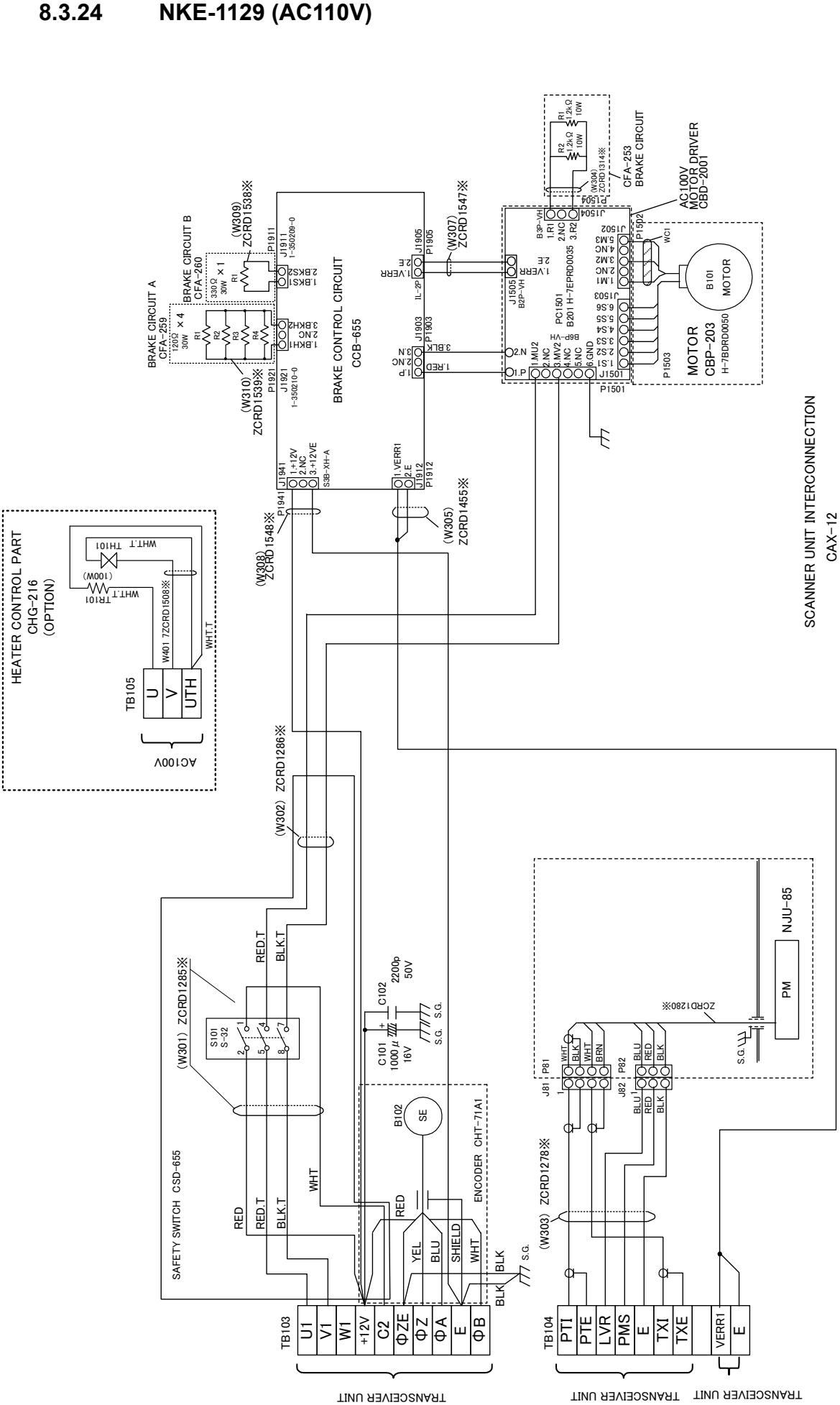
8.3.22 NKE-1130 (AC110V)



