JMR-9230-S/S3
JMR-9225-7X3/9X3/6X/9X/6XH
JMR-9210-6X/6XH
JMR-9272-S
JMR-9282-S/SH
JMR-9296-6X/9X
JMR-7230-S/S3
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

INSTALLATION MANUAL

JRC Japan Radio Co., Ltd.



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.

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.

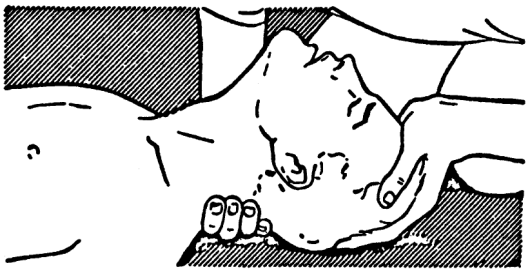
☆Treatment to Give When the Patient Has a Pulse Beating but Has Ceased to Breathe

∗ 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.

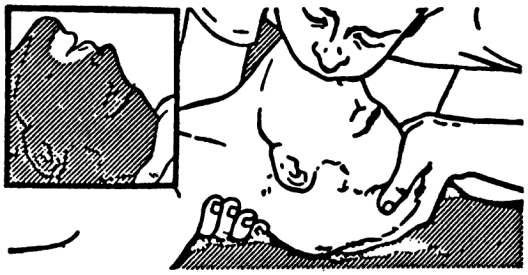
Mouth-to-mouth artificial respiration with the patient's head lifted

[1]



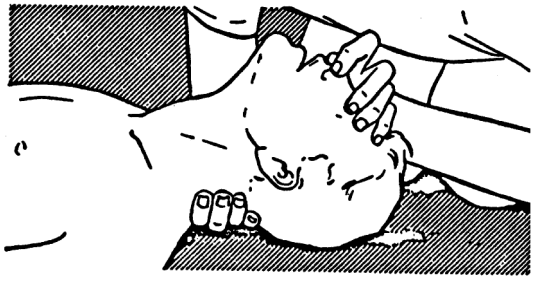
(1) Lift the back part of the patient's head. Support the forehead with one of your hand and the neck with the other hand.→[1].
Many patients will have their airways opened by lifting their head in this way to ease mouth-to-mouth artificial respiration.

[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

☆Treatment to Give When the Patient Has No Pulse Beating and Has Ceased to Breathe

∗ Performing cardiac massage - Fig. 2

If the patient has no pulse beating, with the pupils open and no heartbeat being heard, the patient has a cardiac arrest and requires immediate artificial respiration. Continue this until a medical specialist arrives, and follow his or her directions after that.

(1) Putting one hand on about the lower one third of the patient's ribs and the other hand over the back of the first, with your elbow fully stretched (with bended elbow, you can't press to the extent the patient's ribs are depressed), apply your body weight to the hands to press the patient's body until it is depressed about 2 cm (Repeat this about 50 times a minute). (Cardiac massage)

(2) If only one first-aider is available, perform a cardiac massage about 15 times and then give mouth-to-mouth artificial respiration 2 times. Repeat this sequence.
If two first-aiders are available, while one person performs a cardiac massage 15 times, the other should give mouth-to-mouth artificial respiration 2 times. Repeat this sequence. (Combined cardiac massage and mouth-to-mouth artificial respiration method)

(3) Check the patient's pupils and feel the pulse from time to time. When the pupils are restored to normal and the pulse begins to beat regularly, stop treating and keep the patient calm while giving him or her coffee, tea or any other hot drink to keep him or her warm while watching him or her carefully.

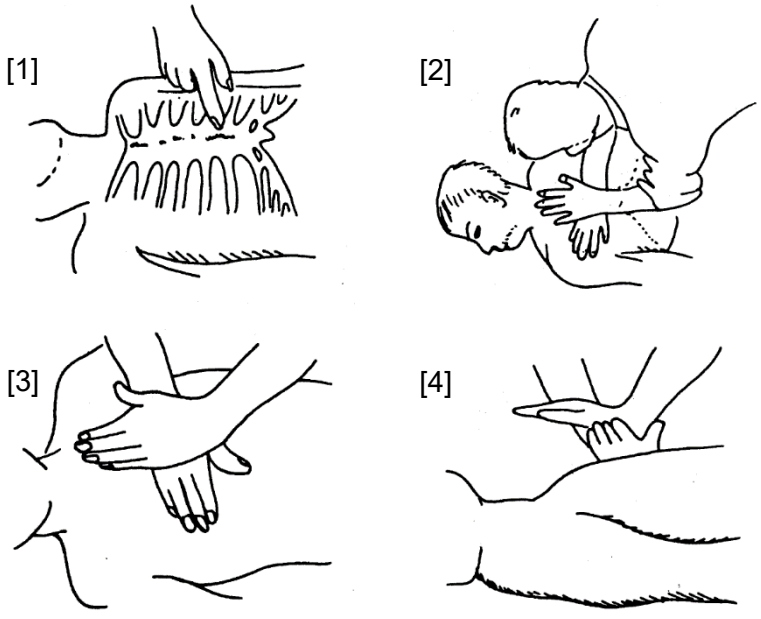


Fig. 2 Cardiac massage

PREFACE

Thank you for purchasing the JRC Multi Function Display JMR-7200/9200 Series, JAN-7201/9201 and JAN-7202/9202.
This equipment meets the performance standards of the IMO (International Maritime Organization) and the IHO (International Hydro graphic Organization), and serves to improve safety, reduce fuel combustion, concentrate voyage information as the main device of the INS (Integrated Navigation System).

- For the best operation, read the instruction manual thoroughly before use.
- Keep this manual in a convenient place for future reference.
  Make use of this manual when experiencing operation difficulties.
- 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.

● Before Operation ●

Pictorial Indication

Various pictorial indications are included in this installation 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

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. When any work must be done on the radar antenna, make sure to turn the safety switch off.

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

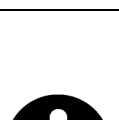
Make sure to install the radar antenna at a place higher than human height. Direct exposure to electromagnetic wave at close range will have adverse effects on the human body.

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.

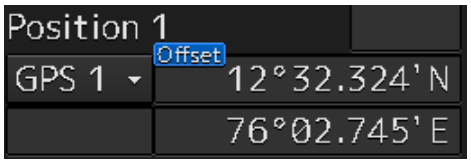
When cleaning the display screen, do not wipe it too strongly with a dry cloth. Also, do not use gasoline or thinner to clean the screen. Failure will result in damage to the screen surface.

⚠WARNING

	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 memory beforehand when reading and writing of the file by using USB memory device. Influences other equipment when the display unit is infected with the virus, and causes the breakdown.
	Do not leave the USB memory or the like in the USB port after use. Malfunctions may result.
	Do not remove USB device while the access lamp (in USB device) is flashing. Data is damage when the USB device is pulled out while accessing it, and it case the breakdown.
	Do not insert or remove the USB device while transmitting. The radar image becomes unstable by accessing the USB device not anticipated, and it causes the 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, strange smell or unusual 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.

⚠WARNING

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.



If the LCD module breaks and the liquid inside spills out to stick to your skin, wash it off immediately under running water for more than 15 minutes. If you find any skin problem afterwards, consult a doctor immediately. If the liquid gets in your eye, wash it off immediately under running water for more than 15 minutes, and then, consult a doctor as soon as possible.

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.

⚠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.
	When using the [AUTO SEA] function, never set the suppression level too high canceling out all image noises from the sea surface at close range. Detection of not only echoes from waves but also targets such as other ships or dangerous objects will become inhibited. When using the [AUTO SEA] function, make sure to choose the most appropriate image noise suppression level.
	When using the [AUTO RAIN] function, never set the suppression level too high. Detection of not only echoes from the rain or snow but also targets such as other ships or dangerous objects will become inhibited. When using the [AUTO RAIN] function, make sure to choose the most appropriate image noise suppression level.
	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

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

⚠CAUTION

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

- If no backup measures, such as using another EDIS 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 turn off the power during index creation by Chart Portfolio.
Otherwise, a malfunction may occur.



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



- Do not place any object on the operation panel.
  Avoid placing anything extremely hot, in particular, as this may deform the panel.
- Do not apply any undue shock on the operation panel, trackball and dials.
  Otherwise, a malfunction may result.
- Please do not press and hold the power button of the operation unit. It becomes the cause that prevents the normal start-up.



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.



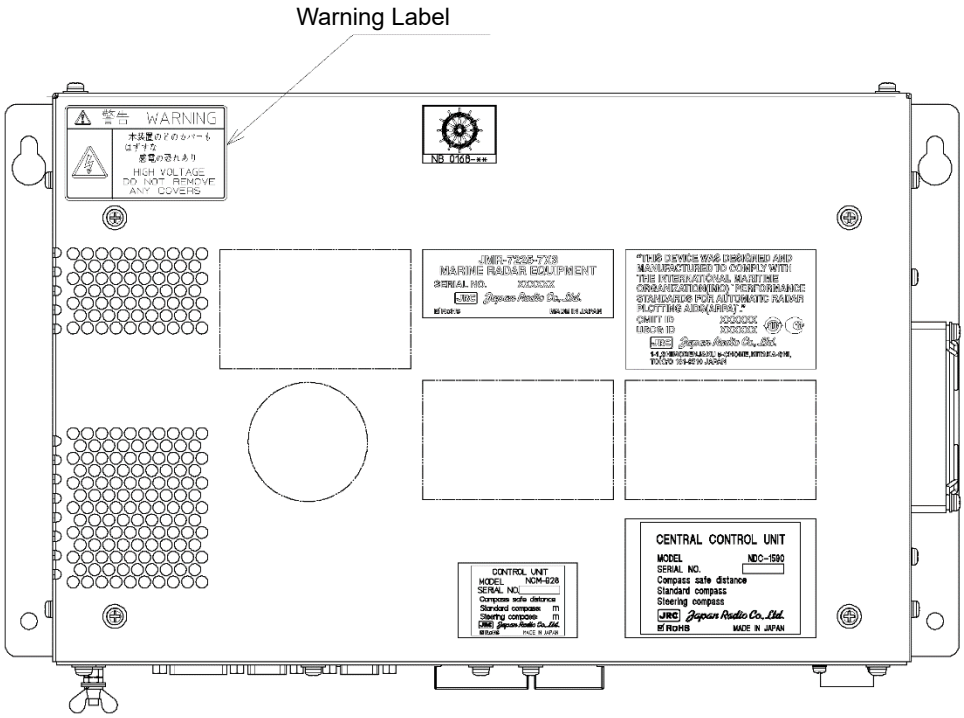
- If a fan alarm or CPU temperature rise alarm has occurred, immediately turn off the power.
  Keeping the equipment in operation under such condition may cause a fire or a malfunction.
  After turning off the power, contact our head office, or a nearby branch or local office to request servicing.



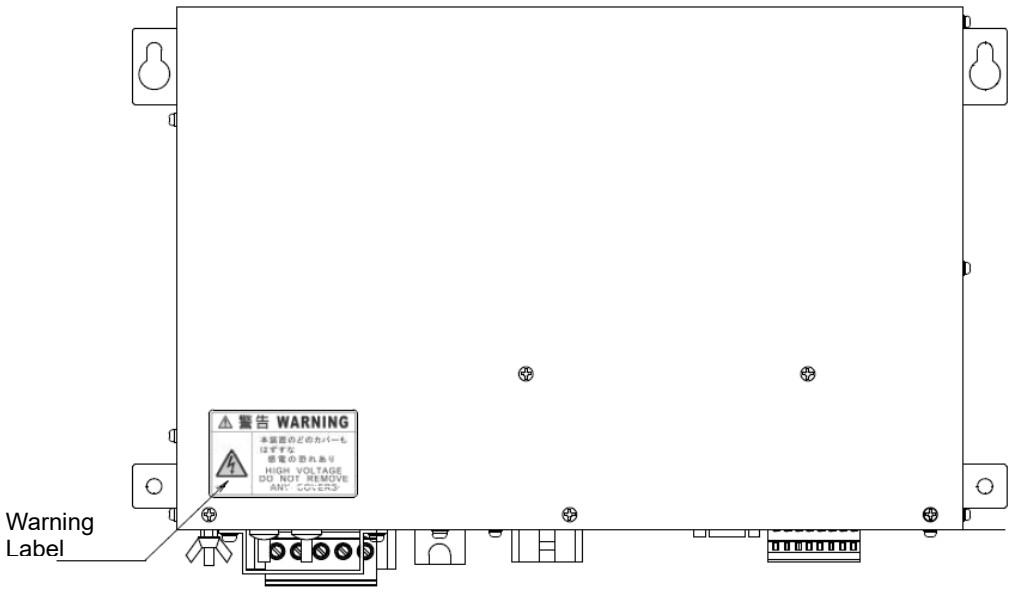
Edit routes in accordance with the world geodetic system (WGS-84).
Use of routes edited with any other geodetic systems may cause accidents.

⚠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 malfunction 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.
	In the case of turning on the power under the condition of low temperature, do pre-heat less than 30 minutes. Otherwise, the equipment may not start normally.
	The judgement of formal or informal about chart depends on the administration organization of the flag state. About the officially of the chart, please contact the administration organization.
	Please do not touch the LAN connector. May have to fail due to static electricity. When attaching and detaching the LAN connection equipment, please remove static electricity by touching the metal.

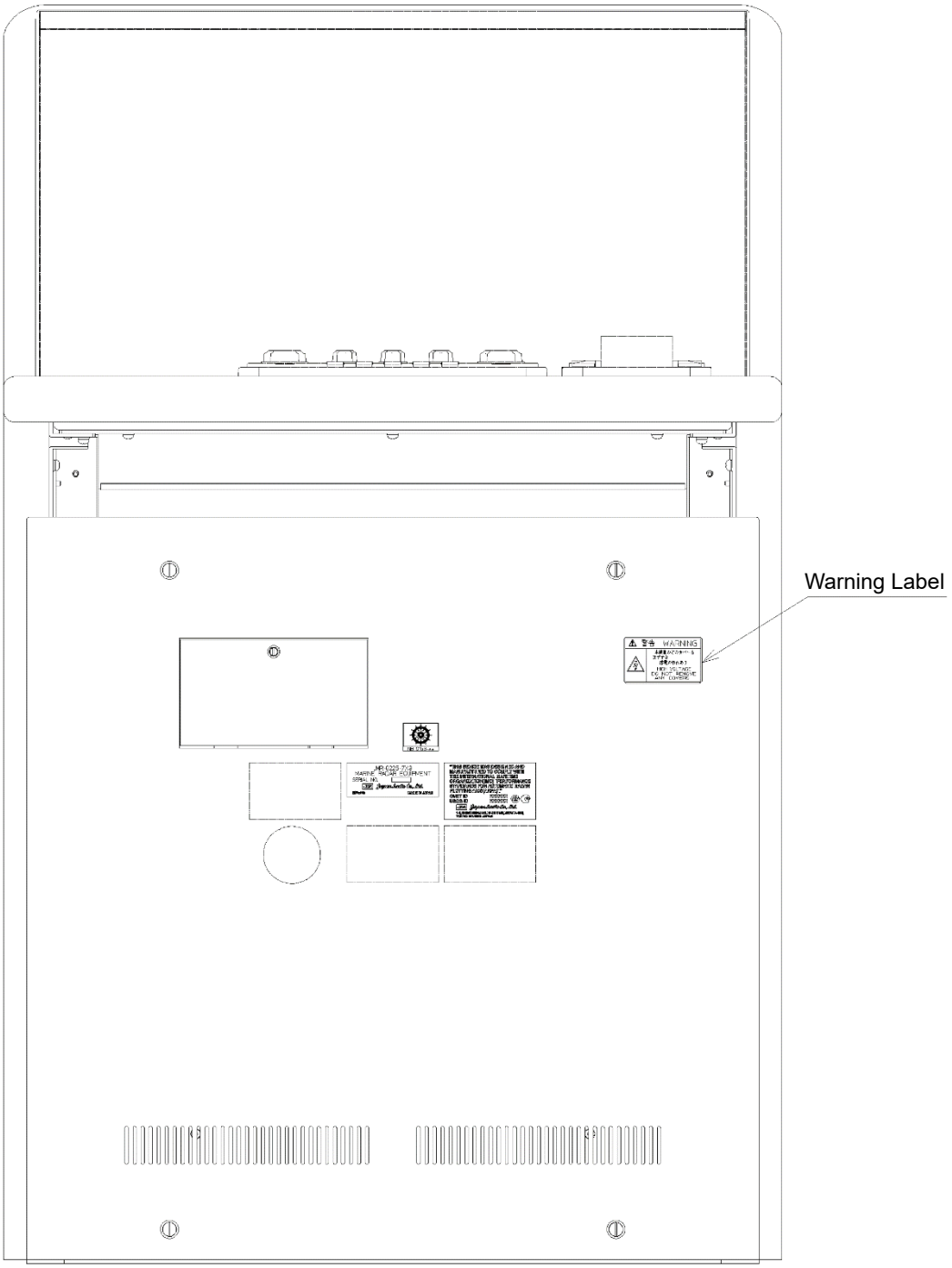
The Mounting Point of the Warning Label



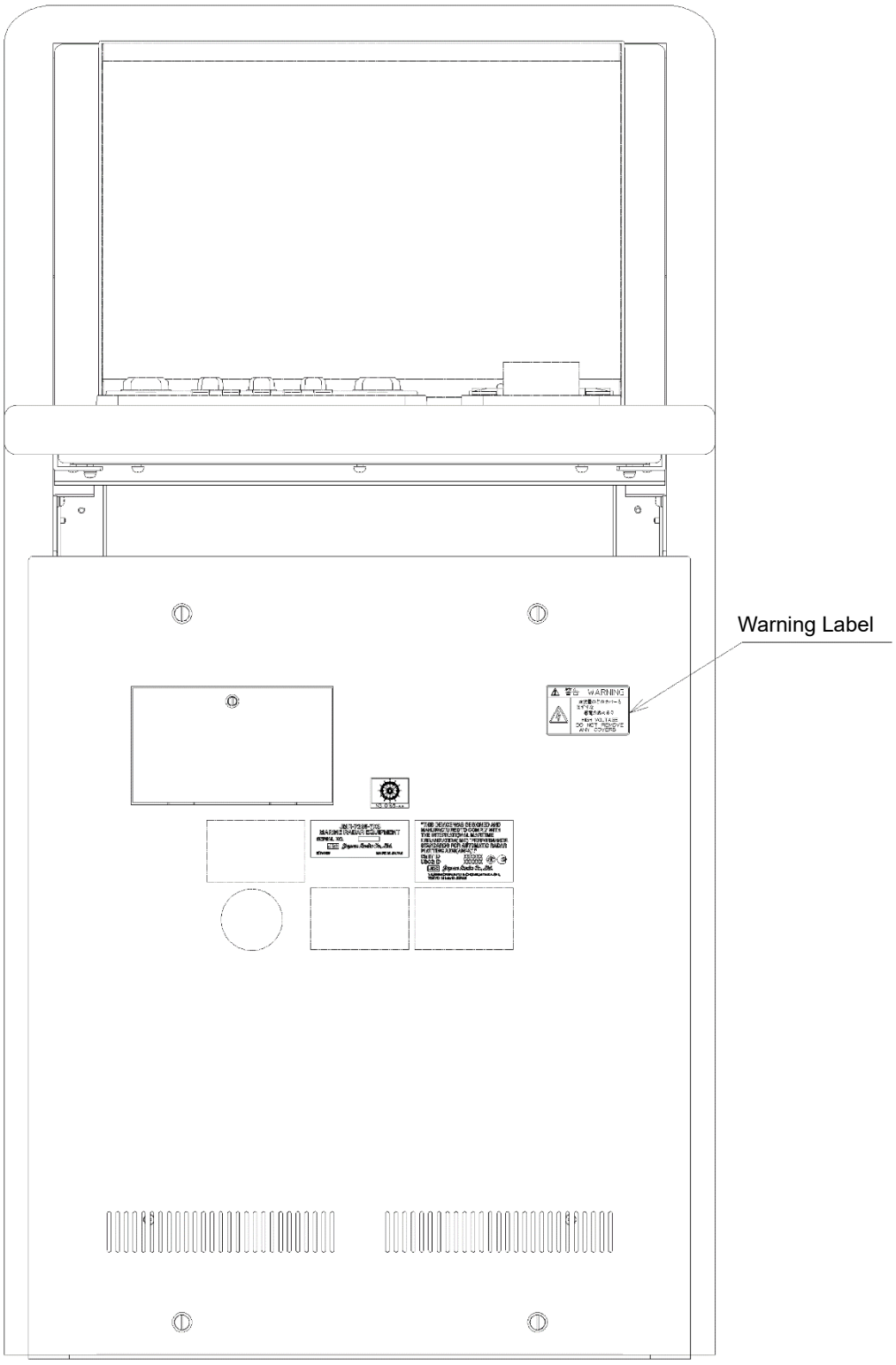
NDC-1590/A Central Control Unit(CCU)



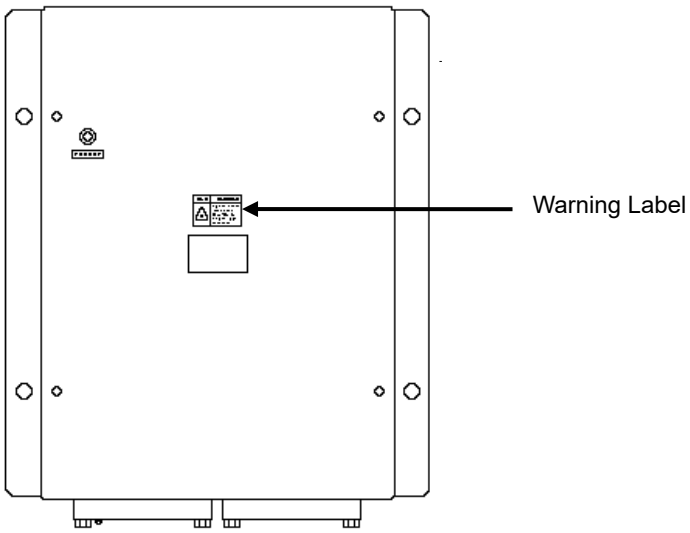
NBD-913 Power Supply Unit(PSU)



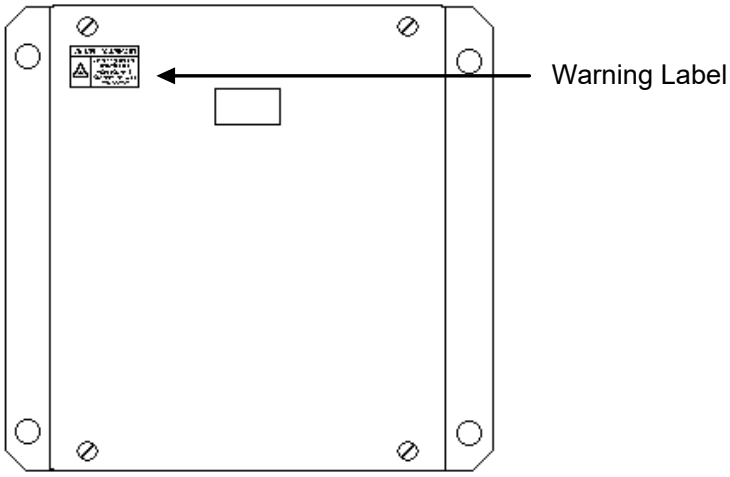
CWA-246 26inch Display Unit Mount Kit



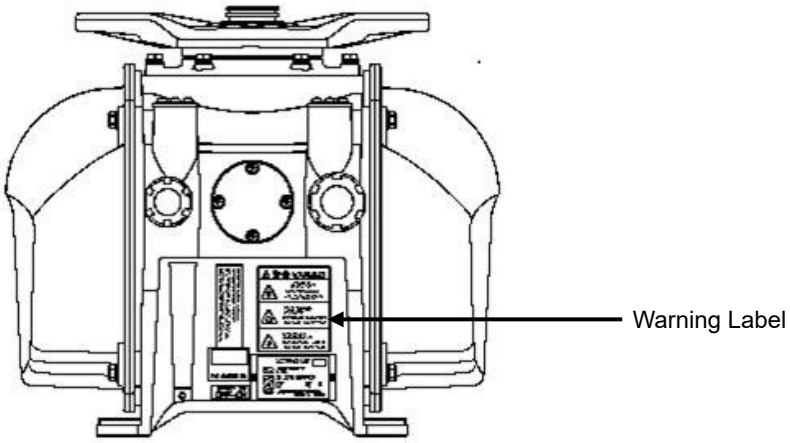
CWA-245 19inch Display Unit Mount Kit



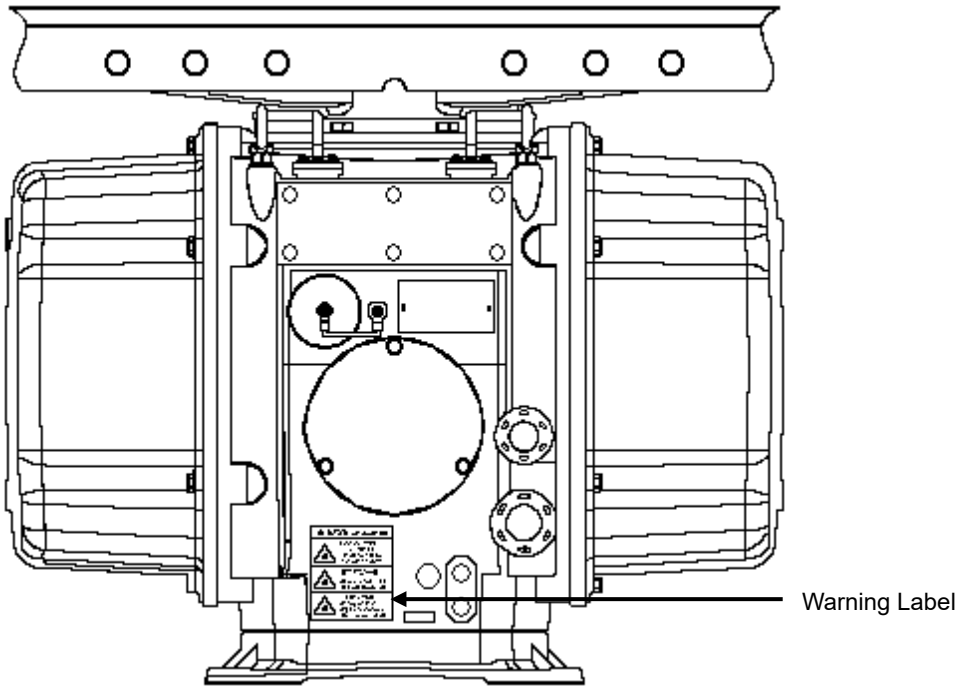
NQE-3141-4A/8A Interswitch Unit (ISW)



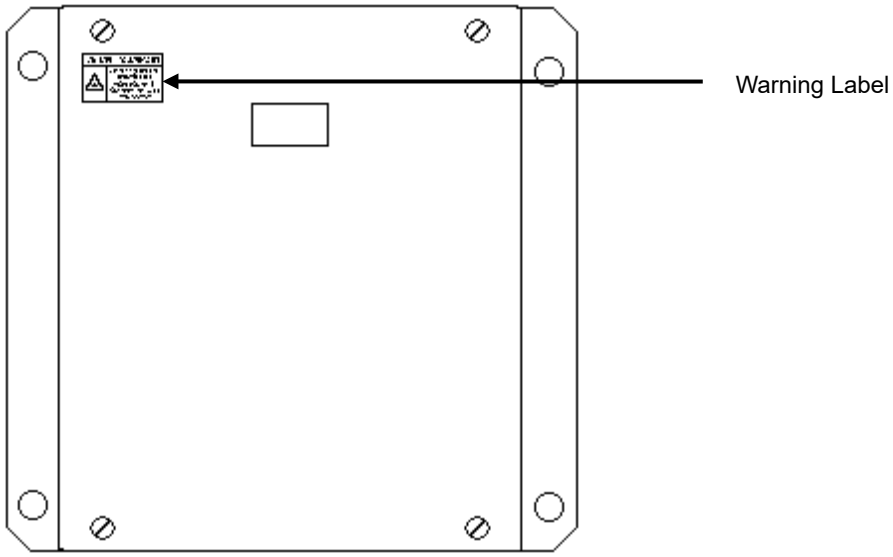
NQE-3167 Power Control Unit



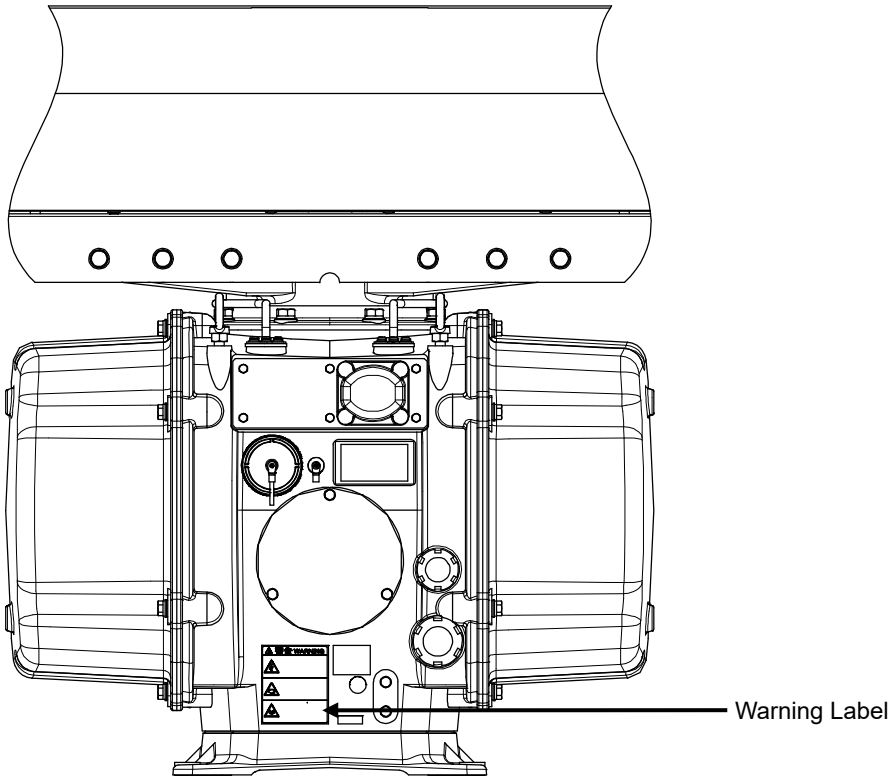
NKE-1129/A-7, NKE-1129/A-9 Radar Antenna
NKE-1125/A-7, NKE-1125/A-9 Radar Antenna
NKE-1696-6/9 Radar Antenna



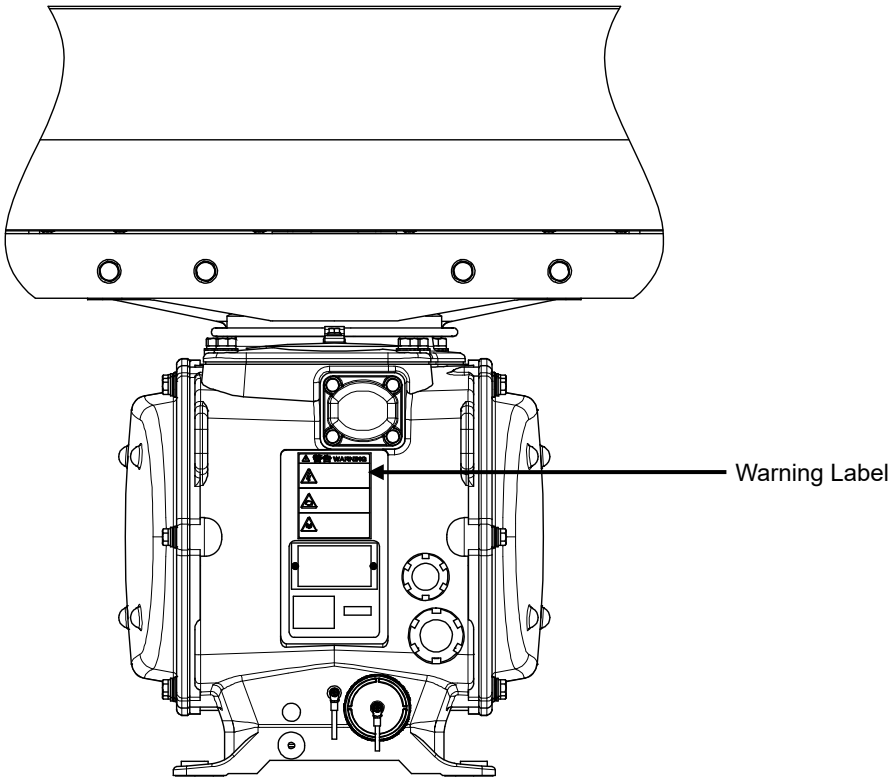
NKE-1139/1139A/1130/1130A Radar Antenna



NTG-3230/A、NTG-3225/A Transmitter-Receiver



NKE-1632/A Radar Antenna



NKE-2632/A, NKE-2632-H Radar Antenna

EQUIPMENT APPEARANCE



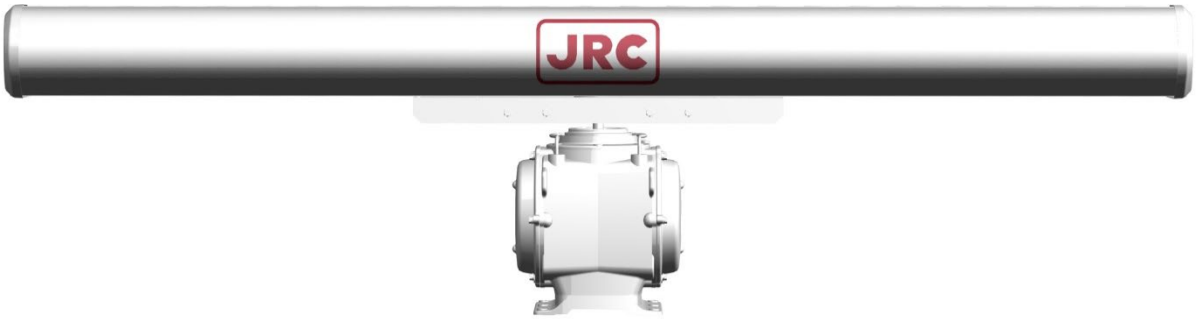
NKE-1139/A Radar Antenna (12 feet)



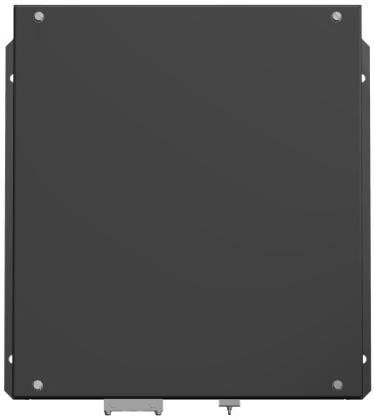
NKE-1130/A Radar Antenna (12 feet)



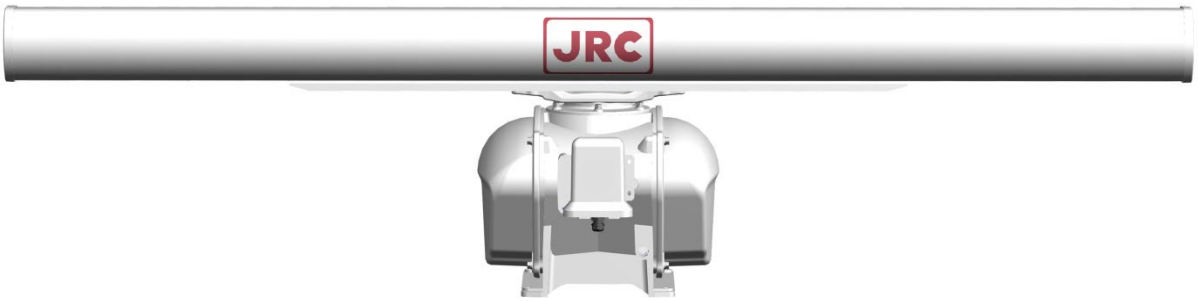
NKE-1632/A Radar Antenna (12 feet)



NKE-2632/A, NKE-2632-H Radar Antenna (8 feet)



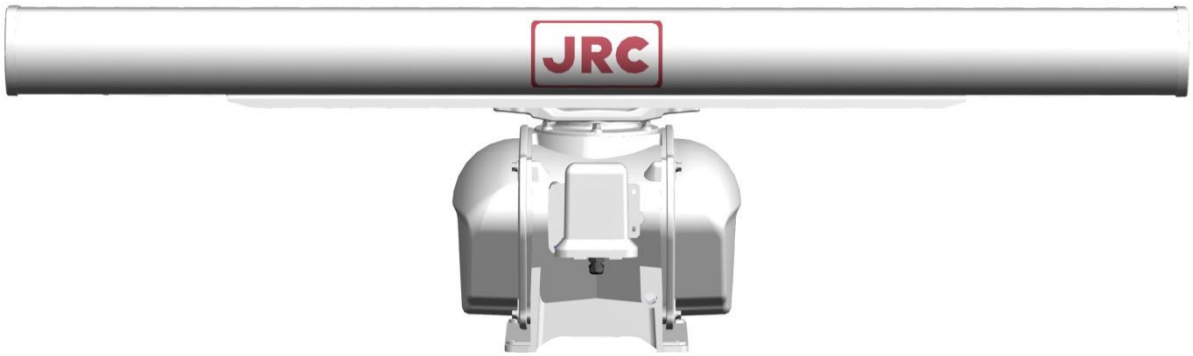
NTG-3230/A Transmitter-Receiver (30 kW)



NKE-1129/A-7 Radar Antenna (7 feet)



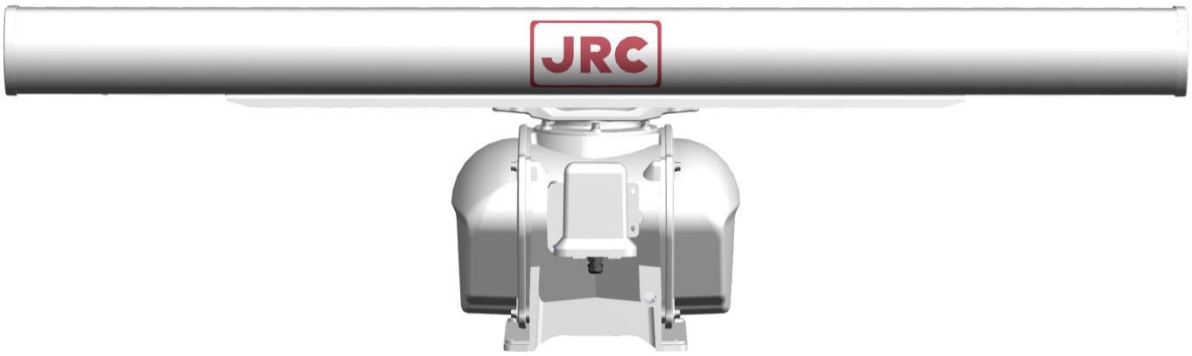
NKE-1129/A-9 Radar Antenna (9 feet)



NKE-2255/A-6 Radar Antenna (6 feet)



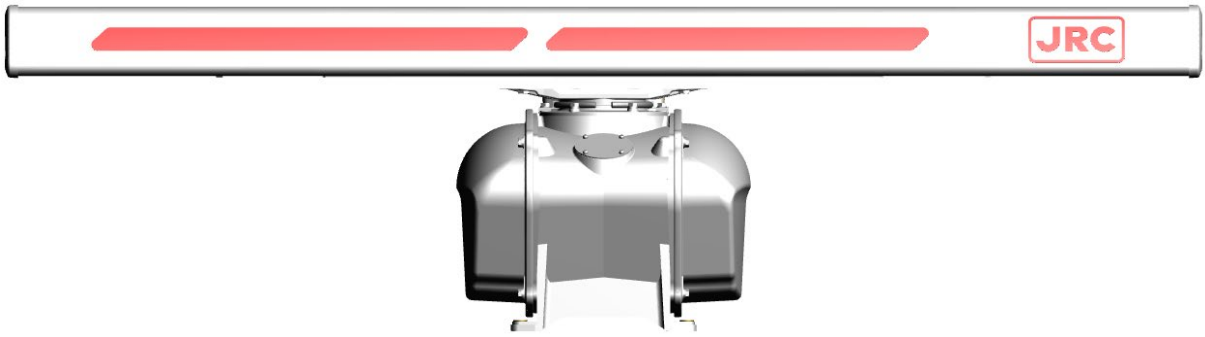
NKE-1125/A-9 Radar Antenna (9 feet)



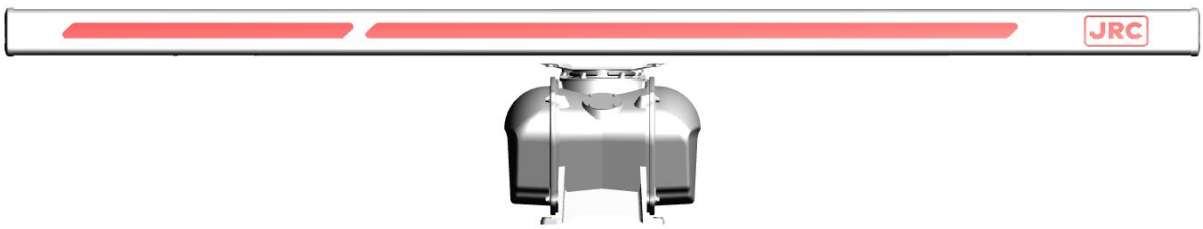
NKE-2254-6HS Radar Antenna (6 feet)



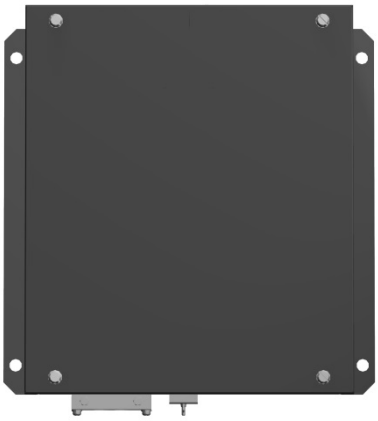
NKE-2103/2103-6HS Radar Antenna (6 feet)



NKE-1696-6 Radar Antenna (6 feet)



NKE-1696-9 Radar Antenna (9 feet)



NTG-3225/A Transmitter-Receiver (25 kW)



CWA-245 19inch Display Unit Mount Kit
(excluding Monitor Unit, Trackball Operation Unit, and Keyboard Operation Unit)



CWA-246 with tray



CWA-246 without tray

CWA-246 26inch Display Unit Mount Kit
(excluding Monitor Unit, Trackball Operation Unit, and Keyboard Operation Unit)



NCE-5605 Trackball Operation Unit - TOPU



NCE-5625 Keyboard Operation Unit - KOPU



NDC-1590/A Central Control Unit - CCU



NBD-913 Power Supply Unit - PSU



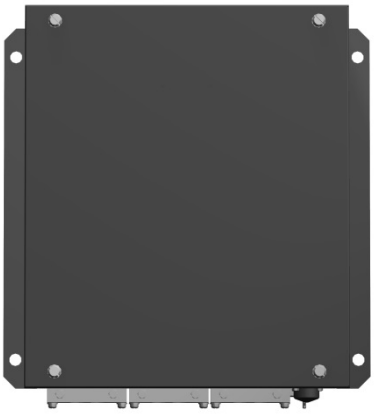
NWZ-207/214 Monitor Unit(19inch)



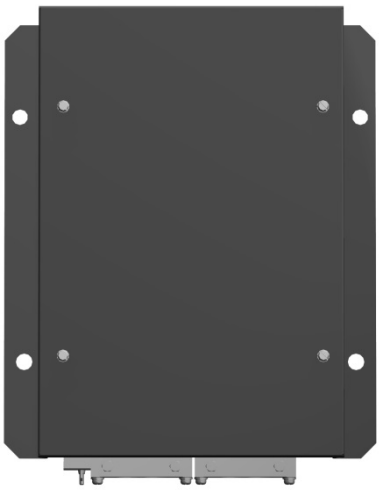
NWZ-208 Monitor Unit(26inch)



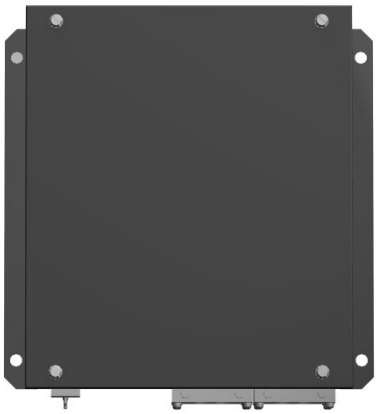
NWZ-233 Monitor Unit(27inch)



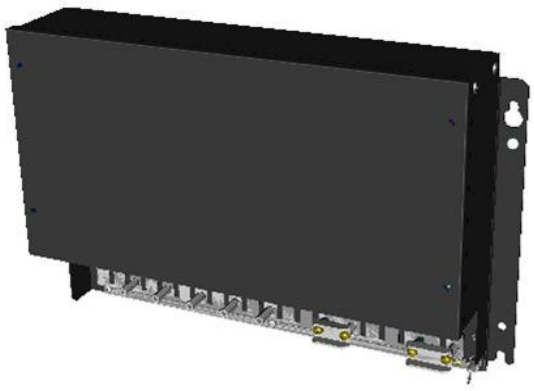
NQE-3167 Power Control Unit (Option)



NQE-3141-4A Interswitch Unit - ISW (4-channel, option)



NQE-3141-8A Interswitch Unit - ISW (8-channel, option)



NQE-1143 Junction Box - JB(Option)

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
AOC	:	Analog Option Circuit(Option interface board in Junction Box)
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
CCU	:	Central Control Unit
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.
CCU	:	Central Control Unit
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
GIF	:	Gyro Interface Circuit(Option interface board in Junction Box)
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 Organization
IMO	:	International Maritime Organization
IR	:	Interference Rejection
ISW	:	Interswitch Unit
JB	:	Junction Box
KOPU	:	Keyboard Operation 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
PSU	:	Power Supply Unit
Q0N	:	A type of radio wave with intra-pulse frequency modulation. It is used for solid-state pulse compression radars.
RIF	:	Radar Interface Circuit
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.
SENSOR LAN SW	:	Sensor LAN Switch Unit
SENC	:	System Electronic Navigational Chart
SLC	:	Serial LAN Interface Circuit
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	:	Stabilisation
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
TOPU	:	Trackball Operation Unit
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.

RIF	:	Radar Interface Circuit(Option interface board in Junction Box)
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.

Contents

Basic Operation

1 Overview 1-1

1.1 Functions 1-1

1.1.1 IMO Performance Standards 1-1

1.1.1.1 Marine radar equipment 1-1

1.1.1.2 ECDIS 1-1

1.1.1.3 Conning display 1-1

1.1.2 Multifunction display 1-1

1.1.3 Integrated Navigation System 1-2

1.1.4 Main Functions of the RADAR mode 1-2

1.1.5 Main Functions of the ECDIS mode 1-3

1.2 Features 1-4

1.3 Components 1-7

2 Installation of Radar Antenna 2-1

2.1 Equipment Cable 2-1

2.1.1 CFQ-6912-** 2-1

2.1.2 2695110056 2-3

2.1.3 2695111162 2-5

2.1.4 Cable end processing method 2-7

2.1.5 Connection to the display-unit side terminal block 2-10

2.2 Installation of the Radar Antenna 2-12

2.2.1 NKE-2103 radar antenna 2-12

2.2.2 NKE-2254-6HS radar antenna 2-14

2.2.3 NKE-1125/A radar antenna 2-16

2.2.4 NKE-1129/A radar antenna 2-18

2.2.5 NKE-1130/A radar antenna 2-20

2.2.6 NKE-1139/A radar antenna 2-22

2.2.7 NKE-1632/A radar antenna 2-24

2.2.8 NKE-2632/A radar antenna 2-26

2.2.9 NKE-1696 radar antenna 2-28

2.3 Installation of Transmitter-Receiver 2-30

2.3.1 NTG-3225/A transmitter-receiver 2-30

2.3.2 NTG-3230/A transmitter-receiver 2-32

2.4 PRECAUTIONS 2-34

2.4.1 Installation of radar antenna 2-35

2.4.2 Routing coaxial cable and flexible wave guide 2-39

2.4.3 Radar antenna installation position 2-42

2.4.4 Confirmation during test run 2-46
2.4.5 Others 2-46

3 Installation of Display Unit 3-1

3.1 Confirmation of Various Units 3-1
3.1.1 In case of JMR-9200Series/JAN-9201/JAN-9202 3-1
3.1.2 In case of JMR-7200 Series/JAN-7201/JAN-7202 3-2
3.2 Confirmation of Various Interface Boards 3-3
3.3 Selecting the Location for Installation 3-4
3.3.1 Outline Drawings of NWZ-208 26inch Monitor Unit 3-5
3.3.2 Outline Drawings of NWZ-233 27inch Monitor Unit 3-6
3.3.3 Outline Drawings of NWZ-233 27inch Monitor Unit (with Adapter) 3-7
3.3.4 Outline Drawings of NWZ-207 19inch Monitor Unit 3-8
3.3.5 Outline Drawings of NWZ-214 19inch Monitor Unit 3-9
3.3.6 Outline Drawings of NCE-5605 Trackball Operation Unit 3-10
3.3.7 Outline Drawings of NCE-5625 Keyboard Operation Unit 3-11
3.3.8 Outline Drawings of CWB-1593 Large Tray 3-12
3.3.9 Outline Drawings of NDC-1590/A Central Control Unit 3-13
3.3.10 Outline Drawings of NBD-913 Power Supply Unit 3-14
3.3.11 Outline Drawings of NQE-1143 Junction Box 3-15
3.3.12 Outline Drawings of NQA-2443/A Sensor LAN Switch Unit 3-16
3.3.13 Outline Drawings of CWA-246 26inch Display Unit Mount Kit 3-18
3.3.14 Outline Drawings of CWA-246 27inch Display Unit Mount Kit 3-19
3.3.15 Outline Drawings of CWA-245 19inch Display Unit Mount Kit 3-20
3.3.16 Outline Drawings of CWB-1595 26inch Desktop Frame 3-21
3.3.17 Outline Drawings of CWB-1595 27inch Desktop Frame 3-22
3.3.18 Outline Drawings of CWB-1660 26inch Desktop Frame 3-23
3.3.19 Outline Drawings of CWB-1660 27inch Desktop Frame 3-24
3.3.20 Outline Drawings of CWB-1594 19inch Desktop Frame 3-25
3.3.21 Outline Drawings of CWB-1659 19inch Desktop Frame 3-26
3.3.22 Outline Drawings of CWB-1596 OPU Desktop Frame 3-27
3.3.23 Precautions for transporting and storing the display unit 3-28
3.3.24 Detaching the front frame of the Display unit mount kit 3-30
3.4 Installation of Standard Equipment 3-39
3.4.1 Installation of Monitor Unit
NWZ-208/NWZ-233/NWZ-207/NWZ-214/NWZ-208-TP/NWZ-207-TP 3-39
3.4.2 Installation of Operation Unit 3-43
3.4.2.1 Installation of Keyboard Operation Unit NCE-5625 3-43
3.4.2.2 Installation of Large Tray CWB-1593 3-45
3.4.2.3 Installation of Trackball Operation Unit NCE-5605 3-46
3.4.3 Installation of Central Control Unit NDC-1590/A 3-48
3.4.3.1 Confirming of type name (NDC-1590 / NDC-1590A) 3-48
3.4.3.2 Installation of Central Control Unit NDC-1590/A 3-51

3.4.4 Installation of Power Supply Unit NBD-913 3-53
3.4.5 Installation of Relay Terminal CQD-2312 3-54
3.4.6 Connection of cables between units 3-57
3.4.6.1 Wiring diagram 3-57
3.4.6.2 Wiring of standalone type 3-58
3.4.6.3 Wiring of Desktop type 3-66
3.4.7 Wiring for Relay Terminal 3-69
3.4.7.1 Processing of wire rod 3-69
3.4.7.2 Connection of Unit and Relay Terminal 3-73
3.5 Installation of Option Equipment 3-78
3.5.1 Installation of Junction Box NQE-1143 3-78
3.5.1.1 Installation of CMH-2370 Serial LAN Interface Circuit (SLC) 3-80
3.5.1.2 Installation of Analog Option Circuit CMJ-560 (AOC) 3-83
3.5.1.3 Installation of Radar Interface Circuit CQD-2273 (RIF) 3-84
3.5.1.4 Installation of Gyro Interface Circuit CMJ-554 (GIF) 3-85
3.5.1.5 Installation of JB NQE-1143 3-86
3.5.2 Connection of Display Unit and RIF CQD-2273 3-89
3.5.2.1 Connection for standalone type 3-89
3.5.2.2 Connection for desktop type 3-92
3.5.3 Installation of NQA-2443/A Sensor LAN Switch Unit 3-94
3.5.3.1 Assembling Ethernet Cable (RJ-45 Type Connector) 3-98
3.5.4 Installation of UPS 3-104
3.5.5 Installation of Hood CWB-2718/1620/1618 3-118
3.5.5.1 Installation of Hood CWB-2718(for 27inch Monitor Unit) / CWB-1620 (for 26inch Monitor Unit) 3-118
3.5.5.2 Installation of Hood CWB-1618 (for 19inch Monitor Unit) 3-120
3.6 Connections with Radar Antenna and Transmitter-Receiver 3-122
3.6.1 NKE-1125/A, NKE-1129/A, NKE-1130/A, NKE-1139/A, NKE-1632/A, NKE-2632/A Radar Antennas 3-123
3.6.2 NKE-2103, NKE-2254 Radar Antennas 3-124
3.6.3 Settings for RADAR I/F Circuit 3-125
3.6.3.1 Connection procedure between Radar Interface Circuit and Radar Antenna 3-126
3.7 Connection with Sensors 3-127
3.7.1 IEC61162-1 Connections 3-128
3.7.2 IEC61162-2 Connections 3-131
3.7.2.1 Communication Type and termination 3-133
3.7.3 LAN Connection 3-134
3.7.4 Contact Input 3-138
3.7.5 Contact Output 3-139
3.7.6 Connections with Gyro Compasses and Electromagnetic Speed Logs 3-143
3.7.7 Settings for Gyro Interface Circuit CMJ-554 3-144
3.7.8 Connection with Analog Sensors 3-148
3.7.9 Backup of sensor signal 3-151

3.8 Connection with ECDIS 3-154
3.8.1 Radar Overlay 3-154
3.8.2 Target Tracking 3-155
3.9 Connection with Radar Display Unit 3-156
3.9.1 Radar Overlay 3-156
3.9.2 Target Tracking 3-157
3.10 Connection with BNWAS 3-158
3.10.1 Transmit watch timer reset signal 3-159
3.11 Ground Connection 3-160
3.11.1 Shield for Equipment 3-160
3.11.2 Cables for Equipment 3-160
3.11.3 Mounting Location 3-160
3.11.4 Grounding 3-160
3.12 Installation of Power Cable 3-161
3.12.1 Input Voltage Specification 3-161
3.12.2 Connecting Power Cable 3-162
3.13 Initialization for the specified model 3-163
3.14 Other Labels 3-173
3.14.1 Sticking position of labels 3-175
3.14.1.1 26/27 inch Standalone Type (JMR-9200 series, JAN-9201 and JAN-9202) 3-175
3.14.1.2 19 inch Standalone Type (JMR-7200 series, JAN-7201 and JAN-7202) 3-176
3.14.1.3 Desktop Type or flush mount type 3-177
3.14.2 Removing position of the wheel mark labels 3-178
3.14.2.1 Standalone Type (JAN-9202) 3-178
3.14.2.2 Standalone Type (JAN-7202) 3-179
3.14.2.3 Standalone or Desktop or flush mount type (JAN-9202 and JAN-7202) 3-180

4 Initial Setting 4-1

4.1 Service Menu [ALL] 4-2
Displaying the Service menu 4-6
4.2 Installation Information [ALL] 4-7
Displaying the [Installation Information] dialog 4-7
Entering an installation date and a time 4-8
Entering an installer name 4-8
Entering an installing company 4-8
Selecting a solid-state radar type (using a solid-state radar) 4-8
4.3 Setting Up a Language [ALL] 4-9
Displaying the [Language] dialog 4-9
Setting up a language 4-10
4.4 Subsystem Installation [ALL] 4-11
Displaying the [Subsystem Installation] dialog 4-11
Changing the subsystem configuration 4-12

Saving subsystem configuration changes 4-18
4.5 Setting Up CCRP (Consistent Common Reference Point) [ALL] 4-19
Displaying the [CCRP] dialog 4-19
Setting CCRP 4-19
4.6 Setting Up a Serial Port [ALL] 4-22
Displaying the [Serial Port] dialog 4-22
[Diagnosis] lamp light colors 4-23
Setting a serial port 4-23
To change the communication settings of the Serial Port 4-29
Checking the communication status 4-32
Line Monitor 4-33
Packet Monitor 4-35
4.7 System Function [ALL] 4-37
Displaying the [System Function] dialog 4-37
Lamp light colors 4-37
Setting a system function 4-38
4.8 Setting Contacts (Contact Input/Output) [ALL] 4-55
Displaying the [Contact] dialog 4-55
Enabling the watch timer reset contact output of the CCU 4-57
Enabling the contact output for PWR FAIL of the CCU 4-57
Selecting the function to be assigned to each contact input of the SLC/ALC 4-57
Selecting a function to be assigned to each contact output of SLC/ALC 4-58
Testing each contact output 4-62
Checking the status of each contact input 4-62
4.9 CAM Configuration and Setting [ALL] 4-63
4.9.1 Install / Update procedure for BAMS Alert database 4-63
4.9.2 Serial port setting 4-70
System configuration example and serial port setting example 4-73
4.9.3 LAN setting 4-74
4.9.4 Setting BNWAS (JCX-161) installation 4-75
4.9.5 Connection with BNWAS by using contact output 4-84
4.9.6 Set up to use DSC (NCT-82/83) to input dry contact alert signals 4-85
DSC installation setting 4-85
Connection of the contact of the buzzer Off signal 4-88
4.10 Setting A/D (Analog/Digital) [ALL] 4-92
Displaying the [A/D] dialog 4-93
Selecting a channel whose connection is to be enabled 4-93
Setting channel details 4-94
Correcting an analog value: Setting method 4-95
4.11 Setting Data Output [RADAR] [ECDIS] 4-99
Displaying the [Data Output] dialog 4-99
Setting Data Output 4-100

Setting the output items of [Navigation Data] 4-102
4.12 Network Setting [ALL] 4-105
Displaying the [Network] dialog 4-105
Setting an IP address of this equipment 4-106
Editing [Network List] 4-107
JRC Network IP Address 4-110
Setting a WAN 4-111
4.13 Redundancy Setting [ALL] 4-113
Displaying the [Redundancy] dialog 4-113
Setting ECDIS for auto sailing 4-113
Setting a display unit for performing the CAM (AMS task) function 4-113
Setting LAN single configuration/duplex configuration 4-114
4.14 Setting Ship's Parameters [ALL] 4-115
Displaying the [Ship General] dialog 4-115
Setting ship's parameters 4-115
4.15 Setting Alert [ALL] 4-117
Setting alert 4-118
Controlling alerts 4-118
Setting an alert talker of the TCS function 4-120
Setting an alert talker of the CAM function 4-120
4.16 Operation Setting at AC Power Failure (Insufficient AC power supply) [ALL] 4-121
Displaying the [AC Power Failure] dialog 4-121
Setting the operation to be performed at the occurrence of the "Power (AC Voltage, Low)" alert 4-122
4.17 Setting Interswitch [RADAR] 4-123
Displaying the [Interswitch] dialog 4-123
Setting Interswitch 4-124
4.18 Setting VDR [RADAR] [ECDIS] 4-125
Displaying the [VDR] dialog 4-125
Setting VDR 4-126
4.19 Setting Autosail (Automatic Sailing System) [ECDIS] 4-127
Displaying the "Autosail" dialog 4-127
Setting the automatic sailing system 4-129
Reach Offset 4-131
Time/Distance to WPT 4-131
Tracking 4-134
4.20 Setting AIS [RADAR][ECDIS] 4-135
Displaying the [AIS] dialog 4-135
Setting AIS 4-135
4.21 Setting of AFT Operation [RADAR][ECDIS] 4-136
Displaying the [AFT Operation] dialog 4-136
Setting an operation mode of AFT Operation 4-137

4.22 Satellite Terminal [ALL] 4-138
Displaying the [Satellite Terminal] dialog 4-138
4.23 Setting Display Size [ALL] 4-140
Displaying the [Display Size] dialog 4-140
Setting a display size 4-141
4.24 Setting Sensor [Conning] 4-142
Displaying the [Sensor] dialog 4-142
Displaying an alert set point 4-142
Setting the GPS switching linkage function 4-143
4.25 Setting Sentence Input [Conning] 4-144
Displaying the [Sentence Input] dialog 4-144
Selecting an input format of the Generator 4-144
Selecting an input format of the Azimuth Thruster 4-144
4.26 Setting Route Sharing [ALL] 4-145
Displaying the [Route Sharing] dialog 4-145
4.27 Setting GPS Shared Route [RADAR][ECDIS] 4-146
Displaying the [GPS Shared Route] dialog 4-146
4.28 Route Plan Exchange [ALL] 4-148
Displaying the [Route Plan Exchange] dialog 4-148
4.29 Own Track [RADAR] 4-149
Displaying the [Own Track] dialog 4-149
4.30 RMS（Remote maintenance settings） [ALL] 4-150
Displaying the [RMS] dialog 4-150
4.31 GPS Buoy [ALL] 4-151
Displaying the [GPS Buoy] dialog 4-151
4.32 VHF(VHF Radiotelephone) [ALL] 4-152
Displaying the [VHF] dialog 4-152
4.33 Tune Adjustment [RADAR] 4-153
4.34 Bearing Adjustment [RADAR][ECDIS] 4-154
4.35 Range Adjustment [RADAR][ECDIS] 4-155
4.36 Master/Slave Radar Operation Mode [RADAR][ECDIS] 4-156
4.37 Setting an Antenna Height [RADAR][ECDIS] 4-157
4.38 Tune Peak Adjustment [RADAR] 4-158
4.39 Setting a Tune Indicator (tuning indicator level) [RADAR] 4-159
4.40 Setting Output BP (Radar Antenna Bearing Pulse Output) [RADAR] 4-160
4.41 Performance Monitor Adjustment [RADAR] 4-161
Flow of Performance Monitor Adjustment 4-161
Adjusting the monitor reception level of a magnetron radar unit 4-162
Adjusting the monitor transmission level of the magnetron radar unit 4-163
Adjusting the monitor transmission level of the solid-state radar unit 4-164
Adjusting the monitor reception level of the solid-state radar unit 4-165

Checking the state of the performance monitor of the magnetron radar unit 4-166
Checking the state of the performance monitor of the solid-state radar unit 4-168
Entry of the amount of attenuation to the label 4-168
4.42 Setting Sector Blank (RADAR Screen Only) [RADAR] 4-169
4.43 Setting TNI Blank [RADAR] 4-170
4.44 Setting Input BP Count [RADAR][ECDIS] 4-171
4.45 Setting Output BP Count [RADAR] 4-172
4.46 Echo Noise Level Adjustment [RADAR][ECDIS] 4-173
4.47 TT (Target Tracking) Function Adjustment (RADAR Screen Only) [RADAR] 4-174
What is quantization level? 4-174
4.48 Adjusting MBS [RADAR][ECDIS] 4-180
4.49 Setting Cable Attenuation [ALL] 4-182
Determining the attenuation correction level 4-183
4.50 Verifying Storage [ALL] 4-184
4.51 RADAR Adjustment (RADAR Screen Only) [RADAR] 4-185
Displaying the [RADAR] dialog 4-185
Changing the operation mode of the safety switch 4-186
Clearing a radar antenna operation time 4-186
Clearing the total transmission time of a radar antenna 4-186
Clearing the total motor rotation time of a radar antenna 4-186
Clearing the total fan rotation time of a radar antenna 4-186
Replacing a TXRX circuit of a radar antenna 4-186
Acquiring the data of the total transmission time, total motor rotation time, and total fan rotation time from the radar antenna 4-186
Saving the data of the total transmission time, total motor rotation time, and total fan rotation time in the radar antenna 4-187
Replacing a TXRX circuit 4-187
4.52 Operating Time Setup [ALL] 4-188
Entering an operating time of the work station 4-189
Clearing the time that is currently displayed 4-189
Changing UPS installation date and time 4-189
Changing the UPS replacement time 4-190
4.53 Initialization [ALL] 4-191
Displaying the [Initialization] dialog 4-191
Initializing the settings other than the Service menu 4-192
Initializing the setting of the Service menu 4-192
4.54 Backup of Data [ALL] 4-194
Creating backup data 4-194
4.55 List of Common Setting Items [ALL] 4-196
4.56 SYNC Manually 4-197
4.57 Update procedure for CONNING ini file [CONNING] 4-198

4.58 Password List [ALL] 4-211
4.59 INS Initial Settings [ALL] 4-212
Settings of functions for supporting INS linking 4-212
Settings for devices required during INS linking 4-213
4.59.1 INS configuration 4-214
System components 4-217
Interface with alert management system 4-219
INS power supply conditions 4-220
INS power supply configuration 4-222
Example of power supply configuration for minimum system 4-224
Example of power supply configuration for maximum system 4-225
INS LAN cable conditions 4-226
4.59.2 Synchronization of the INS Service Menu [ALL] 4-227
4.59.3 Setting CCRP [RADAR] [ECDIS] 4-228
Displaying the [CCRP] dialog 4-228
Setting the measurement reference position of Log1/Log2 4-229
4.59.4 Subsystem Installation [ALL] 4-230
About the Dimmer Sensor 4-231
4.59.5 Serial Port Settings [ALL] 4-232
Illumination colors of the [Diagnosis] lamp 4-232
Settings of serial ports for the dimmer sensor (Dimmer) 4-233
Selection of the communication line to be monitored 4-233
Setting alert handling of the [Detail] dialog 4-234
4.59.6 System function Settings [ALL] 4-237
4.59.7 A/D Settings [ALL] 4-243
4.59.8 Data Output Settings [RADAR][ECDIS] 4-245
To select the TTM sentence output channel 4-245
To execute alert output test 4-246
Alerts allowing test output 4-246
4.59.9 Network Settings [ALL] 4-248
To check the devices currently subjected to chart synchronization 4-248
To change the devices subjected to chart synchronization 4-249
To select whether or not to synchronize charts when newly registering device information 4-249
To enter preset values 4-250
When 10 units are already set up as chart synchronization target units 4-251
When the own task station is any one of No.1 ECDIS to No.4 ECDIS 4-251
4.59.10 Redundancy Settings [ALL] 4-252
To set the priority of the path to receive the gyro sensor 4-252
To make the enable/disable setting for INS linking 4-253
To set up the main server and the sub server 4-253
About Transfer of TCS Right 4-253
4.59.11 Settings of Ship's Parameters [ALL] 4-254

4.59.12 Alert Settings [ALL] 4-255
4.59.13 INS Settings [ALL] 4-256
To display the [INS] dialog 4-256
To specify behavior when INS linking stops 4-256
4.59.14 Sensor Selection and Automatic Switching Function 4-257
4.59.15 Setting of Integrity Check 4-262
4.59.16 Connection Setting of RPS 4-263

5 Option Unit 5-1

5.1 Installation of Interswitch Unit 5-1
5.1.1 End processing of Interswitch cable (2695111153/2695111162) 5-1
5.1.2 Installation of Interswitch Unit 5-2
5.1.3 NQE-3141-4A Inter-board connection diagram 5-4
5.1.4 Outline drawings of NQE-3141-4A/8A interswitch 5-5
5.1.5 Settings of Interswitch 5-7
5.1.6 Confirmation after installation 5-12
5.2 Installation of Power Control Unit 5-13
5.2.1 Connection with NKE-2103 and NKE-2254-6HS radar antennas 5-13
5.2.2 Connections to NKE-1125/A, NTG-3225/A, NKE-1130/A, NTG-3230/A, NKE-1632/A, NKE-2632/A, NKE-1696, NKE-1129/A and NKE-1139/A 5-15
5.2.3 End processing of 2695110056 cable 5-15
5.2.4 End processing of each 2695110056 cable core 5-15
5.2.5 Connection to display unit 5-16
5.2.6 Outline Drawing of NQE-3167 Power Control Unit 5-17
5.2.7 Inter –board connection diagram of power control unit 5-19
5.2.7.1 Inter-board connection diagram of JMR-9230-S3, JMR-7230-S3 5-19
5.2.7.2 Inter-board connection diagram of JMR-9230-S, JMR-7230-S 5-20
5.2.7.3 Inter-board connection diagram of JMR-9272-S, JMR-7272-S 5-21
5.2.7.4 Inter-board connection diagram of JMR-9282-S/SH, JMR-7282-S/SH 5-22
5.2.7.5 Inter-board connection diagram of JMR-9225-7X3/9X3, JMR-7225-7X3/9X3 5-23
5.2.7.6 Inter-board connection diagram of JMR-9225-6X/9X, JMR-7225-6X/9X 5-24
5.2.7.7 Inter-board connection diagram of JMR-9225-6XH, JMR-7225-6XH 5-25
5.2.7.8 Inter-board connection diagram of JMR-9210-6X/6XH, JMR-7210-6X/6XH 5-26
5.2.7.9 Inter-board connection diagram of JMR-9296-6X/9X, JMR-7296-6X/9X 5-27
5.3 Connection of VDR 5-28
5.3.1 Connection with LAN (IEC61162-450) 5-28
5.3.2 Connection with Analog RGB 5-28
5.3.2.1 VDR I/F kit 5-29
5.4 Printer 5-30
5.4.1 Printer Composition 5-30
5.4.2 Printer Assembly 5-31
5.4.3 Setting Printer 5-32
5.4.3.1 Connecting Power Cable and Printer LAN Cable 5-32

5.4.3.2 Confirming Printer IP Address 5-33
5.4.3.3 Setting Printer IP Address 5-34
5.4.4 Equipment setup 5-41
5.4.5 Confirming Printing Operation 5-43
5.5 Connecting managed Ethernet switches 5-50
5.5.1 Setting managed Ethernet switches 5-50
5.5.1.1 Installation 5-53
5.5.1.2 Removal 5-53
5.5.1.3 Cabling the power supply 5-54
5.5.2 Setting managed Ethernet switches 5-54
5.5.2.1 Setting IP addresses of managed Ethernet switches 5-54
5.5.2.2 Setting loop protection of managed Ethernet switches 5-60
5.5.2.3 Setting managed Ethernet switch system events 5-61

6 Appendix 6-1

6.1 Outline Drawing 6-1
6.1.1 Outline Drawings of Radar Antenna NKE-1139/A 6-1
6.1.2 Outline Drawings of Radar Antenna NKE-1130/A 6-2
6.1.3 Outline Drawings of Radar Antenna NKE-1129/A-7 6-3
6.1.4 Outline Drawings of Radar Antenna NKE-1129/A-9 6-4
6.1.5 Outline Drawings of Radar Antenna NKE-1125/A-6 6-5
6.1.6 Outline Drawings of Radar Antenna NKE-1125/A-9 6-6
6.1.7 Outline Drawings of Transmitter-Receiver NTG-3230/A 6-7
6.1.8 Outline Drawings of Transmitter-Receiver NTG-3225/A 6-8
6.1.9 Outline Drawings of Radar Antenna NKE-2254-6HS 6-9
6.1.10 Outline Drawings of Radar Antenna NKE-2103-6/NKE-2103-6HS 6-10
6.1.11 Outline Drawings of Radar Antenna NKE-1632/A 6-11
6.1.12 Outline Drawings of Radar Antenna NKE-2632/A 6-12
6.1.13 Outline Drawings of Radar Antenna NKE-2632-H 6-13
6.1.14 Outline Drawings of Radar Antenna NKE-1696-6 6-14
6.1.15 Outline Drawings of Radar Antenna NKE-1696-9 6-15
6.1.16 Outline Drawings of NWZ-208 26inch Monitor Unit 6-16
6.1.17 Outline Drawings of NWZ-233 27inch Monitor Unit 6-17
6.1.18 Outline Drawings of NWZ-233 27inch Monitor Unit(with Adapter) 6-18
6.1.19 Outline Drawings of NWZ-207 19inch Monitor Unit 6-19
6.1.20 Outline Drawings of NWZ-214 19inch Monitor Unit 6-20
6.1.21 Outline Drawings of NCE-5605 Trackball Operation Unit 6-21
6.1.22 Outline Drawings of NCE-5625 Keyboard Operation Unit 6-22
6.1.23 Outline Drawings of CWB-1593 Large Tray 6-23
6.1.24 Outline Drawings of NDC-1590/A Central Control Unit 6-24
6.1.25 Outline Drawings of NBD-913 Power Supply Unit 6-25
6.1.26 Outline Drawings of NQE-1143 Junction Box 6-26
6.1.27 Outline Drawings of NQA-2443/A Sensor LAN Switch Unit 6-27

6.1.28 Outline Drawing of CWA-246 26inch Display Unit Mount Kit 6-29
6.1.29 Outline Drawing of CWA-246 27inch Display Unit Mount Kit 6-30
6.1.30 Outline Drawings of CWA-245 19inch Display Unit Mount Kit 6-31
6.1.31 Outline Drawings of CWB-1595 26inch Desktop Frame 6-32
6.1.32 Outline Drawings of CWB-1595 27inch Desktop Frame 6-33
6.1.33 Outline Drawings of CWB-1660 26inch Desktop Frame 6-34
6.1.34 Outline Drawings of CWB-1660 27inch Desktop Frame 6-35
6.1.35 Outline Drawings of CWB-1594 19inch Desktop Frame 6-36
6.1.36 Outline Drawings of CWB-1659 19inch Desktop Frame 6-37
6.1.37 Outline Drawings of CWB-1596 OPU Desktop Frame 6-38
6.1.38 Outline Drawings of 7HPN4004 Printer 6-39
6.2 General System Diagram of Standalone Type 6-40
6.2.1 JMR-9210-6X 6-40
6.2.2 JMR-9210-6XH 6-41
6.2.3 JMR-9225-6X 6-42
6.2.4 JMR-9225-6XH 6-43
6.2.5 JMR-9225-9X 6-44
6.2.6 JMR-9225-7X3 6-45
6.2.7 JMR-9225-9X3 6-46
6.2.8 JMR-9230-S 6-47
6.2.9 JMR-9230-S3 6-48
6.2.10 JMR-9272-S 6-49
6.2.11 JMR-9282-S 6-50
6.2.12 JMR-9282-SH 6-51
6.2.13 JMR-9296-6X 6-52
6.2.14 JMR-9296-6X 6-53
6.2.15 JAN-9201 6-54
6.2.16 JAN-9202 6-55
6.2.17 JMR-7210-6X 6-56
6.2.18 JMR-7210-6XH 6-57
6.2.19 JMR-7225-6X 6-58
6.2.20 JMR-7225-6XH 6-59
6.2.21 JMR-7225-9X 6-60
6.2.22 JMR-7225-7X3 6-61
6.2.23 JMR-7225-9X3 6-62
6.2.24 JMR-7230-S 6-63
6.2.25 JMR-7230-S3 6-64
6.2.26 JMR-7272-S 6-65
6.2.27 JMR-7282-S 6-66
6.2.28 JMR-7282-SH 6-67
6.2.29 JMR-7296-6X 6-68
6.2.30 JMR-7296-9X 6-69
6.2.31 JAN-7201 6-70

6.2.32 JAN-7202 6-71
6.3 General System Diagram of Desktop Type 6-72
6.3.1 JMR-9210-6X 6-72
6.3.2 JMR-9210-6XH 6-73
6.3.3 JMR-9225-6X 6-74
6.3.4 JMR-9225-6XH 6-75
6.3.5 JMR-9225-9X 6-76
6.3.6 JMR-9225-7X3 6-77
6.3.7 JMR-9225-9X3 6-78
6.3.8 JMR-9230-S 6-79
6.3.9 JMR-9230-S3 6-80
6.3.10 JMR-9272-S 6-81
6.3.11 JMR-9282-S 6-82
6.3.12 JMR-9282-SH 6-83
6.3.13 JMR-9296-6X 6-84
6.3.14 JMR-9296-9X 6-85
6.3.15 JAN-9201 6-86
6.3.16 JAN-9202 6-87
6.3.17 JMR-7210-6X 6-88
6.3.18 JMR-7210-6XH 6-89
6.3.19 JMR-7225-6X 6-90
6.3.20 JMR-7225-6XH 6-91
6.3.21 JMR-7225-9X 6-92
6.3.22 JMR-7225-7X3 6-93
6.3.23 JMR-7225-9X3 6-94
6.3.24 JMR-7230-S 6-95
6.3.25 JMR-7230-S3 6-96
6.3.26 JMR-7272-S 6-97
6.3.27 JMR-7282-S 6-98
6.3.28 JMR-7282-SH 6-99
6.3.29 JMR-7296-6X 6-100
6.3.30 JMR-7296-9X 6-101
6.3.31 JAN-7201 6-102
6.3.32 JAN-7202 6-103
6.4 Interconnection Diagram of Standalone Type 6-104
6.4.1 JMR-9210-6X/6XH 6-104
6.4.2 JMR-9225-6X/9X 6-106
6.4.3 JMR-9225-6XH 6-108
6.4.4 JMR-9225-7X3/9X3 6-110
6.4.5 JMR-9230-S 6-112
6.4.6 JMR-9230-S3 6-114
6.4.7 JMR-9272-S 6-116
6.4.8 JMR-9282-S/SH 6-118

6.4.9 JMR-9296-6X/9X 6-120
6.4.10 JAN-9201 6-122
6.4.11 JAN-9202 6-124
6.4.12 JMR-7210-6X/6XH 6-126
6.4.13 JMR-7225-6X/9X 6-128
6.4.14 JMR-7225-6XH 6-130
6.4.15 JMR-7225-7X3/9X3 6-132
6.4.16 JMR-7230-S 6-134
6.4.17 JMR-7230-S3 6-136
6.4.18 JMR-7272-S 6-138
6.4.19 JMR-7282-S/SH 6-140
6.4.20 JMR-7296-6X/9X 6-142
6.4.21 JAN-7201 6-144
6.5 Interconnection Diagram of Desktop Type 6-148
6.5.1 JMR-9210-6X/6XH 6-148
6.5.2 JMR-9225-6X/9X 6-150
6.5.3 JMR-9225-6XH 6-152
6.5.4 JMR-9225-7X3/9X3 6-154
6.5.5 JMR-9230-S 6-156
6.5.6 JMR-9230-S3 6-158
6.5.7 JMR-9272-S 6-160
6.5.8 JMR-9282-S/SH 6-162
6.5.9 JMR-9296-6X/9X 6-164
6.5.10 JAN-9201 6-166
6.5.11 JAN-9202 6-168
6.5.12 JMR-7210-6X/6XH 6-170
6.5.13 JMR-7225-6X/9X 6-172
6.5.14 JMR-7225-6XH 6-174
6.5.15 JMR-7225-7X3/9X3 6-176
6.5.16 JMR-7230-S 6-178
6.5.17 JMR-7230-S3 6-180
6.5.18 JMR-7272-S 6-182
6.5.19 JMR-7282-S/SH 6-184
6.5.20 JMR-7296-6X/9X 6-186
6.5.21 JAN-7201 6-188
6.5.22 JAN-7202 6-190
6.6 Radar Antenna Interconnection Diagram 6-192
6.6.1 NKE-1139 (AC110V) 6-192
6.6.2 NKE-1139 (AC220V) 6-193
6.6.3 NKE-1139A(AC110/220V) 6-194
6.6.4 NTG-3230 6-195
6.6.5 NTG-3230A 6-196
6.6.6 NKE-1130 (AC110V) 6-197

6.6.7 NKE-1130 (AC220V) 6-198
6.6.8 NKE-1130A (AC110/220V) 6-199
6.6.9 NKE-1129 (AC110V) 6-200
6.6.10 NKE-1129 (AC220V) 6-201
6.6.11 NKE-1129A(AC110/220V) 6-202
6.6.12 NTG-3225 6-203
6.6.13 NTG-3225A 6-204
6.6.14 NKE-1125 (AC110V) 6-205
6.6.15 NKE-1125 (AC220V) 6-206
6.6.16 NKE-1125A (AC110/220V) 6-207
6.6.17 NKE-2254-6HS 6-208
6.6.18 NKE-2103-6/6HS 6-209
6.6.19 NKE-1632 6-210
6.6.20 NKE-1632A(AC100V) 6-211
6.6.21 NKE-1632A(AC220V) 6-212
6.6.22 NKE-2632/2632-H 6-213
6.6.23 NKE-2632A(AC100V) 6-214
6.6.24 NKE-2632 A(AC220V) 6-215
6.6.25 NKE-1696 6-216
6.7 External Input/Output Sentence Format 6-217
6.7.1 Receivable signals 6-217
6.7.1.1 Ship Heading 6-217
6.7.1.2 Ship Heading correction report 6-217
6.7.1.3 Course 6-218
6.7.1.4 Geodetic positioning system 6-219
6.7.1.5 Date information 6-220
6.7.1.6 COG/SOG 6-221
6.7.1.7 Ship speed through water 6-222
6.7.1.8 Turning speed 6-222
6.7.1.9 Water depth 6-223
6.7.1.10 Wind direction/wind speed 6-223
6.7.1.11 Air temperature 6-224
6.7.1.12 Water temperature 6-224
6.7.1.13 Atmospheric pressure 6-225
6.7.1.14 Humidity 6-226
6.7.1.15 AIS 6-226
6.7.1.16 Alert 6-227
6.7.1.17 Navtex 6-229
6.7.1.18 Water current 6-229
6.7.1.19 Report route transfer 6-230
6.7.1.20 RADAR system data 6-230
6.7.1.21 Own ship data 6-230
6.7.1.22 TT data, AIS target data 6-231

6.7.1.23 Remote control data 6-232
6.7.1.24 Autopilot 6-232
6.7.1.25 Engine (propeller) revolution 6-233
6.7.1.26 Engine telegraph 6-233
6.7.1.27 Rudder angle 6-234
6.7.1.28 Azimuth thruster 6-235
6.7.2 Transmittable signals 6-236
6.7.2.1 Report route transfer 6-236
6.7.2.2 RADAR system data 6-236
6.7.2.3 Own ship data 6-236
6.7.2.4 Watch timer reset 6-236
6.7.2.5 TT data, AIS target data 6-236
6.7.2.6 AIS remote control data 6-236
6.7.2.7 Remote control data 6-237
6.7.2.8 Alert 6-237
6.7.2.9 Navtex 6-238
6.7.2.10 Autopilot 6-238
6.7.2.11 System function ID resolution protocol 6-240
6.7.2.12 Sentences that can be output by Data Output 6-240
6.8 Setting for the Route Transfer by LAN CONnection with the GPS 6-249
6.8.1 How to set the IP address of GPS 6-249
6.8.2 Setting of the LAN for GPS 6-250
6.9 Route Sharing Method among the Devices 6-252
6.10 Specification of Alert Communication with BNWAS 6-255
6.10.1 System Block Diagram 6-255
6.10.1.1 Connection Diagram 6-255
6.10.1.2 Function Diagram 6-255
6.10.2 Mechanism 6-257
6.10.2.1 BNWAS status 6-257
6.10.2.2 Watch alarm 6-258
6.10.2.3 Alarm transfer 6-259
6.10.2.4 Harbor mode function On / Off 6-263
6.10.3 Sentences 6-264
6.10.3.1 Talker ID 6-264
6.10.3.2 ACK sentence 6-264
6.10.3.3 ALR sentence 6-265
6.10.3.4 No-alert message 6-267
6.10.3.5 Back-up navigator call 6-267
6.10.3.6 Buzzer off request 6-267
6.10.3.7 Dormant period report 6-268
6.10.3.8 EVE sentence 6-268
6.10.3.9 HBT sentence 6-269
6.11 Special instruction for DNVGL class notation NAUT(AW) 6-270

6.11.1 Requirement of NAUT(AW) 6-270
6.11.1.1 TCS 6-270
6.11.1.2 CONNING 6-270
6.11.2 System Block Diagram 6-271
6.11.3 Setting 6-272
6.11.3.1 Subsystem Installation 6-272
6.11.3.2 Serial Port 6-275
6.11.3.3 System Function 6-282
6.11.3.4 Network 6-283
6.11.3.5 Redundancy 6-285
6.11.3.6 Autosail 6-285
6.11.4 Conning information display – NAUT(AW) 6-286
6.12 Troubleshooting 6-287
6.13 INS Bootup procedure after CCU/SSD Exchange 6-301
6.14 Maintenance INFO 6-303
6.14.1 Screen items/fields and their function 6-303
6.14.2 Switching to the standard window or the expanded window 6-306
6.14.3 Exporting maintenance information 6-308
6.15 Alert List 6-309

1 Overview

1.1 Functions

1.1.1 IMO Performance Standards

Marine radar equipment, ECDIS, and conning display are the navigation systems that satisfy the following IMO performance standards.

1.1.1.1 Marine radar equipment

- IMO Resolution MSC192: Radar performance standard
- IMO Resolution MSC191: Navigation information display
- IMO Resolution A.694(17): General requirements for marine radio facilities
- IMO Resolution MSC(87): Adoption of performance standards for bridge alert management

1.1.1.2 ECDIS

- IMO Resolution MSC232: ECDIS performance standard
- IMO Resolution MSC191: Navigation information display
- IMO Resolution MSC74 Annex2: TCS performance standard*1
- IMO Resolution A.694(17): General requirements for marine radio facilities
- IMO Resolution MSC(87): Adoption of performance standards for bridge alert management

*1: Case where the Track Control System (TCS) function is added as an option

1.1.1.3 Conning display

- IMO Resolution MSC191: Navigation information display
- IMO Resolution A.694(17): General requirements for marine radio facilities
- IMO Resolution MSC302: Bridge alert management*2

*2: Case where the Alert Management System (AMS) function is added as an option

1.1.2 Multifunction display

The equipment can also be used as a multifunction display (MFD) by adding, as options, the following task functions to the marine radar equipment, ECDIS, or conning display.

- RADAR
- ECDIS
- Conning Display

When the integrated navigation system (INS) is constructed, MFD shall have functions of RADAR, ECDIS, Conning Display, and AMS.

1.1.3 Integrated Navigation System

By connecting multiple MFD units, an integrated navigation system (INS) that satisfies the following IMO performance standards can be constructed.

- IMO Resolution MSC252: Performance standard for the integrated navigation system (INS)

INS shall be installed in compliance with SOLAS V.
INS installation shall comply with the following rules:

- IMO SOLAS regulation V/15: Bridge design, the design and layout of a navigation system and navigation equipment, and principles relating to the bridge operation procedure
- MSC/Circ.982: Guideline of the human engineering standard relating to the bridge equipment and its layout
- Sn.1/Circ.265: Guideline for applying SOLAS regulation V/15 to INS, IBS, and bridge design
- SN.1/Circ.288: Guideline relating to bridge equipment and system (BES) and their layout and integration

1.1.4 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 (Interswitch) 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

1.1.5 Main Functions of the 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 (when ECDIS is used with the optional radar interface board)
- True/Relative motion display
- North-up/Course-up/Head-up/Waypoint-up
- Display of route information such as latitude/longitude at destinations, bearings/ranges up to way-points, 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

Memo
This manual describes how to install various units of the equipment and their initial settings. For how to use the functions of RADAR, ECDIS, and CONNING, refer to the appropriate instruction manuals.

1.2 Features

This equipment 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 and 27inch color LCD of 1920x1080 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 with the latest digital signal processing technology, the target detection capability is ameliorated.

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 independent from the display unit and cable for connecting each display unit are necessary.

Up to 8 units: An interswitch unit independent from the display unit and cable for connecting each display unit 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 autopilot (option).
- The playback function enables checking of the sailed routes.
- The S-57 chart can be updated. (Chart Maintenance)

1.3 Components

A list of components and optional accessories is shown below.

Components of the Display Unit

Unit			Type name	Q'ty	Remarks
LCD monitor		(JMR-92XX/JAN-92XX)	NWZ-208	1	26inch LCD monitor
			NWZ-233		27inch 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	-	1	
		ME-MAX-NEF/QUINT20	-	1	
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		

Components of the Display Unit

Unit		Type name	Q'ty	Remarks
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	26/27inch Display Mount Kit	CWA-246	1	For 26/27inch 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 distribution
	Touch Panel Interconnection	CML-839	1	Option
Desktop type Frame & Cables	26/27inch Desktop Frame	CWB-1595	1	For 26/27inch Monitor
		CWB-1660		
	19inch Desktop Frame	CWB-1594		For 19inch Monitor
		CWB-1659		
	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(For NWZ-208)
		CWB-2718		Option(For NWZ-233)
	(JMR-72XX/JAN-72XX)	CWB-1618		Option
Accessory	CD Cleaner	7ZZNA0426C	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	

Manual list

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 PT500A TCS model Category C *English	7ZPNA4462*1	Option
	JAN-7201/9201 ECDIS Additional Manual for Automatic Sailing TOKYO KEIKI Autopilot PR-6000/9000 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 YOKOGAWA 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.

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-1139/A	P0N	12	NTG-3230/A	30kW	S	AC	24rpm	CAT 1C
NKE-1130/A	P0N	12	-	30kW	S	AC	24rpm	CAT 1C
NKE-1632/A	P0N,Q0N	12	-	250W	S	AC	24rpm	CAT 1C
NKE-2632/A	P0N,Q0N	8	-	250W	S	AC	24rpm	CAT 1C
NKE-2632-H	P0N,Q0N	8	-	250W	S	AC	48rpm	CAT 1C
NKE-1129/A-7	P0N	7	NTG-3225/A	25kW	X	AC	24rpm	CAT 1C
NKE-1129/A-9	P0N	9	NTG-3225/A	25kW	X	AC	24rpm	CAT 1C
NKE-1125/A-6	P0N	6	-	25kW	X	AC	24rpm	CAT 1C
NKE-1125/A-9	P0N	9	-	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
NKE-1696-6	P0N,Q0N	6	-	600W	X	AC	24rpm	CAT 1C
NKE-1696-9	P0N,Q0N	9	-	600W	X	AC	24rpm	CAT 1C

List of General Type Names

General type name	Model	Radar antenna	Transmitter-receiver unit	Display	Ship's mains
JMR-9230-S3	RADAR/MFD	NKE-1139/A	NTG-3230/A	26inch NWZ-208 Or 27inch NWZ-233	100-115VAC 50/60Hz 1φ 220-240VAC 50/60Hz 1φ *Specify between the two when ordering. 24VDC (For backup)
JMR-9230-S		NKE-1130/A	-		
JMR-9272-S*		NKE-1632/A	-		
JMR-9282-S		NKE-2632/A	-		
JMR-9282-SH*		NKE-2632-H	-		
JMR-9225-7X3		NKE-1129/A-7	NTG-3225/A		
JMR-9225-9X3		NKE-1129/A-9	NTG-3225/A		
JMR-9225-6X		NKE-1125/A-6	-		
JMR-9225-9X		NKE-1125/A-9	-		
JMR-9296-6X		NKE-1696-6	-		
JMR-9296-9X		NKE-1696-9	-		
JMR-9225-6XH		NKE-2254-6HS	-		Wide range AC input 24VDC (For backup)
JMR-9210-6X		NKE-2103-6	-		
JMR-9210-6XH		NKE-2103-6HS	-		
JAN-9201	ECDIS	-	-		
JAN-9202	Conning	-	-		
JMR-7230-S3	RADAR/MFD	NKE-1139/A	NTG-3230/A	19inch NWZ-207 or NWZ-214	100-115VAC 50/60Hz 1φ 220-240VAC 50/60Hz 1φ *Specify between the two when ordering. 24VDC (For backup)
JMR-7230-S		NKE-1130/A	-		
JMR-7272-S		NKE-1632/A	-		
JMR-7282-S		NKE-2632/A	-		
JMR-7282-SH		NKE-2632-H	-		
JMR-7225-7X3		NKE-1129/A-7	NTG-3225/A		
JMR-7225-9X3		NKE-1129/A-9	NTG-3225/A		
JMR-7225-6X		NKE-1125/A-6	-		
JMR-7225-9X		NKE-1125/A-9	-		
JMR-7296-6X		NKE-1696-6	-		
JMR-7296-9X		NKE-1696-9	-		
JMR-7225-6XH		NKE-2254-6HS	-		Wide range AC input 24VDC (For backup)
JMR-7210-6X		NKE-2103-6	-		
JMR-7210-6XH		NKE-2103-6HS	-		
JAN-7201	ECDIS	-	-		
JAN-7202	Conning	-	-		

* JMR-9272-S and JMR-9282-S/SH are Solid State Radars.

* JMR-9296-6X/9X are X band Solid State Radars.

Option list of radar antenna

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

Note:

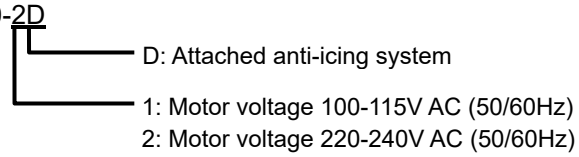
1. The drive motor for the radar antenna is available in 100-115VAC 50/60 Hz 1ϕ or 220-240VAC 50/60 Hz 1ϕ type for NKE-1632/A,2632/A,1139/A,1130/A,1129/A,1125/A,1696 series. Please specify the power source type when ordering.
2. The radar antenna can be equipped with anti-icing system (neck heater) as an option (not available for NKE-2103), and '-D' shall be suffixed to the type name ('-D' or '-E' shall be suffixed to NKE-1632/A, NKE-2632/A, and NKE-2632-H, and NKE-1696.)

   '-D' --- 100V AC (50/60Hz)
   '-E' --- 200V AC (50/60Hz)

Reference:

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

(Example) NKE-1130-2D



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:

Scanner Unit	SCANNER UNIT
Transmitter-receiver unit	TRANSMITTER-RECEIVER UNIT
Monitor Unit	MONITOR UNIT
Trackball operation unit	TRACKBALL OPERATION UNIT
Keyboard operation unit	KEYBOARD OPERATION UNIT
Central Control Unit	CENTRAL CONTROL UNIT
Power supply unit	POWER SUPPLY UNIT
Junction box	JUNCTION BOX
Sensor LAN switch unit	SENSOR LAN SWITCH UNIT
Display Unit Mount Kit	DISPLAY UNIT MOUNT KIT

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 Installation of Radar Antenna

2.1 Equipment Cable

2.1.1 CFQ-6912-**

This is a 19-core shielded composite cable.

The cable length is indicated in the asterisks ** area in the model name, and the available cable lengths are 5, 10, 20, 30, 40, 50, and 65 meters.

This cable is used to connect an NKE-2103 radar antenna or an NKE-2254 radar antenna to the display unit.

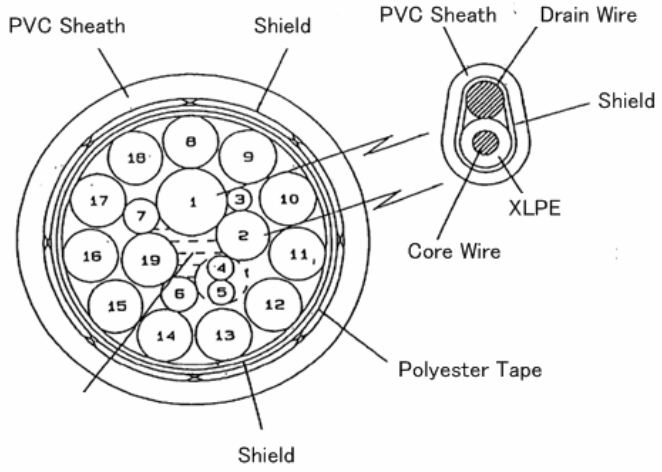


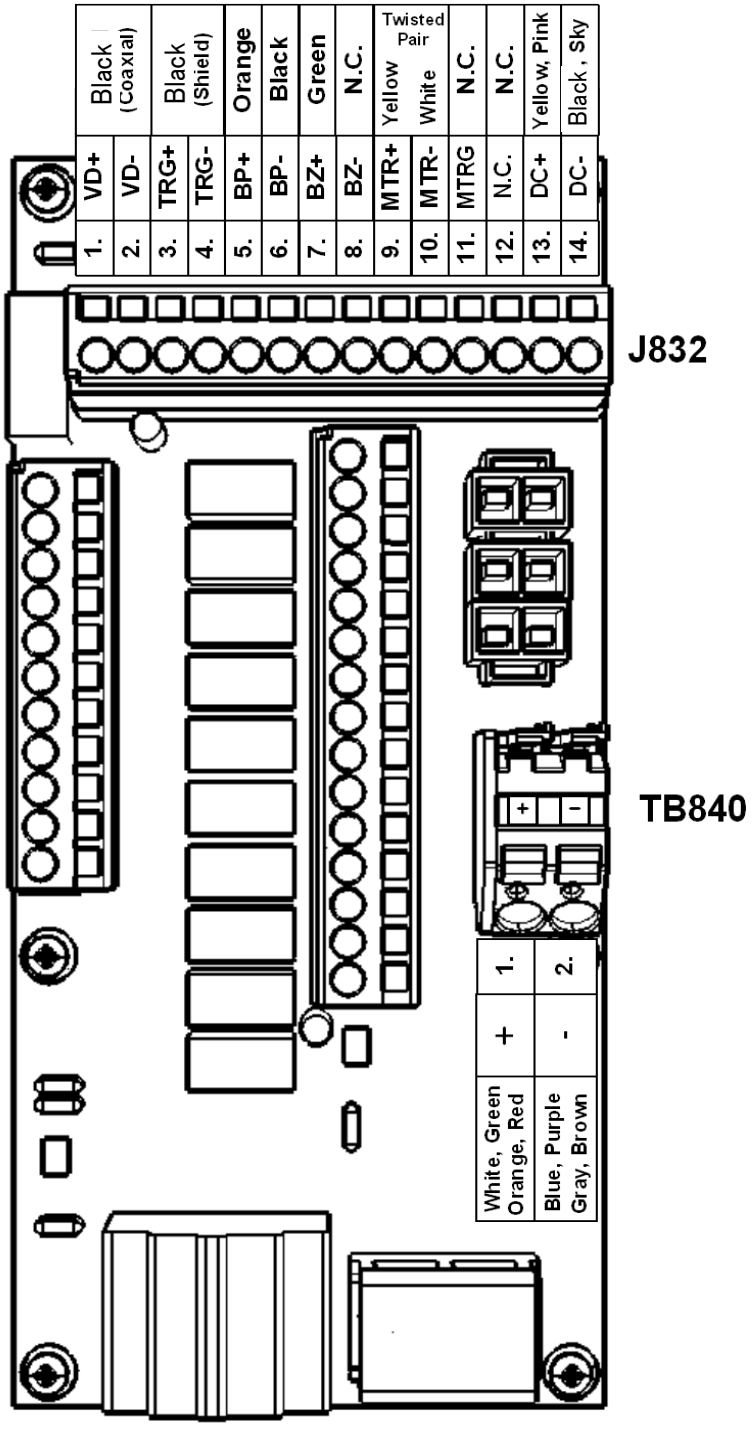
Fig 2-1 Cross-sectional drawing of CFQ-6912

Table 2-1 CFQ-6912 wire

Core (No.)	AWG	No. of Wire /φ	Color	Remarks	CQD-2273 Radar Interface Circuit	
1	AWG24	7/0.2T	Black	Coaxial	J832	Center Conductor: 1. VD+ Outer Conductor 2. VD-
2	AWG24	7/0.2T	Black	Shield	J832	3. TRG+ 4. TRG-
3	AWG24	7/0.2T	Green	Twisted Pair		7. BZ+
4	AWG24	7/0.2T	Yellow			9: MTR+
5	AWG24	7/0.2T	White			10: MTR-
6	AWG22	17/0.16T	Black			6. BP-
7	AWG22	17/0.16T	Orange			5. BP+
8	AWG16	50/0.18T	Blue		TB840	2. -
9	AWG16	50/0.18T	Gray			
10	AWG16	50/0.18T	Purple			
11	AWG16	50/0.18T	Brown			
12	AWG16	50/0.18T	White			1. +
13	AWG16	50/0.18T	Orange			
14	AWG16	50/0.18T	Red			
15	AWG16	50/0.18T	Green			
16	AWG16	50/0.18T	Yellow		J832	13. DC+
17	AWG16	50/0.18T	Black			14. DC-
18	AWG16	50/0.18T	Sky			
19	AWG16	50/0.18T	Pink			13. DC+

maximum diameter 14.5mm

Wire to the CQD-2273 RIF on the Display Unit as shown below. Please refer to the **Chapter 3 Installation of Display Unit** for more information.



CQD-2273 Radar Interface Circuit

2.1.2 2695110056

This is a 14-core shielded composite cable.

This cable is used to connect an NKE-1125/A radar antenna, an NKE-1130/A radar antenna, an NKE-1632/A radar antenna, an NKE-2632/A radar antenna, an NKE-1696 radar antenna, an NTG-3225/A transmitter-receiver or an NTG-3230/A transmitter-receiver to the display unit.

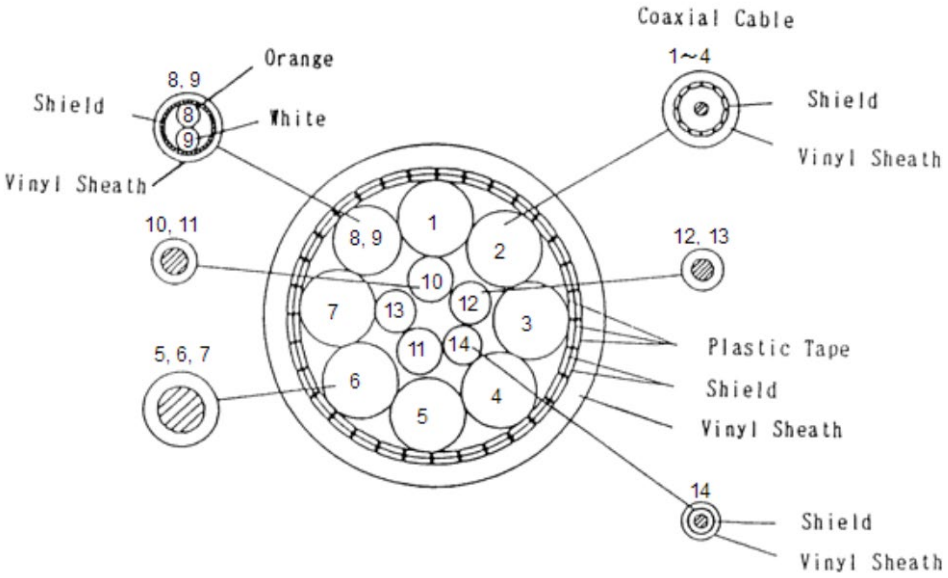


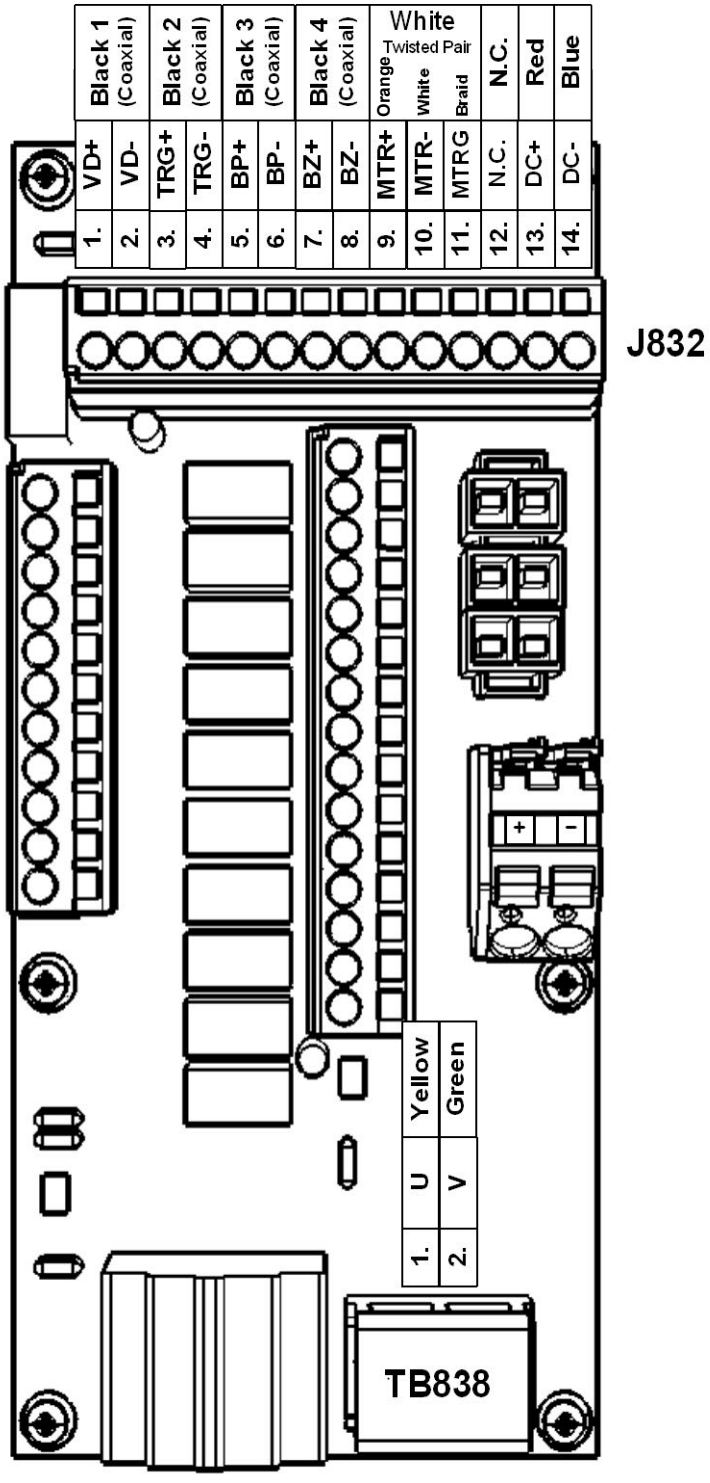
Fig 2-2 Cross-sectional drawing of 2695110056

Table 2-2 2695110056 wire

Core (No.)	Cross Section (mm^2)	No. of wire / φ	Color	Remarks	CQD-2273 Radar Interface Circuit	
1	0.5	19 / 0.18	Black 1	Coaxial Cable	J832	Center Conductor: 1. VD+ Outer Conductor: 2. VD-
2	0.5	19 / 0.18	Black 2	Coaxial Cable		Center Conductor: 3. TRG+ Outer Conductor: 4. TRG-
3	0.5	19 / 0.18	Black 3	Coaxial Cable		Center Conductor: 5. BP+ Outer Conductor: 6. BP-
4	0.5	19 / 0.18	Black 4	Coaxial Cable		Center Conductor: 7. BZ+ Outer Conductor : 8. BZ-
5	5.5	35 / 0.45	Yellow		TB838	1. U
6	5.5	35 / 0.45	Green			2. V
7	5.5	35 / 0.45	Brown		–	–
8	0.3	12 / 0.18	White	Twisted pair cable with Shield sheath white	J832	Orange : 9. MTR+ White: 10. MTR- Braid: 11.MTRG
9	0.3	12 / 0.18	Orange		–	-
10	2	37 / 0.26	Red		J832	13. DC+
11	2	37 / 0.26	Blue		J832	14. DC-
12	1.25	50 / 0.18	Black		–	–
13	1.25	50 / 0.18	Purple		–	–
14	0.5	1 / 0.18	Gray		–	–

maximum diameter 23.0mm

Wire to the CQD-2273 RIF on the Display Unit as shown below. Please refer to the **Chapter 3 Installation of Display Unit** for more information.



CQD-2273 Radar Interface Circuit

2.1.3 2695111162

This is an 18-core shielded composite cable. This cable is used to connect an interswitch to the display unit. After May 2016, the model name has changed. The old model name is 2695111153.

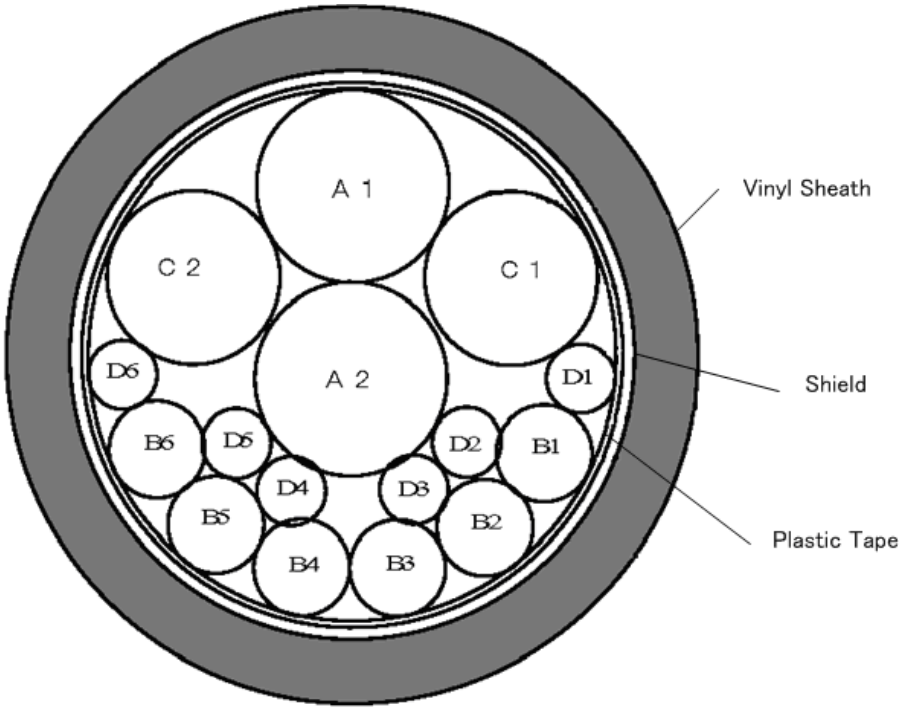


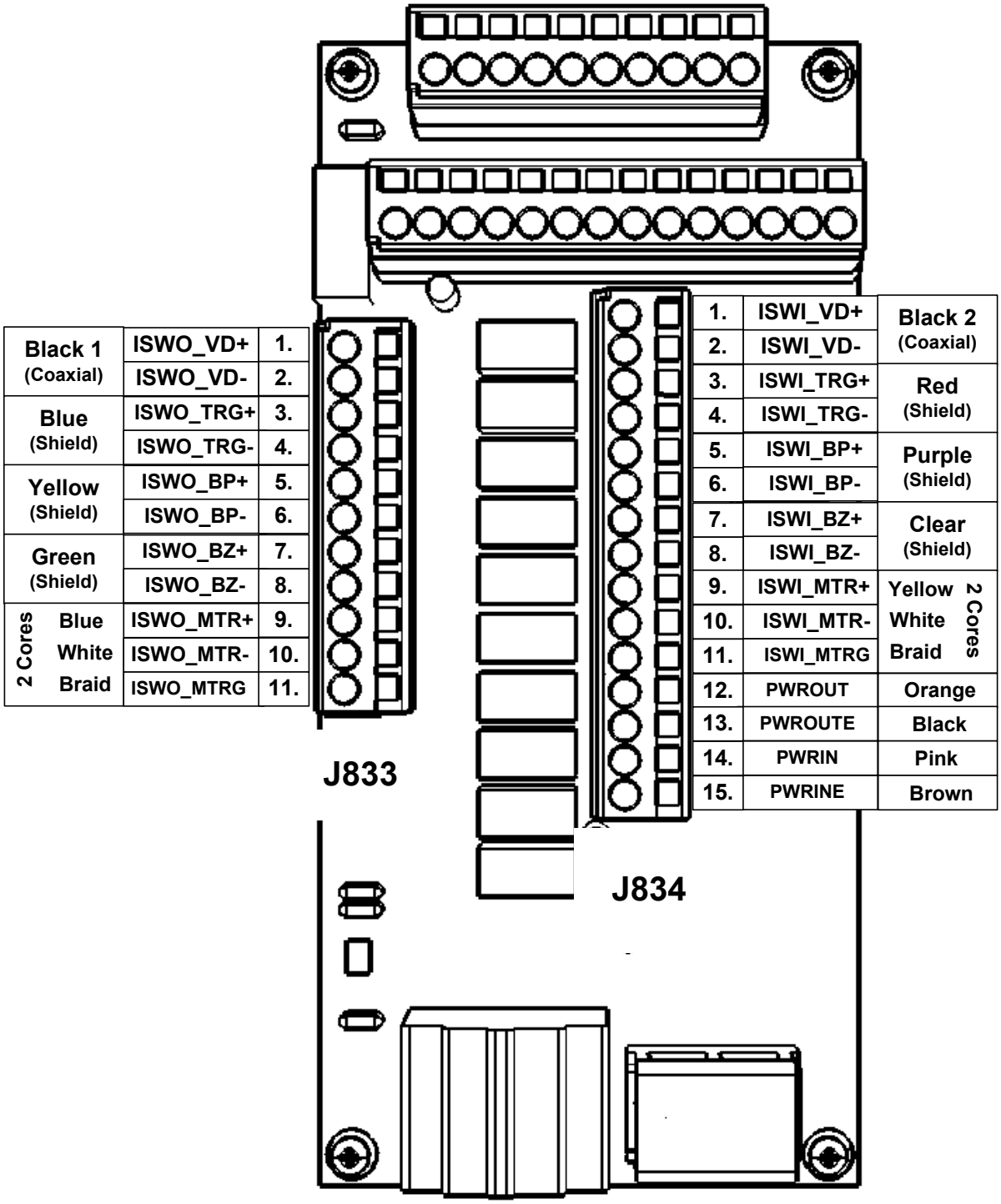
Fig 2-3 Cross-sectional drawing of 2695111162

Table 2-3 2695111162 wire

Wire NO.	Cross Section (mm²)	No. of wire / φ	Color	Remarks		CCD-2273 Radar Interface Circuit
A1	0.5	19 / 0.18	Black 1	Coaxial	J833	Center Conductor: 1. ISWO_VD+ Outer Conductor: 2. ISWO_VD-
A2	0.5	19 / 0.18	Black 2	Coaxial	J834	Center Conductor: 1. ISWI_VD+ Outer Conductor: 2. ISWI_VD-
B1	0.5	20 / 0.18	Blue	Shield	J833	Center Conductor: 3. ISWO_TRG+ Braid: 4. ISWO_TRG-
B2	0.5	20 / 0.18	Yellow	Shield		Center Conductor: 5. ISWO_BP+ Braid: 6. ISWO_BP-
B3	0.5	20 / 0.18	Green	Shield		Center Conductor: 7. ISWO_BZ+ Braid: 8. ISWO_BZ-
B4	0.5	20 / 0.18	Red	Shield	J834	Center Conductor: 3. ISWI_TRG+ Braid: 4. ISWI_TRG-
B5	0.5	20 / 0.18	Purple	Shield		Center Conductor: 5. ISWI_BP+ Braid: 6. ISWI_BP-
B6	0.5	20 / 0.18	Clear	Shield		Center Conductor: 7. ISWI_BZ+ Braid: 8. ISWI_BZ-
C1	0.3	12 / 0.18	Blue	2 Cores Shield	J833	9. ISWO_MTR+
	0.3		White			10. ISWO_MTR-
	–		Braid			11. ISWO_MTRG
C2	0.3	12 / 0.18	Yellow	2 Cores Shield	J834	9. ISWI_MTR+
	0.3		White			10. ISWI_MTR-
	–		Braid			11. ISWI_MTRG
D1	0.5	20 / 0.18	Brown			15. PWRINE
D2	0.5	20 / 0.18	Black			13. PWROUTE
D3	0.5	20 / 0.18	Orange			12. PWROUT
D4	0.5	20 / 0.18	Gray		–	–
D5	0.5	20 / 0.18	Pink		J834	14. PWRIN
D6	0.5	20 / 0.18	SkyBlue		–	–

maximum diameter 18.0mm

Wire to the CQD-2273 RIF on the Display Unit as shown below. Please refer to the **3 Installation of Display Unit** for more information.



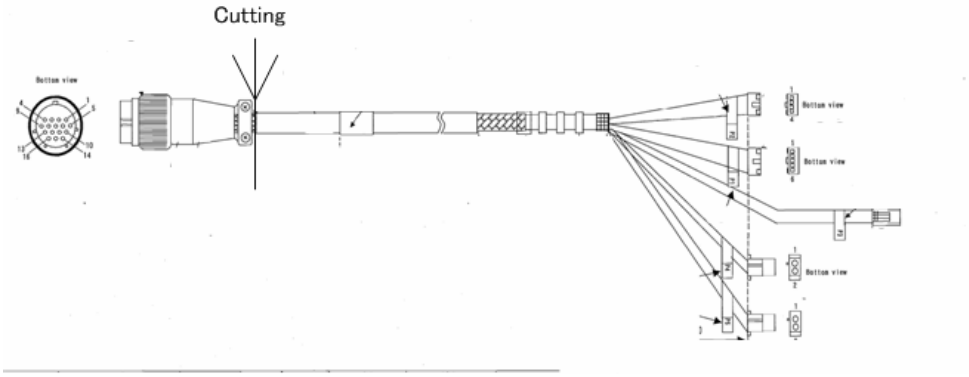
CQD-2273 Radar Interface Circuit

2.1.4 Cable end processing method

Allow for sufficient cable length so that maintenance, inspection, and repair work can be easily executed. Ensure a place to store the cable.

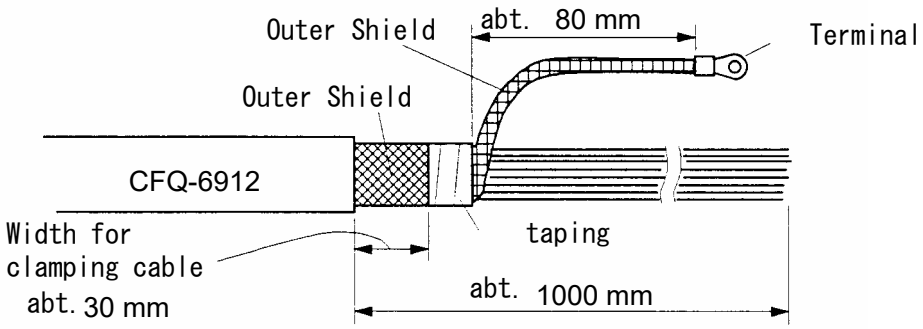
1) CFQ-6912

Cut off the metal shell connector.



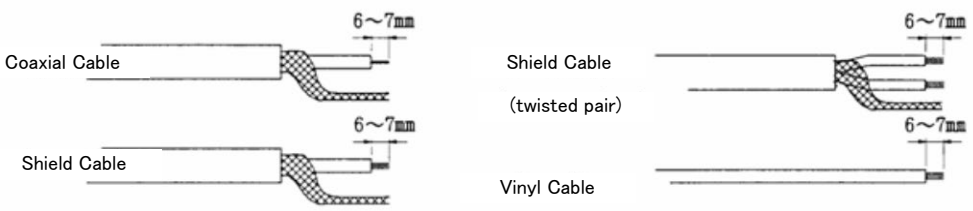
CFQ-6912 Cutting position

Remove about one meter of the outer skin, and then process the double braided shield according to the procedures shown below.



CFQ-6912 Processing of braided shield

Process each cable end according to the procedures shown below.



CFQ-6912

End processing of each wire

Twist each pair of the following colored wires and clamp them to the crimp pin terminal. (V5.5 is recommended.)

- RED.T/GRN.T → + terminal
- WHT.T/ORN.T → + terminal
- PUR.T/BRN.T → - terminal
- BLU.T/GRY.T → - terminal

After that, insert each crimp pin terminal into TB840 of CQD-2273 RIF according to the procedures shown below. (A flat head screwdriver is required.)

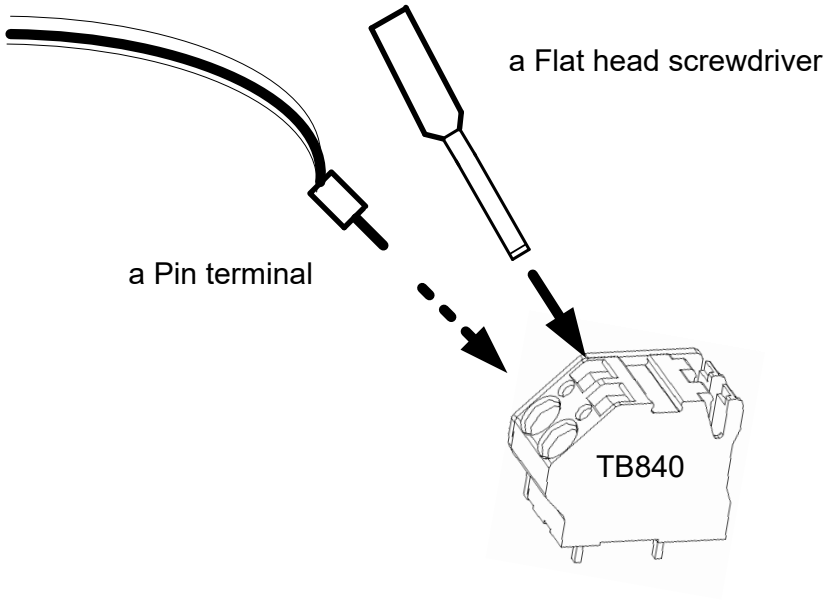
● How to insert the pin terminals into TB840:

(i) Insert your flat head screwdriver into the upper slot.

The cable slot (lower slot) will open.

(ii) Insert the crimp pin terminal into the cable slot (lower slot).

(iii) Pull out your flat head screwdriver and the pin terminal will be fixed.

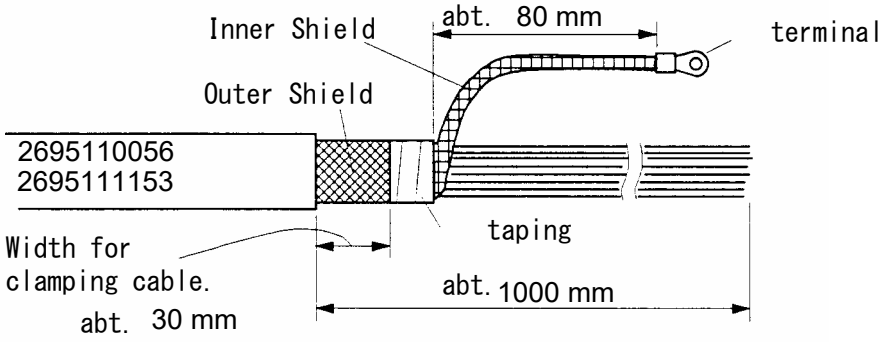


Twist each pair of the following colored wires and connect them to the J832 of CQD-2273 RIF.

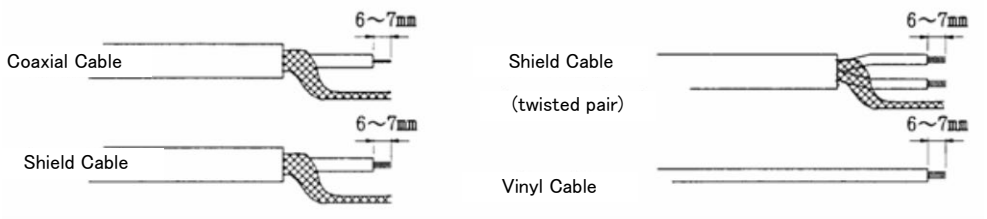
- YEL.T/PNK.T → J832(DC+)
- BLK.T/SKY.T → J832(DC-)

2) 2695110056, 2695111153, 2695111162

Remove about one meter of the outer skin, and then process the double braided shield according to the procedures shown below.



Processing of braided shield (269511056, 2695111153, 2695111162)

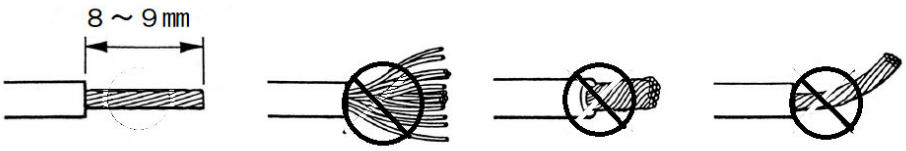


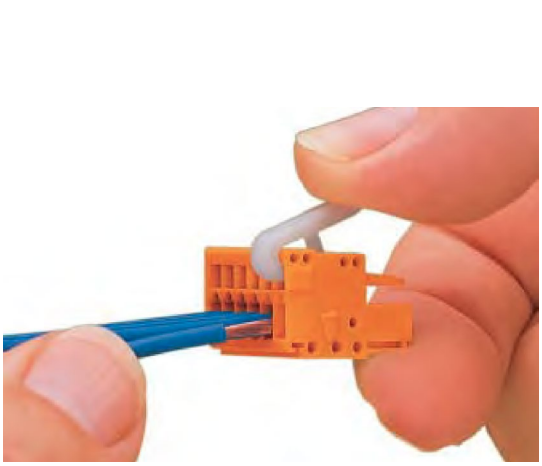
End processing of each wire (269511056, 2695111153, 2695111162)

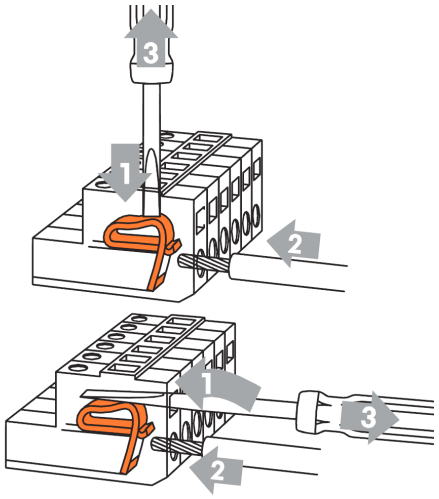
2.1.5 Connection to the display-unit side terminal block

The terminal blocks of the junction box are pluggable type connectors. Connection procedures are described below.

1) Open the cable inlet with the attached lever or a flat head screw driver.
2) Remove 8 to 9 mm of insulation. Check the removal length and disarrayed portion, etc., and then insert the wire until the end comes in contact.
3) Release the tool from the terminal block and tighten the cable.
4) After the cable has been connected, gently tug at the cable to ensure that it is securely fastened.







Terminal block connection method

In order to connect the AC power lines that are Green and Yellow wires of 2695110056 to the NQE-1443 JB, Faston terminals are required.

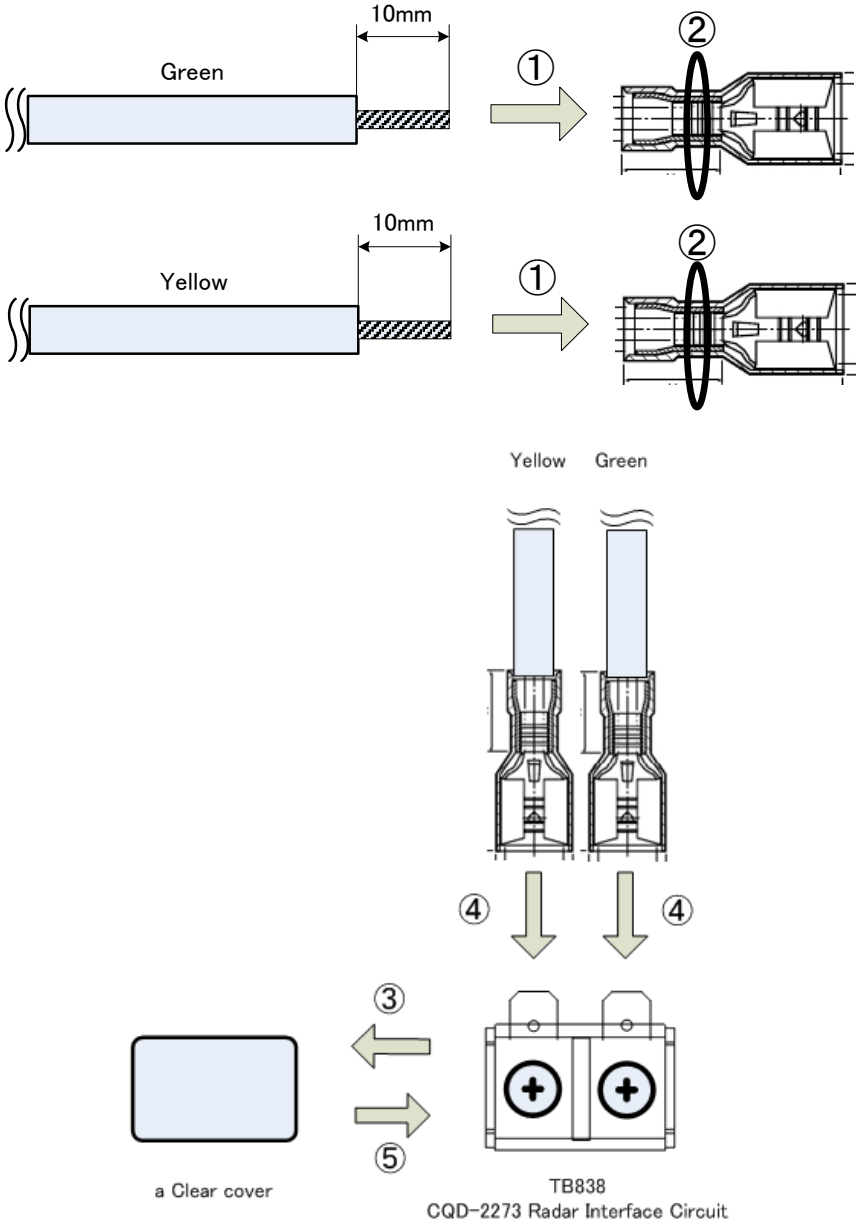
1) Insert the Green or Yellow wire into the Faston terminal.

2) Crimp the wire.

3) Remove the clear cover of TB838 on CQD-2273 RIF.

4) Connect the Green or Yellow wires with Faston terminal to TB838 surely.

5) Return the clear cover surely.



2.2 Installation of the Radar Antenna

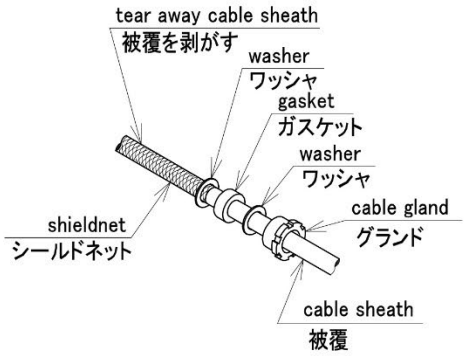
2.2.1 NKE-2103 radar antenna

Instruction for Equipment

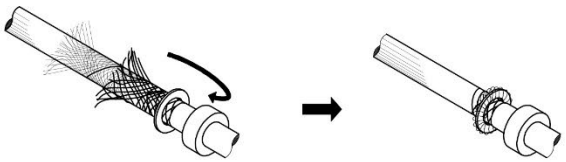
NKE-2103

装備要領

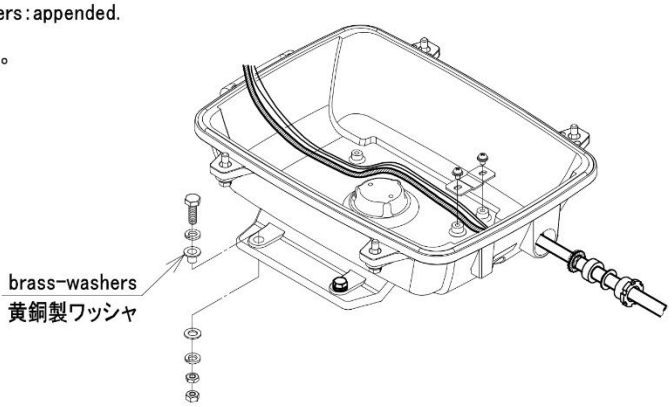
1. Put the cable into cable gland, washers and gasket.
   Tear the tape.
   ケーブルをワッシャ、ガスケット、グランドに通し、
   テープを剥がす。



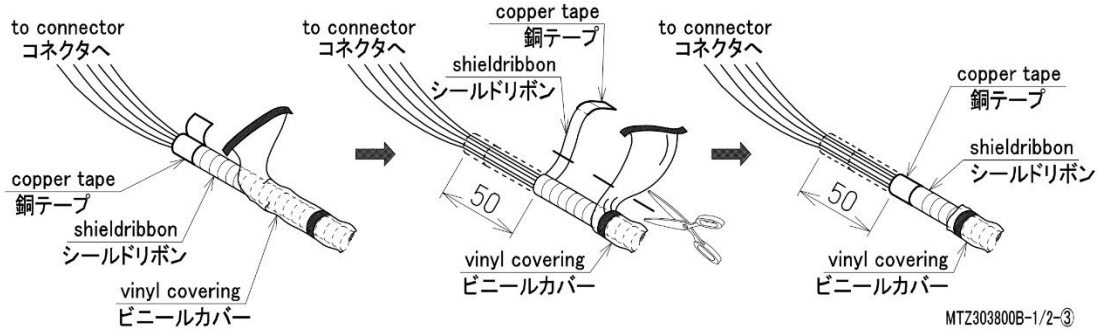
2. Unknit shield net and wrap it around a washer.
   シールドネットをほどき、ワッシャに巻き付ける。



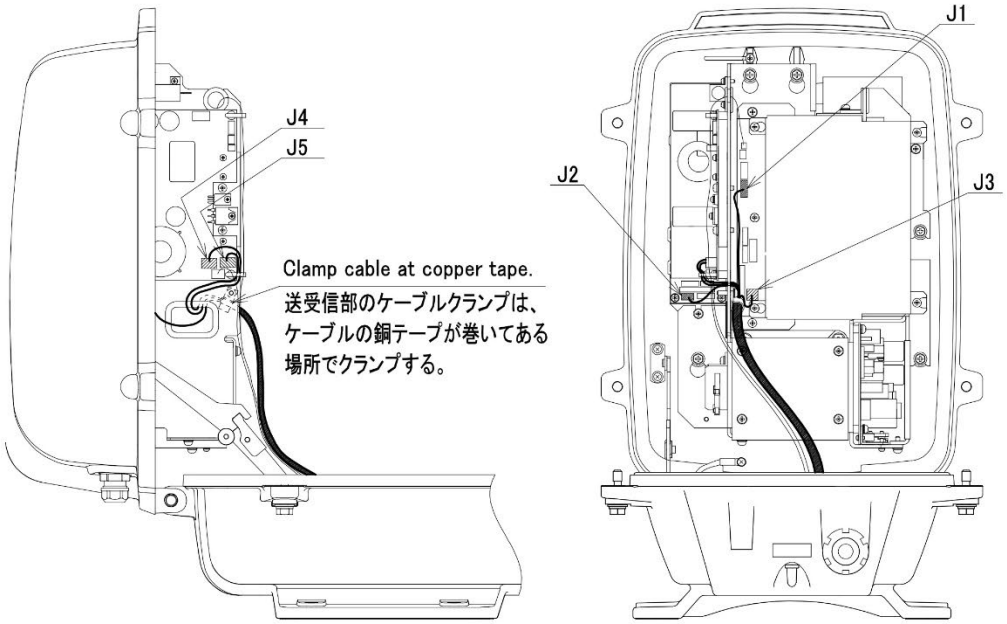
3. Equip the scanner unit with brass-washers : appended.
   黄銅製ワッシャを用い、空中線を装備する。



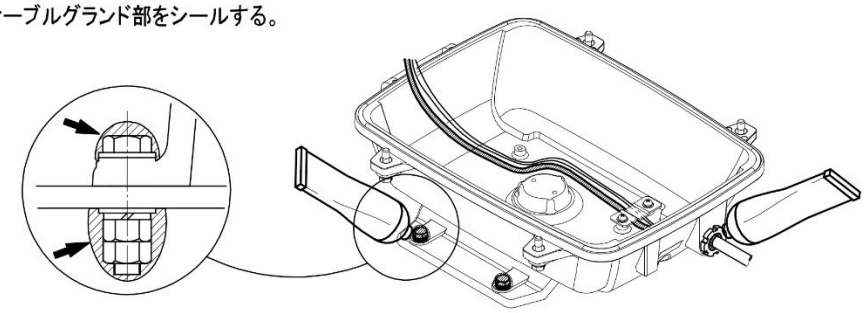
4. Cut the shield ribbon and the vinyl covering from current position to 50mm lower part
   and then put the copper tape again.
   既存の位置から50mmシールドリボンとビニールカバーを剥いて切断し、銅テープを貼り直してください。



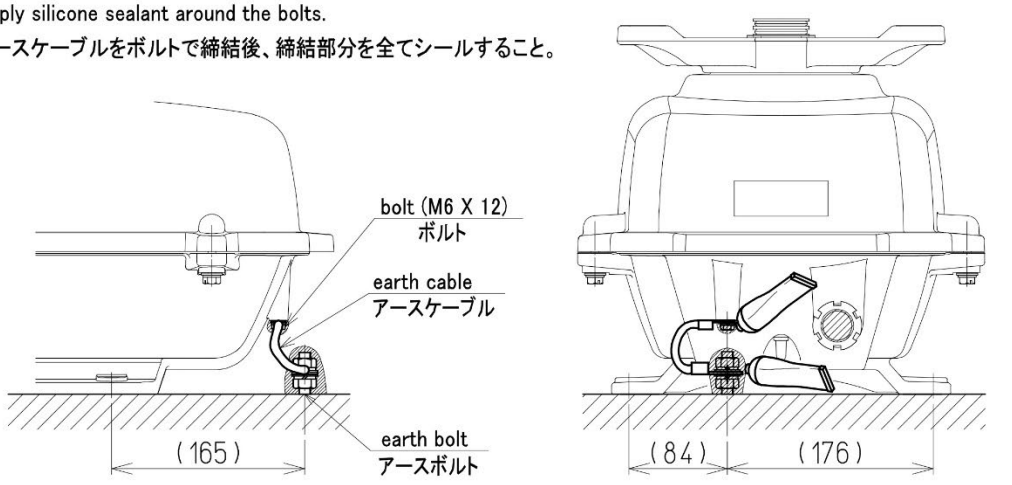
5. Clamp the cable, connect 5 terminals and connecter.
ケーブルを各部でクランプし、端子とコネクタを接続する。



6. Apply silicone sealant around the bolts and into the cable inlet.
ボルトの周辺部とケーブルグランド部をシールする。



7. Bolt the earth cable to mountbase and scanner.
Apply silicone sealant around the bolts.
アースケーブルをボルトで締結後、締結部分を全てシールすること。



MTZ303800B-2/2-③

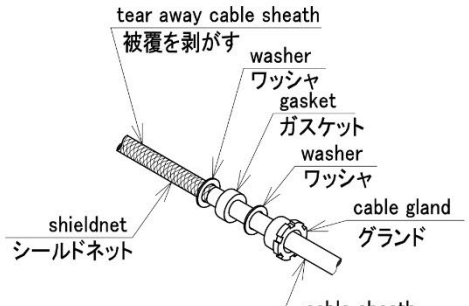
2.2.2 NKE-2254-6HS radar antenna

Instruction for Equipment

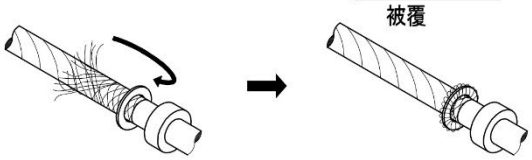
装備要領

NKE-2254

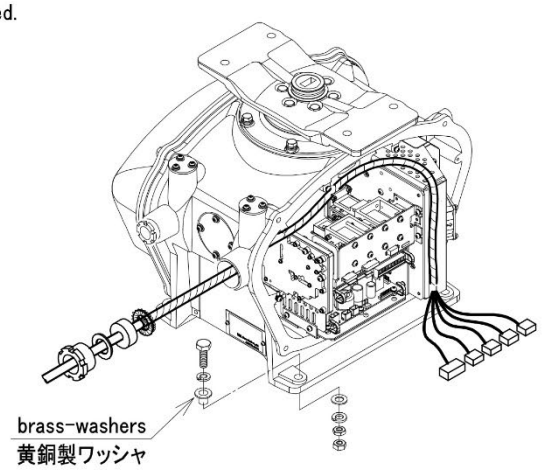
1. Put the cable into cable gland, washers and gasket.
   Tear the tape.
   ケーブルをワッシャ、ガスケット、グランドに通し、
   テープを剥がす。



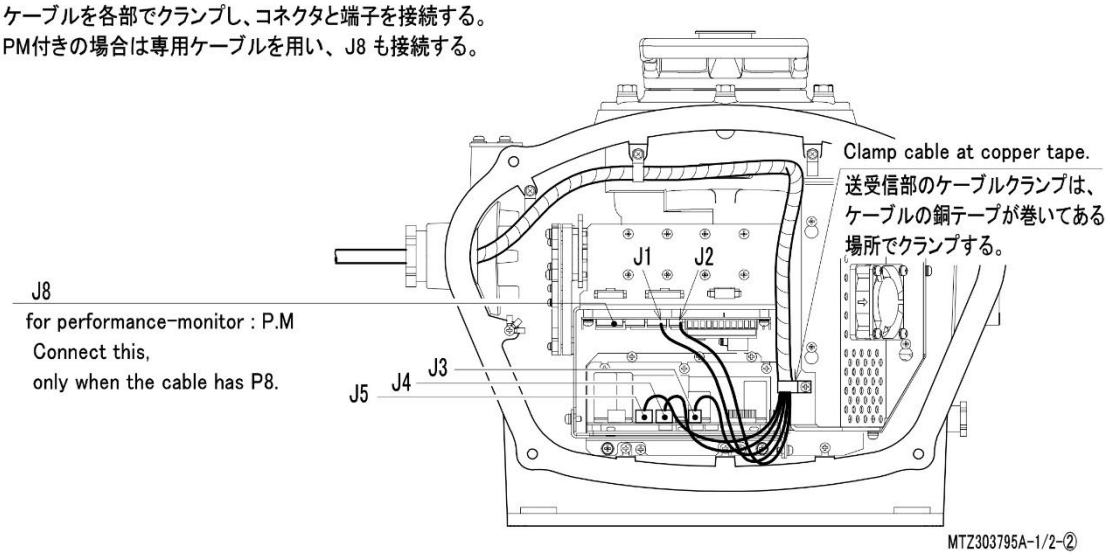
2. Unknit shield net and wrap it around a washer.
   シールドネットをほどき、ワッシャに巻き付ける。



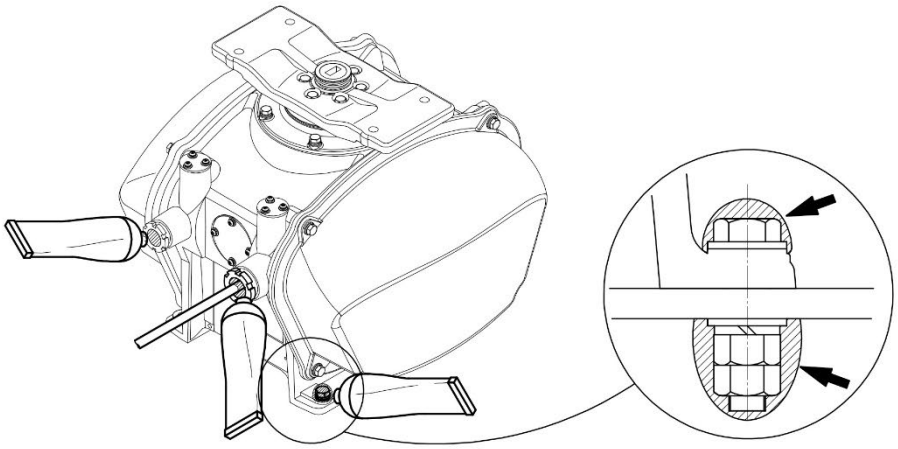
3. Equip the scanner unit with brass-washers : appended.
   黄銅製ワッシャを用い、空中線を装備する。



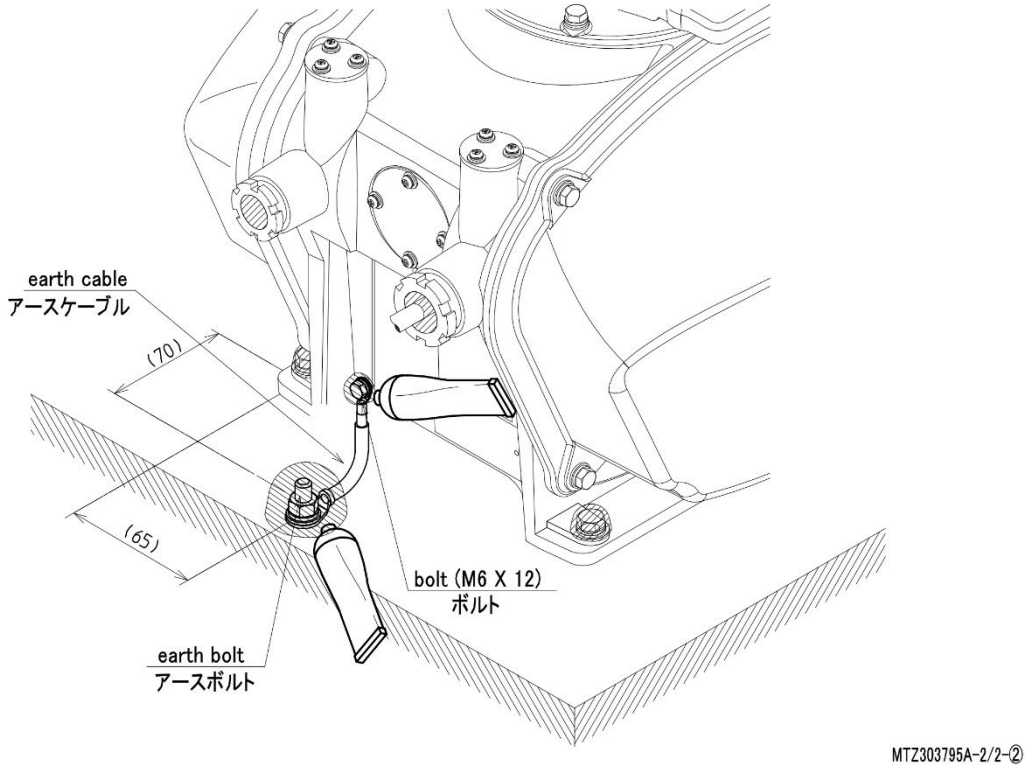
4. Clamp the cable,connect 5 connecters.
   ケーブルを各部でクランプし、コネクタと端子を接続する。
   PM付きの場合は専用ケーブルを用い、J8 も接続する。



5. Apply silicone sealant around the bolts and into the cable inlet.
ボルトの周辺部とケーブルグランド部をシールする。



6. Bolt the earth cable to mountbase and scanner.
Apply silicone sealant around the bolts.
アースケーブルをボルトで締結後、締結部分を全てシールすること。



MTZ303795A-2/2-②

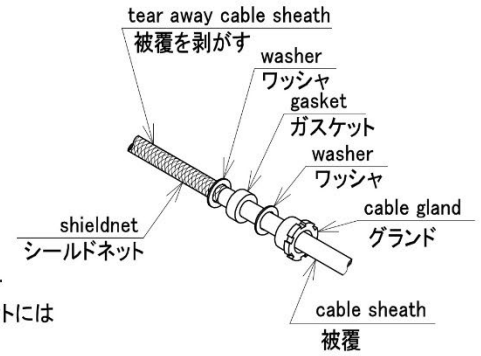
2.2.3 NKE-1125/A radar antenna

Instruction for Equipment

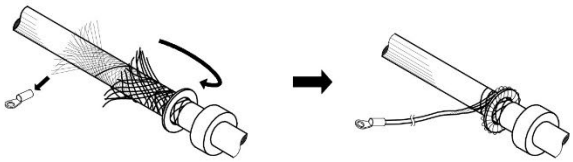
装備要領

NKE-1125PM

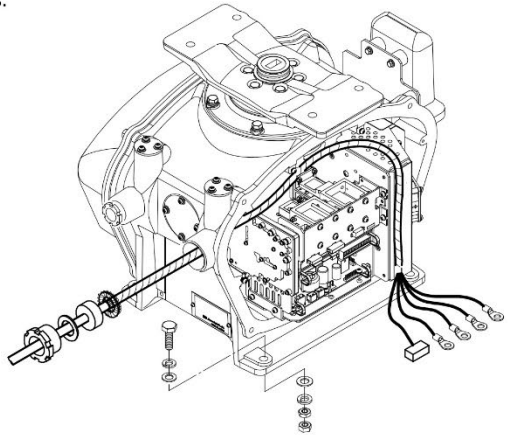
1. Put the cable into cable gland, washers and gasket.
   Tear away the cable sheath.
   ケーブルをワッシャ、ガスケット、グランドに通し、
   被覆を剥がす。



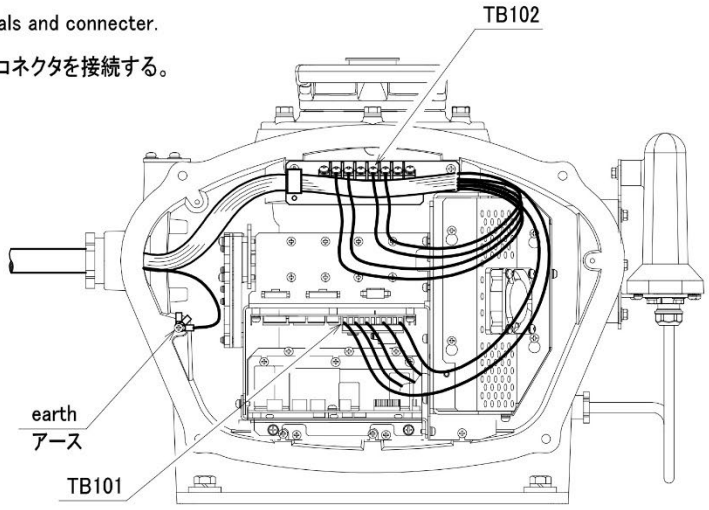
2. Unknit outer shield net and wrap it around a washer.
   Connect a solderless terminal (for a ground) to an inner shield net.
   外側のシールドネットをほどき、座金に巻きつけ、内側のシールドネットには
   丸型圧着端子(アース)を取付ける。



3. Equip the scanner unit with bolts and washers.
   ボルト、ワッシャを用いて、空中線を装備する。

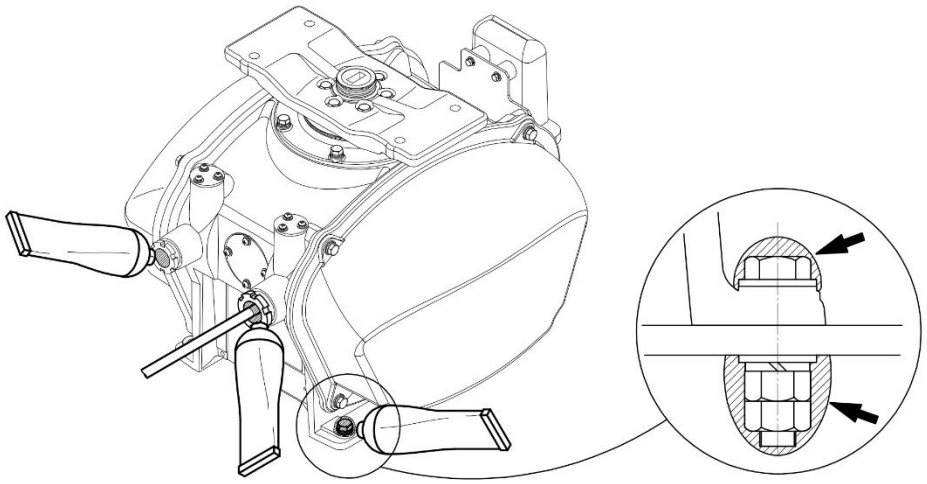


4. Clamp the cable, connect 6 terminals and connecter.
   ケーブルを各部でクランプし、端子とコネクタを接続する。

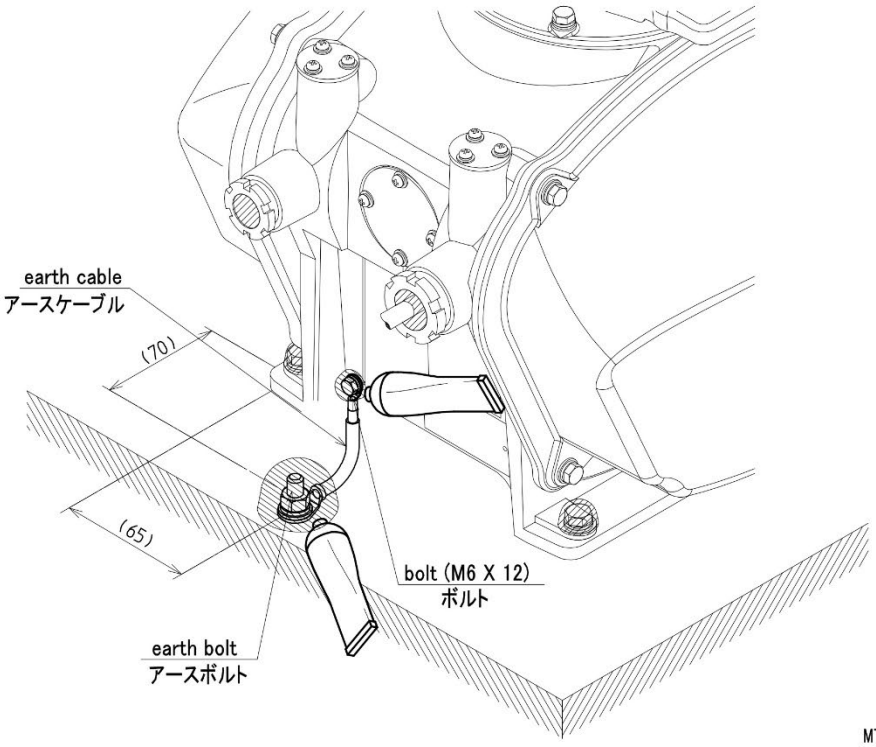


MTZ303794B-1/2-②

5. Apply silicone sealant around the bolts and into the cable inlet.
ボルトの周辺部とケーブルグランド部をシールする。



6. Bolt the earth cable to mountbase and scanner.
Apply silicone sealant around the bolts.
アースケーブルをボルトで締結後、締結部分を全てシールすること。



MTZ303794B-2/2-②

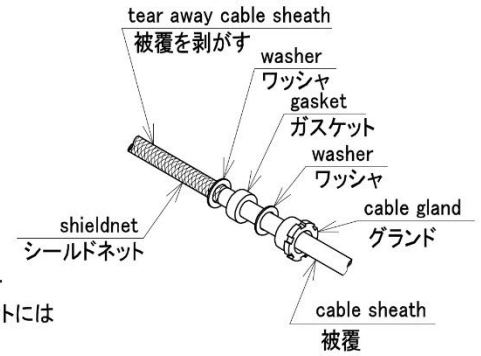
2.2.4 NKE-1129/A radar antenna

Instruction for Equipment

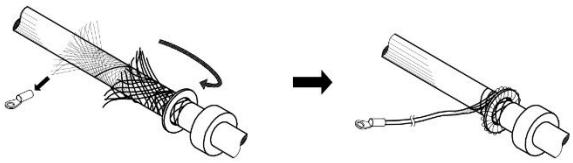
装備要領

NKE-1129PM

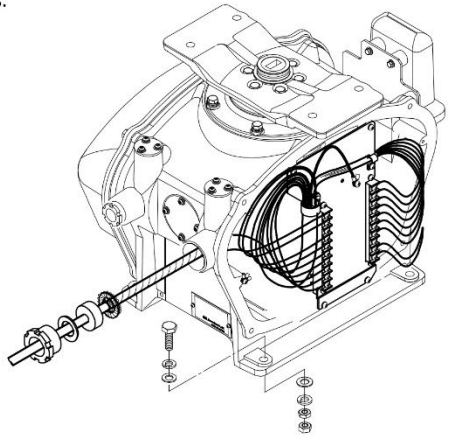
1. Put the cable into cable gland, washers and gasket.
   Tear away the cable sheath.
   ケーブルをワッシャ、ガスケット、グランドに通し、
   被覆を剥がす。



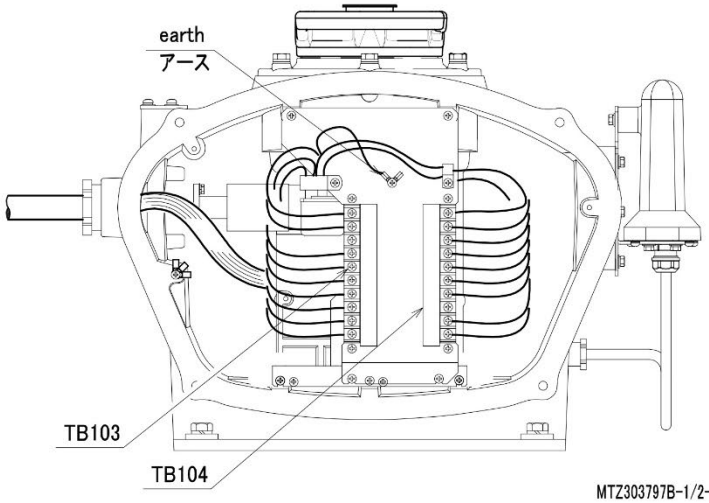
2. Unknit outer shield net and wrap it around a washer.
   Connect a solderless terminal (for a ground) to an inner shield net.
   外側のシールドネットをほどき、座金に巻きつけ、内側のシールドネットには
   丸型圧着端子(アース)を取付ける。



3. Equip the scanner unit with bolts and washers.
   ボルト、ワッシャを用いて、空中線を装備する。

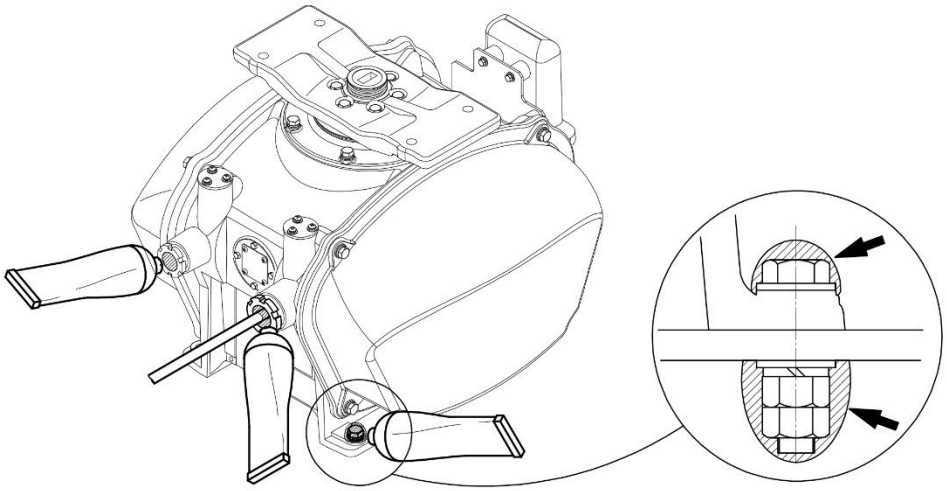


4. Clamp the cable, connect terminals.
   ケーブルを各部でクランプし、端子を接続する。

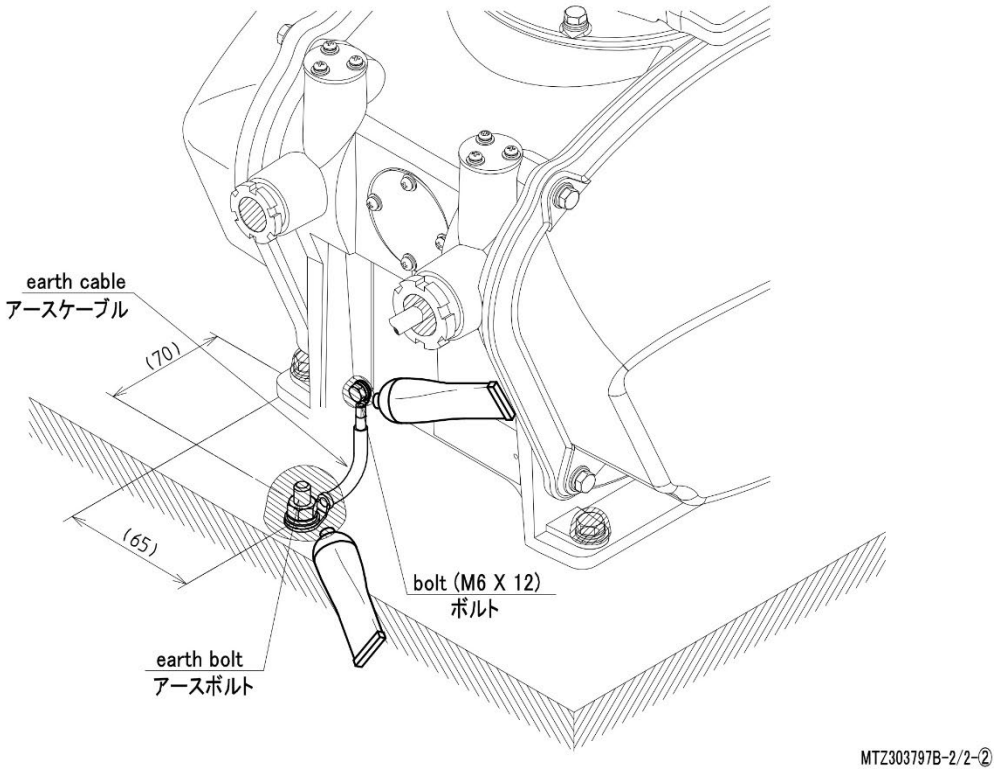


MTZ303797B-1/2-②

5. Apply silicone sealant around the bolts and into the cable inlet.
ボルトの周辺部とケーブルグランド部をシールする。



6. Bolt the earth cable to mountbase and scanner.
Apply silicone sealant around the bolts.
アースケーブルをボルトで締結後、締結部分を全てシールすること。



MTZ303797B-2/2-②

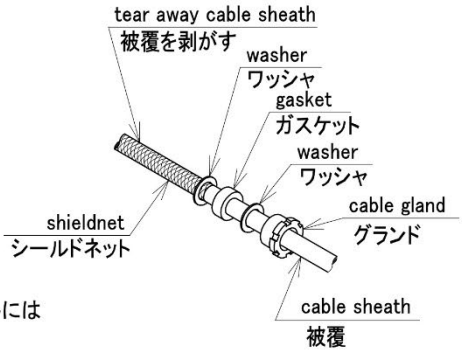
2.2.5 NKE-1130/A radar antenna

Instruction for Equipment

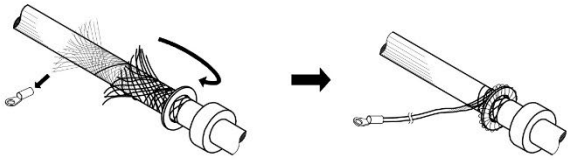
NKE-1130PM

装備要領

1. Put the cable into cable gland, washers and gasket.
   Tear away the cable sheath.
   ケーブルをワッシャ、ガスケット、グランドに通し、
   被覆を剥がす。

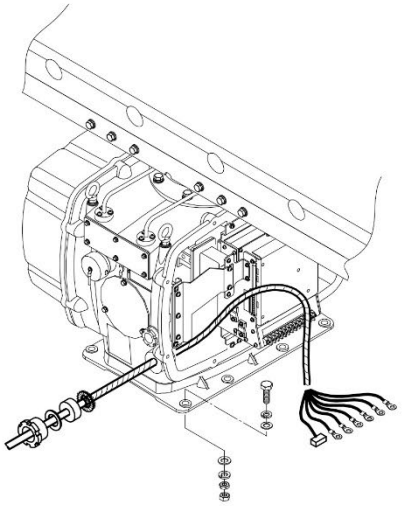


2. Unknit outer shield net and wrap it around a washer.
   Connect a solderless terminal (for a ground) to an inner shield net.
   外側のシールドネットをほどき、座金に巻きつけ、内側のシールドネットには
   丸型圧着端子(アース)を取付ける。



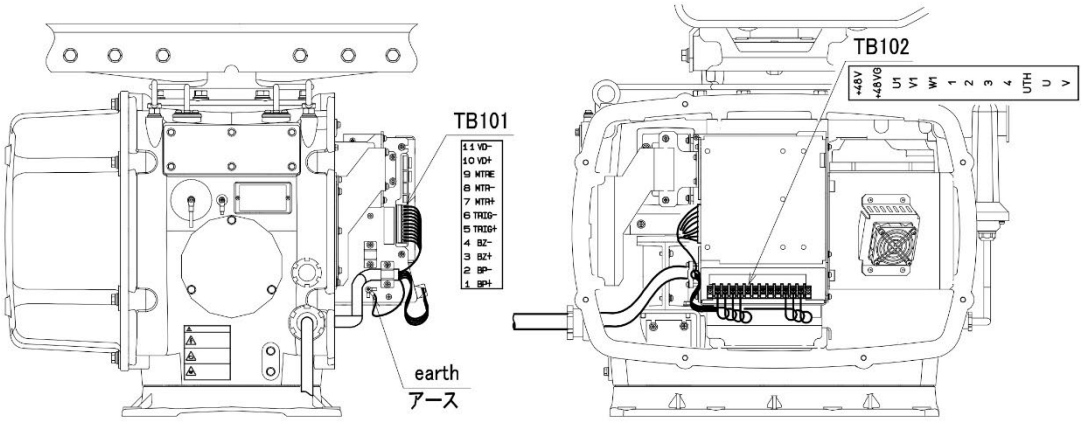
3. Equip the scanner unit with bolts and washers.
   Pass the cable into unit and fix it.

   ボルト、ワッシャを用いて、空中線を装備する。
   ケーブルを機内に引き込み固定して下さい。



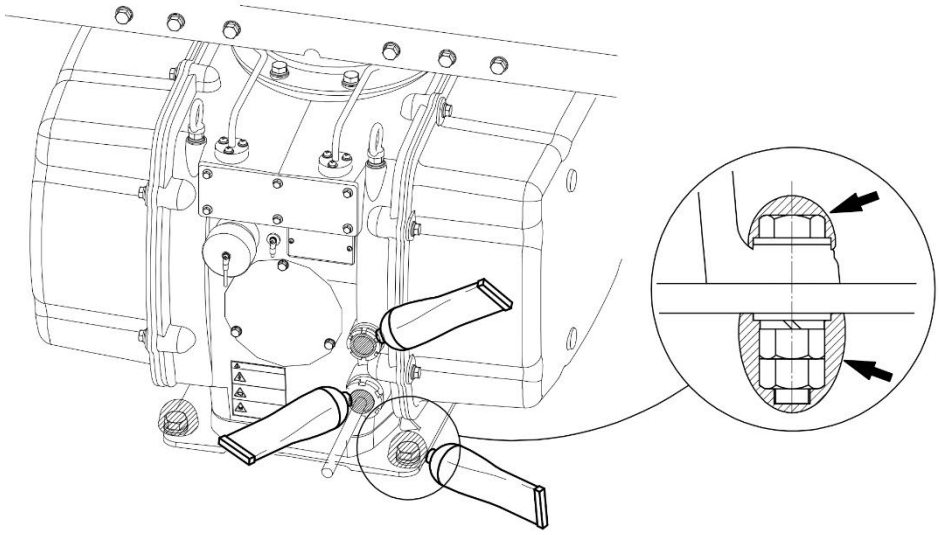
4. Clamp the cable, connect 6 terminals and connecter.

   ケーブルを各部でクランプし、端子とコネクタを接続する。

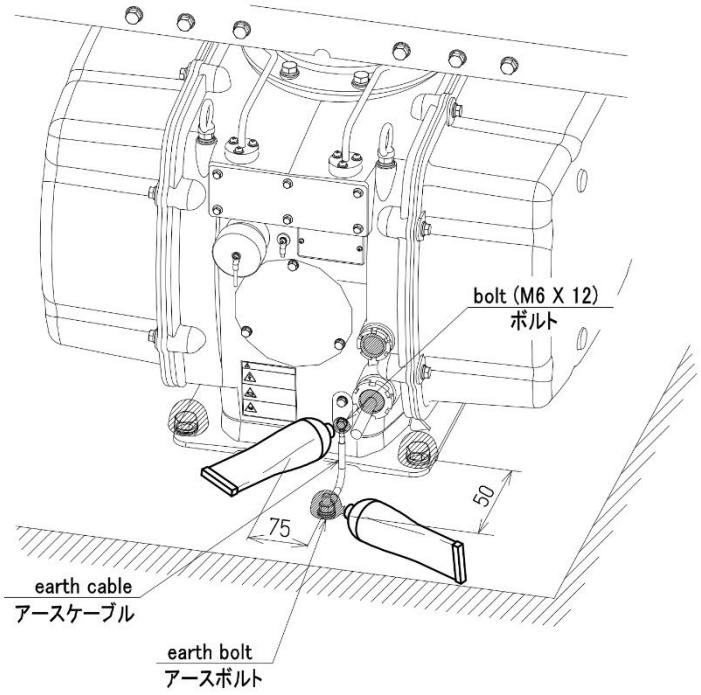


MTZ303822B-1/2-②

5. Apply silicone sealant around the bolts and into the cable inlet.
ボルトの周辺部とケーブルグランド部をシールする。



6. Bolt the earth cable to mountbase and scanner.
Apply silicone sealant around the bolts.
アースケーブルをボルトで締結後、締結部分を全てシールすること。



MTZ303822B-2/2-②

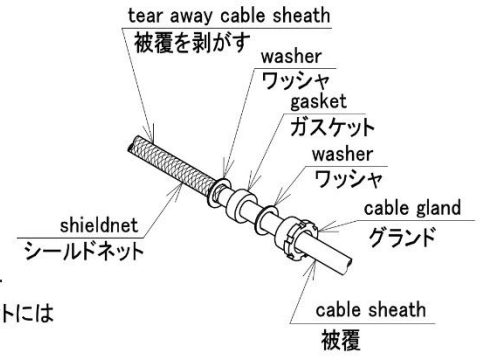
2.2.6 NKE-1139/A radar antenna

Instruction for Equipment

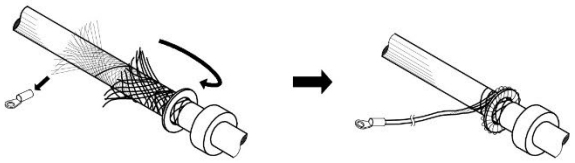
装備要領

NKE-1139PM

1. Put the cable into cable gland, washers and gasket.
   Tear away the cable sheath.
   ケーブルをワッシャ、ガスケット、グランドに通し、
   被覆を剥がす。

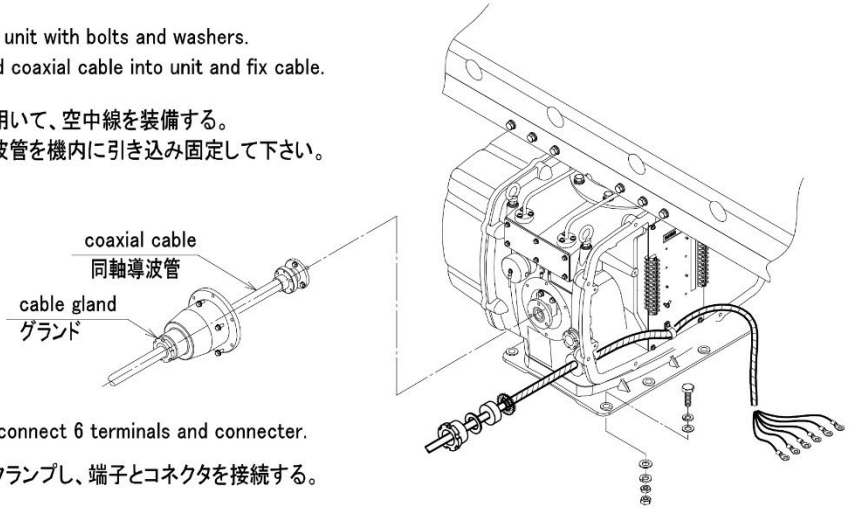


2. Unknit outer shield net and wrap it around a washer.
   Connect a solderless terminal (for a ground) to an inner shield net.
   外側のシールドネットをほどき、座金に巻きつけ、内側のシールドネットには
   丸型圧着端子(アース)を取付ける。



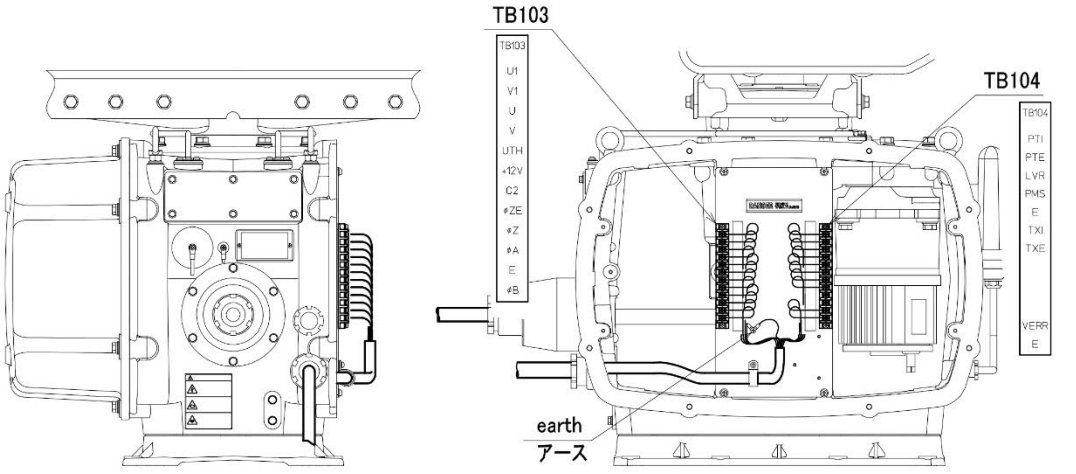
3. Equip the scanner unit with bolts and washers.
   Pass the cable and coaxial cable into unit and fix cable.

   ボルト、ワッシャを用いて、空中線を装備する。
   ケーブルと同軸導波管を機内に引き込み固定して下さい。



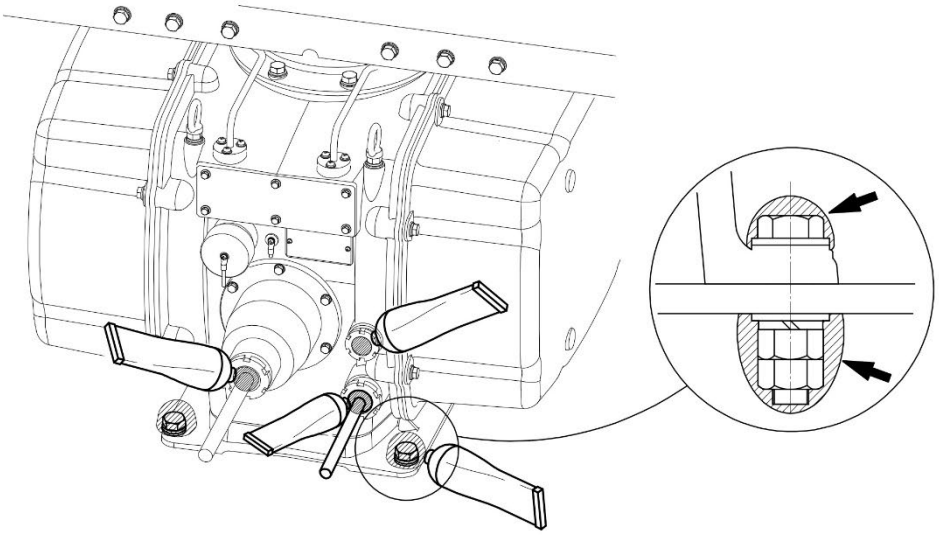
4. Clamp the cable, connect 6 terminals and connecter.

   ケーブルを各部でクランプし、端子とコネクタを接続する。

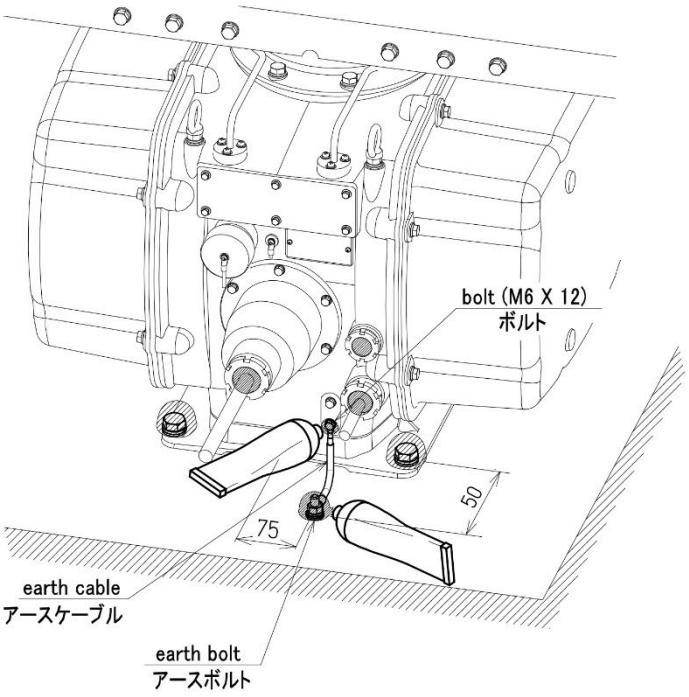


MTZ303823B-1/2-②

5. Apply silicone sealant around the bolts and into the cable inlet.
ボルトの周辺部とケーブルグランド部をシールする。



6. Bolt the earth cable to mountbase and scanner.
Apply silicone sealant around the bolts.
アースケーブルをボルトで締結後、締結部分を全てシールすること。



MTZ303823B-2/2-②

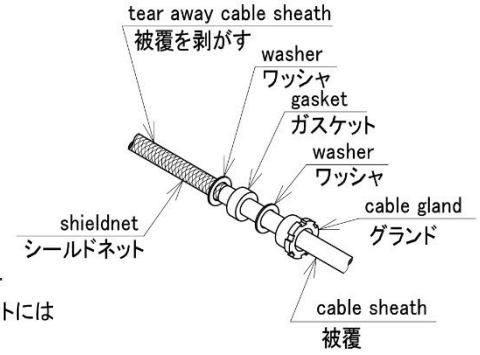
2.2.7 NKE-1632/A radar antenna

Instruction for Equipment

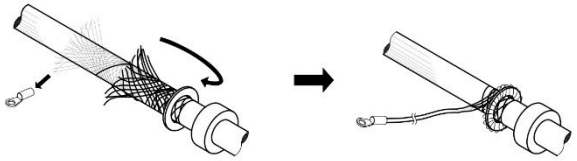
NKE-1632

装備要領

1. Put the cable into cable gland, washers and gasket.
   Tear away the cable sheath.
   ケーブルをワッシャ、ガスケット、グランドに通し、
   被覆を剥がす。

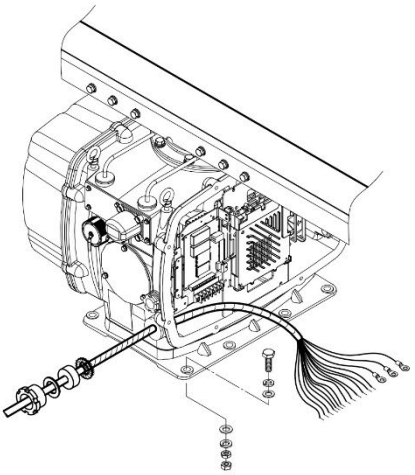


2. Unknit outer shield net and wrap it around a washer.
   Connect a solderless terminal (for a ground) to an inner shield net.
   外側のシールドネットをほどき、座金に巻きつけ、内側のシールドネットには
   丸型圧着端子(アース)を取付ける。

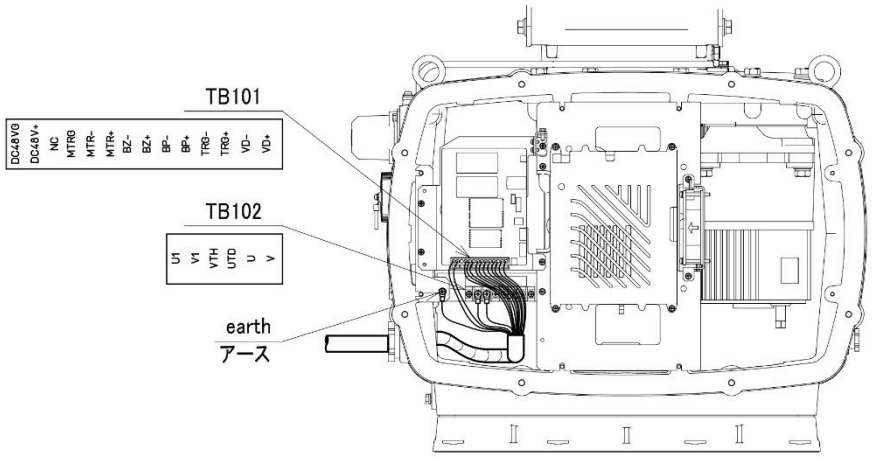


3. Equip the scanner unit with bolts and washers.
   Pass the cable into unit and fix it.

   ボルト、ワッシャを用いて、空中線を装備する。
   ケーブルを機内に引き込み固定して下さい。

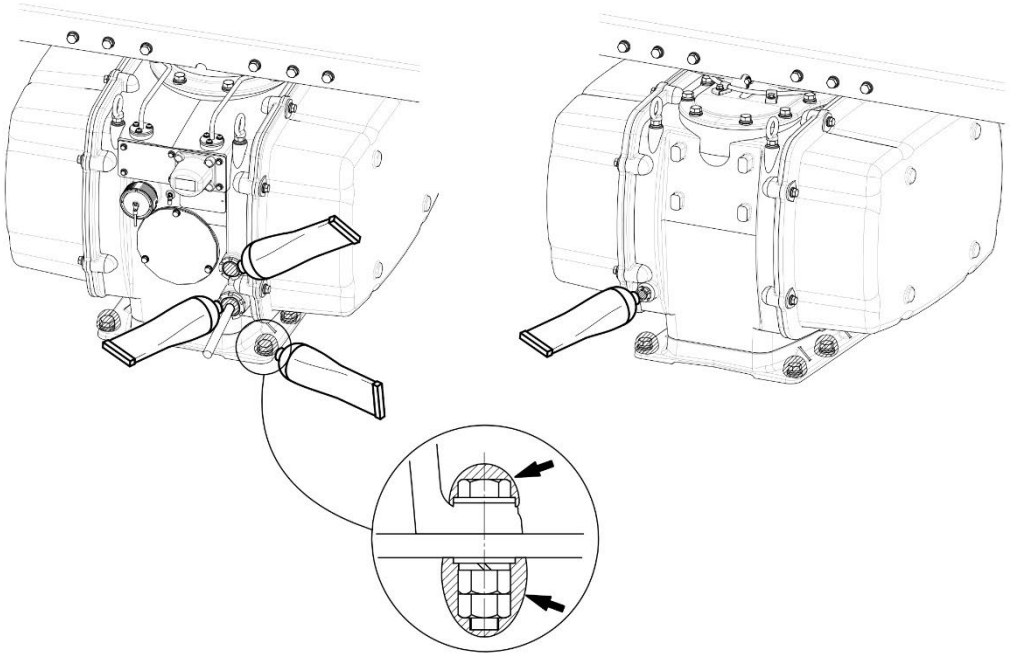


4. Connect 2 terminals and 13 cables and the earth terminal.
   2個の端子と13本のケーブルとアース端子を接続する。

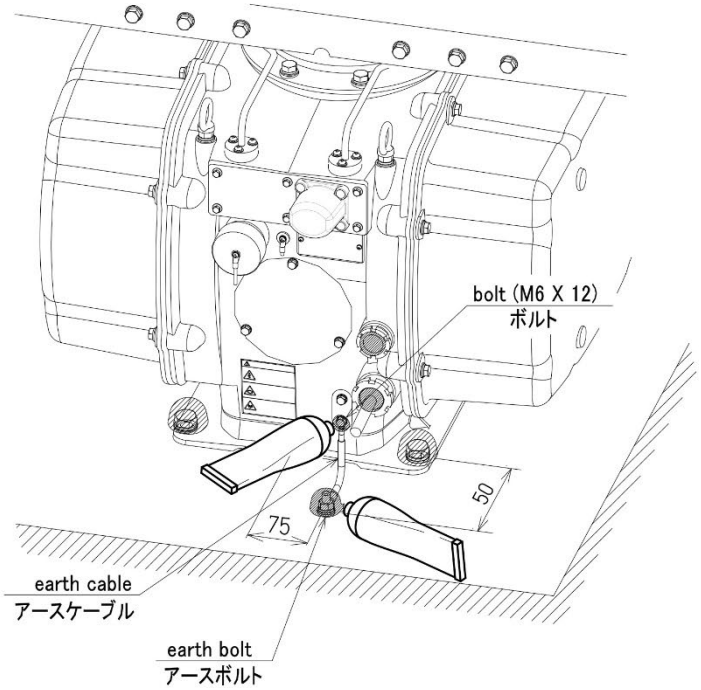


MTZ304749-1/2-③

5. Apply silicone sealant around the bolts and into the cable inlet.
ボルトの周辺部とケーブルグランド部をシールする。



6. Bolt the earth cable to mountbase and scanner.
Apply silicone sealant around the bolts.
アースケーブルをボルトで締結後、締結部分を全てシールすること。



MTZ304749-2/2-③

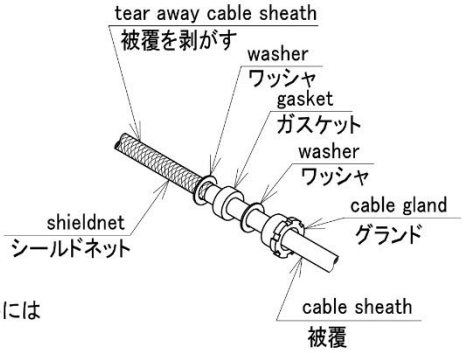
2.2.8 NKE-2632/A radar antenna

Instruction for Equipment

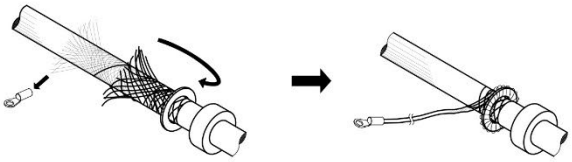
NKE-2632

装備要領

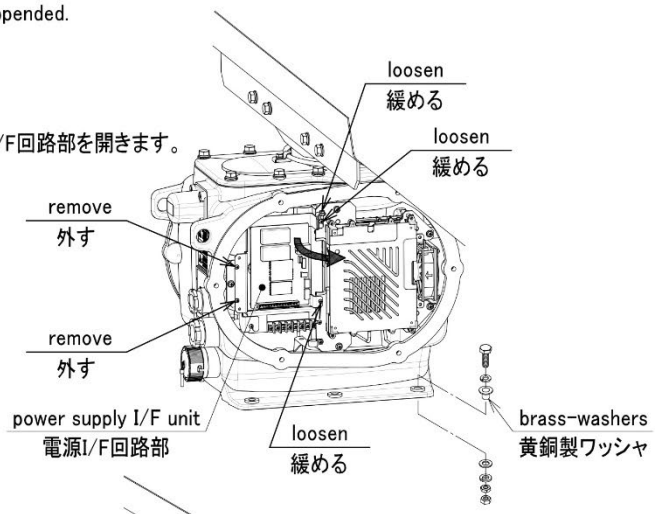
1. Put the cable into cable gland, washers and gasket.
   Tear away the cable sheath.
   ケーブルをワッシャ、ガスケット、グランドに通し、
   被覆を剥がす。



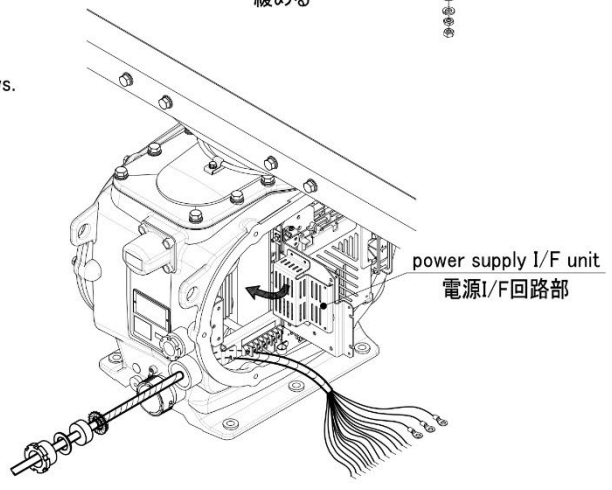
2. Unknit outer shield net and wrap it around a washer.
   Connect a solderless terminal (for a ground) to an inner shield net.
   外側のシールドネットをほどき、座金に巻きつけ、内側のシールドネットには
   丸型圧着端子(アース)を取付ける。



3. Equip the scanner unit with brass-washers : appended.
   Loosen 3 screws and remove 2 screws.
   Open a power supply I/F unit after that.
   黄銅製ワッシャを用い、空中線を装備する。
   3個のねじを緩め、2個のねじを外した後に電源I/F回路部を開きます。

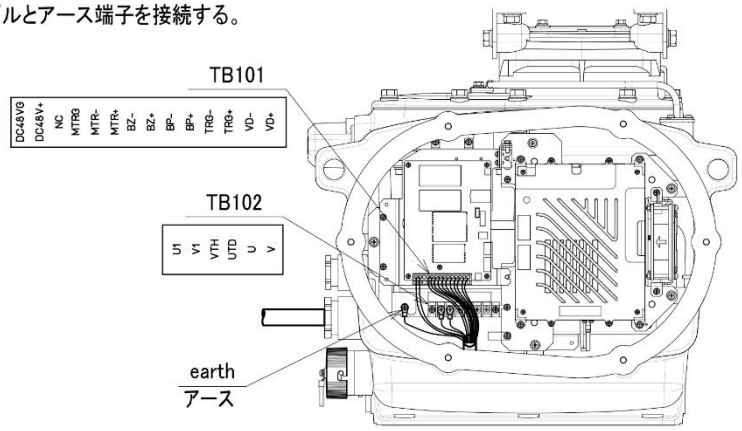


4. Pass the cable into unit and fix it.
   Close a power supply I/F unit and tighten 5 screws.
   ケーブルを機内に引き込み固定する。
   電源I/F回路部を閉じて、5個のねじを締めます。

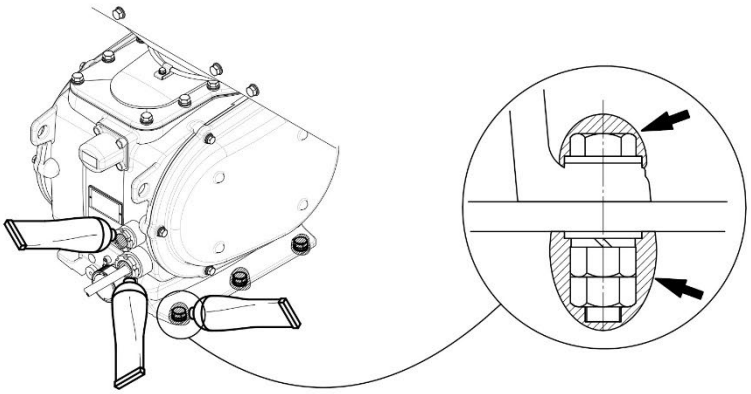


MTZ304750-1/2-③

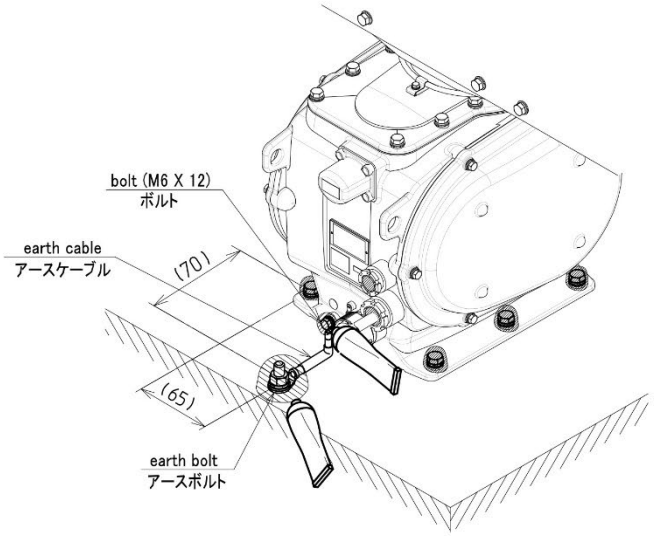
5. Connect 2 terminals and 13 cables and the earth terminal.
2個の端子と13本のケーブルとアース端子を接続する。



6. Apply silicone sealant around the bolts and into the cable inlet.
ボルトの周辺部とケーブルグランド部をシールする。



7. Bolt the earth cable to mountbase and scanner.
Apply silicone sealant around the bolts.
アースケーブルをボルトで締結後、締結部分を全てシールすること。



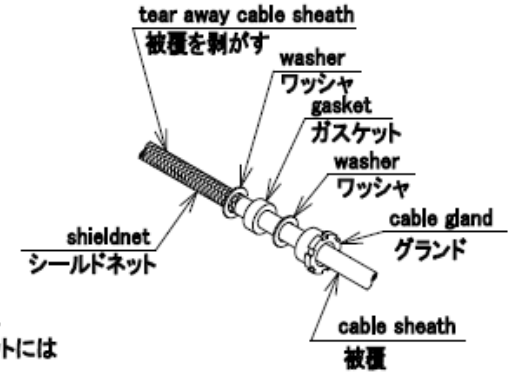
MTZ304750-2/2-③

2.2.9 NKE-1696 radar antenna

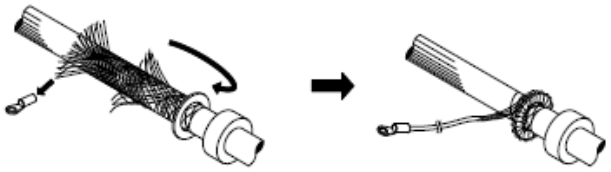
Instruction for Equipment
装備要領

NKE-1696

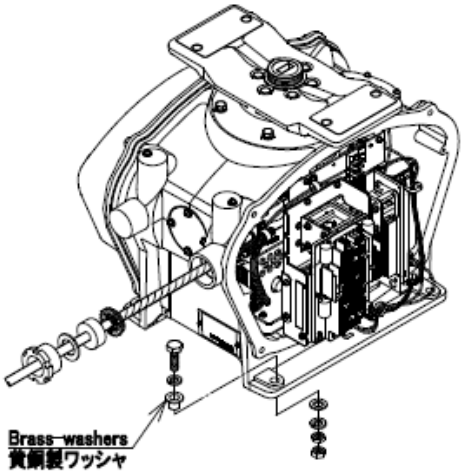
1.Put the cable into cable gland, washers and gasket.
Tear away the cable sheath.
ケーブルをワッシャ、ガスケット、グランドに通し、
被覆を剥がす。



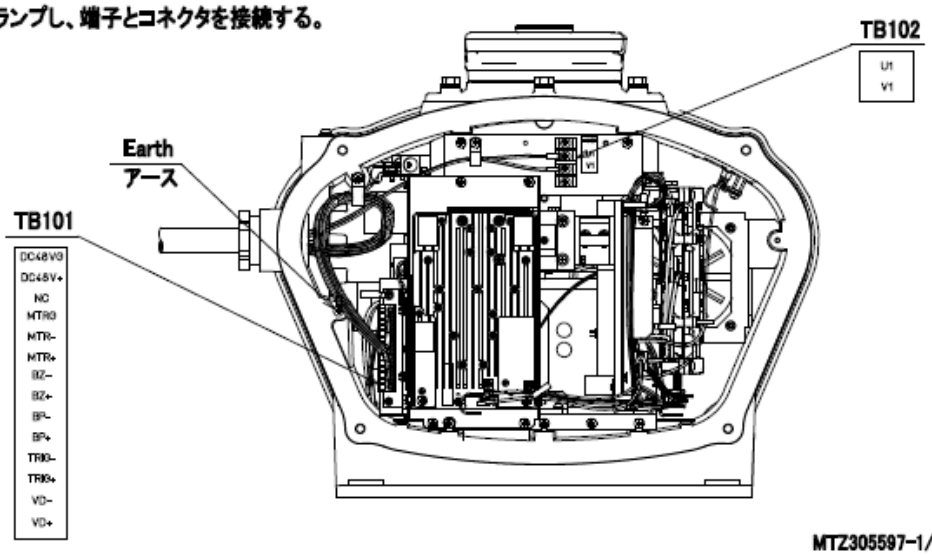
2.Unknit outer shield net and wrap it around a washer.
Connect a solderless terminal (for a ground) to an inner shield net.
外側のシールドネットをほどき、座金に巻きつけ、内側のシールドネットには
丸型圧着端子(アース)を取付ける。



3.Equip the scanner unit with brass-washers:appended.
黄銅製ワッシャを用い、空中線を装備する。

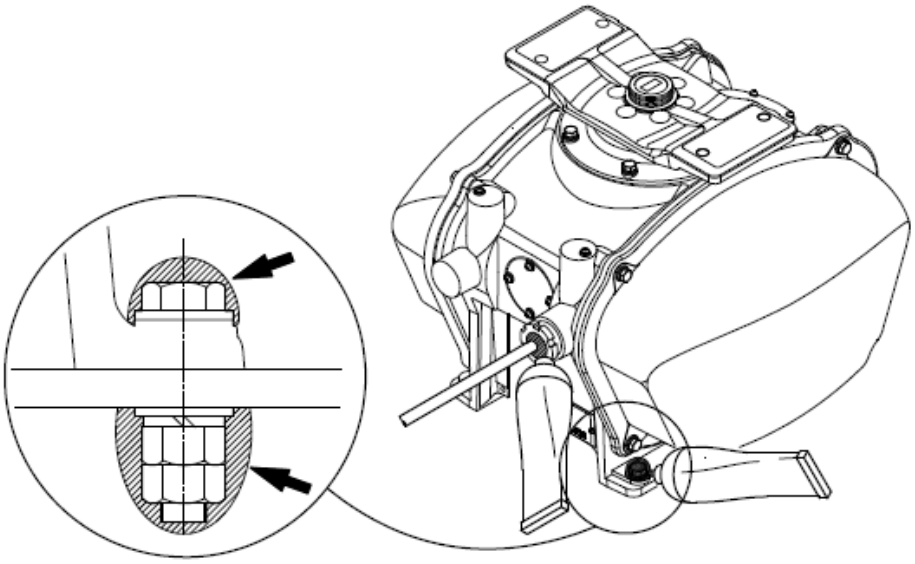


4. Clamp the cable, connect 6 terminals and connecter.
ケーブルを各部でクランプし、端子とコネクタを接続する。

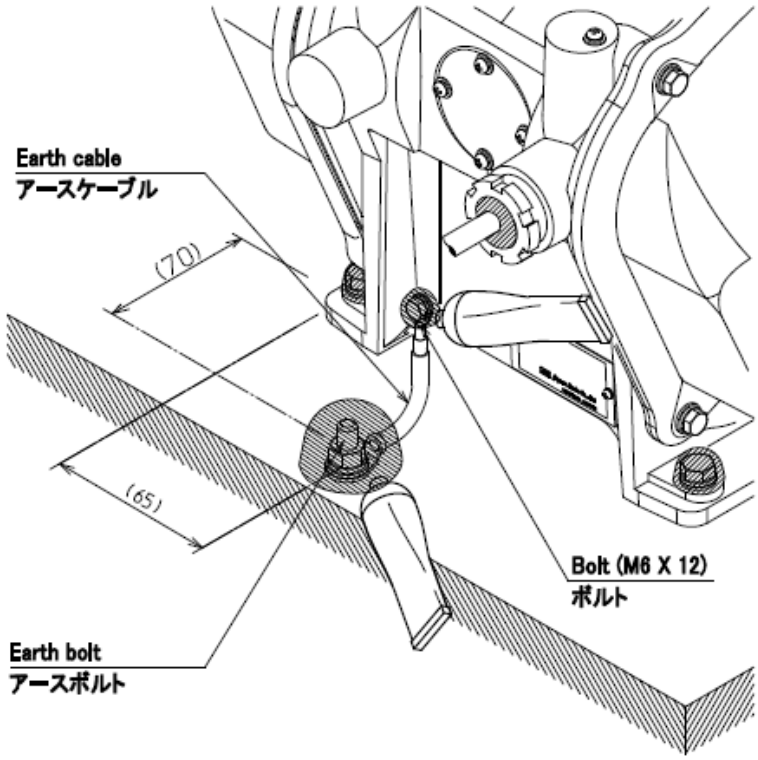


MTZ305597-1/2-①

5.Apply silicone sealant around the bolts and into the cable inlet.
ボルトの周辺部とケーブルグランド部をシールする。



6.Bolt the earth cable to mountbase and scanner.
Apply silicone sealant around the bolts.
アースケーブルをボルトで締結後、締結部分を全てシールする。



MTZ305597-2/2-①

2.3 Installation of Transmitter-Receiver

2.3.1 NTG-3225/A transmitter-receiver

Instruction for Equipment

NTG-3225

装備要領

1. Equip the transmitter with nuts and washers.

   ナット、ワッシャを用いて、送受信機を装備する。

2. Clamp a flexible waveguide terminal with bolts.

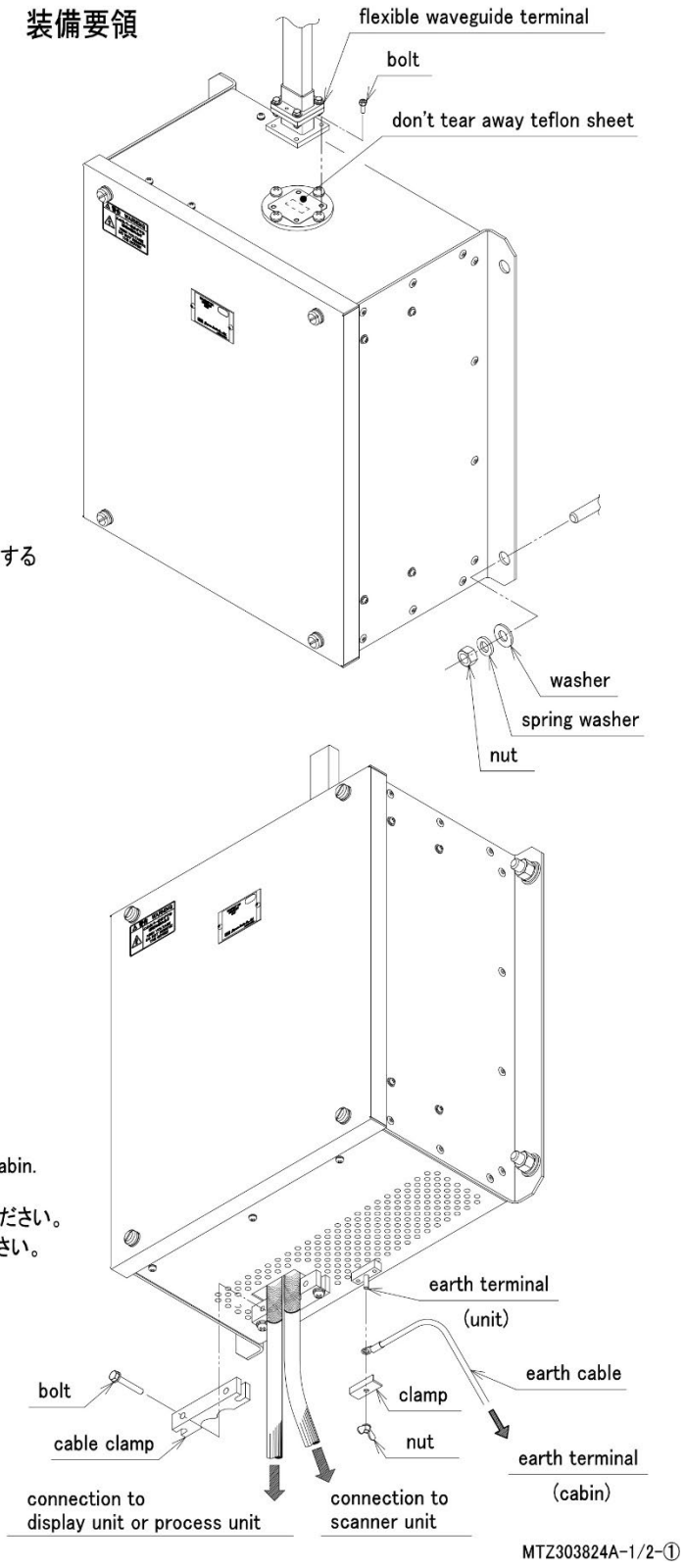
   ボルトを用いて、フレキシブル導波管端子を接続する

3. Pass the cables into unit and clamp them.

   ケーブルを機内に引き込み、固定してください。

4. Connect earth cable to earth terminal of unit.
   Another terminal connect to earth terminal of cabin.

   アースケーブルは機器のアース端子に接続してください。
   もう一方の端末は船内アース端子に接続してください。



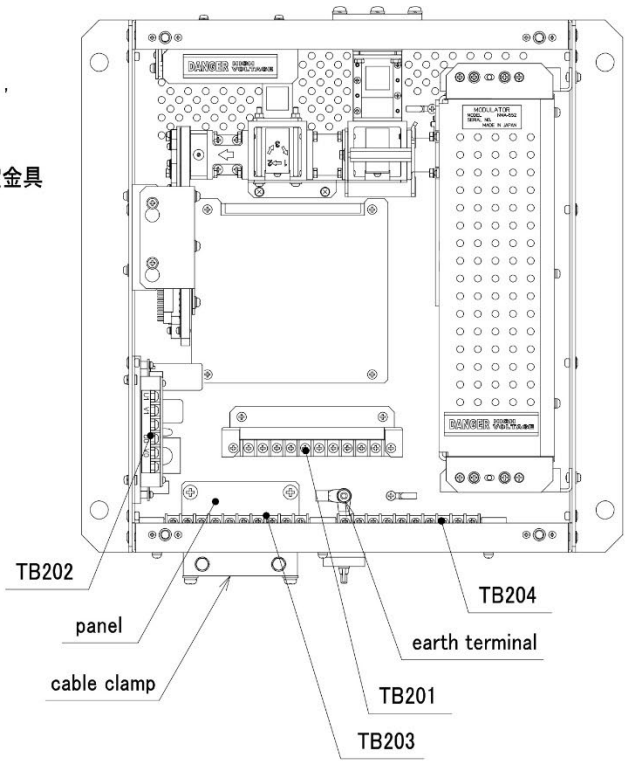
MTZ303824A-1/2-①

※ In case of passing the cables into unit from back , replace cable clamp with panel and clamp them.

背面よりケーブルを引き込む場合は、ケーブル固定金具とパネルを置き換えて固定してください。

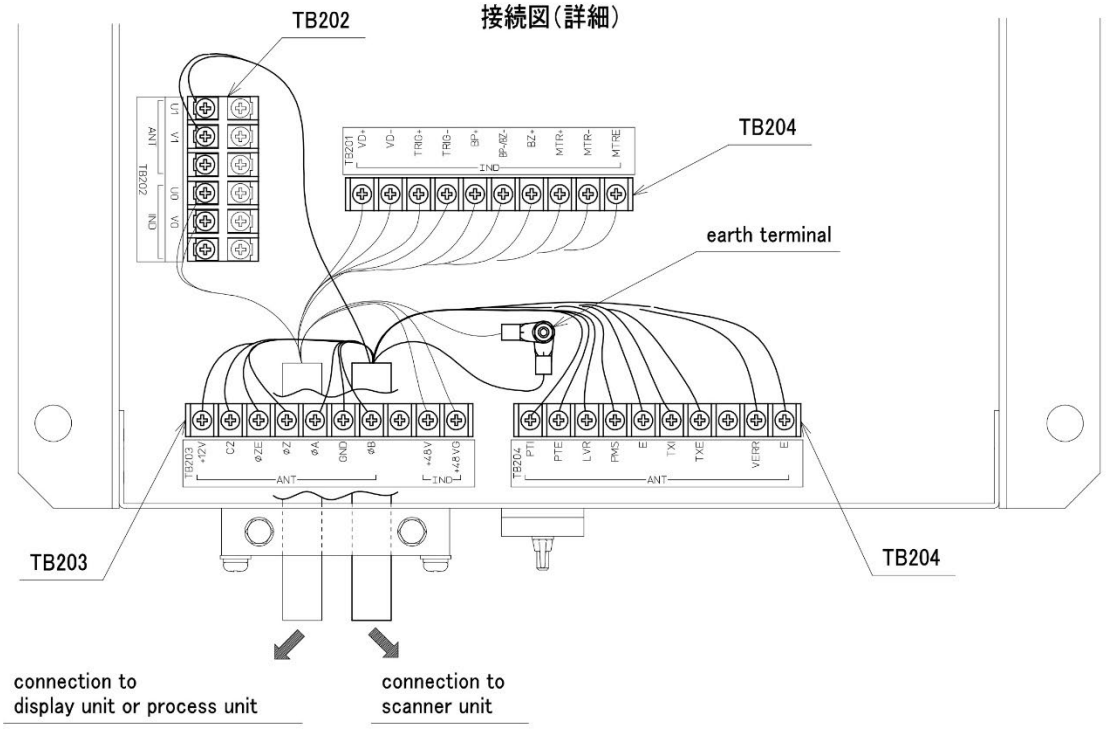
5. Connect the cables to each terminal.

ケーブルの端末を各部に接続してください。



Connected chart

接続図(詳細)



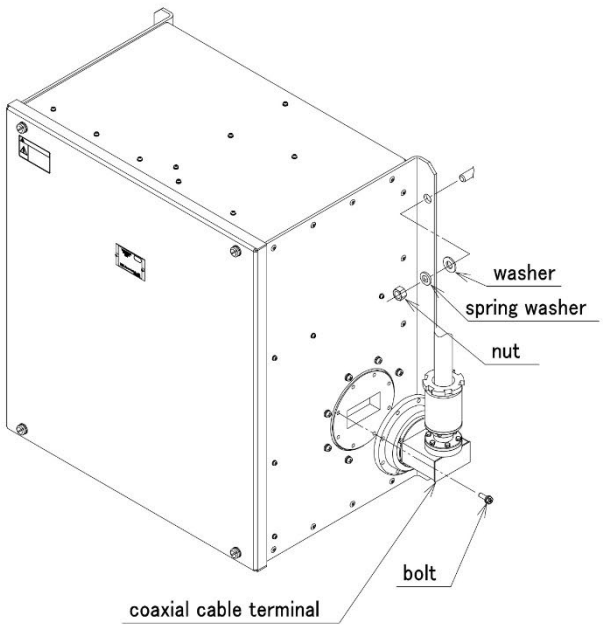
MTZ303824A-2/2-①

2.3.2 NTG-3230/A transmitter-receiver

Instruction for Equipment
装備要領

NTG-3230

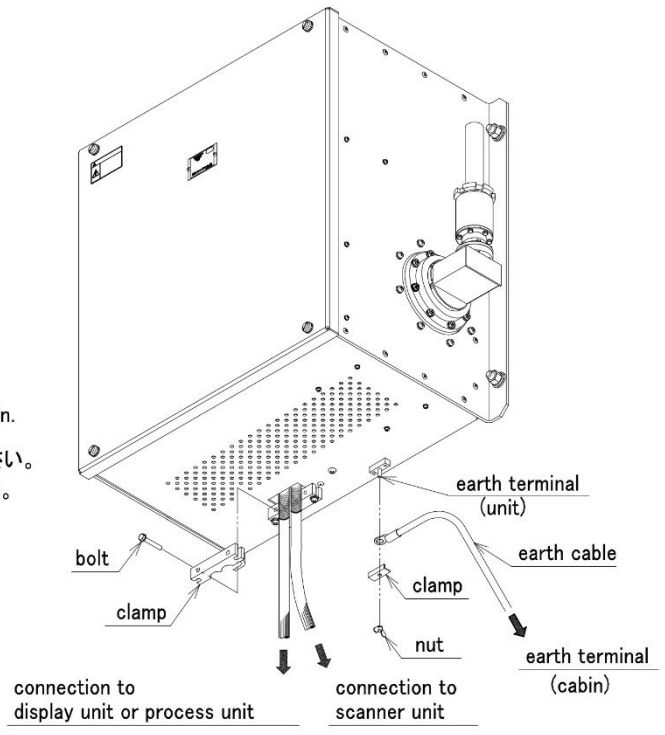
1. Equip the transmitter with nuts and washers.
ナット、ワッシャを用いて、送受信機を装備する。



2. Clamp a coaxial cable terminal with bolts.
ボルトを用いて、同軸導波管端子を接続する

3. Pass the cables into unit and clamp them.
ケーブルを機内に引き込み、固定してください。

4. Connect earth cable to earth terminal of unit.
Another terminal connect to earth terminal of cabin.
アースケーブルは機器のアース端子に接続してください。
もう一方の端末は船内アース端子に接続してください。



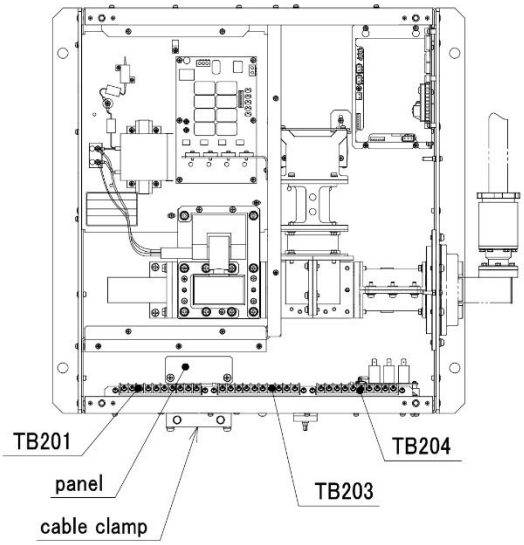
MTZ303825A-1/2-①

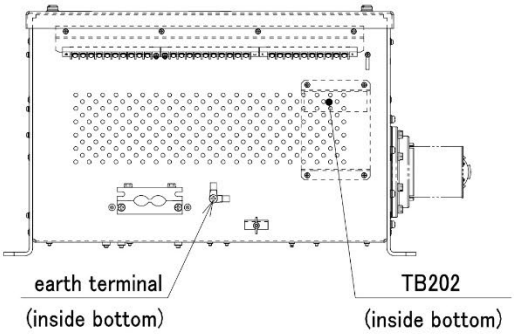
※ In case of passing the cables into unit from back , replace cable clamp with panel and clamp them.

背面よりケーブルを引き込む場合は、ケーブル固定金具とパネルを置き換えて固定してください。

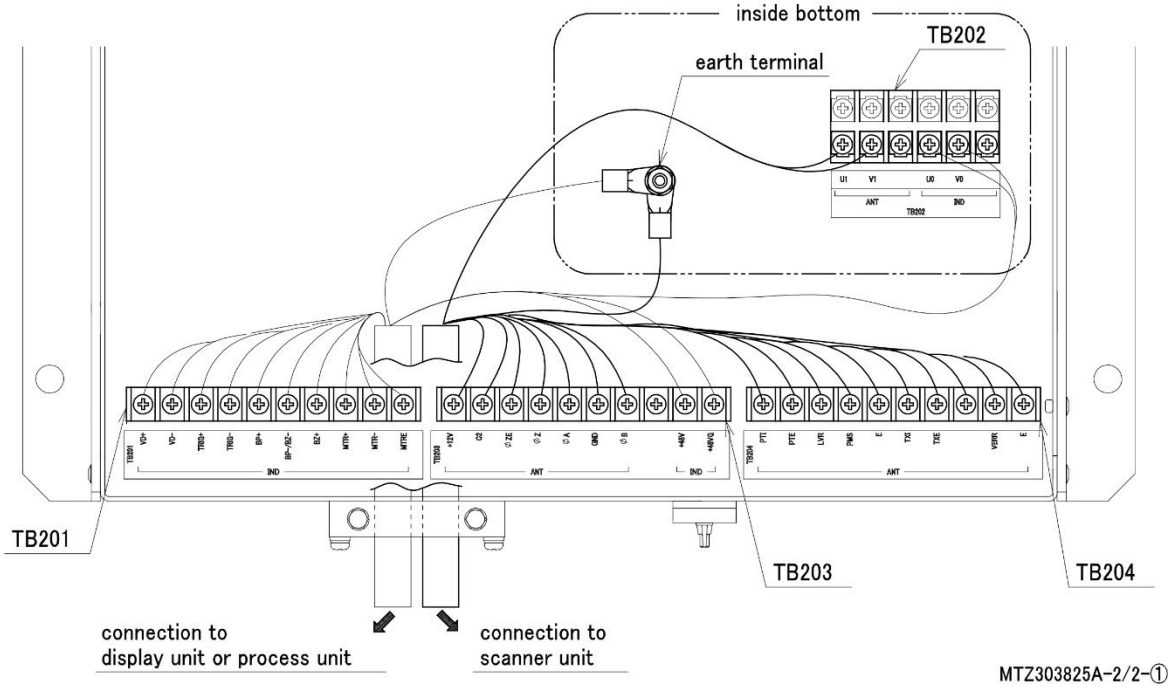
5. Connect the cables to each terminal.

ケーブルの端末を各部に接続してください。





Connected chart
接続図(詳細)



MTZ303825A-2/2-①

2.4 PRECAUTIONS



Microwave radiation level:

Keep away from a scanner when it is transmitting.

The high level of microwave is radiated from the front face of the scanner specified below. The microwave exposure at close range could result in injuries (especially of the eyes).

Microwave radiation level

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



Make sure to install the scanner at a place higher than human height.

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



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



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 without unplugging the power connector may result in electrocution, equipment failure, or accidents.

2.4.1 Installation of radar antenna

1) Precautions for transporting and storing the radar antenna

- A radar antenna is a heavy load. Be very careful about handling it.
- Do not allow the radar antenna fall on its side while it is stored or being installed.
- Do not apply rope to the radar antenna in the way that squeezes or deforms the radiating section.
- When hoisting the radar antenna by a crane, do not hoist it by attaching a belt or a rope only to the radar antenna's radiating section as shown in **Fig 2-4 Improper way to hoist**.
- **When lifting the S-band radar antenna (Fig 2-5 S-band)**:

  When lifting the radar antenna with the radiator by a crane, attach a rope (or belt/wire) to four hoisting eyebolts attached to the radar antenna's chassis, and then lift the radar antenna so that a protector attached on the radiator will be located between the rope and radiator.

  Use suitable rope in length so that the distance from the crane's hook to the hoisting eyebolts will be 2.5m or more.