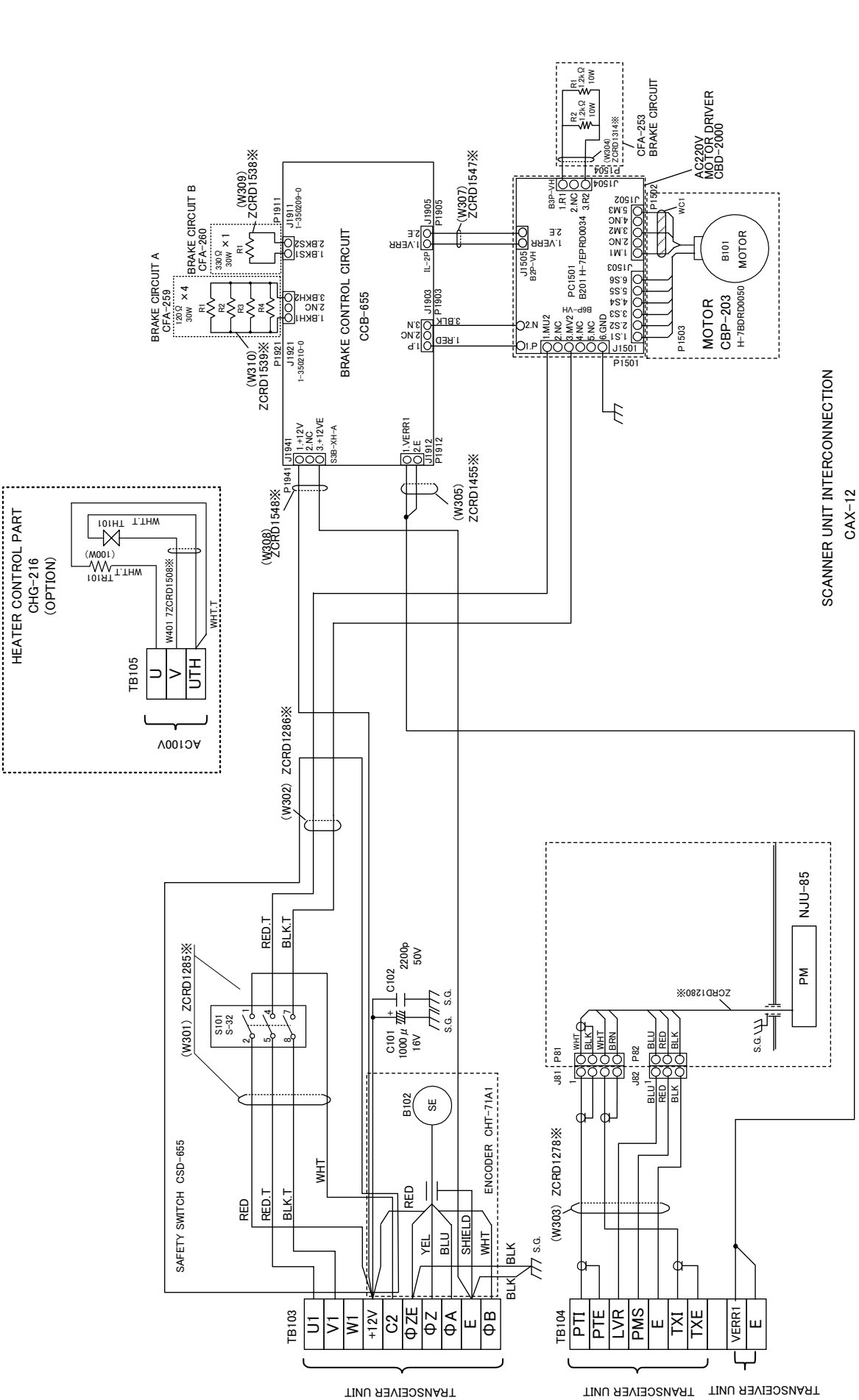


NKE-1130PM （AC220V） S30kw, 2ユニット
空中線機内接続図

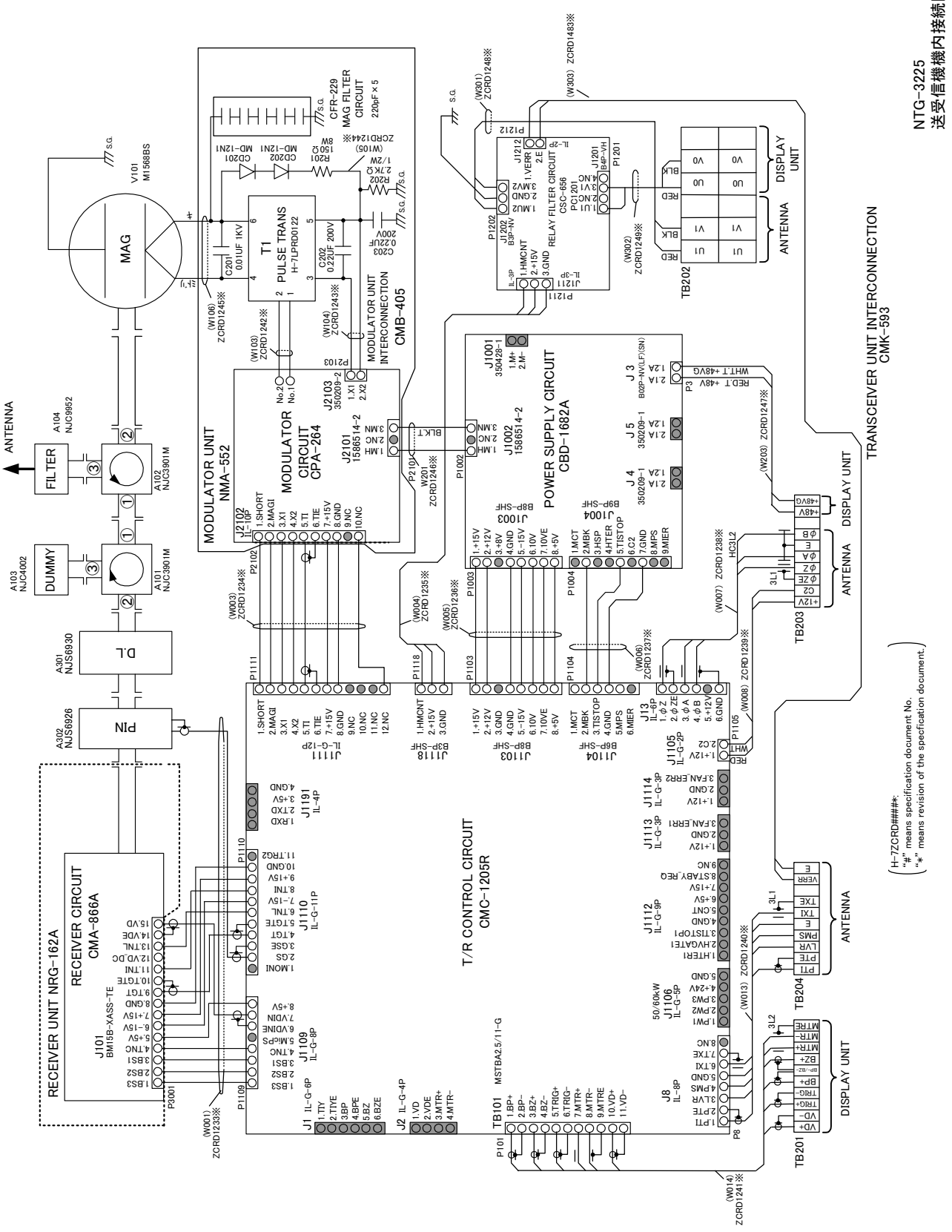
8.3.24 NKE-1129 (AC110V)



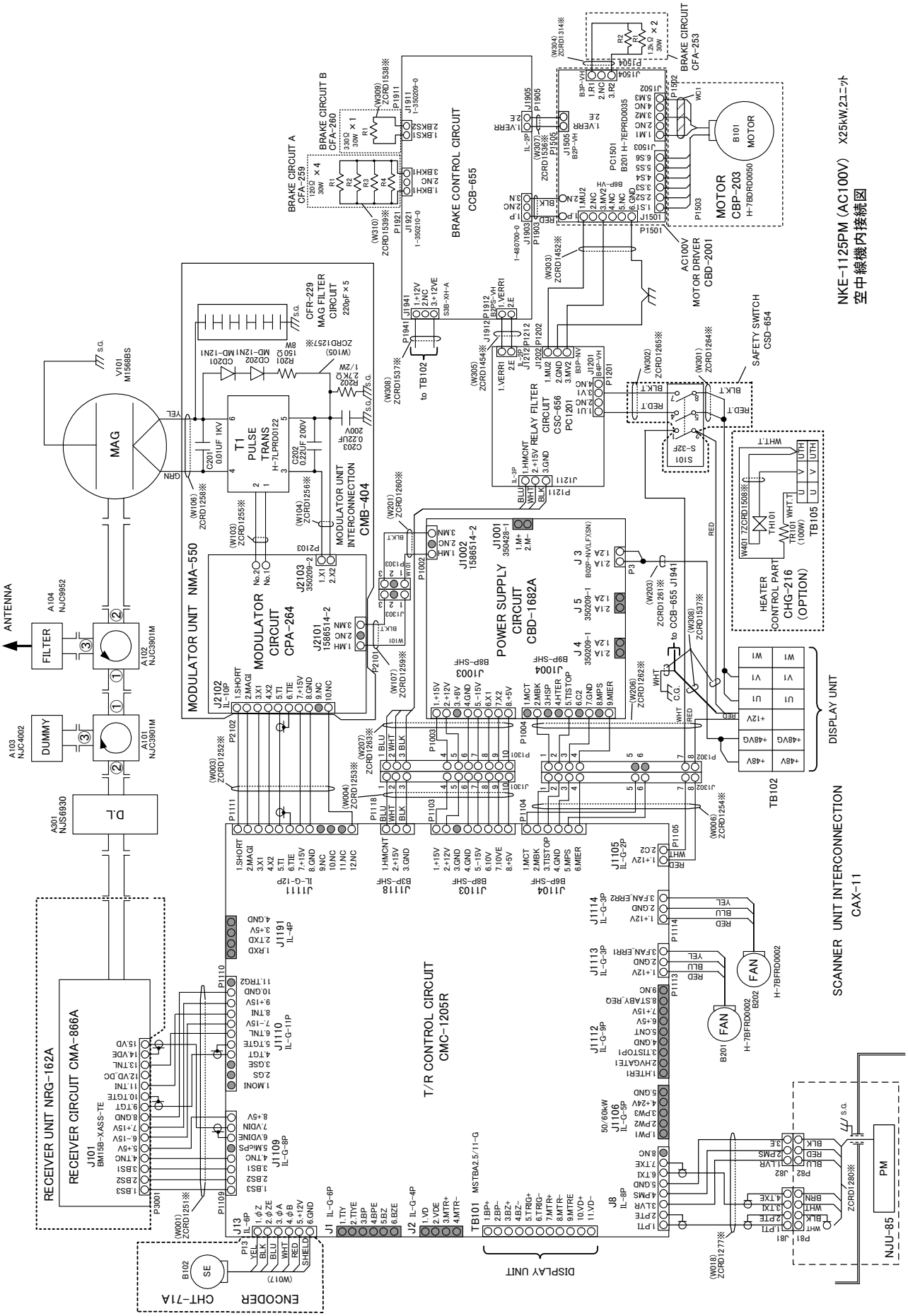
8.3.25 NKE-1129 (AC220V)