  Use the protector attached on the radiator in factory, an additional protector should be not used. Because excessive protector will cause damage to the radiator's radome. After installation of the radar antenna, remove the protector from the radiator.

  If the lifting rope is attached to the radar antenna's support section located at the bottom of the radiator, a load is imposed to the joint between the radiator and the chassis, then this will cause damage.

  On lifting the radar antenna, if the lifting rope (or belt/wire) is short, or a protector is not used, it will scratch the radiator's radome.

  If, moreover, excessive protector is attached to the radiator's redome, the redome will be overloaded and possibly be damaged (cracked, for example). So care should be taken.
- **When lifting the X-band radar antenna** (**Fig 2-6 X-band**):

  Wrap a cloth around the radar antenna's support section located at the bottom of the radiator, and then attach a rope to it to lift the radar antenna.

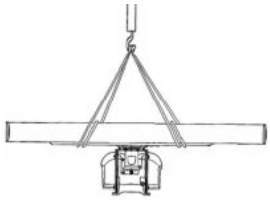


Fig 2-4 Improper way to hoist

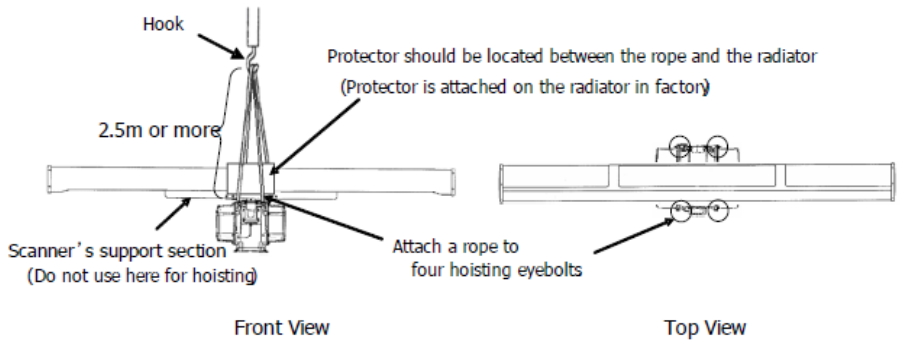


Fig 2-5 S-band

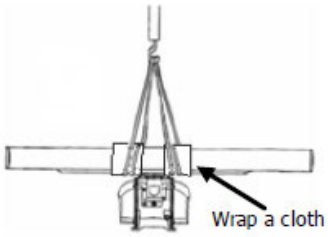


Fig 2-6 X-band

2) Installation procedures

a. Maintain a flat level surface on which to install the radar antenna.

- Use sufficiently thick steel material and reinforcement material for the radar antenna's installation surface (mount base) to reduce vibration and impact. Keep the mount base flat and smooth.
- If there is a partial gap between the mount base and the radar antenna chassis's legs, work on the installation surface so that it becomes flat and smooth. If a gap exists and the radar antenna is tightly clamped, the chassis will distort and become damaged by vibration.

b. Avoid using vibration-proof rubber and resin

- Do not insert an elastic body, such as vibration-proof rubber or resin, between the mount base and the radar antenna chassis' legs. If rubber or resin is inserted, the amplitude of vibration increases, resulting in the possibility of damage to the radar antenna. Furthermore, if installation bolts become loose due to deterioration of rubber or resin, the radar antenna may be damaged or fall from its mount.

3) Installation and clamping method

a. Installation direction

- Installation should be done so that the cable gland is oriented toward the stern.

b. Bolts, nuts and tightening torque to be used

- Use stainless steel bolts for the radar antenna and uniformly tighten all of the bolts using double nuts for each bolt so that the bolts will not become loose (**Table 2-4 Length of radar antenna mounting bolts and tightening torque**).
- Although the length of the bolt will differ according to the thickness of the mount base, use a bolt long enough so that more than 4 millimeters of thread protrudes beyond the double nuts after the double nuts have been tightened.

Table 2-4 Length of radar antenna mounting bolts and tightening torque

	Thickness of Mount Base(mm)	Bolt	Torque(N-m)
S-band	19	M12×65(mm) SUS304	65
X-band	12	M10×55(mm) SUS304	40

c. Use of washer and corrosion-resistant measures

- At the location where a bolt's head or nut comes in contact with the radar antenna chassis' legs and the mount base, insert a plain washer which fits the bolt; and, at the location where the nut comes in contact with the plain washer, insert a spring washer, and then securely tighten the nuts (**Fig 2-7 Use of washer and corrosion-resistant measures**).
- To prevent corrosion due to the contacts between different metals, such as the radar antenna chassis' legs, installation surface, bolts, nuts, etc., cover the bolt's head and nuts with sealant (**Fig 2-7 Use of washer and corrosion-resistant measures**).

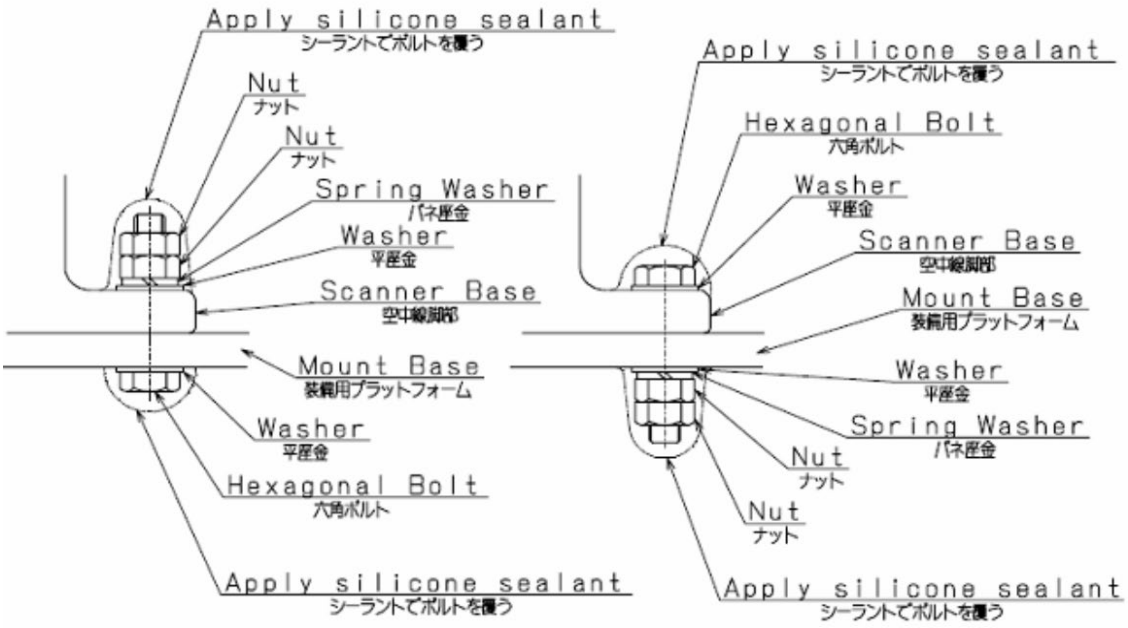


Fig 2-7 Use of washer and corrosion-resistant measures

d. Grounding and corrosion-resistant measures

- Ground the radar antenna chassis and the installation surface (hull) by using an earth line. Apply sealant to the connection portion of the earth line to prevent corrosion and damage by vibration (**Fig 2-8 Grounding and corrosion-resistant measures**).

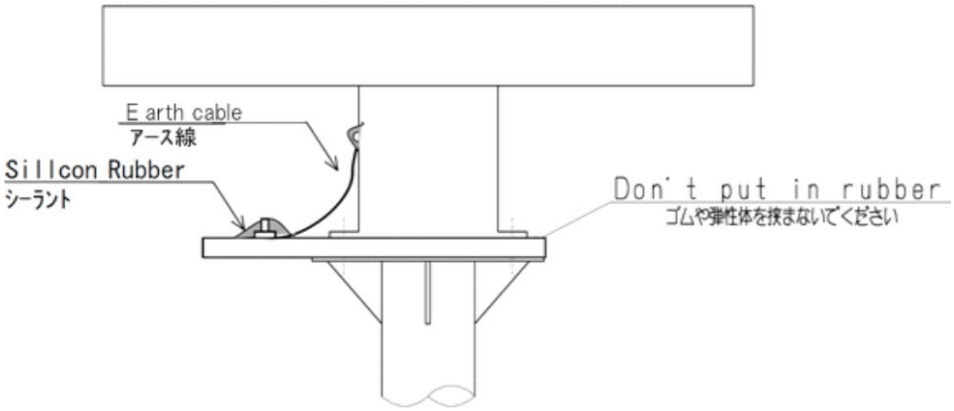


Fig 2-8 Grounding and corrosion-resistant measures

2.4.2 Routing coaxial cable and flexible wave guide

In the case of the three-unit system consisting of the display unit, transmitter-receiver, and the radar antenna, use a Coaxial cable, shown in **Fig 2-9 Coaxial cable**, between the transmitter-receiver and the radar antenna for the S-band, and use a Flexible wave guide, shown in **Fig 2-10 Flexible wave guide**, for the X-band.

1) Protecting coaxial cable and flexible wave guide

- Since cables and wave guides are hollow inside, when mounting them by using electric wire bands, try not to fasten the bands too tightly around the cables and wave guides. If they are fastened too tightly, the inside will become deformed or blocked, which may cause the receiving sensitivity to decrease or the transmitter-receiver to be damaged.

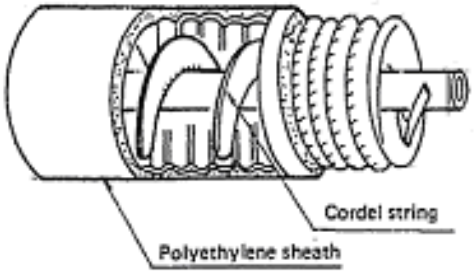


Fig 2-9 Coaxial cable

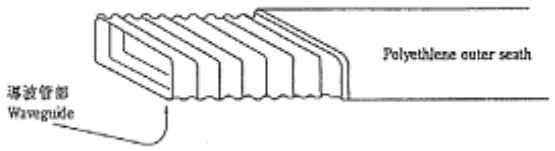


Fig 2-10 Flexible wave guide

Stabilize the coaxial cable and the flexible wave guide by supporting members that are at maximum intervals of 1000 millimeters. Mount an angle whose height is 300 mm to 400 mm as a supporting member for the horizontal wiring portion on the compass deck, and put a protective metal cover over the cable and wave guide.

2) Preventing the connecting portion from becoming detached due to vibration

- So that the connecting portions between the coaxial cable, the flexible wave guide and the radar antenna's chassis stay level, and in order to prevent the connecting portion from becoming detached due to vibration, provide supporting members, as shown in **Fig 2-11 Position of S-band supporting member** and **Fig 2-12 Position of X-band supporting member**.
- The distance from the connecting portion and the supporting member should be 400 millimeters for the S-band and 300 millimeters for X-band.
- If the distance from the connecting portion and the supporting member is longer than the above distance, vibration may cause metal fatigue, resulting in the occurrence of malfunction even if the connecting portion is not removed.

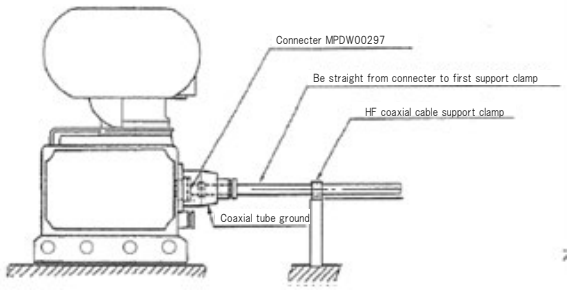


Fig 2-11 Position of S-band supporting member

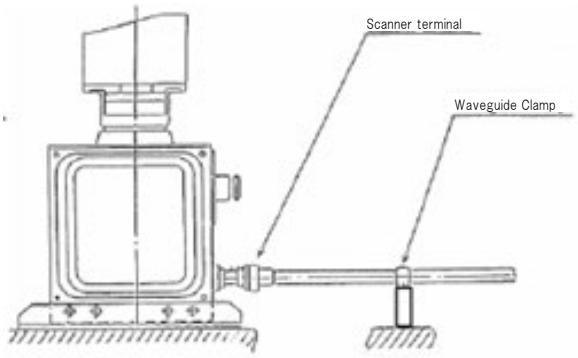


Fig 2-12 Position of X-band supporting member

- For the cable end processing, refer to the procedure manual which comes with the cable.

3) Permissible bending radius

- The permissible bending radius R of flexible wave guide is 200mm/400mm (E-bent/H-bent). More sharp bending with less radius than this must be avoided.
- The permissible bending radius R of coaxial cable is 350mm. More sharp bending with less radius than this must be avoided.

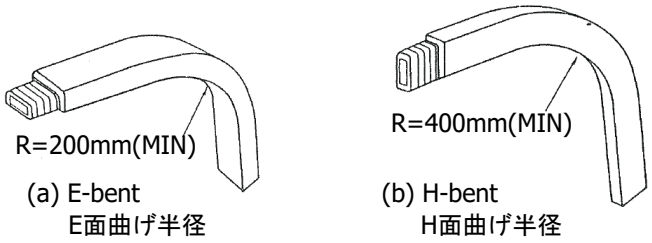


Fig 2-13 The permissible bending radius of flexible wave guide

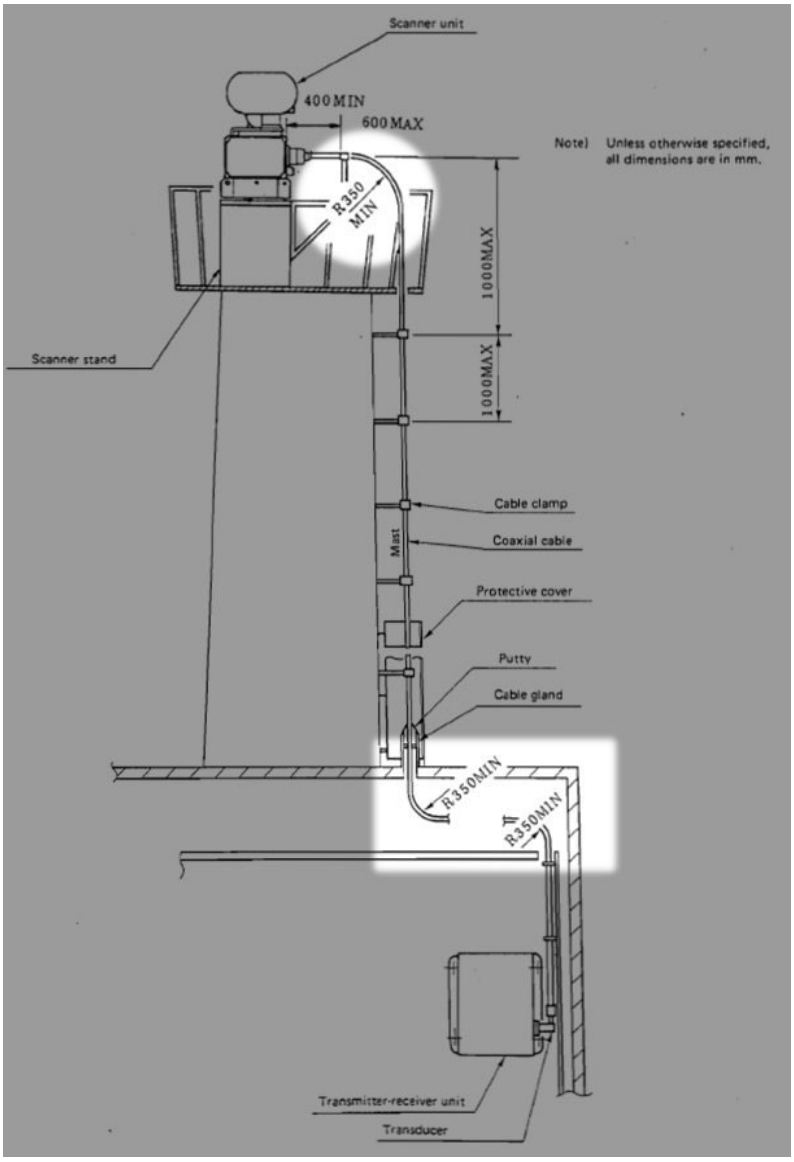


Fig 2-14 The permissible bending radius of coaxial cable

2.4.3 Radar antenna installation position

1) Physical selection criteria

- Install the radar antenna at the center of the mast on the keel line.
- If the radar antenna cannot be installed at the above position for some reason, the amount of deviation must be minimized. And, reinforce the mount base and the platform and take precautions to protect the radar antenna from vibration and impact at the installation position. To avoid the radiating section coming in contact with other installed objects while it is rotating, ensure that there is at least 200 millimeters from the swing circle (turning radius) to other installed objects (Fig 2-15 Installation of radar antenna). The swing circle of the JMR-7200/9200 radar's scanner is as shown in Table 2-5 Swing circle. See “SN.1/Circ.271 6.2(b)”.

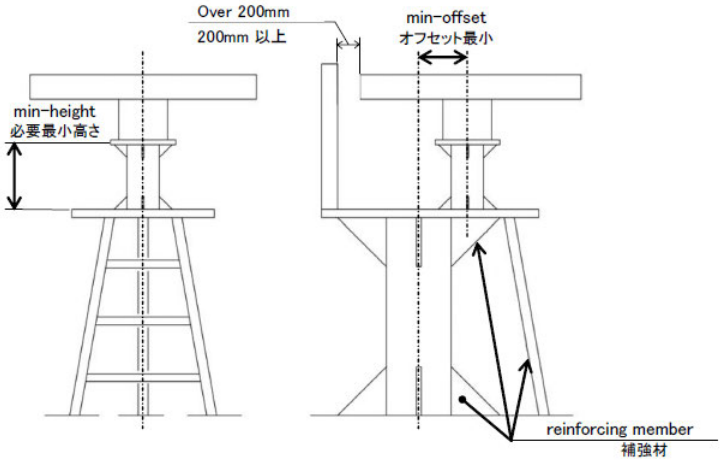


Fig 2-15 Installation of radar antenna

Table 2-5 Swing circle

Radar antenna	(length)	Swing circle
NKE-1696-6	(6ft)	1880 mm
NKE-2103-6/6HS, NKE-1125/A-6, NKE-2254-6HS	(6ft)	1910 mm
NKE-1129/A-7	(7ft)	2270 mm
NKE-2632/A, NKE-2632-H	(8ft)	2770 mm
NKE-1696-9	(9ft)	2810 mm
NKE-1125/A-9, NKE-1129/A-9	(9ft)	2825 mm
NKE-1130/A, NKE-1139/A, NKE-1632/A	(12ft)	4000 mm

- Avoid having a rope or signal flag from winding around the radiating section thereby preventing it from rotating.
- Avoid the effects of dust and heat caused by smoke from a chimney.
- When determining the appropriate radar antenna height and installation location, take into consideration the reduction of vibration, the strength of the hull and the radar antenna mount base, and maintenance properties.
- Provide for maintenance space: platform, safety link, hand rail, steps, etc. The lower edge of a radar antenna should be a minimum of 500 mm above any safety rail. See “SN.1/Circ.271 6.1(b)”.
- When installing the radar antenna, select a location where there are the fewest structural objects in the surrounding area so that the capability to drive the motor will not be depressed by the non-equability wind which is likely to rotate the radar antenna.

2) Electrical selection criteria

- The installation height of the radar antenna relates to the *maximum detection distance*. The higher, the better. However, if it is too high, radio wave energy greatly attenuates above the radar antenna's vertical beam width (the point -3dB from the peak of the main lobe). As a result, it is difficult to detect a close-in target. Sea clutter also increases. Determine the installation height by taking into consideration the weight, maximum length of the cable, and maintenance after installation. See “SN.1/Circ.271 6.3(b), 7.1”.
- If the installation height of the radar antenna is low, it is difficult to detect a long distance target. The ship's mast, derrick, and chimney interfere with radiating beam causing the range that cannot be viewed on the radar display to increase.
  Generally, the lowest radar antenna installation position is supposed to be on the A-B line shown in **Fig 2-16 Lowest radar antenna installation height**.
  - In the case of the JMR-7210/7225/7296/9210/9225/9296 type radar, 2θ equals 20°.
  - In the case of the JMR-7230/7272/7282/9230/9272/9282 type radar, 2θ equals 25°. Specifically, the radar antenna position is normally elevated so that the chimney and the shrine-gate type mast do not interfere with radiating beam.
  - The A-B line shown in **Fig 2-16 Lowest radar antenna installation height**, or L line of sight from the radar antenna to the bow of the ship should hit the surface of the sea in not more than 500 m or twice the ship length, depending which value is smaller, for all load and trim conditions.
  - See “SN.1/Circ.271 6.3(a)”.

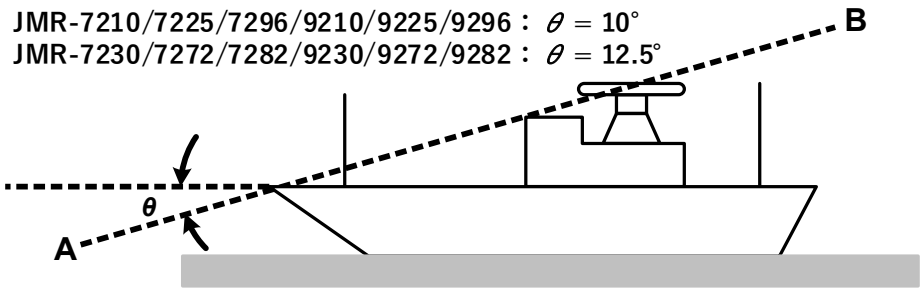


Fig 2-16 Lowest radar antenna installation height

- If it is considered that sufficient installation height cannot be provided when the radar antenna is installed directly on the roof of the wheelhouse, use a mounting rack or radar mast (**Fig 2-17 Mounting rack and mast for the radar antenna**). Normally, when the radar antenna installation height is less than 2 meters from the roof of the wheelhouse, provide a mounting rack assembled with angles to install the radar antenna. When the radar antenna installation height is 2 meters or higher from the roof of the wheelhouse, provide a cylindrical radar mast to install the radar antenna.
  Consider the convenience of the service staff who take care of installation, maintenance, adjustment, and repair of the radar antenna by providing adequate footholds to the mounting rack and the radar mast.

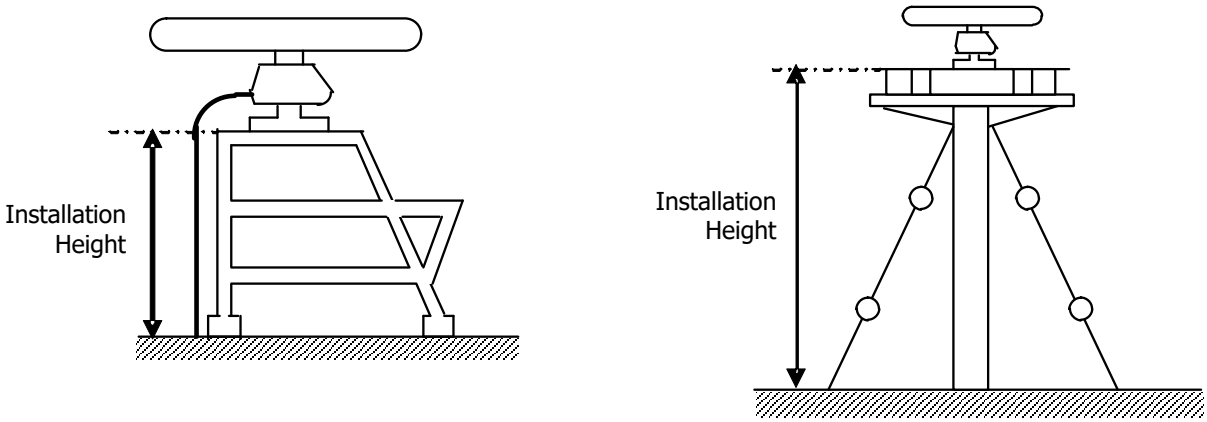


Fig 2-17 Mounting rack and mast for the radar antenna

- When installing the radar antenna, select a location where there are the fewest structural objects in the surrounding area so that false echoes which interfere with target detection will not be generated by signal reflection from other radar antennas, deck structures, and cargo. Only as a guide, note that structural objects should not exist within the range of the vertical beam width (**Fig 2-18 Radar antenna and the surrounding structural objects**). See “SN.1/Circ.271 6.2(a)”.
  - **Vertical beam width of X-band: Approx. 20° (±10.0° when the height of the radiating section is 0°)**
  - **Vertical beam width of S-band: Approx. 25° (±12.5° when the height of the radiating section is 0°)**

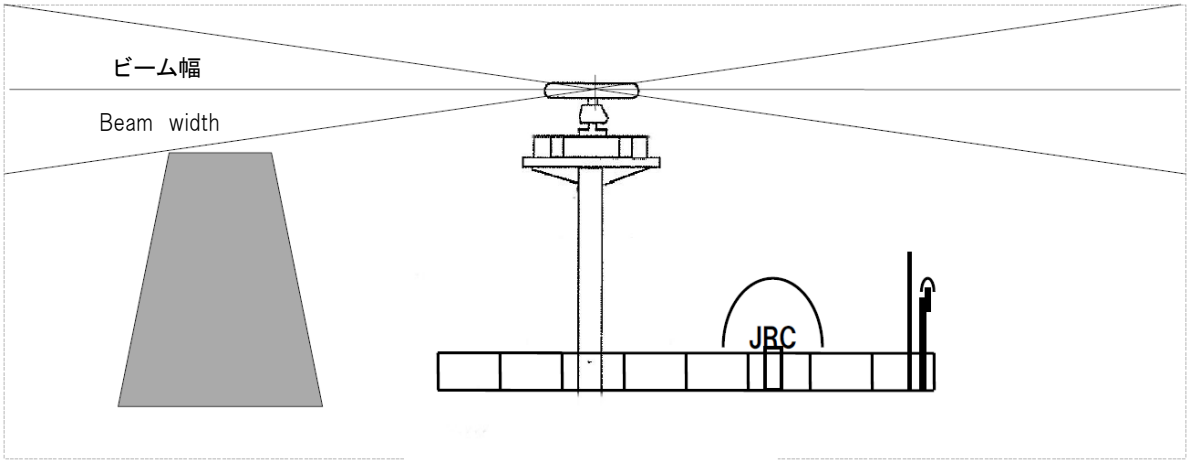
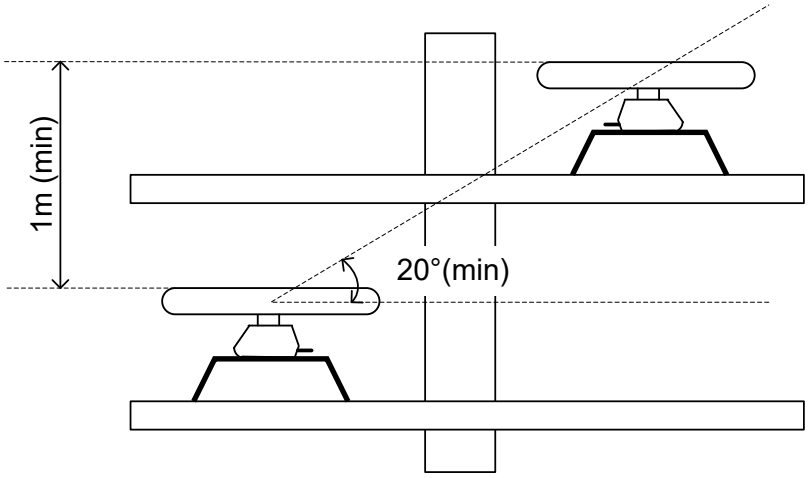


Fig 2-18 Radar antenna and the surrounding structural objects

- When installing two or more radar antennas, radar antennas in close proximity should have a minimum vertical elevation separation angle of 20° and a minimum vertical separation of 1m where possible, so that those radar antennas do not enter each other's vertical beam width range. See “SN.1/Circ.271 6.1(c)”.



- To avoid interference with other equipment and to prevent radio noise from generating, do not place the VHF antenna, GPS antenna, and INMARSAT's redome within the range of the vertical beam width. See “SN.1/Circ.271 6.1(a)”.
- Keep a record of installation height data. The data is necessary for the initial setting of the display unit.
- Minimize the blind sector, and ensure the adequate view angle so that the blind sector does not exist in the range 22.5° from side to rear (**Fig 2-19 Ensuring view angle**). Specifically, ensure a sufficient view field in the straight front (relative bearing 000°). See “SN.1/Circ.271 6.3(c)”.
- Individual blind sectors of more than 5°, or a total arc of blind sectors of more than 20°, should not occur in the remaining arc, excluding the arc in **Fig 2-19 Ensuring view angle**. See “SN.1/Circ.271 6.3(d)”.
- For radar installations with two radar systems, where possible, the antennas should be placed in such a way as to minimize the blind sectors. See “SN.1/Circ.271 6.3(e)”.

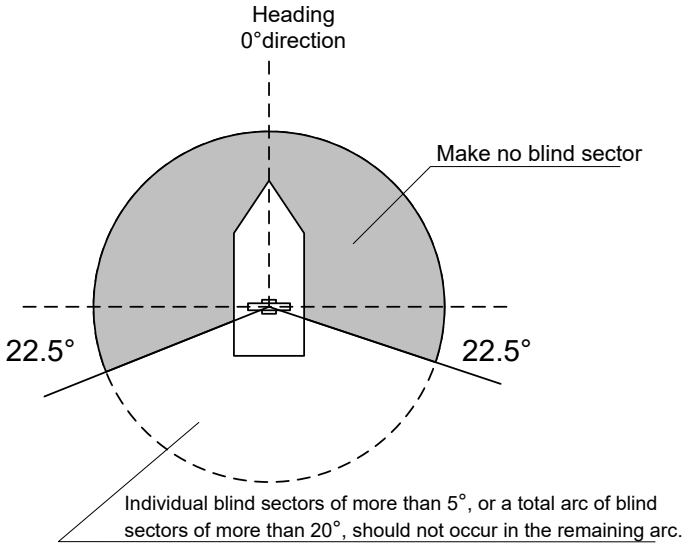


Fig 2-19 Ensuring view angle

- Magnetron which has strong magnetic force is included in the radar antenna. Install the radar antenna at least 6 meters away from nautical instruments including magnetic compasses and chronometers. See “SN.1/Circ.271 6.2(c), 7(c)”.

*If there is a concern that structural objects existing within the vertical beam width may generate false echo, equip the structural objects with a radio wave absorber. (There are two types of absorbers: broadband type having no specific resonant frequency and narrowband type which can absorb a band with a specific frequency. Use those where applicable.) Furthermore, it is effective to install a metal reflector, which reflects radio waves upwardly, between the radar antenna and a structural object so that the radar's radio wave will not directly come in contact with the structural object.

When the structural objects exist in the surrounding area of radar antenna, the false echo may appear. The sector blank function is effective to reduce the signal reflection from the structural objects. Because it can stop transmission. Therefore, it may reduce the false echo appearance.

	Because most radio wave absorbers have poor durability, some must be replaced every year. When installing a reflector, the area to the rear of the reflector becomes a blind sector. Therefore, minimize the size of the reflector. When the sector blank function set to on, ensure a sufficient view field in the straight front.

*The above procedures for selecting a radar antenna installation position are described based on the radar's scanner. Comprehensively select the radar antenna position by considering other radar antenna's installation procedure manual, hull's structure, strength of the selected position, and vibration.

2.4.4 Confirmation during test run

If the radar antenna vibrates a lot during test run, try to reduce or prevent vibration by reinforcing the radar antenna mount base or using wire stays attached to the radar mast.

2.4.5 Others

- The design of the mounting platform for the radar antenna should take into account the vibration requirements of resolution A.694(17) and furthermore defined by IEC 60945. See “SN.1/Circ.271 7(d)”.

Vibration	2 to 13.2Hz	Amplitude	+/-1mm +/-10%
	13.2 to 100Hz	Acceleration	7m/s^2

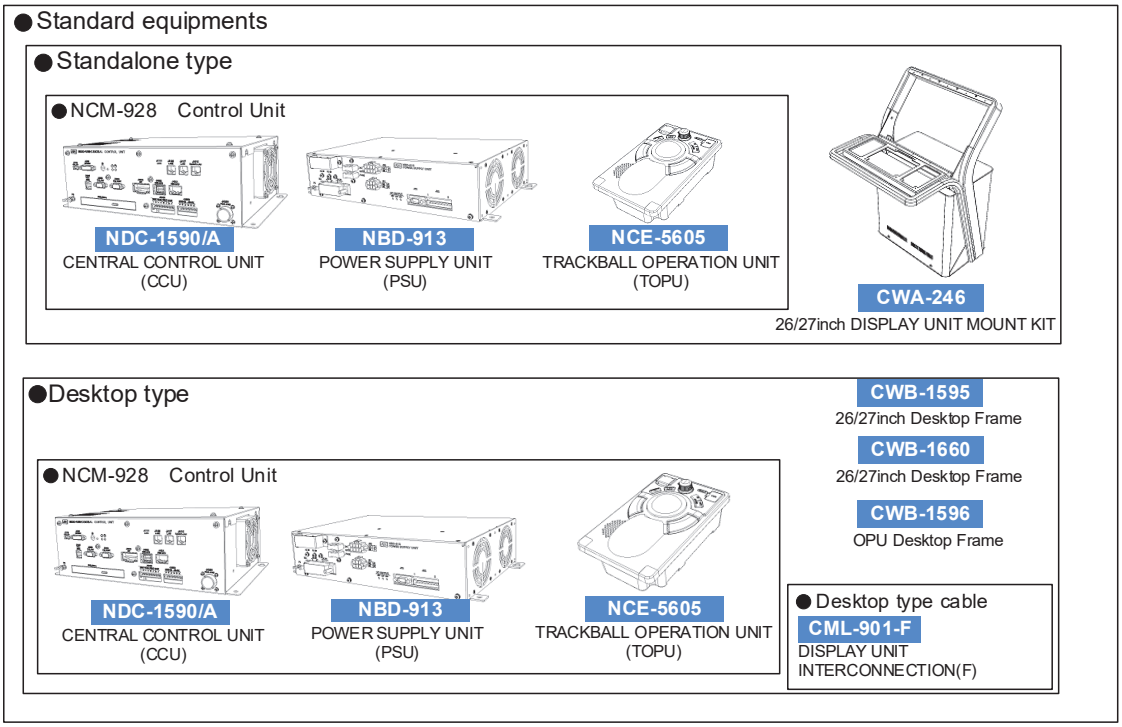
- All installations should facilitate protection of equipment, including cabling, from damage.
- The cables should be kept as short as possible to minimize attenuation of the signal. See “SN.1/Circ.271 7.2(b)”.
- Crossing of cables should be done at right angles(90°) to minimize magnetic field coupling. See “SN.1/Circ.271 7.2(e)”.
- All cables of the radar are to be run away from the cables of other radio equipment as much as possible, thereby eliminating the interference on frequencies used for other radio equipment due to the radar operation. Especially, radar antenna equipment cables should not be run parallel with the cables of other radio equipment. See “SN.1/Circ.271 7.2(h)”.

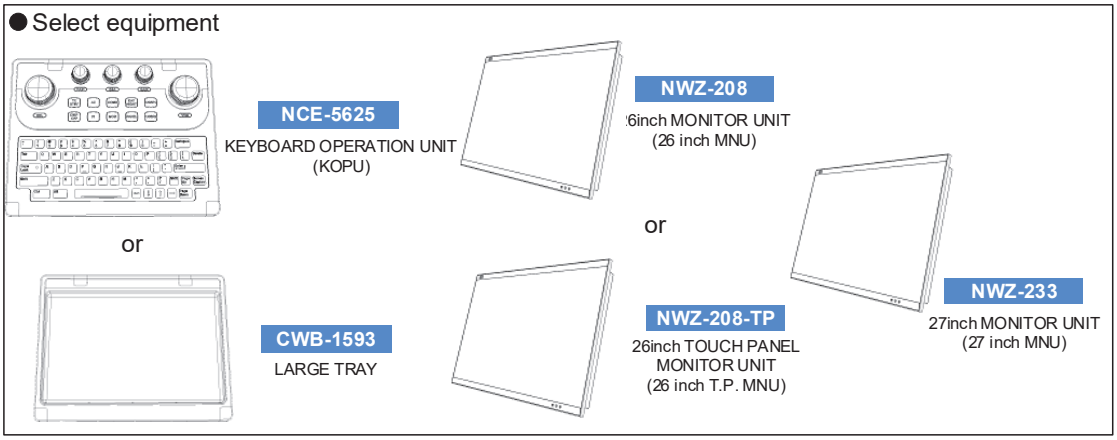
- Cable, coaxial cable and flexible wave guide should not be exposed sharp bends. See also section 2.4.2 (4) “3) Permissible bending radius”. See “SN.1/Circ.271 7.2(g)”.
- Radar antennas and transmitter-receivers should be installed securely according to their installation instructions. See “SN.1/Circ.271 7.2(i)”.

3 Installation of Display Unit

3.1 Confirmation of Various Units

3.1.1 In case of JMR-9200Series/JAN-9201/JAN-9202





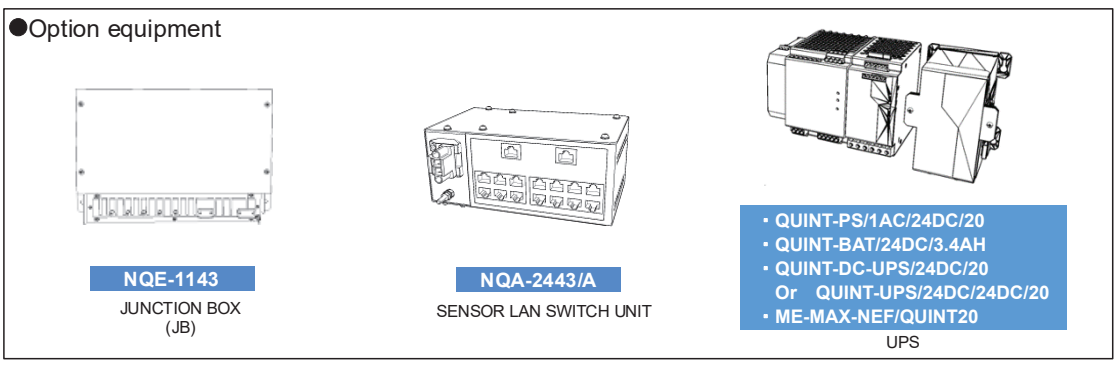


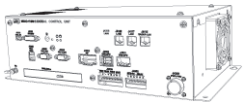
Fig3-1: JMR-9200Series/JAN-9201/JAN-9202 Equipment

3.1.2 In case of JMR-7200 Series/JAN-7201/JAN-7202

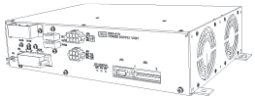
●Standard equipment

●Stand alone type

●NCM-928 Control Unit



NDC-1590/A
CENTRAL CONTROL UNIT
(CCU)



NBD-913
POWER SUPPLY UNIT
(PSU)



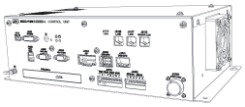
NCE-5605
TRACKBALL OPERATION UNIT
(TOPU)



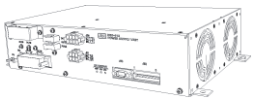
CWA-245
19inch DISPLAY UNIT MOUNT KIT

●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

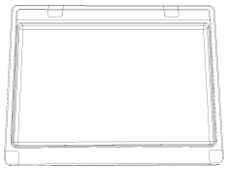
●Desktop type Cable
CML-901-F
DISPLAY UNIT INTERCONNECTION(F)

●Select equipment



NCE-5625
KEYBOARD OPERATION UNIT
(KOPU)

or



CWB-1593
LARGE TRAY



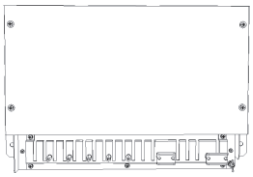
or



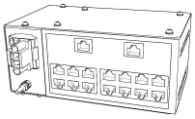
NWZ-207
or
NWZ-214
19inch MONITOR UNIT
(19 inch MNU)

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**

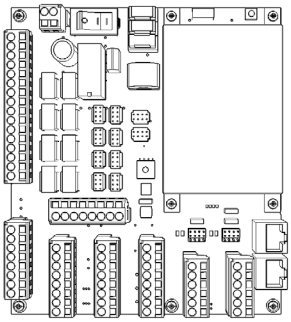
UPS

Fig 3-2: JMR-7200Series/JAN-7201/JAN-7202 Equipment

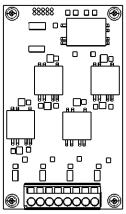
3.2 Confirmation of Various Interface Boards

NQE-1143 Junction Box (JB) consists of interface boards that correspond with the suffix.
Type of interface board is as follow.

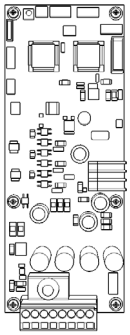
● Interface board



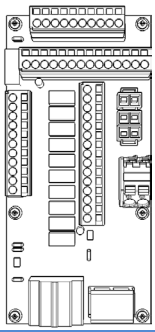
CMH-2370(PC810)
Serial LAN Interface Circuit(SLC)



CMJ-560(PC840)
Analog Option Circuit(AOC)



CMJ-554(PC820)
Gyro Interface Circuit(GIF)



CQD-2273(PC830)
Radar Interface Circuit(RIF)

Fig 3-3: Outline of Interface board

Table 3-1: Definition of the JB Type

Suffix	SLC	AOC	GIF	RIF	SLC#2
-R				✓	
-S	✓				
-SR	✓			✓	
-SS	✓				✓
-GR			✓	✓	
-SAR	✓	✓		✓	
-SA	✓	✓			
-SGR	✓		✓	✓	
-SAGR	✓	✓	✓	✓	
-SG	✓		✓		
-SAG	✓	✓	✓		
-SAS	✓	✓			✓

Therefore, the “NQE-1143-SAGR JB” consists of CMH-2370 SLC, CMJ-560 AOC, CMJ-554 GIF, and CQD-2273 RIF.

3.3 Selecting the Location for Installation

Determine the installation location of the display unit by considering following conditions:

1) Consider the size of each unit described in the outline drawing, and install the unit where it is possible to fix bolts and insert cables from the bottom of the unit.
2) Do not place obstructions around the front side of the unit so that a user can eject a DVD and USB.
3) To decrease an influence over the magnetic compass, separate from the compass by more than 3.0m at least. See “SN.1/Circ.271 7(c)”.
4) Eliminate 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 cable of radio equipment. (Ex. Radiotelephone, communications receiver and direction finder. Etc…)
   Especially inter-wiring cables between radar antenna and display unit of the radar should not be run parallel with the cable of radio equipment.
5) Install the monitor unit so that when the user is looking ahead, the lookout view is not obscured. See “SN.1/Circ.271 7.4(b)”.
6) Make certain that the unit will not be exposed directly to the spray of seawater or rainwater from windows or doors of the bridge.
7) Do not install the unit near equipment that generates heat, or in a place exposed to direct sunlight.
8) Decide the installation location by referring to the outline drawings shown in the next page and the pages that follow.
   For the cable inlet on the Display Unit Mount Kit, refer to the following drawings.
   - **3.3.11 Outline Drawings of CWA-246 26inch Display Unit Mount** Kit
   - **3.3.12 Outline Drawings of CWA-245 19inch Display Unit Mount** Kit

3.3.1 Outline Drawings of NWZ-208 26inch Monitor Unit

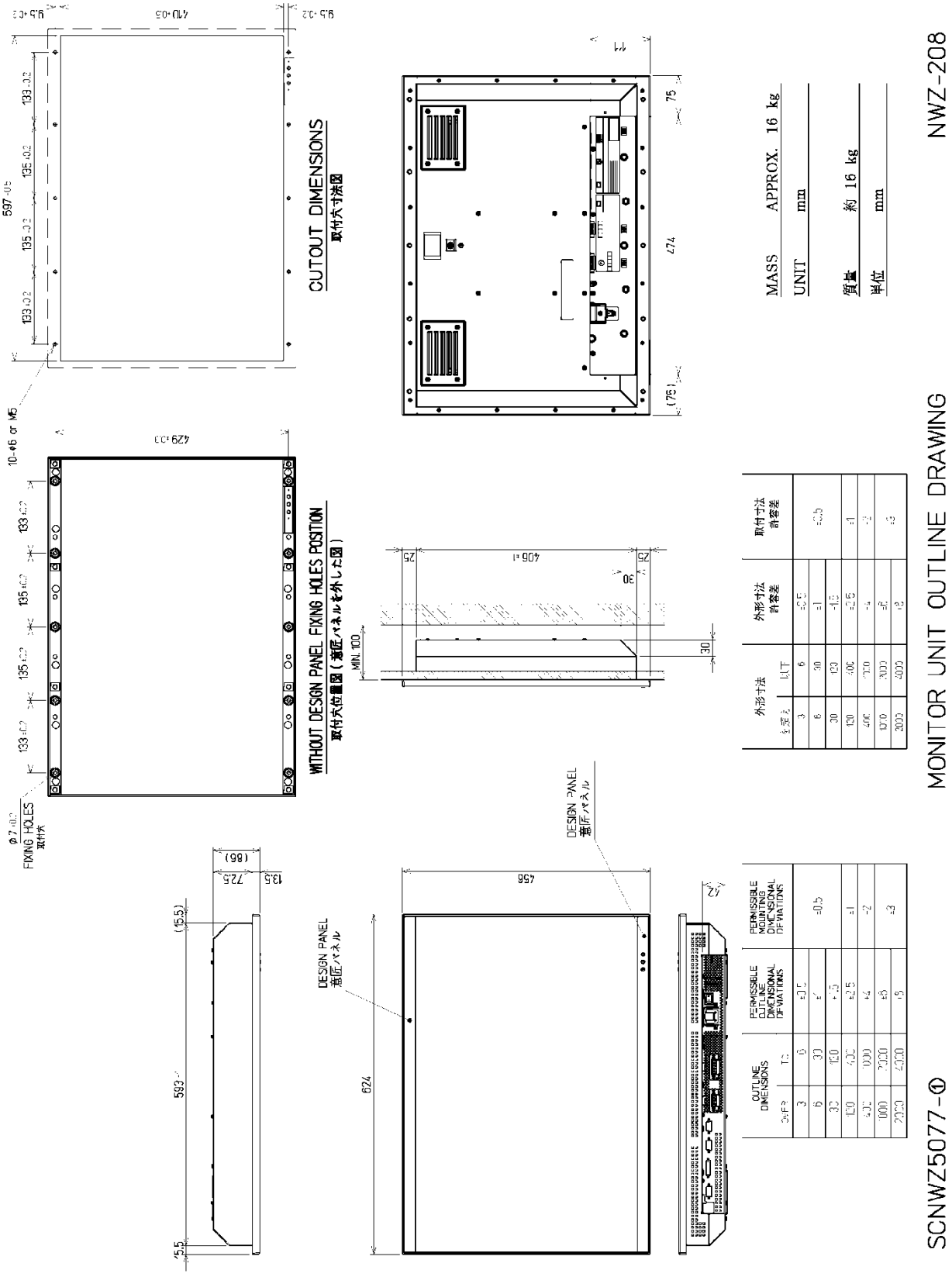


Fig 3-4 Outline Drawings of NWZ-208 26inch Monitor Unit

3.3.2 Outline Drawings of NWZ-233 27inch Monitor Unit

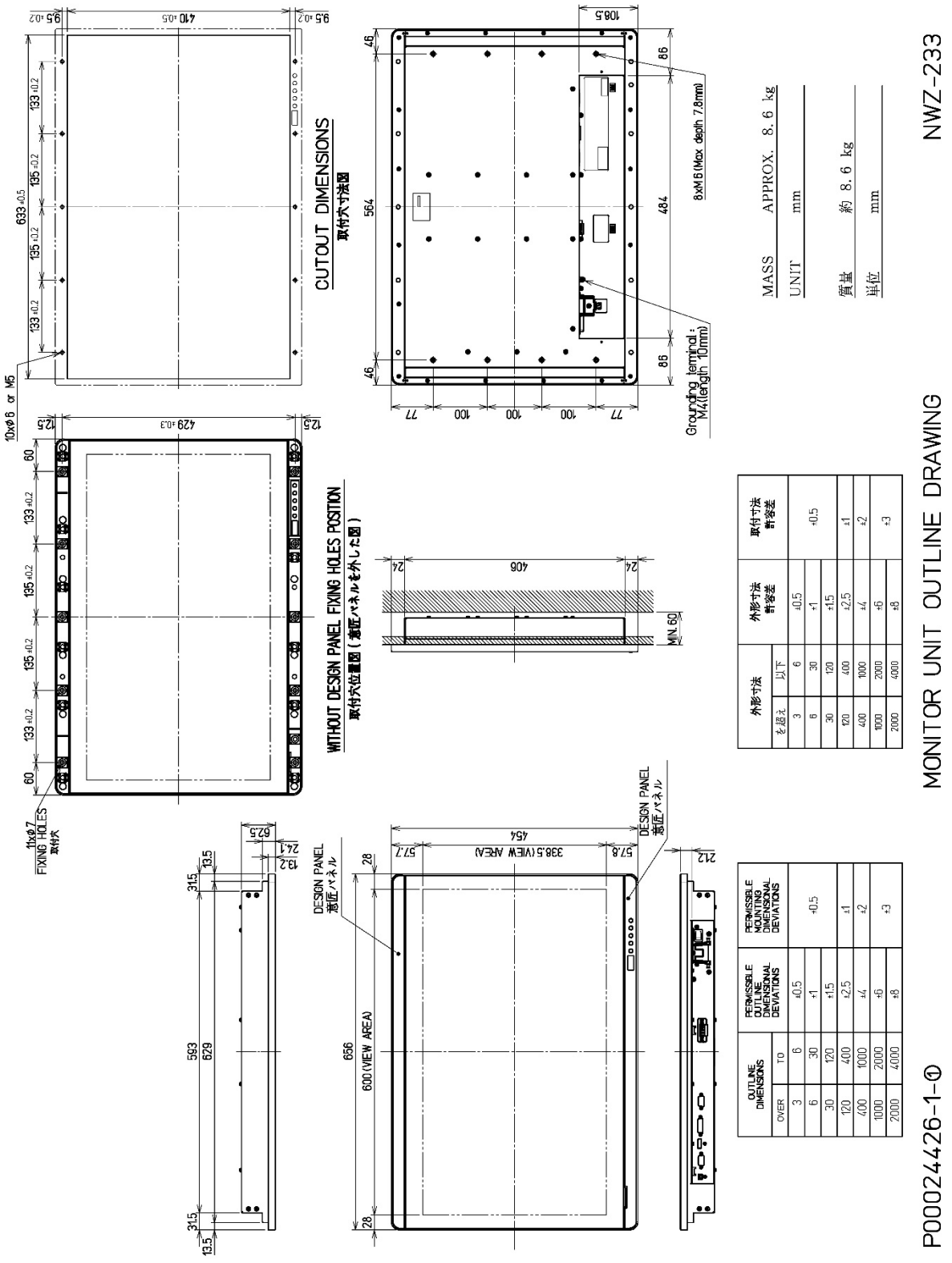


Fig 3-5 Outline Drawings of NWZ-233 27inch Monitor Unit

3.3.3 Outline Drawings of NWZ-233 27inch Monitor Unit (with Adapter)

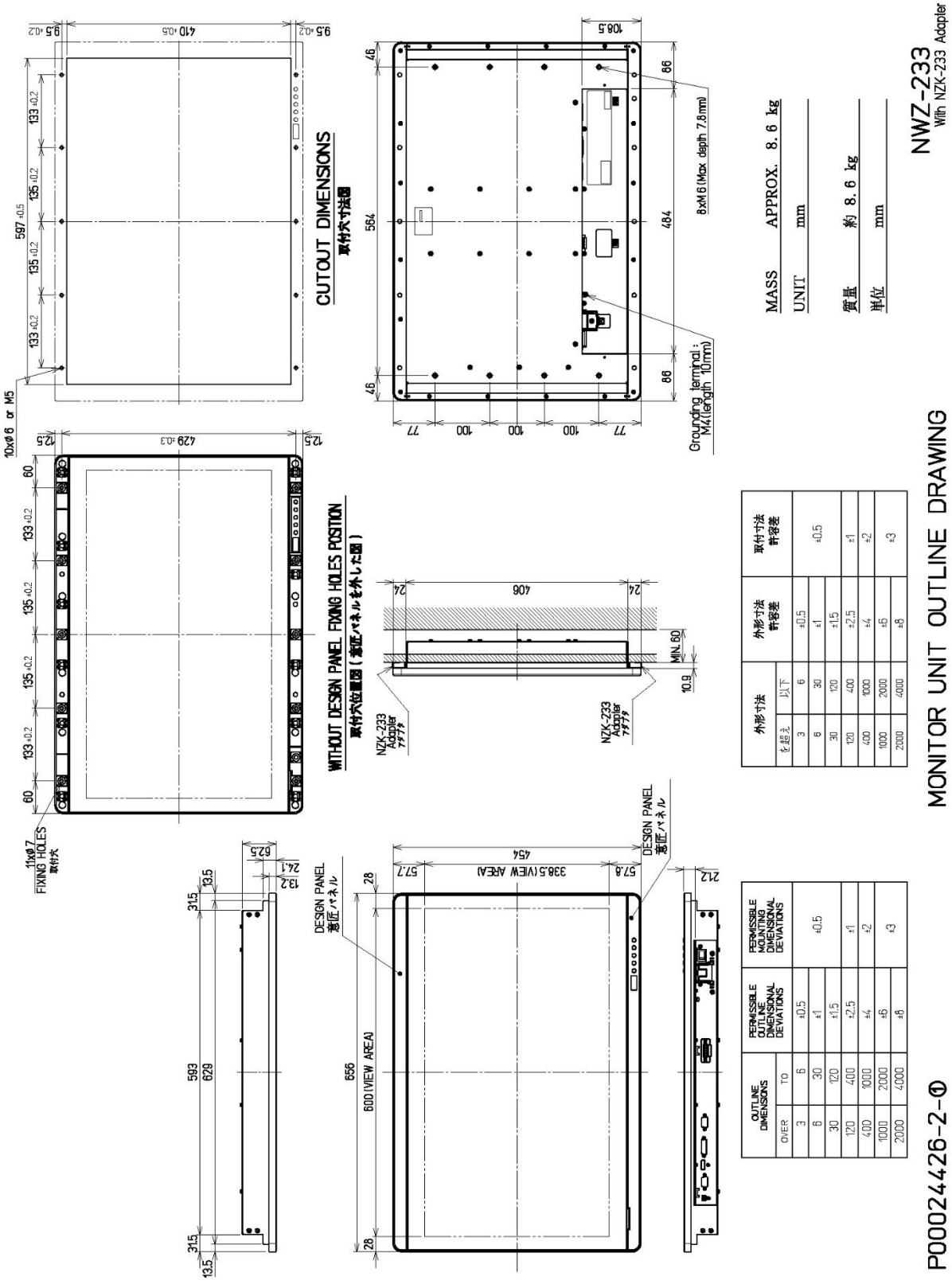


Fig 3-6 Outline Drawings of NWZ-233 27inch Monitor Unit(with Adapter)

3.3.4 Outline Drawings of NWZ-207 19inch Monitor Unit

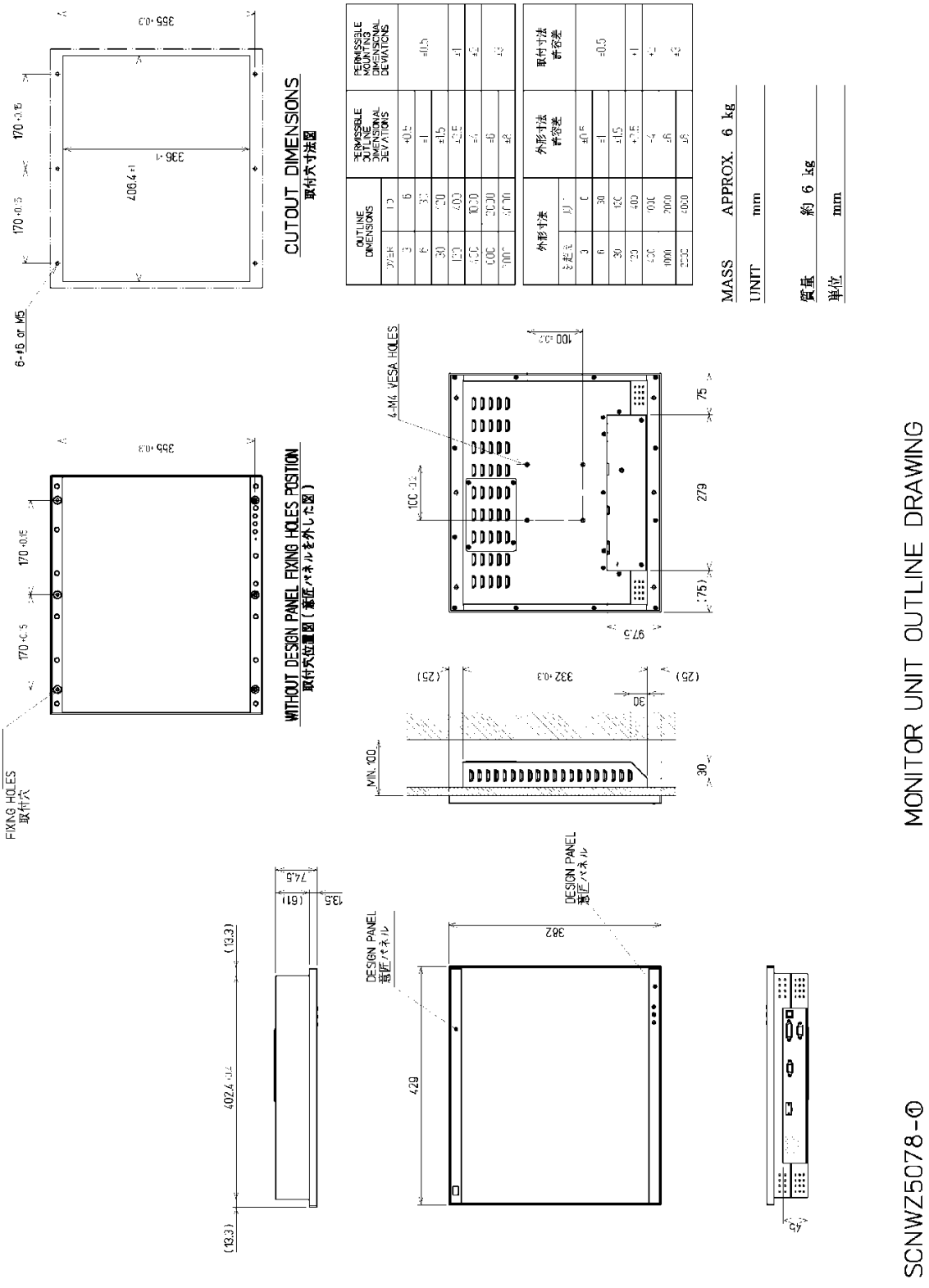
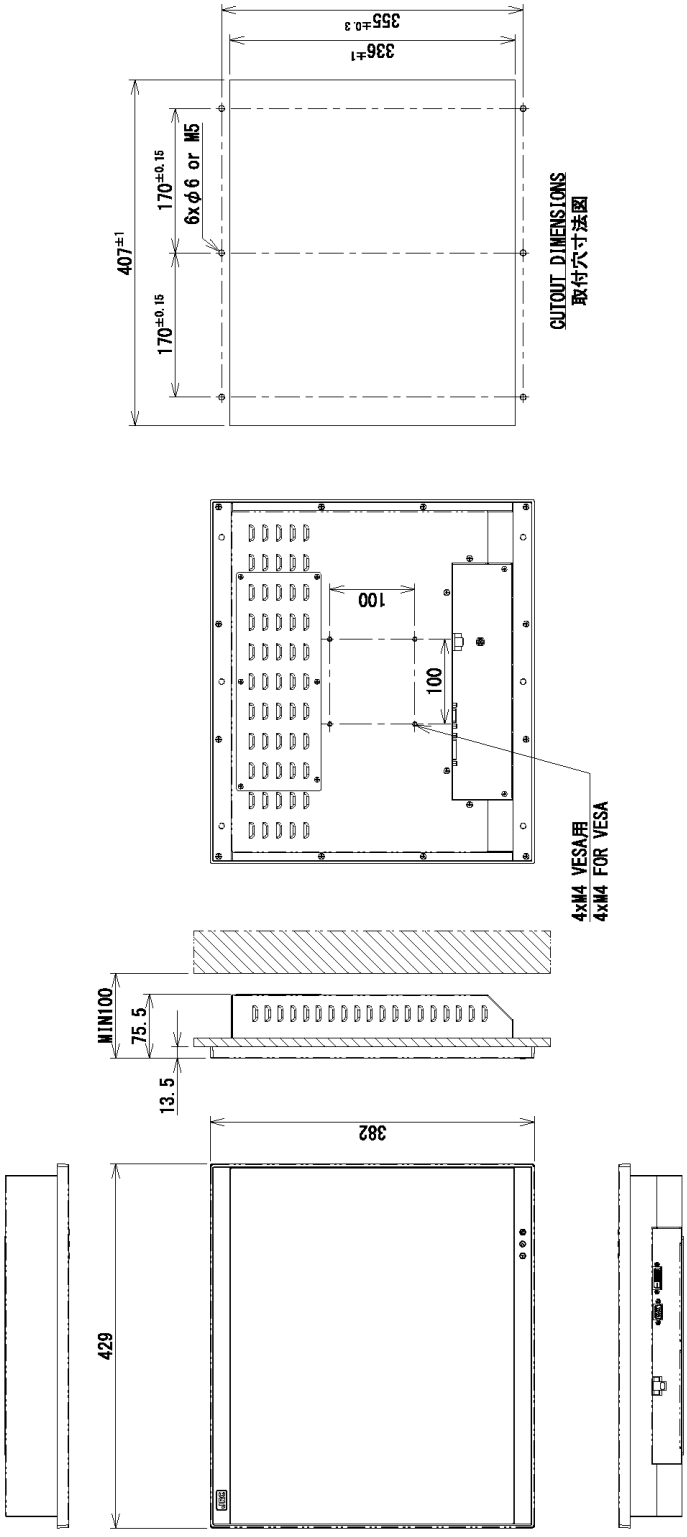


Fig 3-7 Outline Drawings of NWZ-207 19inch Monitor Unit

3.3.5 Outline Drawings of NWZ-214 19inch Monitor Unit



MASS APPROX. 4.6kg
UNIT mm

質量 約 4.6kg
単位 mm

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	

Fig 3-8 Outline Drawings of NWZ-214 19inch Monitor Unit

3.3.6 Outline Drawings of NCE-5605 Trackball Operation Unit

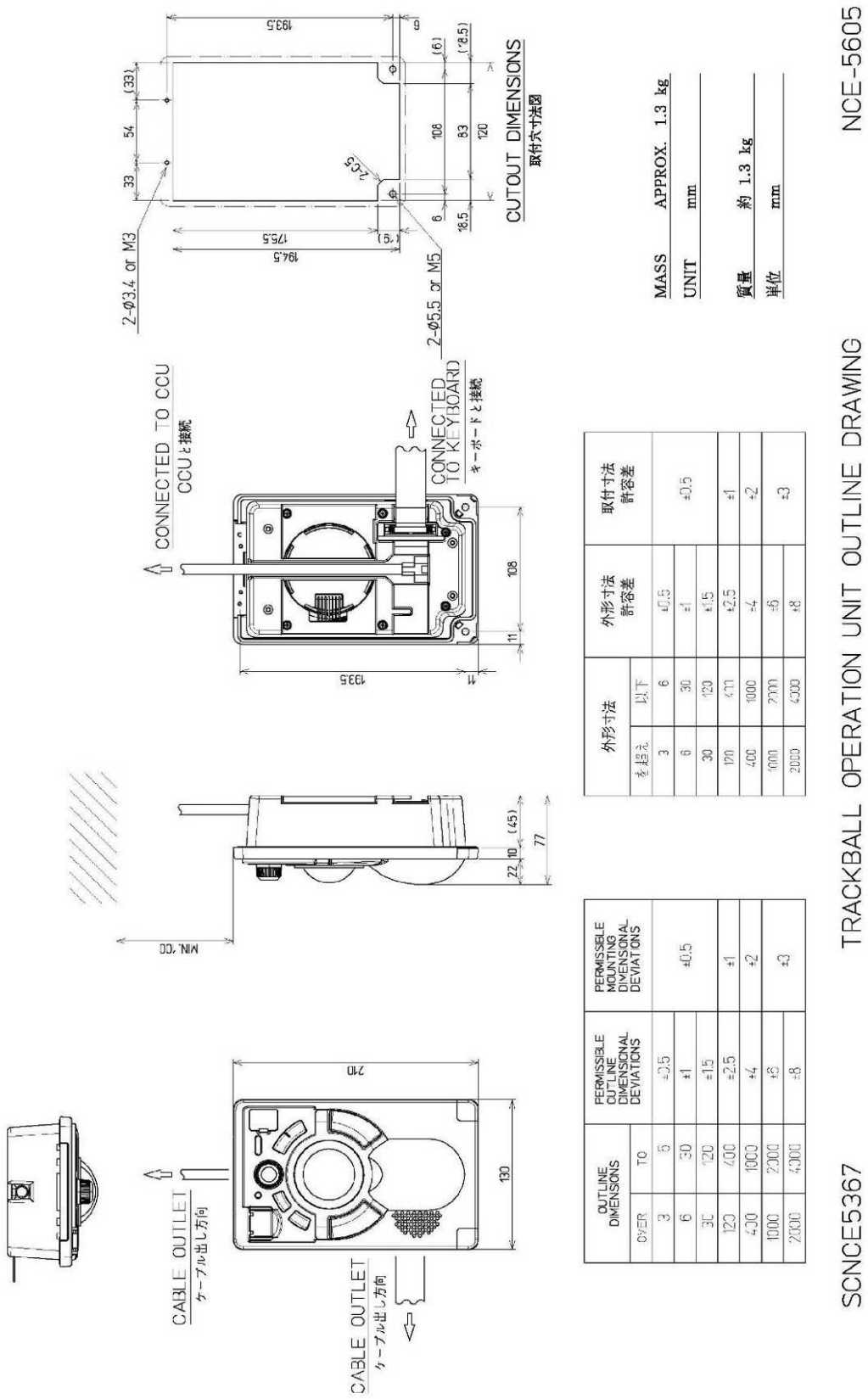
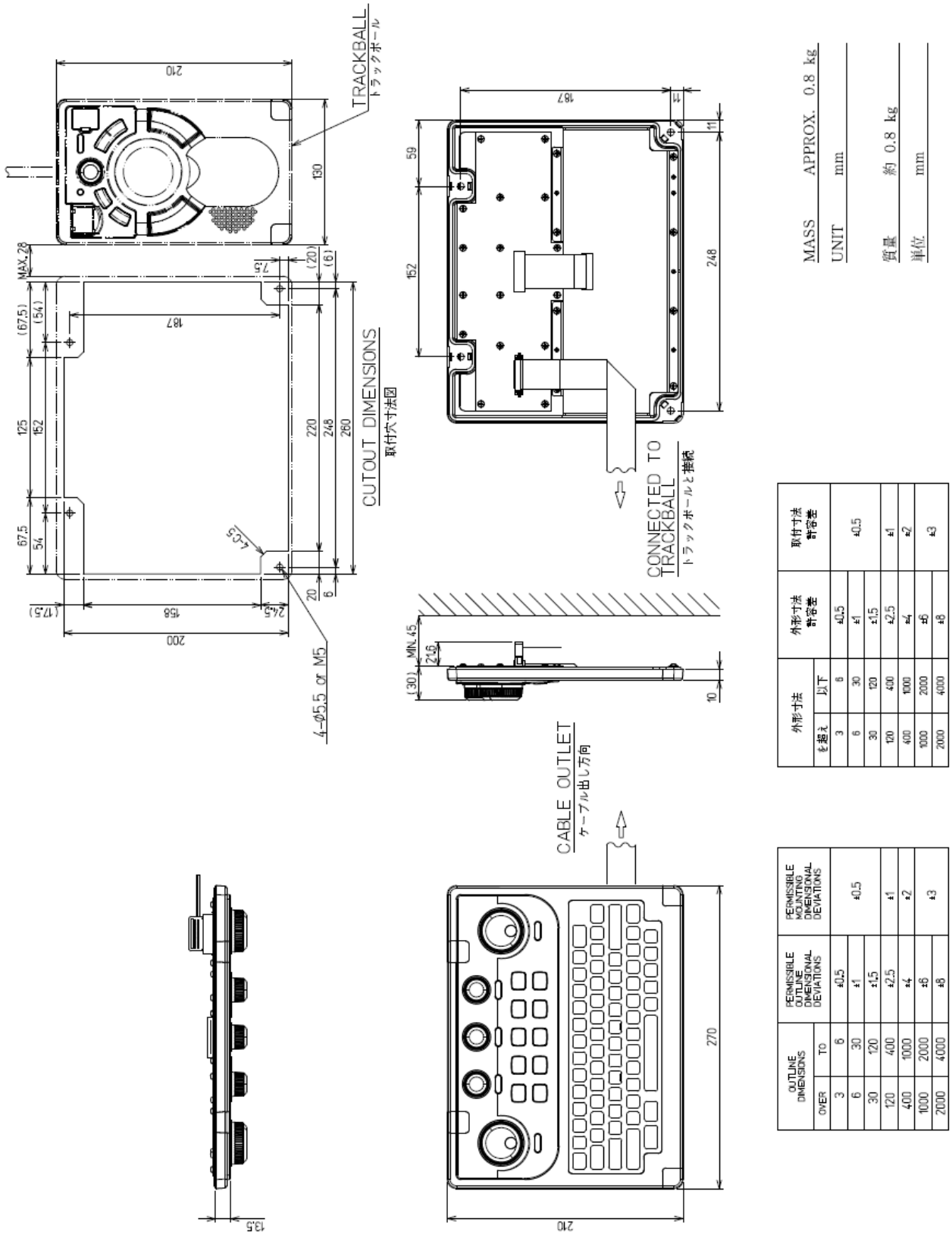


Fig 3-9 Outline Drawings of NCE-5605 Trackball Operation Unit

3.3.7 Outline Drawings of NCE-5625 Keyboard Operation Unit



外形寸法 を超え	以下	外形寸法許容差	取付寸法許容差
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 OVER	TO	PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
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	

Fig 3-10 Outline Drawings of NCE-5625 Keyboard Operation Unit

3.3.8 Outline Drawings of CWB-1593 Large Tray

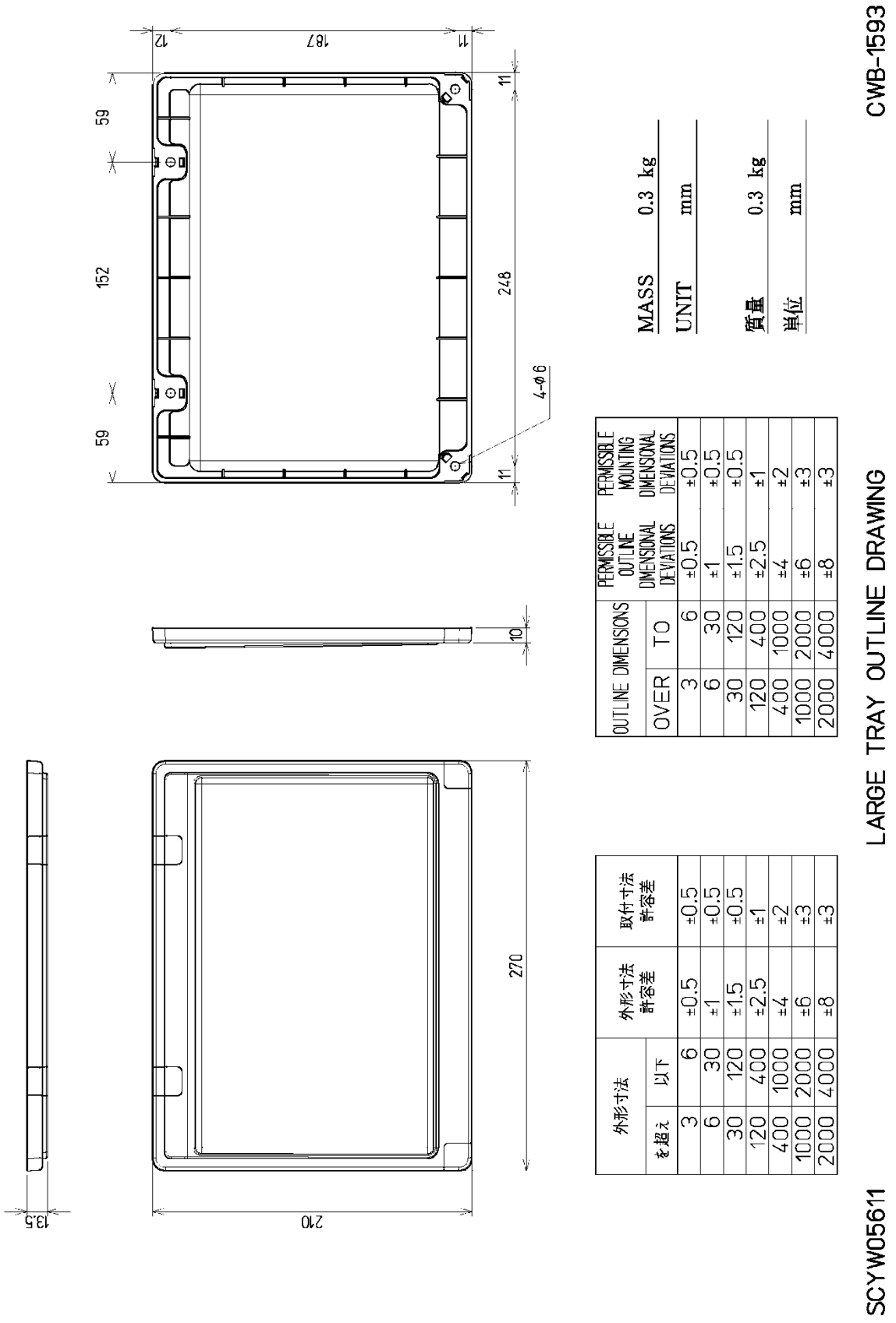


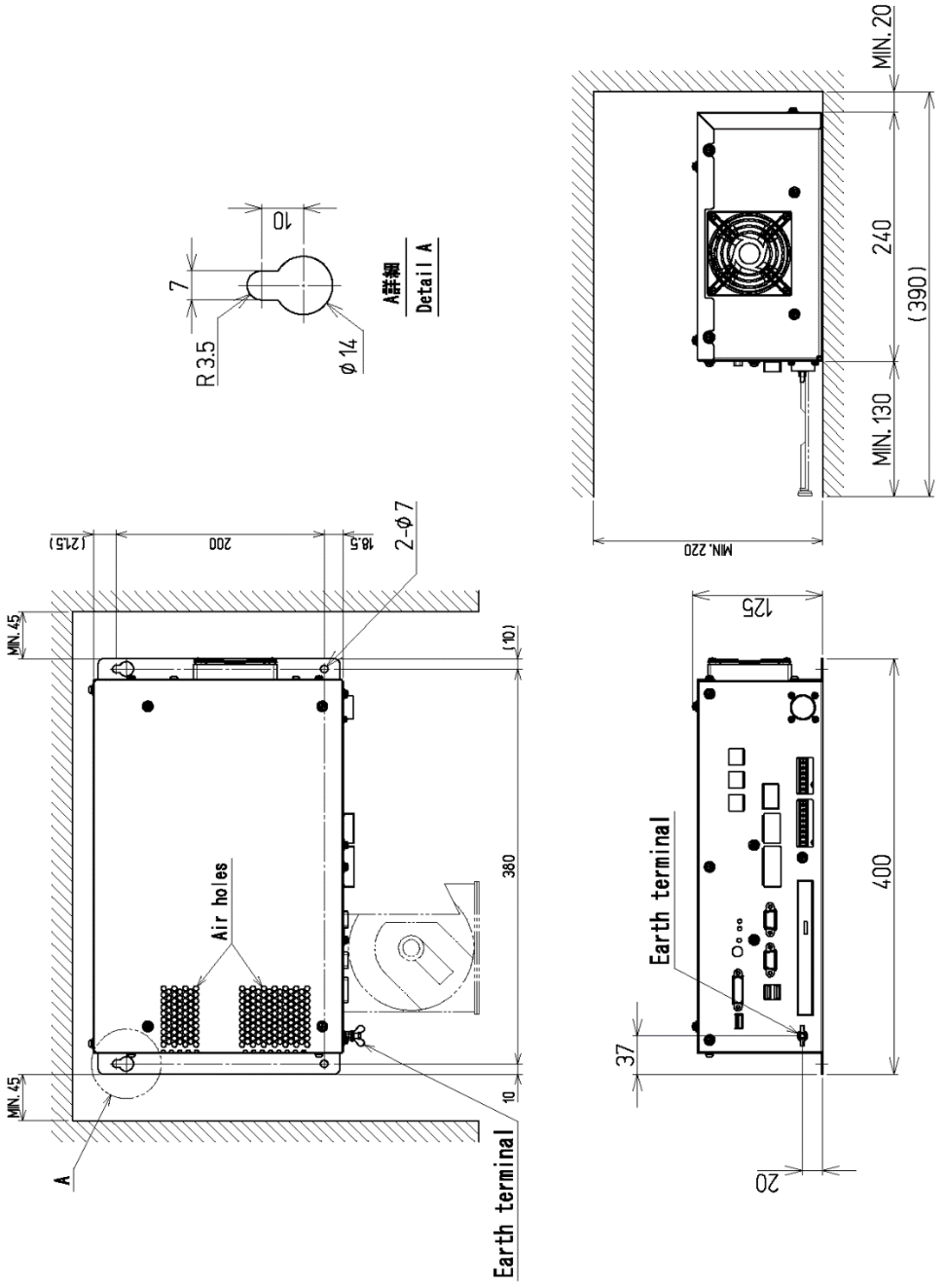
Fig 3-11 Outline Drawings of CWB-1593 Large Tray

3.3.9 Outline Drawings of NDC-1590/A Central Control Unit

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	±3
1000	2000	±6	
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	±1
120	400	±2.5	±2
400	1000	±4	±3
1000	2000	±6	
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

Fig 3-12 Outline Drawings of NDC-1590/A Central Control Unit

3.3.10 Outline Drawings of NBD-913 Power Supply Unit

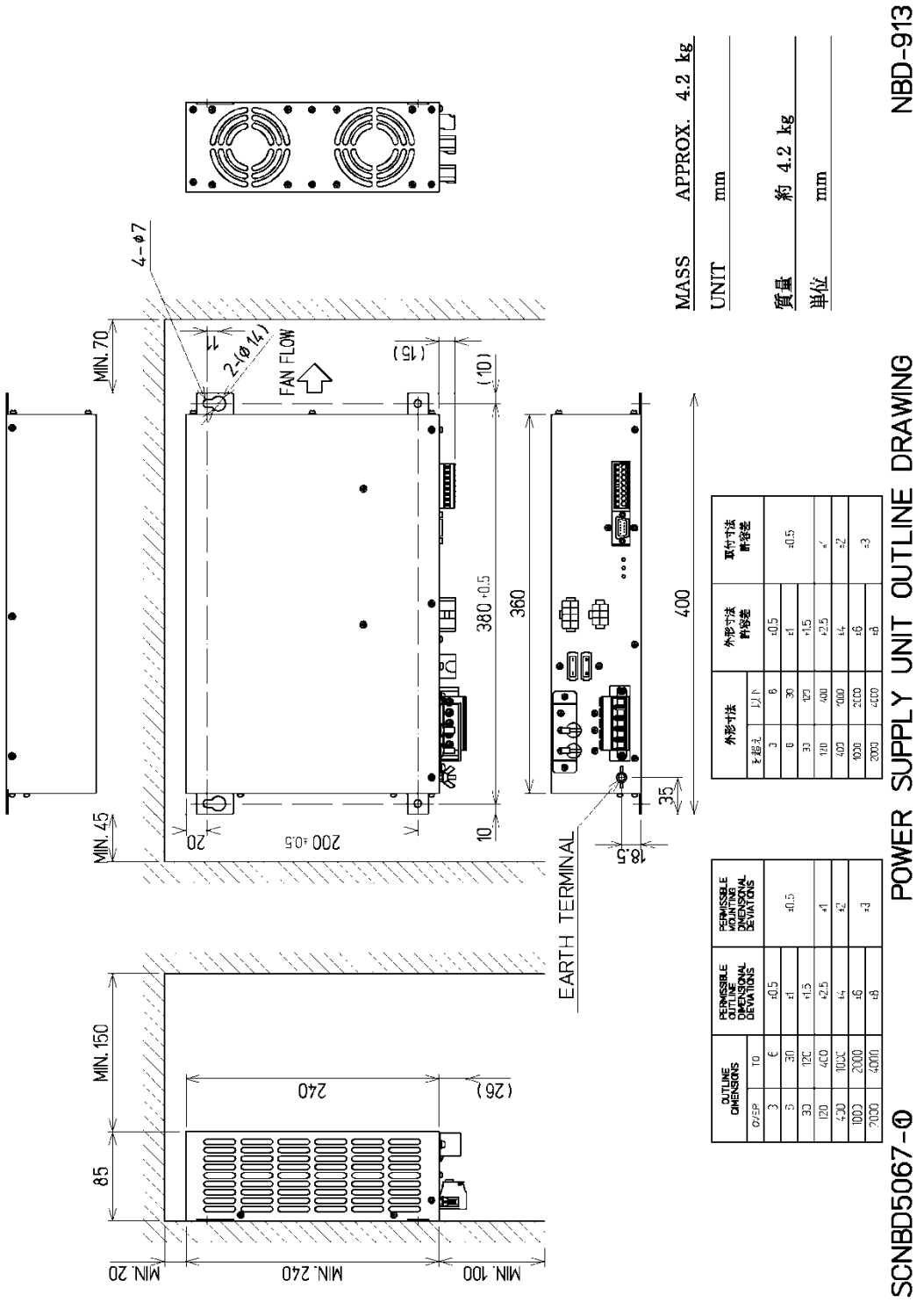


Fig 3-13 Outline Drawings of NBD-913 Power Supply Unit

3.3.11 Outline Drawings of NQE-1143 Junction Box

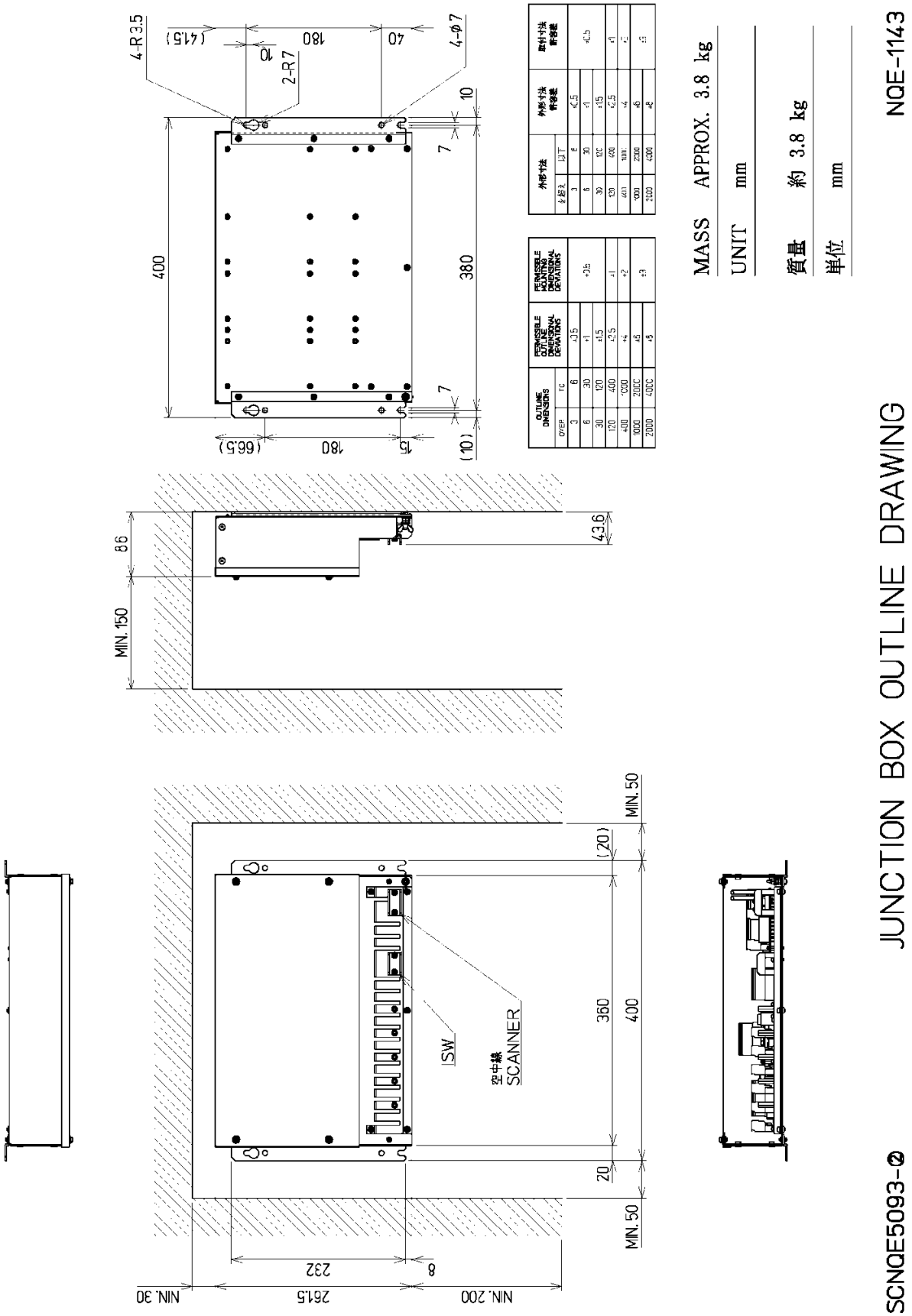


Fig 3-14 Outline Drawings of NQE-1143 Junction Box

3.3.12 Outline Drawings of NQA-2443/A Sensor LAN Switch Unit

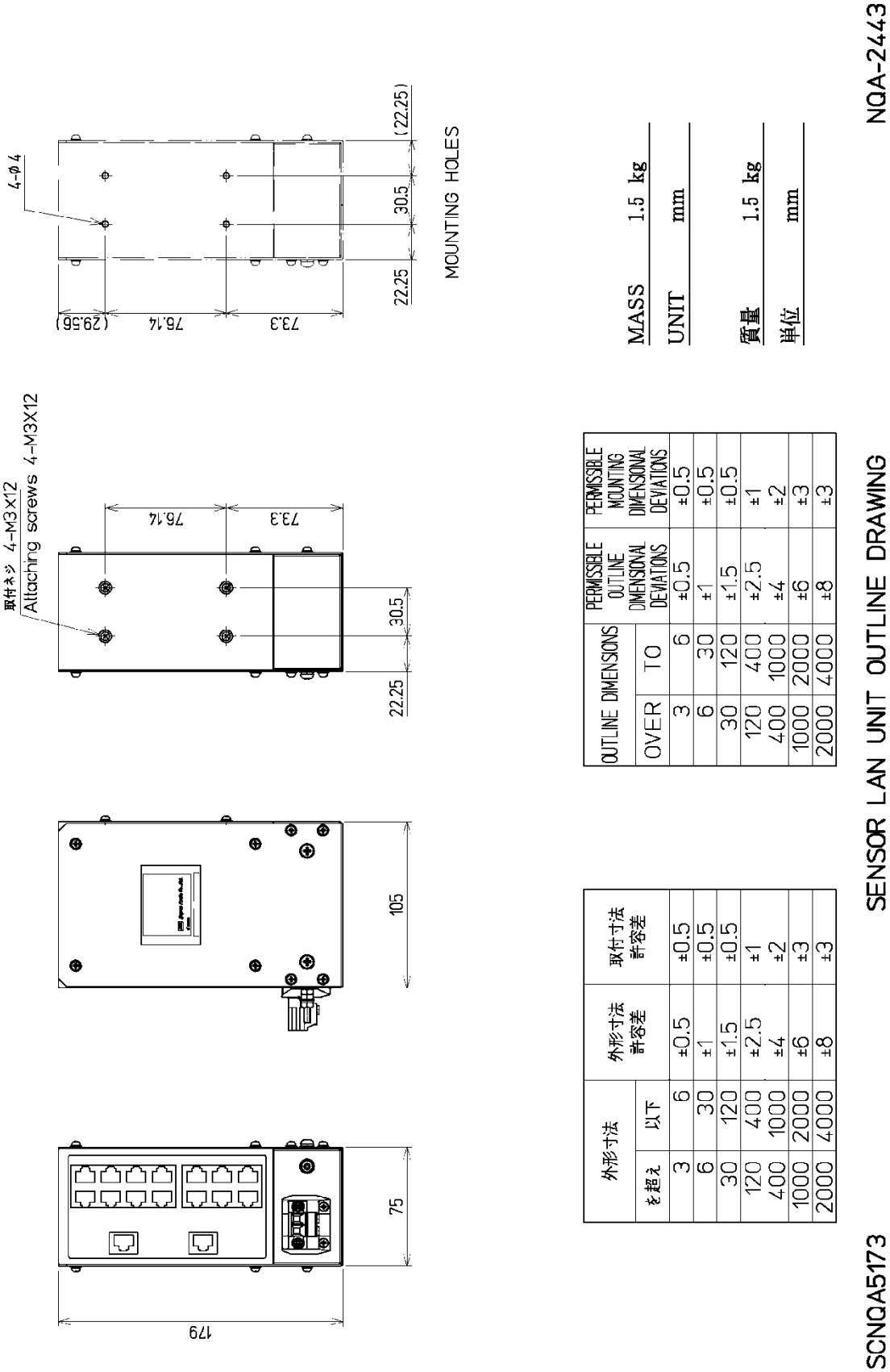


Fig 3-15-1: Outline Drawings of NQA-2443 Sensor LAN Switch Unit

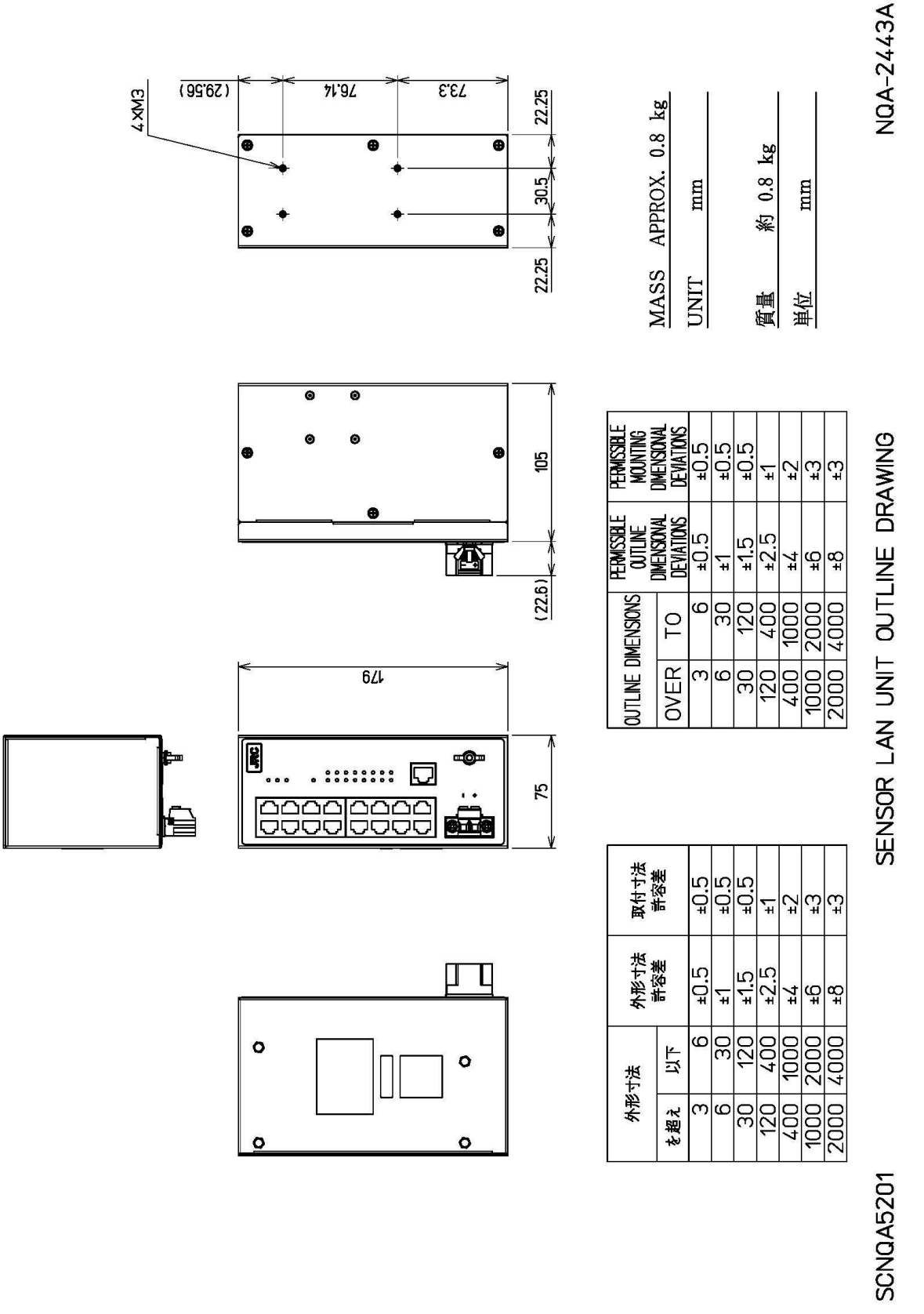
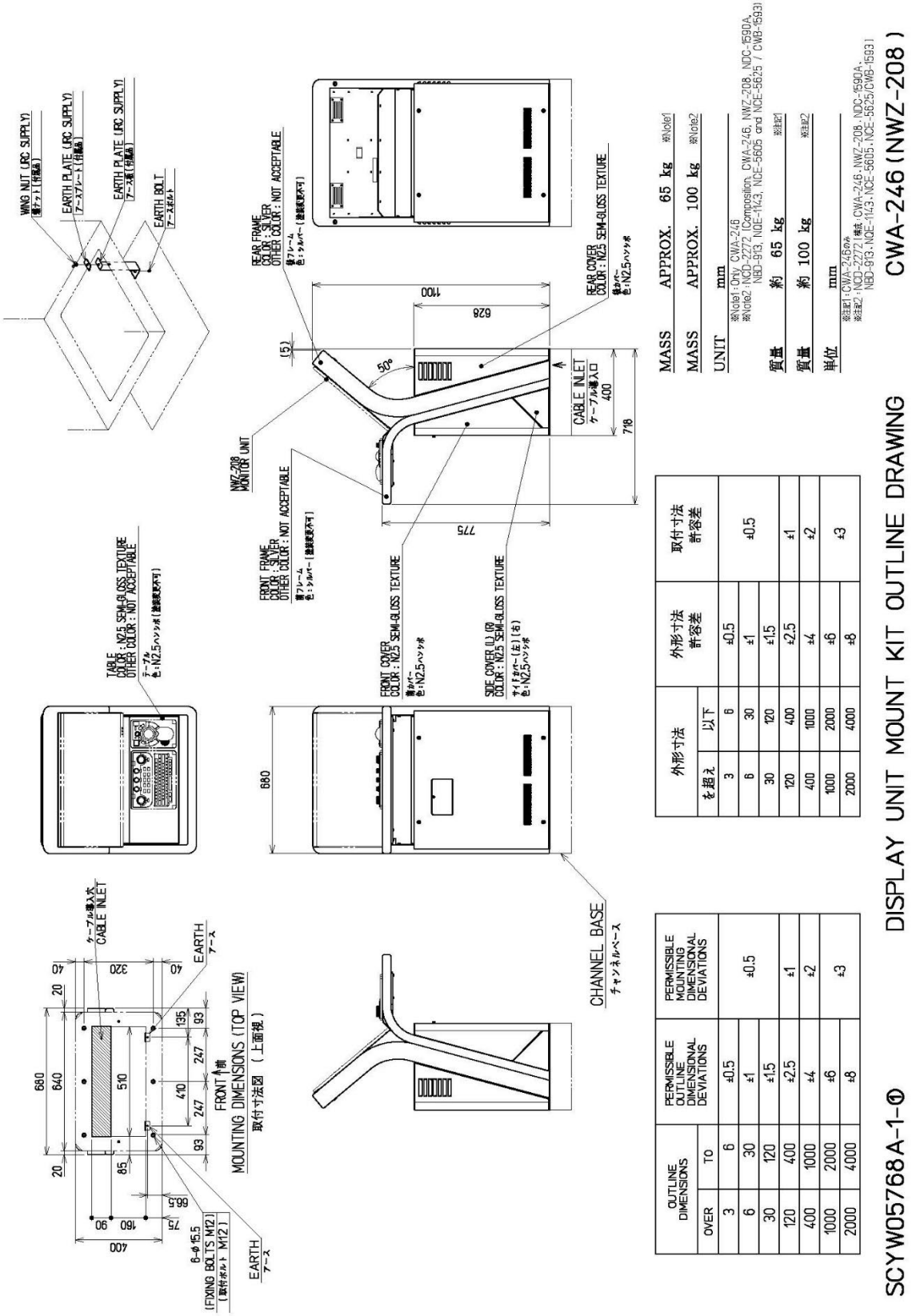


Fig3-13-2: Outline Drawings of NQA-2443A Sensor LAN Switch Unit

3.3.13 Outline Drawings of CWA-246 26inch Display Unit Mount Kit



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	

Fig 3-16 Outline Drawings of CWA-246 26inch Display Unit Mount Kit (With display, trackball operation unit and keyboard operation unit installed)

3.3.14 Outline Drawings of CWA-246 27inch Display Unit Mount Kit

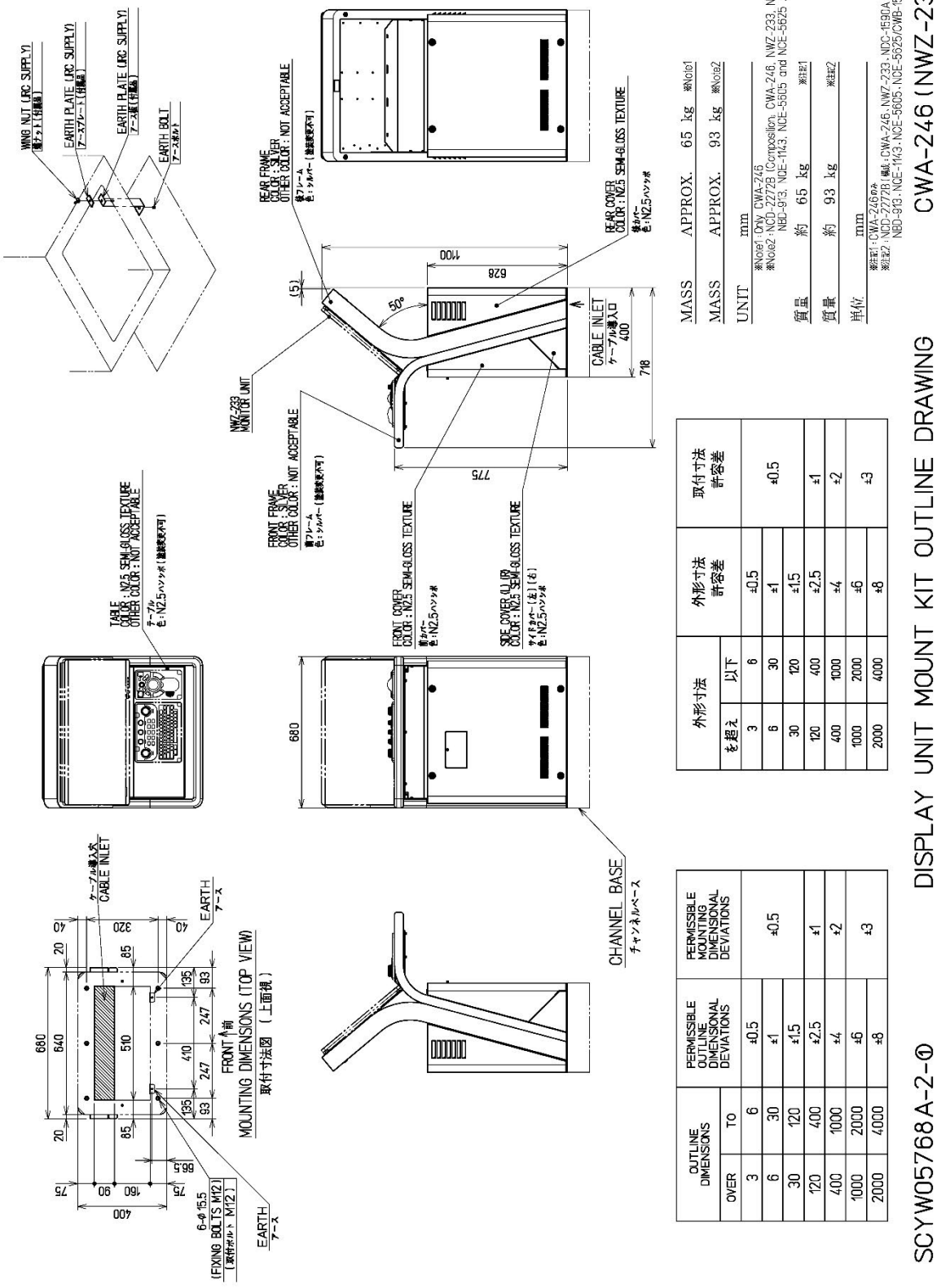


Fig 3-17 Outline Drawings of CWA-246 27inch Display Unit Mount Kit (With display, trackball operation unit and keyboard operation unit installed)

3.3.15 Outline Drawings of CWA-245 19inch Display Unit Mount Kit

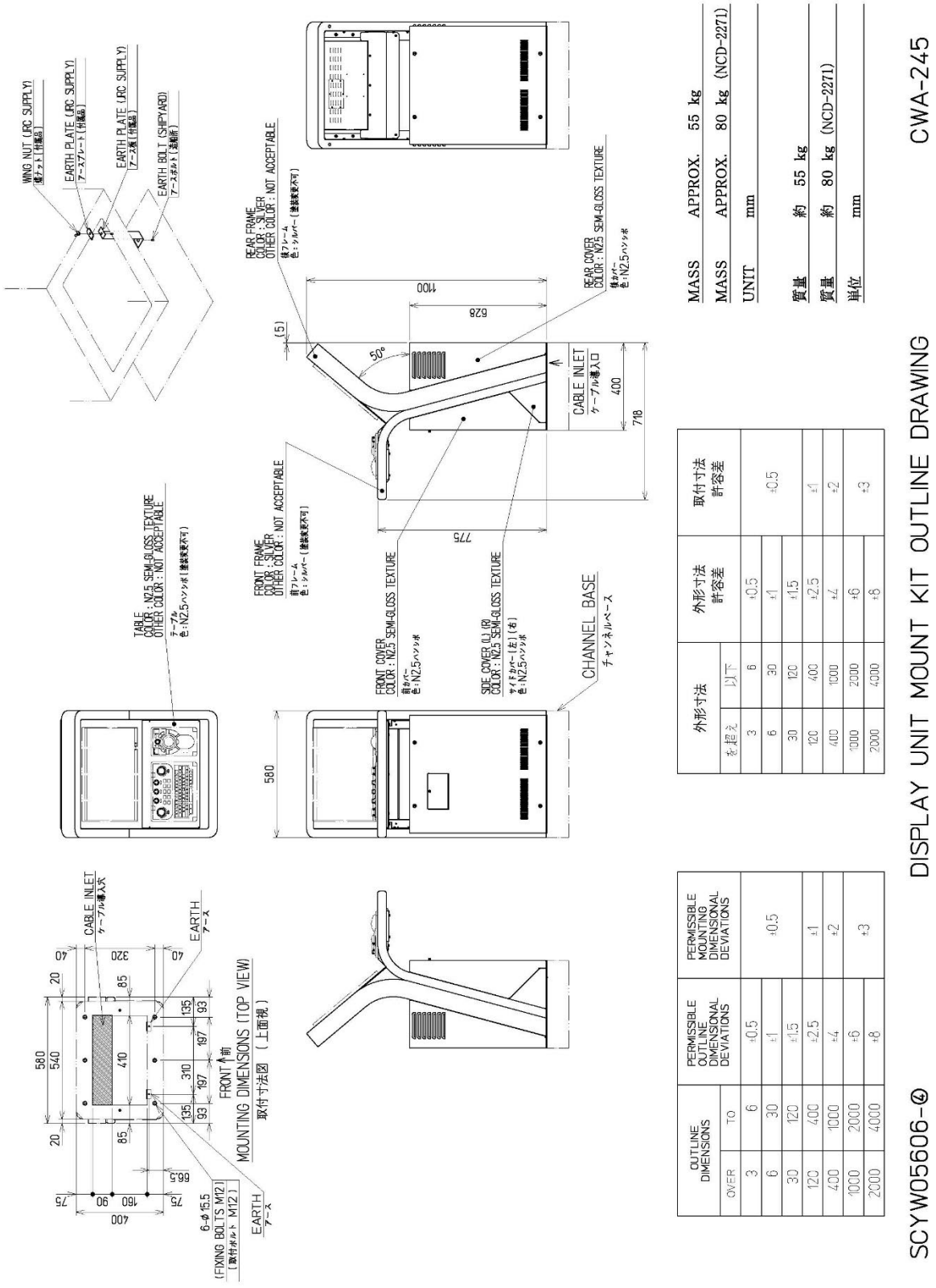
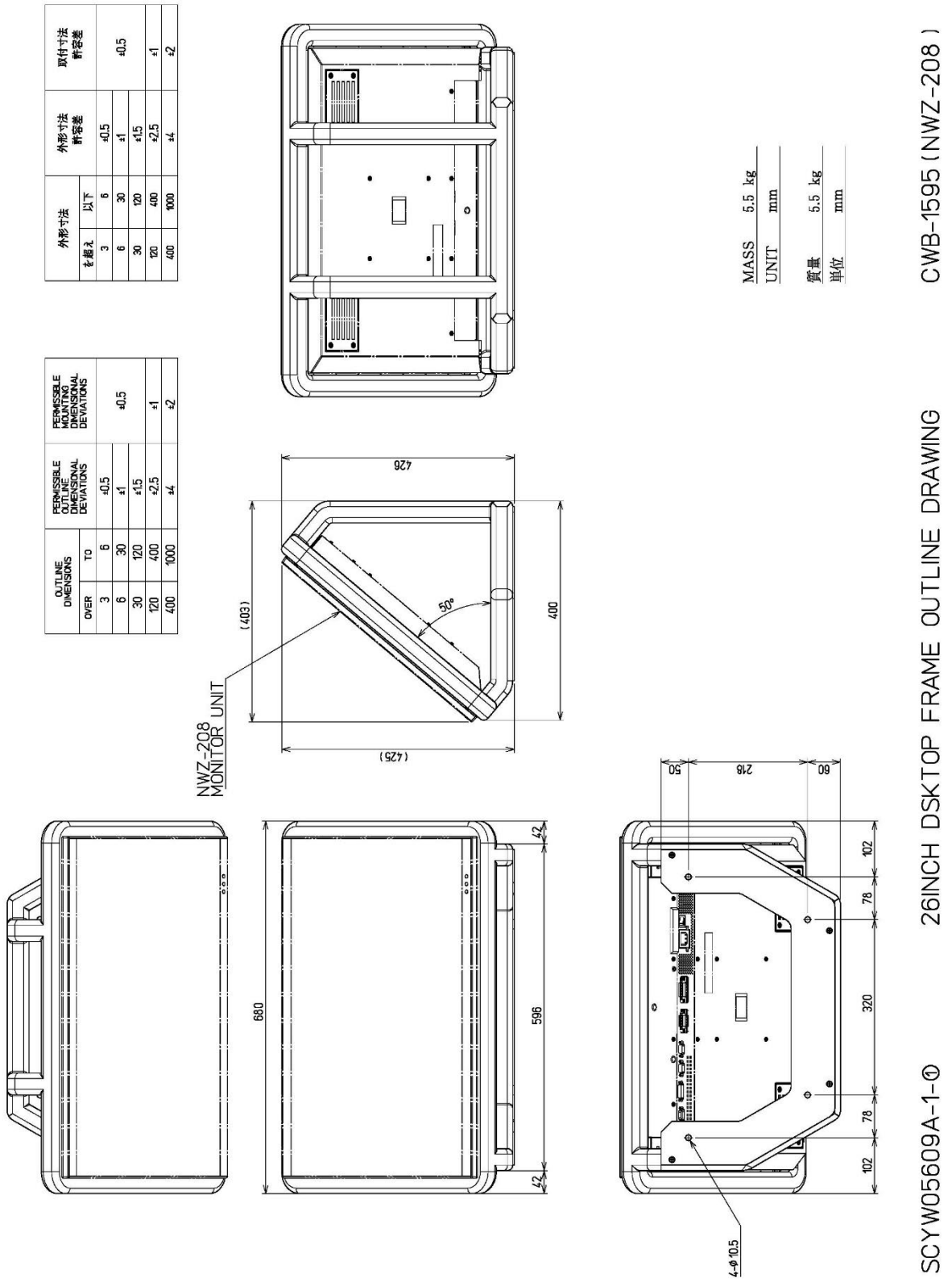


Fig 3-18 Outline Drawings of CWA-245 Display Unit Mount Kit (With display, trackball operation unit and keyboard operation unit installed)

3.3.16 Outline Drawings of CWB-1595 26inch Desktop Frame



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

Fig 3-19 Outline Drawings of CWB-1595 26inch Desktop Frame

3.3.17 Outline Drawings of CWB-1595 27inch Desktop Frame

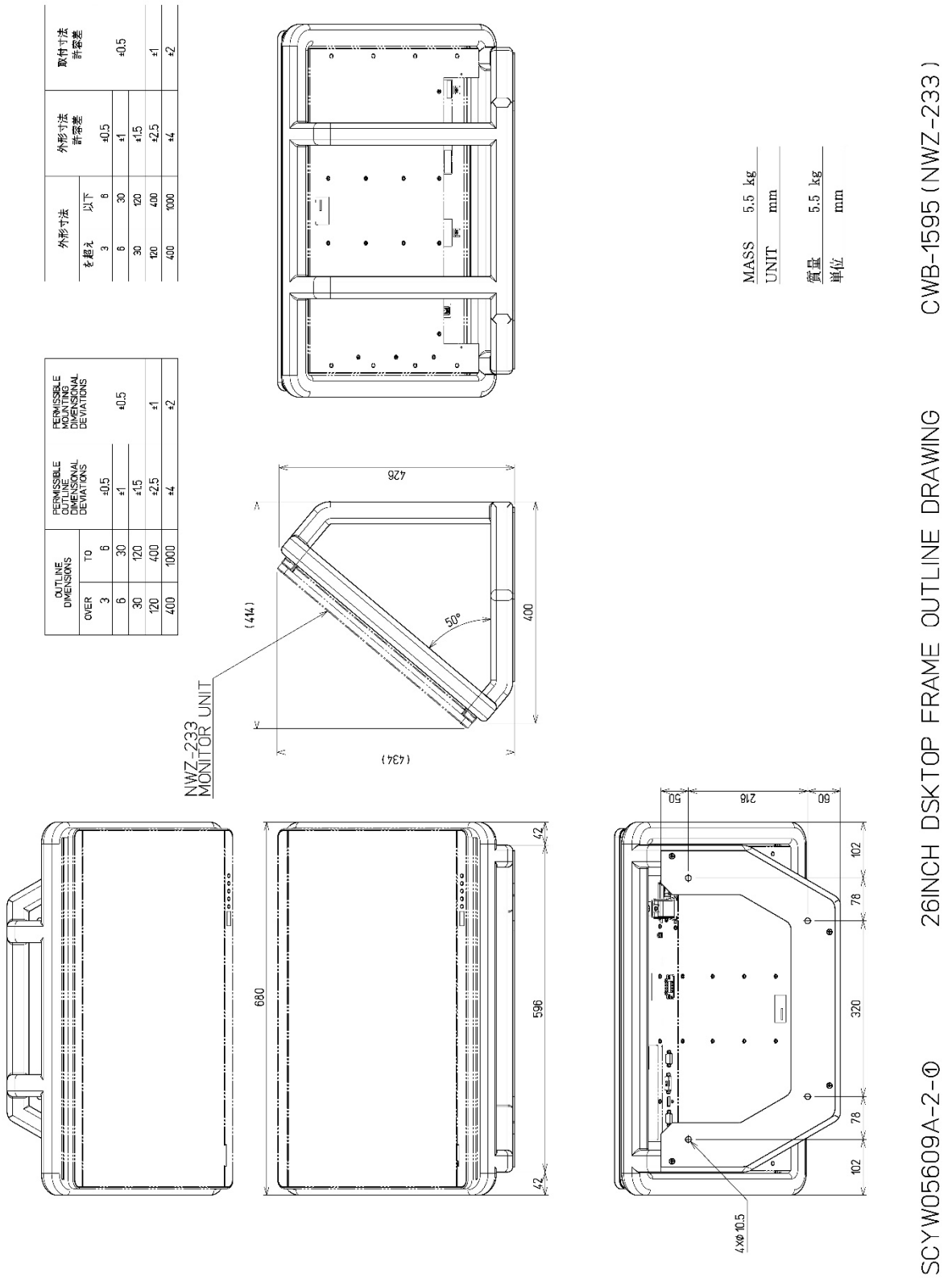


Fig 3-20 Outline Drawings of CWB-1595 27inch Desktop Frame

3.3.18 Outline Drawings of CWB-1660 26inch Desktop Frame

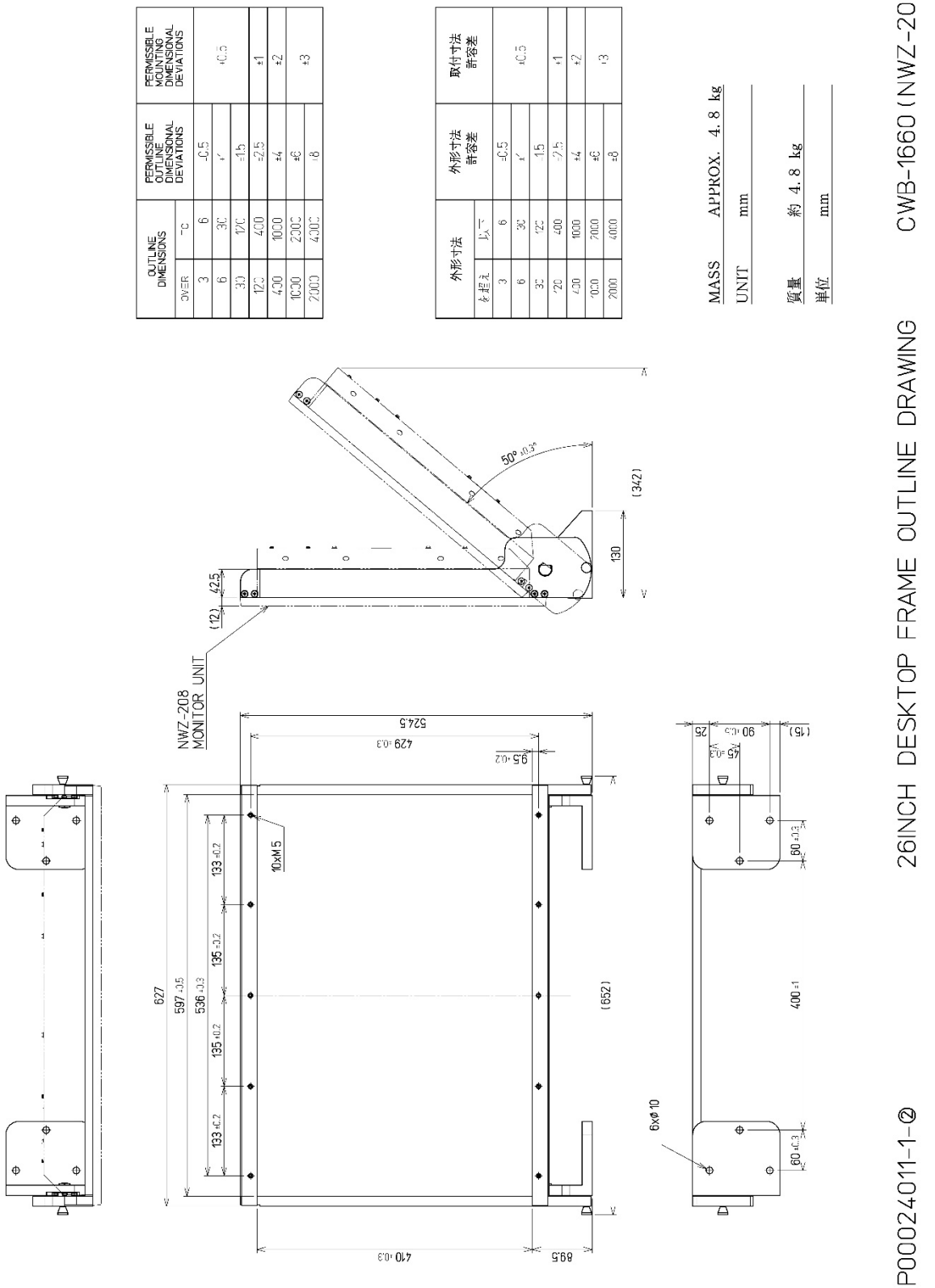


Fig 3-21 Outline Drawings of CWB-1660 26inch Desktop Frame

3.3.19 Outline Drawings of CWB-1660 27inch Desktop Frame

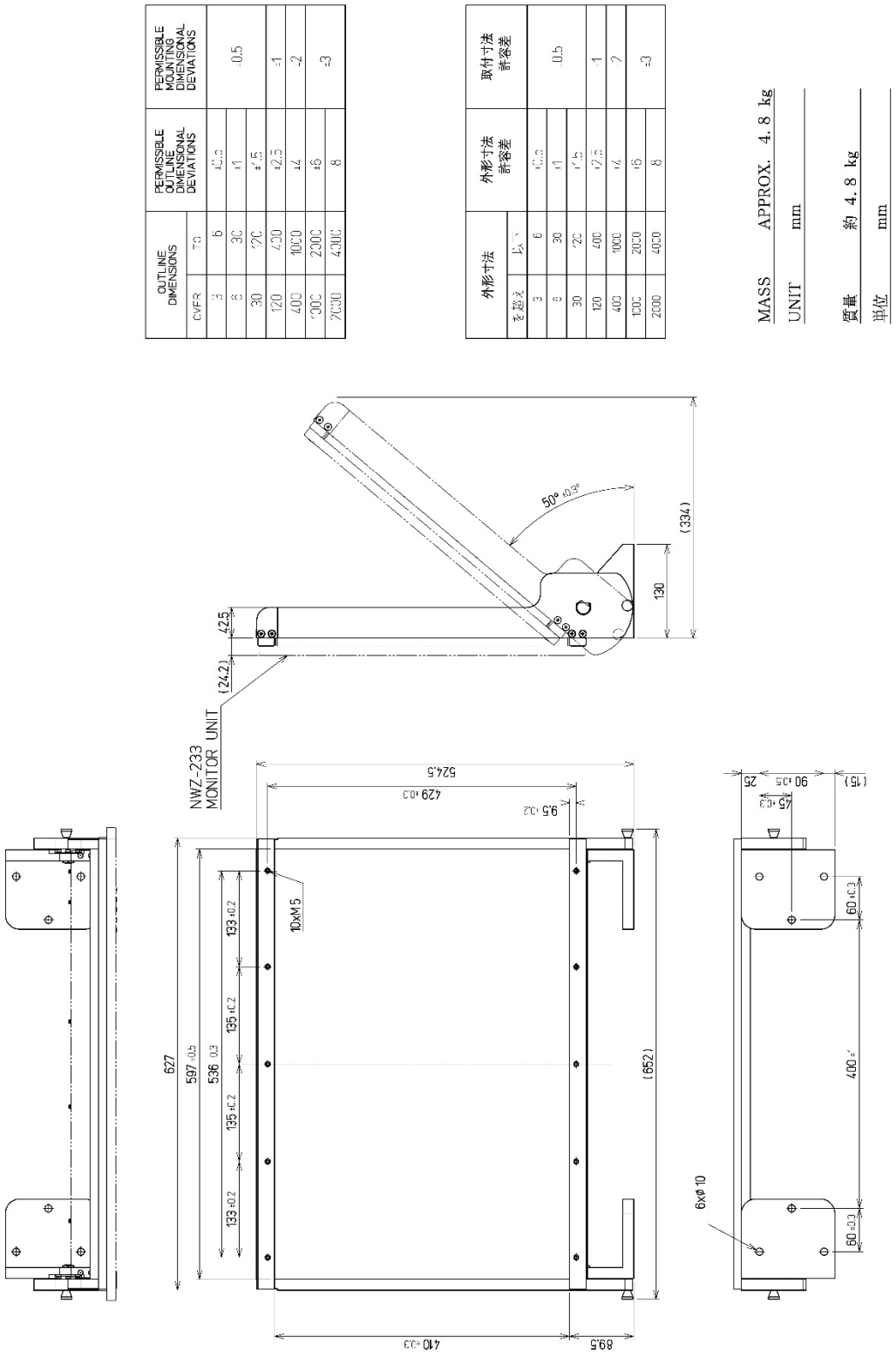


Fig 3-22 Outline Drawings of CWB-1660 27inch Desktop Frame

3.3.20 Outline Drawings of CWB-1594 19inch Desktop Frame

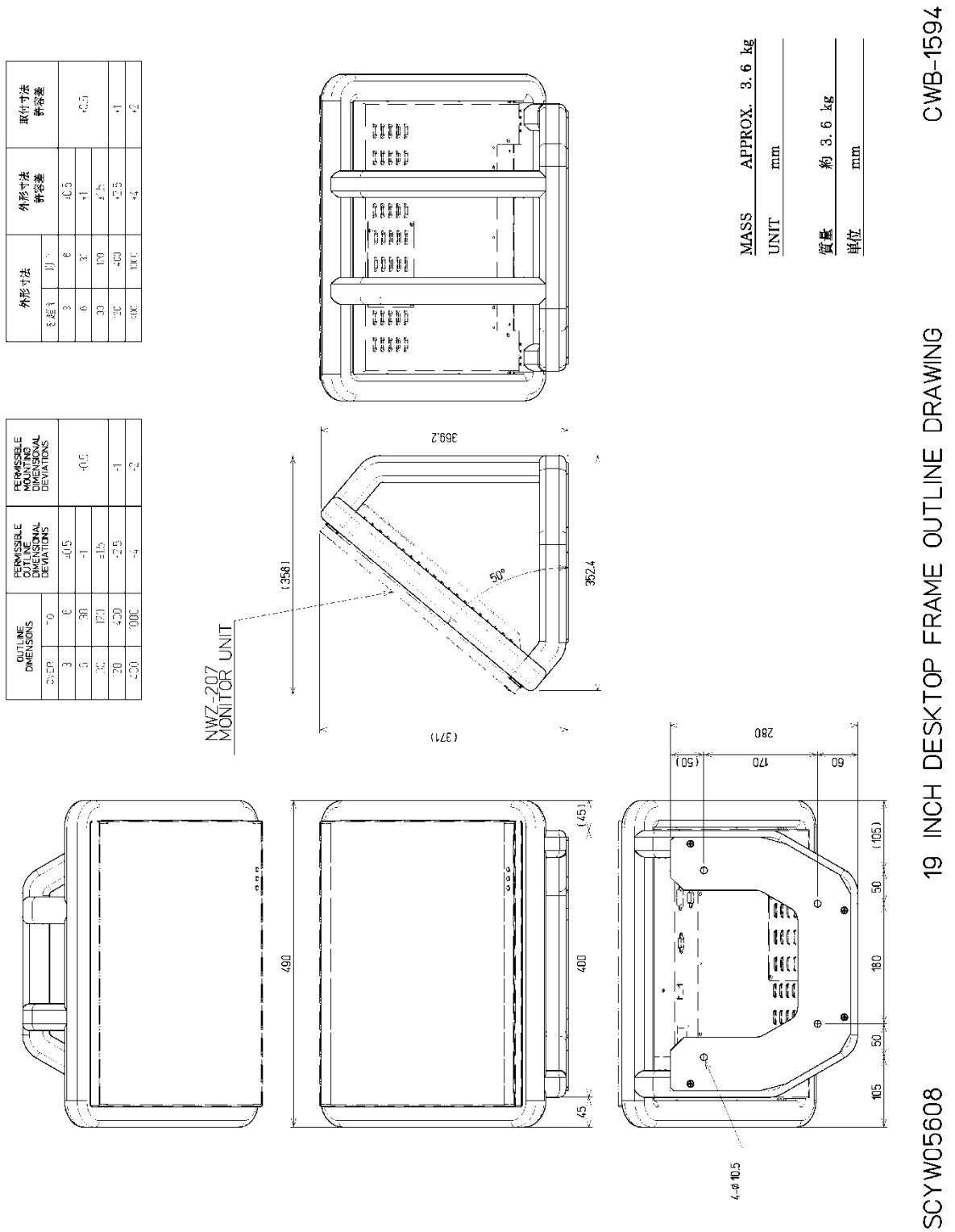


Fig 3-23 Outline Drawings of CWB-1594 19inch Desktop Frame

3.3.21 Outline Drawings of CWB-1659 19inch Desktop Frame

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

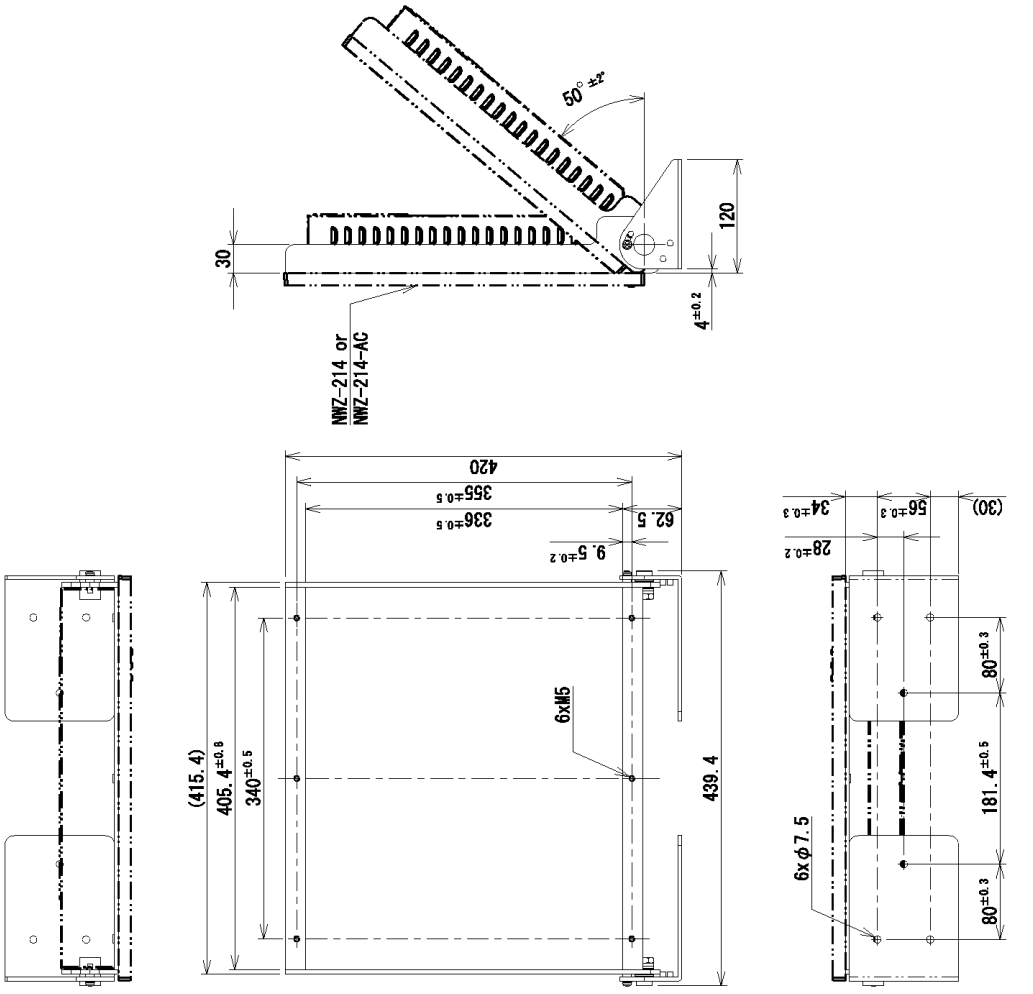


Fig 3-24 Outline Drawings of CWB-1659 19inch Desktop Frame

3.3.22 Outline Drawings of CWB-1596 OPU Desktop Frame

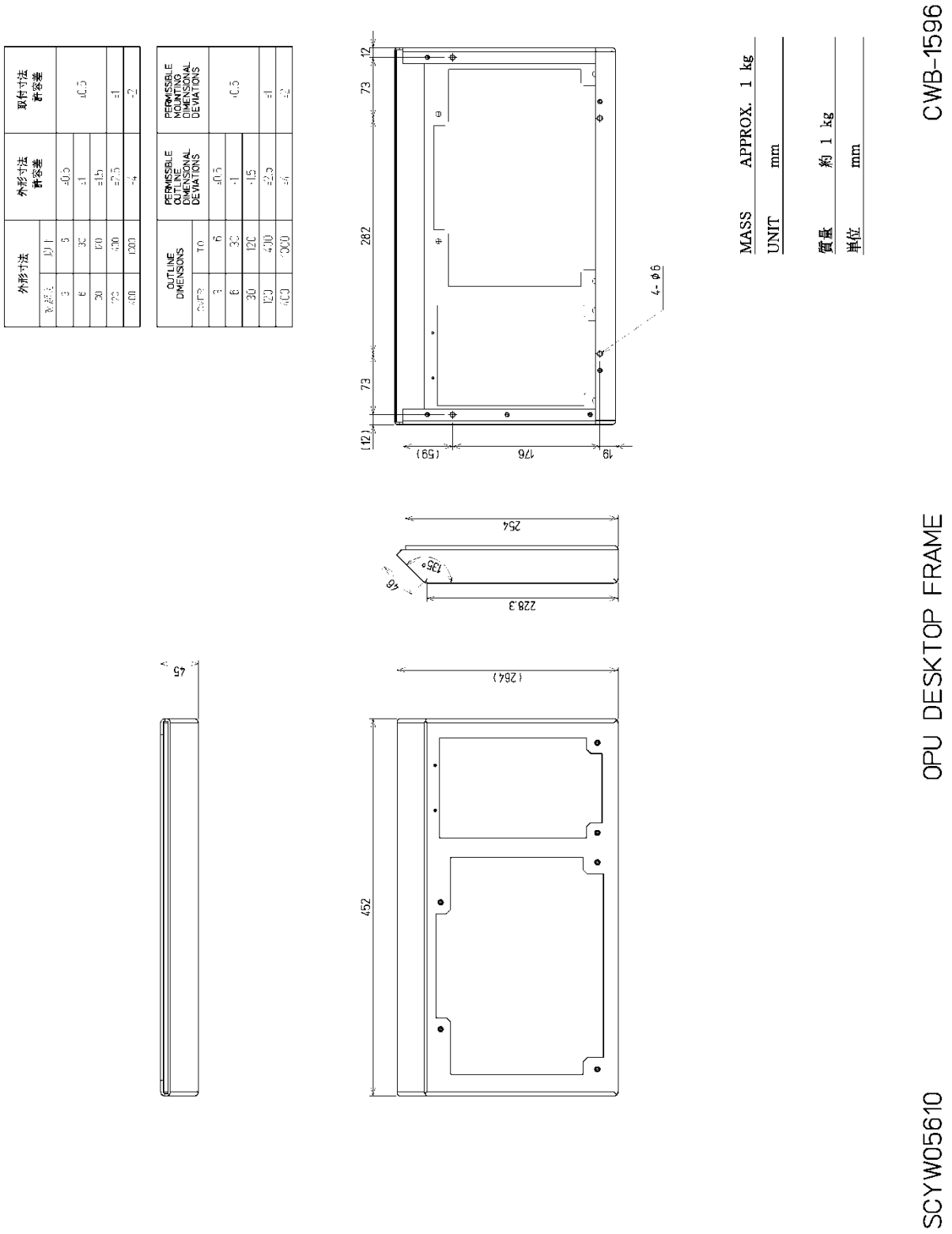


Fig 3-25 Outline Drawings of CWB-1596 OPU Desktop Frame

3.3.23 Precautions for transporting and storing the display unit

- A display unit is a heavy load. Be very careful about handing it.
- Do not allow the display unit fall on its side while it is stored or being installed.
- Be careful when transporting display unit to prevent damage to the monitor unit.

- When lifting the 26inch stand alone type Display Unit
  - Do not hoist the display unit by attaching a belt or rope to the front frame as shown in **Fig 3-20 Improper way to hoist**.

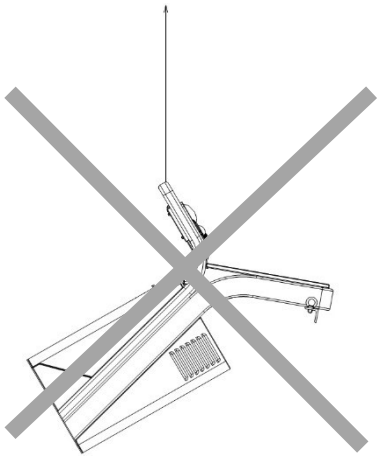


Fig 3-26 Improper way to hoist

- Attach the specified lifting hooks and eyebolts to the display unit, attach the ropes to the four eyebolts, and lift up the display unit. (See **Fig 3-21 Attaching eyebolts and lifting up display unit**)

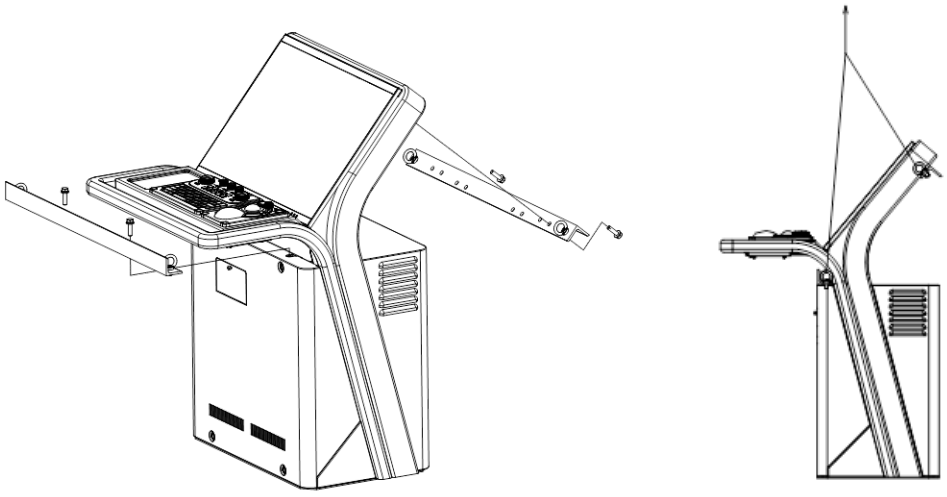


Fig 3-27 Attaching eyebolts and lifting up display unit

- When lifting the 19inch stand alone type Display Unit
  - Do not hoist the display unit by attaching a belt or rope to the front frame as shown in **Fig 3-22 Improper way to hoist**.

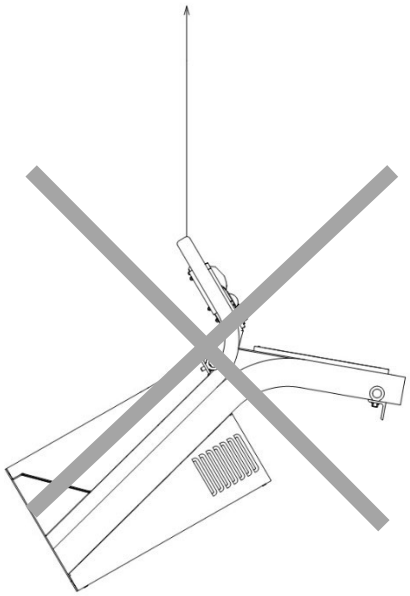


Fig 3-28 Improper way to hoist

- Attach the specified lifting hooks and eyebolts to the display unit, attach the ropes to the four eyebolts, and lift up the display unit. (See **Fig 3-23 Attaching eyebolts and lifting up display unit**)

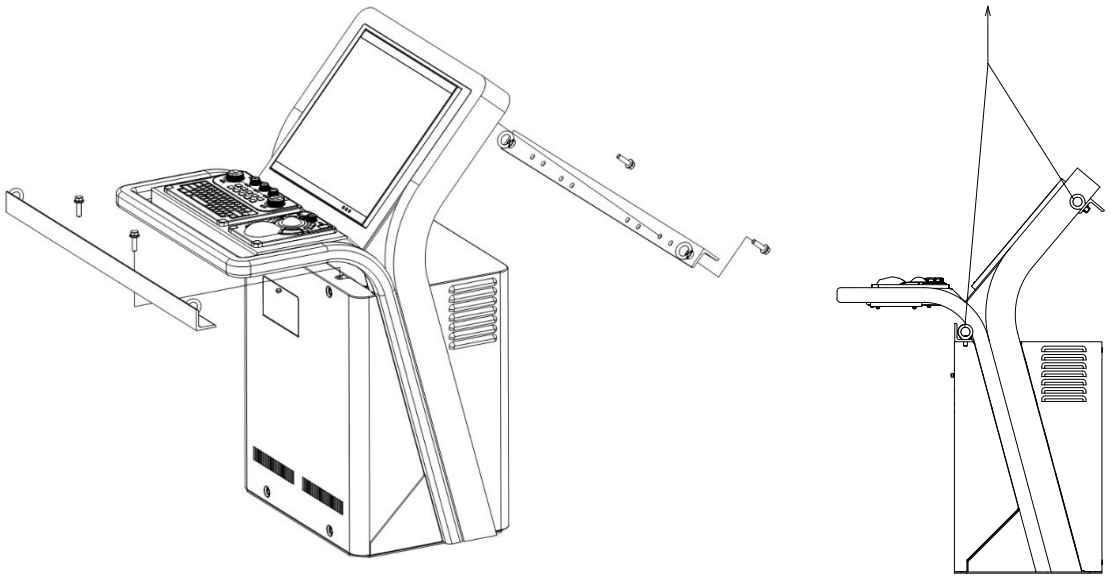
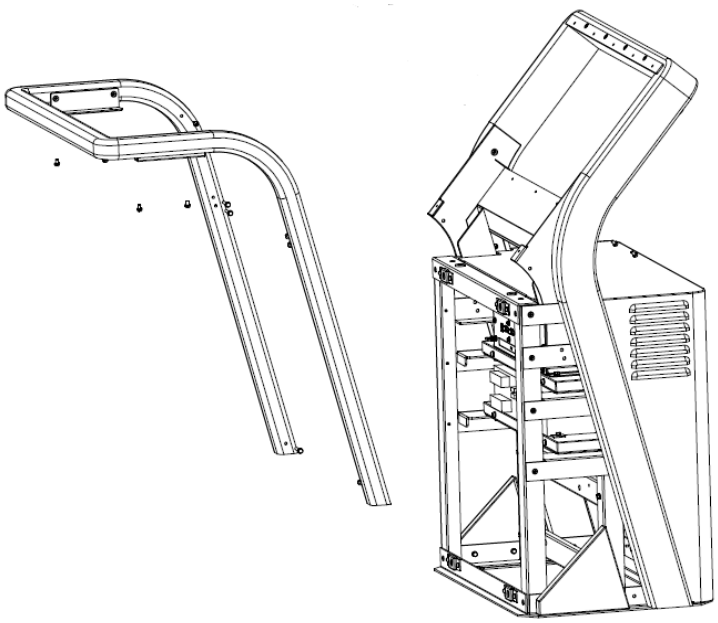


Fig 3-29 Attaching eyebolts and lifting up display unit

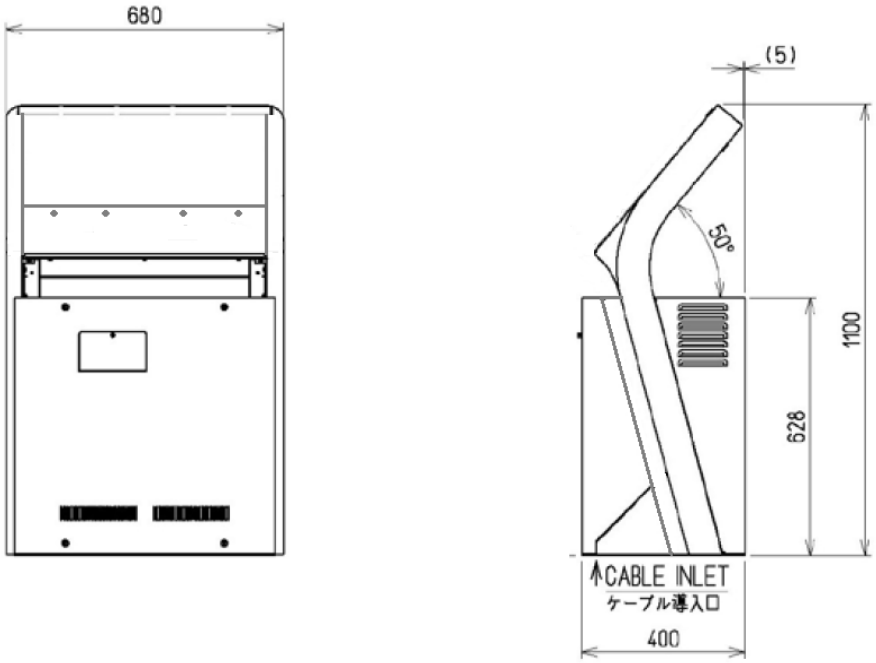
3.3.24 Detaching the front frame of the Display unit mount kit

⚠CAUTION	
	Do not detach 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.

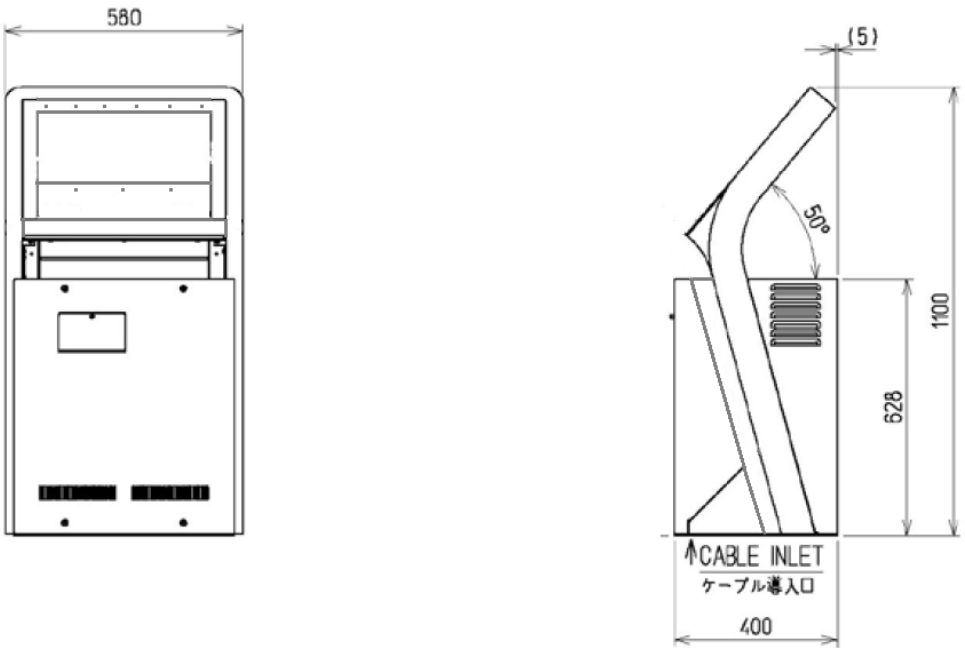
You can pull out the front frame of the Display Unit mount kit if the door of the bridge is too narrow for Display units.



Dimension diagrams of the Display unit mount kit without a front frame



Dimension diagrams of CWA-246: 26/27inch Display Unit mount kit without a front frame



Dimension diagrams of CWA-245: 19inch Display Unit mount kit without a front frame

[Required Tools]

The tools shown in the following table are required for this work

Required Tools

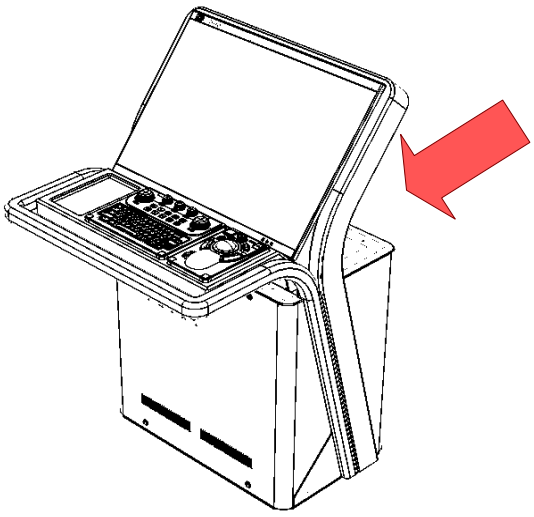
No	Name	Size	Appearance
1	Phillips screwdriver	Size #2	
2	Phillips stubby screwdriver	Size #2	

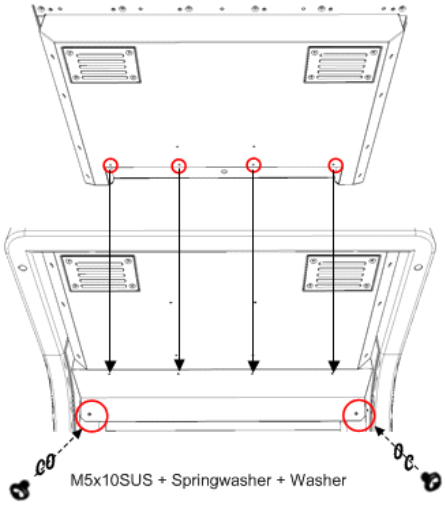
⚠ Do not lose the screws as they will be needed again

⚠ Do not detach the front frame except under unavoidable circumstances for the sake of the ship's structure. It may lead to unexpected accidents when, for example, the monitor or TOPU is being removed.

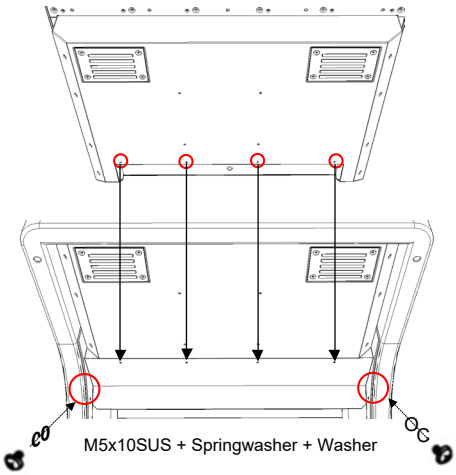
Step 1 Remove the monitor

Remove the monitor from the Display Unit mount kit on the reverse order of installation.
Refer to the 3.4.1
Installation of Monitor Unit NWZ-208/NWZ-233/NWZ-207/NWZ-214/NWZ-208-TP/NWZ-207-TP.



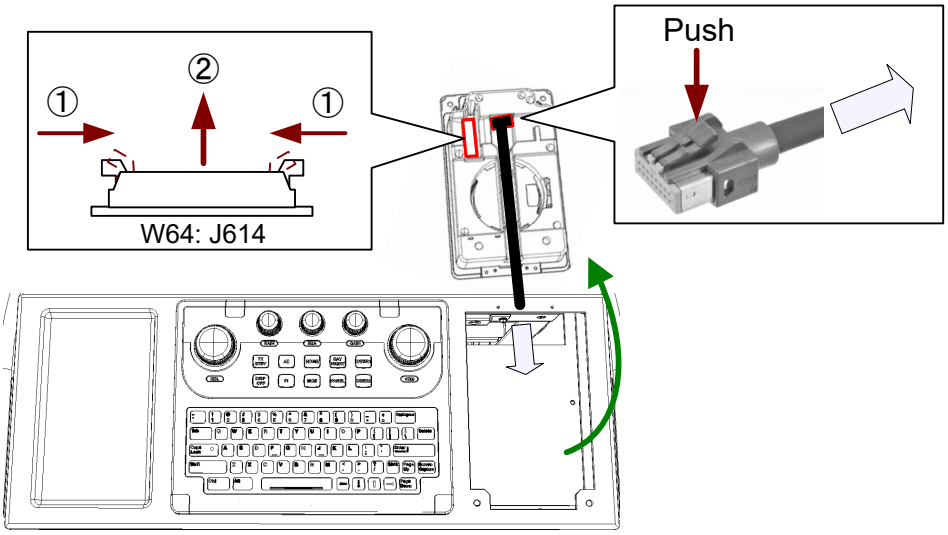


In 2020 later



Step 2 Remove the Trackball Operation Unit

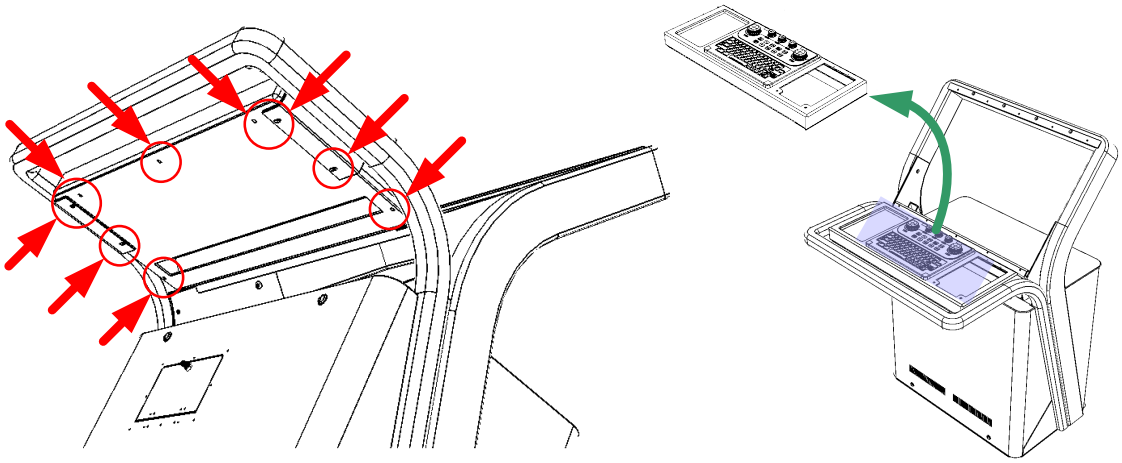
Remove the Trackball Operation Unit from the Display Unit mount kit on the reverse order of installation. Refer to the 3.4.2.3 Installation of Trackball Operation Unit NCE-5605.



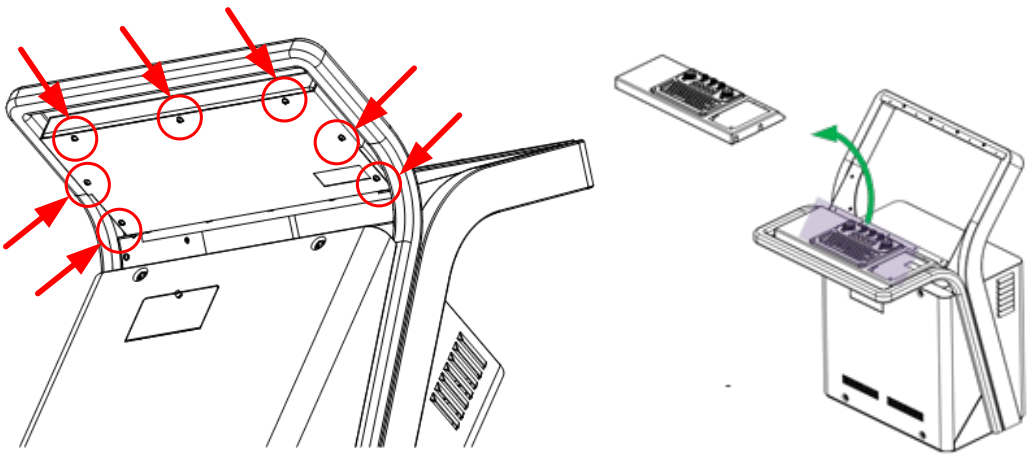
⚠ It is not necessary to remove Keyboard Operation Unit. (If it has been installed.)

Step 3 Remove Operation Unit frame

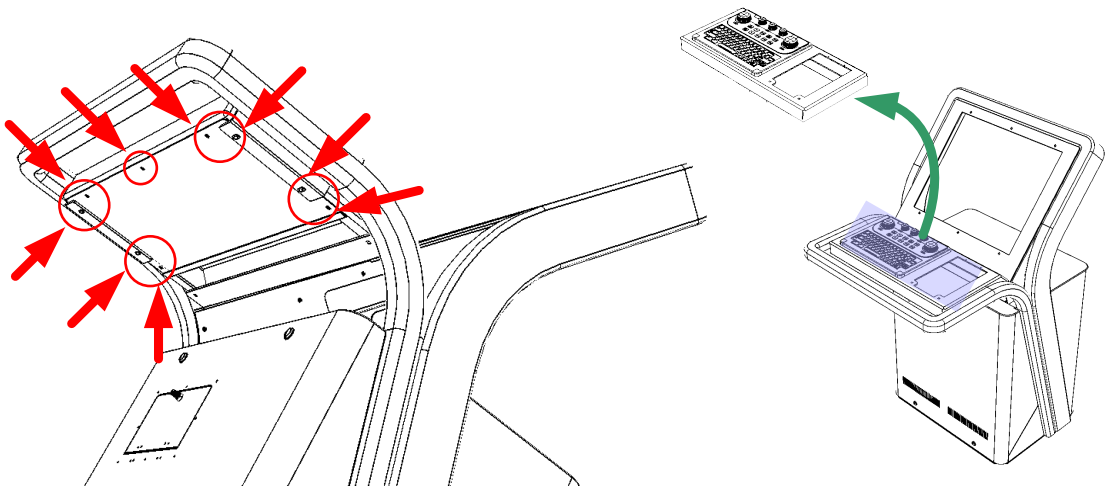
Remove the screws (M4: 9 locations) that fasten the Operation Unit frame and then take out it.



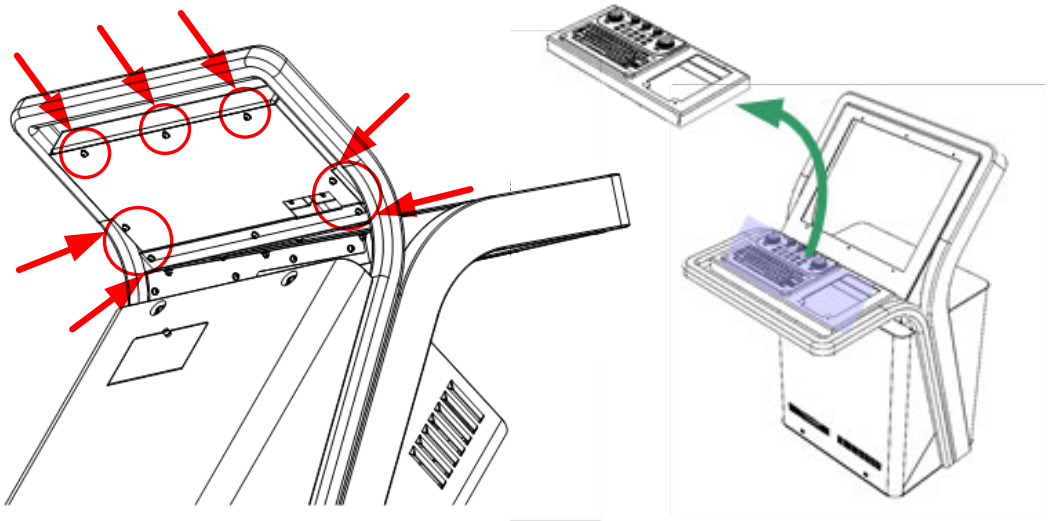
In 2020 later



Taking out the Operation Unit frame from 26inch Display Unit mount kit



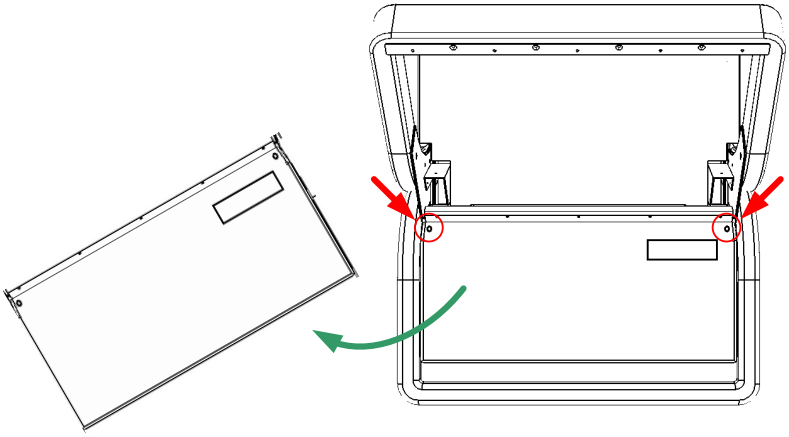
In 2020 later



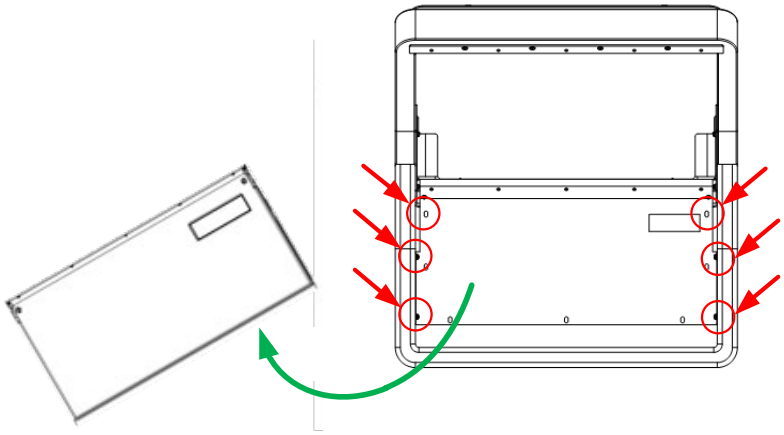
Taking out the Operation Unit frame from 19inch Display Unit mount kit

Step 4 Remove the bottom sheet metal

Remove the bottom sheet metal of Operation Unit frame.
In the 26inch Display Unit mount kit, remove the screws (M3: 2 locations) that fasten the sheet metal and then take out it.



In 2020 later

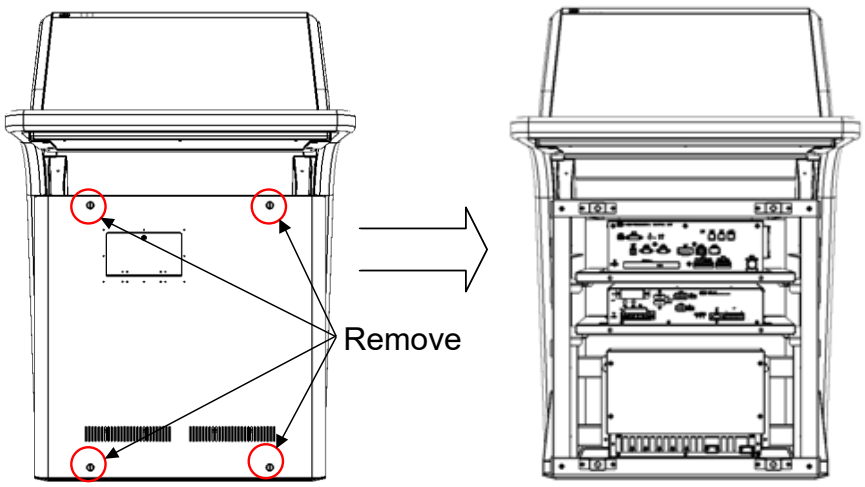


Taking out the Operation Unit sheet metal from 26inch Display Unit mount kit

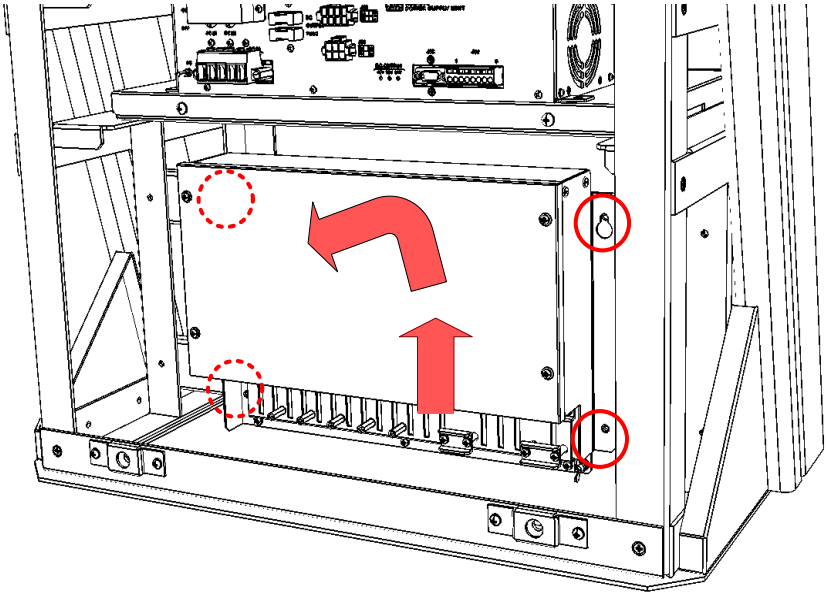
In the 19inch Display Unit mount kit, you can remove the sheet metal and Operation Unit frame together.

Step 5 Remove the front cover and the Junction Box

Remove the front cover from the Display Unit mount kit.

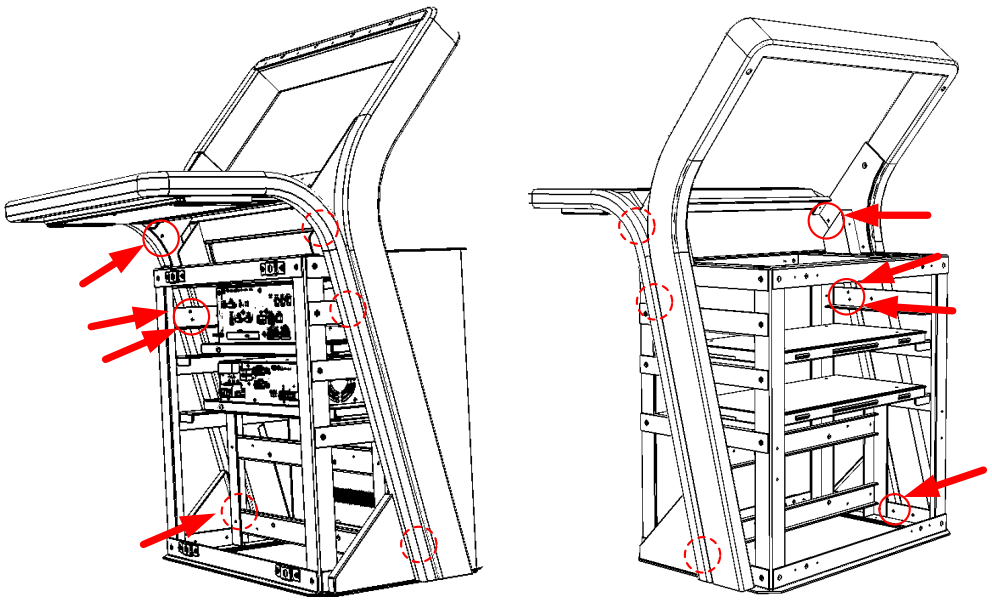


When the Junction box has been installed, remove the Junction box from the Display Unit mount kit on the reverse order of installation.
Refer to the 3.5.1 Installation of Junction Box NQE-1143.

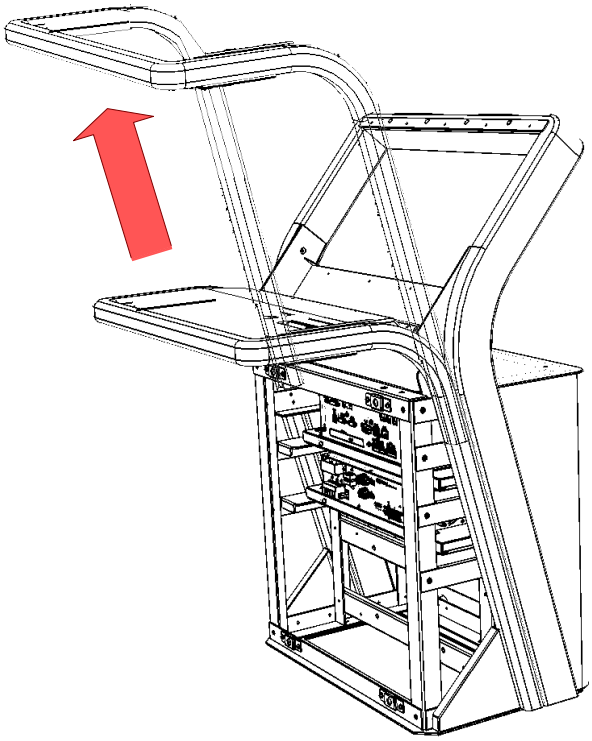


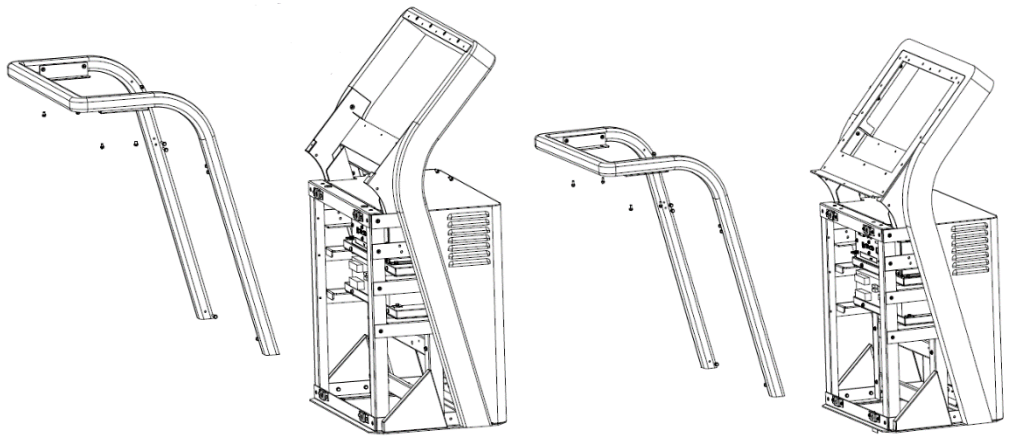
Step 6 Remove the front frame

Using a Phillips stubby screwdriver, remove the M4 screws that fasten the front frame. There 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.





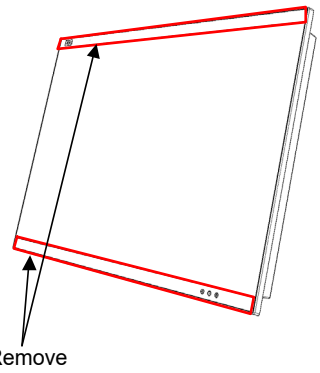
After carrying in the Display Unit Mount Kit is completed, assemble the front frame, junction box, OPU and monitor to the original condition by repeating the same procedure in the reverse order. Please make sure to tighten all the screws and connect all the cables back in place.

This completes carrying in the Display Unit Mount Kit into the bridge that has a narrow door by detaching its front frame.

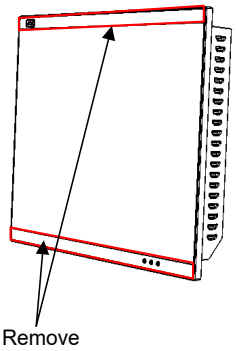
3.4 Installation of Standard Equipment

3.4.1 Installation of Monitor Unit NWZ-208/NWZ-233/NWZ-207/NWZ-214/NWZ-208-TP/NWZ-207-TP

1) Remove the screw covers on the top and bottom of the NWZ-208/NWZ-233/NWZ-207/ NWZ-214/NWZ-208-TP/NWZ-207-TP Monitor Unit.

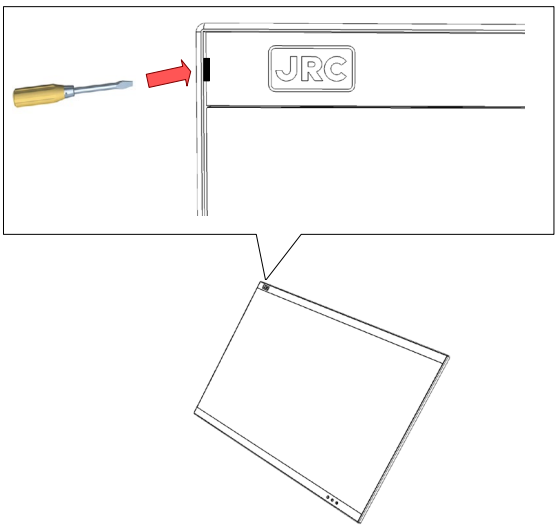


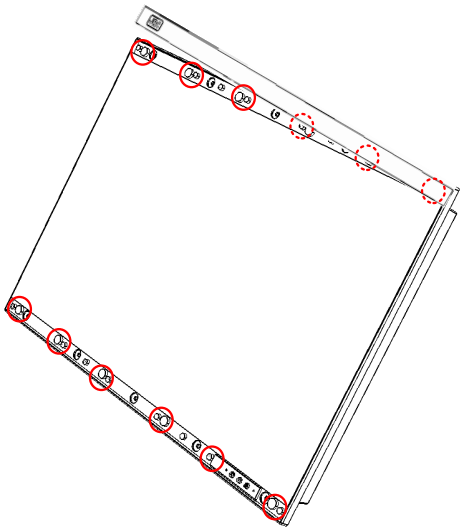
Monitor unit(26inch) NWZ-208/NWZ-208-TP
Monitor unit(27inch) NWZ-233



Monitor unit(19inch)
NWZ-207/NWZ-214/NWZ-207-TP

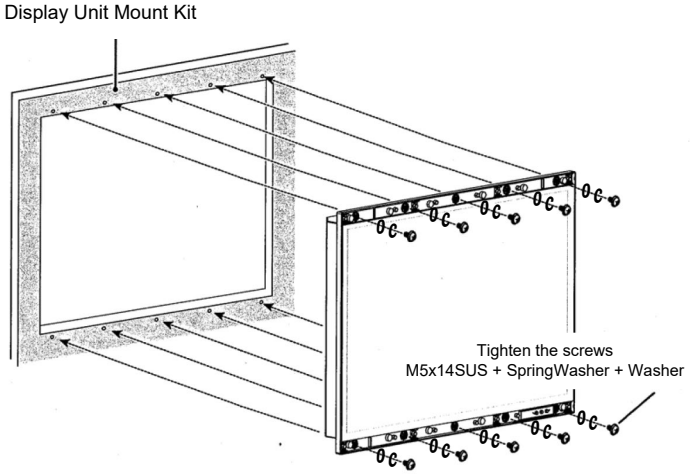
⚠ Insert a small flat blade screwdriver into the end of the screw cover and remove the cover by the principle of leverage. If you try to remove forcibly, the unit may be damaged or the screw cover may be broken.



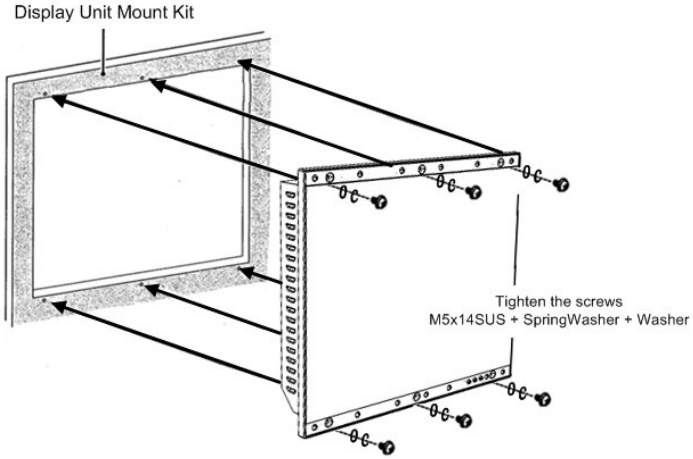


2) Install the Monitor Unit to the Display Unit Mount Kit with screws. Screws are attached to the Monitor Unit.
   Screw: M5x14SUS + Spring washer + Washer (included in CWA-245/CWA-246/CWB-1594/CWB-1595/CWB-1659)
   Number of screw point: 26/27inch Monitor Unit(NWZ-208/NWZ-233/NWZ-208-TP) - 10 points
   19inch Monitor Unit(NWZ-207/ NWZ-214/NWZ-207-TP) - 6 points

⚠ Do not install in a position to close the vents of the monitor. (Except NWZ-233)

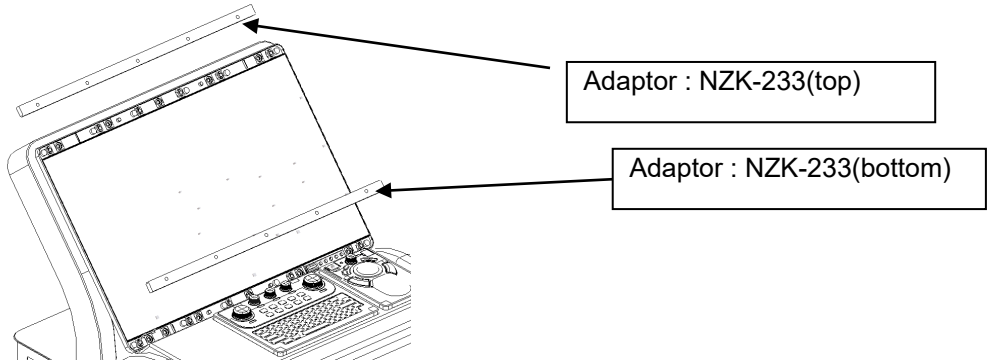


In the case of Monitor Unit (26inch) NWZ-208/NWZ-208-TP,
Monitor Unit (27inch) NWZ-233

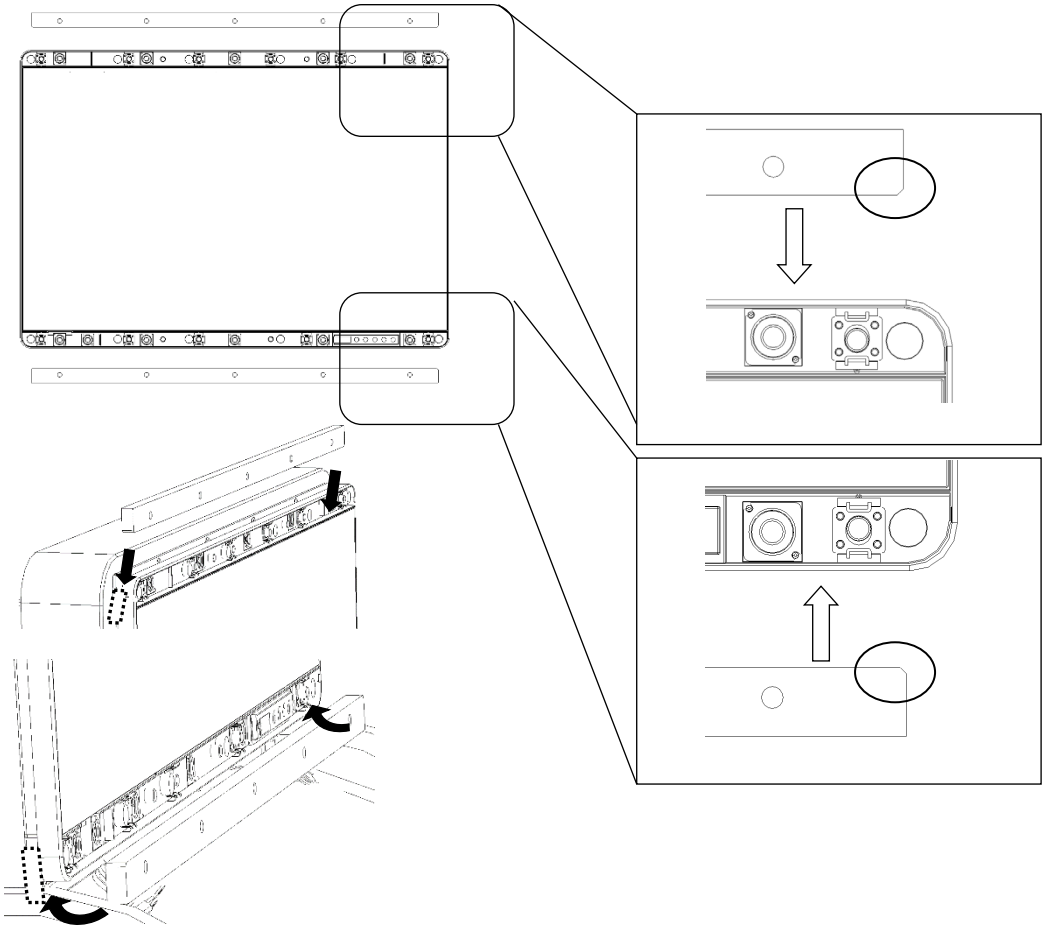


In the case of Monitor Unit (19inch) NWZ-207/ NWZ-214/NWZ-207-TP

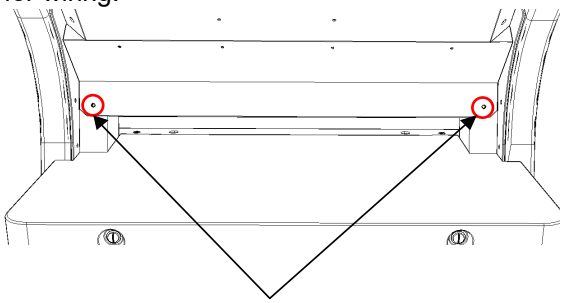
⚠ When mounting the NWZ-233 on the CWA-246/CWB-1595/1660, the adapter NZK-233 is required.
The mounting screws will change to M5x20SUS, but the screws are supplied with the NZK-233.



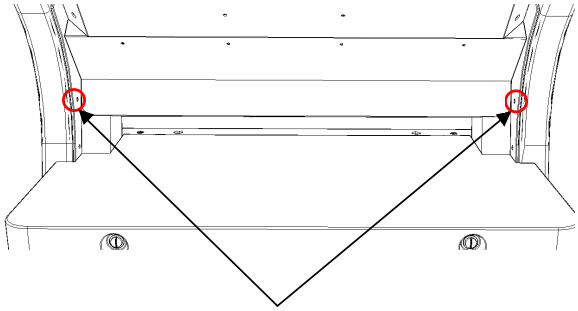
The adaptor is the same component at the top and bottom, but there is a mounting direction, so mount it with care in the right direction.



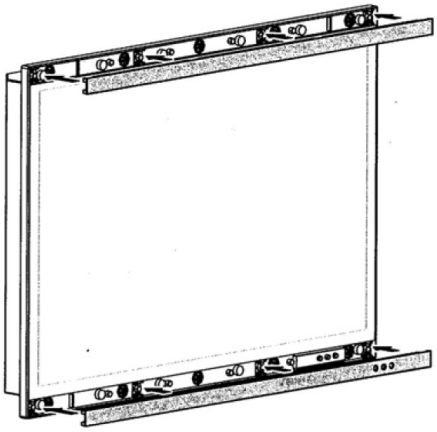
3) Remove the rear panel for wiring.



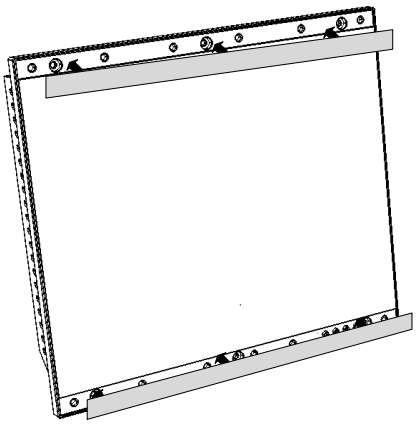
In 2020 later



4) Insert the screw covers into the top and bottom spaces on the monitor.



Monitor unit(26inch) NWZ-208/NWZ-208-TP
Monitor unit(27inch) NWZ-233



Monitor unit(19inch) NWZ-207/
NWZ-214/NWZ-207-TP

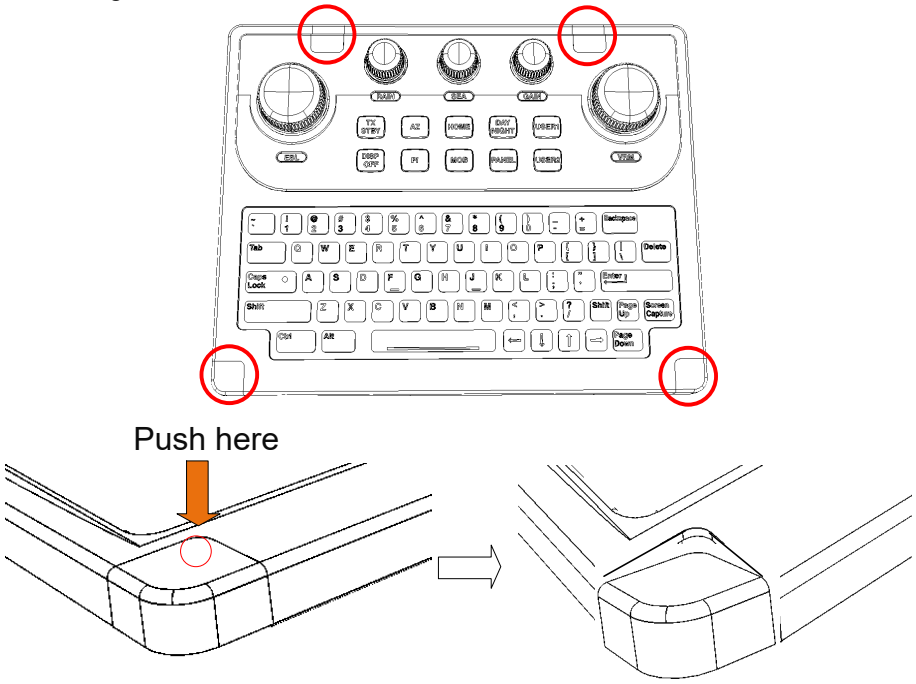
Installation of Monitor Unit ends above.

3.4.2 Installation of Operation Unit

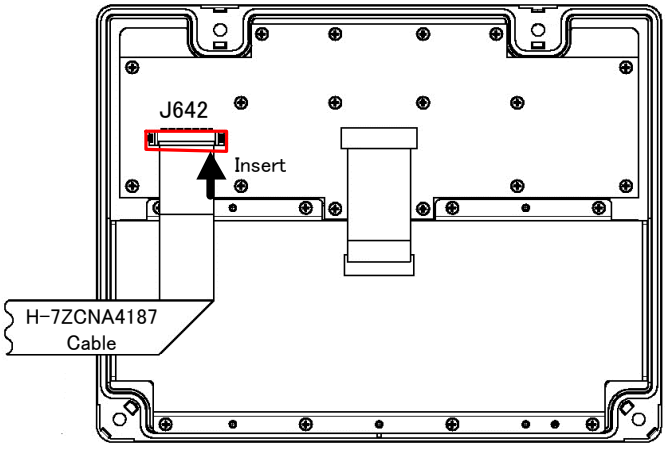
3.4.2.1 Installation of Keyboard Operation Unit NCE-5625

1) Remove the 4 screw covers from the NCE-5625 KOPU by pushing the inside of the cover as shown below.

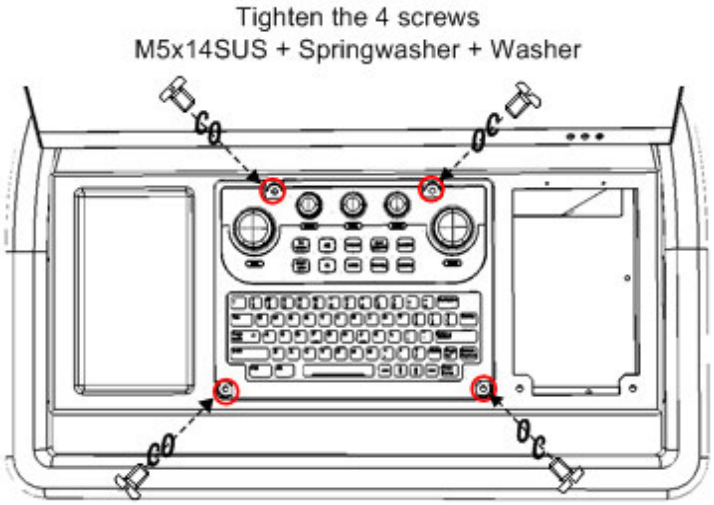
⚠ Do not remove the cover using a flat blade screwdriver. Because there is a possibility that the cover is damaged.



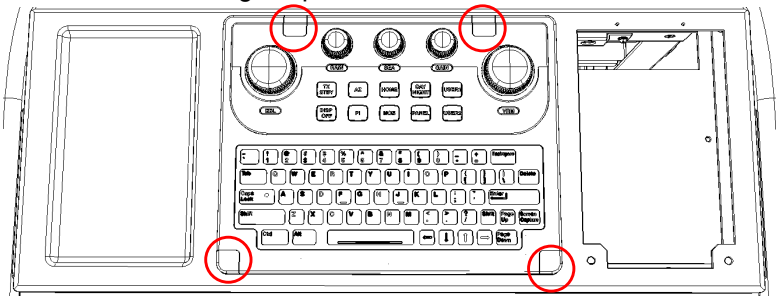
2) Insert the W64: H-7ZCNA4187 cable (included in NCE-5625) to the J642 connector.



3) Install the KOPU to the Display Unit Mount Kit (CWA-245/CWA-246/CWB-1596).
Screw: M5x14SUS + Spring washer + Washer (included in CWA-245/CWA-246/CWB-1596)



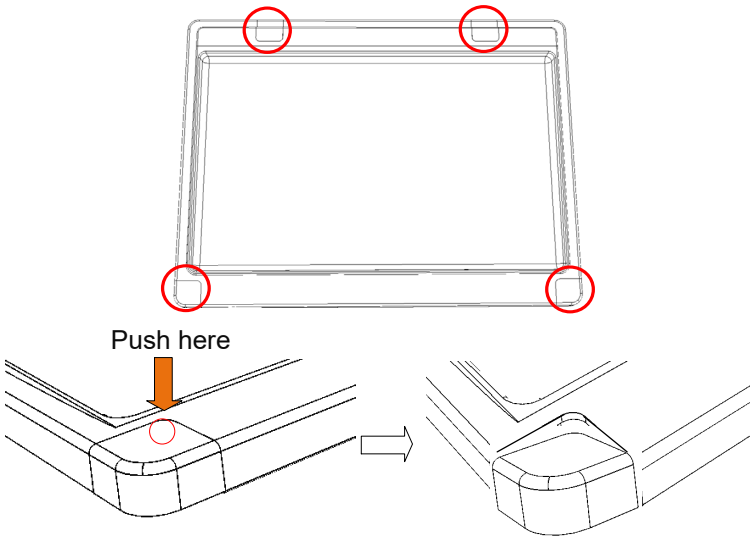
4) Insert the 4 screw covers into the original positions.



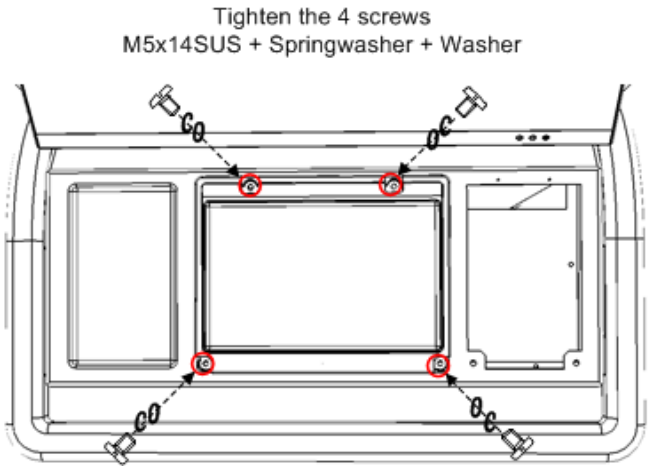
3.4.2.2 Installation of Large Tray CWB-1593

1) Remove the 4 screw covers from the CWB-1593 Large Tray by pushing the inside of the cover as shown below.

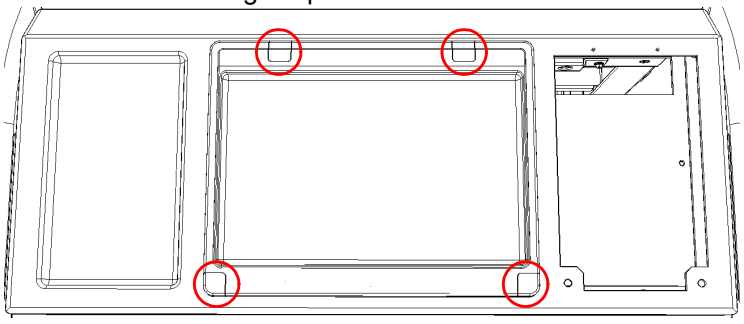
⚠ Do not remove the cover using a flat blade screwdriver. Because there is a possibility that the cover is damaged.



2) Install the Large Tray to the frame (CWA-245/CWA-246/CWB-1596).
Screw: M5x14SUS + Spring washer + Washer (included in CWA-245/CWA-246/CWB-1596)

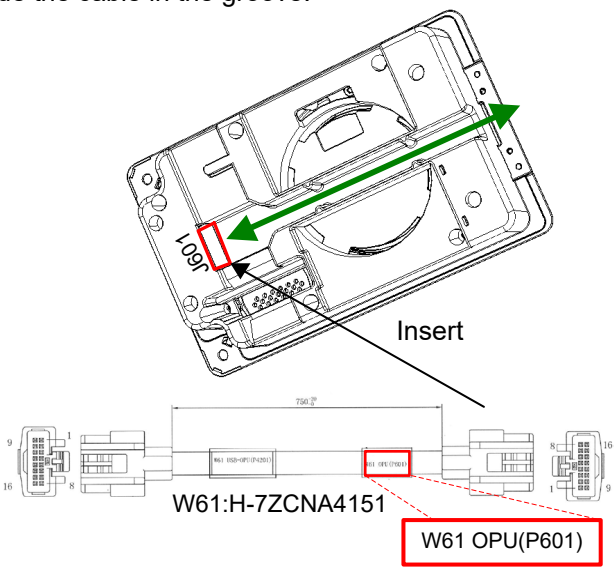


3) Insert the 4 screw covers into the original positions.



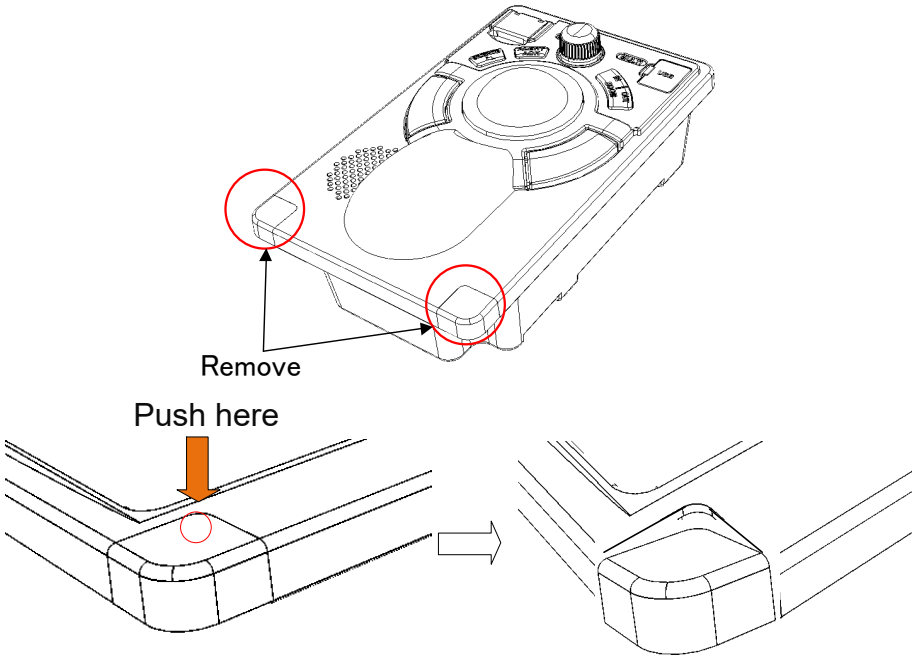
3.4.2.3 Installation of Trackball Operation Unit NCE-5605

1) Insert the W61: H-7ZCNA4151 cable (included in CML-901) to the J601 connector of the TOPU. After connecting, guide the cable in the groove.

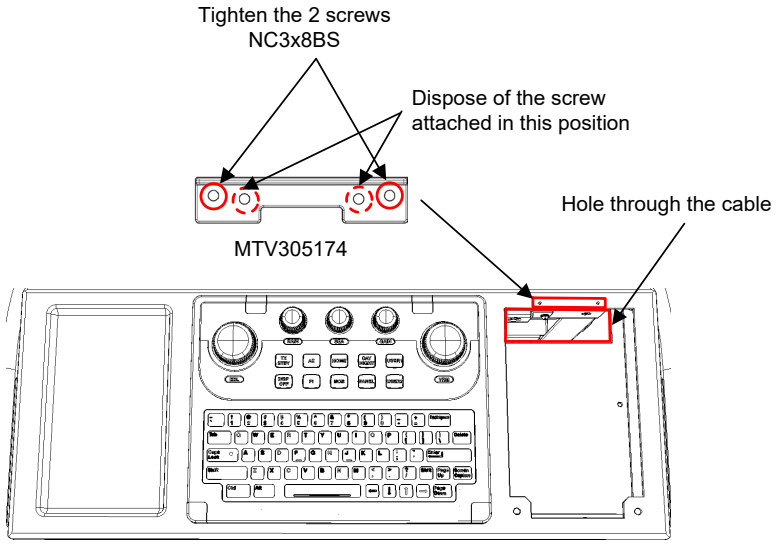


2) Remove the two screw covers from the TOPU by pushing the inside of the cover as shown below.

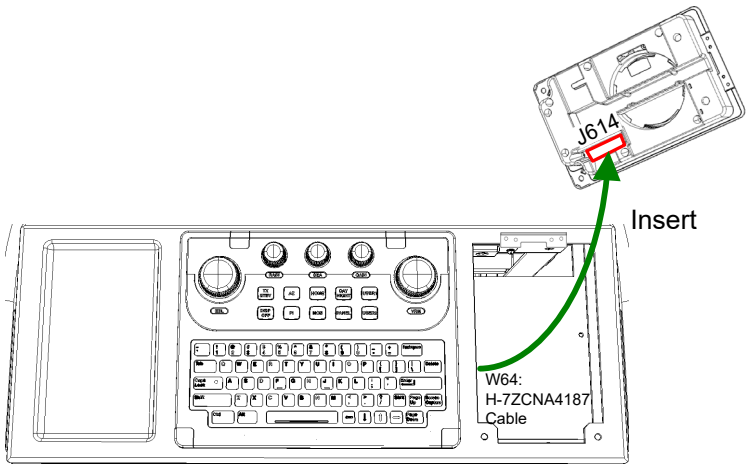
⚠ Do not remove the cover using a flat blade screwdriver. Because there is a possibility that the cover is damaged.



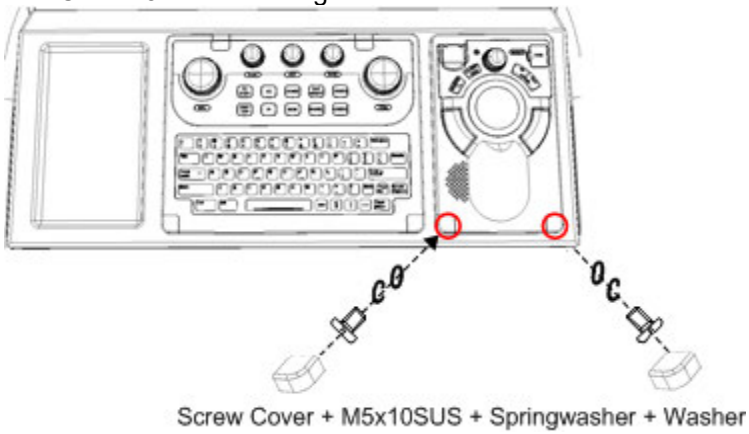
3) Install the TOPU bracket MTV305174 (included in TOPU) to the frame.
Screw: NC3x8BS (included in CWA-245/CWA-246/CWB-1596)



4) When the KOPU has been installed
Connect the W64:H-7ZCNA4187 cable (first to the KOPU by following the procedure described in **3.4.2.1 Installation of Keyboard Operation Unit NCE-5625**, and then) to the J614 connector of the KOPU.



5) Insert the TOPU as shown in the figure below. And Install the TOPU to the Frame.
Pass the W61: H-7ZCNA4151 cable through the cable hole at the bottom of the frame.



3.4.3 Installation of Central Control Unit NDC-1590/A

3.4.3.1 Confirming of type name (NDC-1590 / NDC-1590A)

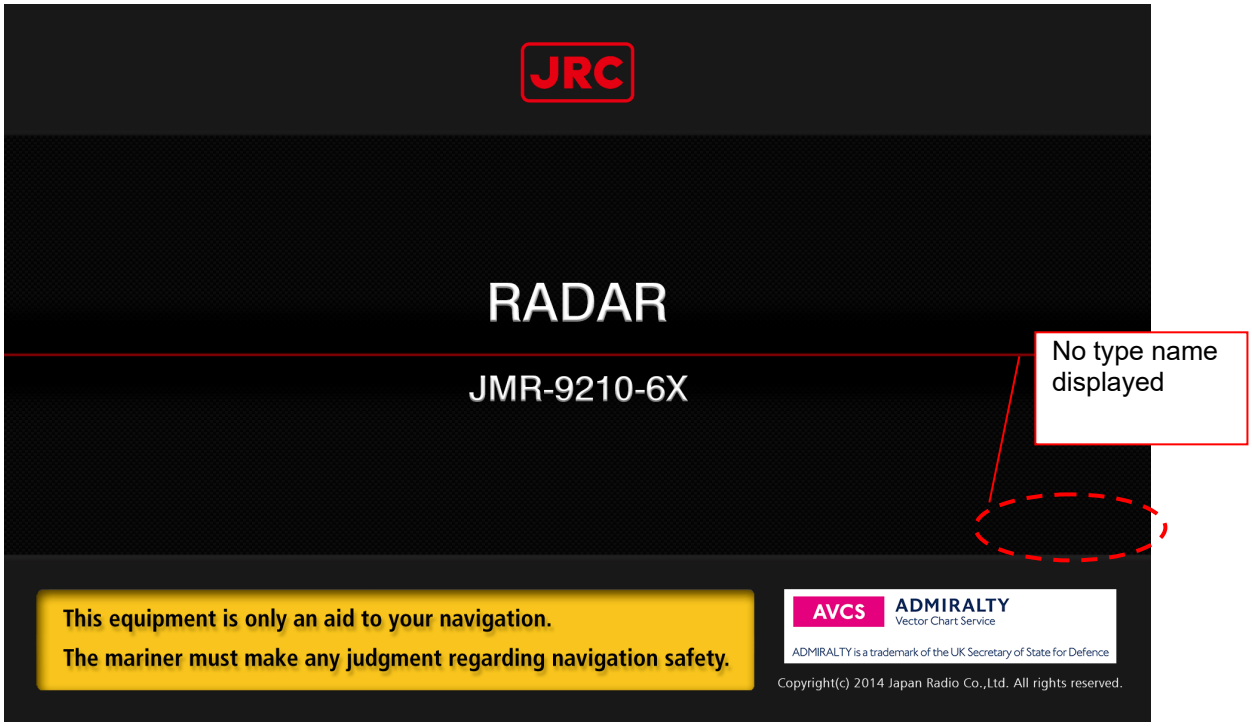
Confirming of type name before turning on the power

Remove the CCU cover. And check the type name on the front of the CCU.

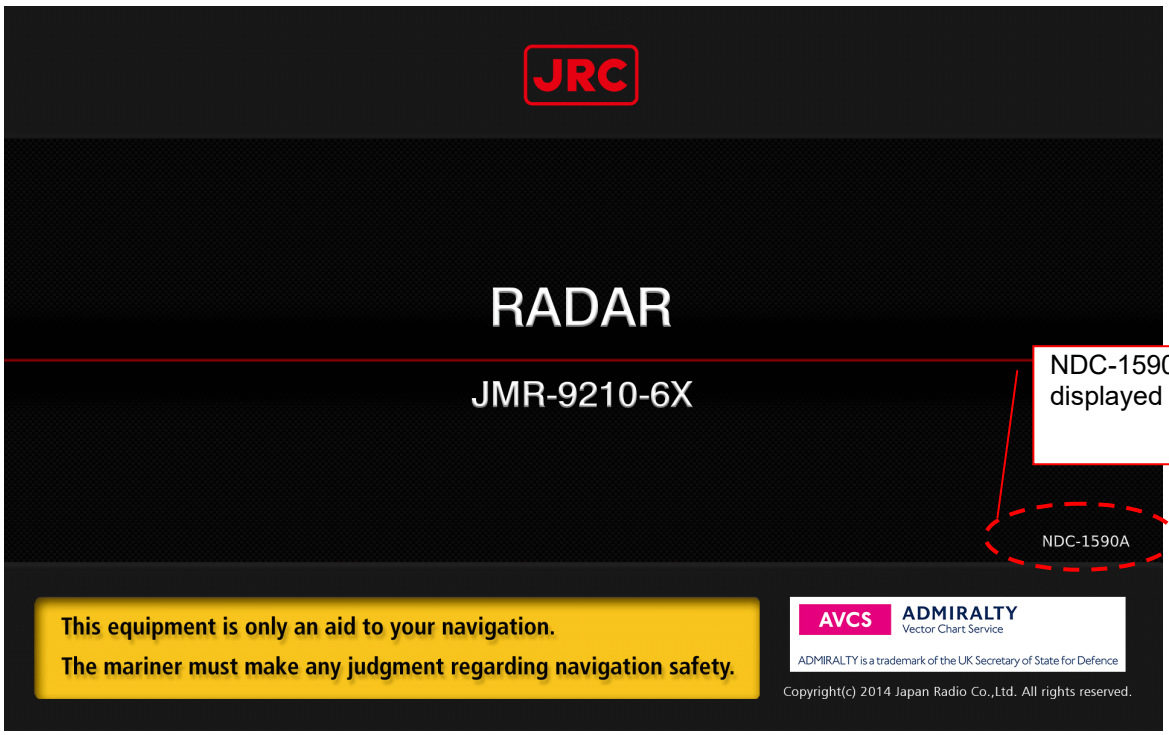


Confirming of type name during start up

After press the [POWER] button, check whether NDC-1590A of type name is displayed on the startup screen.



Startup screen of NDC-1590

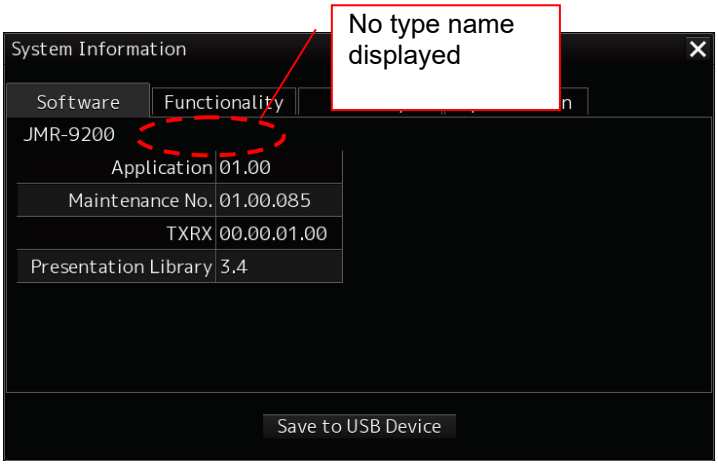


Startup screen of NDC-1590A

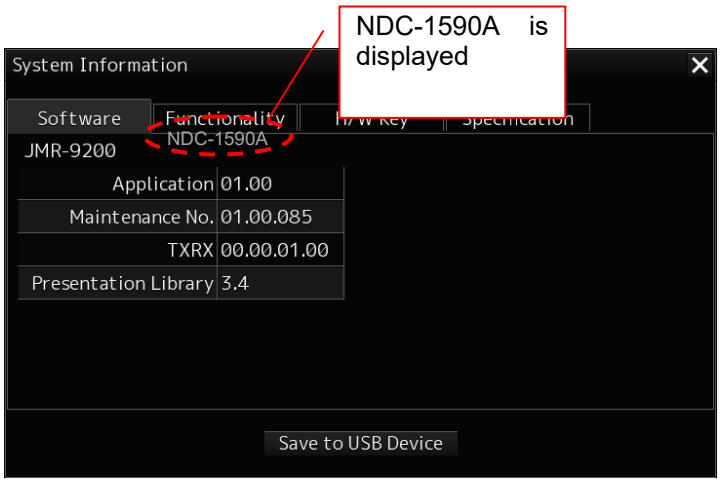
Confirming of type name after startup

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.



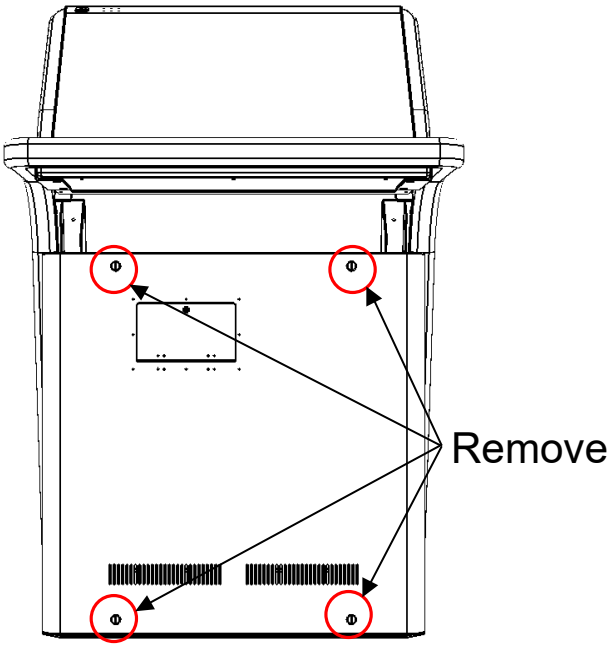
System Information dislog of NDC-1590



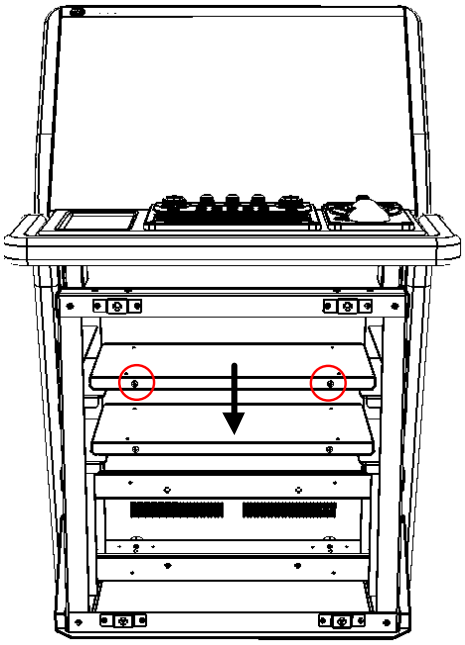
System Information dislog of NDC-1590A

3.4.3.2 Installation of Central Control Unit NDC-1590/A

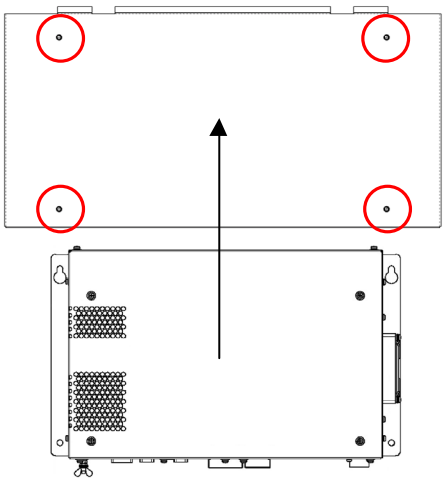
1) Remove the 4 screws from the front cover of the Display Unit.



2) Remove the 2 screws that hold the upper shelf, and remove the shelf.



3) Install the NDC-1590/A CCU to the shelf. Refer to the figure below.

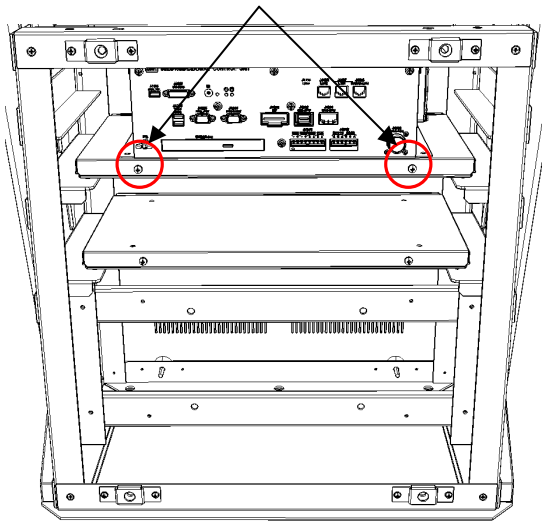


Tighten the 4 screws
M5x10SUS + Springwasher + Washer

4) Insert the shelf with the CCU attached, and secure it with the 2 screws.

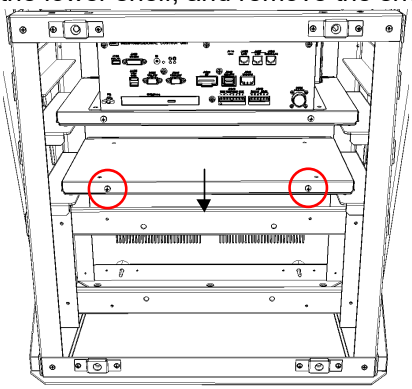
⚠ Make sure the shelf is not floating.

Tighten the 2 screws
M5x10SUS + Springwasher + Washer

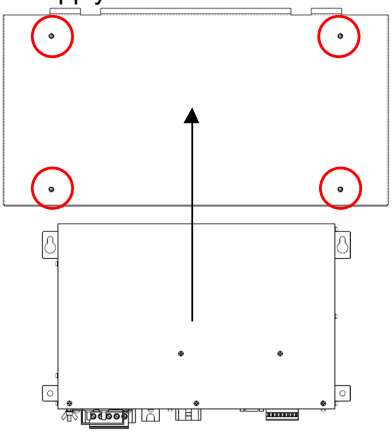


3.4.4 Installation of Power Supply Unit NBD-913

1) Remove the 2 screws that hold the lower shelf, and remove the shelf.



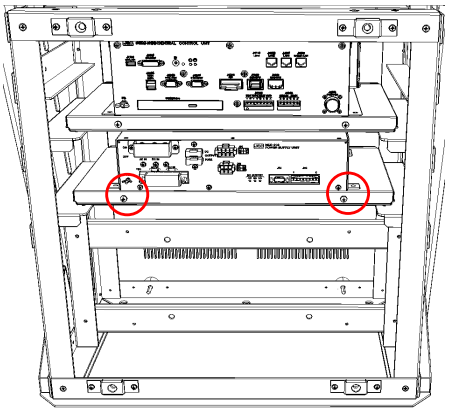
2) Install the NBD-913 PSU-Power Supply Unit to the shelf. Refer to the figure below.



Screw
M5x10SUS+Springwasher+Washer

3) Insert the shelf with the PSU attached, and secure it with the 2 screws.

⚠ Make sure the shelf is not floating.



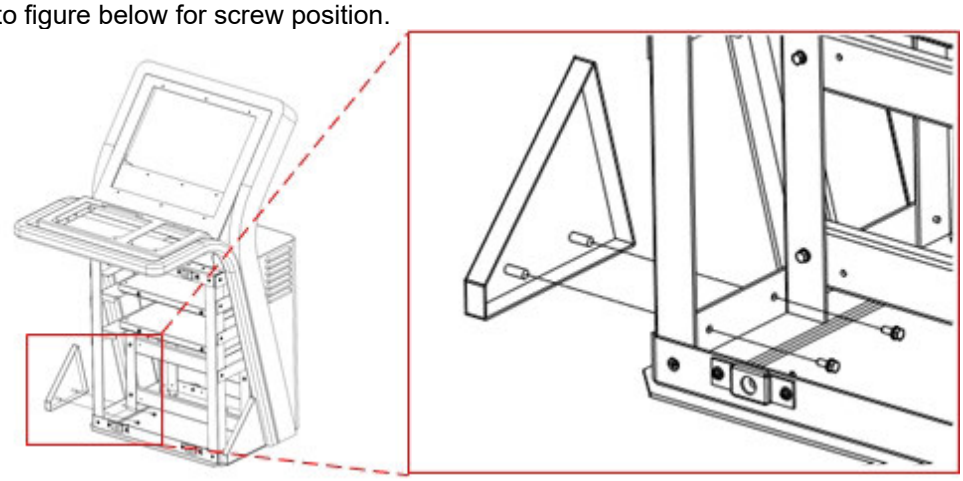
Tighten the 2 screws
M5x10SUS + Springwasher + Washer

3.4.5 Installation of Relay Terminal CQD-2312

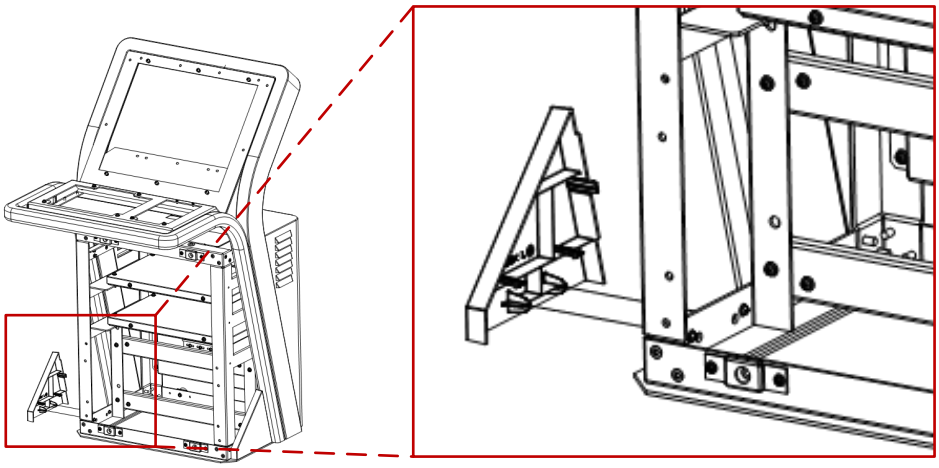
Attach the Relay Terminal CQD-2312 for distribution of the AC/DC power.
When the NQA-2443 Sensor LAN SW and the UPS have been arranged, install the SENSOR LAN SW and UPS before installing the Relay Terminal. For how to install the Relay Terminal, refer to the following articles.

-3.5.3 Installation of NQA-2443/A Sensor LAN Switch Unit
-3.5.4 Installation of UPS

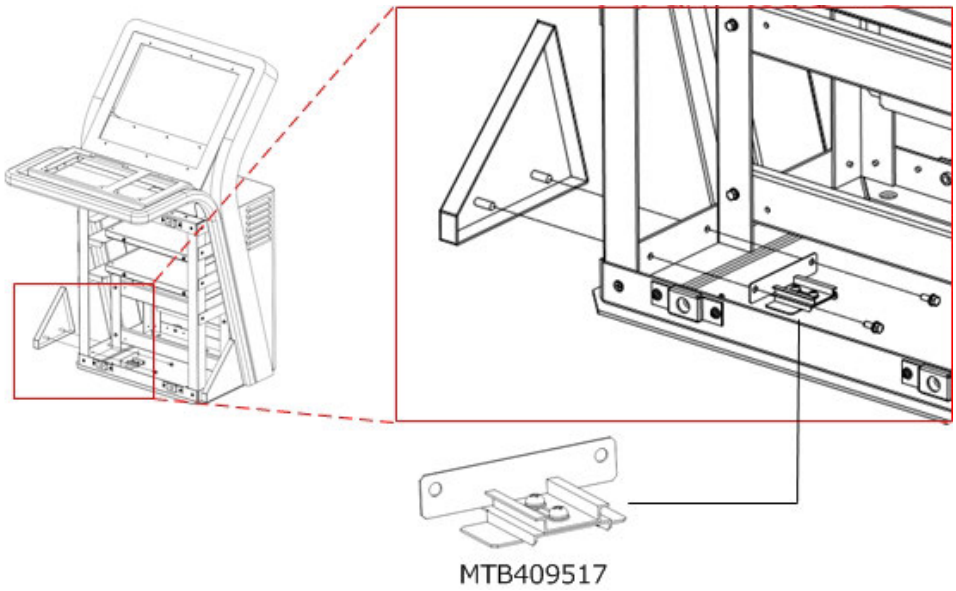
1) Remove the 2 screws located at the lower left portion of the Display Unit Mount Kit (CWA-245/246). Refer to figure below for screw position.



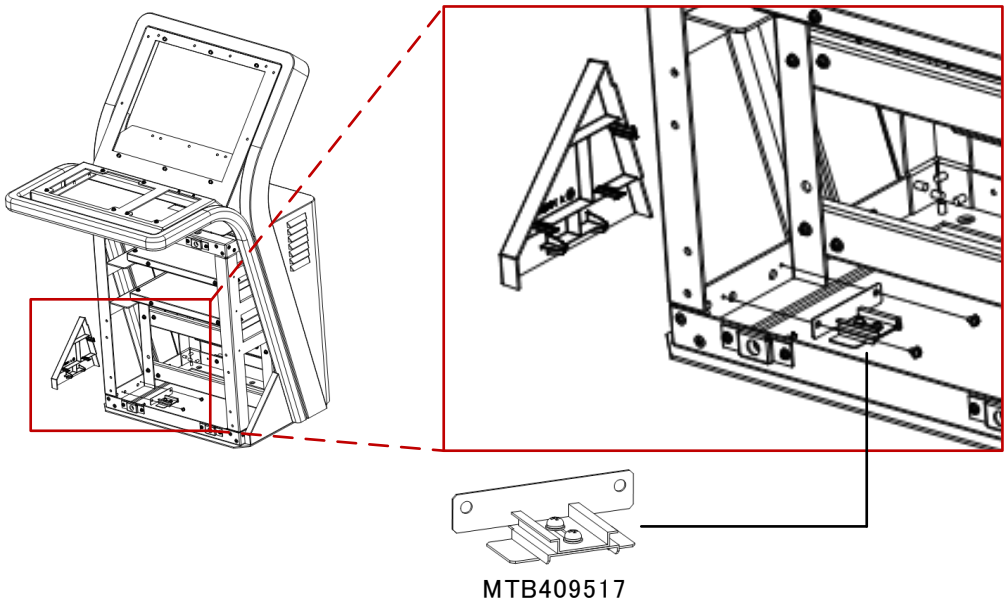
In 2020 later



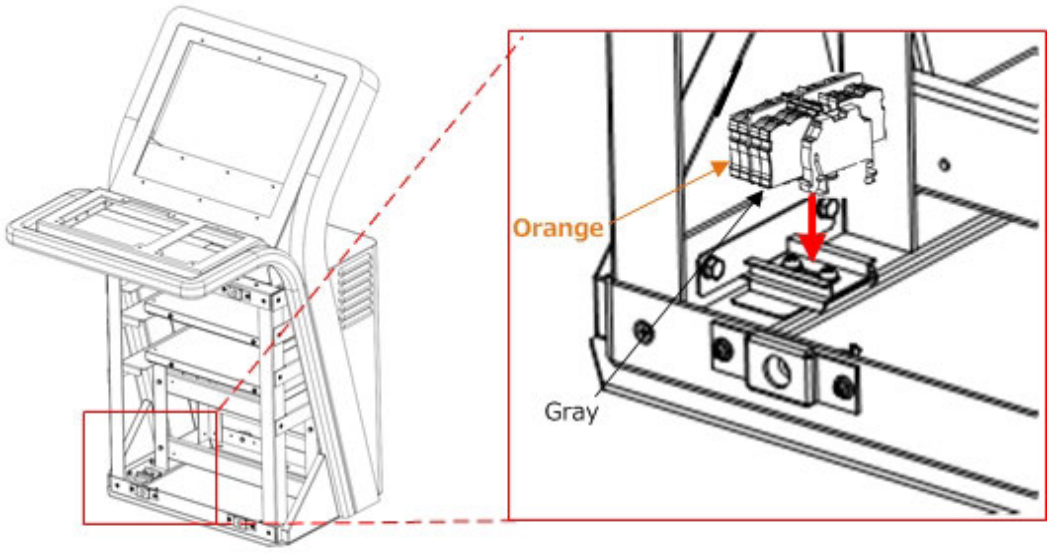
2) Fix the bracket for relay terminal mount(MTB409517) to Display Unit Mount Kit with the screws removed in the previous section

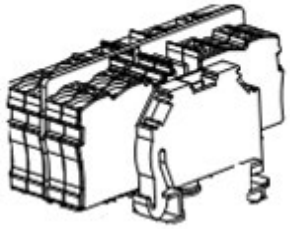


In 2020 later



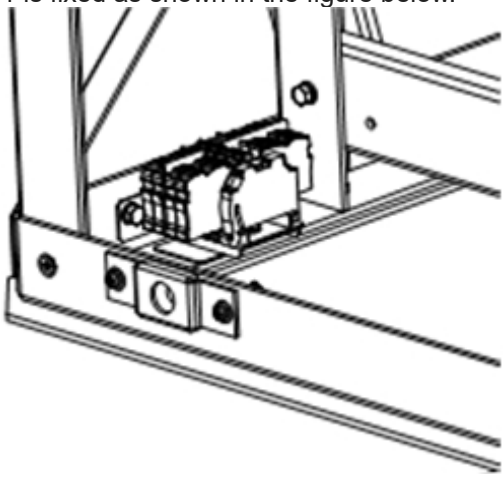
3) While pushing H-7JTNA4061 against the DIN rail as shown below, fix H-7JTNA4061.
The orange terminals (U, V) should be at the left side, and the gray terminals (+, -) at the right.





H-7JTNA4061

4) Make sure that H-7JTNA4061 is fixed as shown in the figure below.



3.4.6 Connection of cables between units

3.4.6.1 Wiring diagram

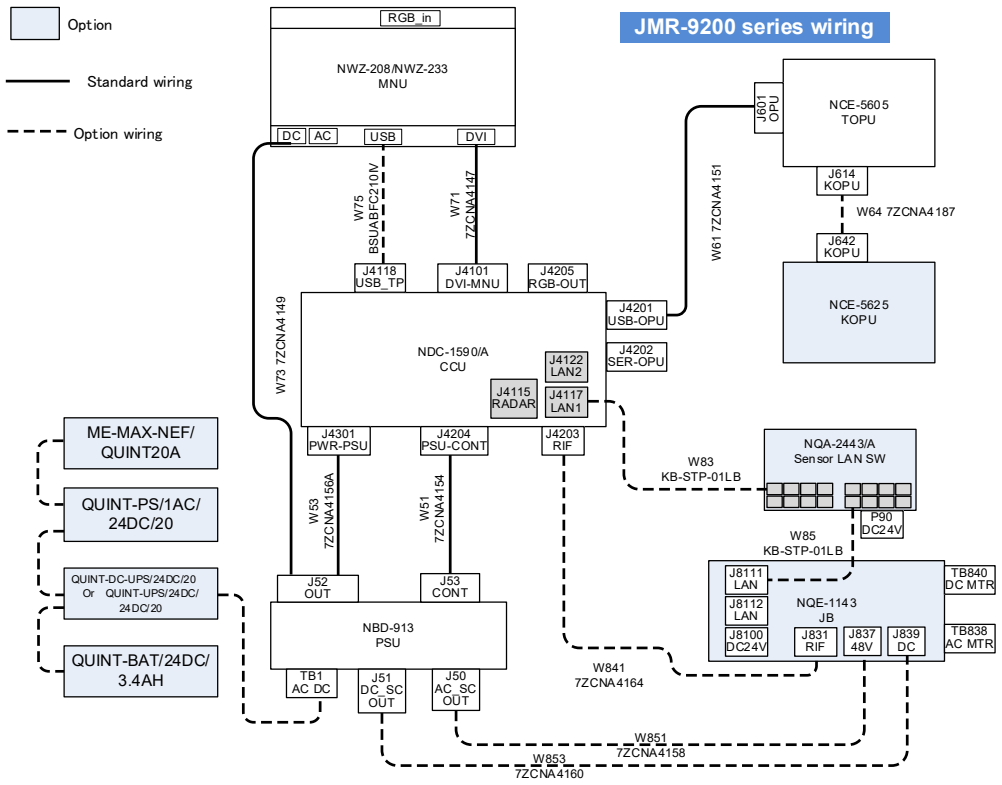


Fig 3-30 JMR-9200Series/JAN-9201/JAN-9202 Wiring Diagram

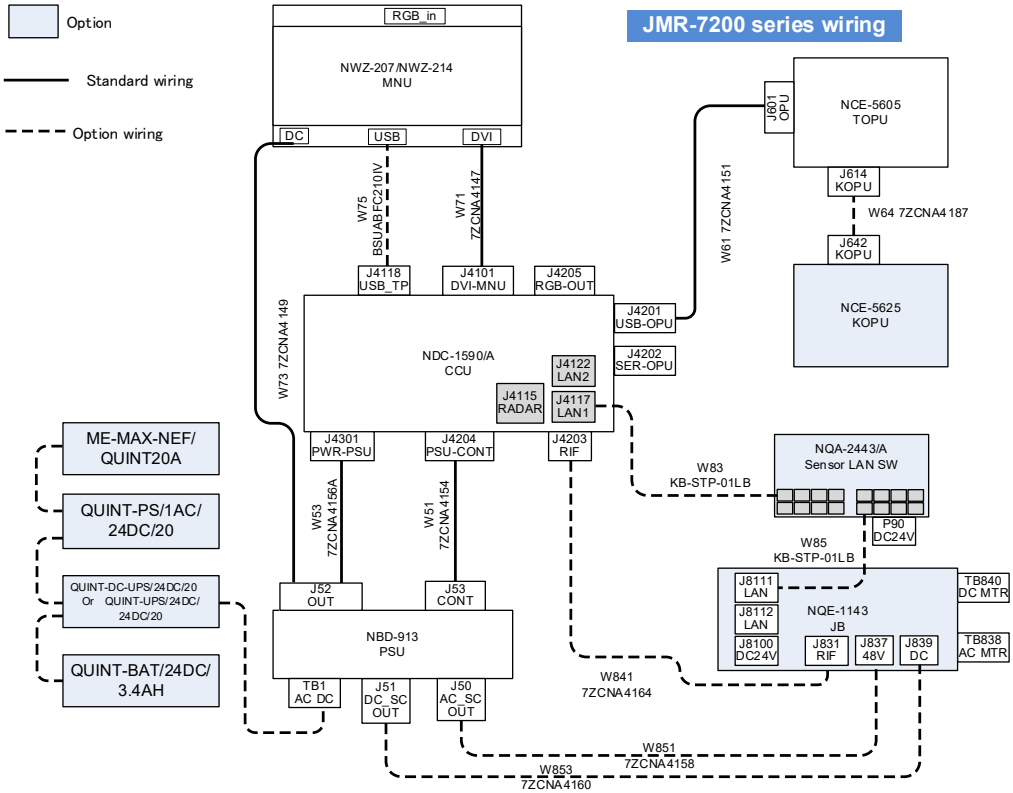
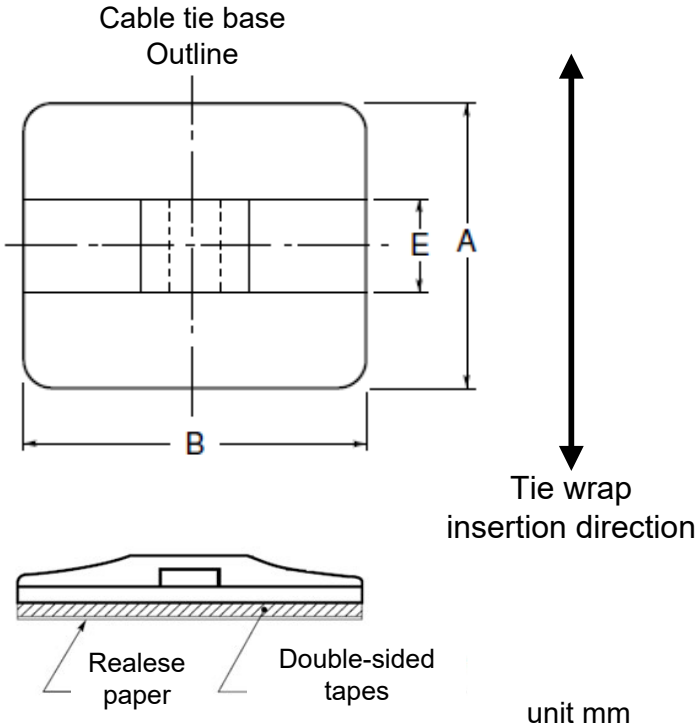


Fig 3-31 JMR-7200Series/JAN-7201/JAN-7202 Wiring Diagram

3.4.6.2 Wiring of standalone type

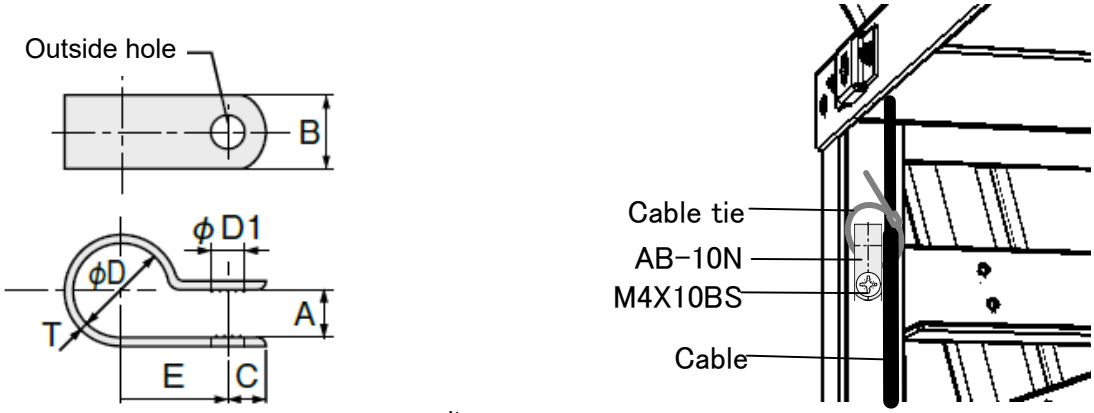
1) Attach the cable tie base(ANP-1, ANP-2) and nylon clip (AB-10N) to the 12 position shown in the figure below.
   - Generally, they have been attached at the factory.



unit mm

Cable tie base	A	B	E	Cable tie type
ANP−1	20	20	7	T30R
ANP−2	25	30	8.2	T50R

Fig 3-32:Cable tie base ANP-1 and ANP-2

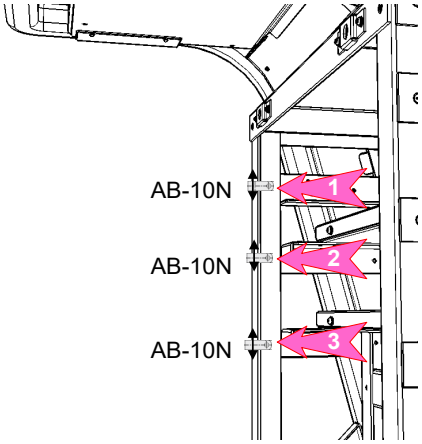


unit mm

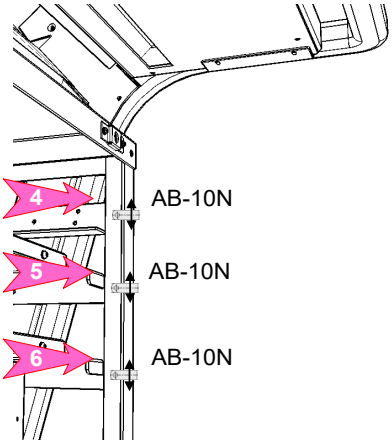
	A	B	C	ϕD	ϕD1	E	T	Screw
AB−10N	6.3	9.5	4.8	16	4.3	15.9	1.1	M4×10

Fig 3-33 Nylon Clip

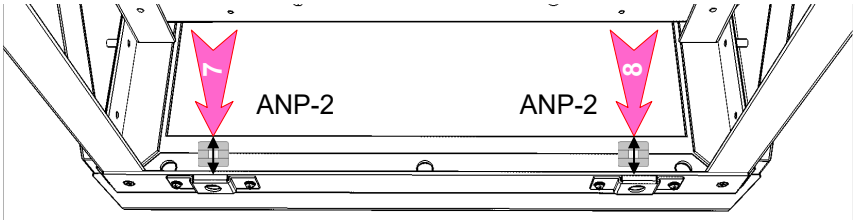
Use the nylon clip AB-10N as a clamp base. Refer to the above diagram.



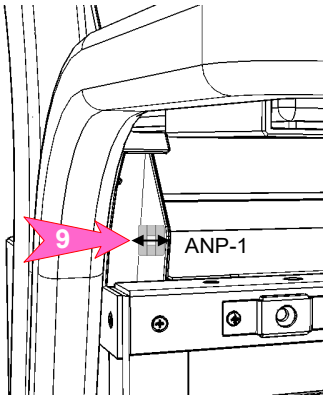
Left-hand side



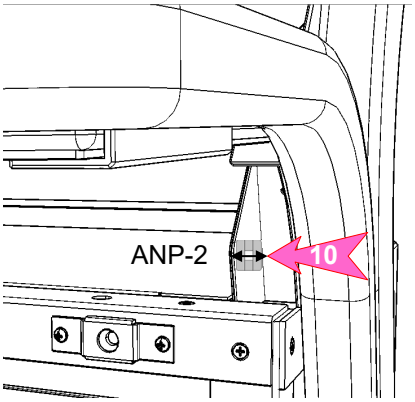
Right-hand side



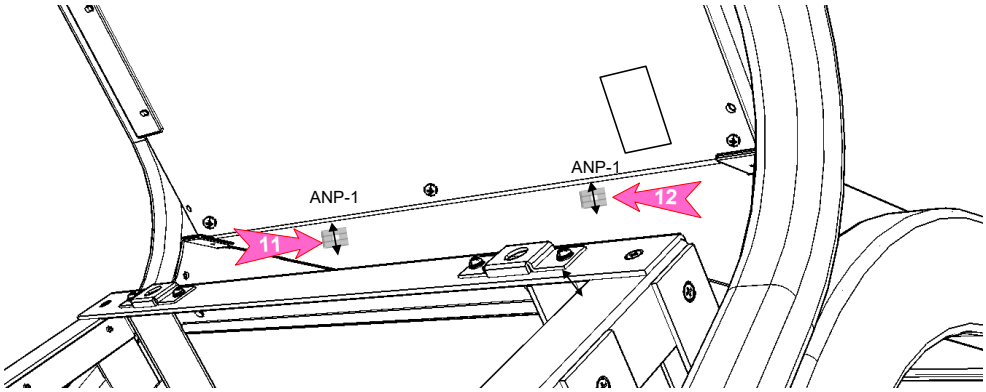
Bottom of the mount kit



Top of the left-hand side



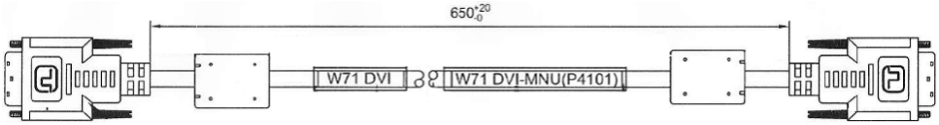
Top of the right-hand side



Back side of the operation unit

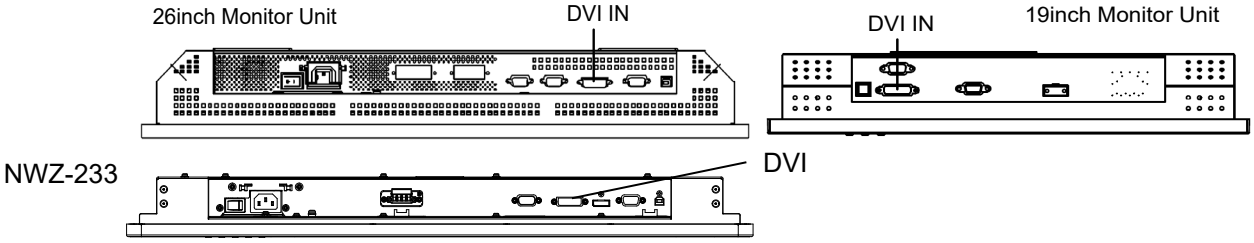
2) Connect the cable with the following procedure.
● For option wiring, refer to **3.5 Installation of Option Equipment**.

W71 : H-7ZCNA4147(CML-901)

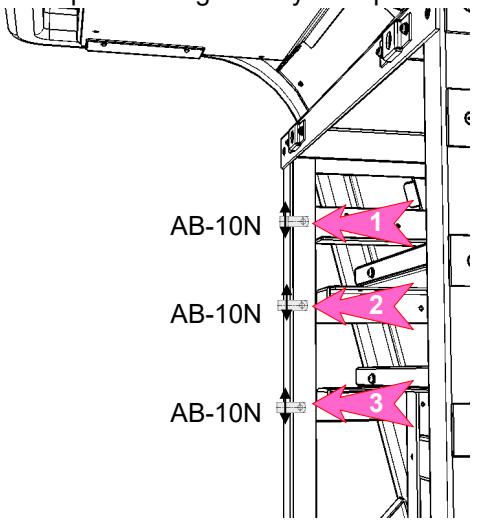


Connect the DVI connector on the Monitor unit and the J4101 connector on the CCU with W71: H-7ZCNA4147 cable.

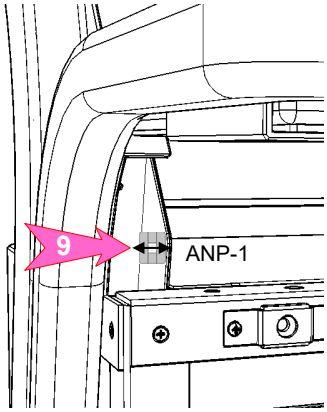
⚠ Be careful when connecting because it is easy to break the connection terminal of the DVI connector.



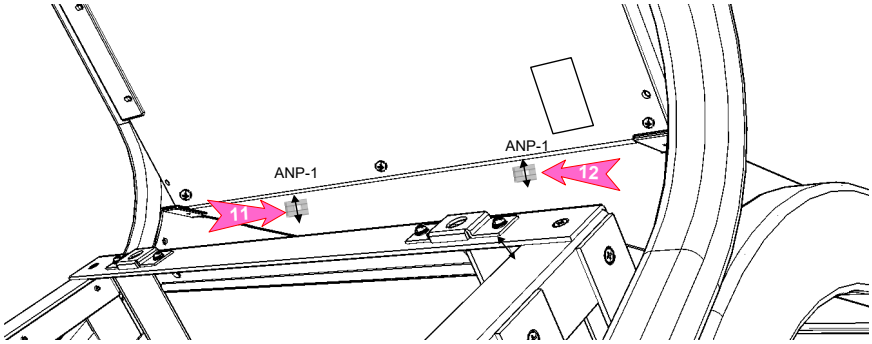
Wire the cable to pass through the nylon clip No.1 and the cable tie base No.9 and 11.



Left-hand side

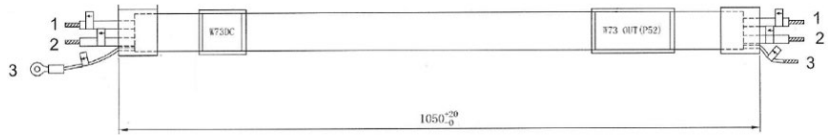


Top of the left-hand side

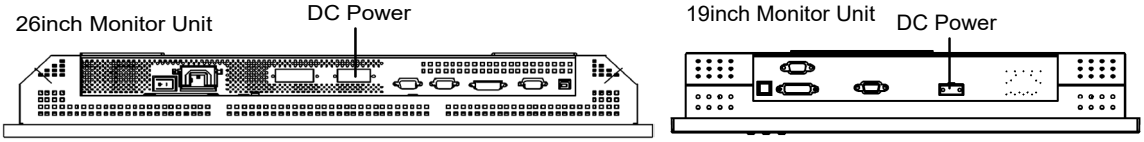


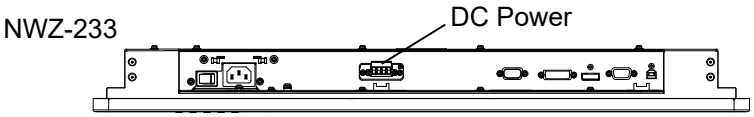
Back side of the operation unit

3) W73：H-7ZCNA4149(CML-901)



Connect the DC power connector on the monitor unit and the P52 connector on the PSU with W73: H-7ZCNA4149 cable.





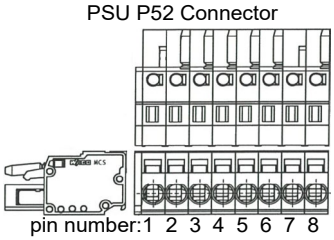
● Wiring to DC power connector on the Monitor Unit

+: red(label: +24V)

-: black(label: -24V)

The polarities of the terminals are described near the connector.

The monitor unit DC power connector has 4 terminals. But only use pins No.2 and No.3.



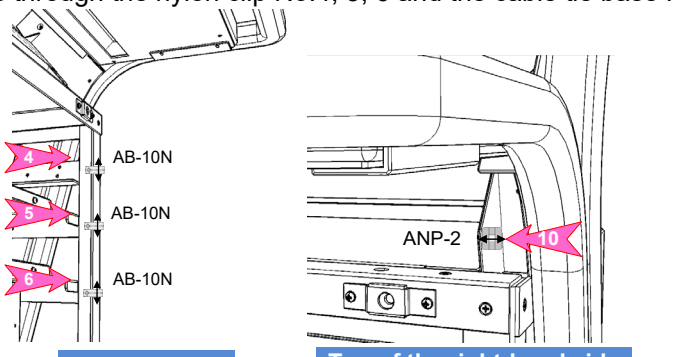
● Wiring to PSU-P52

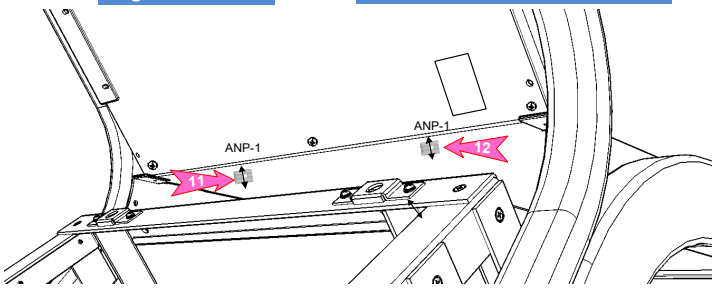
1:red(label:P52-1)

2:black(label:P52-2)

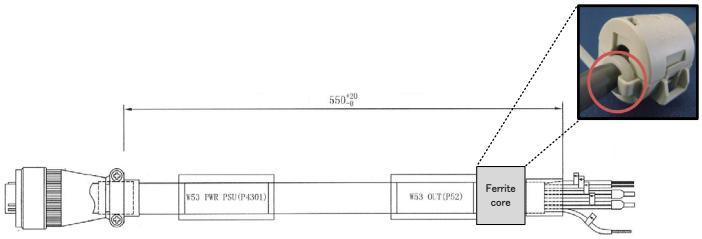
3:shield(label:P52-3)

Wire the cable to pass through the nylon clip No.4, 5, 6 and the cable tie base No.10 and 12.

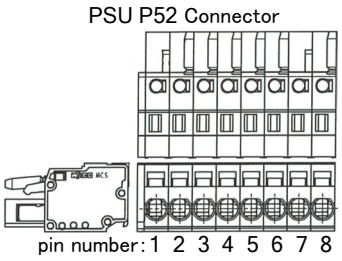




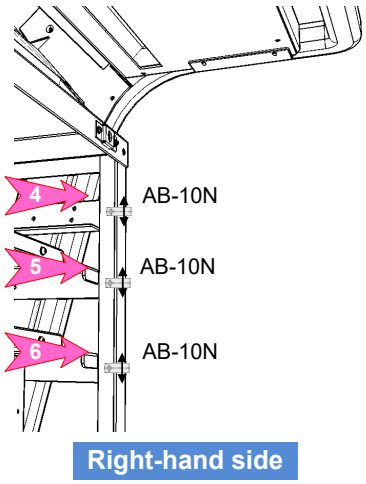
4) W53：H-7ZCNA4156A(CML-901)



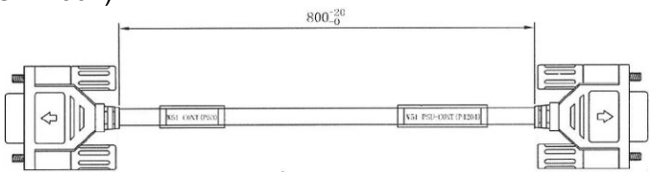
First, attach the ferrite core FL1:GTFC23-11-14 (included in CML-901) to the position shown in the figure above. After that, fix it with the cable tie (included in CML-901).
Second, connect the J4301 connector on the CCU and the P52 connector on the PSU with the W53: H-7ZCNA4156A cable.
Wire the cable to pass through the nylon clip No.5 and 6.



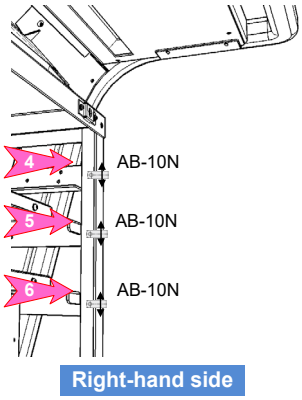
● Wiring to PSU-P52
4 : brown+orange+ferrule(label : P52-4)
5 : yellow+green+ferrule(label : P52-5)
6 : red(label : P52-6)
7 : black(label : P52-7)
8 : shield(label : P52-8)



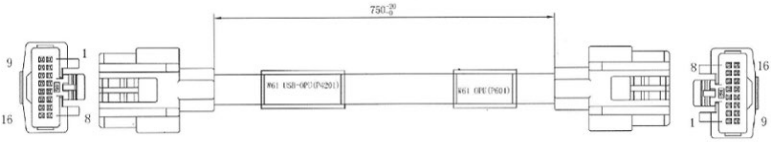
5) W51：H-7ZCNA4154(CML-901)



Connect the J4204 connector on the CCU and the P53 connector on the PSU with the W51: H-7ZCNA4154 cable.
Wire the cable to pass through the nylon clip No.4, 5 and 6.

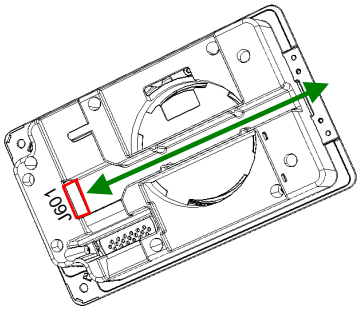


6) W61 : H-7ZCNA4151(CML-901)

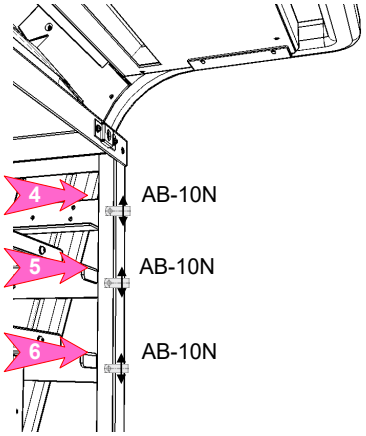


Connect the J601 connector on the TOPU and the J4201 connector on the CCU with the W61: H-7ZCNA4151 cable.

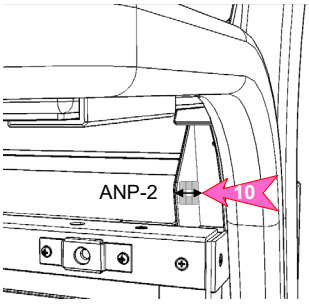
TOPU J601 Connector



Wire the cable to pass through the nylon clip No.4 and the cable tie base No.10.

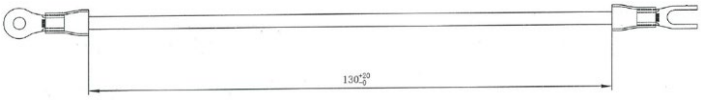


Right-hand side

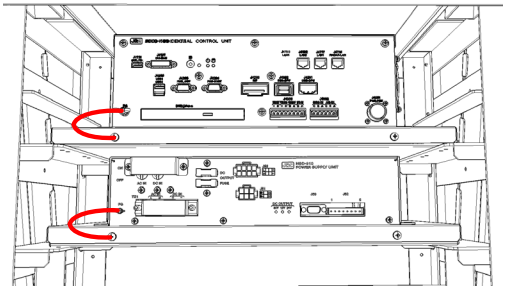


Top of the right-hand side

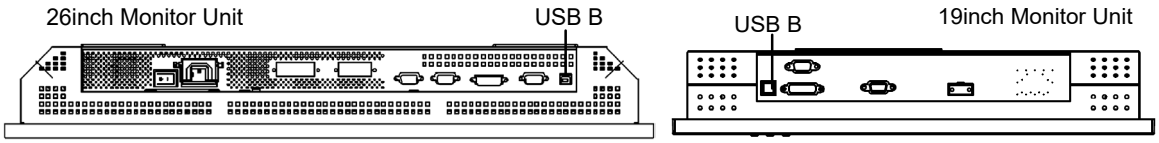
7) W90/91 : H-7ZCNA4214(CML-901)



Connect the FG terminal of the CCU/PSU and the frame with the W90/W91: H-7ZCNA4214 cable.
Y terminal : Frame side
Round terminal : CCU/PSU FG terminal

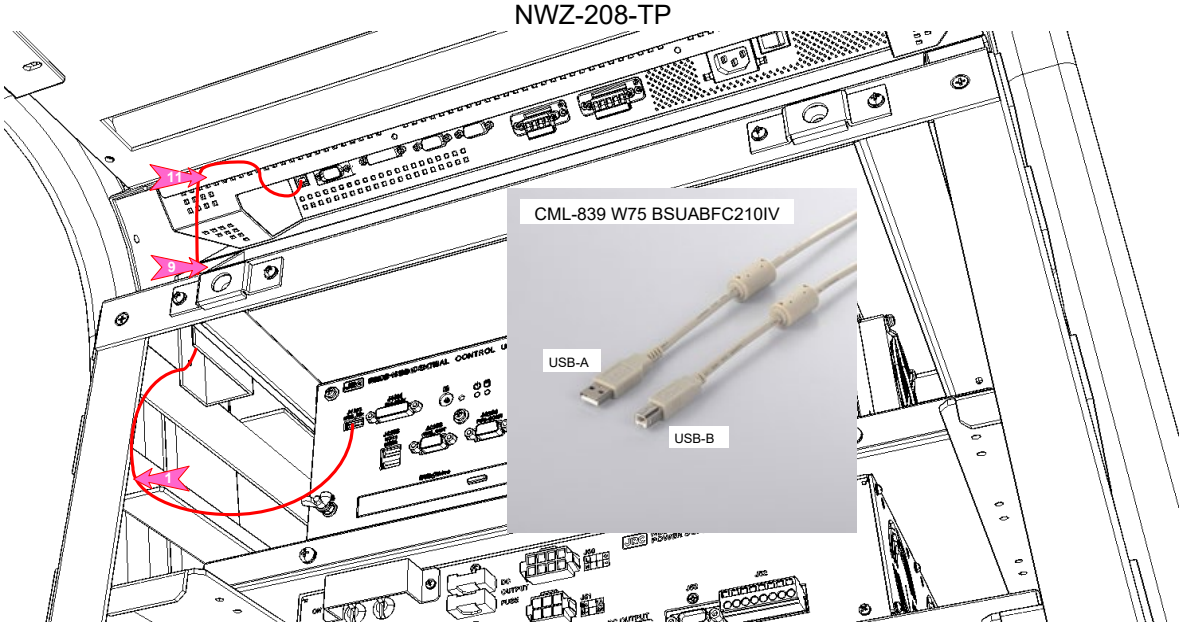


8) When installing the Monitor Unit (touch panel) NWZ-208-TP or NWZ-207-TP
Connect the USB-B connector on the rear of the monitor unit (see below) and the J4118 USB-A connector on the CCU with W75:BSUABFC201IV cable (included in CML-839).

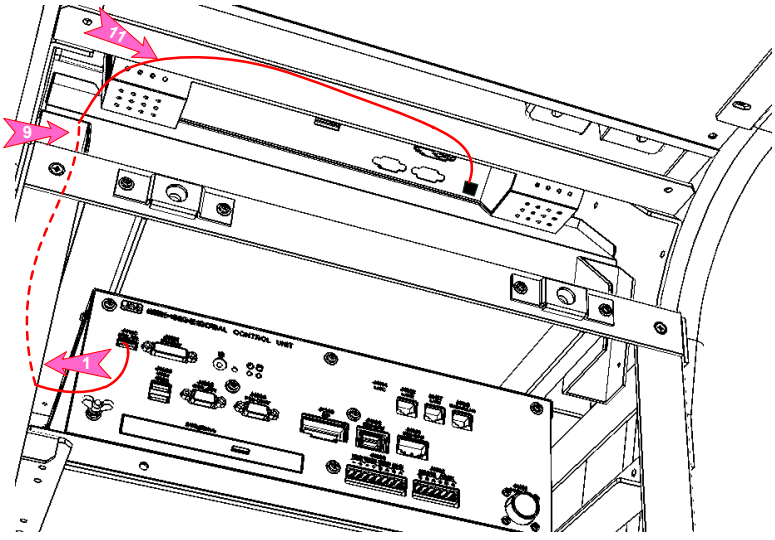


Wire the cable to pass through the nylon clip No.1 and the cable tie base 9 and 11.

NWZ-208-TP



NWZ-207-TP



9) Fasten the cable using the T30R/T50R cable tie to the cable tie base and the nylon clip.
ANP-1: Use the T30R
ANP-2: Use the T50R
AB-10N: No.1 – Use the T30R
No.4,5,6 – Use the T50R

⚠ Use the AB-10N nylon clip as a clamp base. Do not pass a cable through it.

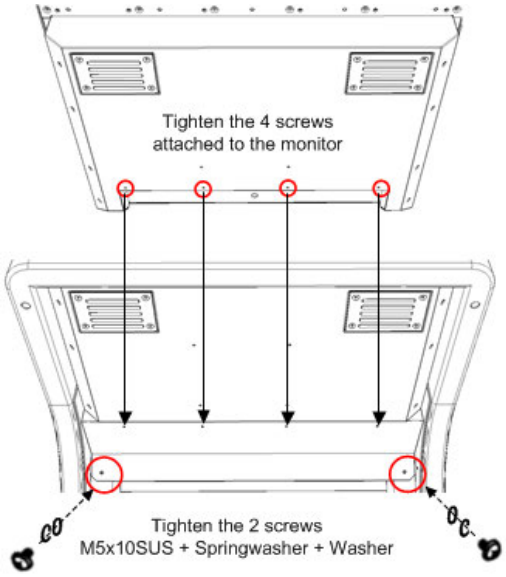
⚠ When installing the option unit, fasten the cables after installing the option unit.

⚠ Be careful so that the cables are not stretched.

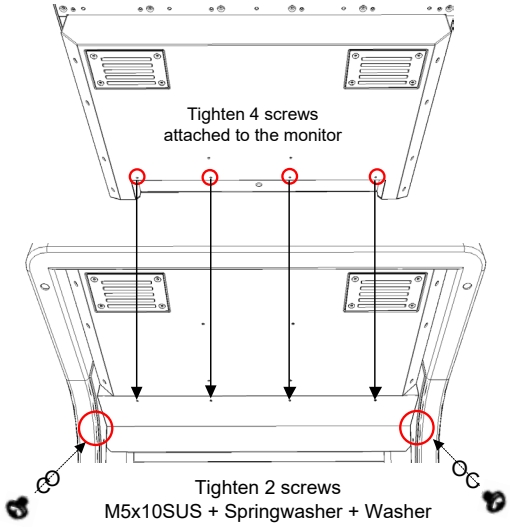
⚠ Fold the cable portions left over.

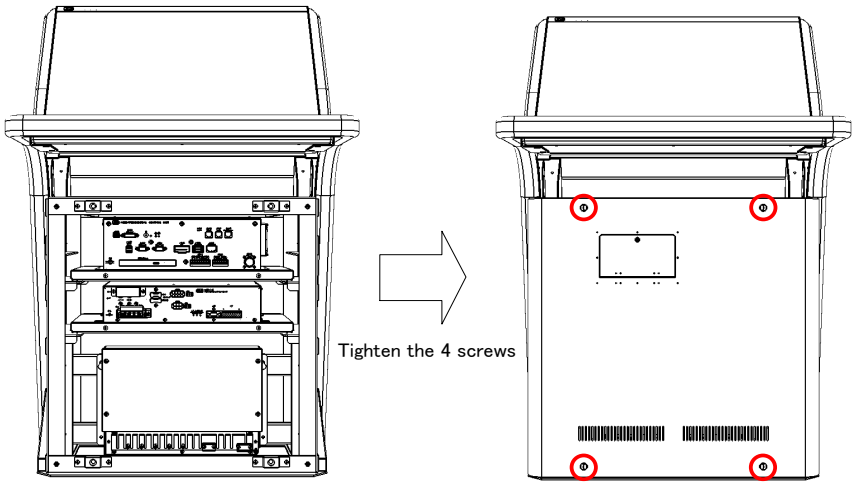
⚠ Don't forget the screw lock of the connector H-7ZCNA4147/4149/4154/4156A, because these connectors are screw locking type connector.

10) Screw the front cover of the Display Unit and the rear cover of the Monitor Unit.



In 2020 later

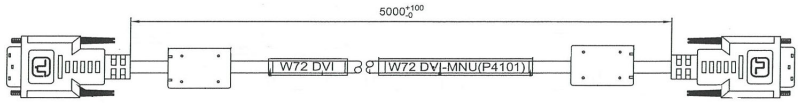




3.4.6.3 Wiring of Desktop type

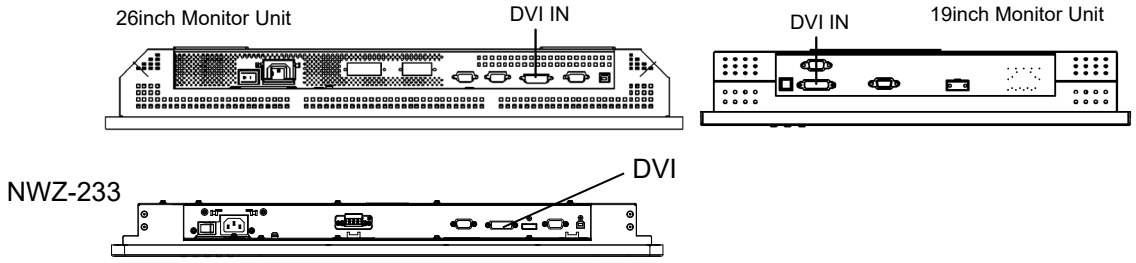
1) Connect the cable with the following wiring diagram and procedure.
   - For option wiring, refer to 3.5 **Installation of Option Equipment**.

W72：H-7ZCNA4148(CML-901-F)

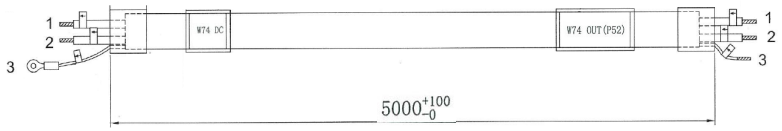


Connect the DVI connector on the Monitor unit and the J4101 connector on the CCU with W72: H-7ZCNA4148 cable.

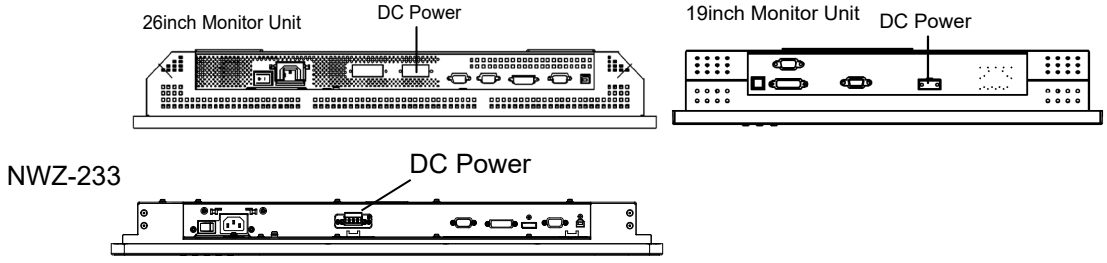
⚠ Be careful when connecting because it is easy to break the connection terminal of the DVI connector.



2) W74：H-7ZCNA4150(CML-901-F)

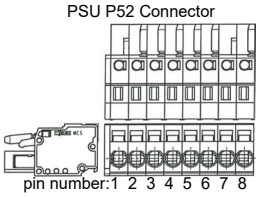


Connect the DC power connector on the Monitor unit and the P52 connector on the PSU with W74: H-7ZCNA4150 cable.



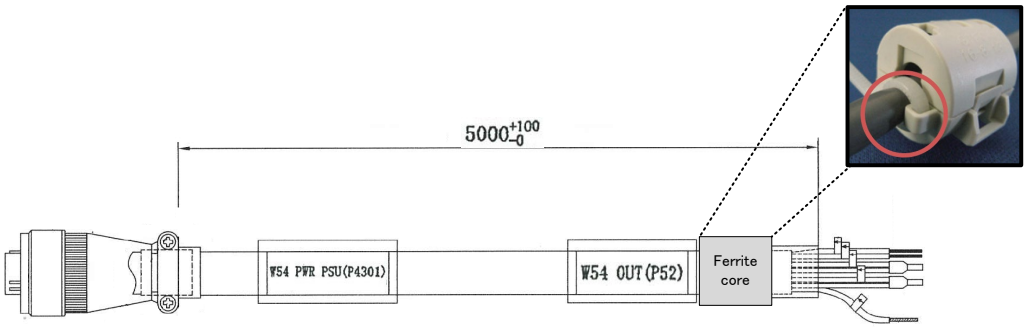
- Wiring to DC power connector on the Monitor unit
  +: red(label: +24V)
  - : black(label: 24VE)

The polarities of the terminals are described near the connector.
The monitor unit DC power connector has 4 terminals. But only use pins No.2 and No.3.



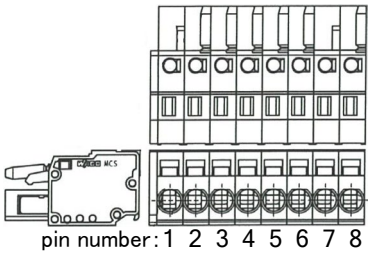
- Wiring to PSU-P52
  1:red(label:P52-1)
  2:black(label:P52-2)
  3:shield(label:P52-3)

3) W54：H-7ZCNA4157A(CML-901-F)



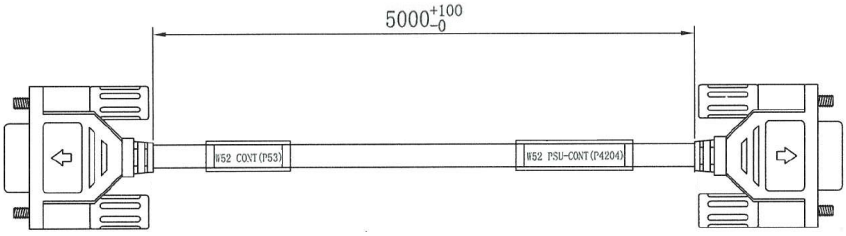
First, attach the ferrite core FL1:GTFC23-11-14 (included in CML-901-F) to the position shown in the figure above. After that, fix the ferrite core with cable tie (included in CML-901-F).
Second, connect the J4301 connector on the CCU and the P52 connector on the PSU with the W54: H-7ZCNA4157A cable.

PSU P52 Connector



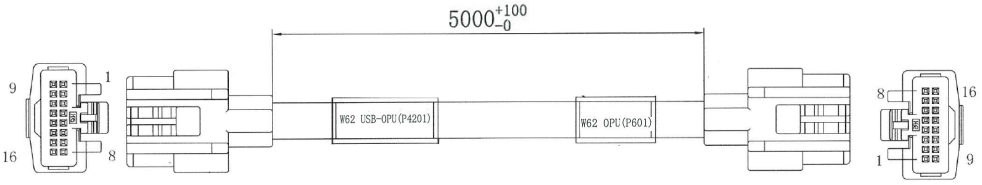
- Wiring to PSU-P52
  - 4 : brown+orange+ferrule(label : P52-4)
  - 5 : yellow+green+ferrule(label : P52-5)
  - 6 : red(label : P52-6)
  - 7 : black(label : P52-7)
  - 8 : shield(label : P52-8)

4) W52：H-7ZCNA4155(CML-901-F)



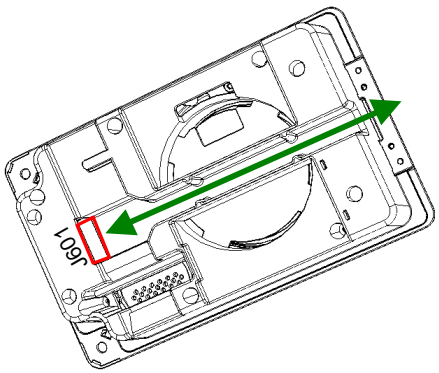
Connect the J4204 connector on the CCU and the P53 connector on the PSU with the W52: H-7ZCNA4155 cable.

5) W62 : H-7ZCNA4152(CML-901-F)



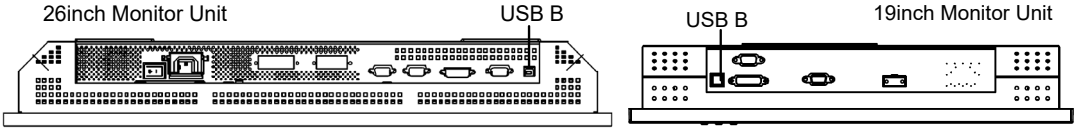
Connect the J601 connector on the TOPU and the J4201 connector on the CCU with the W62: H-7ZCNA4152 cable.

TOPU J601 Connector



6) When installing the Monitor Unit (touch panel) NWZ-208-TP or NWZ-207-TP

Connect the USB-B connector on the monitor unit and the J4118 USB-A connector on the CCU with W75:BSUABFC201IV cable (included in CML-839).



3.4.7 Wiring for Relay Terminal

The CQD-2312 Relay Terminal distributes the AC/DC power to each unit. Wire rod for distribution is attached to the Relay Terminal. Process the wire rod and make connection according to the following procedure.

3.4.7.1 Processing of wire rod

1) NBD-913 Power Supply Unit – wire rod for AC power

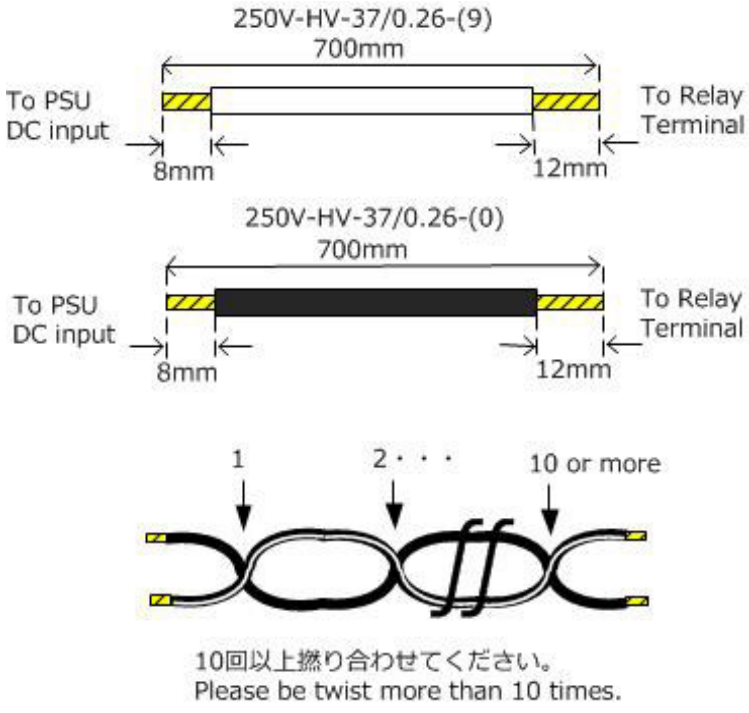
Cut the 2-core vinyl cab tire cable (VCT-2C-70/0.32) attached to the Relay Terminal CQD-2312 to the length shown below. Remainder of this cable is not required. Please dispose it.



2) NBD-913 Power Supply Unit – wire rod for DC power

Cut the white vinyl cable (250V-HV-37/0.26(9)) and black vinyl cable (250V-HV-37/0.26-(0)) attached to the Relay Terminal CQD-2312 to the length shown below.

⚠ Remainder of this cable will be used as AC/DC power cable for option unit(Serial LAN interface circuit, Sensor LAN SW, UPS). Process to cut so as not to waste. Do not dispose until all wiring is complete.

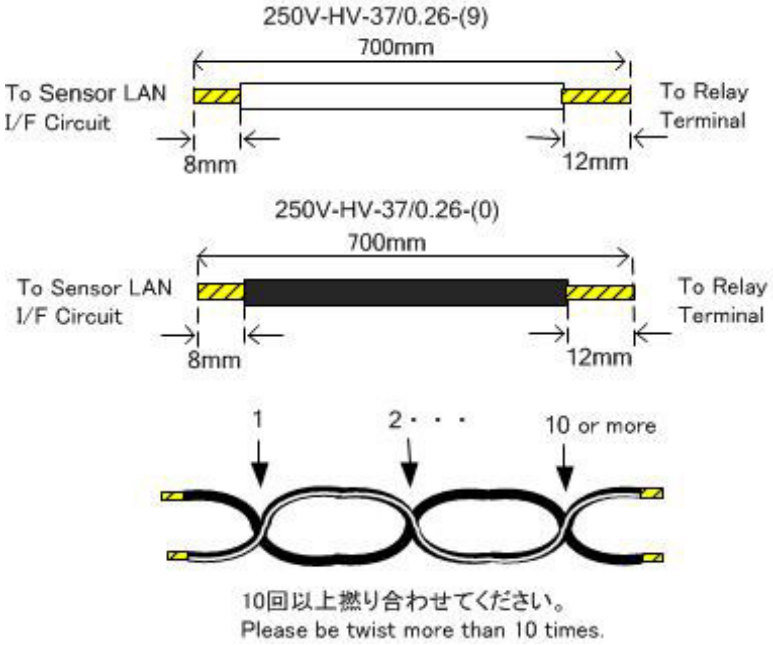


When CMH-2370 Serial LAN interface circuit is arranged

3) CMH-2370 Serial LAN interface circuit - wire rod for DC power

Cut the white vinyl cable(250V-HV-37/0.26(9)) and black vinyl cable(250V-HV-37/0.26-(0)) to length of the following. This cable is remainder of previous section.

⚠ Remainder of this cable will be used as AC/DC power cable for option unit(Serial LAN interface circuit, Sensor LAN SW, UPS). Process to cut so as not to waste. Do not dispose until all wiring is complete.



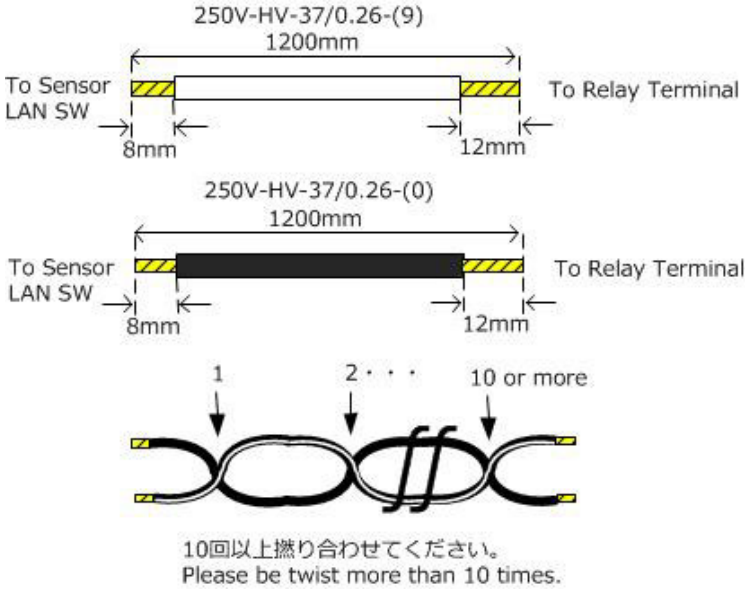
When NQA-2443 SENSOR LAN SW is arranged

4) NQA-2443 SENSOR LAN SW - wire rod for DC power

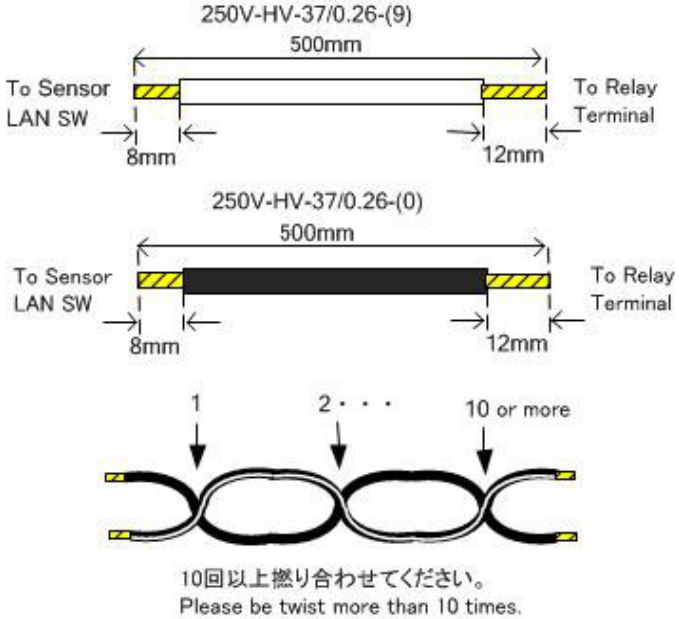
Cut the white vinyl cable(250V-HV-37/0.26(9)) and black vinyl cable(250V-HV-37/0.26-(0)) to length of the following. This cable is remainder of previous section.

⚠ Remainder of this cable will be used as AC/DC power cable for option unit(Serial LAN interface circuit, Sensor LAN SW, UPS). Process to cut so as not to waste. Do not dispose until all wiring is complete.

In case of the 26inch Display Unit Mount Kit(CWA-246)



In case of the 19inch Display Unit Mount Kit(CWA-245)

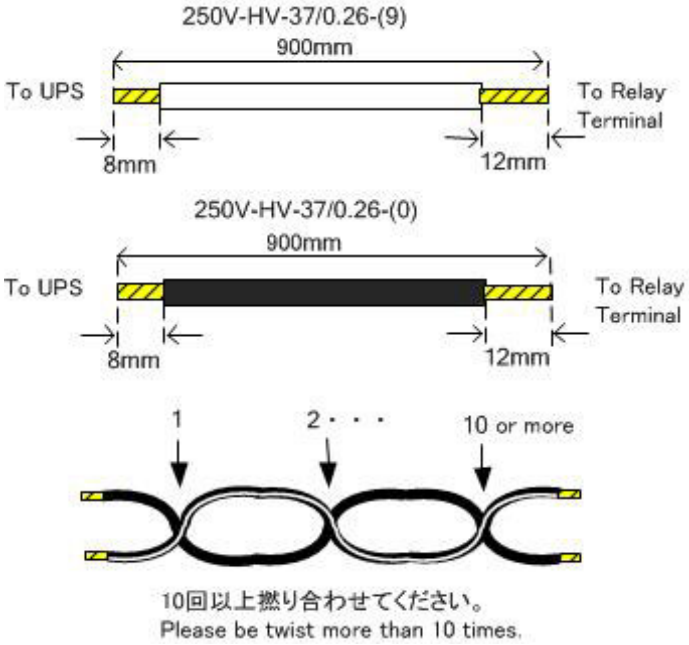


When UPS is arranged

5) UPS - wire rod for DC power output

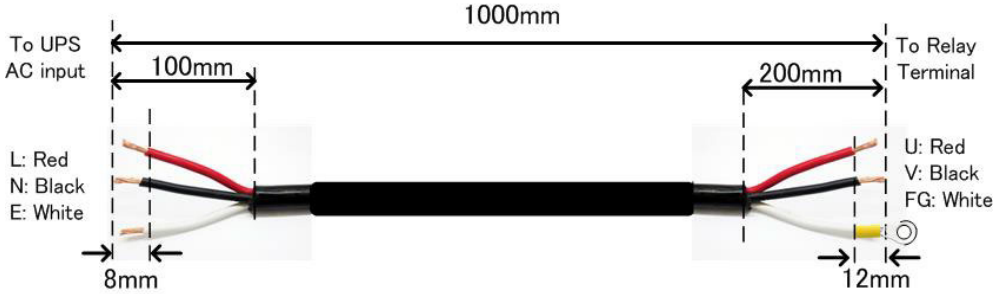
Cut the white vinyl cable(250V-HV-37/0.26(9)) and black vinyl cable(250V-HV-37/0.26-(0)) to length of the following. This cable is remainder of previous section

⚠ Remainder of this cable will be used as AC/DC power cable for option unit(CMH-2370 Serial LAN interface circuit, NQA-2443 Sensor LAN SW, UPS). Process to cut so as not to waste. Do not dispose until all wiring is complete.



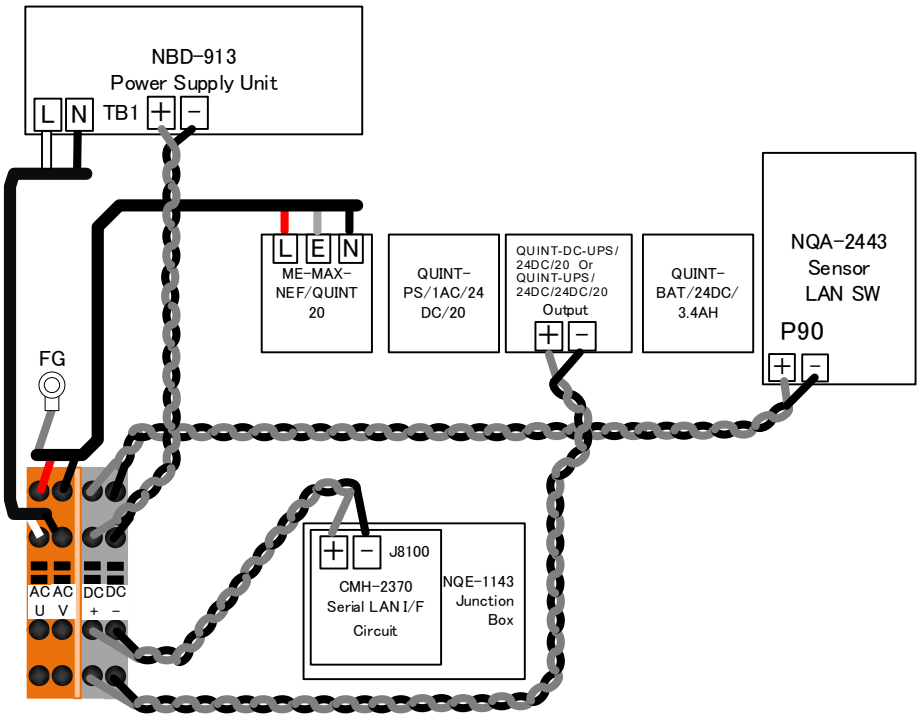
6) UPS - wire rod for AC power input

Cut the 3-core vinyl cab tire cable (VCT-3C-45/0.32) to length of the following, and crimp the crimp terminal (V5.5-5(LF)) to the ground wire (white) at the terminal block side. Remainder of this cable is not required. Please dispose it.



3.4.7.2 Connection of Unit and Relay Terminal

Connect Relay terminal and each unit(NBD-913 Power Supply Unit, CMH-2370 Serial LAN interface circuit, NQA-2443 SENSOR LAN SW, UPS). Use a wire obtained by processing in the previous section

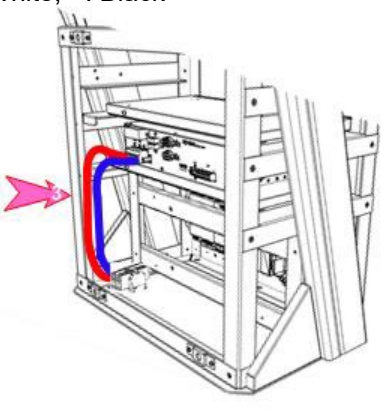


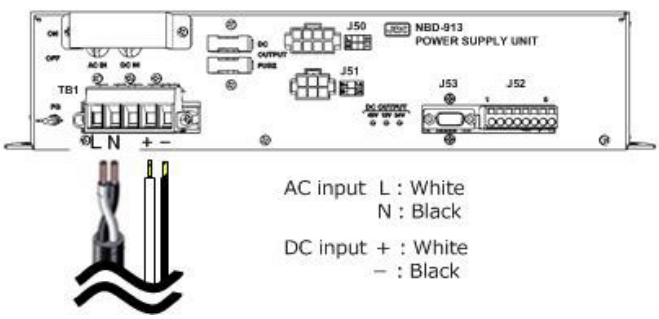
CQD-2312 Relay Terminal Wiring diagram

1) Wiring to the NBD-913 Power Supply Unit

- Wire the 2-core vinyl cab tire cable(VCT-2C-70/0.32) whose length is 550mm to the terminal block(TB1) L and N on NBD-913 Power Supply Unit. L,U : White N,V : Black

- Wire the white vinyl cable(250V-HV-37/0.26(9)) and black vinyl cable(250V-HV-37/0.26-(0)), both being cut to 700mm, to the terminal block(TB1) + and – on NBD-913 Power Supply Unit.
  + : White, - : Black





Wire the cable to pass through the nylon clip No.3.

2) When NQA-2443 SENSOR LAN SW is arranged

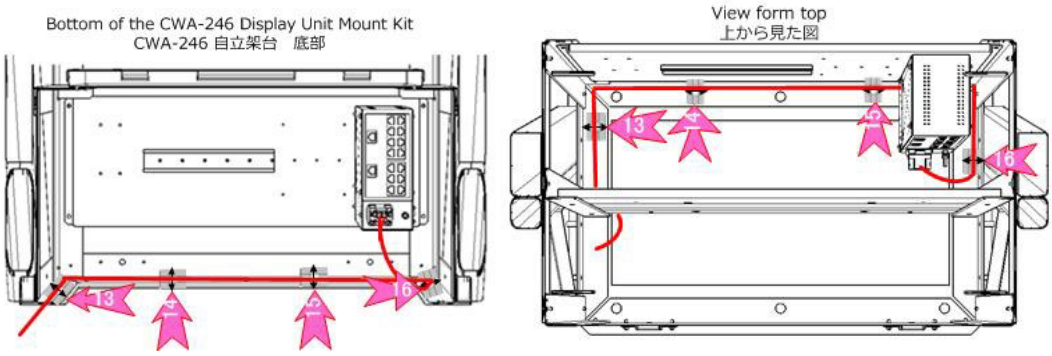
- Refer to the **3.5.3 Installation of NQA-2443/A Sensor LAN** Switch Unit for procedure of the installation.
- Wire the white vinyl cable(250V-HV-37/0.26(9)) and black vinyl cable(250V-HV-37/0.26-(0)) to the terminal block(P90) + and – on NQA-2443 SENSOR LAN SW.
  + : White, - : Black

- Cable length
  CWA-245 19inch Display Unit Mount Kit - 500mm
  CWA-246 26inch Display Unit Mount Kit - 1200mm

⚠ When fixing the cable, keep extra length so that there is no stress to the power connector P90 on the NQA 2443 SENSOR LAN SW.

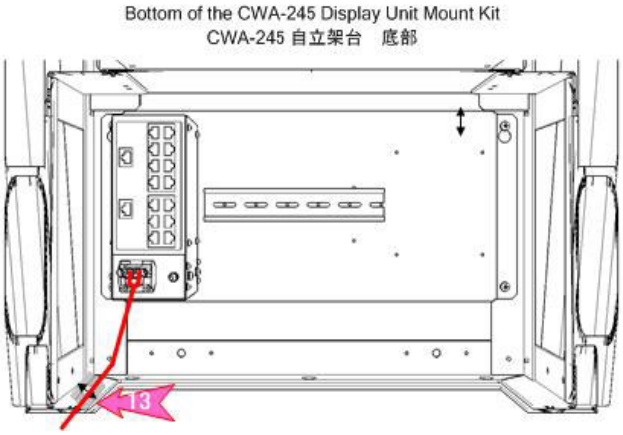
When 26inch Display Unit Mount Kit(CWA-246) is arranged

- Attach the cable tie base ANP-2 to the position of No.13, No.14, No.15 and No.16. And wire the cable.
  (Refer to figure below)
- Fix the power supply cable of NQA-2443 SENSOR LAN SW to No.13, No.14, No.15 and No.16 of the cable tie base using the cable tie T50R.

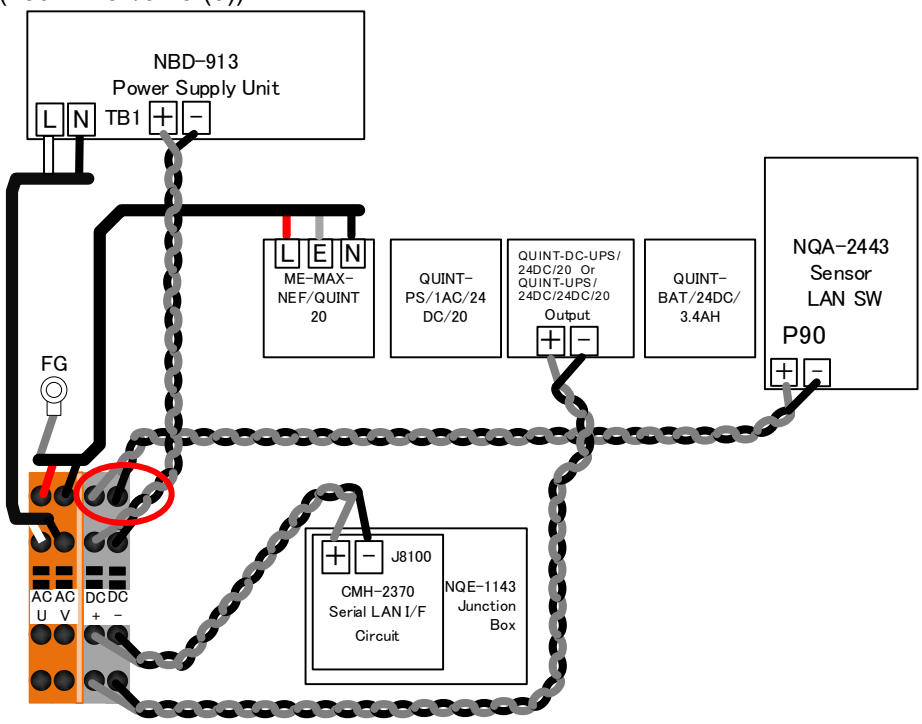


When 19inch Display Unit Mount Kit(CWA-245) is arranged

- Attach the cable tie base ANP-2 to the position of No.13. And wire the cable.(refer to figure below)

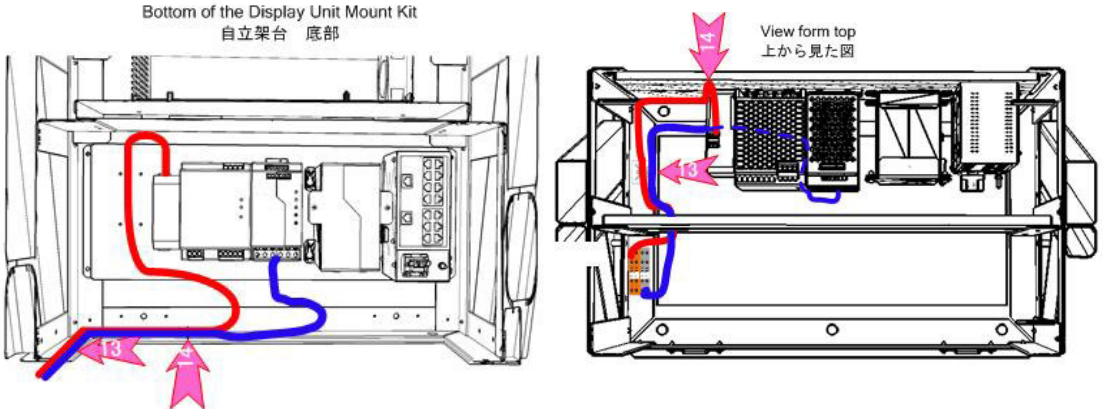


Wiring to the Relay Terminal(Common in CWA-245 and CWA-246)
At the terminal block side, wire the cable to the position surrounded by the circle in the figure below.
DC+ : White (250-HV-37/0.26-(9))
DC- : Black (250-HV-37/0.26-(0))



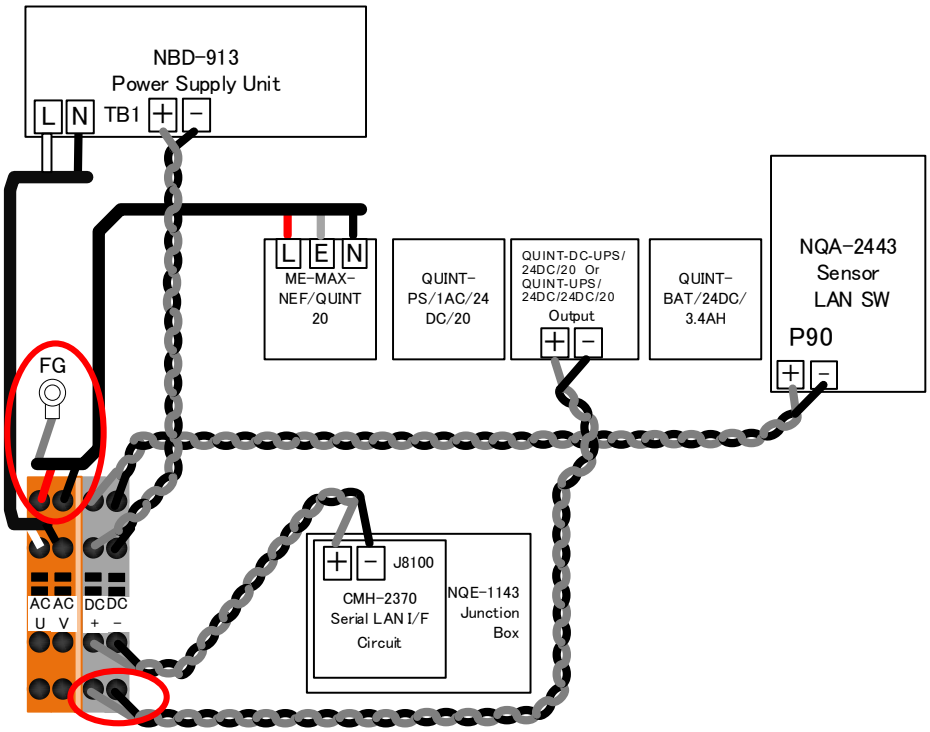
3) When UPS is arranged

- Refer to the **3.5.4** **Installation of** UPS for procedure of the installation.
- Wire the 3-core vinyl cab tire cable (VCT-3C-45/0.32), processed so that its length is 1000 mm, to the IN terminals L, E and N on ME-MAX-NEF/QUIT20.
  L : Red, E : White, N : Black
- Wire the white vinyl cable (250V-HV-37/0.26-(9)) and black vinyl cable (250-HV-37/0.26-(0)), processed so that their length is 900 mm, to the Output terminals + and – (indicated on the unit) on QUINT-DC-UPS/24DC/20 or QUINT-UPS/24DC/24DC/20.
  DC+ : White (250-HV-37/0.26-(9))
  DC- : Black (250-HV-37/0.26-(0))

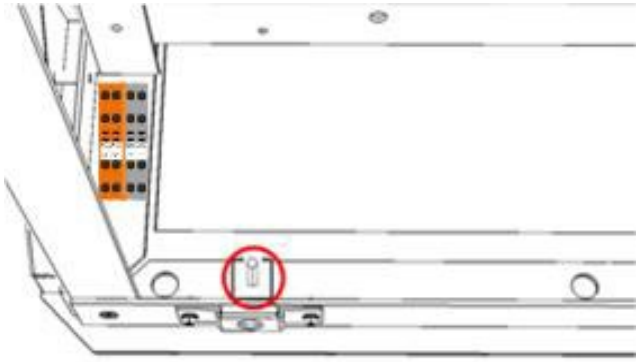


- Attach the cable tie base ANP-2 to the position of No.13 and No.14. And wire the cable.(refer to figure above)

- At the Relay Terminal side, wire the cable to the position surrounded by the circle in the figure below.
  AC-U : Red (VCT-3C-45/0.32)
  AC-V : Black (VCT-3C-45/0.32)
  DC+ : White (250V-HV-37/0.26-(9))
  DC- : Black(250V-HV-37/0.26-(0))



Fix the crimped FG terminal to the thumbscrew.(Refer to figure below)



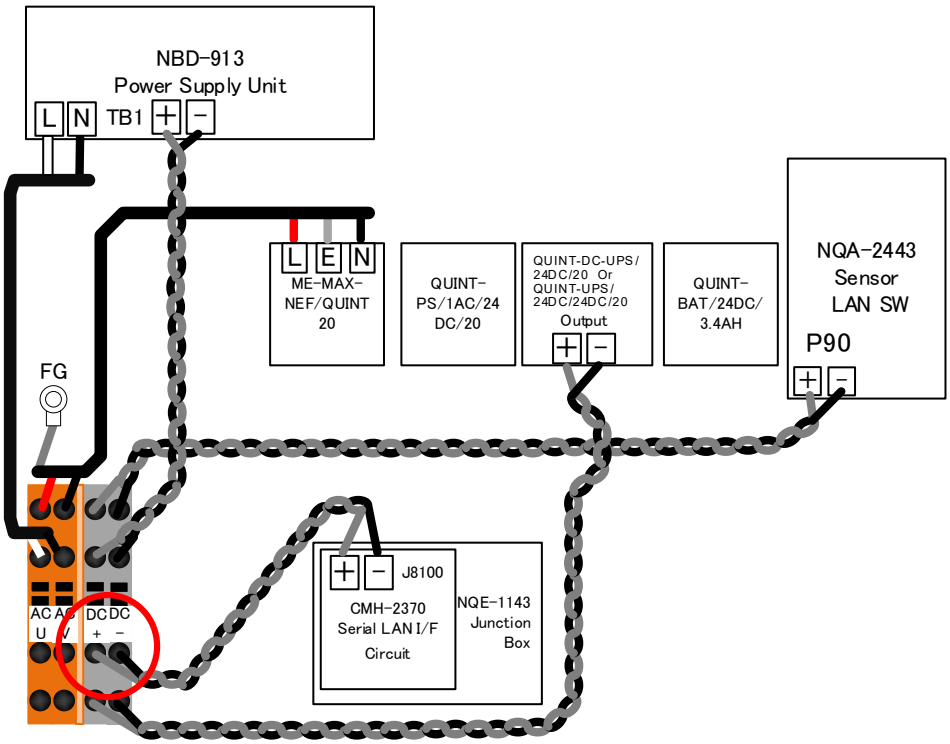
Bottom view(Left hand side)

4) When CMH-2370 Serial LAN interface circuit is arranged

- Refer to the **3.5.1.1 Installation of CMH-2370 Serial LAN Interface Circuit (SLC)** and **3.5.1.5 Installation of JB NQE-1143** for procedure of the installation.
- Wire the white vinyl cable (250V-HV-37/0.26-(9)) and black vinyl cable (250-HV-37/0.26-(0)), processed so that their length is 700 mm, to the J8100 terminal block 24V+ and 24V GND (indicated on the board) on the CMH-2370 Serial LAN interface circuit.
  24V+ : White 24V GND : Black

⚠ When a coil is attached to the CMH-2370 Serial LAN interface circuit, crimp the power cable with the attached connection terminal by following the procedure in 3.5.1.5 Installation of JB NQE-1143, and connect the power cable to J8100 through the coil.

- At the CQD-2312 Relay Terminal, wire the cable to the position surrounded by the circle in the figure below.
  DC+ : White (250-HV-37/0.26-(9))
  DC- : Black (250-HV-37/0.26-(0))



For the inboard power connection, refer to **3.12.2** **Connecting Power** Cable.

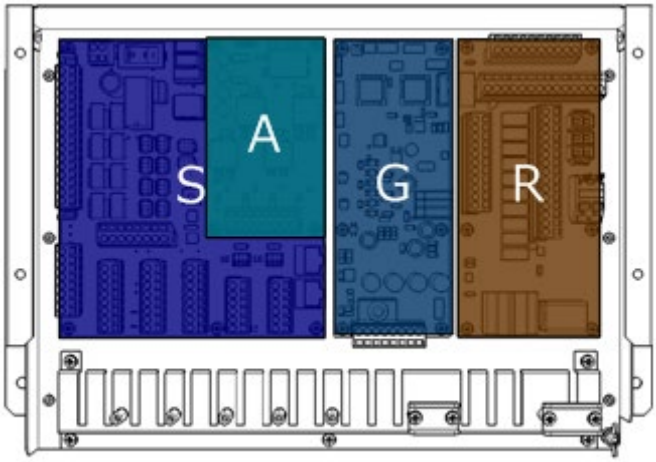
⚠ Before connecting the inboard power, please have finished all the necessary connections.

3.5 Installation of Option Equipment

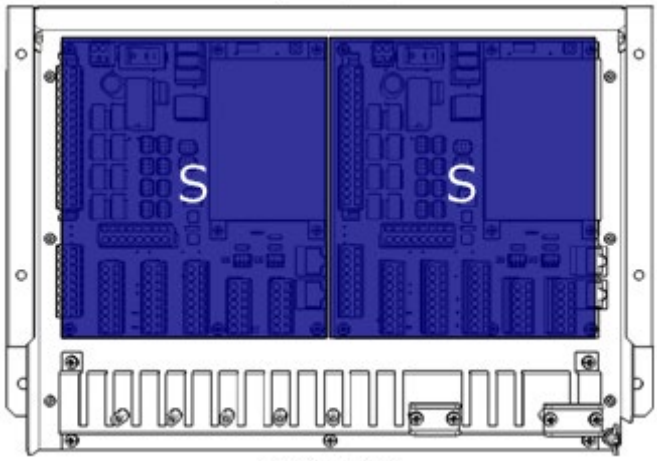
3.5.1 Installation of Junction Box NQE-1143

NQE-1143 Junction Box(JB) consists of interface boards that correspond with the suffix.
Type of JB is shown in the table below.
The suffix is defined by the initials of the board from left when viewed from the front of the JB. Initials of the board not installing are omitted.

Suffix	SLC	AOC	GIF	RIF	SLC#2
-R				✓	
-S	✓				
-SR	✓			✓	
-SS	✓				✓
-GR			✓	✓	
-SAR	✓	✓		✓	
-SA	✓	✓			
-SGR	✓		✓	✓	
-SAGR	✓	✓	✓	✓	
-SG	✓		✓		
-SAG	✓	✓	✓		
-SAS	✓	✓			✓



NQE-1143-SAGR

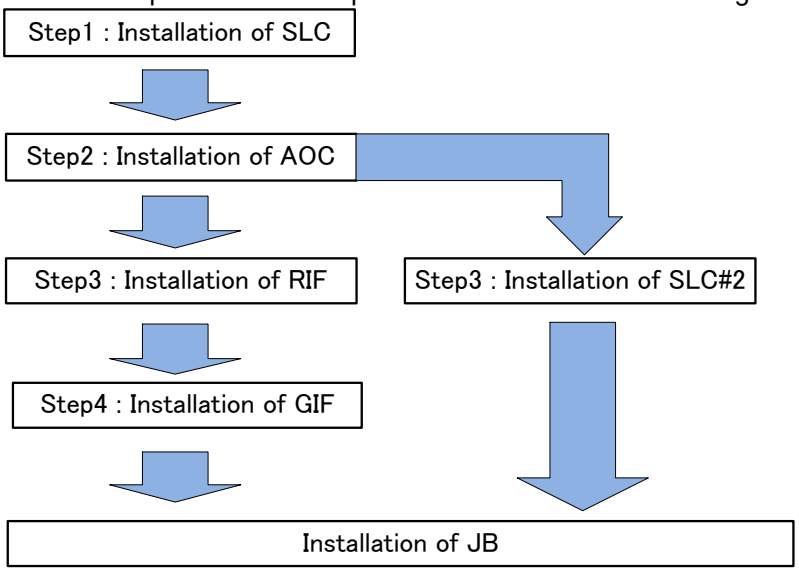


NQE-1143-SS

Therefore, when the type of JB is NQE-1143-SAGR, the JB consists of the CMH-2370 SLC, CMJ-560 AOC, CMJ-554 GIF, and CQD-2273 RIF.

■ Installation Procedure

Refer to the figure below. Skip the Installation procedure of the board not arranged.



■ Board installing parts

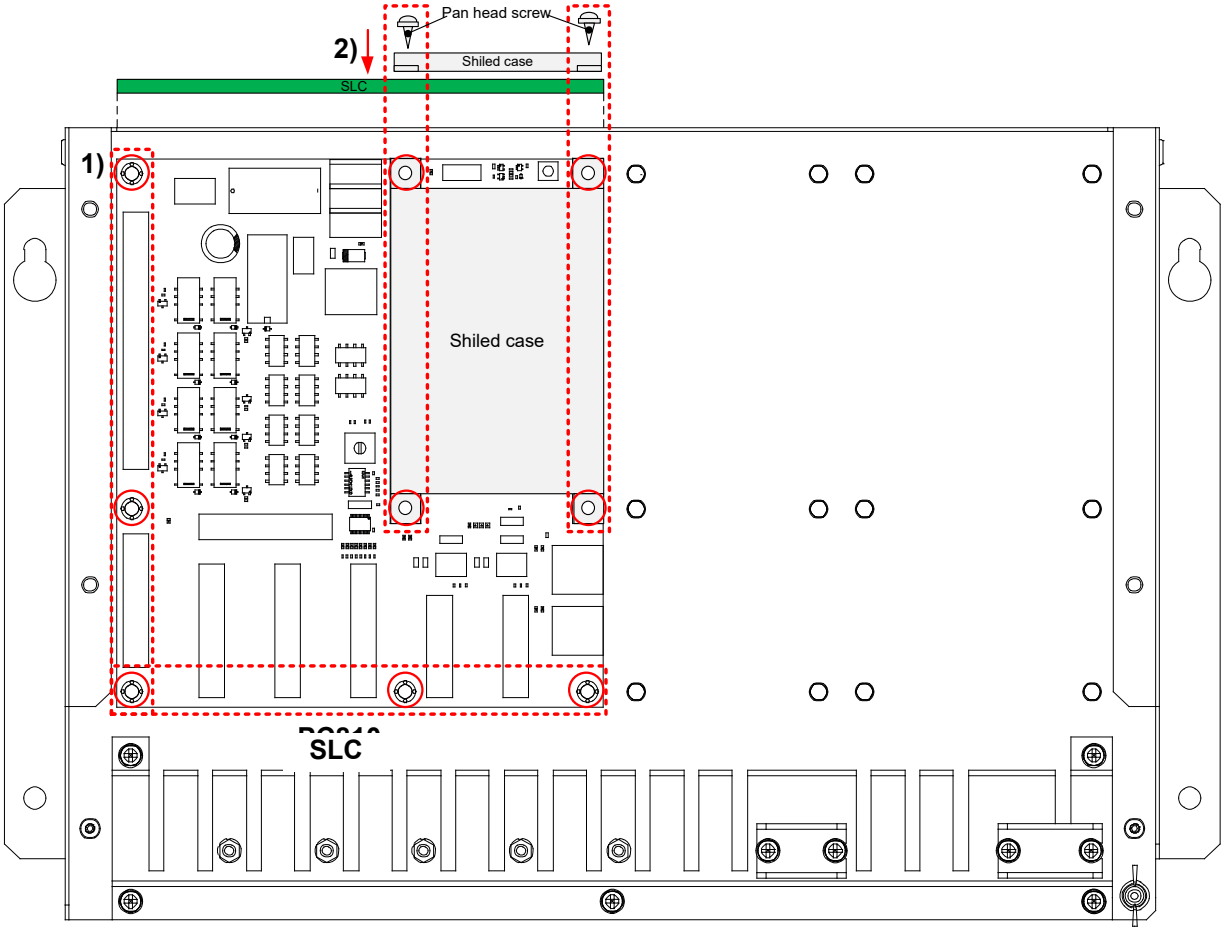
Install the boards using MPTG32506 attached to the CWB-1592 JB frame.

MPTG32506	
Pan head screw BSNC03006B  × 21	Hex Spacer BRBP06403  × 4

3.5.1.1 Installation of CMH-2370 Serial LAN Interface Circuit (SLC)

1) Install the CMH-2370 SLC to the position shown in the figure below using the 5 pan head screws (BSNC03006B) from MPTG32506.

2) Install the shield case to the position shown in the figure below using the 4 pan head screws (BSNC03006B) from MPTG32506.

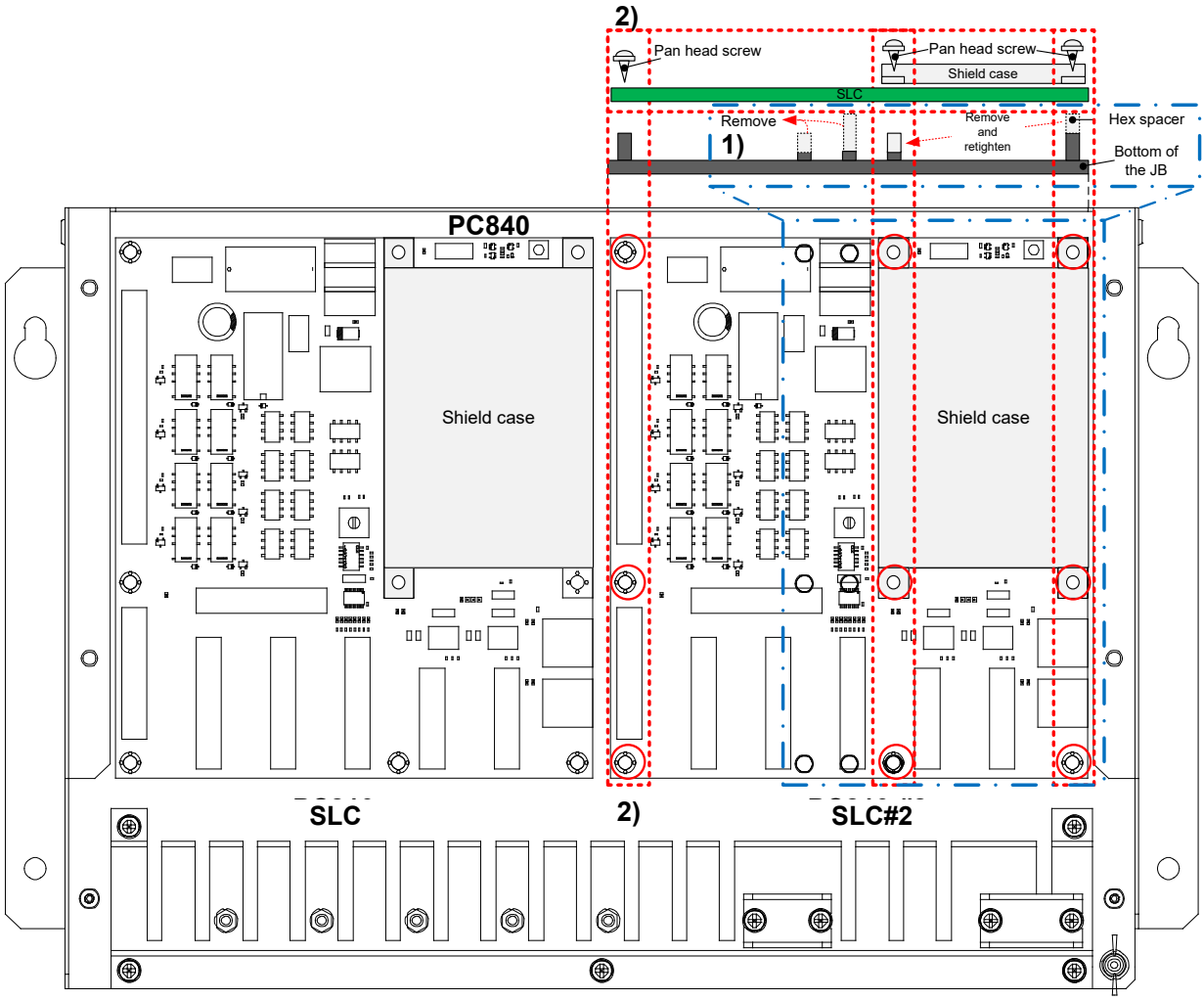


● When installing the second CMH-2370 SLC (SLC#2)

1) Replace the hex spacer in JB shown in the figure below.

⚠ The hex spacer of the rightmost column is reused after being relocated.

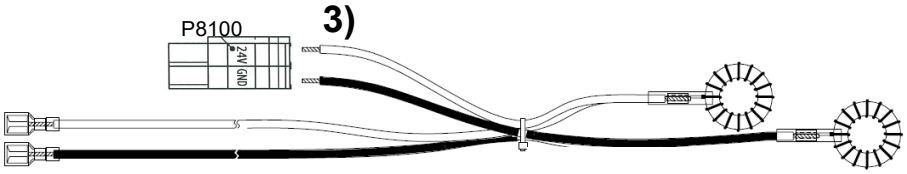
2) Install the CMH-2370 SLC#2 to the position shown in the figure below using the 9 pan head screws (BSNC03006B) from MPTG32506.



■ Installation of the attachment of the CMH-2370 SLC

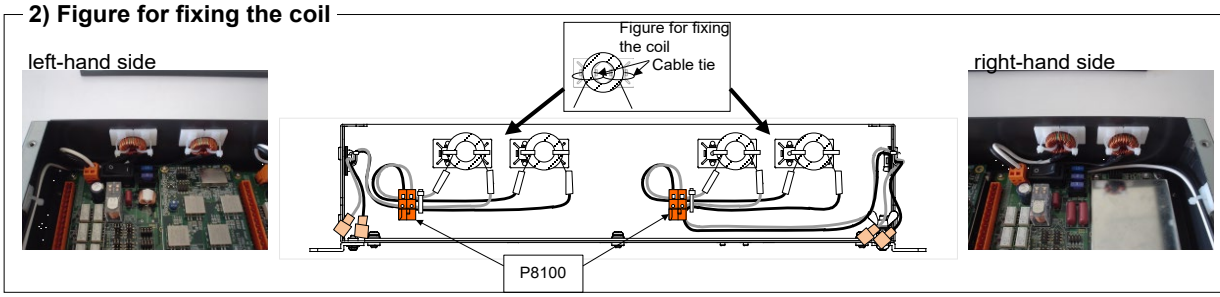
Note: If the coil with cable is not included, there is no need for the following procedure.

1) If the cable with coil in the figure below is included with the CMH-2370 SLC, connect the coils to the P8100 terminal block plug on the SLC as shown below.



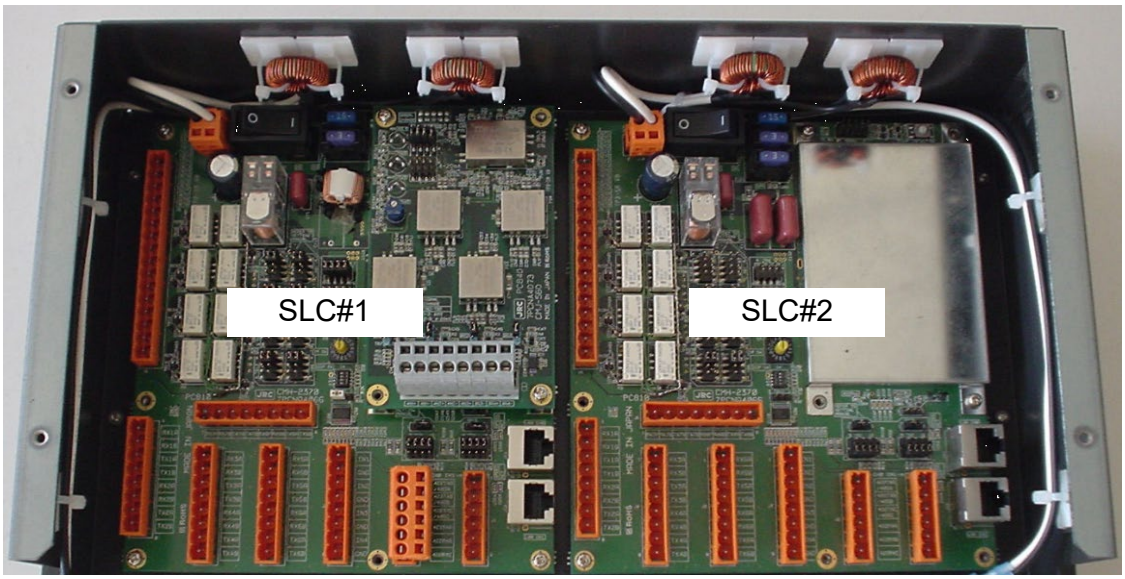
2) Fix the pair of coils to the cable tie base. Refer to figure for fixing the coil.
In case of CMH-2370 SLC#2, attach as well another pair.

2) Figure for fixing the coil



3) Wire the cable, refer to wiring figure below.

3) Wiring figure

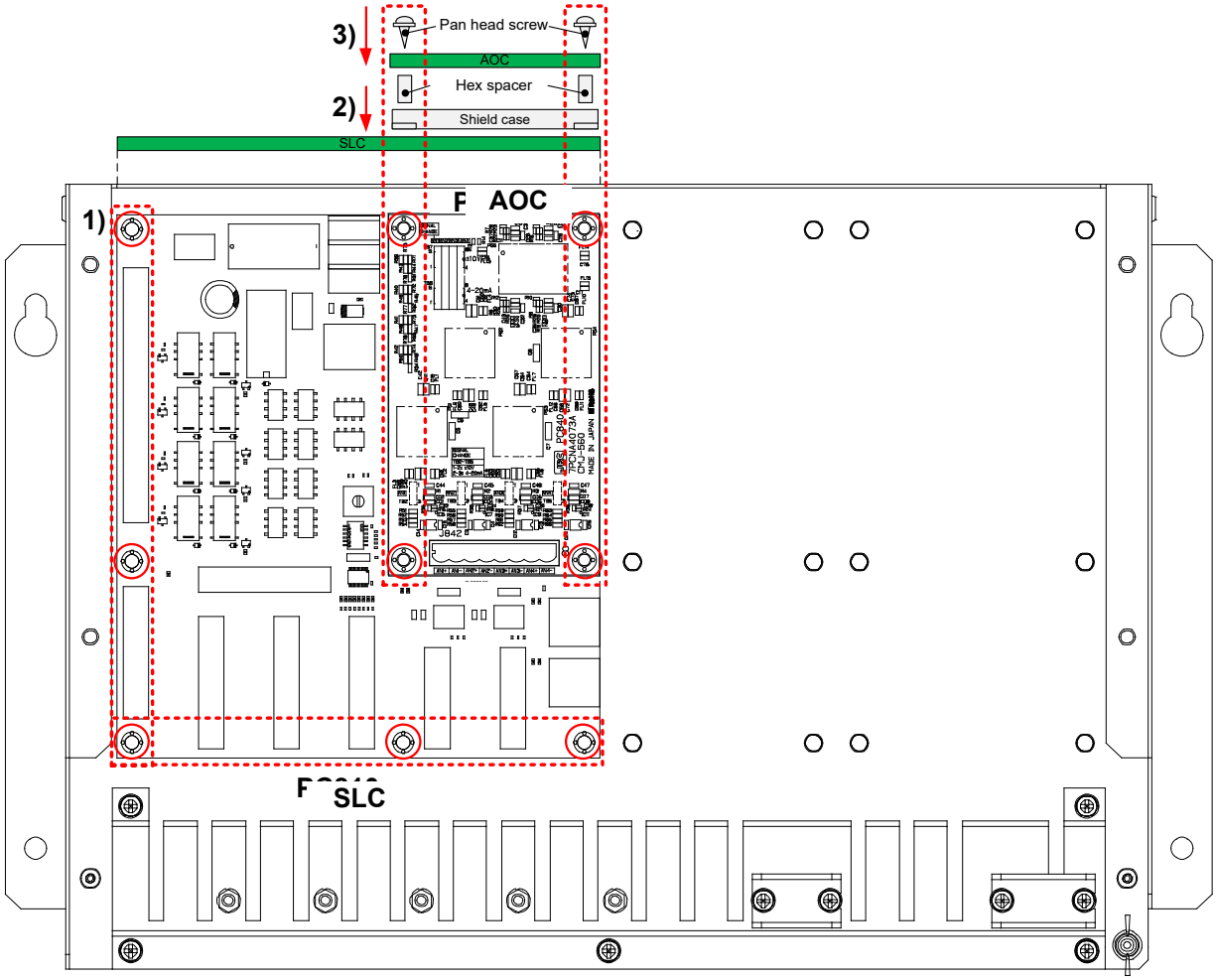


3.5.1.2 Installation of Analog Option Circuit CMJ-560 (AOC)

1) Install the CMH-2370 SLC to the position shown in the figure below using the 5 pan head screws (BSNC03006B) from MPTG32506.

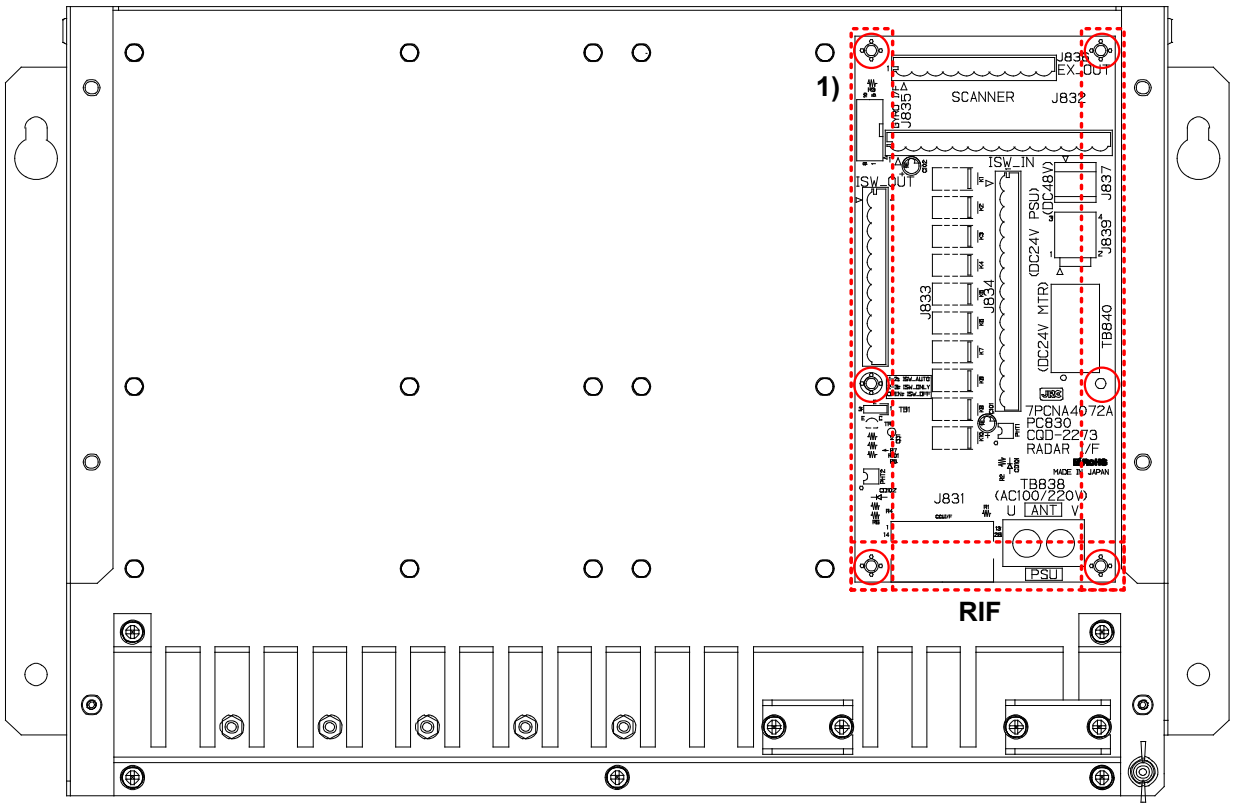
2) Install the shield case to the position shown in the figure below using the 4 hex spacers (BRBP06403) from MPTG32506.

3) Install the CMJ-560 AOC to the position shown in the figure below using the 4 pan head screws (BSNC03006B) from MPTG32506.



3.5.1.3 Installation of Radar Interface Circuit CQD-2273 (RIF)

1) Install the CQD-2273 Radar Interface Circuit (RIF) to the position shown in the figure below using the 6 pan head screws (BSNC03006B) from MPTG32506. Refer to Chapter 3.5.2 Connection of Display Unit and RIF CQD-2273 for wiring.



3.5.1.4 Installation of Gyro Interface Circuit CMJ-554 (GIF)

1) If the CMH-2370 SLC is to be attached to the JB, connect the W82:FF12-10N046XXAFFC cable (included in CMJ-554) to the J8115 connector on the SS side of the CMH-2370 SLC. Make sure the FFC connector is locked.

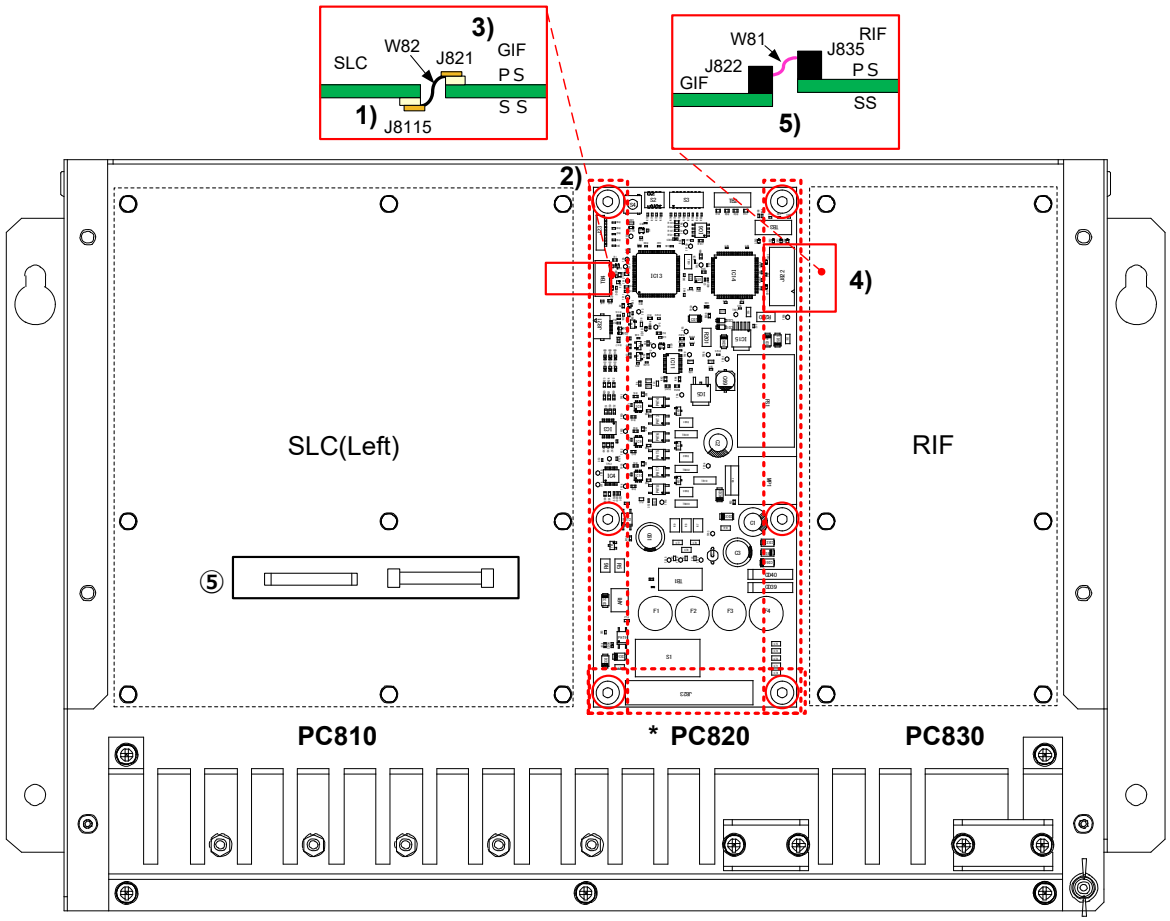
⚠ Avoid diagonal or insufficient insertion.

2) Install the CMJ-554 GIF to the position shown in the figure below using the 6 pan head screws (BSNC03006B) from MPTG32506.

3) Connect the W82: FF12-10N046XXA FFC cable to the J821 FFC connector on the CMJ-554 GIF. Make sure the FFC connector is locked.

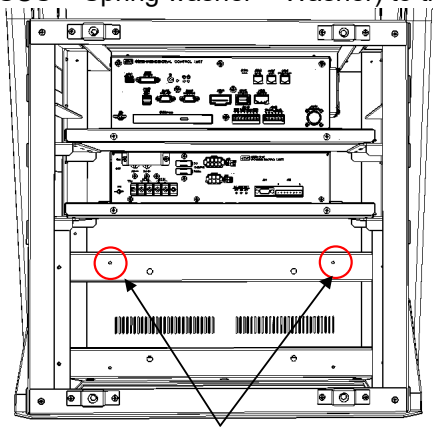
⚠ Avoid diagonal or insufficient insertion.

4) Connect the J822 connector on the CMJ-554 GIF to the J835 connector on the RIF, using W81:CP010391-20 ribbon cable (included in CMJ-554).



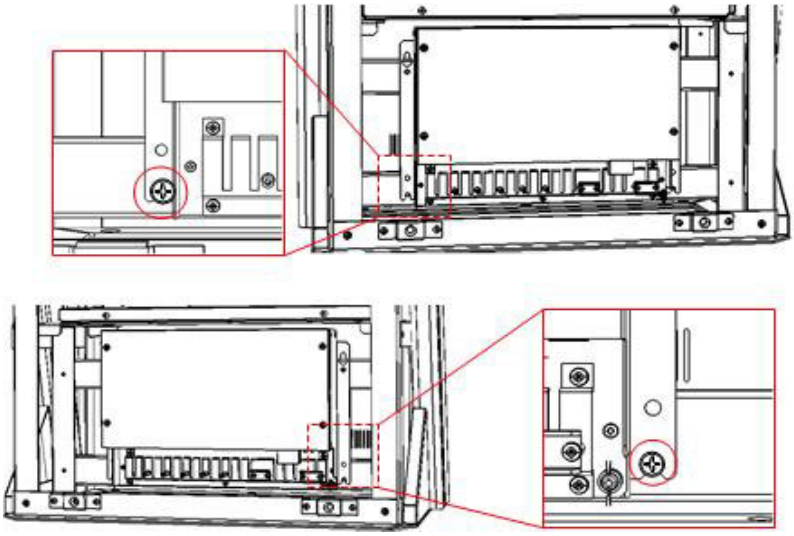
3.5.1.5 Installation of JB NQE-1143

1) Tighten the 2 screws(M5x10SUS + Spring washer + Washer) to the frame loosely.



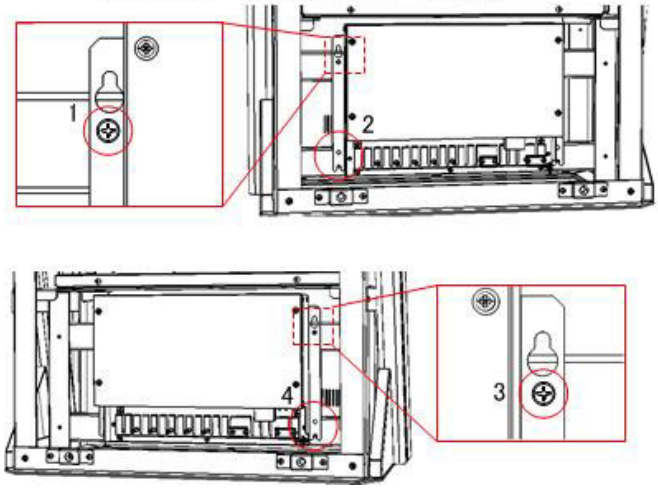
Tighten the 2 screw loosely
M5x10SUS + SPringwasher + Washer

2) Hook the JB to the frame with the 2 screws.



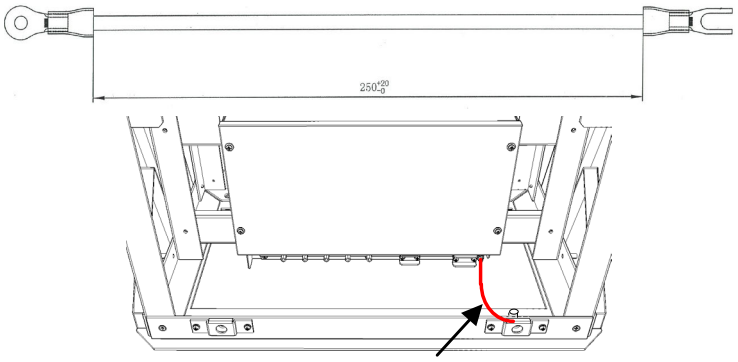
3) Tighten the 4 screws to install the JB to the frame.

Tighten the 4 screw
M5x10SUS + Springwasher + Washer



4) Connect the FG terminal on the JB to the frame using W92:H-7ZCNA4216 (included in CML-901).
Y terminal : Frame side
Round terminal : JB FG side

W92:H-7ZCNA4216

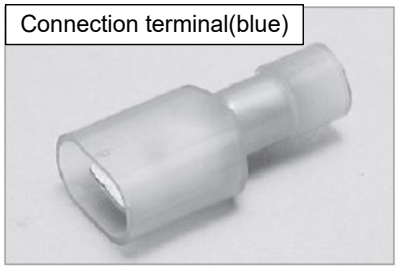


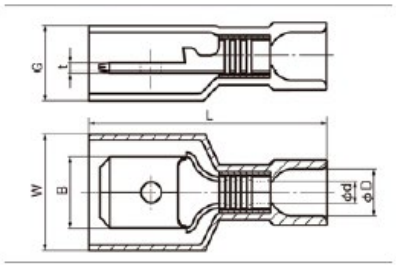
Connect W92

5) If the CMH-2370 SLC is installed to the JB, connect the 24VDC power supply line according to the following procedure.

■ **If the coil and connection terminal is attached to the JB.**
There is a need to supply 24VDC through the coil. Make wiring according to the following procedure.
Step 1: Crimp the 2 connection terminals (blue) attached to the JB to the DC power cable (24V+ and GND).
4 connection terminals (blue) come with one CMH-2370 SLC, 2 of them are supplied as spare parts.
If the CMH-2370 SLC#2 is installed, crimp the connection terminals to the power cable in the same manner.

Connection terminal(blue)

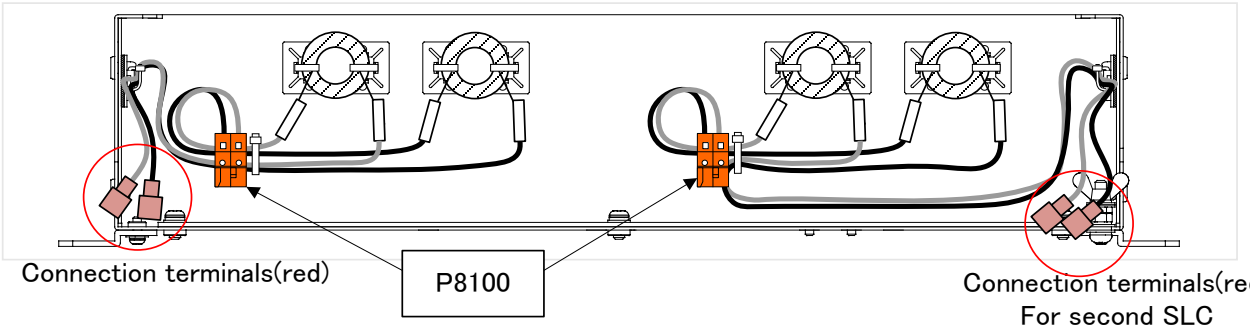




PART NUMBER	DIMENSIONS mm								WIRE RANGE		TOOL No.	
									STRANDED mm^2	AWG	HAND TOOL No.	
	B	W	t	L	ϕd	ϕD	G	H			TOOL BODY No.	DIES No.
TMEDN 630820-MA	6.35	10.3	0.8	22.0	2.55	4.5	6.4	10.0	2.0	14.0	NH12 NH32	
											NA10 NA3	N10 12 N3 12

Step 2: Connect the connection terminals (blue) crimped at the above step 1 to the connection terminals (red) on the JB.

- Polarity of the DC power cable with connection terminals (red) on SLC
  +: White (connected to P8100 labeled with “24V”)
  -: Black (connected to P8100 labeled with “GND”)



Step3: Please fix the DC power cable of the CMH-2370 SLC to the JB using the cable tie.

■ If the connection terminals and coil are not included in the JB

Please connect the DC24V supply line directly to the P8100.

- Terminal assignment of P8100
  Terminal number 1：+24V (labeled with “24V”)
  Terminal number 2：GND (labeled with “GND”)

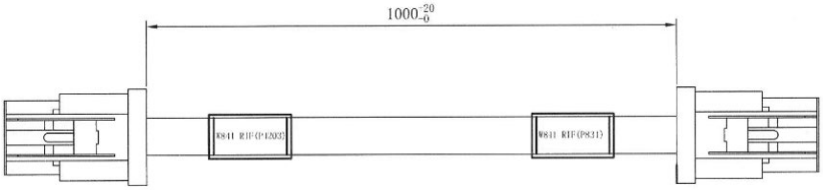
3.5.2 Connection of Display Unit and RIF CQD-2273

3.5.2.1 Connection for standalone type

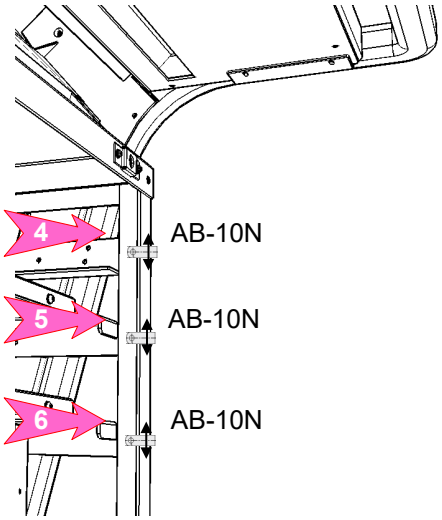
If the RIF is incorporated in JB, connect the RIF and CCU. Either one of the following cables is arranged in accordance with the radar antenna.

- CML-836-AC
- CML-836-DC

• When CML-836-AC has been arranged
W841：H-7ZCNA4164(included in CML-836-AC)
Connect the J831 connector on the RIF to the J4203 on CCU by W841: H-7ZCNA4164.

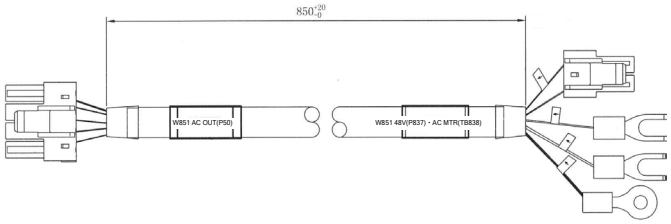


Wire the cable to pass through the nylon clip No.5 and 6.

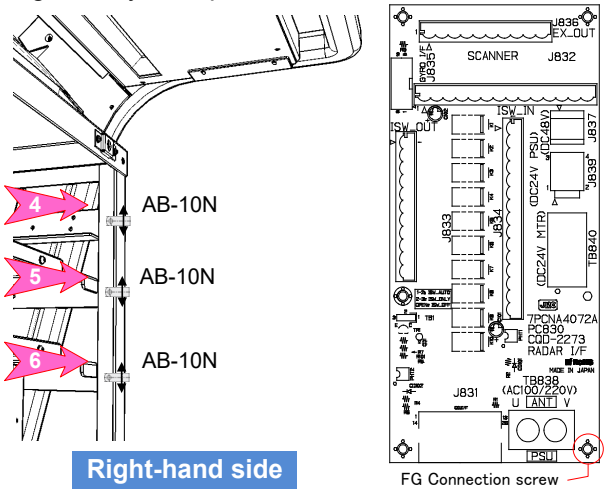


Right-hand side

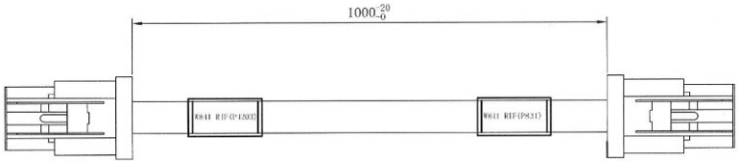
W851：7ZCNA4158(included in CML-836-AC)
・Connect the W851 connector labeled “P50” to the J50 connector on the PSU.
・Connect the connector labeled “P837” in the W851 cable to the J837 connector on the RIF.
・Connect the terminal labeled “U” in the W851 to the TB838 U terminal on the RIF.
・Connect the terminal labeled “V” in the W851 to the TB838 V terminal on the RIF.
・Co-tighten the terminal labeled “FG” in the W851 cable and FG connection screw on the RIF.



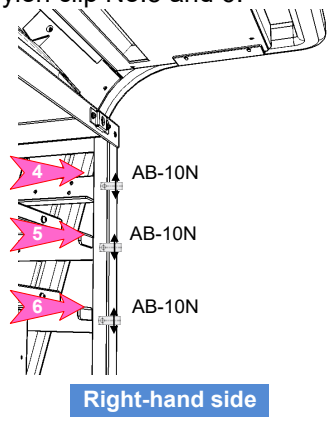
Wire the cable to pass through the nylon clip No.6.



• When CML-836-DC has been arranged
W841：H-7ZCNA4164(included in CML-836-DC)
Connect the J831 connector on the RIF to the J4203 on CCU by W841: H-7ZCNA4164.



Wire the cable to pass through the nylon clip No.5 and 6.

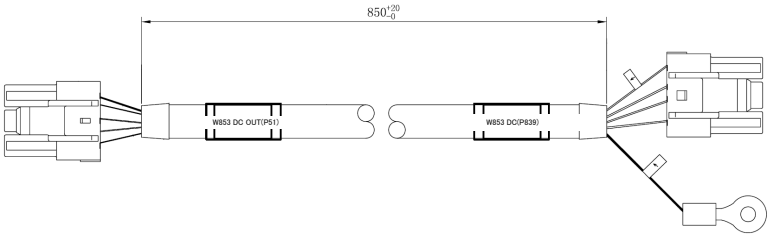


W853：H-7ZCNA4160(included in CML-836-DC)

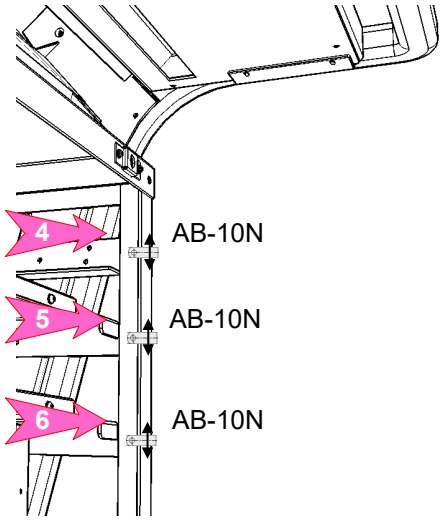
・Connect the W853 connector labeled “P51” to the J51 connector on the PSU.

・Connect the W853 connector labeled “P839” to the J839 connector on the RIF.

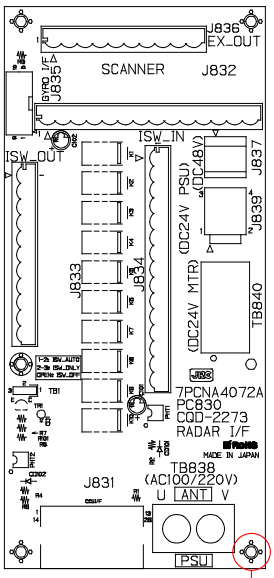
・Co-tighten the terminal labeled “FG” in the W853 cable and FG connection screw on the RIF.



Wire the cable to pass through the nylon clip No.6.



Right-hand side



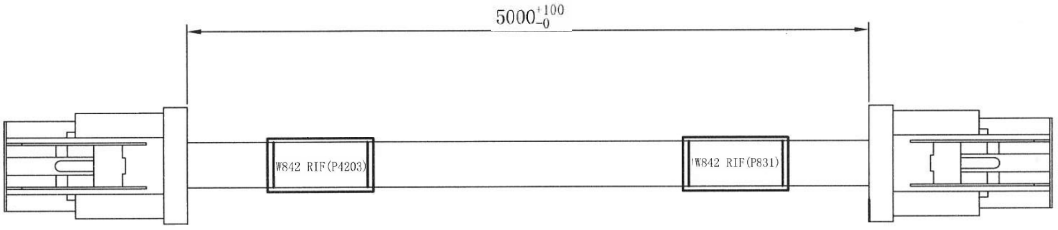
FG Connection screw

3.5.2.2 Connection for desktop type

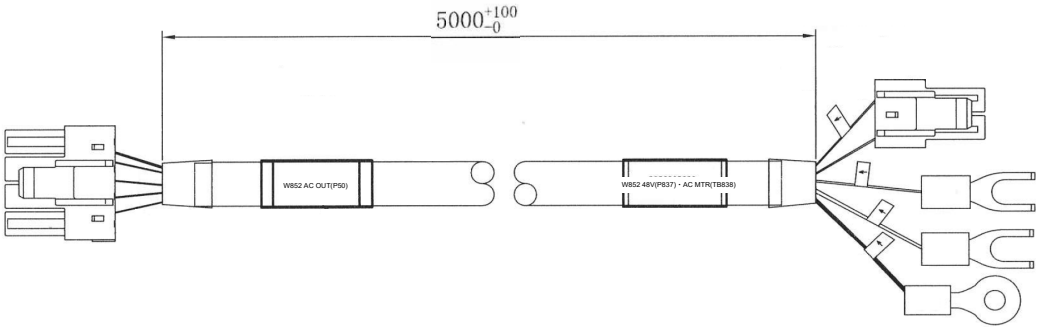
If the RIF is incorporated in JB, connect the RIF and CCU. Either one of the following cables is arranged in accordance with the radar antenna.

・CML-836-ACF
・CML-836-DCF

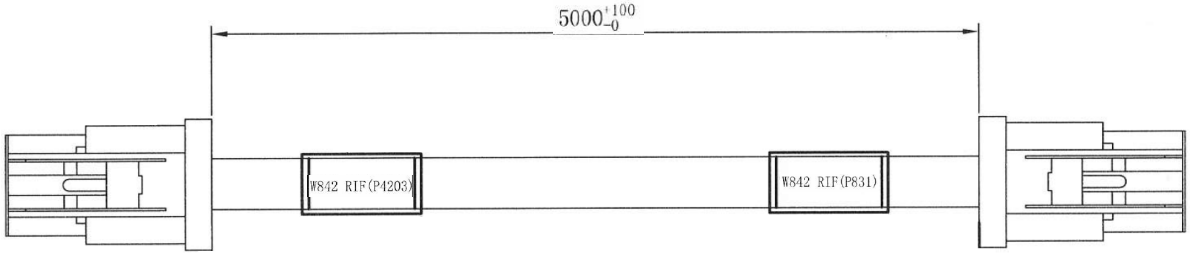
• When CML-836-ACF has been arranged
W842：H-7ZCNA4165(included in CML-836-ACF)
Connect the J831 connector on the RIF to the J4203 on CCU by W842: H-7ZCNA4165.



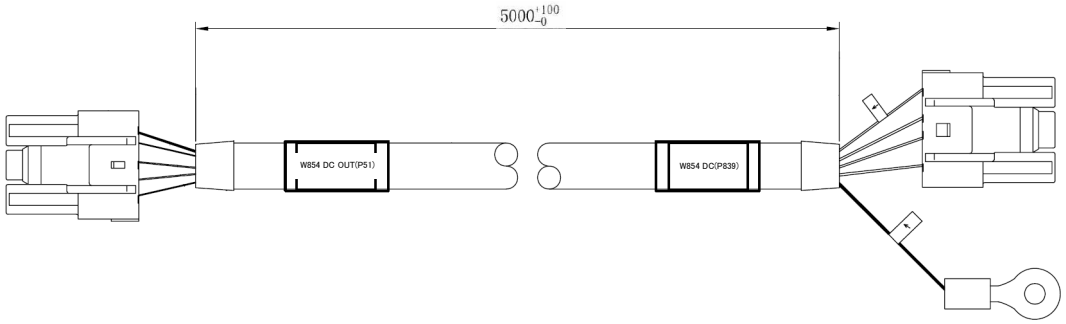
W852：7ZCNA4159(included in CML-836-ACF)
・Connect the W852 connector labeled “P50” to the J50 connector on the PSU.
・Connect the connector labeled “P837” in the W852 cable to the J837 connector on the RIF.
・Connect the terminal labeled “U” in the W852 to the TB838 U terminal on the RIF.
・Connect the terminal labeled “V” in the W852 to the TB838 V terminal on the RIF.
・Co-tighten the terminal labeled “FG” in the W852 cable and FG connection screw (See. **3.5.2.1 Connection for standalone type**) on the RIF.



• When CML-836-DCF has been arranged
W842: H-7ZCNA4165(included in CML-836-DCF)
Connect the J831 connector on the RIF to the J4203 on CCU by W842: H-7ZCNA4165.



W854：H-7ZCNA4161(included in CML-836-DCF)
・Connect the W854 cable connector labeled “P51” to the J51 connector on the PSU.
・Connect the W854 cable connector labeled “P839” to the J839 connector on the RIF.
・Co-tighten the terminal labeled “FG” in the W854 cable and FG connection screw(See. **3.5.2.1 Connection for standalone type**) on the RIF.

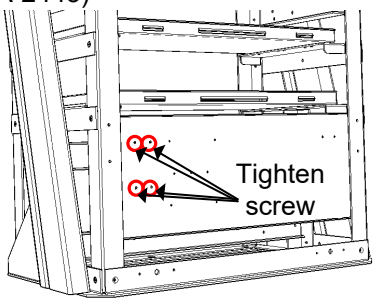


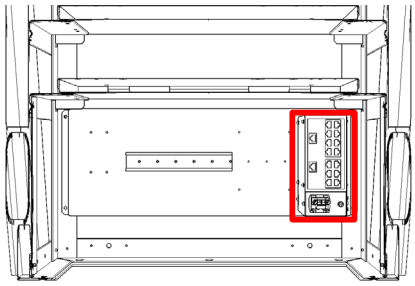
3.5.3 Installation of NQA-2443/A Sensor LAN Switch Unit

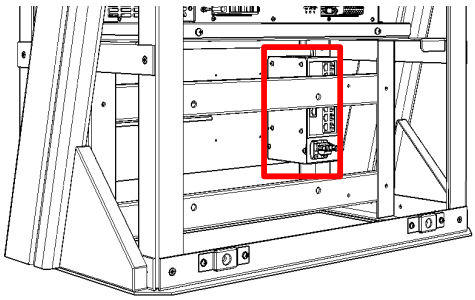
If the NQA-2443 Sensor LAN Switch Unit is arranged, install it to the rear panel of the frame.

■ In case of CWA-246(26inch monitor stand alone type)

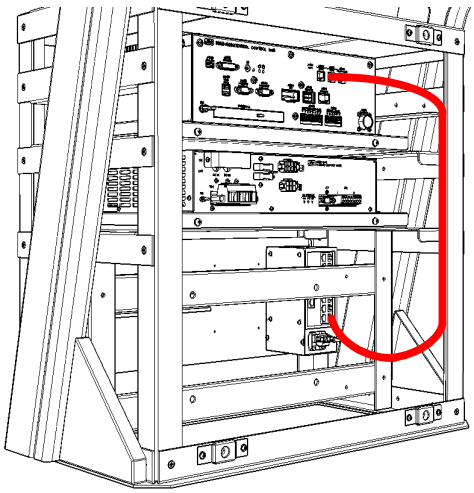
1) Open the rear panel, and install the Sensor LAN Switch unit with the 4 screws as shown below.
Screw: M3x12(included in NQA-2443)

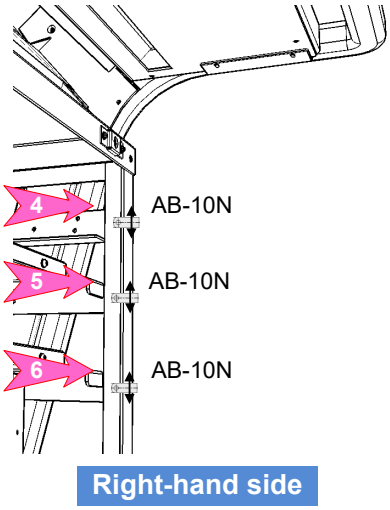






2) Connect the J4117 connector on the CCU and Port12 (NQA-2443) / Port4(NQA-2443A) connector on the Sensor LAN Switch Unit with W83: KB-STP-01LB(included in CML-901).

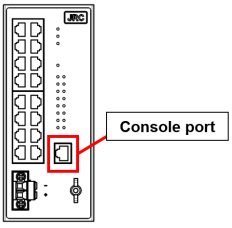




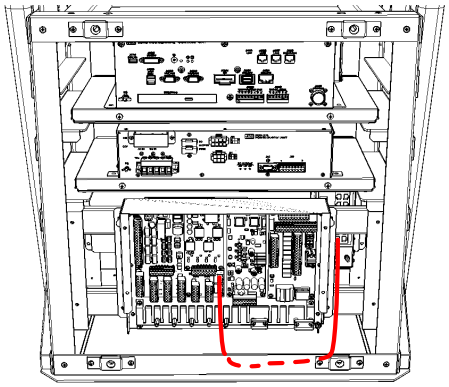
Wire the cable to pass through the nylon clip No.4, 5 and 6.

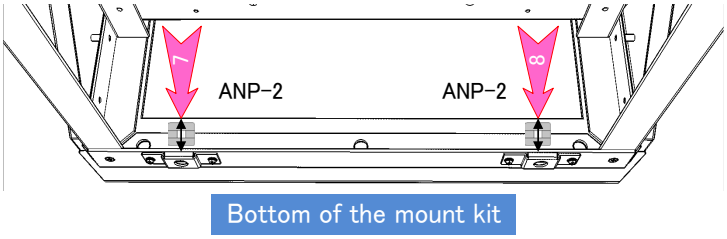
Note

For NQA-2443A, do not connect the J4117 connector on the CCU and console port connector on the Sensor LAN Switch Unit.



3) Connect the J8111 connector on the CMH-2370 SLC and Port12 on the NQA-2443 Sensor LAN Switch Unit with W85: KB-STP01LB (included in CML-841).





Wire the cable to pass through the cable tie base No.8.

Fasten the cable using the T50R cable tie to the cable tie base No.8.

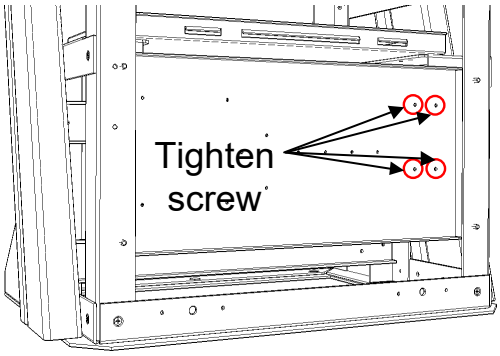
⚠ Be careful so that the cables are not stretched.
Fold the cable portions left over.

⚠WARNING
Before installing power cable, always make sure to turn off the circuit breaker of main power line. Otherwise, it may cause an electric shock or malfunction.

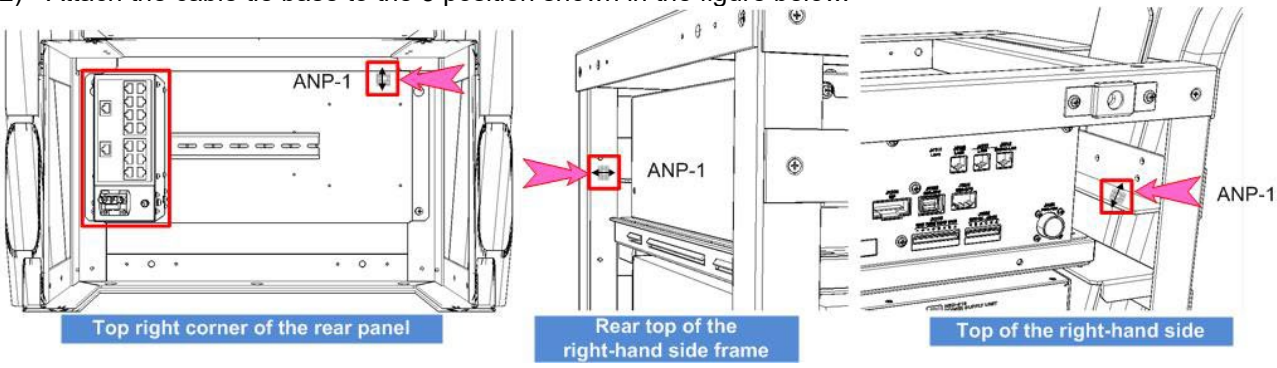
4) Refer to the **3.4.5 Installation of Relay Terminal** CQD-2312. And connect the 24VDC power supply cable.

■ In case of CWA-245(19inch monitor stand alone type)

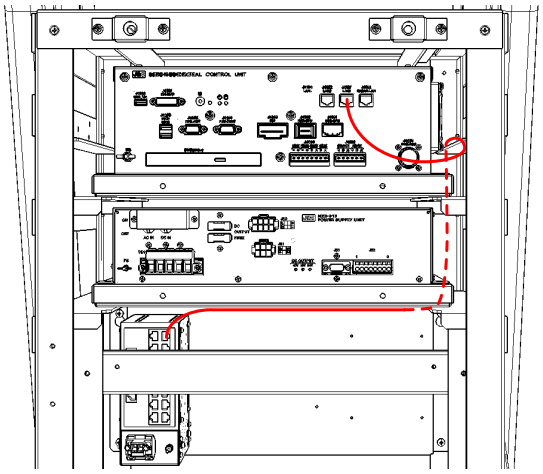
1) Open the rear cover. And screw the Sensor LAN Switch Unit to the rear panel.
Screw: M3x12 (included in NQA-2443)



2) Attach the cable tie base to the 3 position shown in the figure below.

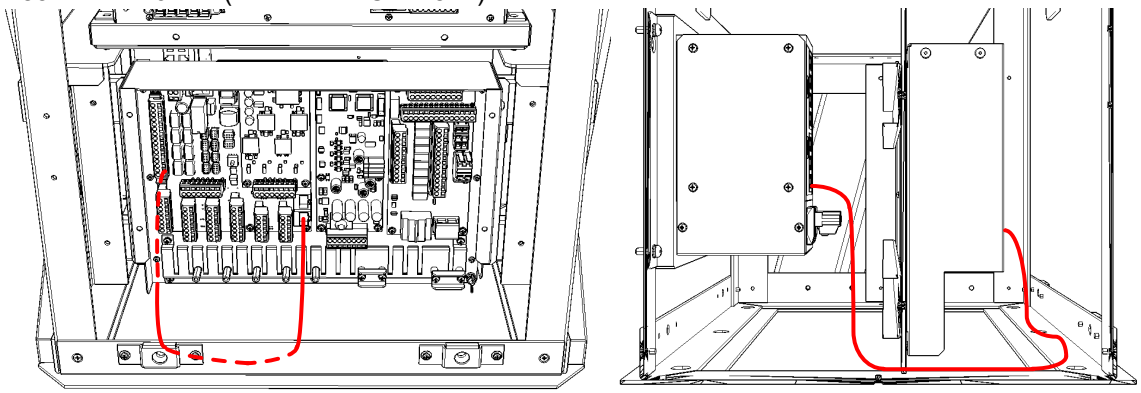


3) Connect the J4117 connector on the CCU and Port1 connector on the Sensor LAN Switch Unit with W83: KB-STP-01LB(included in CML-901).



Wire the cable to pass through the 3 position shown in the figure above.
Fasten the cable using the T30R cable tie to the each cable tie base.

4) Connect the J8111 connector on the SLC to the NQA-2443 Sensor LAN Switch Unit with W85:KB-STP01LB (included in CML-841).



Wire the cable to pass through the cable tie base No.8.
Fasten the cable using the T50R cable tie to the cable tie base No.8.

⚠ Be careful so that the cables are not stretched.
Fold the cable portions left over.

⚠WARNING

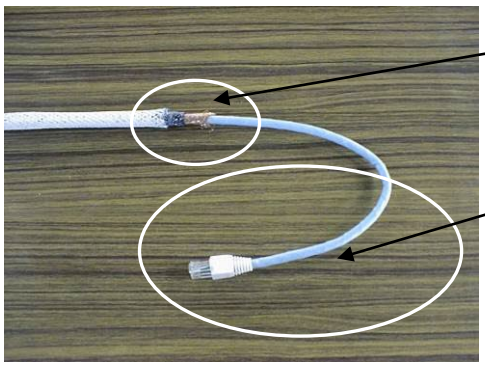
Before installing a power cable, always make sure to turn off the circuit breaker of main power line. Otherwise, it may cause an electric shock or malfunction.

5) Refer to the **3.4.5 Installation of Relay Terminal** CQD-2312. And connect the 24VDC power supply cable.

3.5.3.1 Assembling Ethernet Cable (RJ-45 Type Connector)

Assemble Ethernet cable according to the following procedure.

- **Assemble Outside Sheath of an Ethernet cable**

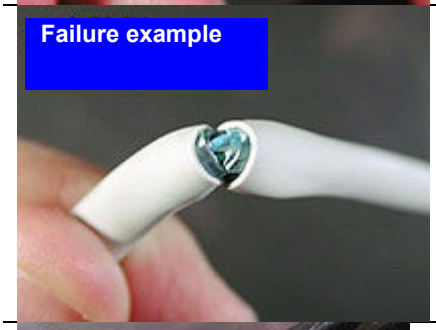


Cut off the metal braid, outside sheath and shield at the cable let-in hole.
Leave the shield length for wiring to the chassis.

LAN cable portion only (including sheath) is used for internal wiring.

- **How to Assemble an Ethernet Connector**

	Let the Ethernet cable pass through the cable boot.
	Measure the length of the cable sheath that is to be peeled. **NOTE**: The rough standard is the length of your thumb (about 5 to 6 cm).
	Make a cut in the sheath by a wire stripper.

	Check by bending the cable that the foil inside is not damaged. If the foil inside is damaged, cut the cable there and go back to the procedure 2 again.
	**[Failure example]** The foil is torn and the core wires inside can be seen.
	Cut the sheath by a cutter vertically from the cut line made by the stripper in the procedure 3. **NOTE**: Do not damage the foil inside.
	Twist the cable to split off the sheath. Peel the sheath along the cut lines made by the stripper and the cutter.
	Check that the foil is not damaged after the sheath is peeled. The foil is OK if it is not torn by the pull of the arrow direction shown in the left figure.



Fold back the foil and roll it up around the cable.

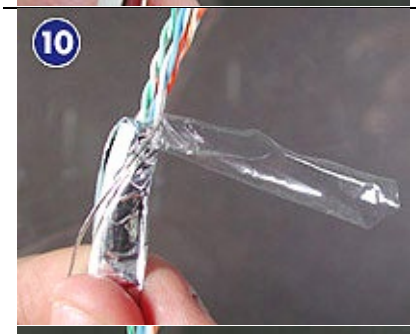
NOTE:

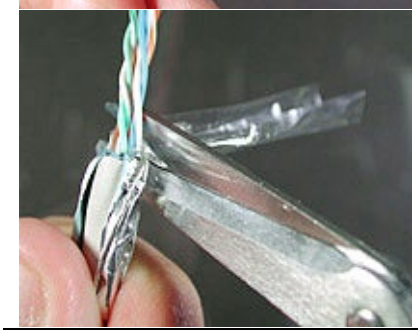
The blue surface of the foil must be touched to the sheath.





As the same way, fold back the drain wire to attach to the sheath.





Cut off the vinyl covering the core wires by scissors.

NOTE:

Cut the vinyl off at the bottom-most of the bare core wires for not blocking the connector to put in.



Untwist the core wires and straighten each wire.

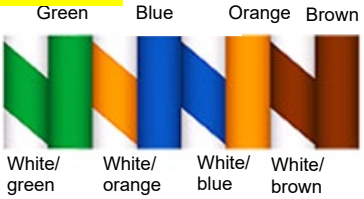


After straightening, arrange the core wires so that the wires are aligned in the wiring order.

NOTE:

Above picture shows the order of “Wiring A.”

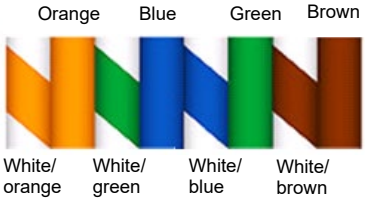
Wiring A



Wiring A: pin number is 1 to 8 in an order from the left.

1	2	3	4	5	6	7	8
W/G	G	W/O	Bl	W/Bl	O	W/Br	Br
Tx+	Tx-	Rx+			Rx-		

Wiring B



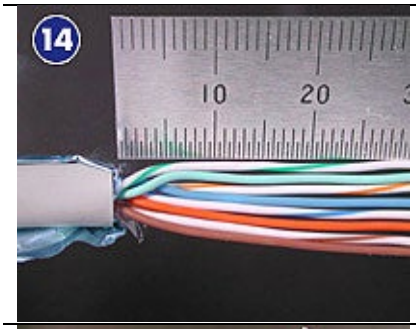
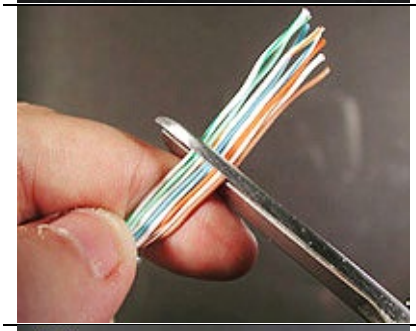
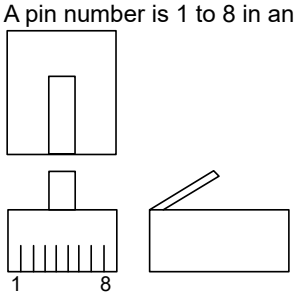
Wiring B: pin number is 1 to 8 in an order from the left.

1	2	3	4	5	6	7	8
W/O	O	W/G	Bl	W/Bl	G	W/Br	Br
Tx+	Tx-	Rx+			Rx-		

W: White, G: Green, O: Orange, Bl: Blue, Br: Brown



Gather all the core wires with maintaining the order.

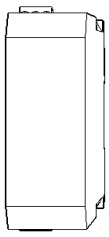
	Cut off the core wires at about 16mm from the sheath. **Useful tip**: First, cut them 1 to 3 mm longer. Then, adjust by inserting the connector.
	
	Insert the core wires into the STP connector. Check that the leading edges of the wires reach to the connector edge. **NOTE**: Also check that the foil and the drain wire are touched to the metal part inside the connector.
	A pin number is 1 to 8 in an order from the left. 
	Calk by a calking tool.

	Cut off the unnecessary foil and drain wire by scissors.
	Attach the cable boot. The cable assembling procedure is completed.

3.5.4 Installation of UPS

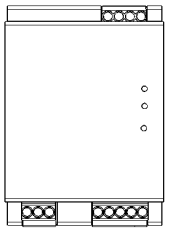
UPS consists of 4 units of the following.

(1)



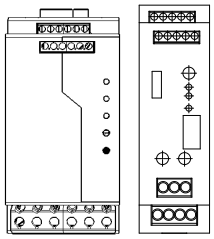
ME-MAX-NEF/QUINT20

(2)



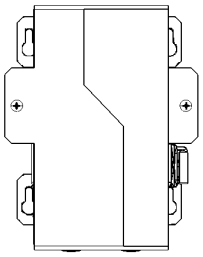
QUINT-PS/ 1AC/24DC/20

(3)



QUINT-DC-UPS/24DC/20
Or
QUINT-UPS/24DC/24DC/20

(4)

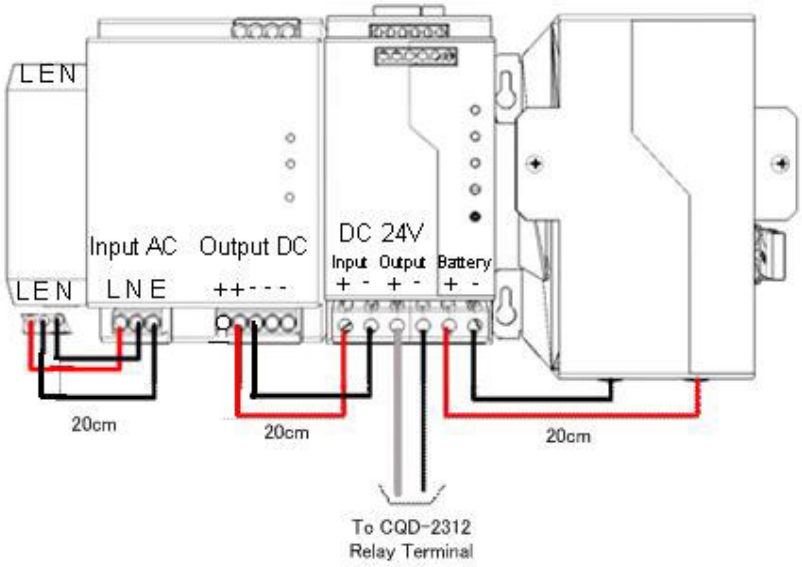


QUINT-BAT/24DC/ 3.4AH

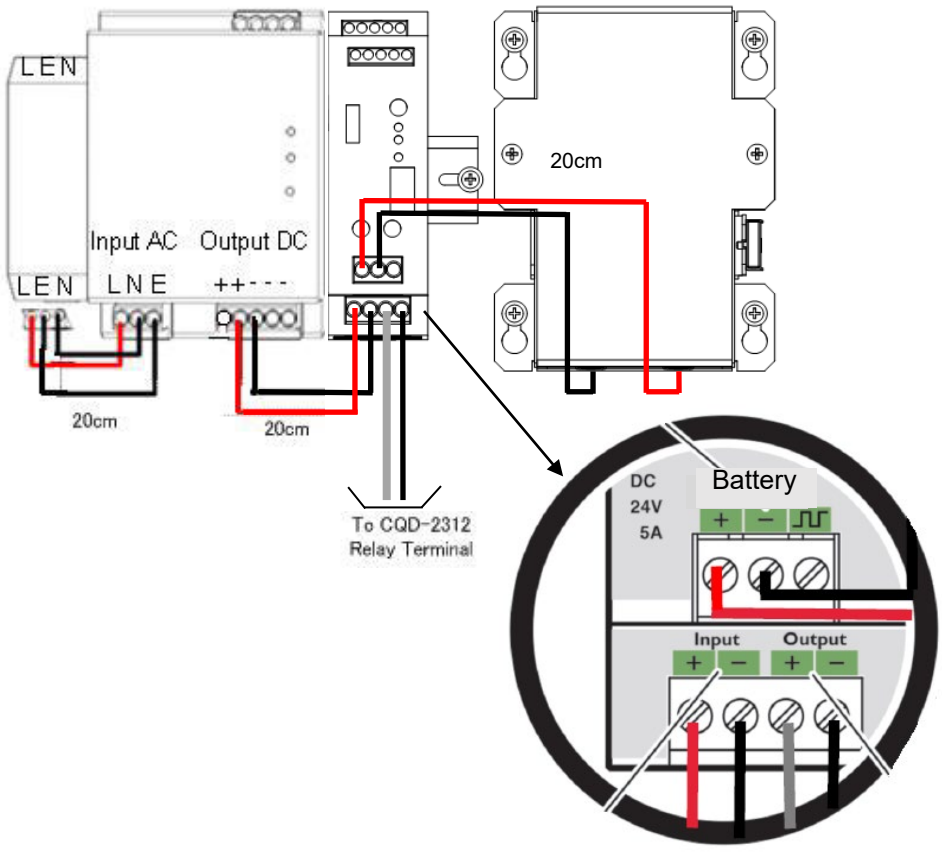
⚠ The main purpose of this UPS is backup for the display unit. NKE-2254-6HS / NKE-2103-6 / NKE-2103-6HS Radar antennas can transmit by changing the setting.(See 4.15 Operation Setting at AC Power Failure (Insufficient AC power supply))
But do not change the settings without instruction.

⚠ After installation of UPS is finished, enter the UPS installing date. Refer to 4.42 Operating Time Setup.
Recommended time to replace the UPS battery is 30,000 hours.
Please replace the UPS battery before reaching the recommended replacement time.

1) Wire the cable as shown in the figure below.
For wiring, cut the cable of 4:QUINT-BAT/24DC/3.4AH. Use another wiring rod for the 24 VDC output connection to the CQD-2312 Relay Terminal. For wiring, refer to **3.4.7 Wiring for Relay** Terminal.
When desktop or flush mount type is arranged, there is no CQD-2312 Relay terminal. Connect to the terminal TB1 on the NBD-913 Power Supply Unit directly.



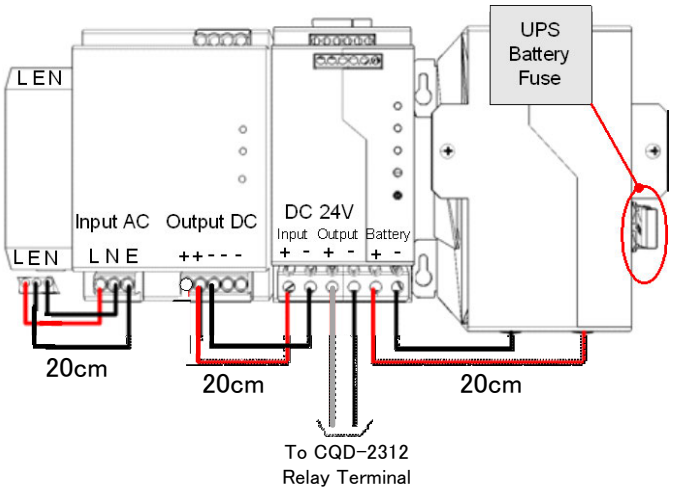
QUINT-DC-UPS/24DC/20 in case



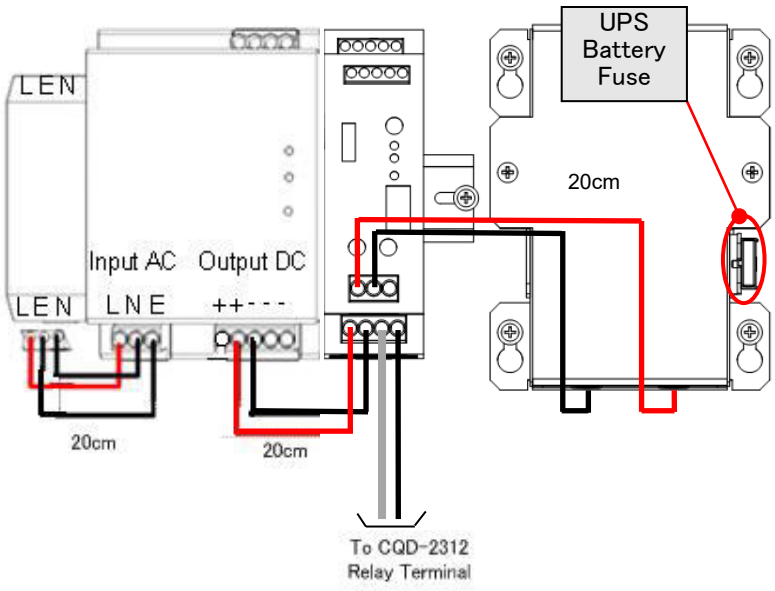
QUINT-UPS/24DC/24DC/20 in case

2) Attach the battery fuse that comes with 4:QUINT-BAT/24DC/3.4AH.

⚠ Pay attention since a small spark may occur while attaching the fuse.

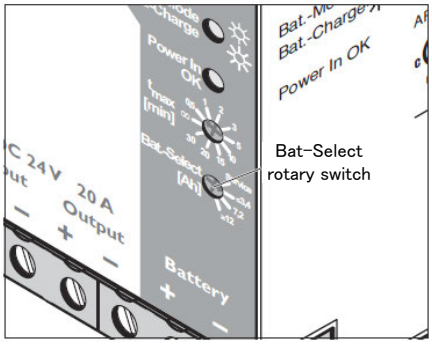


QUINT-DC-UPS/24DC/20 in case

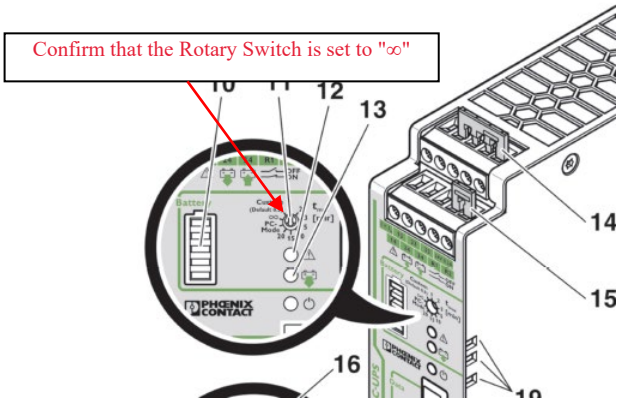


QUINT-UPS/24DC/24DC/20 in case

3) Set the “Bat-Select ” rotary switch on the 3:QUINT-DC-UPS/24DC/20 to 3.4.

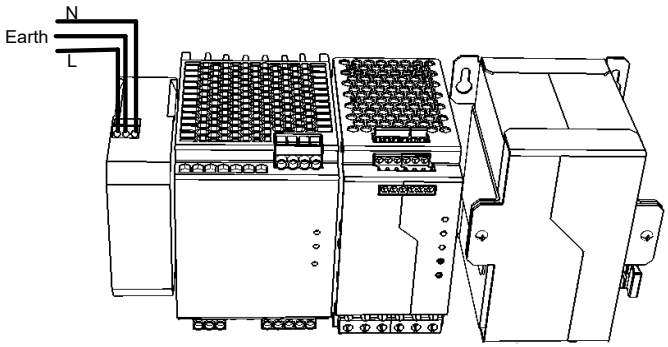


For QUINT-UPS/24DC/24DC/20, set Buffer time setting to "∞".

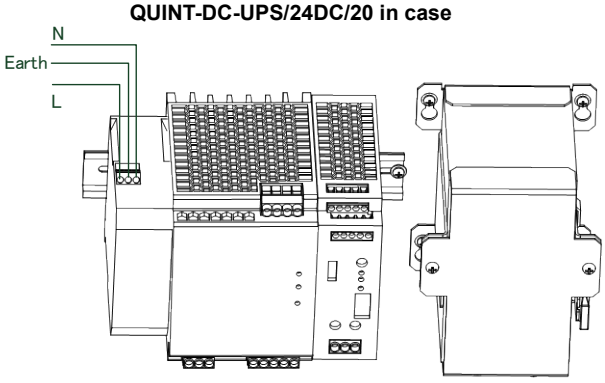


⚠WARNING
Before installing a power cable, always make sure to turn off the circuit breaker of main power line. Otherwise, it may cause an electric shock or malfunction.

4) Connect the AC(100V-220V) power supply line by referring to the figure below. For a stand-alone type, refer to **3.4.7 Wiring for Relay** Terminal, and supply AC power via the Relay Terminal.



QUINT-DC-UPS/24DC/20 in case



QUINT-UPS/24DC/24DC/20 in case

⚠ Make sure that the ground cable of the terminal block in the upper part of the input filter is connected to the ground of the ship.

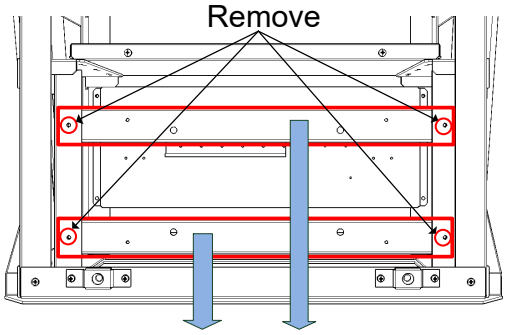
While maintaining the OFF state of the circuit breaker for the power supply of the display unit, turn ON the circuit breaker of the main power line and check that the LEDs of the UPS controller turn ON/OFF as follows.

LED	Color	ON/OFF Status
Alarm	**Red**	**OFF**
Bat.-Mode **Bat.-Charge**	**Yellow**	**Flashing or** **OFF**
Power In OK	**Green**	**ON**

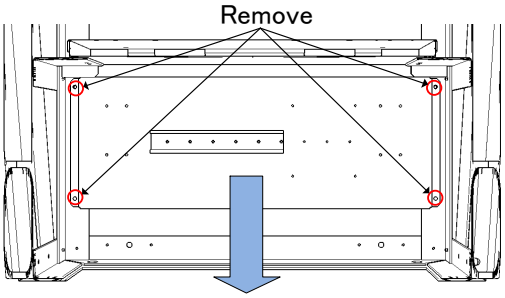
The same check procedure is used for the QUINT-UPS/24DC/24DC/20 as above.
The installation of UPS ends above. Refer to the next page if you want to install the UPS to the inside of the display unit.

■ In case of installing the UPS to the inside of the MFD frame

1) Remove the 4 screws, and remove the 2 frames for installing the JB.

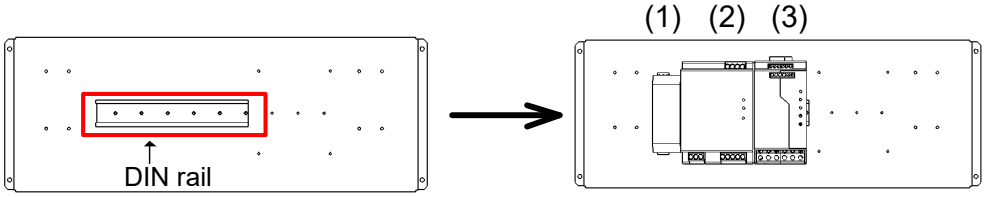


2) Remove the 4 screws, as shown below, and remove the rear panel.

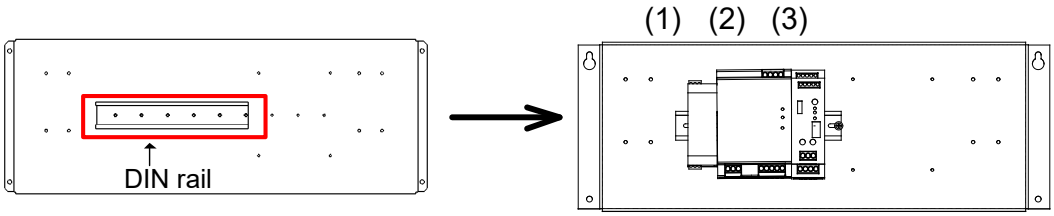


3) Install the UPS units(1), (2), (3) to the DIN rail on the rear panel.

● In case of 26inch Display Unit Mount Kit(CWA-246)

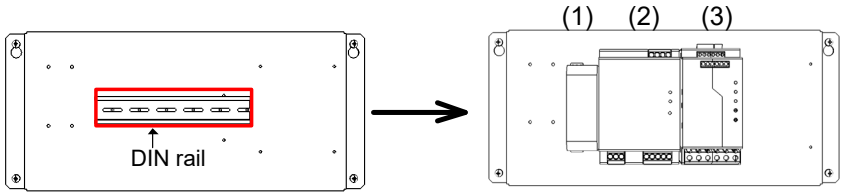


QUINT-DC-UPS/24DC/20 in case

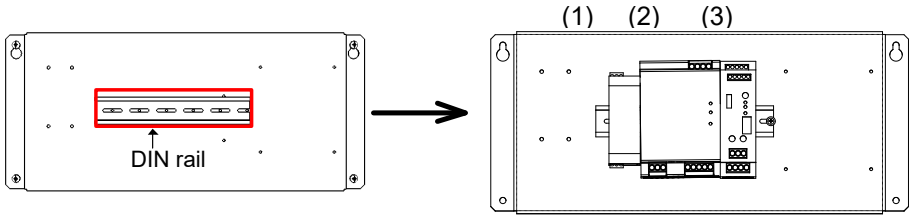


QUINT-UPS/24DC/24DC/20 in case

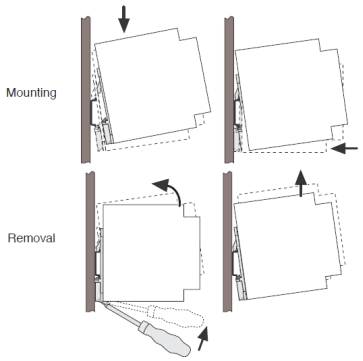
● In case of 19inch Display Unit Mount Kit(CWA-245)



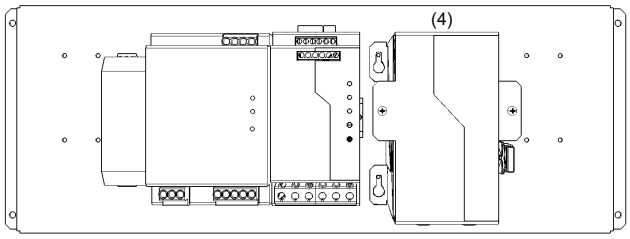
QUINT-DC-UPS/24DC/20 in case



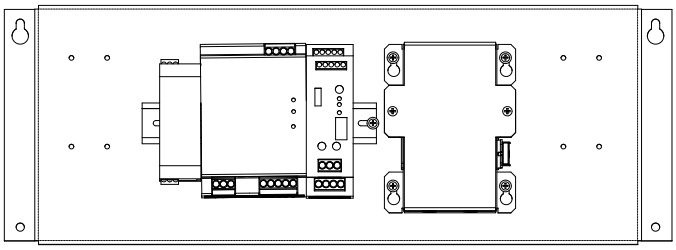
QUINT-UPS/24DC/24DC/20 in case



4) Install QUINT-BAT/24DC/3.4AH to the rear panel.
- In case of 26inch Display Unit Mount Kit(CWA-246)

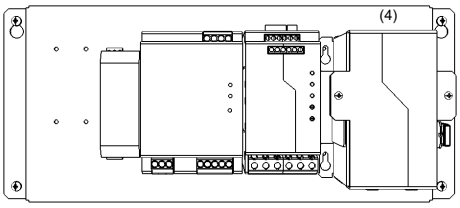


QUINT-DC-UPS/24DC/20 in case

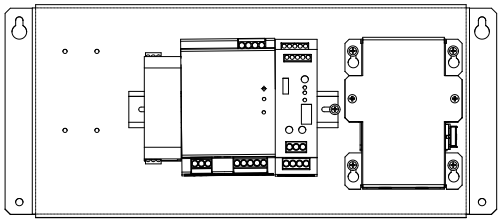


QUINT-UPS/24DC/24DC/20 in case

- In case of 19 inch Display Unit Mount Kit(CWA-245)

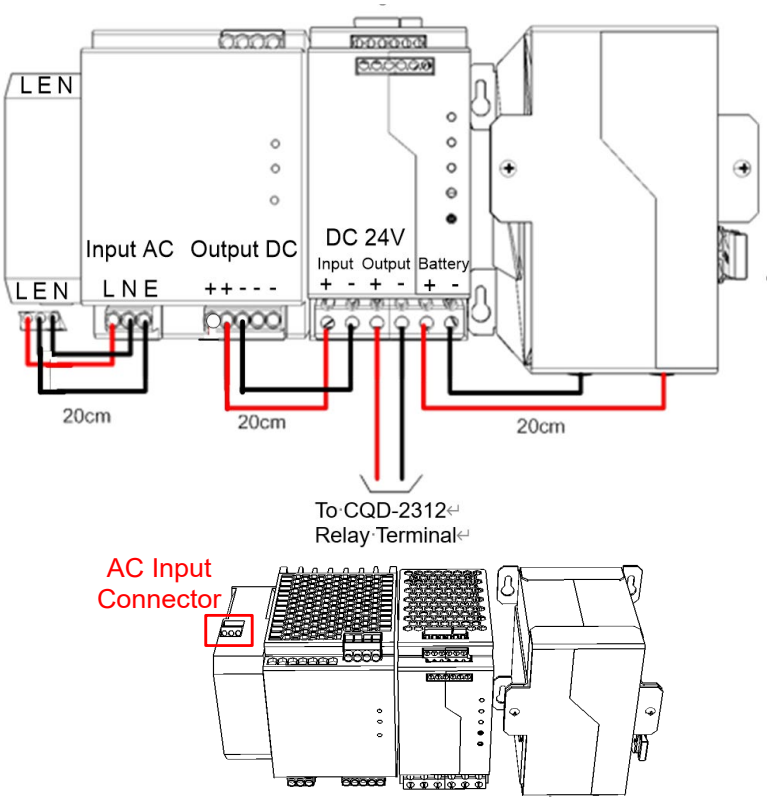


QUINT-DC-UPS/24DC/20 in case

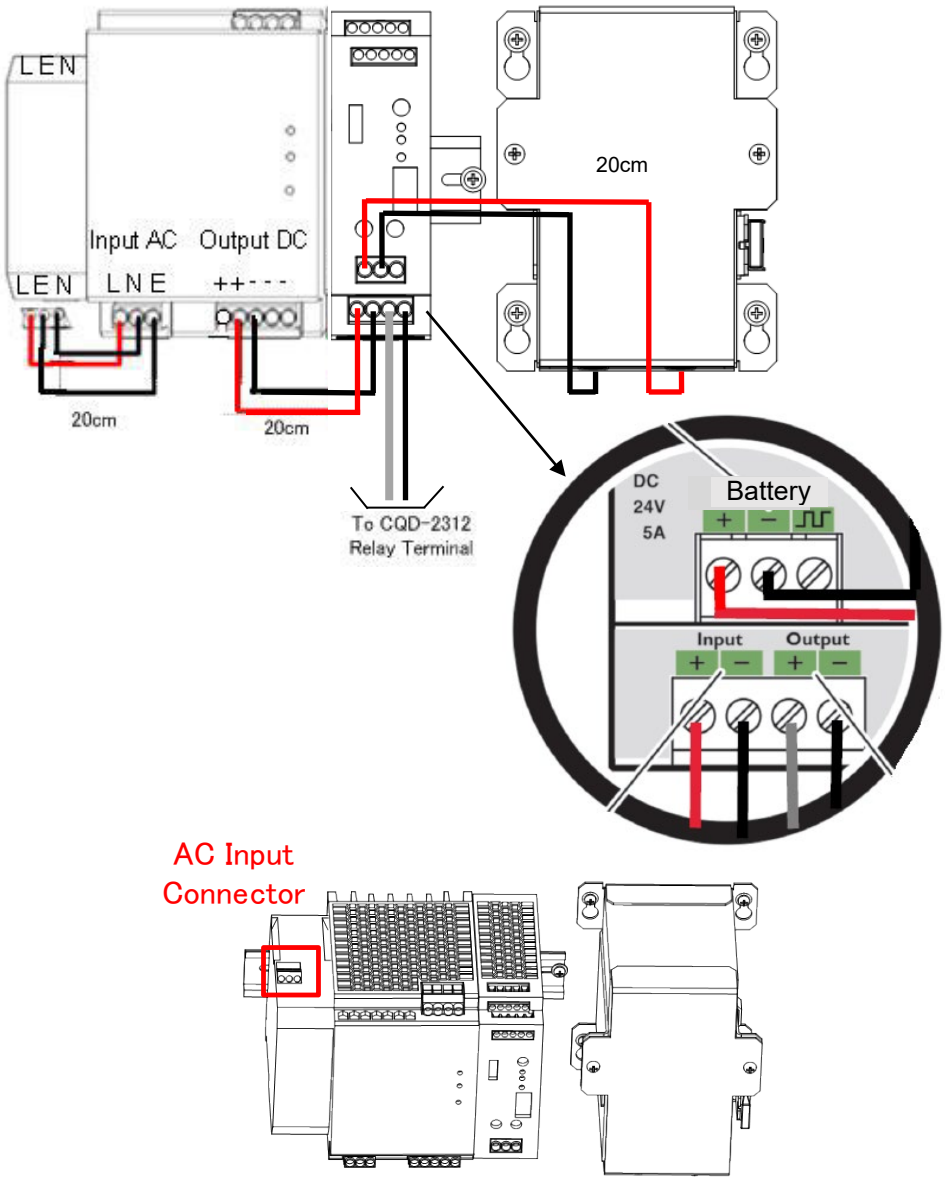


QUINT-UPS/24DC/24DC/20 in case

5) Wire the cable as shown in the figure below.
For wiring, cut the cable of 4:QUINT-BAT/24DC/3.4AH. Use another wiring rod for the 24 VDC output connection to the CQD-2312 Relay Terminal. For wiring, refer to **3.4.7 Wiring for Relay** Terminal. When proceeding, remove the AC input connector of 1.ME-MAX-NEF/QUINT20 for later wiring.



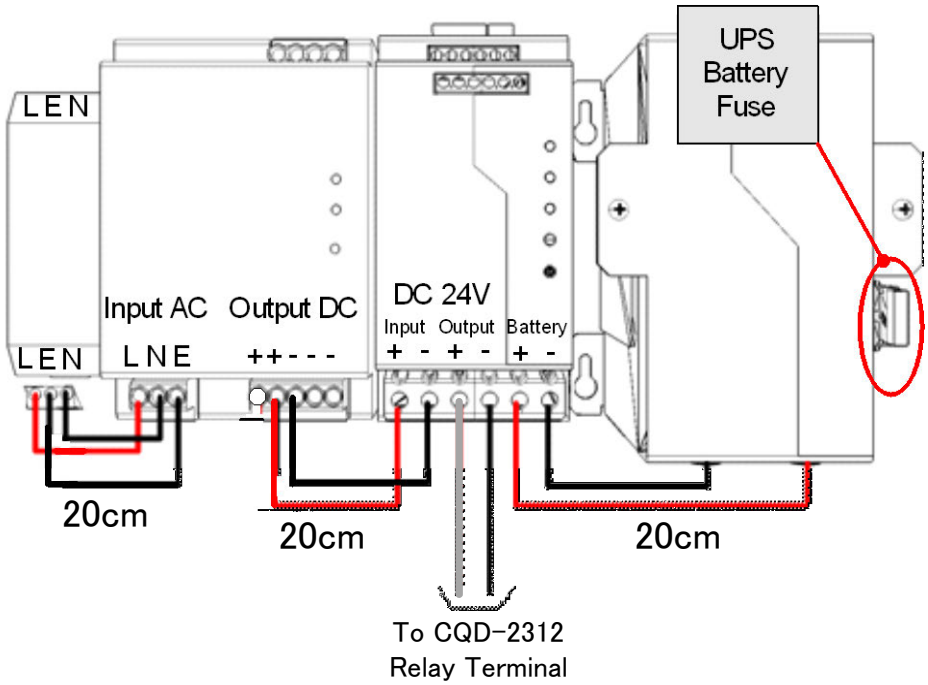
QUINT-DC-UPS/24DC/20 in case



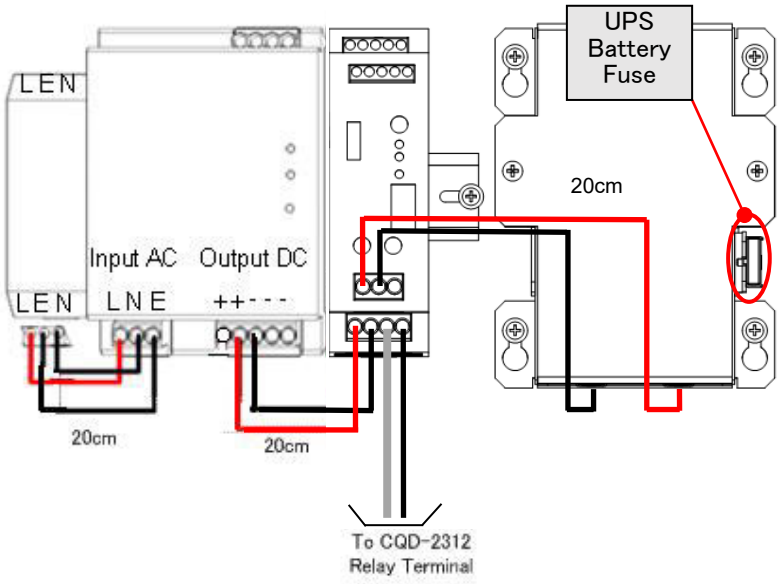
QUINT-UPS/24DC/24DC/20 in case

6) Attach the battery fuse that comes with QUINT-BAT/24DC/3.4AH.

⚠ Pay attention since a small spark may occur while attaching the fuse.

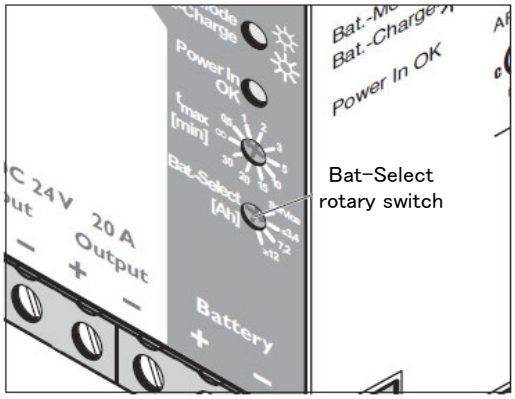


QUINT-DC-UPS/24DC/20 in case

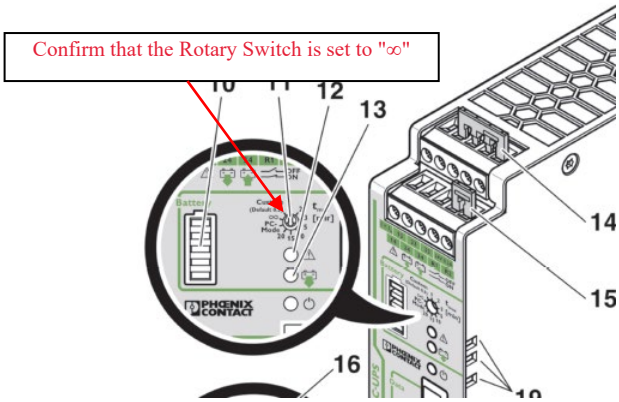


QUINT-UPS/24DC/24DC/20 in case

7) Set the “Bat-Select ” rotary switch on the 3:QUINT-DC-UPS/24DC/20 to “3.4”.



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



8) Make wiring of AC input and DC output and fix the UPS to the frame. Refer to **3.4.7 Wiring for Relay** Terminal.

⚠WARNING

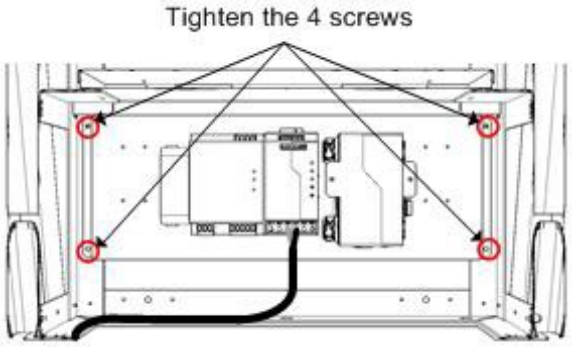
Before installing a power cable, always make sure to turn off the circuit breaker of main power line. Otherwise, it may cause an electric shock or malfunction.

9) 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.

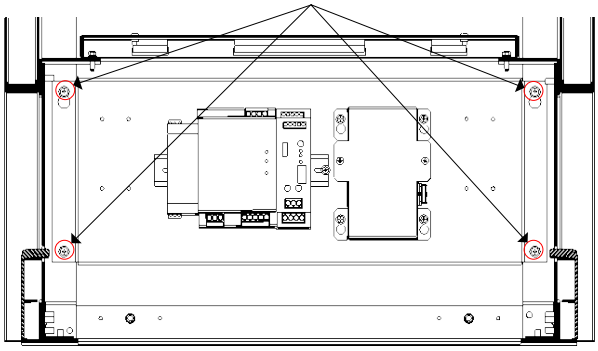
LED	Color	ON/OFF Status
Alarm	**Red**	**OFF**
Bat.-Mode **Bat.-Charge**	**Yellow**	**Flashing or** **OFF**
Power In OK	**Green**	**ON**

The same check procedure is used for the QUINT-UPS/24DC/24DC/20 as above.

10) Install the rear panel with the UPS attached to the frame.

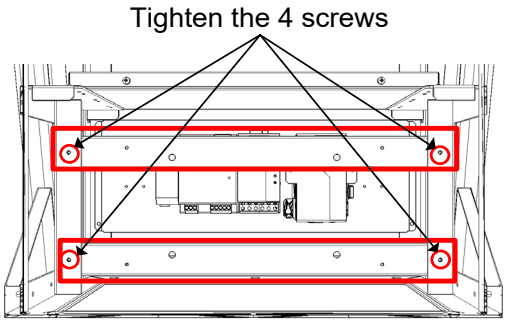


QUINT-DC-UPS/24DC/20 in case

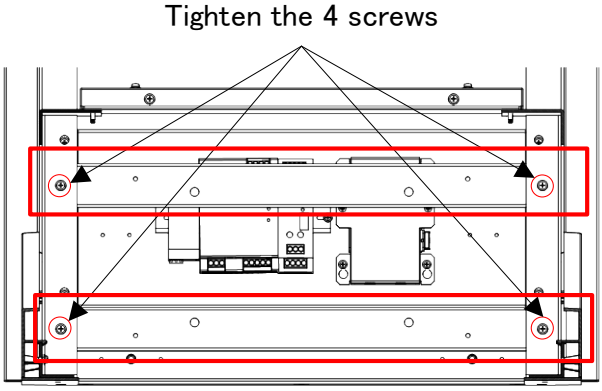


QUINT-UPS/24DC/24DC/20 in case

11) Re-install the 2 frames for installing the JB to their original positions.



QUINT-DC-UPS/24DC/20 in case



QUINT-UPS/24DC/24DC/20 in case

The installation of UPS ends above.

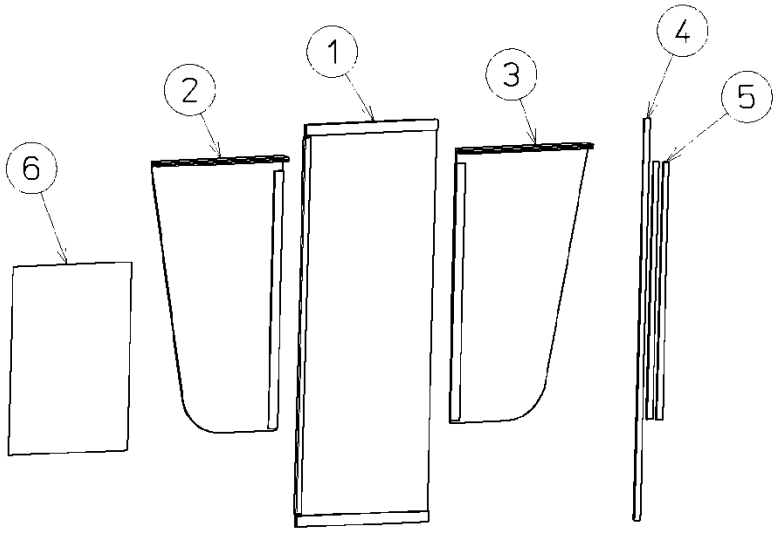
3.5.5 Installation of Hood CWB-2718/1620/1618

3.5.5.1 Installation of Hood CWB-2718(for 27inch Monitor Unit) / CWB-1620 (for 26inch Monitor Unit)

HOOD ASSEMBLING PROCEDURE

フード取付要領書

<PARTS LIST ／ 部品構成>



No.	PARTS NAME	THE NUMBER
1	TOP PLATE	1
2	SIDE PLATE (L)	1
3	SIDE PLATE (R)	1
4	LOCK FASTENER (LONG)	1
5	LOCK FASTENER (SHORT)	2
6	ASSEMBLING PROCEDURE	1

No.	部品名	数量
1	天板	1
2	側面板（左）	1
3	側面板（右）	1
4	ロックファスナー（長）	1
5	ロックファスナー（短）	2
6	取付要領書	1

1. Attach④to the top of the monitor as shown in fig1.
   And attach⑤(2 pieces) to the both sides of the monitor as shown in fig1.

1. 図1のようにモニター上面に④を貼り付ける。
   また、図1のようにモニター両側面に⑤を貼り付ける。

The example is illustrated with CWB-1620 and NWZ-208, but the installation method is the same for the CWB-2718 and NWZ-233 combination.

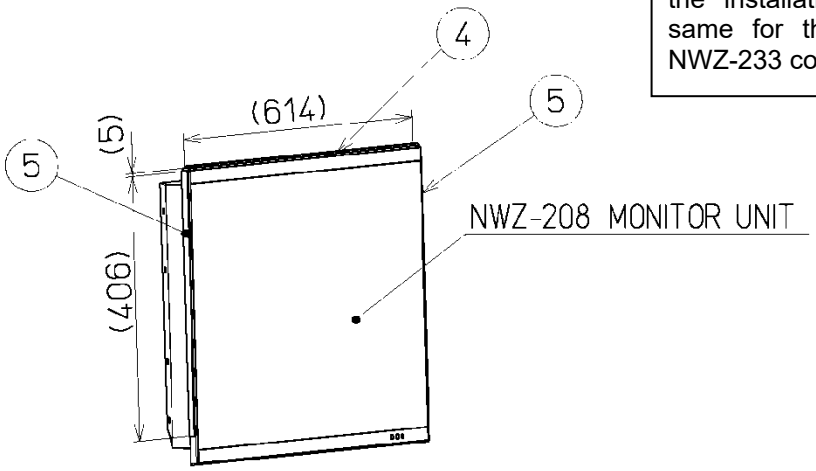


Fig.1 Attachment of the LOCK FASTENER(LONG/SHORT)
図1. ロックファスナーの取り付け

2. Assemble the HOOD as shown in fig2.
2. 図2のように、フードを組み立てる。

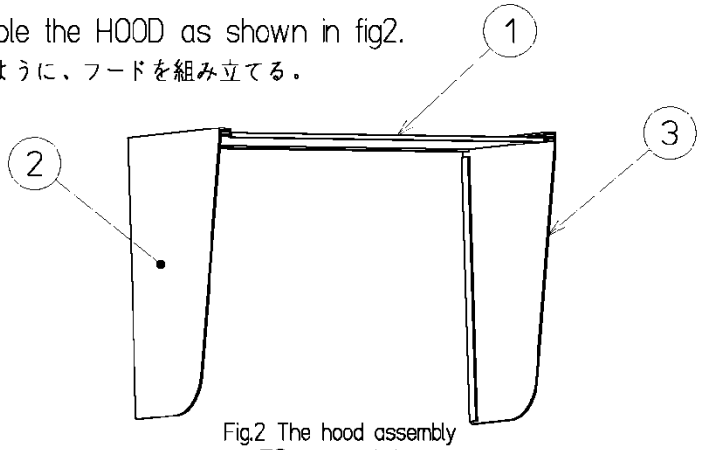


Fig.2 The hood assembly
図2. フードの組立て

3. Attach the hood to the monitor as shown in fig3.
3. 図3のように、フードをモニターに取り付ける。

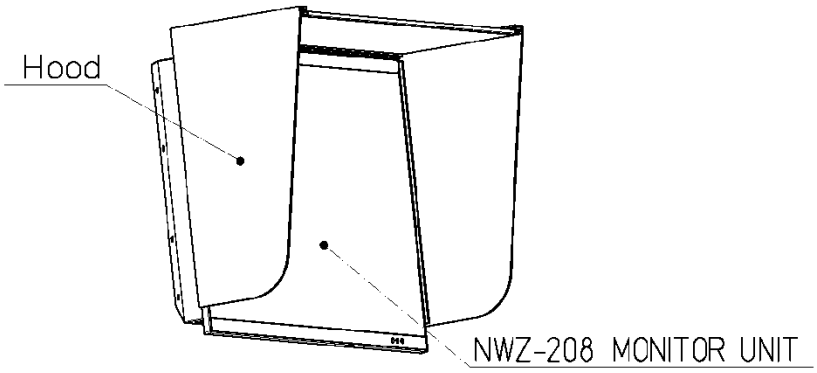
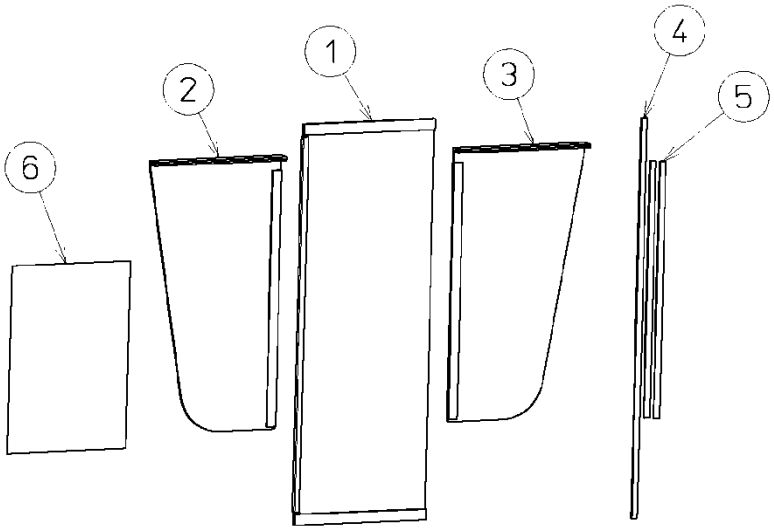


Fig.3 Attachment of the hood
図3. フードの取り付け

3.5.5.2 Installation of Hood CWB-1618 (for 19inch Monitor Unit)

HOOD ASSEMBLING PROCEDURE
フード取付要領書

<PARTS LIST ／ 部品構成>



No.	PARTS NAME	THE NUMBER
1	TOP PLATE	1
2	SIDE PLATE (L)	1
3	SIDE PLATE (R)	1
4	LOCK FASTENER (LONG)	1
5	LOCK FASTENER (SHORT)	2
6	ASSEMBLING PROCEDURE	1

No.	部品名	数量
1	天板	1
2	側面板（左）	1
3	側面板（右）	1
4	ロックファスナー（長）	1
5	ロックファスナー（短）	2
6	取付要領書	1

1. Attach④to the top of the monitor as shown in fig1.
   And attach⑤(2 pieces) to the both sides of the monitor as shown in fig1.

1. 図1のようにモニター上面に④を貼り付ける。
   また、図1のようにモニター両側面に⑤を貼り付ける。

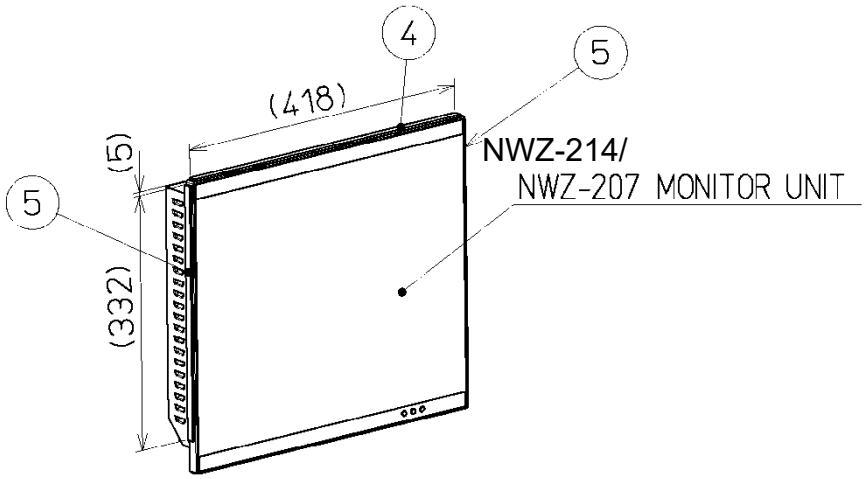


Fig.1 Attachment of the LOCK FASTENER(LONG/SHORT)
図1. ロックファスナーの取り付け

2. Assemble the HOOD as shown in fig2.
2. 図2のように、フードを組み立てる。

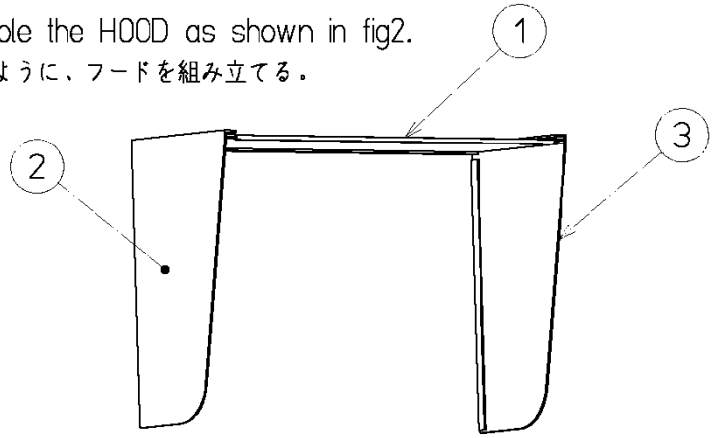


Fig.2 The hood assembly
図2. フードの組立て

3. Attach the hood to the monitor as shown in fig3.
3. 図3のように、フードをモニターに取り付ける。

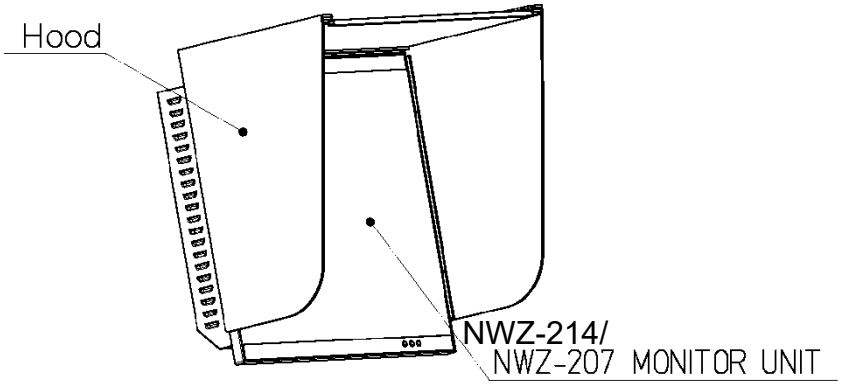


Fig.3 Attachment of the hood
図3. フードの取り付け

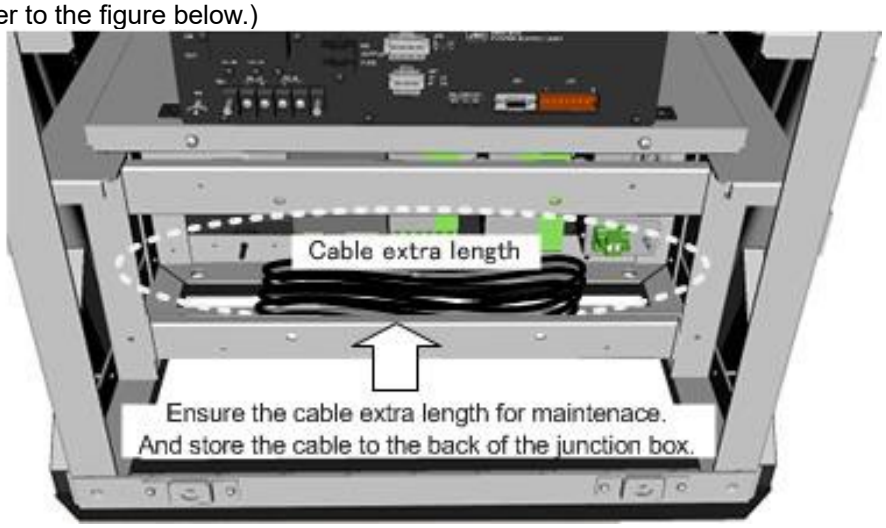
3.6 Connections with Radar Antenna and Transmitter-Receiver

⚠ 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.

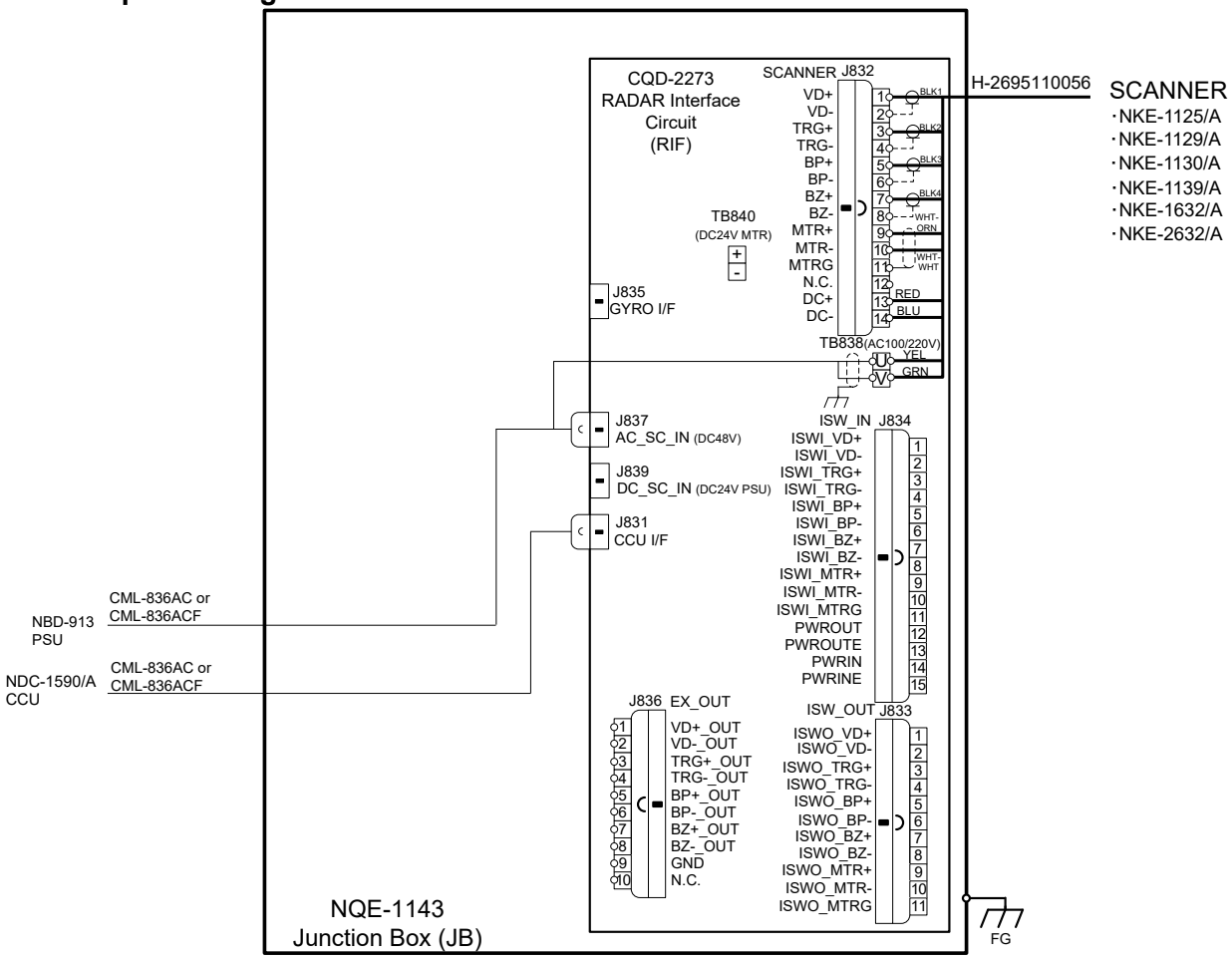
⚠ Do not lose the bolt and screws as they will be needed again.

⚠ Ensure the cable extra length for maintenace. And store the cable to the back of the junction box.
(Refer to the figure below.)



3.6.1 NKE-1125/A, NKE-1129/A, NKE-1130/A, NKE-1139/A, NKE-1632/A, NKE-2632/A Radar Antennas

Connect the Radar Antenna and Transmitter-Receiver to J832 and TB840 of the CQD-2273 RIF.
For the procedure for processing the equipment cable terminal, see **2.1.4 Cable end processing method.**

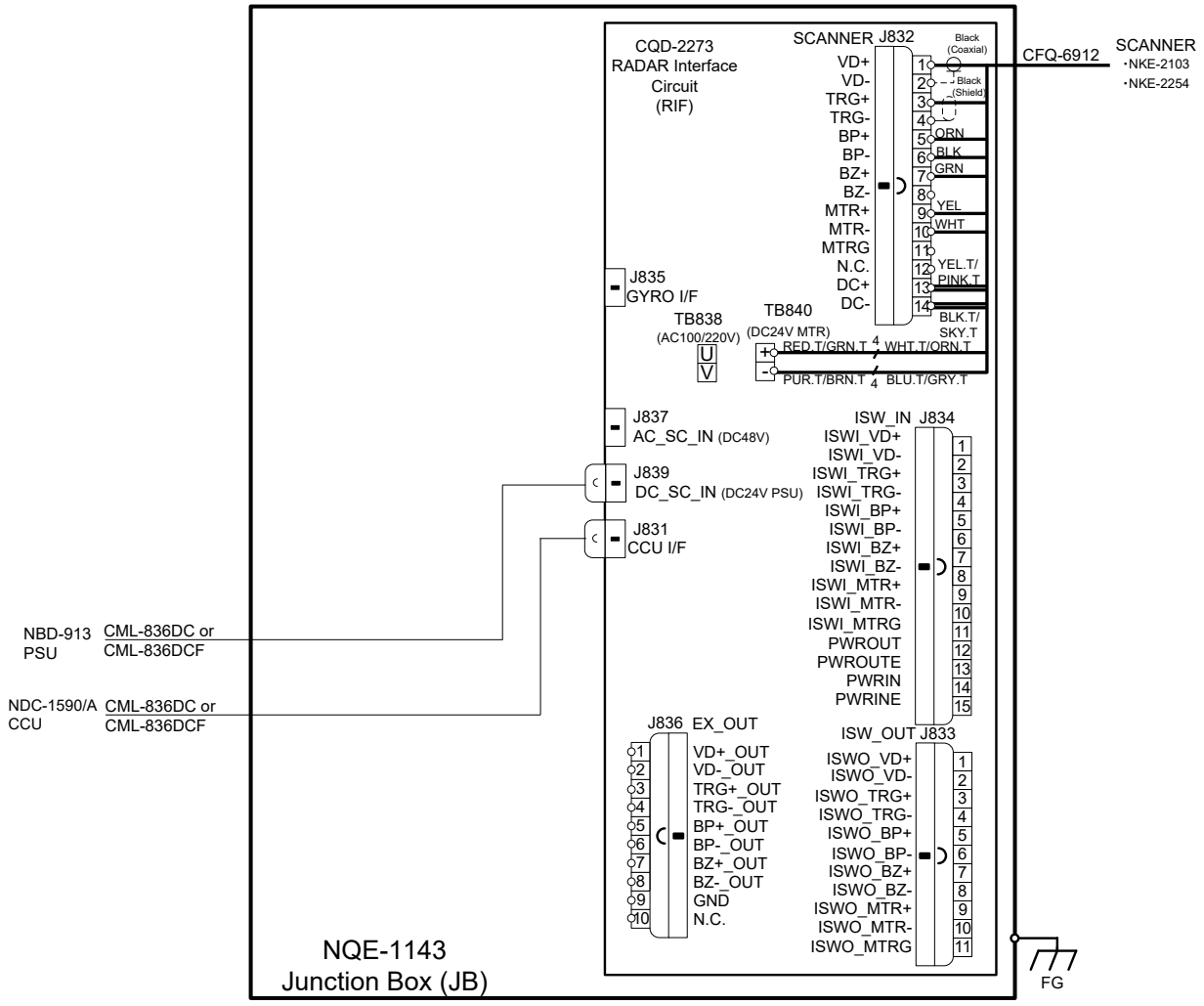


Confirm the model name of the Radar Antenna and the input power voltage to the Display Unit in the following table.

General type name	Radar antenna of 100-115VAC	Radar antenna of 220-240VAC
JMR-9230-S3	NKE-1139/A-1	NKE-1139/A-2
JMR-9230-S	NKE-1130/A-1	NKE-1130/A-2
JMR-9225-7X3	NKE-1129/A-71	NKE-1129-7/A2
JMR-9225-9X3	NKE-1129/A-91	NKE-1129-9/A2
JMR-9225-6X	NKE-1125/A-61	NKE-1125-6/A2
JMR-9225-9X	NKE-1125/A-91	NKE-1125-9/A2

3.6.2 NKE-2103, NKE-2254 Radar Antennas

Connect the Radar Antenna and Transmitter-Receiver to J832 and TB838 of the CQD-2273 RIF.
For the procedure for processing the equipment cable terminal, see 2.1.1 CFQ-6912-**.



3.6.3 Settings for RADAR I/F Circuit

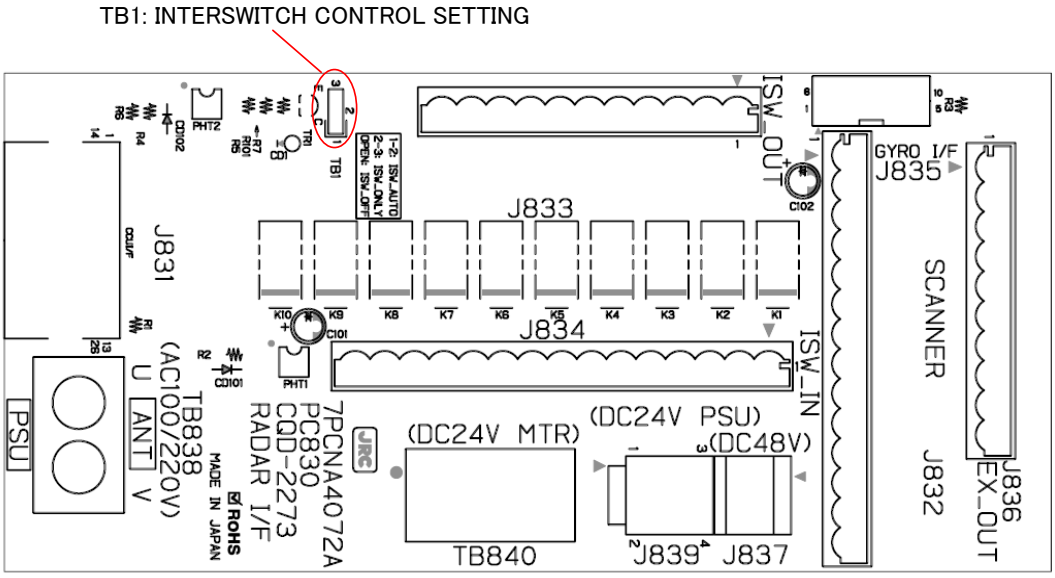


Fig 3-34 CQD-2273 Radar Interface Circuit TB1

Table 3-2 Radar Interface Circuit TB1 Settings

Radar Interface Circuit TB1 Settings		Description
1-2 SHORT CIRCUIT	ISW_AUTO (Factory default)	You can switch the radar antenna 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 mode.
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. (Setting in service mode)

⚠Setting the TB1 of the RIF to “2-3 SHORT CIRCUIT” or “OPEN” should only be done by a qualified service personnel. **It may cause a lower radar system performance.**

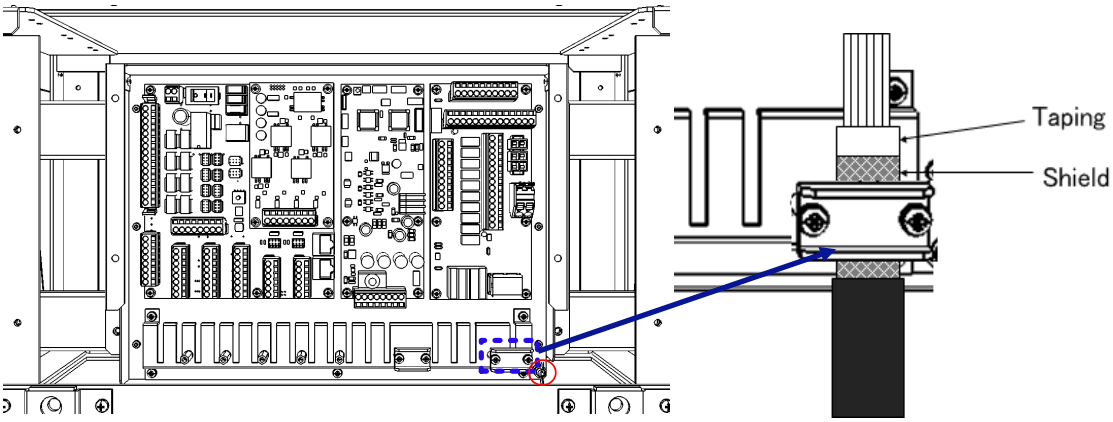
3.6.3.1 Connection procedure between Radar Interface Circuit and Radar Antenna

1. Connect as follows Radar Interface Circuit and Radar Antenna.
   (J832: Signal TB838: AC Power TB840: DC Power)

AC Motor Radar Antenna: NKE-1139/A, NKE-1130/A, NKE-1632/A, NKE-2632/A, NKE-2632-H, NKE-1129/A-7, NKE-1129/A-9, NKE-1125/A-6, NKE-1125/A-9	J832 and TB838
DC Motor Radar Antenna: NKE-2254-6HS, NKE-2103-6, NKE-2103-6HS	J832 and TB840

- For the procedures for processing the equipment cable end, see **2.1.4 Cable end processing method.**
- 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)

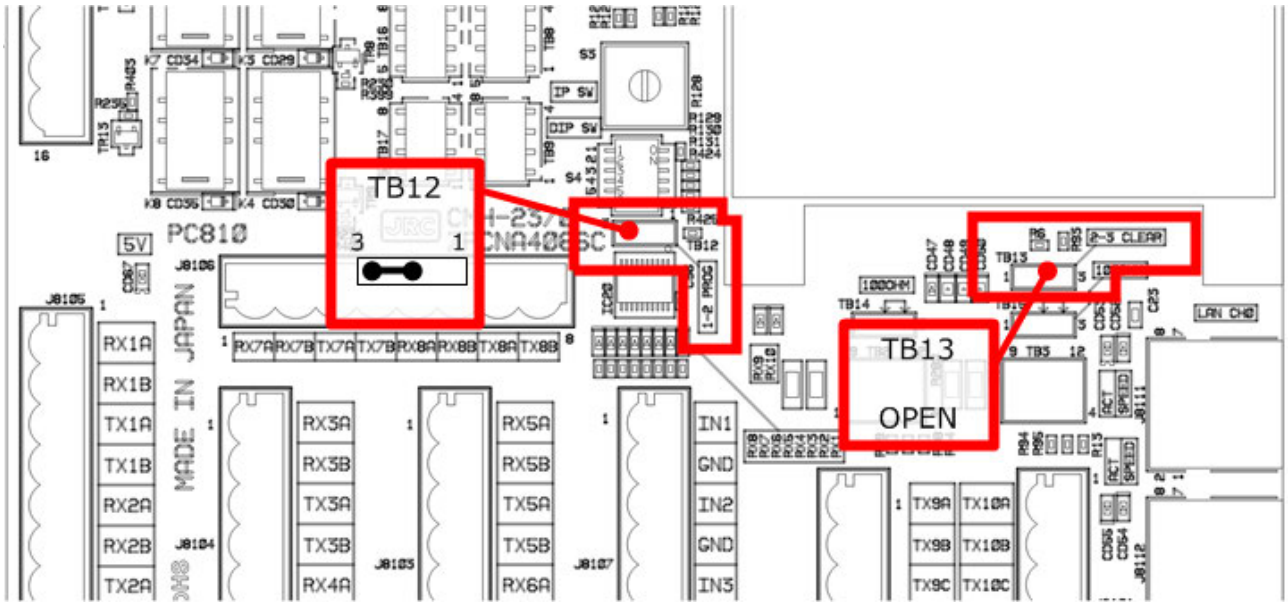
⚠ So that the braided shield is not shorted to the power supply terminal block, please insulate the cable and fix with cable tie. Put the extra length of the cable to the bottom of the display unit so that it does not interfere the installation positions of the UPS and Sensor LAN Switch Unit.



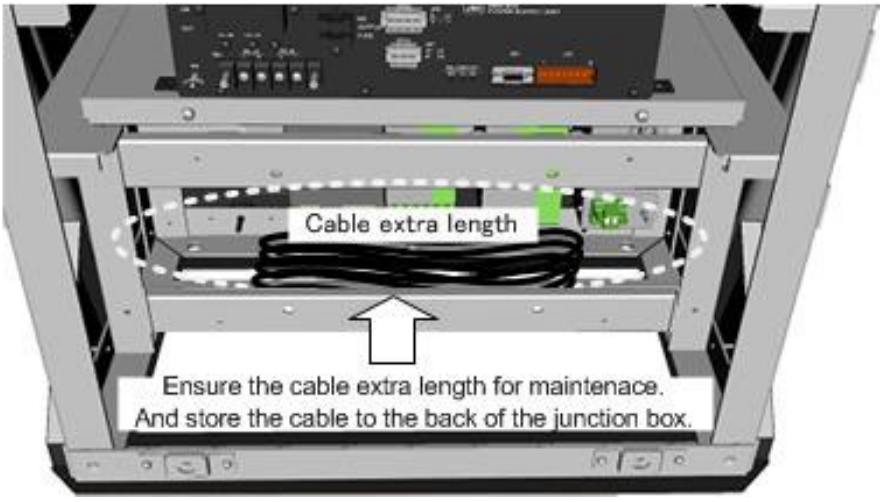
- When connecting the interswitch unit, see **5.1 Installation of Interswitch Unit**.
- When connecting with the ECDIS, see **3.8 Connection with ECDIS.**

3.7 Connection with Sensors

Do not change the settings of TB12 and TB13 that were configured at the factory shipment. Since the equipment starts in maintenance mode, communication with each sensor does not function normally.

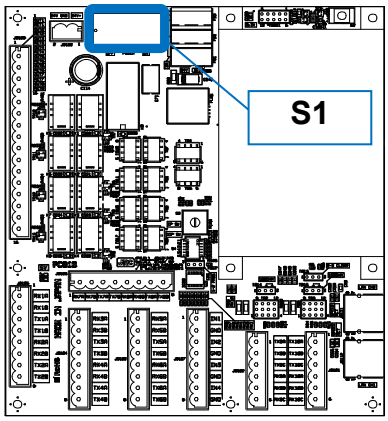


Ensure the cable extra length for maintenace. And store the cable to the back of the junction box.
(Refer to the figure below.)



When the CMH-2370 SLC has been installed in the NQE-1143 JB, start up the CMH-2370 SLC by turning on the switch S1 on the board after wiring. Refer to the figure below for the switch position.

If the CMH-2370 SLC is not started up, IEC61162-1, IEC61162-2, IEC61162-450 connected to the SLC, contact input/output, and communication with analog sensor stay inactivated.

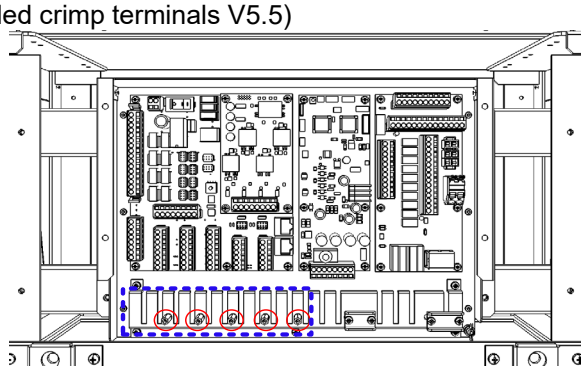


S1 location on CMH-2370 SLC

3.7.1 IEC61162-1 Connections

Connect the communication signals from sensors that use IEC61162-1 to the IEC61162-1 port located on the CMH-2370 SLC. The SLC is located in the NQE-1143 JB. Communication signals from sensors will be connected to terminals RX_A and RX_B compliant to the IEC61162 standard. Communication signals to sensors will be connected to terminals TX_A and TX_B. The number of ports for IEC61162-1 on the SLC is 8 for each receiver and transmitter allocated at J8103-J8106.

- See **Fig 3-34: Connector location on** CMH-2370 about location of J8103-J8106 on CMH-2370.
- To configure the port, refer to **4.6 Setting Up a Serial Port**.
- 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. Put the extra length of the cable to the bottom of the display unit so that it does not interfere the installation positions of the UPS and Sensor LAN Switch Unit.

Table 3-3:Terminal Assignment 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

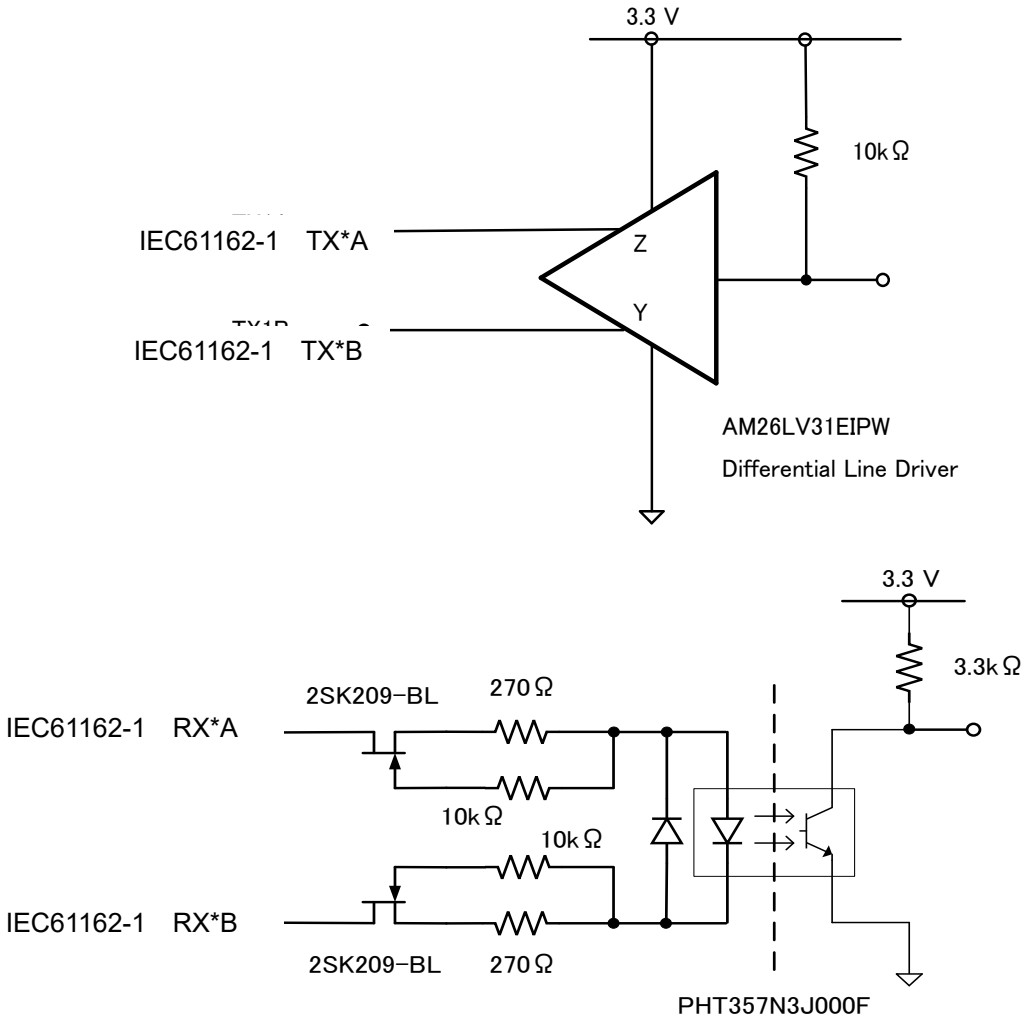
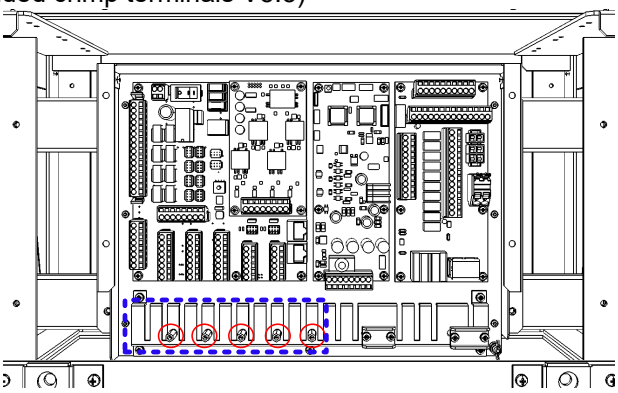


Fig 3-35 IEC61162-1 transmitter-receiver circuit

3.7.2 IEC61162-2 Connections

Connect the communication signals from sensors that use IEC61162-2 to the IEC61162-2 port located on the CMH-2370 SLC. The SLC is located in the NQE-1143 JB. Communication signals from sensors will be connected to terminals RX_A, RX-B and RX_C compliant to the IEC61162 standard. Communication signals to sensors will be connected to terminals TX_A, TX-B and TX_C. The number of ports for IEC61162-2 on the SLC is 2 for each receiver and transmitter allocated at J8101 and J8102.