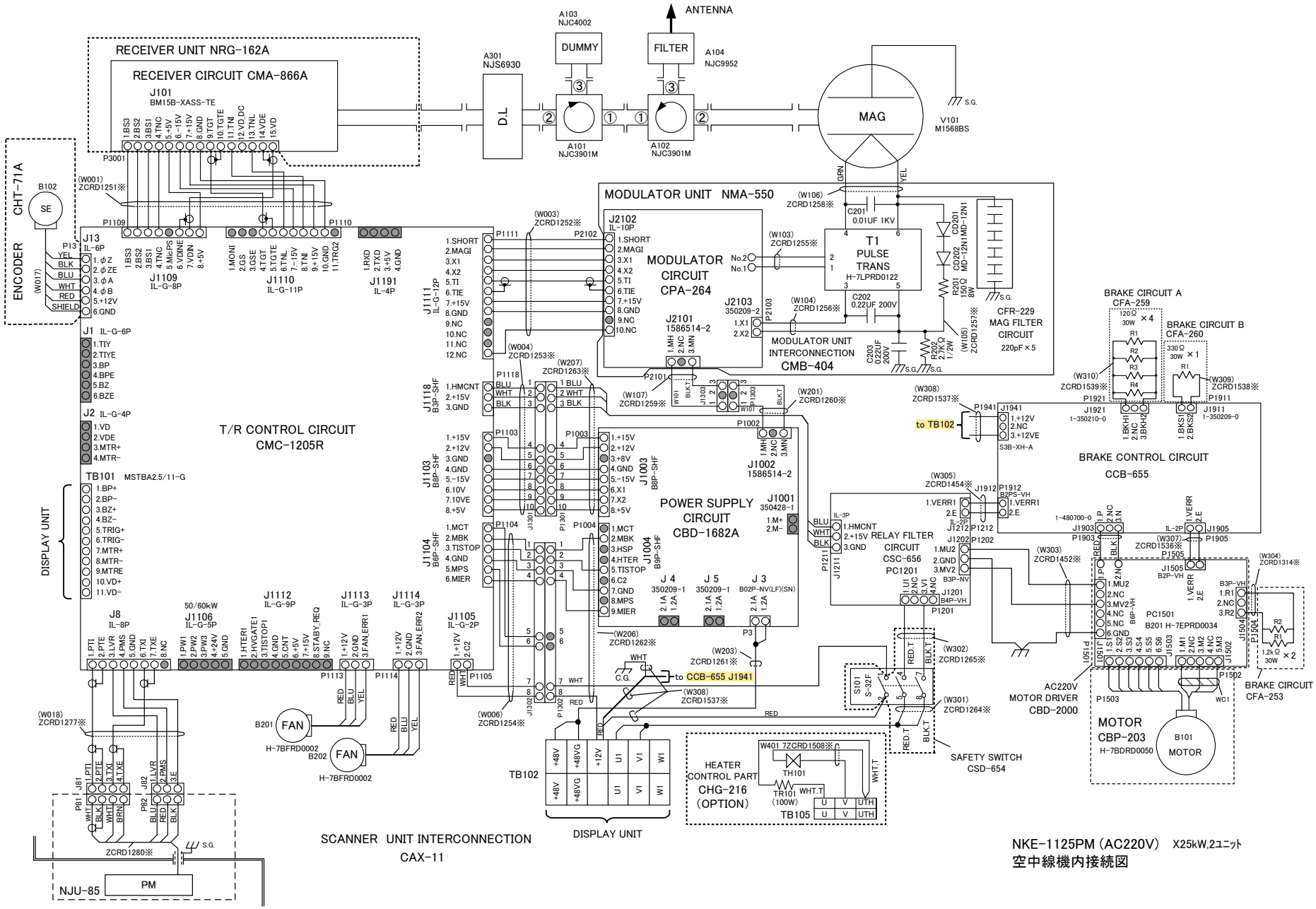


8.3.26 NTG-3225