- See **Fig 3-34: Connector location on** CMH-2370 about location of J8101-J8102 on CMH-2370.
- To configure the port, refer to **4.6 Setting Up a Serial Port**.
- 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. Put the extra length of the cable to the bottom of the display unit so that it does not interfere the installation positions of the UPS and Sensor LAN Switch Unit.

Table 3-4:Terminal Assignment 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

Example: Connection with AIS
Data from the AIS is displayed on the Display Unit, even if there is no communication signal from the Display unit to the AIS.
The AIS alarm displayed on the Display Unit can be stopped by establishing communication between the Display Unit and the AIS.

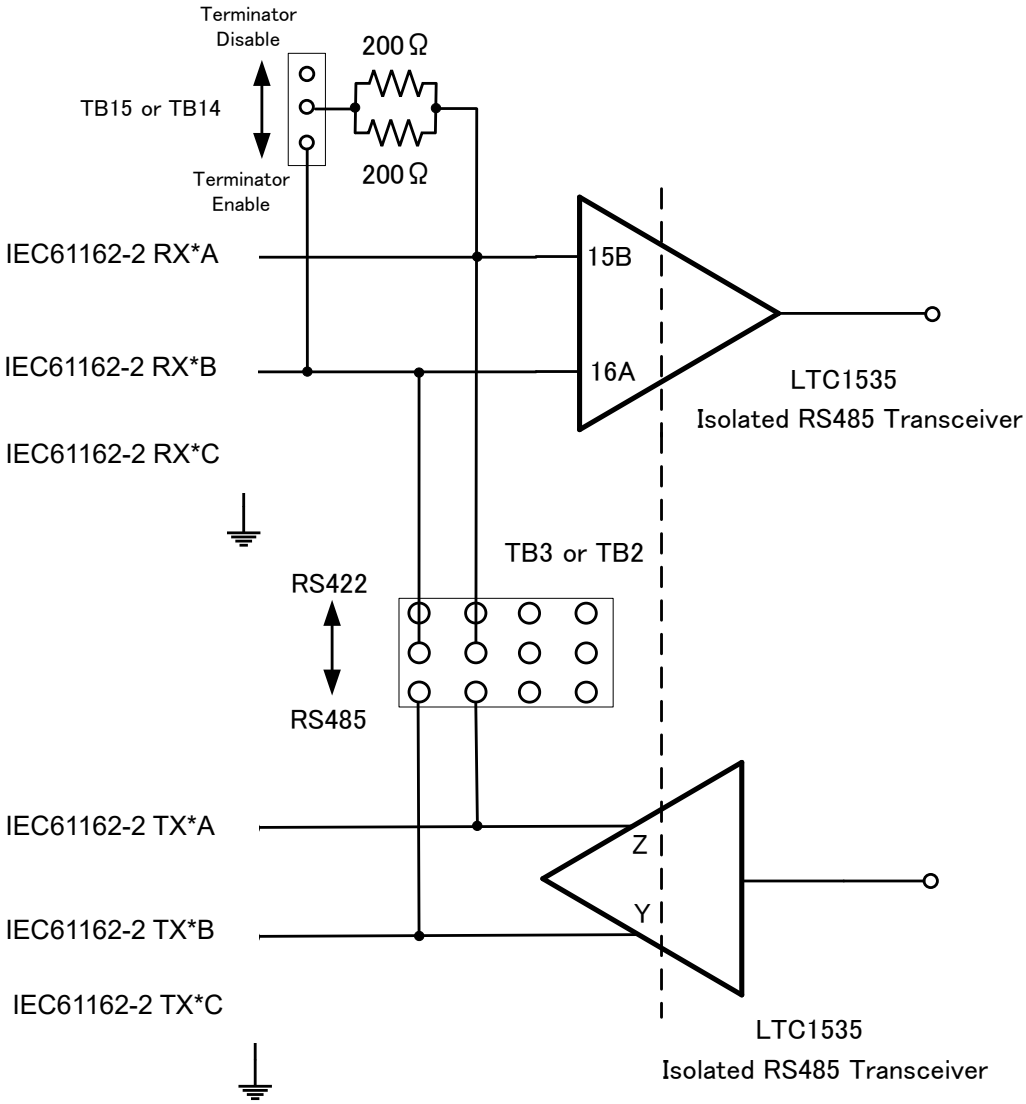
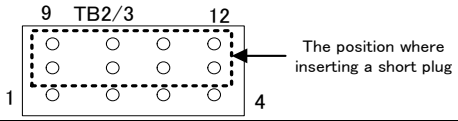
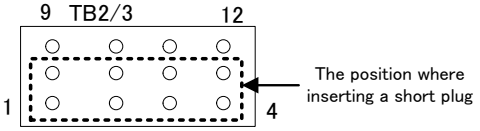


Fig 3-36 IEC61162-2 transmitter-receiver circuit

3.7.2.1 Communication Type and termination

Communication type of CH9 and CH10 can be set to full duplex or half duplex by setting TB2 and TB3 on the CMH-2370 SLC. Full duplex mode is set at the factory. Select the full duplex mode unless otherwise instructed.
To select the communication mode of CH9, set TB2, and to select the communication mode of CH10, set TB3, as described below. (See **Fig 3-31:Communication Type and termination Circuit Diagram**.)

Table 3-5:Setting of communication type

Mode	Setting of TB2 /TB3
Duplex (RS-422)	Short circuit :5-9, 6-10, 7-11, 8-12 
Half duplex (RS-485)	Short circuit :5-1, 6-2, 7-3, 8-4 

To connect multiple receiver circuit, termination can be set to “active” or “inactive” by changing settings of TB14 and TB15.
To change the termination setting of CH9, set TB14, and to change the termination setting of CH10, set TB15, as described below. (See **Fig 3-31:Communication Type and termination Circuit Diagram**.)

Table 3-6:Setting of termination resister

Termination	Terminal No. of TB14 and TB15
w Termination	2-3(Factory setting)
w/o Termination	1-2

Note: For the location of TB2, TB3, TB14, TB15, refer to **Fig 3-34: Connector location on** CMH-2370**.**

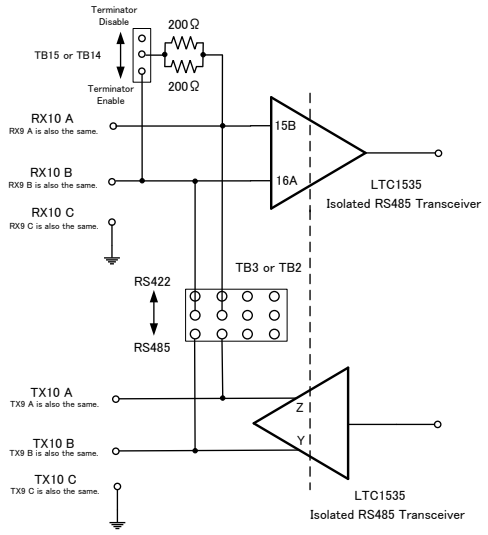


Fig 3-37:Communication Type and termination Circuit Diagram

3.7.3 LAN Connection

The CMH-2370 SLC converts serial data from sensors into LAN protocol data. Converted data is transferred to the NDC-1590/A CCU. When the optional NQA-2443 Sensor LAN Switch Unit is installed, the converted data is sent to the Display Unit via the Sensor LAN Switch Unit. Communication from the Display Unit to sensors, together with communication from sensors to the Display Unit, is available.
The Sensor LAN Switch Unit and the SLC are connected by an Ethernet cable.

Connection of PC or other maker's system to JRC-LAN should only be done by a qualified service personnel.

- **Connecting PC or other maker's system may cause a lower radar system performance.**

Either one of J8111 or J8112 can be used as an active LAN port o the CMH-2370 SLC. The active LAN port is set by S4. The LAN data format can be set also by S4 (IEC61162-450 or JRC Format). (Refer to the Table 3-7: CMH-2370 S4 setting table.)
For the location of J8111, J8112 and S4, refer to **Fig 3-34: Connector location on** CMH-2370

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

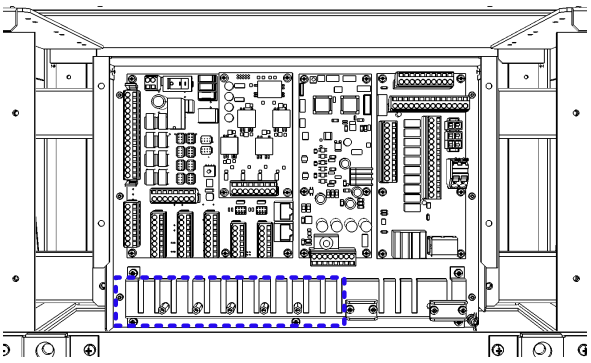


Table 3-7: CMH-2370 S4 setting table

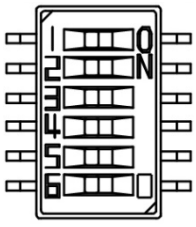


Fig 3-38:Outline of S4

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

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

If some number of CMH-2370s are installed and connected to the same NQA-2443 Sensor LAN Switch Unit, you should change IP address of each CMH-2370 by S3 setting.
(Refer to **Table 3-8: IP Address setting** table)

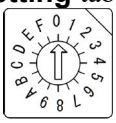


Fig 3-39:Outline of S3

CMH-2370 SLC to be connected to the IAS (Integrated Automation System) or AMS(Alert Management System) is set the operation mode:ALC(Alert LAN Converter) by S3 setting. Also in this case, set the IP address by referring to **Table 3-8: IP Address setting table.**

The location of S3 on the CMH-2370 SLC, refer to **Fig 3-34: Connector location on CMH-2370.**

Table 3-8: 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

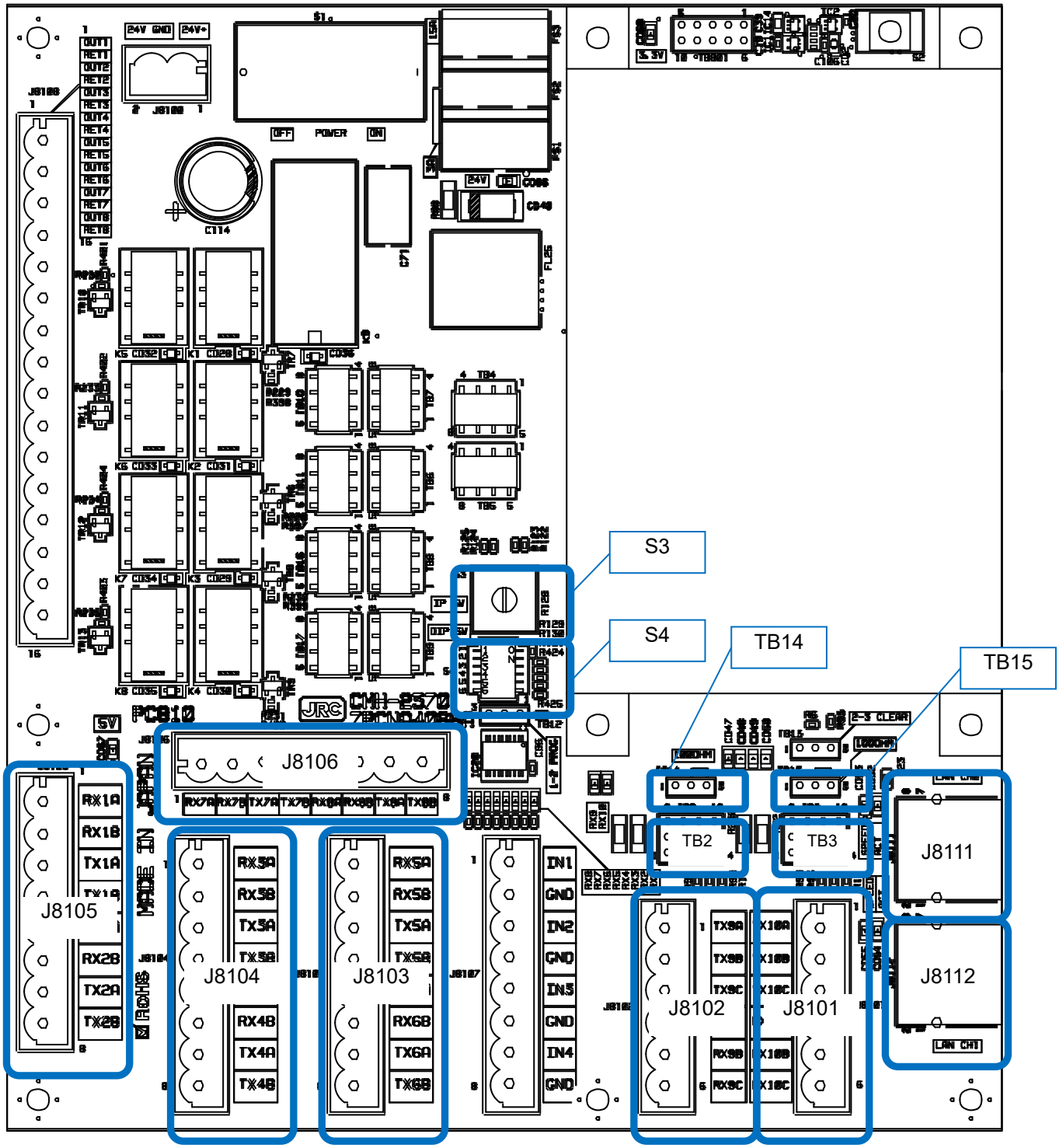


Fig 3-40: Connector location on CMH-2370

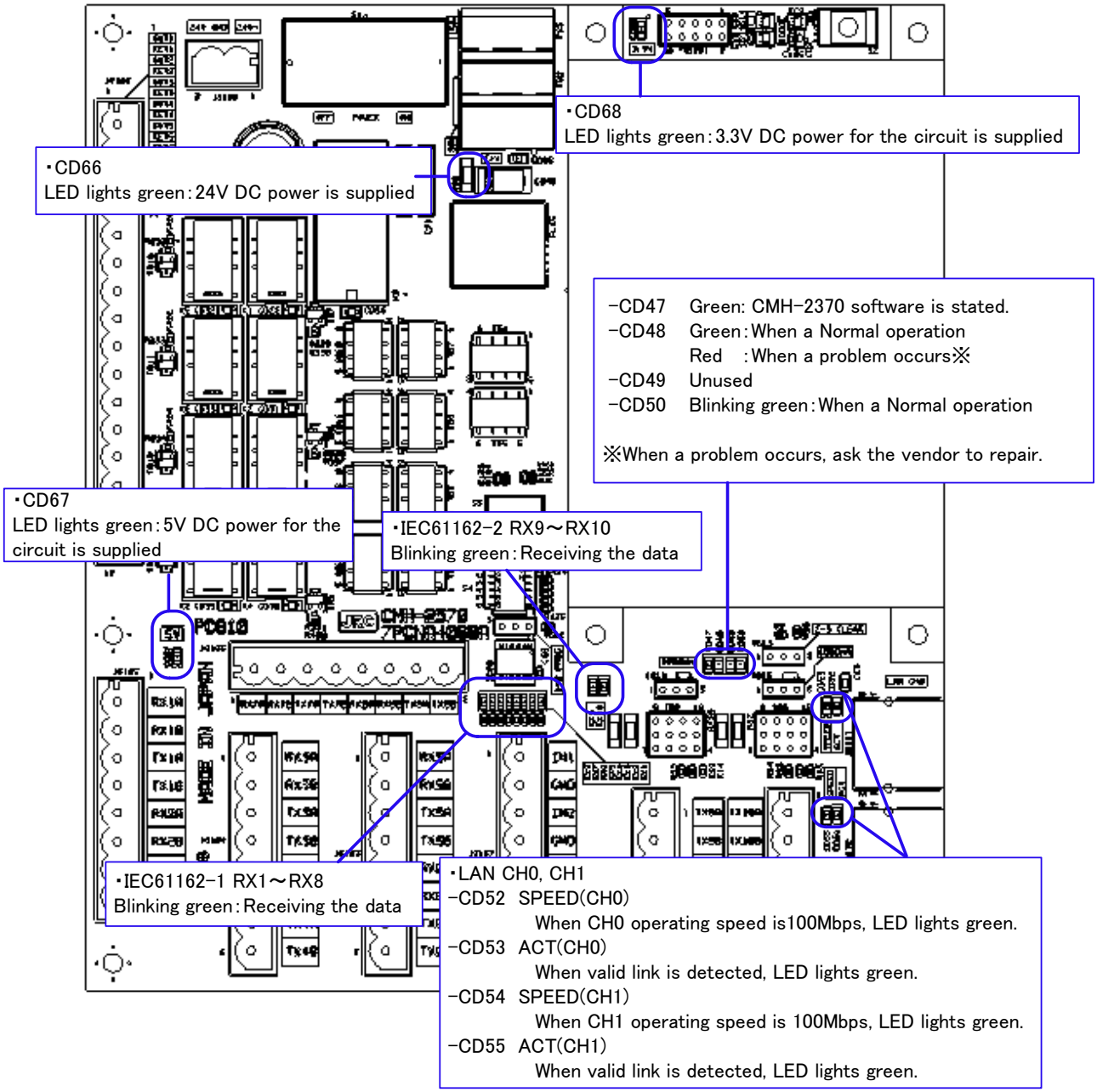


Fig 3-41 CMH-2370 LED

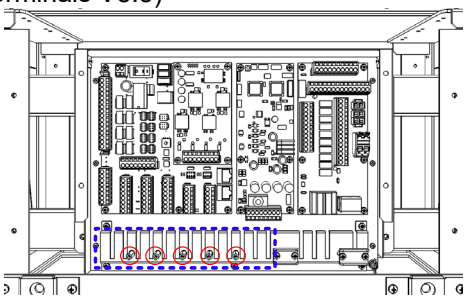
Note

After changing the rotary switch, change the equpment setting or perform SYNC Manually.

3.7.4 Contact Input

Connect the dry contact of other equipment to the Input port located on CMH-2370 in the NQE-1143 JB. The number of Input ports on CMH-2370 is 4, allocated at J8107. For the terminal assignment of J8107, refer to **Table 3-9: Terminal Assign of J8107**. Dry contact of other equipment will be connected to terminals IN and GND.

- See **Fig 3-39: Connector and TB location on CMH-2370** about location of J8107 on CMH-2370.
- To configure the port, refer to **4.6 Setting Up a Serial Port.**
- 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. Put the extra length of the cable to the bottom of the display unit so that it does not interfere the installation positions of the UPS and Sensor LAN Switch Unit.

⚠ 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. See Fig. 3-34 : Input port circuit diagram.

Table 3-9: Terminal Assign of J8107

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

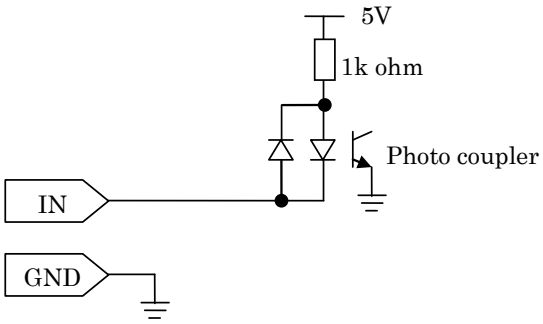
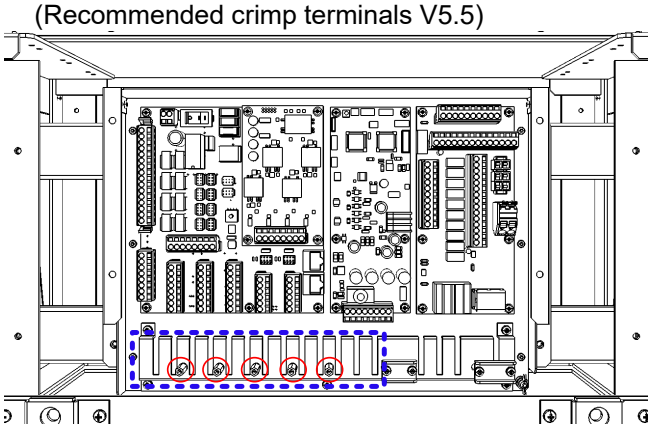


Fig 3-42:Input port circuit diagram

3.7.5 Contact Output

Connect equipment which requests contact output to the output port located on the CMH-2370 SLC in the NQE-1143 JB. The number of output ports on CMH-2370 is 8, allocated at J8108. For the terminal assignment of J8108, refer to **Table 3-10: Terminal Assign of J8108**.

- See **Fig 3-39: Connector and TB location on CMH-2370** about location of J8108 on CMH-2370.
- To configure the port, refer to **4.6 Setting Up a Serial Port.**
- 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. Put the extra length of the cable to the bottom of the display unit so that it does not interfere the installation positions of the UPS and Sensor LAN Switch Unit.

Table 3-10: Terminal Assign of J8108

Terminal Number	J8108
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

Interface for each output port can be changed by the TB4-TB11, TB-16, and TB-17 settings. (Refer to **Fig 3-37 Contact output circuit diagram**.)

- 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.

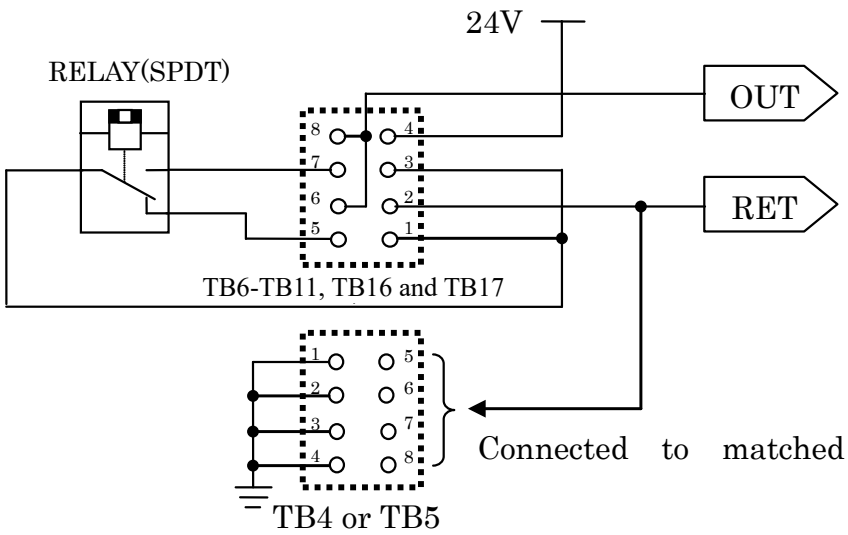


Fig 3-43 Contact output circuit diagram

Matched TB for each OUT and RET is shown in **Table 3-11 Output port and setting jumper.**
And to select Output, the terminals of each TB will be set by Short plugs shown in Fig 3-38: Output port setting by TB.

Table 3-11 Output port and setting jumper

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

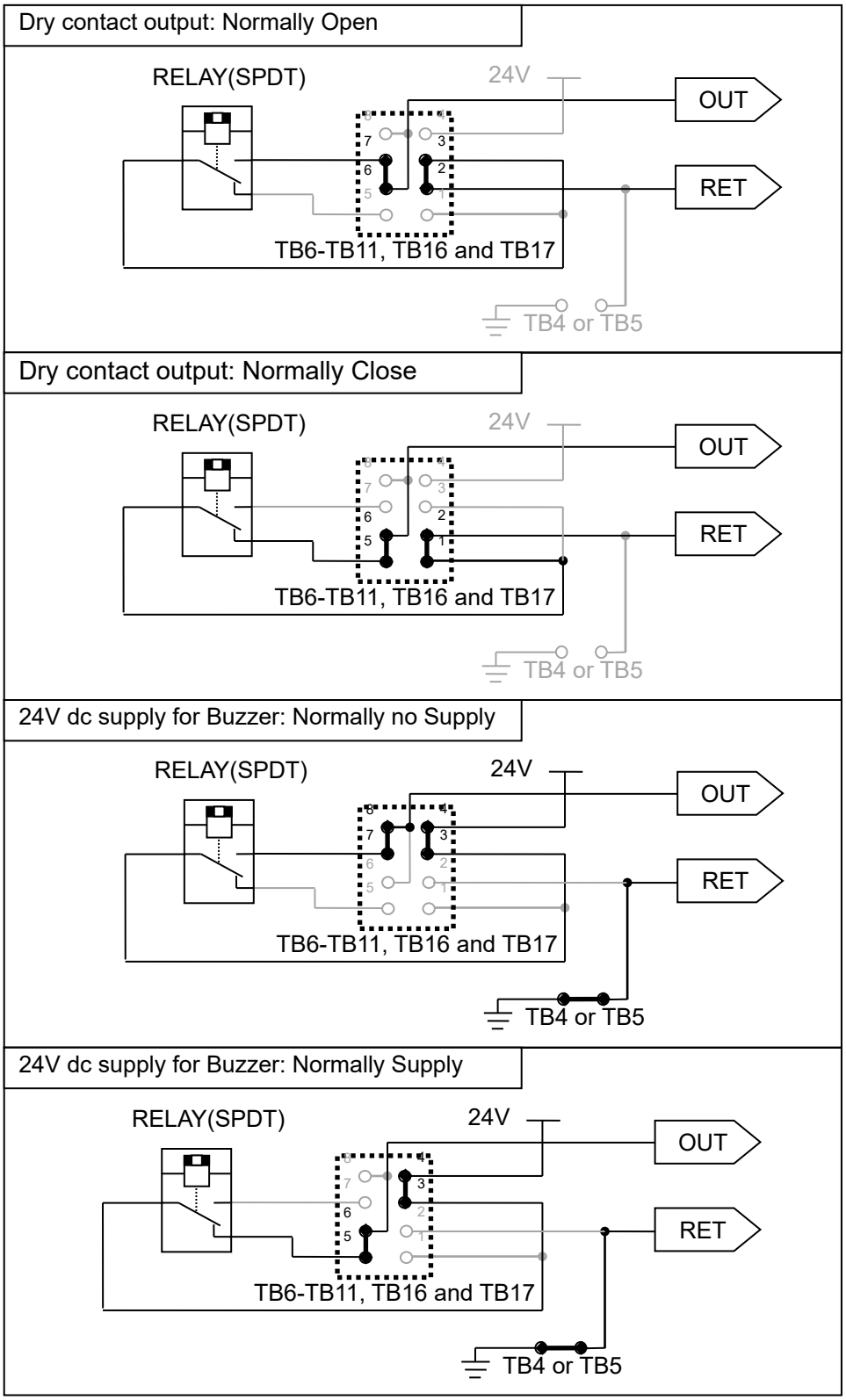


Fig 3-44: Output port setting by TB

⚠ Maximum current of RELAY is 2A.
Do not connect the load including inrush current which exceeds maximum current.

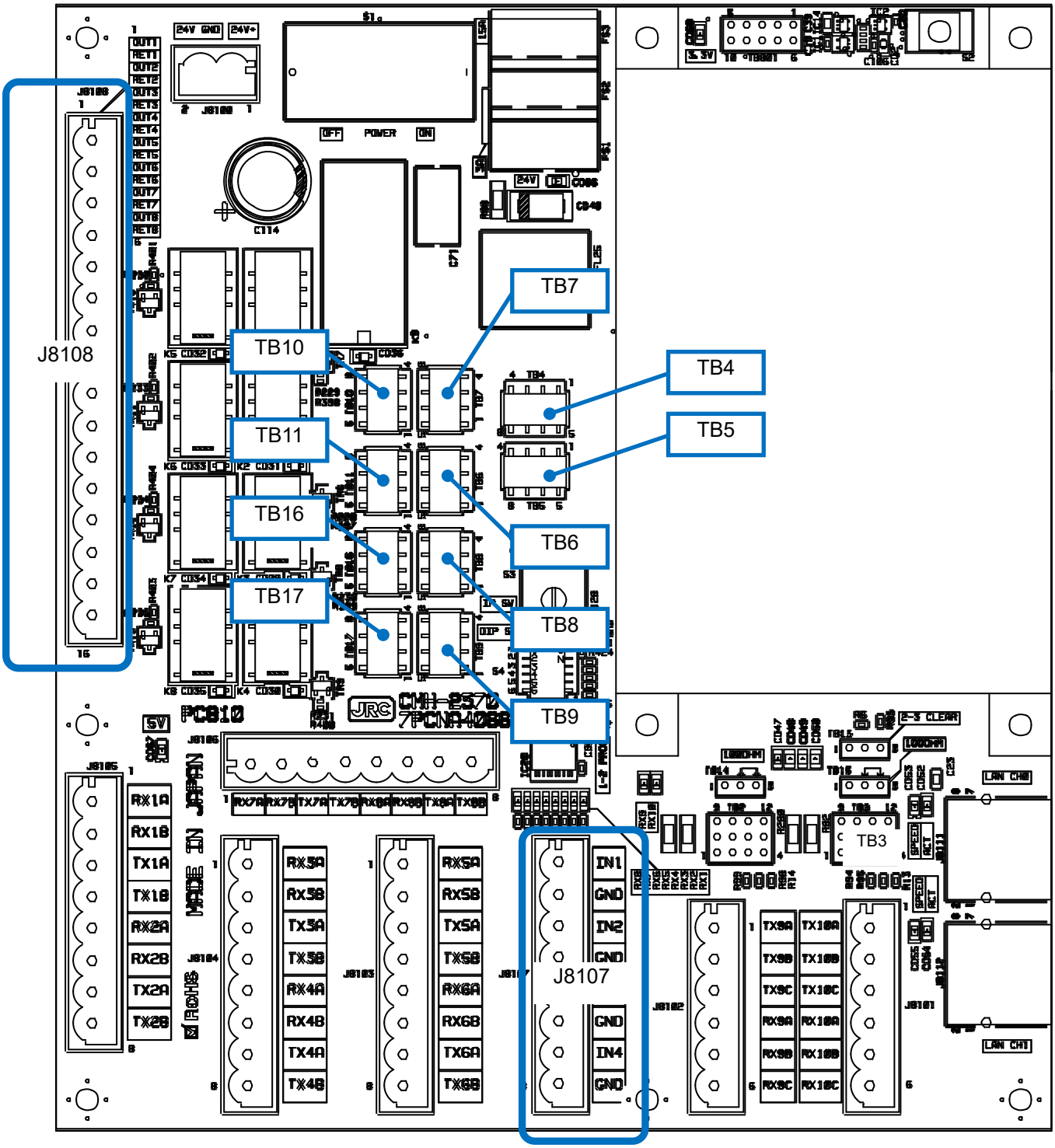


Fig 3-45: Connector and TB location on CMH-2370

3.7.6 Connections with Gyro Compasses and Electromagnetic Speed Logs

Signals from Gyro compass should be connected to J823 (1/R1, 2/S1, 3/S2, S3 and 5/R2) of CMJ-554 Gyro Interface Circuit in the Junction Box.

Connect each Gyro Signals as follows.

Synchro-type GYROs: R1, S1, S2, S3 and R2.
Step-type GYROs: 1, 2, 3 and 5 (5 for Common)

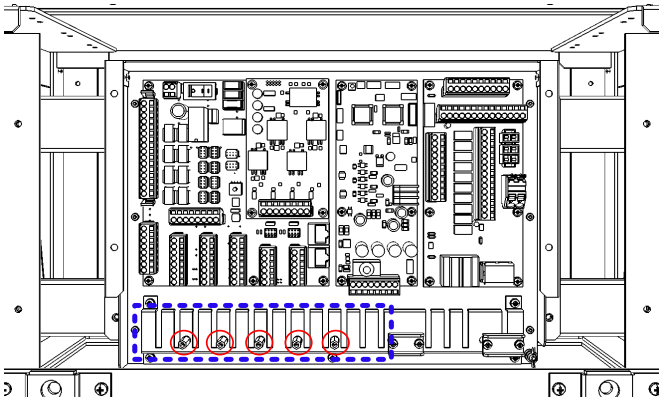
Connect a Gyro equipment or equipment whose performances are equivalent to or superior to those described below. Otherwise the performance of signal process and target tracking will decrease.

	turn rate	update rate
Standard craft	12°/sec	40Hz
High speed craft	20°/sec	40Hz

A Signal from LOG should be connected to J823 (P+, P-) of CMJ-554 Gyro Interface Circuit in the Display Unit. Connect a LOG Signal as follows.

Pulse-type LOGs : P+, P-

- 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. Put the extra length of the cable to the bottom of the display unit so that it does not interfere the installation positions of the UPS and Sensor LAN Switch Unit.

After connecting, refer to the **3.7.7 Settings for Gyro Interface Circuit** CMJ-554 for setting.

3.7.7 Settings for Gyro Interface Circuit CMJ-554

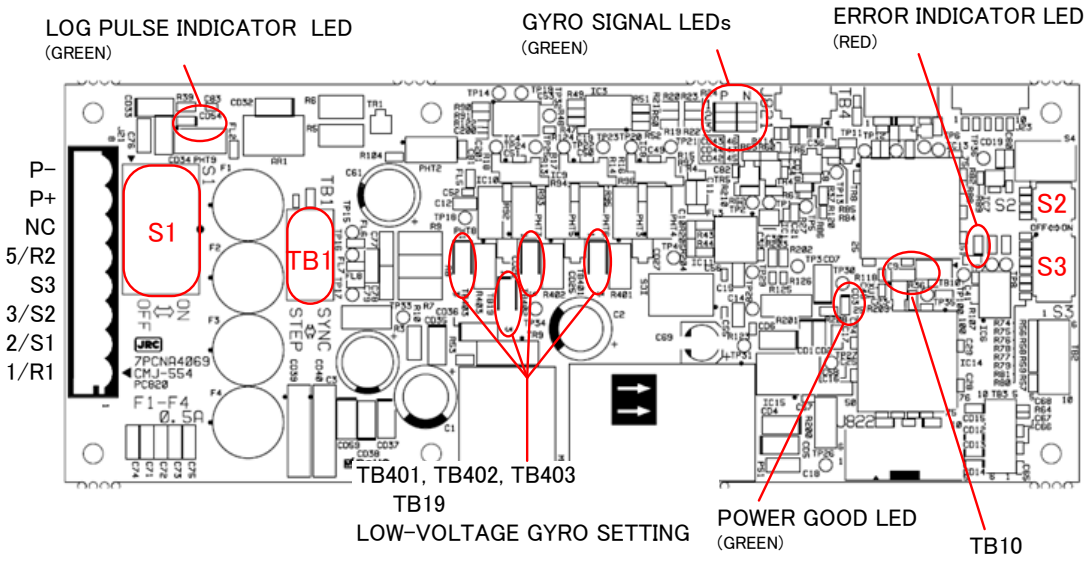


Fig 3-46: CMJ-554 Gyro Interface Circuit

Table 3-12 Setting table of Gyro Interface Circuit TB1

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

Table 3-13 Setting table of Gyro Interface Circuit TB401, TB402, TB403, TB19

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

Table 3-14 Setting table of Gyro Interface Circuit TB10

TB10 Settings	Description
SHORT CIRCUIT	Factory default
OPEN	Not allowed

NOTE: Setting TB10 on the GIF to “OPEN” should only be done by a qualified service personnel.
•It may cause a lower radar system performance.

Table 3-15 Setting table of Gyro Interface Circuit S1

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

Table 3-16 Setting table of Gyro Interface Circuit S2

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

Table 3-17 Setting table of Gyro Interface Circuit S3

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 of CMJ-554 GIF with Gyro compass

1) Turn S1 off.
   Gyro Compass and CMJ-554 Gyro Interface Circuit will be disconnected.

2) Switch the TB1 on the CMJ-554 GIF 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 on the CMJ-554 GIF for your Gyro compass and Speed log according to **Table 3-17 Setting table of Gyro Interface Circuit S3**.
   S3-1 : Gyro Setting (STEP / SYNC)
   S3-2/3 : Gyro Ratio
   S3-4 : The direction of rotation
   S3-5 : Gyro alarm time (LONG / SHORT)
   S3-6 : Log alarm (ON / OFF)
   S3-7/8 : Log setting

4) Set TB401, TB402, TB403 and TB19 on the CMJ-554 GIF 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 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 3-18 Input Port of Gyro Interface Circuit

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 CMJ-554 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.

Setting Examples for some Gyro Compasses

item / Manufacture	Gyro Compasses	Repeater Motors (For reference only)	Excitation Voltage	Gyro Select Switches (S3, TB1 located on the CMJ-554)								
				S3 settings								TB1 setting
				1	2	3	4	5	6	7	8	
TOKYO KEIKI (JAPAN) 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	ON	OFF						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	OFF	ON						STEP
	ES-16 SR-120/220	Step Motor GA-2001G Drawing# 103590820 150 excitation (180X)	35V DC	ON	OFF	ON						STEP
	CMZ-700D ES140/160 PR-26**/6*6*/6*7*, SR-140/160 TG-6000/8000		24V DC									
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
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	OFF	ON						STEP
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
C. PLATH (Germany)	NAVIGAT 763-331E, PLATH NAVIGAT-II/III	Synchro Motor YM14A (360X)	50V AC 50Hz	OFF	OFF	OFF						SYNC

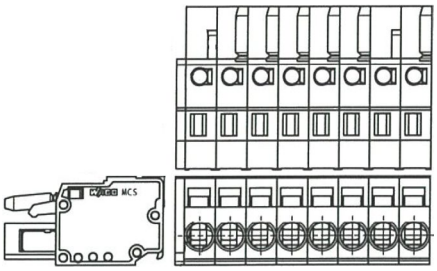
*: Numeric Number

3.7.8 Connection with Analog Sensors

Connect signals from the analog sensor to J842 of the CMJ-560 AOC. Signal input of 4 channels is possible to the AOC.

Terminal assignment of J842 is shown below.

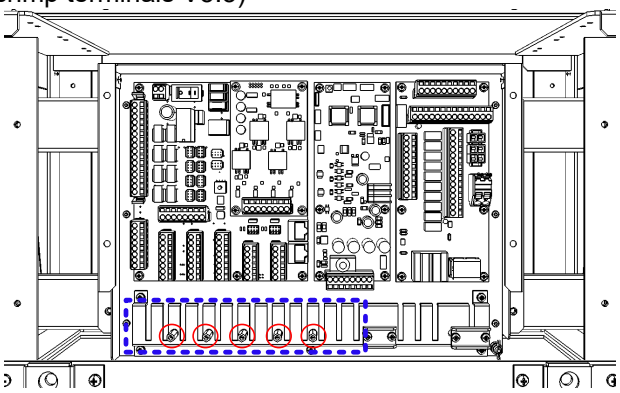
AOC J842 Connector



pin number : 1 2 3 4 5 6 7 8

- 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-

- Connect the cable shield to the hex spacer surrounded by the circle in the figure below. (Recommended crimp terminals V5.5)



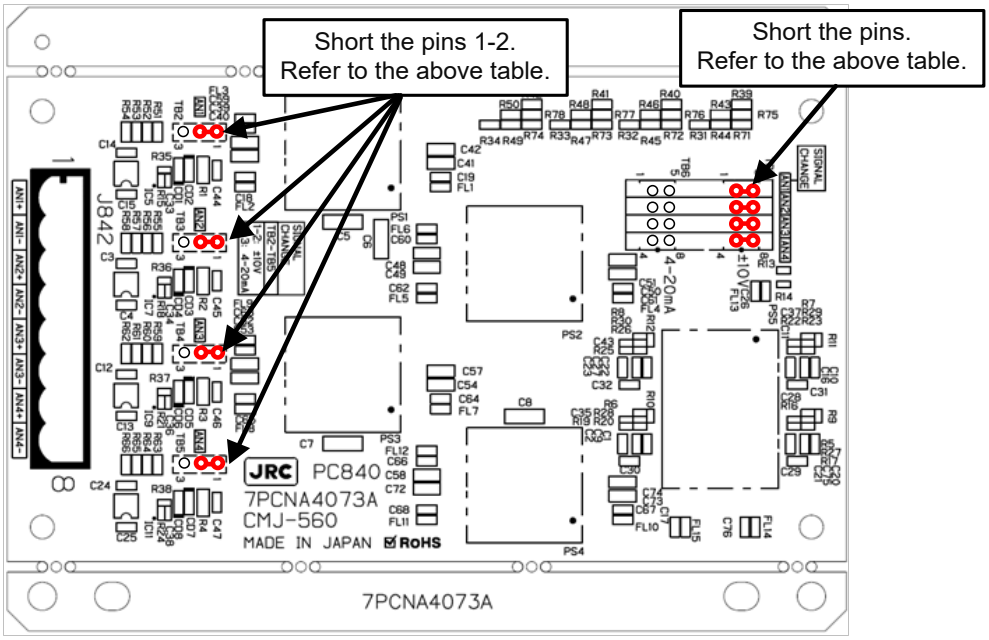
⚠ So that the braided shield is not shorted to the power supply terminal block, please insulate the cable and fix with cable tie. Put the extra length of the cable to the bottom of the display unit so that it does not interfere the installation positions of the UPS and Sensor LAN Switch Unit.

Set the TB2-TB7, by referring to the description from the next page.

According to the output specifications of Analog Sensors, set as follows.

[Setting for Voltage Signal Input]
When Analog Sensors output specifications is Voltage, set as follows.
・Input Signal Range ：-10 V to +10 V

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

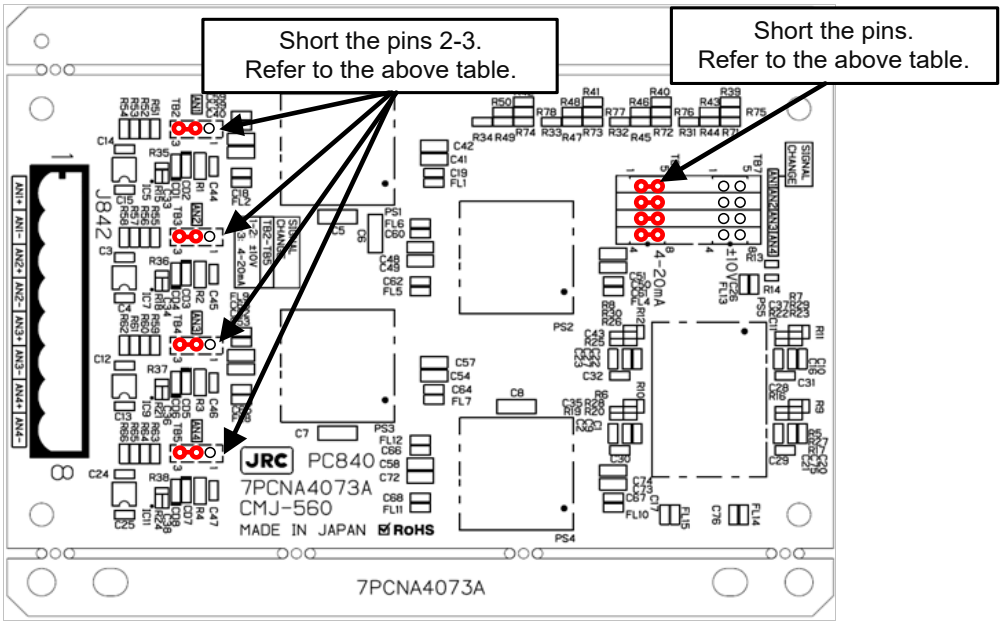


[Setting for Current Signal Input]

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

・Input Signal Range ：4 mA to 20 mA

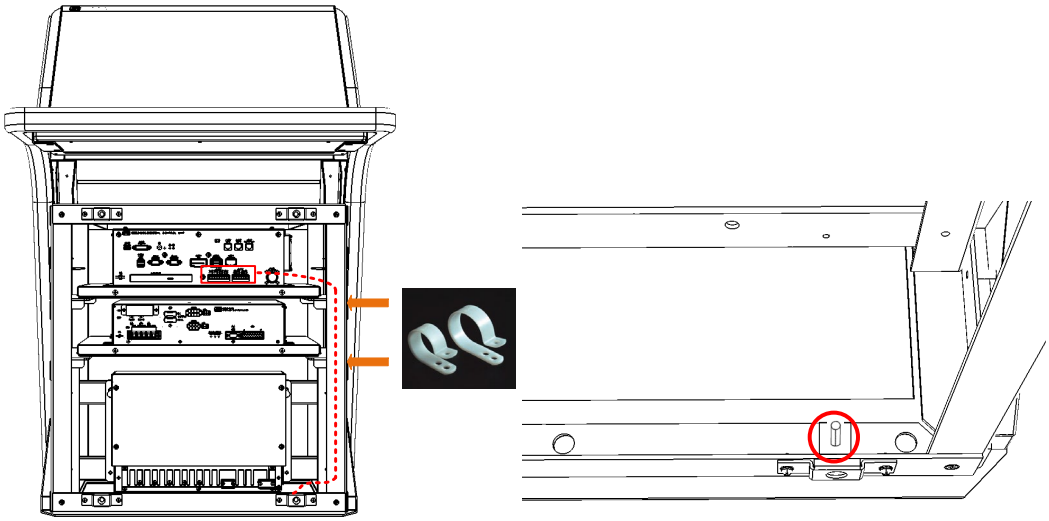
Setting Table of Current Signal Input		
Channel	**Reference**	**Setting**
1	TB2	Short-circuit the pins 2-3
	TB6	Short-circuit the pins 1-5
2	TB3	Short-circuit the pins 2-3
	TB6	Short-circuit the pins 2-6
3	TB4	Short-circuit the pins 2-3
	TB6	Short-circuit the pins 3-7
4	TB5	Short-circuit the pins 2-3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



3.7.9 Backup of sensor signal

There is a receiving port (J4302, J4303) for sensor signal backup on the NDC-1590/A Center Control Unit. Wire as follows if necessary.

- Strip the signal cable exterior about 80cm. And wire as shown in the figure below.
- Fix the cable to the cable tie clip by the two point.(Refer to figure below)
- Crimp a round terminal to the cable shield. (Recommended crimp terminals V5.5) And fix it to the bolt on the bottom of the frame surrounded by the circle in the figure below.



⚠ So that the braided shield is not shorted to the power supply terminal block, please insulate the cable and fix with cable tie. Put the extra length of the cable to the bottom of the display unit so that it does not interfere the installation positions of the UPS and Sensor LAN Switch Unit.

Please connect the sensor to refer to the table on the next page.

Table 3-19 Terminal assignment of J4303

Signal Name		I/O	Specification	Detail
GPS-RX	A	IN	IEC61162-1 A	GPS backup signal
	B	IN	IEC61162-1 B	
SDME-RX	A	IN	IEC61162-1 A	SDME backup signal
	B	IN	IEC61162-1 B	
PWR FAIL	+	—	Contact out Normal-Close	**Refer to 3.10 Connection with BNWAS**
	-	—		
WMRST	+	—	Contact out Normal-Open	
	-	—		

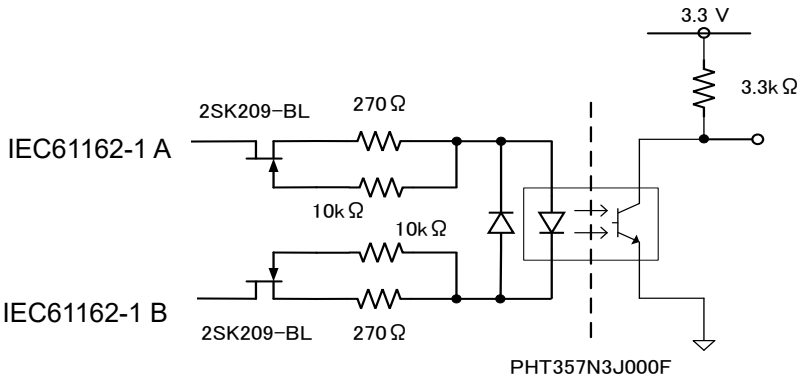


Fig 3-47 IEC61162-1 Input circuit diagram

Table 3-20 Terminal assignment of J4302

Signal Name		I/O	Specification	Detail
AIS-RX	A	IN	IEC61162-2 A	AIS backup signal
	B	IN	IEC61162-2 B	
	C	—	IEC61162-2 C	
GYRO-RX	A	IN	IEC61162-2 A	GYRO backup signal
	B	IN	IEC61162-2 B	
	C	—	IEC61162-2 C	

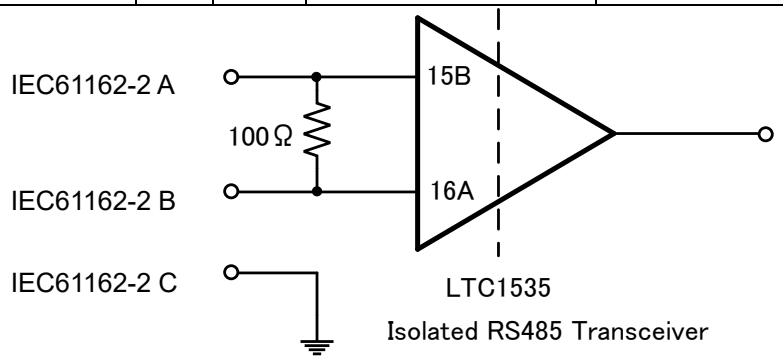


Fig 3-48 IEC61162-2 Input circuit diagram

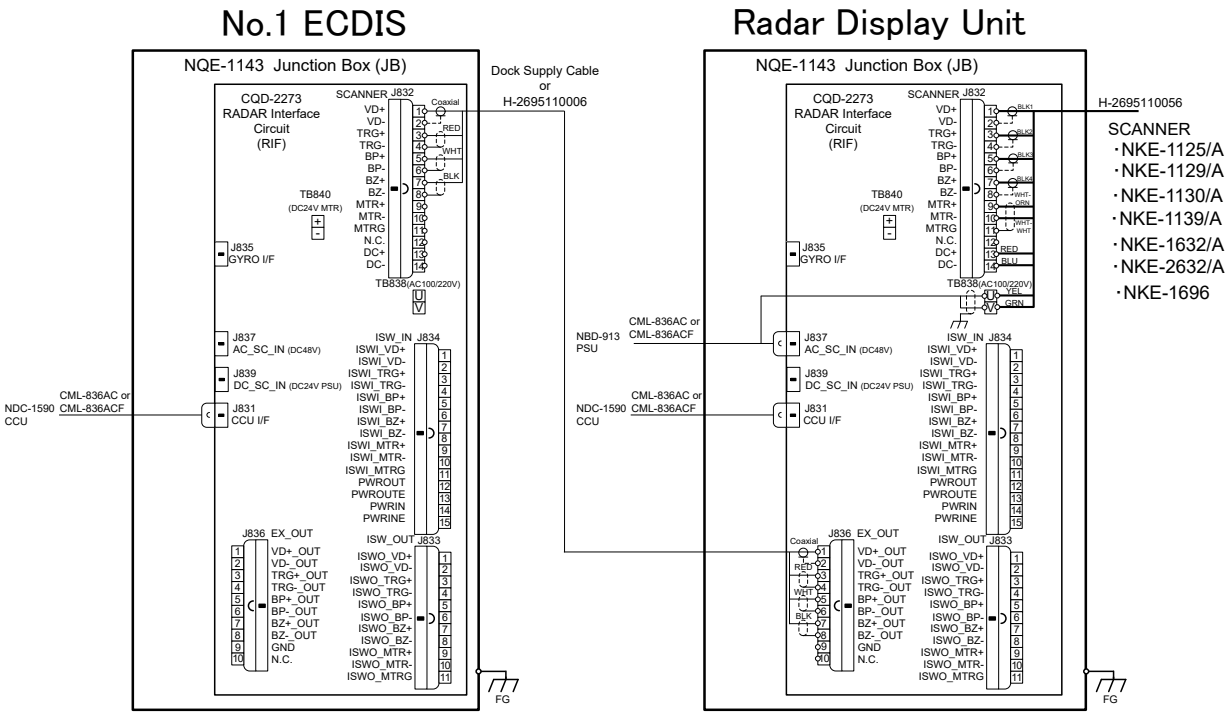
3.8 Connection with ECDIS

3.8.1 Radar Overlay

Connection for the radar overlay is different depending on the presence or absence of NQE-3141 interswitch.

Interswitch	Connection of JMR-9200/7200 Series and JAN-9201,JAN-7201	Connection of JMR-9200/7200Series and JAN-901/901M/701, JAN-2000 or third party ECDIS.
When there is no interswitch (Can connect only one ECDIS)	Connect the CQD-2273 Radar I/F Circuit **J836 EX_OUT**(RADAR side) and **J832 SCANNER**(ECDIS side). Refer to the below figure.	Connect the CQD-2273 Radar I/F circuit **J836 EX_OUT**(RADAR side) **VD+_OUT, VD-_OUT,** **TRG+_OUT, TRG-_OUT,** **BP+_OUT, BP-_OUT,** **BZ+_OUT, BZ-_OUT** and **VD,TRG,BP,BZ signal input terminal (ECDIS side).**
When there is an interswitch (Can connect two or more ECDIS)	Connect via the NQE-3141-4A/8A Interswitch. **Refer to the 5.1 Installation of Interswitch Unit and 5.1.3 NQE-3141-4A Inter-board connection diagram.**	

When doing the radar overlay without interswitch, connect the VD, TRG, BP, BZ terminal as follow.



RADAR-ECDIS connection diagram for Radar overlay(without interswitch)

⚠ When there is no NQE-3141 interswitch, only one ECDIS can be connected to a Radar Display Unit.
Use an interswitch to connect two or more ECDIS.

3.8.2 Target Tracking

Connection for the target tracking differs depending on the receiver of the target tracking information; JAN-9201/JAN-7201, or JAN-901B/701B, JAN-901/901M/701, JAN-2000 and third party ECDIS. Refer to the below table.

Receiver of the target tracking information	Output Specification	Connection
JAN-9201, JAN-7201	LAN	Connect the RADAR that sends target tracking information to the ECDIS that receives the information using LAN via the NQA-2443 Sensor LAN Switch Unit.
JAN-901B/701B, JAN-901/901M/701, JAN-2000 or third party ECDIS	Serial	Information is sent from the IEC61162-1 TX terminal (CH1 to CH8, selected by software) of the CMH-2370 SLC in the Radar Display Unit. Connect to the ECDIS that receives target tracking information by serial connection.

On both the LAN and Serial, output setting by software is needed. Refer to **Chapter4 Initial Setting**.

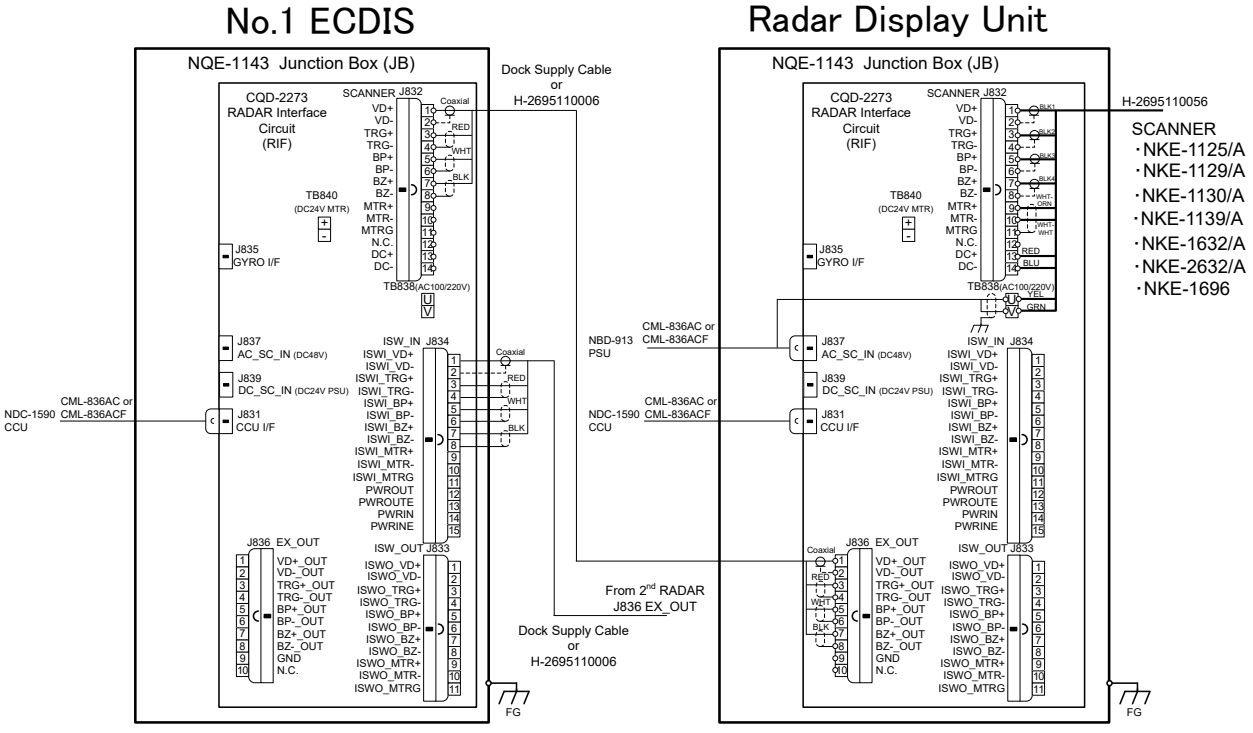
3.9 Connection with Radar Display Unit

3.9.1 Radar Overlay

When the JMA-9100/7100, JMA-5300MK2, JMA-900B or third party RADAR overlay the echo to the JAN-9201.7201, connection for the radar overlay is different depending on the presence or absence of NQE-3141 interswitch. Refer to the below table.

Interswitch	Connection of JAN-9201/7201 and JMR-9200/7200Series	Connection of JAN-9201/7201 and JMA-9100/7100, JMA5300MK2, JMA-900B or third party RADAR
When there is no interswitch (Can connect Maximum two ECDIS)	Connect the CQD-2273 Radar I/F circuit **J836 EX_OUT**(RADAR side) and **J832 SCANNER**(ECDIS side) Second ECDIS: Connect to the **J834 ISW_IN**(ECDIS side) (Refer to figure below)	Connect the CQD-2273 Radar I/F circuit VD, TRG ,BP ,BZ output terminal and **J832 SCANNER**(ECDIS side) **VD+,VD-,TRG+,TRG-,BP+,BP-,BZ+,BZ-.** Second ECDIS: Connect to the **J832 ISW_IN**(ECDIS side) **ISWI_VD+, ISWI _VD-, ISWI _TRG+, ISWI _TRG-, ISWI _BP+, ISWI _BP-, ISWI _BZ+, ISWI _BZ-**.
When there is an interswitch (Can connect two or more RADAR)	Connect via the NQE-3141-4A/8A Interswitch. **Refer to the 5.1 Installation of Interswitch Unit and 5.1.3 NQE-3141-4A Inter-board connection diagram.** **Third party RADAR cannot connect to the Interswitch.**	

When doing the radar overlay without interswitch, connect the VD, TRG, BP, BZ terminal as follow.



RADAR-ECDIS connection diagram for Radar overlay(without interswitch)

⚠ When there is no NQE-3141 interswitch, up to two Radar Display Units can be connected to an ECDIS (JAN-9201/7201).
Use an interswitch to connect three or more Radar Display Units.

3.9.2 Target Tracking

Connection for the target tracking differs depending on the equipment that outputs the information; JMR-9200/7200 series, or JMA-9100/7100, JMA-5300MK2, JMA-900B and third party Radar. Refer to the below table.

Receiver of the target tracking information	Output Specification	Connection
JMR-9200/7200 Series	LAN	Connect the RADAR that sends target tracking information to the ECDIS that receives the information using LAN via the NQA-2443 Sensor LAN Switch Unit.
JMA-9100/7100, JMA-5300MK2, JMA-900B or Third party RADAR	Serial	Connect the target tracking information output terminal of JMA-9100/7100, JMA-5300MK2, JMA-900B or third party Radar to IEC60062-1 RX terminal (CH1 to CH8, selected by software) of the CMH-2370 SLC in the JAN-9201/7201.

On both the LAN and Serial, output setting by software is needed. Refer to **Chapter4 Initial Setting**.

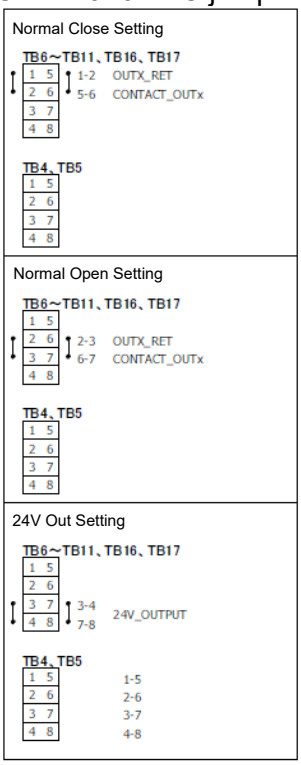
3.10 Connection with BNWAS

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 the signals are set to “normal open” as a factory default.

Terminal block	Signal name	Direction	Description	Notes
CMH-2370 SLC J8108	SYS ALM	OUT	System alarm status is outputted.	Set the jumper to select “Normal-Closed”*1
CMH-2370 SLC J8108	ARPA ALM	OUT	Dangerous ship alarm status is outputted.	Set the jumper to select “Normal-Closed”*1
NDC-1590/A J4303	PWR FAIL	OUT	AC Low Voltage is detected. 24 VDC must be connected to NBD-913 for system backup.	Normal-Closed
CMH-2370 SLC J8107	SYS ACK	IN	Acknowledge input of system alarm.	“False” indicates Open or Disconnection and “True” indicates Closed.
CMH-2370 SLC J8107	ARPA ACK	IN	Acknowledge input of Dangerous ship alarm.	“False” indicates Open or Disconnection and “True” indicates Closed.
CMH-2370 SLC J8108	ACK OUT	OUT	Acknowledge output of alarms.	Set the jumper to select “Normal-Open”*1
NDC-1590/A J4303	WMRST	OUT	Watch Man alarm reset signal.	Normal-Open

*1 CMH-2370 SLC jumper settings



(*) BNWAS Bridge Navigation Watch Alarm System

3.10.1 Transmit watch timer reset signal

To transmit watch timer reset signal to BNWAS, it must be set CCU watch timer reset contact output or serial port. When serial port is set, EVE sentence is sent to BNWAS.For CCU watch timer reset, refer to “4.7 Setting Contacts (Contact Input/Output) [ALL]” . For setting of serial port, refer to “4.6 Setting Up a Serial Port [ALL]”. For EVE sentence, refer to “6.10.3.8 EVE sentence”.

Consideration

BNWAS shall not be possible to initiate the reset function or cancel any audible alarm from ECDIS, equipment or system of BNWAS not physically located in areas of the bridge providing proper look out.

3.11 Ground Connection

All sorts of pulse circuits are built in this equipment. They radiate a high-frequency component of pulse wave as an electromagnetic wave from their circuit itself or cables between the equipment and might interfere as receiver noise by connecting with a receiving antenna or cable of radio communication equipment. A general effective method is shown as follows as a measure to counter interference for this kind of case.

3.11.1 Shield for Equipment

Covers for the purpose of shielding are installed where they are necessary on each component of this equipment. Tighten up screws on the equipment thoroughly in order not to reduce their effect.

3.11.2 Cables for Equipment

Always use specified cables for the connection between components.
Pay enough attention to the connection of cables and processing their end portion.
So that the braided shield is not shorted to the power supply terminal block, please insulate the cable and fix with cable tie. Put the extra length of the cable to the bottom of the display unit so that it does not interfere the installation positions of the UPS and Sensor LAN Switch Unit.

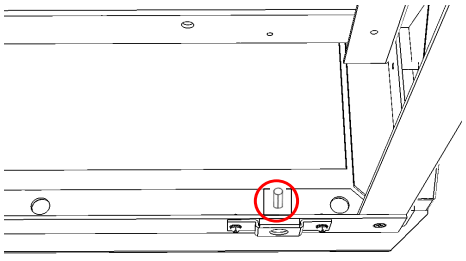
3.11.3 Mounting Location

The equipment is shielded sufficiently, but not completely. Set up very carefully a surrounding cable etc. when you set up the equipment.

3.11.4 Grounding

Ground the equipment to the nearest hull earth terminal thought it might not be an effective method because the state changes considerably by the structure of the hull and the position of radio equipment in relation to this equipment. At the same time, ground the problematic radio equipment by the shortest distance, too

When installing the stand alone type, copper plate is attached to the Display Unit Mount Kit. Fasten the copper plate to the unpainted position surrounded by the circle in the figure below and ground the copper plate to the hull earth.



Display Unit Mount Kit grounding position

3.12 Installation of Power Cable

⚠WARNING

Before installing power cable, always make sure to turn off the circuit breaker of main power line. Otherwise, it may cause an electric shock or malfunction.

3.12.1 Input Voltage Specification

・AC-Input

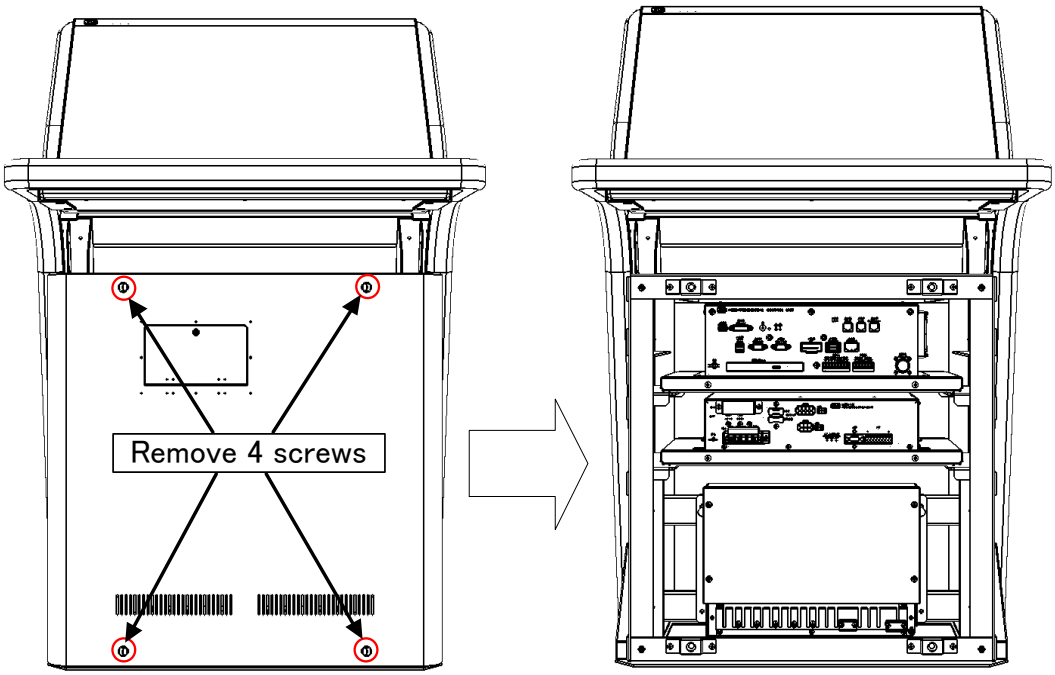
Voltage	: 100 to 115VAC,220 to 240VAC
Voltage ranges	: 85 to 264VAC
Overvoltage Protection	: 295VAC±2V,
Frequency	: 50Hz/60Hz
Input Current	: Max 6.8A(100VAC)/3.4A(220VAC)
Over current Protection	: equipped

・DC-input

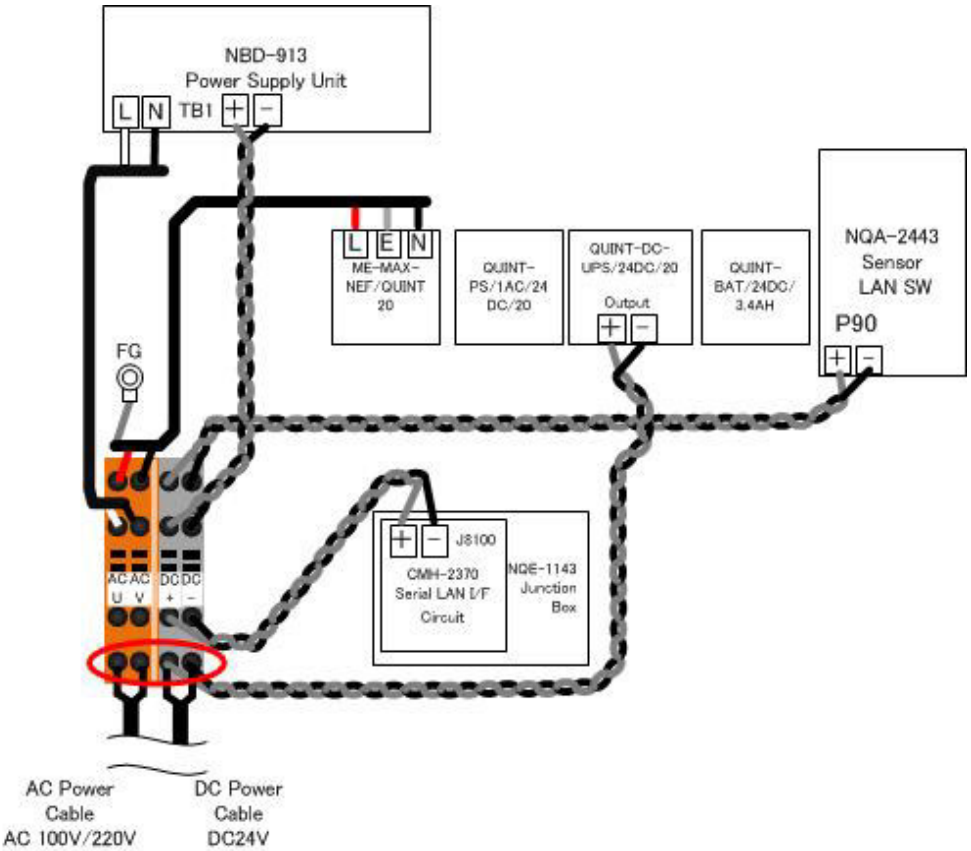
Voltage	: 24VDC
Voltage ranges	: 21.6 to 31.2VDC
Overvoltage Protection	: 42V
Input Current	: Max 3A
Over current Protection	: equipped

3.12.2 Connecting Power Cable

1) Remove the 4 screws as shown below and remove the front cover.



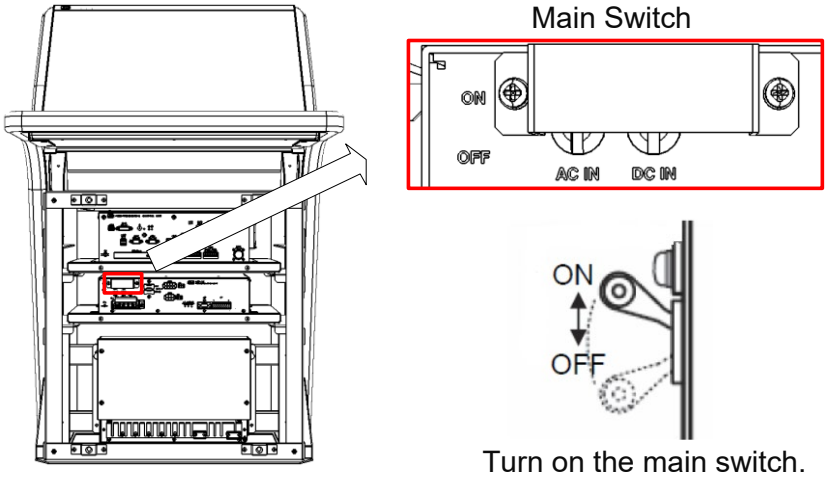
2) After confirming the circuit breaker of the main power line is “OFF”, connect the AC power cable to the AC-U and AC-V terminal on the CQD-2312 Relay terminal. Connect also the DC power cable to the DC+ and DC- terminals on the Relay terminal. For the connection positions on the Relay terminal, refer to the figure below.



3.13 Initialization for the specified model

The initialization procedure described below in not necessary since it has been completed at the factory. Refer to the figure below to turn on the AC/DC circuit breaker, and proceed with Chapter 4 Initial Setting.
When a Display Unit is newly set up using an NDC-1590/A CCU stocked at JRC, the following initialization procedure should be executed.

1) Connect the USB flash drive containing the initialization tool and licence file to the USB connector on the TOPU. And then turn on the AC/DC circuit breaker.



Turn on the main switch.

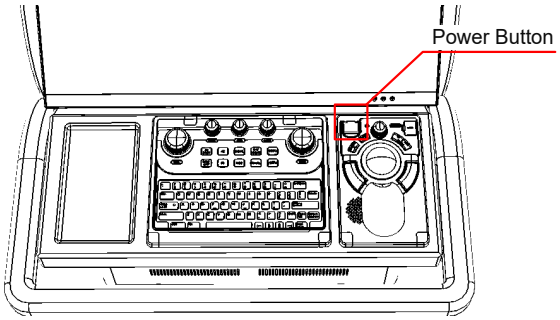
⚠ Before starting initialization, make sure that all the cables and connectors are connected properly.

⚠ The initializaiton tool is autorun. When the USB flash drive is connected, the initialization tool starts.

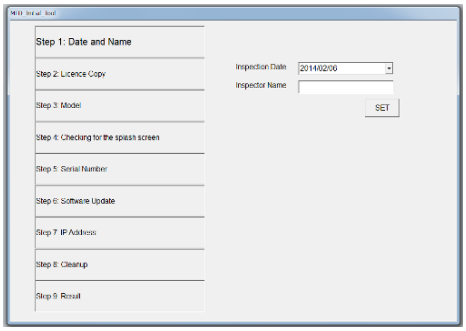
⚠ An USB flash drive having security function cannot be used.

⚠ Make sure to download the correct licence file.
Only one licence file corresponds to one Display Unit. Before starting to download the licence file, contact our head office or a nearby branch or local office.

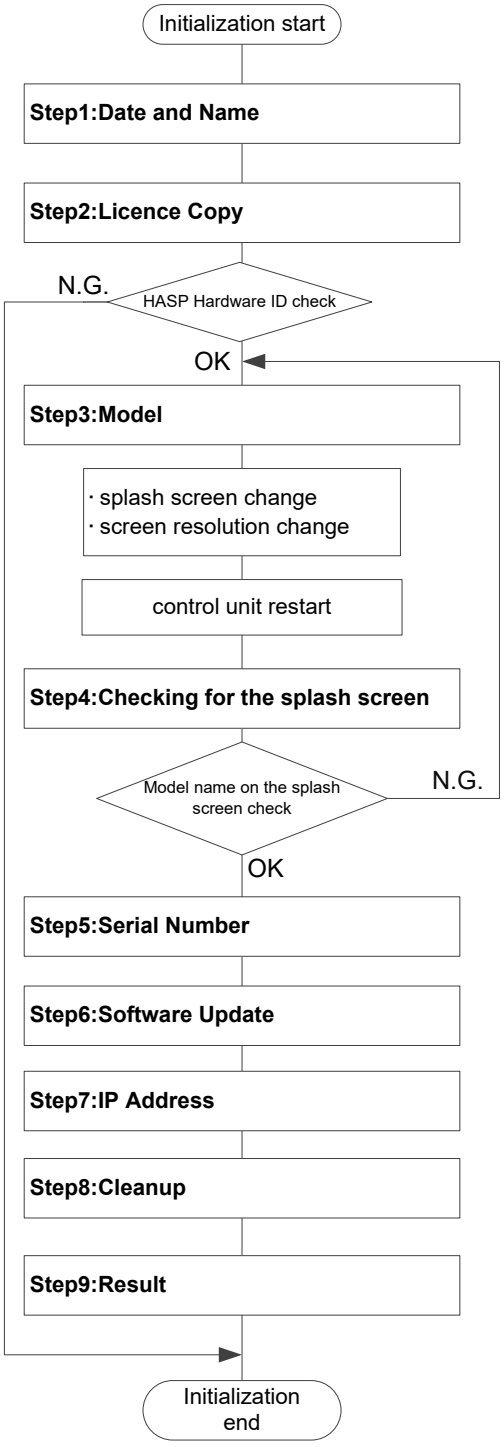
2) The system is turned on automatically only after the first time turning on the main switch. And after a few seconds, the system of the power is down and up automatically. This is a normal behavior. Go to next step.
If the system does not boot up, check the main power and circuit breaker, and press the power button on the TOPU once.



3) Initialization tool is started.



The following describes the outline of Initialization tool.



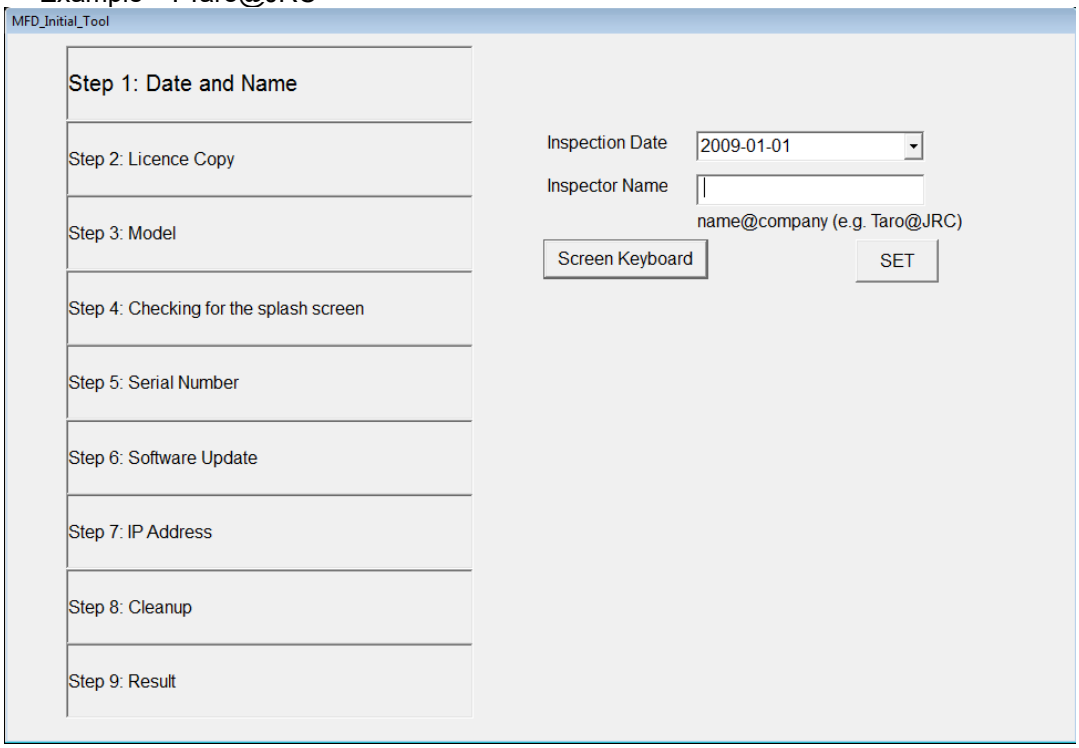
4) Initialize the Display Unit according to the following procedures.

Step1: Date and Name

Input the inspector date, inspector name. And then click the [SET] button.

Format : name@company

Example : Taro@JRC



Step2: Licence Copy

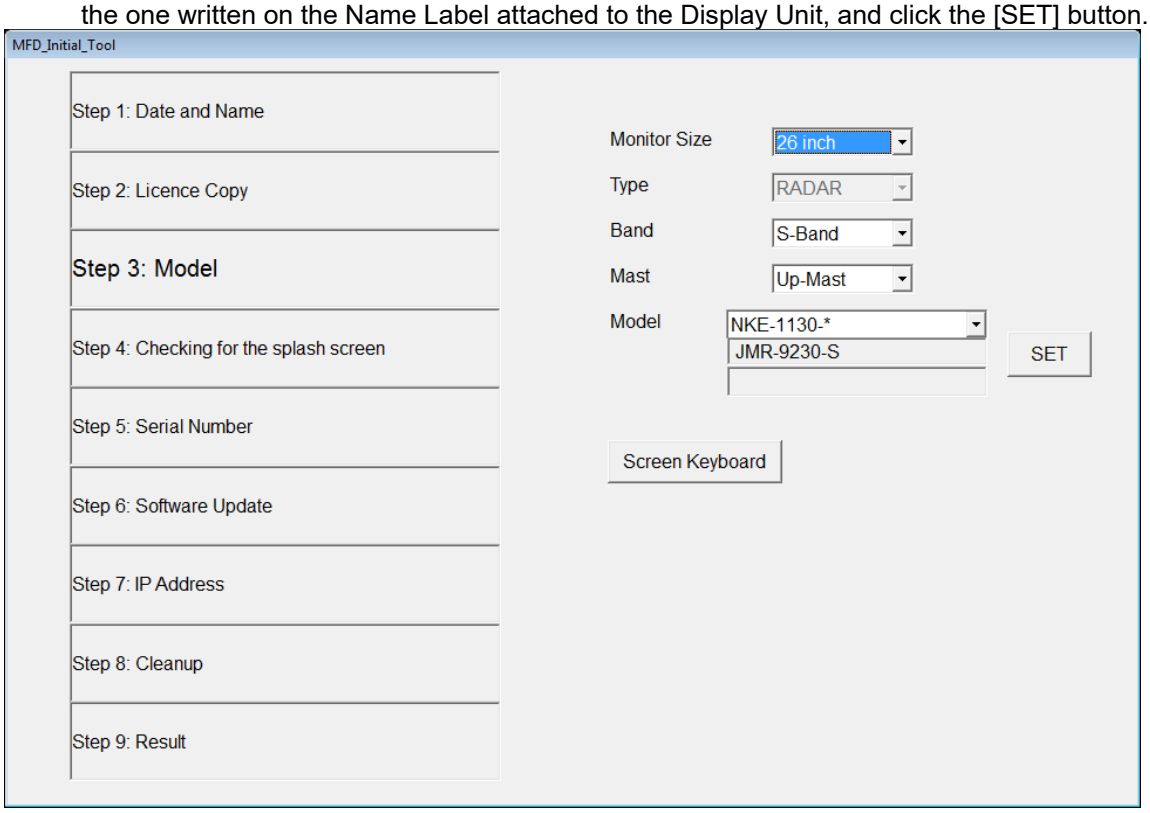
The Hardware ID of HASP is compared with the Hardware ID in the licence file.
If they match, the licence file is copied over.
HASP: Hardware Against Software Piracy (included NDC-1590/A Central Control Unit)

If they mismatch, following dialog is displayed.
Check to see again the license file contained in the USB flash drive.

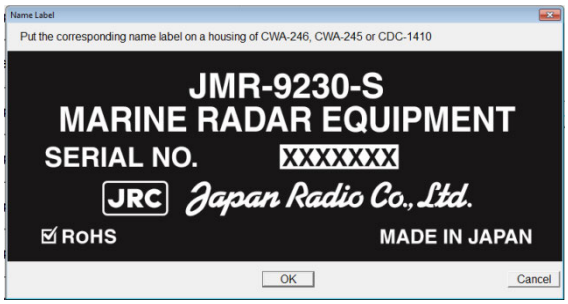


Step3: Model

Set the monitor size and general type name.
Select each item from the drop-down list. Select the general type name that corresponds to the one written on the Name Label attached to the Display Unit, and click the [SET] button.

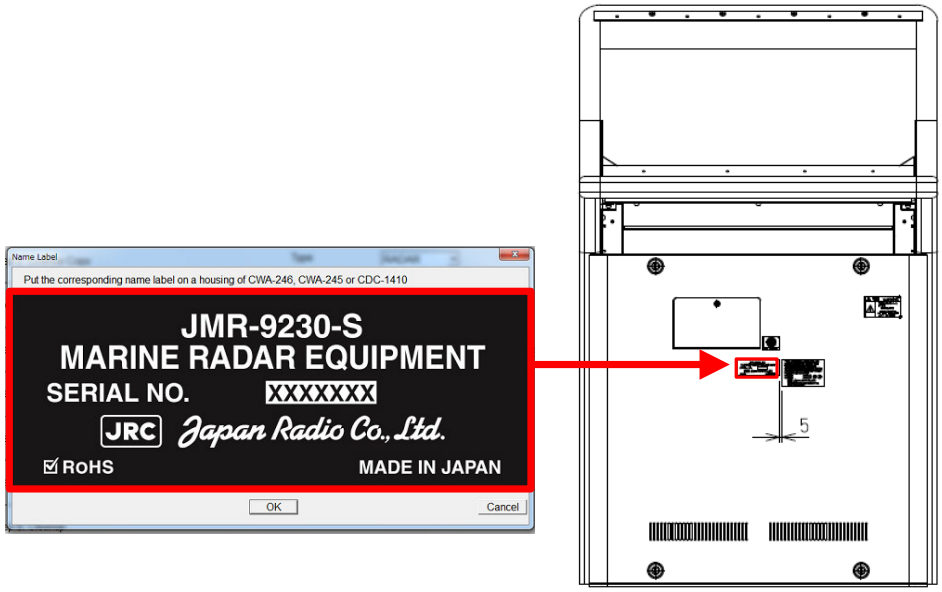


After clicking the [SET] button, the following image is displayed.



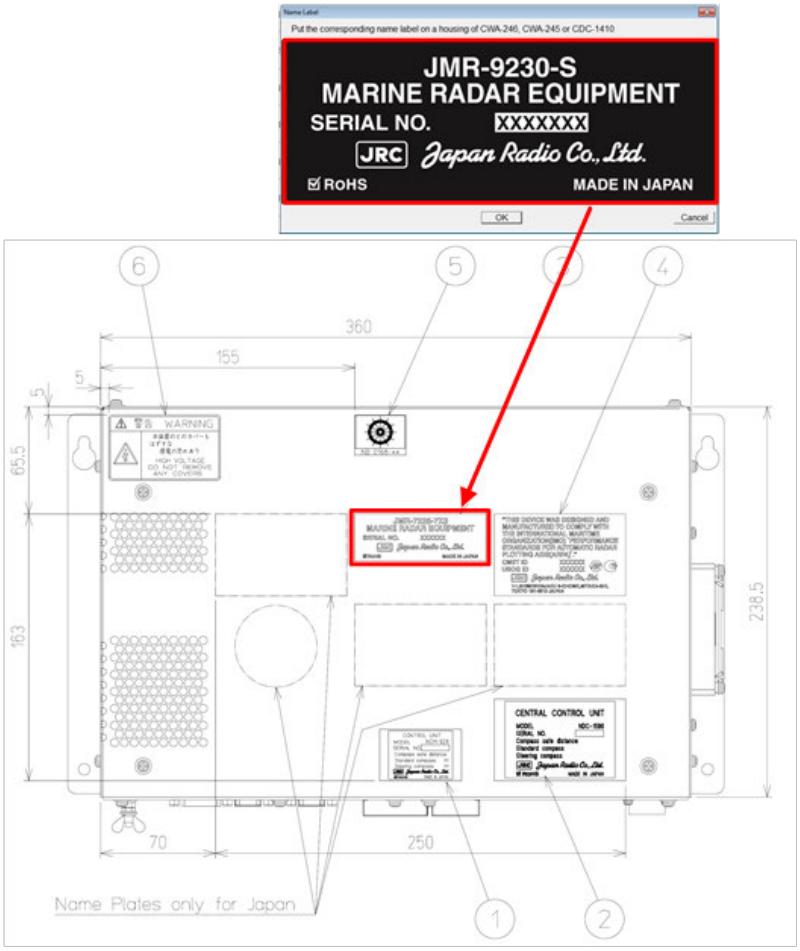
Stick the Name Label identical to the above image, by referring to the figure below.

a) When installing the stand alone type
Stick the Name Label same as the image to the position shown in the figure below.
Two pieces of the Name Labels for all the general type names are provided. Discard the label of the model names that does not match.

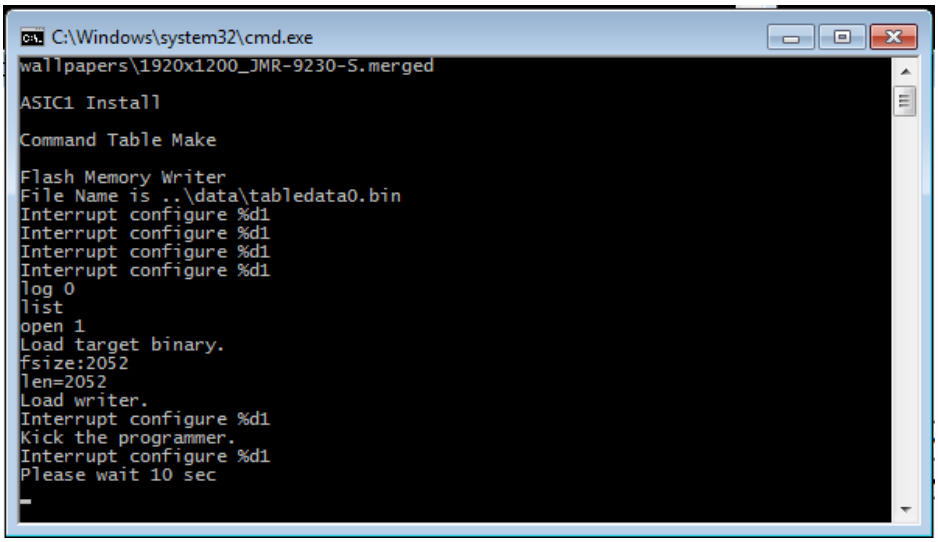


In case of JMR-9230-S

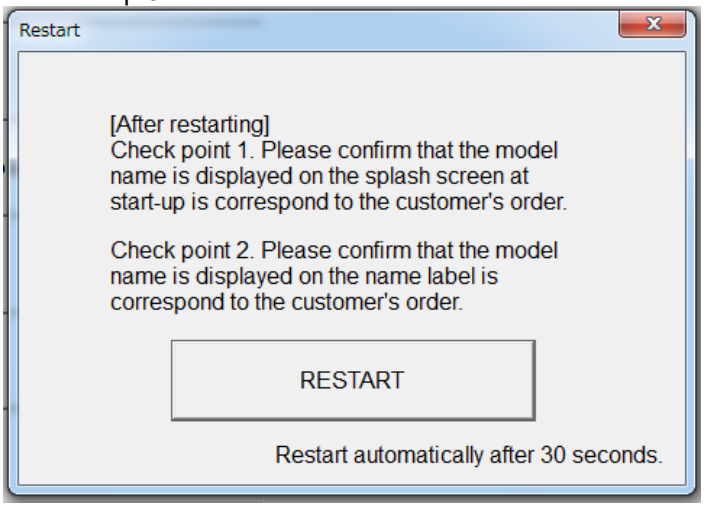
b) When installing the desktop type or flush mount type
Two pieces of the Name Labels for all the general type names are provided. Stick the Name Label same as the displayed image to the top panel of the NDC-1590/A CCU. Put the remaining one of the same general type name into the bag and attach the bag to the NDC-1590/A. Discard the label of the model names that does not match.



After pasting, please press the [OK] button. The following screen is 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.

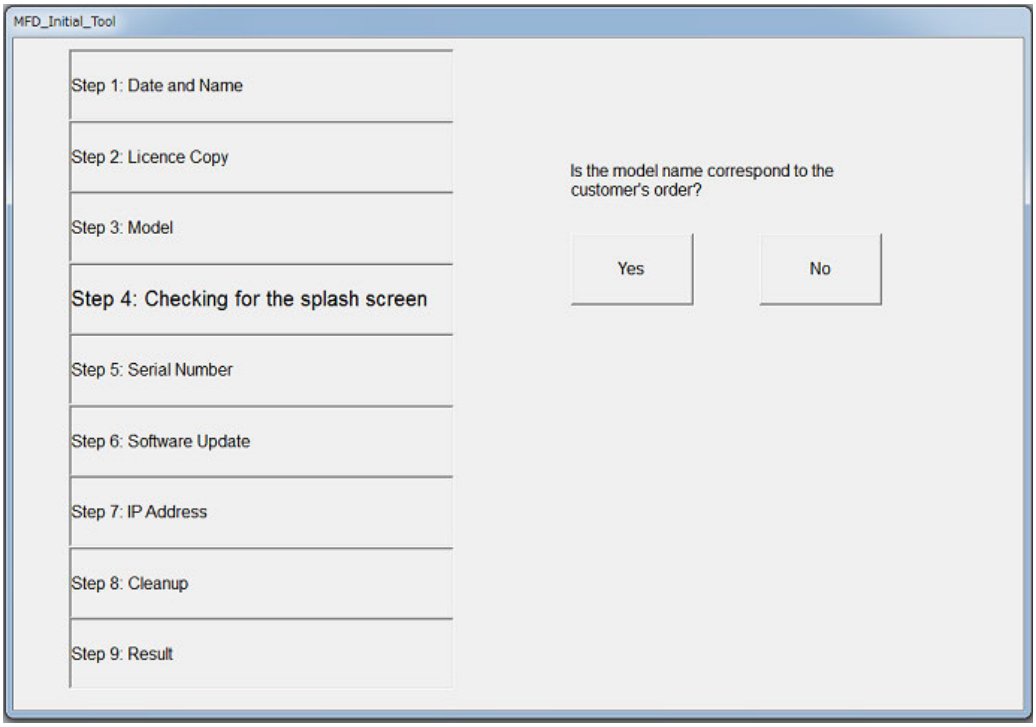


Restart by clicking the [RESTART] button. The system automatically restarts after 30 seconds have elapsed.

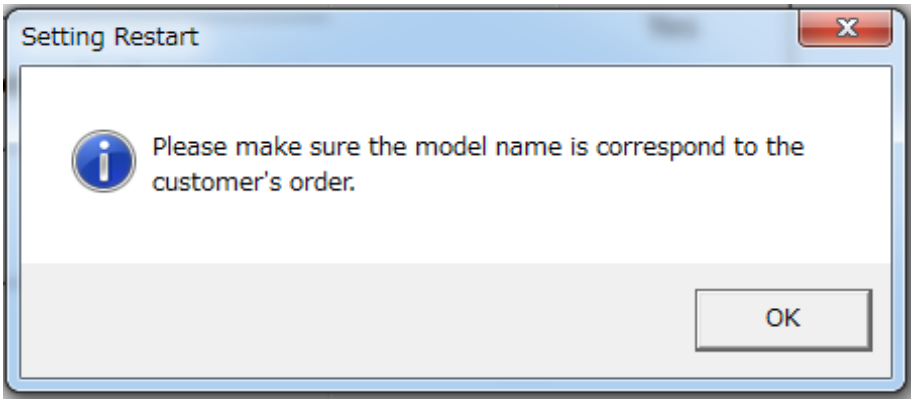
Step4: Checking for the splash screen

After restarting, the following dialog is displayed. Confirm that the Model name displayed on the splash screen and the Name Label sticked in step 3 matches.

- When the model name matched, click the [Yes] button. Proceed to the next step.



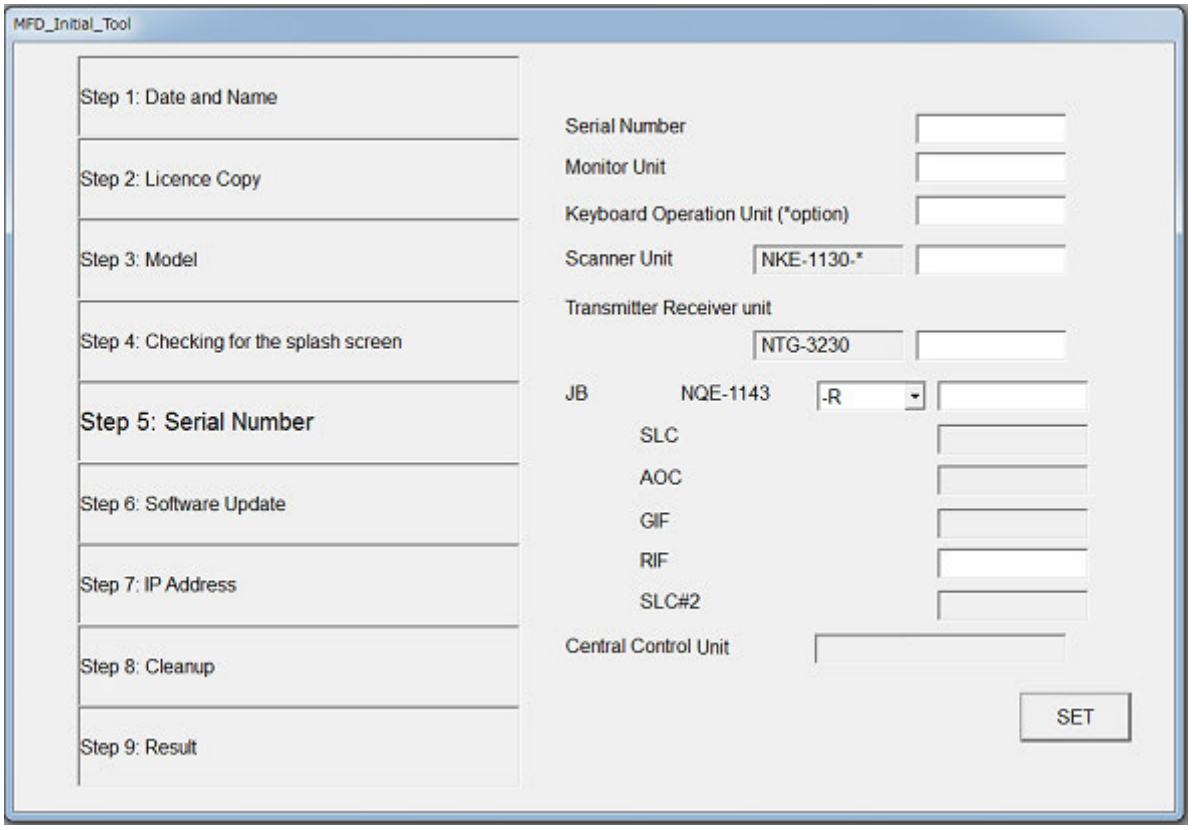
- When the model name mismatched, click the [No] button.
  Initialization tool will return to the screen of step3. Select the model name again.



Step5: Serial Number

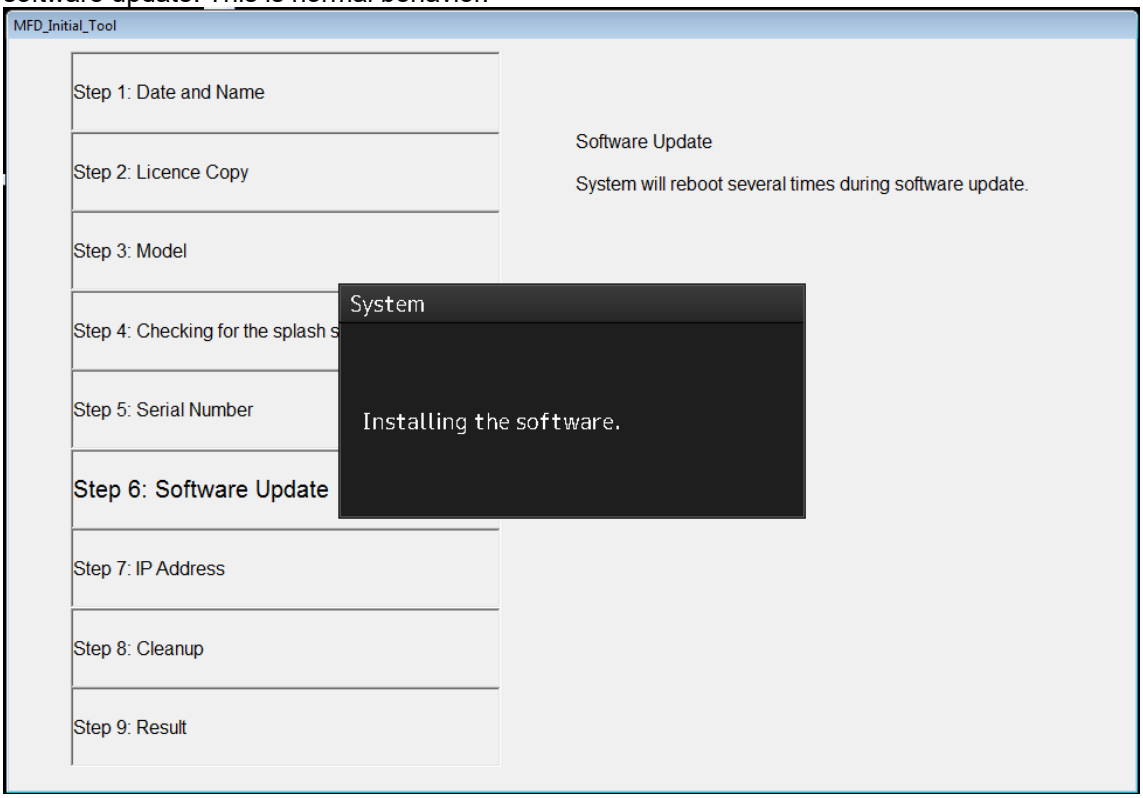
The following dialog is displayed. Input the serial number of each unit. And then click the [SET] button.

- Please make sure that serial number and manufacturing number indicated are matched.
- When setting the desktop type or flush mount type, the serial number of the monitor unit may be left blank.
- When input the JB(Junction box) serial number , enter the barcode number and suffix of JB.
- For SLC, AOC, GIF, RIF, and SLC#2, their serial numbers may be left blank.



Step6: Software Update

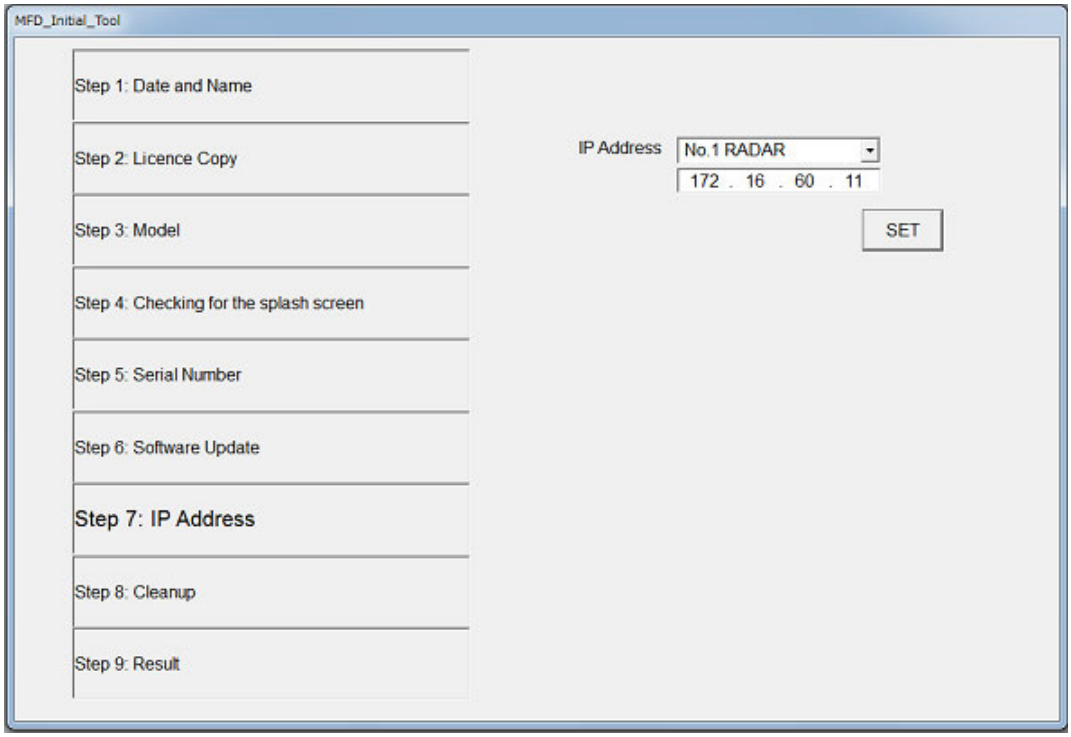
Update is started. It takes several minutes. Display unit will restart several times during the software update. This is normal behavior.



- When the already registered version number is the latest one, Software Update will be skipped.

Step7: IP Address

Set the IP Address by selecting the Unit No. from dropdown list, and then click the [SET] button.

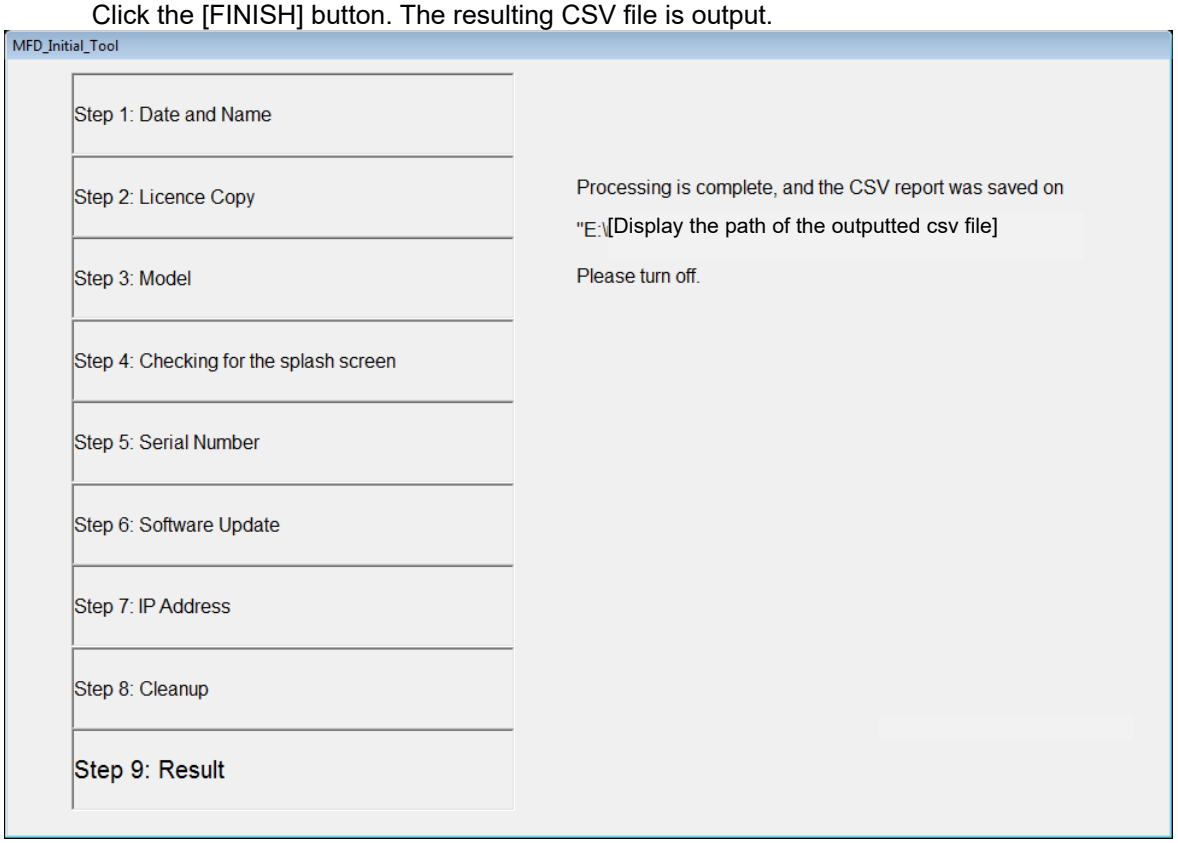


Step8: Cleanup

The tool deletes unnecessary files automatically.

Step9: Result

Click the [FINISH] button. The resulting CSV file is output.

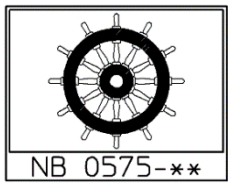
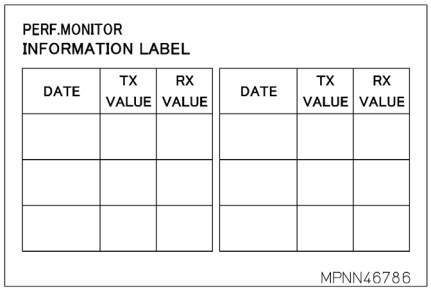


The initialize ends above.

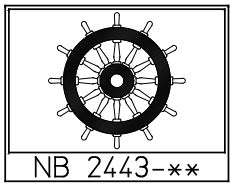
3.14 Other Labels

Labels listed below are attached on the NCM-928. Please stick the labels which corresponds to the model name (RADAR/ECDIS/CONNING) on the top of CCU: NDC-1590/A as follows instruction.
In the case of model name is CONNING, remove the wheel mark labels.

Label list for sticking

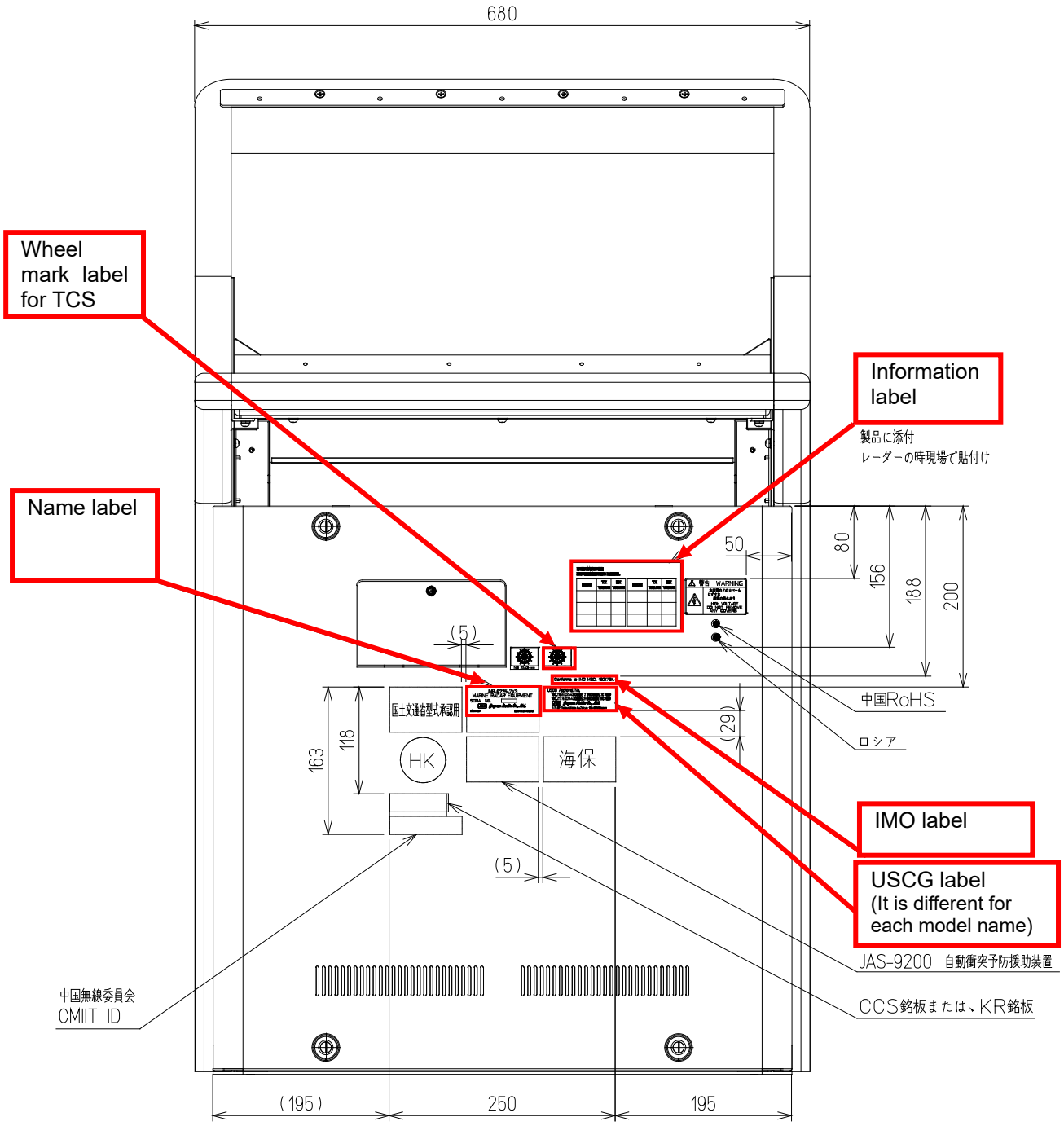
Label		RADAR	ECDIS	CONNING	Remark
Name Label	For example) JMR-7225-7X3 	✓	✓	✓	To stick the Name label, refer to Step3 of 3.13 Initialization for the specified model
IMO label		✓			
USCG label for JMR-9200		✓			Only JMR-9200 series RADAR use it.
USCG label for JMR-7200		✓			Only JMR-7200 series RADAR use it.
USCG label for JAN-9201/7201			✓		Only used for the JAN-9201/ 7201 ECDIS.
Wheel mark label for TCS			✓		Only ECDIS that support the TCS function use it. The wheel mark label for TCS is not to be used for ECDIS that don't support TCS. Remove the wheel mark label NB0575 when not applicable.
INFORMATION LABEL		✓			

Label list for removing

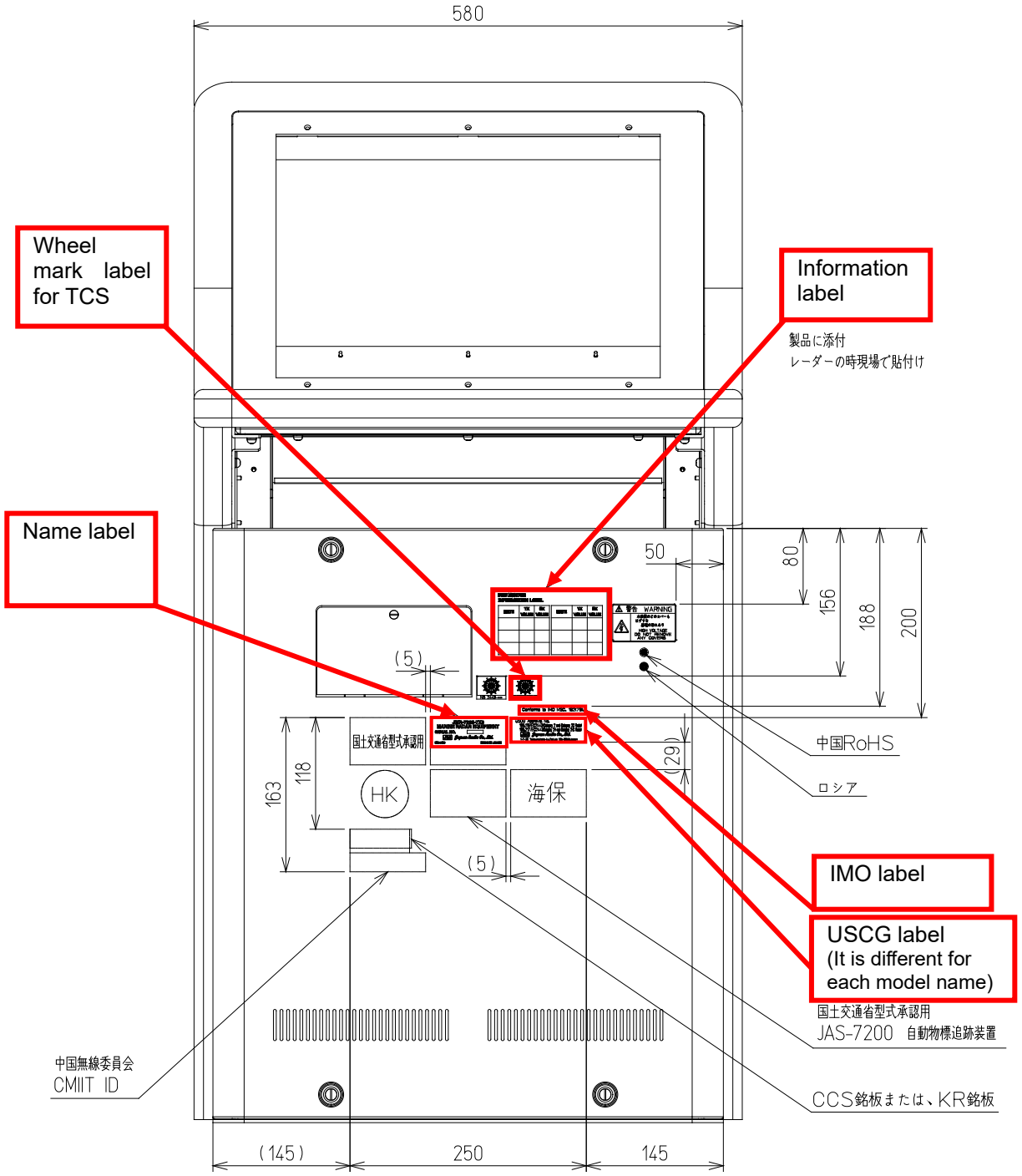
Label		RADAR	ECDIS	CONNING	Remark
Wheel mark label				✓	

3.14.1 Sticking position of labels

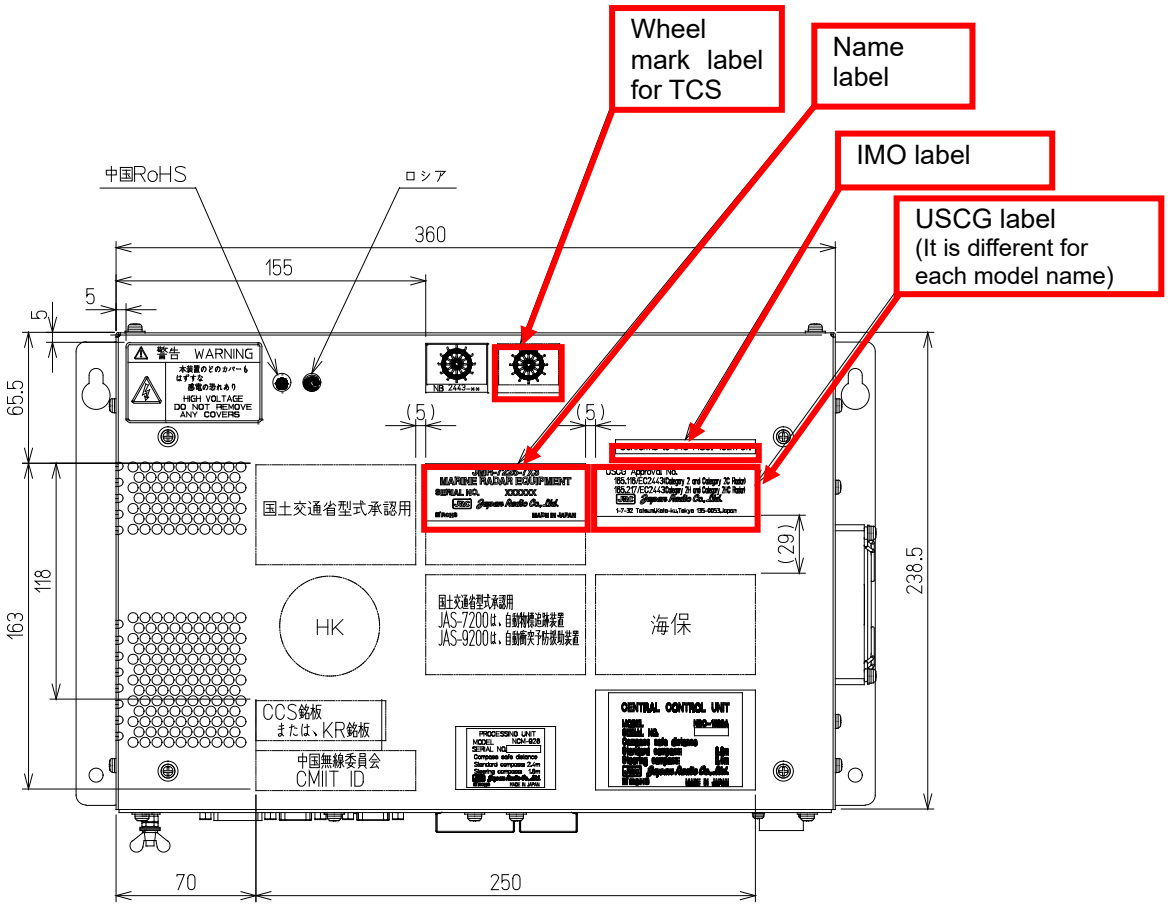
3.14.1.1 26/27 inch Standalone Type (JMR-9200 series, JAN-9201 and JAN-9202)



3.14.1.2 19 inch Standalone Type (JMR-7200 series, JAN-7201 and JAN-7202)



3.14.1.3 Desktop Type or flush mount type

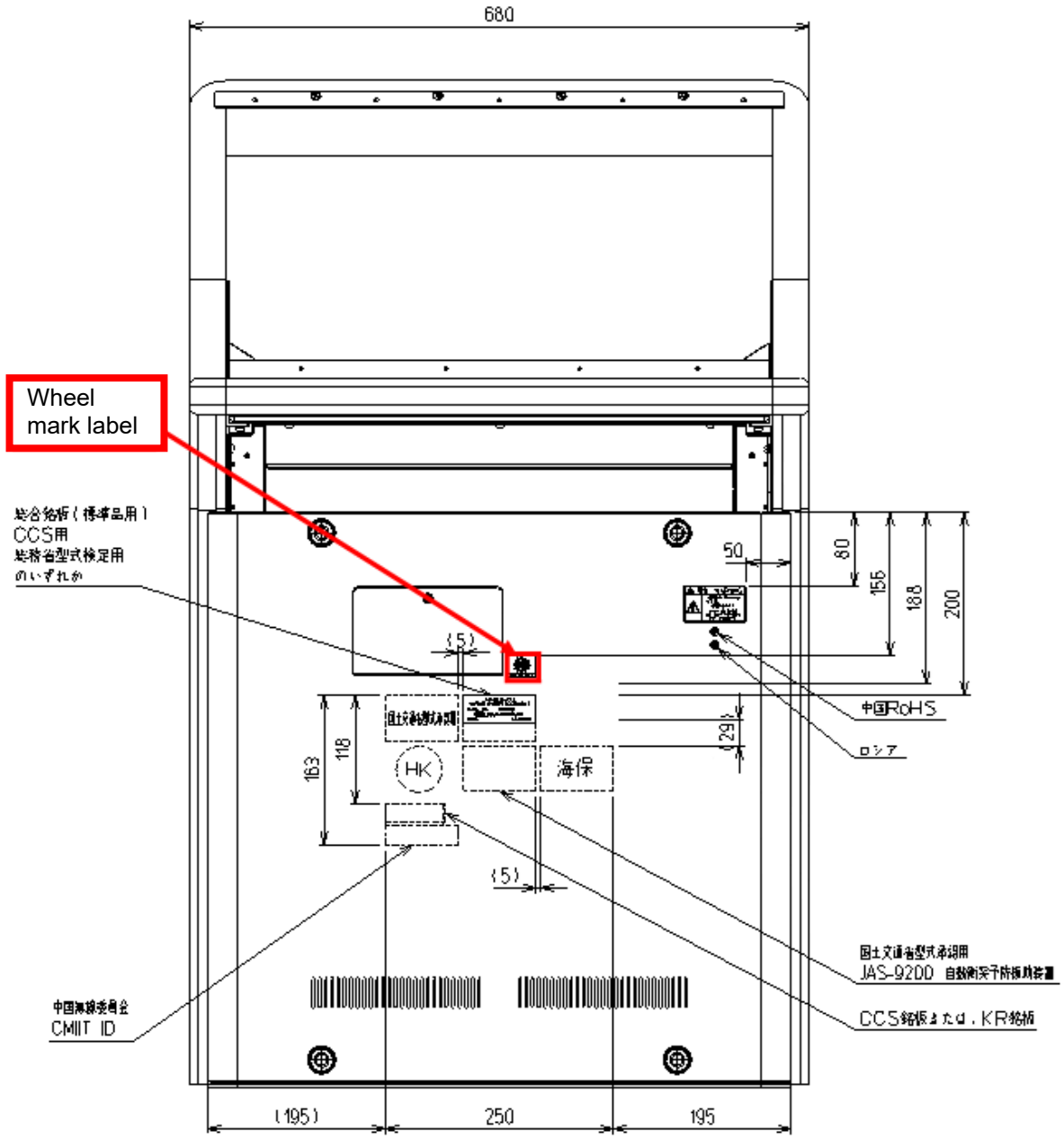


In case of the desktop type or flush mount type, stick the information label to the easy to read position.
Ex. Cover of the NQE-1143 Junction box, front panel of the console.

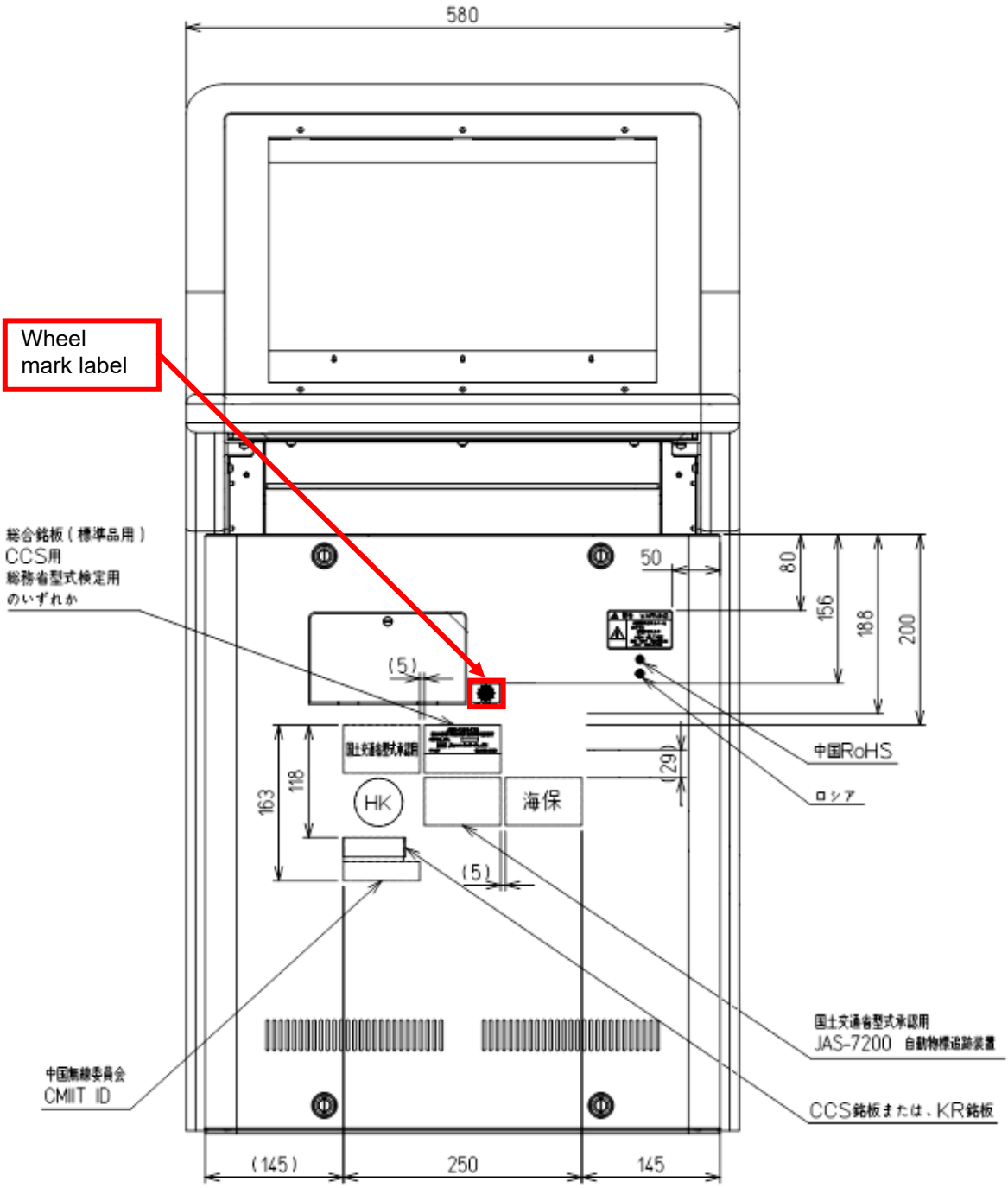
3.14.2 Removing position of the wheel mark labels

Standalone Type : Remove the wheel mark labels from the stand and CCU. (refer to 3.14.2.1 to 3.14.2.3)
Desktop or flush mount type : Remove the wheel mark labels from CCU. (refer to 3.14.2.3)

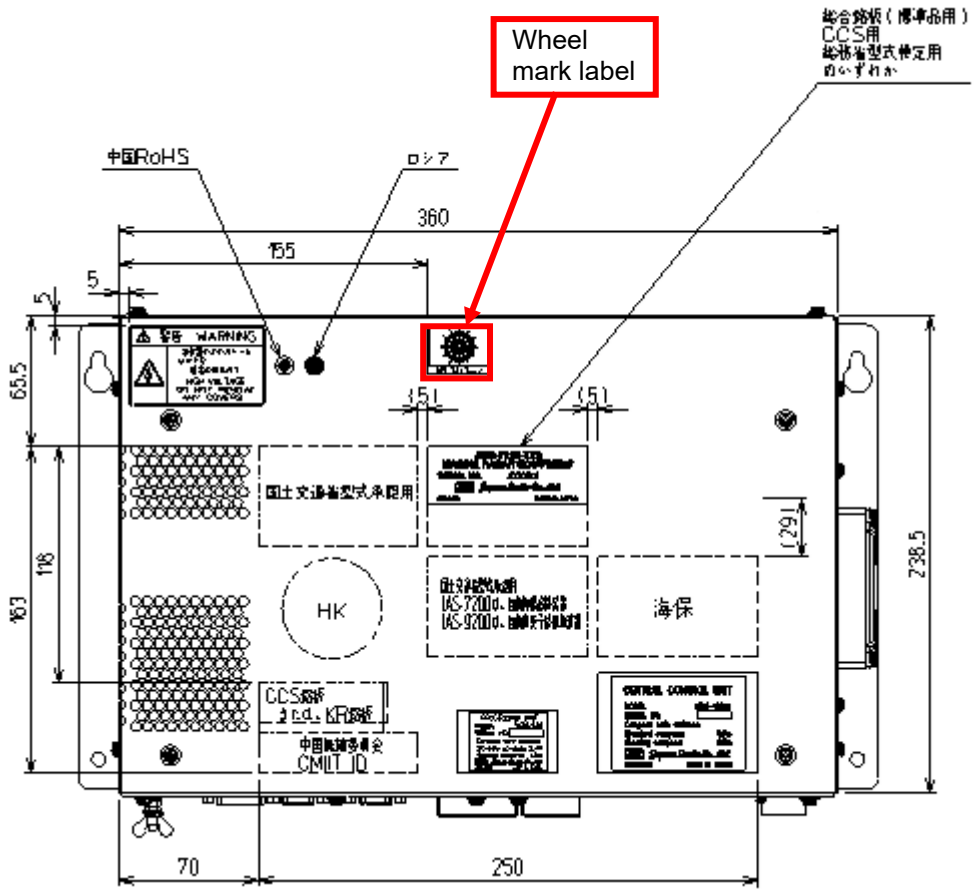
3.14.2.1 Standalone Type (JAN-9202)



3.14.2.2 Standalone Type (JAN-7202)



3.14.2.3 Standalone or Desktop or flush mount type (JAN-9202 and JAN-7202)



4 Initial Setting

⚠CAUTION	
	Never have the equipment adjusted by unauthorized service personnel. If the equipment is set up incorrectly, it may cause unstable operation.
	Never make adjustments while navigating. Doing so may adversely affect the radar functions, causing accidents and/or malfunctions.
	Before moving on to communication and sensor settings, confirm that the operation shown in "3.7 Connection with Sensors" is complete.

Memo

RADAR, ECDIS, or Conning as the task station that needs the setting is indicated, following each section title.

[RADAR/ECDIS/Conning] ⇒ The setting is necessary for the respective task stations.

[ALL] ⇒ The setting is necessary for all the task stations.

However, some settings are reflected in all other task stations once they are set in one station. Refer to "4.1 Service Menu".

4.1 Service Menu [ALL]

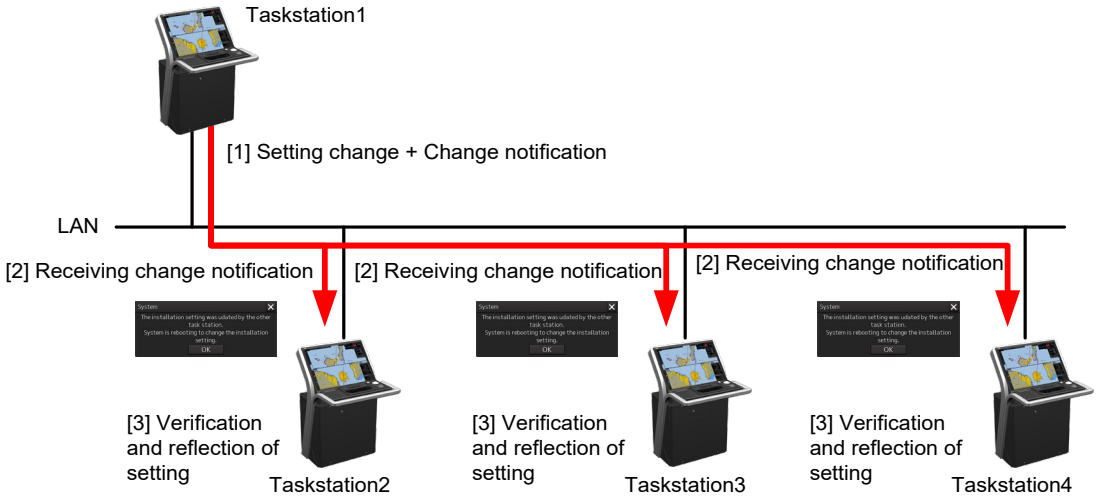
Use the Service menu to make initial settings for the equipment.
The Service menu consists of three submenus of Adjustment, Installation and Maintenance. To display the Service menu, a password is required.

Initial Settings of INS Devices

For the initial settings of INS devices, refer to "4.59 INS Initial Settings [ALL]".

Flow of equipment initial settings

Equipment setting items include setting items that are common among task stations (RADAR, ECDIS, and Conning Display) and setting items that are specific to each task station. Once a common item is set in one task station, the setting is reflected in other task stations also (initial setting synchronization).
Initially, the mechanism of synchronization of common setting items among the task stations is described below.

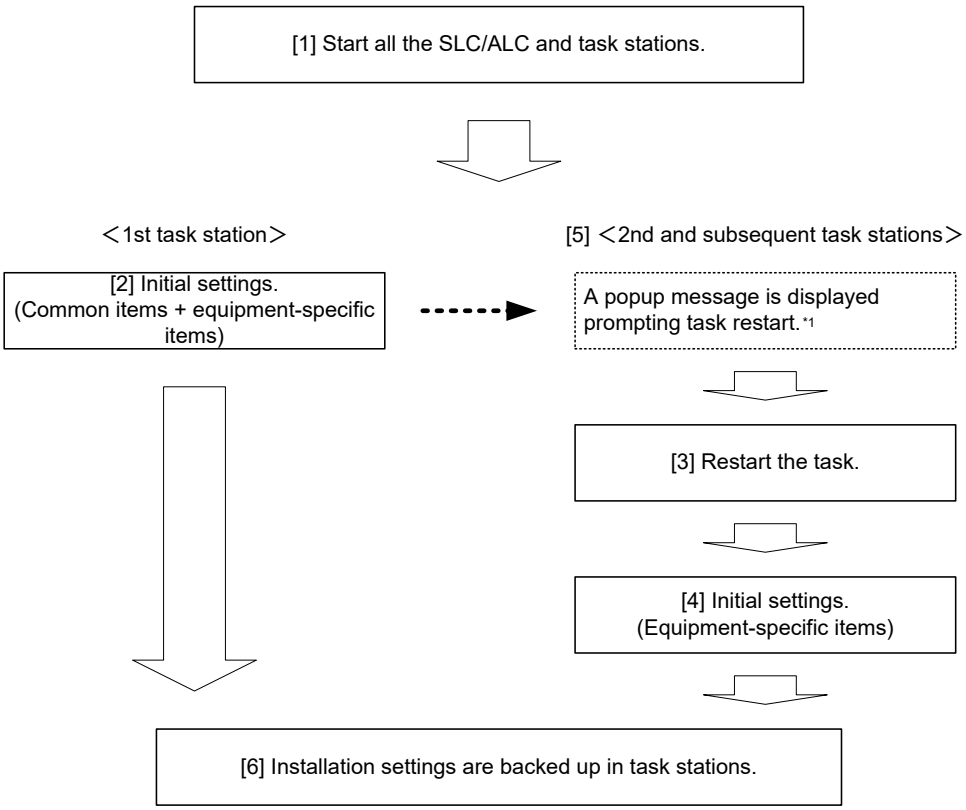


1 **Set the setting items.**
Set a setting item in a task station.

2 **Notify the change of the setting item.**
The change of the setting is notified to other task stations that are connected to the network.

3 **Reflect the change of the setting item.**
The task station that received the change notification updates the common setting items and when the task is restarted, the change is reflected in the own task station.
To make the equipment information that has been changed identical within the system, restart all the MFDs in the system.

The flow of equipment initial settings is shown below.



(*1) If a popup message prompting task restart is not displayed on the 2nd and subsequent task stations, the popup message "System failed to synchronise the equipment setting" is displayed on the 2nd and subsequent task stations.

1 Start all the SLC/ALC and task stations.

By setting the common setting items while all the task stations are active, the common setting items are synchronized through all the task stations.

2 Initialize the 1st task station (task station that is displayed as Master in the Control Status).

In the 1st task station, set common setting items and equipment-specific setting items.

3 Re-activate the task before initializing the 2nd task station (task station that is displayed as Slave in the Control Status).

When an initial setting item is set in the 1st task station, a message is displayed prompting the restart of the task on other task stations. When the message is closed, the tasks are restarted and the common setting items are reflected.

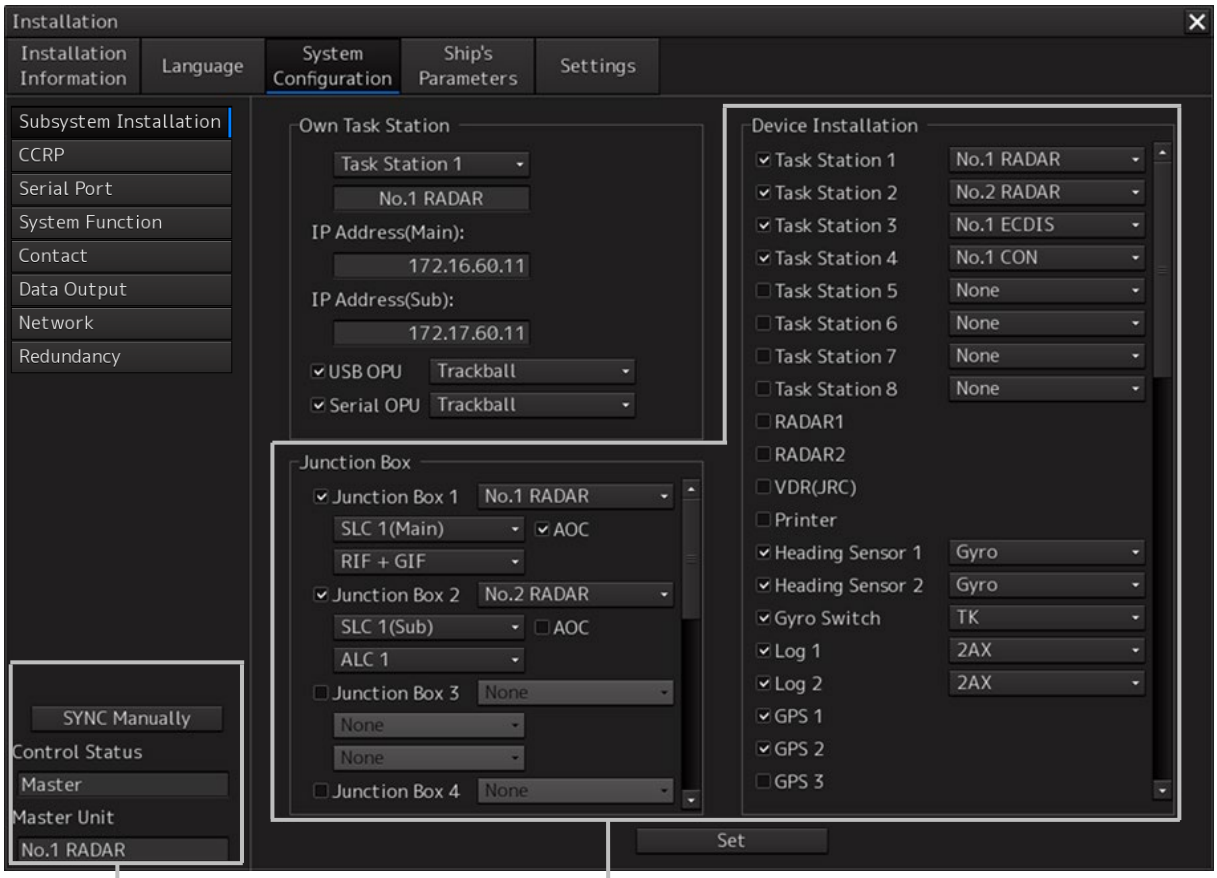
4 Perform initial setting of the 2nd task station.

In the 2nd task station, set an equipment-specific setting item. When a setting screen of the common setting item is displayed on other stations, the common setting item is displayed in the edit disabled state. By maintaining the display of the setting screen (Installation – System Configuration, etc.) after completing the 1st task station, unintended change of the common setting item can be prevented.

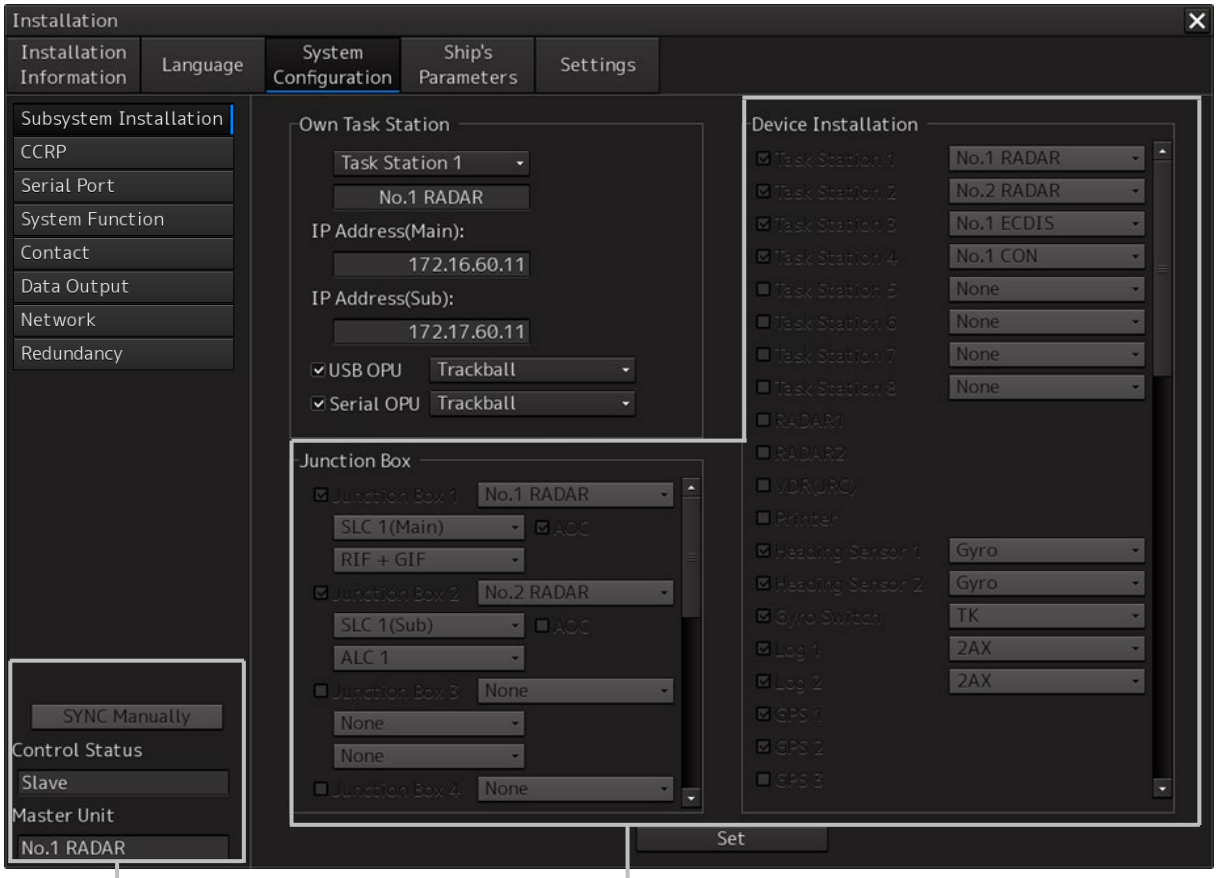
5 **Perform steps 3 and 4 for the remaining task stations.**

6 **Back up the equipment settings in each task station.**
Refer to "0
Backup of Data [ALL]".

The setting screen with common setting items can display the status information as to whether the own station can edit common setting items. When own task station can edit common setting items, "Master" is displayed in Control Status and when display/editing is being performed in other task stations, "Slave" is displayed and the common setting items are displayed in the edit disabled state.



Common setting items can be edited on own task station



"Slave" is displayed in Control Status

Common setting items cannot be edited

Common setting items cannot be edited on own task station

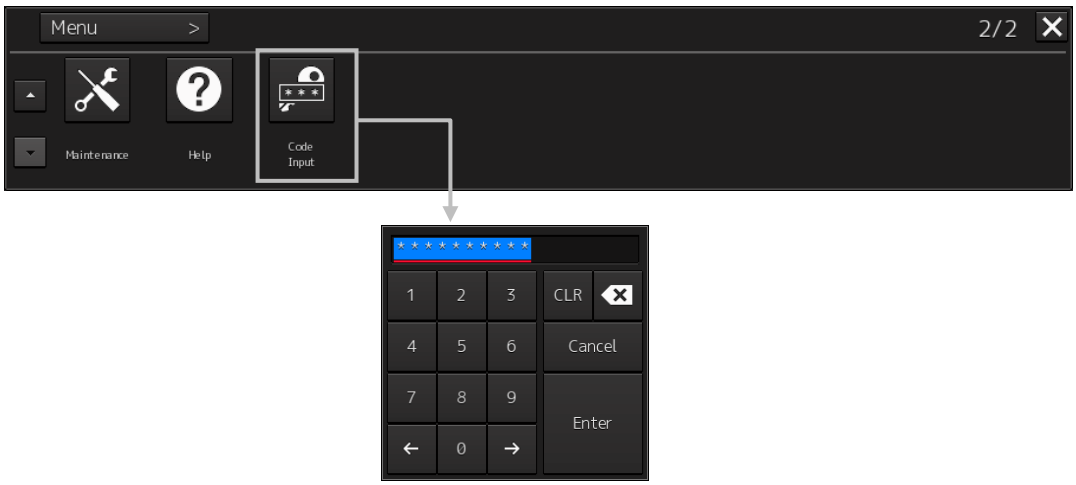
Setting screens containing common setting items are listed below. For the details of common setting items, refer to "0
List of Common Setting Items [ALL]".

Setting screen	Description
Installation – System Configuration	Equipment information and communication settings are common setting items.
Installation – Ship's Parameters	The settings of own ship's parameters are common setting items.
Maintenance – Initialisation	Although there is no setting item, common setting items are initialized by initialization of service setting.

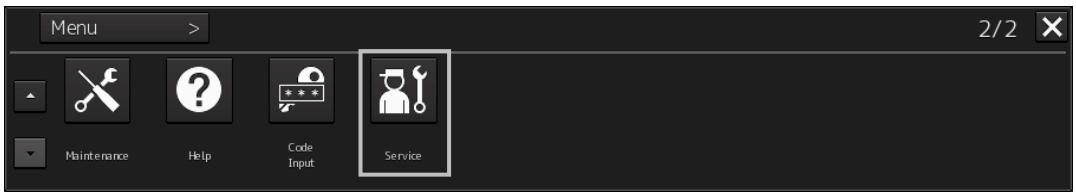
Displaying the Service menu

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

2 **Click the [Code Input] button on the menu.**
The password input dialog is displayed.

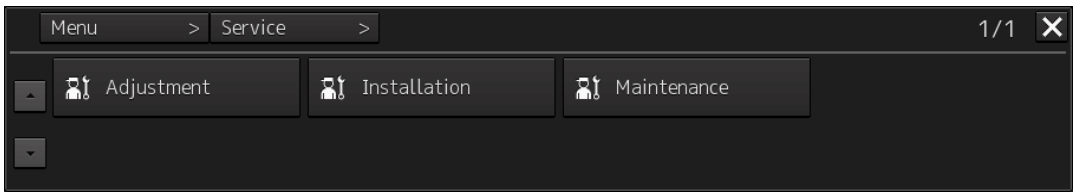


3 **Enter 0009 in Password.**
The [Service] button is added to the menu. Once the [Service] button has been added, the button is continuously displayed until the task menu is closed.



4 **Click on the [Menu] button on the left toolbar.**
The menu is displayed.

5 **Click the [Service] button.**
The submenu is displayed.



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

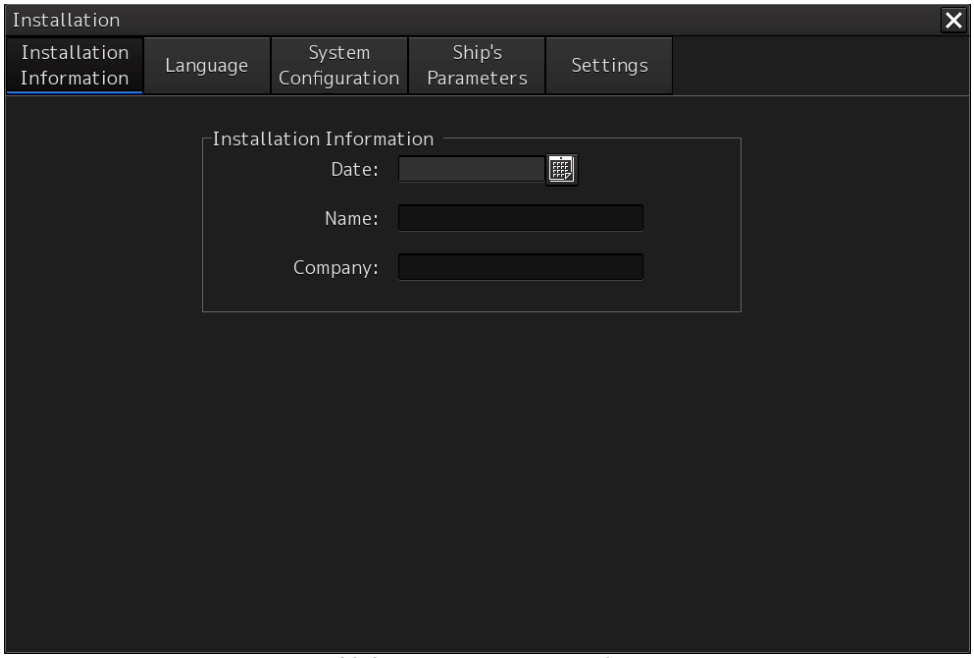
4.2 Installation Information [ALL]

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

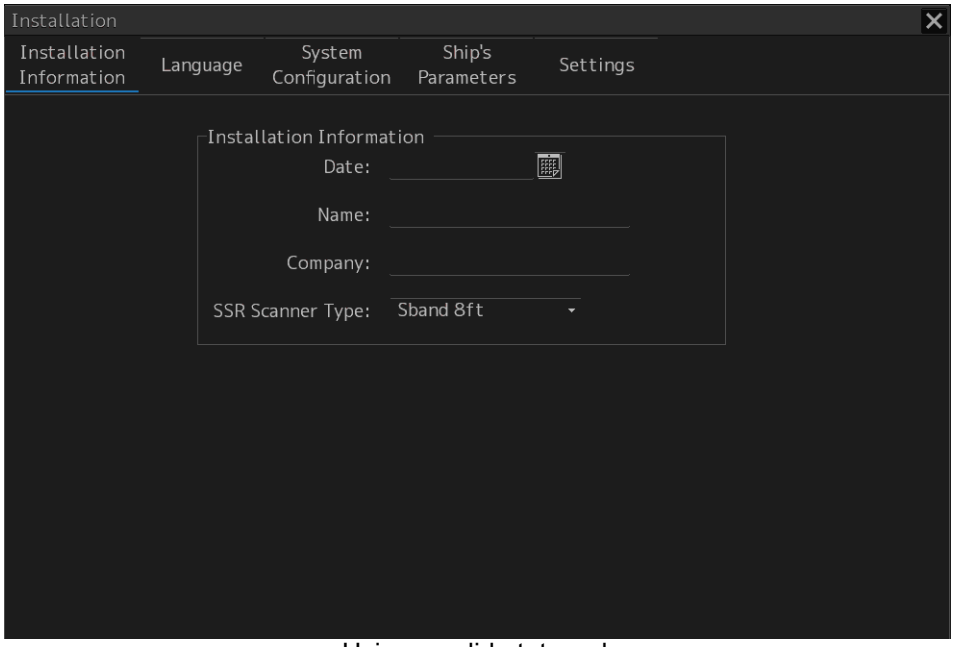
Displaying the [Installation Information] dialog

1 **Display the dialog of the Installation submenu.**

2 **Select [Installation Information] in the Classification pane.**
The [Installation Information screen] dialog is displayed in the Edit/Result pane.



Using a magnetron radar



Using a solid-state radar

Entering an installation date and a time

1 **Click on the calendar button in the [Date] input box.**
A calendar is displayed.

2 **Set a year and a month by using the year selection spin button and the month selection spin button.**

3 **Click on the date to be set from the date selection box.**
The setting is completed and the calendar is closed.

Entering an installer name

1 **Click on the [Name] input box.**
A character input keyboard is displayed.

2 **Enter an installer name (up to 32 characters).**

Entering an installing company

1 **Click on the [Company] input box.**
A character input box is displayed.

2 **Enter an installing company (up to 32 characters).**

Selecting a solid-state radar type (using a solid-state radar)

1 **Select one of the following radar types from the [SSR Scanner Type] combo box.**

- Sband 8ft
- Sband 8ft-HS
- Sband 12ft
- Xband 6ft
- Xband 9ft
- Unselected (when initial setting has not been performed)

4.3 Setting Up a Language [ALL]

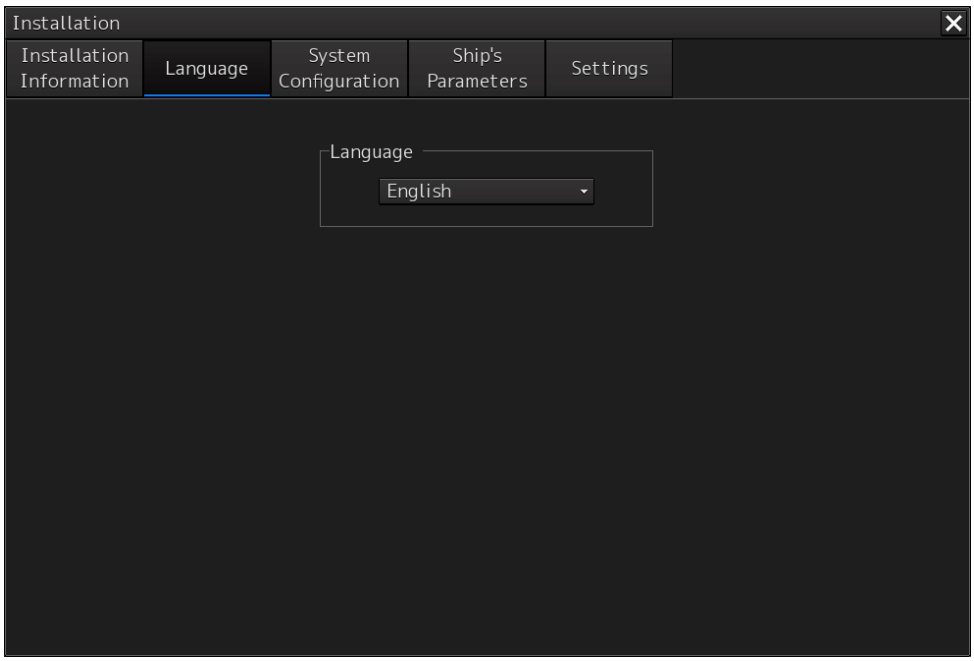
Use the [Language] dialog to set up the language to be used for screen display of this equipment.

Displaying the [Language] dialog

1 Display the dialog of the Installation submenu.

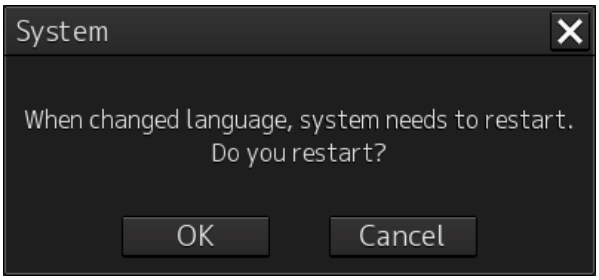
2 Select [Language] in the Classification pane.

The [Language] dialog is displayed in the Edit/Result pane.



Setting up a language

1 **Select the language to be used from the [Language] combo box.**
[English] or [Japanese] can be selected ([English] at the factory setting).
The following message will be displayed.



2 **To restart the system and change the language, click on the [OK] button. To cancel the language switching, close the dialog by clicking on the [Cancel] button or [x] button.**
When the [OK] button is clicked on, the system restarts and the screen display changes to the language that was selected in Step 1.

Note
Ocean Explorer INS firmware supports only [English] as language selection.

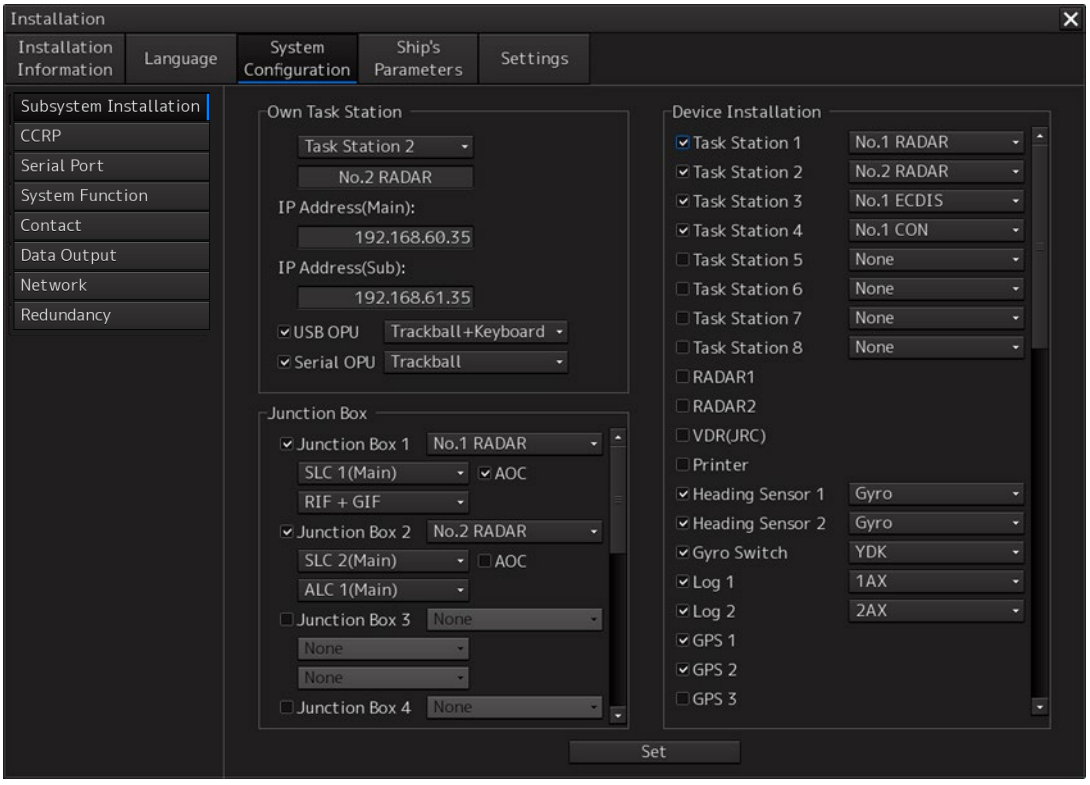
4.4 Subsystem Installation [ALL]

Use the [Subsystem Installation] dialog to verify and change the subsystem configuration of this equipment.

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.



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 to 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 to 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 to 8] check boxes.	None SLC 1 to 4(Main) SLC 1 to 4(Sub) ALC 1 to 4 RIF GIF RIF + GIF
	When SLC is selected from the combo box, select installed/not installed of AOC with the [AOC] check box. **Memo** When "Installed" is set while AOC is not installed, the message "SLC AOC Error" is displayed.	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 equipment from the combo box (For the equipment that can be selected in each subsystem, refer to “Table 4-2 Equipment that can be used by each subsystem”). 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	Not installed: Clear. Installed: Select. Subsystem Task Station 1 to Task Station 8 RADAR 1, 2 *1 VDR(JRC) Printer Heading Sensor 1, 2 *3 Gyro Switch *3 Log 1, 2 GPS 1 to 4 Ship’s Clock Echo Sounder 1 (Transducer 1, 2) *2 Echo Sounder 2 (Transducer 3) *2 AIS NAVTEX Anemometer1 Water TEMP Meter Current Meter Climate Meter TRI Autopilot *4 Rudder Engine/Propeller Engine Telegraph Bow Thruster Stem Thruster Azimuth Thruster Generator S-JOY/Joystick 1 to 5 GPS Selector Log Selector Inmarsat-C 1, 2 Satellite Terminal 1 to 4 BNWAS General Equipment(Alert) GPS Buoy Plotter VHF (JHS-800S) 1 to 3 *5 Hull Motion NeCST *6 General Analog Input 1~10

(*1) For ECDIS, the communication radar is to be checked. Once checked, RADAR1 receives TT data via the LAN from the device assigned to No.1 RADAR and RADAR2 from the device assigned to No.2 RADAR. However, if setting is so made that TT data will be received from a serial port in the serial port setting, TT data is received from a serial port. For the settings of serial port, refer to "4.6 Setting Up a Serial Port".

(*2) Check boxes of Echo Sounder 1 and Echo Sounder 2 are not available. When the check boxes of either or both of Transducer 1 and 2 are checked, Echo Sounder 1 is selected. When the check box of Transducer 3 is checked, Echo Sounder 2 is selected. Also, if you select FURUNO on Echo Sounder 1, Transducer 1 - 3 will be hidden.

(*3) When [Gyro Switch] is assigned to Heading Sensor 1, Heading Sensor 2 and Gyro Switch are disabled. When Gyro Switch is selected, [Gyro Switch] cannot be assigned to Heading Sensor 1.

(*4) For the installation of Autopilot, refer to the TCS Additional Instruction Manual. In particular, check the following chapters for override steering.

- Autopilot manufactured by TOKYO KEIKI
  "4.5 Override Steering Method (Option)" of the additional instruction manual, Autopilot TCS model Category C (TOKYO KEIKI PR-6000 and HCS-9000).
- Autopilot manufactured by YOKOGAWA
  "4.2.3 Override steering (option)" of the additional instruction manual, Autopilot TCS model Category C (YOKOGAWA PT500A and PT900)
- Autopilot manufactured by ALPHATRON
  " 4.5.2 Override (O) control mode (option) " of the additional instruction manual, Autopilot TCS model Category C (ALPHATRON AlphaPilot MFM)

(*5) Use General Equipment(Alert) for alert handling of VHF (JHS-800S) equipment.

(*6) If the "NeCST" checkbox is checked, the Network drive setting must be performed on all MFDs having a ECDIS licence or a RADAR licence.
Confirm the chapter "Linking with JAN-9201/7201" of Installation Manual for J-Marine NeCST(JAN-470) and perform the Network drive setting.

Table 4-1 Device numbers that can be selected

No.	Device numbers that can be selected
1	None
2	No.1 RADAR
3	No.2 RADAR
4	No.3 RADAR
5	No.4 RADAR
6	No.5 RADAR
7	No.6 RADAR
8	No.7 RADAR
9	No.8 RADAR
10	No.1 ECDIS
11	No.2 ECDIS

No.	Device numbers that can be selected
12	No.3 ECDIS
13	No.4 ECDIS
14	No.1 CON
15	No.2 CON
16	No.1 CON (Wing)
17	No.2 CON (Wing)
18	No.1 CON (Remote)
19	No.2 CON (Remote)
20	No.1 RPS
21	No.2 RPS

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

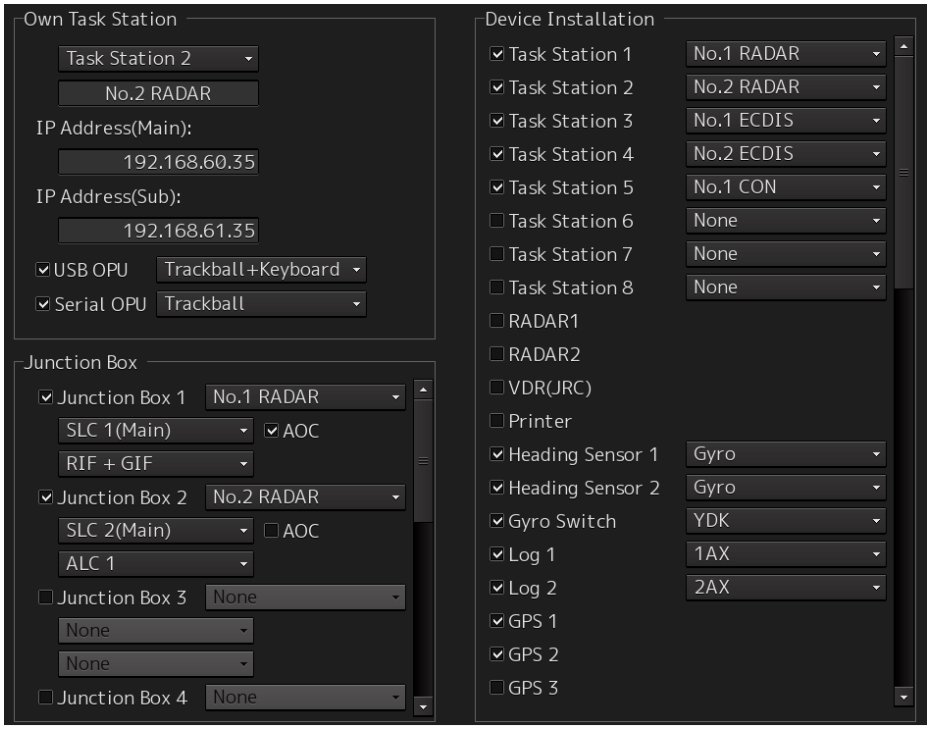


Table 4-2 Equipment that can be used by each subsystem

Subsystem	Equipment
Taskstation 1 to Taskstation 8	Refer to “Table 4-1 Device numbers that can be selected”.
RADAR 1, 2	RADAR 1, 2
VDR	VDR
Printer	Printer
Heading Sensor 1, 2	Gyro/GPS Compass/MAG Compass
Log 1, 2	1AX/2AX/3AX/Satellite 2AX/Satellite 3AX
Gyro Switch	TK/YDK
GPS 1 to 4	GPS 1 to 4
Ship’s Clock	Ship’s Clock
Echo Sounder 1 (Transducer 1, 2)	None/FWD/AFT/MID (FWD can be used only for selecting Transducer 1.)
Echo Sounder 2 (Transducer 3)	
AIS	AIS
NAVTEX	NAVTEX FORMAT/NMEA FORMAT
Anemometer	Anemometer
Water TEMP Meter	Water TEMP Meter
Current Meter	Current Meter

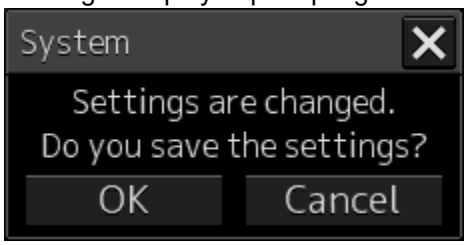
Subsystem	Equipment
Climate Meter	Climate Meter
TRI	TRI
Autopilot	PT500_TCS_C_Ed1, PT500_TCS_C_Ed2, PT900_TCS_C, PR-6000_TCS_C, HCS-9000_TCS_C, TK_Kelvin, AlphaPilotMFM
Rudder	Rudder (Select 1 or 2 for the number of installations)
Engine/Propeller	Engine/Propeller (Select 1 or 2 for the number of installations)
Engine Telegraph	Engine Telegraph (Select 1 or 2 for the number of installations)
Bow Thruster	Bow Thruster (Select a number between 0 and 5 for the number of installations)
Stern Thruster	Stern Thruster (Select a number between 0 and 5 for the number of installations)
Azimuth Thruster	Azimuth Thruster (Select a number between 1 and 6 for the number of installations)
Generator	Generator (Select a number between 1 and 4 for the number of installations)
S-JOY/Joystick 1 to 5	No.1 to No.13 in “Table 4-1 Device numbers that can be selected“ (Select the task station to be connected to S-JOY or MJS-9000)
GPS Selector	NCZ-1537A/NCZ-777
Log Selector	NCZ-1537A/NCZ-777
Inmarsat-C 1, 2	Inmarsat-C 1, 2
Satellite Terminal 1 to 4	JUE-60GX, JUE-251, JUE-501
BNWAS	JCX-161, ACONIS, C20
General Equipment(Alert)	General alert equipment（Select a number between 1 and 10 for the number of installations）
GPS Buoy	GPS Buoy
Plotter	Plotter
VHF (JHS-800S) 1 to 3	JHS-800S
Hull Motion	Hull Motion
NeCST	NeCST
General Analog Input	General Analog Input（Select a number between 1 and 10 for the number of installations）

Note
Ocean Explorer INS does not support devices below;
GPS Buoy, S-Joy, Furuno exho sounder, GPS Plotter, Azimuth Thruster, VHF transceiver and Satellite Terminal.
Ocean Explorer INS supports only Tokyo-keiki PR-9000 and Tokyo-keiki DGC-80/ GT-9000 as autopilot and gyro-system.

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.

4.5 Setting Up CCRP (Consistent Common Reference Point) [ALL]

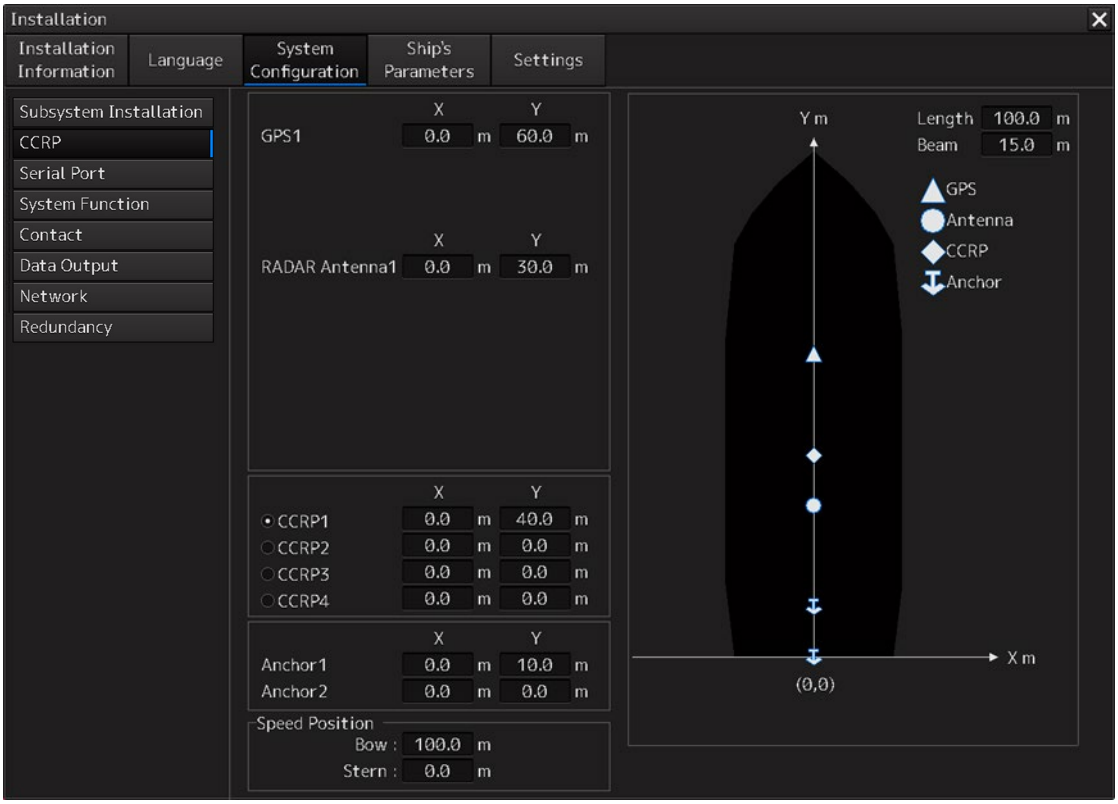
Set a measurement reference position (CCRP) on own ship by using the [CCRP] dialog.

Displaying the [CCRP] dialog

1 Display the dialog of the Installation submenu.

2 Select [System Configuration] in the 1st Classification pane and [CCRP] in the 2nd Classification pane.

The [CCRP] dialog is displayed in the Edit/Result pane.



Note

Configure the GPS setting correctly. The latitude/longitude data that is received from GPS is corrected and displayed as the latitude/longitudie of own ship.

Setting CCRP

Set the following items in the [CCRP] dialog.

Setting Item	Description of Setting	Setting Value
Length (of ship)	Enter the ship's length in the box.	1.0 to 1022.0m
Beam (ship's width)	Enter the ship's width in the box.	1.0 to 126.0m

Setting Item	Description of Setting	Setting Value
GPS1/2/3/4	Enter the equipment positions of GPS1, GPS2, GPS3 and GPS4 in the boxes. X: X axes of GPS1/2/3/4 Y: Y axes of GPS1/2/3/4 **Note** • If "No Equipment" is specified in the [Subsystem Installation] dialog, this is not displayed. • When the input range is changed by modifying [Length] and [Beam], if a value exceeding the input range after modifying has already been entered, the value will be corrected to the maximum or minimum value.	Changes depending on the value of [Length] and [Beam]. If Length=a and Beam=b: X -b/2 to b/2 Y 0.0 to a For example, • if Length=1.0 and Beam=1.0: X -0.5 to 0.5 Y 0.0 to 1.0 • if Length=700.0 and Beam=70.0: X -35.0 to 35.0 Y 0.0 to 700.0
Radar Antennas1 to 8 (equipment positions of radar antennas1 to 8)	Enter the equipment positions of Radar Antennas1 to 8 in the boxes. X: X axes of radar antennas 1 to 8 Y: Y axes of radar antennas 1 to 8 **Note** If "No Equipment" is specified in the [DipSW] settings of the interswitch unit, this is not displayed. When the input range is changed by modifying [Length] and [Beam], if a value exceeding the input range after modifying has already been entered, the value will be corrected to the maximum or minimum value.	
CCRP1/2/3/4	Enter the positions of CCRP1 to CCRP4 of the ship in the boxes. X: X axes of CCRP1/2/3/4 Y: Y axes of CCRP1/2/3/4 **Note** When the input range is changed by modifying [Length] and [Beam], if a value exceeding the input range after modifying has already been entered, the value will be corrected to the maximum or minimum value.	
CCRP	Select the position to be used as the ship's CCRP by clicking the applicable button. **Note** Normally, only CCRP1 is used.	CCRP1 CCRP2 CCRP3 CCRP4

Setting Item	Description of Setting	Setting Value
Anchor1	An anchor position can be set as an offset from the stern center. It can not be set outside the boat. X: The horizontal axis position on the shipboard of Anchor 1 (center is 0) Y: Front-rear axis position on the shipboard of Anchor 1 (stern is 0)	If Length=a and Beam=b: X -b/2 to b/2 Y 0.0 to a
Anchor2	An anchor position can be set as an offset from the stern center. It can not be set outside the boat. X: The horizontal axis position on the shipboard of Anchor 2(center is 0) Y: Front-rear axis position on the shipboard of Anchor 2 (stern is 0)	If Length=a and Beam=b: X -b/2 to b/2 Y 0.0 to a
Speed Position Bow	Enter the distance from the origin (0, 0) to the display point of the right/left ship speed on the Bow side.	0.0 to Ship's length m
Speed Position Stern	Enter the distance from the origin (0, 0) to the display point of the right/left ship speed on the Stern side.	0.0 to Ship's length m

4.6 Setting Up a Serial Port [ALL]

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.

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(Main)/
SLC1–4(Sub)/
ALC1–4

[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 being received.

Lit in orange: In Diagnosis (before decision).

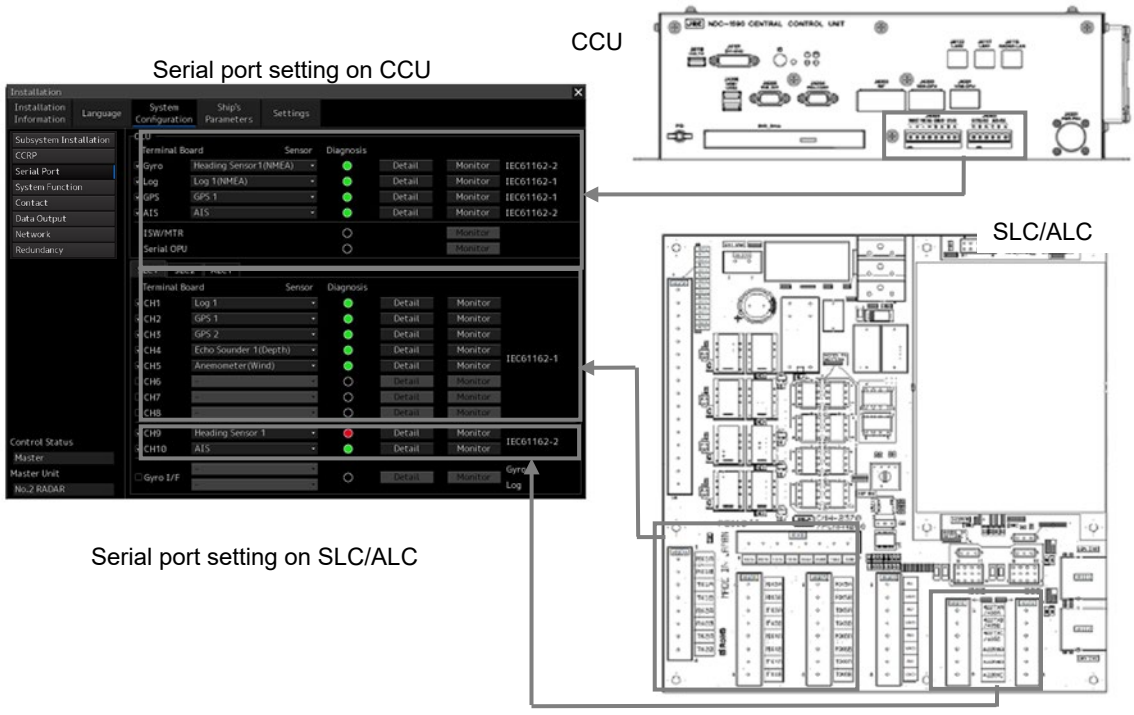
No color: Serial port is disabled.

Note

- When the RADAR slave mode is active, the [Diagnosis] lamp of ISW/MTR is disabled.
- When the [Serial OPU] check box is unchecked after selecting [Service]-[Installation]-[System Configuration]-[Subsystem Installation], the [Diagnosis] lamp of serial OPU is disabled.
- Even if a sentence unrelated to the specified sensor is received, the [Diagnosis] lamp is lit in green as long as the sentence is a normal sentence.

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. Check 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: Check. To disable: Uncheck. The sensors that can be selected vary according to the subsystem installation status. Refer to "Table 4-3 Sensors that can be selected on CCU".
LOG	1. Check 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. Check 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. Check 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 4-3 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)	
	Gyro Switch	Gyro Switch
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) 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.

Judging priority under duplication of sensor LAN

The sensors that can be selected by the serial port on CCU (GPS, GYRO, LOG, and AIS) correspond to LAN duplication. Therefore, the route priority order (MainLAN > SubLAN > CCU) is judged in addition to the status priority order (Normal > Doubtful > Failed > Not plausible > Invalid > Unavailable) and the sentence priority order.

The priority order among the priorities is as follows.

Status priority > sentence priority > route priority

Judging Gyro priority

The Gyro priority judgement method varies according to whether the operating task is ECDIS or any other task.

When the operating task is ECDIS, the same judgement method as the “Judging priority under duplication of sensor LAN” is applied.

When the operating task is other than ECDIS (RADAR, Conning), priority is given to the sentence of a shorter reception interval regardless of the route or sentence status.

Example 1:

CCU GIF: Receives HDT sentences at the interval of 20ms.

SLC GIF: When THS sentences are received at the interval of 40ms, priority is given to CCU GIF:HDT sentence.

Example 2:

CCU GIF: Receives HDT sentences at the interval of 60ms.

SLC GIF: When THS sentences are received at the interval of 30ms, priority is given to SLC GIF:THS sentence.

[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 checking 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: Check. To disable: Uncheck. The sensors that can be selected vary according to the subsystem installation status. Refer to "Table 4-4 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 checking 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 checking 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: Check. To disable: Uncheck. Sensors that can be selected: Gyro: Heading Sensor 1/2, Gyro Switch Log: Log 1/2 * The sensors that can be selected vary according to the subsystem installation status.

Table 4-4 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
Gyro Switch	Gyro Switch
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 Sounder 1(Depth)	Echo Sounder 1 (Transducer 1,2)
Echo Sounder 2(Depth)	Echo Sounder 2 (Transducer 3)
AIS	AIS
NAVTEX	NAVTEX
Anemometer(Wind)	Anemometer(Wind)
Water Temperature Meter	Water Temperature Meter
Current Meter	Current Meter
Climate Meter	Climate Meter
TRI *1	TRI

Sensor name	Devices required as the subsystem (set to "installed" in the [Subsystem Installation] dialog)
Autopilot	Autopilot
Rudder	Rudder (Refer to “Engine number”.)
Engine/Propeller	Engine/Propeller (Refer to “Engine number”.)
Engine Telegraph	Engine Telegraph
Thruster	Thruster (Refer to “thruster number”.)
Azimuth Thruster	Azimuth Thruster (Refer to “Thruster number”.)
Generator	Generator
RADAR1(TT RX)	RADAR1
RADAR2(TT RX)	RADAR2
S-JOY 1 to 5	This setting is used when MFD connects to S-JOY produced by YDK. When changing the setting from Joystick (YDK) to S-JOY 1-5 or S-J I/O Unit + S-JOY 1-5, change all Joystick (YDK) settings for Main SLC and Sub SLC to "- " before changing the setting. - Autopilot(“PT-500_TCS_C_Ed1”, “PT-500_TCS_C_Ed2”,” PT-900_TCS_C”,” ANSCHUTZ” is selected) - S-JOY/Joystick 1 to 5
S-J I/O Unit + S-JOY 1 to 5 *2	
Joystick(YDK)	This setting is used when MFD connects to AP-JOY produced by YDK. When changing the setting from S-JOY 1-5 or S-J I/O Unit + S-JOY 1-5 to Joystick (YDK), change all S-JOY 1-5 or S-J I/O Unit + S-JOY 1-5 settings on the Main SLC and Sub SLC to "- " before changing the setting. - Autopilot(” PT-900_TCS_C” is selected) - S-JOY/Joystick 1 to 5
Joystick I/O Unit	This setting is used when MFD connects to JOY produced by Tokyo keiki. - Autopilot(“PR-6000_TCS_C”, “HCS-9000_TCS_C”,” TK_Kelvin” is selected) - S-JOY/Joystick 1 to 5
GPS Buoy	GPS Buoy
Plotter	Plotter
Other than sensors	
Alert(to CAM) *3	
Alert(from Subsystem) *3	
Alert(to BNWAS) *3	
IAS(MODBUS) *3	
IAS(NMEA) *3	
DSC *3	
NAV/Alert *3	
- *4	

(*1) TRI (Turn Rate Indicator): Indicates a device that transmits ROT.

(*2) S-J I/O stands for S-JOY I/O.

(*3) Used for alert handling. For details, refer to "4.8 CAM Configuration and Setting".
The following restrictions are imposed on [IAS(MODBUS)].

- Can be selected only for CH9 and CH10 of ALC. However, for CH10, [IAS (MODBUS)] can be selected only when [IAS(MODBUS)] is selected in CH9.
- For both CH9 and CH10, if the setting of CH9 is changed to the setting other than [IAS (MODBUS)] while [IAS(MODBUS)] is selected, the setting of CH10 becomes blank.

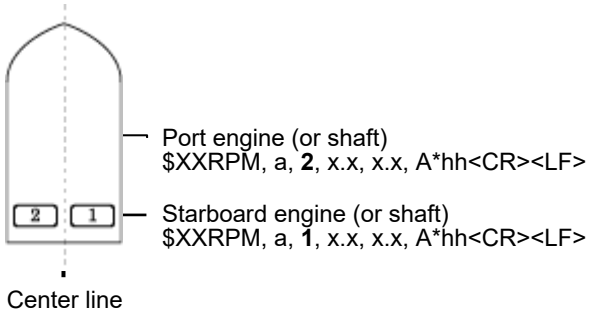
- The value that is set in the [Detail] dialog for CH9 is also reflected in the [Detail] dialog of CH10.
- When [IAS(MODBUS)] is selected for CH10, the [Diagnosis] lamp of CH10 is disabled.

(*4) In the case of the channel used for a data output, it is used.
Refer to "4.10 Setting Data Output".
[Channel settings for data output]
[CHx] check box : Check to enable the port.
[Sensor] combo box : " - "

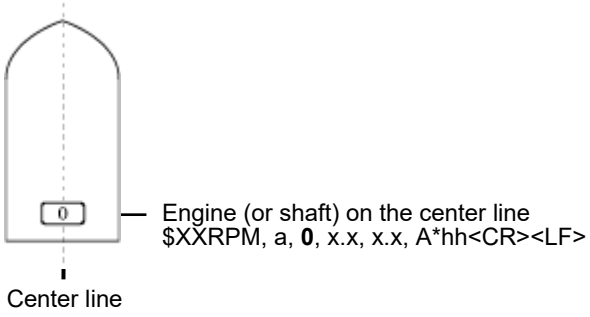
Engine number

The engine (or shaft) number is displayed in the RPM sentence as follows.

Engines two (or shafts)



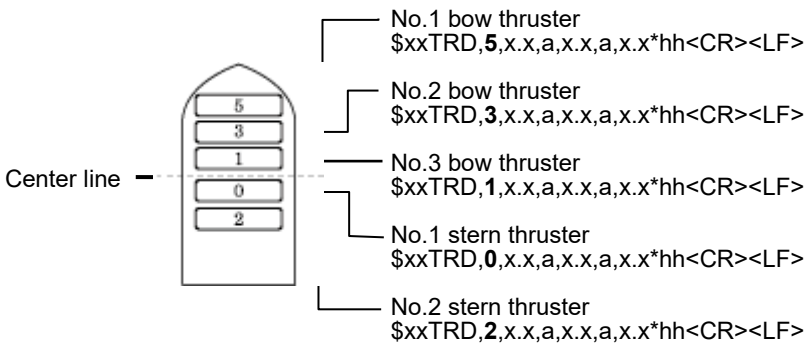
One engine (or shaft)



Thruster number

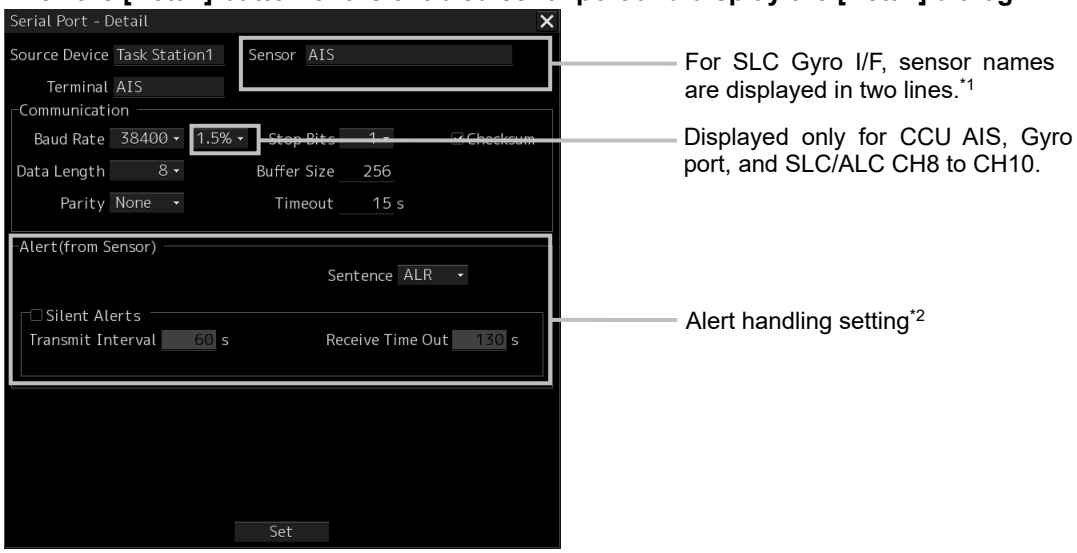
The thruster number is displayed in the TRD/TRC sentence as follows.

Three bow thrusters and two stern thrusters



To change the communication settings of the Serial Port

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

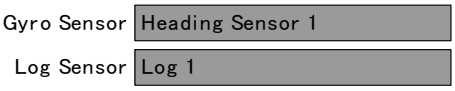


(*1) Sensor name display pattern

[For sensor other than SLC Gyro I/F]



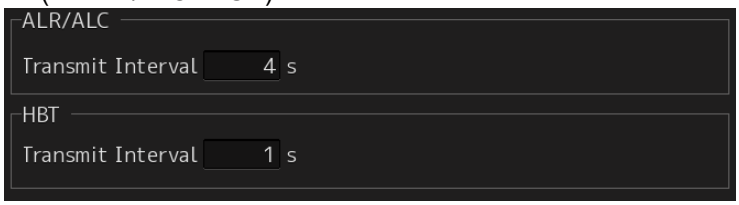
[For SLC Gyro I/F]



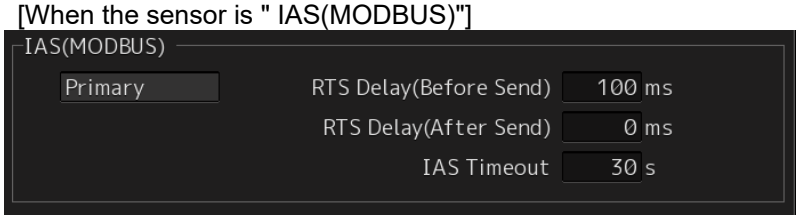
(*2) Display pattern of alert handling setting

[Various sensors (*1)]

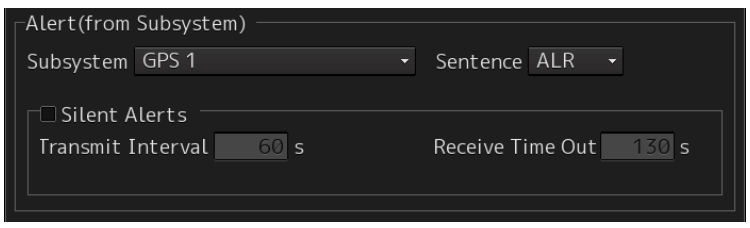
(*1) Other than "Alert(from Subsystem / to CAM / to BNWAS)", "DSC", "NAV/Alert", and "IAS(NMEA / MODBUS)"



[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", “NAV/Alert” 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 case of CCU AIS port, Gyro port, and SLC/ALC 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 4-5 Selectable baud rates").
[Baud Rate] addition ratio combo box	The combo box is displayed in the case of CCU AIS port, Gyro port *1, and SLC/ALC 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 port from the combo box.	5/6/7/8
Parity	Select the parity of the corresponding serial port from the combo box.	None/Odd/Even
Stop Bits (Stop Bit Length)	Select the stop bit length of the corresponding serial port from the combo box.	1/2
Buffer Size	Enter the buffer size of the corresponding serial port in the box.	0 to 10240 bytes
Time Out	Enter the time-out duration of the corresponding serial port on the box.	0 to 999s

Setting Item	Description of Setting	Setting Value
Checksum	Check 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, sensor), BNWAS, and General Equipment. The number of selectable General Equipment varies depending on the number of actually installed General Equipment (1 to 10).
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 include CAM, select TCS. In other cases, select AMS.	AMS/TCS
ALR/ALC	Displayed only when “IAS(NMEA)”/Alert(to BNWAS)” is selected as the sensor. Set a transmit interval (alert transmission cycle) within the range from 1 to 60 seconds.	1 to 60
HBT	Displayed when other than “DSC”, “NAV/Alert”, “- (not selected)”, and “IAS (MODBUS)” is selected as the sensor. To use the sensor other than “Alert(to BNWAS)”, check the check box. Set a transmit interval (alert transmission cycle) within the range from 1 to 30 seconds.	1 to 30
[Primary/Secondary] display	Displayed only when “IAS (MODBUS)” is selected as the sensor. Select the line to be used for the input to MODBUS.	Primary/Secondary
[RTS Delay(Before Send)] input box	Displayed only when “IAS (MODBUS)” is selected as the sensor. Set a transmission delay time (pre-transmission) of MODBUS communication.	0 to 500
[RTS Delay(After Send)] input box	Displayed only when “IAS (MODBUS)” is selected as the sensor. Set a transmission delay time (post-transmission) of MODBUS communication.	0 to 500
[IAS Timeout] input box	Displayed only when “IAS (MODBUS)” is selected as the sensor. Set a MODBUS communication timeout time. When 0 is selected, timeout is not detected.	0 to 30

Table 4-5 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
Autopilot (when Alphapilot MFM is selected)	4800/9600/19200

Note

In the case of the serial port to which "IAS (NMEA)" is assigned, carry out network transmission setting of Primary(connects to SLCx(Main)), and Secondary (connects toSLCx(Sub)) to the same setup.

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.

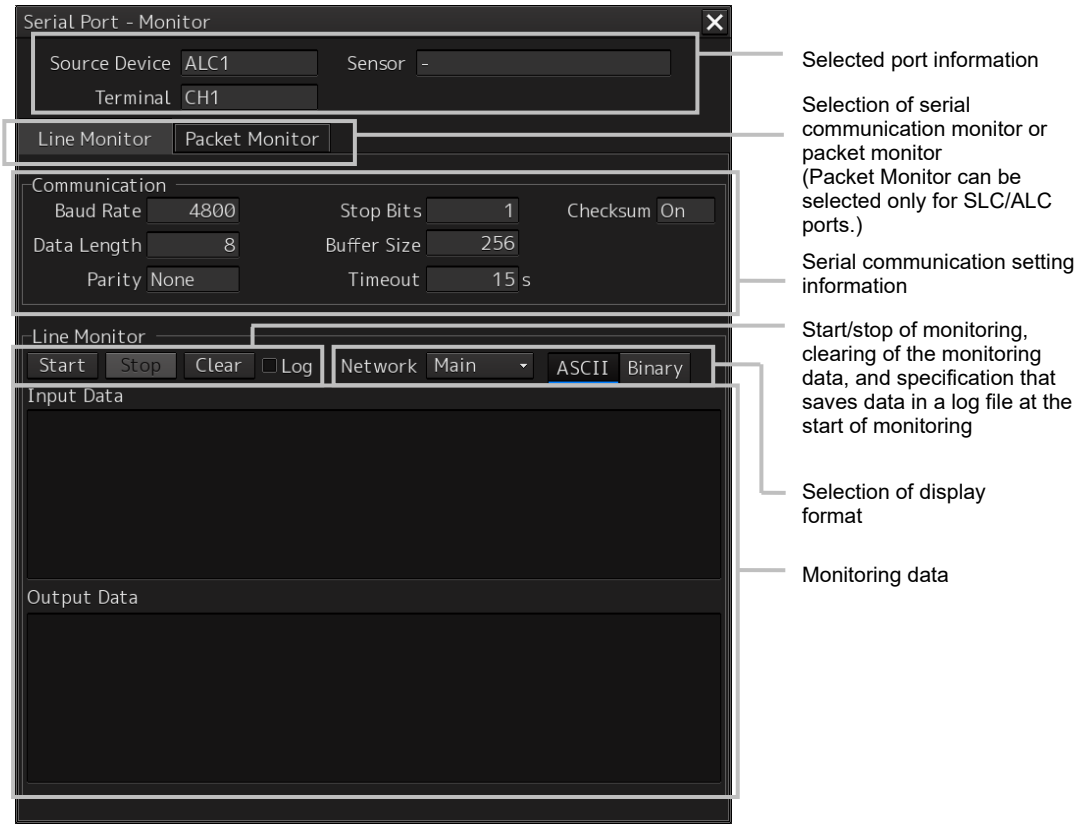
Line Monitor: Displays the serial port communication data.
Packet Monitor: Displays the LAN communication status between the SLC/ALC and this equipment. (Only for SLC/ALC serial ports)

Memo

- For the sentence format, refer to "Chapter 6 Sentence Format."
- When communication statuses are displayed on multiple equipment units through one port, and any of the equipment unit stopped monitoring, monitoring stops at all the equipment units. In this case, restart monitoring.

Line Monitor

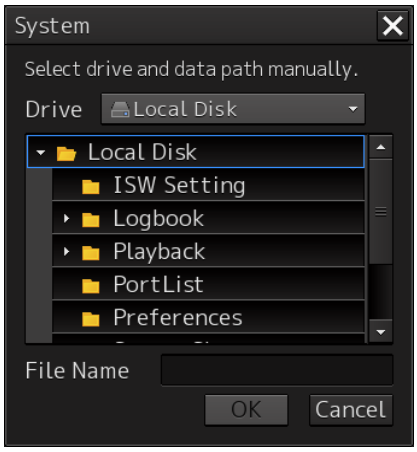
1 Click on the [Monitor] button of the enabled serial port to display the [Monitor] dialog box.



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, check the [Log] check box, and then click on the [Start] button. A dialog box is displayed for selecting the file to be saved.



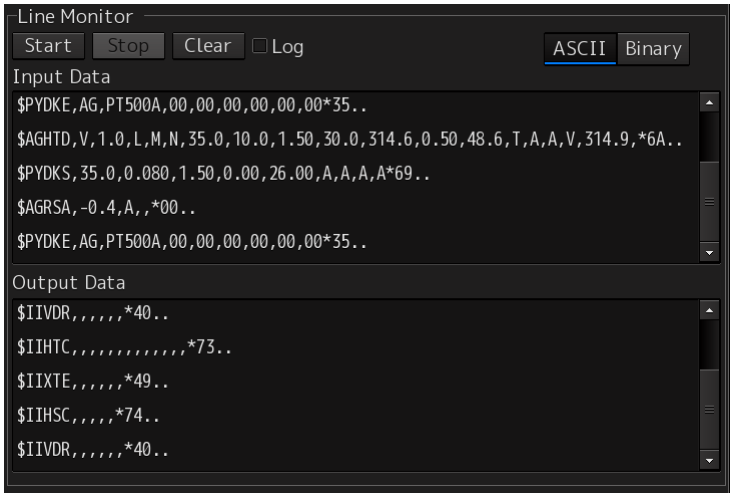
Enter the file name and click on the [OK] button. Monitoring will be started.

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.

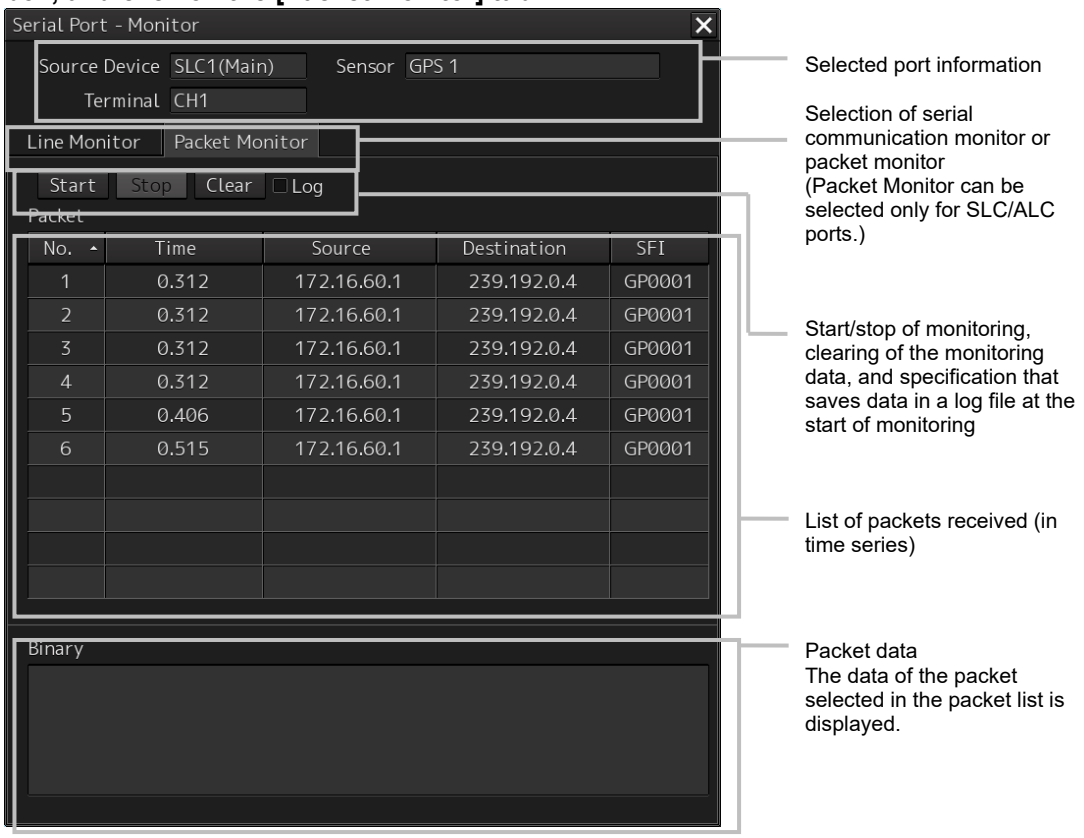
<Monitoring data display example>



3 Click on the [Stop] button to stop monitoring.

Packet Monitor

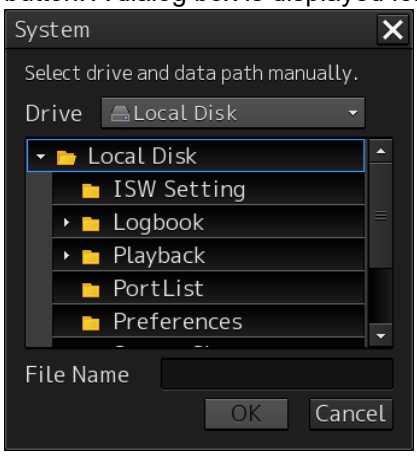
1 Click on the [Monitor] button of the enabled serial port to display the [Monitor] dialog box, and click on the [Packet Monitor] tab.



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, check the [Log] check box, and then click on the [Start] button. A dialog box is displayed for selecting the file to be saved.

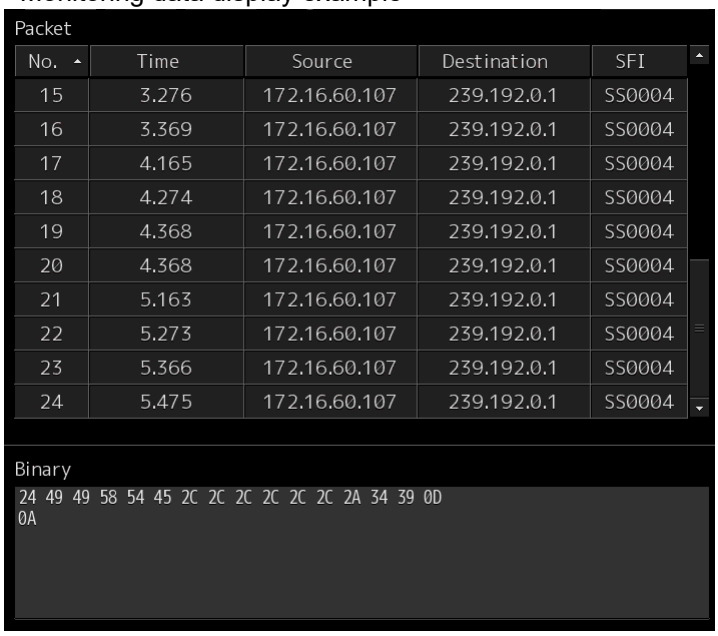


Enter the file name and click on the [OK] button. Monitoring will be started.

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.

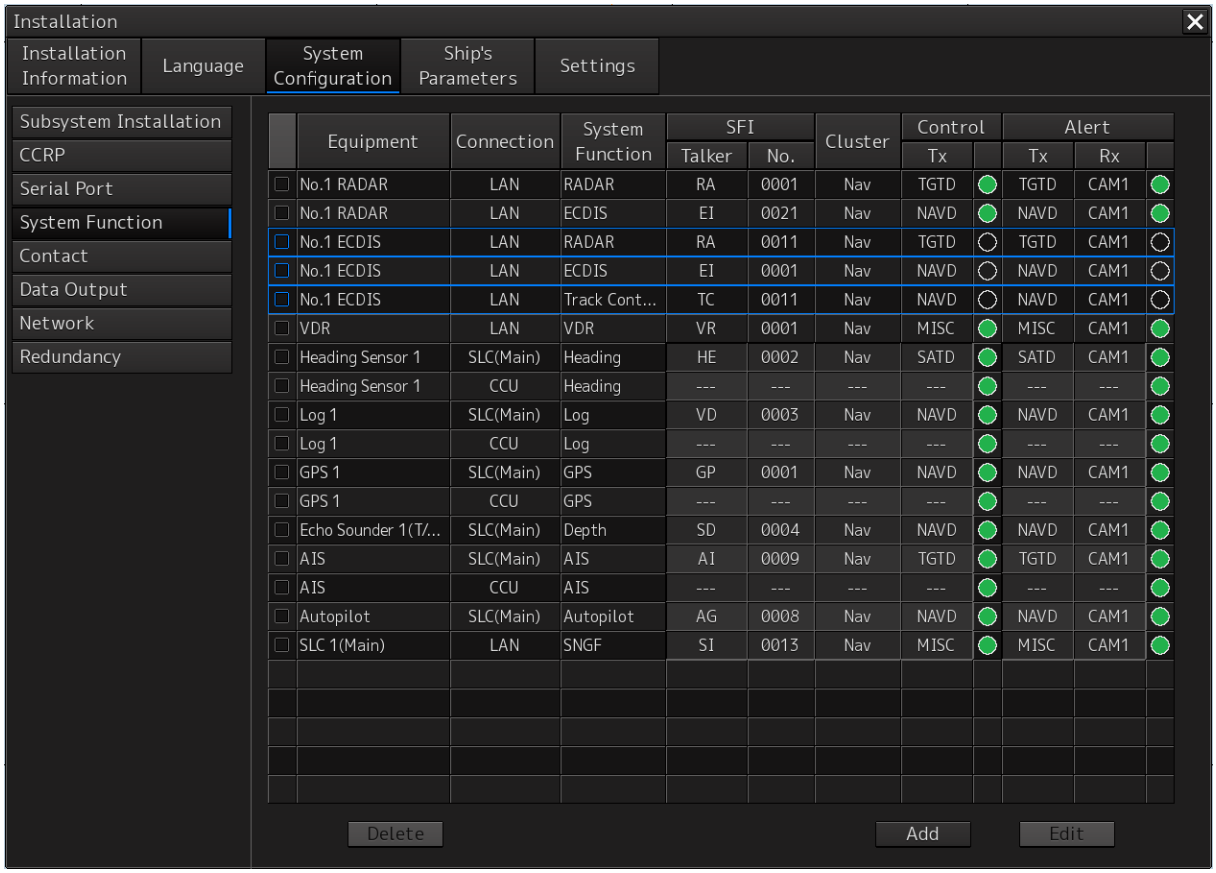
4.7 System Function [ALL]

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)*4	Transmission Group (Alert) Transmit*4	Transmission Group (Alert) Receive*5
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	-	-
BNWAS	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

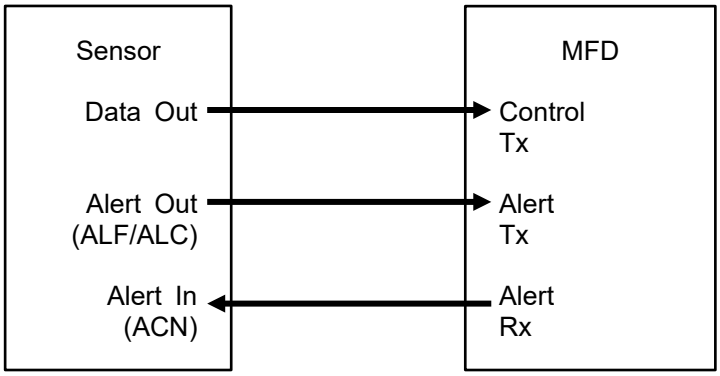
*1 Only NMEA is supported.

*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.

*4 Transmitted by the sensor (received by the MFD).

*5 Received by the sensor (transmitted by the MFD).



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

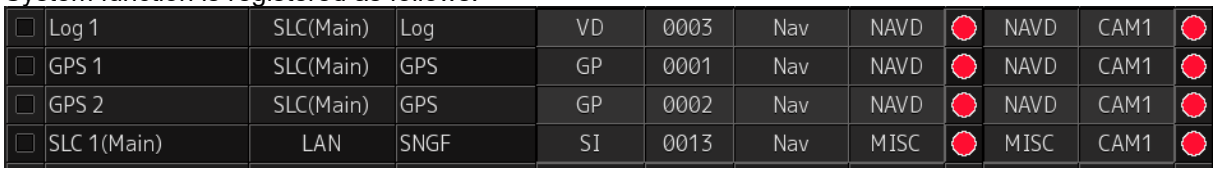
For example1)

SLC1(Main) setting on [Serial Port] dialog.



Equipment	Channel No.
GPS1	1
GPS2	2
Log1	3

System function is registered as follows.



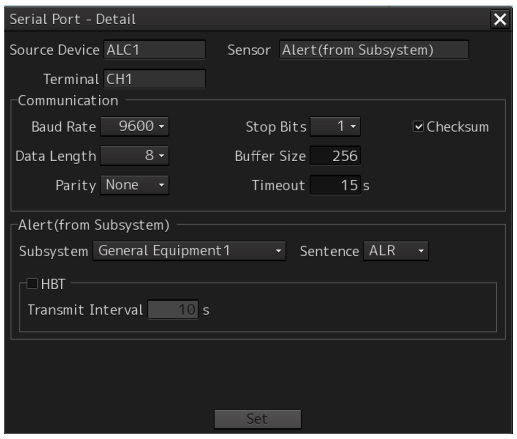
Equipment	System Function	TalkerID Mnemonic	TalkerID Instance No	Cluster	Transmission Group (Control/Data)	Transmission Group (Alert) Transmit	Transmission Group (Alert) Receive
GPS 1	GPS	GP	0001	Nav	NAVD	NAVD	CAM1
GPS 2	GPS	GP	0002	Nav	NAVD	NAVD	CAM1
Log 1	Log	VD	0003	Nav	NAVD	NAVD	CAM1
SLC1(Main)	SNGF	SI	0013	Nav	MISC	MISC	CAM1

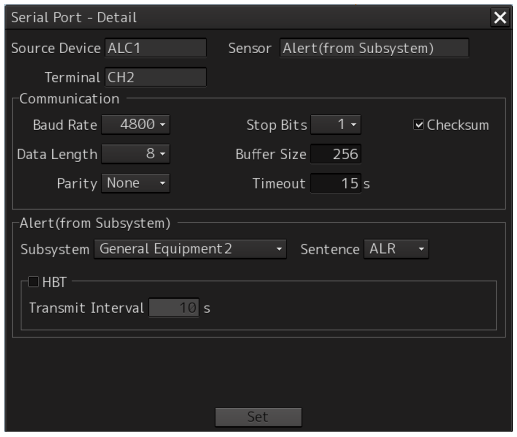
For example2)

ALC1 setting on [Serial Port] dialog.

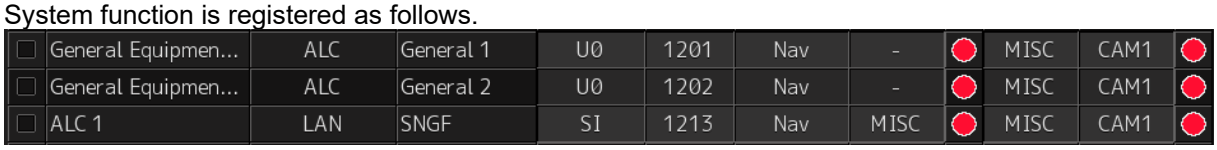


Equipment	Channel No.
General Equipment1	1
General Equipment2	2





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 (Primary function)	II0023	CA0023
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

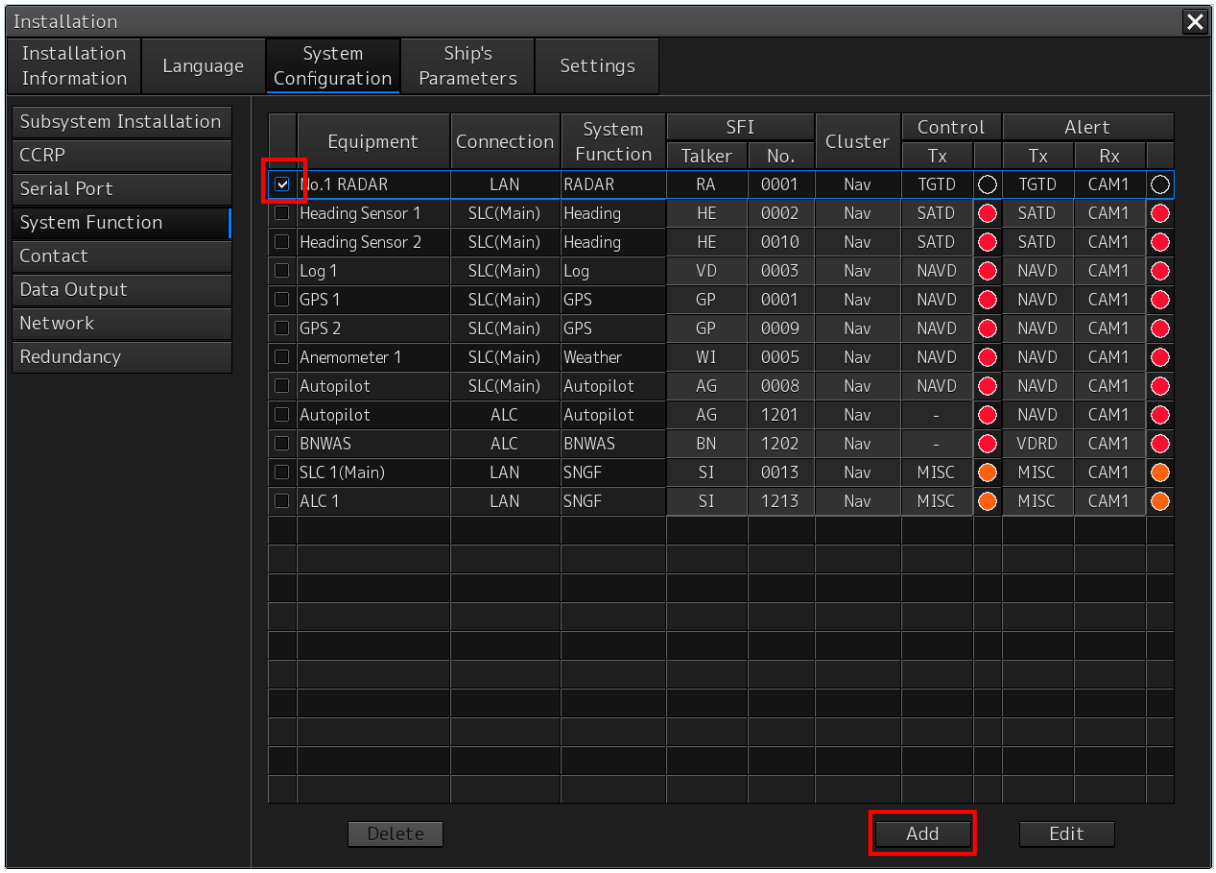
- If JRC's AMS needs to be connected to RADAR, ECDIS, and CONNING manufactured by another company's, set General Equipment (Alert) in [Device installation].

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.

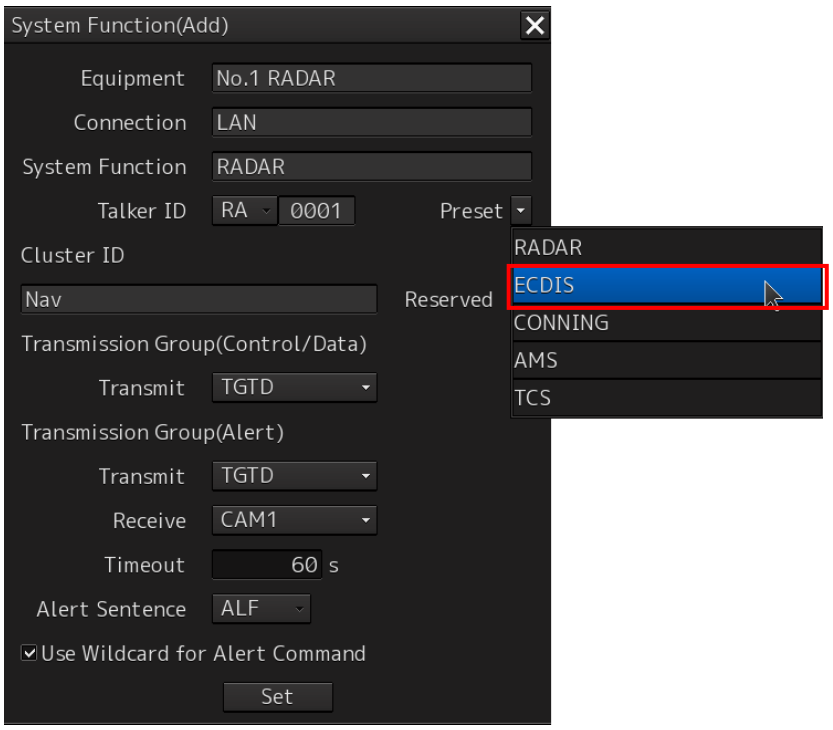
For example1)

If the task station (primary function: RADAR) needs ECDIS and CONNING function, add the system function of ECDIS and CONNING.

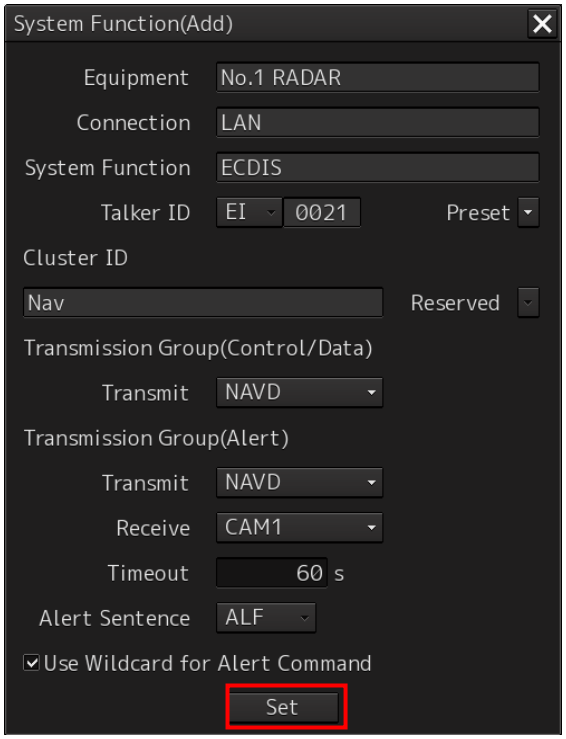
1. Check the checkbox of RADAR and click the [Add] button.



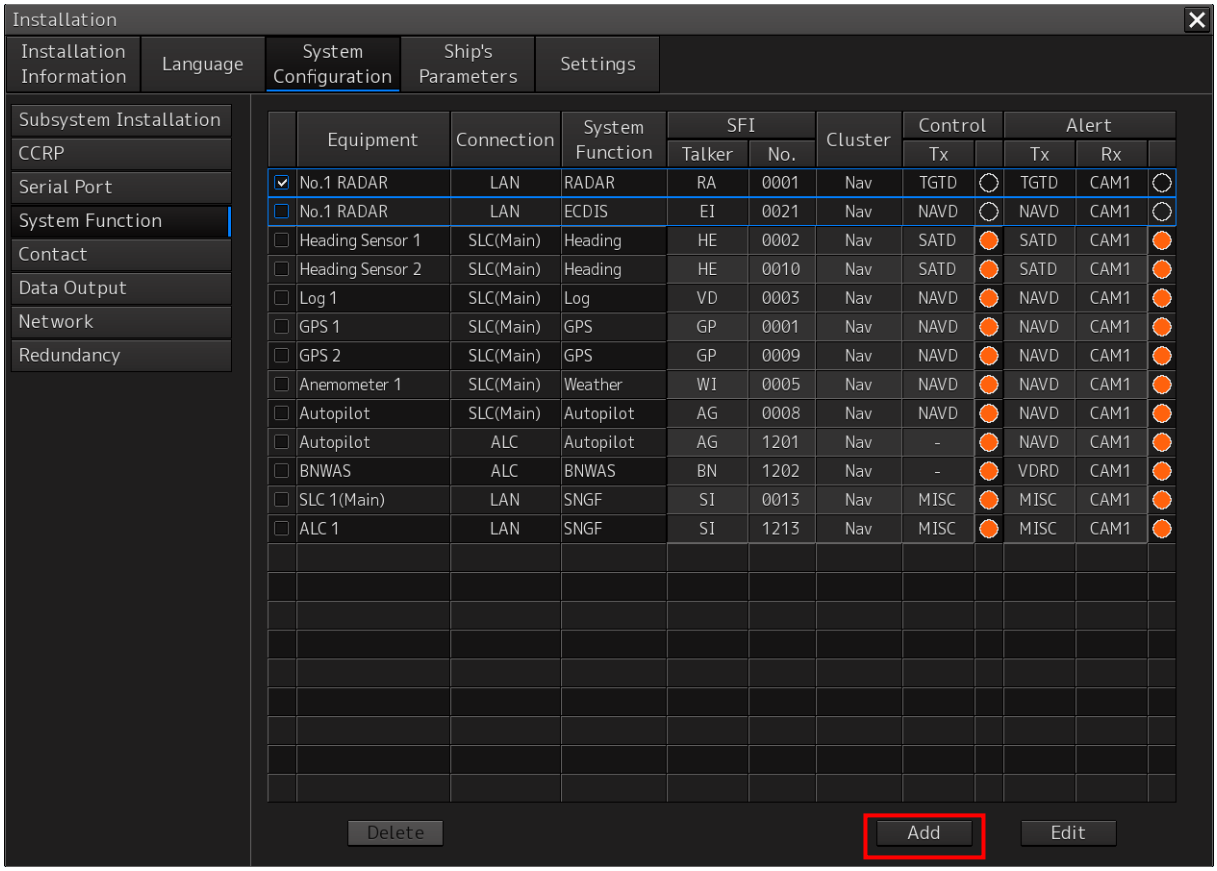
2. Select ECDIS on the preset combo box.



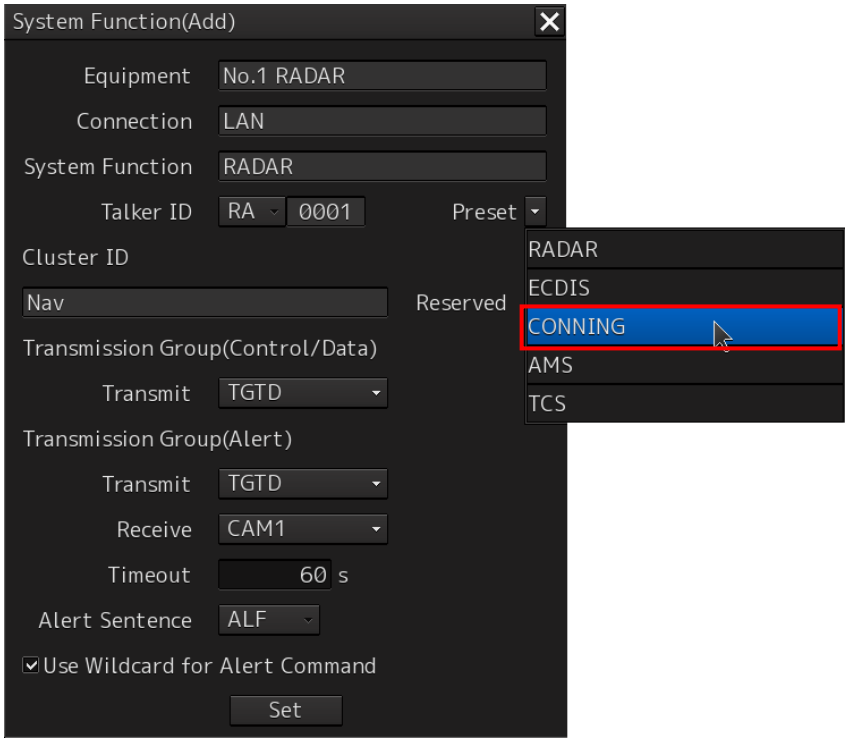
3. Click the [Set] button.



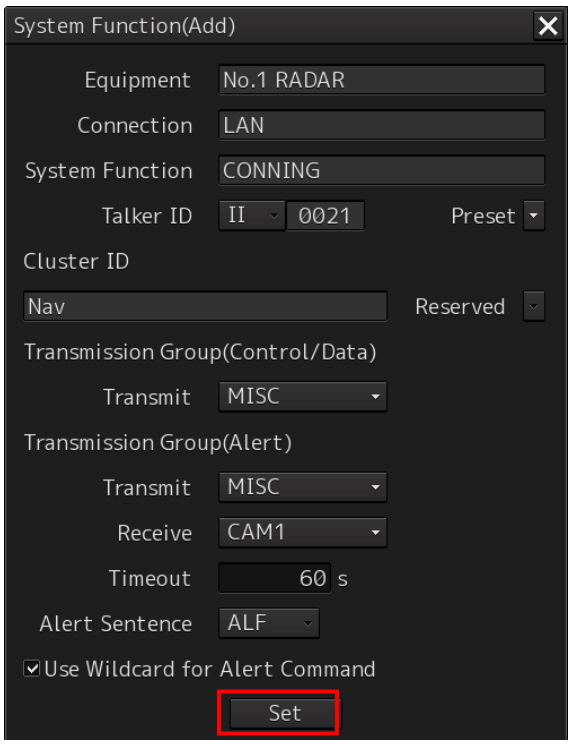
4. ECDIS system functions are added. Click the [Add] button again.



5. Select CONNING on the preset combo box.



6. Click the [Set] button.



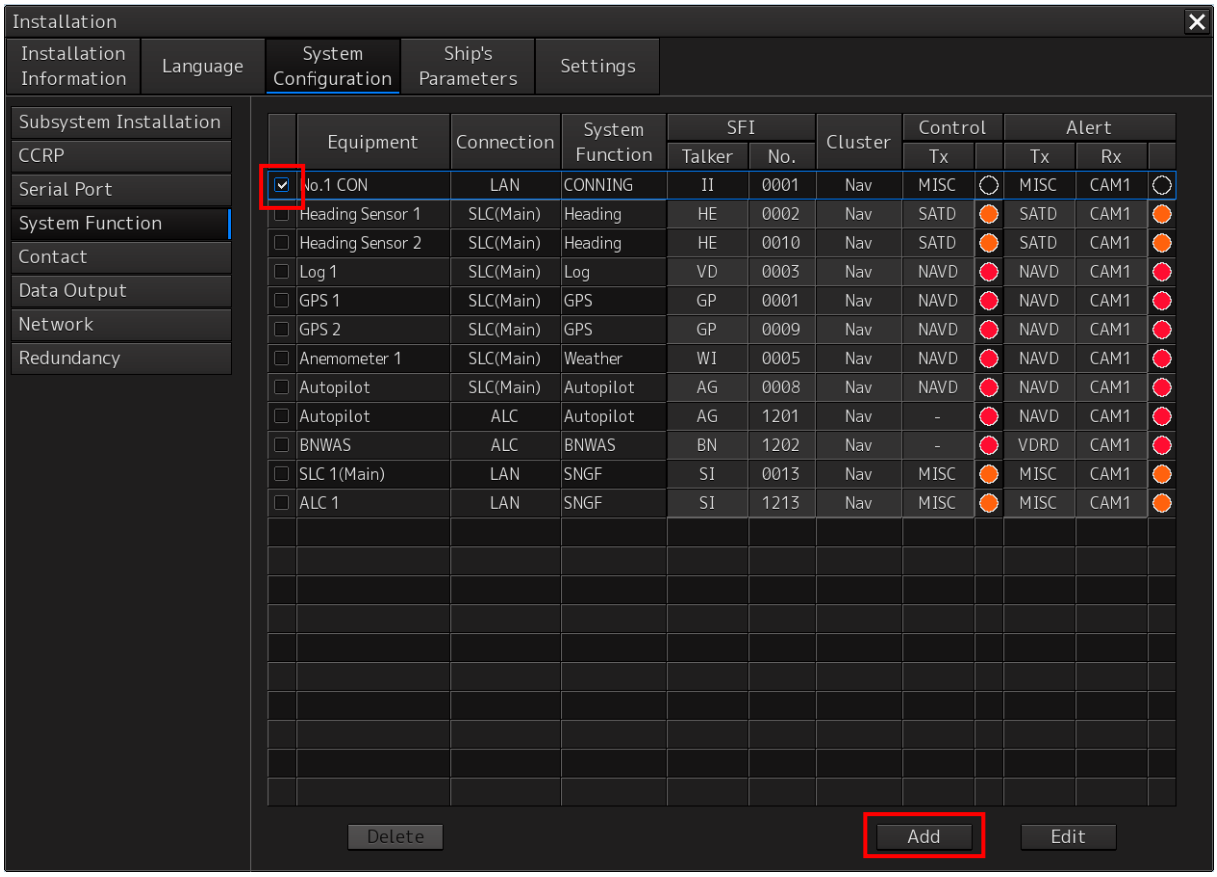
7. CONNING system functions are added.

☑	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	◯

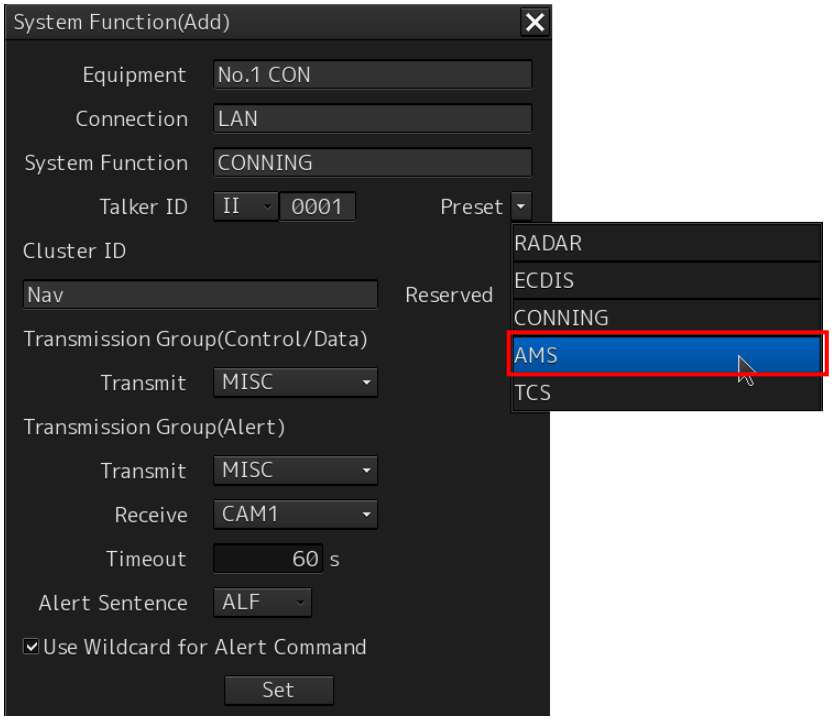
For example2)

If the task station (primary function: CONNING) needs AMS function, add the system function of AMS(CAM).

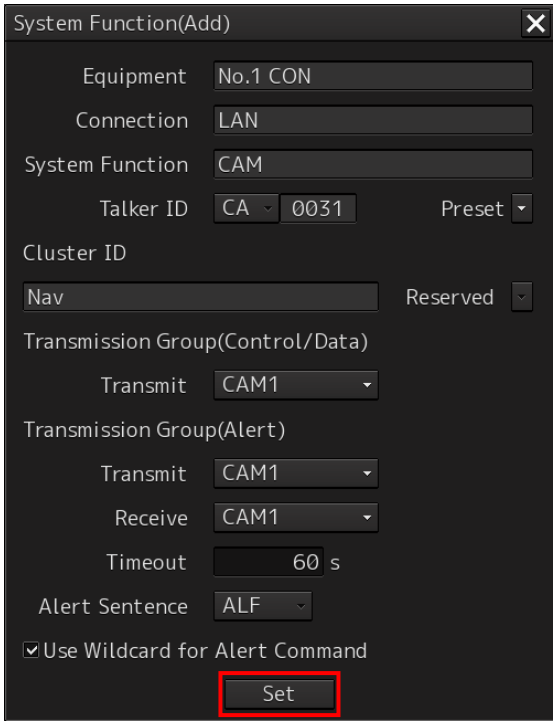
1. Check the checkbox of CONNING and click the [Add] button.



2. Select AMS on the preset combo box.



3. Click the [Set] button.



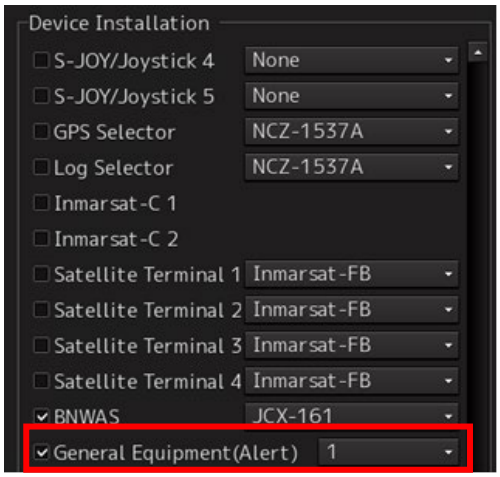
4. CAM system functions are added.

☑	No.1 CON	LAN	CONNING	II	0001	Nav	MISC	◯	MISC	CAM1 ◯
☐	No.1 CON	LAN	CAM	CA	0031	Nav	CAM1	◯	CAM1	CAM1 ◯

For example3)

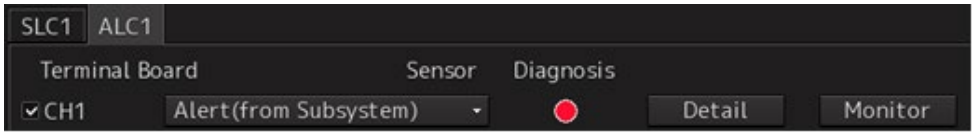
When JRC's AMS needs to be connected to RADAR manufactured by another company's, set as follows.

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.

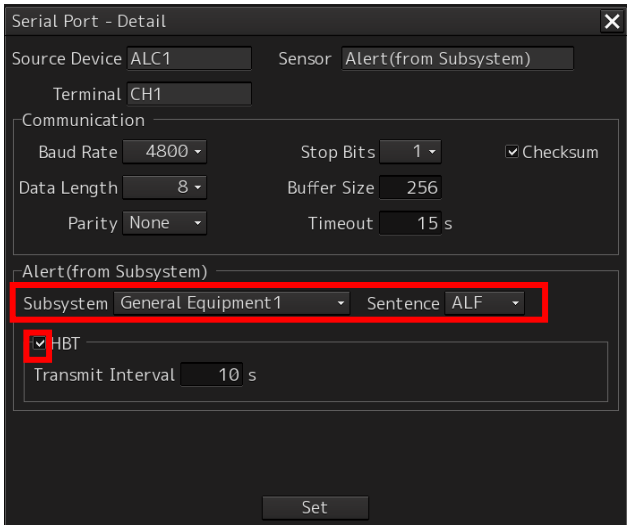


Press the Detail button and set the following.

Subsystem: General Equipment1

Sentence: ALF

HBT: Check

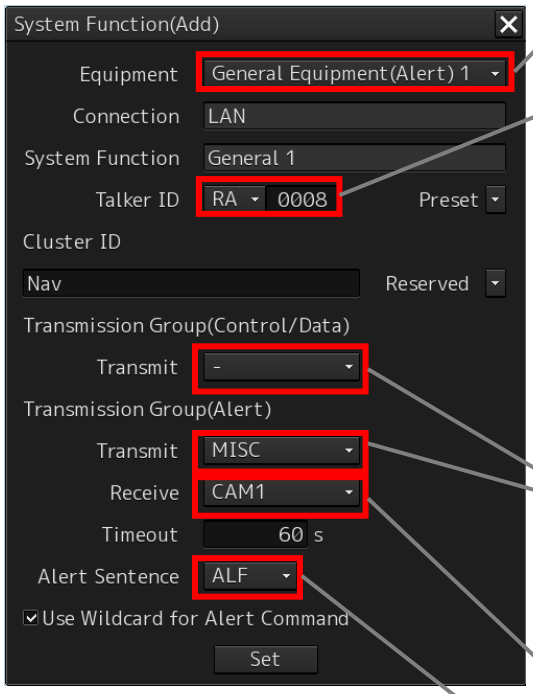


System function is registered as follows.



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].

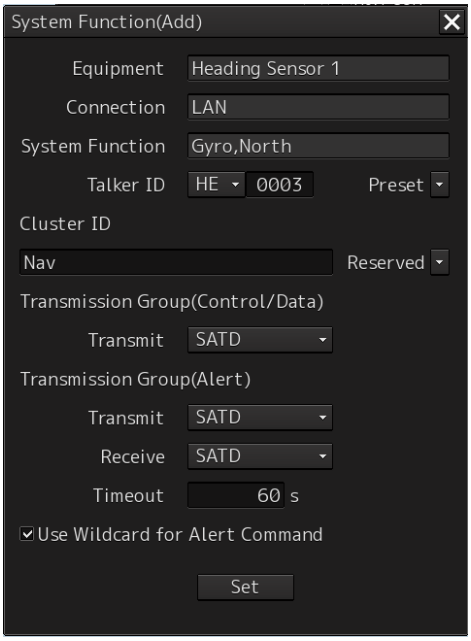
Transmit: Set according to the settings of the connected device. For the combination of the IP address and port number of the transmission group setting name, refer to * 4 of " Add a system function (New equipment)".

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	●

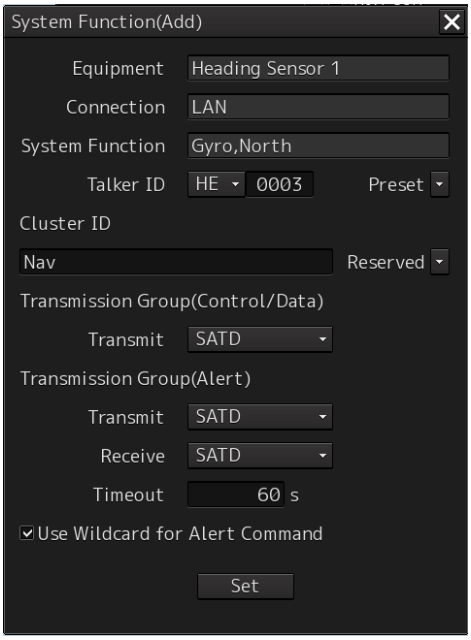
*6: Talker ID Mnemonic, Talker ID Instance No, Transmission Group (Control/Data), Transmission Group (Alert) Transmit and Transmission Group (Alert) Receive can also be set by selecting Equipment on the preset combo box. The following default values will be set.

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

Equipment	System Function	TalkerID Mnemonic	TalkerID Instance No	Transmission Group (Control/Data)	Transmission Group (Alert) Transmit	Transmission Group (Alert) Receive
General Equipment(Alert) 2	General 2	U0	0002	-	MISC	CAM1
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)

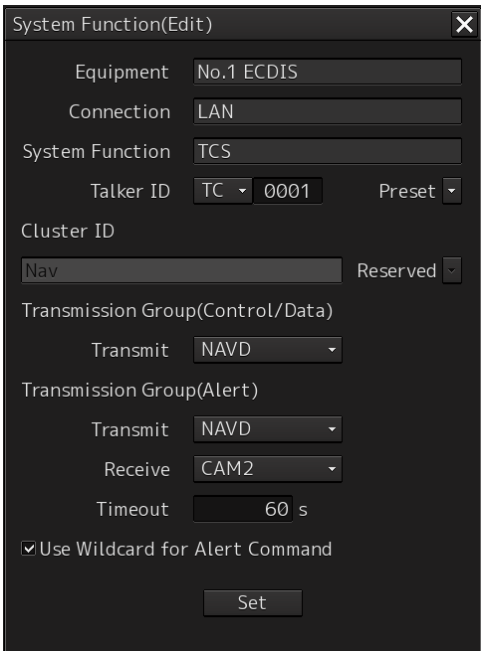
Select the check box and Click the [Add] button and display the [System Function (Add)] dialog.



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.

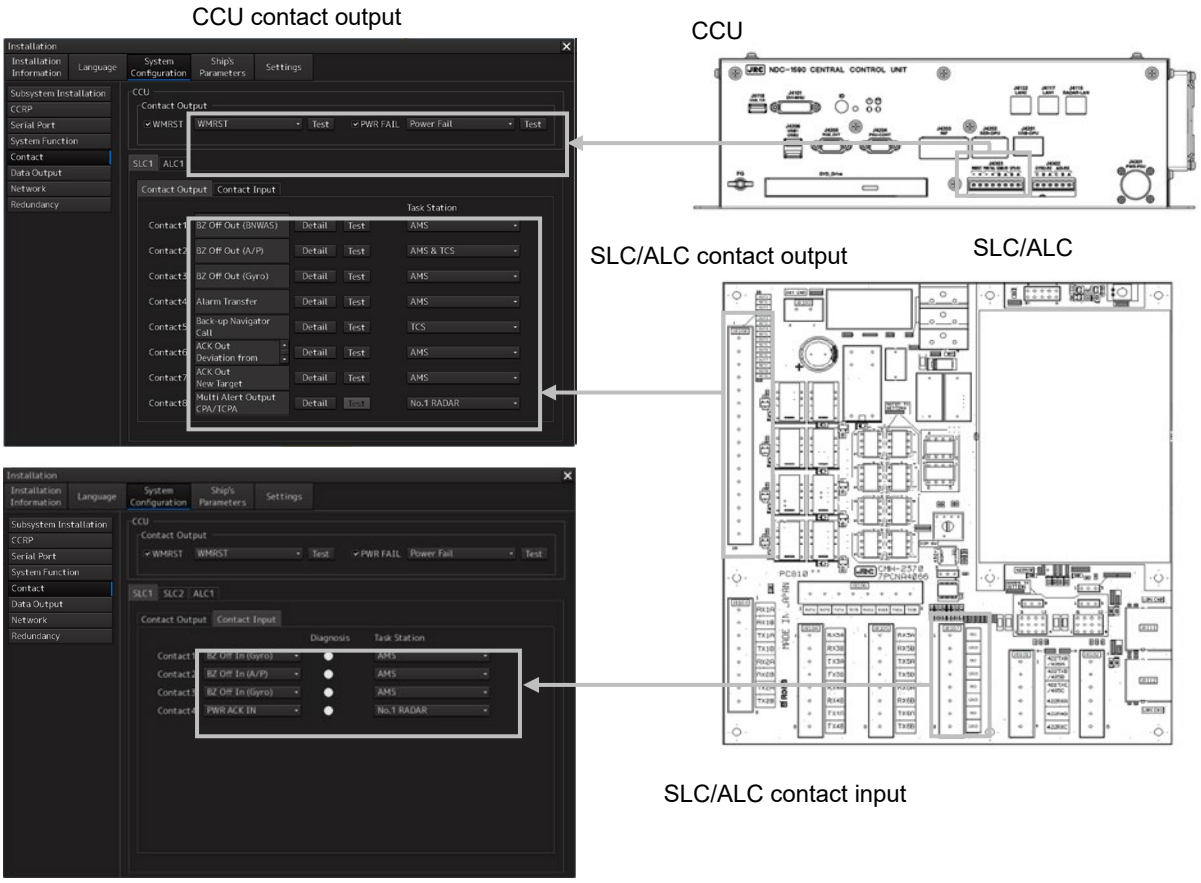
Delete a system function

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.

4.8 Setting Contacts (Contact Input/Output) [ALL]

In the [Contact] dialog, functions can be assigned to the input/output of the contacts that belong to CCU and SLC/ALC.

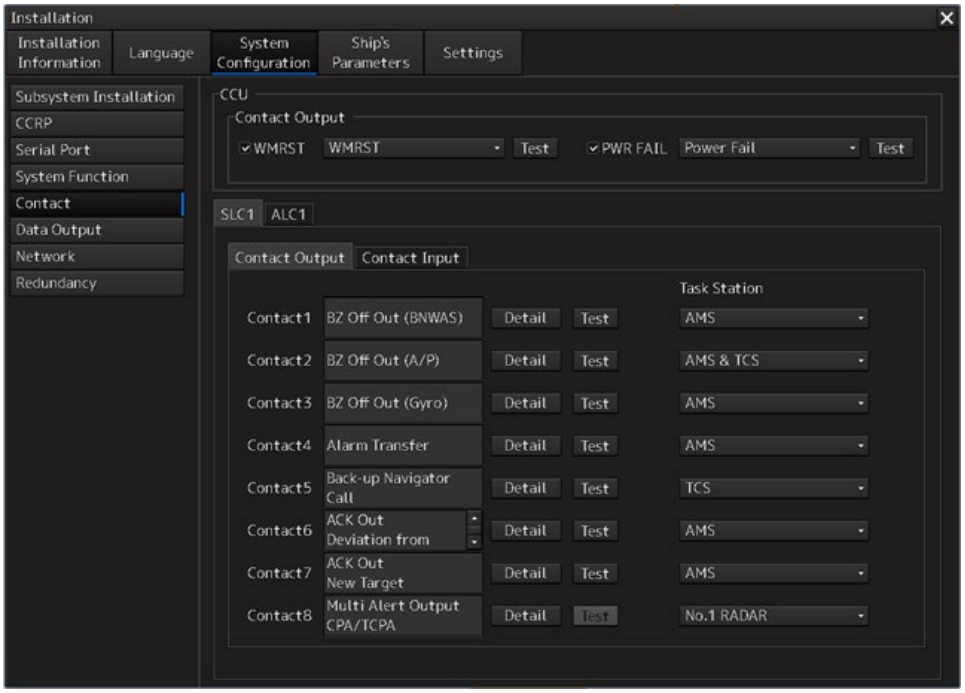


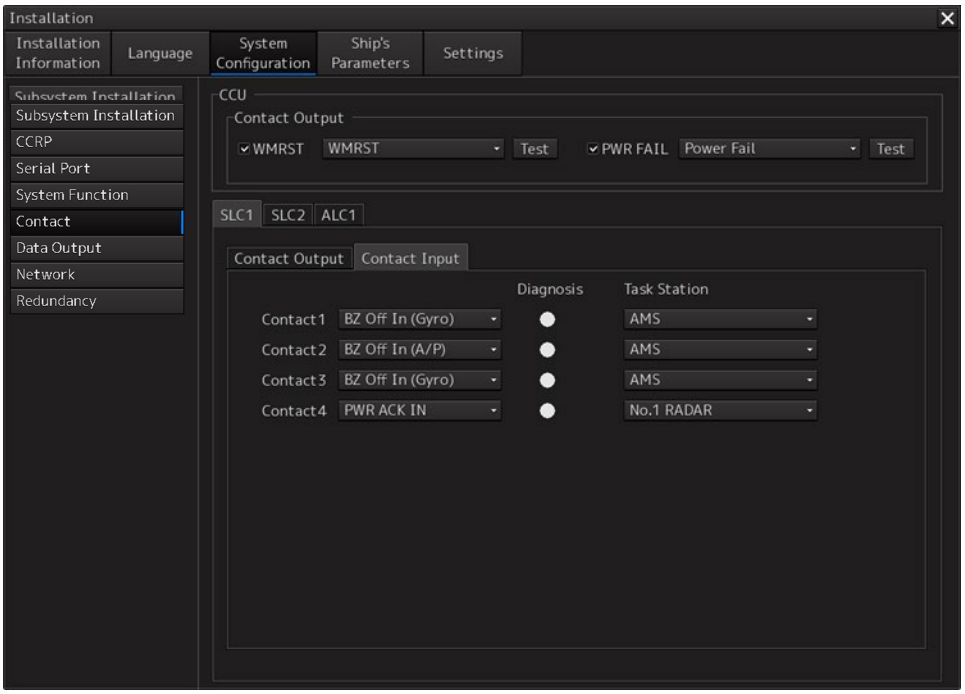
Displaying the [Contact] dialog

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(M) to SLC4(M)/SLC1(S) to SLC4(S)/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.

Enabling the watch timer reset contact output of the CCU

1 **Check 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)

Enabling the contact output for PWR FAIL of the CCU

1 **Check 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 (the operation varies according to an assigned license.)
  Operation in the system with AMS license:
  The message is output when the CAM in other task stations other than CAM becomes invisible. The message is output by CAM when the ALC in which Alarm Transfer that outputs an alert to BNWAS becomes invisible.
  Operation in the system without AMS license:
  The alarm is output when any of the SLCs that are installed resulted in a communication error regardless of Main/Sub of SLC.
  (For details of INS System Fail, refer to "4.8 CAM Configuration and Setting.")
- 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)

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)
- BZ Off In(General 1～10)（Buzzer Off input from General Equipment）
- PWR ACK IN (PWR ACK input)
- FWD/AFT Switch (FWD/AFT console switching input)
- NAV. Mode Switch (Mode switching input of Azimuth Thruster that is displayed on the information monitoring window)
- Remote TX/STBY Switch（Switch RADAR TX / Stand-by by pulse input from the RADAR remote switch connected with the contact.）

(*1) Refer to "4.8 CAM Configuration and Setting".

4 Select the task station to be used by the [Task Station] combo box to the point of contact to which the function is assigned.

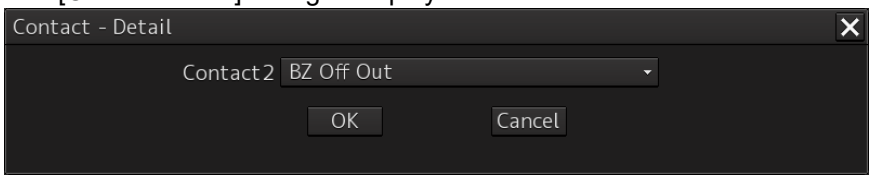
- In the case of the item referred to at all the task stations, select "All".
- The task stations that can be assigned vary depending on the function that is allocated or presence/absence of the AMS license.
- Operation in the system with AMS license
  In BZ Off In(BNWAS)/BZ Off In(A/P)/BZ Off In(Gyro), the setting is fixed to "AMS".
- Operation in the system without AMS license
  In BZ Off In(BNWAS), the setting is fixed to "All".
  In BZ Off In(A/P) or BZ Off In(Gyro), one of the task stations, or "All" can be selected.
- When the task station that is set is applicable to the assignment target, Active/Inactive is displayed by the [Diagnosis] lamp for each function.
- Lit in green: Active
  Off: Inactive

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.

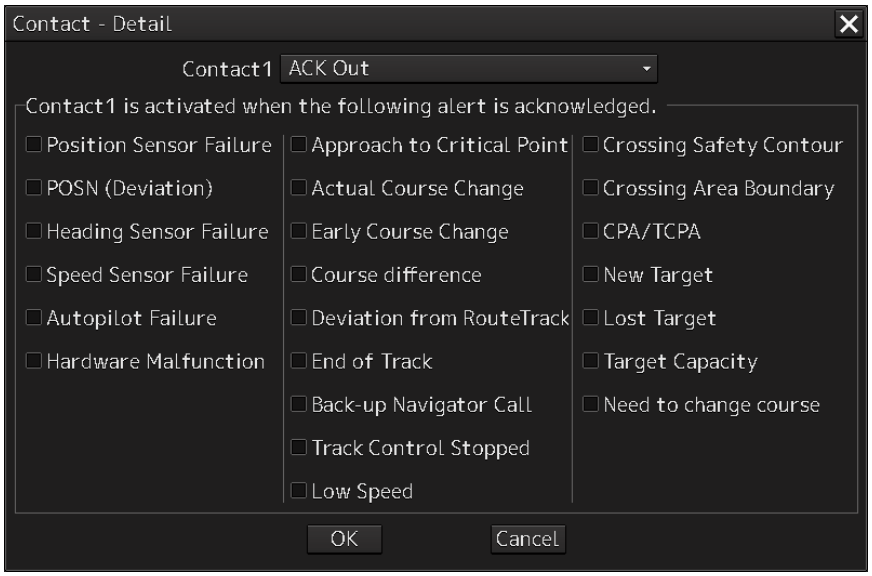


3 Click on the function to be assigned from the combo box.
For the functions that can be assigned, refer to "Table 4-6 Contact outputs that can be selected".

When selecting [ACK OUT]

Check boxes are displayed in the [Contact-Detail] dialog box.

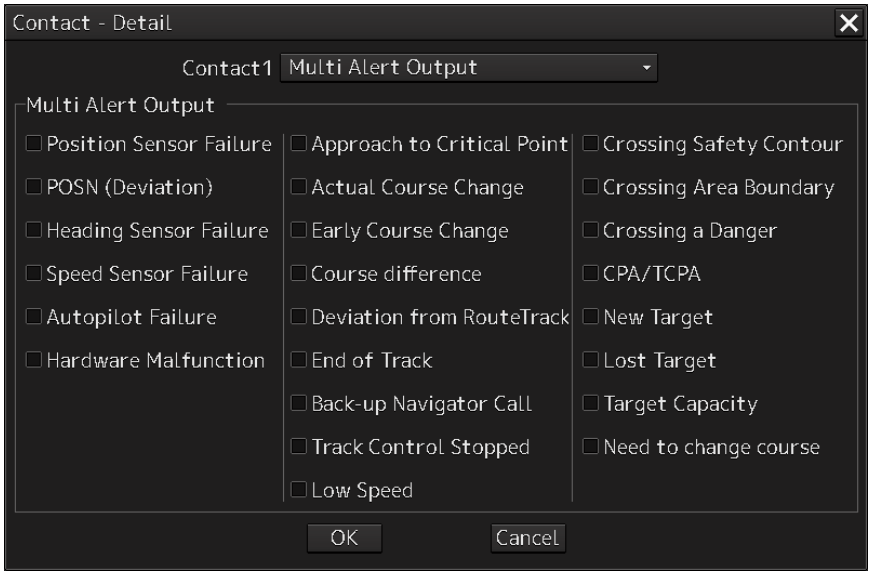
Select the alert to be enabled by checking the check box of it. When the selected alert is acknowledged, the contact is activated.



When selecting [Multi Alert Output]

Check boxes are displayed in the [Contact-Detail] dialog box.

Select the alerts to be enabled by checking 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 Select the task station to be used by the [Task Station] combo box to the point of contact to which the function is assigned.

- 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 4-6 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	Operation in the system with AMS license: The message is output when the CAM in other task stations other than CAM becomes invisible. The message is output by CAM when the ALC in which Alarm Transfer that outputs an alert to BNWAS becomes invisible. Operation in the system without AMS license: The alarm is output when any of the SLCs that are installed resulted in a communication error regardless of Main/Sub of SLC.
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

Contact output that can be selected	Description
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 (not selectable for Ocean Explorer INS)

(*1) Refer to "4.9 CAM Configuration and Setting".

(*2) When [Back-up Navigator Call] is selected as the contact output, [TCS] is added to the options of [Task Station].

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 operate the [Test] button, the task station that is output for test must have been specified in the Task Station combo box.**

> **Memo**
> When “BZ Off Out(A/P)” is selected, the [Test] button is enabled when own equipment has the TCS or AMS license. When the TCS and AMS licenses are not available, the button is disabled.

5. **To stop test output, turn off the light by clicking on the [Test] button again.**

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.**
4. **To operate the Diagnosis lamp, the task station whose display is to be confirmed must have been specified in the Task Station combo box.**
5. **Green lamp display: On (Active) status**
   White lamp display: Off (Normal) status

4.9 CAM Configuration and Setting [ALL]

This section explains alert handling settings to configure the CAM (Central Alert Management) function. AMS license is necessary for the Display Unit to which the CAM function is to be set. For the details, refer to "4.13 Redundancy".

Note
The CAM system with software maintenance No. 01.XX.XXX does not support INS. If INS is installed in vessel, do not install CAM system with software maintenance No. 01.XX.XXX. Software maintenance No. can be confirmed from [Menu]-[Maintenance]-[System Information].

4.9.1 Install / Update procedure for BAMS Alert database

This document is described about the install and updating procedures for BAMS alert database（BAM file）

1. Items for updating

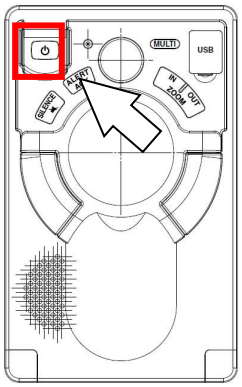
Items	Amount	Note
USB flash memory	1	USB flash memory should include BAM Editor and BAM file.
BAM Editor	1	Newest Software version of BAM Editor should be included in a folder of USB flash memory.
BAM file	1	BAMS Alert database files to be updated should be included in a folder of USB flash memory.

2. Procedure

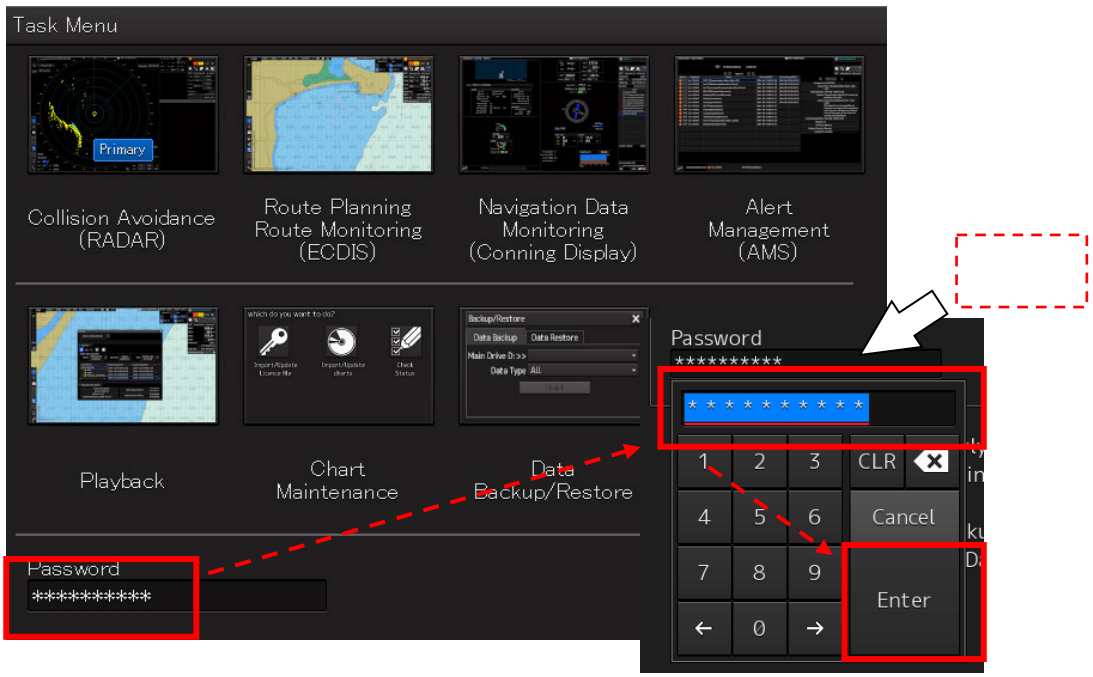
Note

- **Installing new BAM file on each MFD equipment**
- **Any modification of BAM file is needed, be sure to ask to JRC Service Dept to avoid unexpected system error. (If BAM file was modified, Reporting a creation of new BAM file to JRC Service Dept.)**

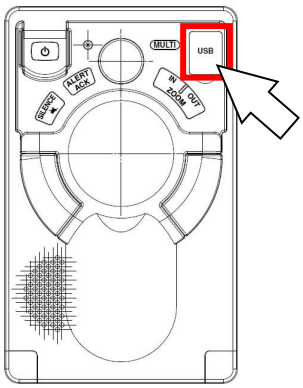
1) Turn the power of MFD on.



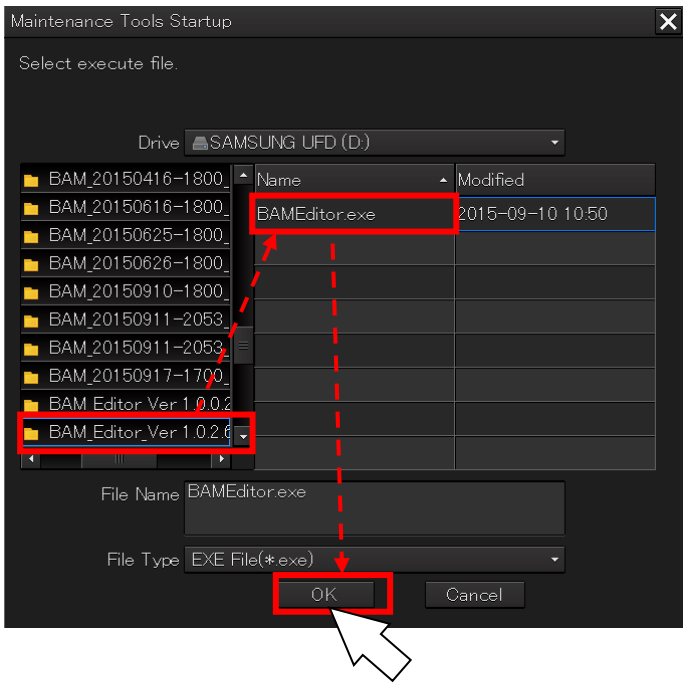
2) On the task menu, enter a password "**1074**", and left click [**Enter**] button .



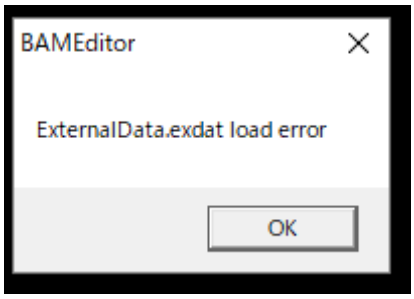
3) The "**maintenance tool Startup**" dialog appears. After that, insert the USB flash drive containing the BAM editor into the USB port of the trackball operation unit.



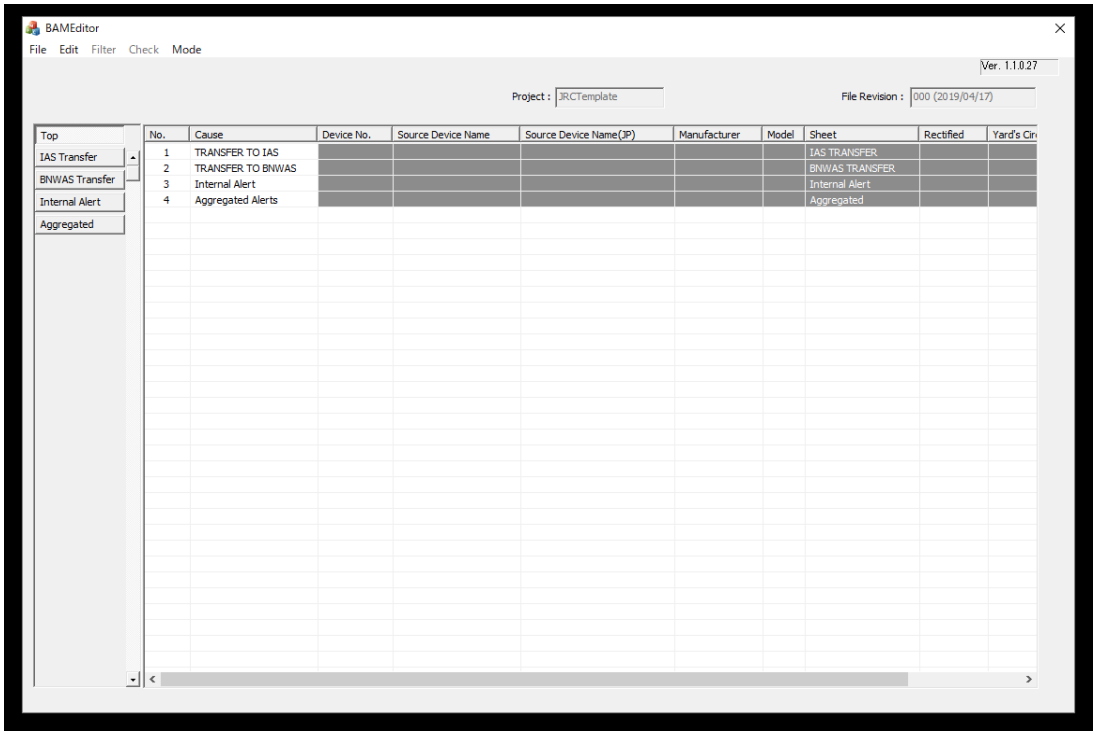
4) Select "**BAMEditor.exe",** and Left click [**OK**] button.



5) If no BAM file is installed on your system, "**ExternalData.exdat load error**" dialog will appear. If it is displayed, click on the [**OK**] button.

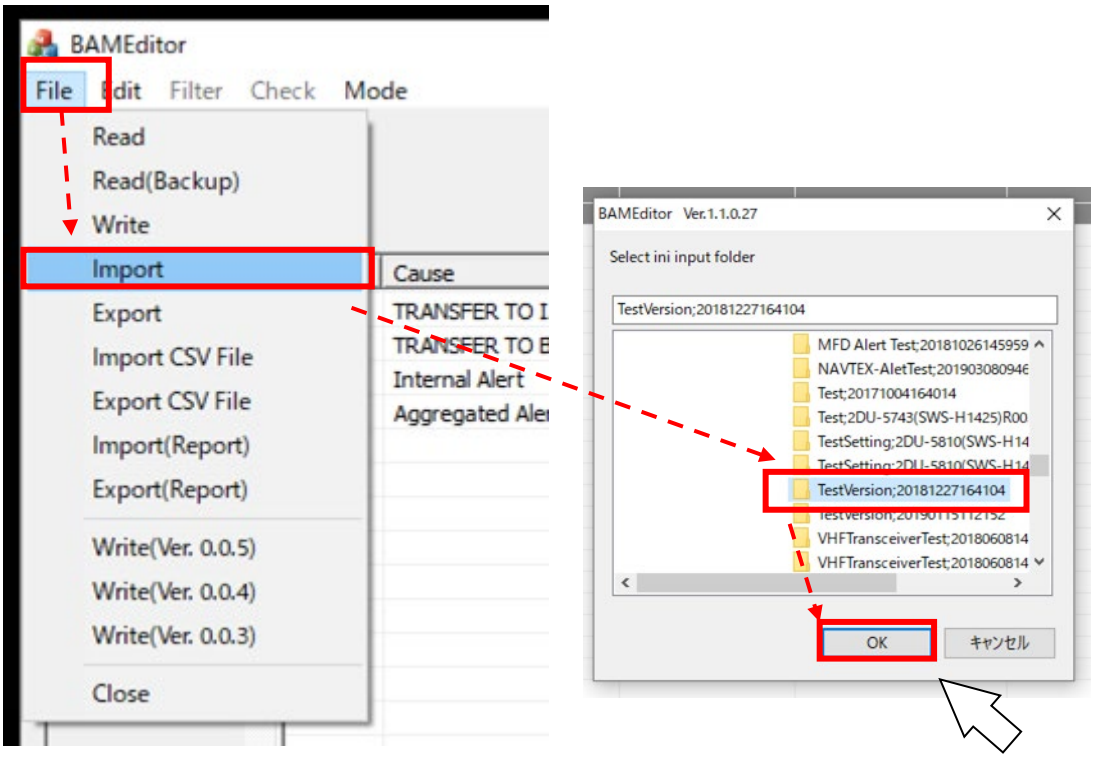


6) The window of BAM editor is displayed.
Note: The picture below is the window when the BAM file is not installed in MFD. If it has been installed, its contents will be displayed in a window.

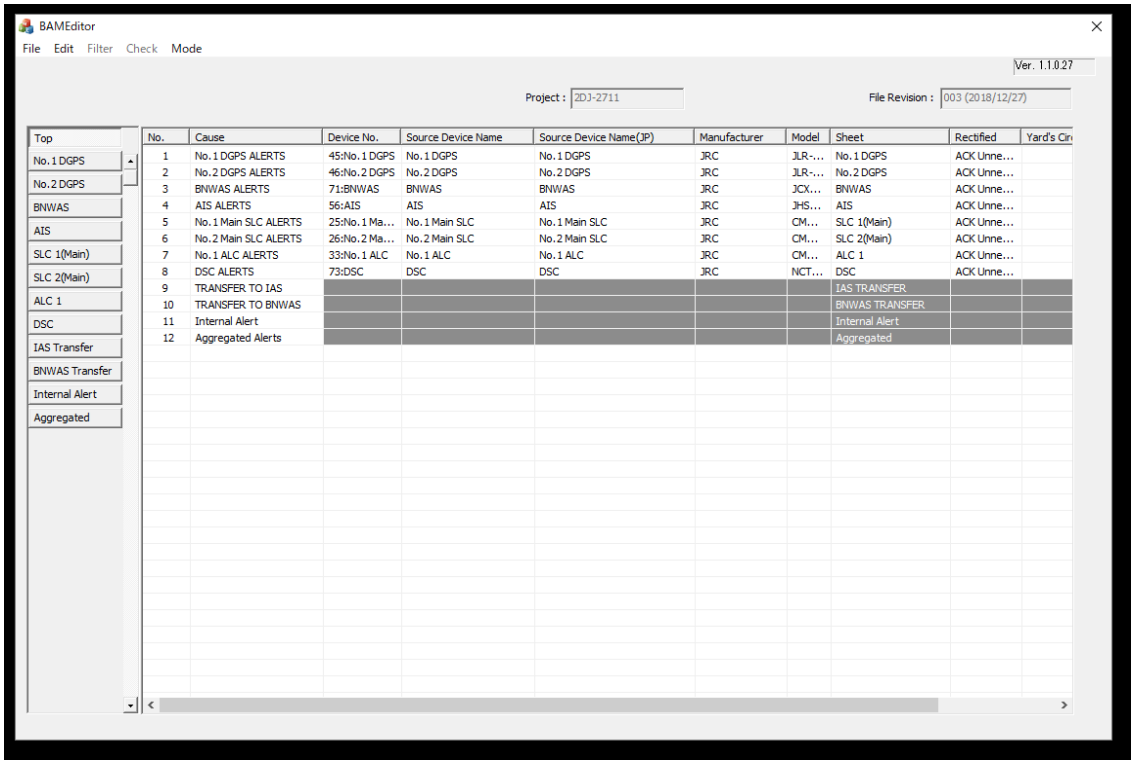


7) Select "**File**" menu, and left click "**Import**".

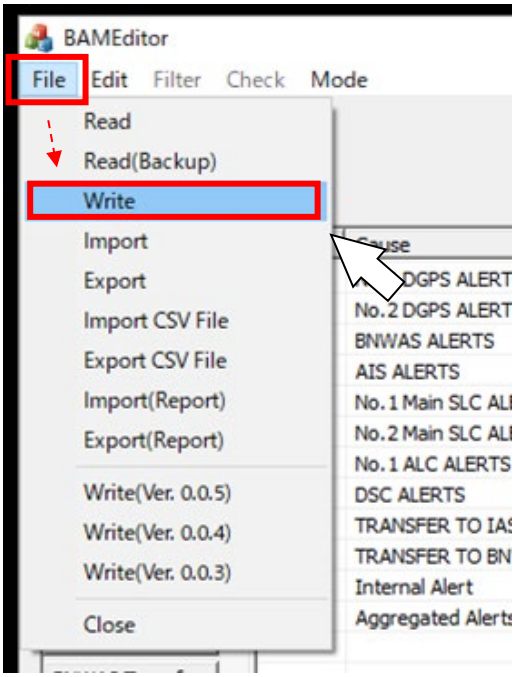
8) Select the folder that includes the files to be updated, and left click [**OK**] button.



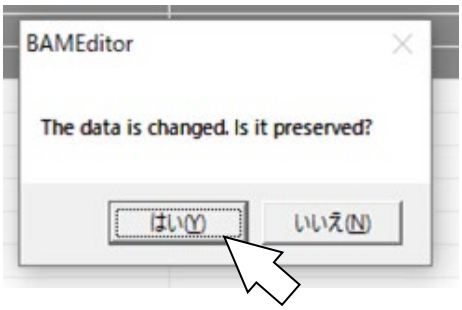
9) The alert list defined in the BAM file is displayed in the BAM editor window.
Confirm that the displayed content is the same as the content of the BAM file that you want to install. If not, start again from step 0.
Note: If you left-click the buttons on the left of the window, a list of alerts defined in the BAM file is displayed.



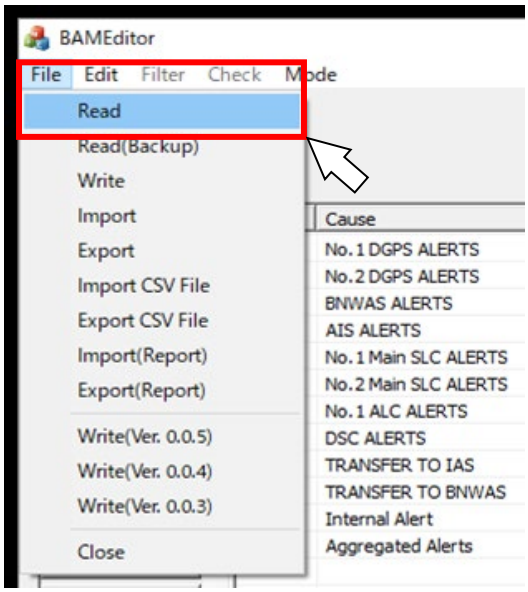
10) Select "**File**" menu, and left click "**Write**".



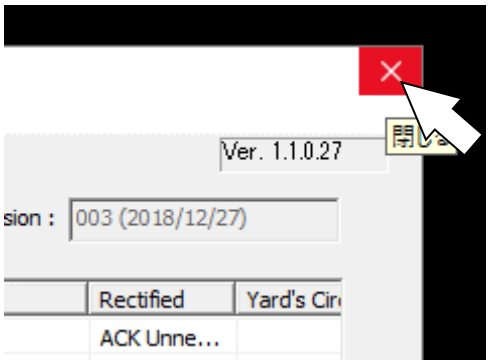
11) Click the [**(Y)**] button when the dialog for confirming whether to rewrite the BAM file installed on the MFD is displayed.



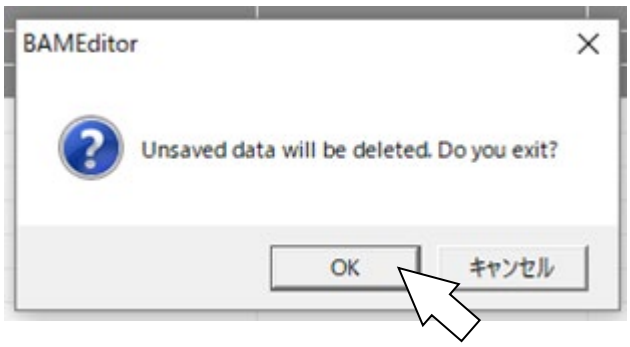
12) The BAM file has been installed on the MFD by the above procedure.
13) To confirm that the installation was successful, left-click "**Read**" in the "**File**" menu and check if the contents displayed in the BAM editor window are the same as in step 9). If not, start again from step 0.



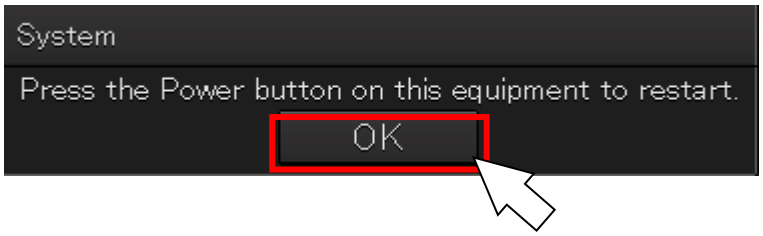
14) Remove the USB flash drive from the trackball operation unit.
15) Left click "**X**" button on the upper right side of the dialog to exit BAM Editor.



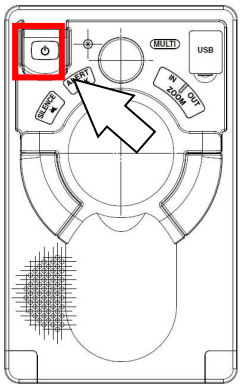
16) A dialog may warn you that data that has not been saved will be deleted, but click the [**OK**] button anyway.



17) The "**System**" dialog as below appears, press the "**PWR**" switch of the trackball operation unit in order to shutdown.



18) After shutdown process completed, press the "**PWR**" switch again in order to restart the equipment.



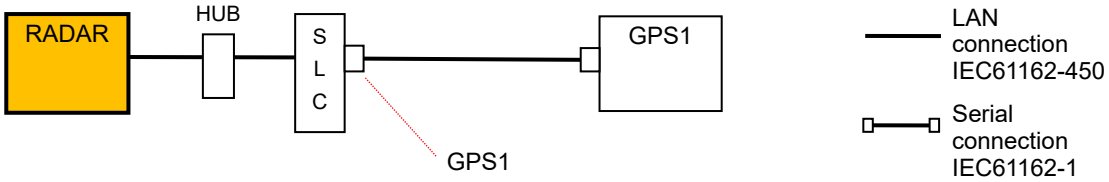
4.9.2 Serial port setting

Shown below are the types of serial port setting to be used for alert handling, and the details of setting. The sentences that can be used are ALF/ALC/ACN/ARC/ALR/ACK.

Memo
The SLC has ten serial ports. The number of SLC boards depends on the vessel.

1 Sensor data

Define the port through which data sentences are to be received from each device (sensor).



Sensor *1	Subsystem *2	Sentence *2	Remarks
GPS1	-	-/ALR/ALF	

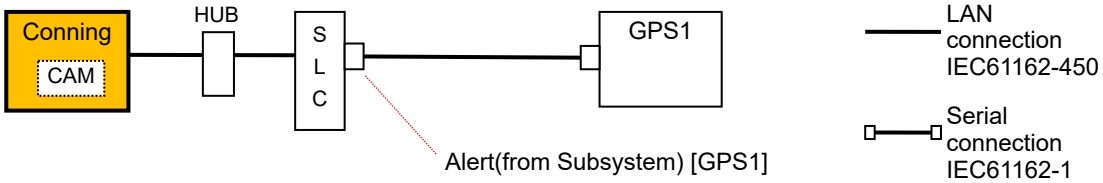
*1 Select the sensor on the Serial Port setting screen.

*2 Set the subsystem on the Serial Port-Detail screen.

- Sensor data is received by the device that needs the data.
- Sentence(ALR/ALF) is a setting value required when alerts are also received from the data port. To receive alerts from another port, select "-" (unselected).

2 Alert(from Subsystem)

Define the port through which Conning(CAM) is to receive alerts from each device (e.g., sensor or IAS).



Sensor *1	Subsystem *2	Sentence *2	Remarks
Alert(from Subsystem)	GPS1	ALR/ALF	

*1 Select the sensor on the Serial Port setting screen.

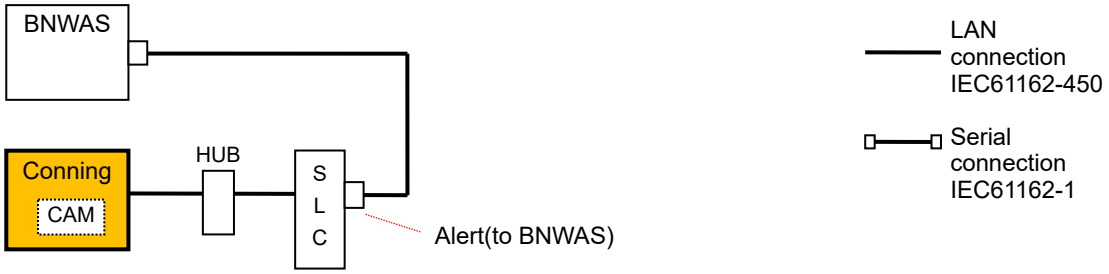
*2 Set the subsystem on the Serial Port-Detail screen.

- The port defined as "Alert(from Subsystem)" is used by Conning(CAM).
- For Subsystem, set a device connected. For Sentence, set the type of alert sentence to be transmitted by the connected device.

3 Alert(to BNWAS)

Define the port through which alerts are to be transmitted to BNWAS.

> **Memo**
> For the connection with BNWAS, a serial port or contact output may be used. When using contact output, refer to "Connection with BNWAS by using contact output".



Sensor *1	Access Source *2	Sentence *2	Remarks
Alert(to BNWAS)	AMS	ALR/ALF	

*1 Select the sensor on the Serial Port setting screen.

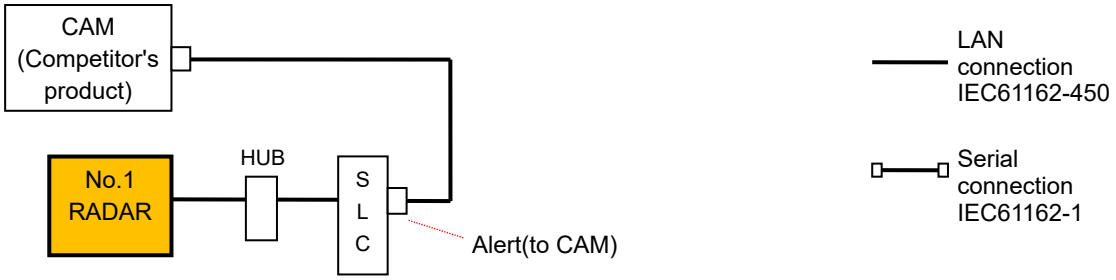
*2 Set the subsystem on the Serial Port-Detail screen.

- The port that is defined as "Alert(to BNWAS)" is used by the equipment that is selected by the Access Source.
  When AMS is selected, the port is used by CAM (main or sub).
  When TCS is selected, ECDIS (main or sub) with TCS authorization is used.

> **Memo**
> When there is no CAM function in the system configuration, set TCS. The alarm transfer related to auto sailing is performed directly by ECIDS with TCS authorization.

4 Alert(to CAM)

Define the port through which the task stations are to transmit alerts to CAM. This setting is necessary if a device (e.g., competitor's product) containing the CAM function is used in place of this equipment.



Sensor *1	Subsystem *2	Sentence *2	Remarks
Alert(to CAM)	No.1 RADAR	ALR/ALF	

*1 Select the sensor on the Serial Port setting screen.

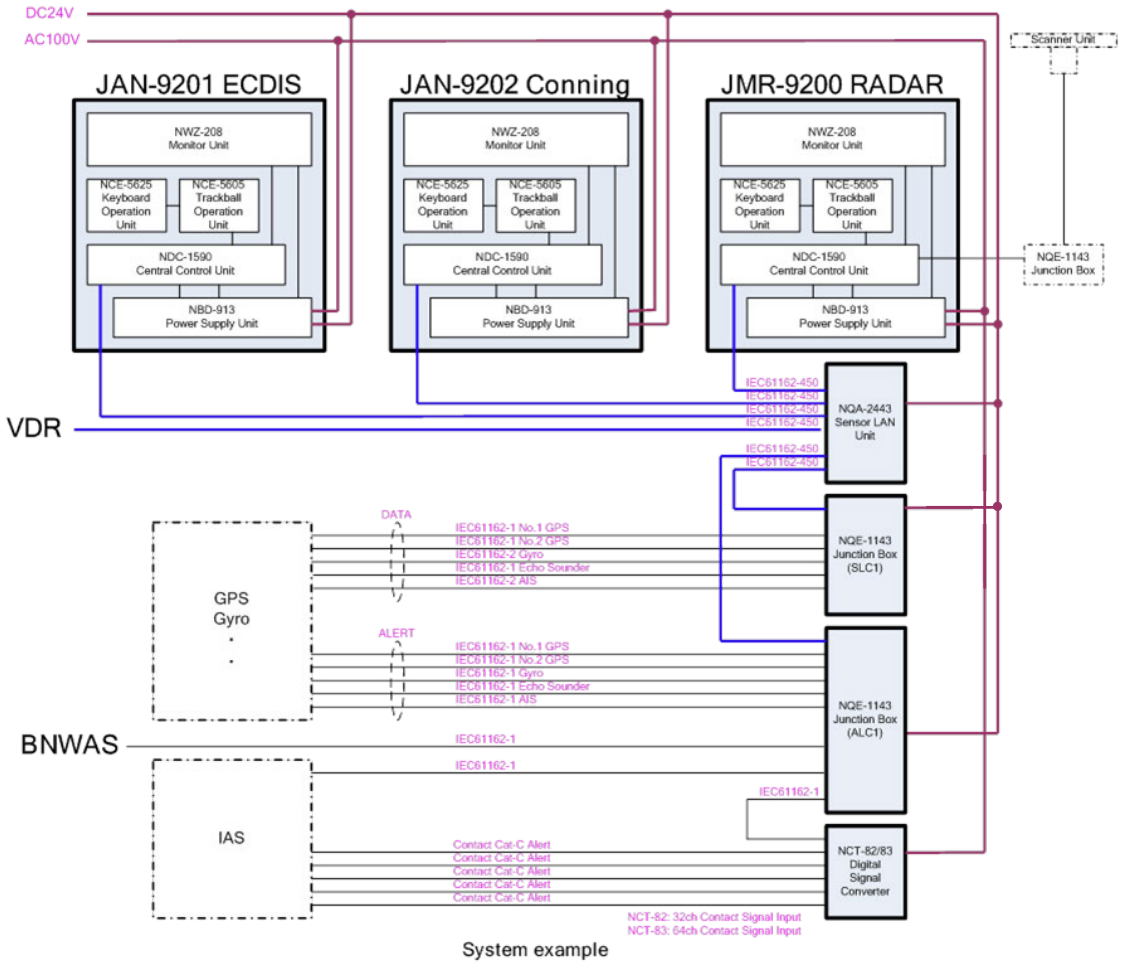
*2 Set the subsystem on the Serial Port-Detail screen.

- The port defined as "Alert(to CAM)" is used by the device selected for Subsystem.
- For Subsystem, set a device (task station) which transmits data. For Sentence, set the type of alert sentence to be transmitted.

System configuration example and serial port setting example

The following shows a system configuration example, and the serial port settings required for the system configuration.

[System configuration example]



System example

[Serial port setting example]

Port	Sensor	Subsystem	Sentence	Access Source	Remarks
SLC1 CH1	GPS1	-	-	-	
SLC1 CH2	GPS2	-	-	-	
SLC1 CH3	Echo Sounder	-	-	-	
SLC1 CH4	AIS	-	-	-	
SLC1 Gyro I/F	Heading Sensor 1	-	-	-	
ALC1 CH1	Alert(from Subsystem)	GPS1	ALR	-	
ALC1 CH2	Alert(from Subsystem)	GPS2	ALR	-	
ALC1 CH3	Alert(from Subsystem)	Echo Sounder	ALR	-	
ALC1 CH4	Alert(from Subsystem)	AIS	ALR	-	
ALC1 CH5	Alert(from Subsystem)	Heading Sensor 1	ALR	-	
ALC1 CH6	Alert(to BNWAS)	-	-	AMS	
ALC1 CH7	DSC	-	-	-	
ALC1 CH9	IAS(NMEA) *	-	ALR	-	

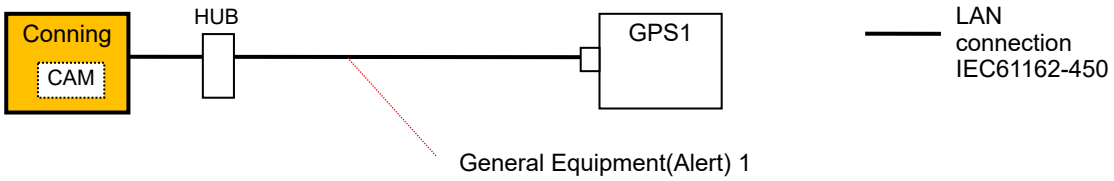
*IAS (NMEA) is not displayed depending on the software version.

[System function setting example]

Equipment	Connection	System Function	SFI		Cluster	Control	Alert	
			Talker	No.		Tx	Tx	Rx
No.1 RADAR	LAN	RADAR	RA	0001	Nav	TGTD	TGTD	CAM1
No.1 ECDIS	LAN	ECDIS	EI	0002	Nav	NAVD	NAVD	CAM1
No.1 CON	LAN	CONNING	II	0003	Nav	MISC	MISC	CAM1
No.1 CON	LAN	CAM	CA	0033	Nav	CAM1	CAM1	CAM1
VDR	LAN	VDR	VR	0001	Nav	MISC	MISC	CAM1
Heading Sendor1	SLC(Main)	Heading	HE	0009	Nav	SATD	SATD	CAM1
Heading Sendor1	ALC	Heading	HE	1205	Nav	-	SATD	CAM1
Heading Sensor1	CCU	Heading	---	---	---	---	---	---
Log1	CCU	Log	---	---	---	---	---	---
GPS1	SLC(Main)	GPS	GP	0001	Nav	NAVD	NAVD	CAM1
GPS1	ALC	GPS	GP	1201	Nav	-	NAVD	CAM1
GPS1	CCU	GPS	---	---	---	---	---	---
GPS2	SLC(Main)	GPS	GP	0002	Nav	NAVD	NAVD	CAM1
GPS2	ALC	GPS	GP	1202	Nav	-	NAVD	CAM1
Echo Sounder 1 (T/D 1,T/D 2)	SLC(Main)	Depth	SD	0003	Nav	NAVD	NAVD	CAM1
Echo Sounder 1 (T/D 1,T/D 2)	ALC	Depth	SD	1203	Nav	-	NAVD	CAM1
AIS	SLC(Main)	AIS	AI	0004	Nav	TGTD	TGTD	CAM1
AIS	ALC	AIS	AI	1204	Nav	-	TGTD	CAM1
AIS	CCU	AIS	---	---	---	---	---	---
BNWAS	ALC	BNWAS	BN	1206	Nav	-	VDRD	CAM1
DSC	ALC	DSC	U1	1207	Nav	-	MISC	CAM1
IAS	ALC	IAS	JE	1209	Nav	MISC	MISC	CAM1
SCL1(Main)	LAN	SNGF	SI	0013	Nav	MISC	MISC	CAM1
ALC1	LAN	SNGF	SI	1213	Nav	MISC	MISC	CAM1

4.9.3 LAN setting

Shown below are the details of LAN setting to be used for alert handling.
Define the port through which Conning(CAM) is to receive alerts from each device (e.g., sensor or IAS).
The sentences that can be used are ALF / ALC / ACN / ARC.



Device Installation *1	Number of installations *1	Sentence	Equipment *2
General Equipment(Alert)	1 to 10	ALF	General Equipment(Alert) 1 to 10

*1 Select the device installation on the Subsystem Installation setting screen. (Refer to 4.4 Subsystem Installation [ALL])

*2 Select the Equipment on the System Function(Add) screen. (Refer to Add a system function (New equipment) in 4.7 System Function [ALL])

- General Equipment (Alert) cannot select the type of sentence to use. Sentence is ALF (fixed).

4.9.4 Setting BNWAS (JCX-161) installation

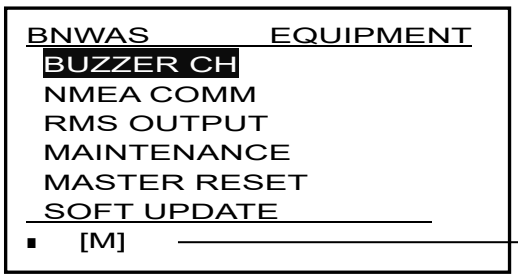
If the BNWAS program version is 01.00, program updating is required since the version does not support BAM. Update the program of the NWZ-4660 display in the following procedure.
Advance to 3 when the version does not support BAM.

Even if the version supports BAM, it is necessary to set the COM port. Set as indicated in 3.
Required time of updating software

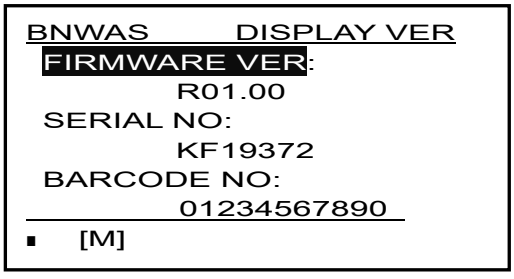
Unit	Required Time (Standard)	Remarks
NWZ-4650 Display	Approx. 2 minutes	On baud rate setting: 115200 bps

1. Confirmation procedure of software version

1) Press  to display the main menu (normal mode).
2) Hold down  and  for 3 seconds.
3) The display is switched to the maintenance menu (maintenance mode).
When the display is switched, the [M] icon is indicated at the bottom of the screen.



4) Select "MAINTENANCE", "SOFT VERSION", and "DISPLAY VER" in this order with  .



2. Update

1) Preparation

Prepare the following:

- Personal Computer (PC)

  OS: Windows XP, Windows Vista, Windows 7(Correspond to the Japanese versions and the English versions respectively)

  Middleware library: .NET framework 3.5 is required.

  COM port is required. When there is no COM port, prepare a USB serial conversion adapter.

- Data cable (must be prepared independently)
- -Set of PC software products for updating

  Decompress the distributed file “JrcUpdateTool_v030.zip.

  The following files are contained. Store them in the same directory on the PC.

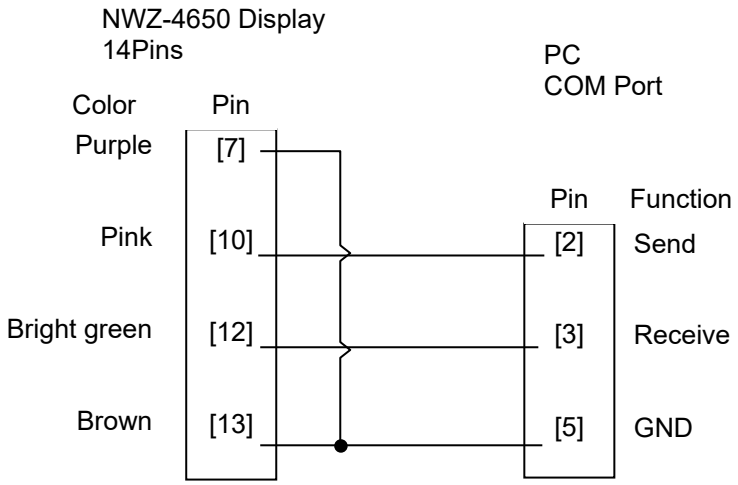
File name	Contents
JrcUpdateTool.exe	Execution file
JrcUpdateTool.exe.config	Application setting file
jrcnet.csv	JRC network definition file
lewnet.csv	LWE network definition file
equipment.csv	Equipment definition file
filter.csv	Filter definition file
serial.csv	Serial equipment definition file
Readme.txt	Quick instruction document (English)
Readme_J.txt	Japanese instruction document (for internal use)

- Update file (xxxxxxx.img)

2) Copy one set of PC software products for updating (such as JrcUpdateTool.exe) and the update file to arbitrary folders of the PC.
3) Turn on the power supply of NWZ-4650. (Turn on the power supply of NCK-175.)
4) Confirm the current software version of NWZ-4650.

   → Refer to "1 Confirmation procedure of software version”.
5) Turn off the power supply of NWZ-4650. (Turn off the power supply of NCK-175.)
6) Connect NWZ-4650 and the COM port (RS-232C) of the PC with the cable.

   An internal wiring diagram is shown below.



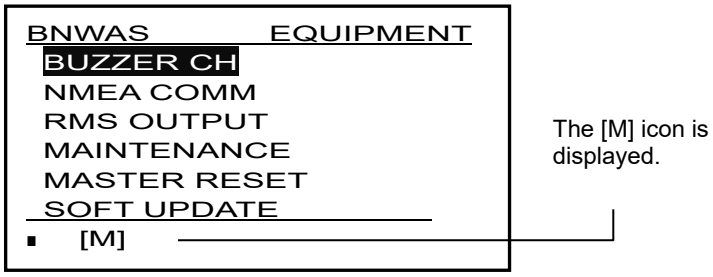
7) Turn on the power supply of NWZ-4650. (Turn on the power supply of NCK-175.)

8) Set NWZ-4650 into a standby state of program transfer as follows.

[1] Press  to display the main menu (normal mode).

[2] Hold down  and  for 3 seconds.

[3] The menu is switched to the maintenance menu (maintenance mode).
When the mode is switched to the maintenance mode, the [M] icon is displayed at the bottom of the screen.



[4] Select " SOFT UPDATE " with  .

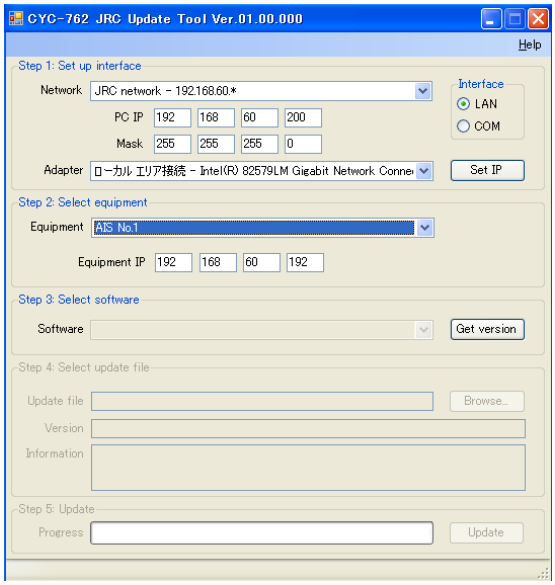
[5] Since the following pop-up is indicated, select "YES."



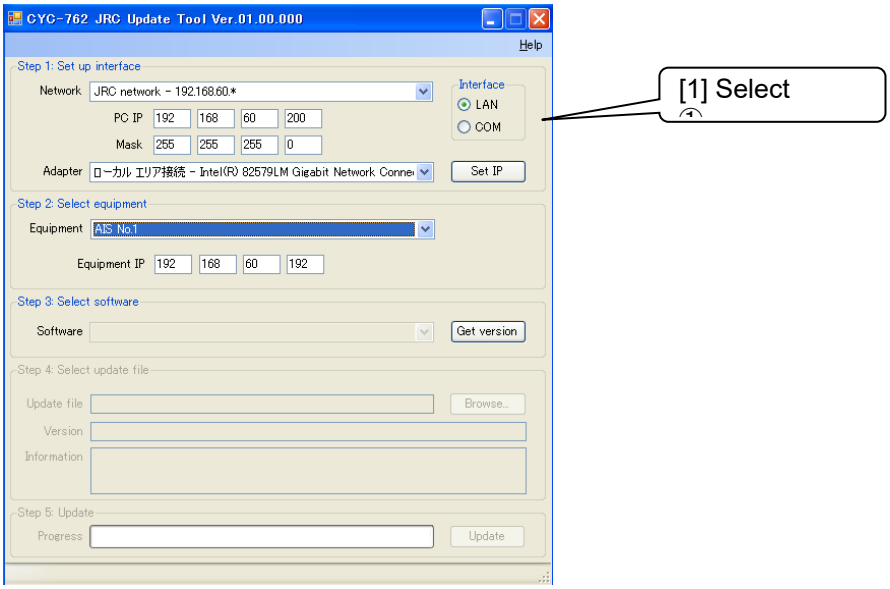
[6] The following pop-up is displayed, indicating the standby state of program transfer.



9) If the PC is using other applications, close them, and then run the PC software for updating (JrcUpdateTool.exe).
Startup screen of the PC software for updating

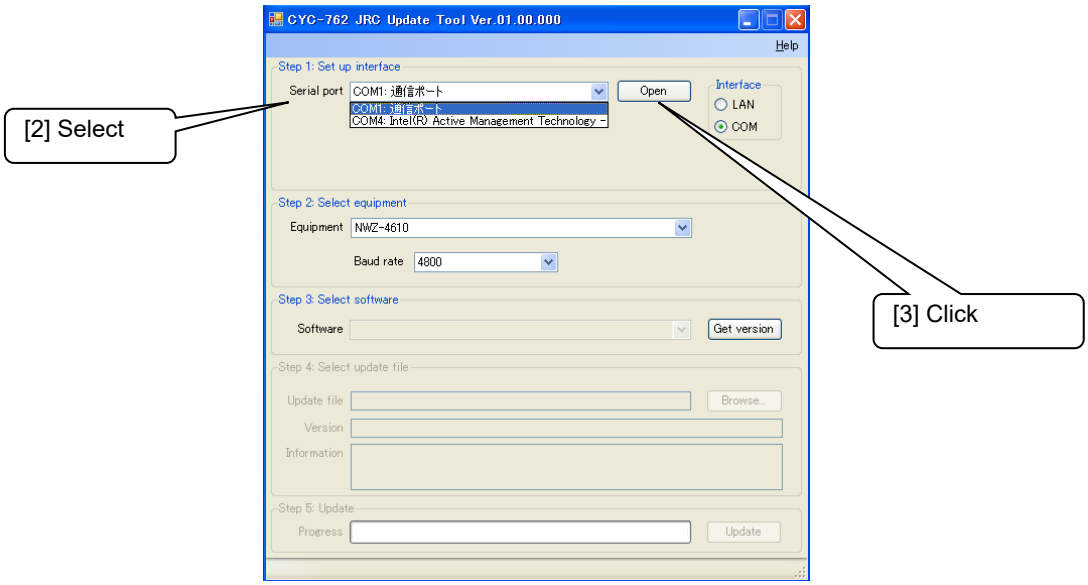


10) Set a serial port
[1] Select [COM] in the [Interface] column, and change to the serial setting screen.

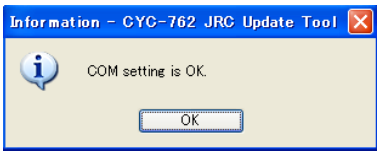


[2] Select the COM port for the update communication from the [Serial Port] list.

[3] Click on the [Open] button.



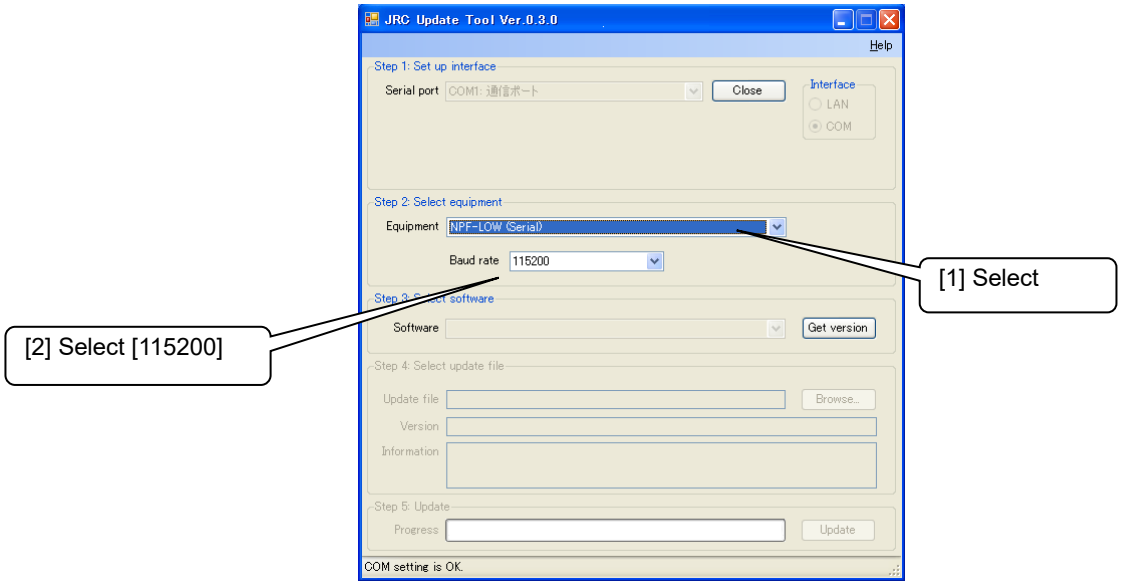
[4] When the message "COM setting is OK." is indicated, click on the [OK] button.



11) Select the connection destination equipment.

[1] Select the connection destination equipment "NPF-Low (Serial)" from the [Equipment] list.

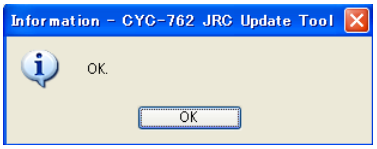
[2] Select the baud rate [115200] from the [Baud rate] list.



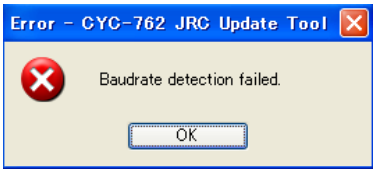
12) Select the software to be updated.

[1] Click on the [Get version] button.

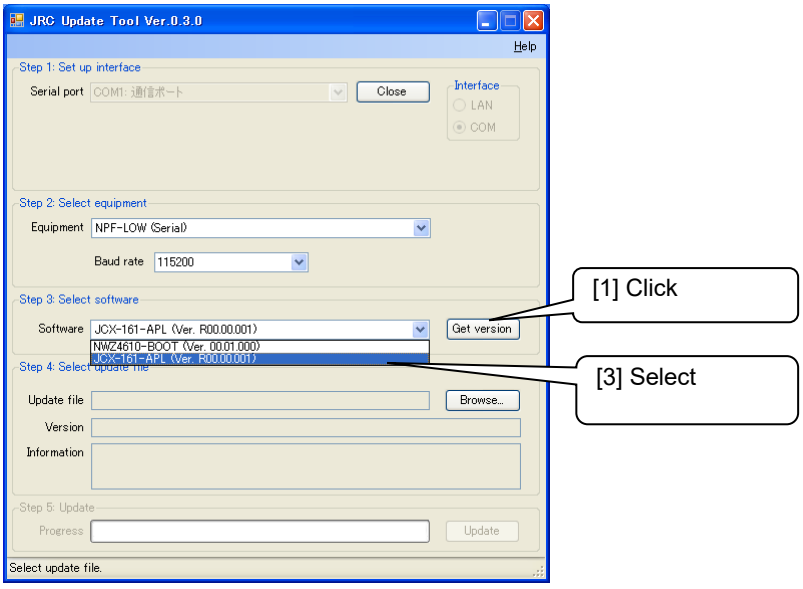
[2] Since the message "OK." is indicated, click on the [OK] button.



If "Baudrate detection failed" is indicated, check the connection again.

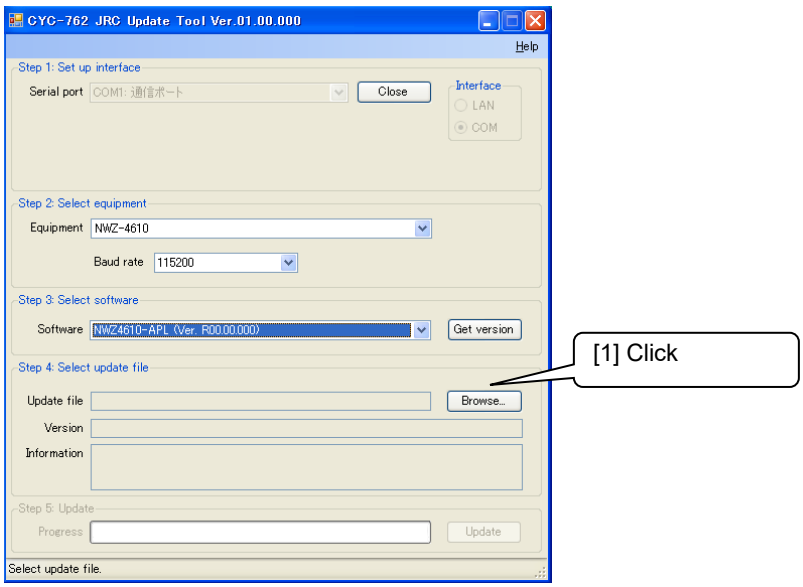


[3] Select [JCX-161-APL (Ver.R00.00.000)] from the [Software] list.

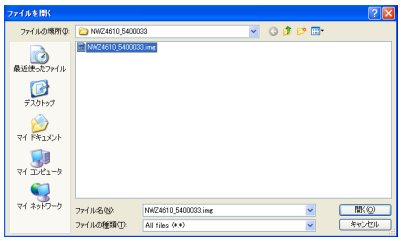


13) Select the file for the update.

[1] Click on the [Browse] button to open the file selection dialog.



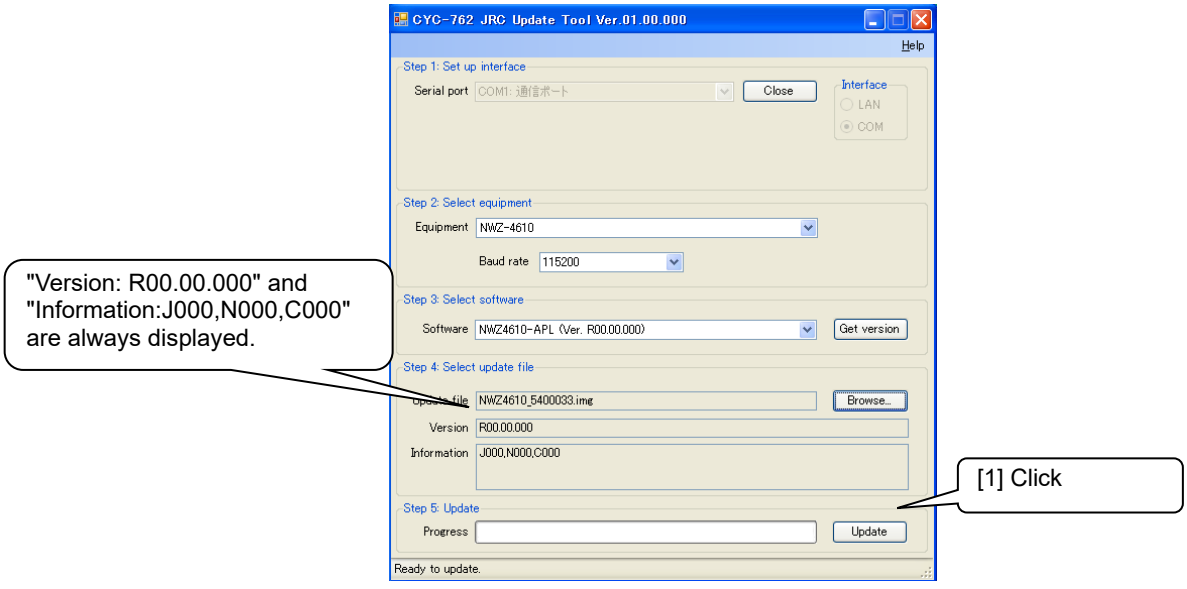
[2] Select the update file (xxxxxxx.img) from the file selection dialog.



[3] The information on the selected file is displayed in the [Version] column and the [Information] column.

14) Perform the update.

[1] Click on the [Update] button, and the update processing starts.



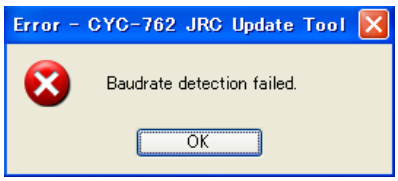
During updating, the following is indicated on the screen in the display.

R0003
Update now.
• • • • • •

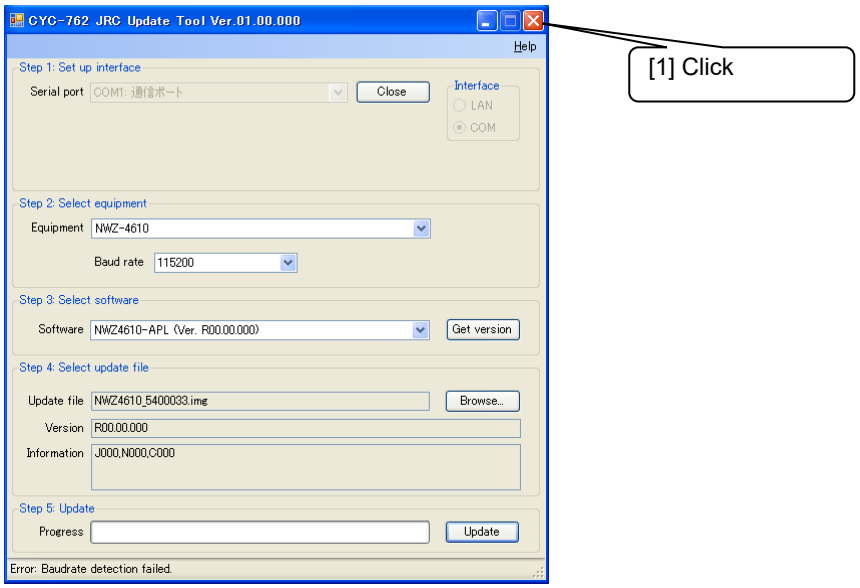
[2] When the update is completed normally, the following is indicated on the screen in the display, and it automatically restarts.

R0000
Update completed.
Please reset.

[3] When the update is completed, the progress bar may be indicated again, and the following error pop-up may be indicated, but the update has been completed. Disregard this error, and click on the [OK] button.



15) Close the application by clicking on the [x] button of the window upper part.

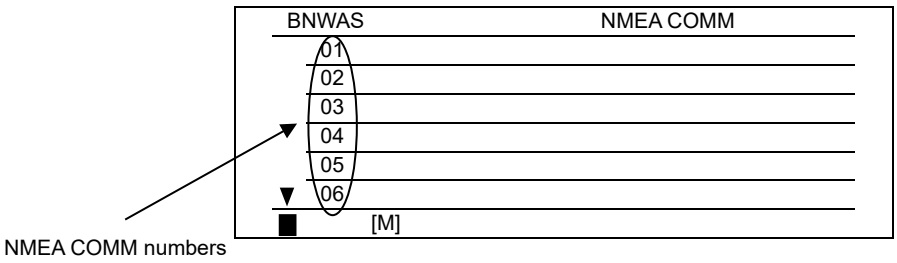


16) Confirm the current software version and make sure that it has been updated.
17) Turn off the power supply of NWZ-4650. (Turn off the power supply of NCK-175.)
18) Remove the power supply/data cable connected between NWZ-4650 and the PC.

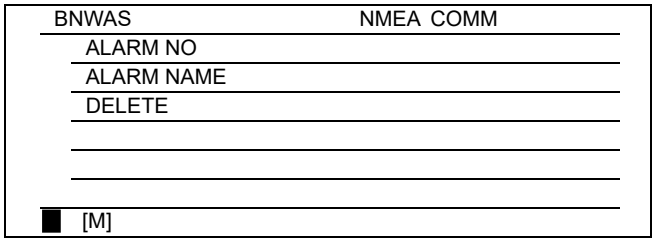
3. NMEA COMM (COMMUNICATION) Setting

Set the alarm list to be processed when an external navigation equipment alarm is received. Set the alarm number and alarm name as the contents and for INS Ver., set 01, 02, and 03 only.

1) Display the maintenance menu by referring to "■ Confirmation procedure of software version".
2) Select “NMEA COMM” with , and then press ENT to display the following screen.



3) Select a NMEA COMM number you want to set with , and then press ENT . After that, the following screen is displayed.



4) Select a setting item with , and then press ENT .
When “ALRAM NO” or “ALRAM NAME” is selected, a character input screen is displayed, so enter the following items in each NMEA COMM.
   - 01 ALARM NO → XX260
     ALARM NAME → None
   - 02 ALARM NO → IN260
     ALARM NAME → EMERGENCY CA
   - 03 ALARM NO → RA260
     ALARM NAME → RADAR

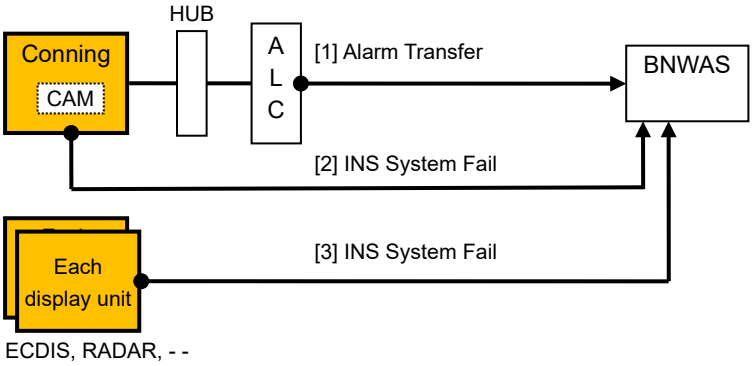
   When “DELETE” is selected, the set content for the NMEA COMM number is deleted.

5) Press CLR to return to maintenance mode.

4.9.5 Connection with BNWAS by using contact output

See below for the connection with BNWAS when contact output is used.

[Connection example]



[1] Alarm Transfer

Set "Alarm Transfer" for the SLC/ALC contact.

In addition to the normal alarm transfer, the alarm is used for notifying that other equipment units (ECDIS, etc.) became invisible from CAM.

[2] INS System Fail (CAM)

Set "INS System Fail" for the "PWR FAIL" contact of the task station.

- Operation in the system with AMS license
  The message is output by CAM when the ALC in which Alarm Transfer that outputs an alert to BNWAS becomes invisible.
- Operation in the system without AMS license
  The message is output when the SLC in the system becomes invisible.

[3] INS System Fail (Each display unit other than CAM)

Set "INS System Fail" for the "PWR FAIL" contact of the task station.

- Operation in the system with AMS license
  The message is output when the CAM in the system becomes invisible.
- Operation in the system without AMS license
  The message is output when the SLC in the system becomes invisible.

4.9.6 Set up to use DSC (NCT-82/83) to input dry contact alert signals

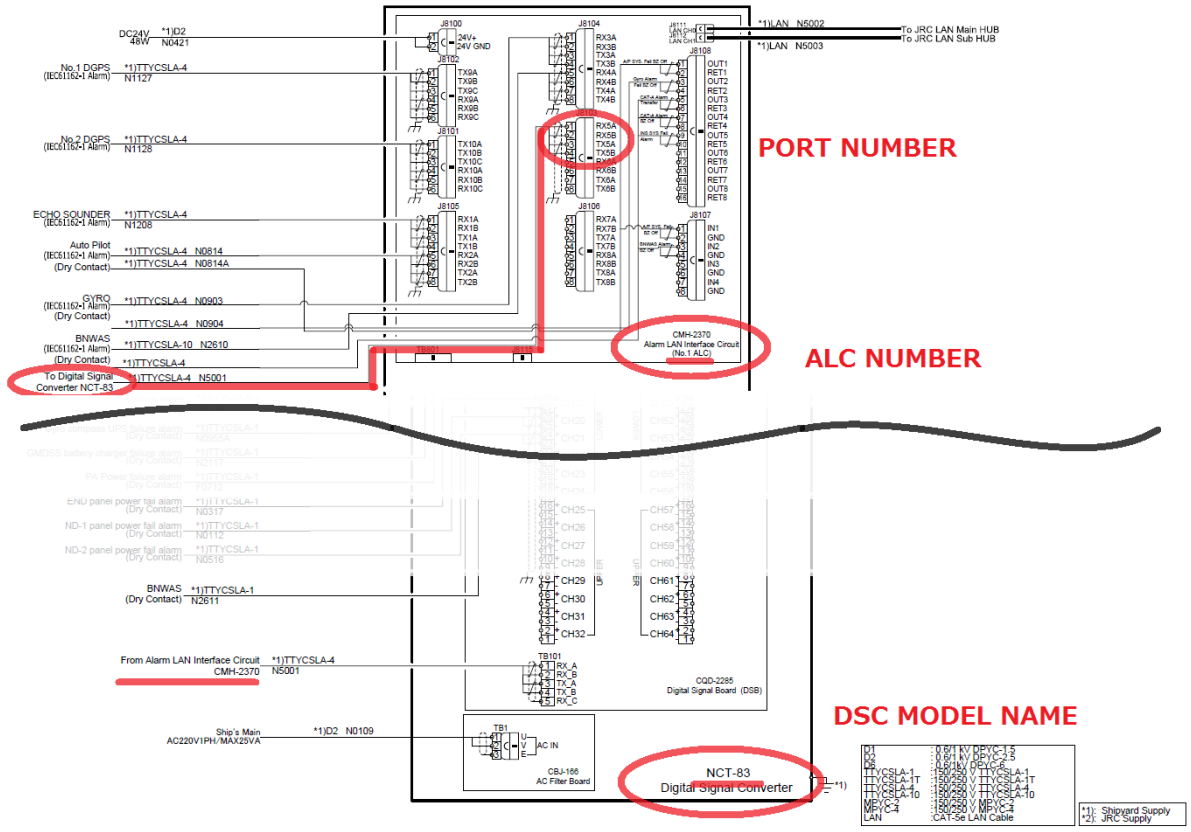
Set up DSC when DSC is used for contact input dry contact alert signals.

DSC installation setting

All the contact point inputs of DSC are set to Disable at the factory shipment.
Set all the contact point inputs to Enable by using the DSC setting tool (DSC_Setup.exe).
Download the DSC setting tool from MS Web and store it in the USB memory.
Check the following items with the construction drawing and actual wiring status prior to the setting.

- ALC number and port number to which DSC is connected
- DSC model name (NCT-82 or NCT-83)

  NCT-82 32 contact point
  NCT-83 64 contact point



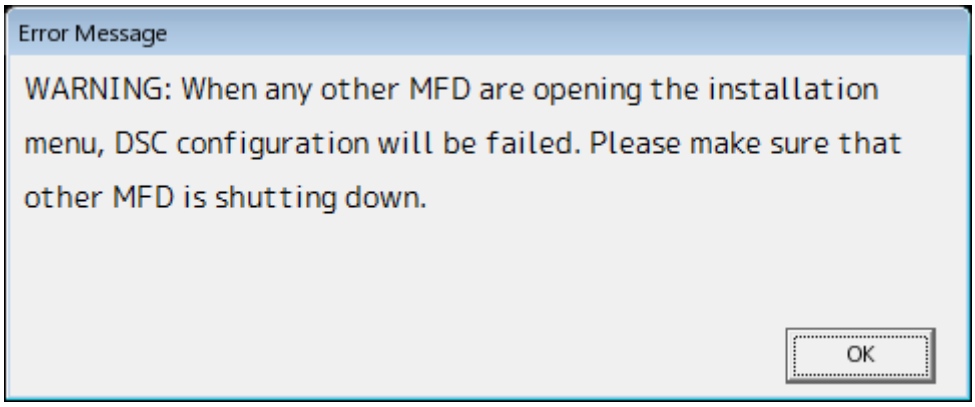
7. Interconnection Diagram of GRD-921 Bridge Interface(6/8)

ALC number, port number, and DSC model name

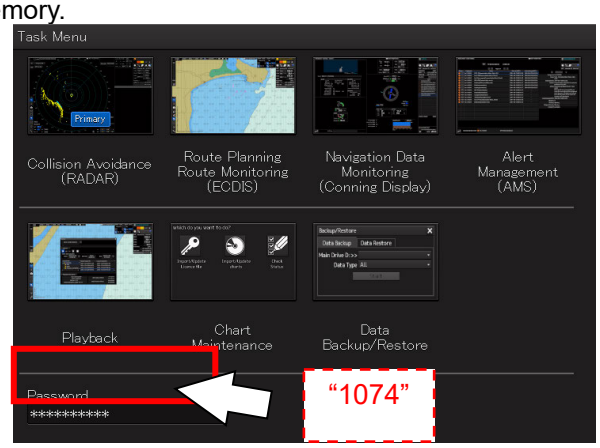
The DSC setting tool is activated from MFD and initializes the setting of each CH via ALC to which DSC is connected. Prior to the setting, check that either DSC or ALC display unit is activated.

Note

When you set from excepting the indicator perform this setting, you will not be able to perform a set of DSC correctly. After you turn off the power source other than the indicator to be used, please set of DSC.

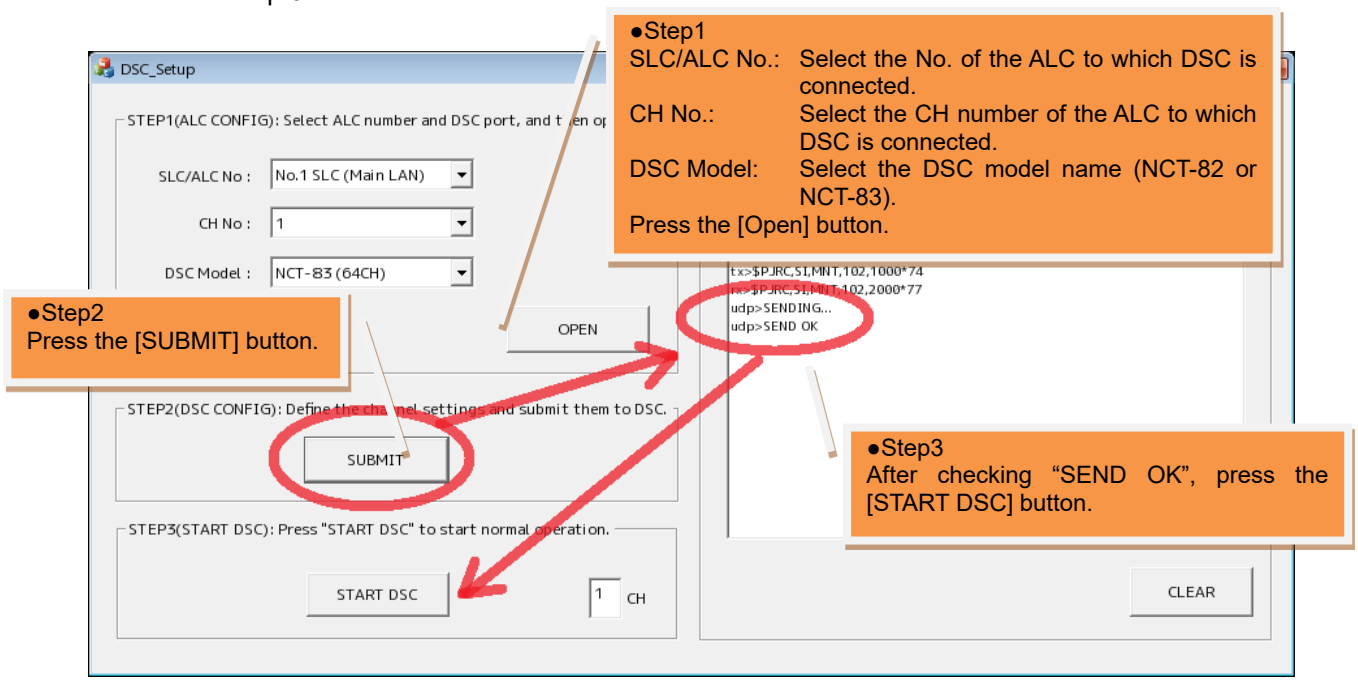


1) Starting the tool
Enter password “1074” from the task menu and select "DSC_Setup.exe" from the USB memory.

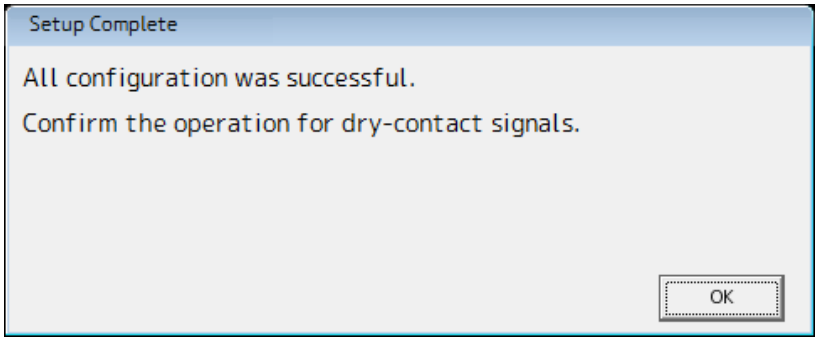


Task menu

2) When DSC_Setup software is activatged, perform the operations in the order from Step 1 to Step 3 as shown below.



3) When the dialog that is shown below is displayed, the setting is completed. Close the "DSC_Setup.exe" software and terminate the processing.

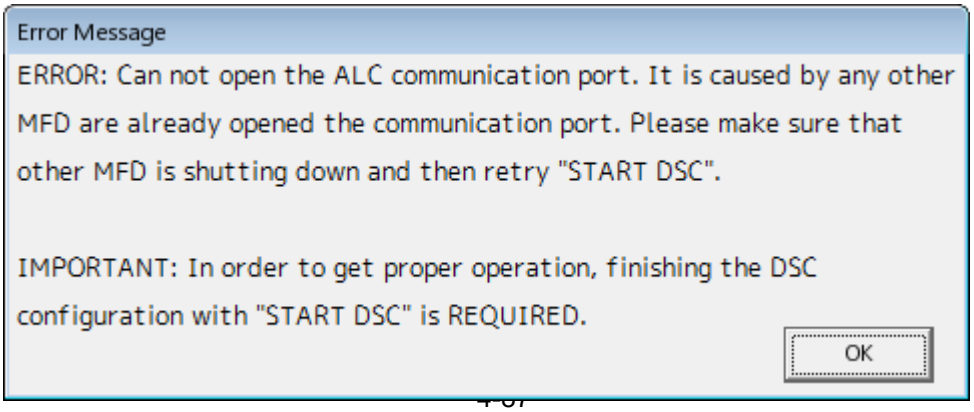


Note

When communication is not carried out normally, the error message of the figure below is displayed.

In order to start the operation, it must be START DSC is completed.

Confirm the shutdown state of other apparatuses and the state of the power supply of ALC, and, please carry out STEP 3 again.



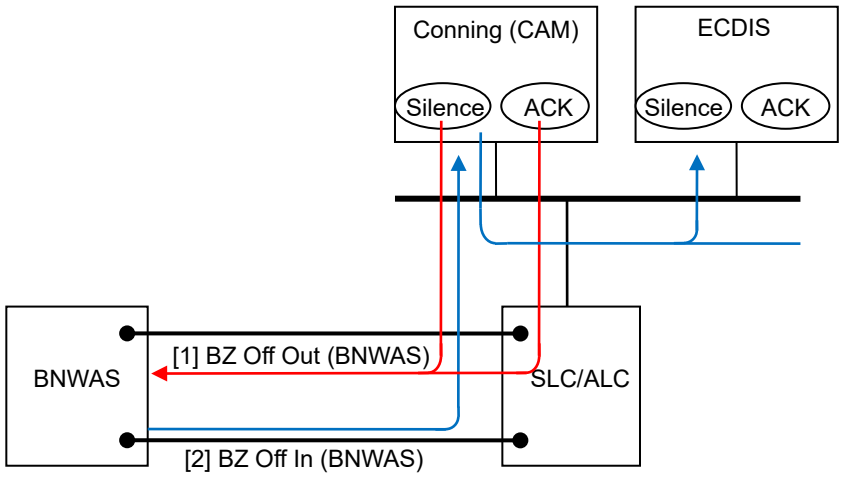
Connection of the contact of the buzzer Off signal

This section describes the configuration and setting for notifying buzzer Off by using contact input/output.

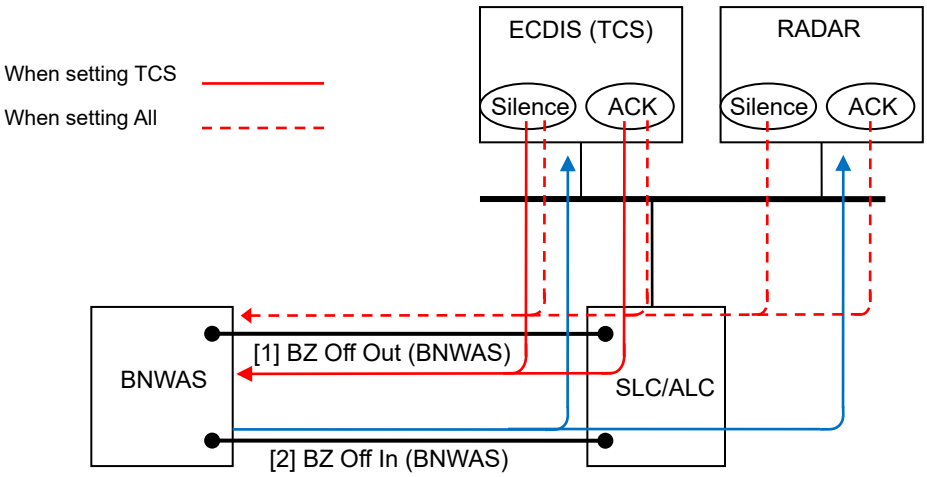
● Connection with BNWAS

See below for the connection when BNWAS and CAM are connected by contacts.

[Connection in the system with AMS license]



[Connection in the system without AMS license]



[1] Contact output "BZ Off Out (BNWAS)"

- Operation in the system with AMS license
  Set AMS for the Task Station that is used. When silence operation is performed on CAM, the message is output regardless of the emission or non-emission of the alert sound. The message is also output when Emergency Call is cancelled.
- Operation in the system without AMS license
  Set TCS or All in the Task Station that is used. The message is output by the silence operation on the task station that is specified by Task Station. Silence is not performed for the alert that occurred in a different task station.

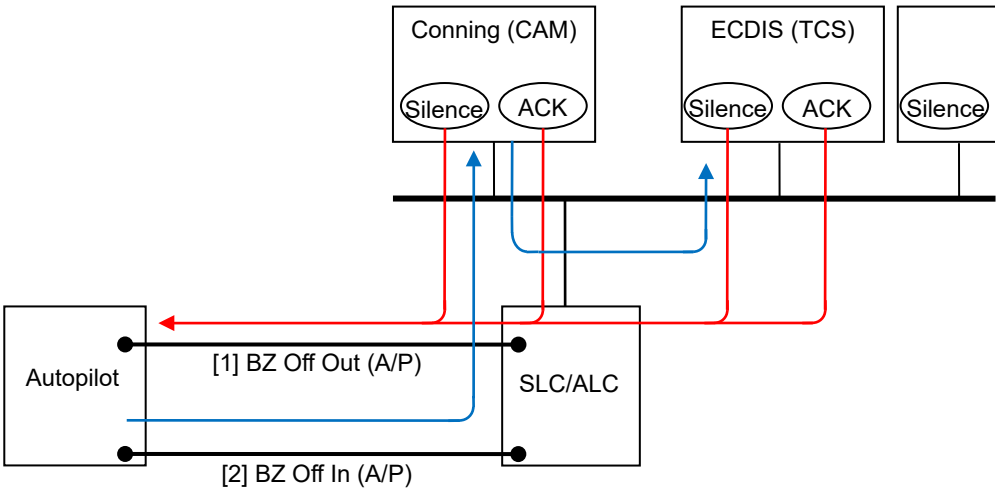
[2] Contact input "BZ Off In (BNWAS)"

- Operation in the system with AMS license
  Set AMS for the Task Station that is used.
  The same operation as that performed when the message is received by CAM is performed and silence operation is performed.
  All the unacknowledged alerts are silenced temporarily. Backup Navigator Call also stops.
  The Alarm Transfer contact operation is set to OFF.
- Operation in the system without AMS license
  Set All for the Task Station that is used.
  The same operation as that performed when the message is received by all the task stations from BNWAS and silence operation is performed.
  All the unacknowledged alerts are silenced temporarily. Backup Navigator Call also stops.
  The Alarm Transfer contact operation is set to OFF.

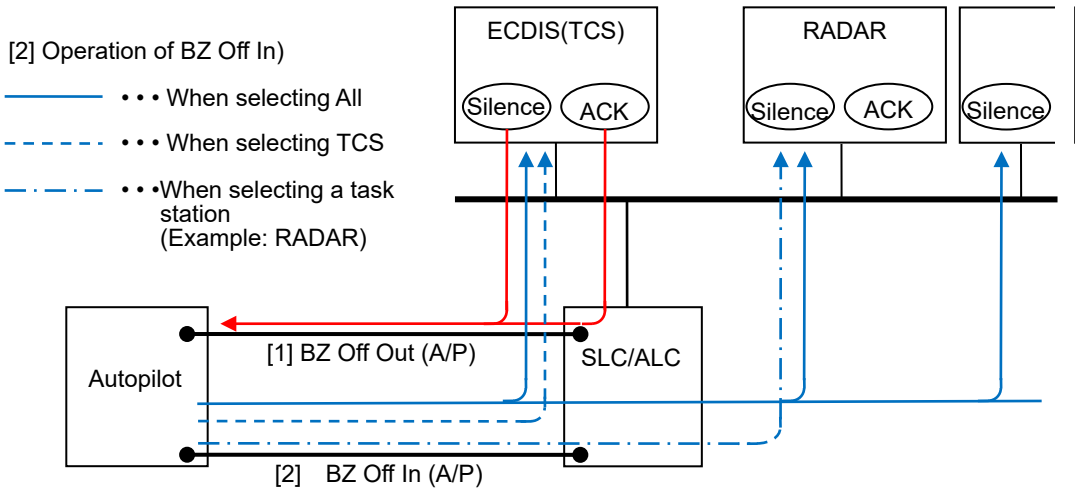
● **Connection with Autopilot**

See below for the connection when buzzer off notification is performed by contact between Autopilot and CAM.

[Connection in the system with AMS license]



[Connection in the system without AMS license]



[1] Contact output "BZ Off Out (A/P)"

The Task Station to be used is fixed to “AMS & TCS”.

Set "BZ Off Out (A/P)" for the contact output port of SLC or ALC that is connected to Autopilot.

Buzzer Off is output when silence operation is performed or all the Autopilot alarms are acknowledged.

[2] Contact input "BZ Off In (A/P)"

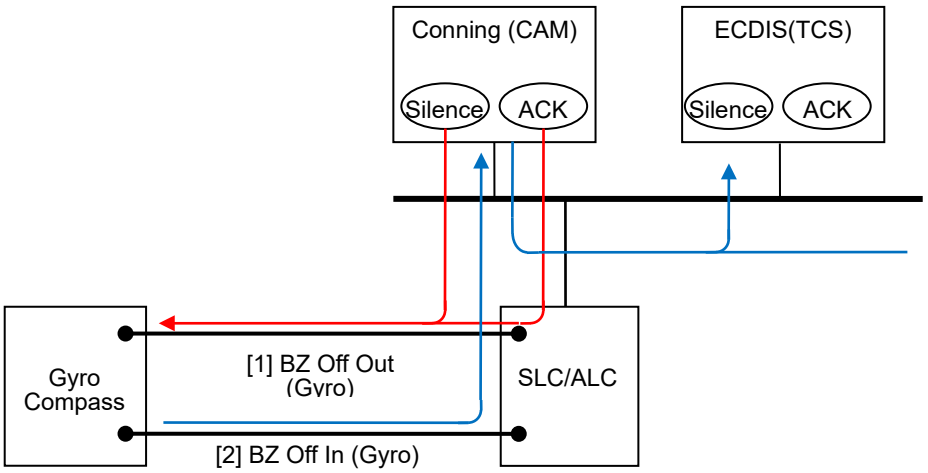
- Setting in the system with AMS license
  Set AMS for the Task Station that is used.
- Setting in the system without AMS license
  Set ALL, TCS, or task station for the Task Station that is to be used.

Set "BZ Off In (A/P)" in the contact input port of SLC or ALC that is connected to Autopilot. The message is notified when silence operation is performed by Autopilot regardless of the presence or absence of the AMS license.

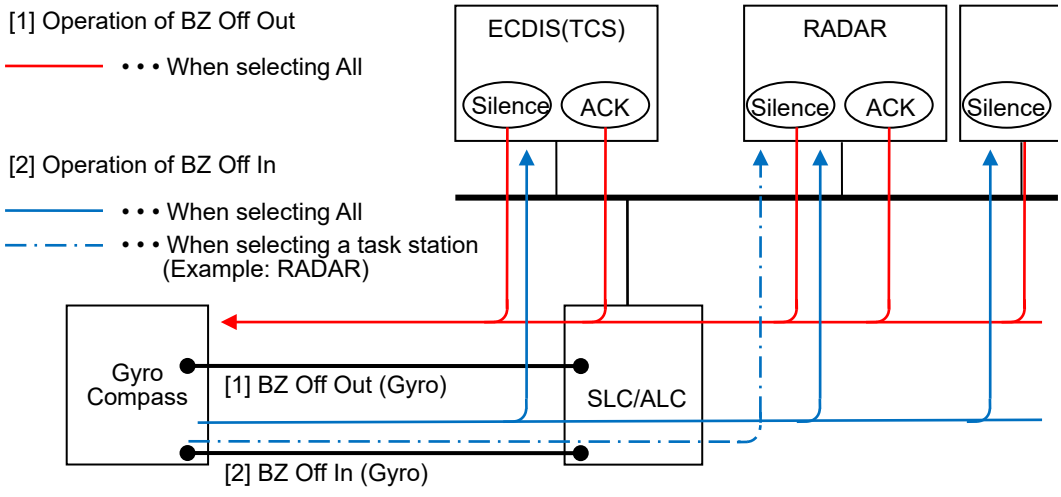
● Connection with Gyro Compass

See below for the connection under which buzzer off is notified by the contact between Gyro Compass and CAM.

[Connection in the system with AMS license]



[Connection in the system without AMS license]



[1] Contact output "BZ Off Out (Gyro)"

- Setting in the system with AMS license
  Set AMS for the Task Station that is used.
- Setting in the system without AMS license
  Set All for the Task Station that is used.

Set "BZ Off Out (Gyro)" in the contact output of SLC or ALC that is connected to the Gyro Compass. The message is output from the specified task station when all the silence operation and Gyro Compass alarms are approved regardless of the presence or absence of the AMS license.

[2] Contact input "BZ Off In (Gyro)"

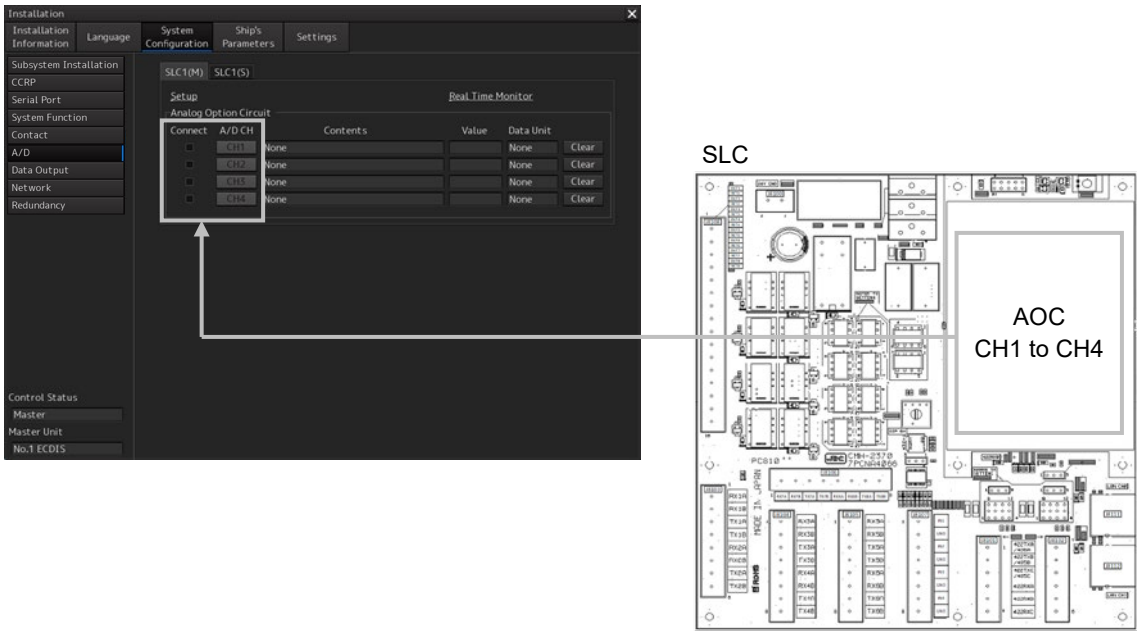
- Setting in the system with AMS license
  Set AMS for the Task Station that is used.
- Setting in the system without AMS license
  Set All or one of the task stations for the Task Station to be used.

Set "BZ Off In (Gyro)" in the contact input port of SLC or ALC that is connected to Gyro Compass. The message is notified when silence operation is performed by the Gyro Compass regardless of the presence or absence of the AMS license.

4.10 Setting A/D (Analog/Digital) [ALL]

Setting A/D (Analog/Digital) [ALL]

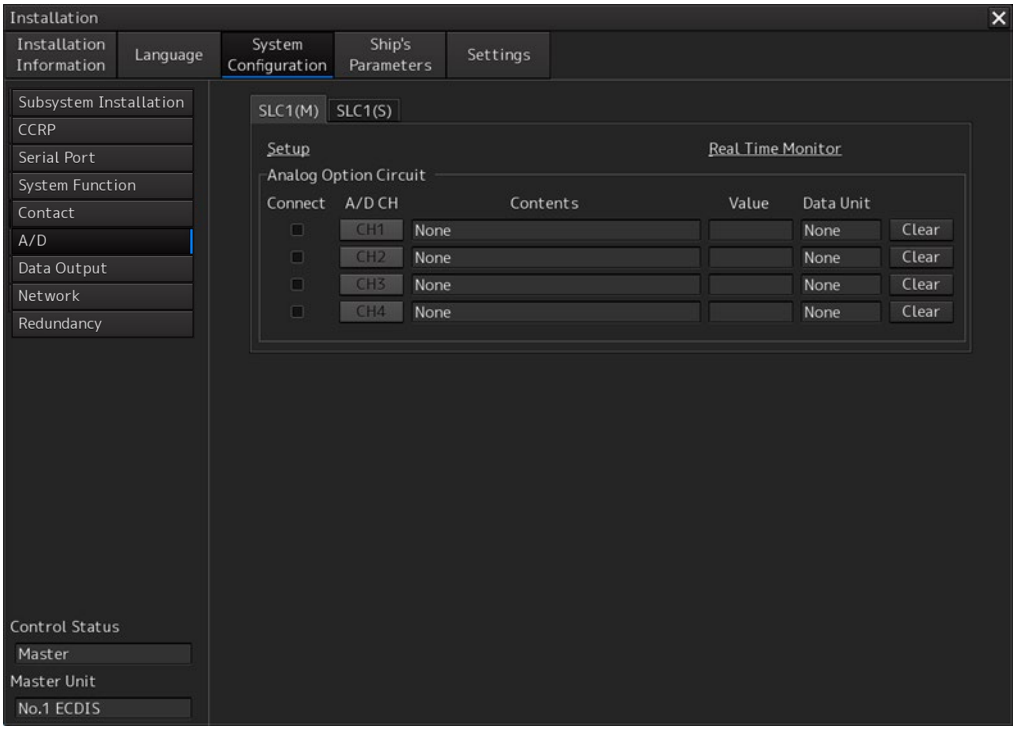
When making a connection to an analog sensor, settings for receiving sensor data from the analog input on AOC can be made in the [A/D] dialog.



Displaying the [A/D] dialog

1 **Display the dialog of the Installation submenu.**

2 **Select [System Configuration] in the 1st Classification pane and [A/D] in the 2nd Classification pane.**
The "A/D" dialog is displayed in the Edit/Result pane.



Note
The tab display changes according to the installation position of the analog option circuit (AOC).
The [A/D] dialog is not displayed when AOC is not installed.

Selecting a channel whose connection is to be enabled

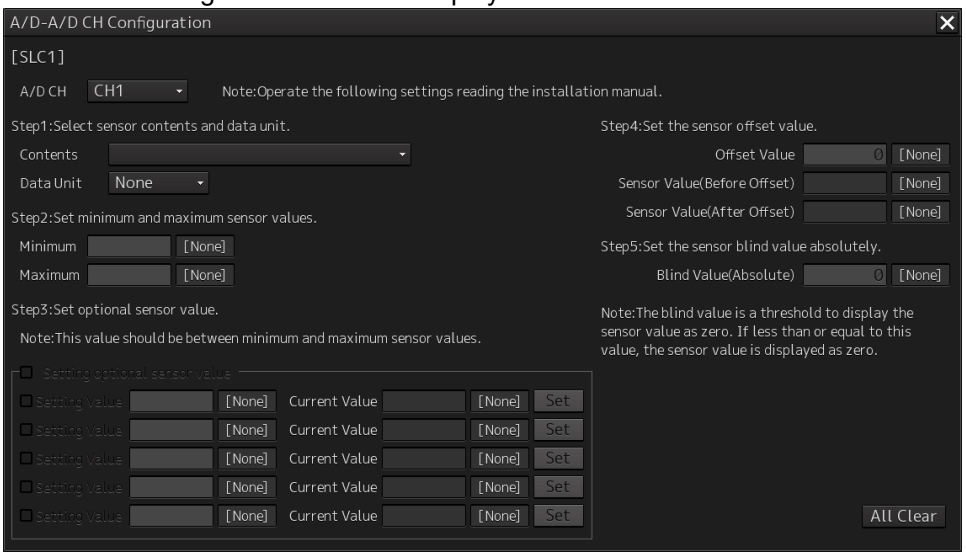
1 **Select any of the SLC1(M) to SLC4(M) and SLC1(S) to SLC4(S) tabs.**

2 **Check the [Connect] check box.**
The detail setting of each channel is displayed in the [Contents] (sentence contents) display box, [Value] (sensor value) display box, and [Data Unit] display box.
To clear the display, click on the [Clear] button.

Setting channel details

1 Click on the [CH1] to [CH4] buttons.

A channel setting detail window is displayed.

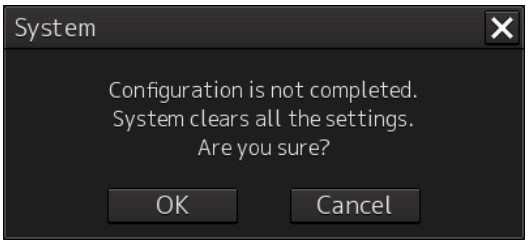


2 Set the details by using the following procedure.

	Setting completion condition
Step1 Selecting a sensor type and the unit	Set [Contents] and [Data Unit] • Select the type of the sensor to be connected to the channel that is selected in [A/D CH] and the unit of the sensor value from the dropdown list. **Note** When General Analog Data (1~10) is selected for contents, make sure to set the Data unit to ºC. (It is no problem that ºC is different from the actual unit. Actual unit is defined in conning ini file.)
Step2 Setting a range	Enter values in [Minimum] and [Maximum]. • Enter the maximum value and the minimum value of the sensor by referencing the specification of the sensor to be connected to the channel that is selected in [A/D CH].
A/D setting is completed when the settings up to Step 2 are made. Set Step 3, Step 4, and Step 5 as required.	
Step3 Correcting an analog value	Check the [Setting optional sensor value] check box and enter two or more setting values. • For the details of settings, refer to Step 3 "Correcting an analog value: Setting method".
Step4 Setting offset	Enter a value in [Offset Value]. • If there is an error between the value that is displayed in [Sensor Value(Before Offset)] and the value that is displayed in the actual sensor, enter the error value in [Offset Value]. After the input, the value produced after offsetting to [Sensor Value(Before Offset)] is displayed on [Sensor Value(After Offset)]. **Note** When a sensor output can be adjusted freely, check the error with the sensor output set to "0".

	Setting completion condition
Step5 Setting a blind zone	Enter a value in [Blind Value(Absolute)]. • Set a blind zone within the range from +[Blind Value(Absolute)] to -[Blind Value(Absolute)] using sensor value "0" as the center. Example: When [Unit]-"rpm" is set and "3" is entered in [Blind Value(Absolute)], "0 rpm" is displayed on the display unit for the range from -3 rpm to 3 rpm. **Note** • There is an input limit for the blind zone setting and the input value limit is 10% of [Maximum]. • When using this function, set so that the sensor value "0" is included between [Maximum]-[Minimum].

When an attempt is made to close the window by interrupting the setting, a message dialog is displayed for termination verification.



When the [OK] button is clicked on, the values that have been changed are reset to the initial values (or values set previously). When the [Cancel] button is clicked on, the dialog is closed and the channel setting detail window is displayed.

Correcting an analog value: Setting method

If there is a difference between the display on the actual sensor and the display unit, perform correction using the following procedure.

1 Check the [Setting optional sensor value] check box.

2 Determine two value points encompassing the range to be corrected and adjust the sensor value to either of the two.

3 Read the value of the actual sensor being connected while maintaining the output of 2) and enter the reading in [Setting Value].
The pre-correction sensor value on the display unit is displayed in [Current Value].

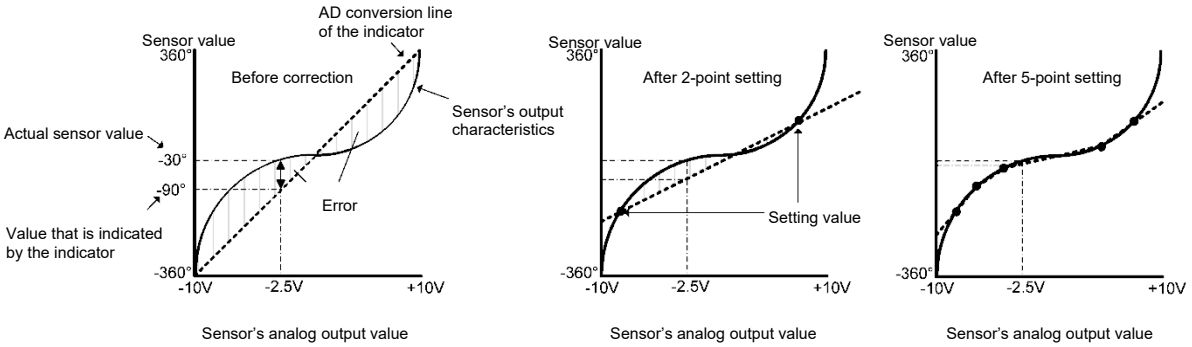
Note
In [Setting Value], enter the value that is read from the meter that is attached to the sensor itself, not the sensor value that is displayed on the display unit.

4 Press the [Set] button while maintaining the output of 2). One setting value is recorded.

5 Enter another set value in steps 2) to 4). Up to five values can be set.

As shown below, a correction is made in the form of line segment approximation of the corresponding curve of the analog output (V or mA) and the sensor value in the section that is encompassed by the setting values.

Example) Case where Unit: deg, Maximum: 360, and Minimum: -360 are set



- Determine the setting values so that the sensor value range that is normally used is encompassed.
- To disable the correction, uncheck the [Setting optional sensor value] check box.

The following table shows the setting contents.

Section	Description of setting	Setting value
[Step1] Contents	Open the list by clicking on the ▼ button and click on the contents of the data to be acquired with A/D.	None Contents (Refer to "Table 4-7 Contents list")
[Step1] Data Unit	Select a data unit from the combo box.	00:None 01:deg 02:min-1 03:rpm 04:m/s 05:km/h 06:knots 07:m 08:kg 09:m/min 10:N 11:% 12:mw
[Step2] Minimum	Enter the sensor minimum value in the box.	Changes according to the data unit.
[Step2] Maximum	Enter the sensor maximum value in the box.	Changes according to the data unit.
[Step3] Setting optional sensor value (Sensor adjustment value)	Enable the sensor adjustment value setting between the minimum value and the maximum value by checking the check box.	Enable: Check. Disable: Uncheck.
[Step3] Setting Value (Sensor value)	Enter a sensor value between the minimum value and the maximum value in the box.	Changes according to the data unit.
[Step3] Current Value (Current sensor value)	When the check box for [Setting optional sensor value] is checked, the current sensor value is displayed in real time.	

Section	Description of setting	Setting value
[Step3] Set	Set the sensor value that is displayed in real time to fixed display by clicking on the button.	
[Step3] Delete	Delete operation sentences of Setting Value, Current Value, and Set by clicking on the button.	
[Step4] Offset Value	Enter an offset value of the sensor in the box.	Changes according to the data unit.
[Step4] Sensor Value(Before Offset)	The sensor value prior to the reflection of the offset value is displayed in real time.	Changes according to the data unit.
[Step4] Sensor Value(After Offset)	The sensor value after the reflection of the offset value is displayed in real time.	Changes according to the data unit.
[Step5] Blind Value(Absolute)	Enter an absolute value of the sensor blind zone value in the box.	Changes according to the data unit.
All Clear	Reset all the settings to the initial values by clicking on the button.	

Table 4-7 Contents list

A use	Display character string
Rudder order and response	Rudder Order ,Manual
	Port Rudder Order ,Manual
	Starboard Rudder Order, Manual
	Rudder Response, Manual
	Port Rudder Response, Manual
	Starboard Rudder Response, Manual
Engine order and response	M/E RPM Set Order
	M/E RPM Actual Response *1
	Port M/E RPM Set Order
	Port M/E RPM Actual Response *1
	Starboard M/E RPM Set Order
	Starboard M/E RPM Actual Response *1
	CPP Order
	CPP Response
	Port CPP Order
	Port CPP Response
	Starboard CPP Order
	Starboard CPP Response
	Bow Thruster (1 to 5) Order
	Bow Thruster (1 to 5) Response
	Stern Thruster (1 to 5) Order
	Stern Thruster (1 to 5) Response
	Bow Thruster (1 to 5) Pitch Order
	Bow Thruster (1 to 5) Pitch Response
	Generator Power
	Azimuth thruster Angle (NAV. Mode)
	Azimuth thruster RPM (NAV. Mode)
Hull Motion	Hull Motion Trim
General Analog	General Analog Data (1~10)

*1 For CPP (variable pitch propeller), the revolution speed meter display is not available in the conning block. Only numeric value display is available.

4.11 Setting Data Output [RADAR] [ECDIS]

Use the [Data Output] dialog to set the channel to which data is output.

Note

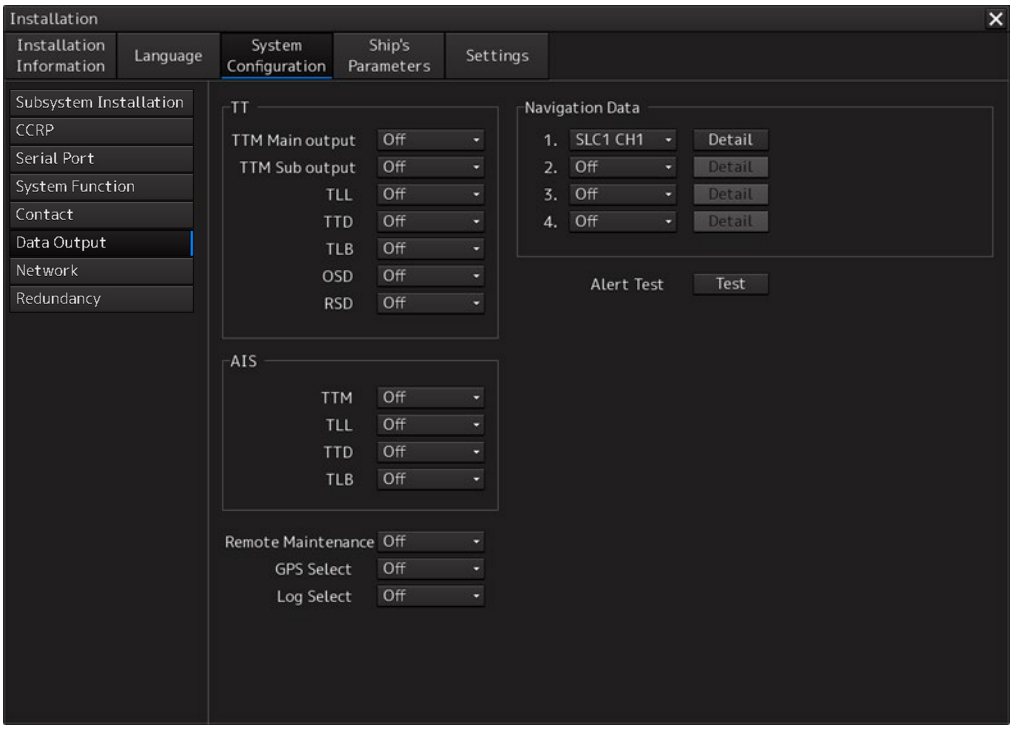
- Set data output so that data is not output by multiple task stations through one serial port.
- Enable the serial port for the data output on the Serial Port setting screen. (Refer to "4.6 Setting Up a Serial Port".)

Displaying the [Data Output] dialog

1 Display the dialog of the Installation submenu.

2 Select [System Configuration] in the 1st Classification pane and [Data Output] in the 2nd Classification pane.

The [Data Output] dialog is displayed in the Edit/Result pane.



Setting Data Output

Select a data output channel from the combo boxes that are listed below.

Setting item	Description of setting	Setting value
TTM Main/Sub output (TT)	Select a channel to which a TTM sentence of TT is output. When outputting TTM to two display units, assign a channel to each of [TTM Main output] and [TTM Sub output]. When outputting TTM to one display unit, use [TTM Main output].	Off/ SLC1 to 4 CH1 to CH8/ ALC1 to 4 CH1 to CH8/ LAN
TLL (TT)	Select a channel to which a TLL sentence of TT is output.	
TTD (TT)	Select a channel to which a TTD sentence of TT is output.	
TLB (TT)	Select a channel to which a TLB sentence of TT is output.	
OSD(TT)	Select a channel to which an OSD sentence of TT is output.	Off/ SLC1 to 4 CH1 to CH8/ ALC1 to 4 CH1 to CH8
RSD(TT)	Select a channel to which a RSD sentence of TT is output.	
TTM (AIS)	Select a channel to which a TTM sentence of AIS is output.	
TLL (AIS)	Select a channel to which a TLL sentence of AIS is output.	
TTD (AIS)	Select a channel to which a TTD sentence of AIS is output.	
TLB (AIS)	Select a channel to which a TLB sentence of AIS is output.	
Remote Maintenance	Select a channel to which remote maintenance information is output.	Off/ SLC1 to 4 CH1 to CH8/ ALC1 to 4 CH1 to CH8/ LAN(Old)/LAN(New) **LAN(Old)**: LAN output for current VDR (JCY-1800) **LAN(New)**: LAN output for new VDR (JCY-1900)
GPS Select	Select the channel to which switching instruction is output for GPS Selector. *Displayed only when the Selector is "NCZ-1537A".	Off/ SLC1 to 4 CH1 to CH8/ ALC1 to 4 CH1 to CH8
Log Select	Select the channel to which switching instruction is output for Log Selector. *Displayed only when the Selector is NCZ-1537A".	
Navigation Data1 to 4	Select a channel to which navigation data is output. Select the output contents in the Detail dialog box, which is displayed by clicking on the [Detail] button. If "IAS" is selected, data is output from the channel that has been selected "IAS (NMEA)" in the Serial Port setting. However, it is not outputted when a display unit is except CAM(Main and Sub).	Off/ SLC1 to 4 CH1 to CH8/ ALC1 to 4 CH1 to CH8/ IAS NAV/Alert

Memo

- The distribution of TT and AIS can set up the combination of the following sentences.

Sentence	Combination					Remarks
TTM	○					
TLL		○				
TTD			○		○	
TLB				○	○	

* OSD and RSD sentence of TT group can be set up in all the combination.

- TT1 / 2-REL/GND/SEA" is displayed on TT display button of Sub Information Area of ECDIS by the movement mode and stabilization mode of RADAR.
-



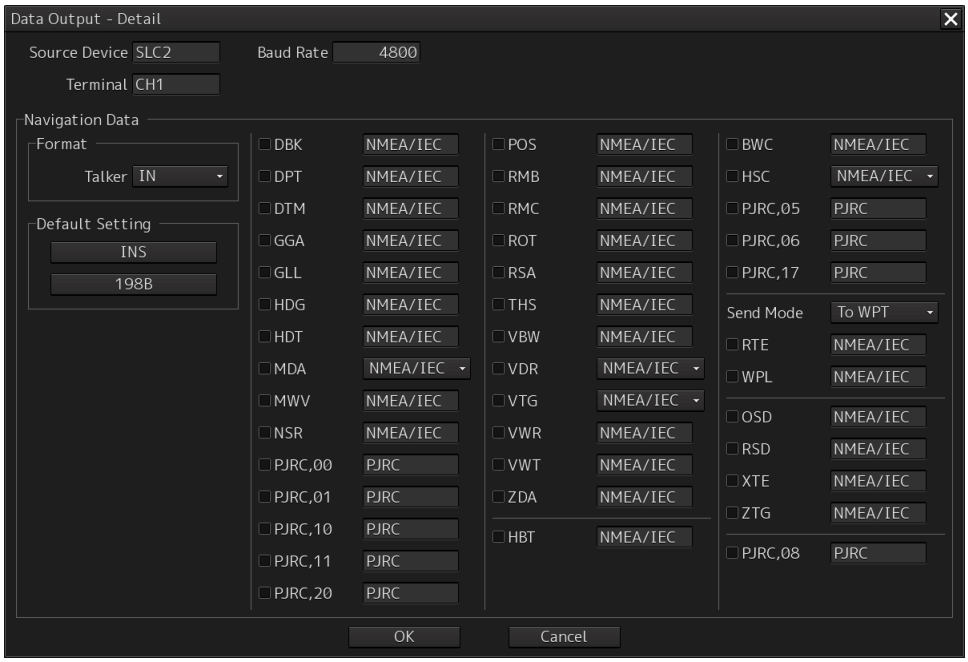
In order to be displayed correctly, set up the sentence to be transmitted according to the following tables.

Sentence	Description	Remarks
TTM	An OSD sentence is transmitted with a TTM sentence. "TT1-***" is displayed when an OSD sentence is not transmitted.	
TLL	In the case of a TLL sentence, "REL/GND/SEA" cannot be displayed. "TT1-***" is always displayed.	
TTD	In the case of TTD sentence, “TT1-REL/GND/SEA” is displayed without transmission of other sentences.	

- "OSD" and "RSD" sentence are only transmitted by RADAR mode .
- When ECDIS software version is Ver.1.30 or later, it is necessary to set both TTD and TLB for Target Track output sentence from RADAR in order to display association symbols. In this case, the software version of RADAR is also need to be Ver.1.30 or later.

Setting the output items of [Navigation Data]

1 Click on the [Detail] button to display the Detail dialog box.



2 Select the sentence to be output.

The default settings can be selected all together by the [INS] and [198B] buttons.

INS: Selects the default items for INS.

198B: Selects the default items for 198B.

Select the sentence to be output.

Setting Item	Description of Setting	Default Setting
DBK	Checking the check box outputs the DBK sentence.	198B
DPT	Checking the check box outputs the DPT sentence.	INS
DTM	Checking the check box outputs the DTM sentence.	INS
GGA	Checking the check box outputs the GGA sentence.	
GLL	Checking the check box outputs the GLL sentence.	INS
HDG	Checking the check box outputs the HDG sentence.	
HDT	Checking the check box outputs the HDT sentence.	198B
MDA	Checking the check box outputs the MDA sentence.	INS,198B
MWV	Checking the check box outputs the MWV sentence.	
NSR	Checking the check box outputs the NSR sentence.	INS
PJRC,00	Checking the check box outputs the PJRC, 00 sentence.	198B
PJRC,01	Checking the check box outputs the PJRC, 01 sentence.	198B
PJRC,10	Checking the check box outputs the PJRC, 10 sentence.	198B
PJRC,20	Checking the check box outputs the PJRC, 20 sentence.	198B
POS	Checking the check box outputs the POS sentence.	INS
RMB	Checking the check box outputs the RMB sentence.	
RMC	Checking the check box outputs the RMC sentence.	

Setting Item	Description of Setting	Default Setting
ROT	Checking the check box outputs the ROT sentence.	198B
RSA	Checking the check box outputs the RSA sentence.	198B
THS	Checking the check box outputs the THS sentence.	INS
VBW	Checking the check box outputs the VBW sentence.	INS
VDR	Checking the check box outputs the VDR sentence.	INS,198B
VTG	Checking the check box outputs the VTG sentence.	INS,198B
VWR	Checking the check box outputs the VWR sentence.	198B
VWT	Checking the check box outputs the VWT sentence.	198B
XDR	Checking the check box outputs the XDR sentence.	INS
ZDA	Checking the check box outputs the ZDA sentence.	INS
HBT	Checking the check box outputs the HBT sentence.	INS
BWC	Checking the check box outputs the BWC sentence.	198B
HSC	Checking the check box outputs the HSC sentence.	INS,198B
PJRC,05	When this item is checked, the PJRC,05 sentence is output.	198B
PJRC,06	When this item is checked, the PJRC,06 sentence is output.	198B
PJRC,17	When this item is checked, the PJRC,17 sentence is output.	198B
RTE	Checking the check box outputs the RTE sentence. The following information is output depending on the contents that are selected in the Send Mode combo box. To WPT: Information relating to the current WPT is output. All: Information relating to the entire WPT is output. To WPT+All: Information relating to the entire WPT and information relating to the current WPT are output.	
WPL	Checking the check box outputs the WPL sentence. The following information is output depending on the contents that are selected in the Send Mode combo box. To WPT: Information relating to the current WPT is output. Al: Information relating to the entire WPT is output. To WPT+All: Information relating to the entire WPT and information relating to the current WPT are output.	
OSD	Checking the check box outputs the OSD sentence.	
RSD	Checking the check box outputs the RSD sentence.	
XTE	When this item is checked, the XTE sentence is output.	198B
ZTG	When this item is checked, the ZTG sentence is output.	198B
APB	When this item is checked, the APB sentence is output.	
BOD	When this item is checked, the BOD sentence is output.	
PJRC,08	When this item is checked, the PJRC,08 sentence is output.	198B

3 Click on the [OK] button.

Note

The number of sentences that can be transmitted per second varies depending on the baud rate of the selected channel. When a large number of sentences are selected, transmit them by adjusting the transmission interval.

When the number of sentences that are selected exceeds the limit allowed for the corresponding baud rate that is indicated in the following table and the OK button is pressed, a warning message is displayed. When a warning message is displayed, increase the baud rate if possible or transmit through multiple ports.

Baud Rate	No. of sentences	Remarks
2400	3	
4800	5	
9600	10	
19200	20	
38400	40	

4.12 Network Setting [ALL]

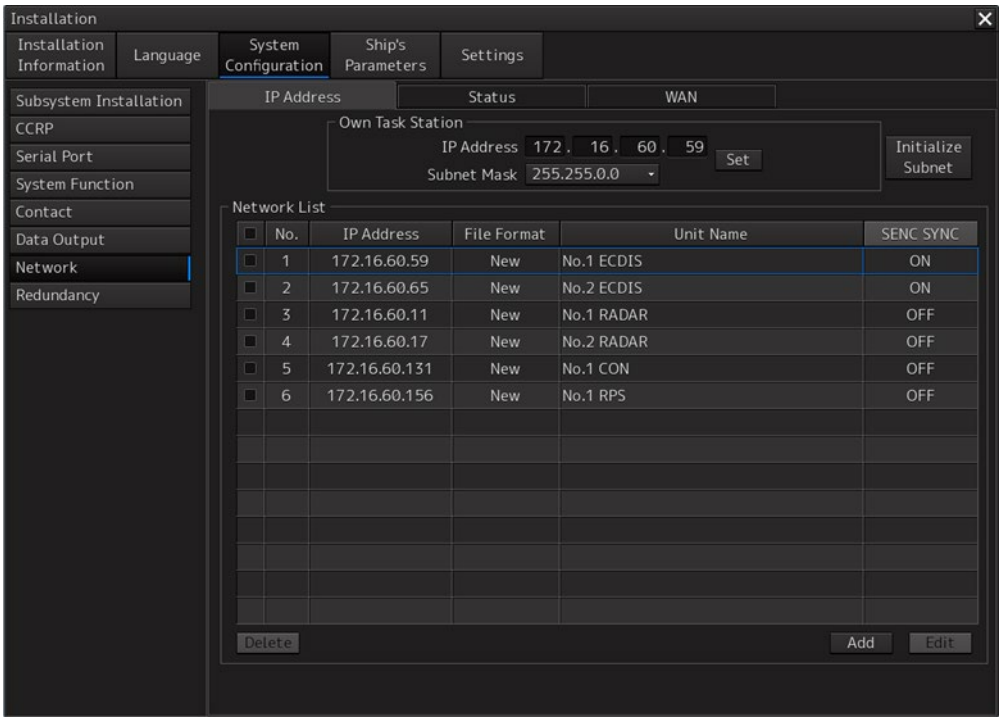
The [Network] dialog enables the setting of the IP address of own equipment and registration of the equipment with which files are shared and charts are synchronized within the system.

Displaying the [Network] dialog

1 Display the dialog of the Installation submenu.

2 Select [System Configuration] in the 1st Classification pane and [Network] in the 2nd Classification pane.

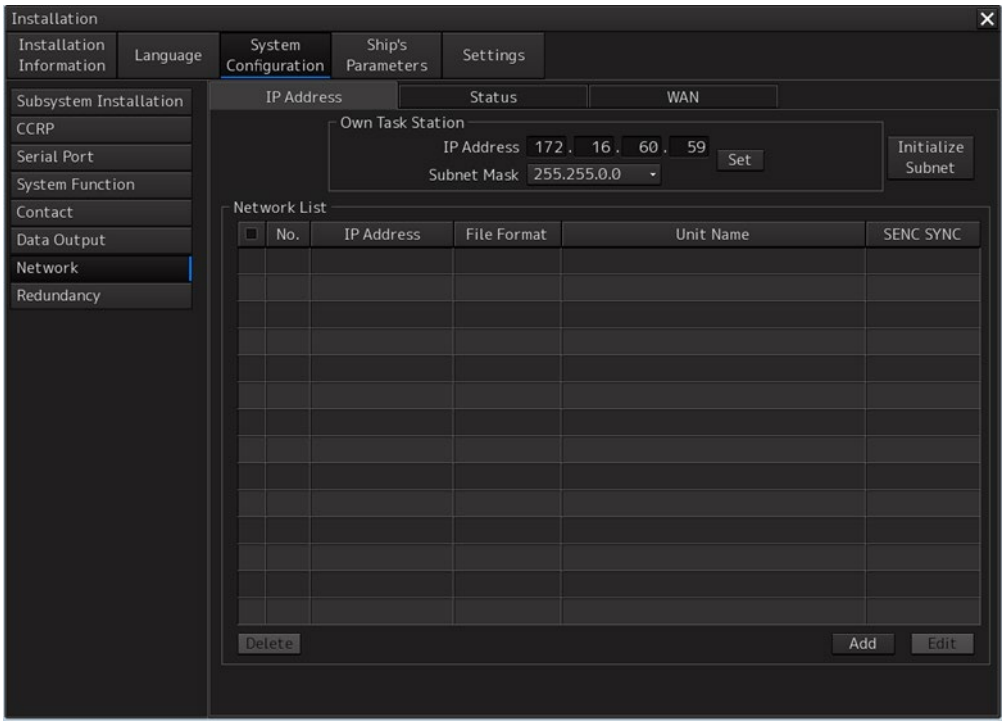
The [Network] dialog is displayed in the Edit/Result pane.



The IP address of this equipment (Own Task Station) and the IP address of each unit on the network are listed in [Network List].

Setting an IP address of this equipment

1 Display the [IP Address] tab by clicking on the tab name display.



2 Click on the [IP Address] input box of [Own Task Station].
A numeric input keyboard is displayed.

3 Enter an IP address (from 0.0.0.0 to 255.255.255.255)

4 If the IP address for JRC LAN (192.168.60.xxx) was set in step 3, change the subnet mask to 255.255.255.0.

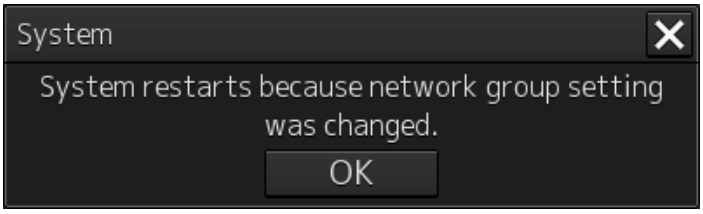


> **Memo:**
> **If the IP address for IEC61162-450 (172.16.60.xxx) was set in step3, there is no need to change the subnet mask.**
>
> 
>

5 Click on the [Set] button.
If the set IP address is not registered in the [Network List], the address will be newly registered as follows:

No.: Automatically assigned
File Format: New
Unit Name: Name of this equipment (example: No.1 RADAR)
SENC SYNC: When any of No.1 ECDIS to No.4 ECDIS is selected in Own Task Station, check this item and if any other option is selected, uncheck this item.

When any of the values from the 1st octet to the 3rd octet is changed, the following message is displayed.



6 Click on the [OK] button.

The dialog is closed and the system restarts.

Editing [Network List]

Up to 32 equipment information items on the network can be registered in [Network List].
The following items can be registered.

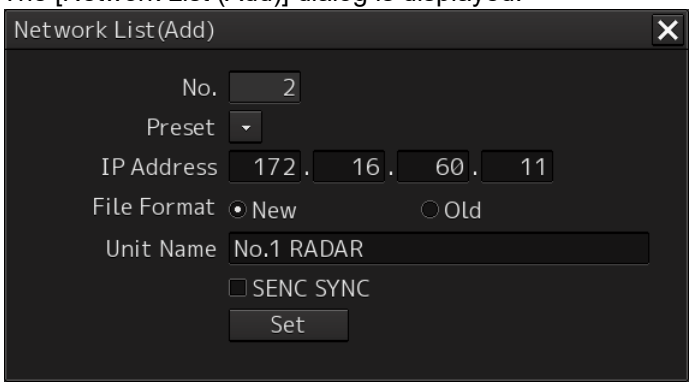
No.:	Automatic assignment (1 to 32)
Preset:	Equipment name (RADAR/ECDIS/CON/RPS)
IP Address:	IP address of the equipment
File Format:	File format of the equipment with which files are shared (New/Old)
	New: Do not select New for this equipment.
	Old : Select this option for any equipment other than this equipment.
Unit Name:	Name of the equipment (Example No.1 RADAR)
SENC SYNC:	Equipment with which the chart is synchronized (ON/OFF)

Note
In the Network List, register only the equipment with which file sharing/chart synchronization is performed within the system.

● Registering new information

1 Click on the [Add] button.

The [Network List (Add)] dialog is displayed.



2 Select an equipment name in the [Preset] menu.

The IP address that is preset for selected equipment name is input in the [IP Address] input box.
[New] or [Old] is selected for the [File Format] according to the file format that is preset for the selected equipment name.
The selected equipment name is displayed in the [Unit Name] input box.

Note
If any of No.1 ECDIS to No.4 ECDIS is selected as the equipment name, the [SENC SYNC] check box is checked automatically.

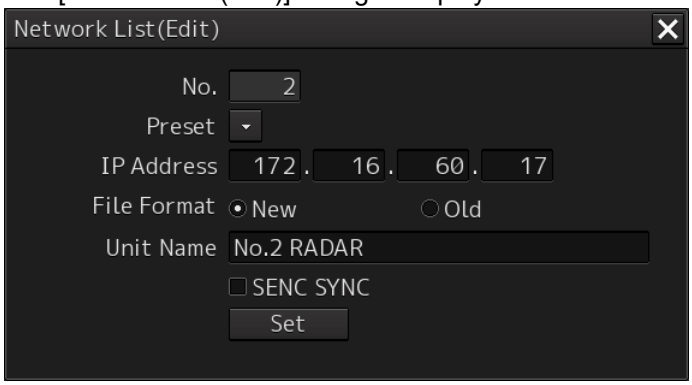
3 **Click on the [Set] button.**
The [Network List (Add)] dialog is closed and the information that is set is displayed in [Network List].

Note
The display information is invalid unless at least one of the [IP address], [File Format], and [Unit name] is input.

● **Changing the registered information**

1 **On [Network List], check the check box of the row where the equipment whose information is to be changed is displayed.**

2 **Click on the [Edit] button.**
The [Network List (Edit)] dialog is displayed.

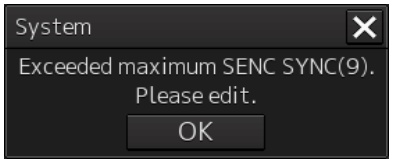


3 **To change the [IP Address], click on the [IP Address] input box.**
A numeric input keyboard is displayed.
Select an IP address (0.0.0.0 to 255.255.255.255).
*For the old equipment, the IP address needs to be changed.

4 **To change the [File Format], click on the [New] or [Old] button.**

5 **To change the [Unit Name], change the unit name of the input box (up to 20 characters can be used).**

6 **To change [SENC SYCN], check or uncheck the [SENC SYNC] check box.**
When 9 equipment units have already been set for chart synchronization:
If addition of another equipment for synchronization is attempted and the [Set] button is clicked on the [Network List (Edit)] dialog or the [Network List (Add)] dialog, an error message is displayed.



Close the dialog by clicking on the [OK] button or [x] button.
Remove some of the equipment from the synchronization targets so that the number of chart synchronization target equipment units does not exceed 9.

7 **Click on the [Set] button.**
The [Network List (Edit)] dialog is closed and the information of the unit that has been selected in [Network List] is changed.

● **Deleting information**

1 **On [Network List], check the check box of the row where the information to be deleted is displayed.**

2 **Click on the [Delete] button.**
The information that has been selected in Step 1 is deleted from [Network List].

[Reference]

JRC Network IP Address

Network	Main-LAN	Sub-LAN
Old equipment (used by JMA-9100 and JAN-901B)	192.168.060.xxx	192.168.061.xxx
This equipment (complies with IEC61162-450)	172.016.060.xxx	172.017.060.xxx

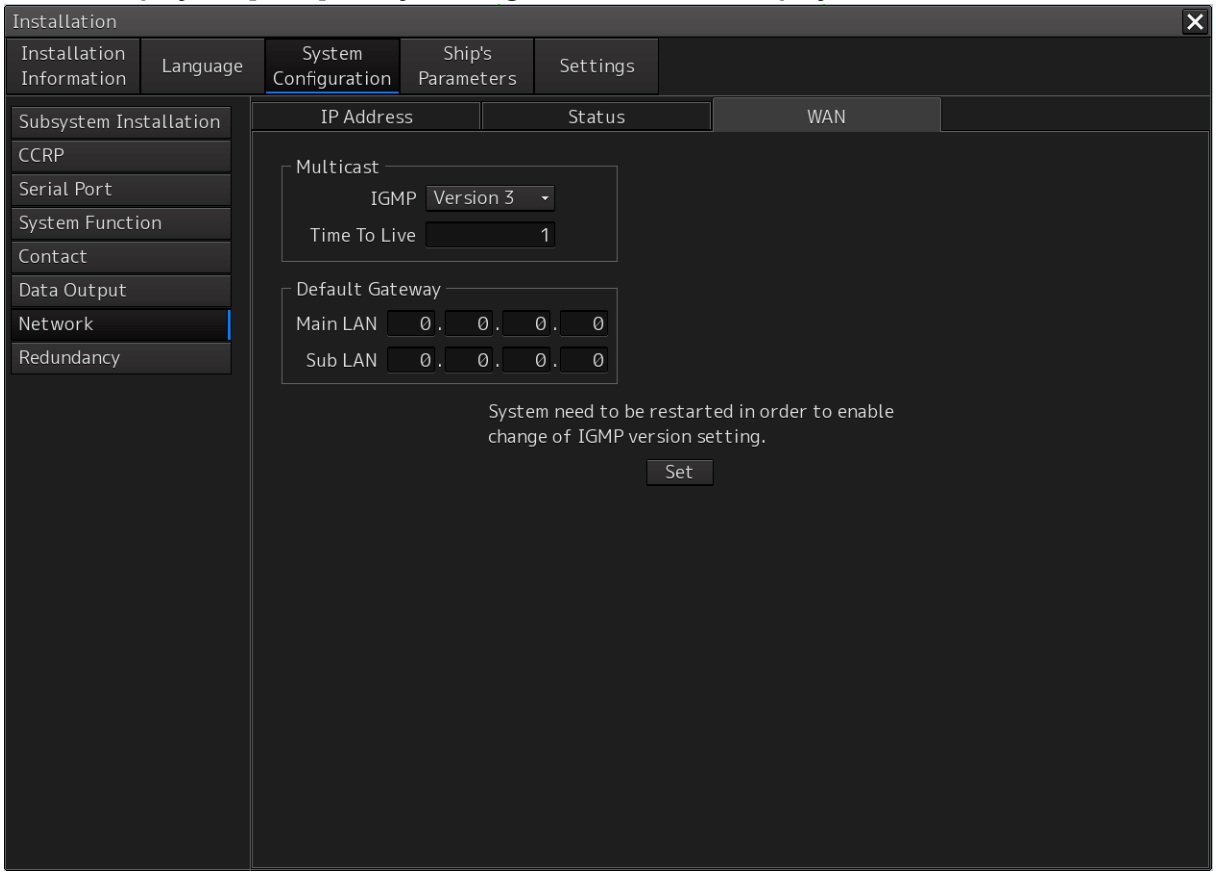
Note
When the course is shared with GPS, the IP address of the GPS equipment must be set in the IP address 172.16.60.xxx of the network of this equipment (complies with IEC61162-450). (Refer to 6.8.1 for the setting method.)

Registration of the IP address of the GPS equipment in the Network List of this equipment is not required.

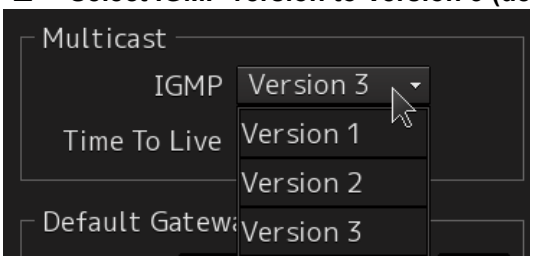
JRC unit	IP address 4th Octet
No.1 RADAR	11
No.2 RADAR	17
No.3 RADAR	23
No.4 RADAR	29
No.5 RADAR	35
No.6 RADAR	41
No.7 RADAR	47
No.8 RADAR	53
No.1 ECDIS	59
No.2 ECDIS	65
No.3 ECDIS	71
No.4 ECDIS	77
No.1 CON	131
No.2 CON	135
No.1 CON(Wing)	139
No.2 CON(Wing)	140
No.1 CON(Remote)	141
No.2 CON(Remote)	142
No.1 RPS	156
No.2 RPS	157

Setting a WAN

1 Display the [WAN] tab by clicking on the tab name display.

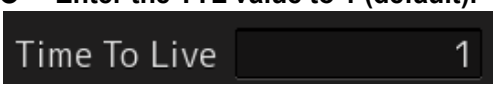


2 Select IGMP version to Version 3 (default).



Note:
IGMP is Internet Group Management Protocol for receiving of multicast data.

3 Enter the TTL value to 1 (default).



Note:
TTL is Time to live. The TTL is decremented by 1 each time it passes through the router. Packets with a TTL of 0 are discarded.

4 Enter the Default Gateway as follows.

LAN	Default Gateway (default)
Main LAN	0.0.0.0
Sub LAN	0.0.0.0

Note:
If the equipment is connected to the default gateway, enter the IP address of the default gateway according to the specifications of the default gateway.

4.13 Redundancy Setting [ALL]

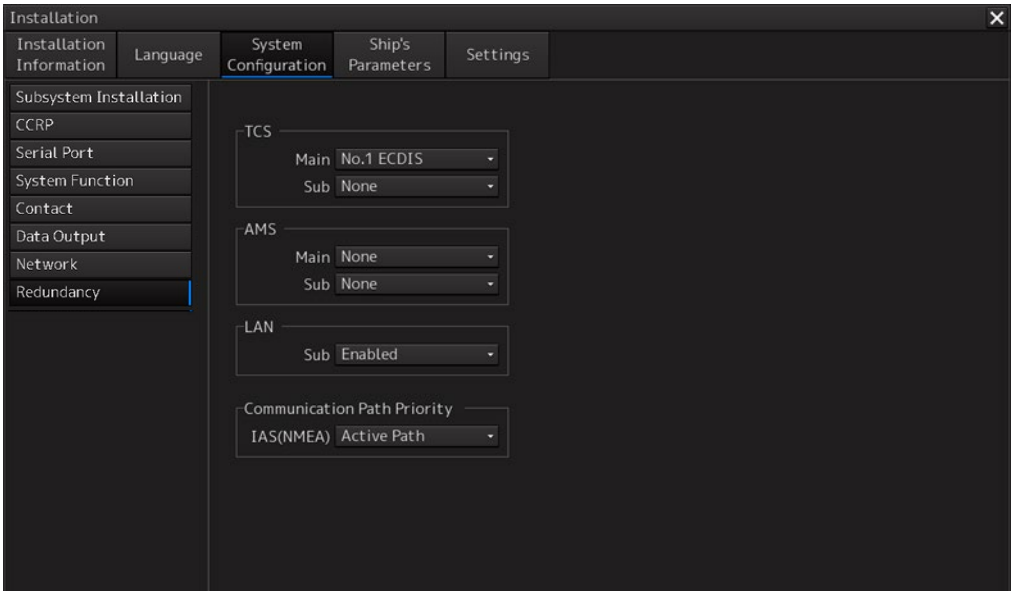
Set system redundancy in the [Redundancy] dialog.

Displaying the [Redundancy] dialog

1 Display the dialog box of the Installation submenu.

2 Select [System Configuration] in the 1st classification pane and [Redundancy] in the 2nd classification pane.

The [Redundancy] dialog is displayed in the edit/result pane.



Setting ECDIS for auto sailing

Set the following items in the "TCS" group.

Setting item	Description of setting	Setting value
Main	Select a display unit (ECDIS) for executing the auto sailing function. A display unit (ECDIS) with TCS license must be selected.	Display unit that is installed in the system *Normally, No.1ECDIS is set.
Sub	Select a backup display unit of the auto sailing function. A display unit (ECDIS) with TCS license must be selected.	Display unit that is installed in the system

When selecting Main or Sub, system function of TCS is automatically added to the selected task station.

Setting a display unit for performing the CAM (AMS task) function

Set the following in the "AMS" group.

The display unit that is to be set requires the AMS license.

Setting item	Description of setting	Setting value
Main	Select a display unit for executing the CAM function.	Display unit that is installed in the system *Normally, No.1CON is set.
Sub	Select a backup display unit of the CAM function.	Display unit that is installed in the system

Normally, Main collects alerts and distributes them to the system. When Main stops, Sub takes over the tasks of Main. When Sub stops, Main takes over the tasks of Sub.

The indicator that has AMS licence and does not set Main or Sub is operated as CAM(Client). CAM(Client) receives distribution of alert information from Main or Sub and displays in alert management screen.

When selecting Main or Sub, system function of AMS is not automatically added to the selected task station.

Setting LAN single configuration/duplex configuration

Set the following in the "LAN" group.

Setting item	Description of setting	Setting value
Sub	Select Enable/Disable sub LAN. To make the LAN have a duplex configuration, set the [Sub] combo box in [LAN] to [Enabled]. To make the LAN have a single configuration, set the [Sub] combo box in [LAN] to [Disabled].	Enabled/Disabled

To enable sub LAN, check the setting of DIP switch S4 of the CMH-2370 serial LAN interface circuit.

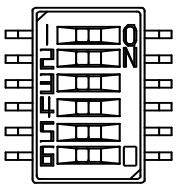
Setting IAS (NMEA) to LAN duplicate output

When Sub LAN is valid, set the following.

Setting item	Setting contents	Setting value
IAS（NMEA）	When Active Path is selected, IAS (NMEA) is output via Main LAN. It is not output via Sub LAN.	Active Path
	When Dual Path is selected, IAS (NMEA) is output via Main/Sub LAN.	Dual Path

Memo

To change the setting of switch S4, restart the CMH-2370 serial LAN interface circuit by using switch S1.



Outline of CMH-2370 S4

CMH-2370 S4 setting table

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

4.14 Setting Ship's Parameters [ALL]

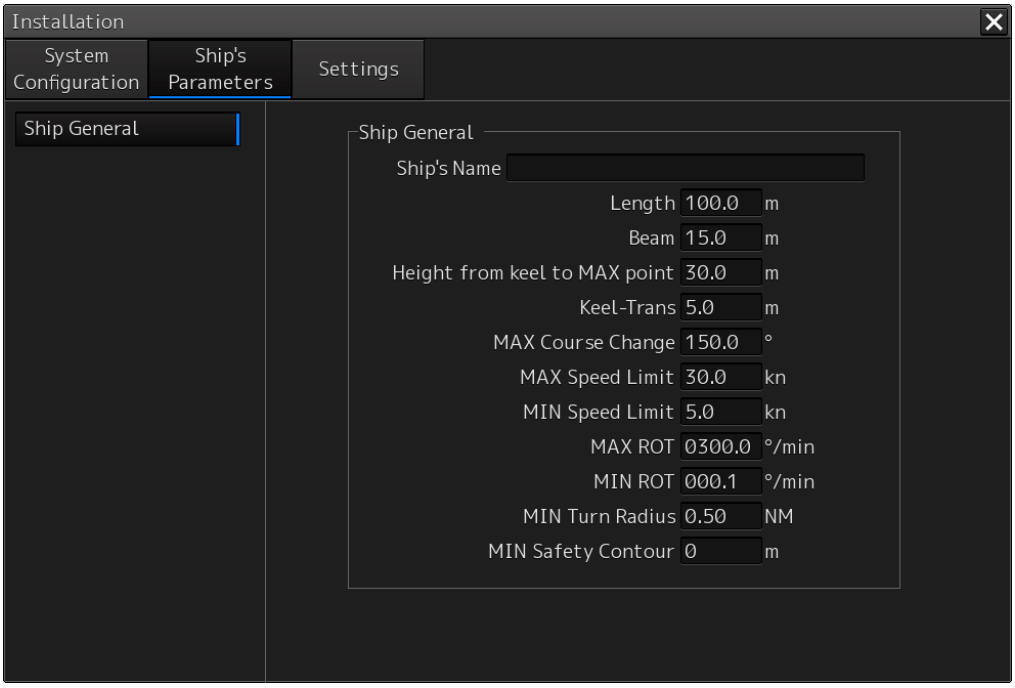
Use the [Ship General] dialog to set ship's parameters.

Displaying the [Ship General] dialog

1 Display the dialog of the Installation submenu.

2 Select [Ship Parameter] in the 1st Classification pane and [Ship General] in the 2nd Classification pane.

The [Ship General] dialog is displayed in the Edit/Result pane.



Setting ship's parameters

Set the following items in the [Ship General] dialog.

Setting item	Description of setting	Setting value
Ship's Name	Enter own ship's name in the box.	Max. 20 characters
Length (of ship)	Enter own ship's length in the box.	1.0 to 1022.0 m
Beam (ship's width)	Enter own ship's beam in the box.	1.0 to 126.0 m
Height from keel to MAX point (Height from the keel to the maximum point of the ship)	Enter the height from the keel to the maximum point of the ship in the box.	1.0 to 126.0 m
Keel-Trans (distance between the echo sounder transducer and the keel)	Enter the distance between the echo sounder transducer of the depth sounder and the keel. (Required when displaying the water depth with the keel fixed)	0.0 to 20.0 m
MAX Course Change (limit value of course change angle)	Enter the limit value of the course change angle of the planned route in the box.	20.0 to 359.9°
MAX Speed Limit	Enter the ship's maximum speed in the box.	10.0 to 99.9 kn
MIN Speed Limit	Enter the ship's minimum speed in the box.	0.0 to 89.9 kn

Setting item	Description of setting	Setting value
MAX ROT	Enter the maximum rate of turn in the box.	1.0 to 1200.0°/min (INS: 30.0 to 600.0°/min)
MIN ROT	Enter the minimum rate of turn in the box.	0.0 to 570.0°/min
MIN Turning Radius	Enter the minimum turn radius in the box.	0.00 to 9.99 NM
MIN Safety Contour (Minimum value of SafetyContour that can be set)	Enter the minimiu value of SafetyContour in the box.	0 to 200 m

Note

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

4.15 Setting Alert [ALL]

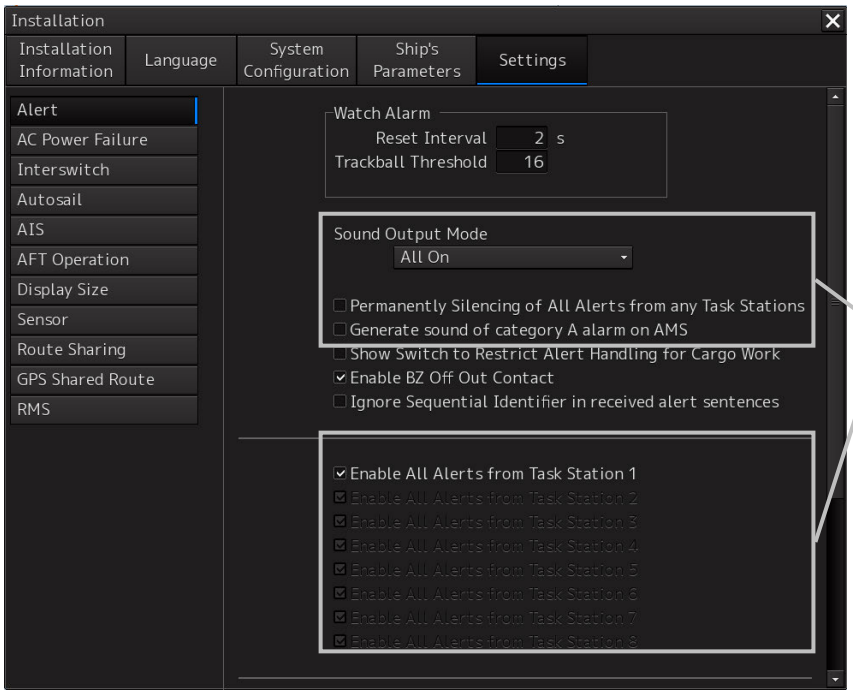
Use the [Alert] dialog to set alert details.

Displaying the [Alert] dialog

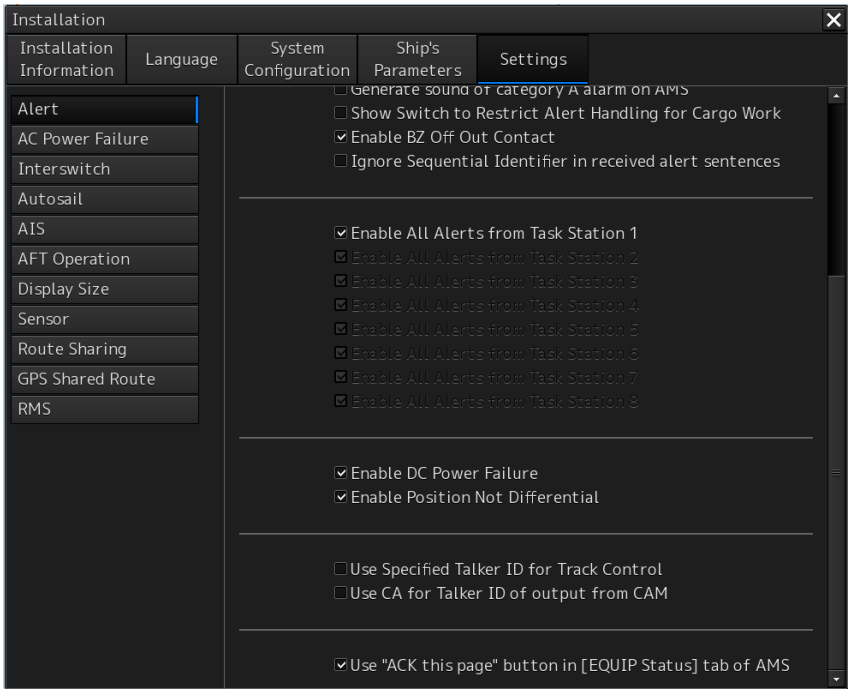
1 Display the dialog of the Installation submenu.

2 Select [Setting] in the 1st Classification pane and [Alert] in the 2nd Classification pane.

The [Alert] dialog is displayed in the Edit/Result pane.



Note
Do not change these setting if the equipment is used on a ship. "Checked" violates the IEC62923 standard.
For details, refer to the description of each setting item.



Setting alert

Set the following items in the [Alert] dialog.

Setting item	Description of setting	Setting value
Reset Interval	Enter the interval for resetting watch alarm. When 0 is entered, a reset signal (watch timer reset signal) is not issued to the central monitoring unit.	0 to 999s
Trackball Threshold	Enter a trackball shift amount as the watch alarm reset condition.	0 to 128 pixels
Sound Output Mode	Set an alert sound output mode. **All On**: Emits all the alert sounds. (According to the [Volume] setting of [General-Sounds] of the Settings menu) **All Off**: Restricts emission of all the alert sounds forcibly. **Off for Contact Output**: Forcibly restricts emission of the alert sounds that are set for contact output in [Contact Output] of System Configuration-Contact of the Installation submenu. **Note** Do not change this setting to ALL OFF if the equipment is used on a ship. "All OFF" violates the IEC62923 standard. "ALL OFF" is used for exhibitions or demonstrations. The alert sounds do not include the key operation sound (Key ACK), operation error sound (OPE Miss), and interswitch setting completion sound.	All On All Off Off for Contact Output

Controlling alerts

Alerts can be silenced from any task station or unnecessary alerts can be silenced under a specific condition.

Permanently silencing all alerts from any task stations

The handling of the permanent collective transmission command for alerts varies depending on whether the task station is functioning as AMS.

- **Task station functioning as AMS**

  When this item is checked, the permanent collective transmission command is received and all the alerts are silenced permanently.

- **Task station not functioning as AMS**

  When this item is checked, the permanent collective transmission command is transmitted.

Note
Do not check this setting if the equipment is used on a ship. “Checked” violates the IEC62923 standard.

Sounding/Not sounding the category A alarm on AMS

To sound the category A alarm, check the check box for [Generate sound of category A alarm on AMS]. To not sound the alarm, uncheck the check box.

> **Note**
> Do not check this setting if the equipment is used on a ship. “Checked” violates the IEC62923 standard.

To show / hide the toggle harbor mode icon

In the [Show Switch to Restrict Alert Handling for Cargo Work] check box, you can toggle the harbor mode switch icon on / off. Check the box to display the icon. Uncheck the box to hide the icon.

To enable / disable the operation of driving the BZ Off Out contact from the indicator

With the [Enable BZ Off Out Contact] check box, you can toggle the operation of driving the BZ Off Out contact enable / disable from the set indicator. Check the box to enable the operation. Uncheck the box to disable the operation.

To receive alerts from some equipment (JFE-680, etc.) that are not compatible with IEC62923 (BAM standard for MED application requirements after August 2021) that uses ALF for alert sentences.

In the [Ignore Sequential Identifier in received alert sentences] check box, MFD will be possible to receive alerts from some equipment (JFE-680, etc.) that are not compatible with IEC62923 (BAM standard for MED application requirements after August 2021) that uses ALF for alert sentences. Check the box to receive.

Displaying alerts of the specified task station only

By specifying a task station by checking any of [Enable All Alerts from Task Station 1] to [Enable All Alerts from Task Station 8] check boxes, only the alerts from the specified task station can be displayed. The communication abnormality between the specified task station and own equipment is also detected concurrently.

> **Note**
> Do not change the check box of Task stations other than RPS to clear. ("clear" violates the IEC standard.) Clear the check box only for Task stations for which RPS is set.
>
> In the [Enable All Alerts from Task Station 1] to [Enable All Alerts from Task Station 8] check boxes, uncheck the check box for the task station of own equipment, and you will be able to select [OFF] (voice OFF) in the following setting items of [Settings] - [Sounds].
> - Navigation 1 to Navigation 3
> - CPA/TCPA

Issuing Power (DC Low Voltage) alerts

Check the Enable Power(DC Low Voltage) (Power(DC Low Voltage) alert enable) check box.
When DC power supply is not connected to the task station under the installation, Power(DC Low Voltage) alerts can be controlled by unchecking the item.

Setting an alert talker of the TCS function

A special talker can be assigned to the alert sentence relating to the TCS function sent via serial signal.

Assigning a special talker

Check the ‘Use Specified Talker ID for Track Control’ check box.
For ALF/ARC/ALR, an alert relating to TCS is output under Talker:TC only when TCS is implemented.
An alert that is used as a trigger for ending TCS such as Track Control Stopper or End Of Track is output under Talker:TC at TCS termination also.
Alerts at TCS non-implementation or alerts other than TCS are output depending on the equipment such as Talker:EI.

Setting an alert talker of the CAM function

A special talker can be assigned to the alert sentence relating to the CAM function sent via serial signal.

Assigning a special talker

Check the ‘Use CA for Talker ID of output from CAM’ check box.
For ACK / CAN to the sensor set to Alert from subsystem or Alert from sensor in the serial port setting, ALR to the BNWAS, and alert output IAS (NMEA), CAM is output under Talker: CA.

4.16 Operation Setting at AC Power Failure (Insufficient AC power supply) [ALL]

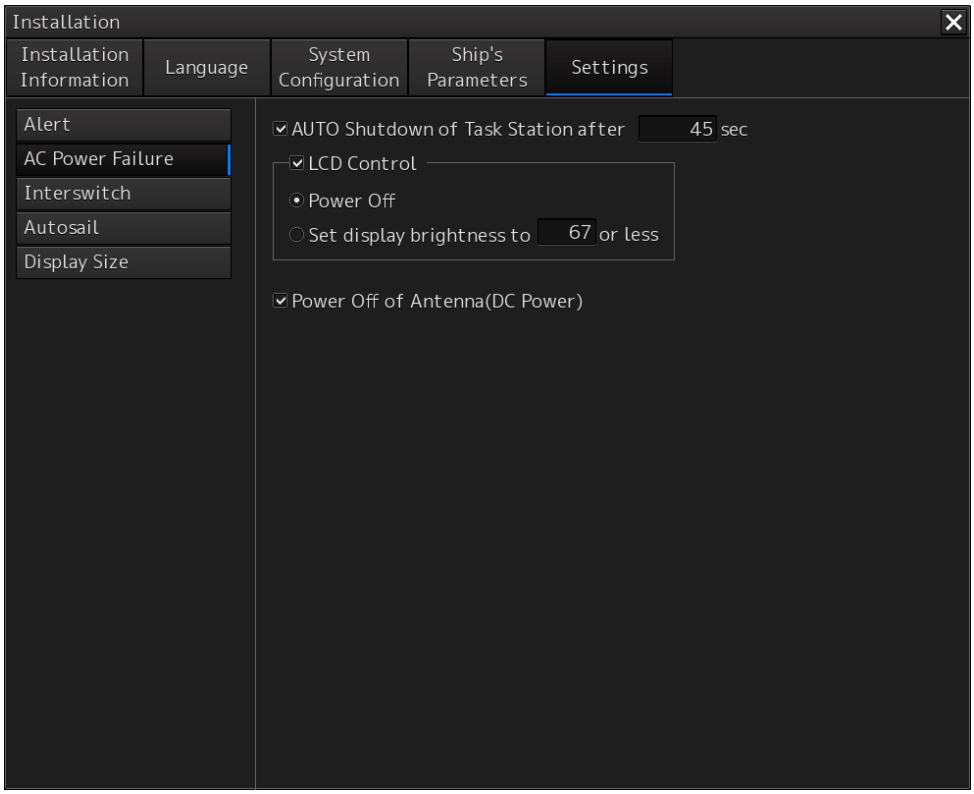
Use the [AC Power Failure] dialog to set the operation to be performed when a "Power (AC Voltage, Low)" alert occurs due to insufficient AC power supply (mainly power failure).

Displaying the [AC Power Failure] dialog

1 Display the dialog of the Installation submenu.

2 Select [Settings] in the 1st Classification pane and [AC Power Failure] in the 2nd Classification pane.

The [AC Power Failure] dialog is displayed in the Edit/Result pane.



Setting the operation to be performed at the occurrence of the "Power (AC Voltage, Low)" alert

Set the following in the [AC Power Failure] dialog.

Setting item	Description of Setting	Setting value
AUTO Shutdown of Task Station	1. Use the check box to select whether to shut down Task Station automatically. 2. When this item is checked, enter in the input box the time until automatic shutdown is executed. **Note:** When "AC Low Voltage" alert is cleared prior to automatic shutdown, automatic shutdown is not executed.	**Shut down automatically:** Check the check box **Do not shut down automatically:** Uncheck **Time until automatic shutdown:** 0~9999s
LCD Control	1. Use the check box to select whether to control LCD. 2. When this item is checked, select the LCD control method by clicking on the radio button. 3. When [Set display brightness] is selected as the LCD control method, enter the LCD brightness value in the [Set display brightness] input box. **Note** ● When "AC Low Voltage" alert is cleared prior to automatic shutdown, the LCD is reset to the pre-alert state. ● The brightness is changed only when the current display brightness value is greater than the set value.	**Control LCD:** Check the check box. **Do not control LCD:** Uncheck **LCD control method** **Power Off:** LCD power supply is turned off. **Set display brightness:** Set the brightness below the specified display brightness. **LCD brightness value:** 0 to 100
Power Off of Antenna (DC Power) (Radar antenna power supply off (DC power supply))	Use the check box to select whether to turn off the power supply of the radar antenna that is operating with the DC power supply. **Note** If "AC Low Voltage" alert is cleared prior to automatic shutdown, the radar antenna power supply is not turned off.	**Turn off the power supply:** Check the check box. **Do not turn off the power supply:** Uncheck

4.17 Setting Interswitch [RADAR]

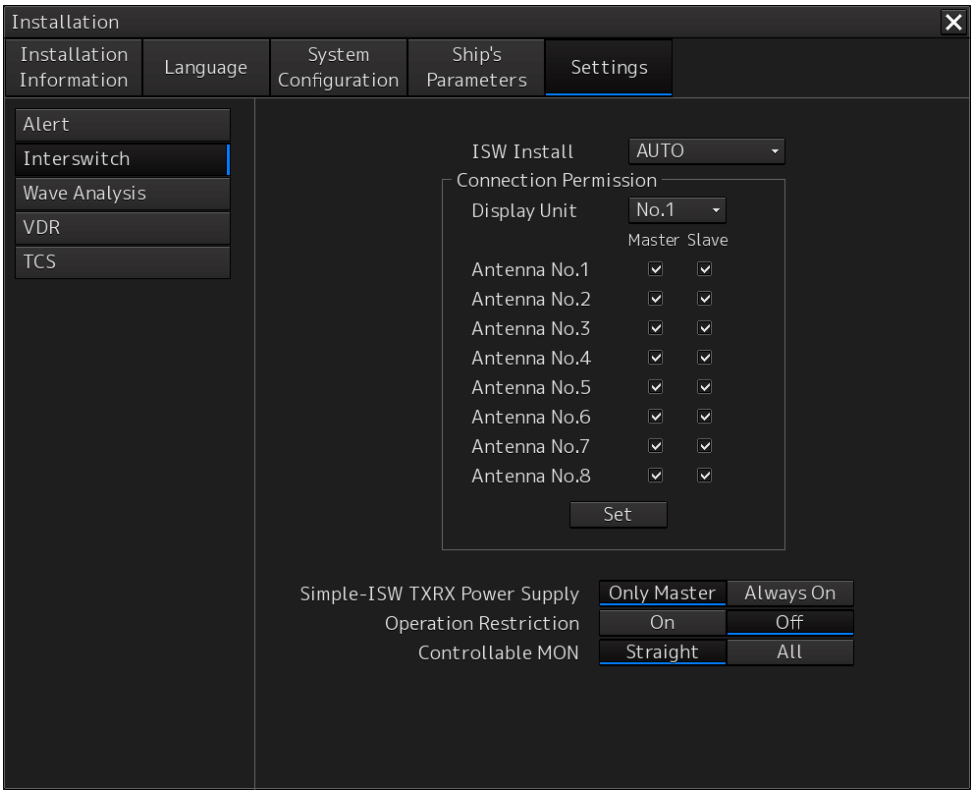
Use the [Interswitch] dialog to set the details of interswitch.

Displaying the [Interswitch] dialog

1 Display the dialog of the Installation submenu.

2 Select [Setting] in the 1st Classification pane and [Interswitch] in the 2nd Classification pane.

The [Interswitch] dialog is displayed in the Edit/Result pane.



Setting Interswitch

Set the following items in the [Interswitch] dialog.

Setting item	Description of setting	Setting value
ISW Install (Interswitch installation mode)	Select an interswitch installation mode from the combo box. **AUTO**: Checks interswitch installation automatically. **On**: Interswitch installed **Off**: Interswitch not installed **Simple ISW**: Simple interswitch mode	AUTO On Off Simple ISW
Display Unit (Workstation)	Select a workstation number under which interswitch connection permission is to be set from the combo box. When the [Set] button is clicked on, the interswitch setting is changed.	No.1 to No.8
Master/Slave (Master/slave)	Select Master/Slave of the antenna that can be connected via the interswitch from the workstation that is selected in [Display Unit] by checking the antenna number check box. When the [Set] button is clicked on, the interswitch setting is changed.	Master Slave
Simple-ISW TXRX Power Supply (Power supply to the antenna by simple interswitch)	Set highlight display by clicking on the button and select whether the power supply for own antenna is constantly set to ON or the power supply is set to ON only for the master antenna when a simple interswitch is used.	Only Master (ON for master only) Always ON
Operation Restriction	Set highlight display by clicking on the button and select operation restriction On/Off. When On is selected, the following interswitch functions are restricted. • Change the connection statuses of other workstations at switching of the connection status between the antenna and the workstation. • Load the connection patterns. • Set the name in the antenna/workstation.	On Off
Controlable MON (Controllable performance monitor)	Set highlight display by clicking on the button and set controllable performance monitor. **Straight:** Can adjust only the performance monitors of the antennas of straight connection. **All**: Can adjust performance monitors of the antennas other than those of straight connection also.	Straight All

4.18 Setting VDR [RADAR] [ECDIS]

Use the [VDR] dialog to set the details of VDR.

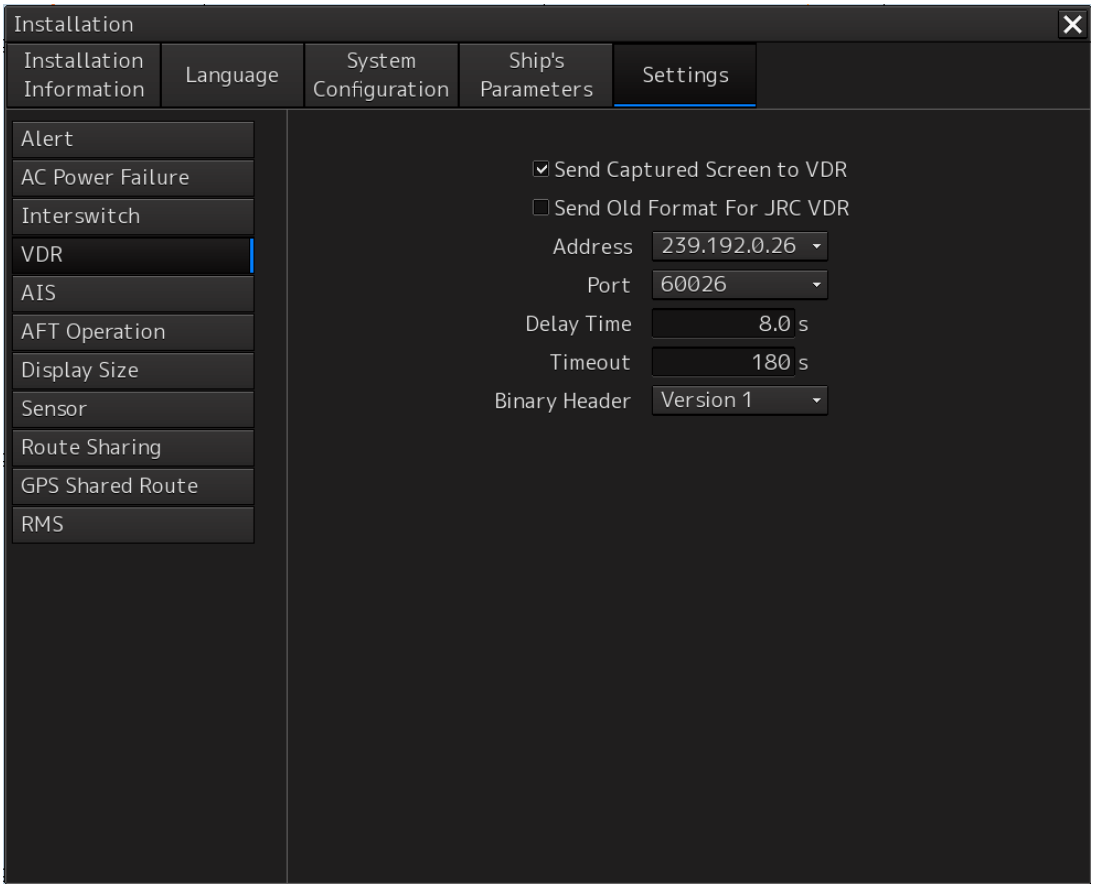
> **Note**
> When VDR "installed" is not specified in the Subsystem Installation dialog, the [VDR] dialog is not displayed.

Displaying the [VDR] dialog

1 **Display the dialog of the Installation submenu.**

2 **Select [Setting] in the 1st Classification pane and [VDR] in the 2nd Classification pane.**

The [VDR] dialog is displayed in the Edit/Result pane.



Setting VDR

Set the following items in the [VDR] dialog.

Setting item	Description of setting	Setting value
Send Captured Screen to VDR	Select whether images are captured within 2 seconds after changing the information and transmitted via the network for VDR.	Transmit: Check. Not transmit: Uncheck.
Send Old Format For JRC VDR	Select whether to send the sentence in the old format that was transmitted by the old MFD (Ver 01.20.012 or earlier).	Transmit: Check. Not transmit: Uncheck.
Address	When [Send Captured Screen to VDR] is checked, select a transmission destination multicast address of the captured image.	239.192.0.26/ 239.192.0.27/ 239.192.0.28/ 239.192.0.29/ 239.192.0.30
Port	When [Send Captured Screen to VDR] is checked, select a transmission destination port number of the captured image.	60026/ 60027/ 60028/ 60029/ 60030
Delay Time	Enter in the input box a delay time when transmitting an image from RADAR or ECDIS. Set an interval so that the output timings are not concentrated when data is sent from each device.	0.0 to 14.5s
Timeout	Enter in the input box the VDR connection timeout period.	1 to 999s
Binary Header	Select the version of the binary transfer protocol for the VDR connection. Version 1: The binary transfer protocol of IEC 61162-450 Ed.1 Version 2: The binary transfer protocol of IEC 61162-450 Ed.2 **Note:** Select the protocol version according to the VDR side.	Version 1 Version 2

4.19 Setting Autosail (Automatic Sailing System) [ECDIS]

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

Note

Unless the following two conditions are satisfied, the [Autosail] dialog is not displayed.

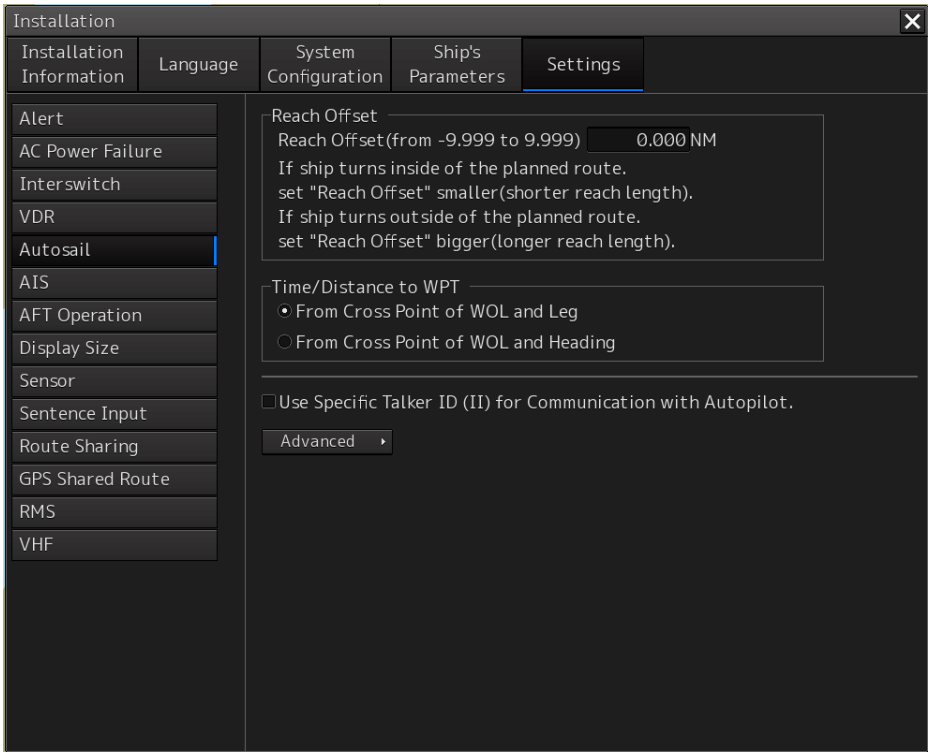
- "Autosail function" is provided as an optional license.
- "Installed" is set for "Autopilot" in the Subsystem Installation dialog.

Displaying the "Autosail" dialog

1 Display the dialog of the Installation submenu

2 Select [Settings] in the 1st Classification pane and [Autosail] in the 2nd Classification pane.

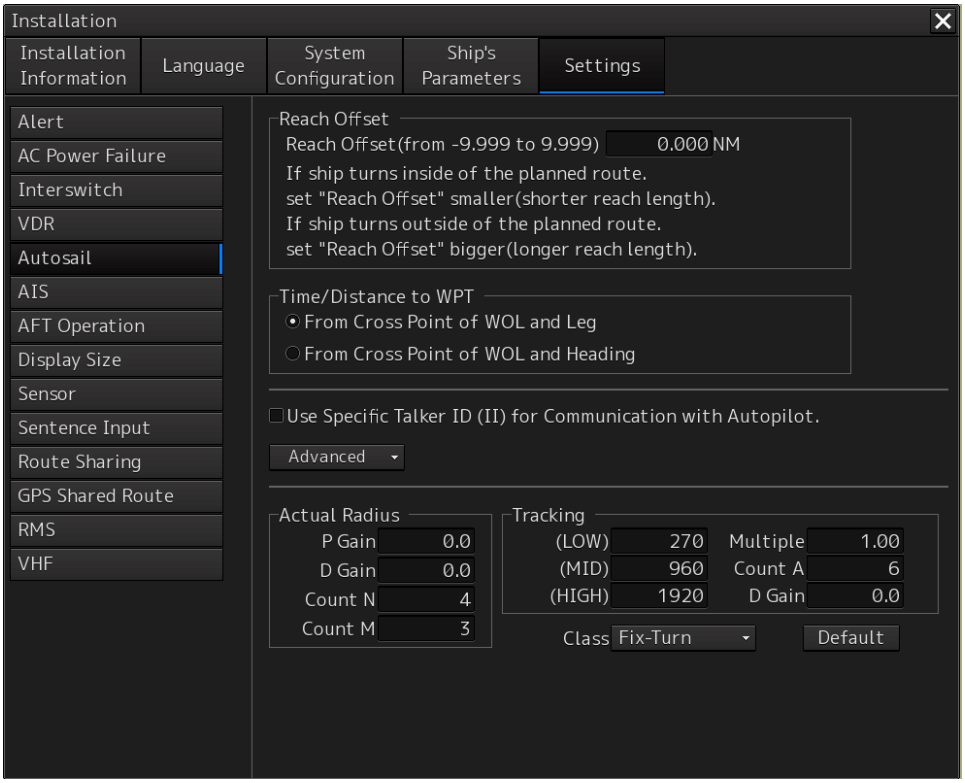
The [Autosail] dialog is displayed in the Edit/Result pane.



Clicking on the [Advanced] (extended display) button shows the [Actual Radius] and [Tracking] display sections.

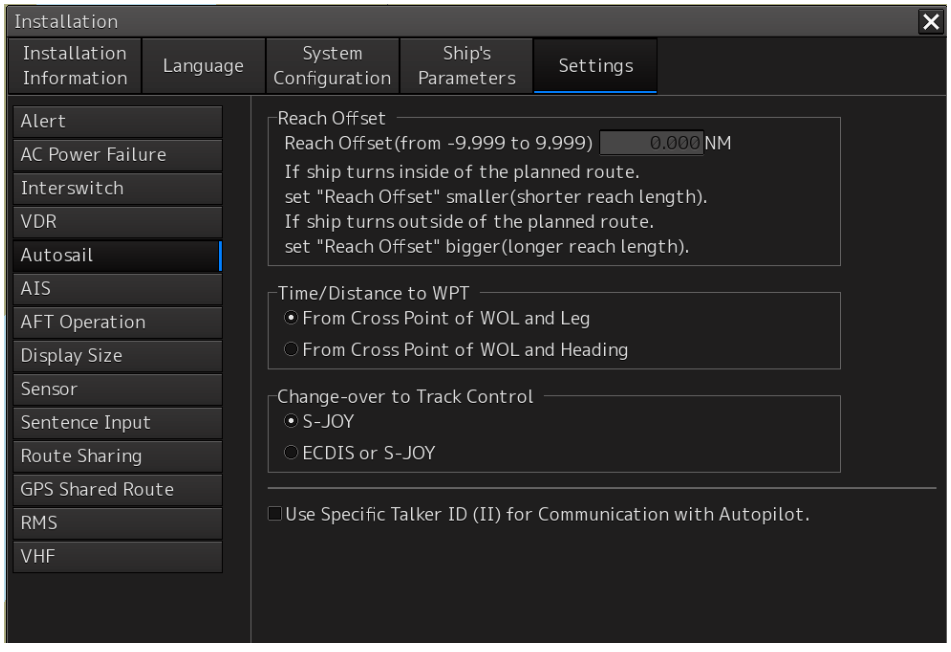
Note

The [Advanced] button is displayed only when PT500_TCS_C_Ed1 is used.



Note

The Change-over to Track Control is displayed only when PT900_TCS_C and S-joy is used.



Setting the automatic sailing system

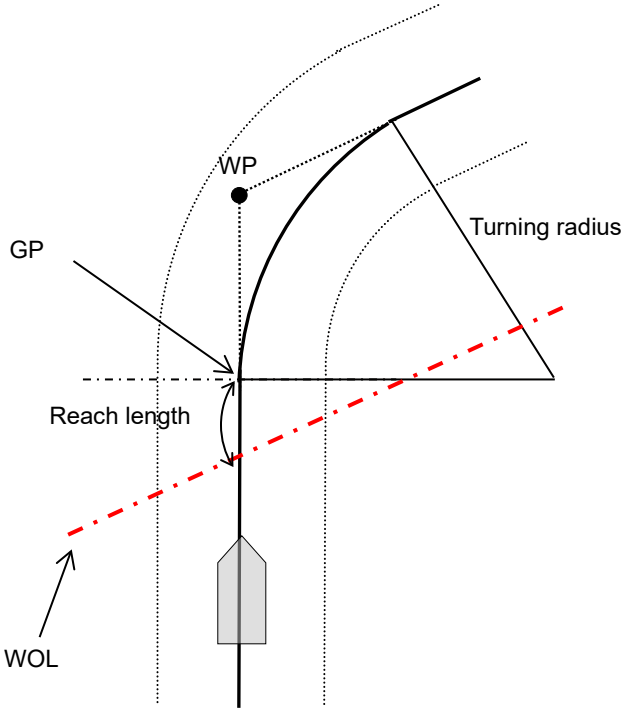
Set the following items in the [Autosail] dialog.

Setting Item	Description of Setting	Setting Value
Reach Offset	Enter the reach offset in the box. For the details, refer to "Reach Offset". **Note** Not used when PT500_TCS_C_Ed2, PT900_TCS_C and AlphapilotMFM is used.	-9.999 to 9.999 NM
Time/Distance to WPT	Select this to select the method of calculating the time and distance from own ship to WPT. **From cross point of WOL and leg:** Calculate between "own ship" and "intersection between WOL and leg". (Recommended) **From cross point of WOL and heading:** Calculate between "own ship" and "intersection between WOL and ship's heading". For the details, refer to "Time/Distance to WPT".	From cross point of WOL and leg From cross point of WOL and heading
Change-over to Track Control	Select this to select the method of starting TCS. **S-JOY** Can start TCS by S-JOY. **ECDIS or S-JOY** Can start TCS by Autosail button of ECDIS menu or S-JOY.	S-JOY ECDIS or S-JOY
Use Specific Talker ID (II) for Communication with Autopilot.	Select whether to send the sentence to the autopilot using II as a special talker (TC is usually used as a talker). Check he check box when connecting to a PT900 that does not support IEC 62923 (BAM standard for MED application requirements after August 2021).	Using II as a special talker: Check Not using II as a special talker: Uncheck
Actual Radius (Order turn course radius)	To calculate an order turn course radius, enter a proportional gain (P Gain), a differential gain (D Gain), an averaging count for proportion (Count N), and a difference averaging count (Count M) in the box. **Note** Used when PT500_TCS_C_Ed1 is used.	**P Gain:** 0.0 to 999.9 **D Gain:** 0.0 to 9999.9 **Count N:** 0 to 999 **Count M:** 0 to 999
Tracking	To calculate a course to steer, enter a gain (Low, MID, High), an exponential term (Multiple), a gain averaging count (Count A), and a derivative term gain (D gain) in the box. For the details, refer to "Tracking". **Note** Used when PT500_TCS_C_Ed1 is used.	**Low/Mid/High:** 0 to 9999 [min.(1/60°)/NM] **Multiple:** 0.00 to 1.00 **Count A:** 0 to 999 **D Gain:** 0.0 to 999.9
Class	Select a ship model in the combo box. The Advanced setting parameters are changed collectively according to the selected ship model. **Note** Used when PT500_TCS_C_Ed1 is used.	Fix-Turn Fast-Ferry Container Tanker

Default	Collectively reset the Advanced setting parameters to the setting values at factory delivery by pressing the button.	

Reach Offset

When the turning angle is ±3 degrees or more, WOL is displayed at the position (Reach Offset position) by the reach length before GP, which is the intersection of the turning radius and leg. The reach derivation calculation method varies depending on the autopilot that is connected.

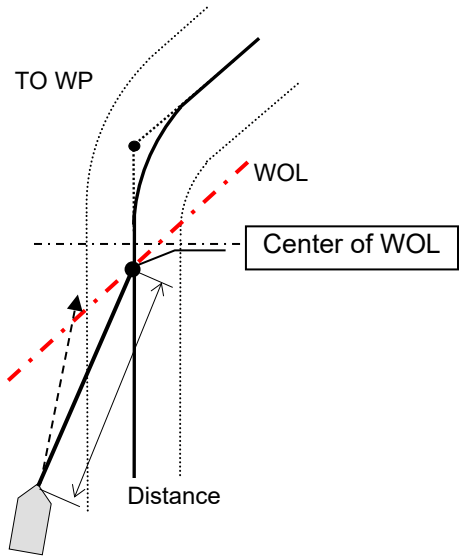


GP : Geometrical point, radii starts

Time/Distance to WPT

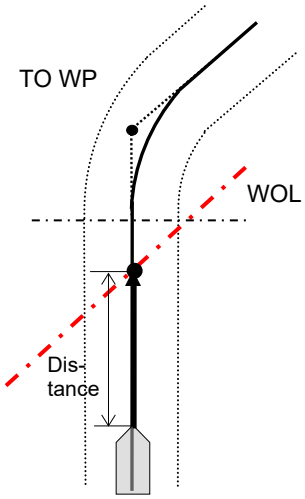
From cross point of WOL and leg (based on the center point between own ship and WOL)

As shown below, the distance/TTG calculation reference point is used as the center point of WOL. As a result, the distance to TO WP can be calculated almost accurately regardless of XTD of own ship and ship's heading. However, note that the timing does not always match the ECC/ACC display timing.

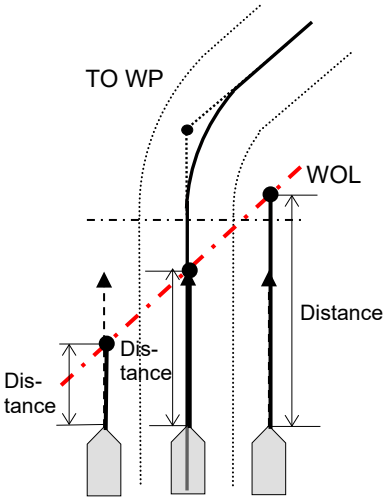


From cross point of WOL and heading (based on the intersection between ship's heading and WOL)

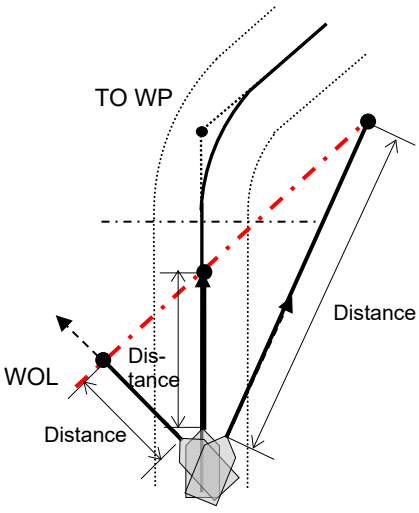
With the same calculation method as the ECC/ACC derivation timing, the TTG display timing and ECC/ACC occurrence timing match.



However, when own ship is off-course from the center of the route or the heading of own ship does not match the leg bearing as shown below, the value changes significantly.



Own ship is off-course



Heading of own ship does not match the leg bearing

Switching between From cross point of WOL and leg and From cross point of WOL and heading

Dest WP calculation switches as follows.

From cross point of WOL and leg	DestWP=TO WP	Calculate the distance between own ship and the center of WOL of TO WP (Figure A)
	DestWP>TO WP	For the subsequent leg length, add the distance between WPs to the distance between own ship and WOL center of TO WP. (Figure B)
From cross point of WOL and heading	DestWP=TO WP	Calculate the distance between own ship and the intersection of the heading of own ship and WOL of TO WP (Figure C).
	DestWP>TO WP	For the subsequent leg length, add the distance between WPs to the distance between own ship and the intersection of own ship heading and WOL of TO WP (Figure D).