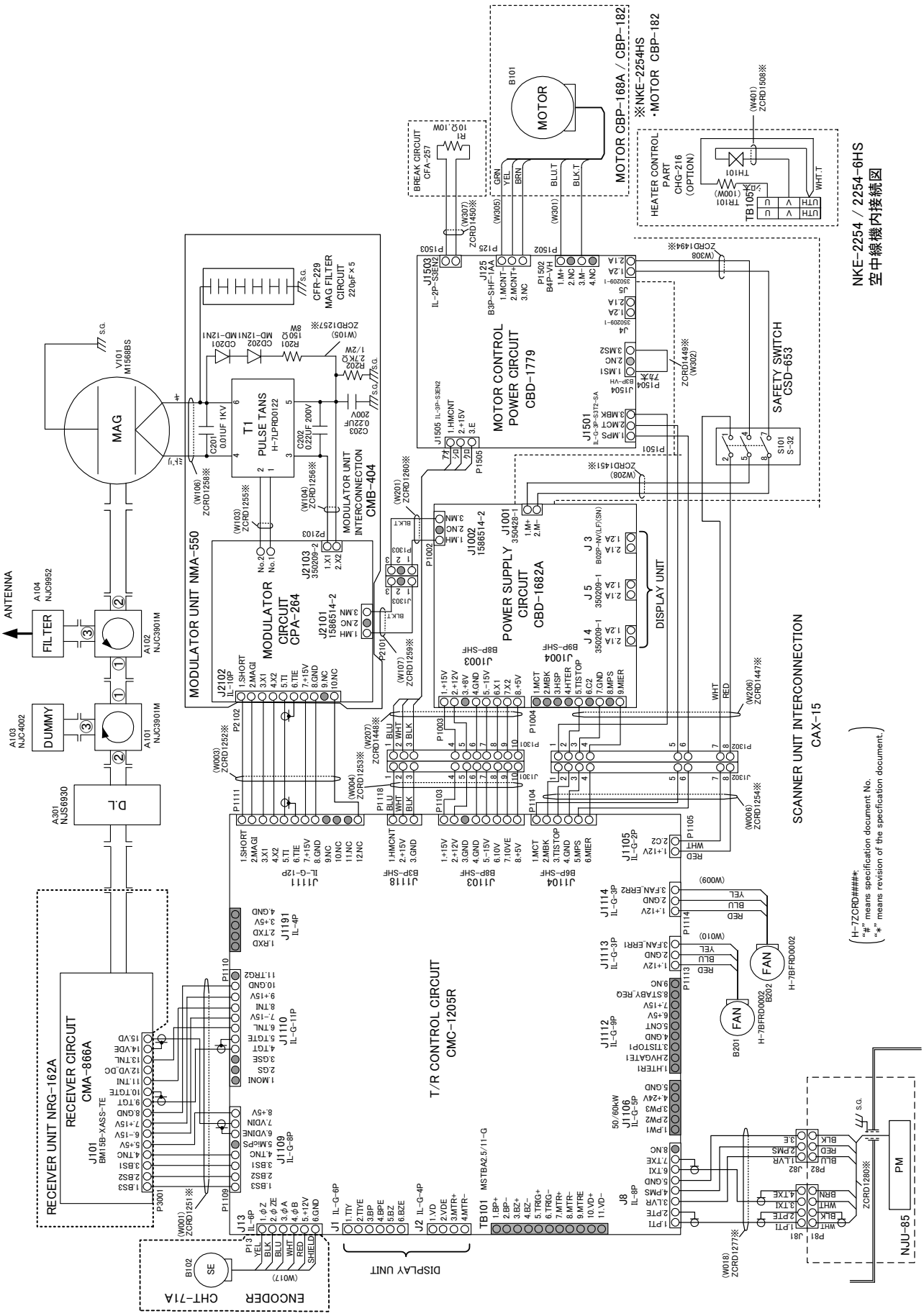
8.3.27 NKE-1125 (AC110V)