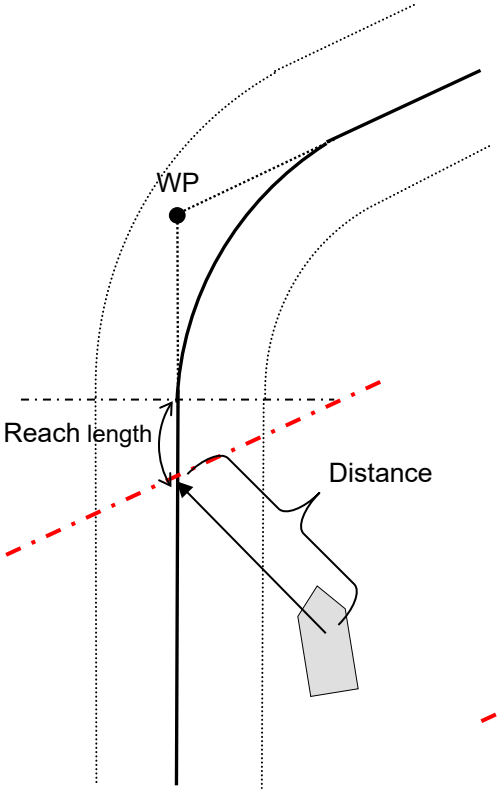


Figure A

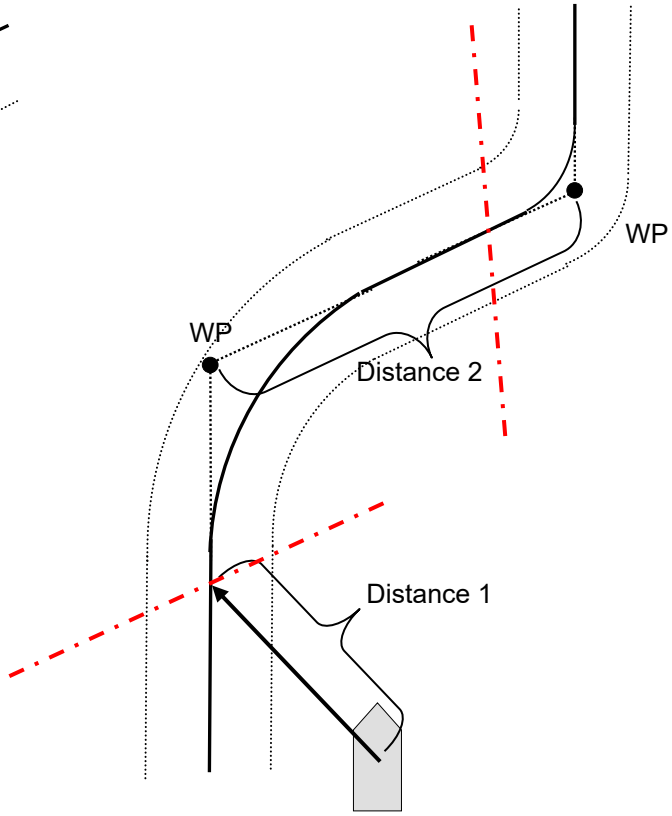


Figure B

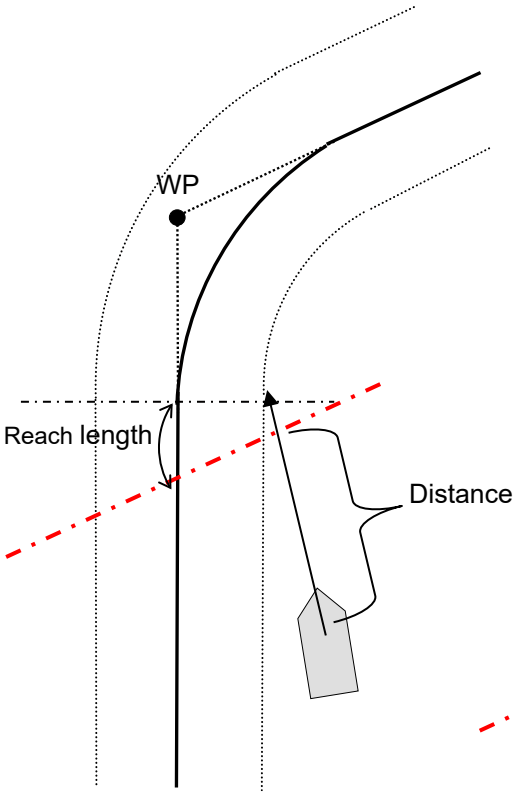


Figure C

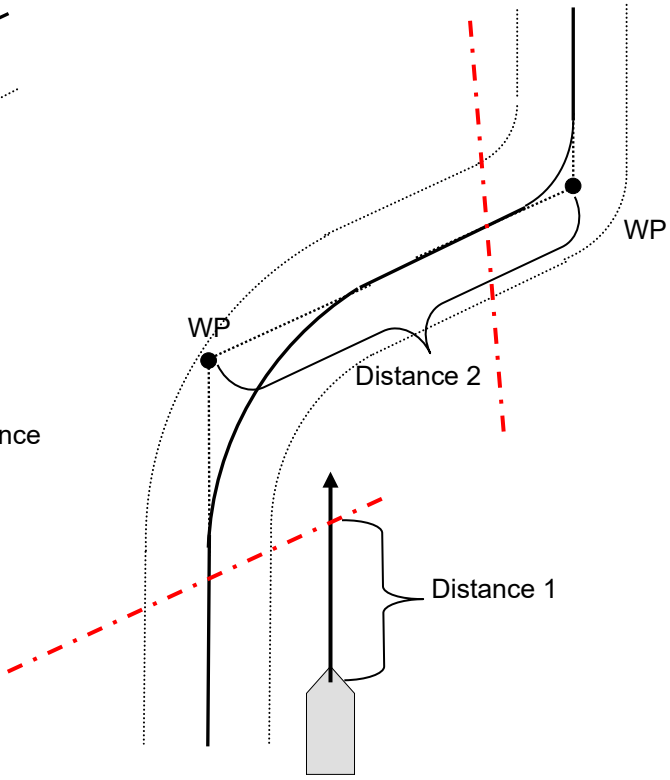
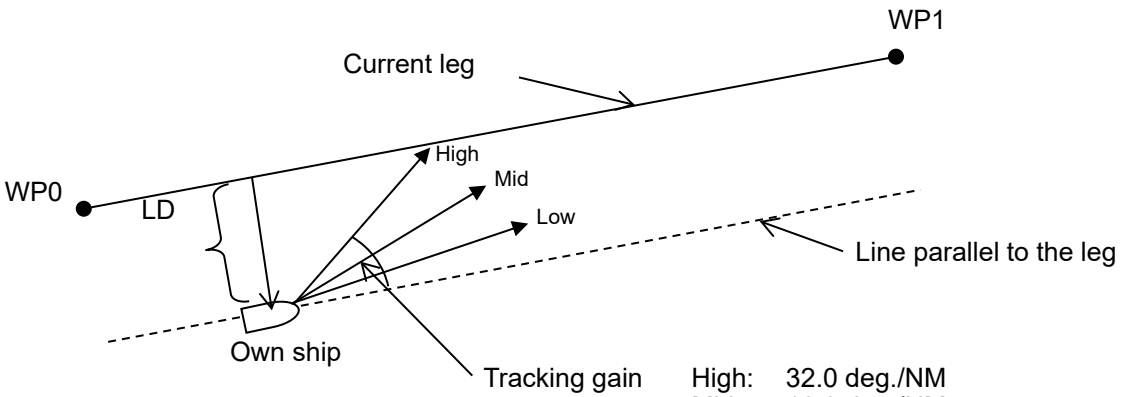


Figure D

Tracking

A tracking gain is a value that indicates the degree of swiftness for returning to the course when the ship becomes off-course. Three types of gain values are available, Low, Mid, and High.
For instance, assume that own ship's position is set to 1NM on the right side of the leg, and the gain is set to 16deg./NM (Mid). In this case the ship approaches the leg at the angle of 16°. As the distance (LD) between the ship and the leg decreases, the angle also decreases. While the ship is sailing on the leg, the angle is the same angle of WP1 viewed from WP0. If the LD increases, the angle also increases. The rudder control may become impossible depending on the setting of the gain.



High: 32.0 deg./NM
Mid: 16.0 deg./NM
Low: 4.5 deg./NM

4.20 Setting AIS [RADAR][ECDIS]

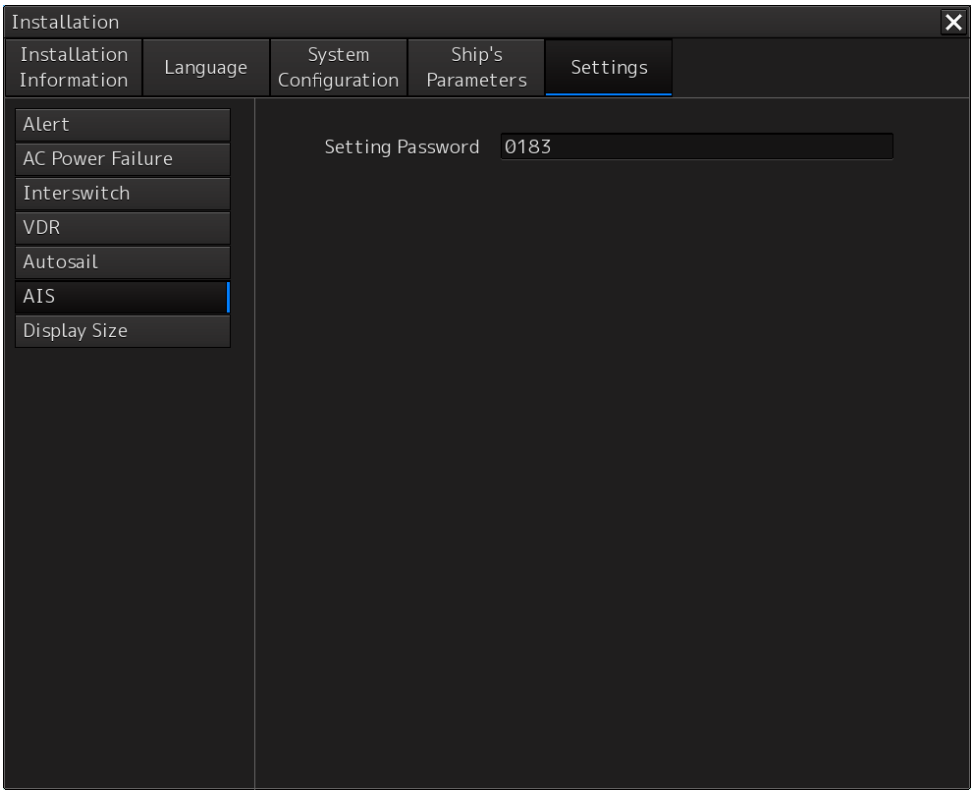
Set AIS in the [AIS] dialog.

Note
When AIS "installed" is not set in the subsystem Installation dialog, the [AIS] dialog is not displayed.

Displaying the [AIS] dialog

1 Display the dialog of the Installation submenu.

2 Select [Setting] in the 1st Classification pane and [AIS] in the 2nd Classification pane.
The [AIS] dialog is displayed in the Edit/Result pane.



Setting AIS

Set the following in the [AIS] dialog.

Setting item	Description of setting	Setting value
Setting Password	JHS-183 requires a password when changing the Voyage data from an external device. If you have changed password on the AIS, change this setting to the same password. AIS (JHS-182) does not require a password, so this setting is ignored.	Up to 32 characters (numeric value only)

4.21 Setting of AFT Operation [RADAR][ECDIS]

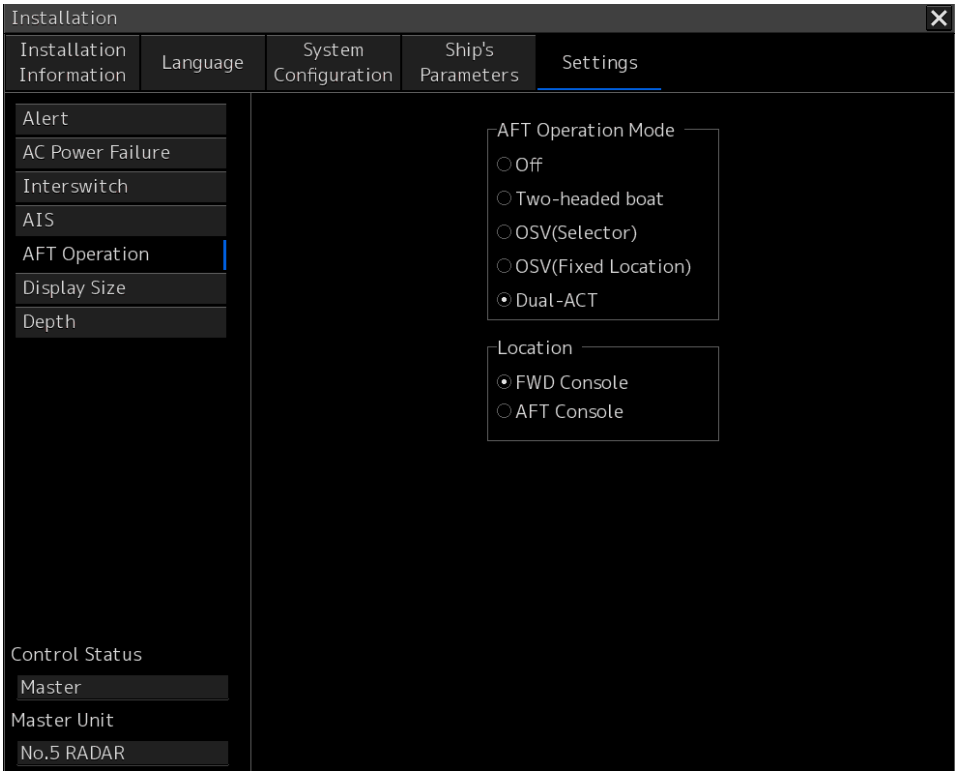
Set AFT manoeuvering operations in the [AFT Operation] dialog.

Displaying the [AFT Operation] dialog

1 Display the Installation submenu dialog.

2 Select [Setting] in the 1st classification pane and [AFT Operation] in the 2nd classification pane.

The [AFT Operation] dialog is displayed in the editing/result pane.



Setting an operation mode of AFT Operation

Set the following items in the [AFT Operation] dialog.

Setting item	Setting contents	Setting value
AFT Operation Mode	Select AFT maneuvering Enable/Disable and the operation mode of AFT maneuvering. **Off**: Disables AFT maneuvering (not performed). **Two-headed boat**: Two-headed mode **OSV (Selector):** Offshore Service Mode (Used when switching is made between FWD operation and AFT operation by external contact input) **OSV (Fixed Location):** Offshore Service Mode (Used when the FWD operation indicator and the AFT operation indicator are installed) **Dual-ACT**: Dual ACT mode	Off Two-headed boat OSV (Selector) OSV (Fixed Location) Dual-ACT
Dual-ACT Location	Select the console position in ACT dual mode. **FWD Console:** Front console **AFT Console:** Rear console	FWD Console AFT Console

[Differences of AFT Operation Modes]

AFT Operation Mode	Configuration	Switching between FWD operation and AFT operation by contact input (FWD/AFT Switch)	180° turning of ship's heading at AFT operation	180° turning of an image (such as RADAR echo or chart) at AFT operation and H UP
Two-headed boat:	CCU x 1, Monitor x 2	√	√	√
OSV (Selector)	CCU x 1, Monitor x 2	√	-	√
OSV (Fixed Location)	FWD operation (CCU x 1, Monitor x 1) AFT operation (CCU x 1, Monitor x 1)	-	-	√
Dual-ACT	FWD operation (CCU x 1, Monitor x 1) AFT operation (CCU x 1, Monitor x 1)	-	√	√

4.22 Satellite Terminal [ALL]

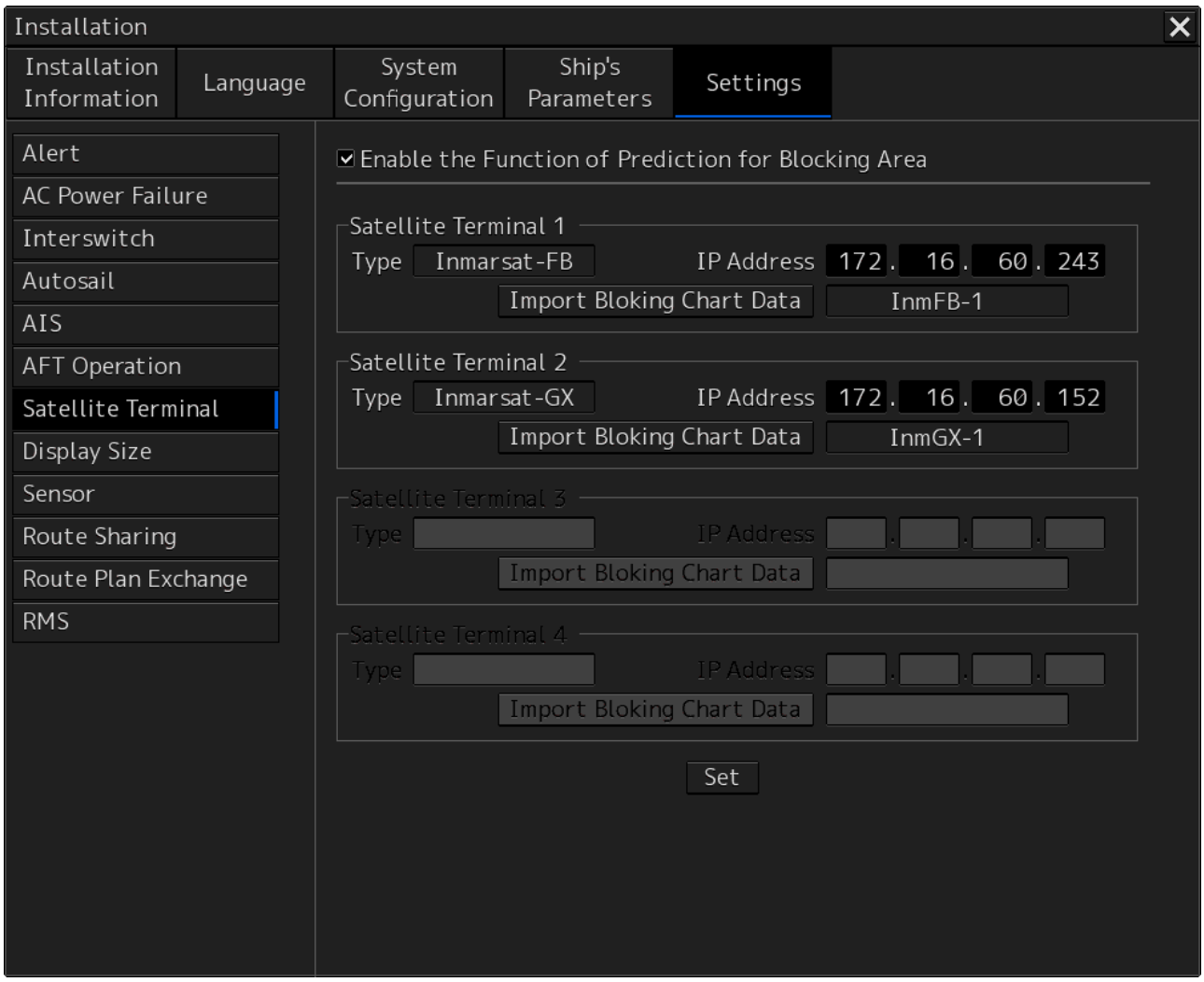
In the "Satellite Terminal" dialogue, configure the satellite communication earth stations (JUE-60GX, JUE-251, JUE-501). It can be set up to 4 in total. The settings in this dialog are not synchronized between the MFDs.

Displaying the [Satellite Terminal] dialog

1 Display the Installation submenu dialog.

2 Select [Setting] in the 1st classification pane and [Satellite Terminal] in the 2nd classification pane.

The [Satellite Terminal] dialog is displayed in the editing/result pane.



In the **Enable the Function of Prediction for Blocking Area** check box, this feature can be enabled. If it's not needed, check OFF and click "Set" button.

In the **Satellite Terminal 1 to 4** group box, configure the satellite communication terminal that its needed to calculate whether it can be visible from communication satellite. These antennas are selected in the "Satellite Terminal 1 to 4" in the [Installation]-[System Configuration]-[Subsystem Installation]-[Device Installation].

Note

- Use from the top in order of "Satellite Terminal 1 to 4" in the [Device Installation].

In the **Type** display box, the communication specification of each antenna is displayed.
[Inmarsat-FB] The antenna is for Inmarsat FleetBroadband service.
[Inmarsat-GX] The antenna is for Inmarsat Global Xpress service.

In the **IP Address** input box, configure the IP address of each satellite communication terminal. The default value is as follows, Set up properly according to the bridge network design.

Satellite Communication Terminal	IP Address (default value)
JUE-60GX	172.16.60.152
JUE-251 / JUE-501	172.16.60.243

In the **Import Blocking Chart Data** button, import a data file (filename extension: *blk) called a blocking chart. After import succeeded, a antenna name will be displayed on right side of the button. The antenna name is read from imported blocking chart data file.

Note

- Ocean Explorer INS does not support Satellite Terminal.
- This feature supports only LAN1(MAIN). It does not support LAN2(SUB).

4.23 Setting Display Size [ALL]

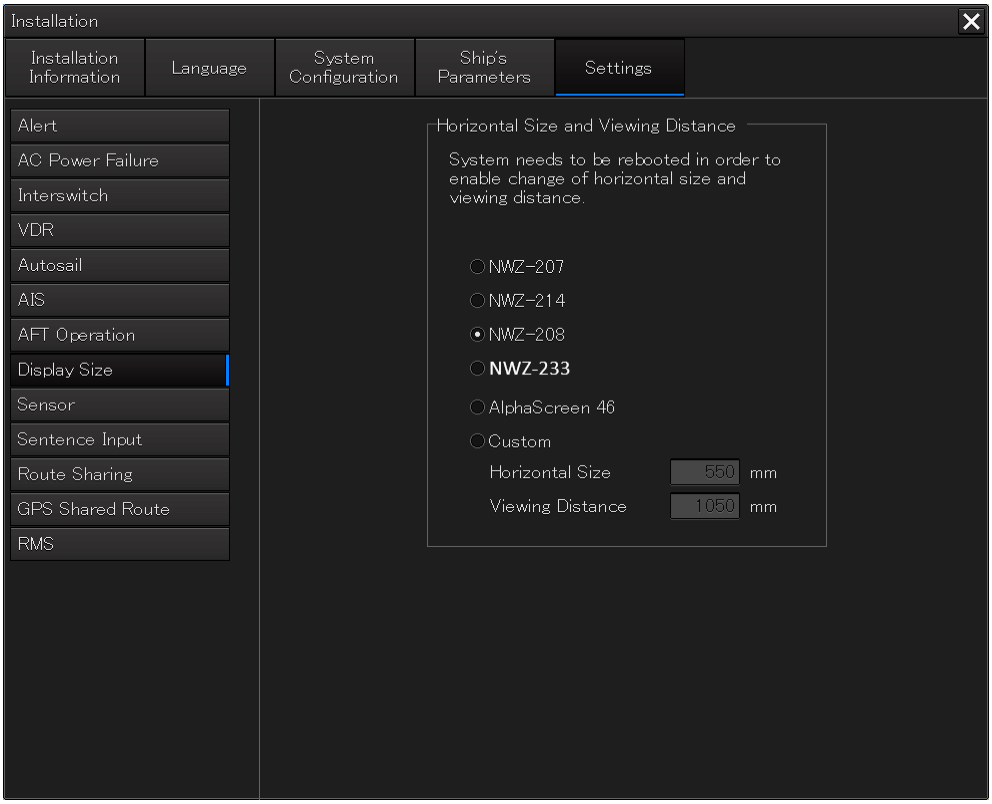
Use the [Display Size] dialog to set the horizontal width (excluding the display frame and blank spaces) of the display section of the display to be used.

Displaying the [Display Size] dialog

1 Display the dialog of the Installation submenu.

2 Select [Settings] in the 1st Classification pane and [Display Size] in the 2nd Classification pane.

The [Display Size] dialog is displayed in the Edit/Result pane.



Setting a display size

1 Select a desired display size (horizontal width) by clicking on the button in [Horizontal Size].

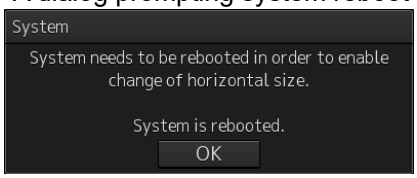
NWZ-207: 19-inch display (376.32mm)
NWZ-214: 19-inch display (376.32mm)
NWZ-208: 26-inch display (550.08mm)
NWZ-233: 27-inch display (597.60mm)
AlphaScreen 46: 46-inch display (1018.08mm)
Custom: Custom size

When [NWZ-207] or [NWZ-214] is selected, the value in the [Custom] input box is set to "376 mm". When [NWZ-208] is selected, the value in the [Custom] input box is set to "550 mm". When [NWZ-233] is selected, the value in the [Custom] input box is set to "597 mm". When [AlphaScreen 46] is selected, the value of the [Custom] input box becomes “1018”.

2 When [Custom] is selected, input a desired display size in the input box (160 to 1200 mm).

3 Close the dialog of the Installation submenu.

A dialog prompting system reboot is displayed.



4 To change the display size, click on the [OK] button. To cancel the change, close the dialog by clicking on the [x] button.

When the [OK] button is clicked on, the system is rebooted

Note

- When AlphaScreen 46 is set, the LCD FAN item that is displayed by selecting [Menu] – [Maintenance] – [Operating Time] is set to a non-display state.

Note

- Ocean Explorer INS firmware supports only [**NWZ-208:** 26-inch display] as display size selection.

4.24 Setting Sensor [Conning]

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

Note

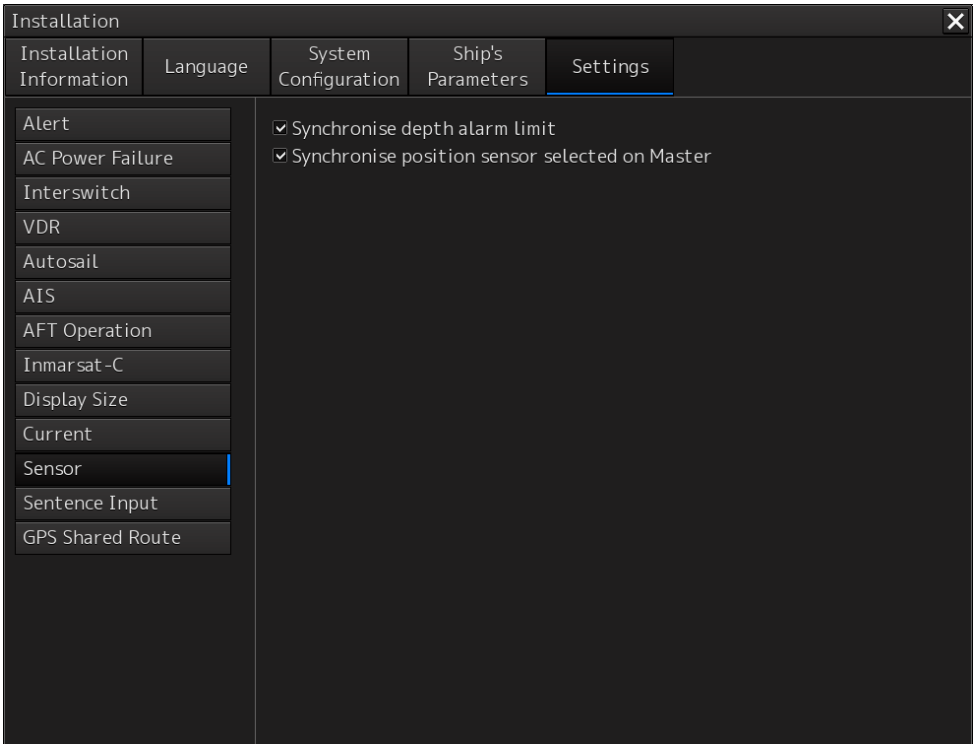
- When [Echo Sounder (Transducer 1, 2)] or [Echo Sounder 2 (Transducer 3)] is not selected as the installation by selecting [System Configuration] – [Susbsytem Installation], “Synchronise depth alarm limit” is displayed as invalid.

Displaying the [Sensor] dialog

1 Display the dialog of the Installation submenu.

2 Select [Settings] in the 1st classification pane and [Sensor] in the 2nd classification pane.

The [Sensor] dialog is displayed in the edit/result pane.



Displaying an alert set point

Check the [Synchronise depth alarm limit] check box.

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

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

Setting the GPS switching linkage function

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

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

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

4.25 Setting Sentence Input [Conning]

The input format of Generator and AzimuthThruster can be selected on the [Sentence Input] dialog.

Note

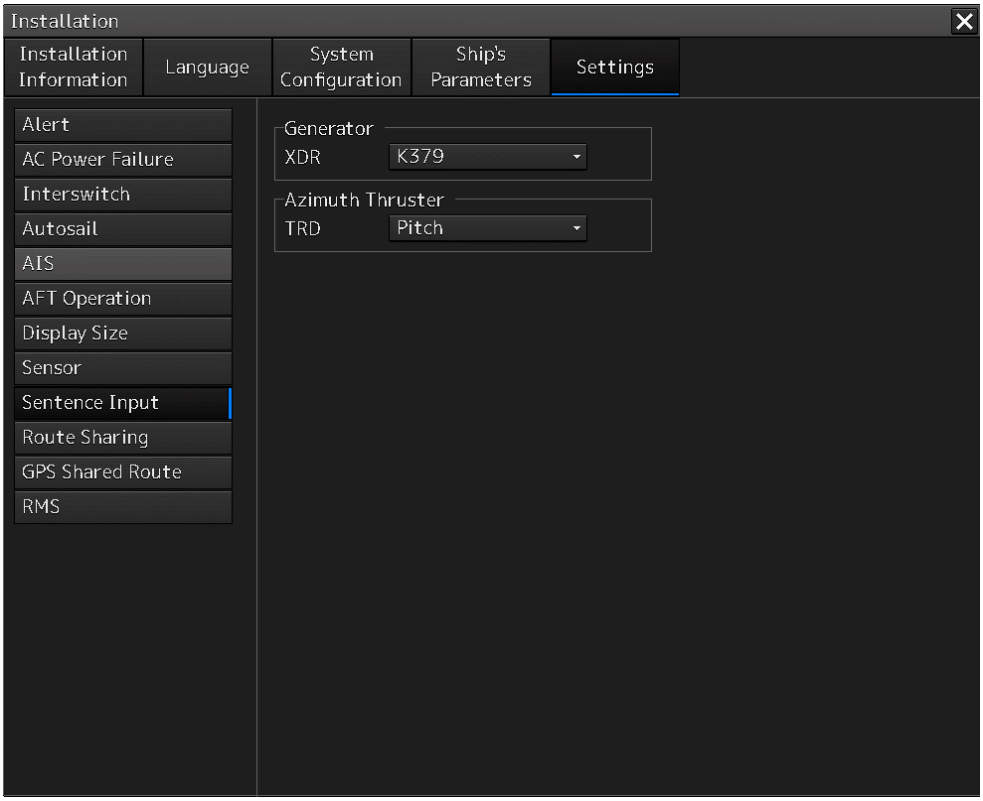
- The [Sentence Input] dialog is displayed when [Generator] or [Azimuth Thruster]is selected as the installation by selecting [System Configuration] – [Subsystem Installation].

Displaying the [Sentence Input] dialog

1 Display a dialog of the Installation submenu.

2 Select [Settings] in the first classification pane and [Sentence Input] in the second classification pane.

The [Sentence Input] dialog is displayed in the edit/result pane.



Selecting an input format of the Generator

Select an input format of the Generator in the [XDR] combo box.

- K739
- K381

Selecting an input format of the Azimuth Thruster

Select an input format of the Azimuth Thruster in the [TRD] combo box.

- Pitch
- Power

4.26 Setting Route Sharing [ALL]

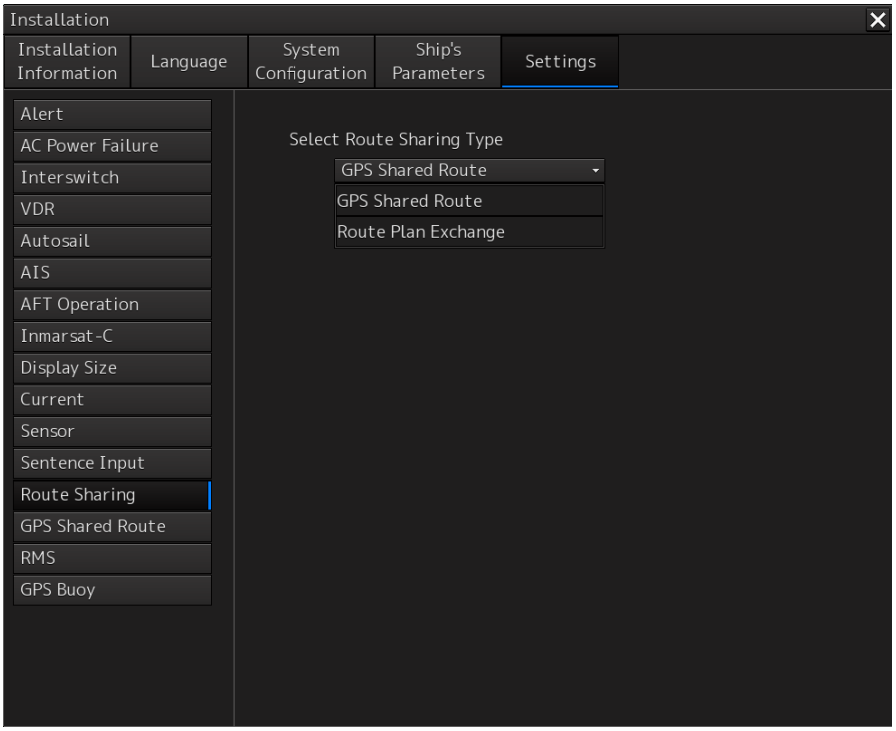
In the "Route Sharing" dialog, change the route sharing method used for route sharing.

Displaying the [Route Sharing] dialog

1 Display a dialog of the Installation submenu.

2 Select [Settings] in the first classification pane and [Route Sharing] in the second classification pane.

The [Route Sharing] dialog is displayed in the edit/result pane.



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

GPS Shared Route:（Refer to 4.25 GPS shared route）

Route Plan Exchange:（Refer to 4.26 Route Plan Exchange）

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

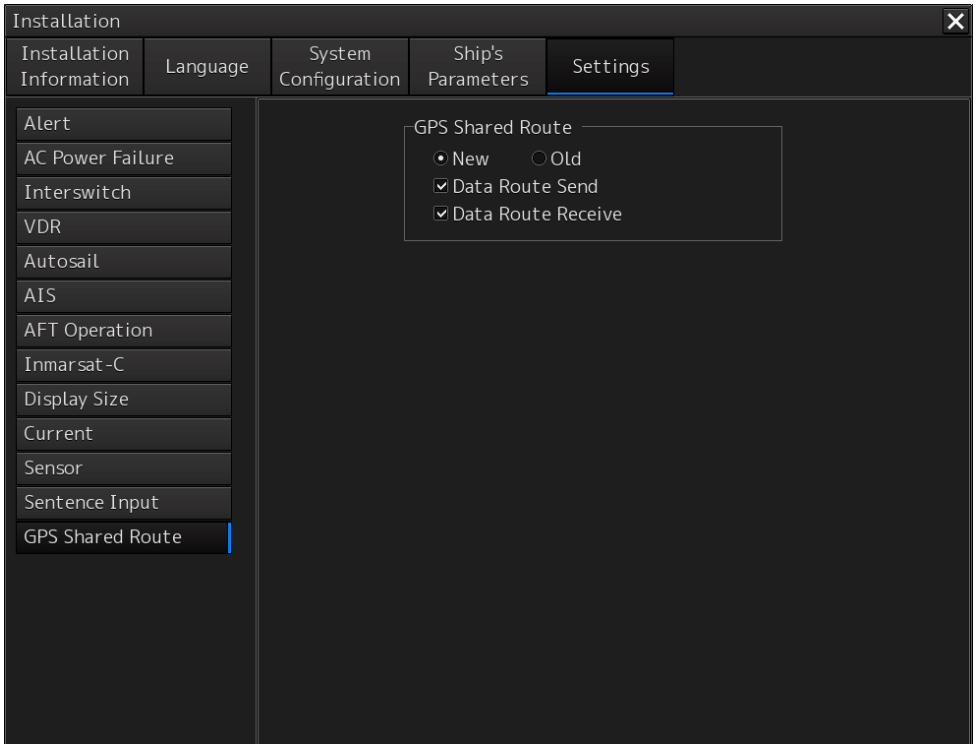
4.27 Setting GPS Shared Route [RADAR][ECDIS]

This function enables the switching between new route sharing and old route sharing and the setting of data route transmission/reception to ON/OFF.
Note: For details of route sharing, see 6.9 Route Sharing Method among the Devices.

Displaying the [GPS Shared Route] dialog

1 Display a dialog of the Installation submenu.

2 Select [Settings] in the first classification pane and [GPS Shared Route] in the second classification pane.
The [GPS Shared Route] dialog is displayed in the edit/result pane.



[Setting GPS Shared Route]

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

[Display/Non-display according to the license status]

License status	Setting value			
	New	Old	Data Route Send	Data Route Receive
INS configuration ECDIS license available	Non-display	Non-display	Display (Setting: On)	Display (Setting: On)
Non-INS configuration ECDIS license available	Display (Setting: On)	Display (Setting: Off)	Display Setting: On	Display (Setting: On)
INS configuration ECDIS license unavailable	Non-display	Non-display	Non-display	Non-display
Non-INS configuration ECDIS license unavailable	Display (Setting: On)	Display (Setting: Off)	Non-display	Non-display

4.28 Route Plan Exchange [ALL]

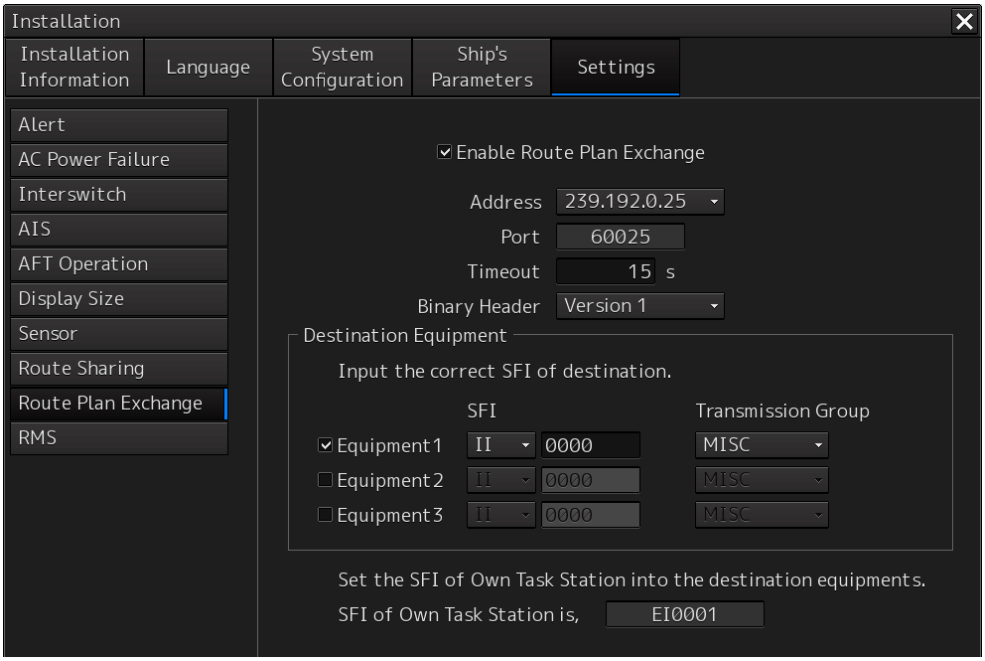
You can switch the enable / disable of route plan exchange and make various settings.

Displaying the [Route Plan Exchange] dialog

1 Display a dialog of the Installation submenu.

2 Select [Settings] in the first classification pane and [Route Plan Exchange] in the second classification pane.

The [Route Plan Exchange] dialog is displayed in the edit/result pane.



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

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

・239.192.0.21 ・239.192.0.22 ・239.192.0.23 ・239.192.0.24 ・239.192.0.25

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

In the **Binary Header** combo box, you can select the version of the binary communication protocol to be used with other devices communicating in the route planning exchange. Select the protocol version according to the device on the other side.

In the **Equipment** check box, you can enable or disable the settings for other devices that communicate with the other device in the route exchange.

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

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

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

Note
Ocean Explorer INS offers route plan exchange function with CCRS, does not have this setting dialog.

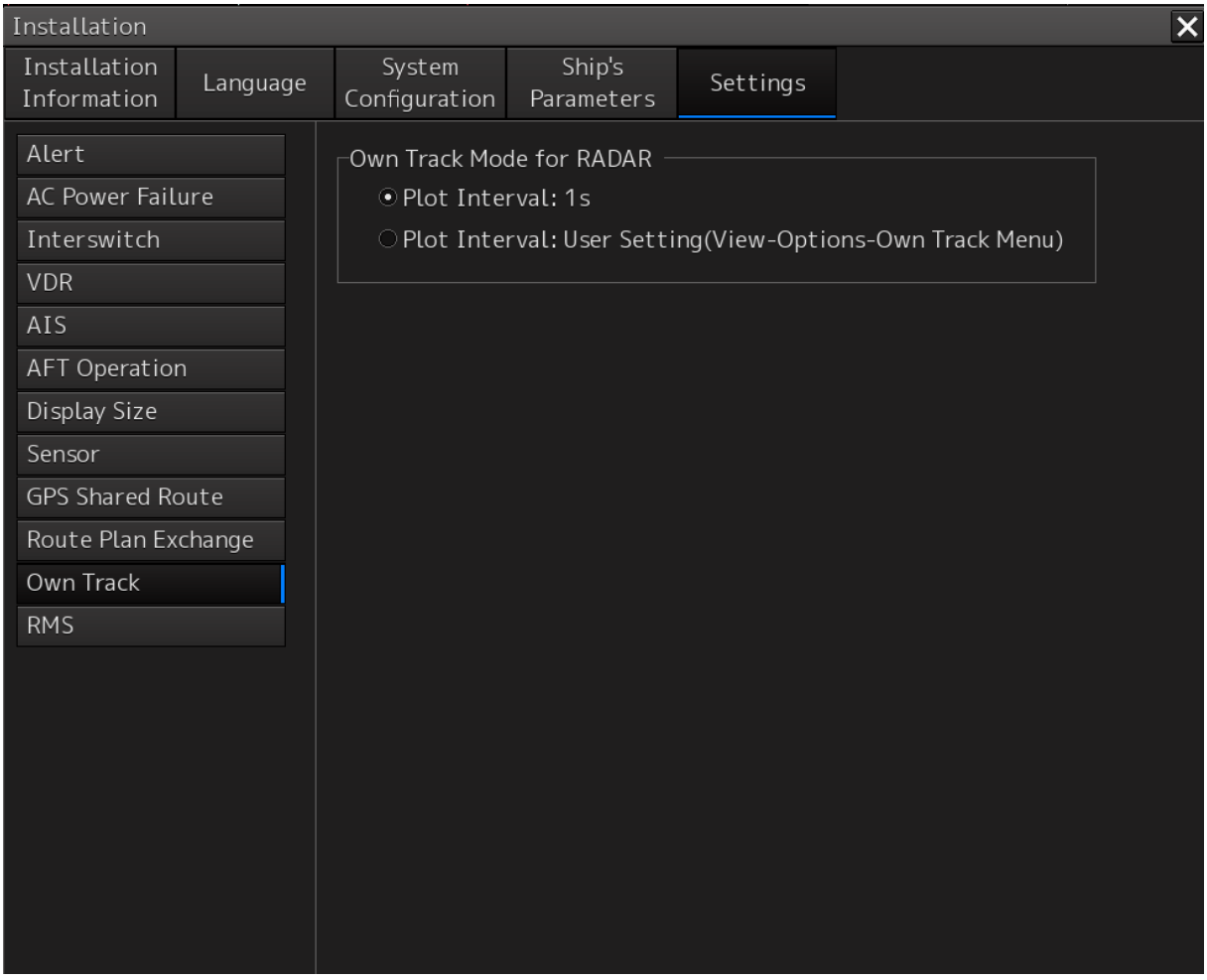
4.29 Own Track [RADAR]

You can switch between ECDIS own ship's track and RADAR own ship's track on the [Own Track] dialog.

Note
- The [Own Track] dialog is displayed when RADAR standalone license is used.

Displaying the [Own Track] dialog

1. **Display a dialog of the Installation submenu.**
2. **Select [Settings] in the first classification pane and [Own Track] in the second classification pane.**
   The [Own Track] dialog is displayed in the edit/result pane.



You can switch between ECDIS own ship's track and RADAR own ship's track.

・Plot Interval:1s ⋯ ECDIS own ship’s track

・Plot Interval:User Setting(View-Options-Own Track Menu) ⋯ RADAR own ship's track.

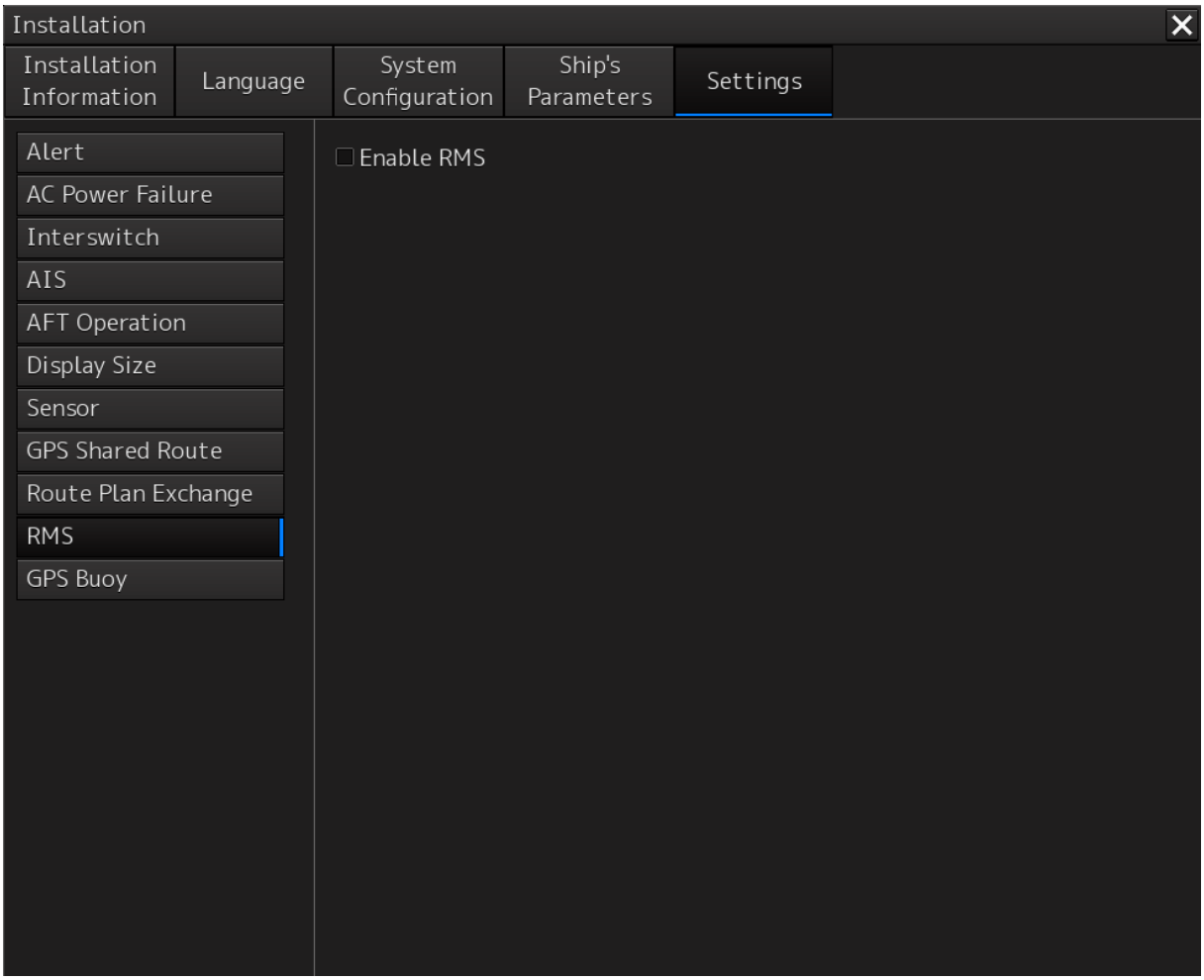
4.30 RMS（Remote maintenance settings） [ALL]

You can set enable / disable remote maintenance function on the [RMS] dialog.

Displaying the [RMS] dialog

1 **Display a dialog of the Installation submenu.**

2 **Select [Settings] in the first classification pane and [RMS] in the second classification pane.**
The [RMS] dialog is displayed in the edit/result pane.



By turning on the **Enable RMS** check box, you can enable remote maintenance function.3

This setting is subject to setting value synchronization.

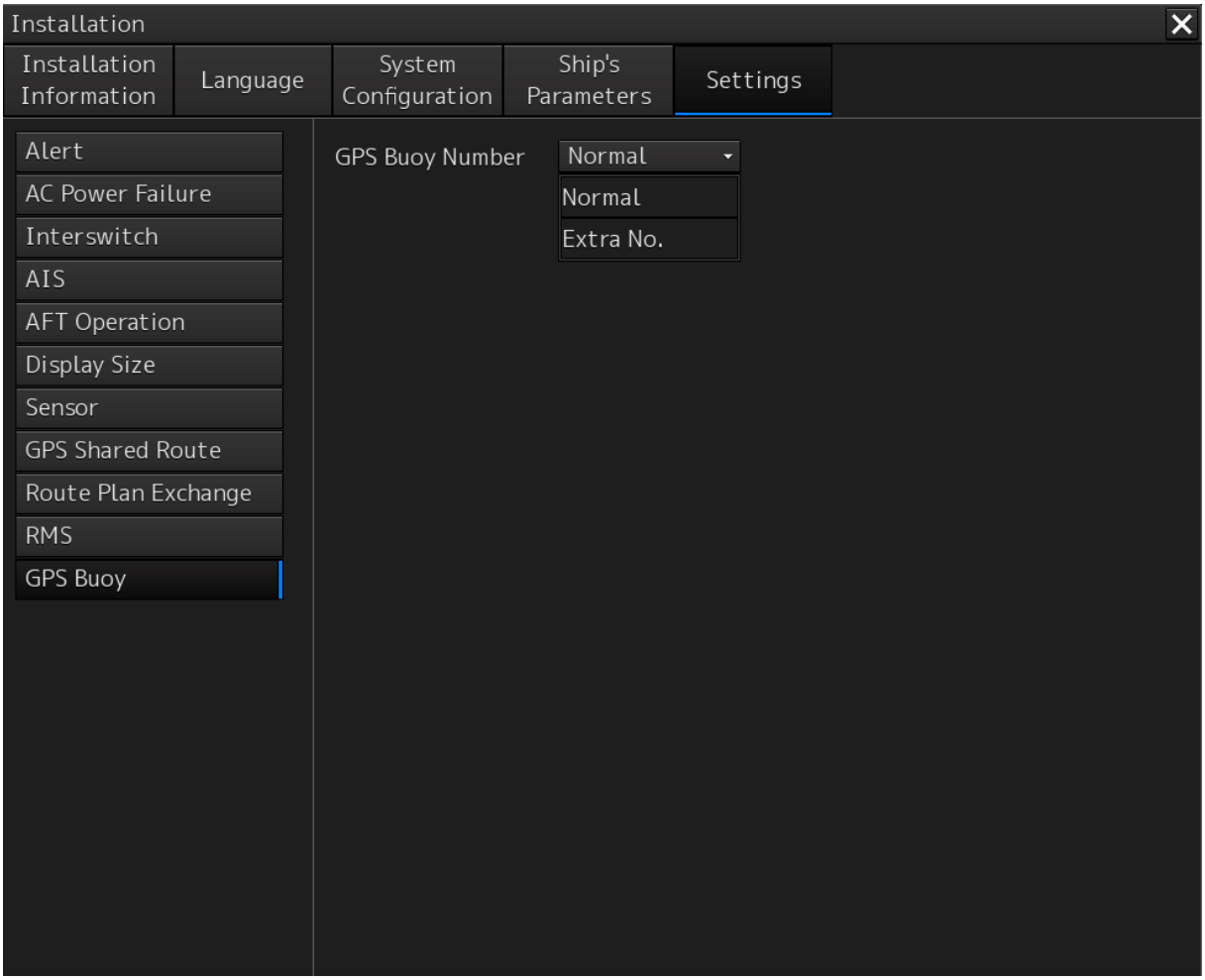
4.31 GPS Buoy [ALL]

You can select the reference GPS buoy number on the [GPS Buoy] dialog.

Displaying the [GPS Buoy] dialog

1 **Display a dialog of the Installation submenu.**

2 **Select [Settings] in the first classification pane and [GPS Buoy] in the second classification pane.**
The [GPS Buoy] dialog is displayed in the edit/result pane.



In the **GPS Buoy Number** combo box, you can select the reference GPS buoy number.

- When **Normal** is selected, the numerical value of the 16th field of the BLV sentence is treated as a buoy number.

- When **Extra No.** is selected, the eighth and ninth characters of the 19th field of BLV sentence are treated as buoy number.

Note
- Ocean Explorer INS does not support GPS buoy.

4.32 VHF(VHF Radiotelephone) [ALL]

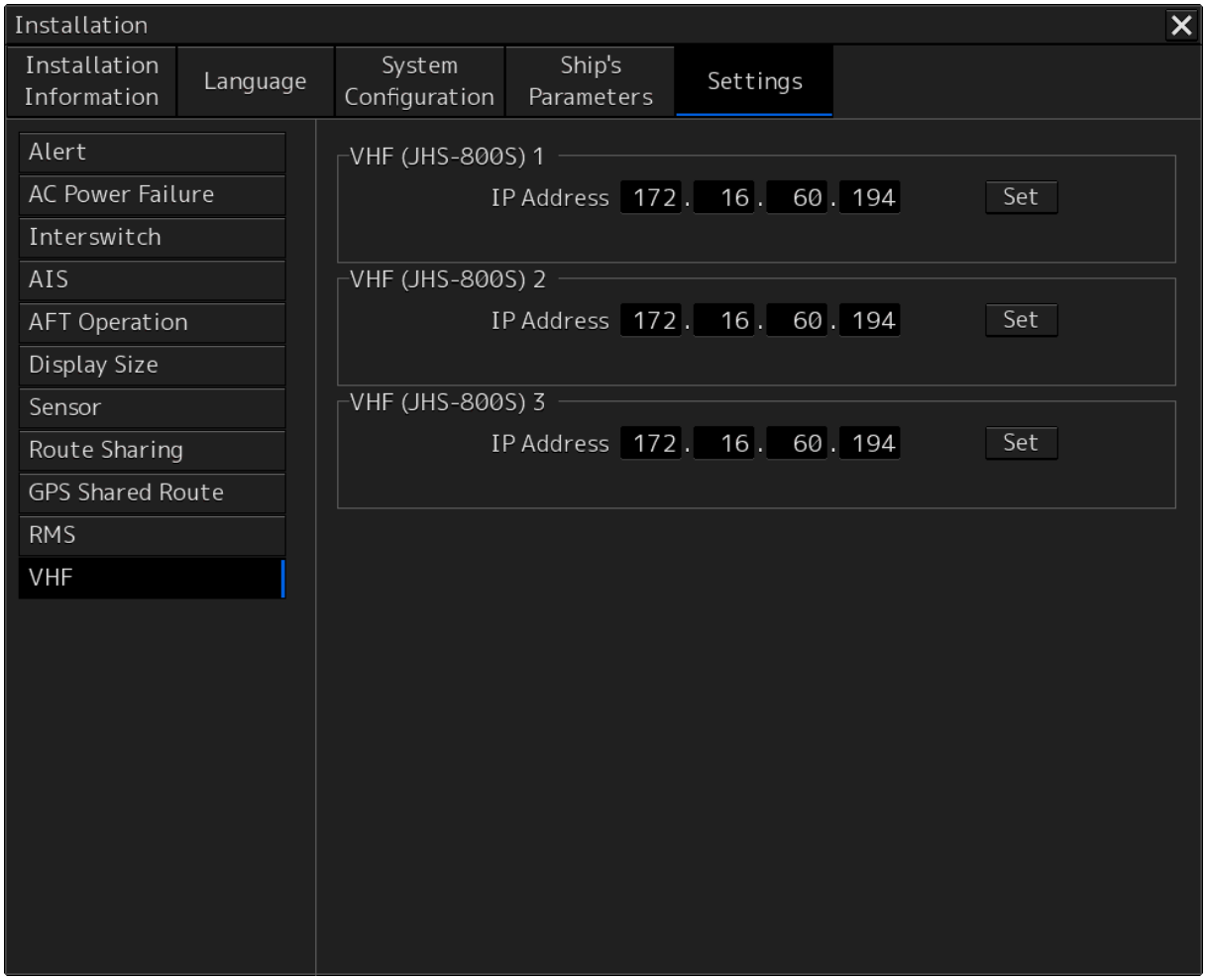
You can set the IP Address for up to 3 VHF equipments on the [VHF] dialog.

Displaying the [VHF] dialog

3 Display a dialog of the Installation submenu.

4 Select [Settings] in the first classification pane and [VHF] in the second classification pane.

The [VHF] dialog is displayed in the edit/result pane.



In the **IP Address** input box, you can set the IP Address of VHF (JHS-800S). Click [Set] button for store the settings.

Note

- Ocean Explorer INS does not support VHF.

4.33 Tune Adjustment [RADAR]

At installation or replacement of the magnetron, tuning adjustments of the transmitter and receiver of the radar antenna are necessary.

Note

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

1 Display the dialog of the Adjustment submenu.

2 Select [Basic Adjustment] in the Classification pane.

The [Basic Adjustment] dialog is displayed in the Edit pane.

Note

ISW needs to be set to Master.



3 Click on the [Tune Adjustment] input box.

A numeric keyboard is displayed.

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

5 Click on the [x] button.

When the dialog is closed, the adjustment value is saved in the radar antenna.

4.34 Bearing Adjustment [RADAR][ECDIS]

Adjust the bearing so that the target measured by the compass of the ship on [Bearing Adjustment] of the [Basic Adjustment] dialog and the bearing of the image displayed on the radar screen match.

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

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

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

3 **Display the dialog of the Adjustment submenu.**

4 **Select [Basic Adjustment] in the Classification pane.**
The [Basic Adjustment] dialog is displayed in the Edit pane.



5 **Click on the [Bearing Adjustment] input box.**
A numeric value input keyboard is displayed.

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

7 **Click on the [X] button.**
When the dialog is closed, the adjustment value is saved in the radar antenna.

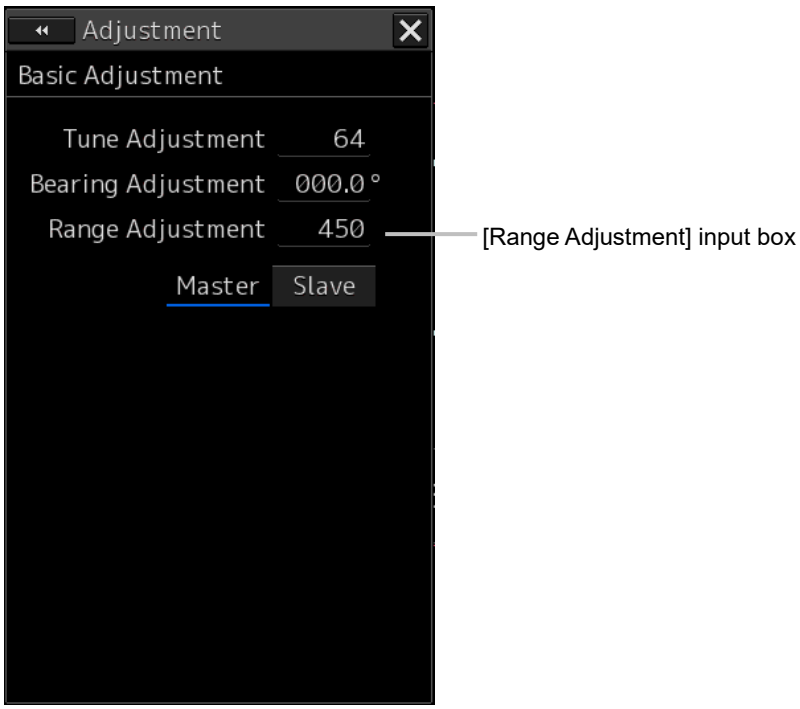
4.35 Range Adjustment [RADAR][ECDIS]

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

1 On the radar screen, specify a target whose distance is available in advance.

2 Display the dialog of the Adjustment submenu.

3 Select [Basic Adjustment] in the Classification pane.
The [Basic Adjustment] dialog is displayed in the Edit pane.



4 Click on the [Range Adjustment] input box.
A numeric input keyboard is displayed.

5 Enter an adjustment value in the input box so that the distance of the target specified in Step 1 indicates the correct distance. (128 to 1024)

6 Click on the [X] button.

4.36 Master/Slave Radar Operation Mode [RADAR][ECDIS]

Either the Master or Slave radar operation mode can be selected.

1 Display the dialog of the Adjustment submenu.

2 Select [Basic Adjustment] in the Classification pane.

The [Basic Adjustment] dialog is displayed in the Edit pane.



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

Master:

Can control the radar antenna.

Slave:

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

Note

- While in the Slave mode, the operation to control the radar antenna is disabled.
- When ECDIS receives radar signals directly from the radar, set the radar operation mode to Slave.
- When ECDIS receives radar signals via interswitch, set the radar operation mode to Master.

4 Click on the [X] button

4.37 Setting an Antenna Height [RADAR][ECDIS]

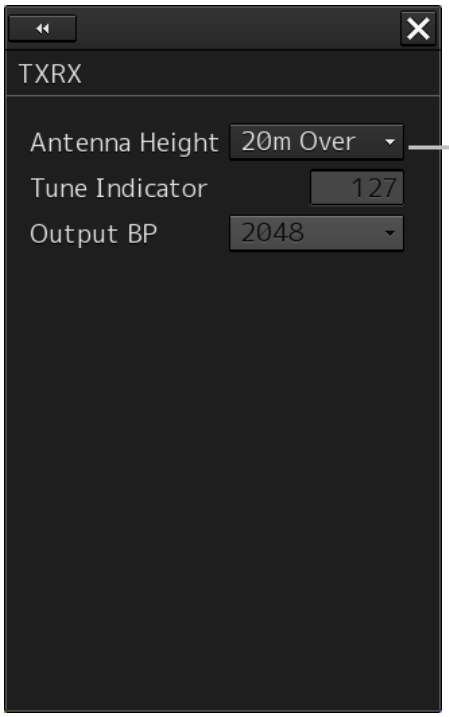
Set a height of the antenna of a radar unit.

Note
Once you have set the antenna height, do not change it unnecessarily.

1 Measure the height from the sea surface to the antenna.

2 Display the dialog of the Adjustment submenu.

3 Select [TXRX] in the Classification pane.
The [TXRX] dialog is displayed in the Edit pane.



4 Select the setting value corresponding to the antenna height that was measured in Step 1 from the [Antenna Height] combo box.
- Under 5 m (5 m or less)
- 5-10 m
- 10-20 m
- 20 m Over (20 m or more)

5 Click on the [X] button.

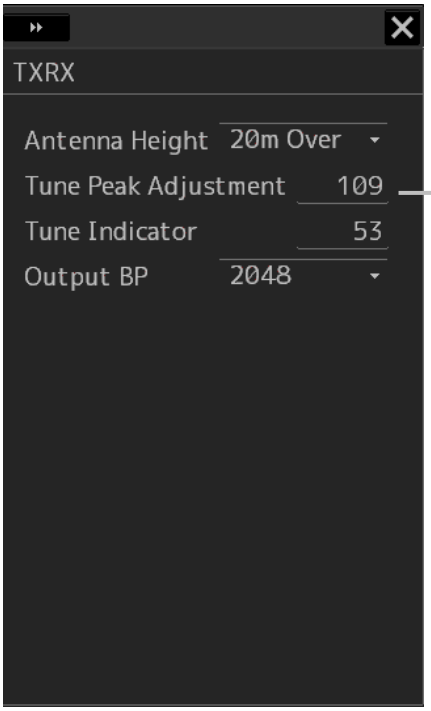
4.38 Tune Peak Adjustment [RADAR]

Perform tuning adjustments of the transmitter and the receiver (only when using an antenna of 10 kW).

Note
- This function is disabled in radar Slave mode.
- Not displayed at connection of a solid state radar unit.

1 Display the dialog of the Adjustment submenu.

2 Select [TXRX] in the Classification pane.
The [TXRX] dialog is displayed in the Edit pane.



3 Click on the [Tune Indicator] (tune indicator bar display) input box.
A numeric input keyboard is displayed.

4 Enter a setting value in the input box so that the tuning bar indicates the maximum range (0 to 127).

5 Click on the [x] button.
When the dialog is closed, the adjustment value is saved in the radar antenna.

4.39 Setting a Tune Indicator (tuning indicator level) [RADAR]

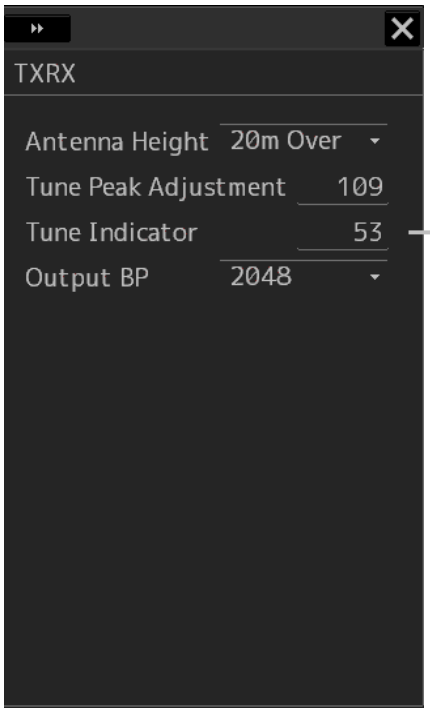
Set the scale when the tuning bar touches the peak value.

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

1 Set the range to 48 nm or more.

2 Display the dialog of the Adjustment submenu.

3 Select [TXRX] in the Classification pane.
The [TXRX] dialog is displayed in the Edit pane.



4 Click on the [Tune Indicator] input box.
A numeric value input keyboard is displayed.

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

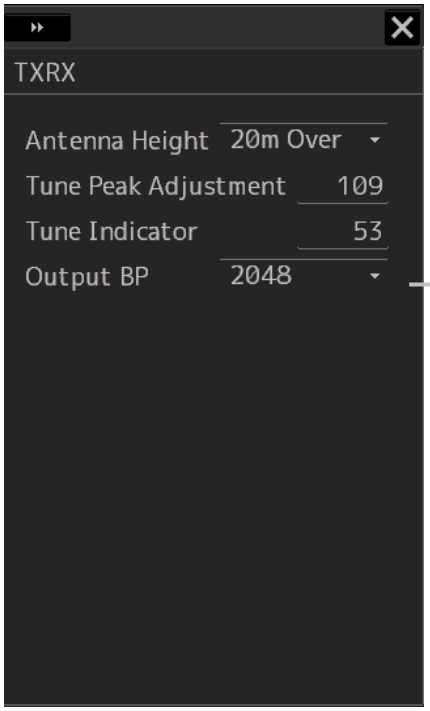
6 Click on the [x] button.
When the dialog is closed, the adjustment value is saved in the radar antenna.

4.40 Setting Output BP (Radar Antenna Bearing Pulse Output) [RADAR]

Note
- This function cannot be selected while the NKE-2103 radar antenna is connected.

1 Display the dialog of the Adjustment submenu.

2 Select [TXRX] in the Classification pane.
The [TXRX] dialog is displayed in the Edit pane.



3 Select a bearing pulse count that is output from the radar antenna from the [Output BP] combo box (2048 or 4096).

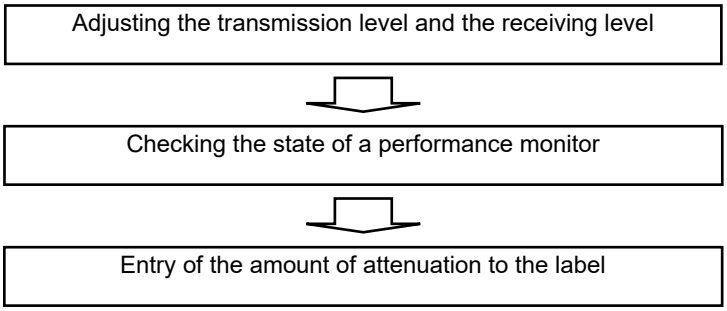
4 Click on the [x] button.

4.41 Performance Monitor Adjustment [RADAR]

Adjust the radar transmission/reception state by using the [Performance Monitor] dialog (using magnetron radar) or [Performance Monitor (SSR)] dialog (using solid-state radar). The items that are displayed in the dialog vary according to the type of the radar antenna.

Flow of Performance Monitor Adjustment

Perform adjustment of a performance monitor according to the following procedures.



[Adjusting the transmission level and the receiving level.]

Adjust the performance monitor according to the explanation given under the following sections:

- Adjusting the monitor reception level of a magnetron radar unit
- Adjusting the monitor transmission level of the magnetron radar unit
- Adjusting the monitor reception level of the solid-state radar unit
- Adjusting the monitor transmission level of the solid-state radar unit

[Checking the state of a performance monitor]

Check the amount of attenuation after adjusting a performance monitor according to the explanation given under the following sections:

- Checking the state of the performance monitor of the magnetron radar unit
- Checking the state of the performance monitor of the solid-state radar unit

[Entry of the amount of attenuation to the label]

Enter the amount of attenuation to the label according to the explanation given under the following sections:

- Entry of the amount of attenuation to the label

Note

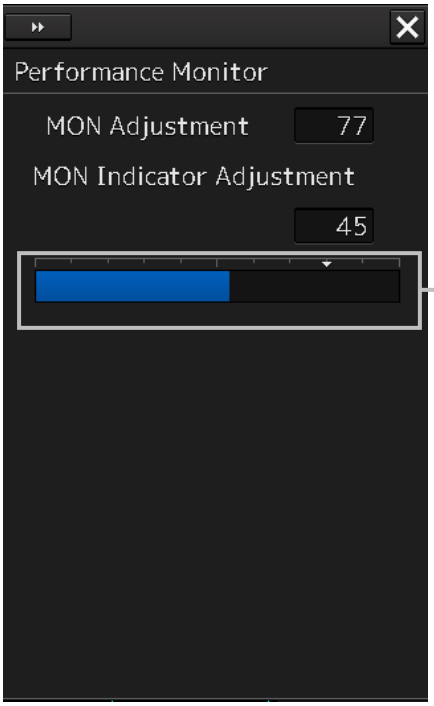
- When the radar is in the Slave mode, the [Performance Monitor] dialog (or [Performance Monitor (SSR)] dialog is disabled.
- If a master unit other than straight connection is being set in interswitch setting, the "Performance Monitor" screen (or "Performance Monitor (SSR)" screen) is disabled (except when [Controllable MON] is being set to [All] with [settings] - [interswitch] in the [Installation] dialog box).
- When the [Performance Monitor] dialog is displayed, the sector blank in the PPI screen is hidden. When the solid state radar antenna is connected, the PM sector is displayed; in the case of the magnetron radar, the sector is not displayed.
- While adjusting the performance monitor, TGT acquisition is not canceled by the target tracking function.
  If a TGT symbol is displayed inside a pattern of the performance monitor and adjusting is difficult, cancel TGT acquisition once.
- After adjusting the performance monitor, be sure to check the state of the performance monitor and enter the amount of attenuation to the label.

Adjusting the monitor reception level of a magnetron radar unit

Adjust the circuit that monitors the reception performance of the magnetron radar unit.

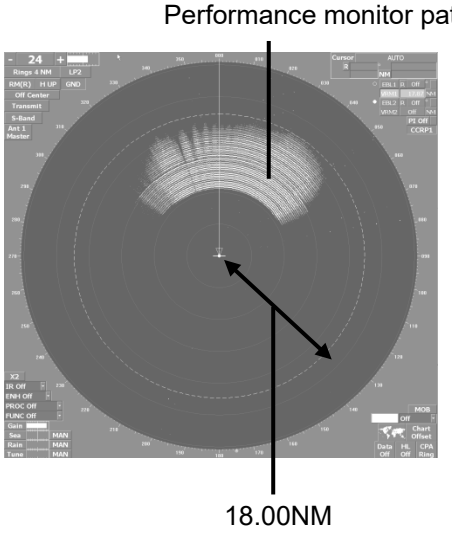
1 **Display the dialog of the Adjustment submenu.**

2 **Select [MON] in the Classification pane.**
The [Performance Monitor] dialog is displayed in the Edit pane.



3 **Click on the [MON Adjustment] (MON reception level adjustment) input box.**
A numeric value input keyboard is displayed.

4 **Enter a setting value in the input box so that the farthest position of the performance monitor pattern becomes 18.00 NM. (0 to 127)**



5 **Click on the [x] button.**

When the dialog is closed, the adjustment value is saved in the radar antenna.

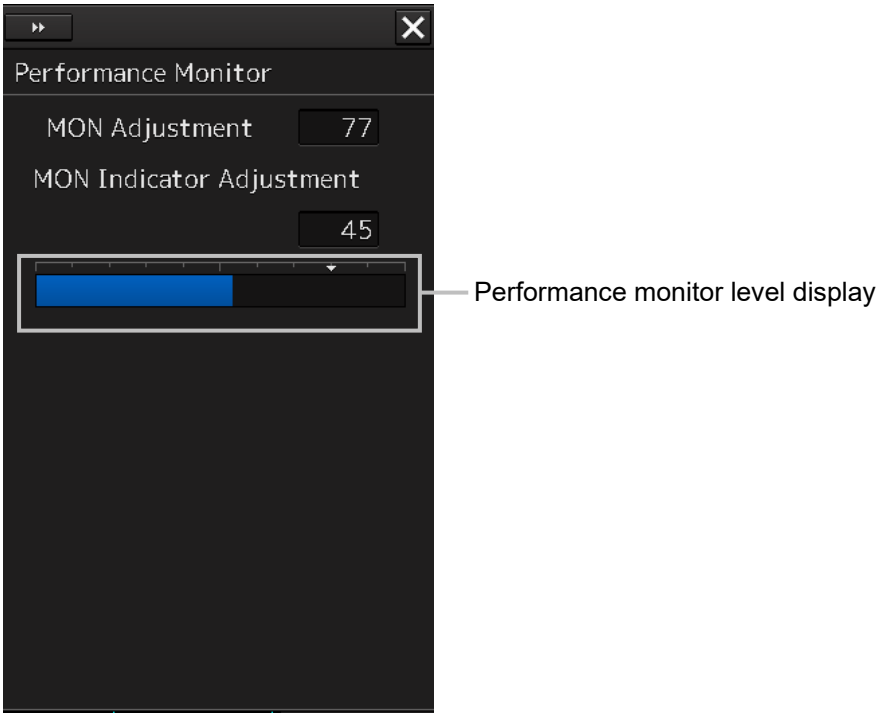
Adjusting the monitor transmission level of the magnetron radar unit

Adjust the circuit that monitors the transmission performance of the magnetron radar unit.

1 **Display the dialog of the Adjustment submenu.**

2 **Select [MON] in the Classification pane.**

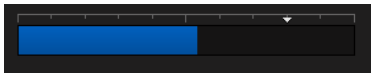
The [Performance Monitor] dialog is displayed in the Edit pane.



3 **Click on the [MON Indicator Adjustment] input box.**

A numeric value input keyboard is displayed.

4 **Enter a setting value in the input box so that "8" is displayed as the performance monitor level (0 to 127).**



Adjust to 8.

5 **Click on the [x] button.**

When the dialog is closed, the adjustment value is saved in the radar antenna.

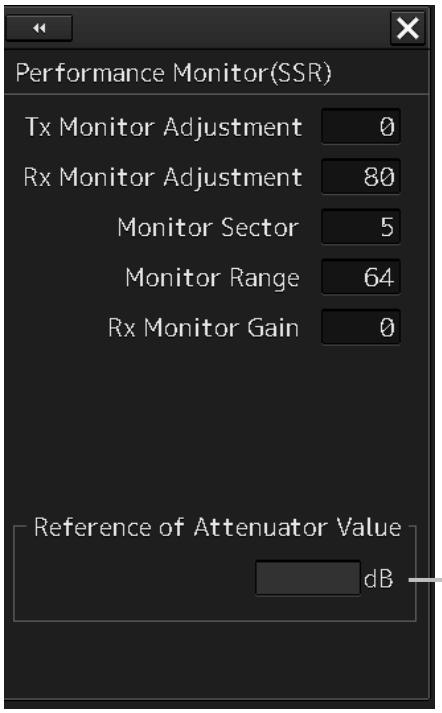
Adjusting the monitor transmission level of the solid-state radar unit

Adjust the circuit that monitors the transmission performance of the solid-state radar unit.

1 **Display the dialog of the Adjustment submenu.**

2 **Select [MON] in the Classification pane.**

The [Performance Monitor (SSR)] dialog is displayed in the Edit pane.



3 **Click on the [TX Monitor Adjustment] input box.**

A numeric input keyboard is displayed.

The value displayed in [Reference of Attenuator Value] is used as the transmission attenuator value.

4 **Enter a setting value in the input box so that the display of [Reference of Attenuator Value] indicates "0.0±1.0dB" (0 to 127).**

5 **Click on the [x] button.**

When the dialog is closed, the adjustment value is saved in the radar antenna.

Note

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

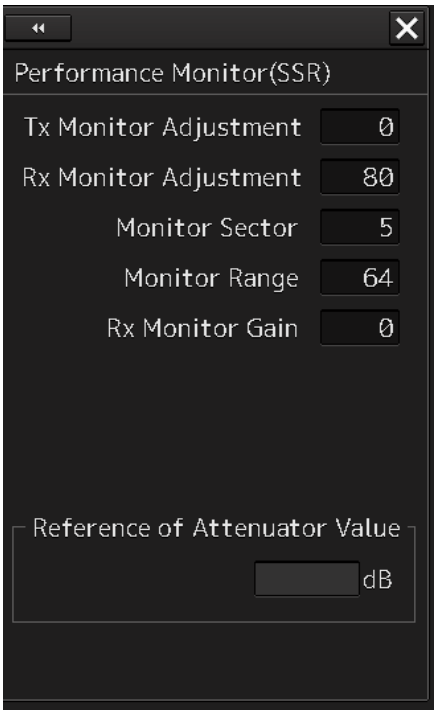
Adjusting the monitor reception level of the solid-state radar unit

Adjust the circuit that monitors the reception performance of the solid-state radar unit.

1 **Display the dialog of the Adjustment submenu.**

2 **Select [MON] in the Classification pane.**

The [Performance Monitor (SSR)] dialog is displayed in the Edit pane.



3 **Click on the [Monitor Sector] input box.**

A numeric input keyboard is displayed.

The value displayed in [Reference of Attenuator Value] is used as the reception attenuator value.

4 **Enter a setting value in the input box so that the display of [Reference of Attenuator Value] indicates the maximum value.**

5 **Click on the [RX Monitor Adjustment] input box.**

A numeric input keyboard is displayed.

6 **Enter a setting value in the input box so that the display of [Reference of Attenuator Value] indicates "0.0±1.0dB" (0 to 127).**

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

When the dialog is closed, the adjustment value is saved in the radar antenna.

Note

The values set in the [Monitor Range] input box and the [RX Monitor Gain] input box must not be changed.

Checking the state of the performance monitor of the magnetron radar unit

The state of the performance monitor of a magnetron radar unit is checked.

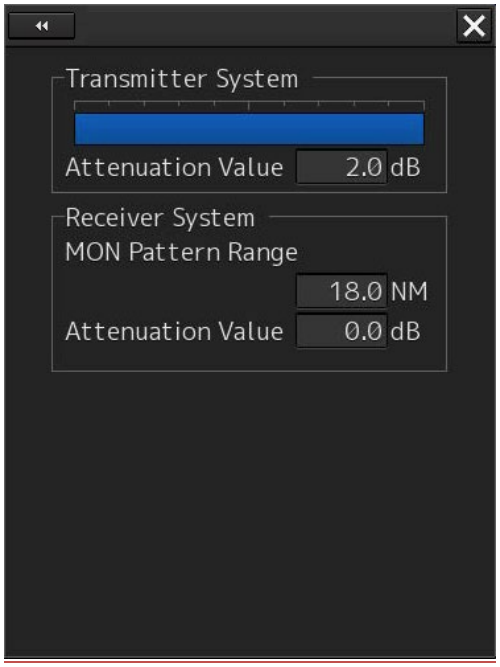
Note

Close the [Performance Monitor] dialog, when the dialog is being displayed, and end adjustment of a performance monitor.

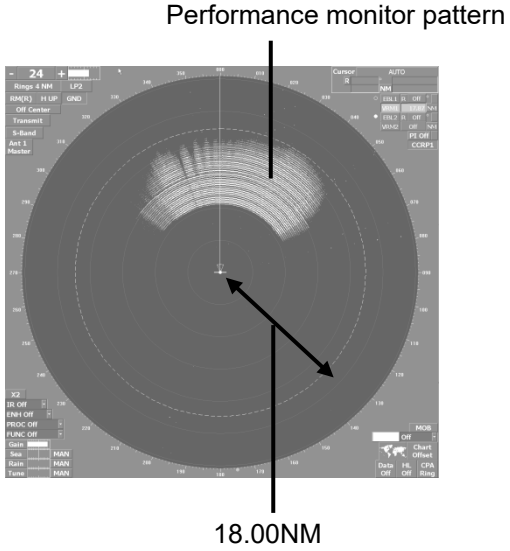
1 **Display the dialog of the Maintenance - Selftest submenu.**

2 **Select [MON Check] in the Classification pane.**

The [MON Check] dialog is displayed in the Edit pane.



3 Turn the [VRM] dial so that the farthest position of the performance monitor pattern becomes 18.00 NM.



4 Check the amount of attenuation in the dialog box.

Benchmarks for the amount of attenuation are as follows:

Attention Value of Transmitter:

At normal: -6.9 dB to +2.0 dB

At degrading performances: -15.0 dB to -7.0 dB

Attention Value of Receiver:

At normal: -2.9 dB to +3.5 dB

At degrading performances: -15.0 dB to -3.0 dB

Note

When confirming the attenuation value of the transmitter, after opening the dialog box, wait for one minute, and then read its value.

Checking the state of the performance monitor of the solid-state radar unit

The state of the performance monitor of a solid-state radar unit is checked.

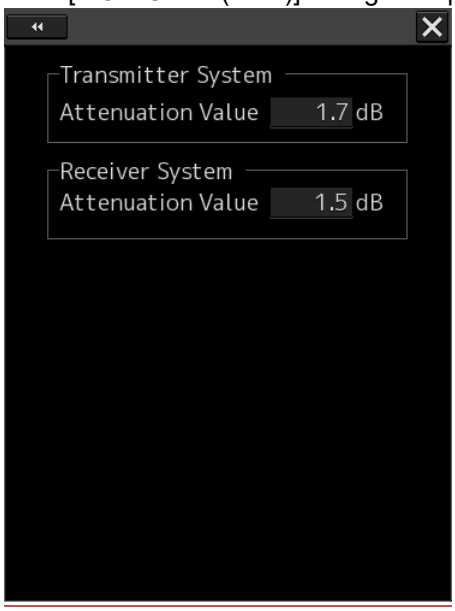
Note

Close the [Performance Monitor(SSR)] dialog, when the dialog is being displayed, and end adjustment of a performance monitor.

1 Display the dialog of the Maintenance - Selftest submenu.

2 Select [MON Check(SSR)] in the Classification pane.

The [MON Check(SSR)] dialog is displayed in the Edit pane.



3 Verify the attenuation of the transmission unit and reception unit of the system.

The guideline of the attenuation is as follows.

Attenuation of the transmission unit:

Normal: -6.9dB to +7.0dB

Performance deterioration: -20.0dB to -7.0dB

Attenuation of the reception unit:

Normal: -6.9dB to +7.0dB

Performance deterioration: -20.0dB to -7.0dB

Note

- To verify the attenuation of the transmission unit, read the value displayed one minute after the dialog is opened.

Entry of the amount of attenuation to the label

Enter the amount of attenuation to the "PERF.MONITOR INFORMATION LABEL" label after adjusting a performance monitor.

1 Enter the following contents to the "PERF.MONITOR INFORMATION LABEL" label.

DATE: Date of adjustment

TX VALUE: The amount of attenuation of transmitter system after adjustment

RX VALUE: The amount of attenuation of receiver system after adjustment

4.42 Setting Sector Blank (RADAR Screen Only) [RADAR]

The sector blank is an area that has been set up by specifying a fan-shaped range (sector), stopping the transmission in that bearing, and hiding radar echoes. The sector blank runs in the relative bearing using the ship's heading as reference.
Three types of sectors can be set up (sector blanks 1/2/3).

Note
- Disabled in radar Slave mode.

1 Display the dialog of the Adjustment submenu.

2 Select [Sector Blank] in the Classification pane.
The [Sector Blank] dialog is displayed in the Edit pane.



3 Select sector blank to be set by checking [Use Sector1/2/3] (using sector blank 1/2/3).

4 Click on the [Make Sector1/2/3] (creating sector blank 1/2/3) button that corresponds to the sector blank number that was selected in Step 1.
The cursor is set to the sector blank 1/2/3 creation mode.

5 Draw sector blank with the cursor.
The following information items are displayed regarding the sector blank that is being created.
Start Angle: Sector blank starting angle
End Angle: Sector blank ending angle

6 Click on the [x] button.
When the dialog is closed, the adjustment value is saved in the radar antenna.

4.43 Setting TNI Blank [RADAR]

It is possible to create TNI Blank and use it as a sector.

Note
- Disabled in radar Slave mode.
- Not displayed at connection of a sold-state radar unit.

1 Display the dialog of the Adjustment submenu.

2 Select [TNI Blank] in the Classification pane.

The [TNI Blank] dialog is displayed in the Edit pane.



3 Check the [Use TNI Blank] check box.

4 Click on the [Make Sector] button.

The cursor mode is set to the TNI blank creation mode.

5 Draw TNI blank using the cursor.

The following information is displayed for the TNI blank that is being created.

Start Angle: TNI blank starting angle

End Angle: TNI blank ending angle.

6 Click on the [x] button.

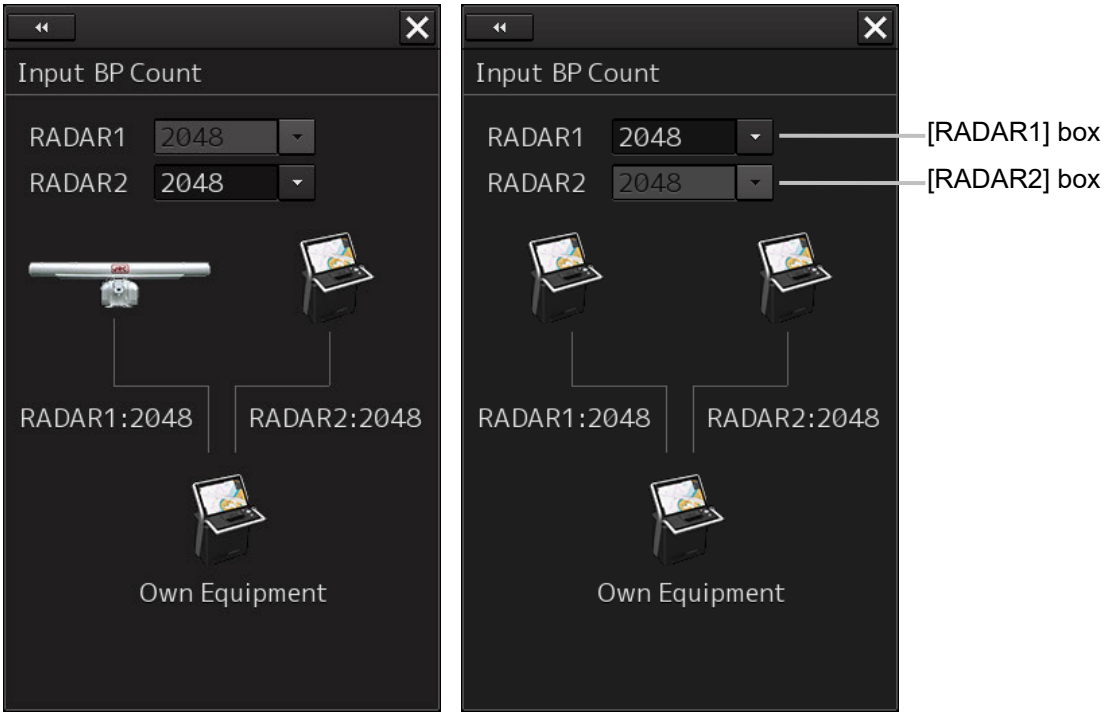
When the dialog is closed, the adjustment value is saved in the radar antenna.

4.44 Setting Input BP Count [RADAR][ECDIS]

Set a bearing pulse count to be input from radar 1 or radar 2.

1 Display the dialog of the Adjustment submenu.

2 Select [Input BP Count] in the Classification pane.
The [Input BP Count] dialog is displayed in the Edit pane.



3 Select an input bearing pulse count in the [RADAR1/2] box (360/415/830/1024/2048/4096). Alternatively, display a numeric input dialog by clicking on the box and enter an input bearing pulse count (360 to 4096).

Note
- The [RADAR1] combo box is disabled under the Master unit.
- When the output BP count is set to a value other than 2048 or 4096 in the Slave unit, only 2048 or 4096 can be selected from the [RADAR1] combo box.
- Either or (both) of the input BP count and the output BP count of the Slave unit must be set to 2048 or 4096.

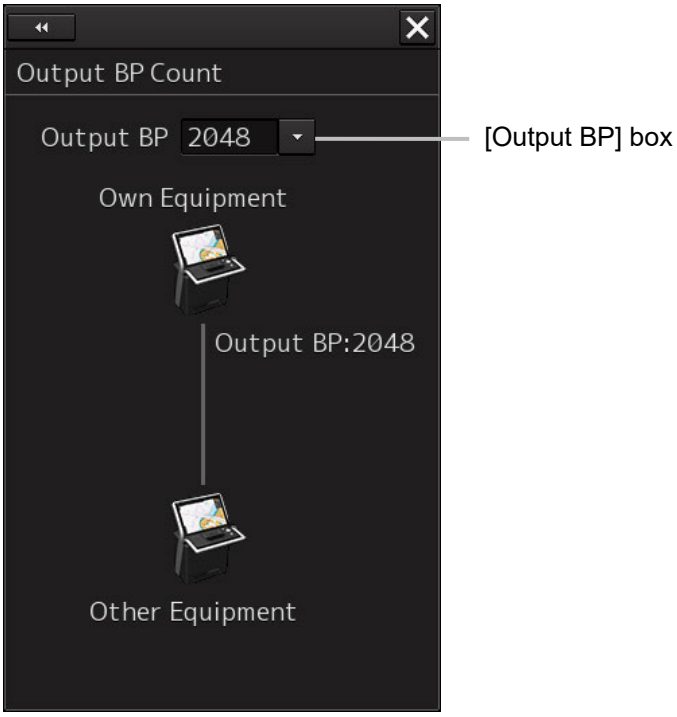
4 Click on the [x] button.

4.45 Setting Output BP Count [RADAR]

Set a bearing pulse count to be output to the Slave unit.

1 Display the dialog of the Adjustment submenu.

2 Select [Output BP Count] in the Classification pane.
The [Output BP Count] dialog is displayed in the Edit pane.



3 Select an output bearing pulse count in the [Output BP] box (360/415/830/1024/2048/4096). Alternatively, display a numeric input dialog by clicking on the box and enter an output bearing pulse count (360 to 4096).

Note
- When the input BP count is set to a value other than 2048 or 4096 in the Slave unit, only 2048 or 4096 can be selected from the [Output BP] combo box.
- Either or (both) of the input BP count and the output BP count of the Slave unit must be set to 2048 or 4096.

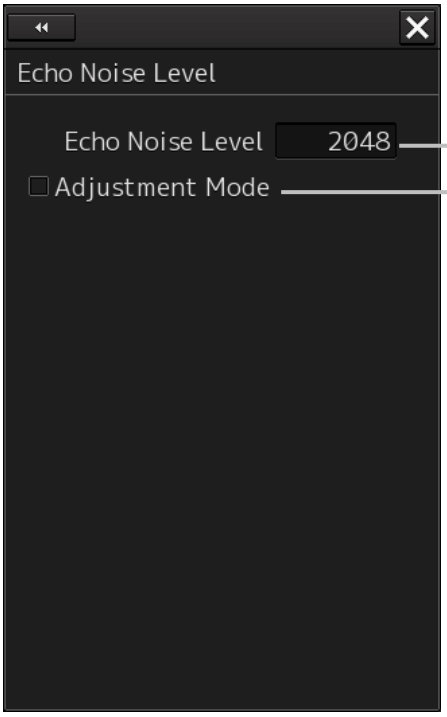
4 Click on the [x] button.

4.46 Echo Noise Level Adjustment [RADAR][ECDIS]

Adjust the level of the noise contained in radar echo.

1 Display the dialog of the Adjustment submenu.

2 Select [Echo Noise Level] in the Classification pane.
The [Echo Noise Level] dialog is displayed in the Edit pane.



3 Check the [Adjust Mode] check box.

4 Click on the [Echo Noise Level] input box.
A numeric input keyboard is displayed.

5 Enter a numeric value of around 2200 (1960 at factory delivery).

> **Note**
> • This setting has been adjusted at factory delivery. Do not change the setting unnecessarily.

6 Reduce the value in the [Echo Noise Level] input box while checking the monitor and record the value at which the radar image is filled with yellow for the first time.

7 Enter the value that is calculated by subtracting 80 from the recorded value (permissible range: 0 to 4095).

8 Click on the [x] button.

4.47 TT (Target Tracking) Function Adjustment (RADAR Screen Only) [RADAR]

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

- Vector constant
- Quantization level
- Gate size used for tracking
- TT limit ring

What is quantization level?

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

⚠CAUTION	
	Do not change the quantization level settings indiscreetly. If inappropriate values are set, the acquisition of the target tracking function and the tracking function will deteriorate, possibly causing accidents.

Setting vector constants

Adjust the vector tracking performance of the target tracking function.

1 Display the dialog of the Adjustment submenu.

2 Select [TT] in the Classification pane.

The [TT] dialog is displayed in the Edit pane.



3 Click on the [Vector Constant] input box.

A numeric input keyboard is displayed.

4 Enter a setting value in the input box.

Note

Do not change this setting unnecessarily. Normally, set 4 for [Vector Constant]. By increasing the value of [Vector Constant], tracking of the target vector can be improved when the target and own ship changes the course or speed. However, note that the vector precision deteriorates.

5 Click on the [x] button.

Setting quantization levels at manual acquisition

1 **Display the dialog of the Adjustment submenu.**

2 **Select [TT] in the Classification pane.**

The [TT] dialog is displayed in the Edit pane.



3 **Select a quantization threshold value at manual acquisition from the [VD Level Mode (Manual)] (quantization mode at manual acquisition) combo box.**

- Auto Threshold1
- Auto Threshold2
- Manual Threshold

4 **Click on the [VD level (Manual)] (quantization level at manual acquisition) input box.**

A numeric input keyboard is displayed.

5 **Enter a setting value in the input box (0 to 255).**

> **Note**
> Do not change this setting unnecessarily.

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

Setting quantization levels at automatic acquisition

1 **Display the dialog of the Adjustment submenu.**

2 **Select [TT] in the Classification pane.**
The [TT] dialog is displayed in the Edit pane.



3 **Click on the [VD Level (Auto)] (quantization level at automatic acquisition) input box.**
A numeric input keyboard is displayed.

4 **Enter a setting value in the input box (0 to 255).**

5 **Click on the [x] button.**

Setting a gate size to be used for tracking

1 **Display the dialog of the Adjustment submenu.**

2 **Select [TT] in the Classification pane.**

The [TT] dialog is displayed in the Edit pane.



3 **Select a gate size from the [Gate Size] combo box.**

- Small
- Medium
- Large

4 **Click on the [x] button.**

Displaying a TT limit ring

1 **Display the dialog of the Adjustment submenu.**

2 **Select [TT] in the Classification pane.**

The [TT] dialog is displayed in the Edit pane.



3 **To display a TT limit ring, check the [Limit Ring] check box.**

4 **Click on the [x] button.**

4.48 Adjusting MBS [RADAR][ECDIS]

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

⚠WARNING

Do not change this setting indiscreetly.
If wrong adjustment is performed, the nearest target will be erased, causing collision to lead to death or serious injury.

1 Display the dialog of the Adjustment submenu.

2 Select [MBS] in the Classification pane.
The [MBS] dialog is displayed in the Edit pane.



3 Click on the [Initial Level] (MBS initial level) input box.
A numeric value input keyboard is displayed.

4 Enter an initial level of MBS so that the image of main bang becomes optimum (faint image remains on the screen). (0 to 1023)

5 Click on the [Area Offset] (MBS area offset) input box.
A numeric value input keyboard is displayed

6 **Enter a MBS area offset value (-0.200 to 0.200[NM]) so that the image of the main bang becomes the optimum (remains lightly on the screen).**

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

4.49 Setting Cable Attenuation [ALL]

Set an attenuation correction level of the radar video signal level by the cable.

1 Display the dialog of the Adjustment submenu.

2 Select [Cable Attenuation] in the Classification pane.
The [Cable Attenuation] dialog is displayed in the Edit pane.



3 Select a correction level from the [Correction level] combo box (0dB (OFF) 2dB/4dB/6dB).

4 Select an appropriate level from the connected cable and the length by using "Determining the attenuation correction level" that is described below.

5 Click on the [x] button.

Determining the attenuation correction level

Perform the following procedure for the antenna for which cable attenuation is to be set.

1 **Record the types and lengths of all the cables that are installed and used from the antenna to the display unit.**

In the environment where ISW is used, as the cable from the display unit to ISW is structured in two way mode, a double length is required.

2 **Read the attenuation correction level corresponding to the installed cable that is recorded from the following correspondence table.**

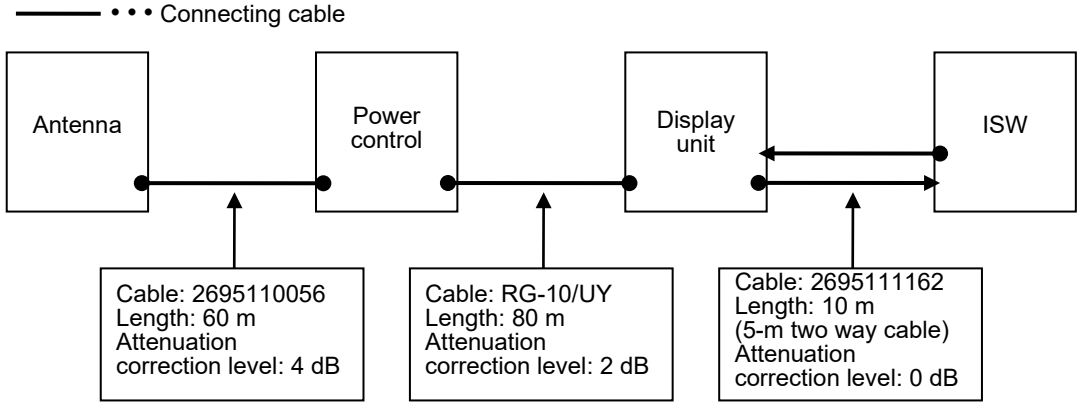
Cable installed	Cable length [m]	Attenuation correction level [dB]
CFQ-6912	- 20	0
	20 - 35	2
	35 - 50	4
	50 -	6
2695110056 or 2695111153 or 2695111162	- 25	0
	25 - 50	2
	50 - 75	4
	75 -	6
RG-10/UY (2661111153)	- 70	0
	70 - 140	2
	140 - 210	4
	210 -	6

3 **Select the total value of attenuation correction levels of all the cables that are installed.**

If the value is 6dB or more, use 6dB.

4 **If ISW is available, perform the above procedure by changing the antenna to be set.**

(Example)For the following configuration, select 6dB (=4dB+2dB+0dB).



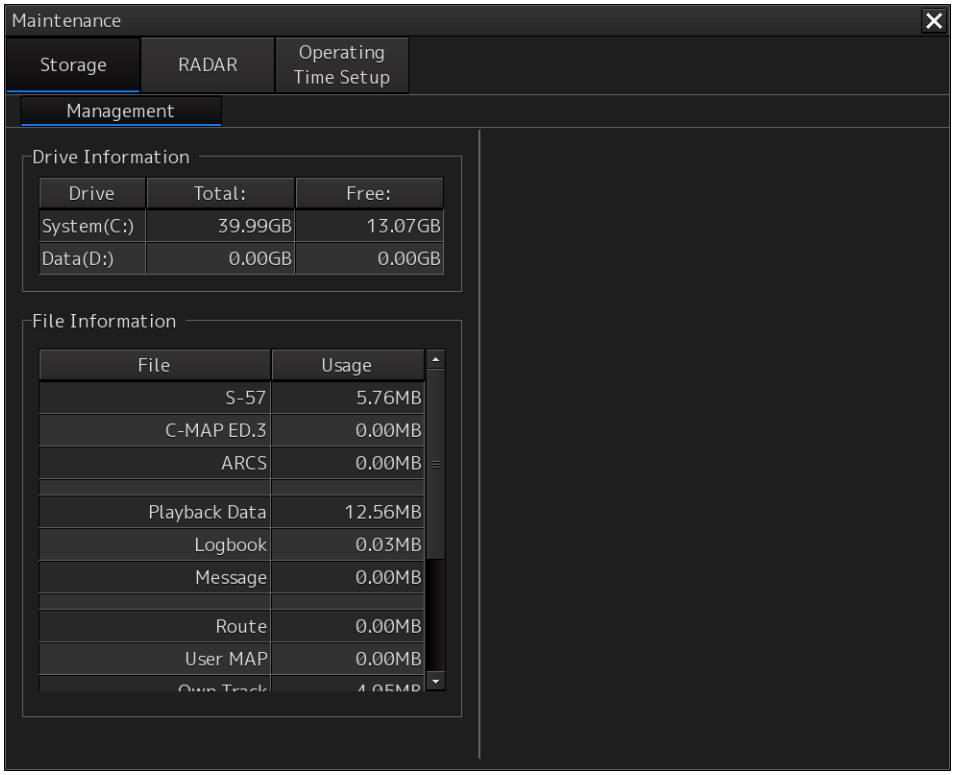
4.50 Verifying Storage [ALL]

Use the [Management] dialog to verify the storage that is used.

1 Display the dialog of the Maintenance submenu.

2 Select [Storage] in the 1st Classification pane and [Management] in the 2nd Classification pane.

The [Management] dialog is displayed in the Edit/Result pane.



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

4.51 RADAR Adjustment (RADAR Screen Only) [RADAR]

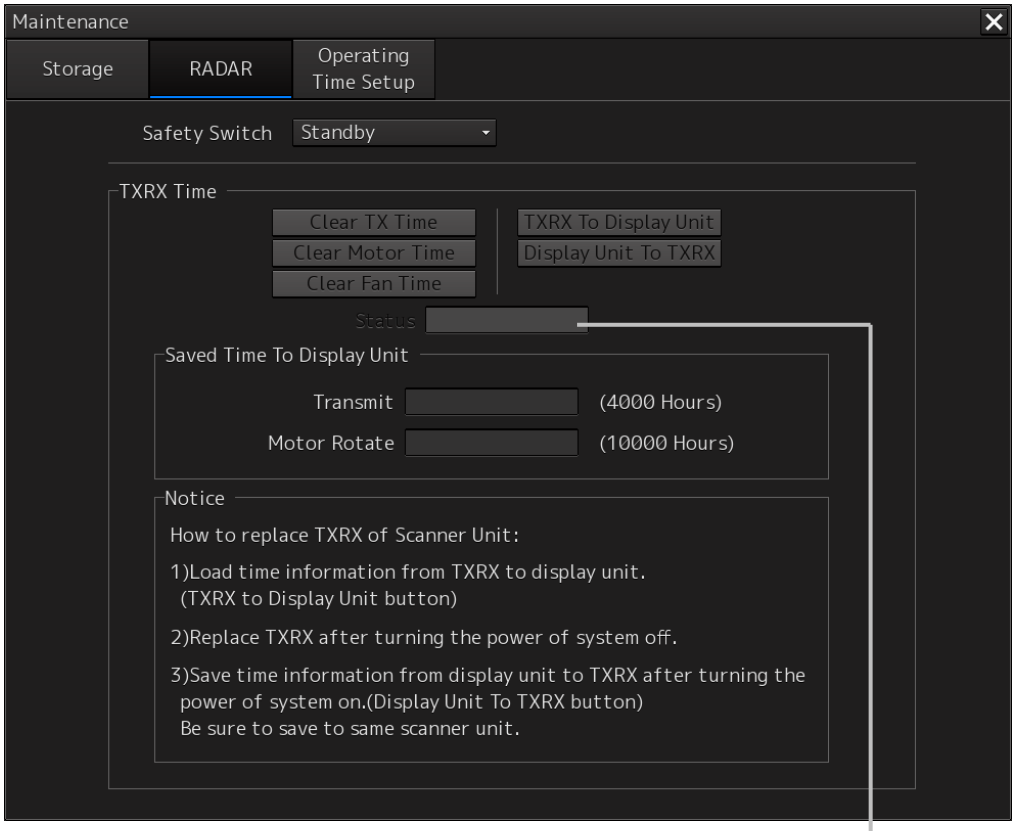
Use the [RADAR] dialog to maintain the radar.

Displaying the [RADAR] dialog

1 Display the dialog of the Maintenance submenu.

2 Select [RADAR] in the Classification pane.

The RADAR dialog is displayed in the Edit/Result pane.



Transmission result display

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 radar antenna is set to OFF.

Setting	Operation
TX-Off	• No radiant section's rotation and transmission • PPI screen transmission status • 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 transmission status • Maintains the transmitting state without generating BP or BZ alarm

Clearing a radar antenna operation time

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

Clearing the total transmission time of a radar antenna

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

Clearing the total motor rotation time of a radar antenna

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

Clearing the total fan rotation time of a radar antenna

Click on the [Clear Fan Time] (resetting the fan rotation time) button.

Replacing a TXRX circuit of a radar antenna

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

Acquiring the data of the total transmission time, total motor rotation time, and total fan rotation time from the radar antenna

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

The data of the total transmission time, the total motor rotation time and total fan rotation time is acquired from the radar 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 transmission time acquired from the radar antenna
Motor Rotate: Total motor rotation time acquired from the radar antenna
FAN time: Total fan rotation time acquired from the radar antenna

Saving the data of the total transmission time, total motor rotation time, and total fan rotation time in the radar antenna

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

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

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

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

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

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

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

Replacing a TXRX circuit

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

1 By clicking on the [TXRX To Display Unit] button, load the data of the total transmission time and the total motor rotation time from the radar antenna to the display unit.

2 Turn off the power of the system and replace the TXRX circuit.

3 Turn on the power of the system and write the data of the total transmission time and the total motor rotation time in the transmitter-receiver of the radar antenna by clicking on the [Display Unit To TXRX].

Note

- Make sure that data is written to the transmitter-receiver of the same radar antenna when the data is loaded.
- A total fan rotation time is acquired and saved for a solid state antenna only.

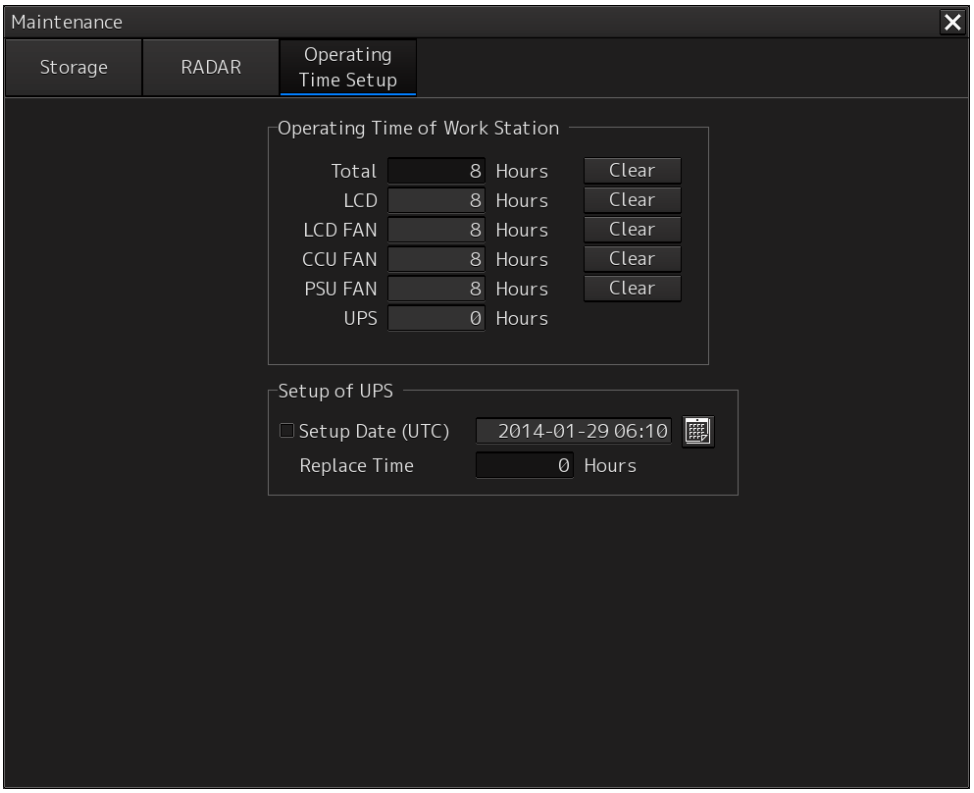
4.52 Operating Time Setup [ALL]

Use the "Operating Time Setup" dialog to specify a total operating time of the display unit and verify the operating time of each equipment.
When UPS is connected to the display unit, the guideline of the replacement timing can be checked by registering the UPS installation date and time.

Displaying the "Operating Time Setup" dialog

1 Display the dialog of the Maintenance submenu.

2 Select [Operating Time Setup] in the Classification pane.
The [Operating Time Setup] dialog is displayed in the Edit/Result pane.



The operating times of the following installations are displayed.

- LCD
- LCD FAN
- CCU FAN
- PSU FAN
- UPS

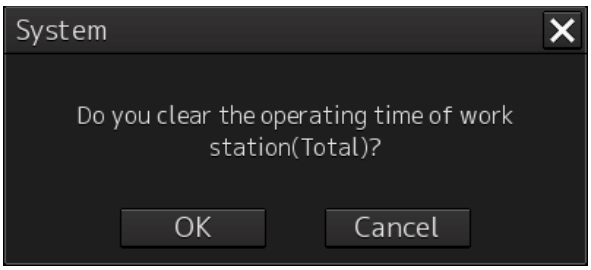
Entering an operating time of the work station

1 **Click on the [Total] (total time) input box in the [Operating Time of Work Station].**
A numeric input keyboard is displayed.

2 **Enter a total operating time of the display unit (0 to 999999 hours).**

Clearing the time that is currently displayed

1 **Click on the [Clear] button on the right side of the operating time display.**
The dialog for verifying execution of clearing is displayed.



2 **To clear the time, click on the [OK] button. To cancel the clearing, click on the [Cancel] button.**

Changing UPS installation date and time

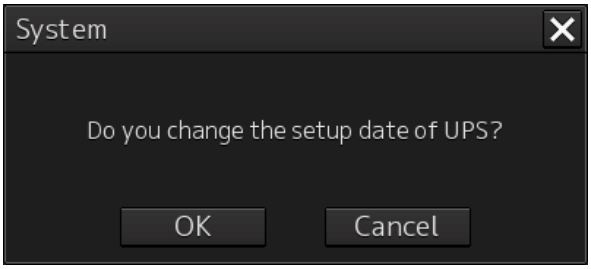
1 **Click on the calendar button.**
A calendar is displayed.

2 **Set a year and a month by using the year selection spin button and the month selection spin button.**

3 **Click on the date to be set from the date selection box.**

4 **Set a time by clicking on the time spin button of the time picker.**

5 **Click on the [OK] button.**
The setting is completed and the calendar is closed.
A dialog for confirming the change of the installation date and time is displayed.



6 **To change the installation date and time, click on the [OK] button. To cancel the change, click on the [Cancel] button.**
The UPS installation date and time is displayed in [Setup Date (UTC)].

7 Check the [Setup Date (UTC)] (installation date and time) check box in the [Setup of UPS] section.

Changing the UPS replacement time

1 Normally, it is not necessary to change the UPS replacement time. As the exception, when the UPS of a different replacement time is used, input of the replacement time is necessary. An alert can be generated at an appropriate timing when the UPS replacement time is reached.

2 To change the UPS replacement time, click on the [Replace Time] input box.
A numeric value input keyboard is displayed.

3 Input a replacement time (0-999999 Hours).

4.53 Initialization [ALL]

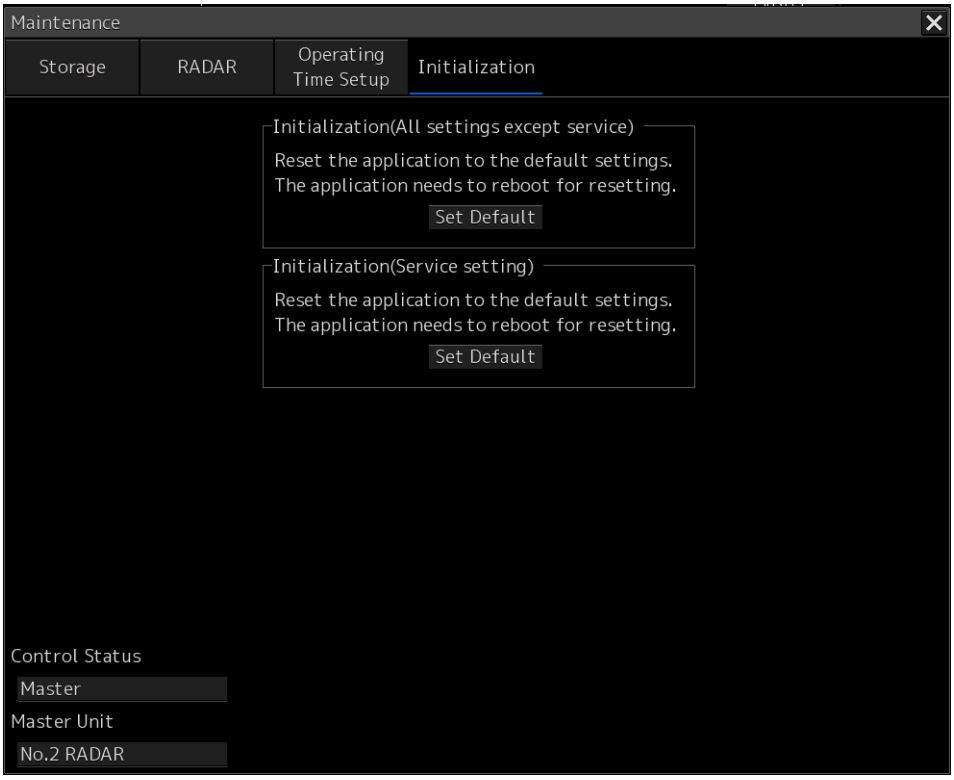
The [Initialization] dialog can be used to return (initialize) the menu setting to the factory delivery state.

Displaying the [Initialization] dialog

1 Display the dialog of the Maintenance submenu.

2 Select [Initialization] in the classification pane.

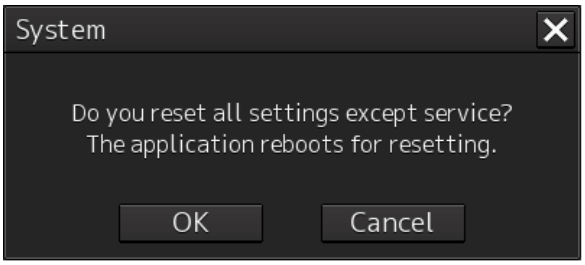
The [Initialization] dialog is displayed in the Edit/Result pane.



Initializing the settings other than the Service menu

1 Click on [Set Default] (resetting to the default setting) of [Initialization (All settings except service)].

The dialog prompting confirmation for execution of initialization is displayed.



2 To execute initialization, click on the [OK] button. To cancel initialization, click on the [Cancel] or [x] button to close the dialog.

When the [OK] button is clicked on, the settings other than the Service menu are initialized and the equipment restarts.

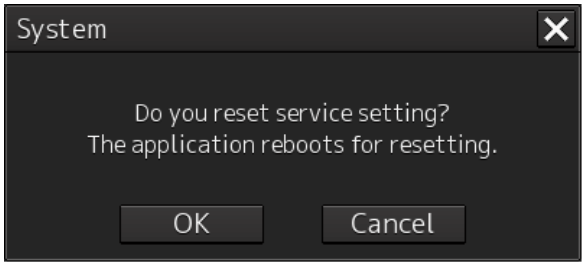
Note

When the MIN Safety Contour(Minimum value of Safety Contour that can be set) of the Own ship's parameters is set greater than the value of default(30m) of the Safety Contour setting , if the settings are initialized by this function,The MIN Safety Contour is used as Safety Contour.For the method of the Own ship's parameters, refer to "4.13 Setting own ship's parameters".

Initializing the setting of the Service menu

1 Click on the [Set Default] (reset to the default setting) button of [Initialization (Service setting)].

The dialog for promoting confirmation for execution of initialization is displayed.



2 To execute initialization, click on the [OK] button. To cancel initialization, click on the [Cancel] or [x] button to close the dialog.

When the [OK] button is clicked on, the setting of the Service menu is initialized and the equipment restarts.

Memo

When the Control Status indicates Slave, the [Set Default] button of [Initialization (Service setting)] cannot be clicked on.

Note

When the setting of the Service menu is initialized, common setting items of initialization (refer to **4.47 List of Common Setting Items**) will be reset to the default state in all task stations.

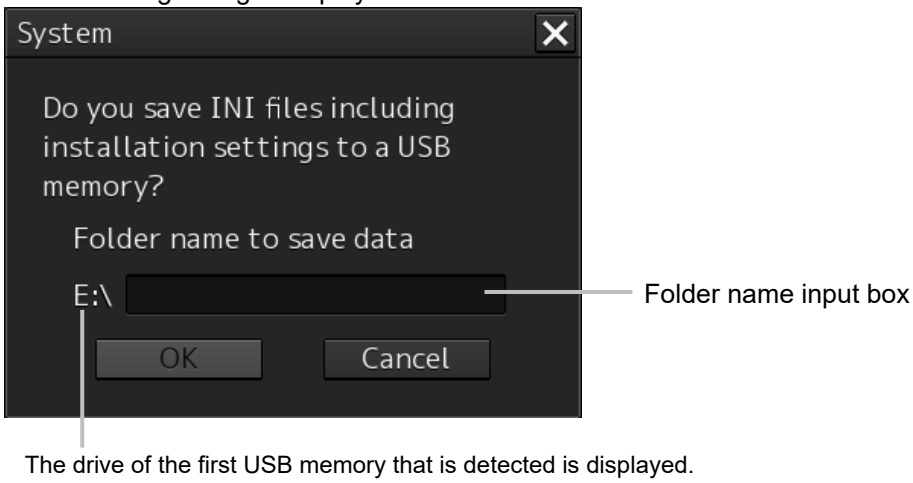
When initialization is executed, set these items to correct state again.

4.54 Backup of Data [ALL]

After completing installation, create a backup version (save) of the setting status in USB memory as the "INI" folder.
Use the backup data that is created in the INI folder as the attached reference material of the construction report.

Creating backup data

1 **Enter 1111 in "Password" of the task menu.**
The following dialog is displayed.



2 **Click on the folder name input box.**
A character input software keyboard is displayed.

3 **Enter a name of the folder under which the INI folder is to be saved (up to 64 characters).**
In a folder name input box, "unit number_YYYYMMDDHHMMSS" (UTC) is displayed in the state of the first stage.
To change the folder under which the INI folder is to be saved, enter a folder name.

> **Note**
> Do not enter any blank space in the folder name.

4 **Click on the [OK] button.**
The folder under the name that is specified in Step 3 is created in the USB memory and the INI folder is saved in that folder.
To cancel the backup operation of the INI folder, click on the [Cancel] button or the [X] button.

Case where the USB memory contains a folder of the same name

When the [OK] button is clicked on, a dialog is displayed prompting confirmation of overwriting the data.

Specify whether the data is to be overwritten or the operation is to be cancelled and another folder name is to be specified.

Case where backup cannot be executed

In any of the following cases, the [OK] button is disabled, thereby disabling backup operation.

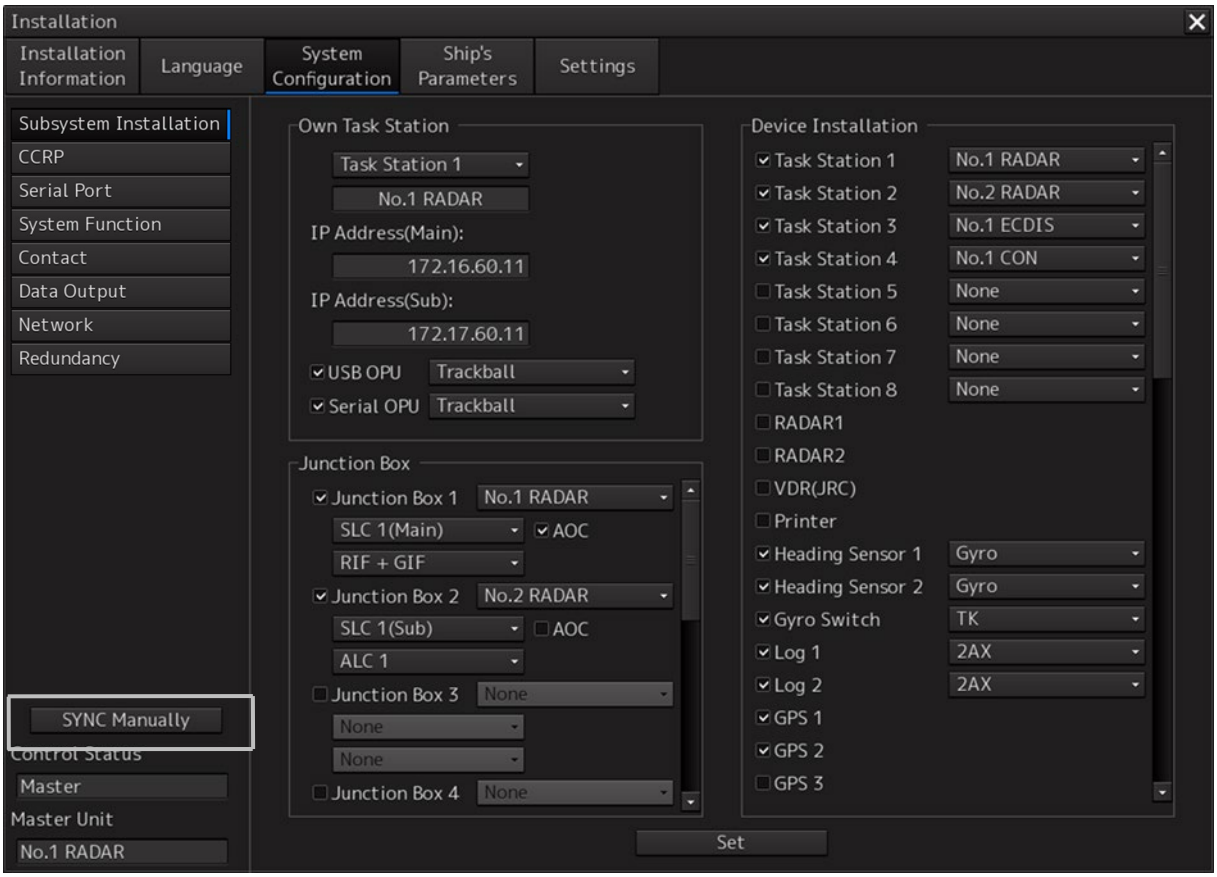
- The USB memory cannot be recognized.
- A folder name has not been input in the folder name input box.
- An invalid folder name (for example: containing blank space) is input in the folder name input box.

4.55 List of Common Setting Items [ALL]

Menu		Item	Remarks
Installation	System Configuration	Subsystem Installation	Excluding Own Task Station.
		CCRP	
		Serial Port	Excluding Serial Port of CCU.
		Contact	Excluding Contact of CCU.
		A/D	
		Network	Excluding IP address setting of own task station
		Redundancy	
	Ship's Parameter	Ship General	

4.56 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.



4.57 Update procedure for CONNING ini file [CONNING]

Follow the steps below to update the ini file on the Conning screen.

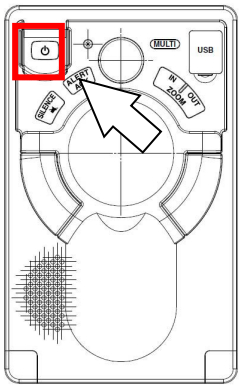
Note:
- When 19 inch monitor is installed in CONNING, update ini file as needed.
- When 26/27 inch monitor is installed in CONNING, make sure to update ini file. (Ini file for 19 inch monitor is installed as default) If ini file is not updated, the layout of conning screen will be broken.
- Note that ini file for 19 inch monitor is different from ini file for 26/27 inch monitor.
- Update the ini file on MFD devices having Conning license. (It is not necessary to update the ini file of all MFD devices)

1. Items for updating

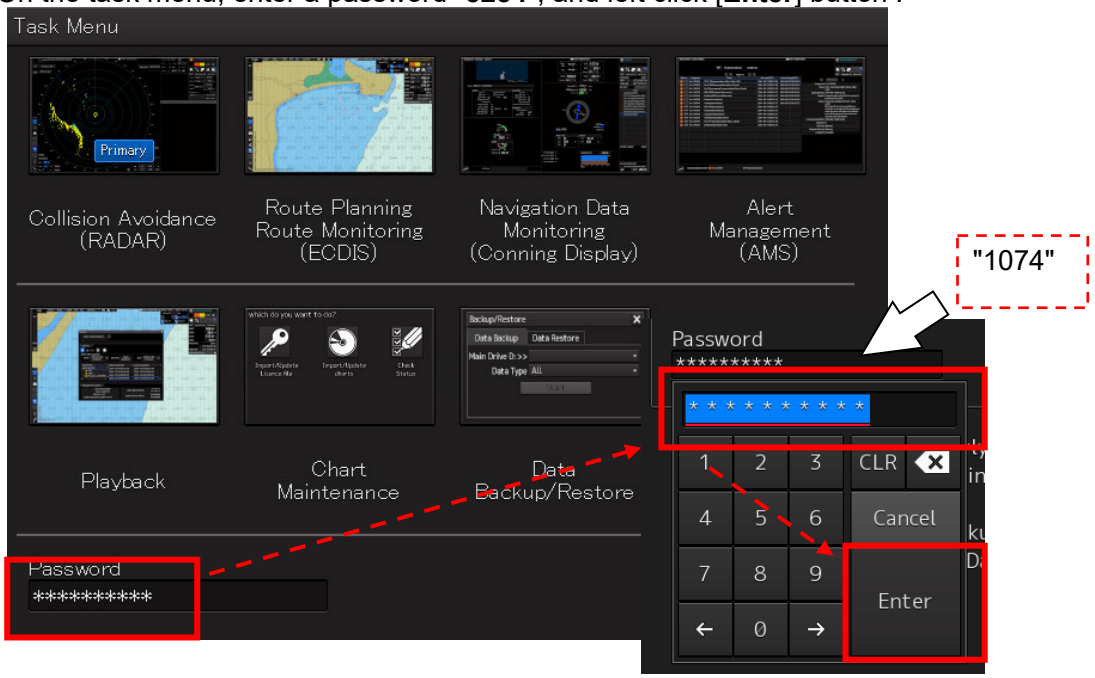
Items	Amount	Note
USB flash memory	1	USB flash memory should include Conning folder.
Conning folder	1	The folder including the conning ini file. Conning folder to be updated should be included in a folder of USB flash memory.

2. Procedure

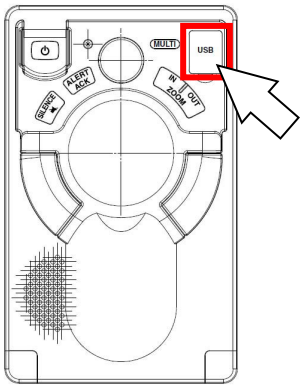
1) Turn the power of MFD on.

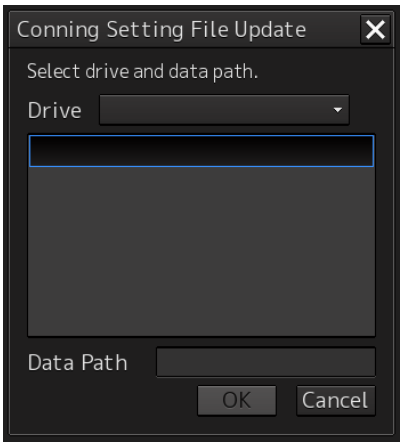


2) On the task menu, enter a password "**5254**", and left click [**Enter**] button .

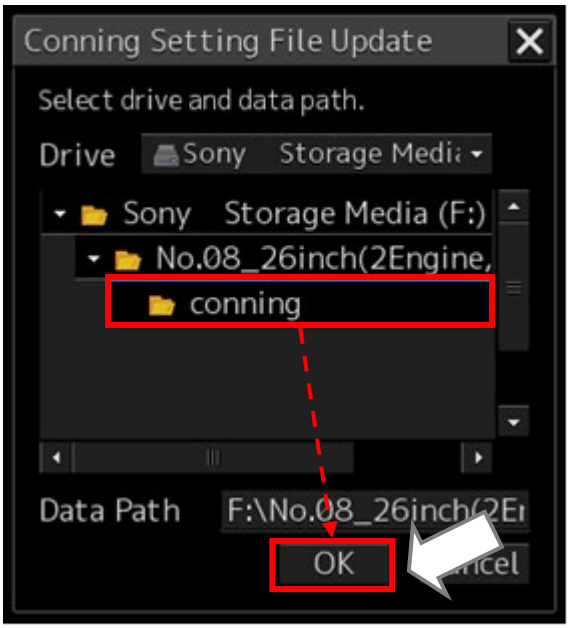


3) The "**Conning Setting File Update**" dialog appears. After that, insert the USB flash drive containing the Conning folder into the USB port of the trackball operation unit.

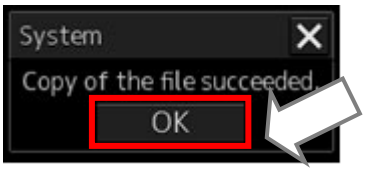




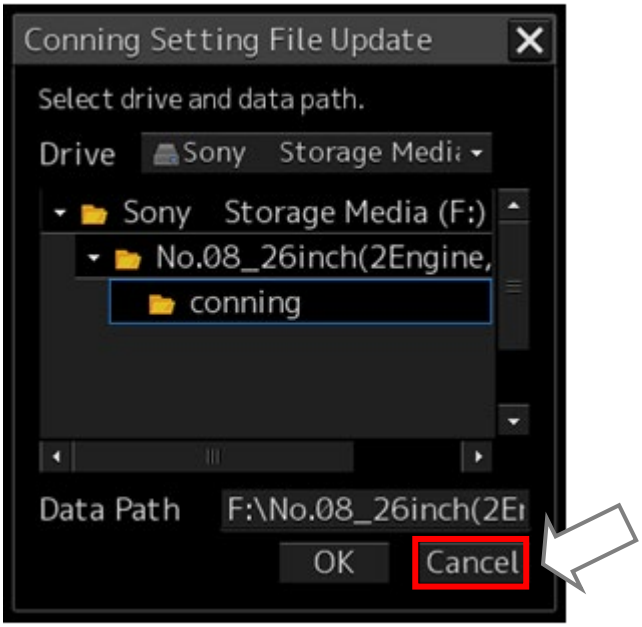
4) Select “**Conning**” folder in the USB flash drive on the "**Conning Setting File Update**" dialog. And left click [**OK**] button.



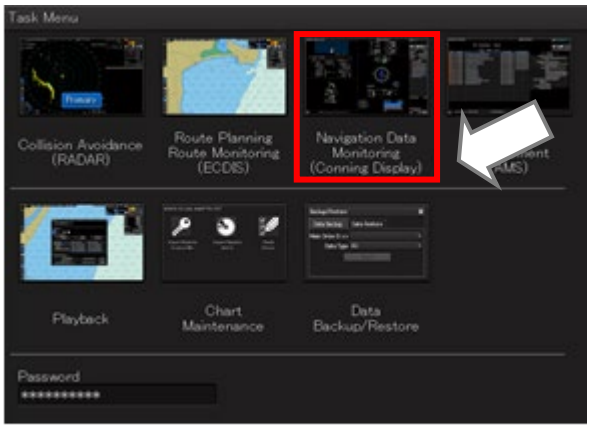
5) If “**System**” dialog is displayed, click on the [**OK**] button.



6) Left click [**Cancel**] button on "**Conning Setting File Update**" dialog.



7) Select "**Navigation Data Monitoring(Conning Display)**" from Task Menu.

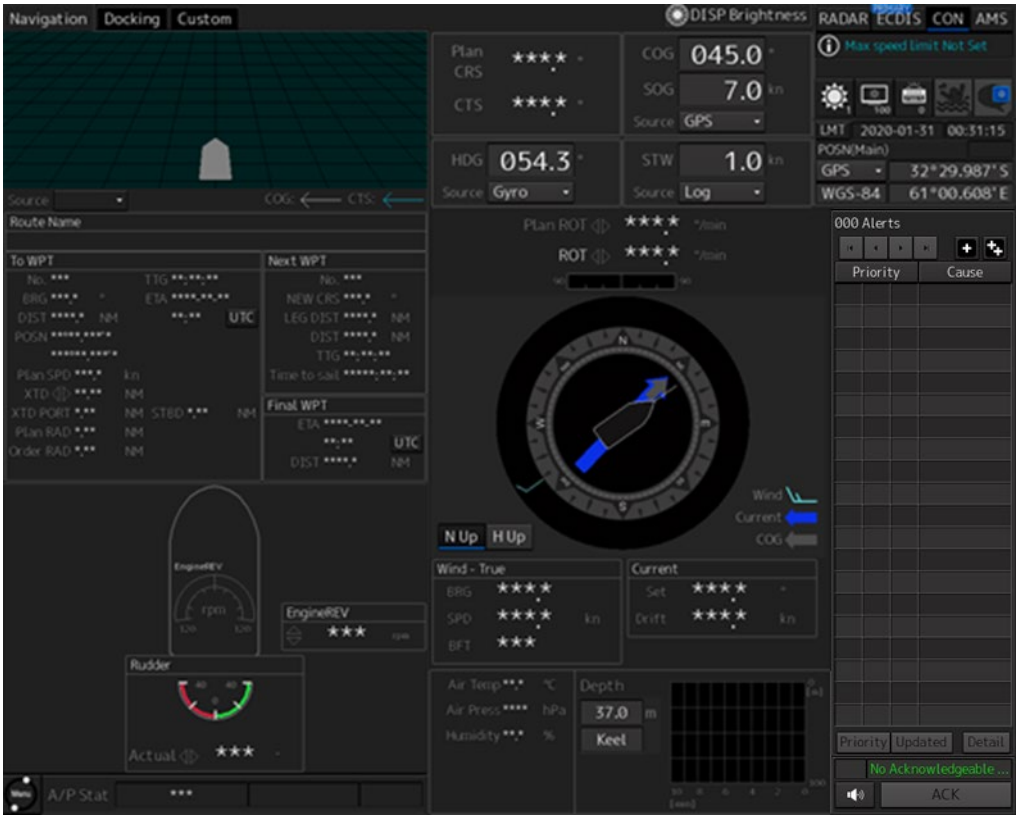


8) Check that CONNING screen was updated.

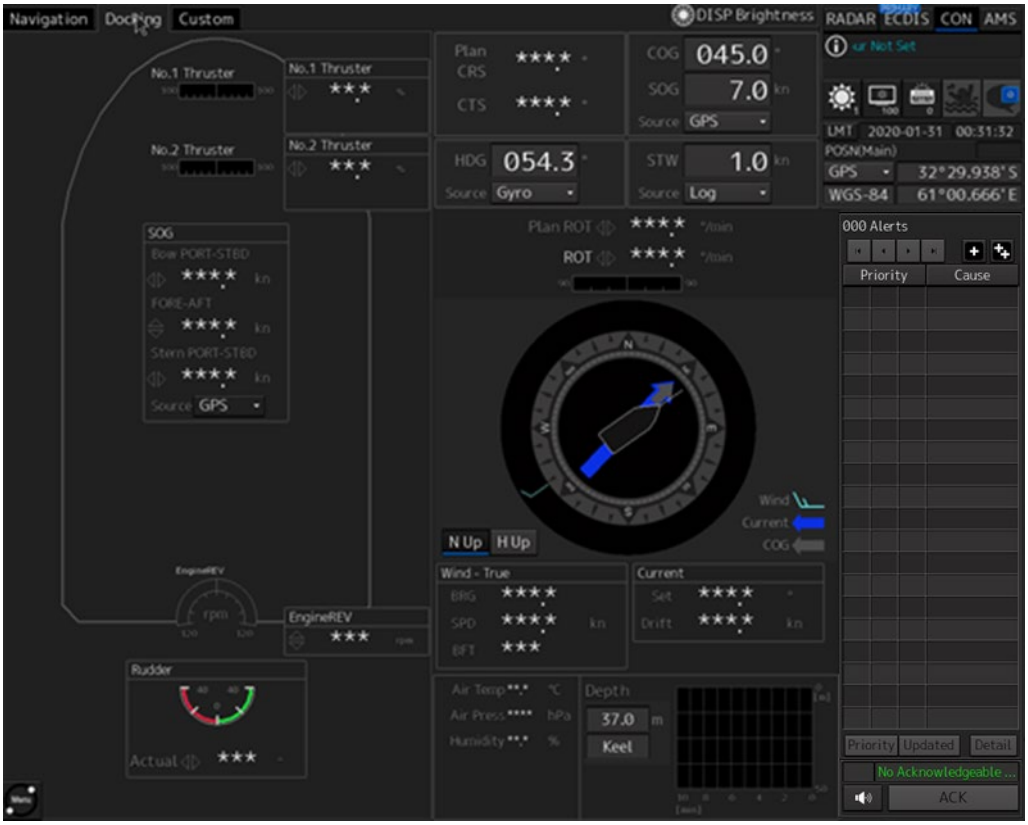


Example for CONNING screen

1) 19inch(Default)



Navigation Screen



Docking Screen

2) 19inch (1Engine)



Navigation Screen



Docking Screen

3) 26/27inch (1Engine)



Navigation Screen

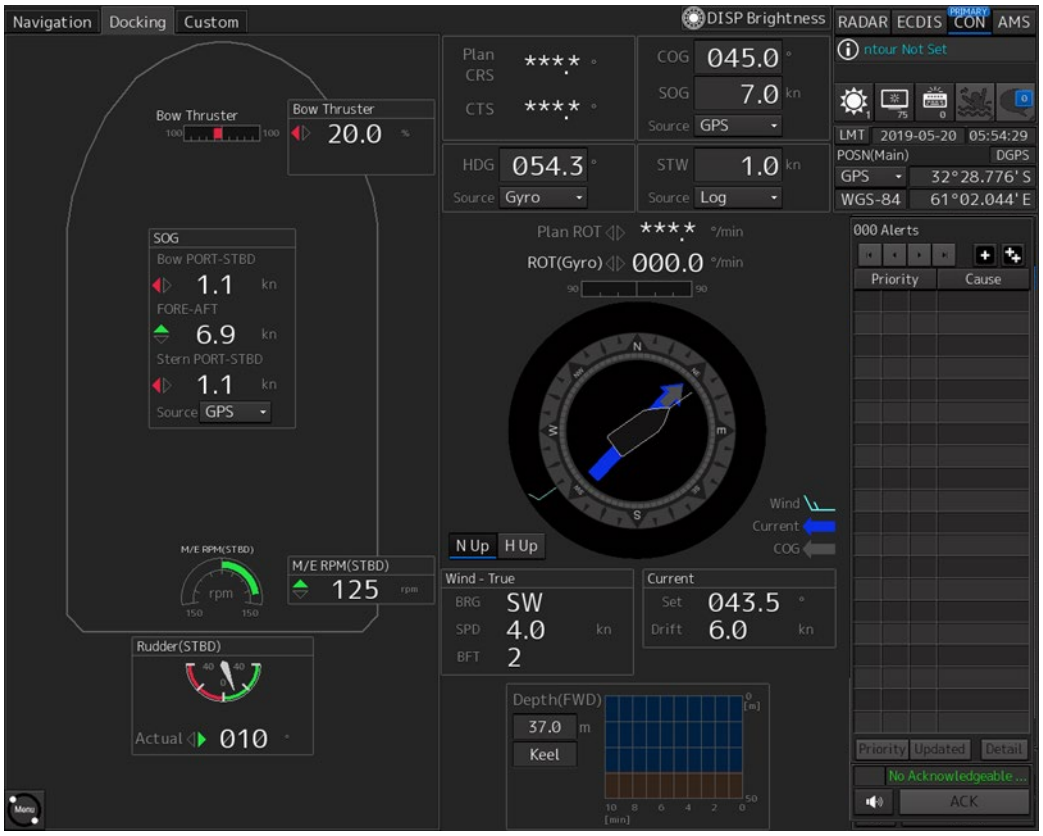


Docking Screen

4) 19inch (1Engine,BowTHR)



Navigation Screen

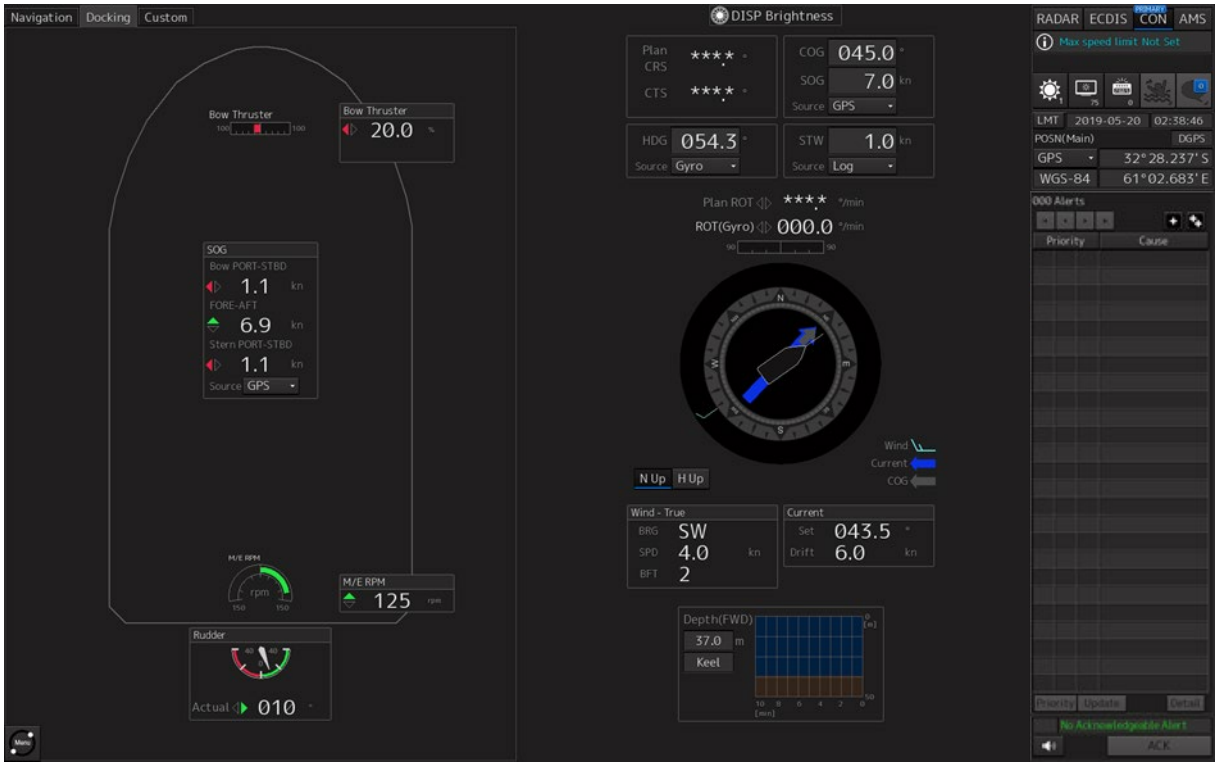


Docking Screen

5) 26/27inch (1Engine,BowTHR)



Navigation Screen

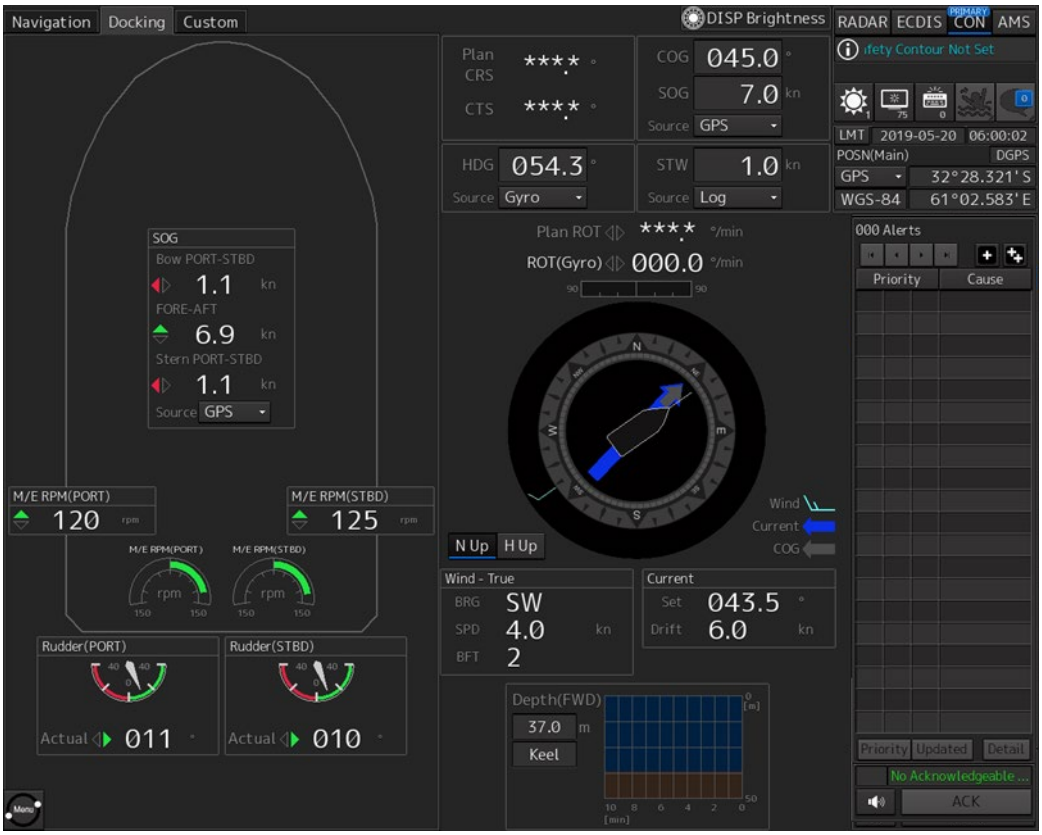


Docking Screen

6) 19inch (2Engine)



Navigation Screen



Docking Screen

7) 26/27inch (2Engine)



Navigation Screen

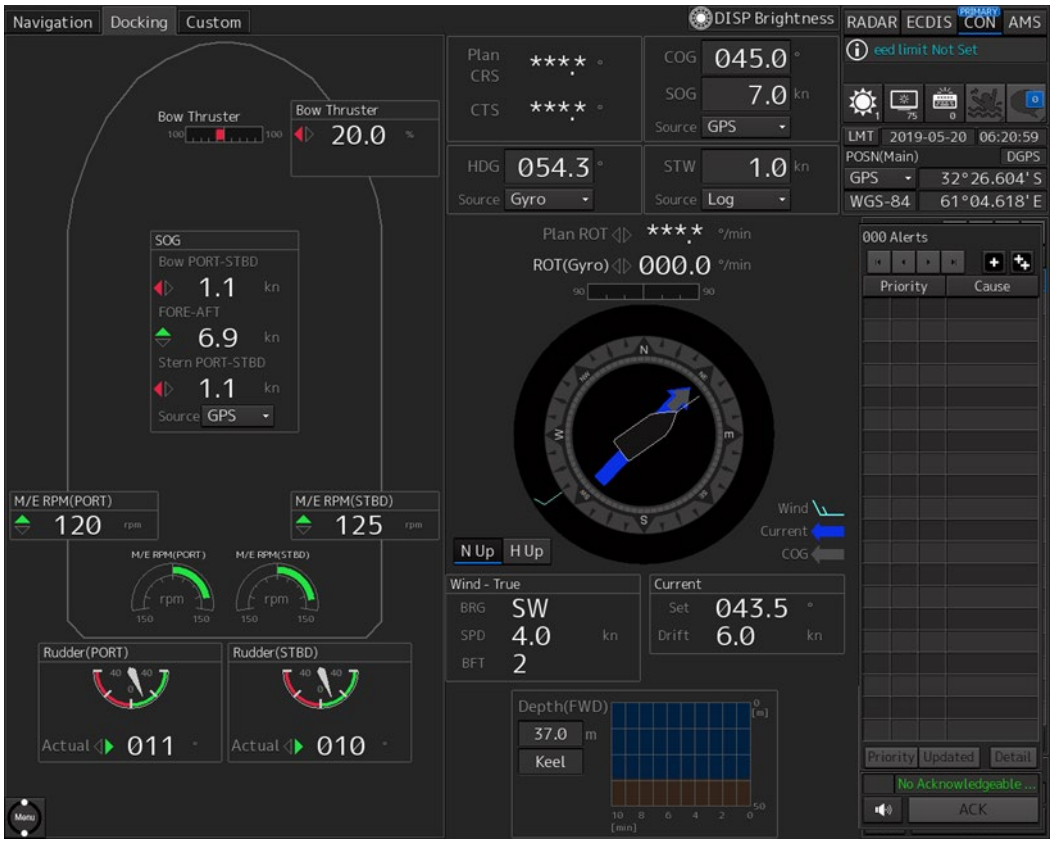


Docking Screen

8) 19inch (2Engine,BowTHR)



Navigation Screen

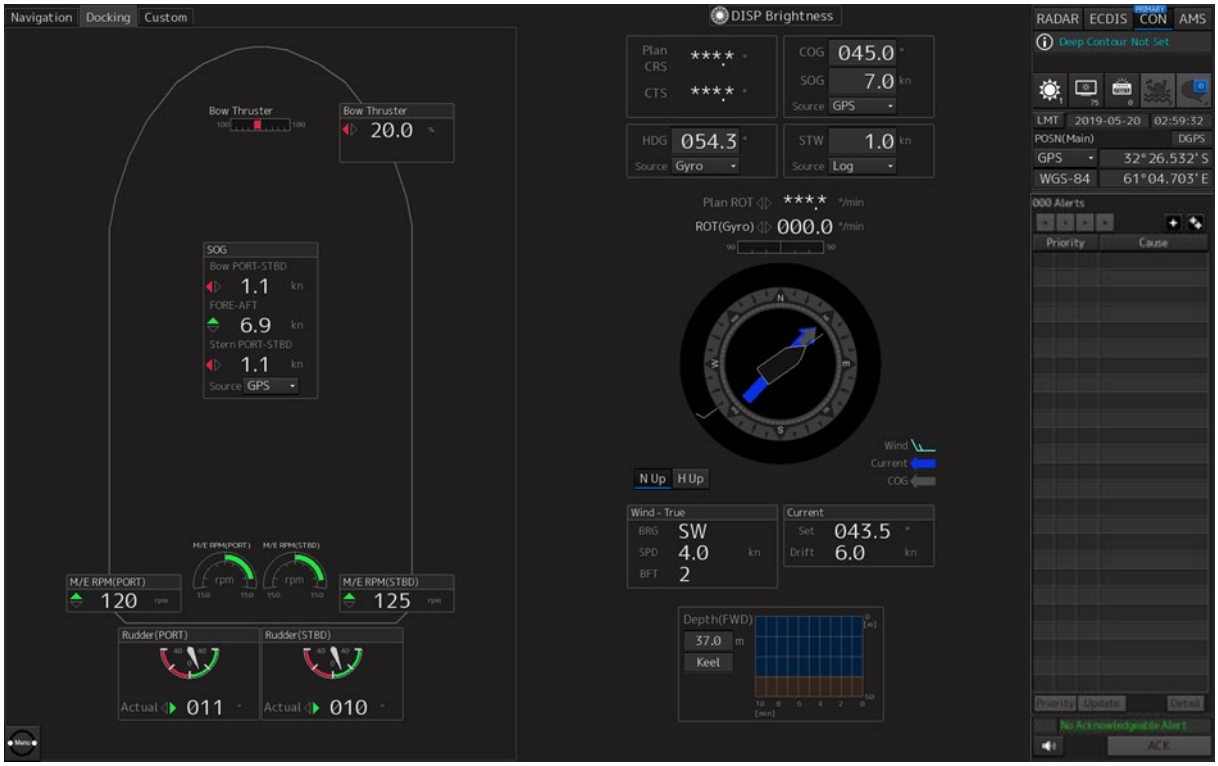


Docking Screen

9) 26/27inch (2Engine,BowTHR)



Navigation Screen



Docking Screen

4.58 Password List [ALL]

No.	Dialog	Password	Action
1	Menu-Maintenance-System Information-[Software] tab	0000	Displays the detailed software version for service engineers.
2	Menu-Code input	9999	Returns to the task menu.
3	Menu-Code input	0	Displays the service menu for users.
4	Menu-Code input	0009	Displays the service menu for service engineers.
5	Task menu-Password	9380	Opens the license import dialog.
6	Task menu-Password	1111	Opens the dialog for backing up the INI folder.
7	Task menu-Password	0913	Start Internet Explorer.
8	Task menu-Password	5254	Update the ini file on the Conning screen. Open the folder selection dialog and import the ini file in the folder and update the file.
9	Task menu-Password	2222	Copies the ENC Permit file in the USB memory.
10	Task menu-Password	1074	Opens the maintenance tool Startup dialog. Start the selected maintenance tool.

4.59 INS Initial Settings [ALL]

To the Service menu of INS devices, devices including task stations and sensors, which are required to implement INS linking, are provided in addition to functions for supporting INS linking.
This section describes the initial setup of each device for implementing INS linking by presenting differences from non-INS devices.

Settings of functions for supporting INS linking

Function	Setting/Execution Method	Reference
Implementation of INS linking	Select [System Configuration] and display the [Redundancy] dialog. In the [INS] combo box, specify enabling or disabling INS linking.	4.12 Redundancy Settings
Duplex configuration of LAN between devices	Select [System Configuration] and display the [Redundancy] dialog. In the [LAN] combo box, select single configuration or duplex configuration for the LAN between devices.	4.12 Redundancy Settings
Selection of server equipment due to implementation of INS linking	Select [System Configuration] and display the [Redundancy] dialog. In the [CCRS Server] combo box, select the devices to be used as the main server and the sub server.	4.12 Redundancy Settings
Confirmation of installed/not installed of AOC of SLC due to duplex configuration of LAN between devices	Select [System Configuration] and display the [Subsystem Installation] dialog. In the [Junction Box] box, specify whether or not AOC (analog option circuit) is installed for the sub SLC. Select [System Configuration] and display the [A/D] dialog. In the [SLC] box, verify the settings of the AOC for the main and sub lines.	4.56.4 Subsystem Installation 4.56.6 A/D Settings
Selection of line for ALC monitoring due to duplex configuration of LAN between devices	Select [System Configuration] and display the [Serial Port] dialog. In the [Network] combo box, select to use the main line or the sub line for ALC monitoring.	4.56.5 Serial Port Settings
Selection of Gyro sensor reception path due to duplex configuration of LAN between devices	Select [System Configuration] and display the [Redundancy] dialog. In the [Communication path priority] combo box, specify the priority of the path for receiving the Gyro sensor.	4.12 Redundancy Settings
Set the alert transmission cycle and reception timeout for each serial port to which alerts are to be input from each sensor	Change the alert handling setting in the [Detail] dialog by selecting [System Configuration] - [Serial Port] dialog.	4.56.5 Serial Port Settings
Selection of ACK handling method for category A alerts	Select [Settings] and display the [Alert] dialog. In the [Acknowledge the category A alert] combo box, specify on which operation screen ACK will be performed.	4.56.11 Alert Settings
Switching between the main and sub TTM output channels	Select [System Configuration] and display the [Data Output] dialog. In [TT], specify both the main and sub TTM output channels individually.	4.56.7 Data Output Settings
Execution of alert output test	Select [System Configuration] and display the [Data Output] dialog. In [Alert Test], perform test output of an alert signal.	4.56.7 Data Output Settings
Setup of chart synchronization target devices	Select [System Configuration] and display the [Network] dialog. In [SENC SYNC], set up devices subjected to chart synchronization and devices not subjected to chart synchronization.	4.56.8 Network Settings

Function	Setting/Execution Method	Reference
Setup of operation to be continued when INS linking stops during automatic sailing in the overlay state	Select [Settings] and display the [INS] dialog. In [INS synchronisation stopped priority], select an operation you want to continue.	4.56.12 INS Settings

Settings for devices required during INS linking

Device	Setting/Check Method	Reference
Task station 9, task station 10, junction box 9	Select [System Configuration] and display the [Subsystem Installation] dialog. In [Own Task Station], [Junction Box] and [Device Installation], make the setting for task station 9, task station 10 and junction box 9.	4.56.4 Subsystem Installation
Dimmer sensor (sharing of color luminance information among devices)	Select [System Configuration] and display the [Subsystem Installation] dialog. In [Device Installation], select the dimmer sensor. Select [System Configuration] and display the [Serial Port] dialog. In [SLC], check the data reception status of the dimmer sensor.	4.56.4 Subsystem Installation 4.56.5 Serial Port Settings
Echo sounders/ echo sounder transducers	Select [Ship's Parameters] and display the [Ship General] dialog. Set up the distance between the keel and each of the three echo sounder transducers individually.	4.56.10 Settings of Ship's Parameters
Log1/Log2	Set the measurement reference position of the equipment that is installed as Log1/Log2 in the [System Configuration] - [CCRP] dialog.	4.56.3 Setting CCRP

4.59.1 INS configuration

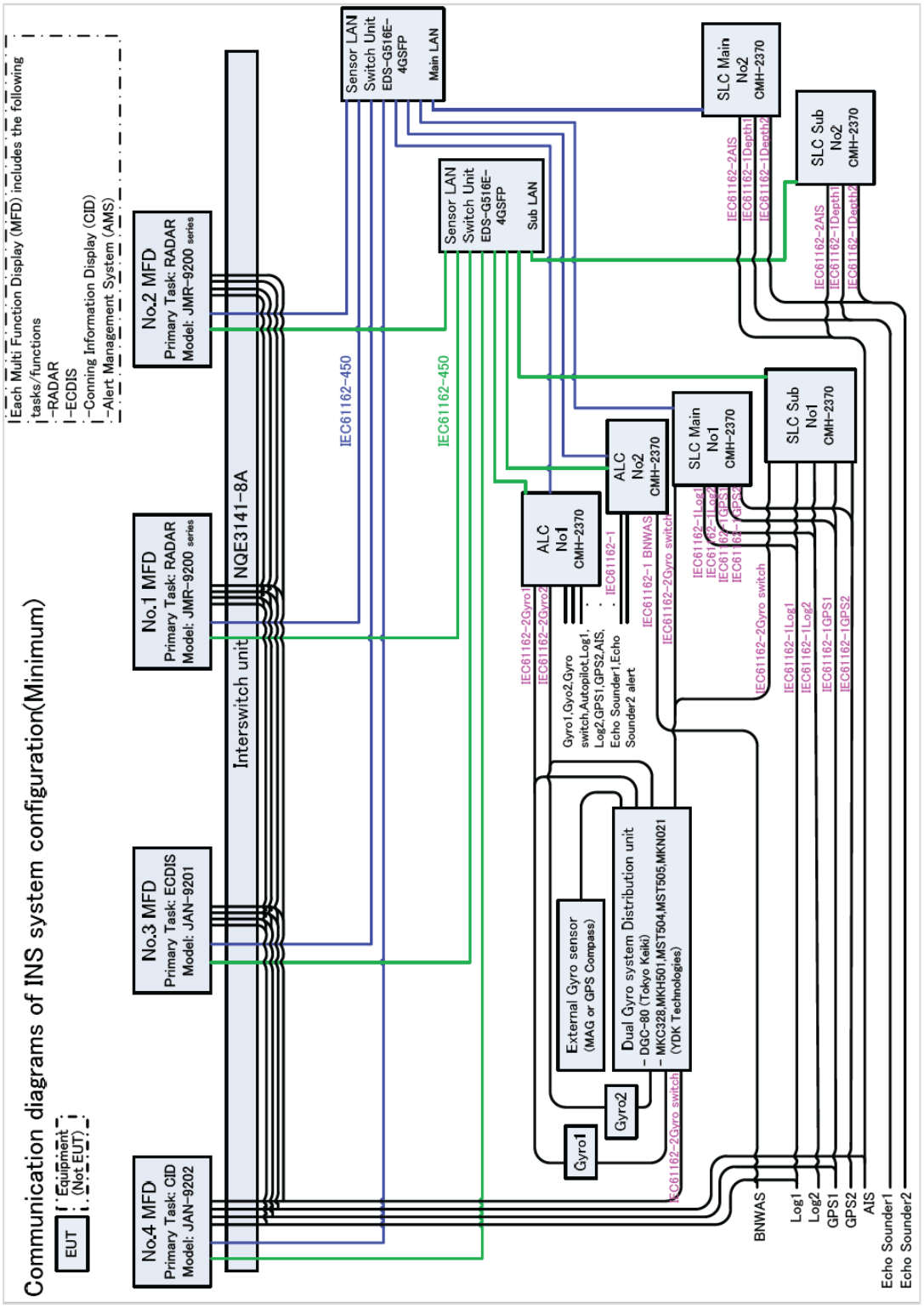
The INS comprises multiple task stations (equipment for operating and displaying information on the bridge) and navigation equipment.
Task stations execute tasks of RADAR, ECDIS, Conning Display, and AMS by switching and they are also called MFD (Multi Function Display).
It is described as a “task station” henceforth in principle.

Minimum system configuration

See the diagram for the minimum system configuration that can realize the functions required for INS. (The minimum system configuration satisfies the SOLAS V requirements.)

The following task stations are required. These task stations must be MFD with the RADAR/ECDIS/ Conning Display/AMS task.

- RADAR(X band)
- RADAR(S band)
- ECDIS
- Conning Display

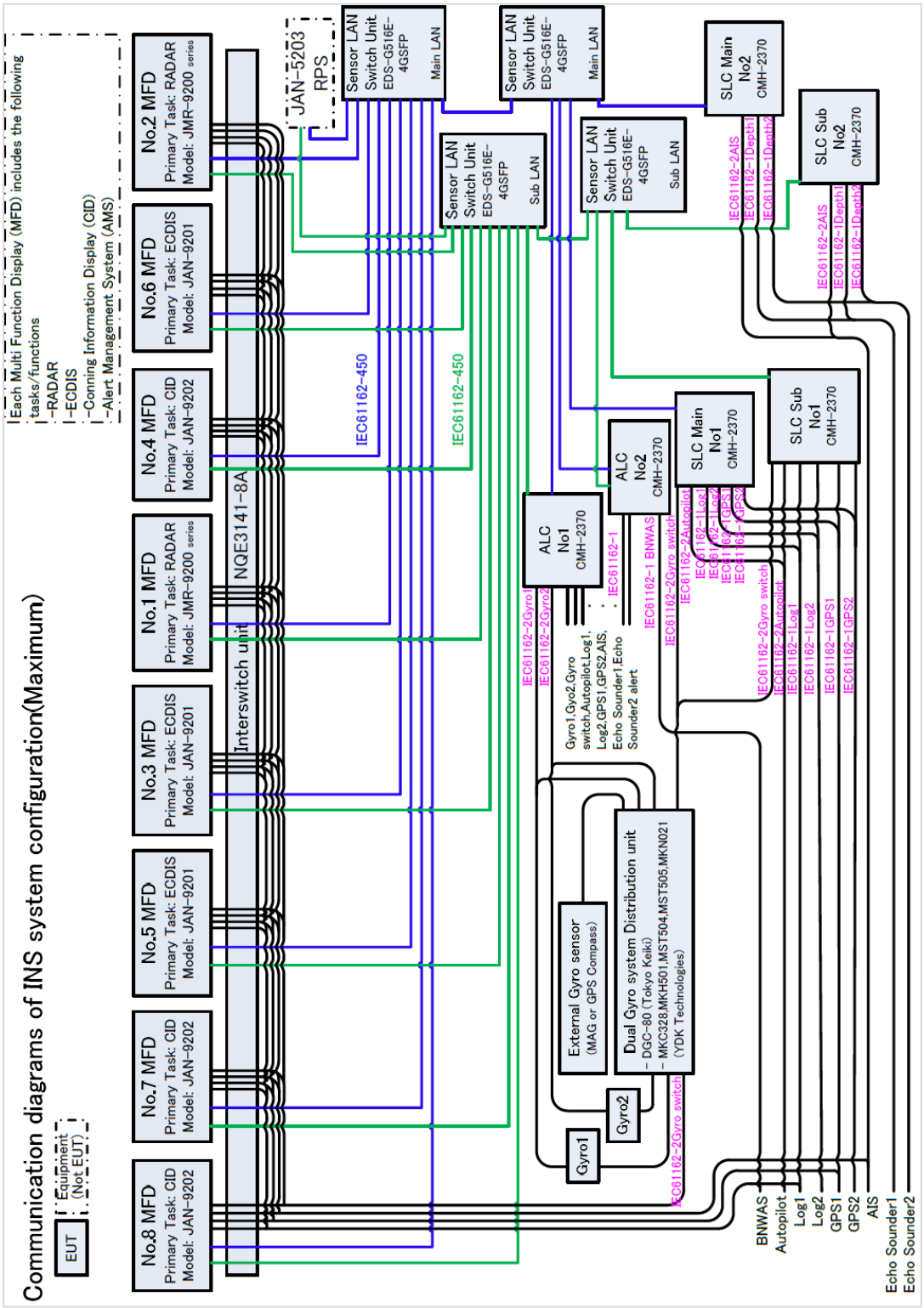


Maximum system configuration

See below for the maximum system configuration that includes all the equipment units that can be connected.

For task stations, up to 9 units (8 MFD units and 1 RPS unit) can be connected concurrently by adding 5 units to the 4 units, which are required for the minimum system configuration.

Autopilot can be combined.



System components

Note

The equipment items that configure the system must be provided with the ability of transmitting alerts defined by MSC.252(83) Appendix 5 Table 2.

The equipment items that configure the system are listed below.

Equipment	Description
MFD	MFD is a task station that can execute the navigation aid functions such as RADAR, ECDIS, Conning Display, and AMS by switching. • RADAR: Detects targets for avoiding collisions. • ECDIS: Performs route monitoring or route planning. • Conning Display: Displays various types of navigation information data. • AMS: Performs concentrated display of navigation-related alert information and IAS (Integrated Automation System-control system of organizations/cargoes).
Interswitch Unit	Switches the connections of the radar processing unit in each task station and two or more radar antennas.
RPS	Route Planning System. Creates a route plan.
SLC/ALC	Serial-LAN converter/alert-LAN converter. Provides various types of sensor data and alert information to INS via LAN. Basically, SLC is used for sensor data and ALC is used for alert information.
Sensor LAN Switch Unit	Data from the sensor is transmitted to the task station and alert management by the task station is performed via this unit.
Autopilot	Automatic navigation equipment under TCS Class B or Class C
Gyro Compass System	Measures ship's heading bearing. Normally, two gyro compass systems are installed and output is switched between automatic and manual (by a switch, etc.).
BNWAS	Emits alarm sound inside of cabins. When the alarm that is issued from the bridge is not acknowledged for a specified period of time, the alarm is transferred from AMS to this unit. Note: BNWAS must be connected in order to satisfy specification requirement for BAM and TCS.
VDR	Voyage data recorder
GPS	Measures the position of the ship. Normally, two GPS units are installed to secure redundancy and integrity.
Echo Sounder	Measures the water depth.
Speed Log (for STW) (Speed Through Water)	Measures the speed through water. Normally, this equipment is installed independent of the sensor that measures the speed over the ground. Doppler sonar, Doppler log, and electromagnetic log are available.
Speed Log (for COG/SOG) (Course Over the Ground/Speed Over the Ground)	Measures the speed over the ground and course over the ground. Normally, this equipment is installed independent of the sensor that measures the speed through water. Doppler sonar and satellite log are available.
External Gyro Sensor	External sensor that measures the ship's heading. A magnetic compass or GPS compass is used.

Equipment	Description
Dual Gyro System Distribution Unit	Distributes data from two Gyro Compass Systems.
AIS	Automatic identification system
NAVTEX	Navigation alarm receiver
Anemometer & Anemoscope	Measures wind speed/wind direction.
Rudder	Measures the port side and starboard side rudder angles.
Engine/Propeller	Measures the revolution per minute of the engine or propeller.
Engine Telegraph	Engine telegraph equipment
Thruster	Measures the revolution per minute and pitch angle of the side thruster.
Azimuth Thruster	Measures the revolution per minute and pitch angle of the azimuth thruster.
Digital Signal Converter	Mainly distributes contact inputs for alarm to LAN.
IAS	Inputs alert information from IAS.

Interface with alert management system

Equipment outside INS shall use the following standard interface defined by IMO, as an interface between the alert management and the equipment.

- IEC60945 (2002, Ed.4)
- IEC61162-1 (2016, Ed.5)
- IEC61162-450 (2018, Ed.2)
- IEC62923-1 (2018, Ed.1)
- IEC62923-2 (2018, Ed.1)

Sentences for alert handling are:

- ALR/ACK
- ALF/ALC/ACN/ARC/AGL (defined by IEC61924-2, IEC62923-1)

In addition, interface by dry contact is also available.

INS power supply conditions

The following table lists the conditions of the power supply for the components of this system.

Unit		Operation mode	Power supply	Power supply specification (per unit)	Use of UPS	Requirements for enabling continuous operation for 45 seconds with the backup power supply even at the failure in the main power supply
Task station	RADAR	Normal	Main generator/ emergency generator for ships	AC100-240V, maximum apparent power 1900VA	Used: 2.2kVA (per unit)	Supply power individually with each RADAR. Separate the power supply from the switchboard power supply. A UPS bypass switch is required.
		Backup	UPS	-		
	ECDIS	Normal	Main generator/ emergency generator for ships	AC100-240V, maximum apparent power 240VA	Not used[*1]	Supply power individually with each ECDIS. Separate the power supply from the switchboard power supply. The capacity required for the backup operation under DC24V is 1A/h per unit.
		Backup	Provisional power supply by emergency batteries	DC21.6-31.2V[*1], maximum power consumption 240W		
	CONNING	Normal	Main generator/ emergency generator for ships	AC100-240V, maximum apparent power 240VA	Not used [*1]	Supply power individually with each CONNING. Separate the power supply from the switchboard power supply. The capacity required for the backup operation under DC24V is 1A/h per unit.
		Backup	Provisional power supply by emergency batteries	DC21.6-31.2V[*1], maximum power consumption 240W		

Unit		**Operation mode**	**Power supply**	**Power supply specification (per unit)**	**Use of UPS**	**Requirements for enabling continuous operation for 45 seconds with the backup power supply even at the failure in the main power supply**
Task station	CONNING for wing	Normal	Main generator/ emergency generator for ships	AC100-240V, maximum apparent power 240VA	Not used *1	Supply power individually with each CONNING for wing. Separate the power supply from the switchboard power supply. The capacity required for the backup operation under DC24V is 1A/h per unit.
		Backup	Provisional power supply by emergency batteries	DC21.6-31.2V*1, maximum power consumption 240W		
Sensor LAN EDS-G516E-4GSFP		Normal	Provisional power supply by an emergency charger	DC21.6-31.2V, maximum power consumption 14.4W	Not used	Supply power individually with the main line and the sub line. Separate the power supply from the switchboard power supply. The capacity required for the backup operation under DC24V is 0.2A/h per unit.
		Backup	Provisional power supply by emergency batteries			
SLC/ALC CMH-2370		Normal	Provisional power supply by an emergency charger	DC21.6-31.2V, maximum power consumption 9.6W	Not used	Supply power individually with the main line and the sub line. Separate the power supply from the switchboard power supply. The capacity required for the backup operation under DC24V is 0.1A/h per unit.
		Backup	Provisional power supply by emergency batteries			

Unit	Operation mode	Power supply	Power supply specification (per unit)	Use of UPS	Requirements for enabling continuous operation for 45 seconds with the backup power supply even at the failure in the main power supply
Interswitch NQE-3141-8A	Normal	Main generator/ emergency generator for ships	AC100-240V, maximum apparent power 60VA	Used (can be shared with RADAR UPS)	
	Backup	UPS	-		
Dual Gyro system distributor DGC-80	Normal	Provisional power supply by an emergency charger	DC21.6-31.2V, maximum power consumption 250W	Not used	
	Backup	Provisional power supply by emergency batteries	DC21.6-31.2V, maximum power consumption 75W		

*1 : When DC24V is not connected, UPS of 1kVA and a UPS bypass switch are required for task station backup operation.

INS power supply configuration

INS power supply configuration complies INS standard rules (below quoted from IEC 61924-2. 7.8.3 power supply). The power supply configuration supplies power to primary sensors, RADAR antennas, and all MFDs in the system via distribution boards which have automatic changeover function from/to the main power line to/from the sub (emergency) power line. And the power supply configuration ensures to supply power to sensors and all MFDs in the period of changeover power lines with UPS. The period is longer than 45s.

Please inquire each sensor manufacturers or dealers for information of power supply conditions in detail. Please inquire JRC sales or dealers for UPS for RADAR antennas. Some antenna models need UPS.

Two examples of power supply configurations (for minimum and for maximum systems) are shown below. These examples satisfy three requirements;

(1) MFDs, HUBs and sensors are supplied power from main power line and emergency power line.

(2) Power supply lines consist of main power line and emergency power line.

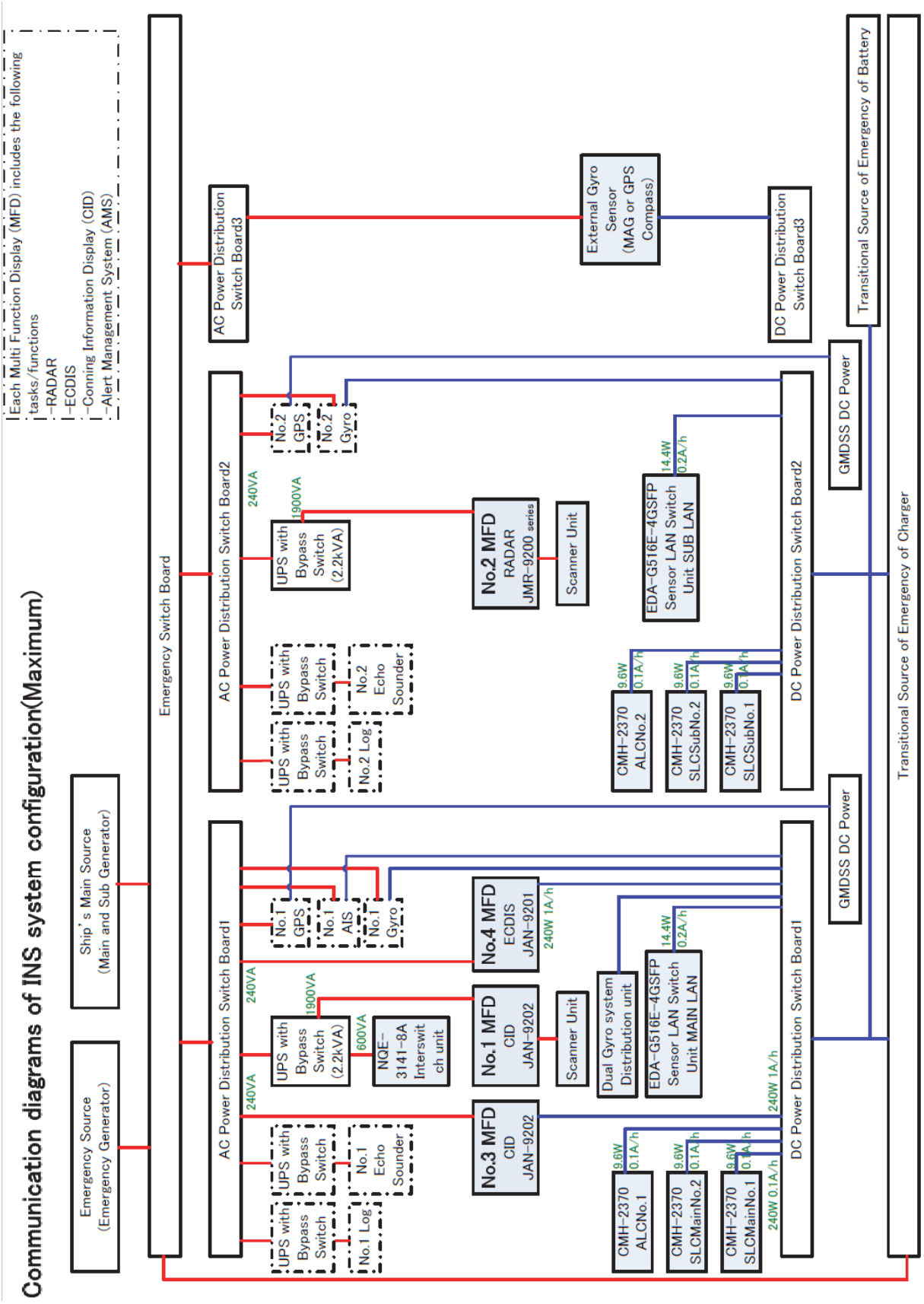
(3) More than 45s of duration period, the UPS ensure that MFDs, HUBs and sensors are supplied power.

IEC 61924-2, 7.8.3 Power supply, 7.8.3.1 Requirement
(MSC 252/13.4.1) Power supply requirements applying to parts of the INS as a result of other IMO requirements shall remain applicable.
(MSC 252/13.4.2) The INS including the sensors for position, speed, heading and depth shall be supplied:

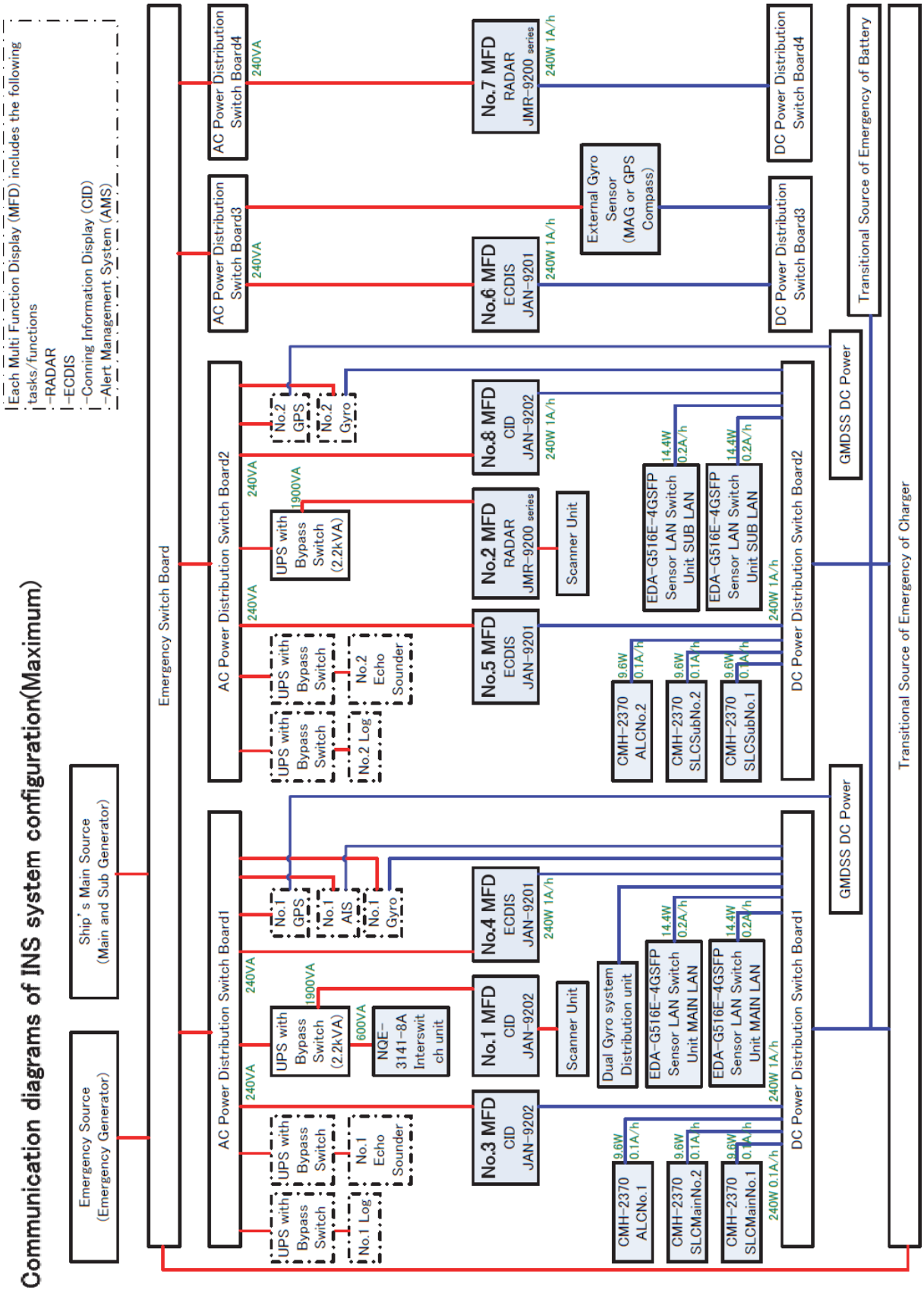
1 from both the main and the emergency source of electrical power with automated changeover through a local distribution board with provision to preclude inadvertent shutdown; and

2 from a transitional source of electrical power for a duration of not less than 45 s.

Example of power supply configuration for minimum system



Example of power supply configuration for maximum system



INS LAN cable conditions

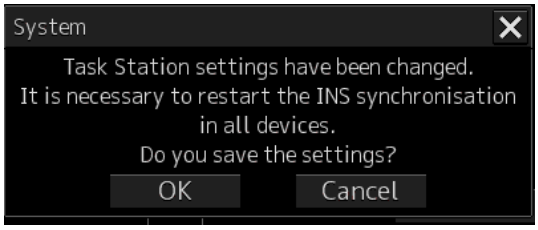
The following table shows the LAN cable conditions for the connection of this system.

LAN cable	Category	Connection type
	Category 5e or higher	Straight

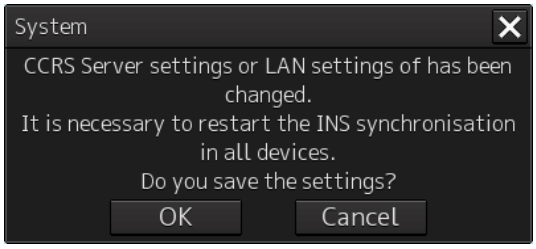
4.59.2 Synchronization of the INS Service Menu [ALL]

If a specific setting of the Service menu is changed during INS linking, it is necessary to restart each device being linked and reconfigure synchronization.
If synchronization stops due to setting change and restart of devices are necessary, the following confirmation dialog appears.

- When tried to change the settings of a task station



- Any of “LAN setting”, “INS linkage enable/disable”, and “CCRS Server setting” is changed in the [System Configuration] - [Redundancy] dialog.



When the [OK] button is clicked on, the changed information is sent to the linked device and a popup message is displayed on the device, promoting restart.

When the [OK] button is enabled after preparation for restart is completed, click on the [OK] button. The device restarts and a task menu is displayed.

Note
If preparation for restart is not completed within 10 seconds after the popup message mentioned above is displayed, the [OK] button is enabled automatically.

4.59.3 Setting CCRP [RADAR] [ECDIS]

Note

In this system, one CCRP must be used. No alternative CCRP can be used.

⚠CAUTION

Set the position of CCRP to the conning position (position of the equipment for steering the vessel). Failure to set the conning position generates an error in the ship speed and position. If the system is used under this condition, accidents such as collision and running around may occur.

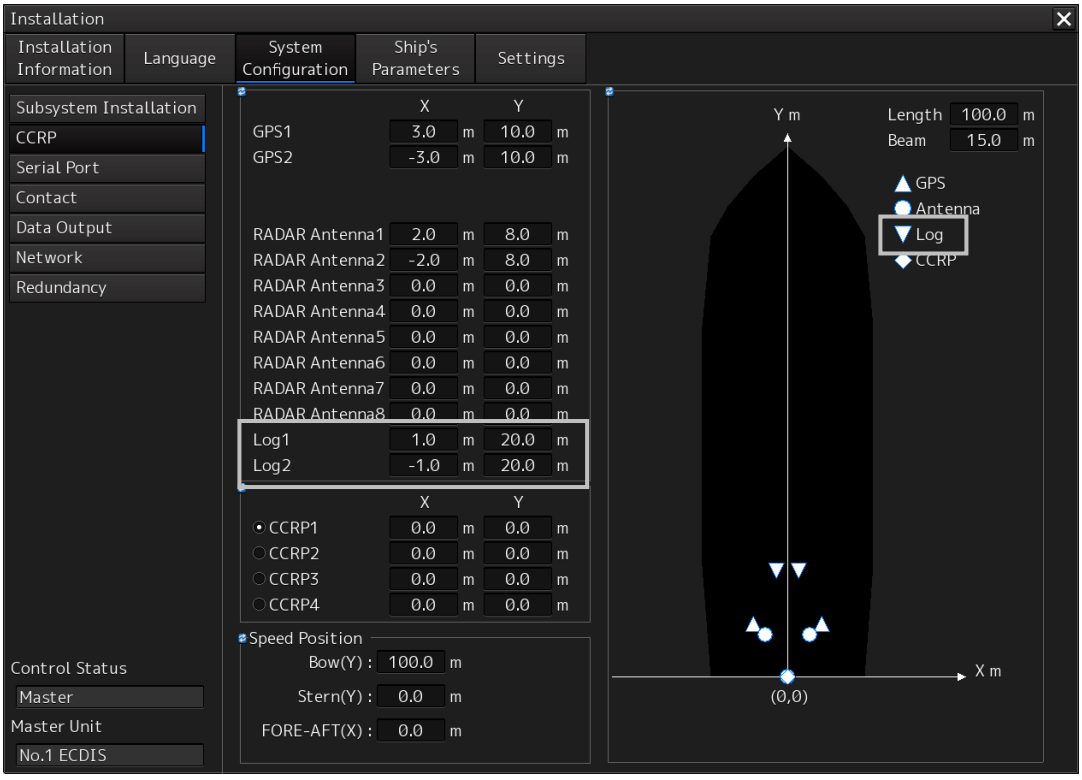
In the INS equipment, the measurement reference position of the equipment that is installed as Log1/Log2 can be set by using the [System Configuration] - [CCRP] dialog.

Displaying the [CCRP] dialog

1 Display the dialog of the Installation submenu.

2 Select [System Configuration] in the 1st classification pane and [CCRP] in the 2nd classification pane.

The [CCRP] dialog is displayed in the editing/result pane.



Setting the measurement reference position of Log1/Log2

Enter the installation position of Log1/Log2 in the box.
X: X axis of Log1/2
Y: Y axis of Log1/2
The values change as follows according to the values of [Length] and [Beam].

Where Length=a and Beam=b
X -b/2 to b/2
Y 0.0 to a

For instance, where Length=1.0 and Beam=1.0
X -0.5 to 0.5
Y 0.0 to 1.0

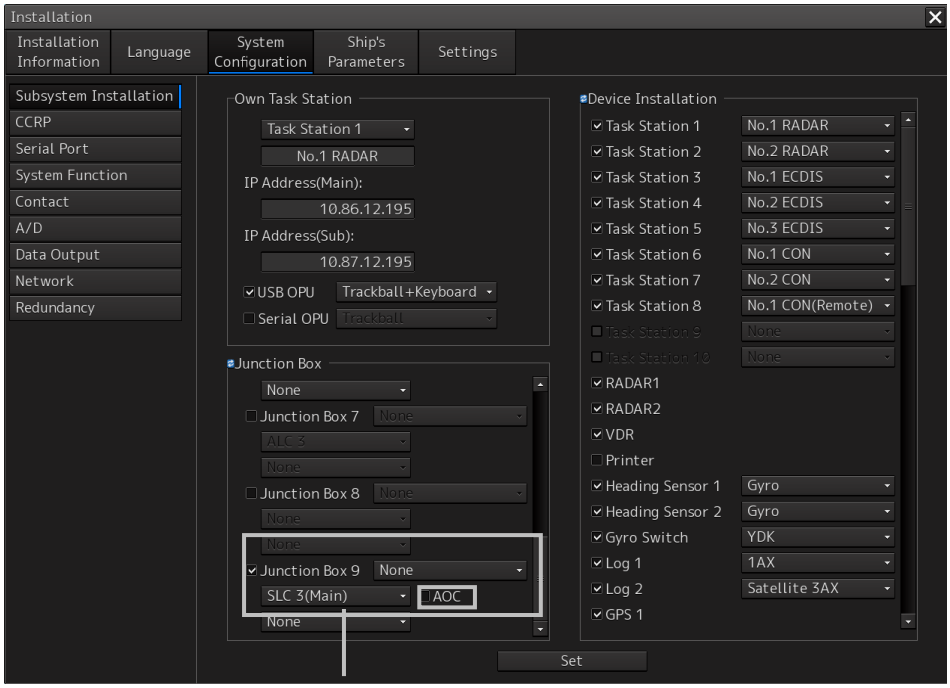
Where Length=700.0 and Beam=70.0
X -35.0 to 35.0
Y 0.0 to 700.0

Note
- Not displayed when “Not installed” is set in the [Subsystem Installation] dialog.
- When the input range is changed as a result of the change of [Length] and [Beam] and a value exceeding the changed input range has already been input, the value is corrected to the maximum value or the minimum value.

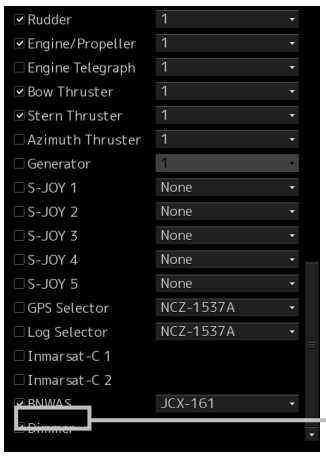
4.59.4 Subsystem Installation [ALL]

On INS devices, the setting content of the [Subsystem Installation] dialog that appears by selecting [System Configuration] changes as follows.

- While in INS linking, if an attempt is made to change the settings of a task station in [Own Task Station] or [Device Installation], a confirmation dialog prompting to restart the linked devices appears. (See "4.56.2 Synchronization of the INS Service Menu.")
- Up to 8 task stations can be set up. (The configuration with the maximum number of devices consists of 8 MFD units and 1 RPS unit.)
- Junction box 9 is added.
- If [SLC(Sub)] is selected as a junction box, it is also possible to select installed or not installed of AOC.
- You can select the dimmer sensor (Dimmer) in [Device Installation].



Junction Box
- Junction Box 9 is added.
- An [AOC] check box also appears when [SLC(Sub)] is selected.



Device Installation
Dimmer is added.

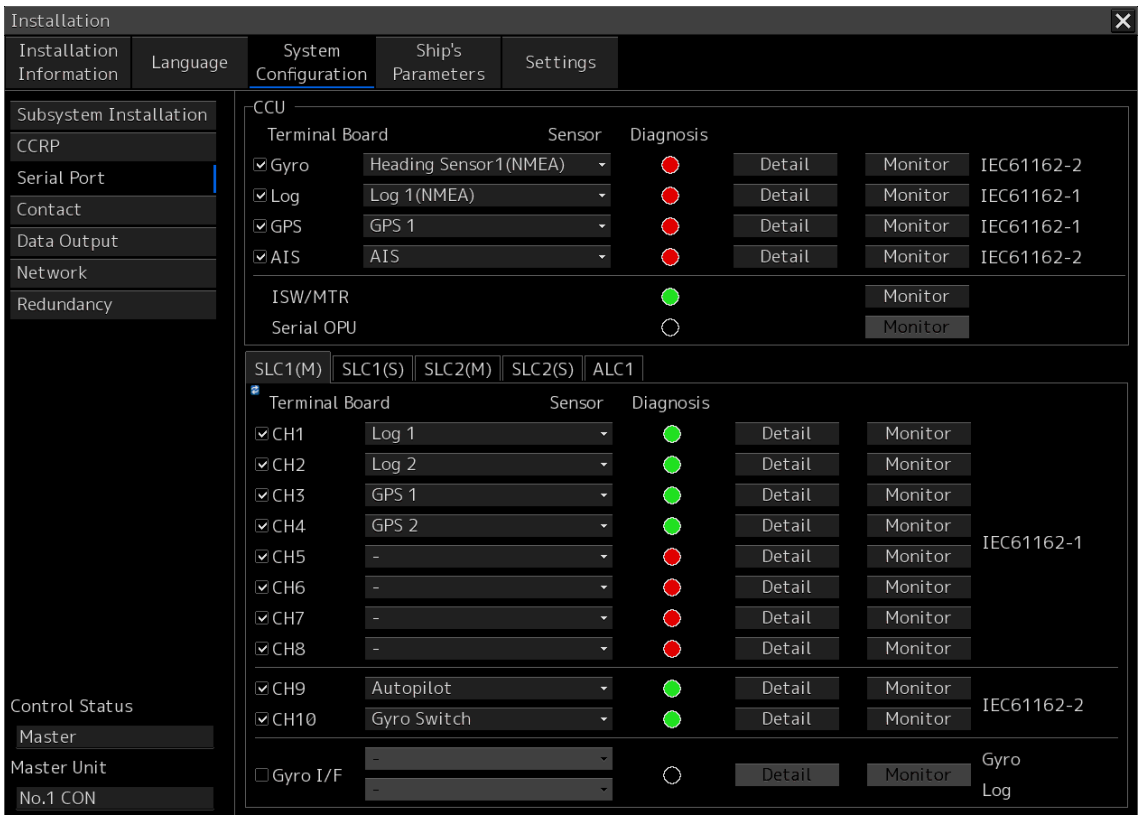
About the Dimmer Sensor

When the [Dimmer] check box is checked in [Device Installation], the dimmer sensor is selected to be installed.
While the devices in the INS are divided into groups and the Day/Night mode is synchronized with the screen brightness among the devices in each group, the setting information on the Day/Night mode and the screen brightness can be transmitted/received between the devices belonging to group A and the dimmer sensor.
When communicating with the devices in group A, select [System Configuration] and display the [Serial Port] dialog. Make the setting of the serial port for the dimmer sensor.

4.59.5 Serial Port Settings [ALL]

On INS devices, the setting content of the [Serial Port] dialog that appears by selecting [System Configuration] changes as follows.

- The illumination colors of the [Diagnosis] lamp have changed.
- The serial port for the dimmer sensor (Dimmer) can be set.
- When the communication statuses of the serial ports on ALC are checked on the [Line Monitor] tab of the [Monitor] dialog, you can select the communication line to be monitored (main or sub line).
- The alert handling setting of the [Detail] dialog has been changed.



Illumination colors of the [Diagnosis] lamp

The diagnostic result on whether or not the sentence from the sensor assigned to each serial port can be received as well as the statuses of the ISW/MTR and serial OPU are displayed.

- **Illuminated in red:** Data not received yet. Or when data that cannot be recognized as a sentence is received (when data is received with a wrong baud rate or reversed polarity).
- **Illuminated in green:** During data reception (including the case of checksum abnormality).
- **Illuminated in yellow:** During diagnostics (before judgment).
- **Colorless:** The serial port is disabled.

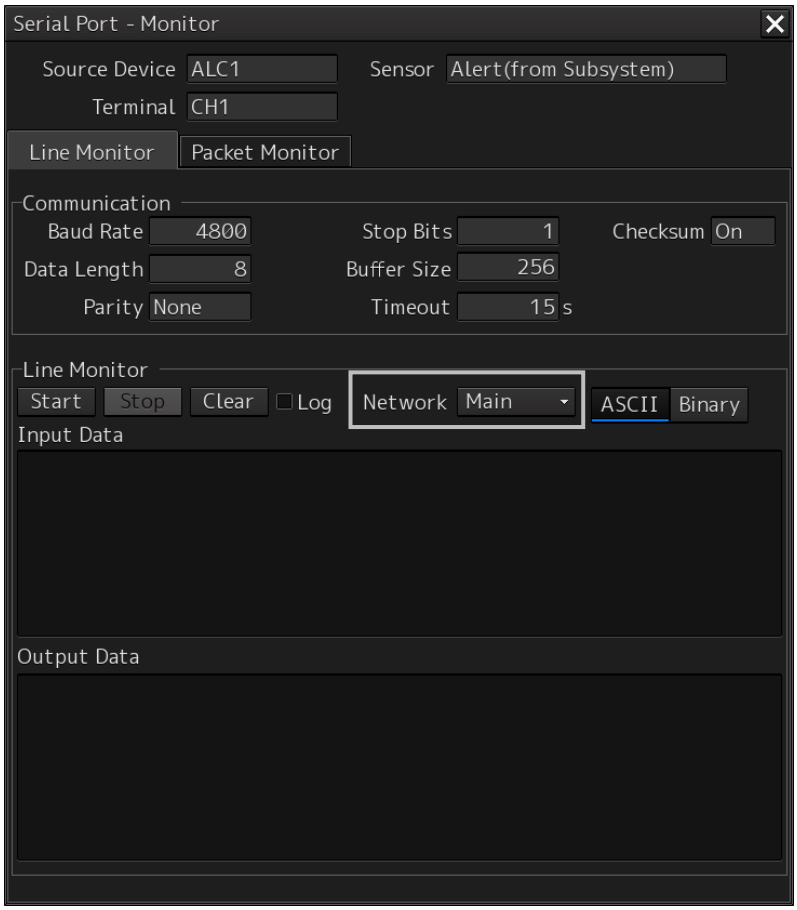
Settings of serial ports for the dimmer sensor (Dimmer)

Display the [Detail] dialog of the serial port to which the dimmer sensor has been assigned and set up that serial port.
The settings at the time of shipment are as shown below.

Sensor Name	Baud Rate	Data Length	Parity	Stop Bits	Buffer Size	Time Out	Checksum
Dimmer	4,800	8	None	1	256	15	On

Selection of the communication line to be monitored

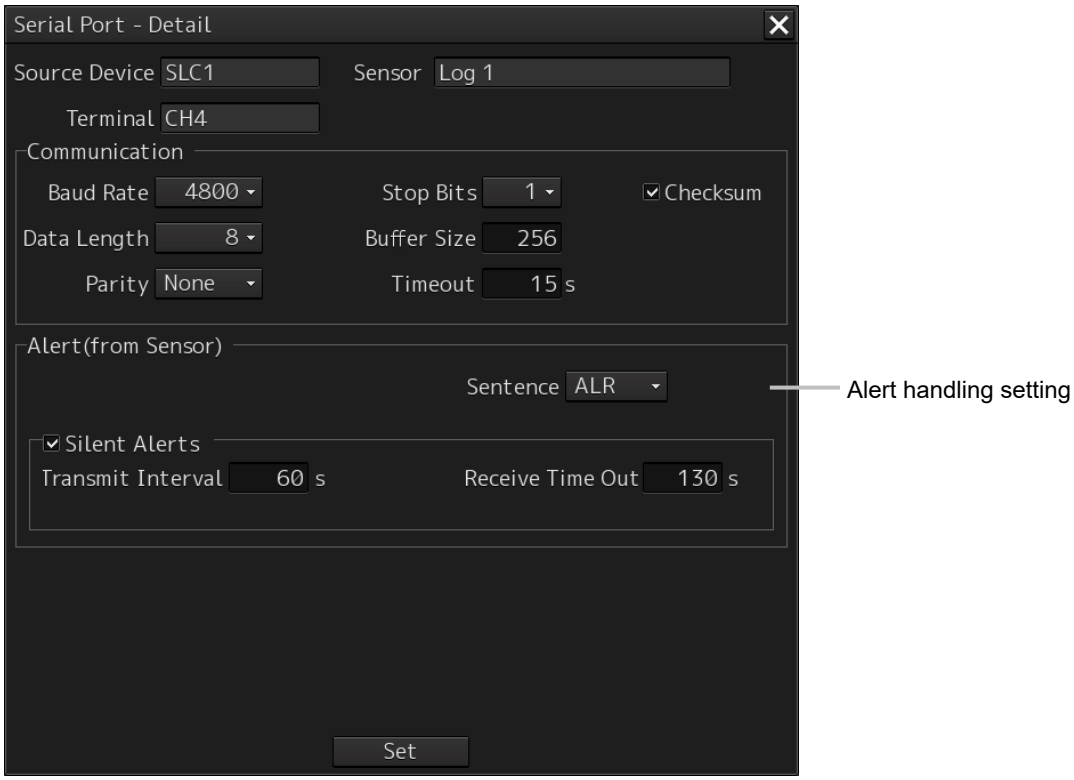
When checking the communication statuses of the serial ports on ALC, you can select the communication line to be monitored (main or sub line) in the [Monitor] dialog.



[Line Monitor] Tab of the [Monitor] Dialog (in the Case of ALC)

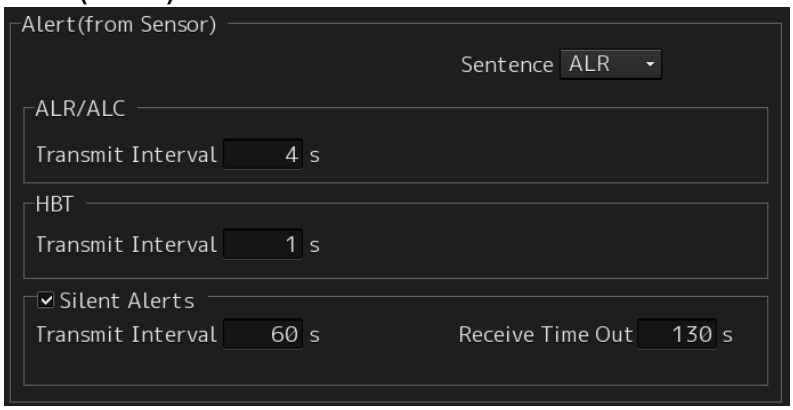
In the [Network] combo box, select [Main] or [Sub].

Setting alert handling of the [Detail] dialog

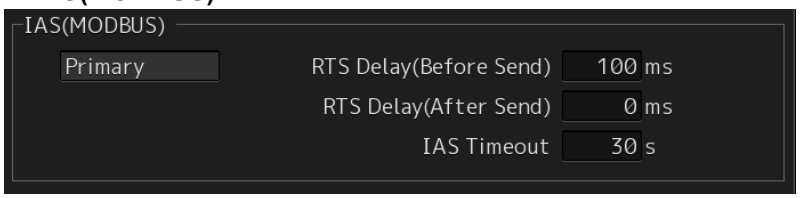


The contents of the alert handling setting of the [Detail] dialog changes according to the setting of the combo box as follows.

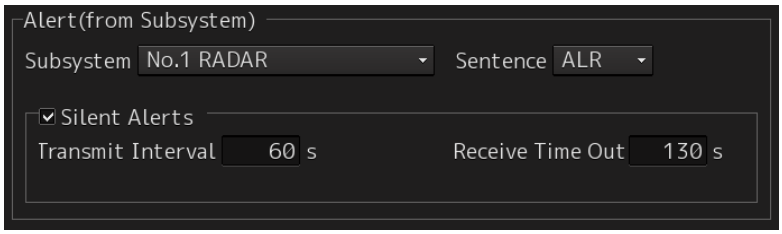
- **IAS(NMEA)**



- **IAS(MODBUS)**



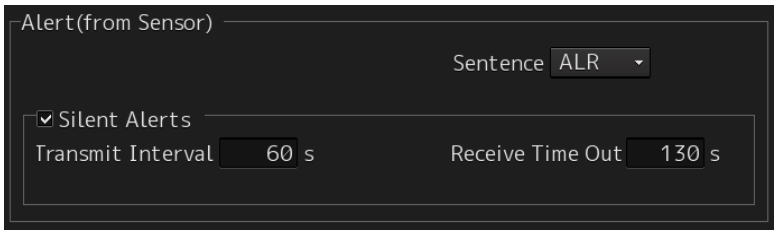
- **Alert(from Subsystem)**



- **Alert(to BNWAS)**



- **Other sensors**



The table below shows the setting items and setting values.

Setting item	Setting operation	Target alert
Access Source	Displayed only when "Alert(to BNWAS)" is selected for the sensor. Select the equipment that communicates with BNWAS. Setting for MFD: For MFD, be sure to select AMS because alert output from AMS is required. Setting for other than MFD: Select either TCS or AMS.	AMS/TCS
Silent Alerts	When transmitting “empty alarm acknowledge message” to the main AMS equipment from the communication target sensor, check the [Silent Alerts] check box. **Checking the [Silent Alerts] check box** • Set a transmit interval (alert transmission cycle) within the range from 1 to 60 seconds (60 seconds at the factory setting). • Set a Receive Time Out within the range from 1 to 130 seconds (130 seconds at the factory setting). When “empty alarm acknowledge message” cannot be received within the reception timeout time, transmission of “empty alarm acknowledge message” is stopped, transmission of all the alert sentences from the target sensor stops. When “empty acknowledgement message” is received, transmission of alert sentence restarts.	Except for Dimmer, DSC, NAV, Alert, S-JOY1 to S-JOY5, S-J I/O*1 Unit + S-JOY1 to S-JOY5, Joystick I/O Unit, and IAS (MODBUS)

*1: S-J I/O stands for S-JOY I/O.

4.59.6 System function Settings [ALL]

On INS devices, there is need to set the following system function.
- ECDIS, TCS, RADAR, CONNING, AMS and INS system function for each task station.
- System function for CCRS server
- System function for Scanner group

Setting up of ECDIS, TCS, RADAR, CONNING, AMS and INS system function for each task station.
Add a system function referring to 4.7 System Function [ALL].
Talker ID for multiple functions will be registered as follows.

Equipment	Talker ID					
	ECDIS	TCS	RADAR	CONNING	AMS	INS
No.1 ECDIS	EI0001 (Primary function)	TC0011	RA0011	II0011	CA0011	IN0011
No.2 ECDIS	EI0002 (Primary function)	TC0012	RA0012	II0012	CA0012	IN0012
No.3 ECDIS	EI0003 (Primary function)	TC0013	RA0013	II0013	CA0013	IN0013
No.4 ECDIS	EI0004 (Primary function)	TC0014	RA0014	II0014	CA0014	IN0014
No.1 RPS	EI0005	-	-	-	-	-
No.2 RPS	EI0006	-	-	-	-	-
No.1 RADAR	EI0021	TC0021	RA0001 (Primary function)	II0021	CA0021	IN0021
No.2 RADAR	EI0022	TC0022	RA0002 (Primary function)	II0022	CA0022	IN0022
No.3 RADAR	EI0023	TC0023	RA0003 (Primary function)	II0023	CA0023	IN0023
No.4 RADAR	EI0024	TC0024	RA0004 (Primary function)	II0024	CA0024	IN0024
No.5 RADAR	EI0025	TC0025	RA0005 (Primary function)	II0025	CA0025	IN0025
No.6 RADAR	EI0026	TC0026	RA0006 (Primary function)	II0026	CA0026	IN0026
No.7 RADAR	EI0027	TC0027	RA0007 (Primary function)	II0027	CA0027	IN0027
No.8 RADAR	EI0028	TC0028	RA0008 (Primary function)	II0028	CA0028	IN0028
No.1 CONNING	EI0031	TC0031	RA0031	II0001 (Primary function)	CA0031	IN0031
No.2 CONNING	EI0032	TC0032	RA0032	II0002 (Primary function)	CA0032	IN0032

Equipment	Talker ID					
	ECDIS	TCS	RADAR	CONNING	AMS	INS
No.1 CONNING(Wing)	EI0033	TC0033	RA0033	II0003 (Primary function)	CA0033	IN0033
No.2 CONNING(Wing)	EI0034	TC0034	RA0034	II0004 (Primary function)	CA0034	IN0034
No.1 CONNING(Remote)	EI0035	TC0035	RA0035	II0005 (Primary function)	CA0035	IN0035
No.2 CONNING(Remote)	EI0036	TC0036	RA0036	II0006 (Primary function)	CA0036	IN0036

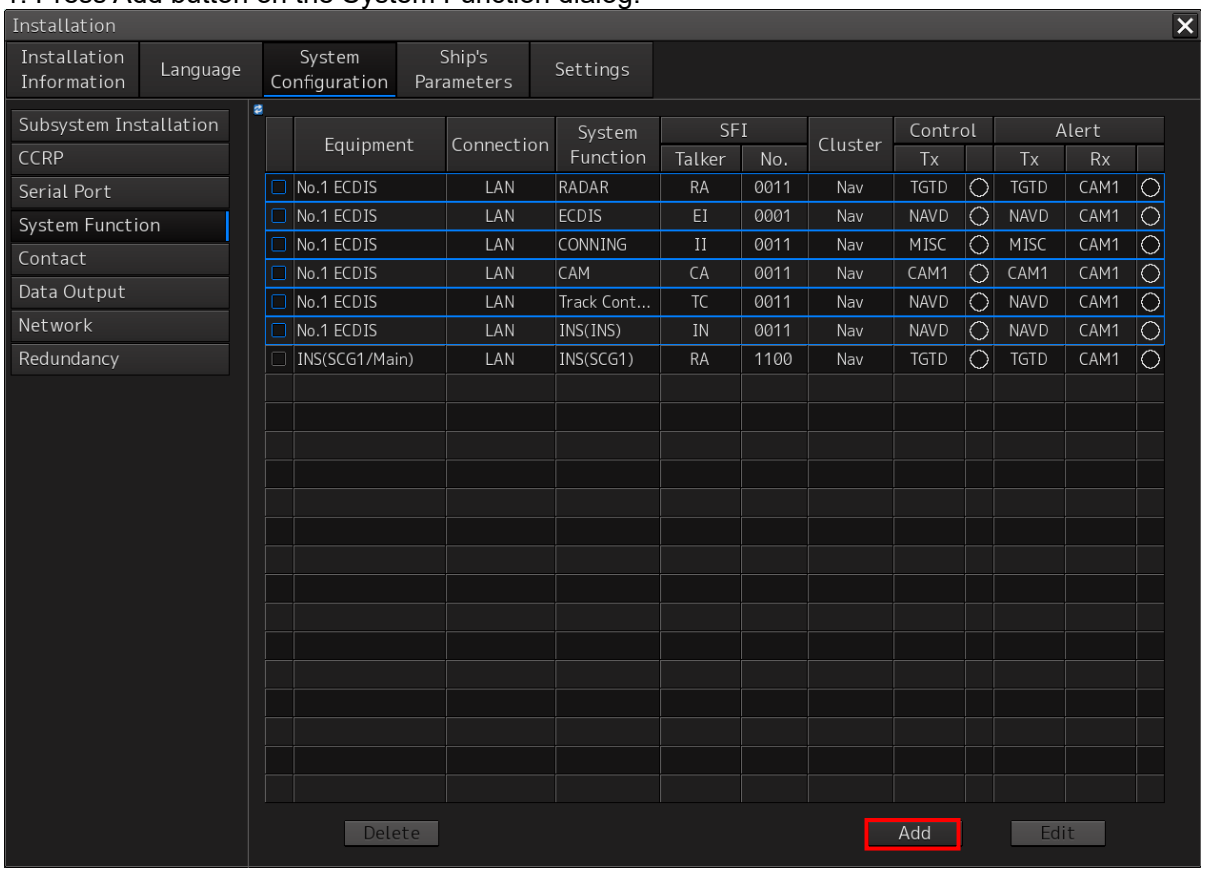
Setting up of system function for CCRS server

Add a system function for CCRS server as follows.

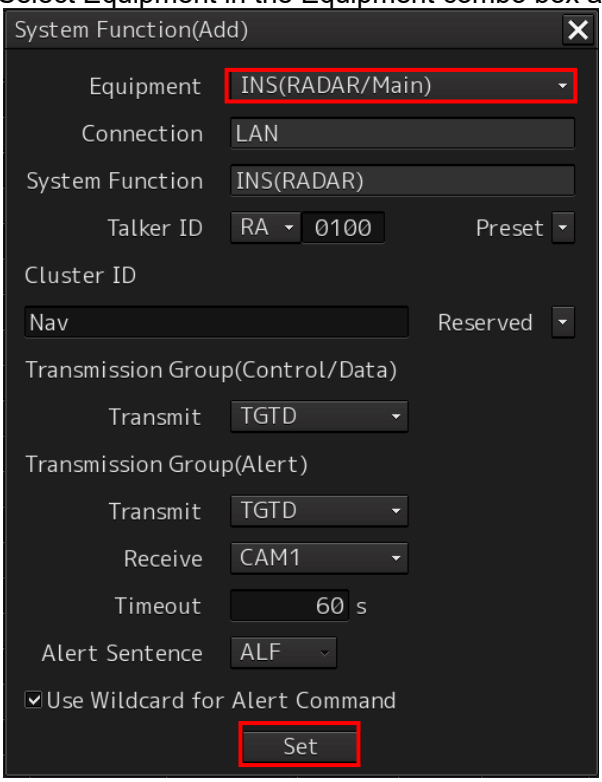
Repeat steps 1 and 2 until all of the following Equipment has been added.

Equipment
INS(RADAR/Main)
INS(ECDIS/Main)
INS(CONNING/Main)
INS(AMS/Main)
INS(TCS/Main)
INS(INS/Main)
INS(RADAR/Sub)
INS(ECDIS/Sub)
INS(CONNING/Sub)
INS(AMS/Sub)
INS(TCS/Sub)
INS(INS/Sub)

1. Press Add button on the System Function dialog.



2. Select Equipment in the Equipment combo box and press the Set button.



Talker ID for CCRS server will be registered as follows.

CCRS Server	Talker ID					
	INS(RADAR)	INS(ECDIS)	INS(CONNING)	INS(AMS)	INS(TCS)	INS(INS)
Main	RA0100	EI0100	II0100	CA0100	TC0100	IN0100
Sub	RA0200	EI0200	II0200	CA0200	TC0200	IN0200

Setting up of system function for Scanner group

Add system functions for the number of Main (Master) or Sub (Slave) of the scanner group (Antenna number) that exist in the INS system referring to step 1 to 2 for Setting up of system function for CCRS server.

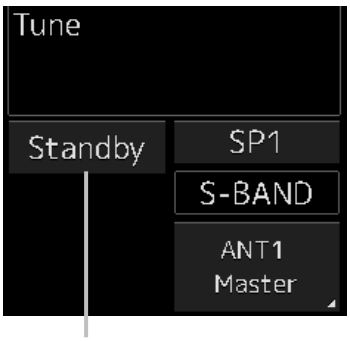
Scanner group	Main/Sub	Equipment
Group 1	Main	INS(SCG1/Main)
	Sub	INS(SCG1/Sub)
Group 2	Main	INS(SCG2/Main)
	Sub	INS(SCG2/Sub)
Group 3	Main	INS(SCG3/Main)
	Sub	INS(SCG3/Sub)
Group 4	Main	INS(SCG4/Main)
	Sub	INS(SCG4/Sub)
Group 5	Main	INS(SCG5/Main)
	Sub	INS(SCG5/Sub)
Group 6	Main	INS(SCG6/Main)
	Sub	INS(SCG6/Sub)
Group 7	Main	INS(SCG7/Main)
	Sub	INS(SCG7/Sub)
Group 8	Main	INS(SCG8/Main)
	Sub	INS(SCG8/Sub)

Confirmation of the Main (Master) and Sub (Slave) of the scanner group (Antenna No) that exists in the INS system

1 In the transmission state, click on the Standby/Transmission change button.

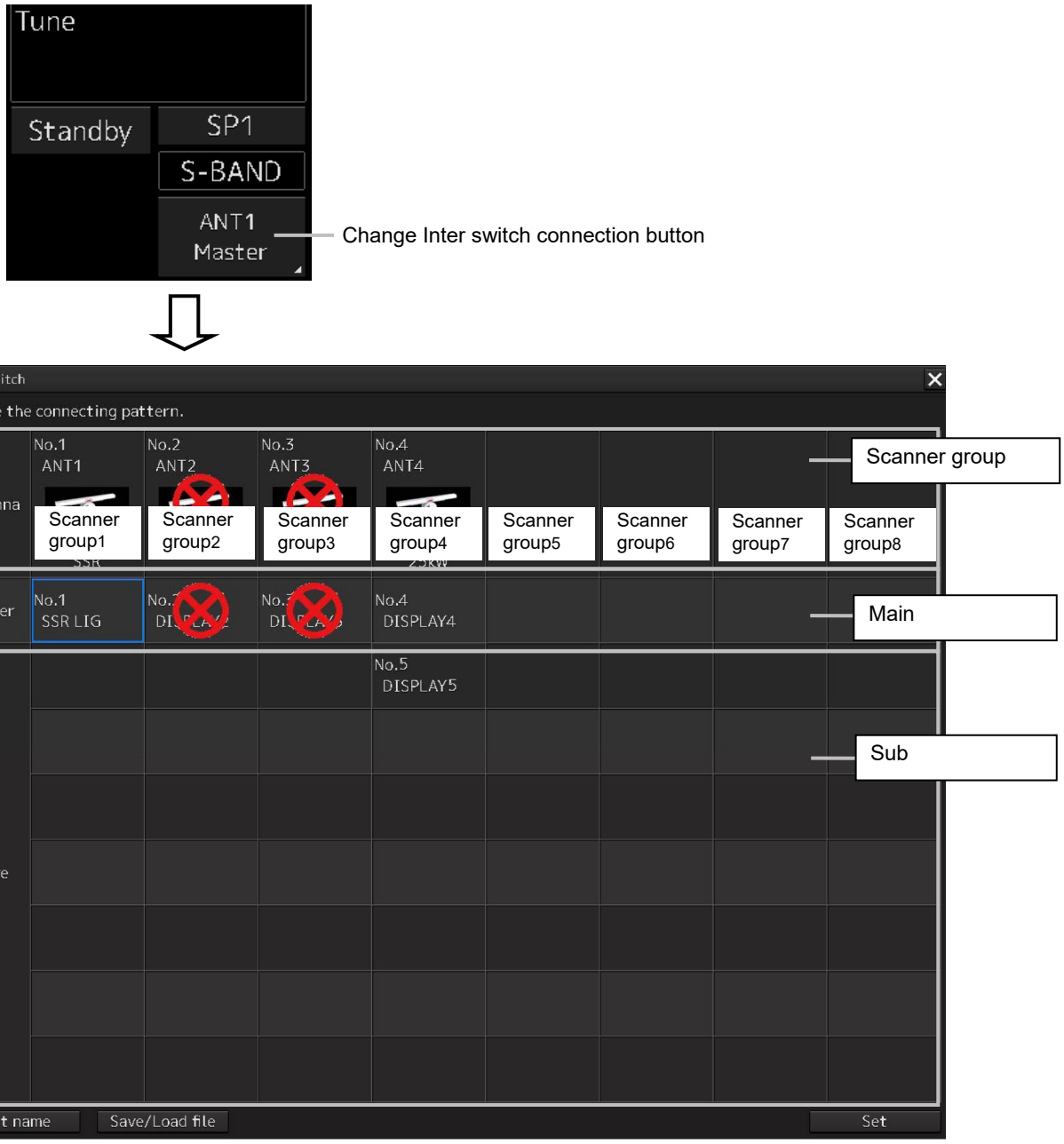
"Standby" is displayed on the button and the equipment is set to Transmission Not Ready state.

If the equipment is already in the Transmission Not Ready state, this operation is not required.



Standby/Transmit changeover button

2 Click the Change Inter switch connection button.



In this figure, scanner group 1 and scanner group 4 are connected. Set the Main and Sub system functions for scanner group 1 and scanner group 4 as follows.

Scanner group	Main/Sub	Equipment
Group 1	Main	INS(SCG1/Main)
	Sub	INS(SCG1/Sub)
Group 4	Main	INS(SCG4/Main)
	Sub	INS(SCG4/Sub)

Talker ID for Scanner group will be registered as follows.

Scanner group	Talker ID	
	INS(SCG/Main)	INS(SCG/Sub)
Group 1	RA1100	RA1200
Group 2	RA2100	RA2200
Group 3	RA3100	RA3200
Group 4	RA4100	RA4200
Group 5	RA5100	RA5200
Group 6	RA6100	RA6200
Group 7	RA7100	RA7200
Group 8	RA8100	RA8200

Note:
- On INS devices, TCS system functions are not automatically registered because there is no redundancy setting in the [Redundancy] dialog. Make sure to add a system function in the [System Function] dialog.
- All CCRS server system functions need to be registered.
- Scanner group system functions need to be registered that the number of Main or Sub task stations of the scanner group that exist in the INS system.

4.59.7 A/D Settings [ALL]

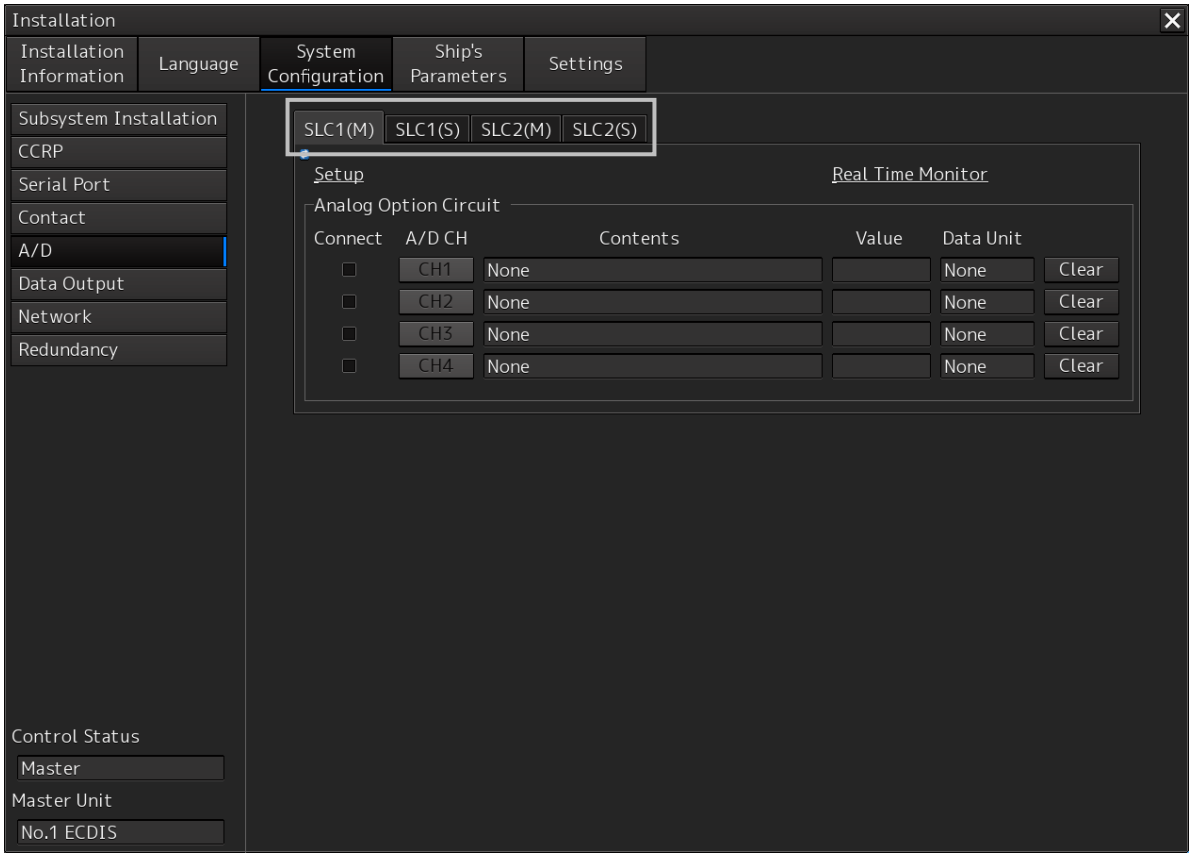
When the SLC is configured with two lines of the main and sub lines, the settings about the analog option circuit (AOC) to be installed in each of the two lines are displayed. The tab name displays on the [A/D] dialog and the channel settings detail dialog that appear when [System Configuration] is selected change as shown below.

Display location	For one SLC line	For two SLC lines
[A/D] dialog	SLC1 to SLC4	SLC1(M), SLC2(M), SLC3(M), SLC4(M), SLC1(S), SLC2(S), SLC3(S), SLC4(S)
Channel setting detail dialog	SLC1 to SLC4	SLC1(Main), SLC2(Main), SLC3(Main), SLC4(Main), SLC1(Sub), SLC2(Sub), SLC3(Sub), SLC4(Sub)

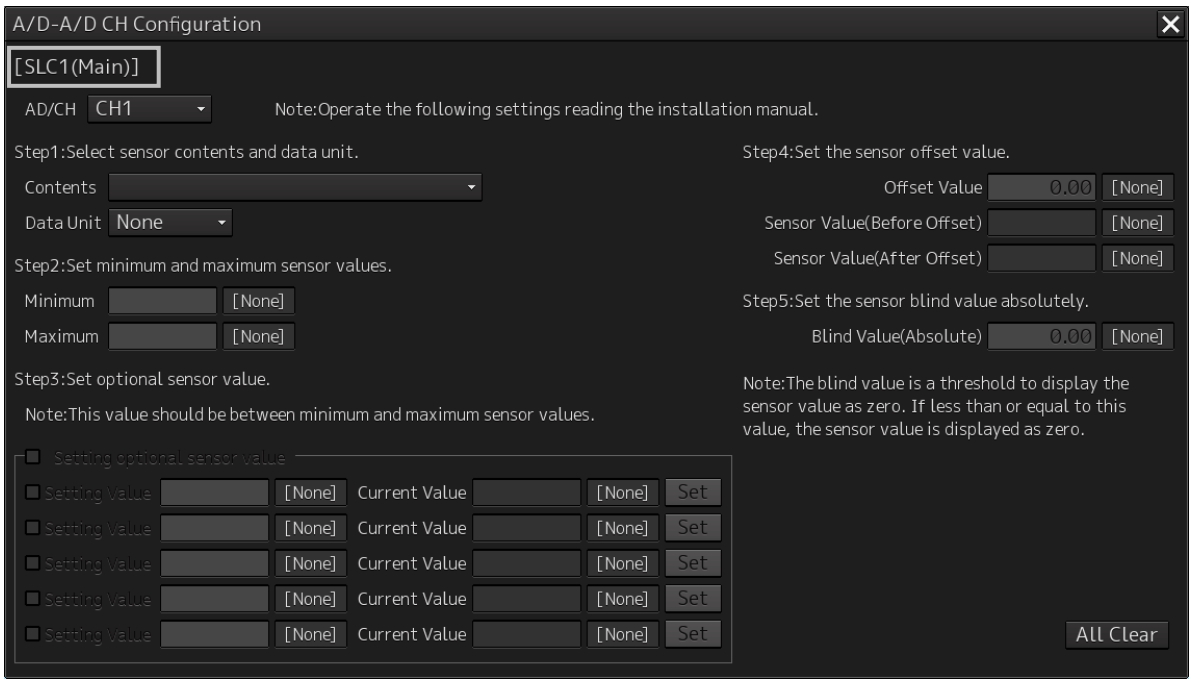
Note

On INS devices, when the SLC consists of two lines of the main and sub lines, whether the AOC is installed or not can be set even if the SLC of the sub line is selected.

When setting the AOC that is installed in the SLC device in the sub line in the [A/D] dialog, if any of [SLC1 (Sub)] to [SLC4 (Sub)] is selected for installation in [Junction Box] in the [Subsystem Installation] dialog that is displayed by selecting [System Configuration], be sure to check the [AOC] check box for the corresponding SLC device. None of the SLCs whose [AOC] check box of the SLC device is not checked is displayed in the [A/D] dialog even if AOC is connected to the SLC device.



[A/D] Dialog

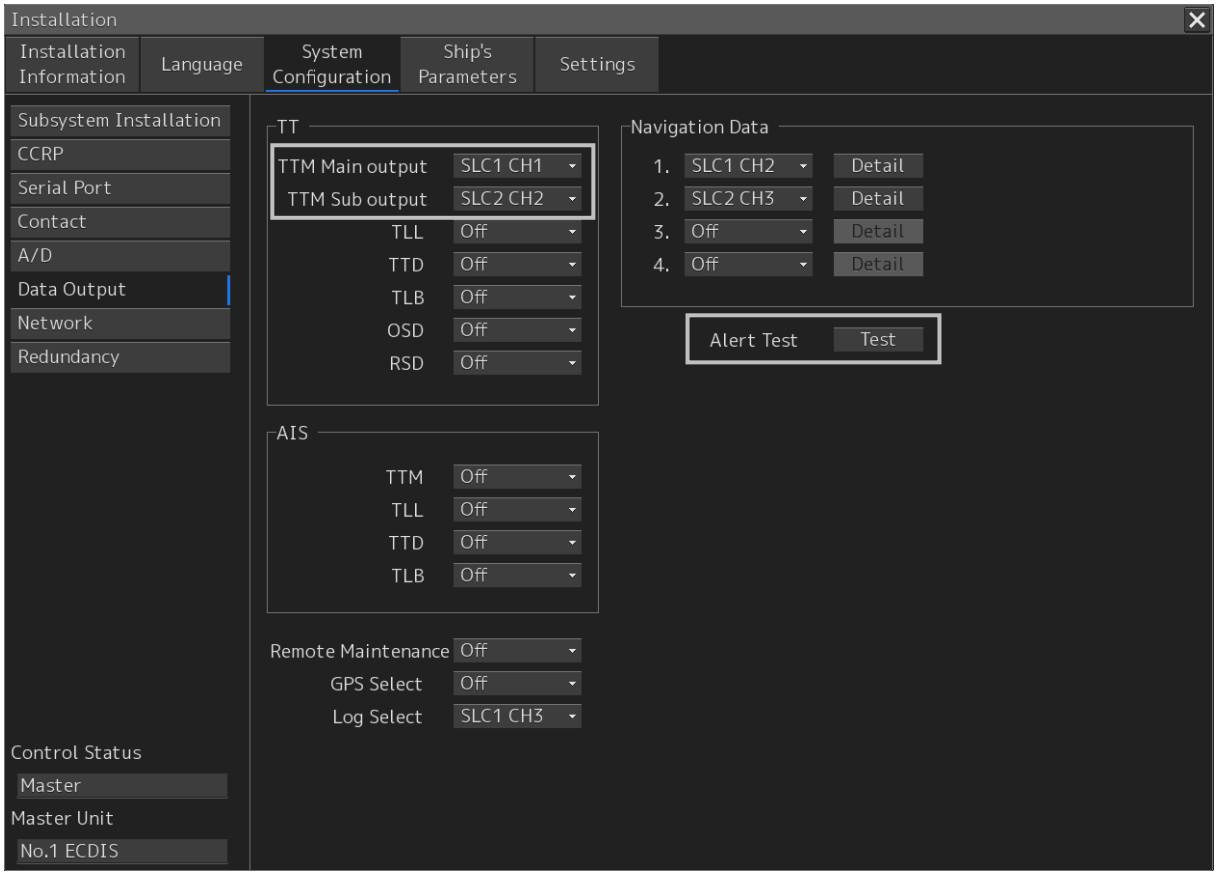


Channel Settings Detail Dialog

4.59.8 Data Output Settings [RADAR][ECDIS]

On INS devices, the setting content of the [Data Output] dialog that appears by selecting [System Configuration] changes as shown below.

- The channel to output TTM sentences can be selected separately for the main and sub lines.
- Alert output test can be executed.



To select the TTM sentence output channel

Select the main output channel in the [TTM Main output] combo box and the sub output channel in the [TTM Sub output] combo box.

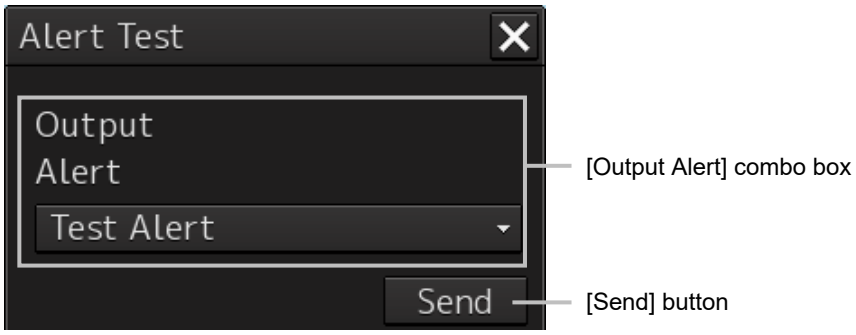
Setting values (common to main and sub):

- Off (setting at the time of shipment)
- SLC1 to 4, CH1 to CH8
- ALC1 to 4, CH1 to CH8
- LAN

To execute alert output test

1 Click on the [Test] button.

The [Alert Test] dialog appears.



2 Select the alert for performing output test in the [Output Alert] combo box.

For the types of alerts that can be selected, see "Alerts allowing test output".

3 Click on the [Send] button.

The alert you selected is output as a test.

Alerts allowing test output

Alerts that can be output from each INS device for testing are shown in the table below.

Alert	License held by MFD[*1]			Description of Alert			
	RADAR	ECDIS	Conning/ AMS	Priority	Category	BNWAS transfer	Remarks
Test Alert	Can be output	Can be output	Can be output	Warning	B	-	IEC 61924-2/8.8.2 Testing of alerts ALF,,999
POSN(Sensor Failure)	-	Can be output	-	Alarm	B	Supported	
POSN(Deviation)	-	Can be output	-	Warning	B	-	
HDG(Sensor Failure)	-	Can be output	-	Alarm	B	Supported	
STW(Sensor Failure)	-	Can be output	-	Warning	B	-	
Lost AP	-	Can be output	-	Caution	B	-	
System Failure	-	Can be output	-	Warning	B	-	Data Disk1 Fail
Arrived at WPT	-	Can be output	-	Warning	A	-	Arrived at WPT
Actual Course Change	-	Can be output	-	Alarm	A	Supported	
Course Difference	-	Can be output	-	Warning	A	-	
Cross Track (Dev EX)	-	Can be output	-	Alarm	A	Supported	

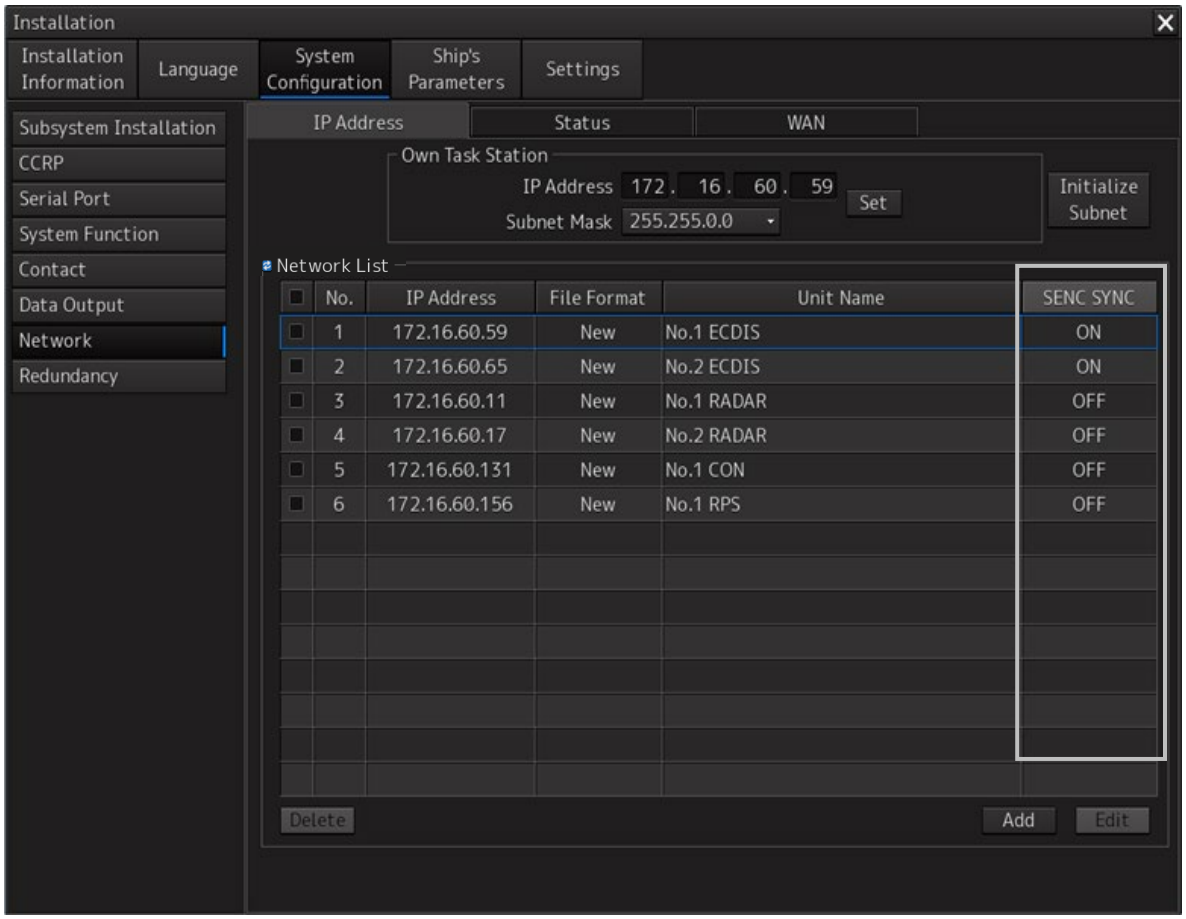
Alert	License held by MFD*1			Description of Alert			
	RADAR	ECDIS	Conning/ AMS	Priority	Category	BNWAS transfer	Remarks
Arrived at LAST WPT	-	Can be output	-	Alarm	A	Supported	
Track Control Stopped	-	Can be output	-	Alarm	B	Supported	
Crossing Safety Contour	-	Can be output	-	Alarm	A	Supported	
Caution Area	-	Can be output	-	Warning	A	-	Crossing caution area
Dangerous Symbol	-	Can be output	-	Warning	A	-	Crossing a danger (obstruction)
CPA/TCPA(AIS)	Can be output	Can be output	-	Alarm	A	Supported	Multiple output of CPA/TCPA (AIS) can be performed.
New TT#n Target	Can be output	-	-	Warning	A	-	New Target (TT)
Lost AIS Target	Can be output	-	-	Warning	A	-	Lost (AIS)
AIS 95% Capacity	Can be output	-	-	Caution	B	-	AIS 95% Capacity
AC Power Failure	Can be output	Can be output	-	Warning	B	-	Power (AC Low Voltage)

*1: The alert that can be output for testing varies depending on the presence/absence of the license held by MFD. All the MFDs that configure INS have the RADAR/ECDIS/Conning/AMS licenses. Therefore, all the alerts in the above table can be output for testing.

4.59.9 Network Settings [ALL]

On INS devices, the setting content of the [Network] dialog that appears by selecting [System Configuration] as well as operation changes as shown below.

- While in INS linking, if an attempt is made to change the IP address of [Own Task Station], a confirmation dialog prompting to restart the linked devices appears. (See "4.56.2 Synchronization of the INS Service Menu".)
- Up to 10 devices can be set up as the targets of chart synchronization (SENC SYNC).
- No.1 ECDIS to No.4 ECDIS are automatically subjected to chart synchronization.
- When newly registering or changing device information, preset values can be entered.



To check the devices currently subjected to chart synchronization

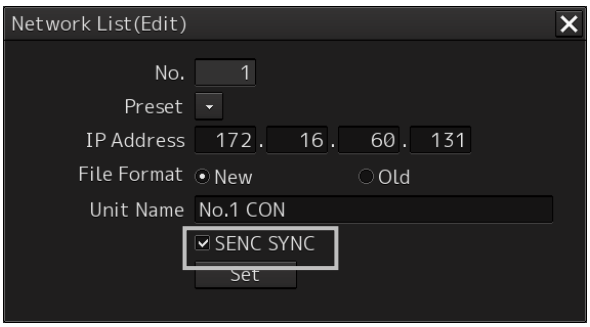
For devices subjected to synchronization, [ON] appears in the [SENC SYNC] column of [Network List]. For devices not subjected to synchronization, [OFF] appears in the [SENC SYNC] column of [Network List].

To change the devices subjected to chart synchronization

1 **In [Network List], check the check boxes on the rows of the devices you want to set up as or exclude from targets of synchronization.**

2 **Click on the [Edit] button**

The [Network List (Edit)] dialog appears.



3 **Check the [SENC SYNC] check box for the device you want to set up as a target of synchronization. Uncheck the [SENC SYNC] check box for the device you want to exclude from a target of synchronization.**

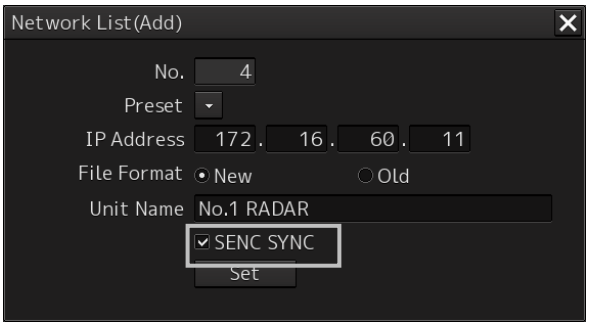
4 **Click on the [Set] button**

The [Network List (Edit)] dialog closes and the ON/OFF display on the [SENC SYNC] column changes according to the operation in step 3.

To select whether or not to synchronize charts when newly registering device information

1 **Click on the [Add] button.**

The [Network List (Add)] dialog appears.



2 **Specify the IP address, file format and unit name.**

It is also possible to enter preset values. For details, see "To enter preset values" (page 4-250).

Note

When any of No.1 ECDIS to No.4 ECDIS is specified as the unit name, the [SENC SYNC] check box is automatically checked.

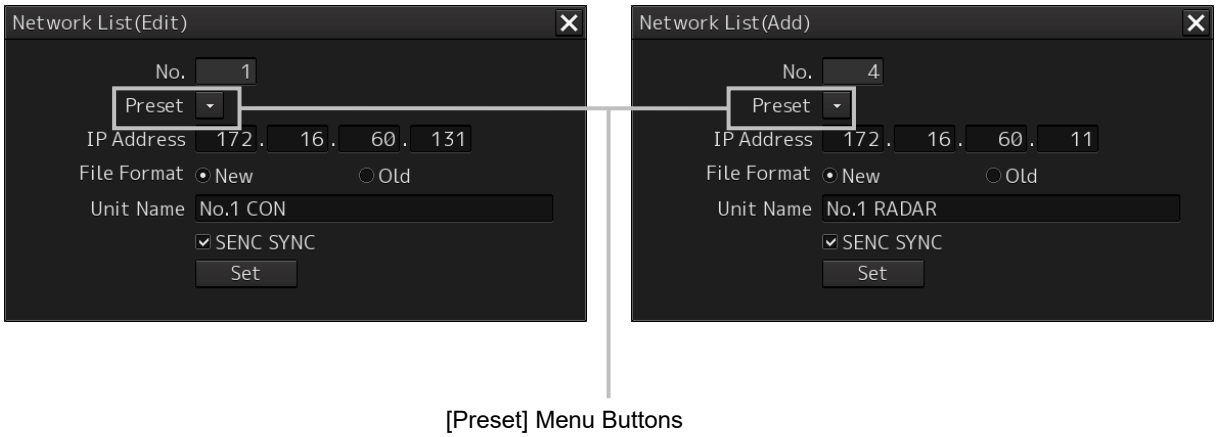
3 Check the [SENC SYNC] check box for the device you want to set up as a target of synchronization. Uncheck the [SENC SYNC] check box for the device you want to exclude from a target of synchronization.

4 Click on the [Set] button

The [Network List (Add)] dialog closes and the device information appears in [Network List]. According to the operation in step 3, either [ON] or [OFF] appears in the [SENC SYNC] column.

To enter preset values

In either the [Network List (Edit)] dialog or the [Network List (Add)] dialog, preset values can be entered when specifying the IP address, file format and unit name.



1 Using the [Preset] menu, select a unit name.

The unit name you select appears in the [Unit Name] input box.

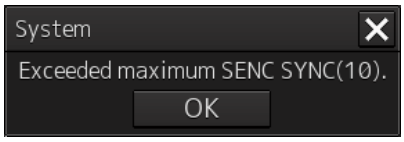
The IP address preset for the unit name you select is automatically entered in the [IP Address] input box.

According to the file format preset for the unit name you select, either [New] or [Old] is automatically selected in [File Format].

> **Note**
> When any of No.1 ECDIS to No.4 ECDIS is specified as the unit name, the [SENC SYNC] check box is automatically checked.

When 10 units are already set up as chart synchronization target units

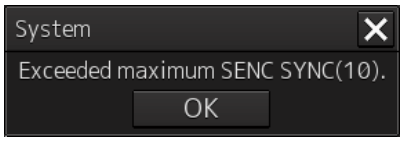
When you try to add another synchronization target device, an error message appears when the [Set] button is clicked in either the [Network List (Edit)] dialog or the [Network List (Add)] dialog.



Click on the [OK] button or the [X] button to close the dialog.
Remove one device so that the total chart synchronization target devices do not exceed 10 units.

When the own task station is any one of No.1 ECDIS to No.4 ECDIS

Each time the IP address is changed, the own task station is automatically set up as a chart synchronization target device. ([ON] appears in the [SENC SYNC] column of [Network List].)
However, if there are already 10 chart synchronization target devices, the following error message will appear and the own task station will not be subjected to chart synchronization. ([OFF] appears in the [SENC SYNC] column of [Network List].)



Click on the [OK] button or the [X] button to close the dialog.
Remove any one of the devices from chart synchronization target and set up the own task station as a chart synchronization target device.

Note
Ocean Explorer INS firmware does not supports C-Map.

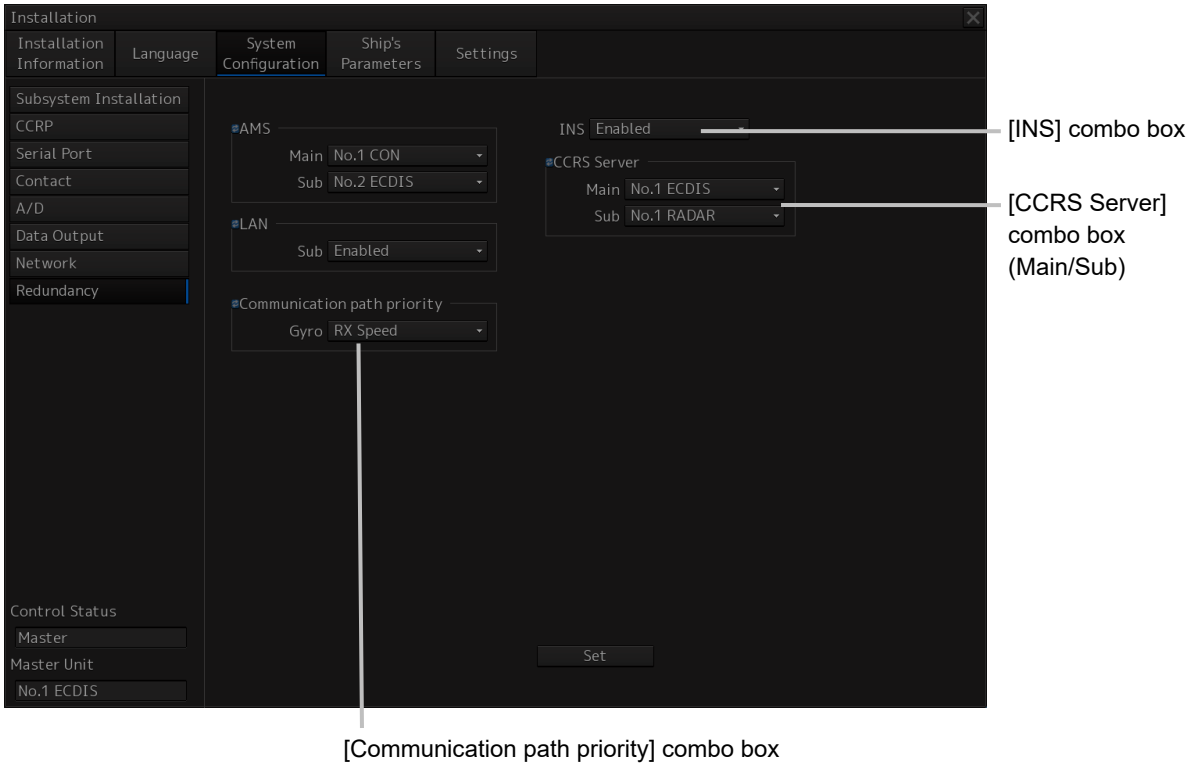
4.59.10 Redundancy Settings [ALL]

On INS devices, the setting content of the [Redundancy] dialog that appears by selecting [System Configuration] changes as shown below.

- While in INS linking, if an attempt is made to change any settings of [LAN], [INS] and [CCRS Server], a confirmation dialog prompting to restart the linked devices appears. (See "4.56.2 Synchronization of the INS Service Menu.")
- It is not possible to set up the ECDIS (TCS main unit) which performs auto sailing and the ECDIS (TCS sub unit) which backs up auto sailing.
- The priority of the path to receive the gyro sensor can be set.
- Whether to enable or disable INS linking can be set.
- The devices that function as the servers (main/sub) can be selected.

Note

- If Control Status in equipment setup change is Slave, LAN setting cannot be changed.
- As for equipment for which Control Status in equipment setup change is set to Slave, even if the Communication path priority is changed, when the equipment is restarted, the setting of the equipment with Control Status set to Master supersedes the changed path priority.



To set the priority of the path to receive the gyro sensor

Set the [Communication path priority] combo box to any one of the following:

- LAN: Priority gets higher in the order of Main LAN > Sub LAN (in duplex configuration) > CCU.
- CCU: Priority gets higher in the order of CCU > Main LAN > Sub LAN (in duplex configuration).
- RX Speed: The path with a shorter report interval is automatically selected.

The setting at the time of shipment is [RX Speed].

To make the enable/disable setting for INS linking

To enable INS linking, set the [INS] combo box to [Enabled].
To disable INS linking, set the [INS] combo box to [Disabled].
All MFDs in the system are required to be set [Enable]. At the time of shipment, [Disabled] is set.

Note
It is not possible to make the enable/disable setting for INS linking for devices without INS license.

To set up the main server and the sub server

When INS linking is enabled, you can select the devices that function as the servers (main/sub).
Set the [Main] combo box and the [Sub] combo box in [CCRS Server] to any one of the following:

- No.1 RADAR to No.4 RADAR
- No.1 ECDIS to No.4 ECDIS
- No.1 CON to No.2 CON

At the time of shipment, No. 1 CON is set as the main server, and No. 2 RADAR as the sub server.

Notes
- It is not possible to set up the main server and the sub server for devices without INS license.
- It is not possible to set up the main server and the sub server if INS linking is disabled.
- It is not possible to set up both the main server and the sub server for the same device.

About Transfer of TCS Right

In the INS, the TCS main device and the TCS sub device are not fixed as dedicated units. All devices with TCS license can have TCS right. The device that has started auto sailing will have TCS right (TCS main device) and all other devices with TCS license will be TCS sub devices.

Note
When assigning an AMS function and a CCRS server function to task stations, take the following points into consideration.

- Do not assign many functions to one task station, but assign multiple functions to multiple task stations.
- Give priority to the following assignment:
  - AMS function to Conning Display
  - CCRS server function to ECDIS

[Assignment example in the minimum system configuration]
Task stations in the minimum system configuration:

- RADAR (X band)
- RADAR (S band)
- ECDIS
- Conning Display

Assignment example:
AMS (Main) function to Conning Display
AMS (Sub) function to RADAR (X band)
CCRS server (Main) function to Conning Display
CCRS server (Sub) function to RADAR (S band)

4.59.11 Settings of Ship's Parameters [ALL]

On INS devices, the distance between the keel and the echo sounder transducers, which are required to display the water depth with the keel fixed, can be set individually for three echo sounder transducers.

In the [Ship General] dialog that appears by selecting [Ship's Parameters], enter the distance between the keel and echo sounder transducers 1 to 3 in each of the following input boxes:

- [Keel-Trans(T/D 1) – xxx]
- [Keel-Trans(T/D 2) – xxx]
- [Keel-Trans(T/D 3) – xxx]

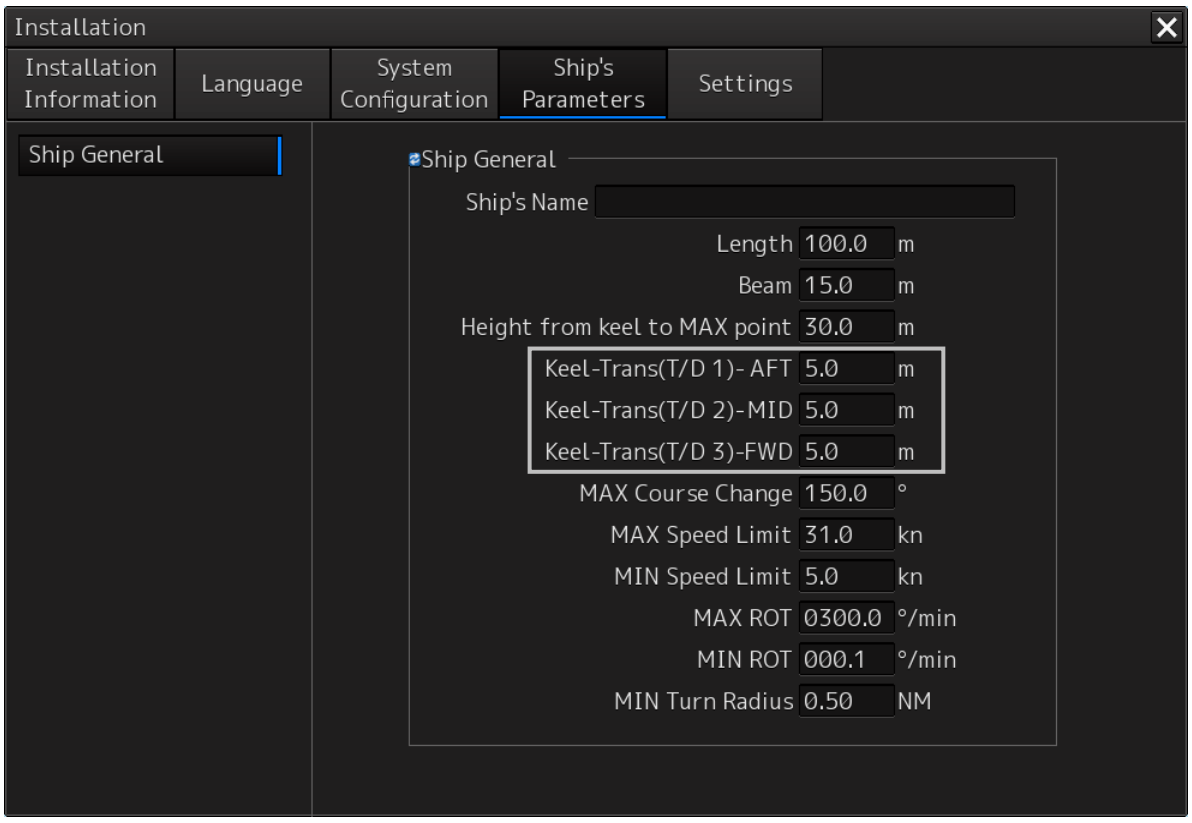
Trans(T/D 1 - 3) stands for echo sounder transducers 1 to 3.

Note

If any of the Echo Sounder 1 (Transducer 1, 2) to Echo Sounder 2 (Transducer 3) check boxes in [Device Installation] of the [Subsystem Installation] dialog is unchecked, or the combo box is set to [None], the [Keel-Trans(T/D 1) – xxx] to [Keel-Trans(T/D 3) – xxx] will not be displayed.

xxx is either one of FWD, AFT and MID.

The display changes according to the echo sounder transducers selected in Echo Sounder 1 (Transducer 1, 2) to Echo Sounder 2 (Transducer 3) of [Subsystem Installation].



Note

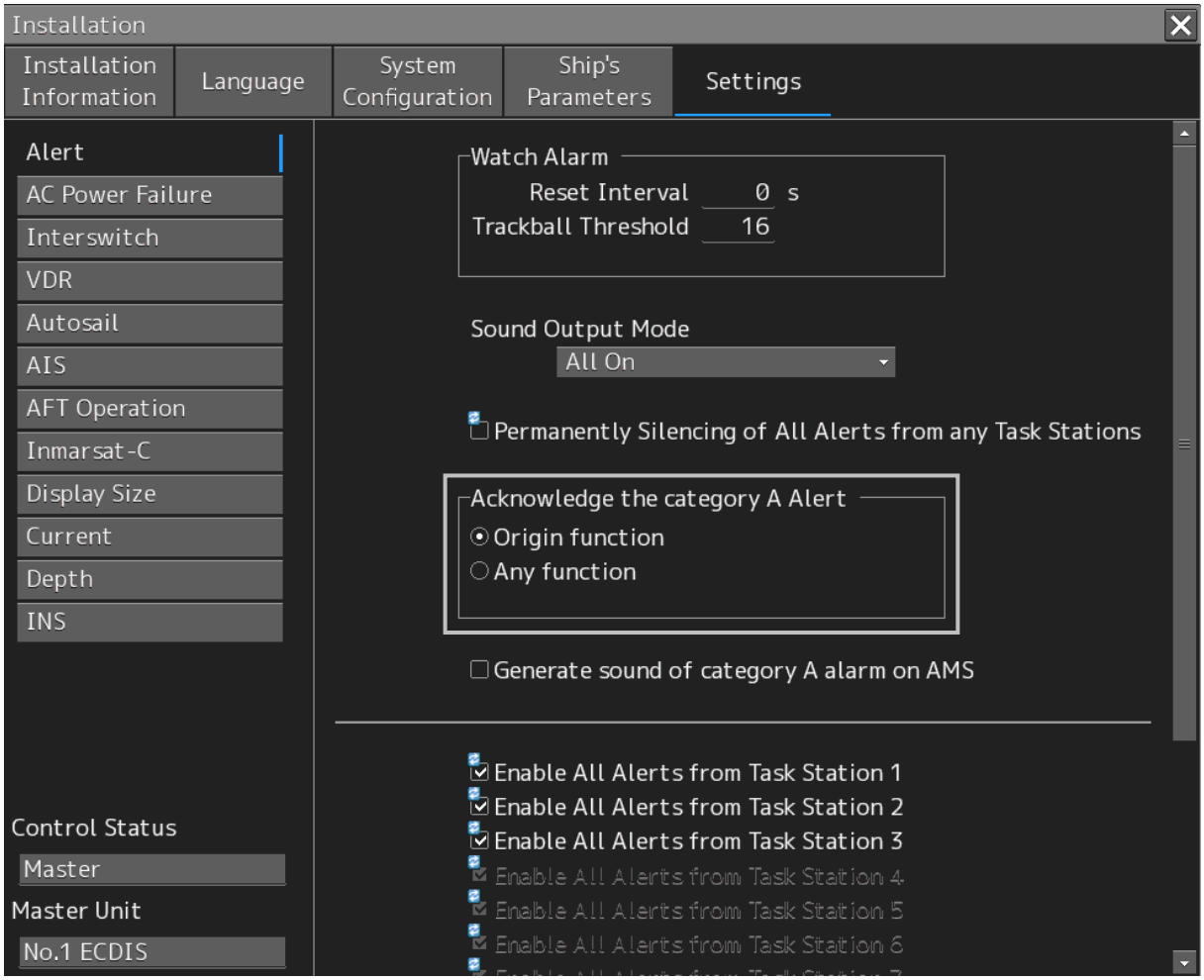
The distance between the keel and the echo sounder transducer should be equal to the distance set on the transducer. Otherwise, the content of DPT sentence transmitted by the MFD will differ from the content of DTP sentence received from the transducer.

4.59.12 Alert Settings [ALL]

On INS devices, it is possible to specify on which operation screen the system performs ACK for category A alerts.

In [Acknowledge the category A Alert] of the [Alert] dialog that appears by selecting [Settings], select one of the following:

- Origin function: ACK can only be executed on the operation screen where an alert is occurring.
- Any function: ACK can be executed on any operation screens other than the one where an alert is occurring.



4.59.13 INS Settings [ALL]

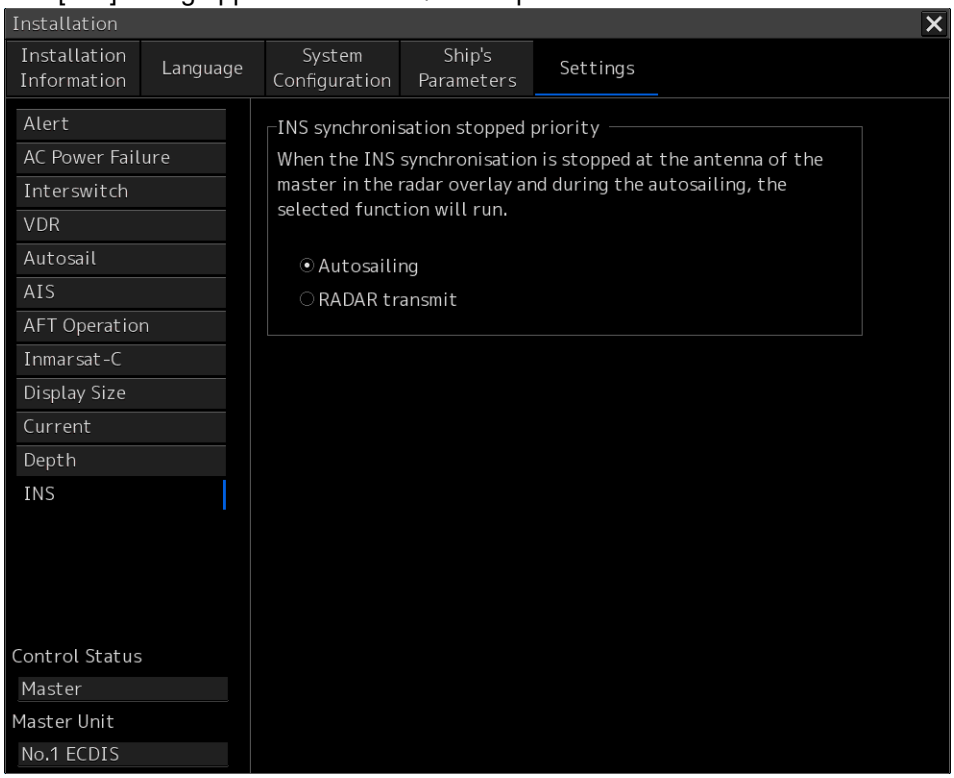
On INS devices, it is possible to specify behavior when INS linking stops during auto sailing while the master MFD in the scanner group is executing radar overlay via the [INS] dialog that appears by selecting [Settings].

To display the [INS] dialog

1 Display the dialog from the Installation submenu.

2 Select [Settings] in the 1st classification pane and [INS] in the 2nd classification pane.

The [INS] dialog appears in the Edit/Result pane.



To specify behavior when INS linking stops

If INS linking stops during auto sailing while the master MFD in the scanner group is executing radar overlay, whether to continue auto sailing (ECDIS operation mode) or whether to continue radar transmission (RADAR operation mode) can be selected.
In [INS synchronisation stopped priority], click on [Autosailing] or [RADAR transmit]. The setting at the time of shipment is [Autosailing].

4.59.14 Sensor Selection and Automatic Switching Function

Note

The sensors that can be selected vary depending on the installation, so, basically, the service engineer should perform this setting. Before changing the setting, the service engineer should make sure that he/she fully understands the function of this setting.

To enable the automatic sensor switching function, the Main and Sub sensors must be specified with the [AUTO Selection] check box checked.

Examples of standard settings are shown below.

[Example of sensors that are installed]

- GPS: 2 units
- Gyro Compass System: 2 units
- Speed Log: 2 units
  (Log 1 = Doppler Sonar, Log 2 = EM Log)
- Echo Sounder: 2 units

[Setting example]

- Position: Main = GPS 1, Sub=GPS 2
- Heading: Main = Gyro 1, Sub = Gyro 2
- STW: Main = Log 1, Sub = Log 2
- COG/SOG: Main = Log 1, Sub = GPS
- Time: Main = GPS, Sub = None
- Depth: Main = FWD, Sub = AFT

As the main and sub sensors that can be selected, only the sensors that are installed are displayed.

Memo

Set this function from the RADAR, ECDIS, or Conning Display task.

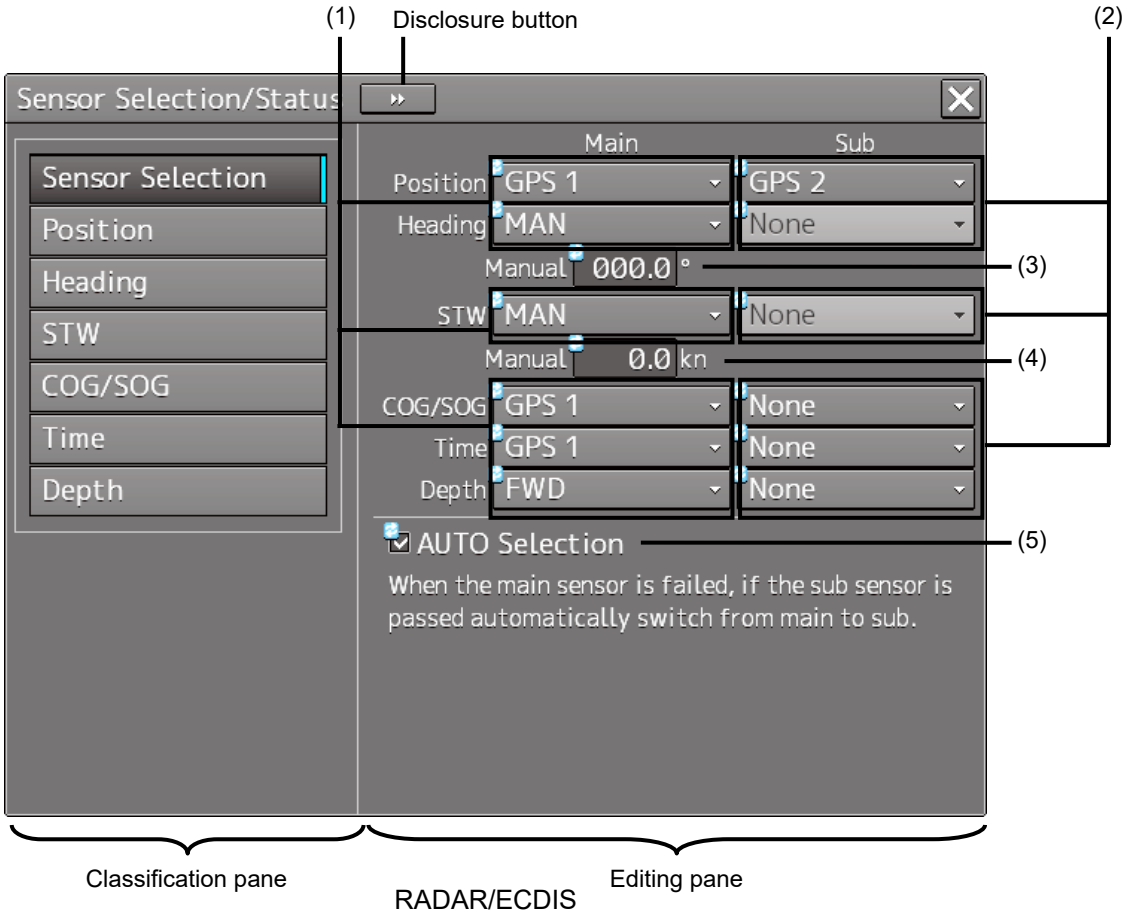
The contents of the [Sensor Selection/Status] dialog are different between RADAR/ECDIS and Conning Display.

Select sensors and set the automatic switching function in the [Sensor Selection/Status] dialog.

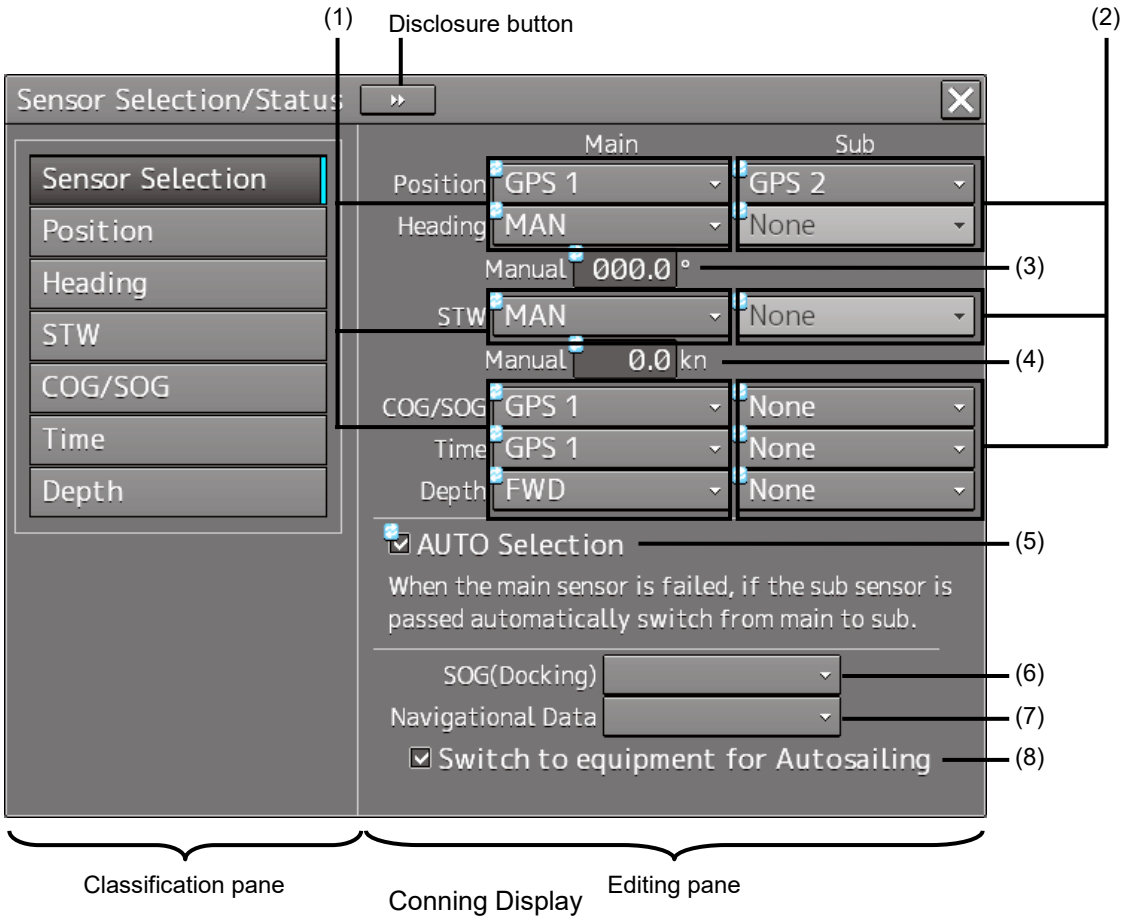
1 **Click on the [Menu] button on the Left Tool Bar.**
A menu is displayed.

2 **Click on [Maintenance] in the menu.**
A submenu is displayed.

3 **Click on the [Sensor Selection/Status] button in the submenu.**
The [Sensor Selection/Status] dialog is displayed.



RADAR/ECDIS



Conning Display

The [Sensor Selection/Status] dialog comprises a classification pane and an editing pane.
The classification pane can be hidden by clicking on the Disclosure button (>>). To redisplay the classification pane, click on the Disclosure button (<<).

Select sensors and set the automatic switching function in the editing pane.

(1) [Main](main equipment selection) combo box
Select the sensor source of the main equipment for acquiring information on each of [Position]/[Heading]/[STW]/[COG/SOG]/[Time]/[Depth].

Setting item	Setting contents	Setting value
Position	Select the sensor source of the position.	GPS x and DR (x: Equipment number)
Heading (ship's heading bearing)	Select the sensor source of the ship's heading bearing. When the Gyro Compass System with the automatic switching function is used, the sensor source display is switched automatically according to the switching status.	MAN, Gyro x, MAG x, G/C x (x: Equipment number)
STW (speed through water)	Select the sensor source of speed through water.	MAN and Log x (x: Equipment number)
COG/SOG (course over the ground/speed over the ground)	Select the sensor source of the course over the ground/speed over the ground. Even if multiple GPS units are installed also, [GPS] is selected without distinguishing individually. When GPS is selected as the Position, the same GPS is selected automatically.	Log x and GPS (x: Equipment number)
Time (time correction)	Select the sensor source that is to be used for time correction of INS.	GPS x, Ship Clock ("x": Device number)
Depth	Select the sensor source of water depth.	FWD, AFT, MID, E/S1, E/S2

(2) [Sub](sub equipment selection) combo box

Select the sub sensor for acquiring information on each of [Position]/[Heading]/[STW]/[COG/SOG]/[Time]/[Depth].

Setting item	Setting contents	Setting value
Position	Select the sensor source of the position.	GPS x, DR and None (x: Equipment number)
Heading (ship's heading bearing)	Select the sensor source of the ship's heading bearing. When the Gyro Compass System with the automatic switching function is used, the sensor source display is switched automatically according to the switching status.	Gyro x, MAG x, G/C x, AUTO(*1), None (x: Equipment number Auto(*1): Disabled)
STW (speed through water)	Select the sensor source of speed through water.	Log x and None (x: Equipment number)
COG/SOG (course over the ground/speed over the ground)	Select the sensor source of the course over the ground/speed over the ground. Even if multiple GPS units are installed also, [GPS] is selected without distinguishing individually. When GPS is selected as the Position, the same GPS is selected automatically.	Log x, GPS, and None (x: Equipment number)
Time (time correction)	Select the sensor source that is to be used for time correction of INS.	GPS x, Ship Clock, None ("x": Device number)
Depth	Select the sensor source of water depth.	FWD, AFT, MID, E/S1, E/S2, None

(3) Heading input box

When [MAN] is selected in the [Heading](Main) combo box, a ship's heading bearing value can be input.
A value can be set within the range from 0.0 to 359.9°.

(4) STW input box

When [MAN] (manual) is selected in the [STW](Main) combo box, a speed through water can be input.
A value can be set within the range from -99.9kn to 99.9kn.

(5) [AUTO Selection] (automatic selection) check box

When this item is checked, the main sensor becomes abnormal, and the sub sensor is normal, the sub sensor is selected automatically.
However, when [None] is selected in the [Sub] combo box, the sub sensor is not selected automatically.

(6) [SOG(Docking)] combo box (Display only Conning Display)

Setting item	Setting contents	Setting value
SOG(Docking)	Select the sensor source of speed over the ground (Docking).	Log x and GPS (x: Equipment number)

(7) [Navigational Data] (Route monitoring information) combo box (Display Conning Display only)

Setting item	Setting contents	Setting value
Navigational Data	Select the sensor source for acquiring route monitoring information.	ECDIS x, RADAR x, CON x, CON-W x, CON-R x (x: Equipment number)

(8) [Switch to equipment for Autosailing] check box (Display Conning Display only)

Check this item when acquiring route monitoring information from the task station under automatic sailing.

To acquire information from the source that is selected in [Navigational Data], uncheck the item.

Note

If a task station receives an alert indicating a failure or malfunction from the main sensor while the sub sensor is operating normally, the main sensor will be replaced with the sub sensor and the sub sensor will be used as the main sensor. The main sensor will also be replaced with the sub sensor if the task station determines that the main sensor is Unavailable, Invalid, Not Plausible, or Failed and if MFD determines that the sub sensor has high reliability.

4.59.15 Setting of Integrity Check

Regarding the time threshold of integrity check and the communication time-out of the serial port, adjust time threshold of integrity check so that the following relationship is kept.

Time threshold of position integrity check • Integrity(with Sensor) - Primary - Time Limit • Integrity(with DR) - Secondary - Time Limit	>	Communication time-out of the serial port • GPS1: Serial Port-Detail-Timeout • GPS2: Serial Port-Detail-Timeout
Time threshold of STW integrity check • Integrity(with Sensor) - Primary - Time Limit • Integrity(with SOG) - Secondary - Time Limit	>	Communication time-out of the serial port • Log1: Serial Port-Detail-Timeout • Log2: Serial Port-Detail-Timeout
Time threshold of COG/SOG integrity check • Integrity(with Sensor) - Primary - Time Limit • Integrity(with HDG/STW) - Secondary - Time Limit	>	Communication time-out of the serial port • GPS1: Serial Port-Detail-Timeout • GPS2: Serial Port-Detail-Timeout • Log1: Serial Port-Detail-Timeout • Log2: Serial Port-Detail-Timeout • Heading Sensor1: Serial Port-Detail-Timeout • Heading Sensor2: Serial Port-Detail-Timeout
Time threshold of time integrity check • Integrity(with Sensor) - GPS - Time Limit • Integrity(with Sensor) - Ships clock - Time Limit	>	Communication time-out of the serial port • GPS1: Serial Port-Detail-Timeout • GPS2: Serial Port-Detail-Timeout • Ship's Clock: Serial Port-Detail-Timeout
Time threshold of heading integrity check (Time threshold configured on gyrocompass system)	>	Communication time-out of the serial port • Heading Sensor1: Serial Port-Detail-Timeout • Heading Sensor2: Serial Port-Detail-Timeout

Click on [Alert] on the menu, and set the time threshold of each Integrity check.
First activate the service menu (refer to **Displaying the Service menu** in Chapter 4, click on [Service] - [Installation] - [System Configuration] - [Serial Port] on the menu, and set the communication time-out of each serial port.
Regarding the time threshold of heading integrity, it is necessary to set on gyrocompass system.

4.59.16 Connection Setting of RPS

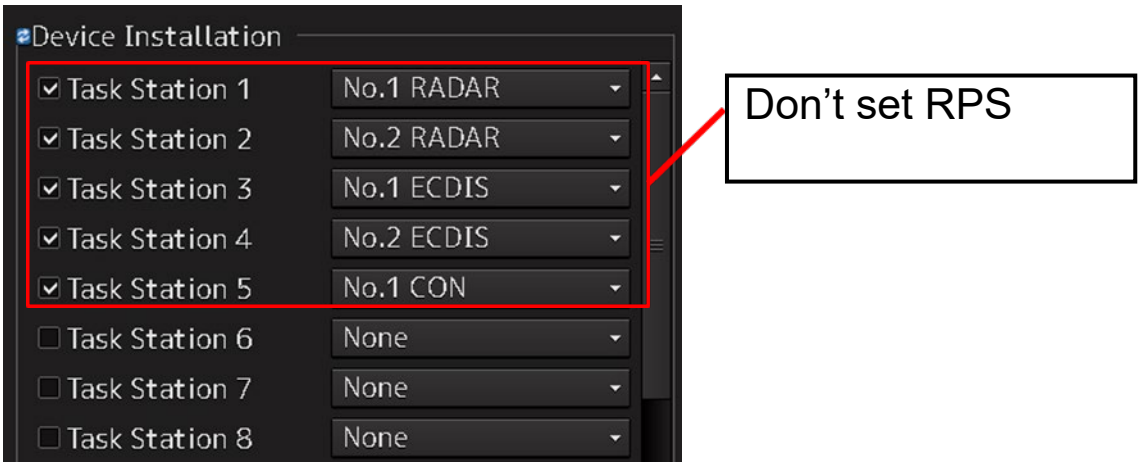
RPS does not support INS software (02.XX.XXX). Therefore, RPS needs to install software (01.50.044 or later). Also, the RPS needs to be set up for installation setting without syncing settings from the MFD.

The following settings should be carried out in MFD(ECDIS/RADAR/CONNING).

1 **Click on the [Menu] button on the left toolbar. Select [Service]-[Installation].**

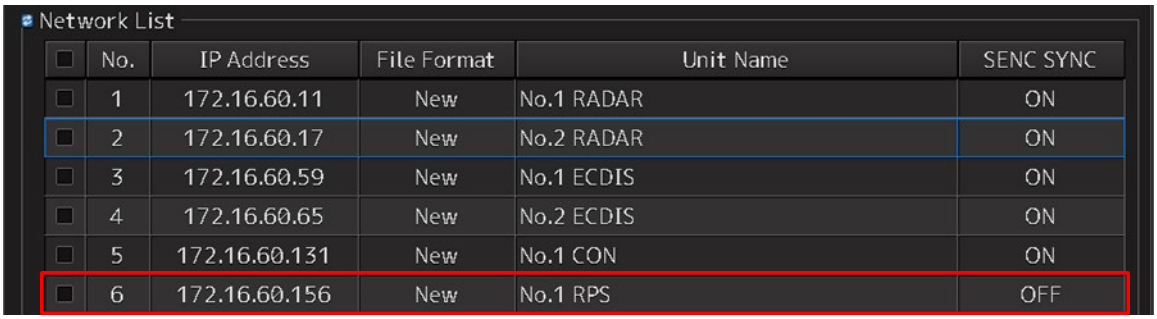
2 **Select [System Configuration] in the 1st Classification pane and [Subsystem Configuration] in the 2nd Classification pane.**

3 **Don't set RPS as Task station in Device Installation.**



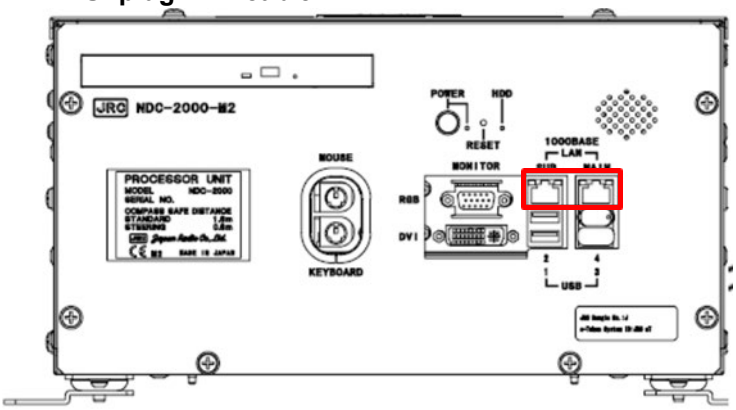
4 **Select [Network] in the 2nd Classification pane.**

5 **Set RPS IP address in network list.**



The following settings should be carried out in RPS.

1 **Unplug LAN cable.**



2 **Turn on RPS.**

3 **Update RPS with the latest MFD software (01.50.044 or later). Don't update RPS with the INS MFD software (02.XX.XXX)**

4 **Click on the [Menu] button on the left toolbar. Select [Service]-[Installation].**

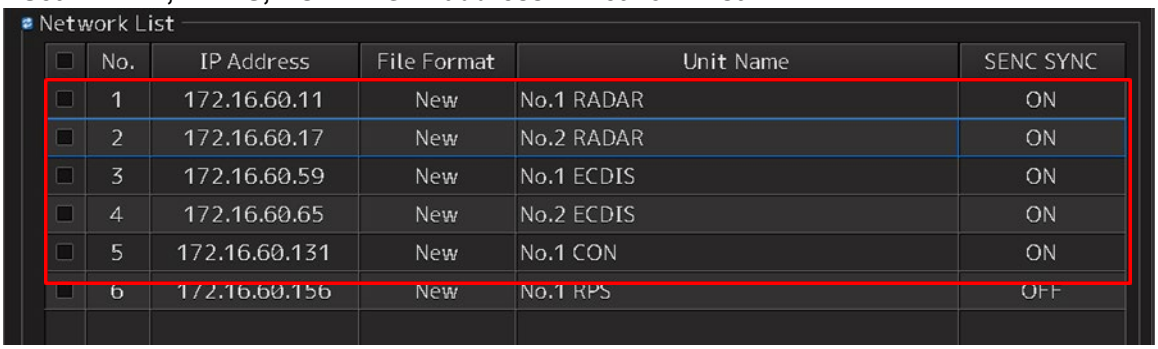
5 **Select [System Configuration] in the 1st Classification pane and [Subsystem Configuration] in the 2nd Classification pane.**

6 **Set only RPS as Task station in Device Installation.**



7 **Select [Network] in the 2nd Classification pane.**

8 **Set RADAR, ECDIS, CONNING IP address in Network List.**



9 **Set other necessary settings such as Subsystem Installation, CCRP, Serial Port etc. while referring to the MFD equipment settings.**

RPS connected to the INS does not synchronize settings with the MFD, all settings must be set manually.

10 Turn off RPS.

11 Insert LAN cable.

12 Turn on RPS.

Note:
After setting above, if installation dialog was opened on RPS or MFD (RADAR/ECDIS/CONNING), installation settings is not synchronized between RPS and MFD (RADAR/ECDIS/CONNING).
If installation setting is changed in MFD(RADAR/ECDIS/CONNING), a reboot popup dialog will not appear on the RPS screen.

5 Option Unit

5.1 Installation of Interswitch Unit

5.1.1 End processing of Interswitch cable (2695111153/2695111162)

Remove about one meter of the outer skin, and then process the double braided shield according to the procedures shown below.

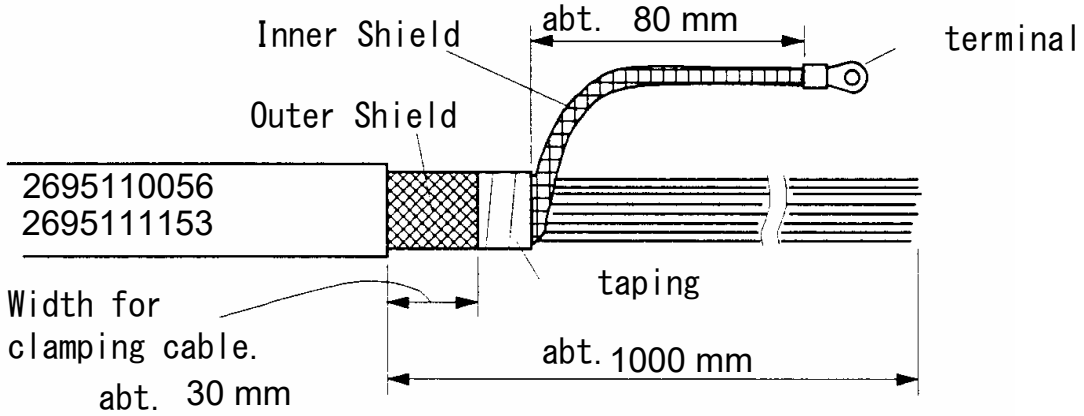


Fig 5-1: Processing of braided shield 2695111153/2695111162

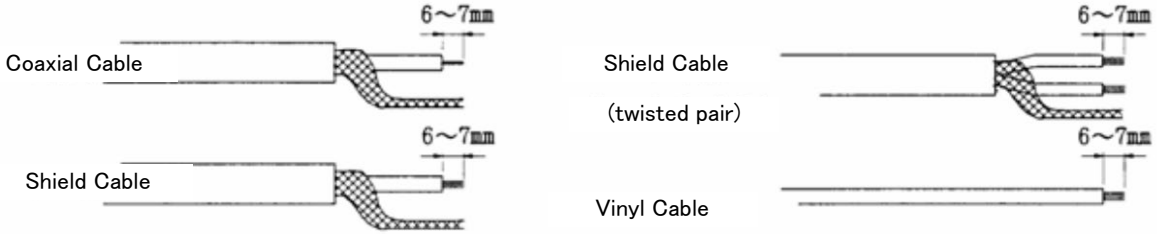


Fig 5-2: End processing of each cable core

5.1.2 Installation of Interswitch Unit

There are two types of NQE-3141 Interswitch unit; NQE-3141-4A (4ch) and NQE-3141-8A (8ch). The 8ch Interswitch unit consists of two internal boards of the 4ch Interswitch unit.

Installation Procedure

1) Ground the provided earth plate to the hull ground.

2) Connect the Interswitch to the CQD-2273 RIF of each Display Unit using the interswitch cable (2695111153/2695111162). For wiring of RADAR and ECDIS, refer to **Fig 5-4: NQE-3141-4A Inter-board connection diagram**.

   -When connecting to the JAN-901/901M/701 and third-party ECDIS.

   Connect the input terminals VD, TRG, BP and BZ of JAN-901/901M/701 and third-party ECDIS to the VDOUT, TRGOUT, BPOUT and BZOUT terminals of the Interswitch. (Refer to **Fig 5-4: NQE-3141-4A Inter-board connection diagram**.)

   - When connecting to the JMA-9100/7100, JMA-5300MK2, JMA-900B.

   Connect VD, TRG, BP, MTR and PWR to the Interswitch input/output terminals of each equipment.

   For JMR-9200 series, the signal output from RIF to Interswitch is named ISWO, and the signal input from Interswitch to RIF is named ISWI. (Refer to **Fig 5-4: NQE-3141-4A Inter-board connection diagram**.)

   Wiring to each channel in the case of NQE-3141-8A is identical. Check the wiring channels in the construction chart, and make wiring.

3) Refer to **5.1.1 End processing of Interswitch cable (2695111153/2695111162)** for how to process the end of Interswitch cable. When connecting to the Display Unit side, fix the shield part with pressing by metal fittings surrounded by the dotted line in the figure below, and connect the shield to the thumbscrew surrounded by a circle or hex spacer surrounded by a circle (recommended crimp terminals V5.5).

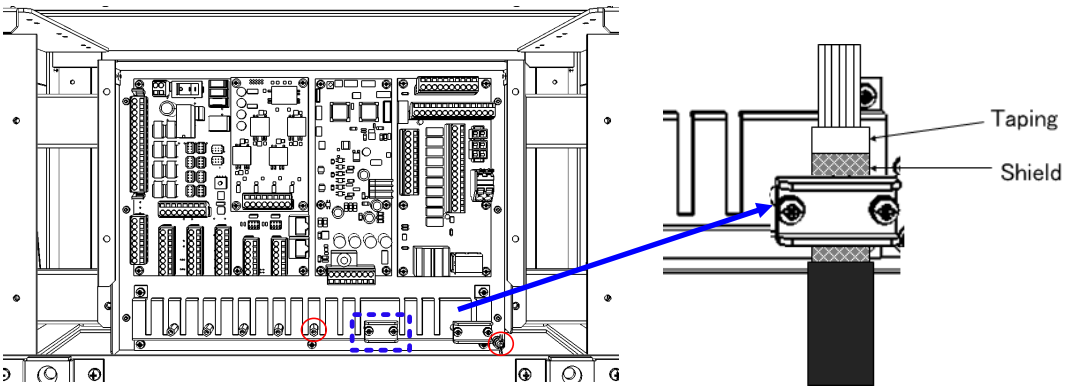


Fig 5-3: Fixing and grounding the Interswitch cable

When connecting to the Interswitch side, fix the shield part by the metal parts shown in the following figure.



Fig 5-4 Cable inlet of the NQE-3141-8A

⚠ So that the braided shield is not shorted to the power supply terminal block, please insulate the cable and fix with cable tie. Put the extra length of the cable to the bottom of the display unit so that it does not interfere with the installation positions of the UPS and Sensor LAN Switch Unit.

4) After the installation is finished, refer to the **5.1.6 Confirmation after installation** and check the operation.

5.1.3 NQE-3141-4A Inter-board connection diagram

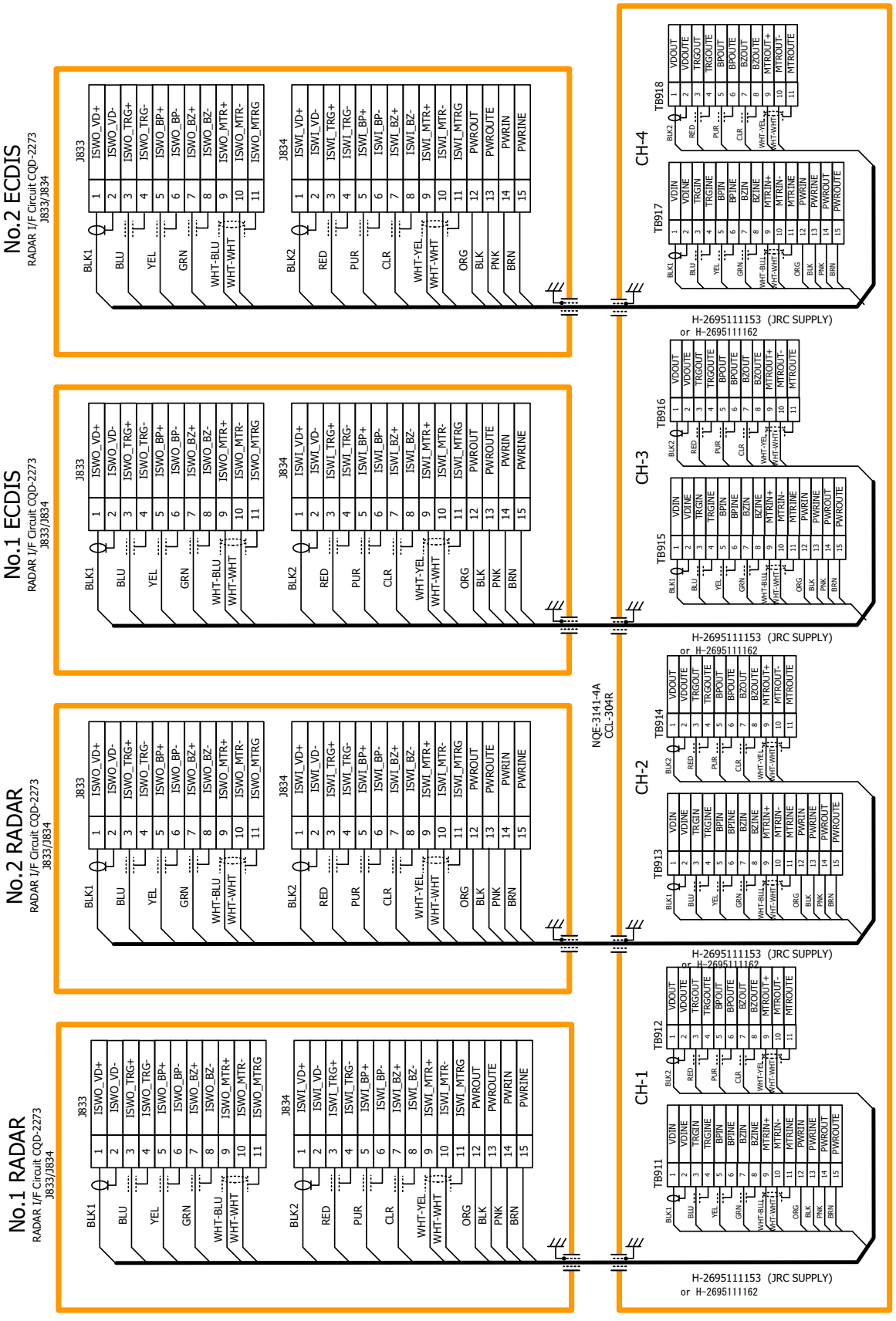


Fig 5-5: NQE-3141-4A Inter-board connection diagram

5.1.4 Outline drawings of NQE-3141-4A/8A interswitch

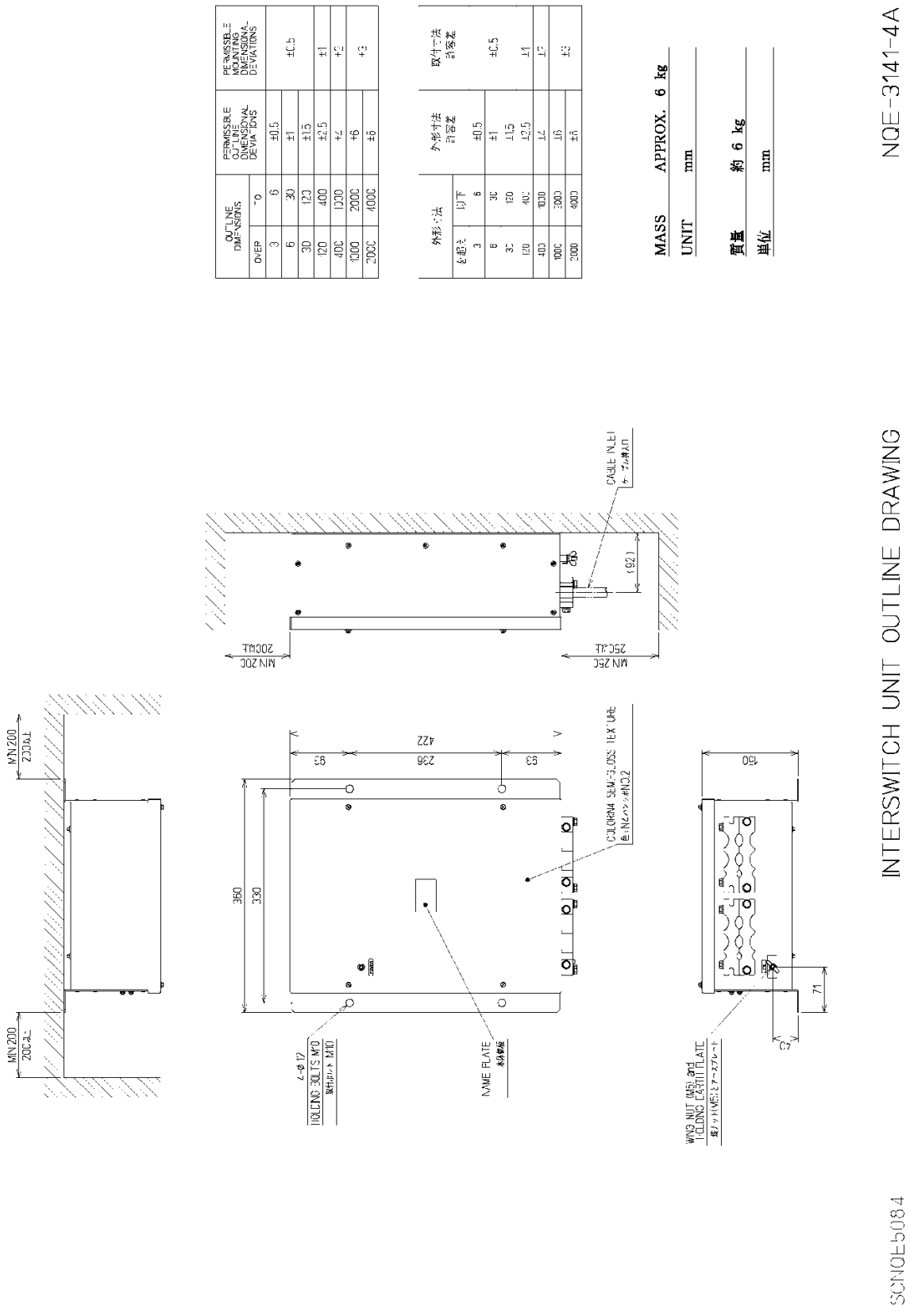


Fig 5-6: Outline Drawing of NQE-3141-4A Interswitch Unit (4ch)

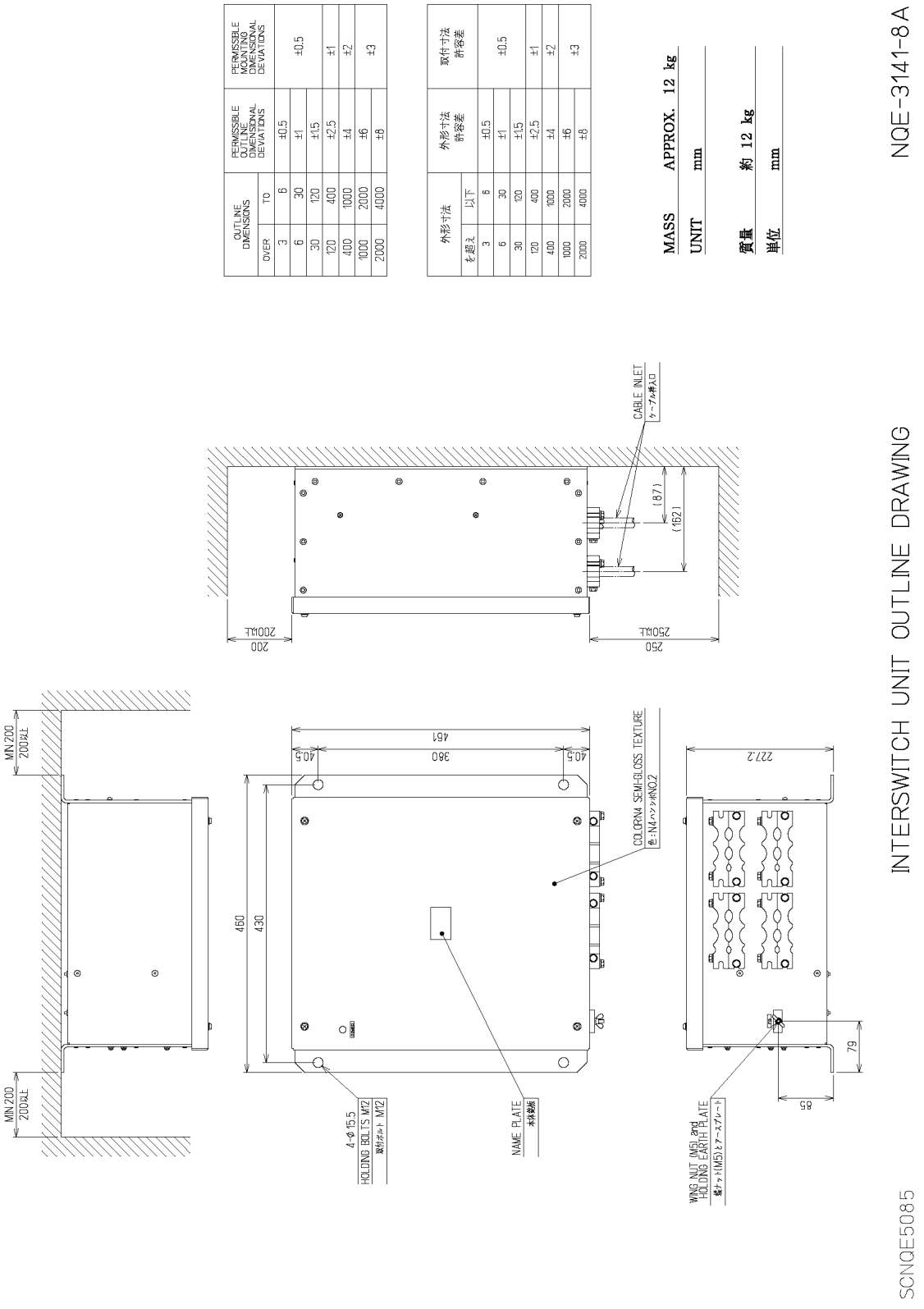


Fig 5-7: Outline Drawing of NQE-3141-8A Interswitch Unit (8ch)

5.1.5 Settings of Interswitch

Since settings have been normally made upon shipment from factory, it is advised to only confirm the settings.

a. Settings of NQE-3141-4A

Set dip switches SW11, SW12, and SW13 as shown below.

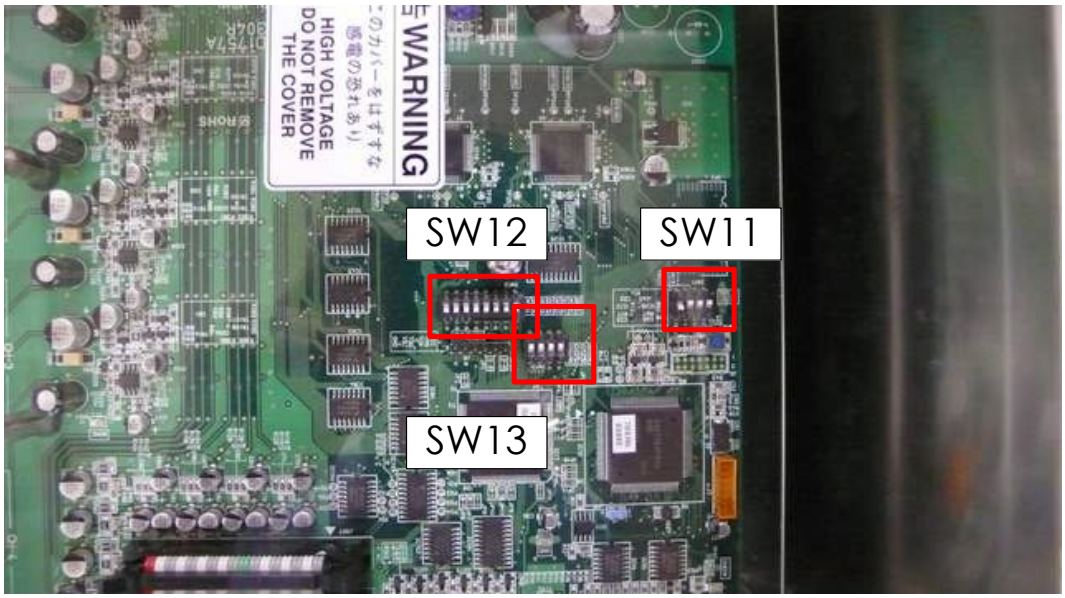


Fig 5-8: CML-304R DIP Switch

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



Set all OFF.

2) SW12 setting (expansion mode, master/slave setting)

Radar Connection Setting



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

3) SW13 (unused)



Set all OFF.

b. Settings of NQE-3141-8A

The internal structure of NQE-3141-8A includes two units of CCL-304R in the two-storied structure.

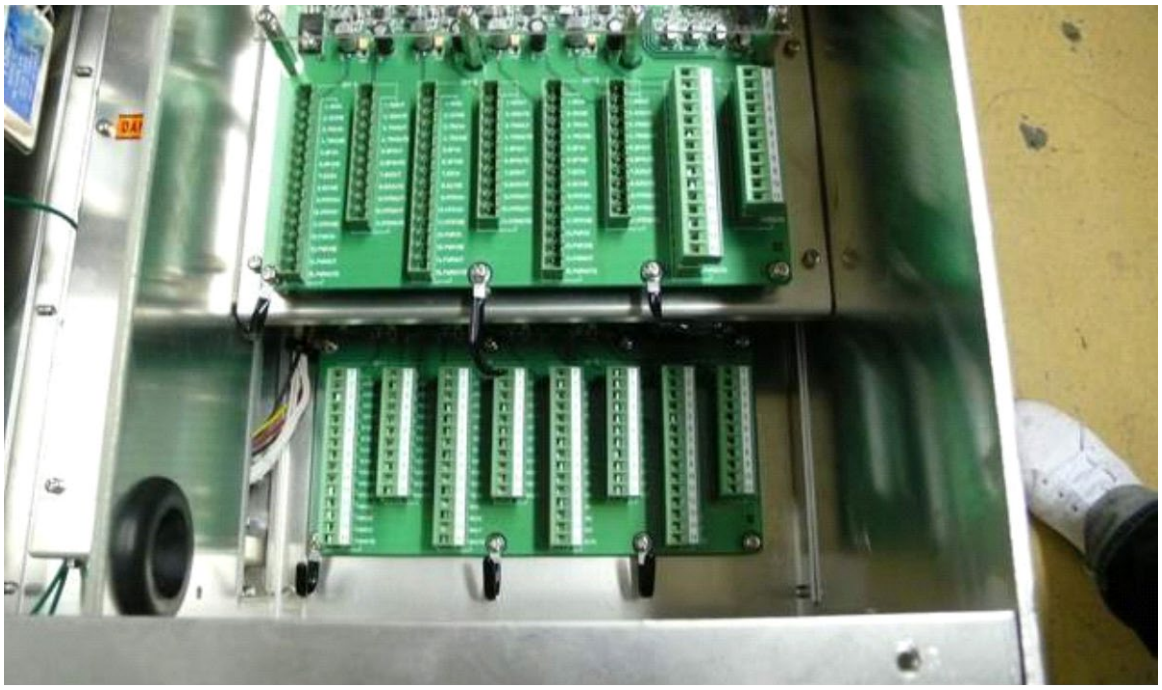


Fig 5-9: NQE-3141-8A internal structure

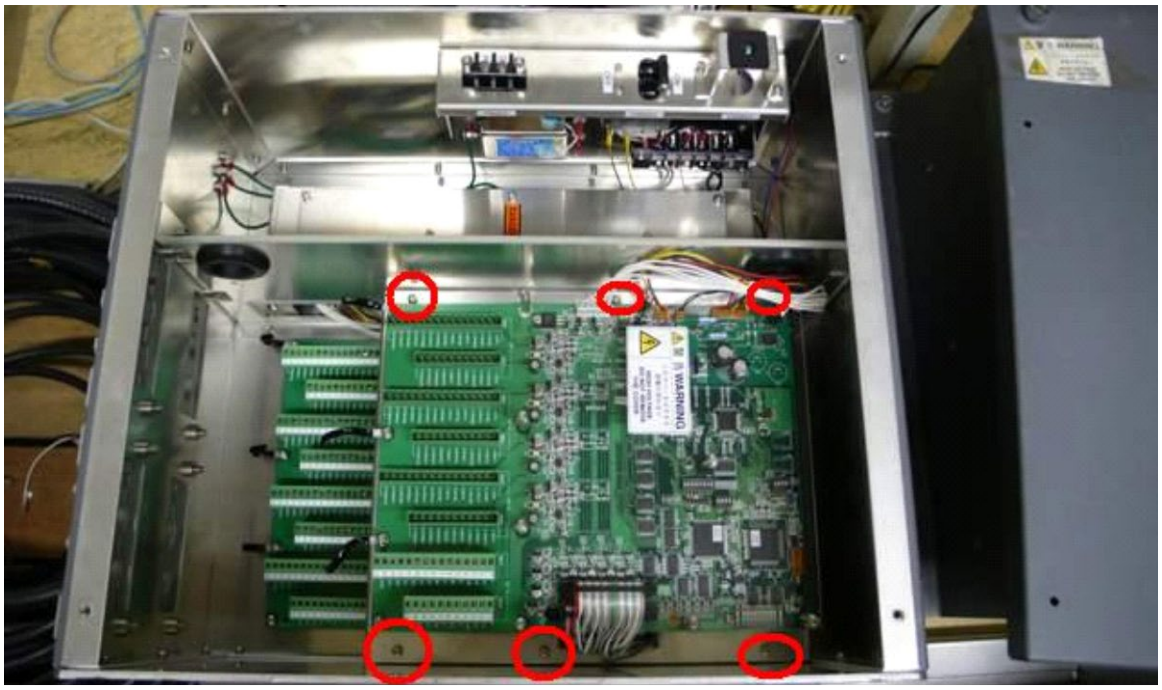


Fig 5-10: Access to Lower Board of NQE-3141-8A

- Although dip switches settings are basically the same as the settings shown in the preceding article, it is necessary to make settings for each of the two SW12.
- It is necessary to remove the six screws surrounded by circles in **Fig 5-10: Access to Lower Board of NQE-3141-8A** in order to access the first story portion.
- With regard to SW12 on the board located at the upper position, make settings for CH1 to CH4.
- With regard to SW12 on the board located at the lower position, make settings for CH5 to CH8.
- CH1 to CH4 displayed on the terminal block mean CH5 to CH8.
- Settings have been made for SW11 and SW13 upon shipment. Do not change those settings.

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

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



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

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



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

5.1.6 Confirmation after installation

1) After having checked connections, turn on the switchboard breaker.

2) Turn on the power to the radar display unit, and make sure that the interswitch button is displayed on the screen and pressing the button will switch antennas.

3) When a system consists of two devices, make sure that both left and right radars conform to the screen indication.

4) When a system consists of three devices or more, make sure that the CH number and the display unit position are arranged as intended.

5.2 Installation of Power Control Unit

Power control unit NQE-3167 is used when a radar antenna and a transmitter-receiver are installed at a location away from the bridge, such as a foremast.

In the case of a two-unit type antenna, the maximum length of the cable that connects between the display unit and the radar antenna is 65 meters. In the case of a three-unit type antenna, the maximum length of the cable that connects between the display unit and the transmitter-receiver is 35 meters.

By using NQE-3167 power control unit, the maximum length of the cable that connects between the display unit and the radar antenna (transmitter-receiver) can be extended up to 465 meters.

Maximum length of the cable connecting between the radar antenna and the transmitter-receiver	30m
Maximum length of the cable connecting between the transmitter-receiver and the PCU	35m
Maximum length of the cable connecting between the display unit and the PCU	400m

5.2.1 Connection with NKE-2103 and NKE-2254-6HS radar antennas

Use 19-core composite cable CFQ-6912-** for the installation of those types of radar antennas (Asterisks ** indicate the cable length, and the available cable length is 5, 10, 20, 30, 40, 50, and 65)

The display-unit side end of this cable is a metal shell round connector. (See 2.1.1CFQ**-6912-****) Connect that cable to J2 of the power control unit.

If the metal shell round connector is cut, connect the cable to TB3 located in the power control unit. For procedures for processing the cable end, see Section **2.1.4 Cable end processing method**.

With regard to six devices, such as MOTOR+ (2P), MOTOR-(2P), 1A (+48V), and 2A (48VG), two AWG16 cables must be connected to one terminal block. As necessary, use a bar-mould crimp-type terminal or the like. (See **Fig 5-11: Connection of CFQ-6912**)

Connection to the AC/DC converter NBA-5135 is not necessary. Instead, power control unit NQE-3167 supplies DC power.

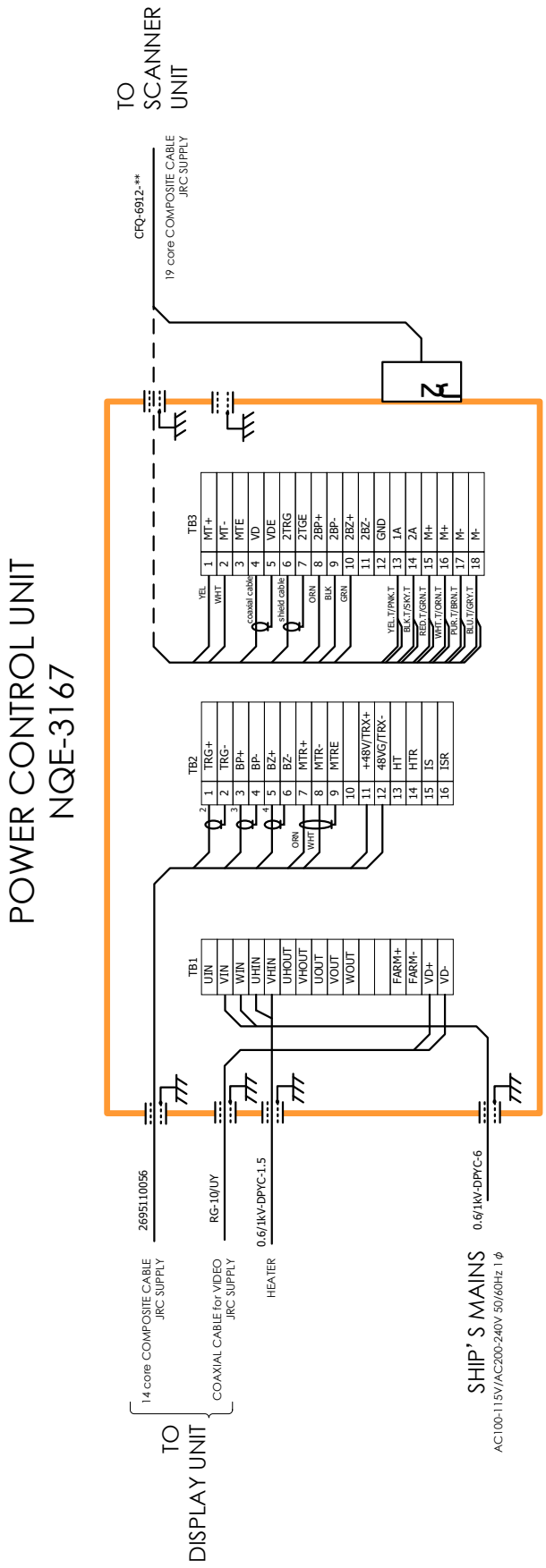


Fig 5-11: Connection of CFQ-6912

5.2.2 Connections to NKE-1125/A, NTG-3225/A, NKE-1130/A, NTG-3230/A, NKE-1632/A, NKE-2632/A, NKE-1696, NKE-1129/A and NKE-1139/A

Use 14-core composite cable 2695110056 for the installation of those types of radar antennas.

Refer to **Fig 5-12: End processing of 2695110056 cable** and **Fig 5-13: End processing of each 2695110056 cable core** for how to process the end of cables.

For the wiring procedures, see 5.2.7 Inter –board connection diagram of power control unit.

5.2.3 End processing of 2695110056 cable

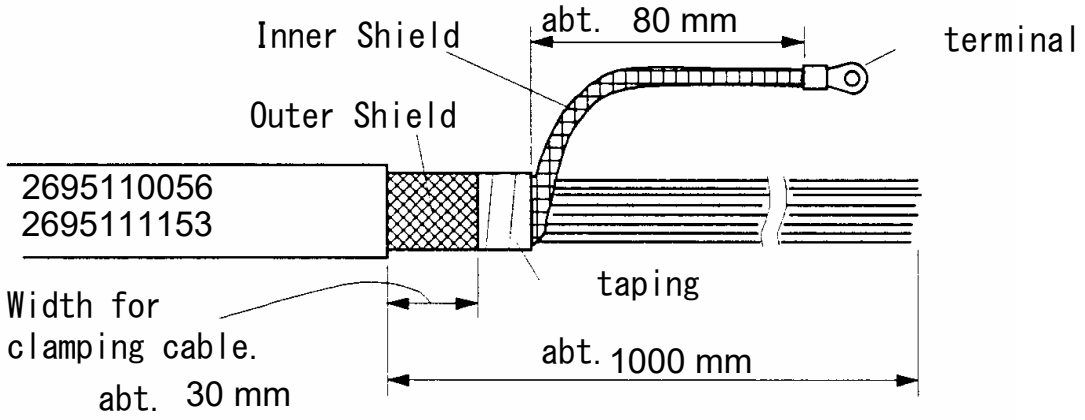


Fig 5-12: End processing of 2695110056 cable

5.2.4 End processing of each 2695110056 cable core

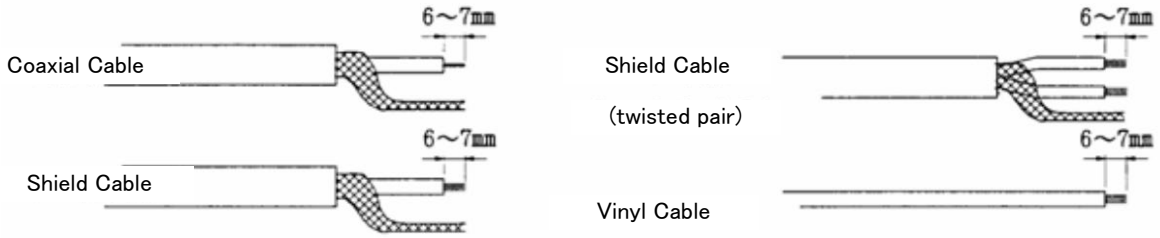


Fig 5-13: End processing of each 2695110056 cable core

5.2.5 Connection to display unit

Use 14-core composite cable 2695110056 and coaxial cable RG-10/UY to connect power control unit NQE-3167 to each display unit.

Among the two cables, use coaxial cable RG-10/UY to connect the radar video signal.

Refer to **Fig 5-12: End processing of 2695110056 cable** and **Fig 5-13: End processing of each 2695110056 cable core** for how to process the end of cables. For the wiring procedures, see 5.2.7 Inter –board connection diagram of power control unit**.**

5.2.6 Outline Drawing of NQE-3167 Power Control Unit

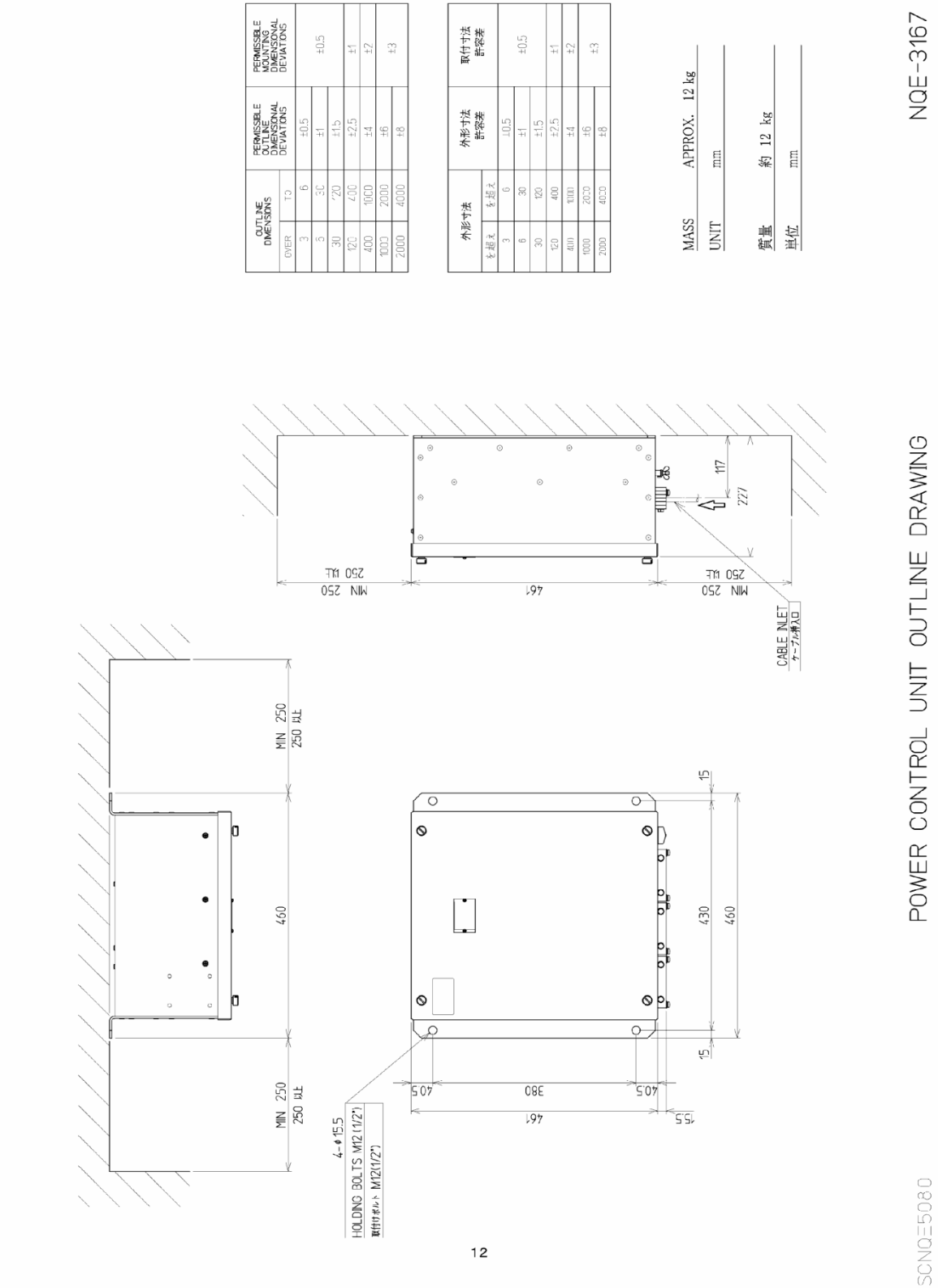


Fig 5-14: Outline Drawing of NQE-3167 Power Control Unit

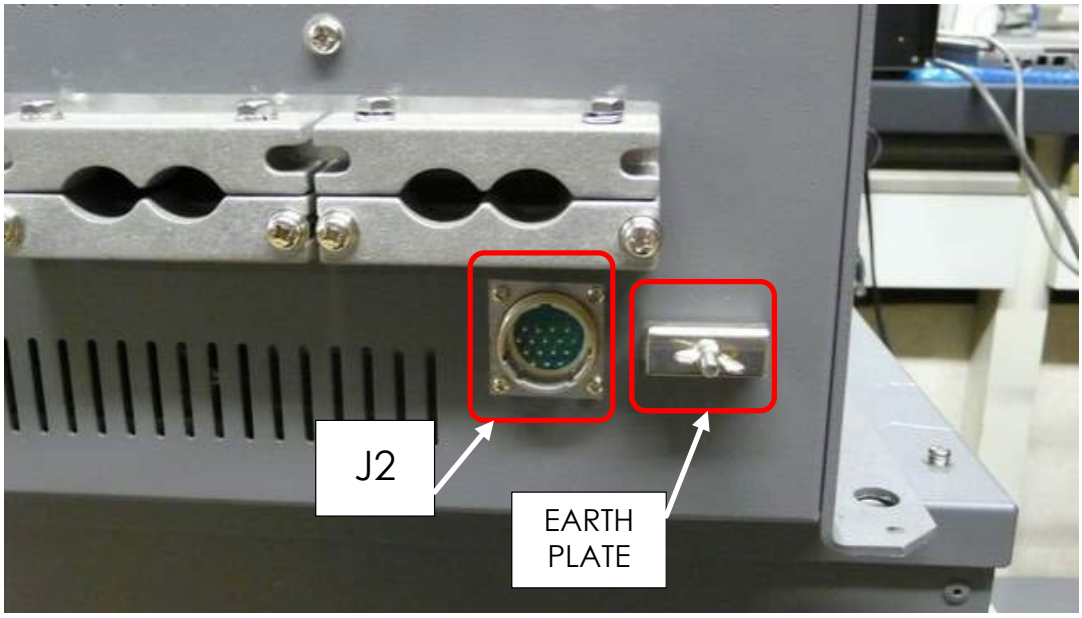


Fig 5-15: NQE-3167 cable entrance

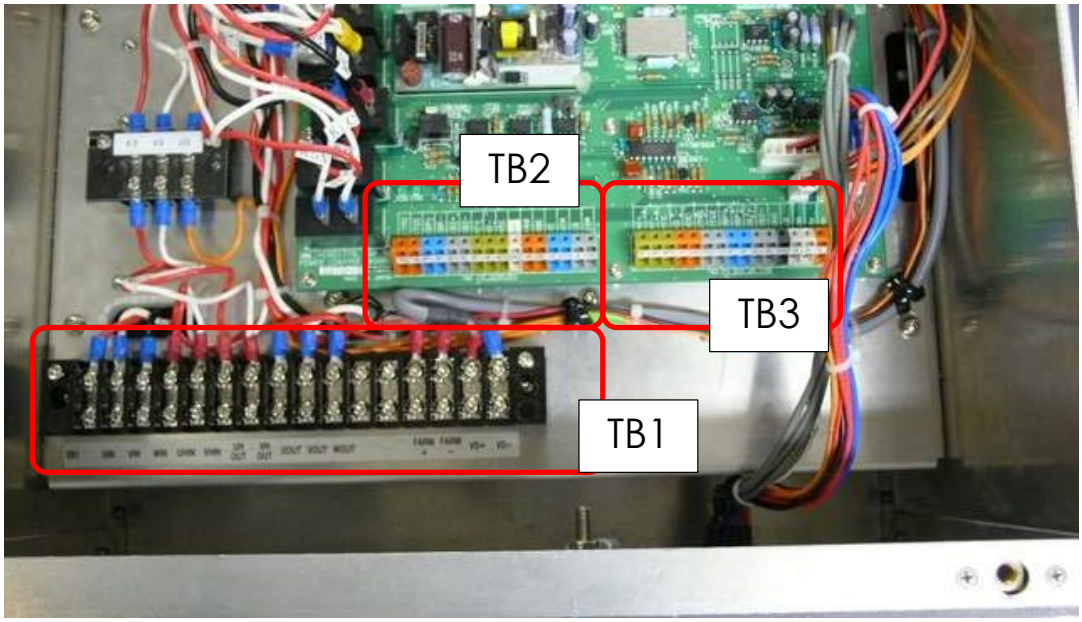
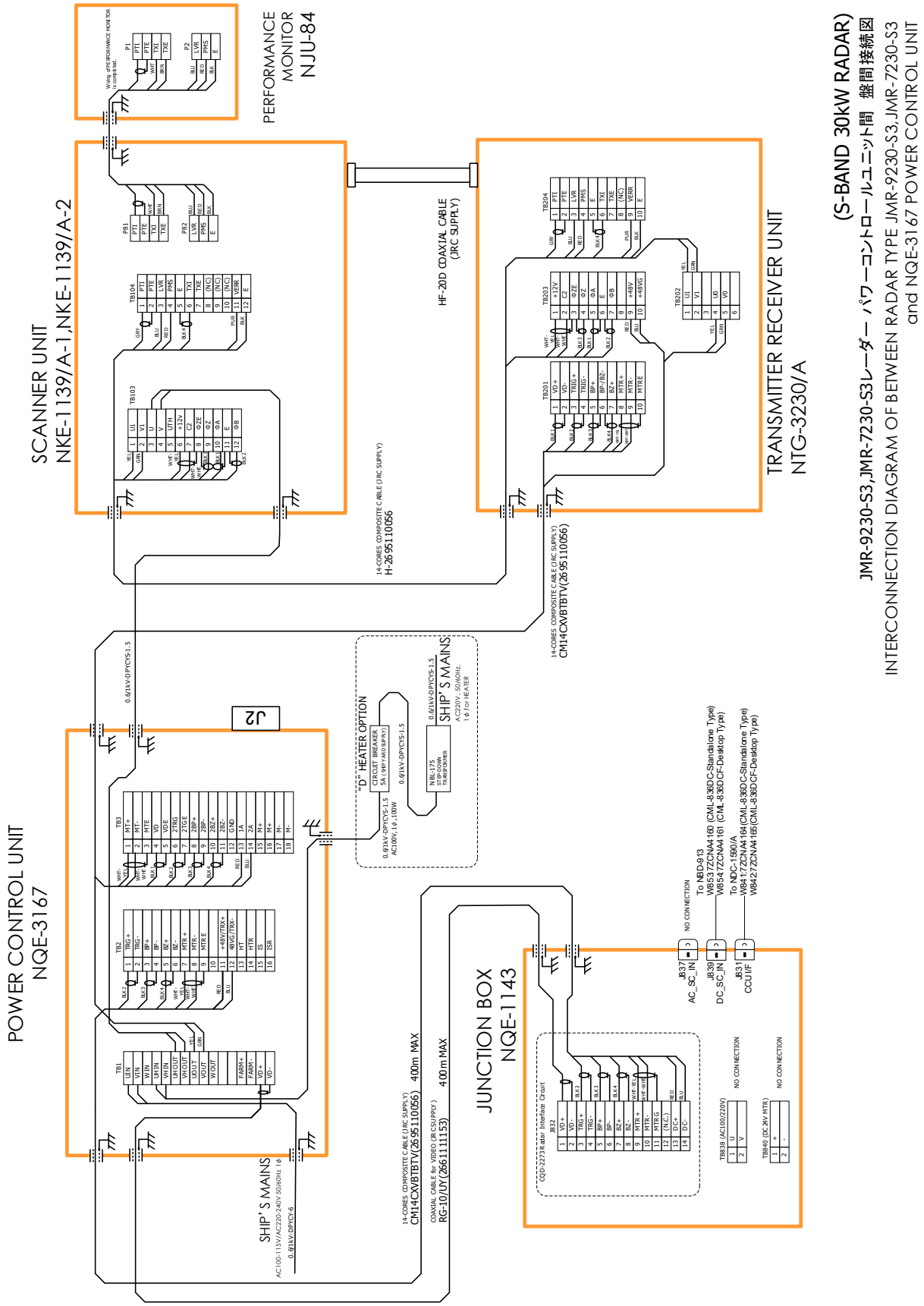


Fig 5-16: NQE-3167 terminal block

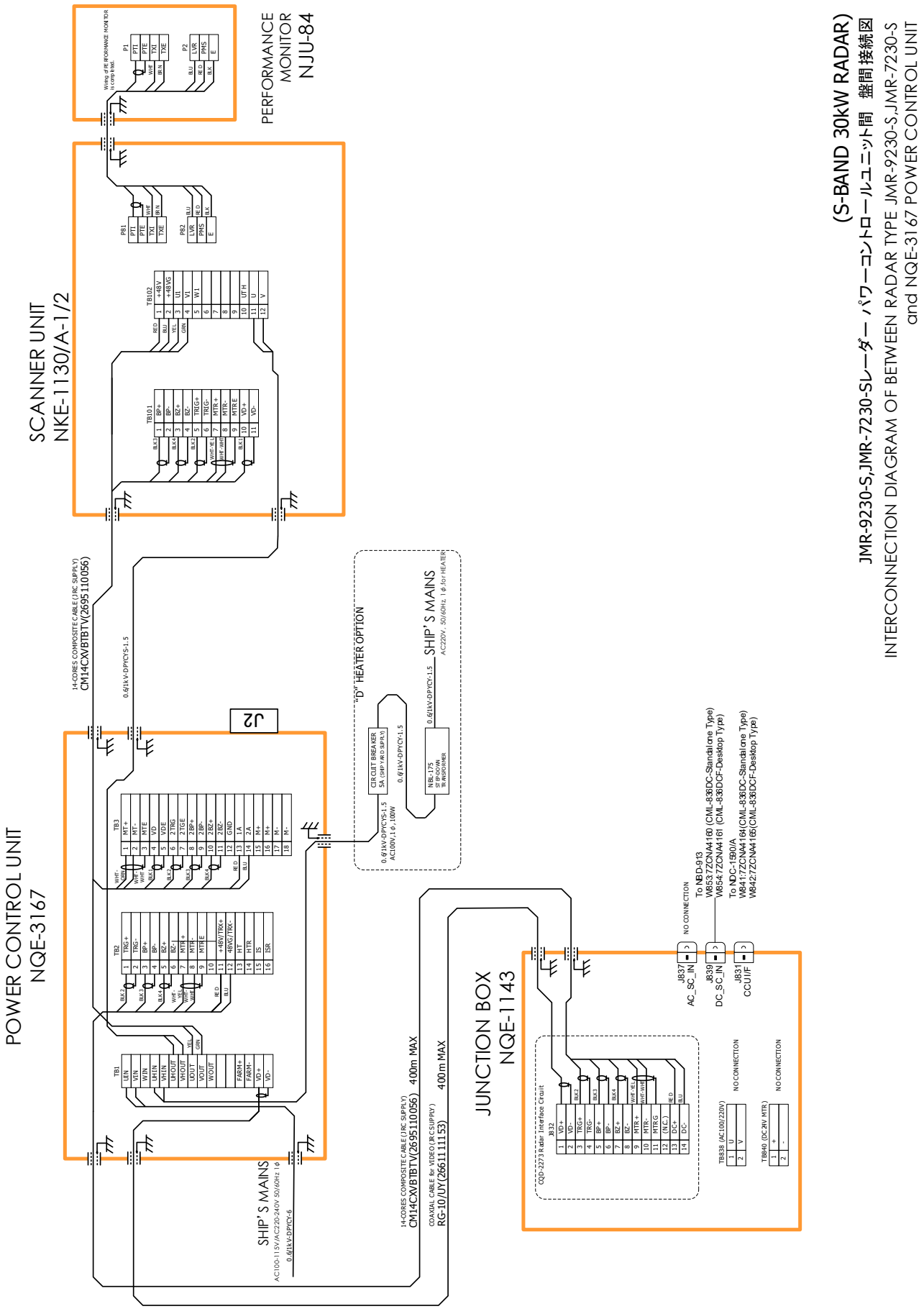
⚠ Securely ground the included earth plate to the hull's earth.

5.2.7 Inter –board connection diagram of power control unit

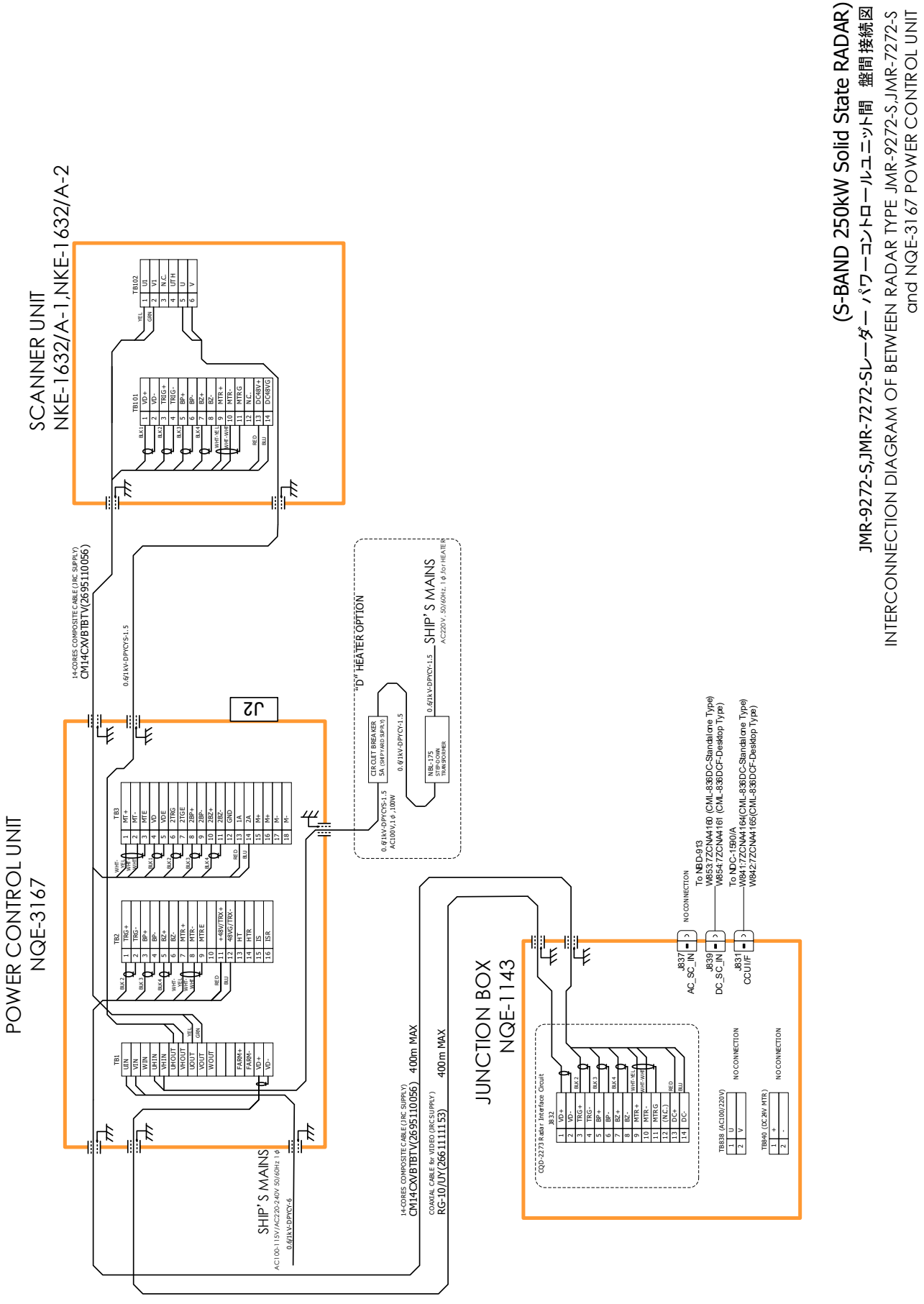
5.2.7.1 Inter-board connection diagram of JMR-9230-S3, JMR-7230-S3



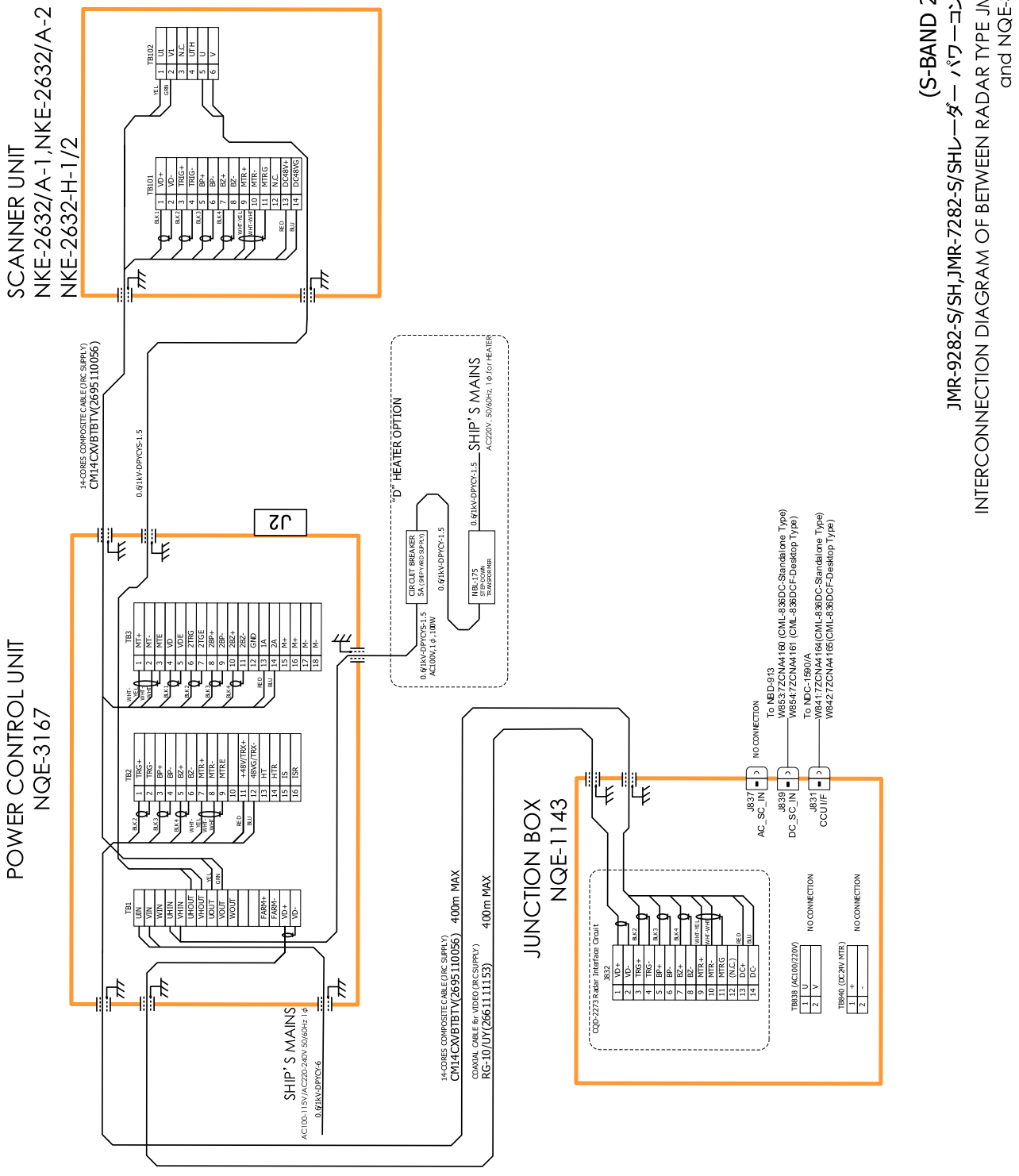
5.2.7.2 Inter-board connection diagram of JMR-9230-S, JMR-7230-S



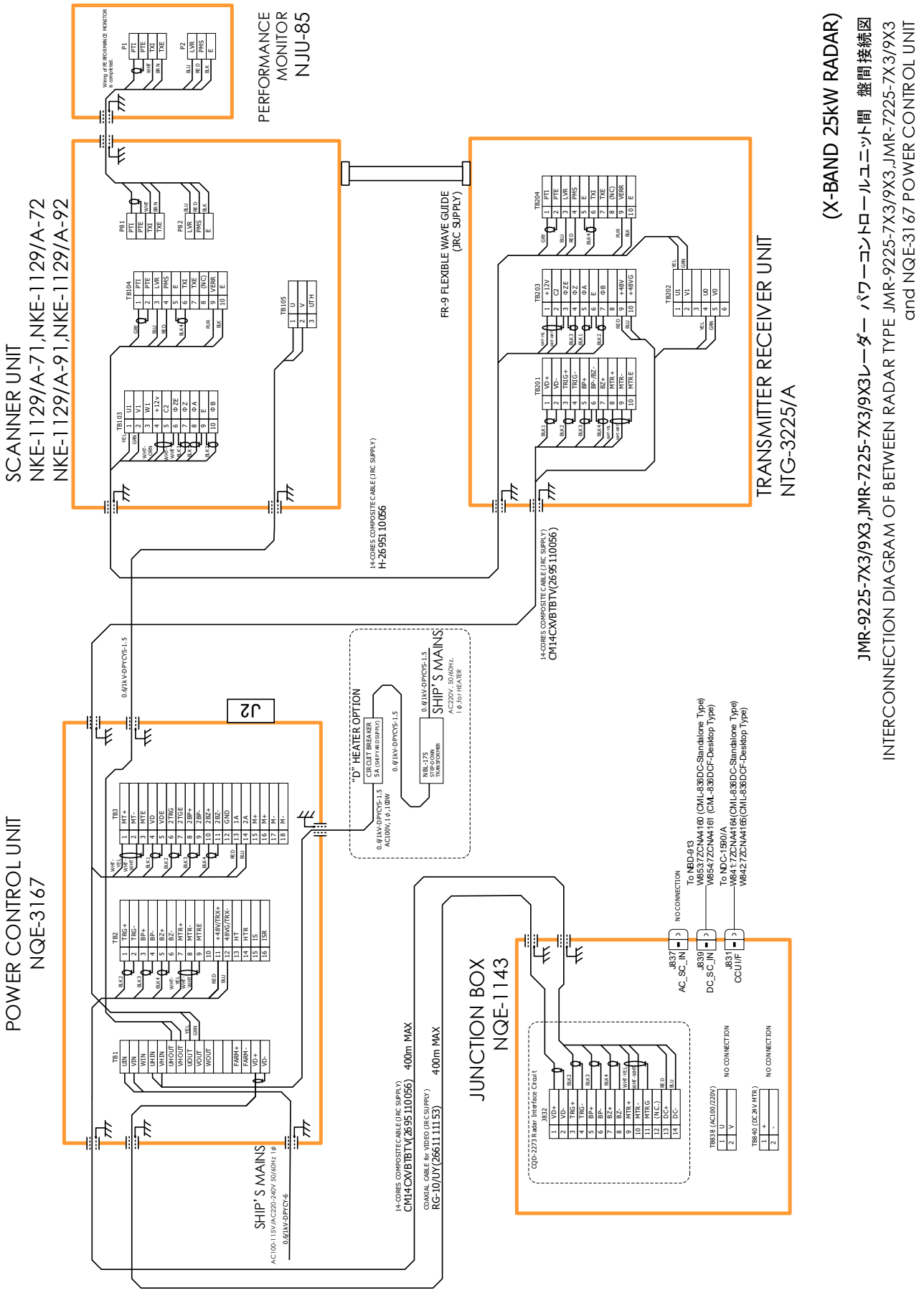
5.2.7.3 Inter-board connection diagram of JMR-9272-S, JMR-7272-S



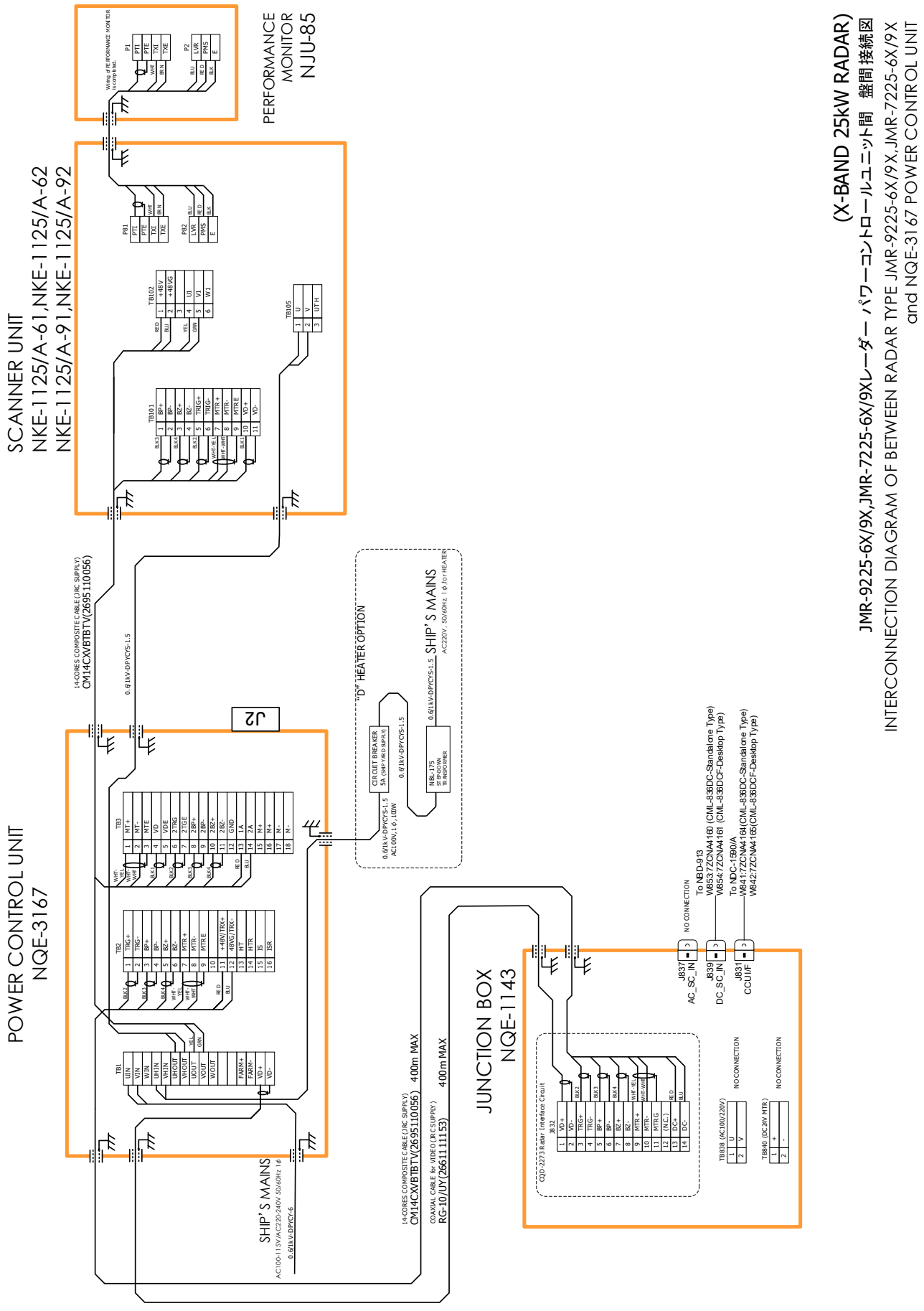
5.2.7.4 Inter-board connection diagram of JMR-9282-S/SH, JMR-7282-S/SH



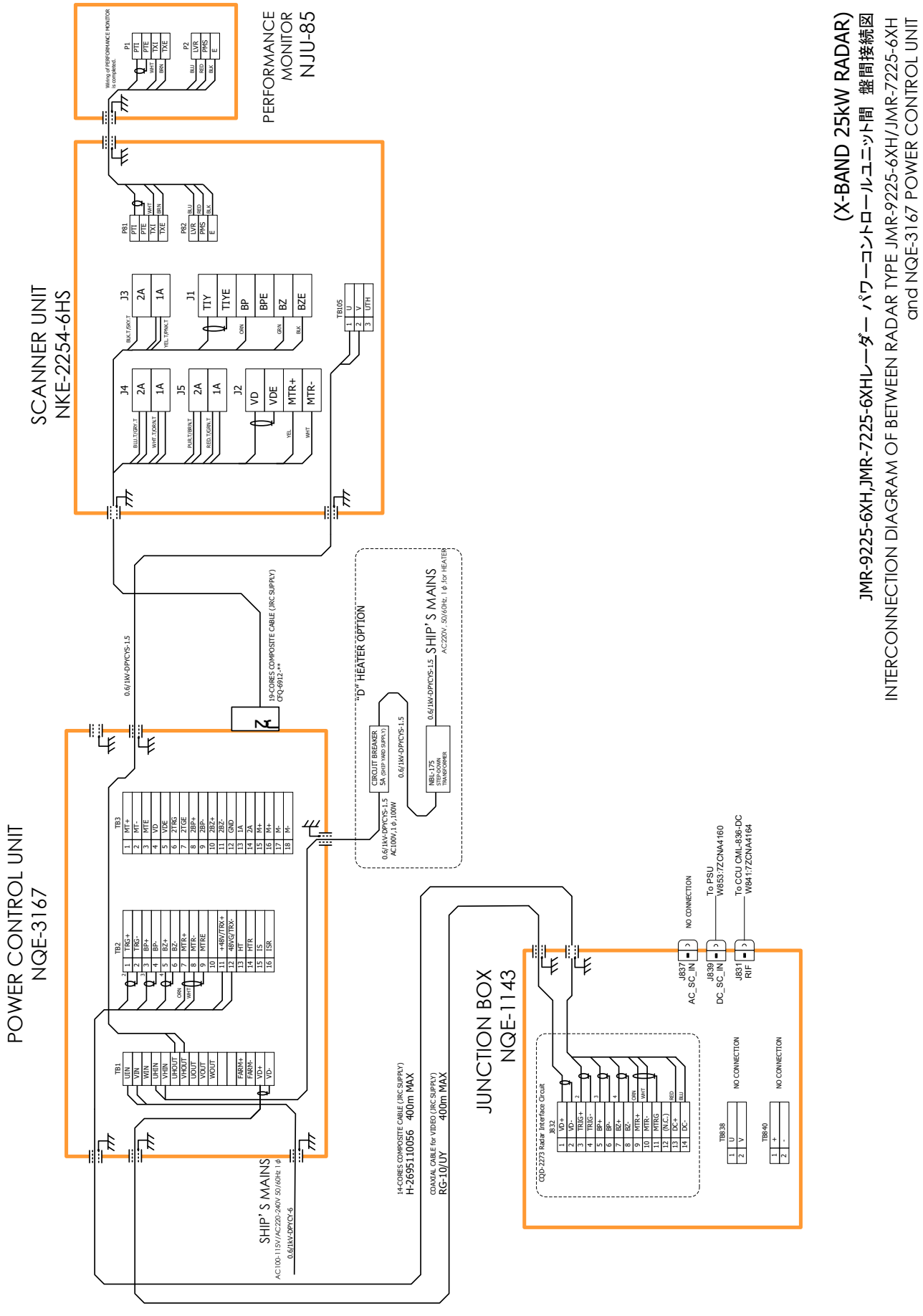
5.2.7.5 Inter-board connection diagram of JMR-9225-7X3/9X3, JMR-7225-7X3/9X3



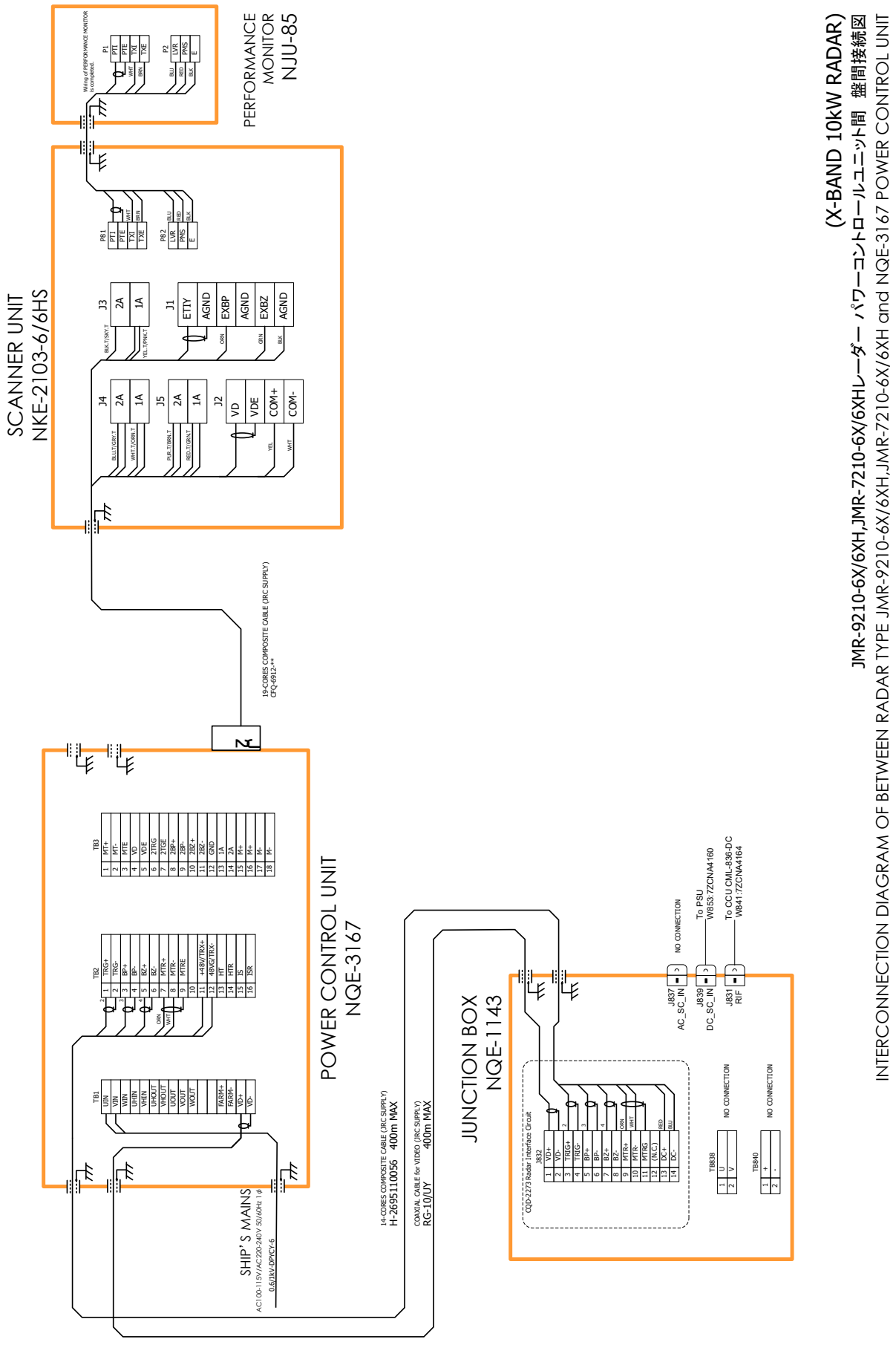
5.2.7.6 Inter-board connection diagram of JMR-9225-6X/9X, JMR-7225-6X/9X



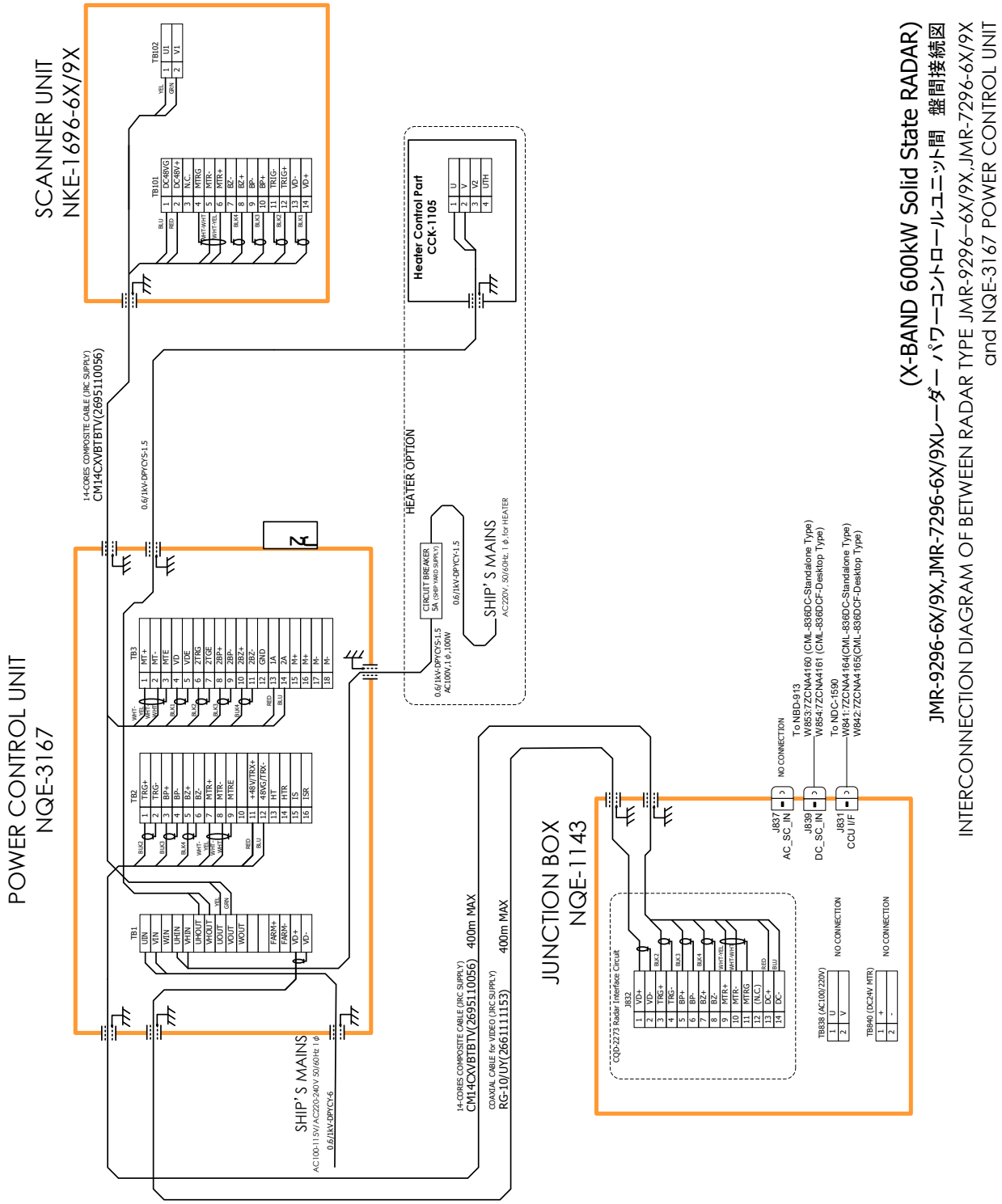
5.2.7.7 Inter-board connection diagram of JMR-9225-6XH, JMR-7225-6XH



5.2.7.8 Inter-board connection diagram of JMR-9210-6X/6XH, JMR-7210-6X/6XH



5.2.7.9 Inter-board connection diagram of JMR-9296-6X/9X, JMR-7296-6X/9X



5.3 Connection of VDR

5.3.1 Connection with LAN (IEC61162-450)

When the VDR have LAN port, use connection with the LAN (IEC61162-450). There is the LAN port J4117 which is located in central control unit (NDC-1590/A). See the drawing below.

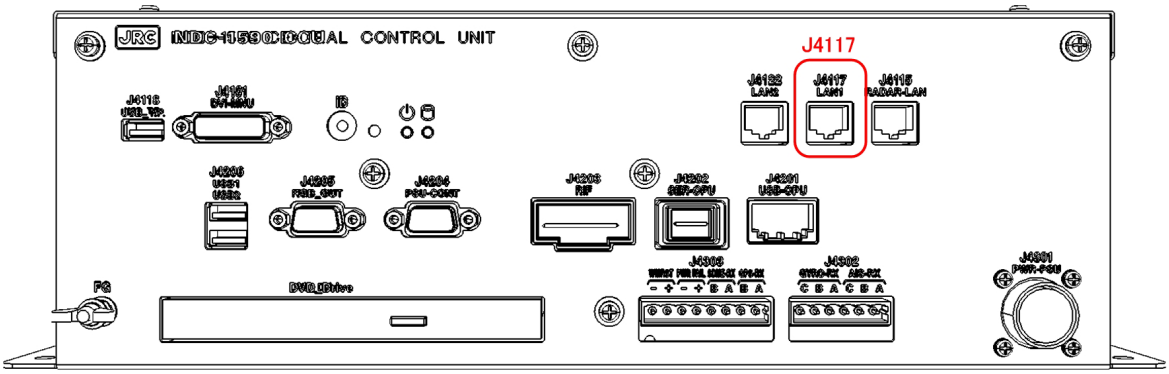


Fig 5-17 VDR connection connector LAN(IEC61162-450)

After the connection, please set the display unit by referring to the **4.15 Setting of VDR.**

5.3.2 Connection with Analog RGB

When the VDR does not have LAN port, use connection with Analog RGB.

Analog RGB signal for VDR is output from J4205 which is located in the central control unit (NDC-1590/A). See the drawing below.

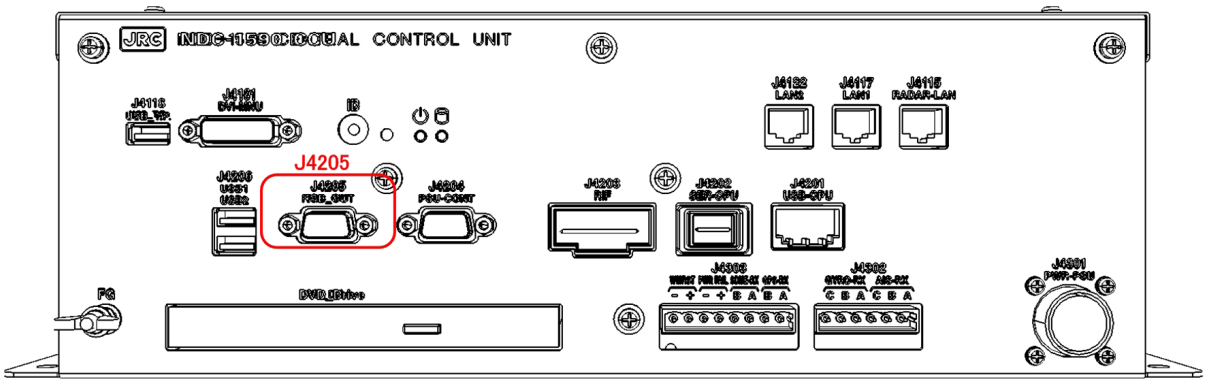


Fig 5-18: VDR connection connector Analog RGB

5.3.2.1 VDR I/F kit

The VDR I/F kit is used to connect analog RGB signal to VDR.

VDR I/F kit CQD-1891 includes:

DSUB15P - BNC cable (KB5BNC2K, 2 meters)	1 pcs
BNC to BNC adapter (BNC-A-JJ)	5 pcs
BNC connector (3CV-P2) 5 piece	5 pcs

Use 3C-2V coaxial cable for connection.

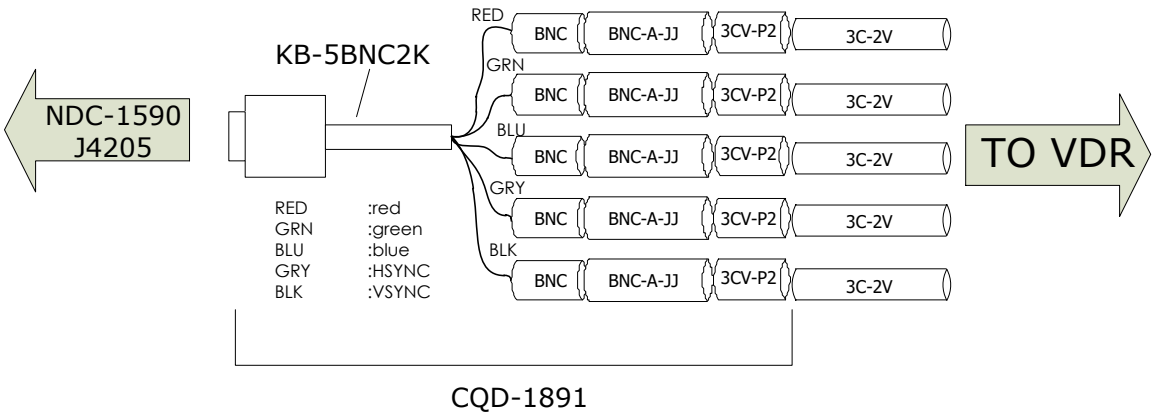


Fig 5-19: CQD-1891 VDR I/F Kit

5.4 Printer

Set the printer according to the following procedures.

⚠CAUTION
When there is no keyboard operating unit, prepare the keyboard of a USB interface. There is a procedure that cannot be set for the keyboard not to exist.

5.4.1 Printer Composition

The printer composition is as follow.

- Necessary for setting

No	Name	Remarks
1	Start Poster	
2	AC Adaptor	
3	Ink	
4	Printer Head	
5	Print Paper	
6	USB Keyboard	When NCE-5625 Keyboard Operation Unit is not equipped.

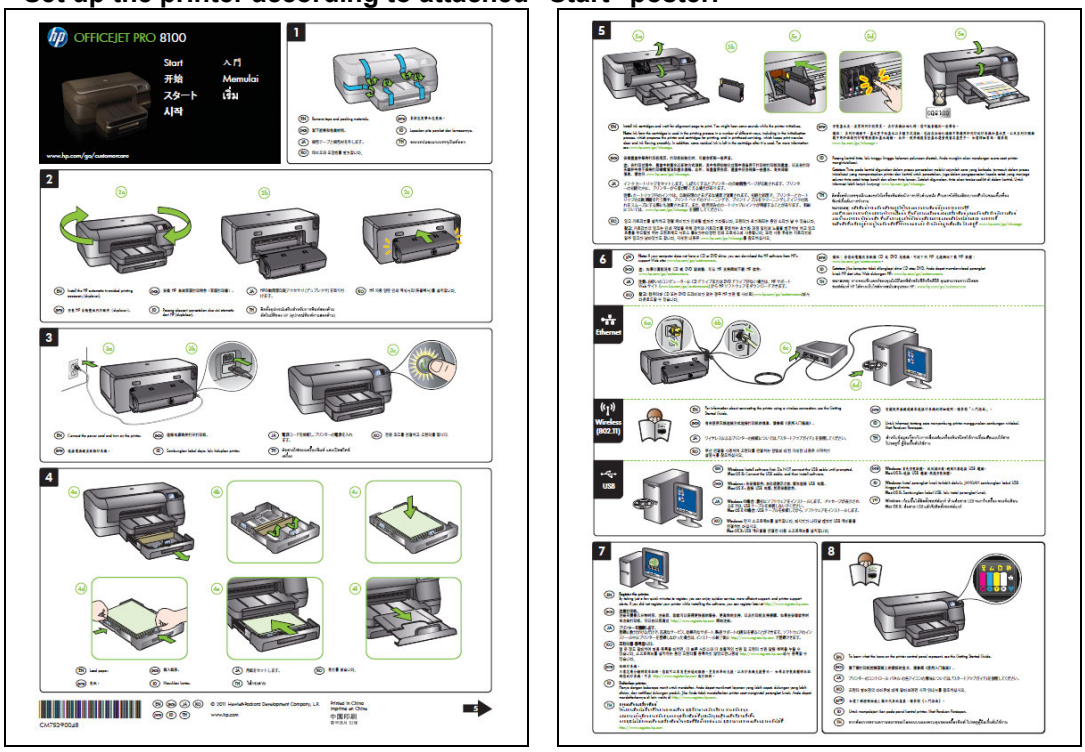
- Not necessary for setting

No	Name	Remarks
7	LAN Cable	Not used. Use the specified LAN cable.
8	USB Cable	Not used.
9	Warranty Card	Please keep it in the ship carefully.
10	Directions of print paper	Please keep it in the ship carefully.
11	Support documentation	Please keep it in the ship carefully.

5.4.2 Printer Assembly

Assemble the printer according to the following procedures.

① **Set up the printer according to attached "Start" poster.**



Example:For OfficeJetPro8100 series

② **Set some papers and push the power button.**

5.4.3 Setting Printer

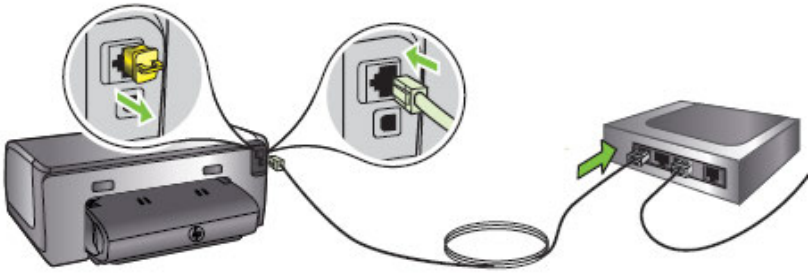
The setting method of the printer is described.
Set the printer according to the following procedures.

5.4.3.1 Connecting Power Cable and Printer LAN Cable

Connect the power cable and the LAN cable to the printer and the NQA-2443 SENSOR LAN SW respectively. Connecting location is described in the "Start" poster.



Connecting location of power cable



Connecting location of LAN cable

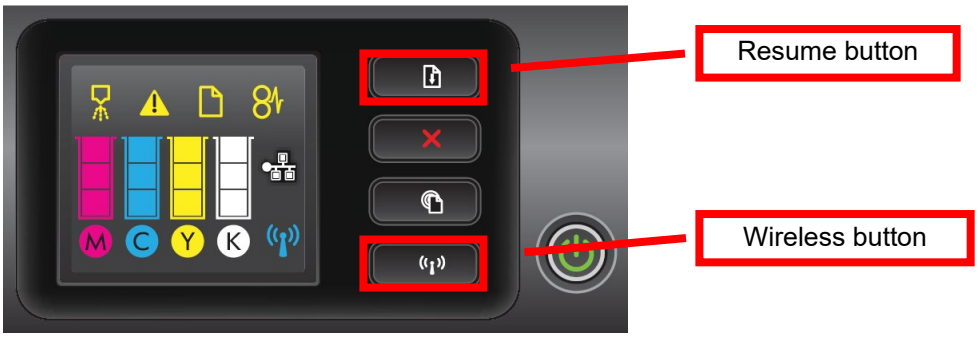
5.4.3.2 Confirming Printer IP Address

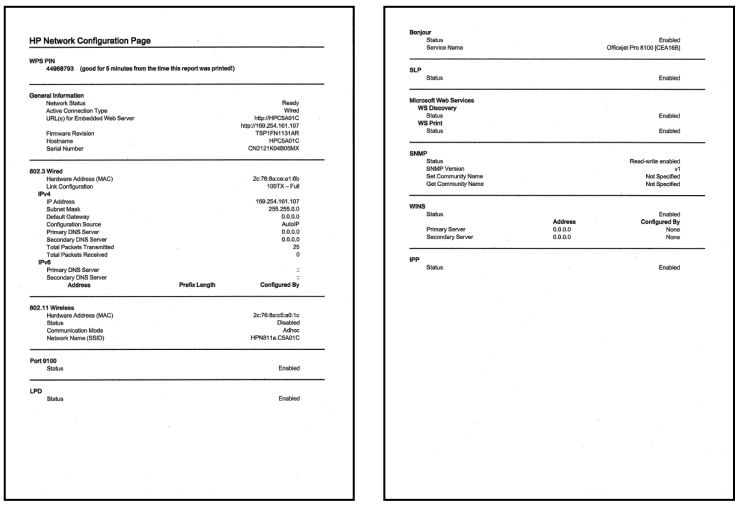
Confirm IP address of the printer according to the following procedures.

- **For OfficeJetPro8100 series**

1. **Power on Printer.**
2. **Keep pressing "Resume" button and "Wireless" button (see below diagram) at the same time.**

   Confirm that 2 pieces of paper " HP Network Configuration Page" are printed.





HP Network Configuration Page

WPS PIN
44868793 (good for 5 minutes from the time this report was printed)

General Information
Network Status Ready
Active Connection Type Wired
URL(s) for Embedded Web Server http://HPC5A01C
http://169.254.161.107
TSPIFN1131AR
Firmware Revision
Hostname HPC5A01C
Serial Number CN21K04B09MX

802.3 Wired
Hardware Address (MAC) 2c:76:8a:ce:a1:6b
Link Configuration 100TX – Full
IPv4
IP Address 169.254.161.107
Subnet Mask 255.255.0.0
Default Gateway 0.0.0.0
Configuration Source AutoIP
Primary DNS Server 0.0.0.0
Secondary DNS Server 0.0.0.0
Total Packets Transmitted 25
Total Packets Received 0
IPv6
Primary DNS Server ::
Secondary DNS Server ::
Address Prefix Length Configured By

802.11 Wireless
Hardware Address (MAC) 2c:76:8a:cc:a1:6c
Status Disabled
Communication Mode Adhoc
Network Name (SSID) HPN811a.C5A01C

Port 9100
Status Enabled

LPD
Status Enabled

Bonjour
Status Enabled
Service Name Officejet Pro 8100 [CEA16B]

SLP
Status Enabled

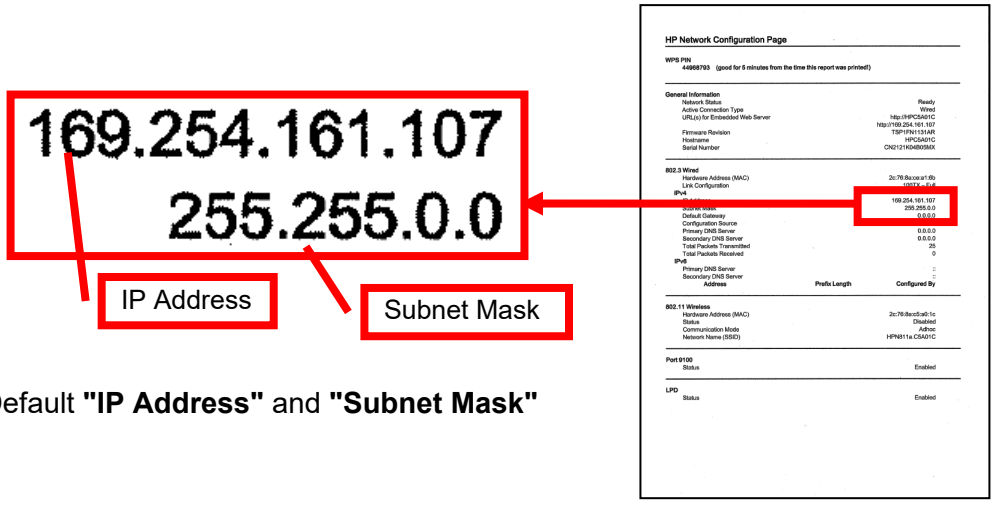
Microsoft Web Services
WS Discovery
Status Enabled
WS Print
Status Enabled

SNMP
Status Read-write enabled
SNMP Version v1
Set Community Name Not Specified
Get Community Name Not Specified

WINS
Status Enabled
Address Configured By
Primary Server 0.0.0.0 None
Secondary Server 0.0.0.0 None

IPP
Status Enabled

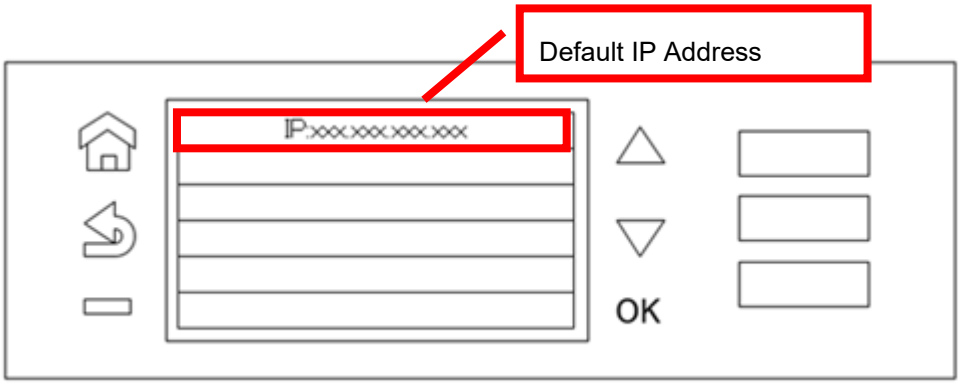
3. **Confirm default "IP Address" and "Subnet Mask" on the "HP Network Configuration Page".**



Default **"IP Address"** and **"Subnet Mask"**

● **For OfficeJetPro8200 series**

1. **Power on Printer.**
2. **Select "Network" from the home screen and press the OK button.**
   Screen of network setting is displayed.
3. **Confirm default "IP Address" .**

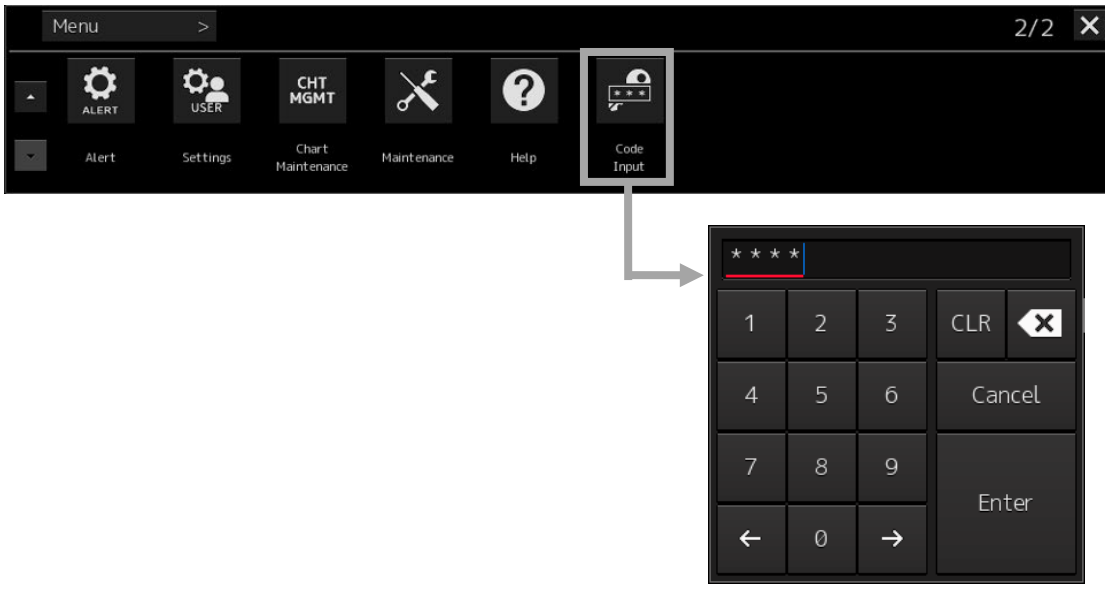


Screen image

5.4.3.3 Setting Printer IP Address

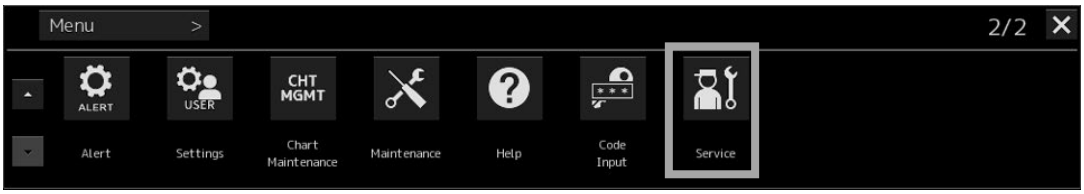
Set up the IP address of the printer according to the following procedures.

1. **Power on this equipment.**
2. **After the default task starts, click the [Menu] button of the "Left Tool Bar".**
   The **"Menu"** dialog is displayed.
3. **Click [Code Input] button.**
   The **"Password"** dialog is displayed.



4. **After the password "0009" is input with the software keyboard, click the [Enter] button.**

   The **[service]** button is added to the menu. Once the **[Service]** button is added, it will be displayed until the task menu is finished.



5. **Click the [Service] button of the "Menu" dialog.**

   The sub menu of [Service] is displayed.

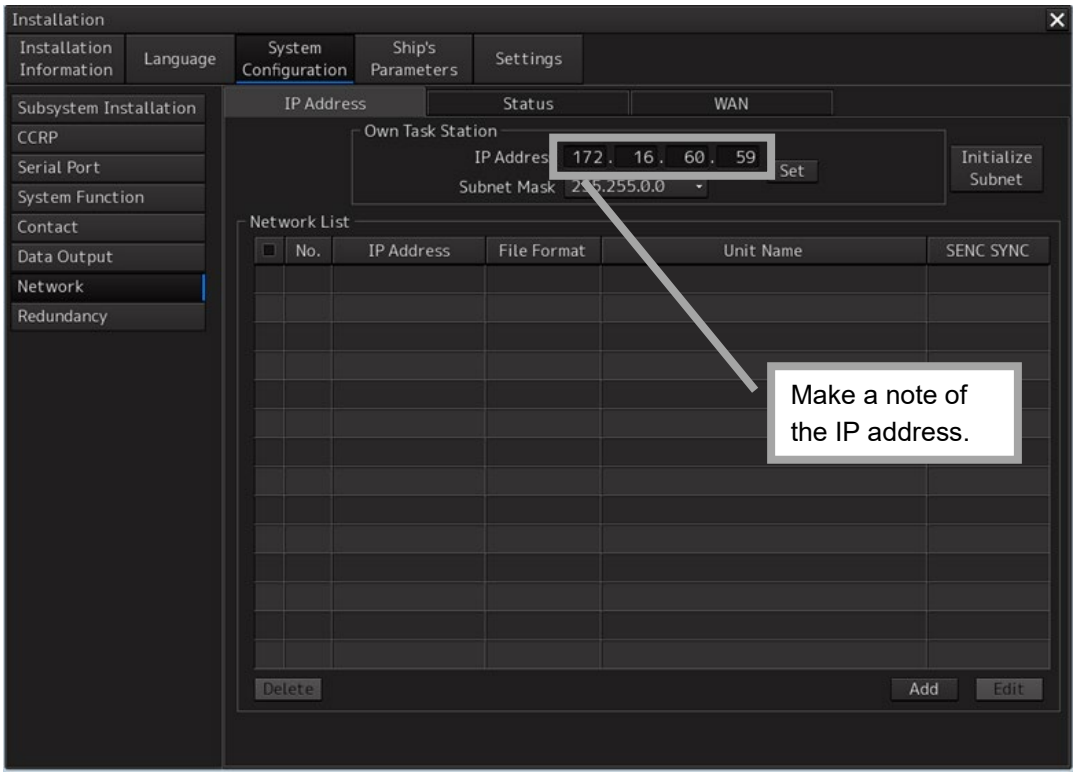


6. **Click the [Installation] button.**

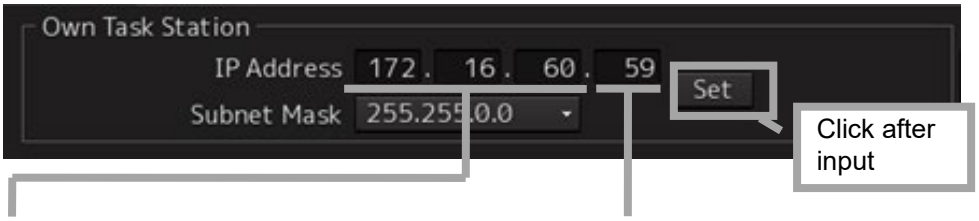
   The **"Installation"** dialog is displayed.

7. **Select [System Configuration] in the 1st classification pane and [Network] in the 2nd classification pane.**

   The **"Network"** dialog is displayed on the edit pane. Make a note of the present IP address.



8. **According to the following explanation, input the IP address of "Own Task Station" and click the [Set] button.**



1st to 3rd octet
Input the default IP address of the printer.

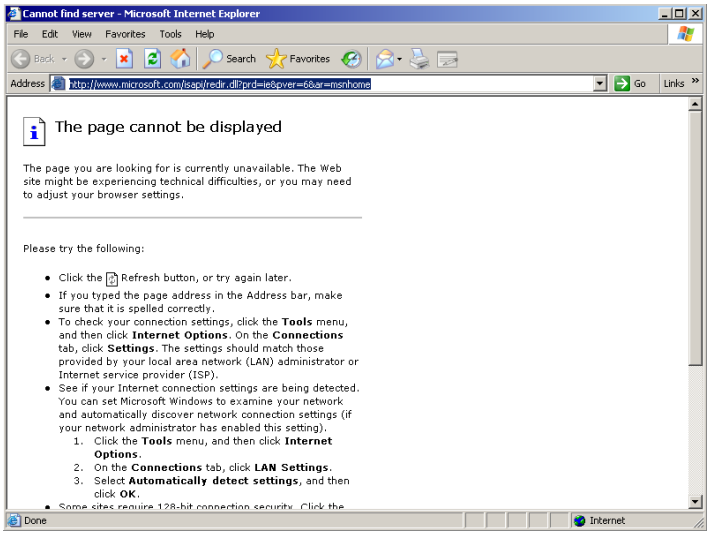
4th octet
Input a different value from the default IP address of the printer.

9. **Click the ［Code Input］ button of the "Menu" dialog. And after the password "9999" is input with the software keyboard, click the [Enter] button.**

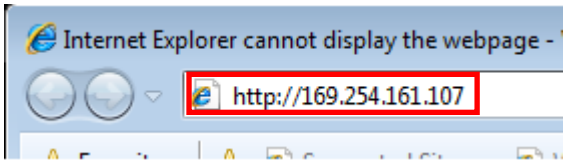
   The task is finished and it returns to the task menu screen.

10. **Input the password "0913" into the "Code input" box of the task menu screen.**

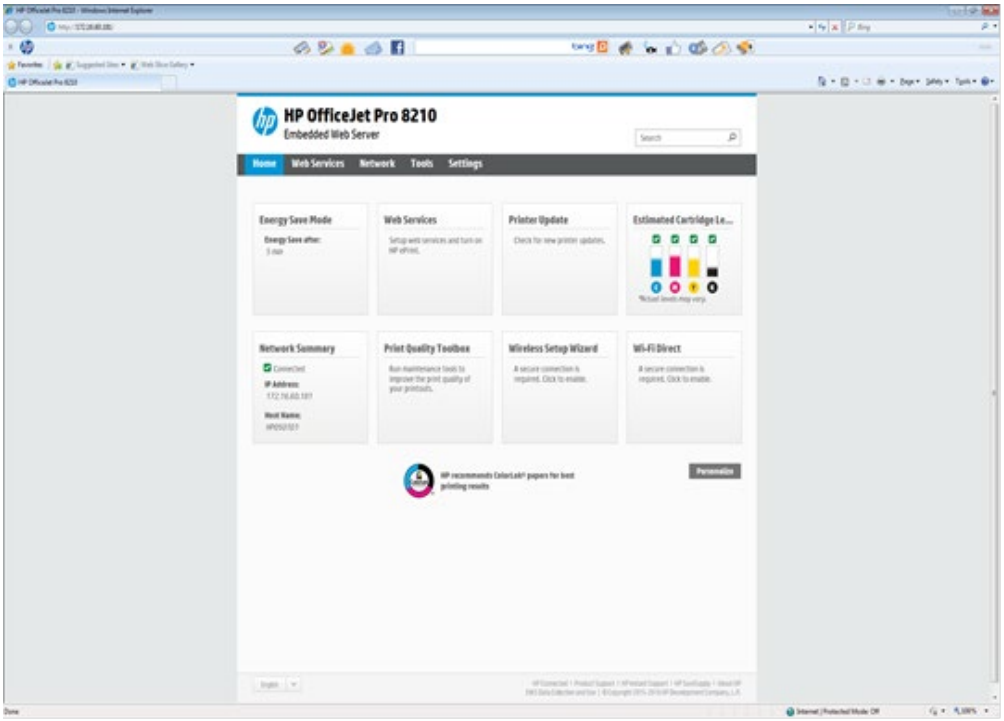
    The "Internet Explore" is displayed.



11. Input [http:///IP address of printer] into the address bar.



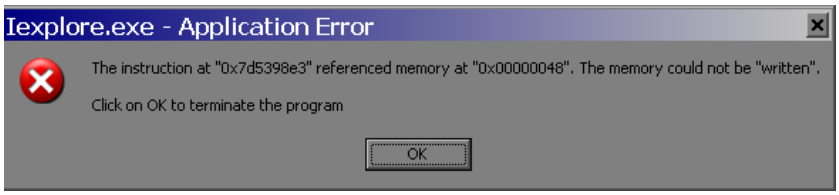
Setting page of printer is displayed.



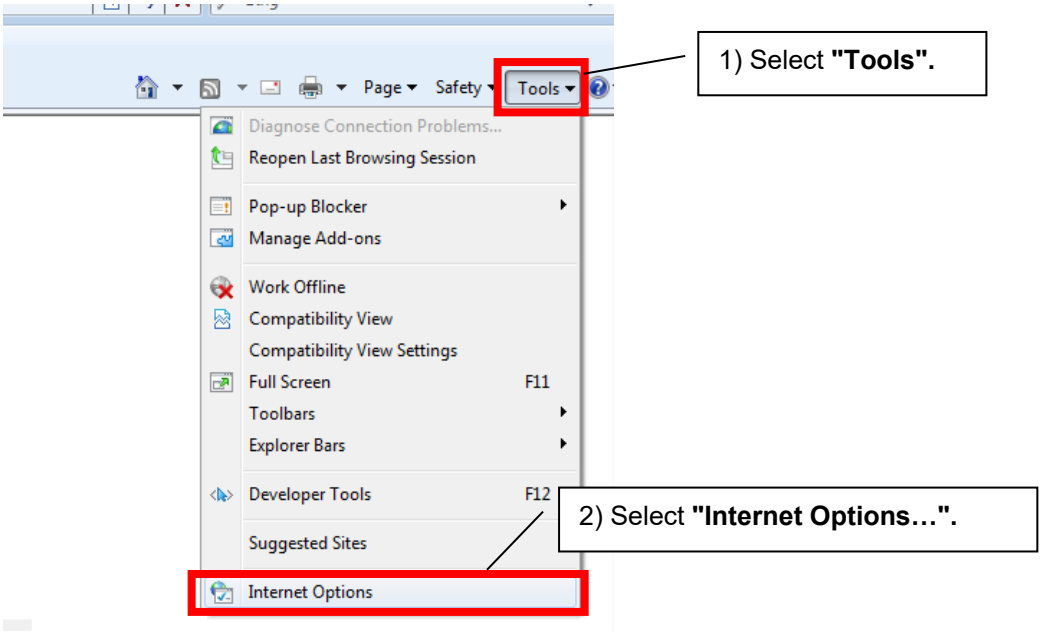
Example:For OfficeJetPro 8200 series

Note:

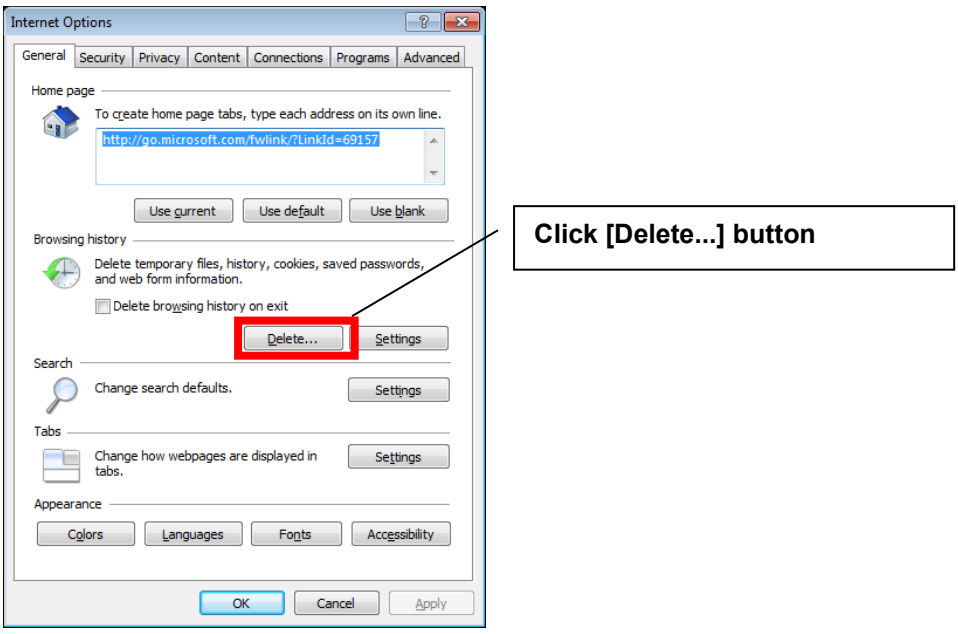
When following error is displayed, delete "Temporary Internet files" as follows.



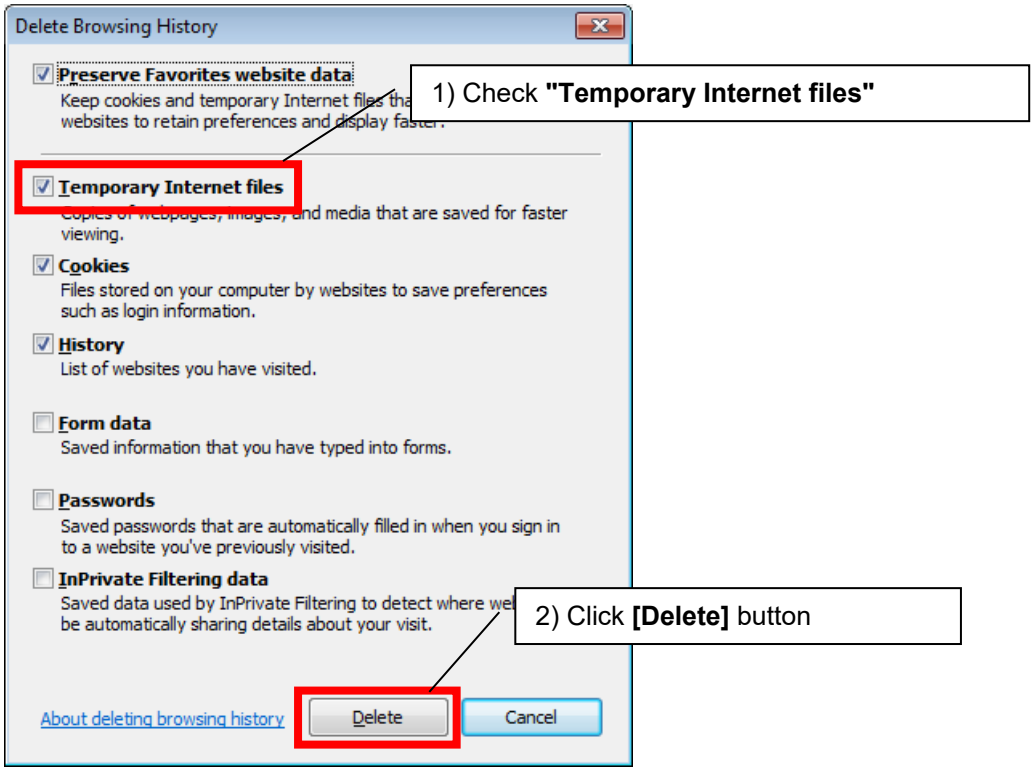
1) Start Internet explorer again. Select "Tools" - "Internet Options…"



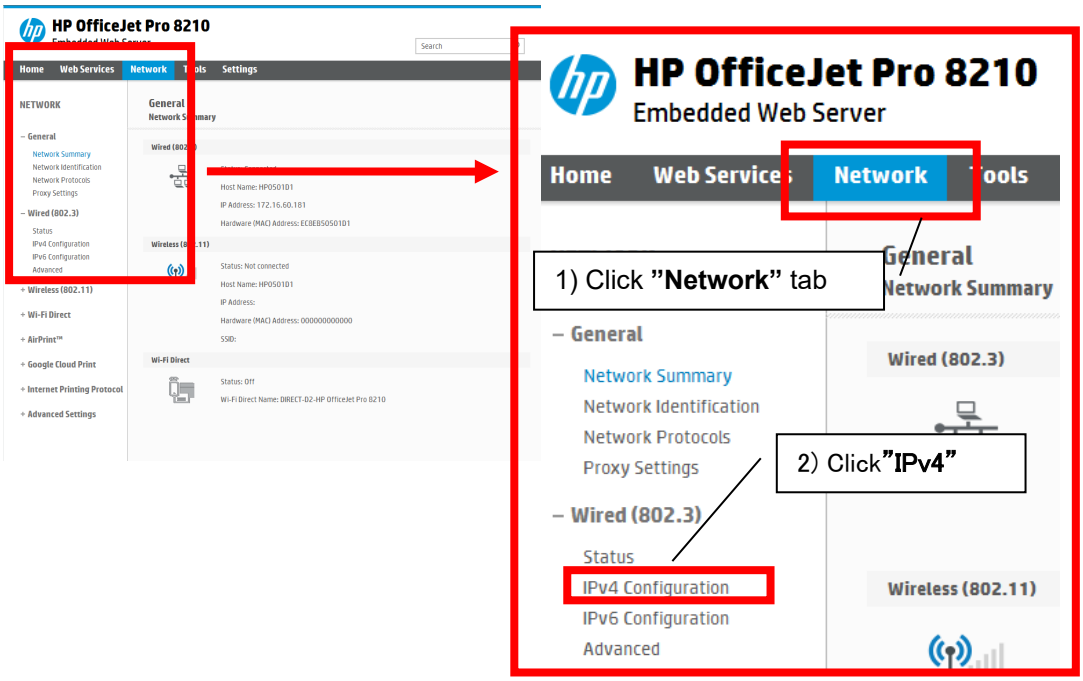
2) "Internet Options" dialog is displayed. Click [Delete...] button.



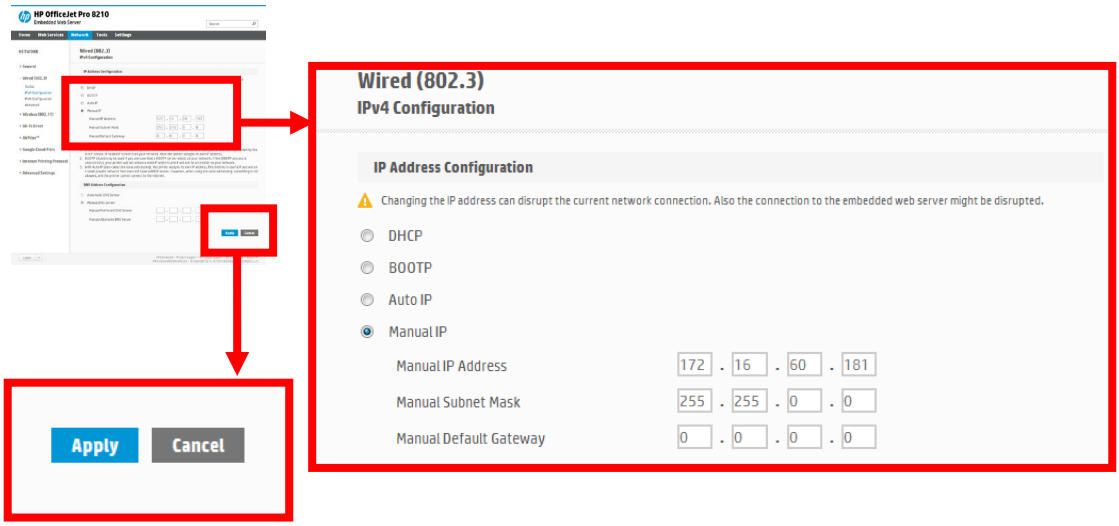
3) **"Delete Browsing History"** dialog is displayed. Check **"Temporary Internet Files"** and click **[Delete]** button.



12. Click [Network] and select "IPv4"of "Wired (802.3)".



13. Enter **"Manual IP Address"**, **"Manual Subnet Mask"** and **"Manual Default Gateway"** according to bellow diagram. After enter the value, click Apply button.

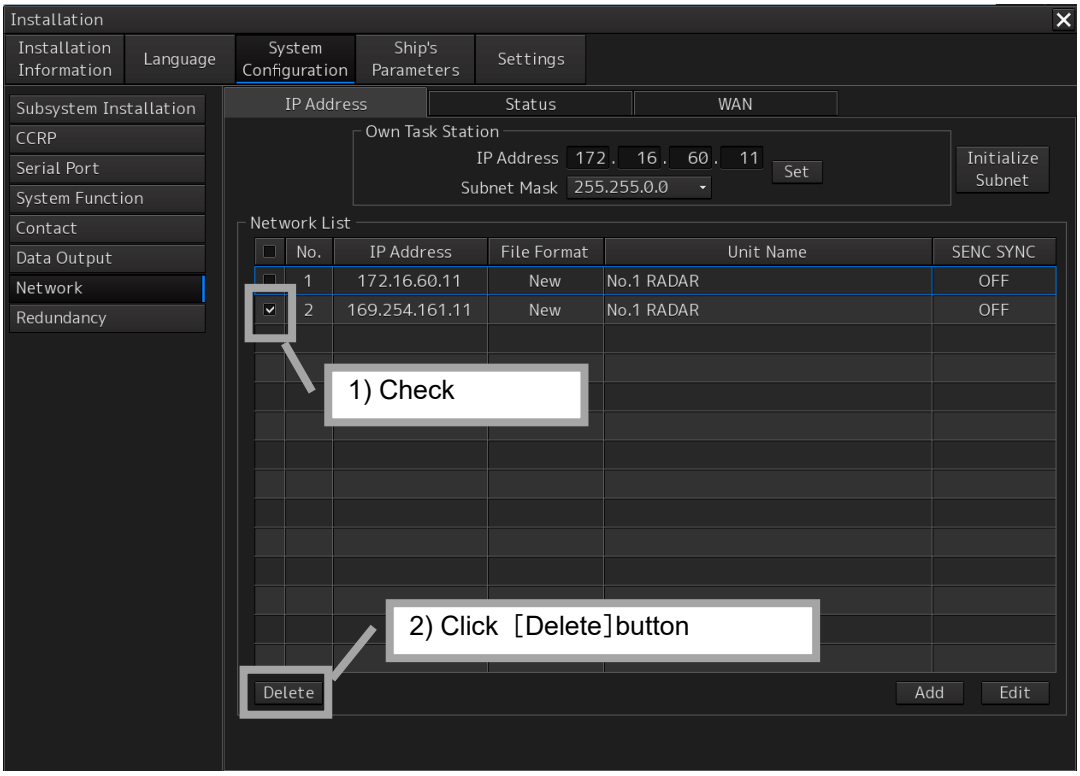


	No.1 Printer	No.2 Printer
IP Address	172.16.60.181	172.16.60.182
Subnet Mask	255.255.0.0	255.255.0.0
Default Gateway	172.16.60.225	172.16.60.225

14. After setup, close the "Internet Explore" and start a task.

15. Return the IP address of this equipment to the original value according to the procedure of 8.

16. The IP address assigned for the printer setup is added to Network List of the Network dialog. Check the line of relevance and click the [Delete] button.



5.4.4 Equipment setup

The existence of a printer is set up by equipment setup of a subsystem.

Change the equipment setup of the subsystem in the **"Subsystem Installation"** dialog.

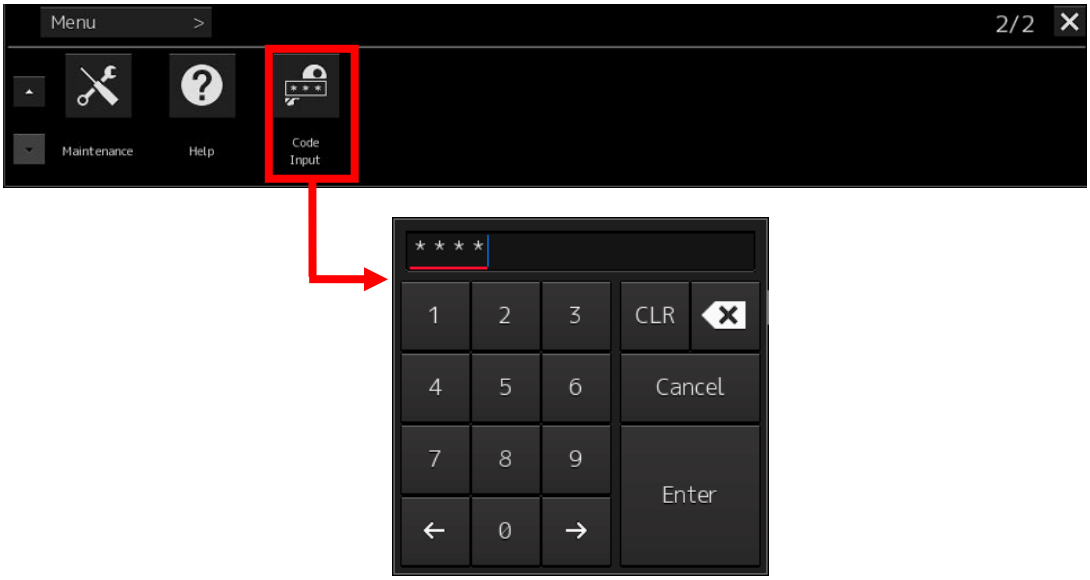
Note:
Refer to 4.4 "Subsystem Installation".

1. **Click the [Menu] button of the "Left Tool Bar".**

   The **"Menu"** dialog is displayed.

2. **Click [Code Input] button.**

   The **"Password"** dialog is displayed.



3. **After the password "0009" is input with the software keyboard, click the [Enter] button.**

   The **[service]** button is added to the menu. Once the **[Service]** button is added, it will be displayed until the task menu is finished.

4. **Click the [Service] button of the "Menu" dialog.**

   The sub menu of [Service] is displayed.

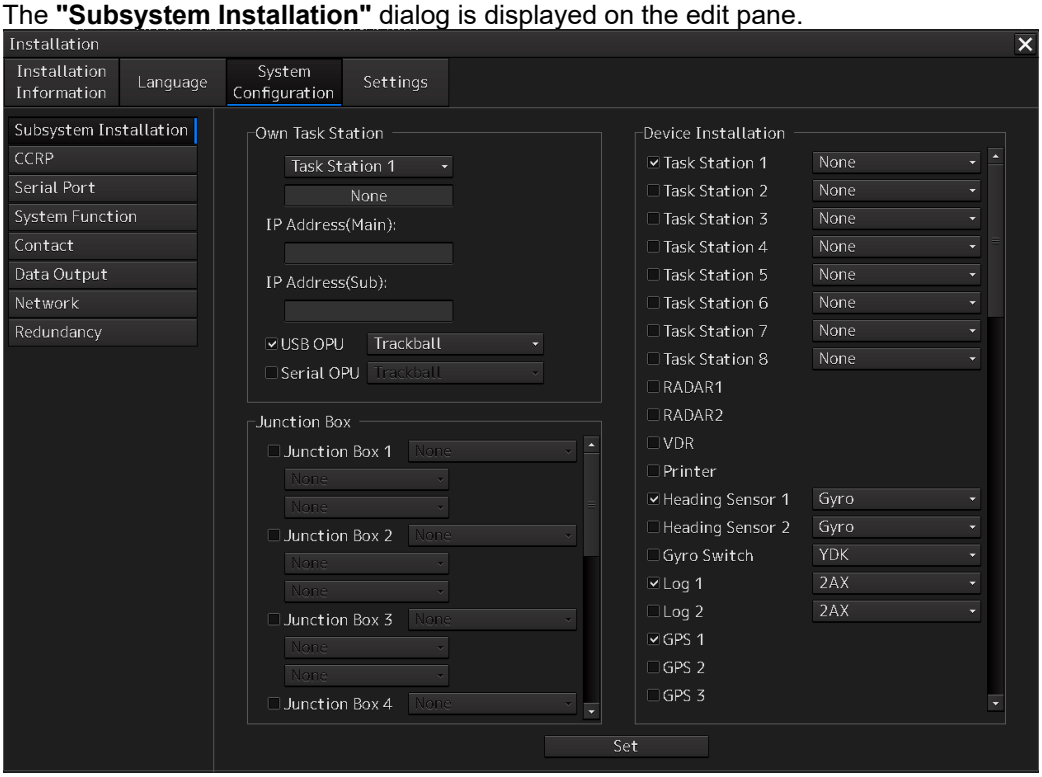


5. **Click the [Installation] button.**

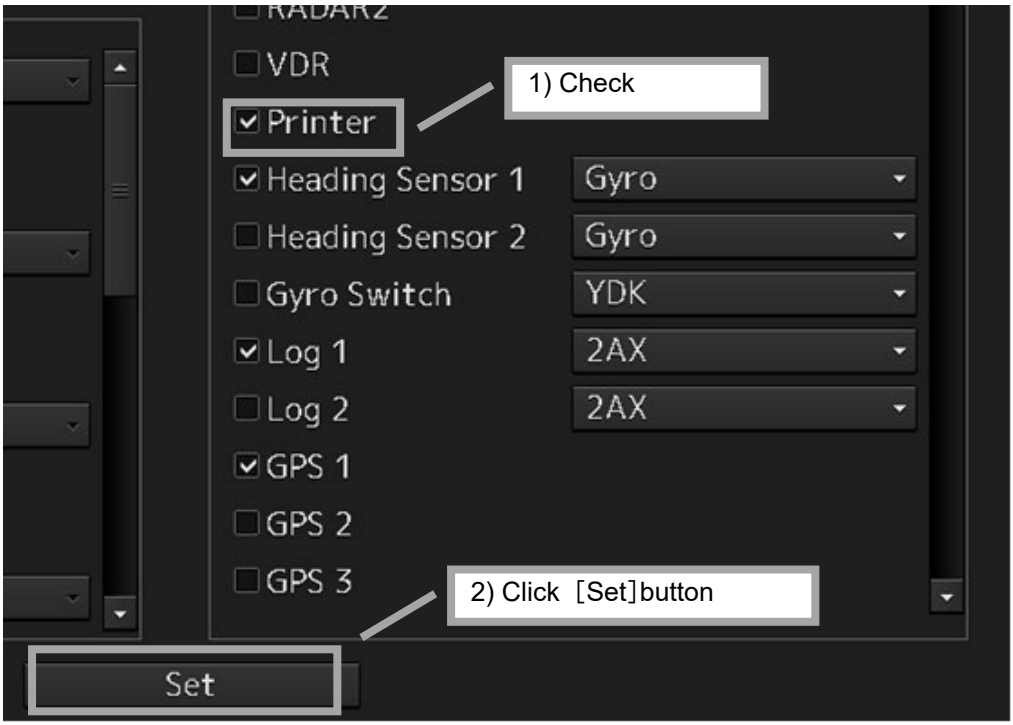
   The **"Installation"** dialog is displayed.

6. **Select [System Configuration] in the 1st classification pane and [Subsystem Installation] in the 2nd classification pane.**

The **"Subsystem Installation"** dialog is displayed on the edit pane.



7. **Check [Printer] in "Device Installation" and click the [Set] button.**

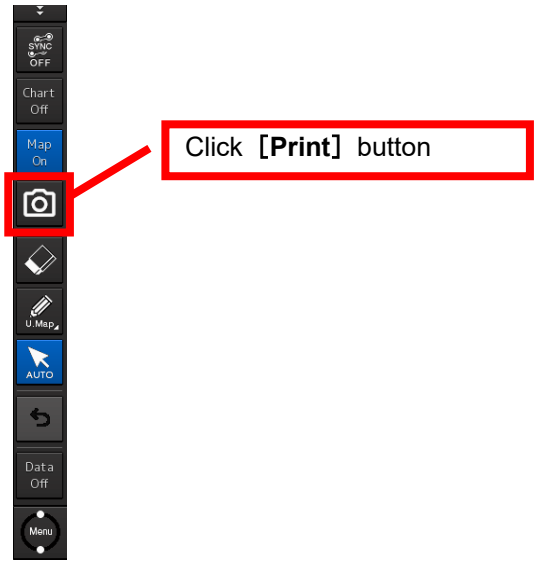


5.4.5 Confirming Printing Operation

Confirm the printer prints normally on the sheet according to the following procedures.

⚠CAUTION
Since there is no print function in "Conning Display", it cannot confirm in "Conning Display".

1. **Click the［Print］button of "Left Tool Bar".**



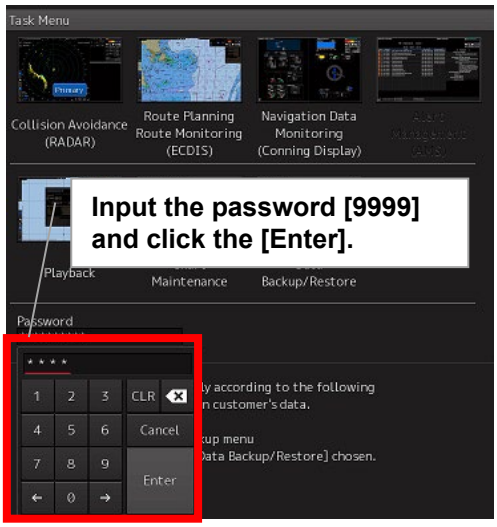
2. **Confirm a screen image on display is printed.**

When the image cannot printed

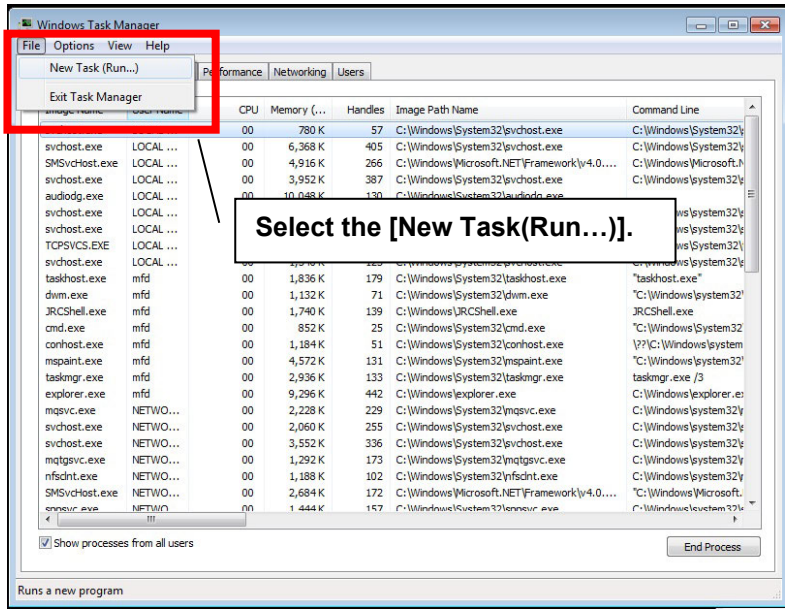
Set the printer port for each Display Unit according to the following procedures.

In the following procedures, a keyboard is required for keyboard input. When the NCE-5625 KOPU is not installed, prepare a commercially available keyboard with USB interface.

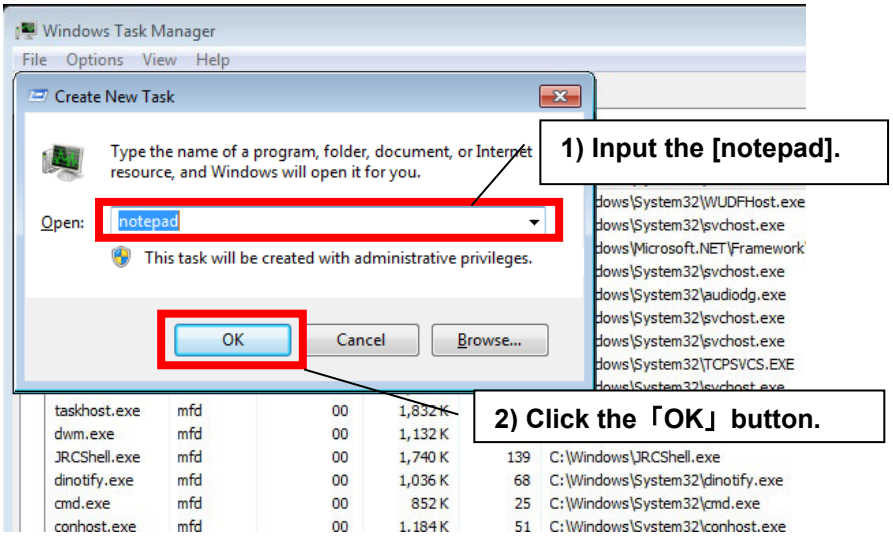
1. Input the password [9999] on the task menu, and click the [Enter]. Task manager will open.



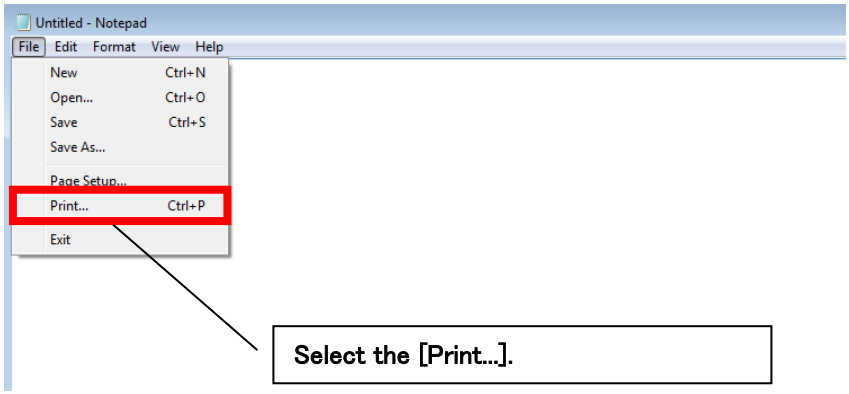
2. Select the [File]-[New Task(Run…)].



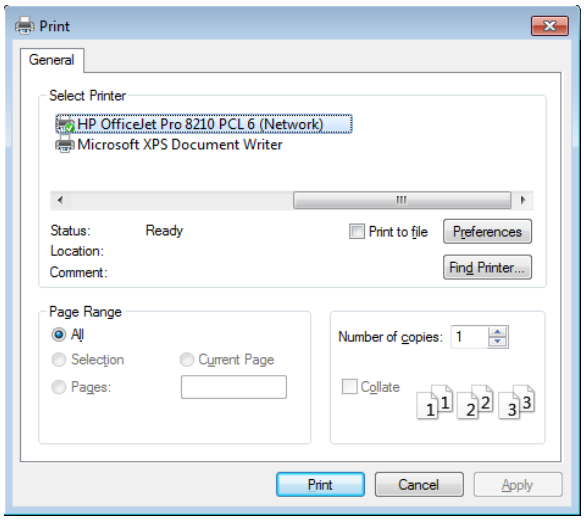
3. Following dialog opens. Input the [notepad] and click the [OK] button.



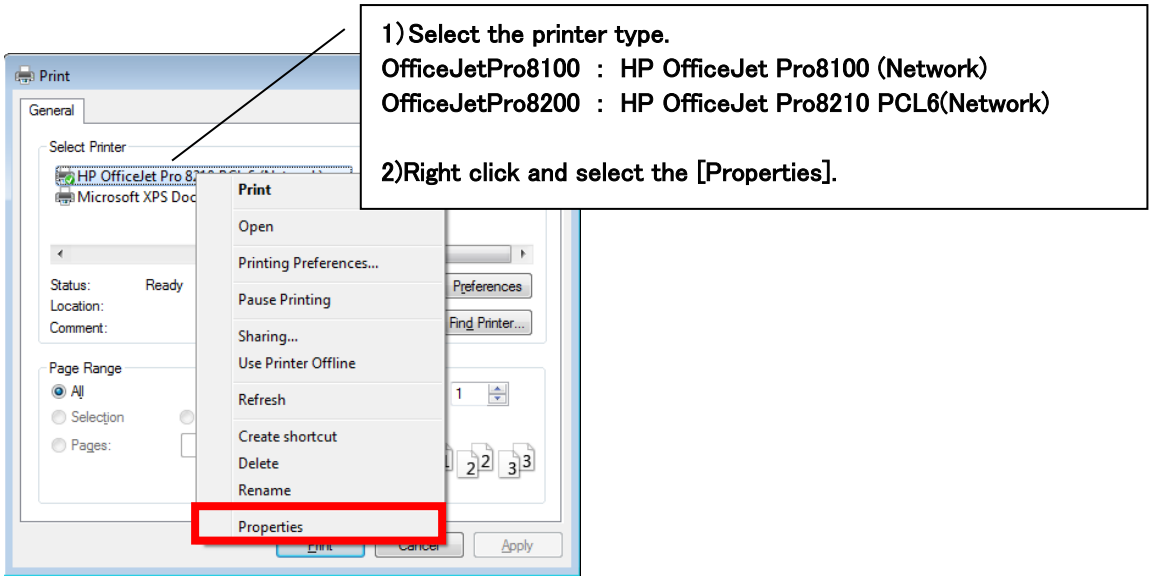
4. Click the [Print…] of [File] tab from the open notepad.



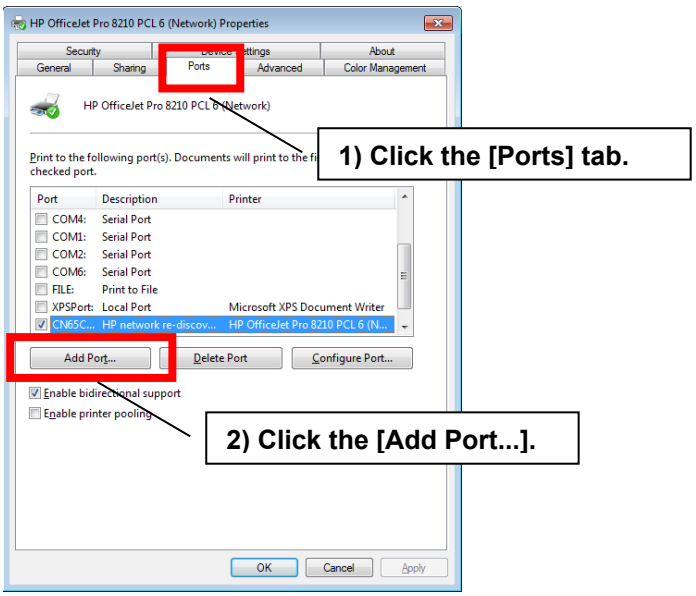
5. “Print” dialog is displayed.



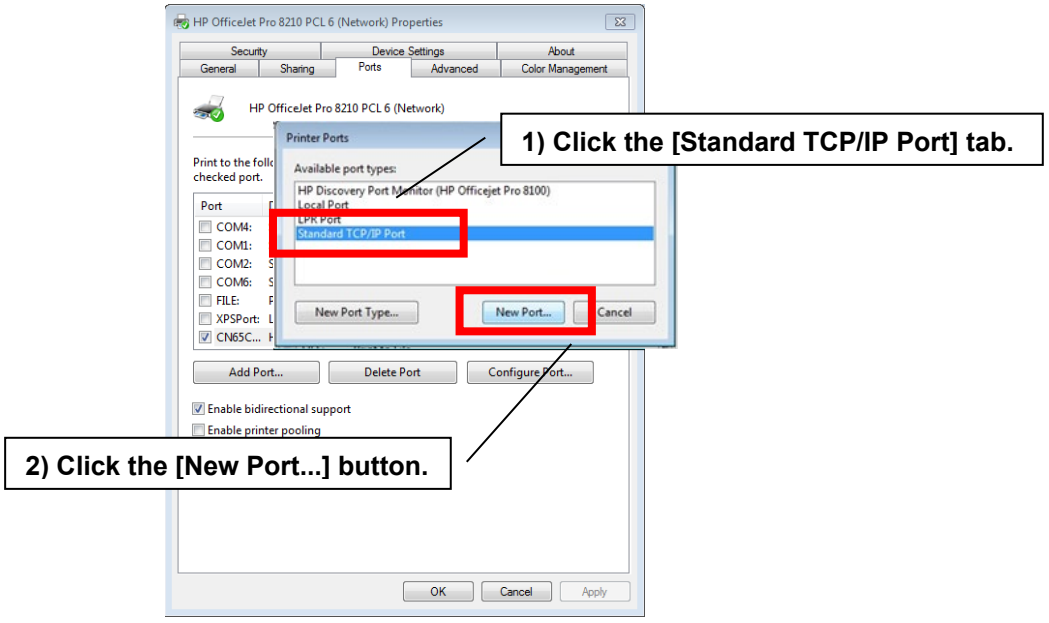
6. Select and right click the driver from “Select Printer” and select the [properties].



7. Click the [Add Port] button from [Ports] tab.

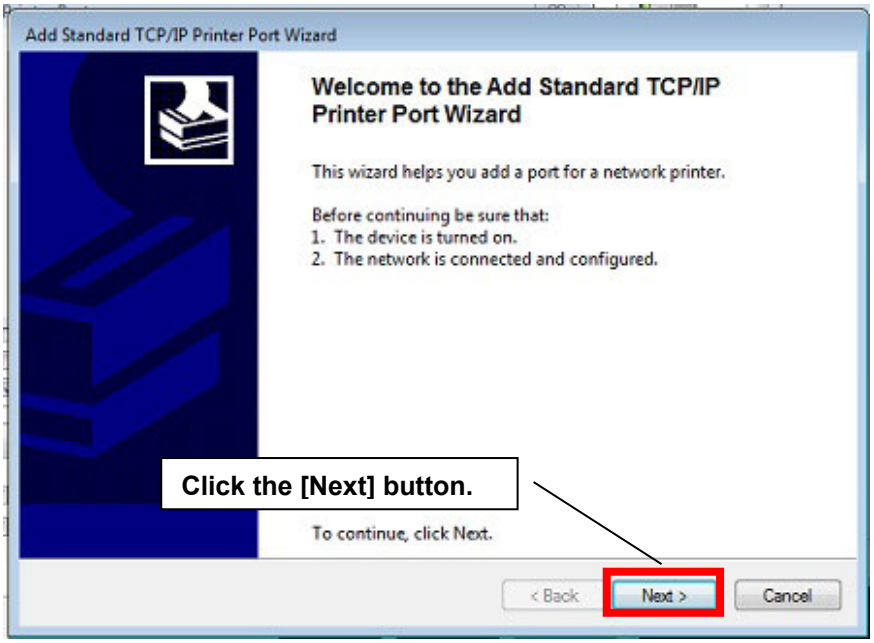


8. Select the [Standard TCP/IP Port] and click the [New Port…] button.



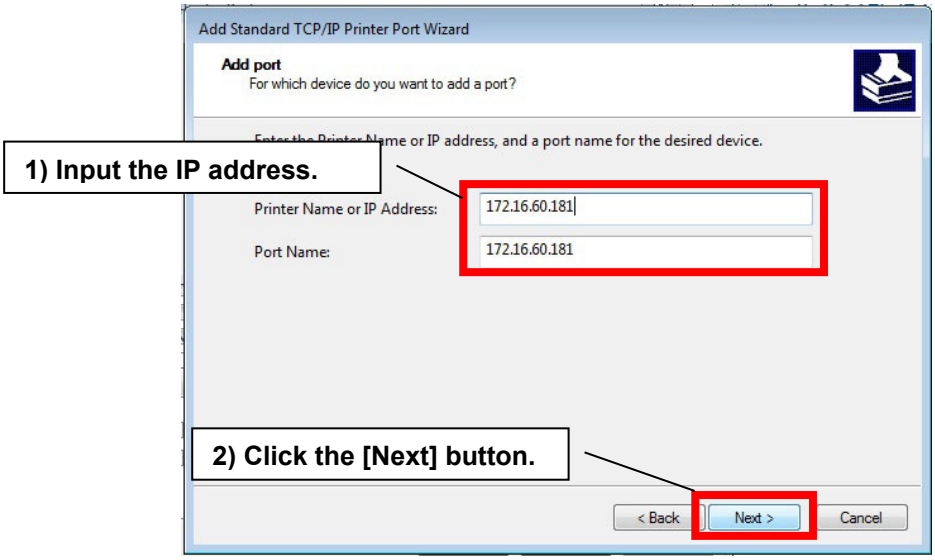
9. Following dialog opens. Check the printer is connected to the network and turned on.

After checking, click the [Next] button.

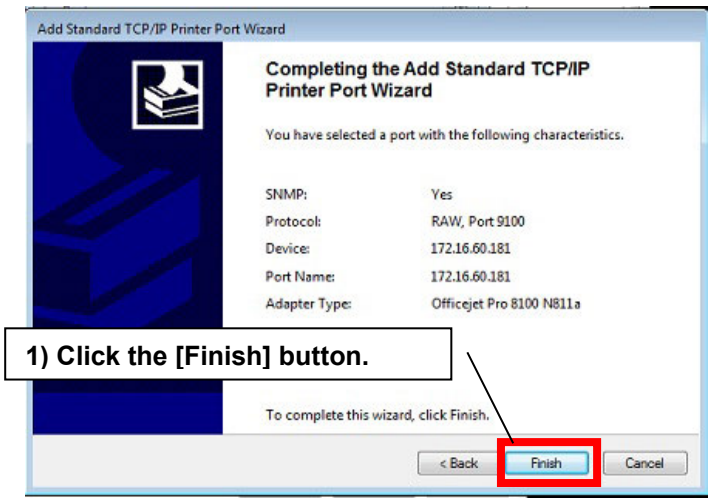


10. Input the No.1 Printer IP address-[172.16.60.181] and click the [Next] button.

When setting the No.2 Printer, input the IP address [172.16.60.182].



11. When the following screen is displayed, click the [Finish] button.



Setting of the printer port is end. Restart the display unit, and confirm a screen image on display is printed. Refer to the **5.4.5 Confirming Printing Operation.**

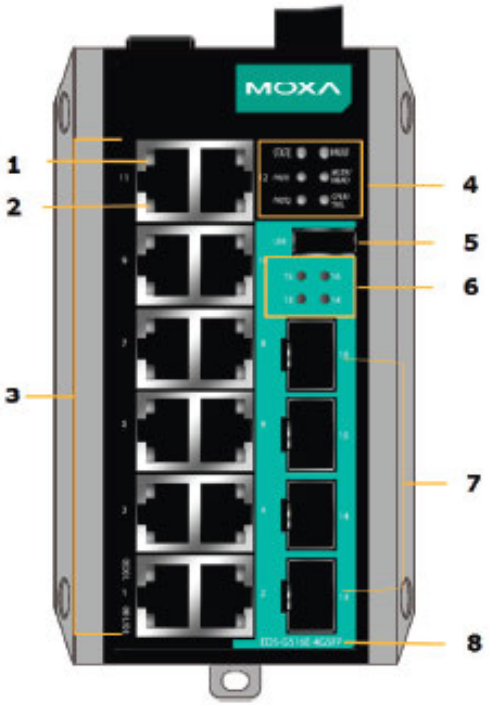
12. Set the other display unit about the printer port by the same procedure (When the image cannot print 1-11).

Setting of the printer port is end above.

5.5 Connecting managed Ethernet switches

When using managed Ethernet switches (same meaning as HUB), install and set the switches according to the procedure that is described below.

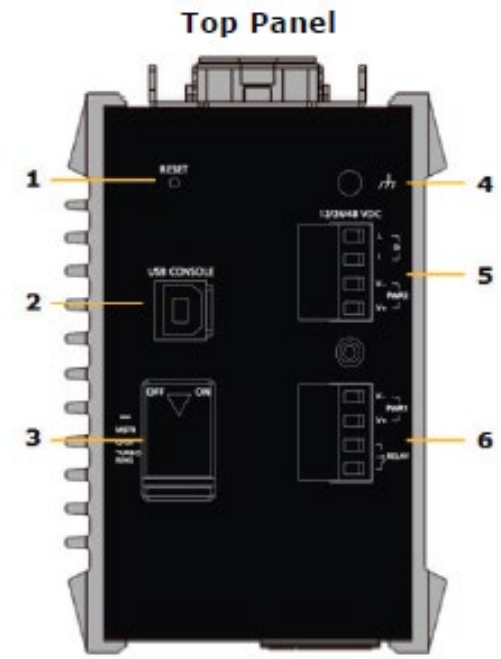
5.5.1 Setting managed Ethernet switches



EDS-G516E-4GSFP

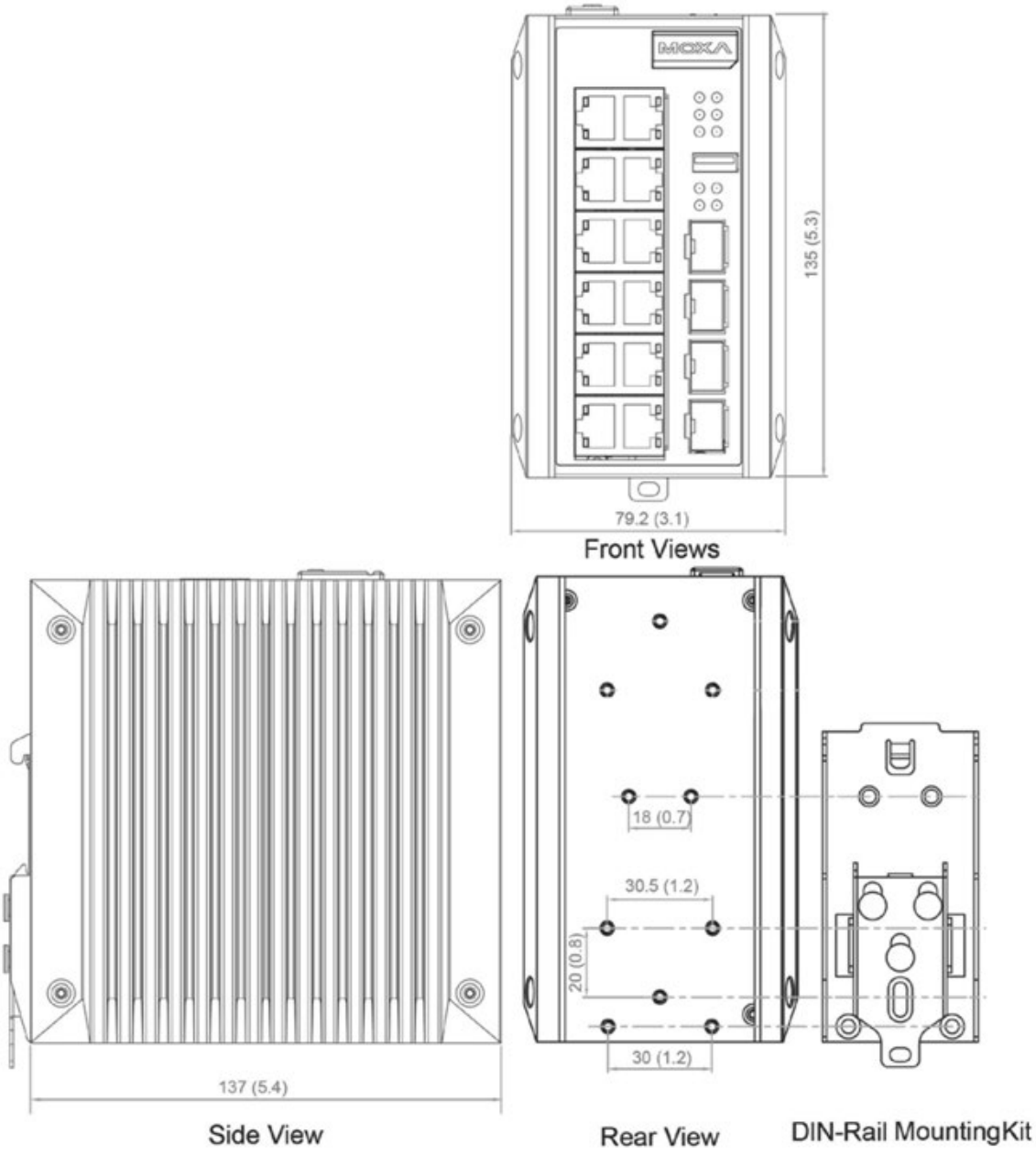
Front Panel

1. 1000BaseT(X) LED indicator
2. 10/100BaseT(X) LED indicator
3. 10/100/1000BaseT(X) ports
   EDS-G508E: 1 to 8
   EDS-G512E-4GSFP: 1 to 8
   EDS-G516E-4GSFP: 1 to 12
4. System status LED
   - STATE LED indicator
   - PWR1 LED indicator
   - PWR2 LED indicator
   - FAULT LED indicator
   - MSTR/HEAD LED indicator
   - CPLR/TAIL LED indicator
5. USB storage port
6. SFP port LED indicator
   EDS-G512E-4GSFP: 9 to 12
   EDS-G516E-4GSFP: 13 to 16
7. 100/1000BaseSFP slots
8. Model Name



Top Panel

1. Reset button
2. USB console port
3. DIP switches for Turbo Ring, Ring Master and Ring Coupler
4. Grounding screw
5. 4-pin terminal block for digital input and power input 2
6. 4-pin terminal block for relay output and power input 1



ATTENTION

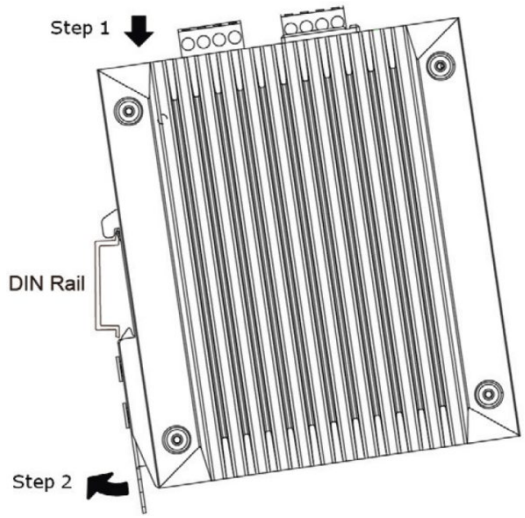
Do not look into the SFP connectors directly.