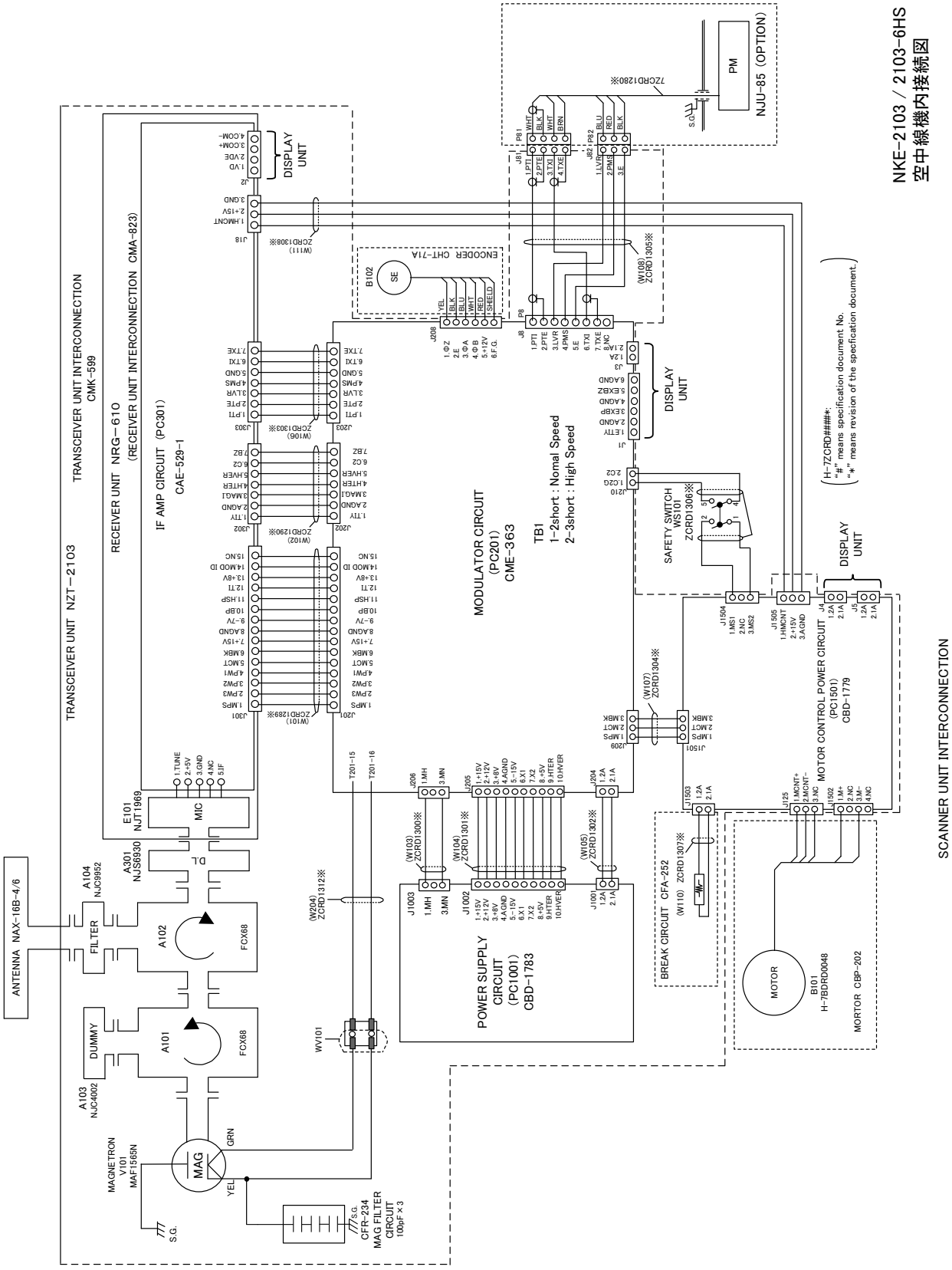


NKE-1125PM (AC220V) X25kW,2ユニット
空中線機内接続図

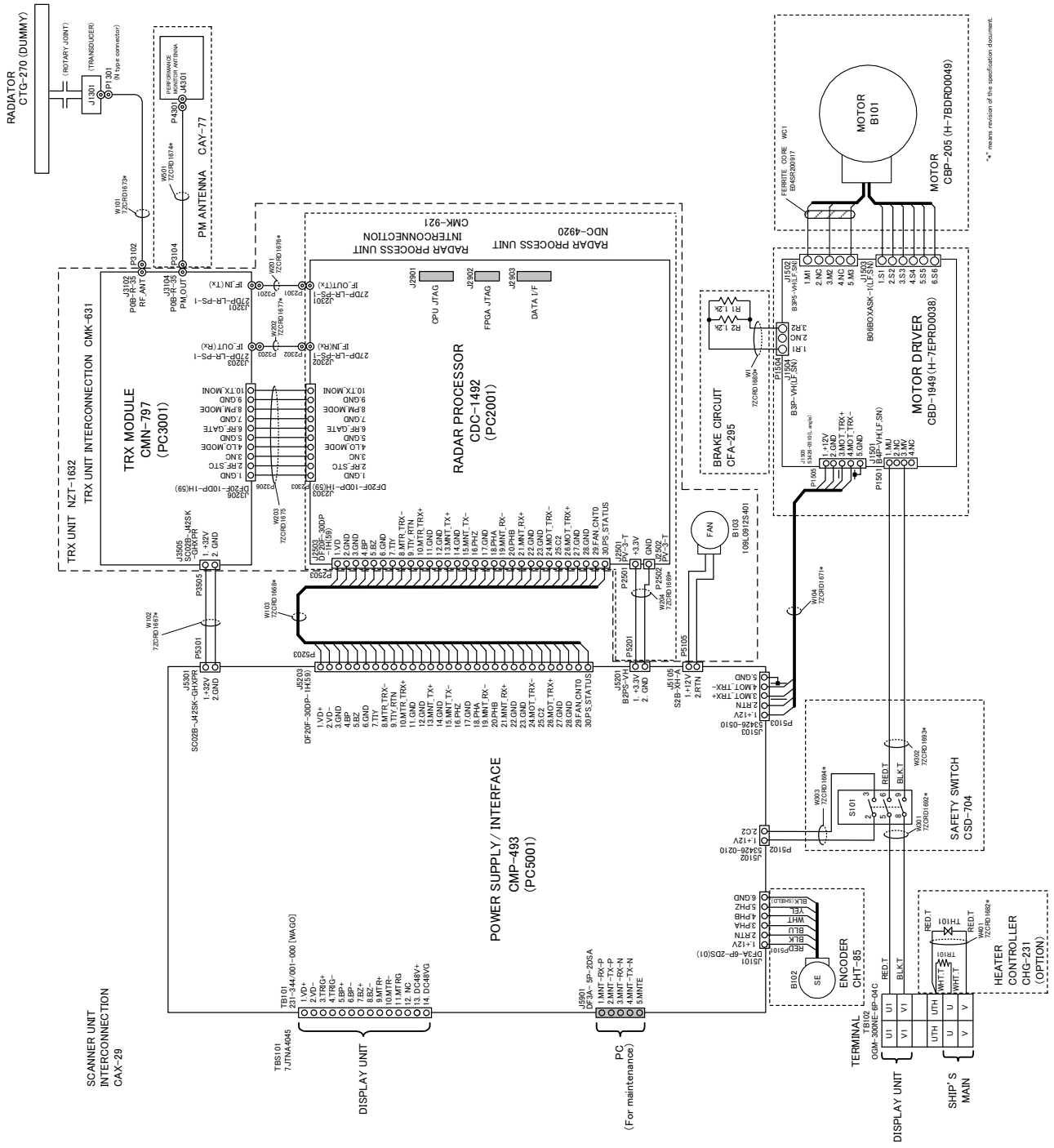
8.3.29 NKE-2254-6HS



8.3.30 NKE-2103-6/6HS

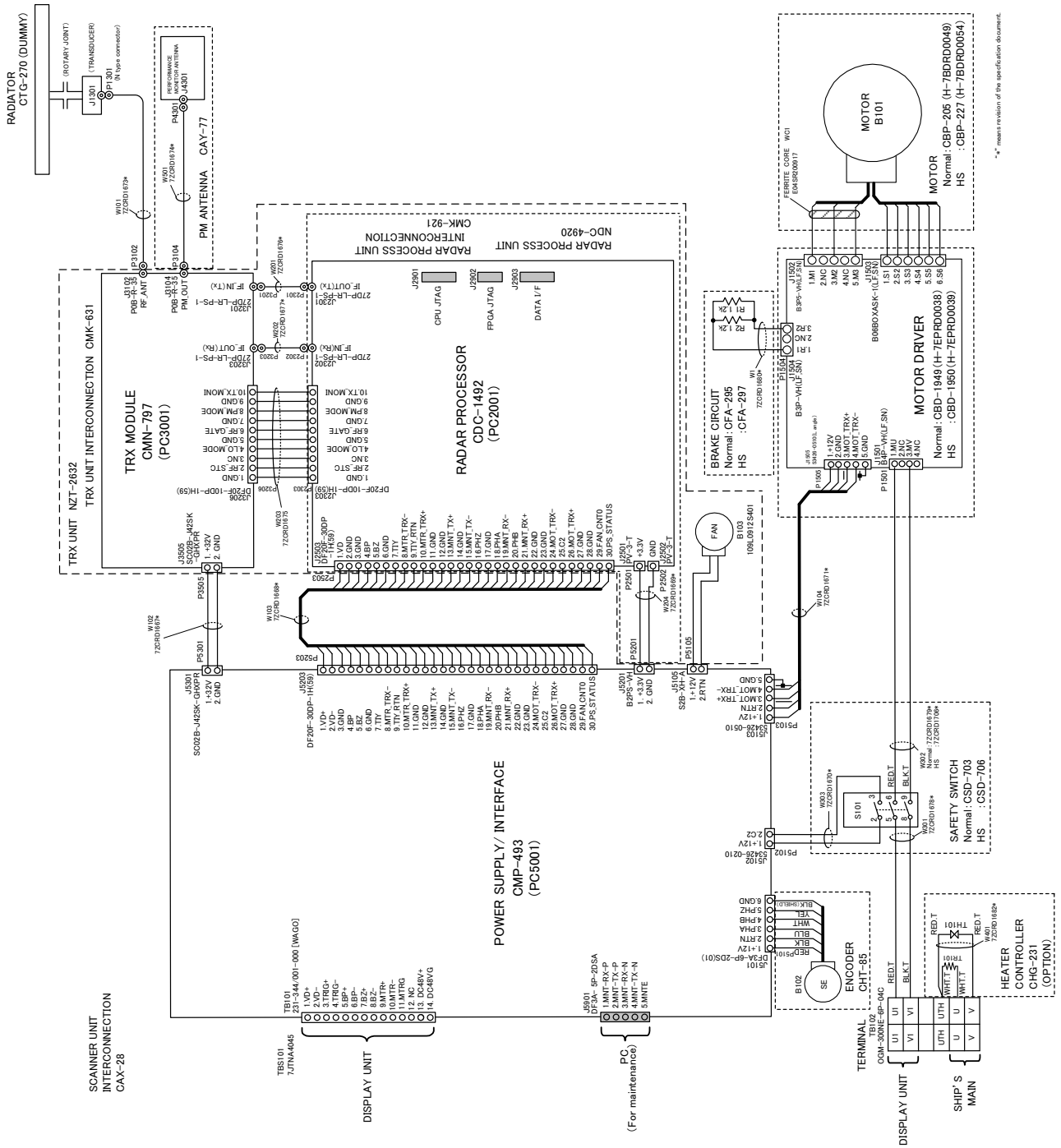


8.3.31 NKE-1632



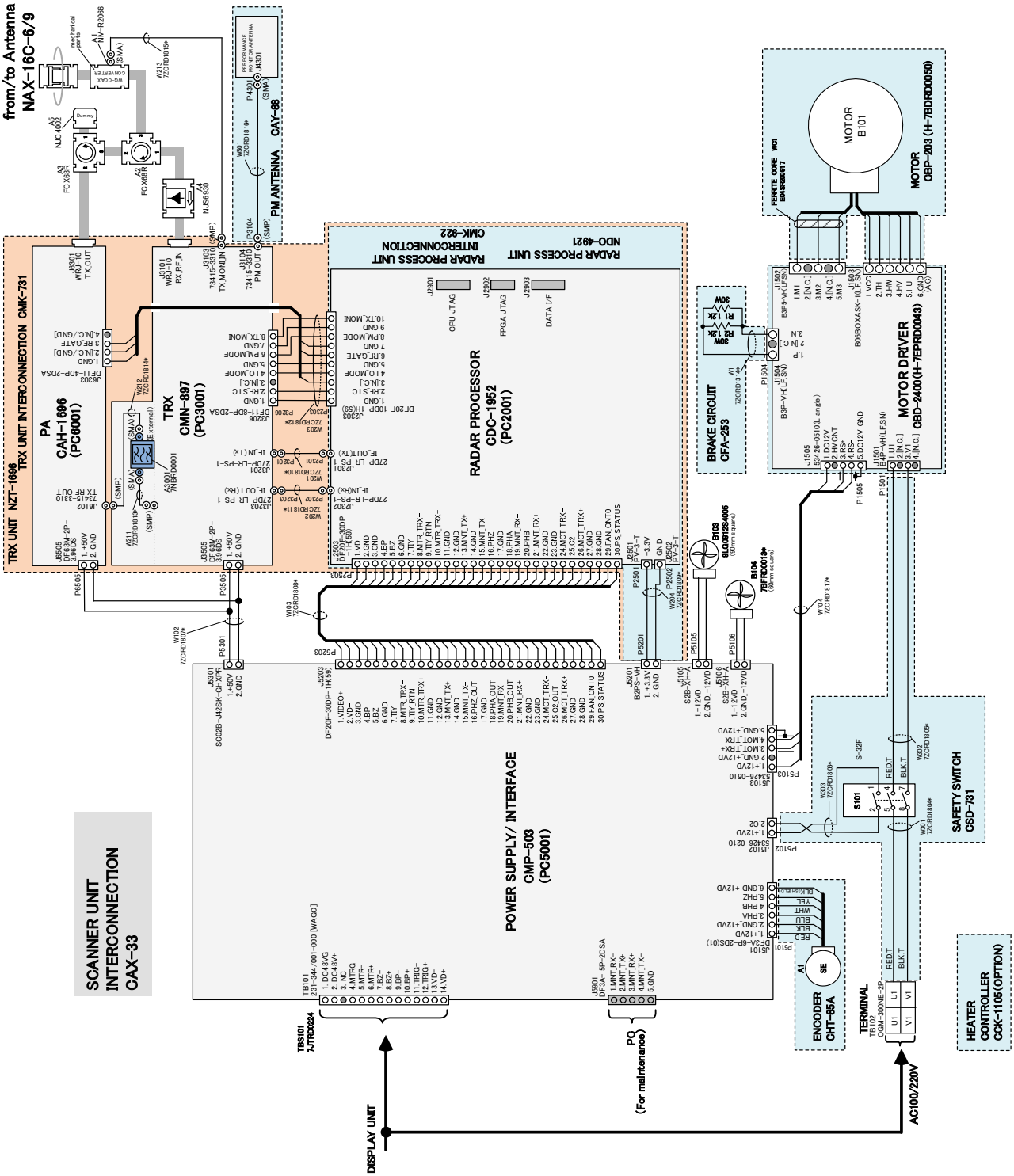
NKE-1632 INTERCONNECTION

8.3.32 NKE-2632/NKE-2632-H



NKE-2632/2632-H INTERCONNECTION

8.3.33 NKE-1696



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Not use the asbestos

For further information,contact:

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