This equipment is a Class 1 Laser/LED product, so looking into the connectors directly may cause serious damage to your eyes.

*SFP connectors: Four unused connectors on the right side

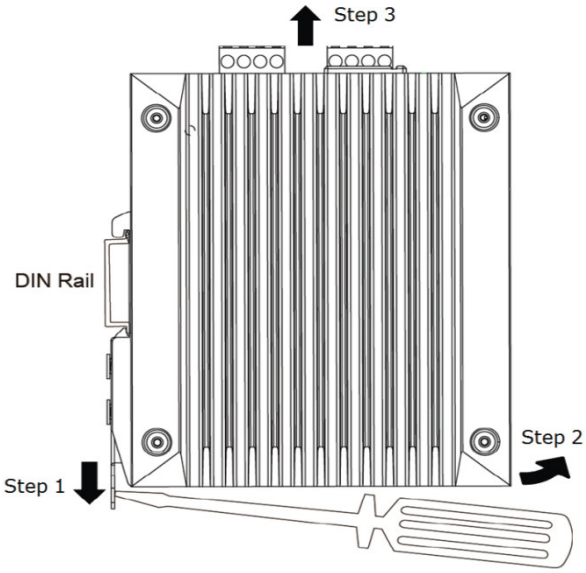
Fig 5-20: Outline Drawing of EDS-G516E-4GSFP-T

5.5.1.1 Installation



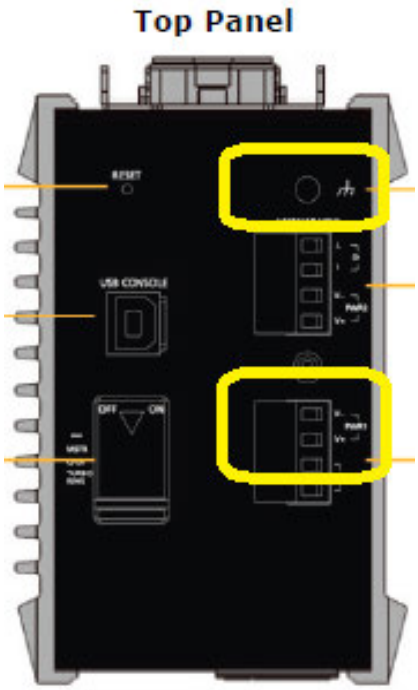
1) Insert the upper lip of the DIN rail into the DIN-rail mounting kit.
2) Press the EDS-G516E-4GSFP-T towards the DIN rail until it snaps into place.

5.5.1.2 Removal



1) Pull down the latch on the mounting kit with a flat-head screwdriver.
2) Slightly pull the EDS-G516E-4GSFP-T forward
3) Lift up to remove it from the DIN rail.

5.5.1.3 Cabling the power supply



1) Firstly, connect the ground terminal to the hull ground.
2) Remove power supply terminal block PWR1 from the top panel of the unit and connect the on-board DC power supply to V-/V+.
3) Fix the cable by using a small flat-head screw driver. At this time, make sure that the covering is not meshed in.
4) Make sure that the cable is fixed by pulling it lightly.
5) Insert and connect the terminal block to the top panel of the unit.
6) After turning on the power supply, check the LED lighting statuses.
   STATE: Lit Green
   PWR1: Lit Amber

5.5.2 Setting managed Ethernet switches

5.5.2.1 Setting IP addresses of managed Ethernet switches

Change the IP addresses of the managed Ethernet switches by using the following procedure.

Note
When setting an IP address, turn on the power supply of the managed Ethernet switches one by one and then connect it with the indicator. Be sure to turn on the power supply of only the target switch and not to turn on the power supply of any other managed Ethernet switch. (Pull out the power supply terminal block on the top panel of the unit.)

At the factory shipment, the IP addresses of all the managed Ethernet switches are set to 192.168.127.253. If connection is made by turning on multiple managed Ethernet switches by mistake, different IP addresses cannot be assigned to individual switches and the same IP address will be assigned to all the switches.

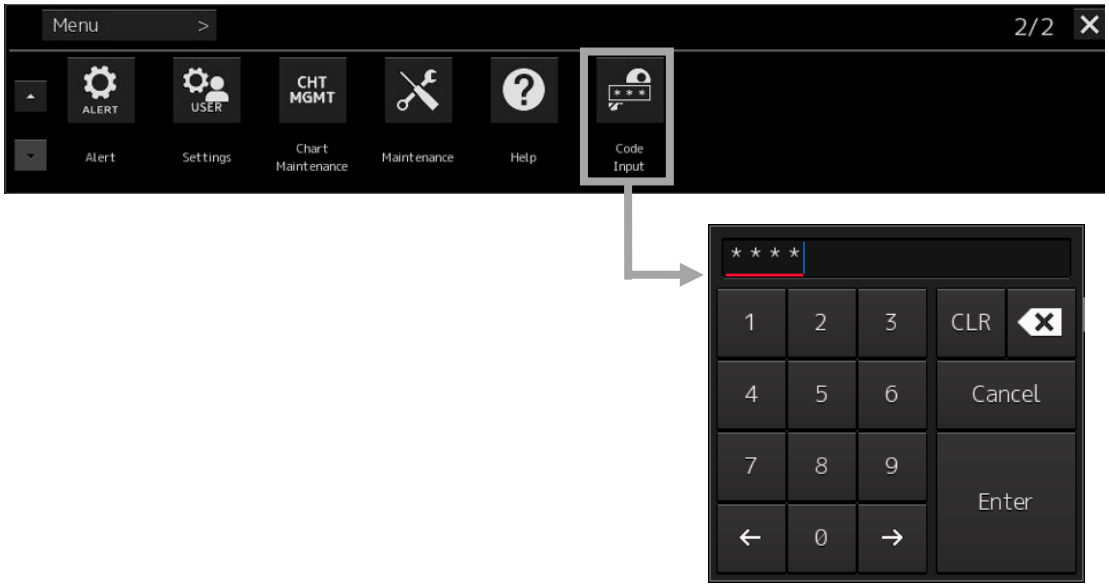
1. **Make sure that the indicator and the managed Ethernet switch are connected by a LAN cable.**
2. **Turn on the power supply of one managed Ethernet switch to be set. Do not turn on the power supply of any other managed Ethernet switch. (Disconnect the power supply terminal block at the top panel of the unit.)**
3. **Press the power supply button of any of the indicators (RADAR/ECDIS/Conning Display).**
   The task menu is displayed.

4. **After the default task starts, click the [Menu] button of the "Left Tool Bar".**

   The **"Menu"** dialog is displayed.

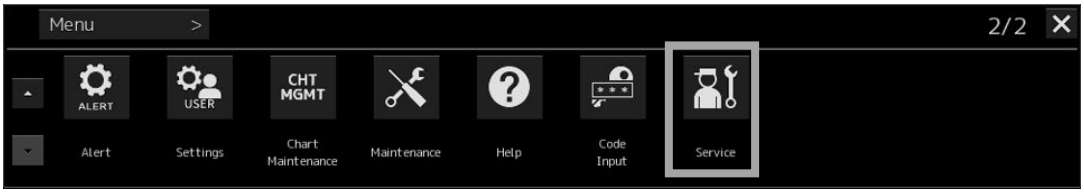
5. **Click [Code Input] button.**

   The **"Password"** dialog is displayed.



6. **After the password "0009" is input with the software keyboard, click the [Enter] button.**

   The **[service]** button is added to the menu. Once the **[Service]** button is added, it will be displayed until the task menu is finished.



7. **Click the [Service] button of the "Menu" dialog.**

   The sub menu of [Service] is displayed.

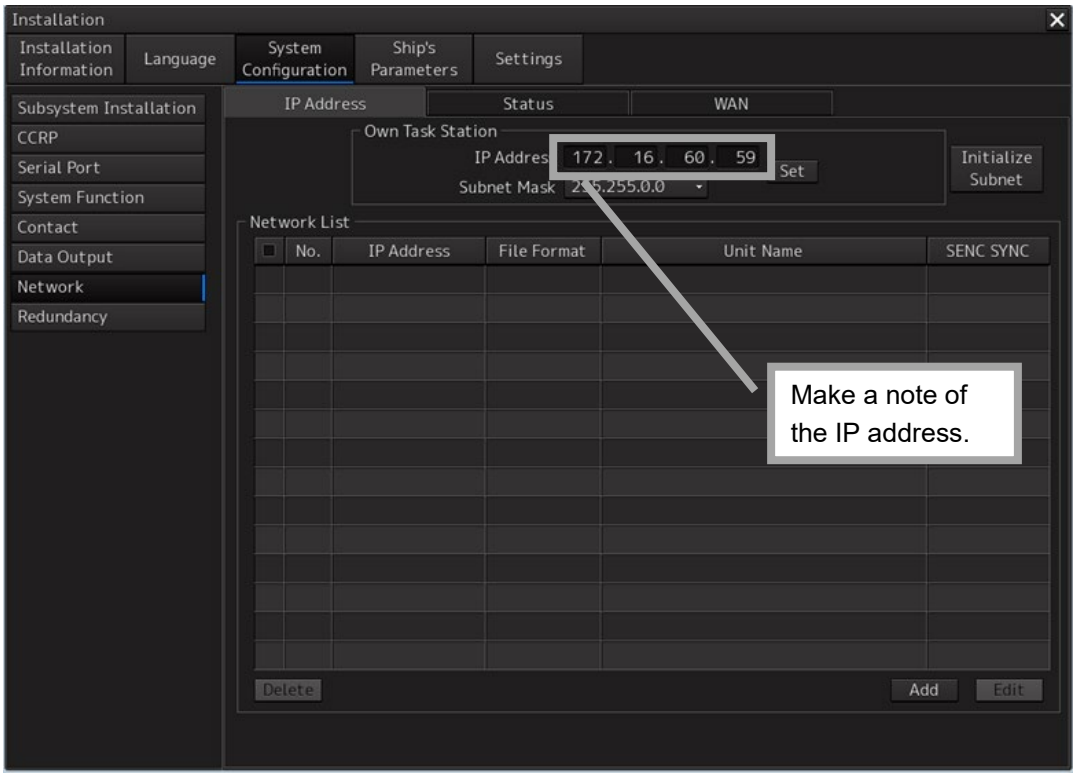


8. **Click the [Installation] button.**

   The **"Installation"** dialog is displayed.

9. Select [System Configuration] in the 1st classification pane and [Network] in the 2nd classification pane.

The **"Network"** dialog is displayed on the edit pane. Make a note of the present IP address.



10. According to the following explanation, input the IP address of "Own Task Station" and click the [Set] button.



1st to 3rd octet
Input the default IP address of the managed Ethernet switches (192.168.127).

For example: 192.168.127.100

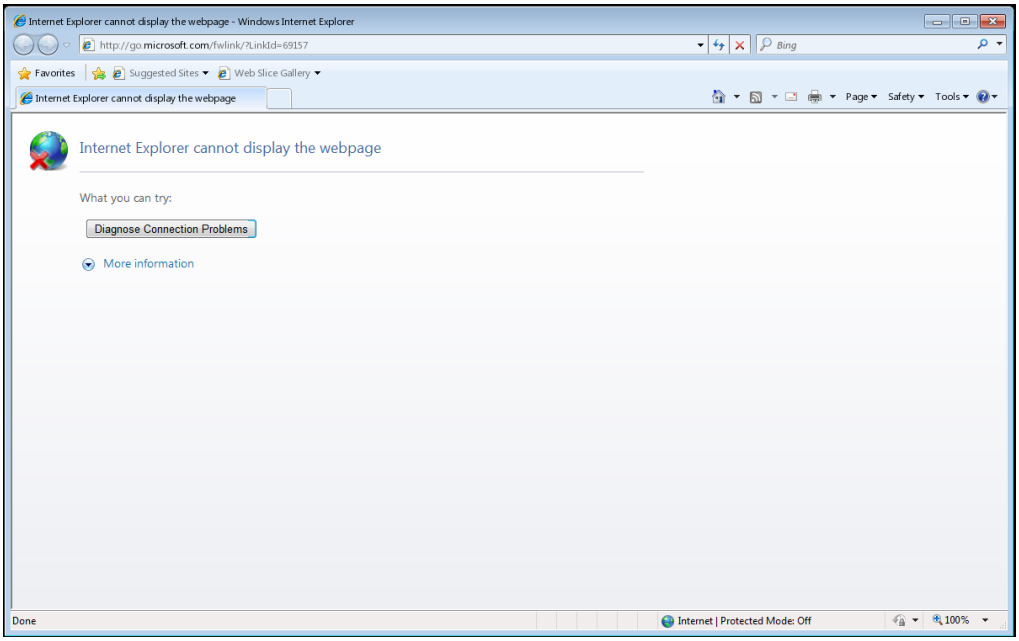
4th octet
Input a different value from the default IP address (253) of the managed Ethernet

11. Click the［Code Input］button of the "Menu" dialog. And after the password "9999" is input with the software keyboard, click the [Enter] button.

The task is finished and it returns to the task menu screen.

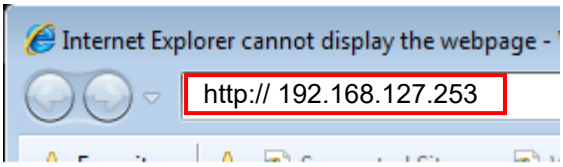
12. Enter password 0913 in the password box of the task menu.

Internet Explorer is displayed.

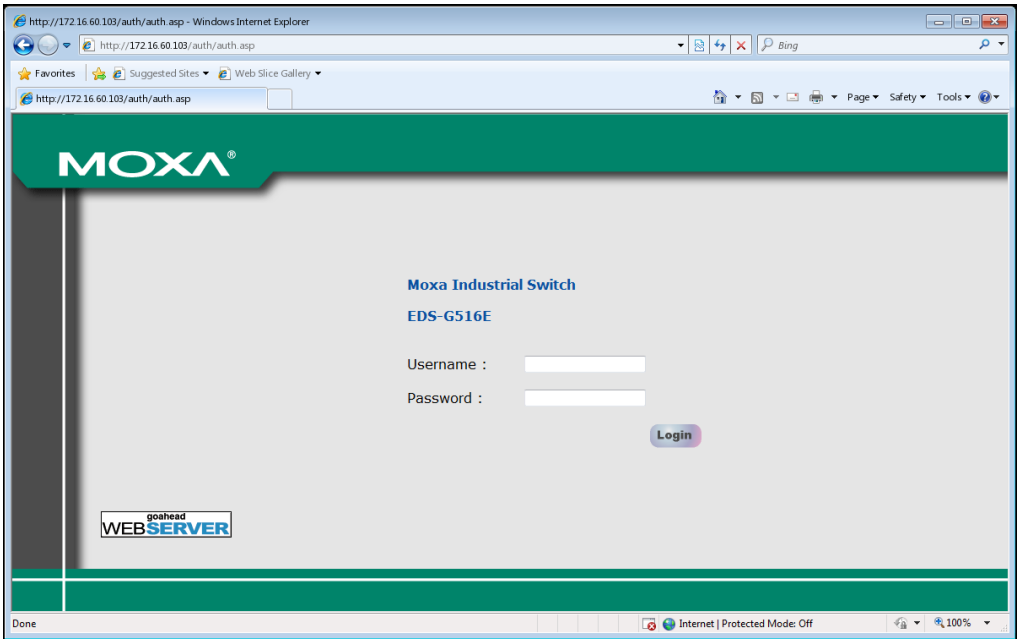


13. Enter [http://192.168.127.253] in the address field.

192.168.127.253 is the IP address of the managed Ethernet switch at the factory shipment.



A login page of “Moxa Industrial Switch” is displayed.

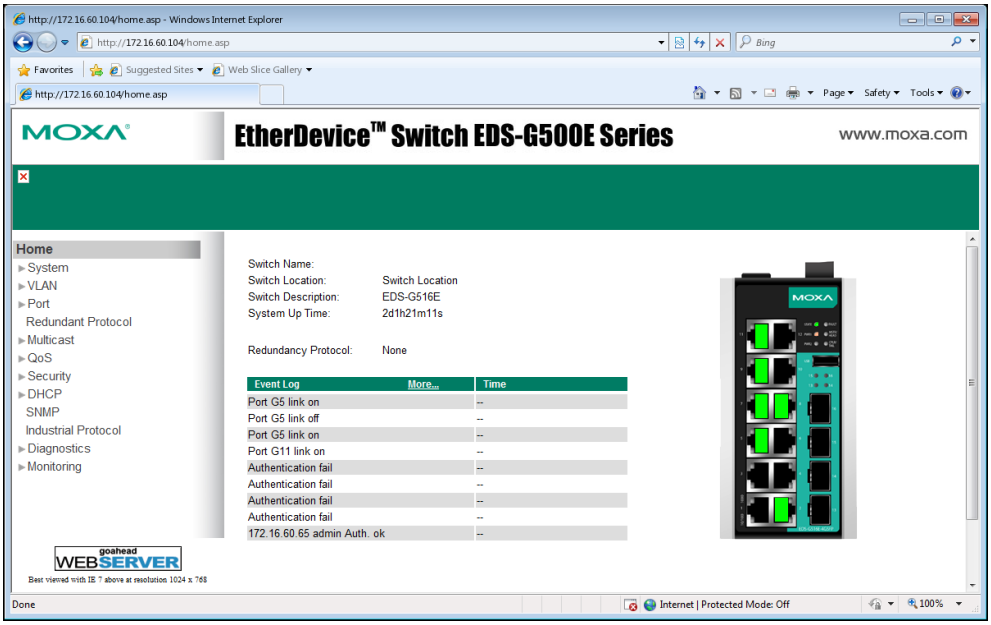


14. Enter the following information in Username and Password.

Username: admin

Password: moxa

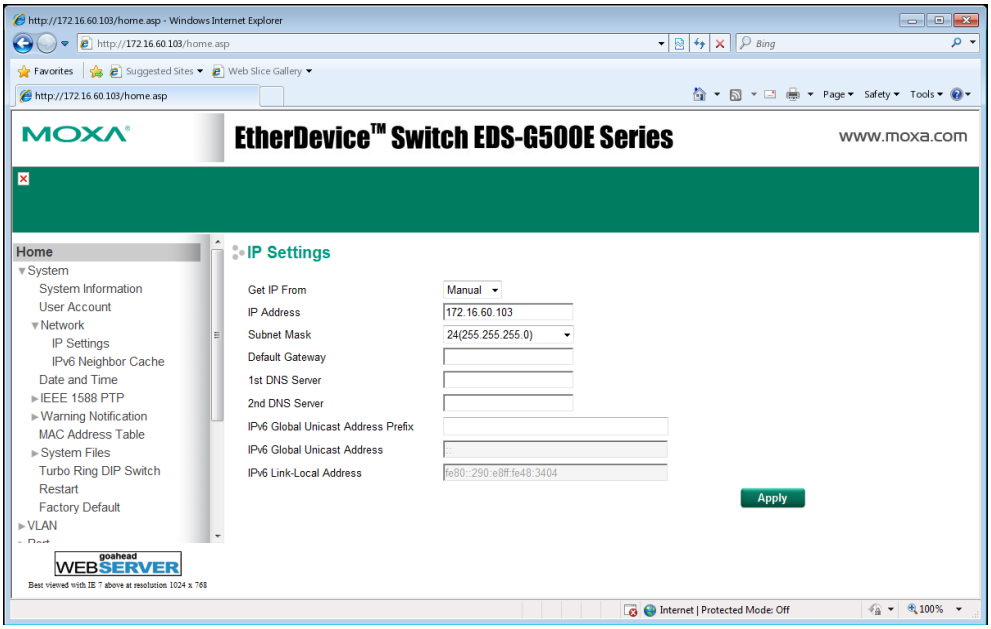
The top page is displayed.



A green icon is displayed for the port to which the equipment is connected.

15. Select [System]-[Network]-[IP Settings] from the menu on the left side of the screen.

The IP Settings screen is displayed.



16. Set the IP Address according to the roles shown below.

- HUB-1 for Main LAN: 172.16.60.103
- HUB-2 for Main LAN: 172.16.60.104
- HUB-1 for Sub LAN: 172.17.60.103
- HUB-2 for Sub LAN: 172.17.60.104

17. Press the [Apply] button.

The setting is applied.

18. Please repeat steps 4 to 14 and log in again from the login screen.

In step 10, set the IP address as follows, and in step 13, enter the IP address set in step 16.



1st to 3rd octet
-If the IP address of the HUB for the Main LAN was set in step 16, input 172.16.60.

- If the IP address of the HUB for the Sub LAN was set in step 16, input 172.17.60.

4th octet
Input a different value from the IP address (103 and 104) of the managed Ethernet switches.

For example:

When the IP address of the HUB for the Main LAN is set: 172.16.60.11

When the IP address of the HUB for the Sub LAN is set: 172.17.60.11

Note: The fourth octet is different for each MFD model. Please be careful not to overlap addresses.

5.5.2.2 Setting loop protection of managed Ethernet switches

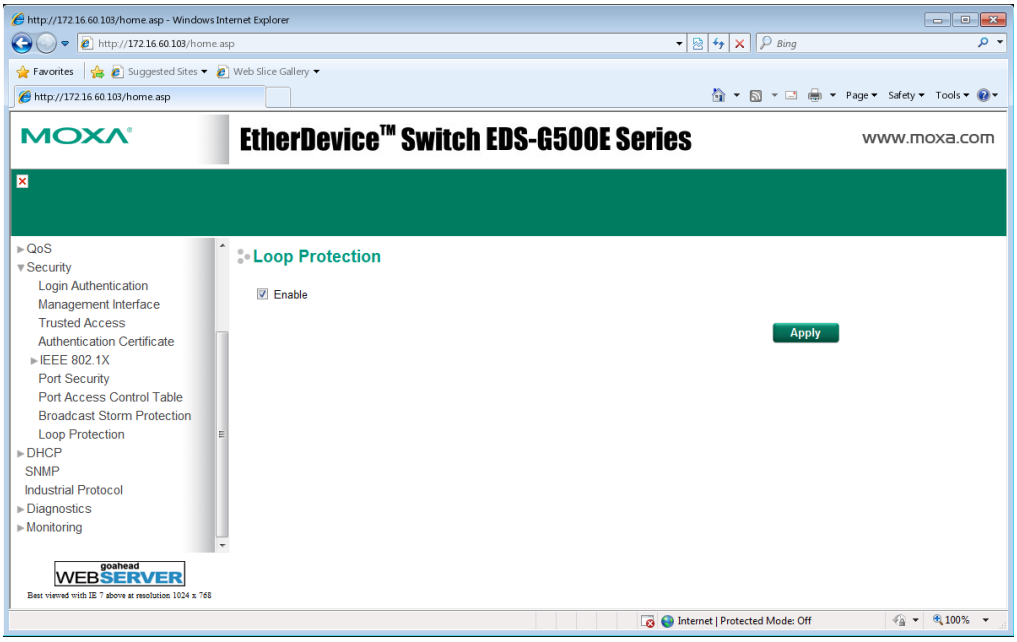
Change the setting of the loop protection of managed Ethernet switches according to the procedure described below. Loop protection is a function that monitors communication failures caused by the loop configuration of a network and, at the occurrence of a loop, blocks the faulty port automatically to prevent communication failures.

Note

- Set loop protection for all the managed Ethernet switches one by one. If this setting is not performed, the function for blocking the port with a communication fault is disabled at the occurrence of a communication failure that is caused by the loop configuration.

1. Select [Security]-[Loop Protection] from the menu on the left side of the screen.

The Loop Protection screen is displayed.



2. Check the [Enable] check box.

At the factory shipment, [Enable] is not checked.

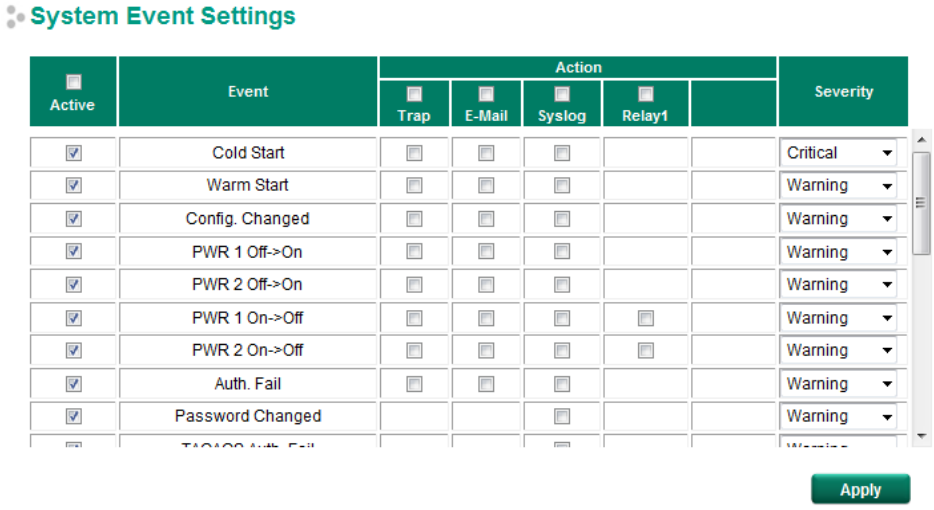
3. Press the [Apply] button.

The setting is applied.

5.5.2.3 Setting managed Ethernet switch system events

Traffic monitoring can be performed with a managed Ethernet switch.
The MFD inquires the amount of traffic of the managed Ethernet switch, and issues Maintenance INFO if the amount exceeds the threshold value, and then clears the Maintenance INFO if the amount falls below the threshold value.

1. **Select [System]-[Warning Notification]-[System Event logs] from the menu on the left side of the screen.**
   System Event Settings screen is displayed.



2. No setting changes are required for the INS. Check if the settings for INS are the default values.

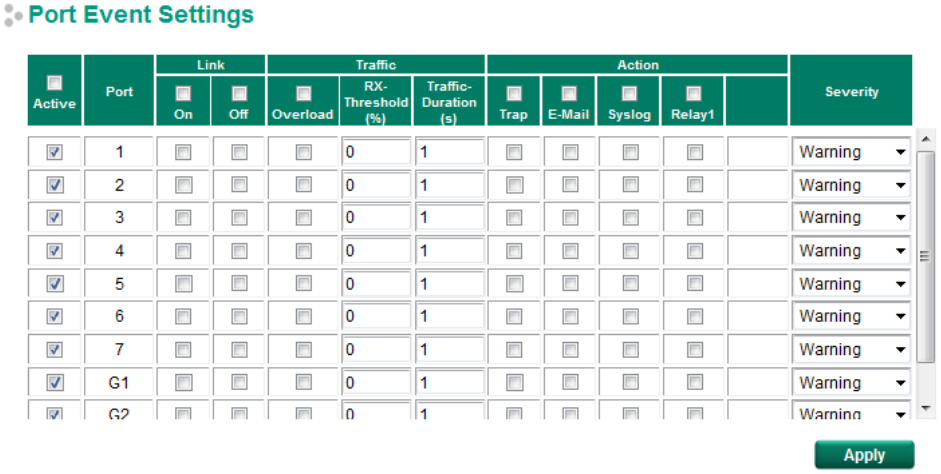
System Event Settings

Active	Event	Action					Severity
		Trap	E-Mail	Syslog	Relay1		
☑	Cold Start	☑	☐	☑			Critical
☑	Warm Start	☑	☐	☑			Warning
☑	Config. Changed	☑	☐	☑			Warning
☑	PWR 1 Off->On	☑	☐	☑			Warning
☑	PWR 2 Off->On	☑	☐	☑			Warning
☑	PWR 1 On->Off	☑	☐	☑	☐		Warning
☑	PWR 2 On->Off	☑	☐	☑	☐		Warning
☑	Auth. Fail	☑	☐	☑			Warning
☑	Password Changed			☑			Warning
☑	TACACS Auth. Fail			☑			Warning
☑	Radius Auth. Fail			☑			Warning
☑	Topology Changed	☑	☐	☑			Warning
☑	Coupling Changed	☑	☐	☑			Warning
☑	Master Changed	☑	☐	☑			Warning
☑	RSTP Root Changed	☑		☑			Warning
☑	RSTP Topo. Changed	☑		☑			Warning
☑	Turbo Ring Break				☐		Warning
☑	DI 1 On		☐	☑	☐		Warning
☑	DI 1 Off		☐	☑	☐		Warning
☑	ABC-02 Status			☑			Warning
☑	Web Login			☑			Warning
☑	Rate Limited On (Disable Port)	☑		☑			Warning
☑	Rate Limited Off (Disable Port)	☑		☑			Warning
☑	Port Looping	☑		☑			Warning
☑	LLDP Table Changed	☑					Information

3. Select [System]-[Warning Notification]- [Port event settings] from the menu on the left side of the screen.

Port Event Settings screen is displayed.

[UI display setting]



The items that can be set on the UI are shown below. (○: Settable)

Port event	Timing for sending warning e-mail	Trap	Syslog
Link-ON	When the port is connected	○	○
Link-OFF	When the port is disconnected	○	○
Traffic-Overload	When the port traffic exceeds the threshold value	○	○
Traffic-Threshold (%)	Traffic excess threshold value		
Traffic-Duration (sec.)	Traffic excess event detection interval (1 to 300 sec) A warning occurs when the average traffic in this duration exceeds the threshold value.		

[INS setting]

Make settings as shown below.

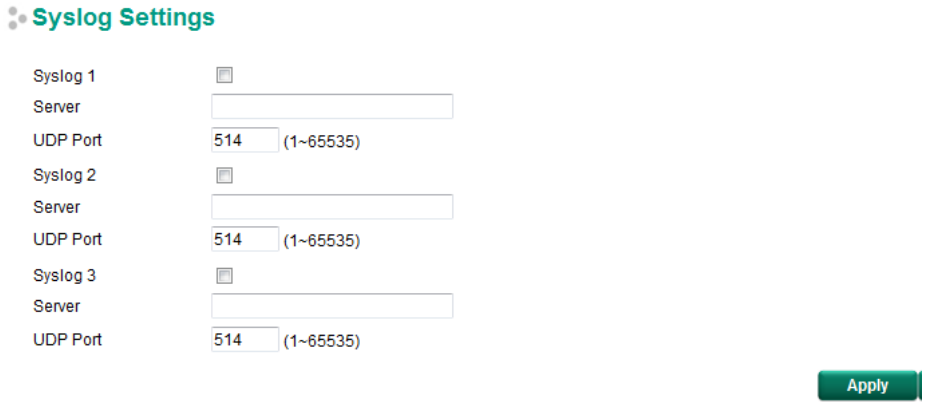
Port event	Setting value
Link-ON	ON
Link-OFF	ON
Traffic-Overload	ON
Traffic-Threshold (%)	16
Traffic-Duration (sec.)	10
Trap	ON
Syslog	ON
Severity	Warning

4. Select [System]-[Warning Notification]- [Syslog Server Settings] from the menu on the left side of the screen.

Syslog Setting screen is displayed.

Set the destination on the UI as shown below. A maximum of 3 devices can be set.

No setting changes are required for the INS. Check if the settings for INS are the default values.

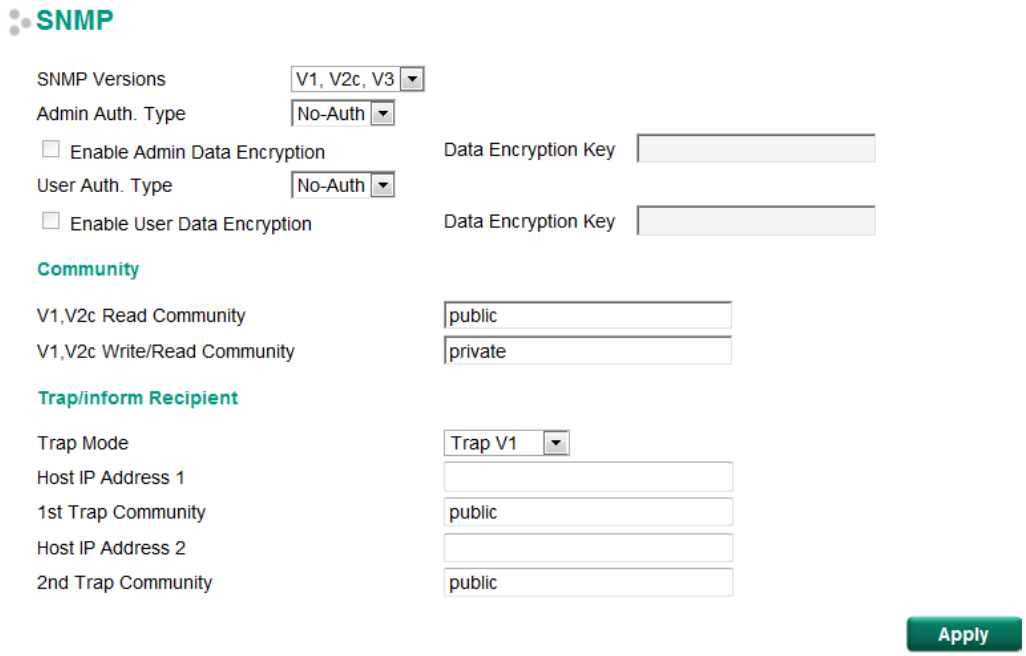


Setting item	Setting
IP Address	Syslog server IP address
Port Destination (1 to 65535)	UDP port (default: 514)

5. Set the Trap notification mode.

Two types of notification modes can be set with a managed Ethernet switch.

[UI display setting]



AdminAuth and UserAuth are used only with SNMP V3, so their explanation is omitted here.

Setting item	Description	Remarks
SNMP Versions	Specify the SNMP protocol version.	• V1, V2c, V3 • V1, V2c • V3 only
V1, V2c Read Community	Specify the community string for authenticating the SNMP agent for read-only access.	Up to 30 characters
V1, V2c Write/Read Community	Specify the community string for authenticating the SNMP agent for read/write access.	Up to 30 characters
Trap Mode	See *1.	• Trap V1 • Trap V2c • Inform V2c
Host IP Address	Specify the trap server IP address or name.	IP or name
Trap Community	Specify the community character string to be used for authentication.	Up to 30 characters

*1:

- **SNMP Trap Mode - Trap**
  In trap mode, the SNMP agent sends SNMPv1 trap PDU to the NMS.
  There is no method for the agent to see if the trap has reached the NMS, so no acknowledgement is sent from the NMS.
- **SNMP Trap Mode - Inform**
  If a notification message posted to the SNMPv2 mechanism is sent to the NMS from the SNMP agent, the receiver sends the response to the sender that confirms the event receipt. This action is the same as for acquisition and setting requests. If the SNMP agent does not receive any response from the NMS within the specified period, it resends the trap to the NMS agent (default: 1 hour). The maximum time-out duration is 300 seconds (default: 1 sec), and the maximum number of retries is 99. When the SNMP agent receives acknowledgement from the NMS, it stops resending the notification message.

[INS setting]

Make settings as shown below.

Setting item	Setting value
SNMP Versions	V1, V2c
Admin Auth Type	No-Auth
User Auth Type	No-Auth
V1, V2c Read Community	Public
V1, V2c Write/Read Community	Private

The items other than the above should be left with the default values.

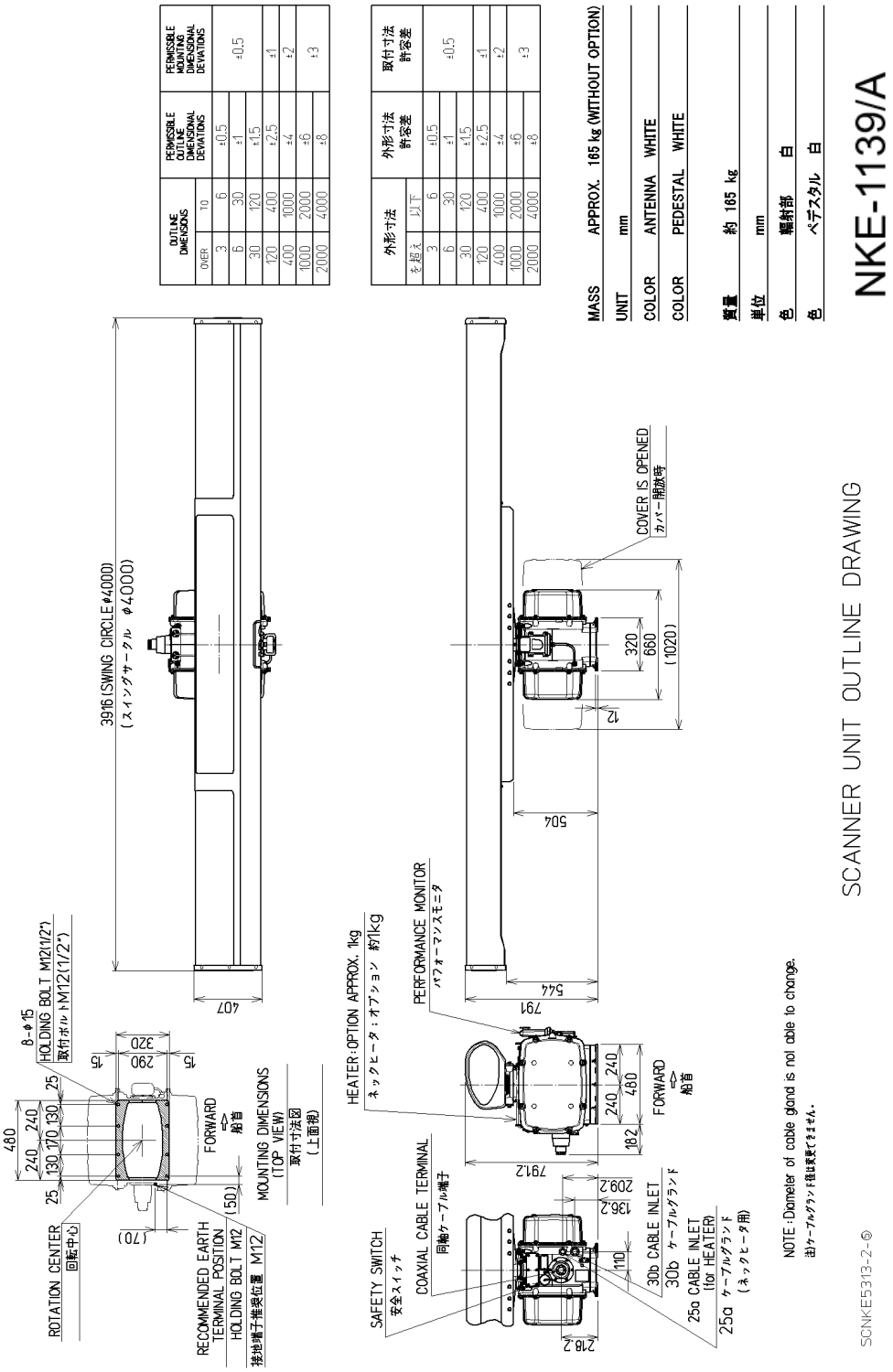
6. If there is a managed HUB whose settings have not been completed, please perform the settings again from 5.5.2.1 Setting IP addresses of managed Ethernet switches.

7. Please return the MFD IP address used in the settings to the original.

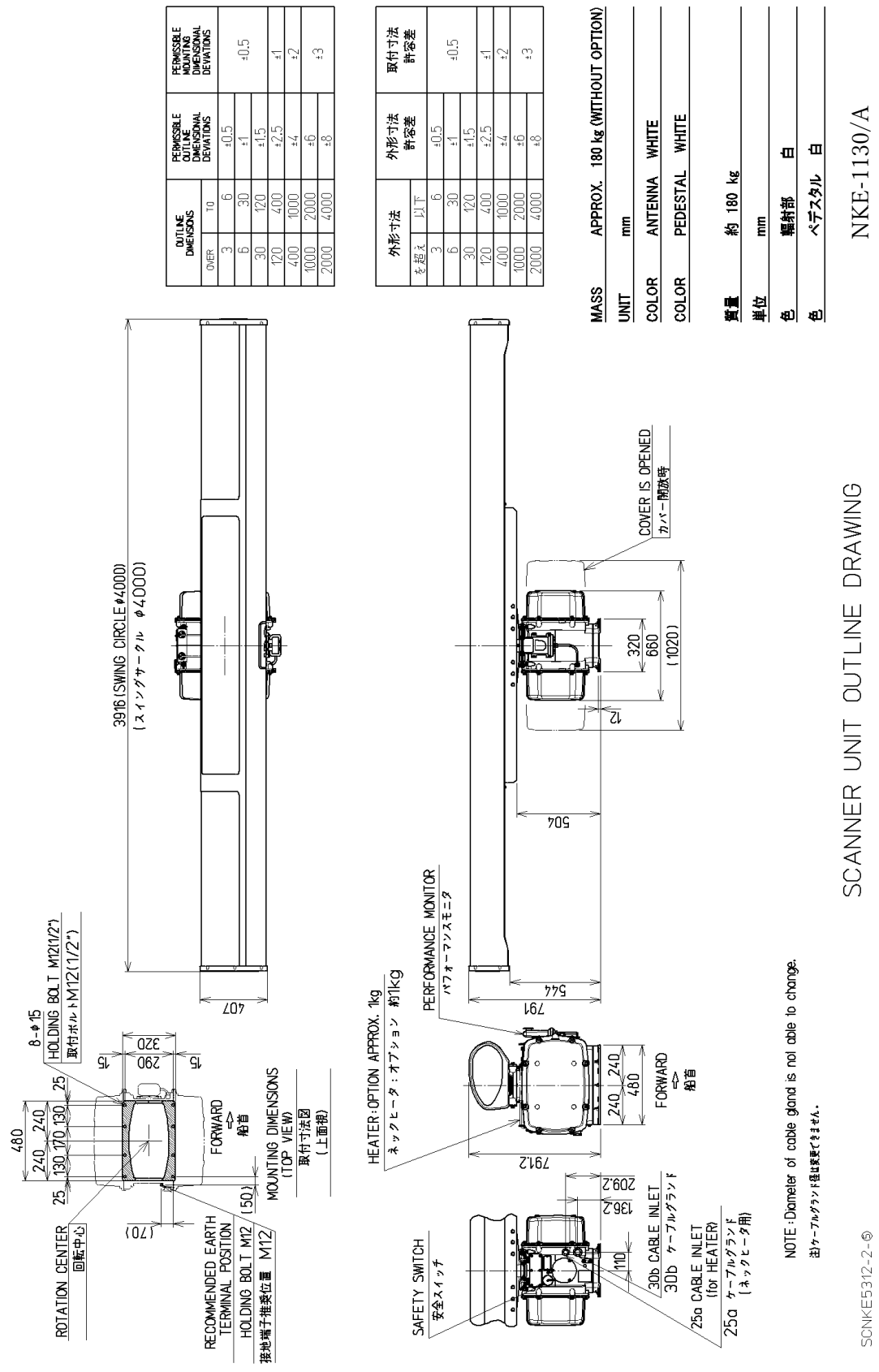
6 Appendix

6.1 Outline Drawing

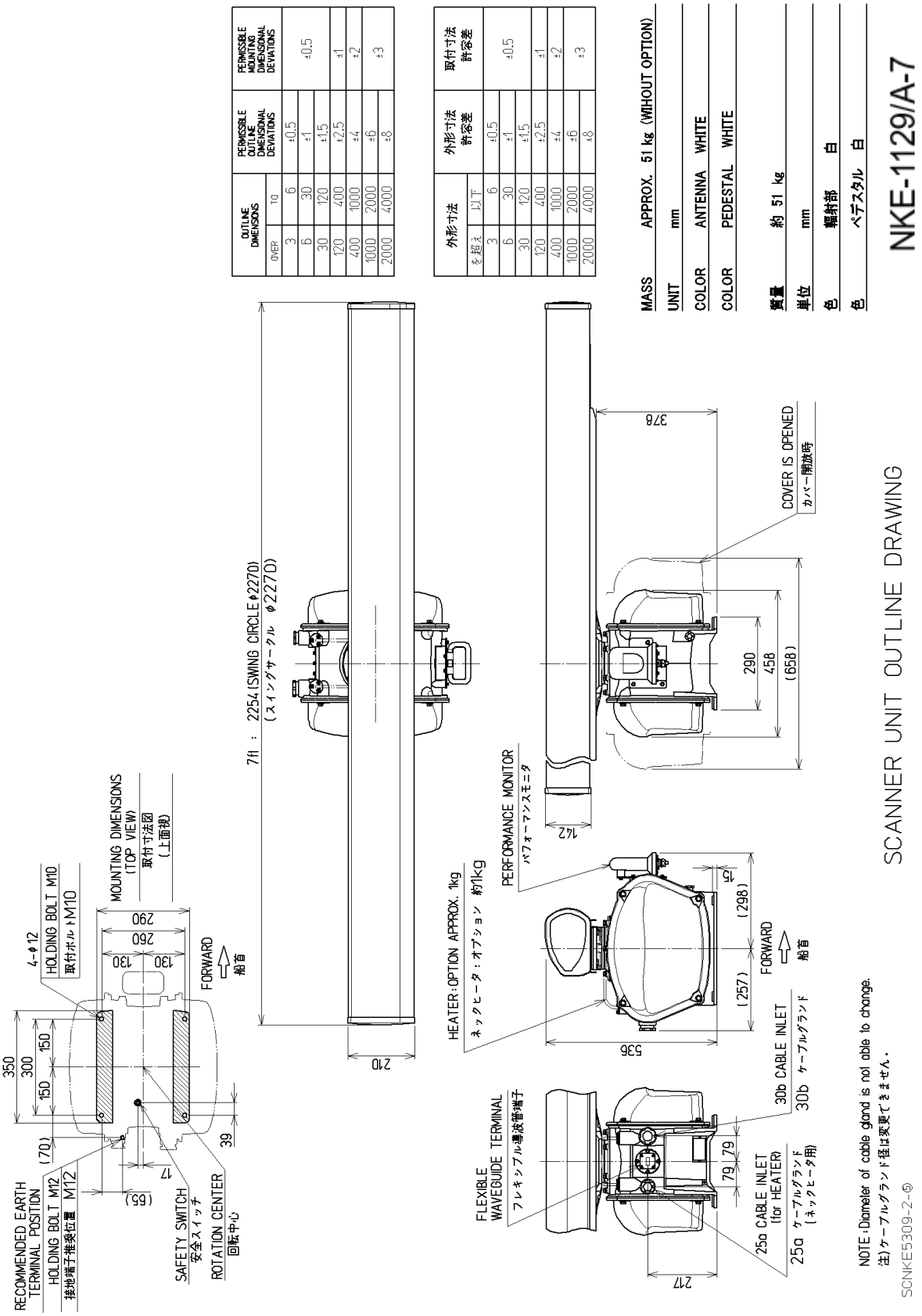
6.1.1 Outline Drawings of Radar Antenna NKE-1139/A



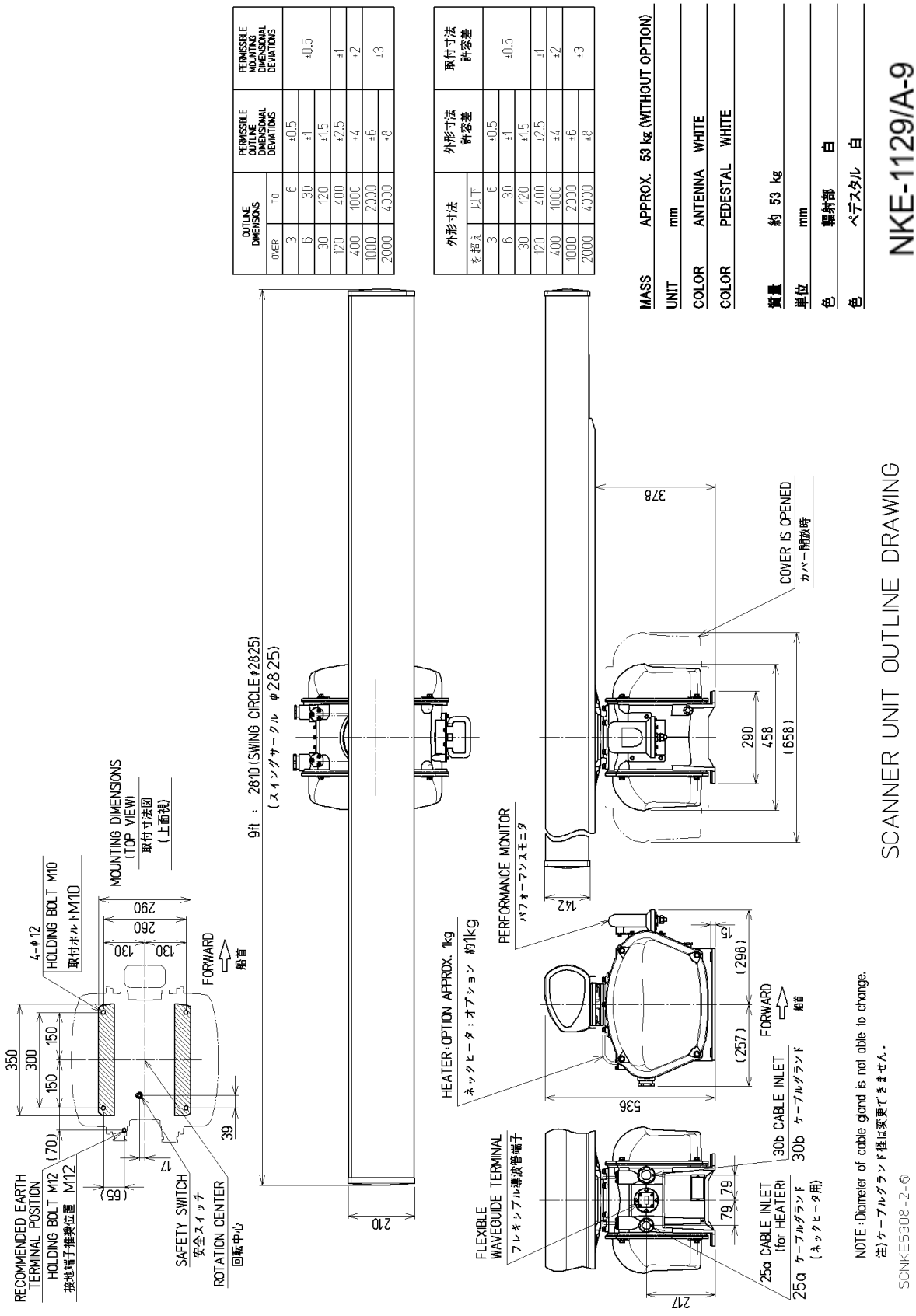
6.1.2 Outline Drawings of Radar Antenna NKE-1130/A



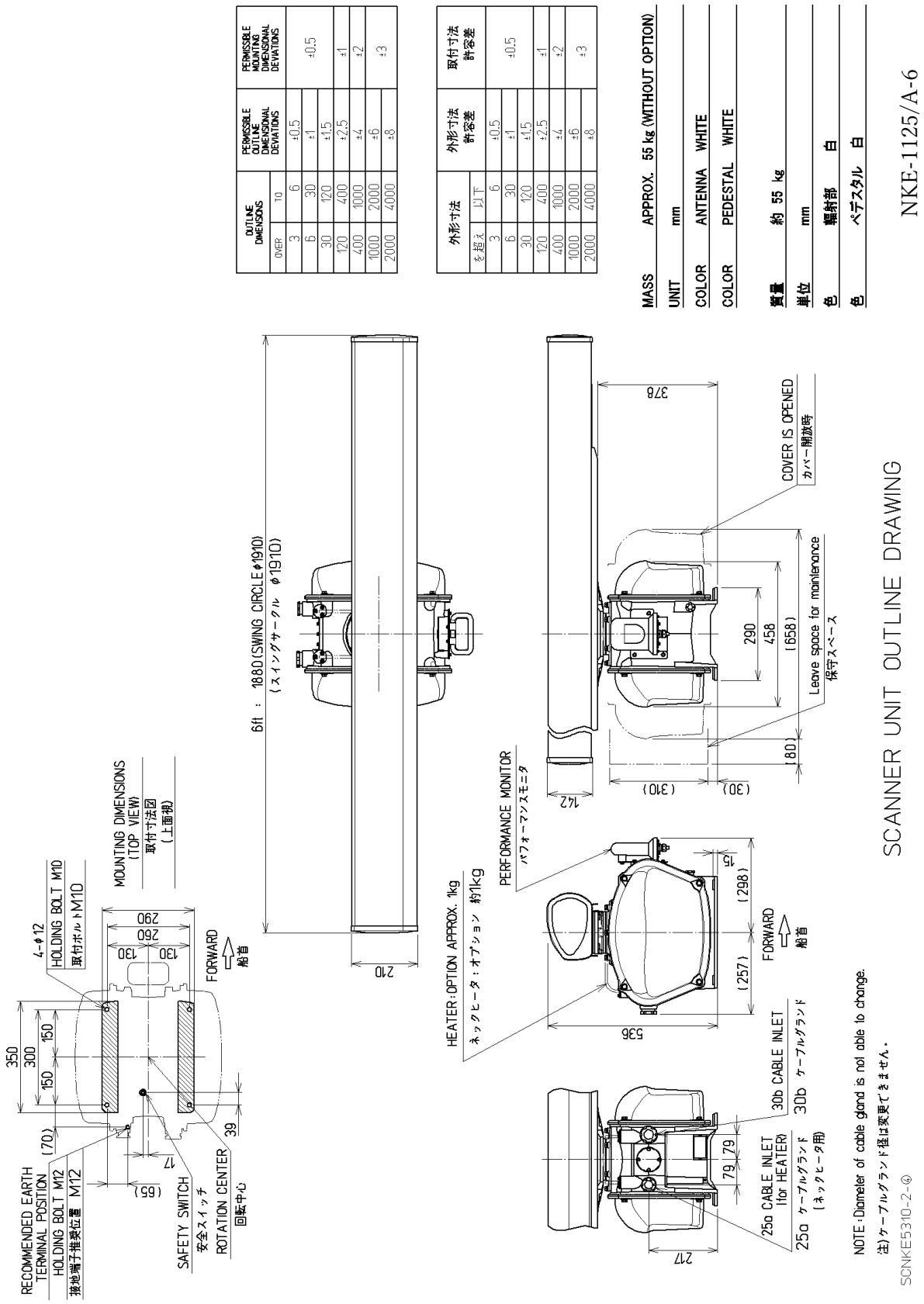
6.1.3 Outline Drawings of Radar Antenna NKE-1129/A-7



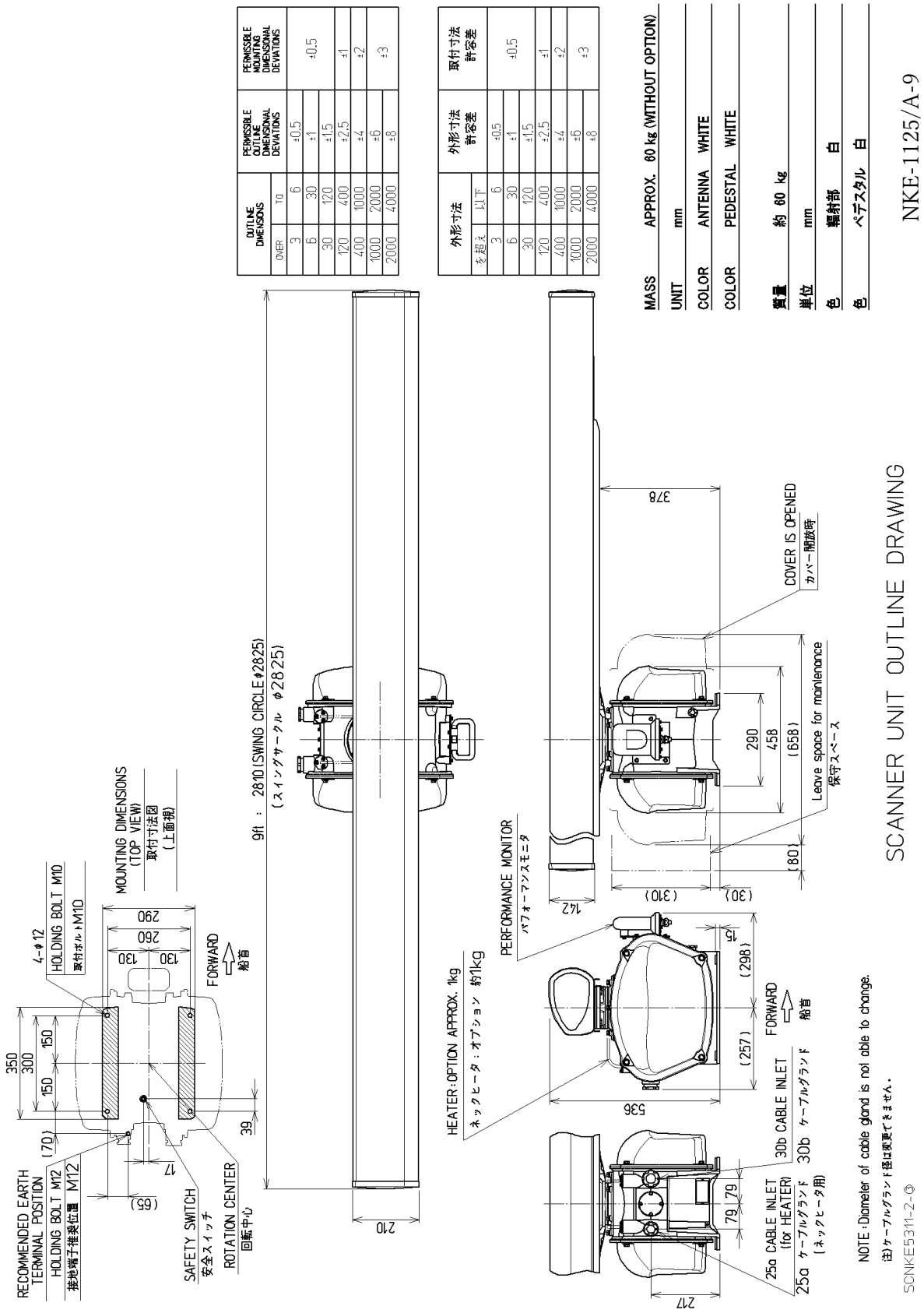
6.1.4 Outline Drawings of Radar Antenna NKE-1129/A-9



6.1.5 Outline Drawings of Radar Antenna NKE-1125/A-6



6.1.6 Outline Drawings of Radar Antenna NKE-1125/A-9



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	

6.1.7 Outline Drawings of Transmitter-Receiver NTG-3230/A

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	±3
1000	2000	±6	
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. 33 kg

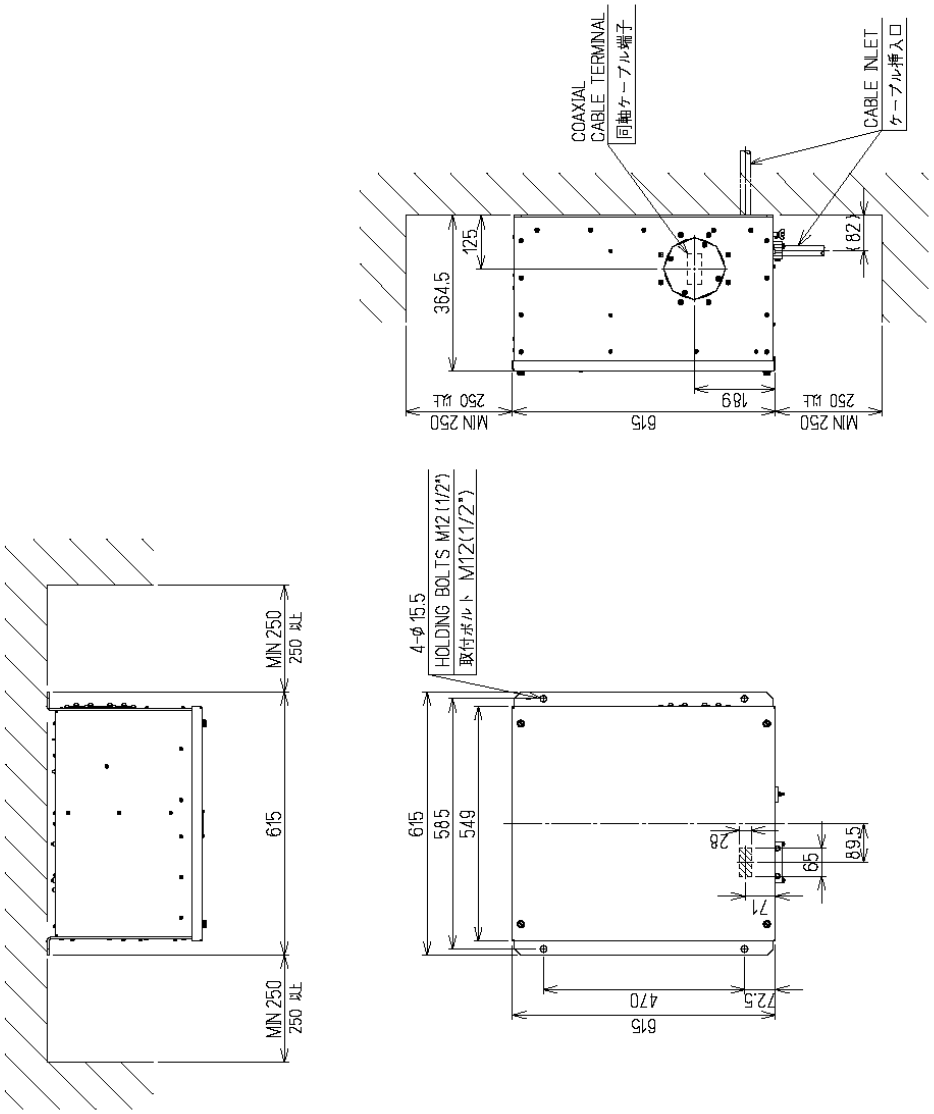
UNIT mm

質量 約 33 kg

単位 mm

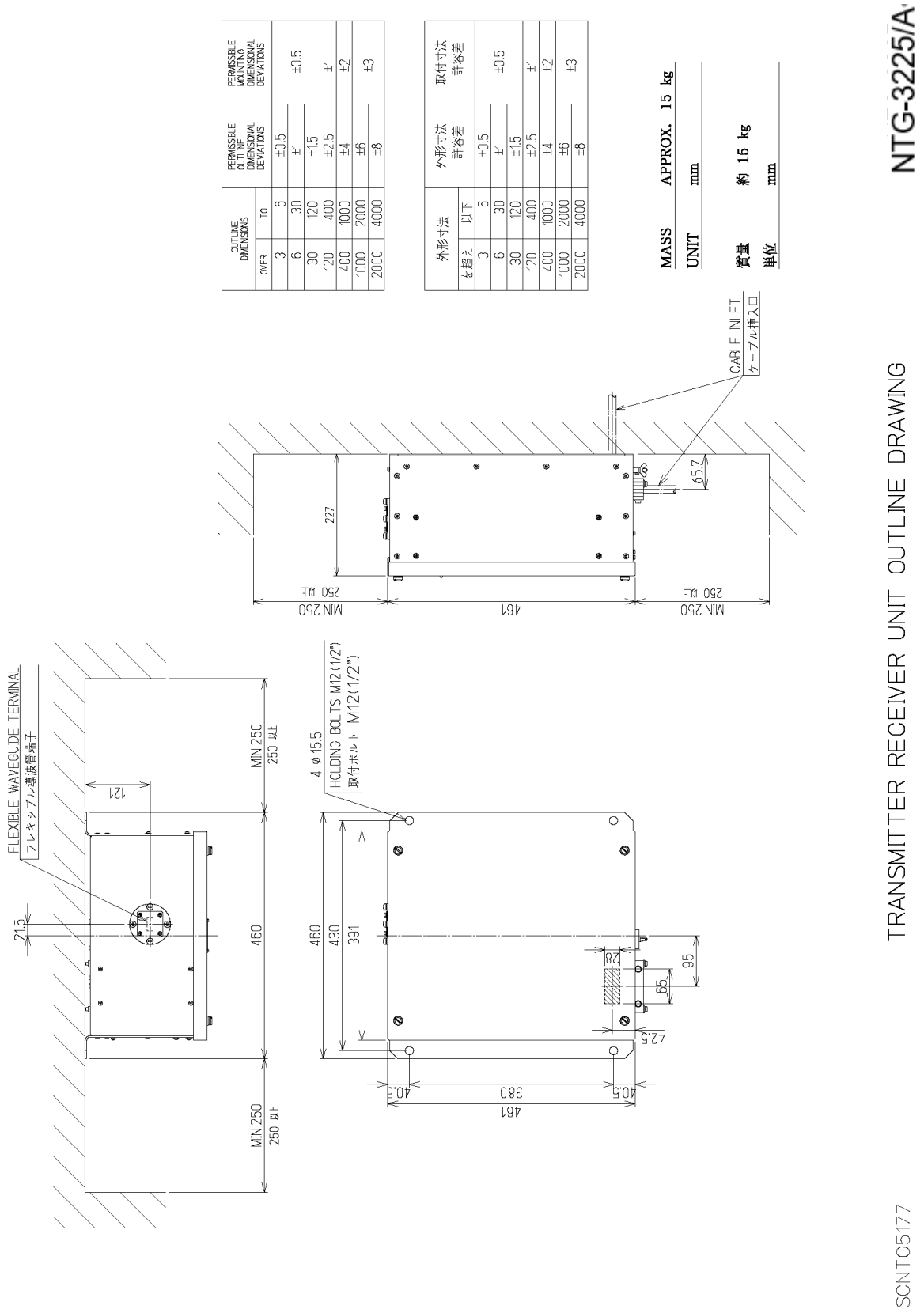
NTG-3230/A

TRANSMITTER RECEIVER UNIT OUTLINE DRAWING



SCNT05176

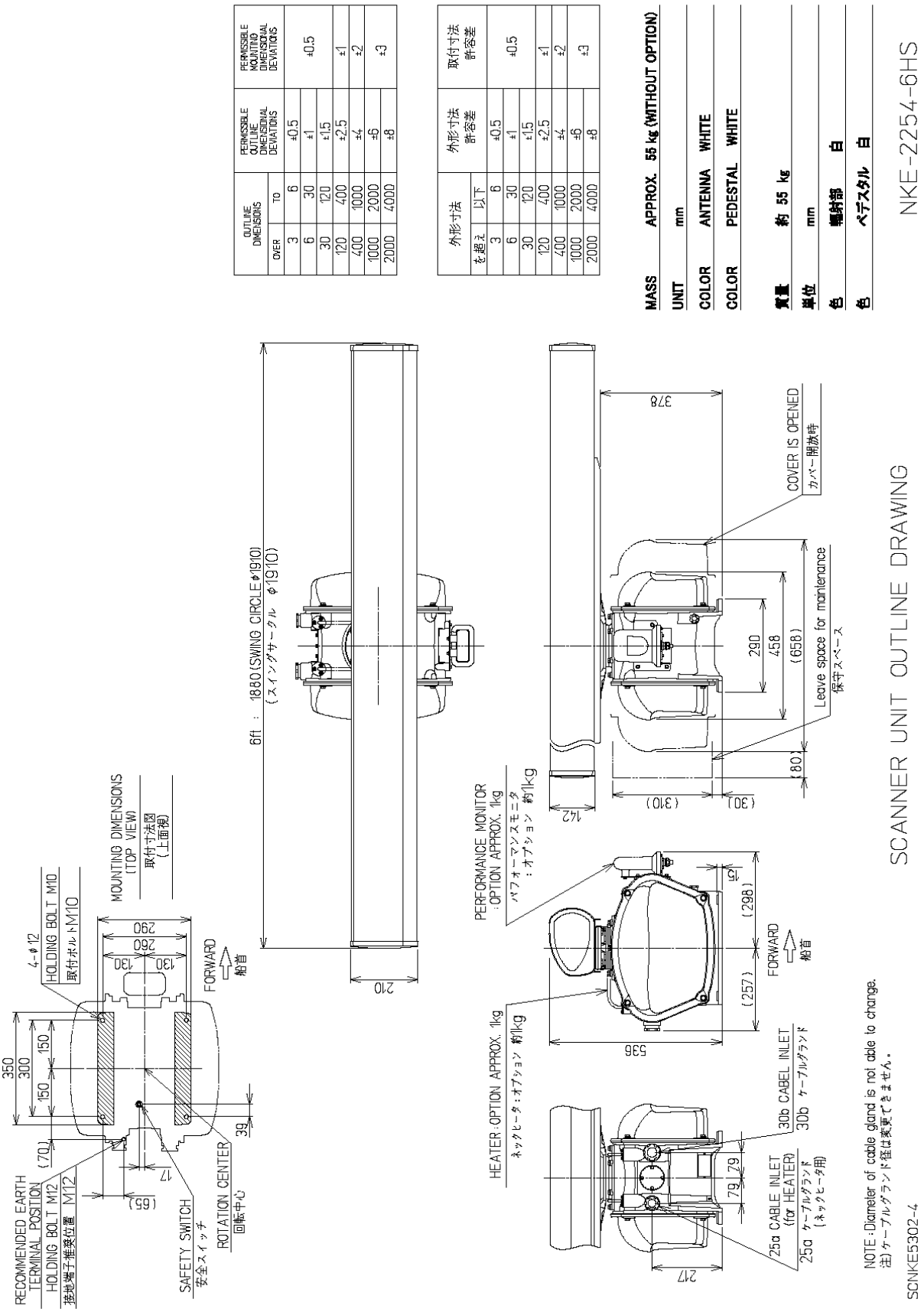
6.1.8 Outline Drawings of Transmitter-Receiver NTG-3225/A



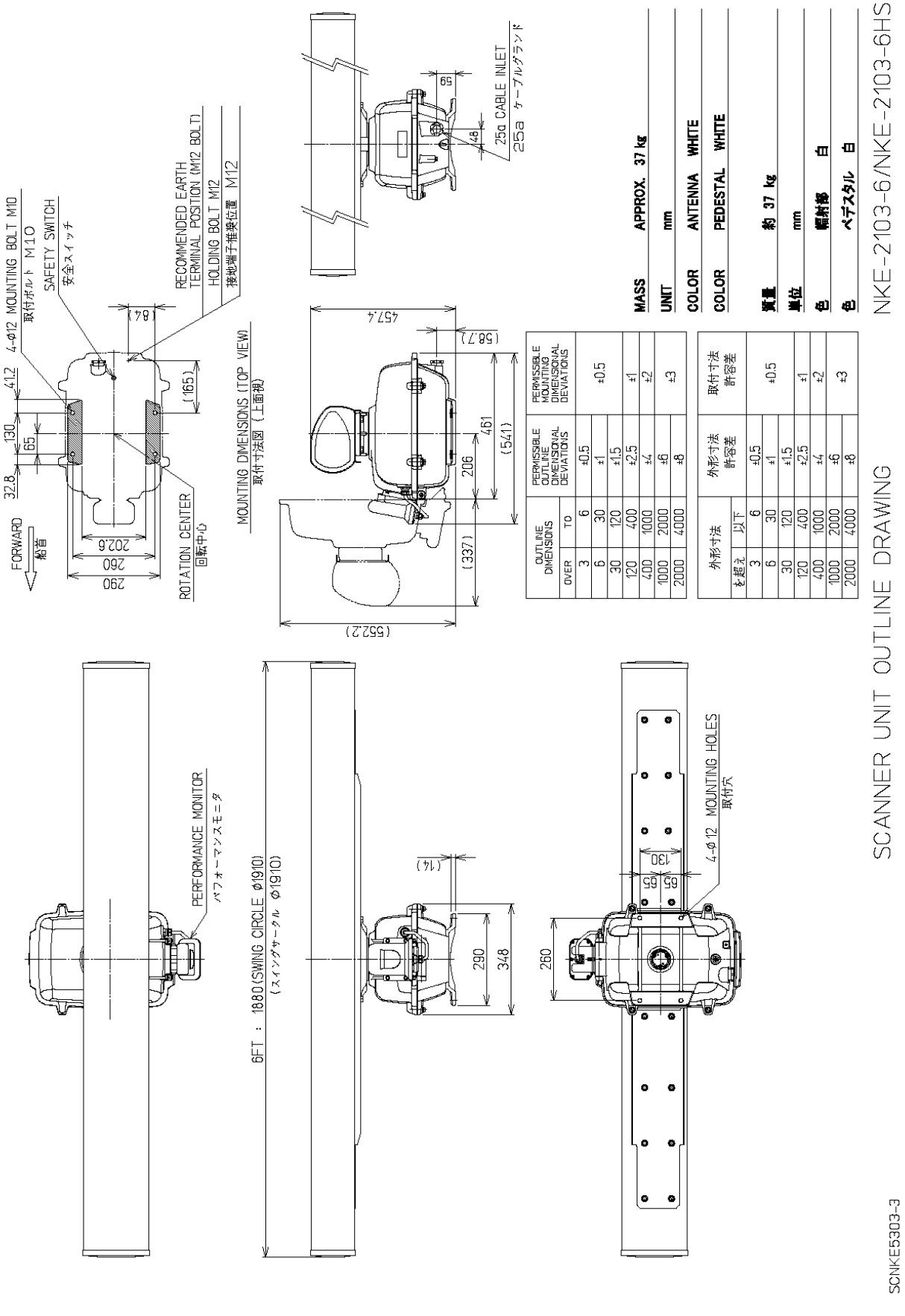
OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
OVER	TO		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	±1
120	400	±2.5	±2
400	1000	±4	
1000	2000	±6	±3
2000	4000	±8	

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	

6.1.9 Outline Drawings of Radar Antenna NKE-2254-6HS



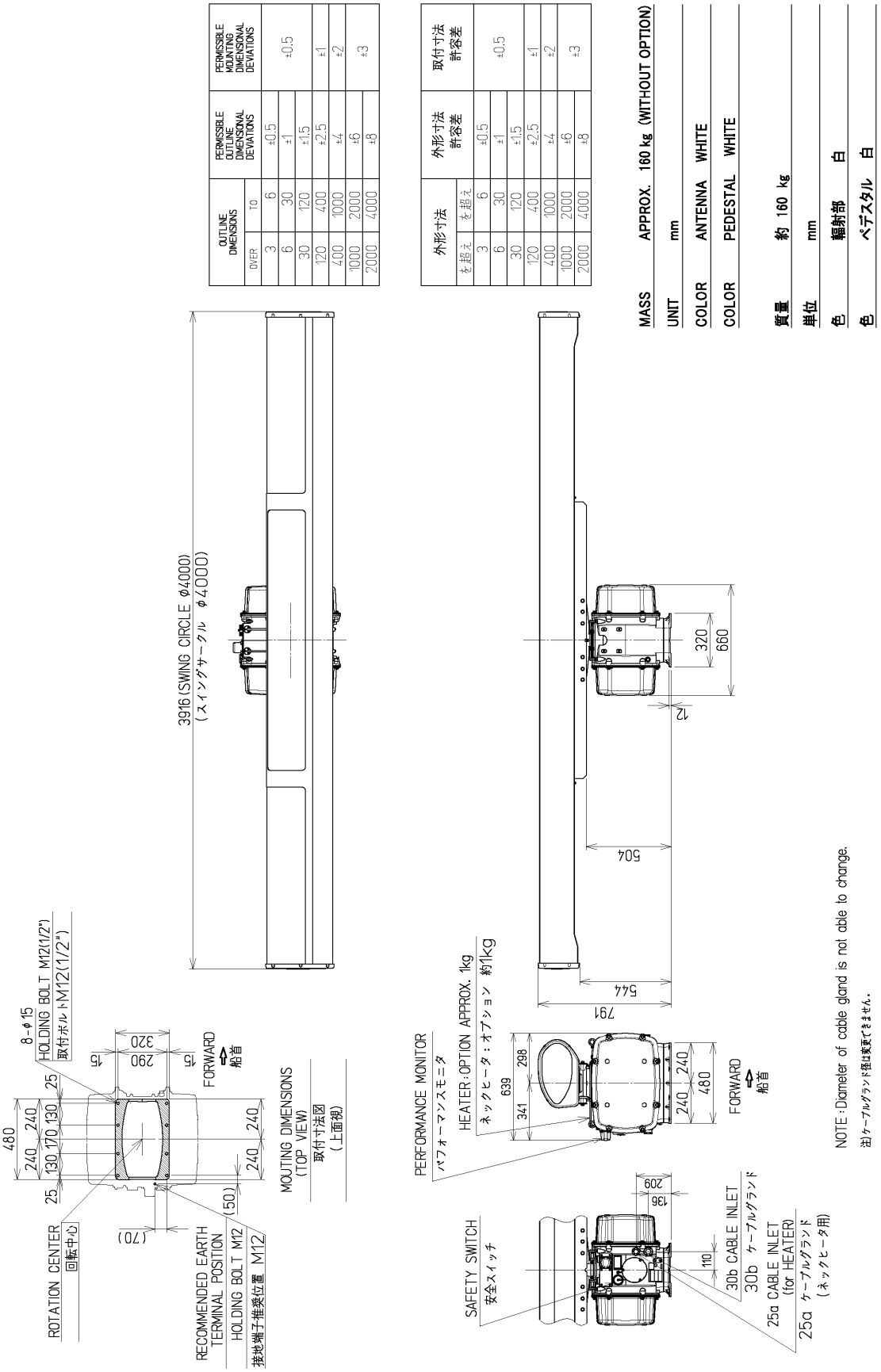
6.1.10 Outline Drawings of Radar Antenna NKE-2103-6/NKE-2103-6HS



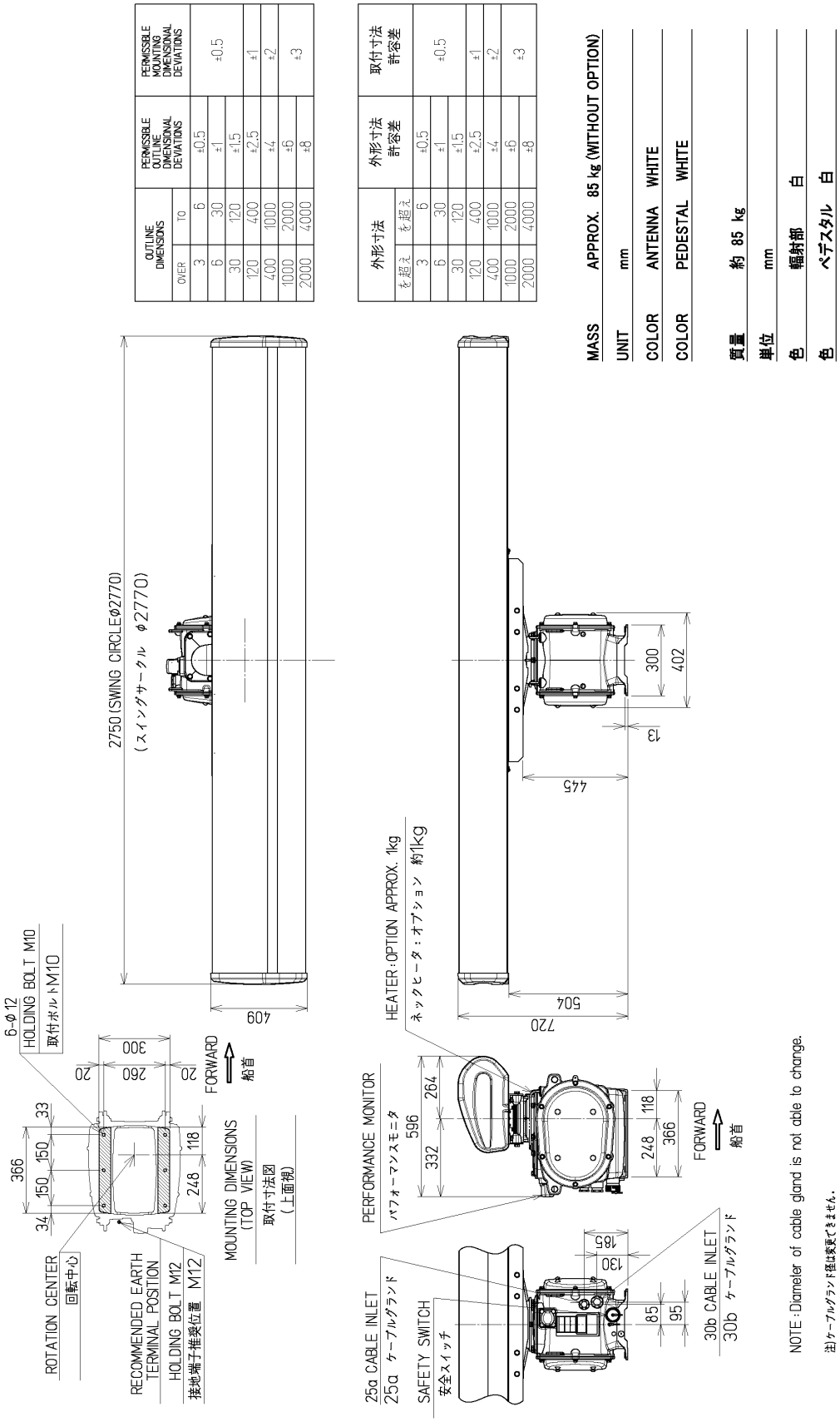
OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
OVER	TO		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	

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	

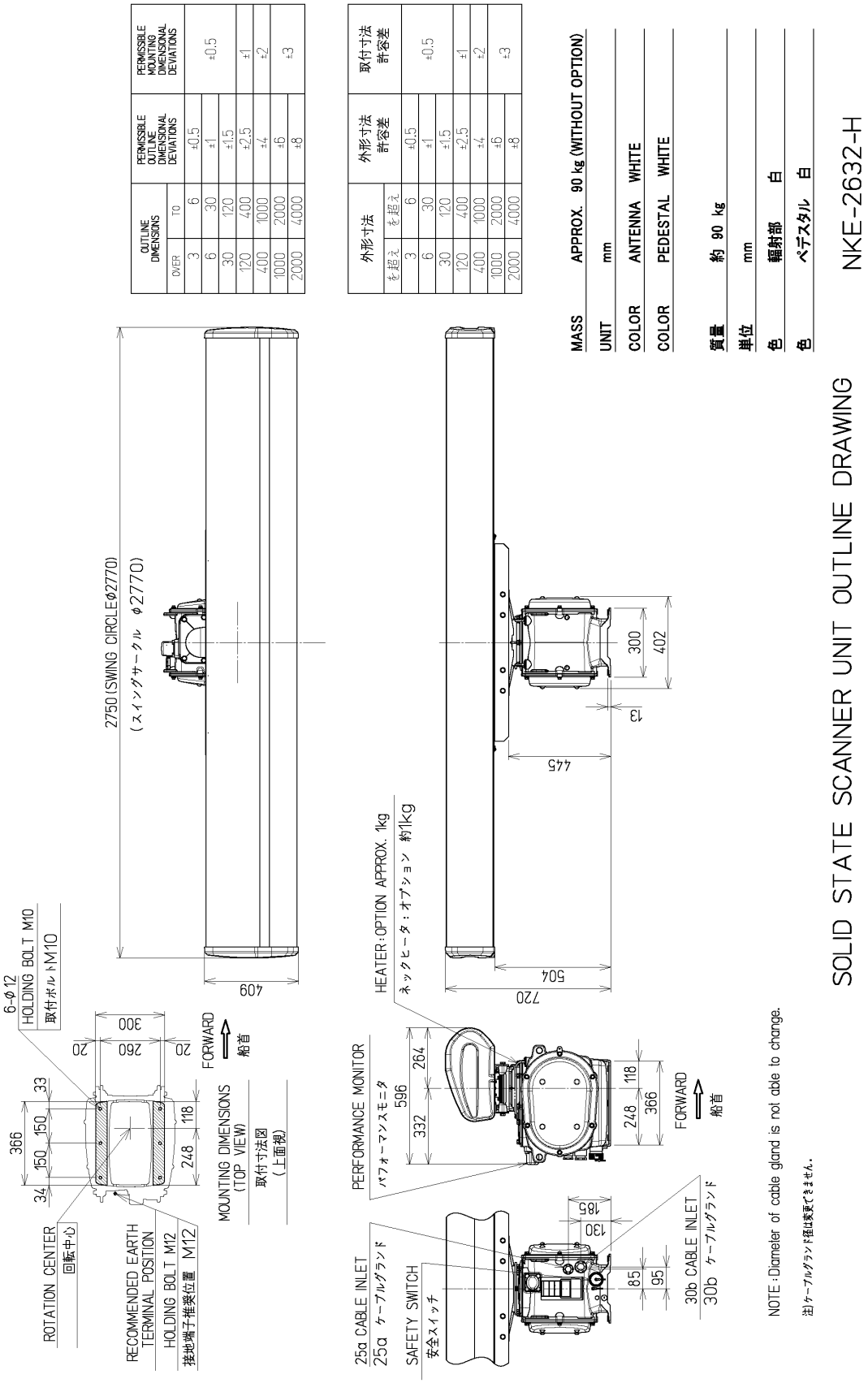
6.1.11 Outline Drawings of Radar Antenna NKE-1632/A



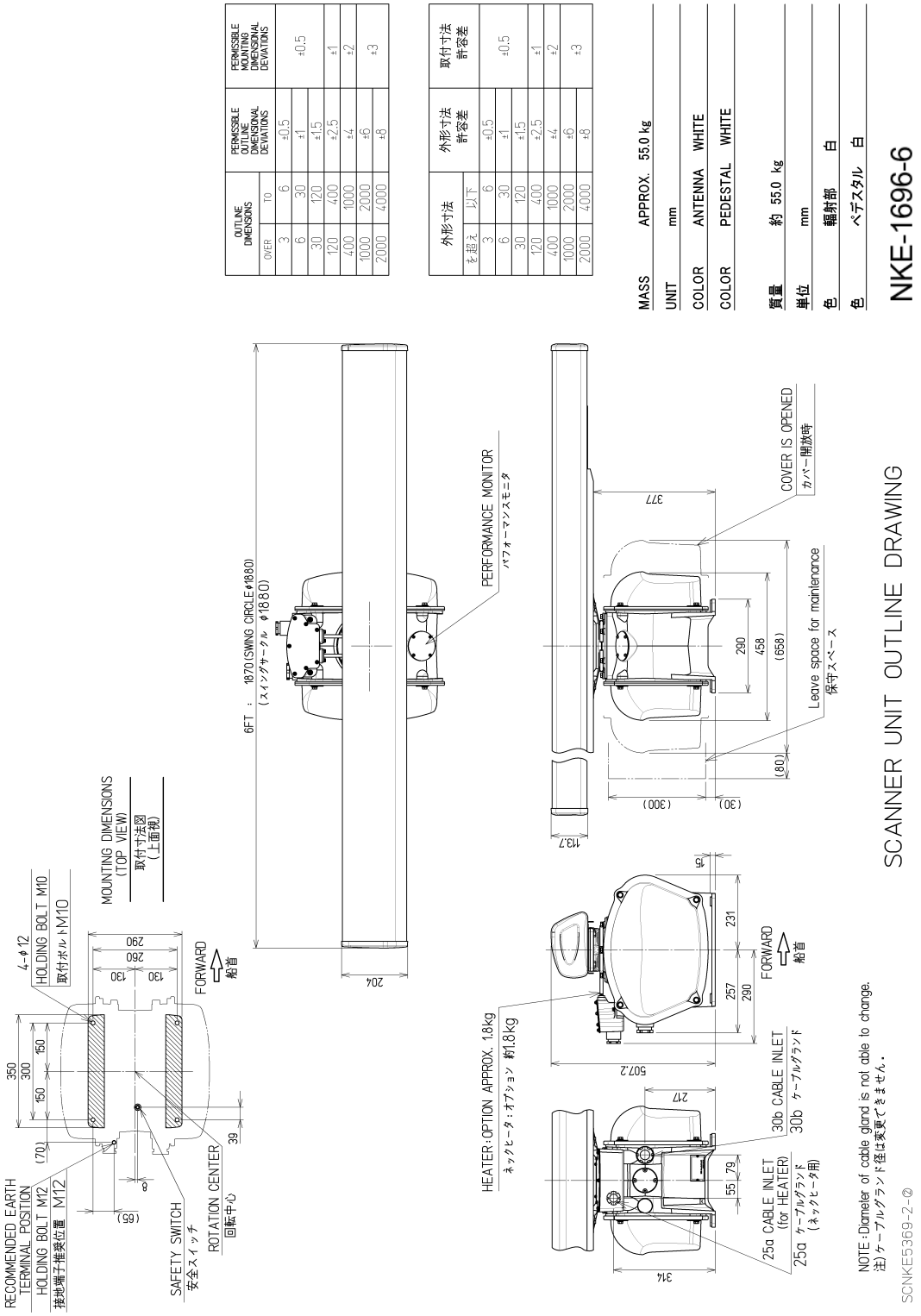
6.1.12 Outline Drawings of Radar Antenna NKE-2632/A



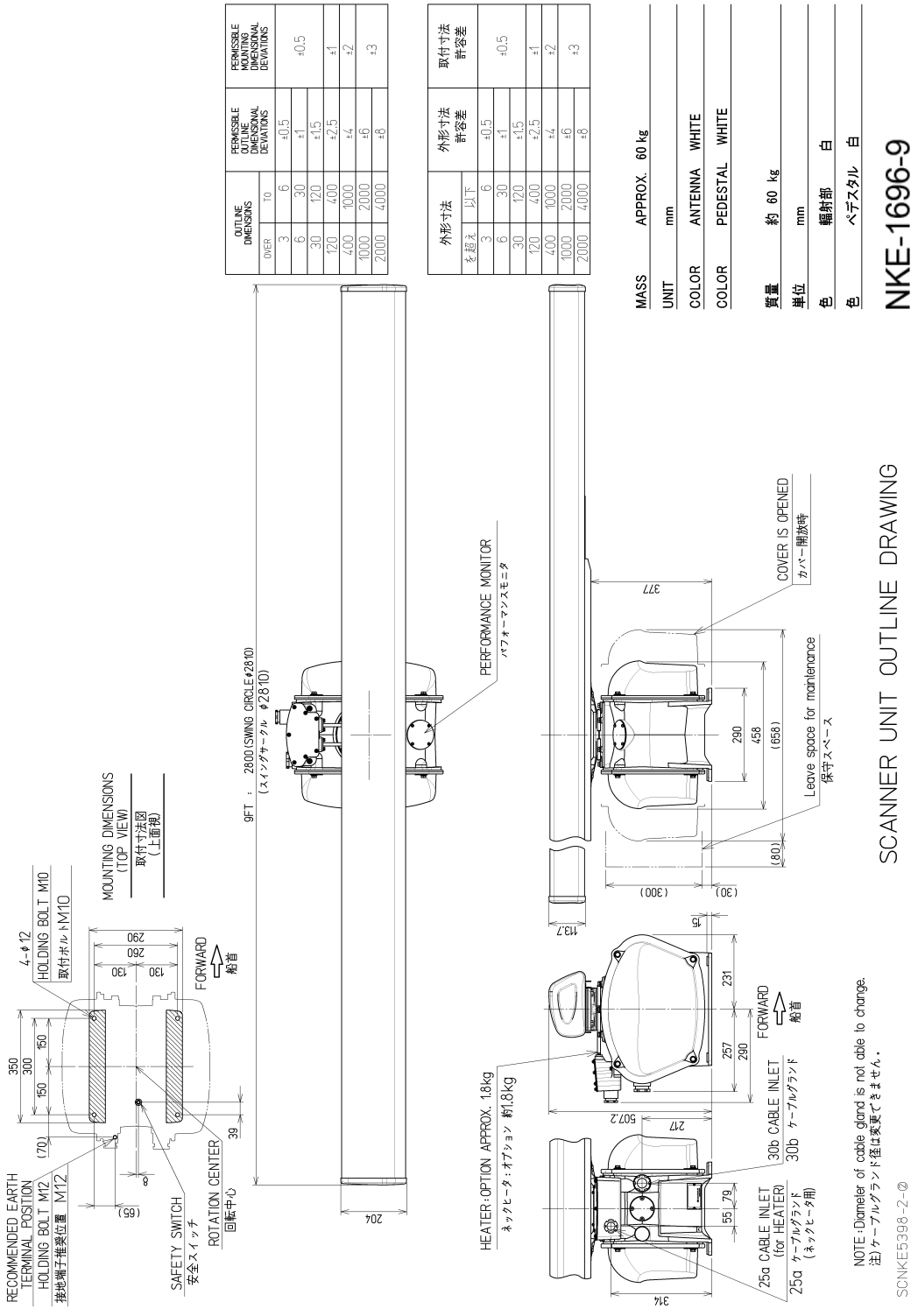
6.1.13 Outline Drawings of Radar Antenna NKE-2632-H



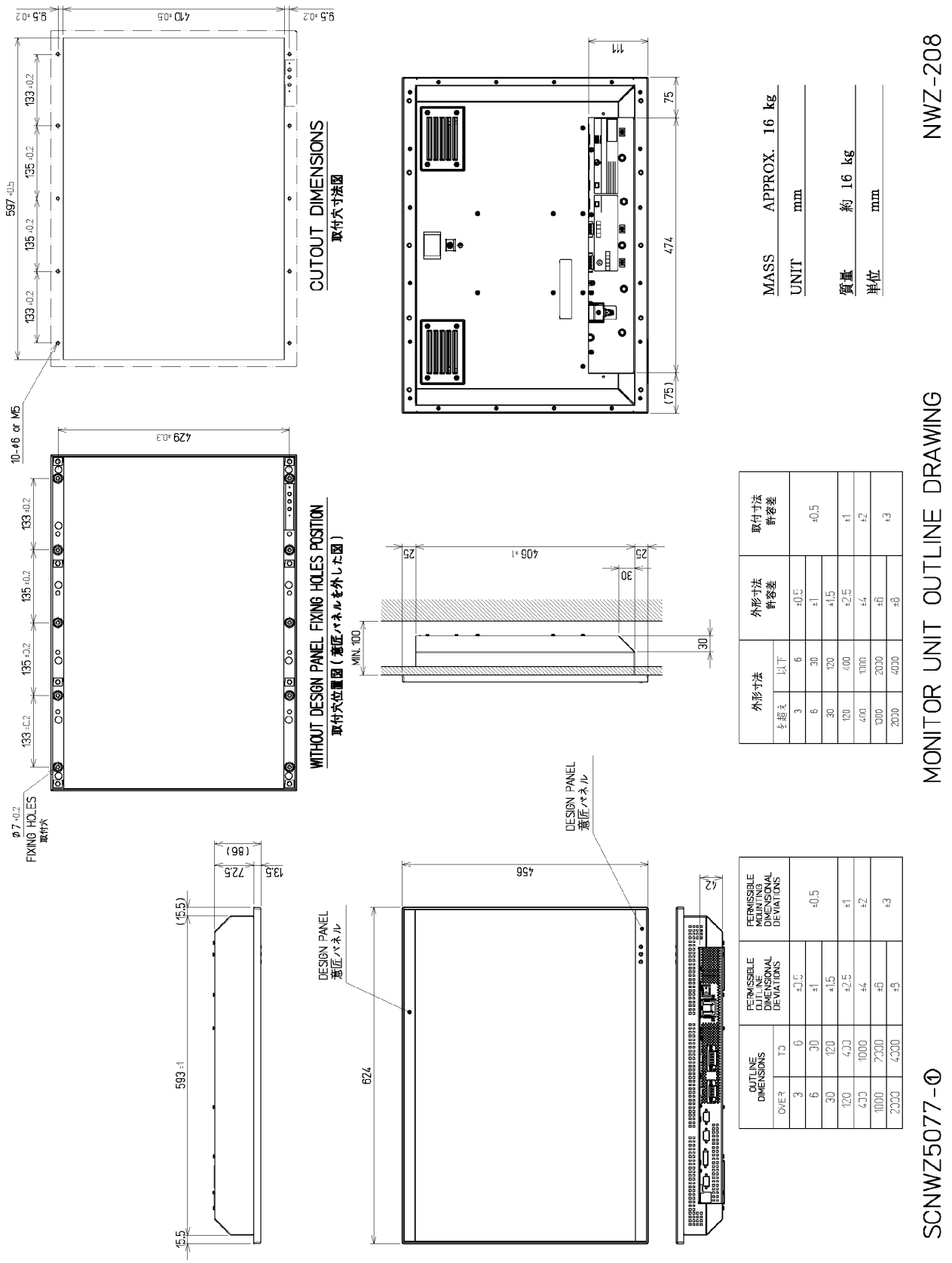
6.1.14 Outline Drawings of Radar Antenna NKE-1696-6



6.1.15 Outline Drawings of Radar Antenna NKE-1696-9



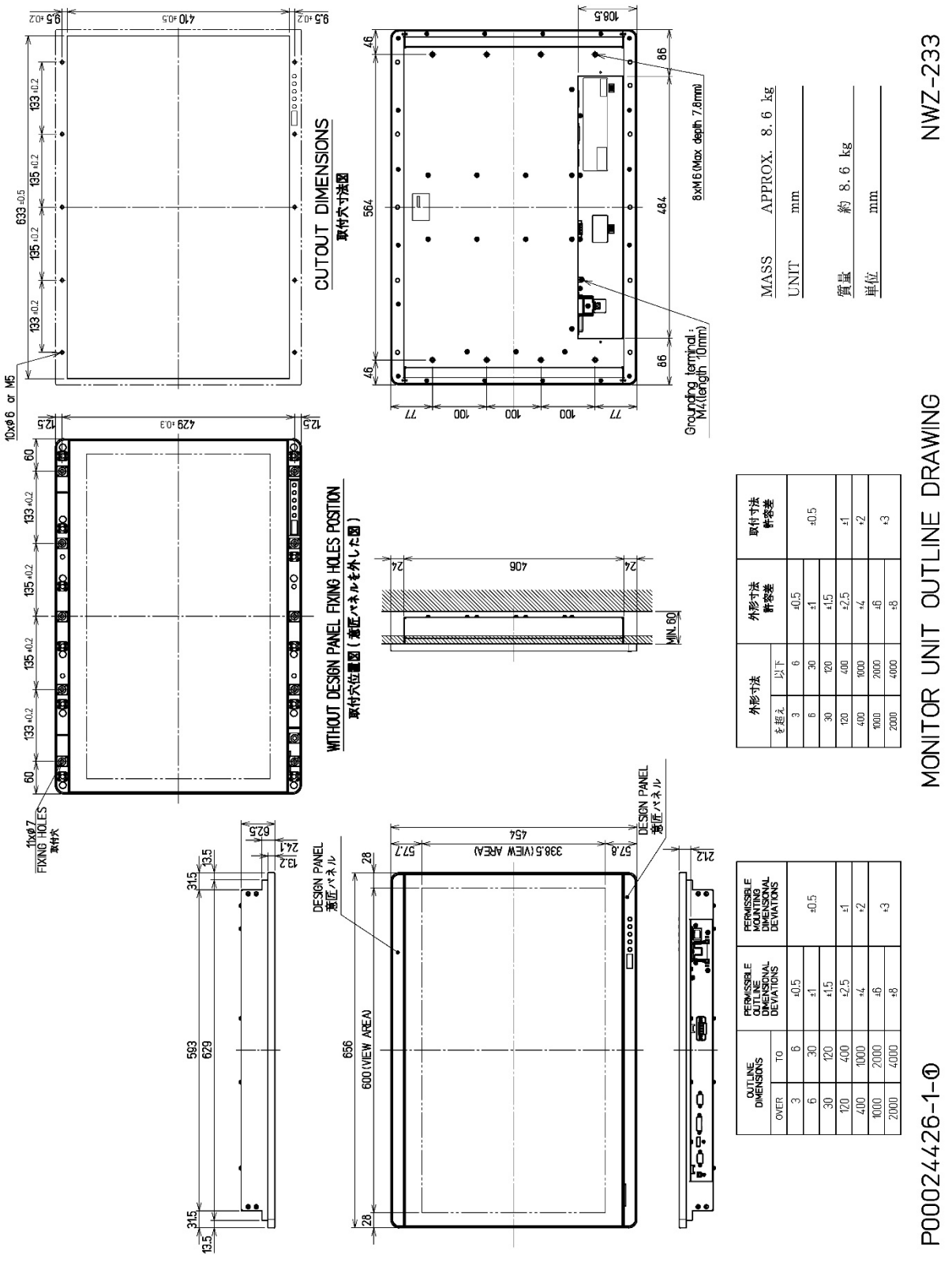
6.1.16 Outline Drawings of NWZ-208 26inch Monitor Unit



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	

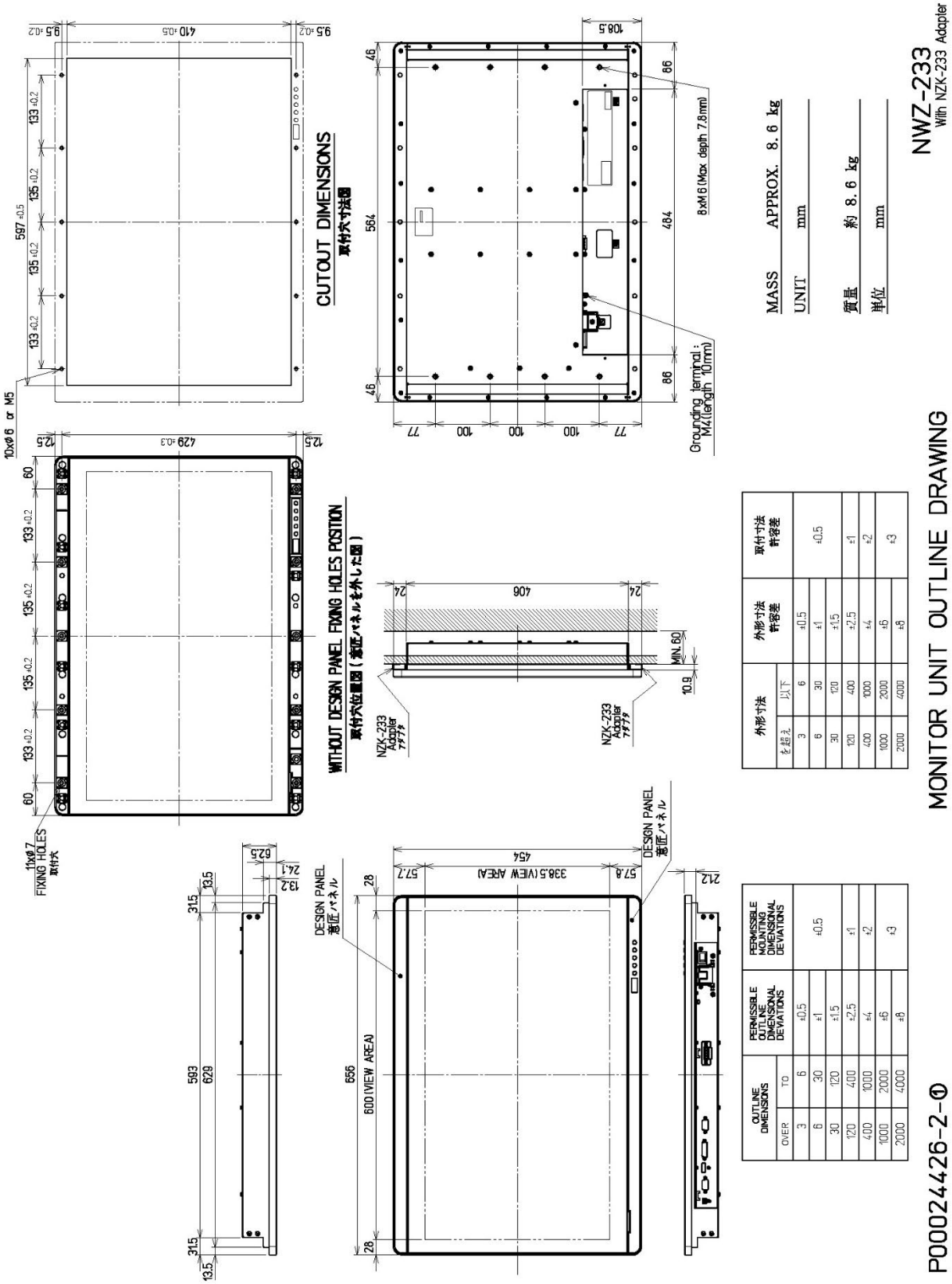
6.1.17 Outline Drawings of NWZ-233 27inch Monitor Unit



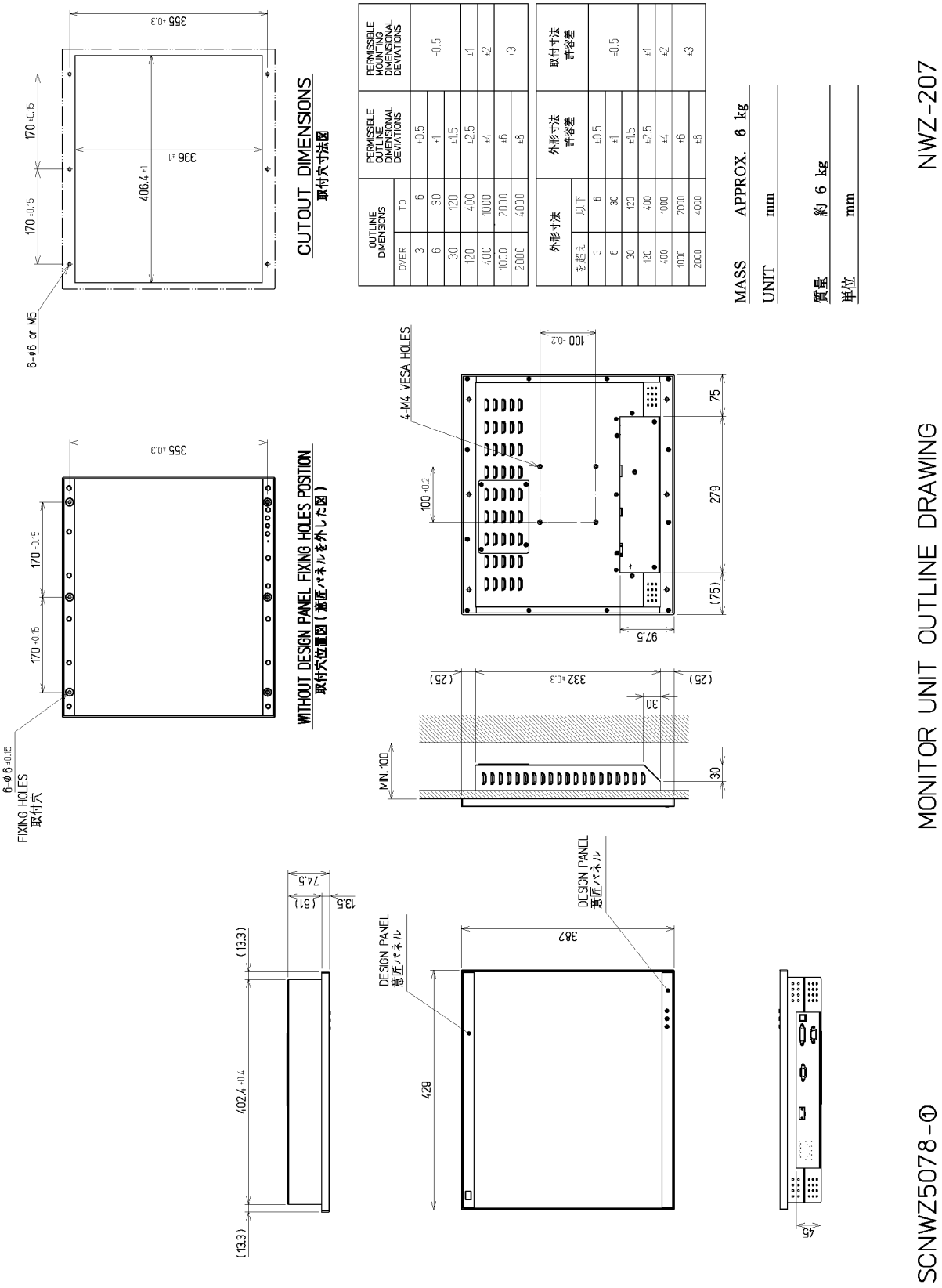
OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
OVER	TO		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	

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	

6.1.18 Outline Drawings of NWZ-233 27inch Monitor Unit(with Adapter)

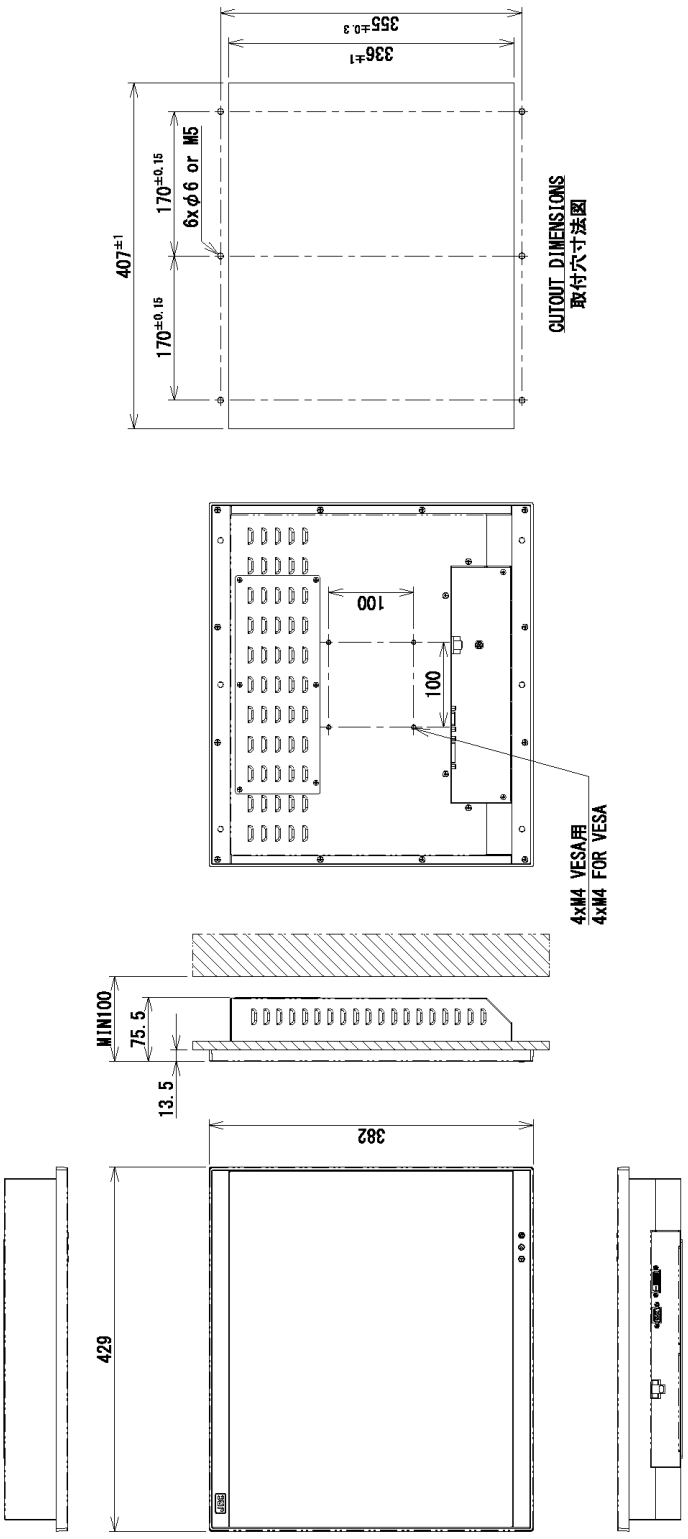


6.1.19 Outline Drawings of NWZ-207 19inch Monitor Unit



6.1.20 Outline Drawings of NWZ-214 19inch Monitor Unit

NWZ-214



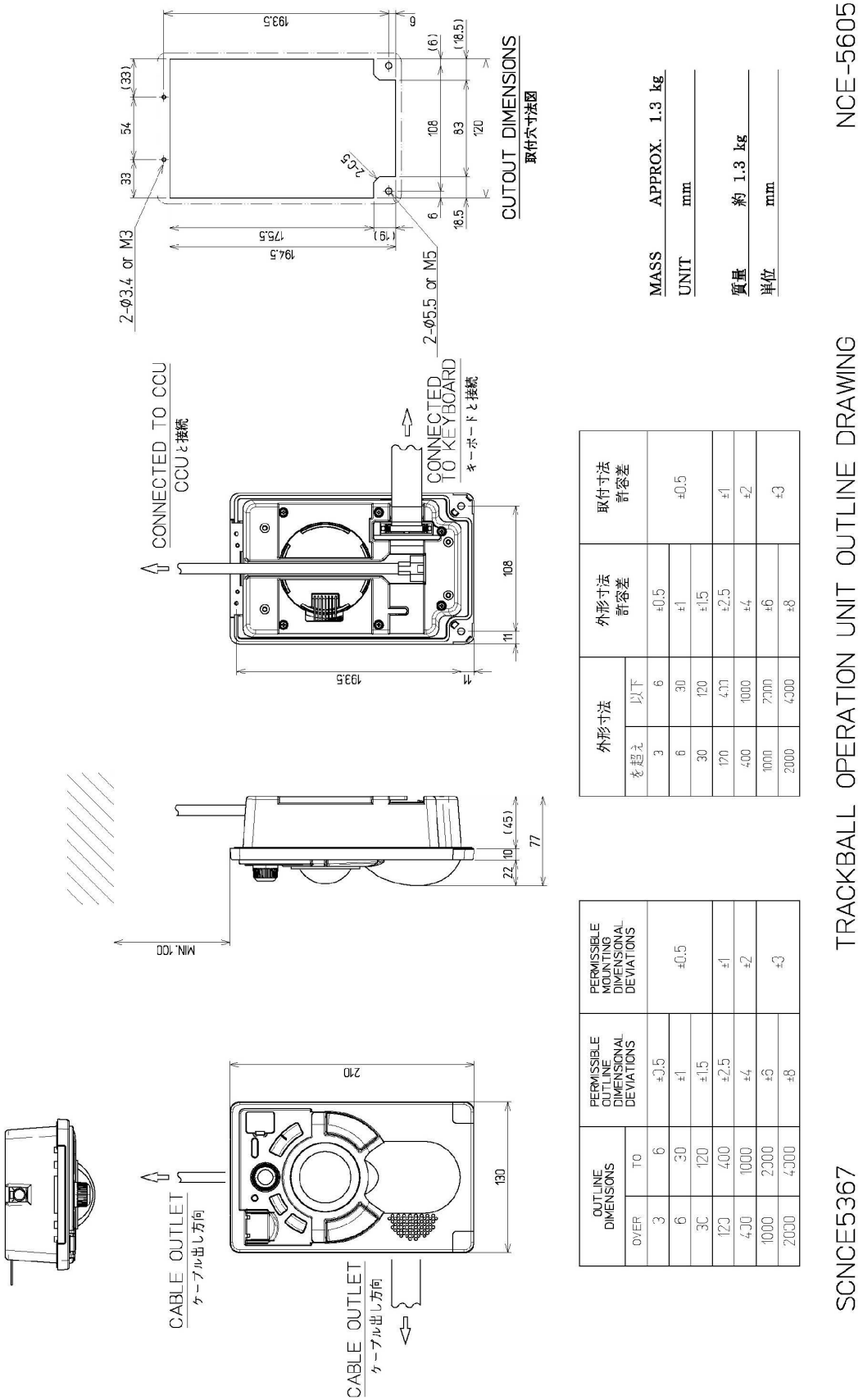
OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
OVER	TO		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	±1
120	400	±2.5	
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	

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	±1
120	400	±2.5	
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

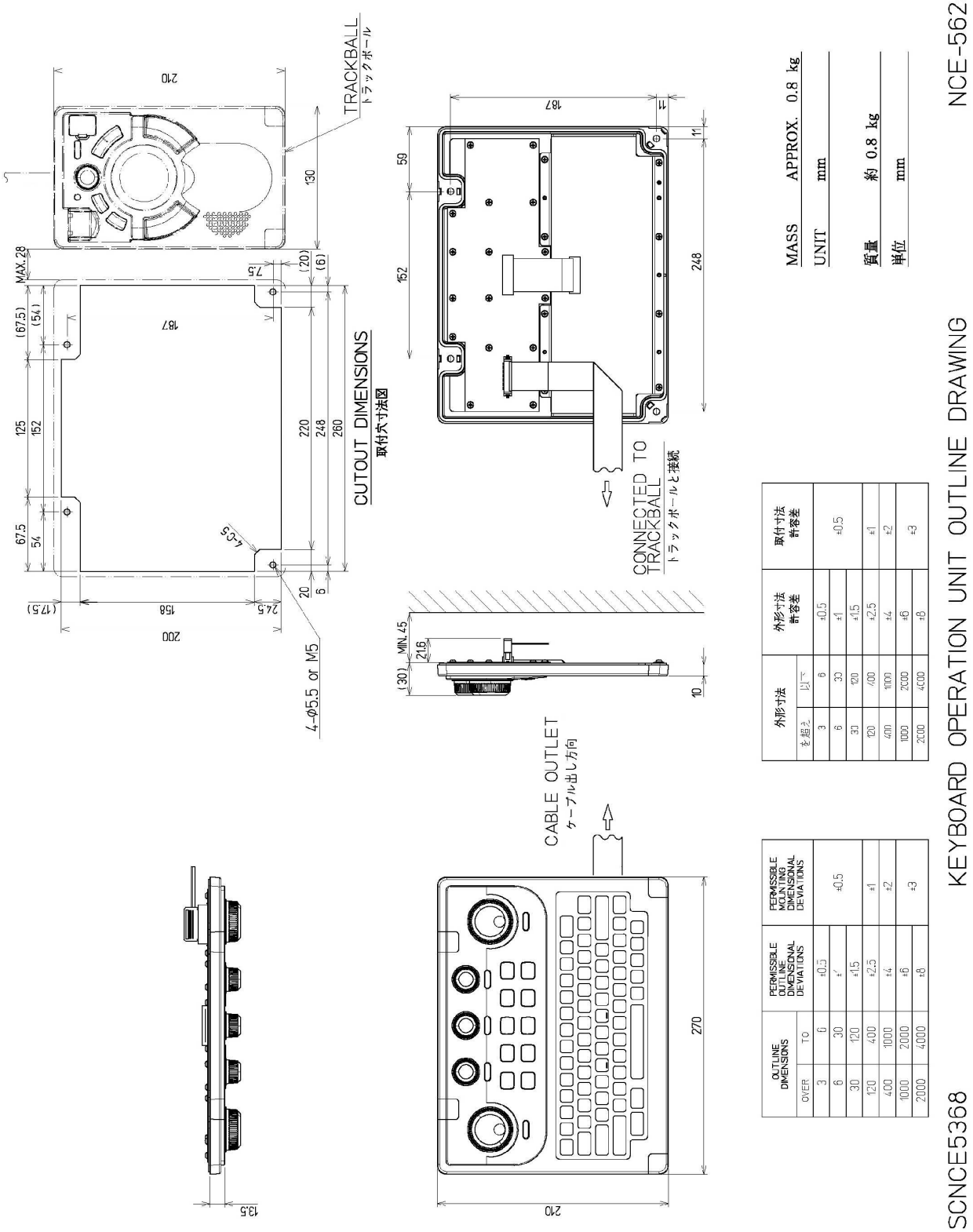
6.1.21 Outline Drawings of NCE-5605 Trackball Operation Unit



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	

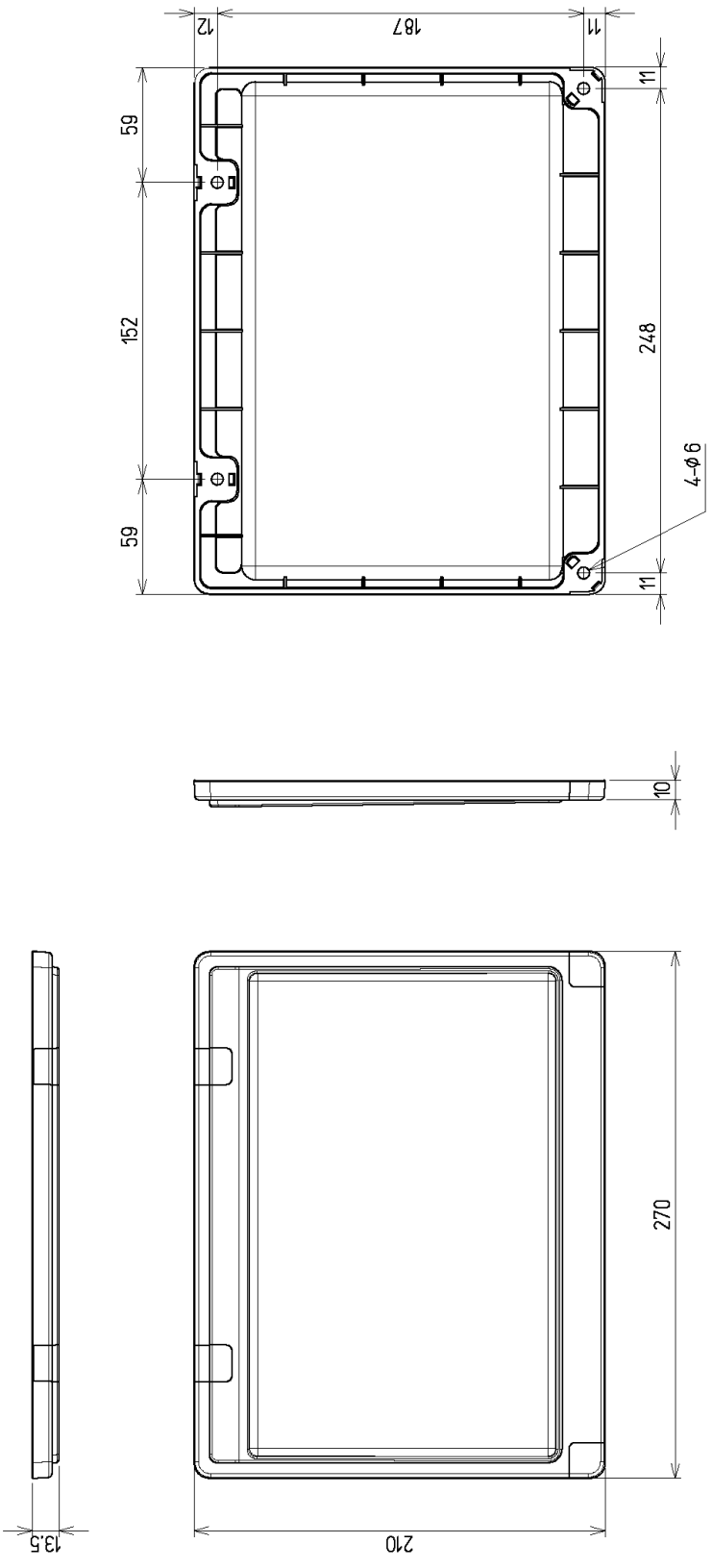
6.1.22 Outline Drawings of NCE-5625 Keyboard Operation Unit



外形寸法 を超え	以下	外形寸法 許容差	取付寸法 許容差
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 OVER	TO	PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
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	

6.1.23 Outline Drawings of CWB-1593 Large Tray



MASS 0.3 kg

UNIT mm

質量 0.3 kg

単位 mm

CWB-1593

LARGE TRAY OUTLINE DRAWING

SCYW05611

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

6.1.24 Outline Drawings of NDC-1590/A Central Control Unit

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	

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	

MASS APPROX. 5.6 kg

UNIT mm

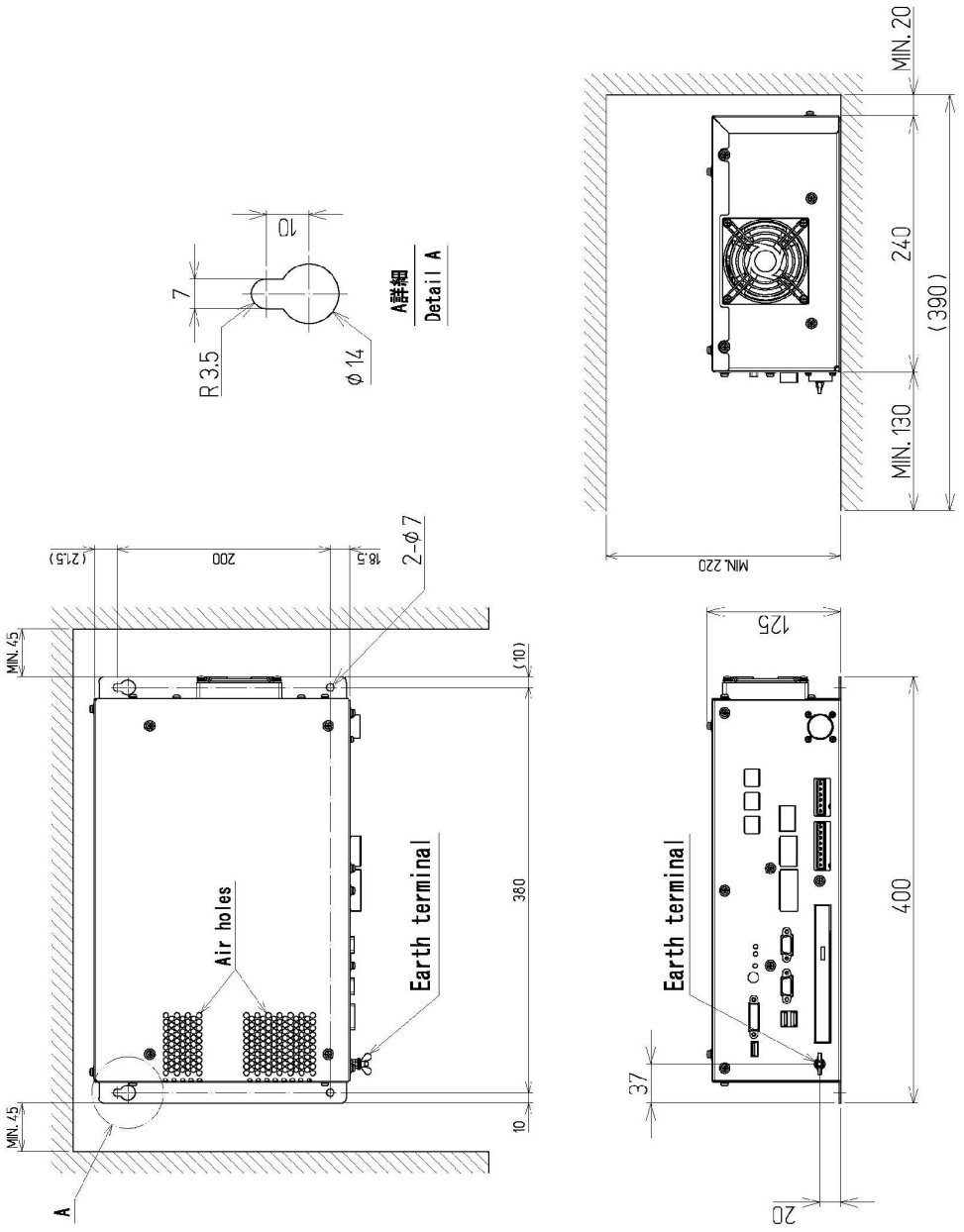
質量 約 5.6 kg

単位 mm

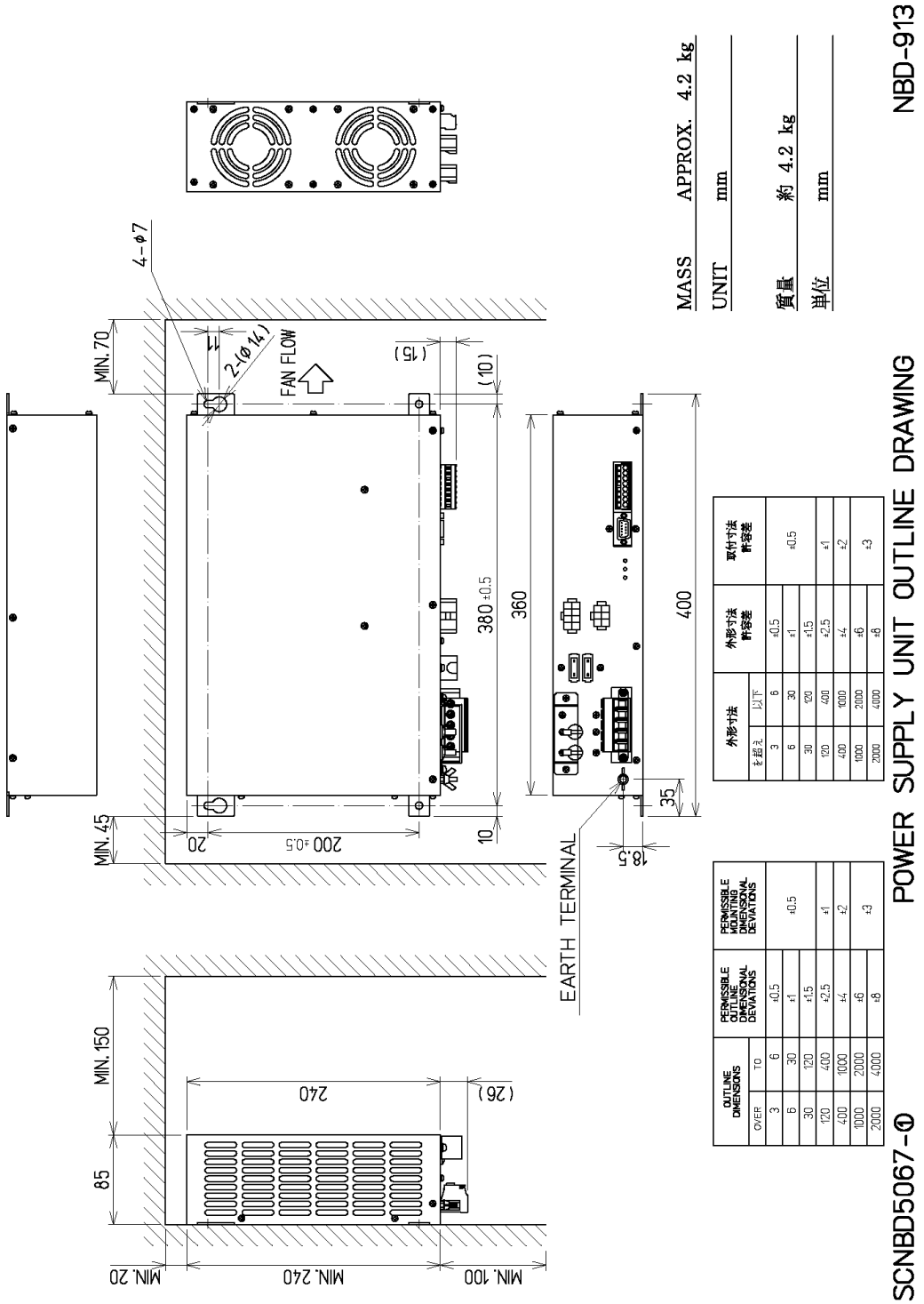
NDC-1590/A

CENTRAL CONTROL UNIT OUTLINE DRAWING

SCNDC5246



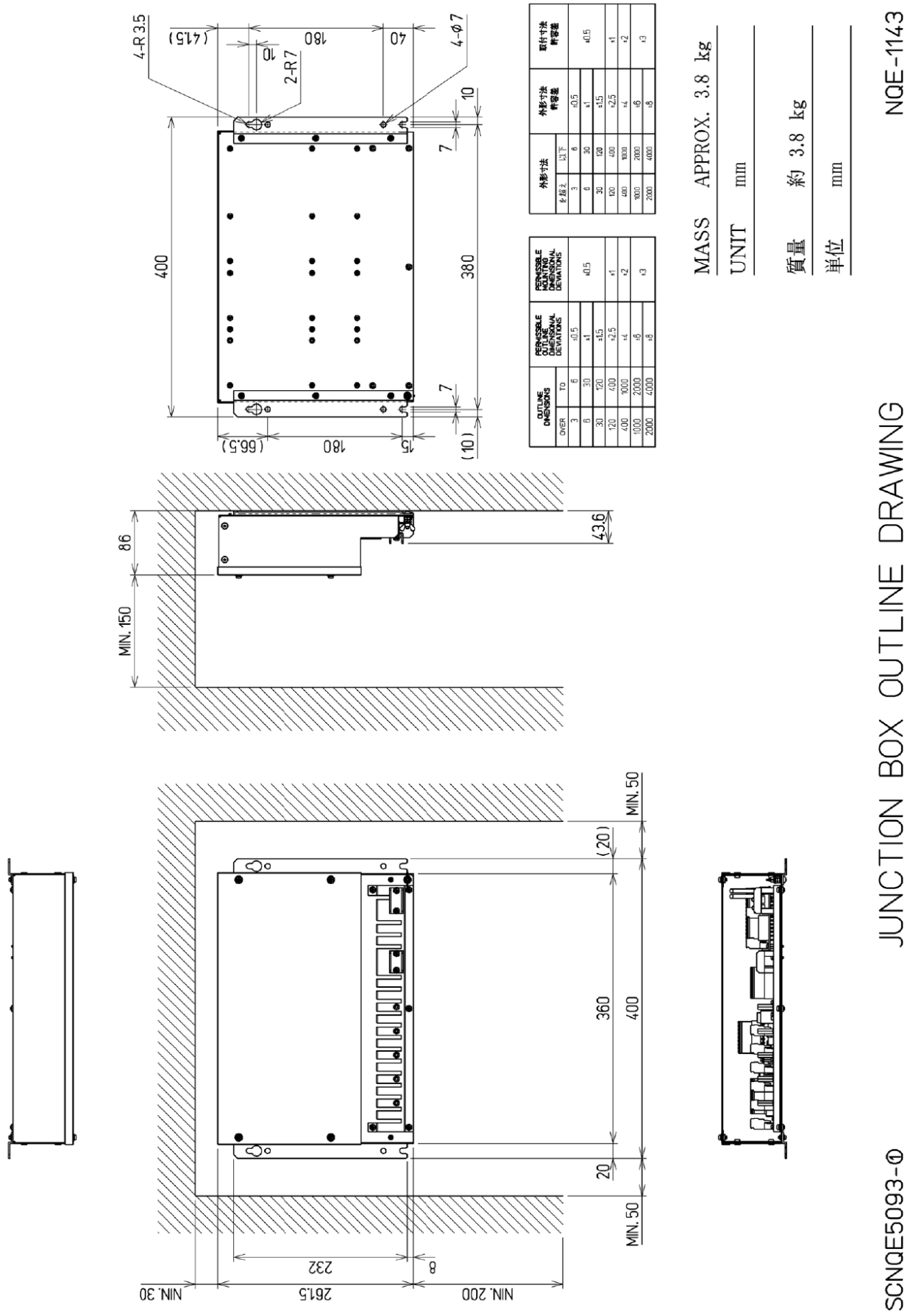
6.1.25 Outline Drawings of NBD-913 Power Supply Unit



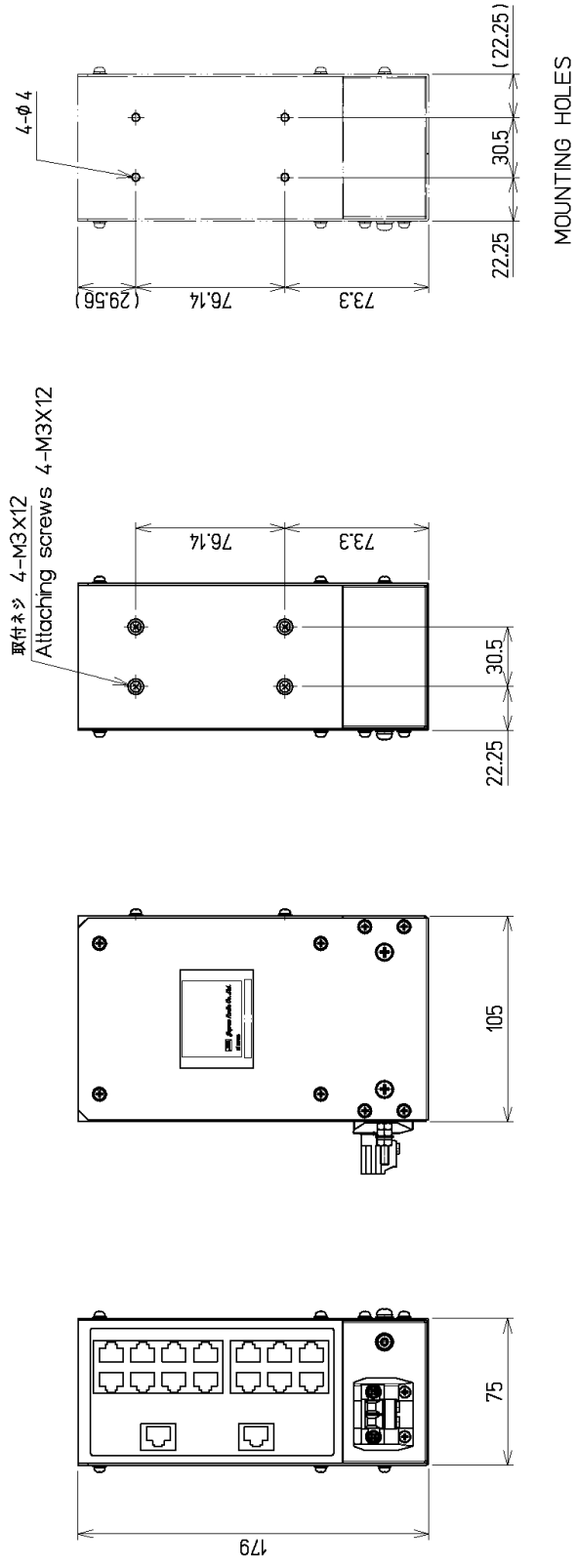
OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
OVER	TO		
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	

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	

6.1.26 Outline Drawings of NQE-1143 Junction Box



6.1.27 Outline Drawings of NQA-2443/A Sensor LAN Switch Unit



MASS 1.5 kg

UNIT mm

質量 1.5 kg

単位 mm

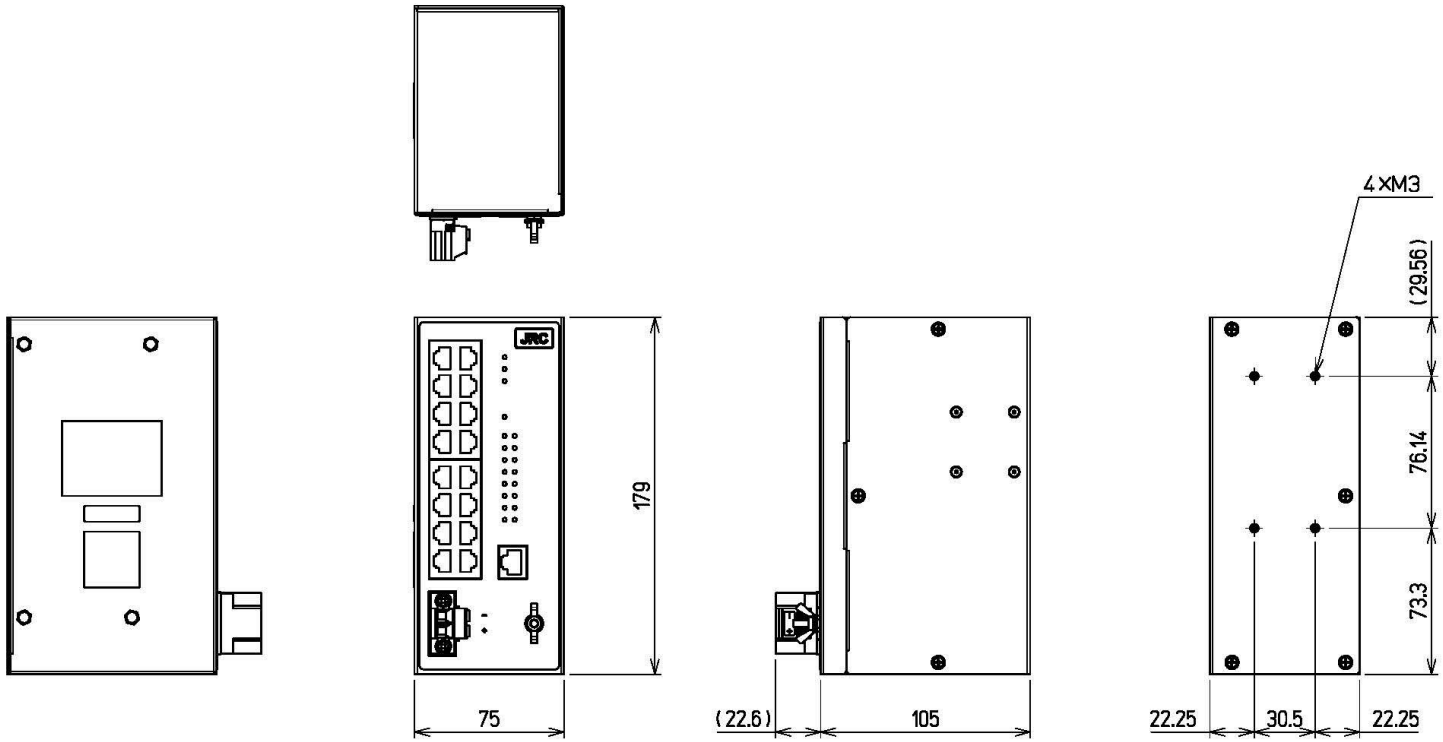
NQA-2443

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

SENSOR LAN UNIT OUTLINE DRAWING

SCNQA5173



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

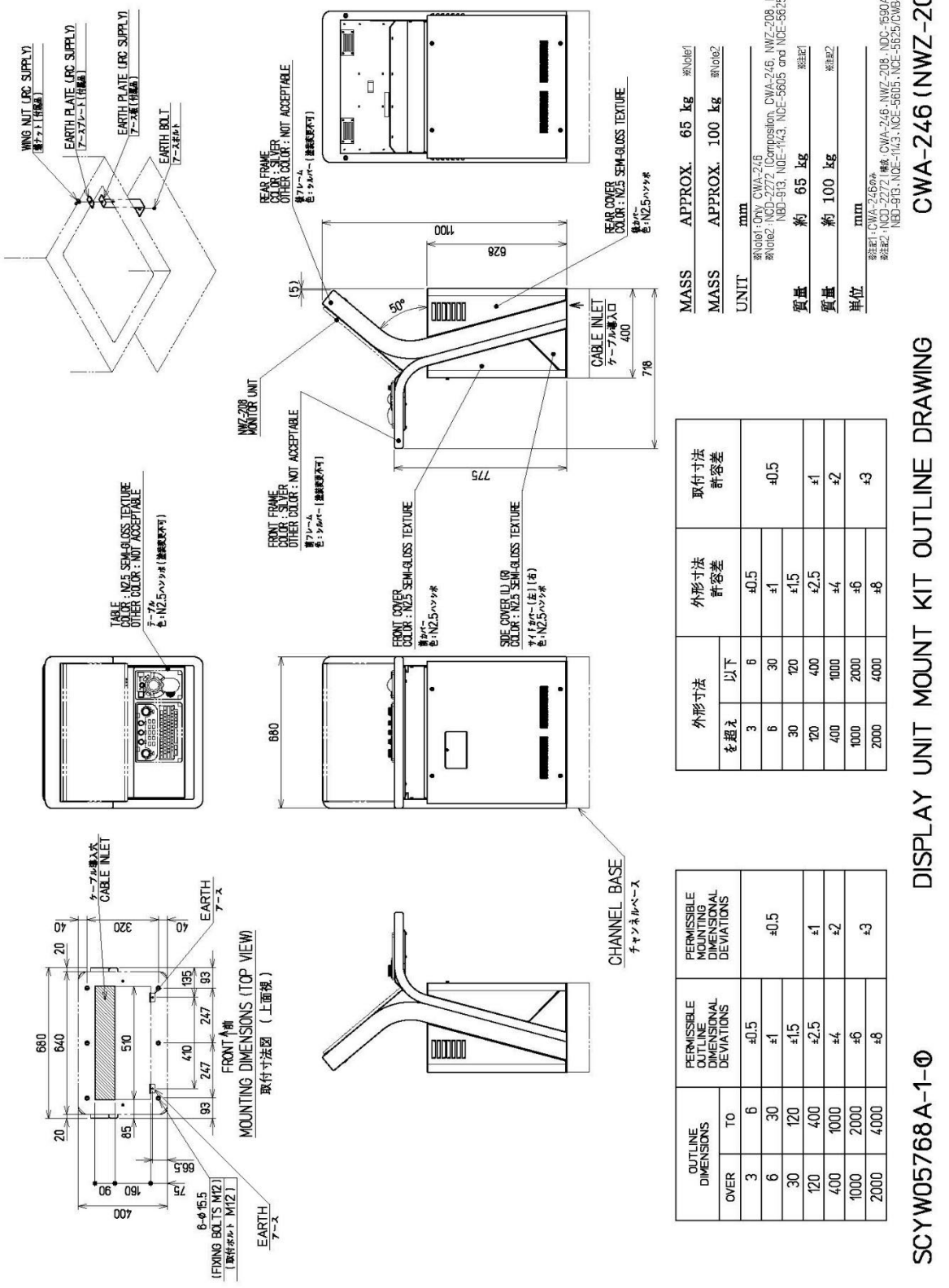
単位 mm

SCNQA5201

SENSOR LAN UNIT OUTLINE DRAWING

NQA-2443A

6.1.28 Outline Drawing of CWA-246 26inch Display Unit Mount Kit

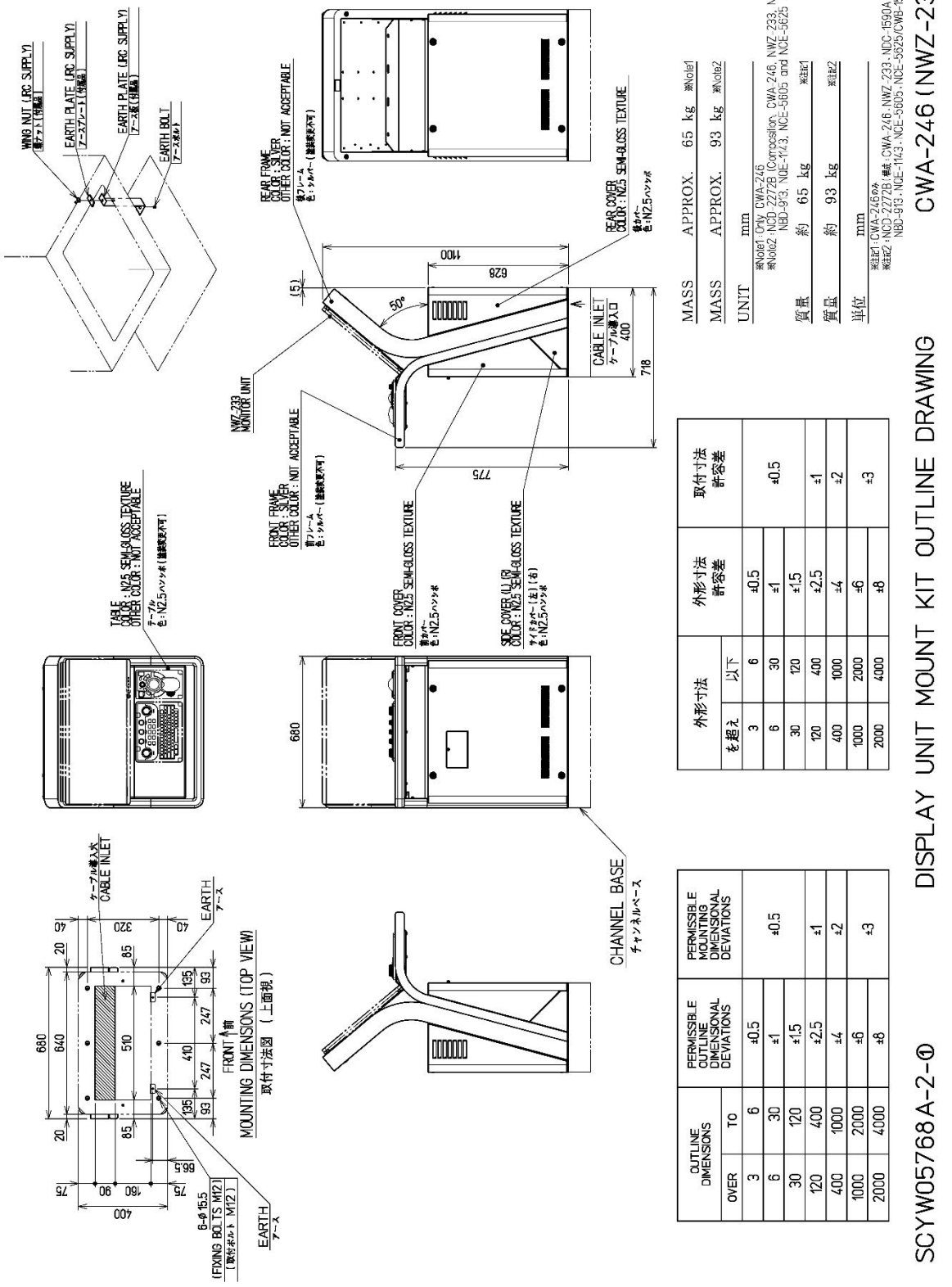


外形寸法 を超え	外形寸法 以下	外形寸法許容差	取付寸法許容差
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	

OUTLINE DIMENSIONS OVER	OUTLINE DIMENSIONS TO	PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
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)

6.1.29 Outline Drawing of CWA-246 27inch Display Unit Mount Kit

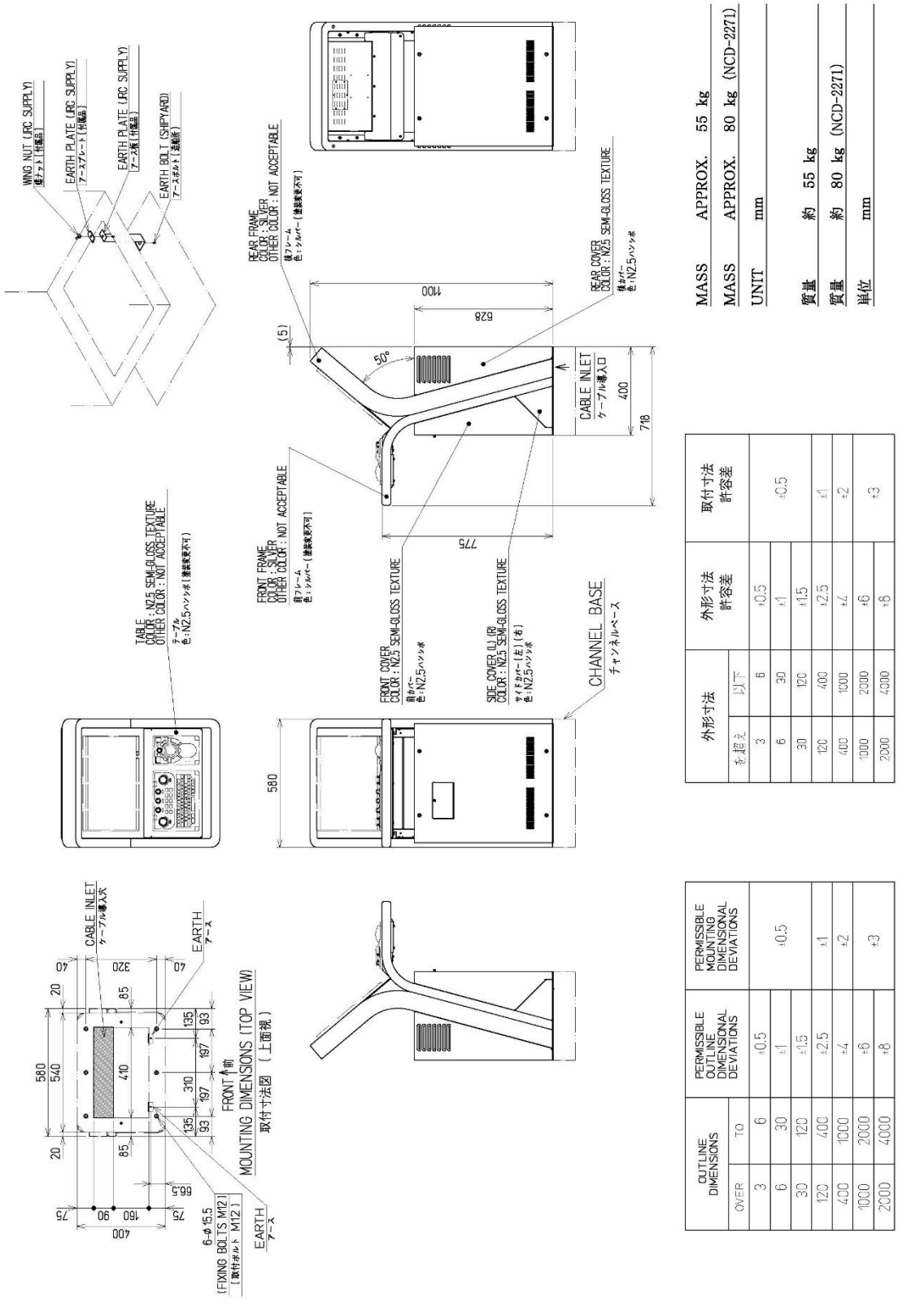


外形寸法 を超え	以下	外形寸法許容差	取付寸法許容差
3	6	±0.5	±0.5
6	30	±1	
30	120	±1.5	
120	400	±2.5	±1
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	

OUTLINE DIMENSIONS OVER	TO	PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
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)

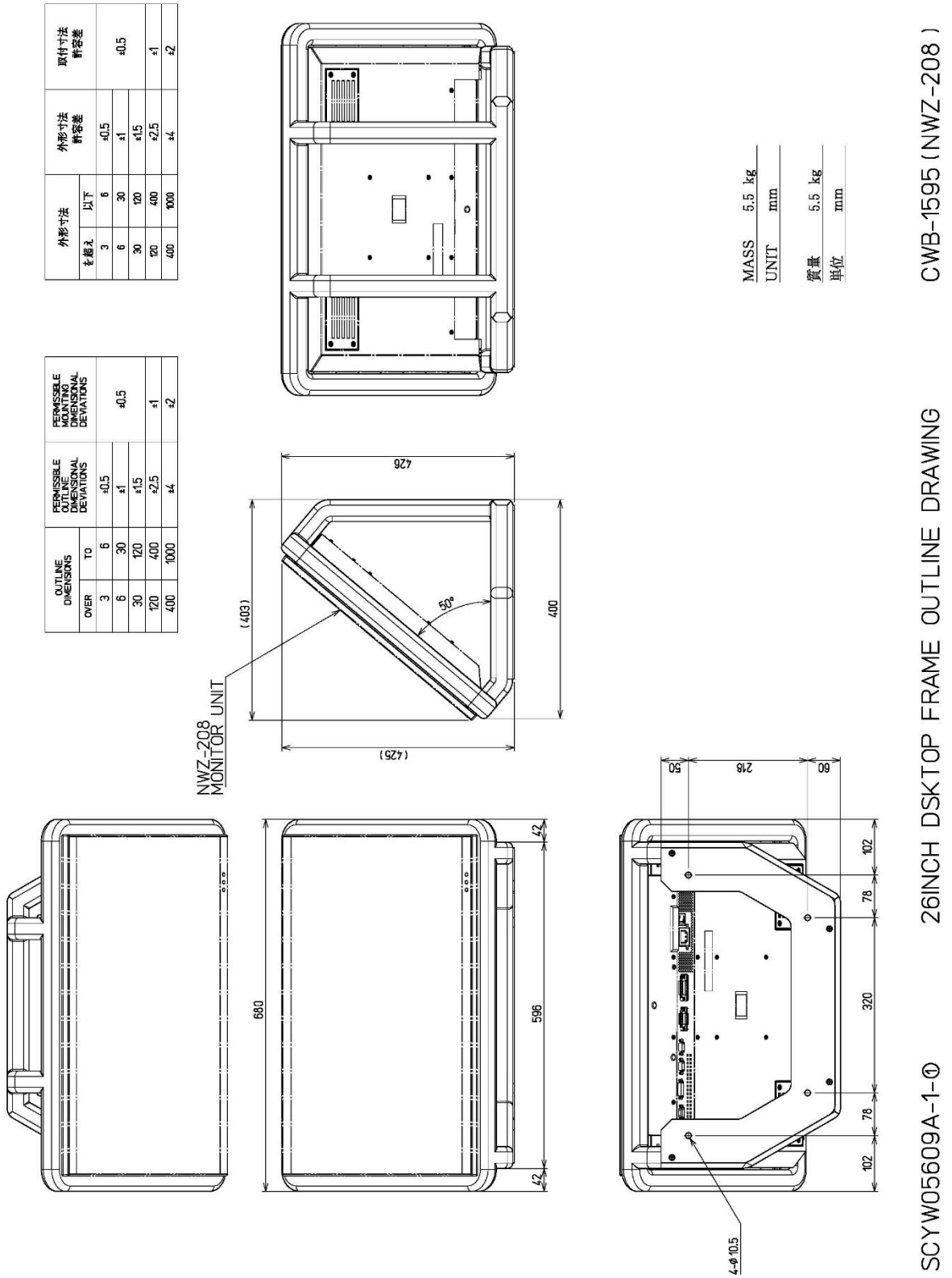
6.1.30 Outline Drawings of CWA-245 19inch Display Unit Mount Kit



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	

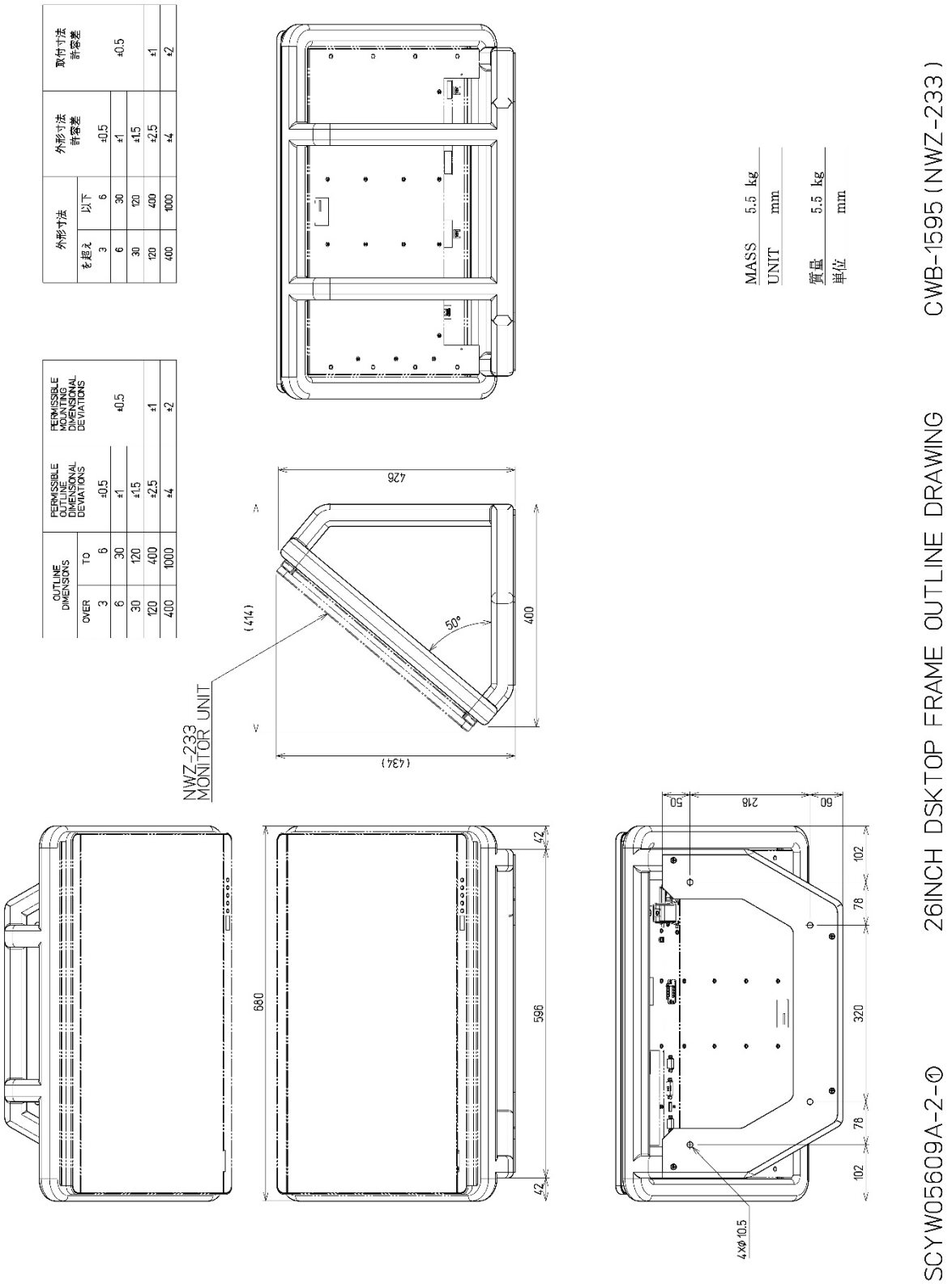
6.1.31 Outline Drawings of CWB-1595 26inch Desktop Frame



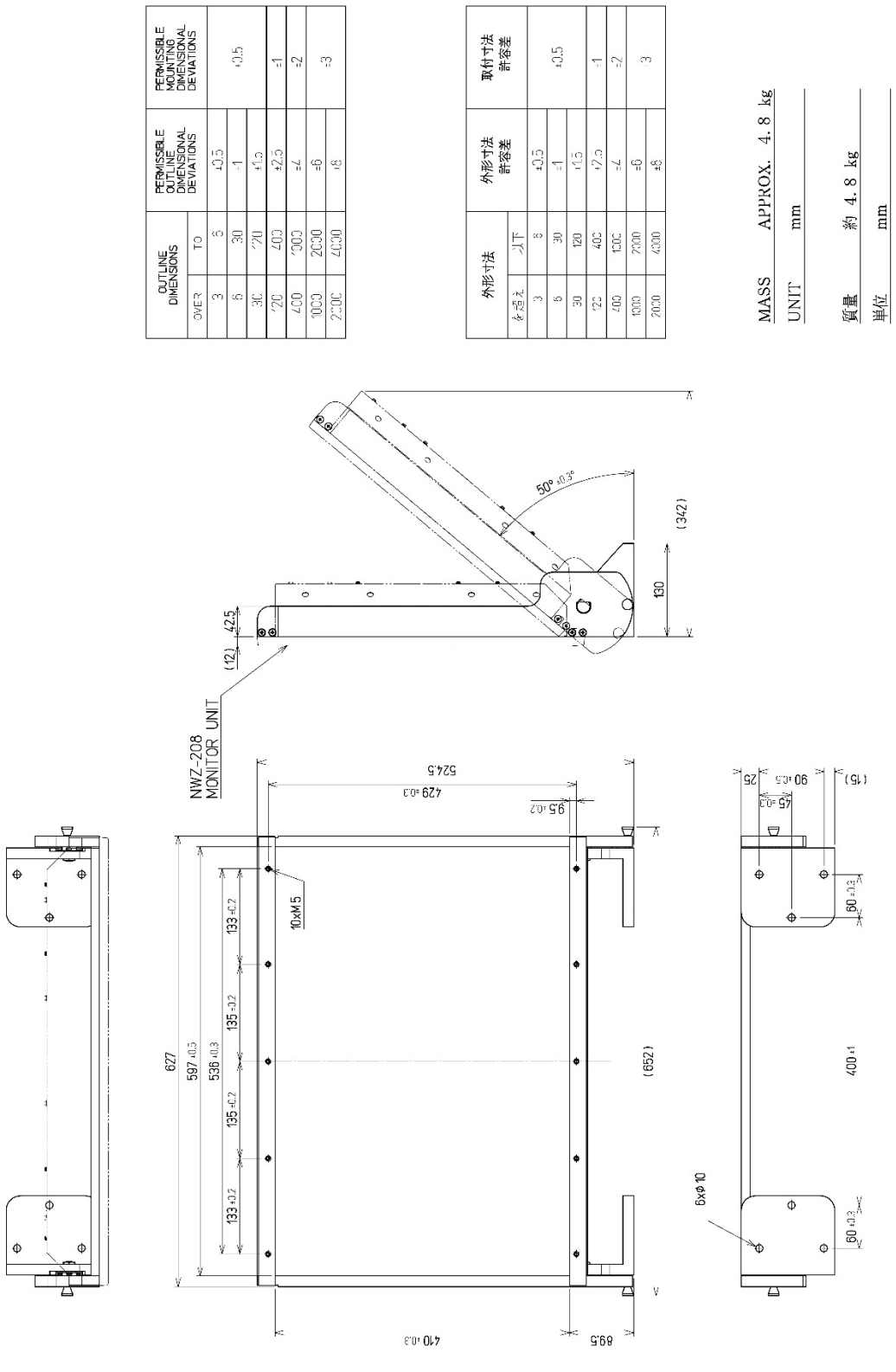
外形寸法		取付寸法許容差
を超え	以下	
3	6	±0.5
6	30	±1
30	120	±1.5
120	400	±2.5
400	1000	±4

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

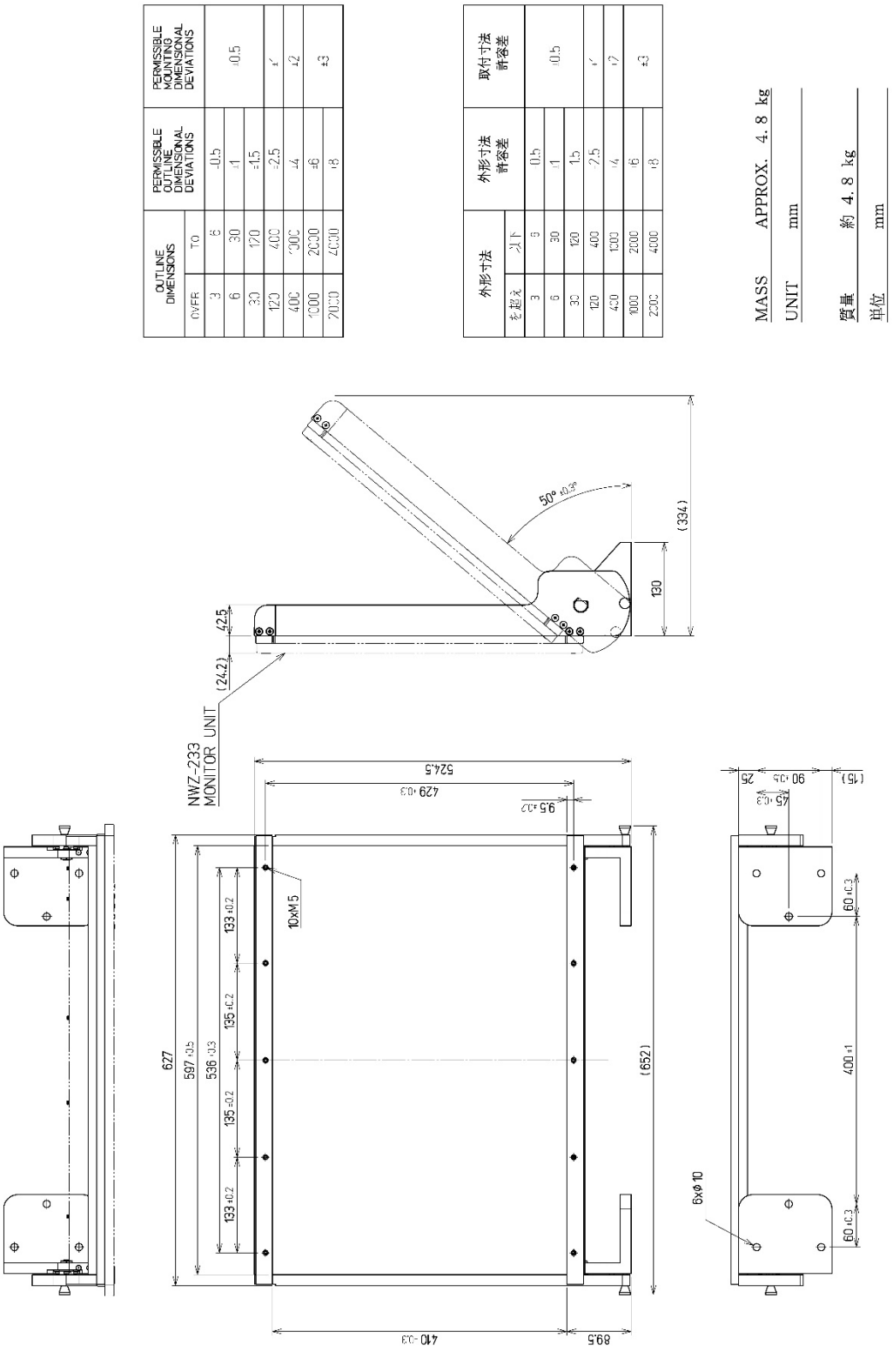
6.1.32 Outline Drawings of CWB-1595 27inch Desktop Frame



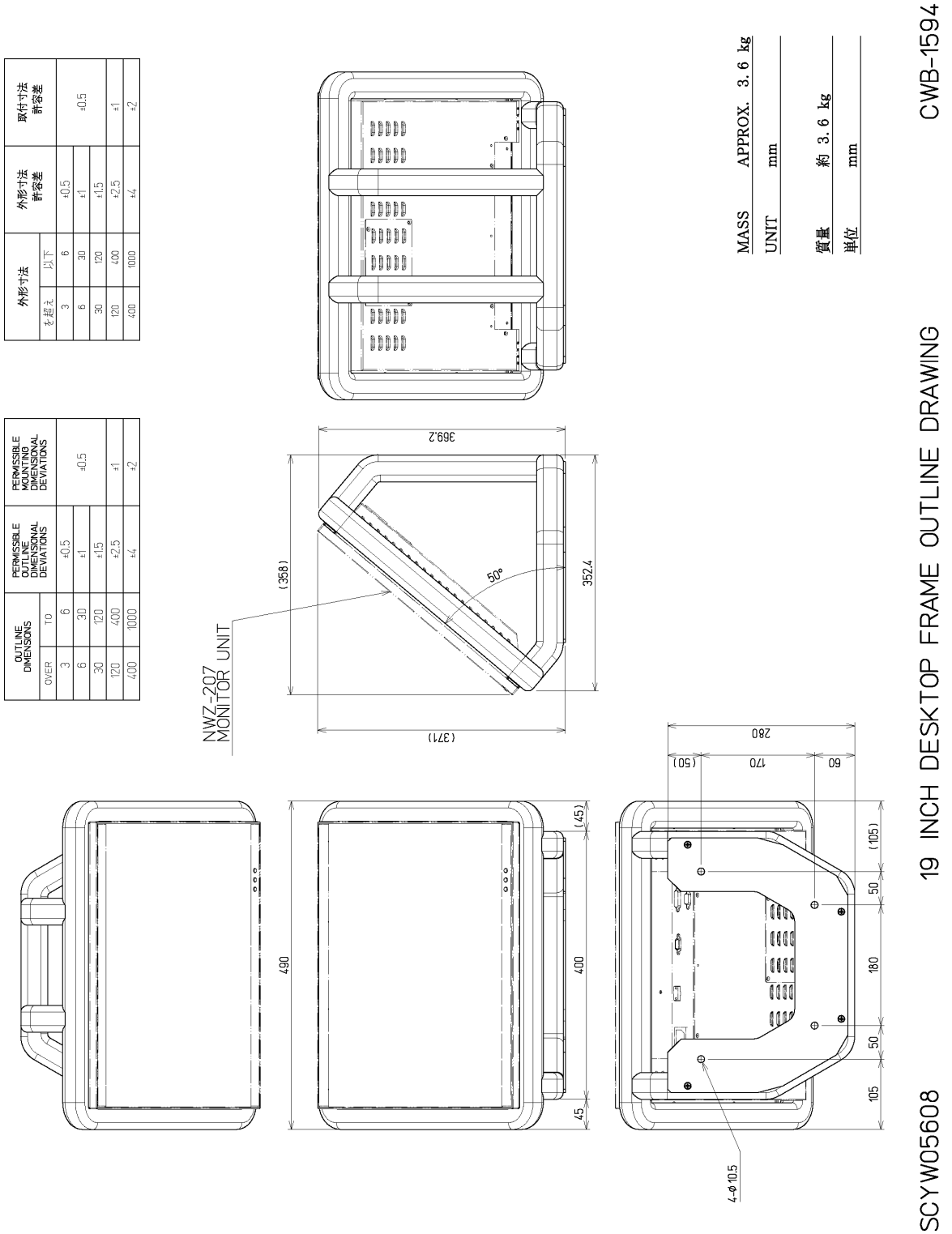
6.1.33 Outline Drawings of CWB-1660 26inch Desktop Frame



6.1.34 Outline Drawings of CWB-1660 27inch Desktop Frame



6.1.35 Outline Drawings of CWB-1594 19inch Desktop Frame



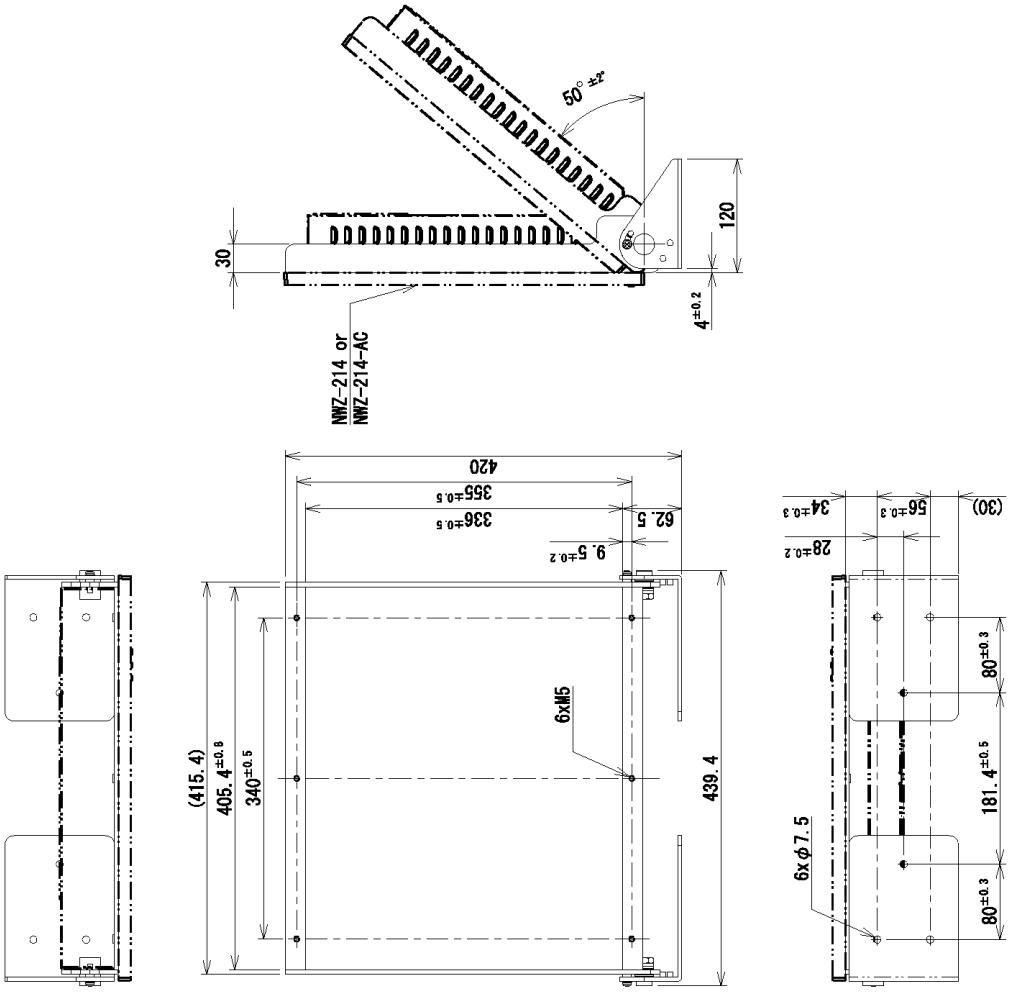
6.1.36 Outline Drawings of CWB-1659 19inch Desktop Frame

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	
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	±1
120	400	±2.5	
400	1000	±4	±2
1000	2000	±6	±3
2000	4000	±8	

MASS APPROX. 1.2kg
UNIT mm

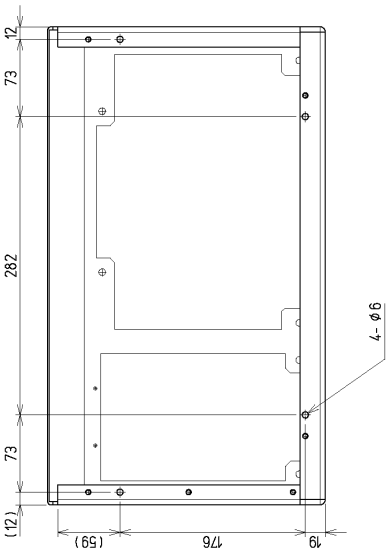
質量 約 1.2kg
単位 mm

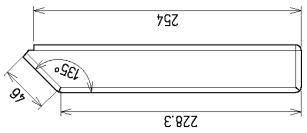


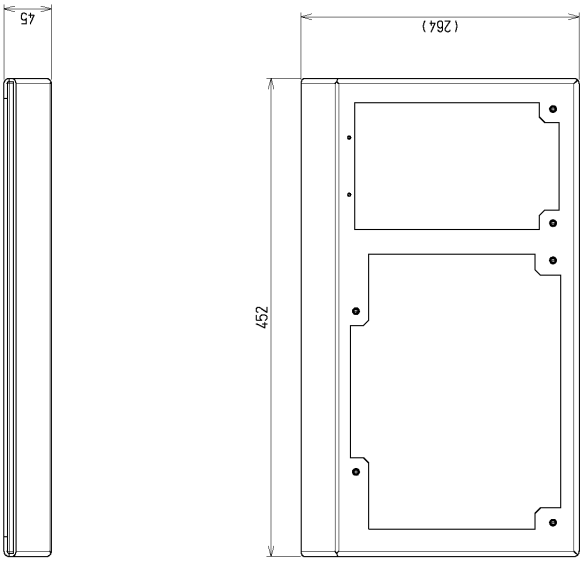
6.1.37 Outline Drawings of CWB-1596 OPU Desktop Frame

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	
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	±1
120	400	±2.5	
400	1000	±4	±2







MASS APPROX. 1 kg

UNIT mm

質量 約 1 kg

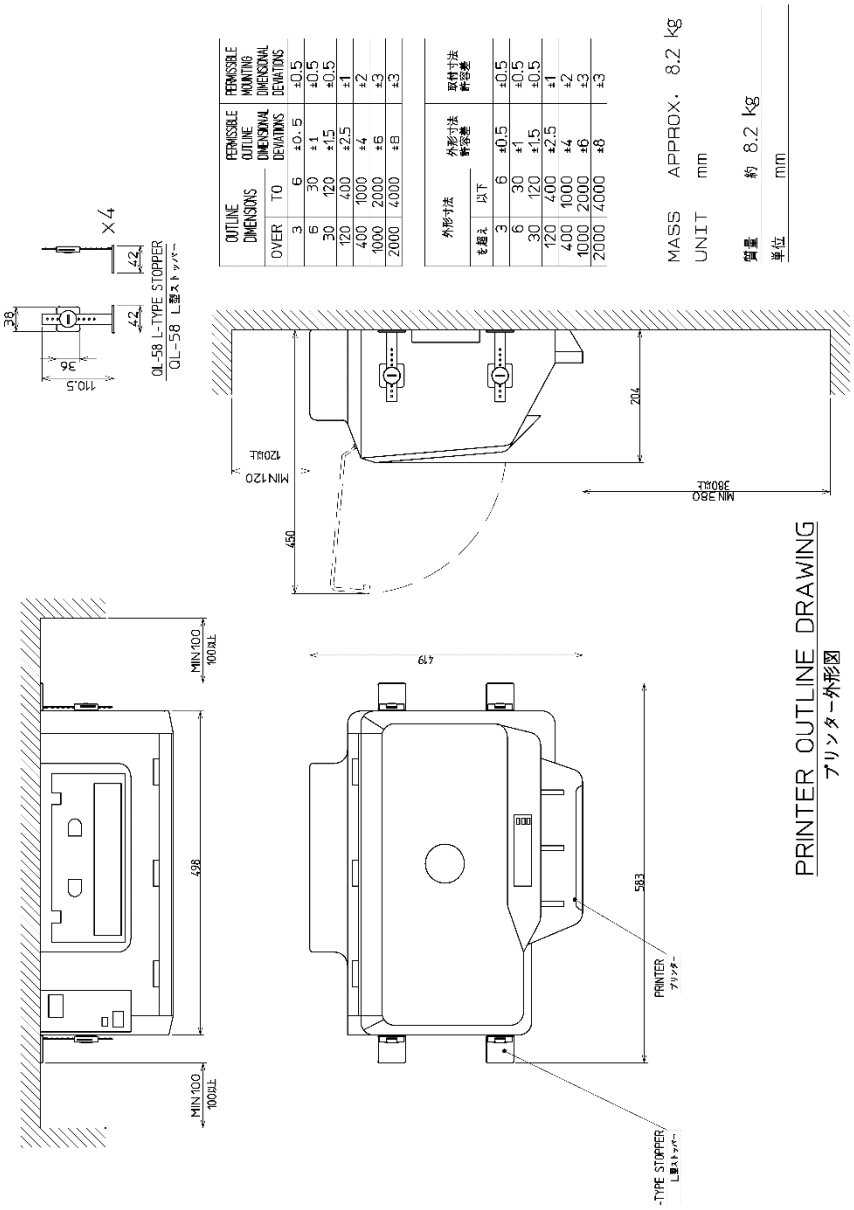
単位 mm

CWB-1596

OPU DESKTOP FRAME

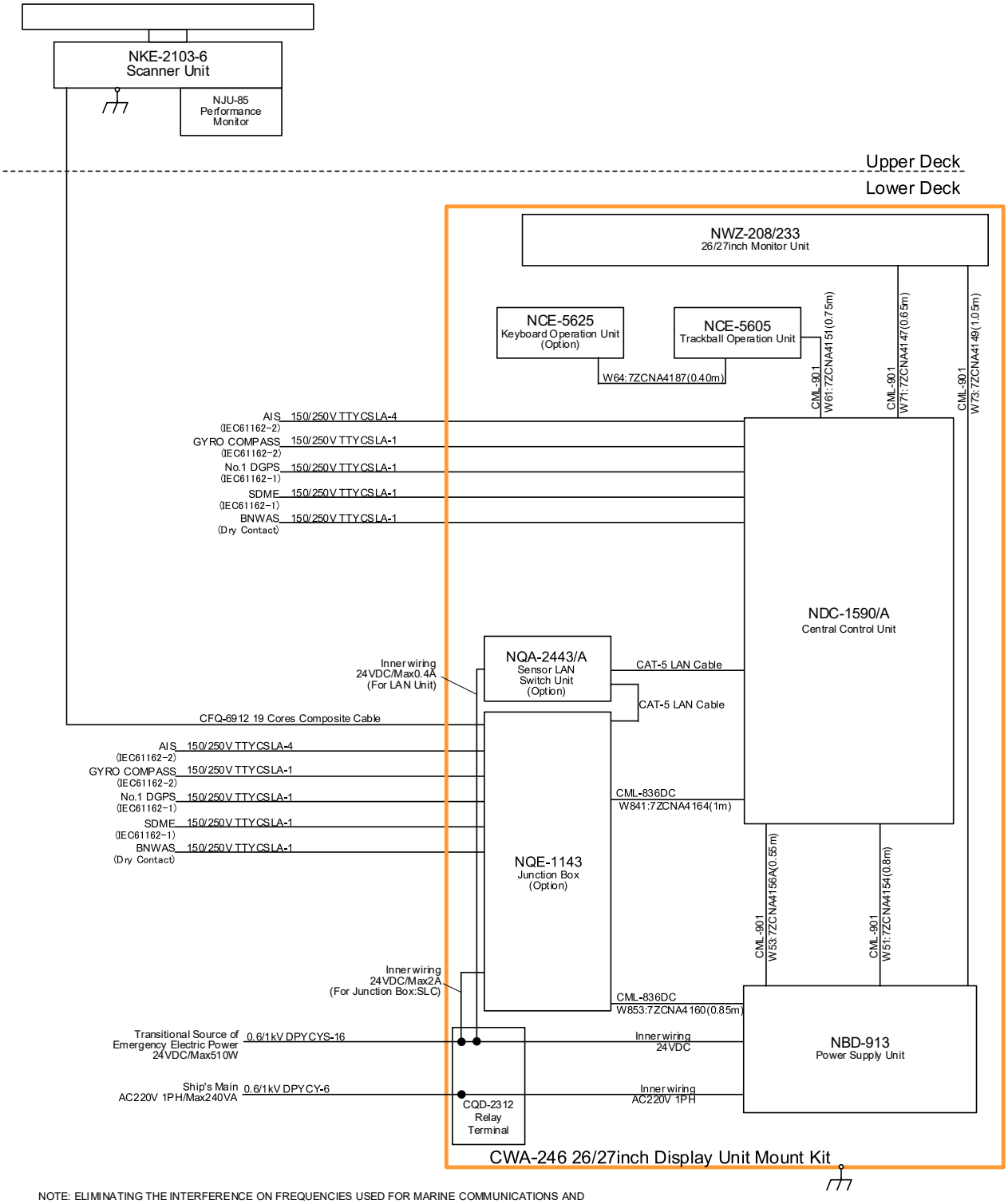
SCYW05610

6.1.38 Outline Drawings of 7HPN4004 Printer



6.2 General System Diagram of Standalone Type

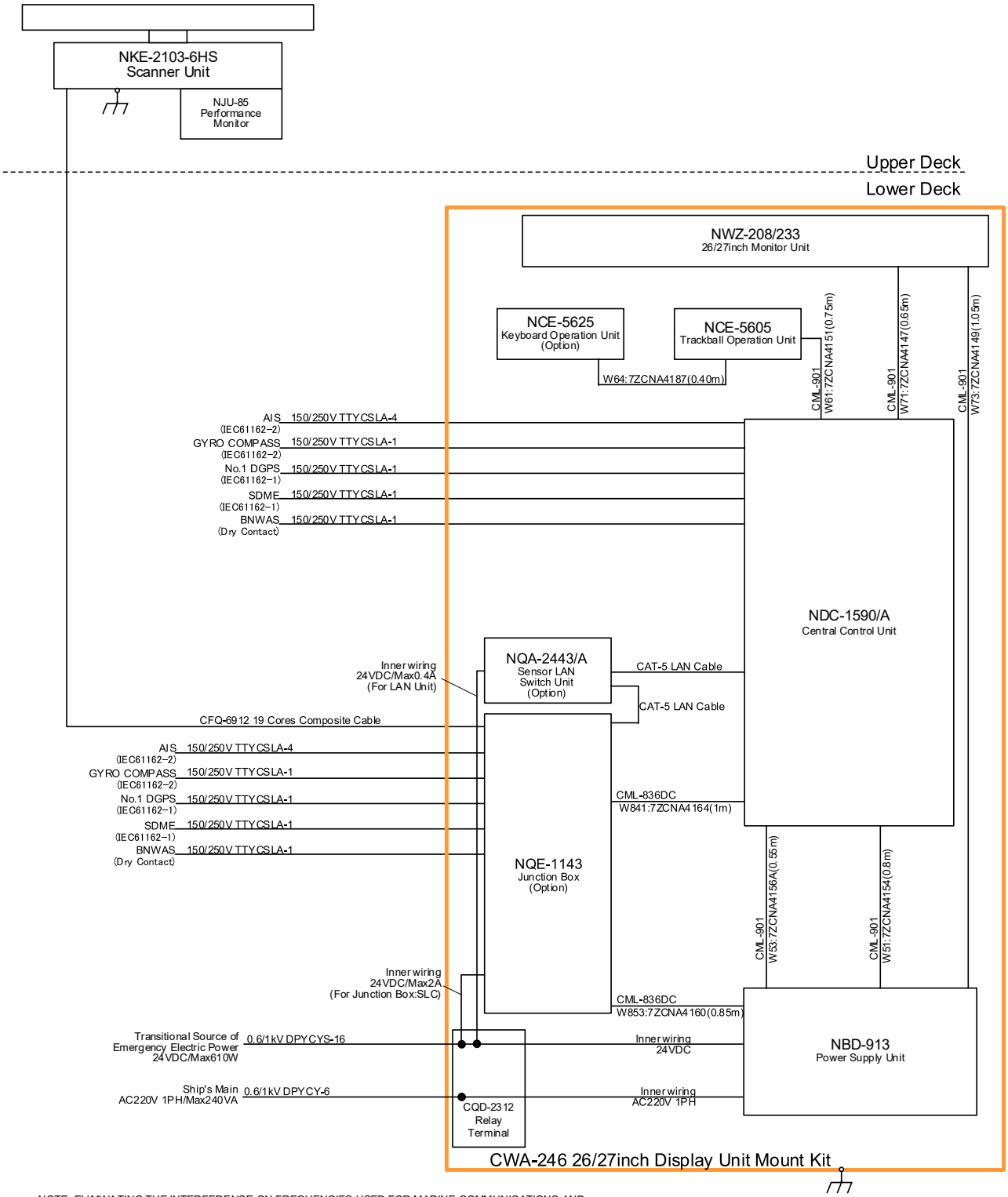
6.2.1 JMR-9210-6X



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

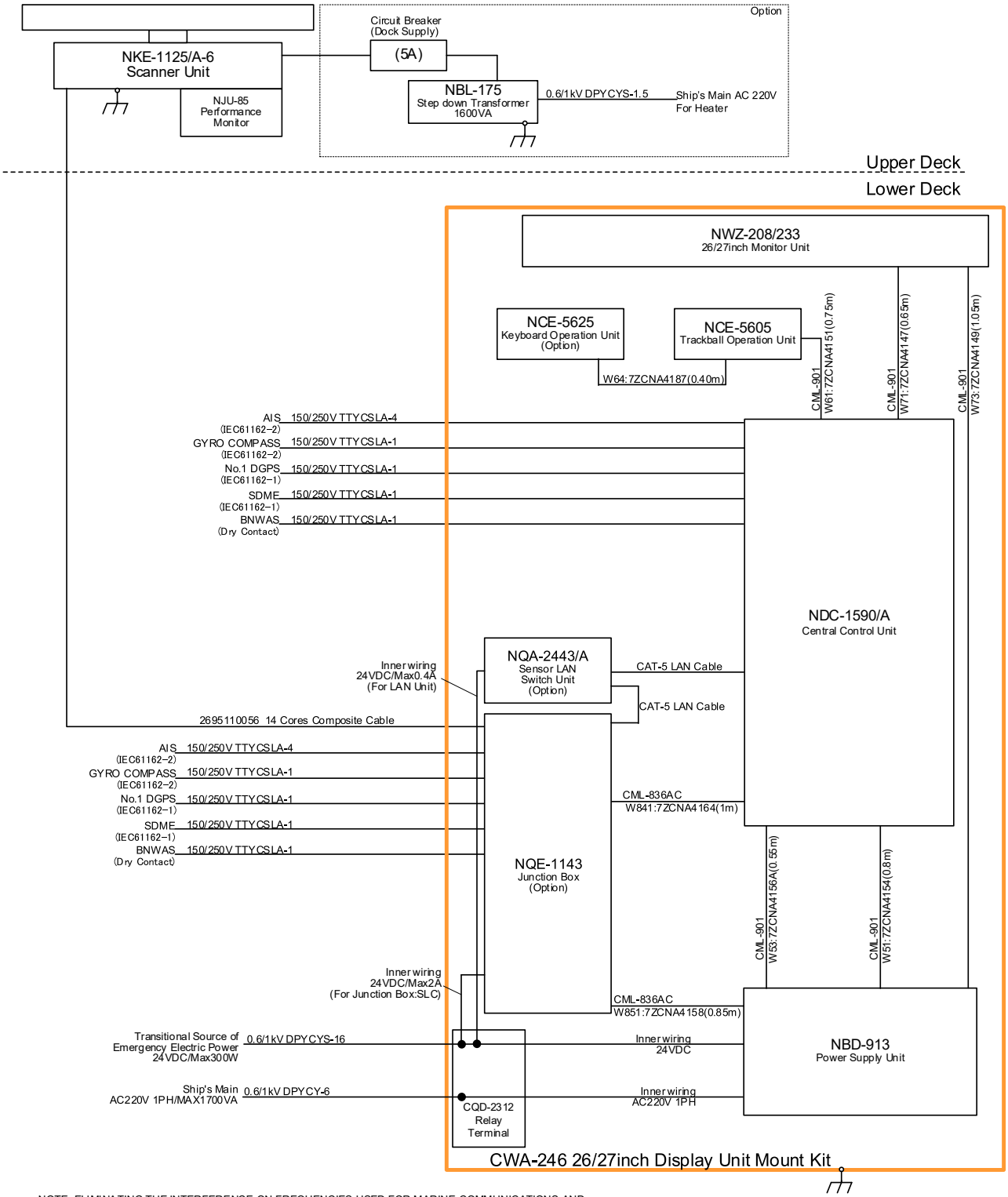
6.2.2 JMR-9210-6XH



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

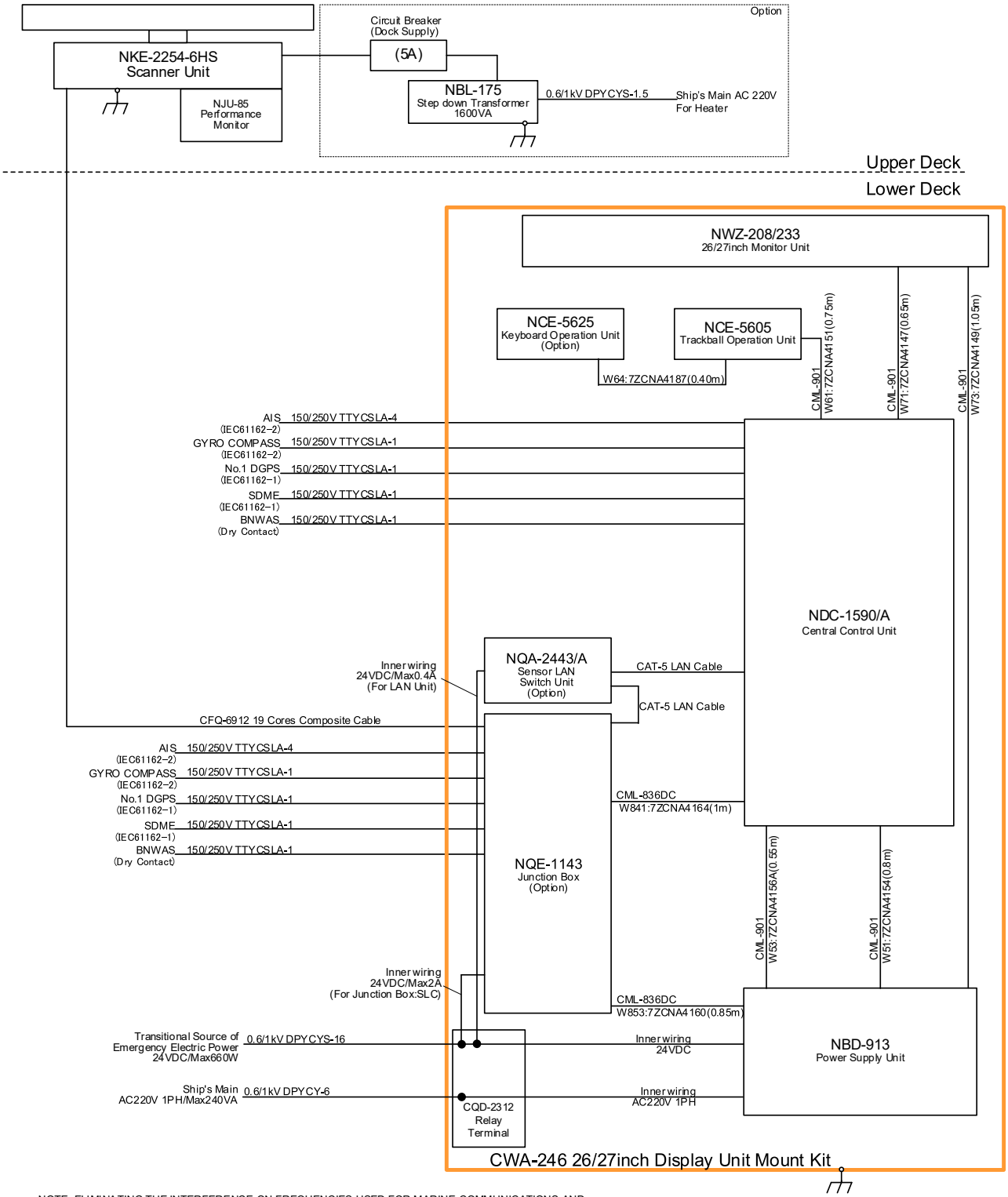
6.2.3 JMR-9225-6X



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

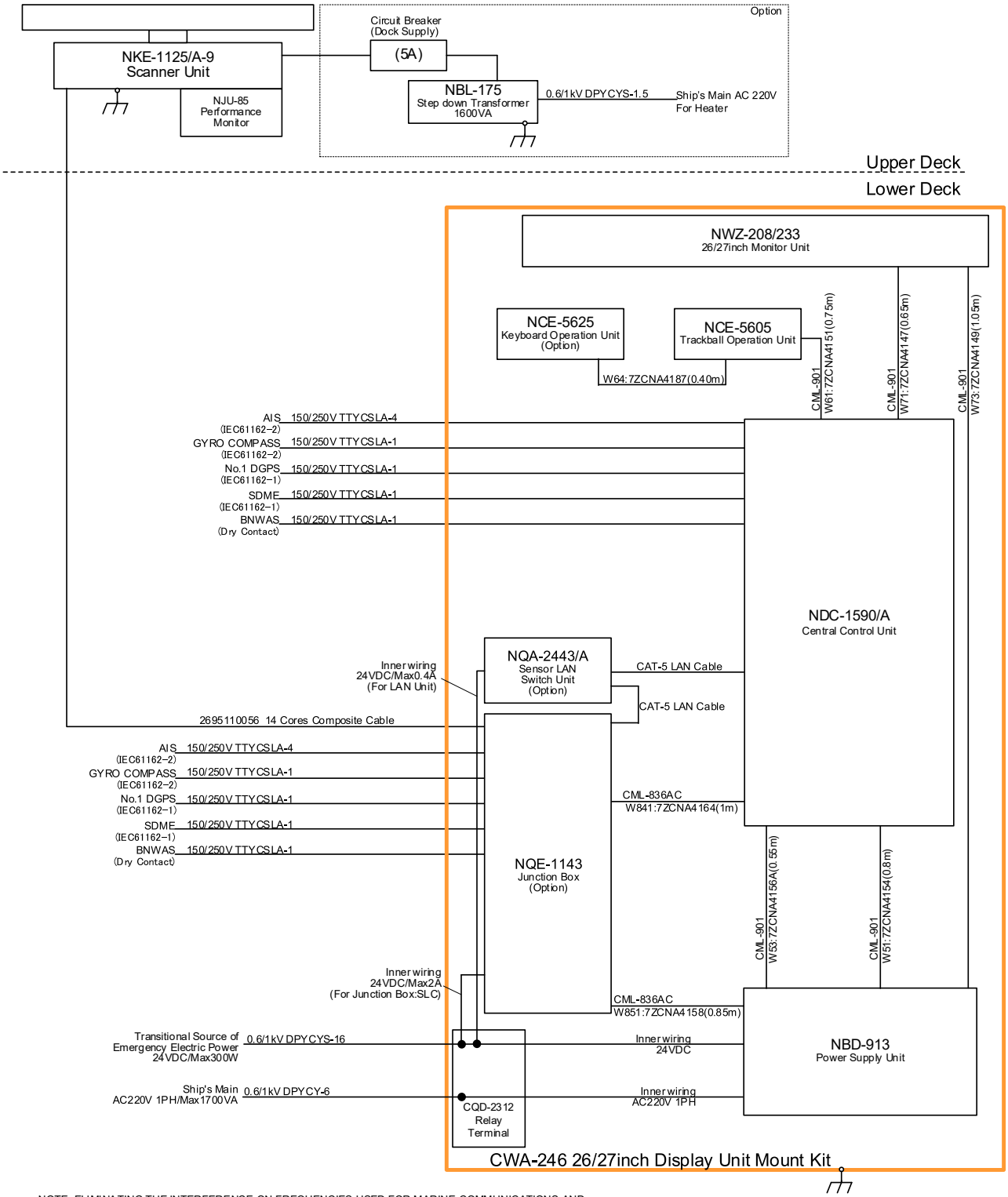
6.2.4 JMR-9225-6XH



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

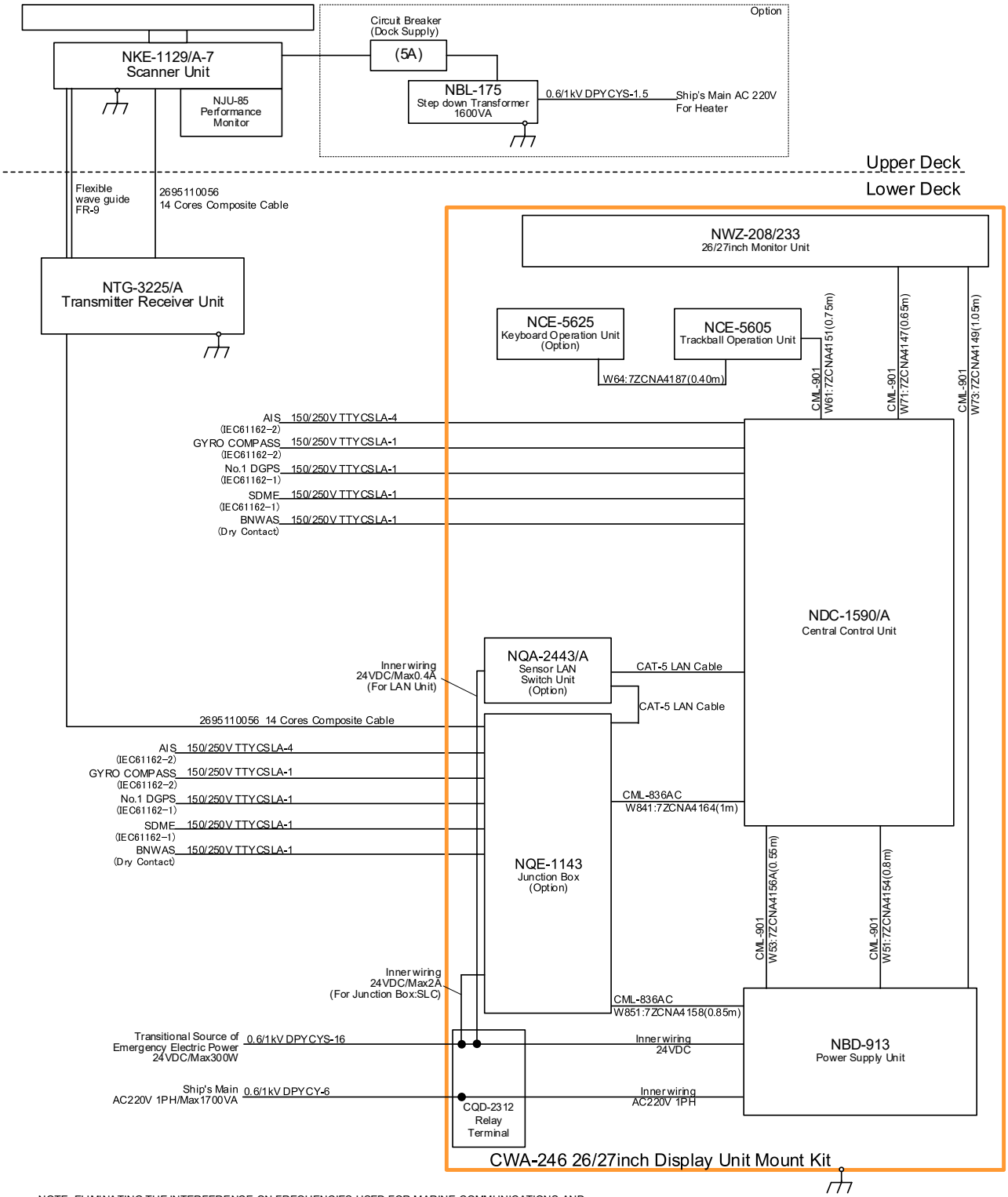
6.2.5 JMR-9225-9X



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

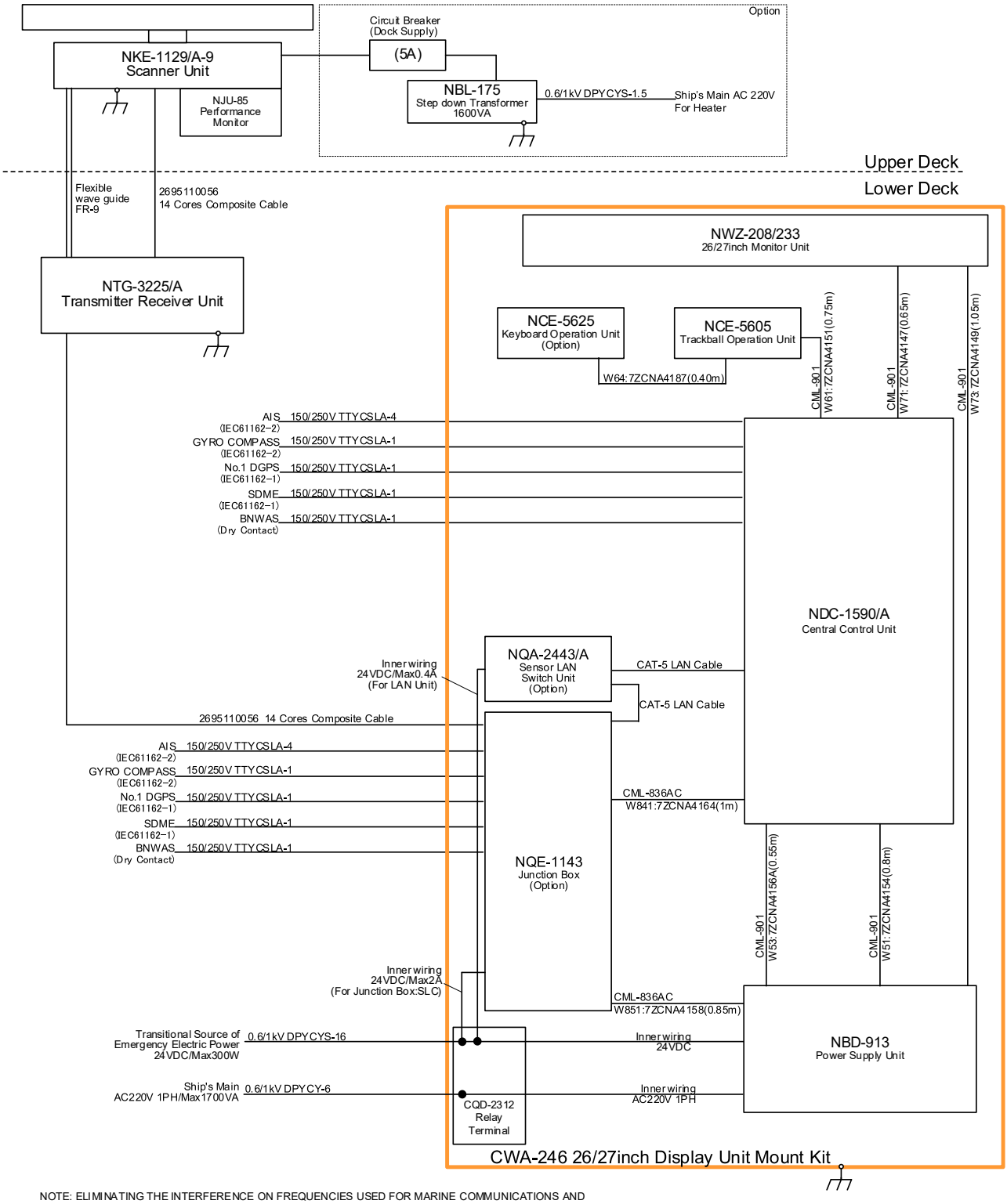
6.2.6 JMR-9225-7X3



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

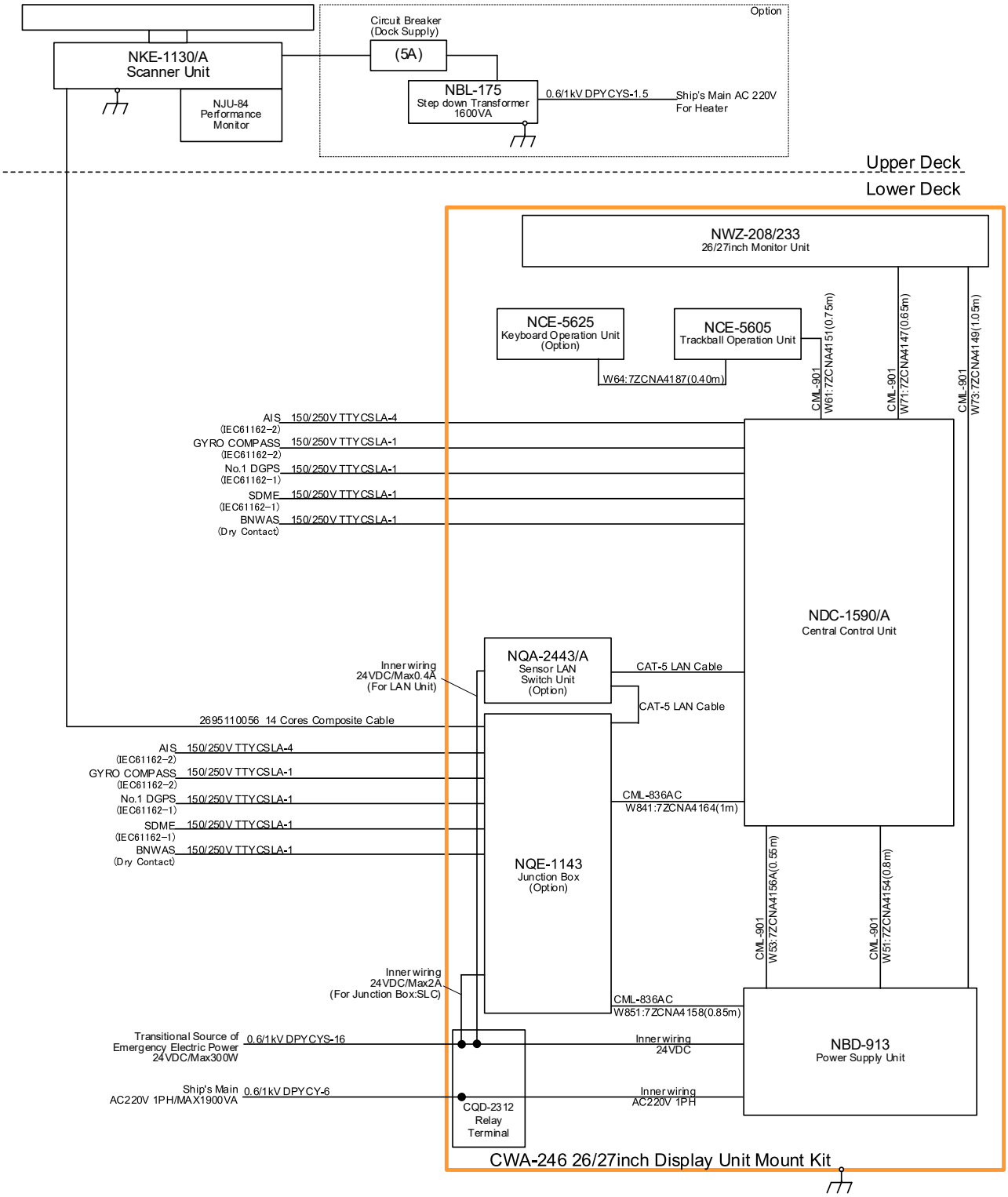
6.2.7 JMR-9225-9X3



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

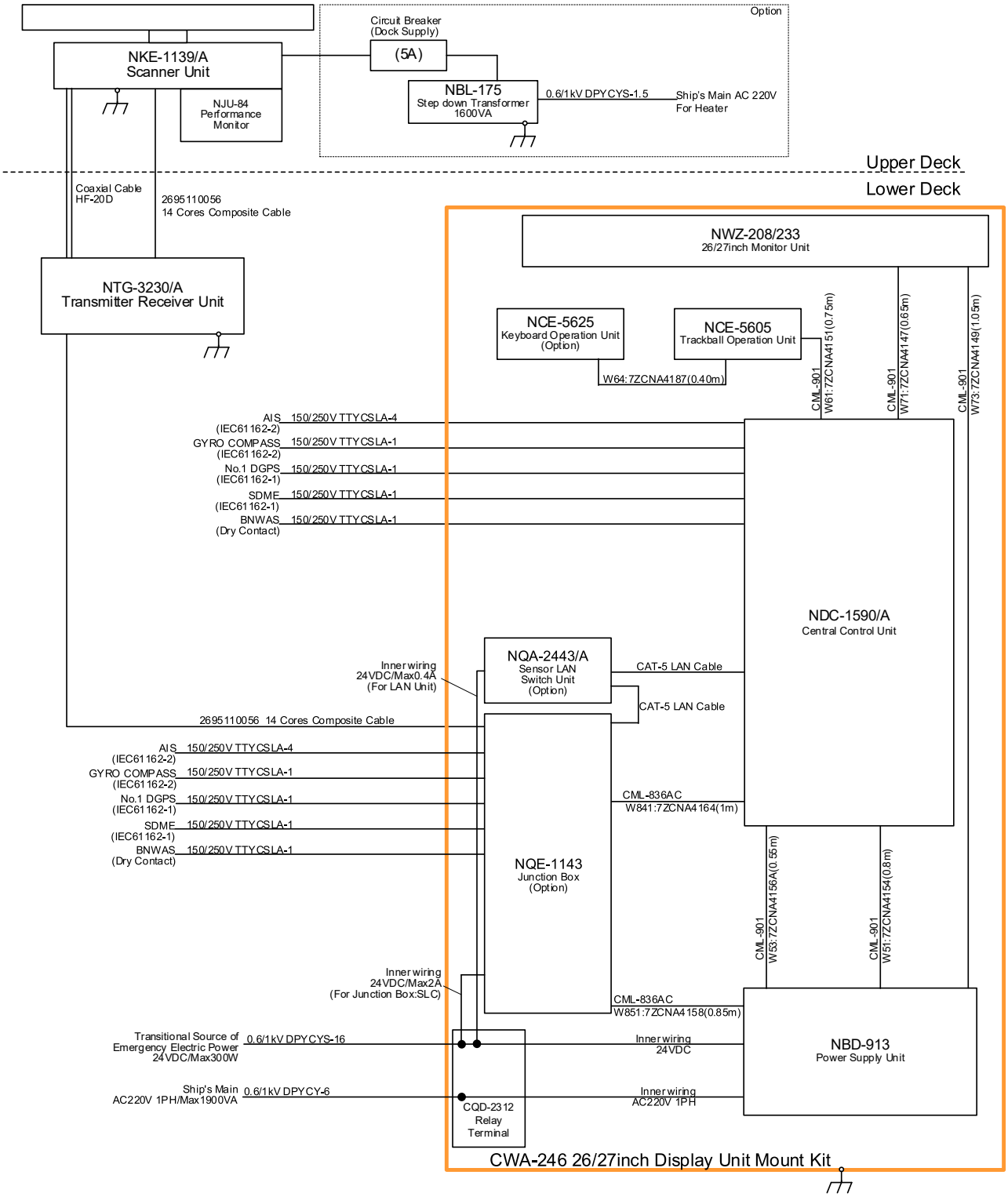
6.2.8 JMR-9230-S



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

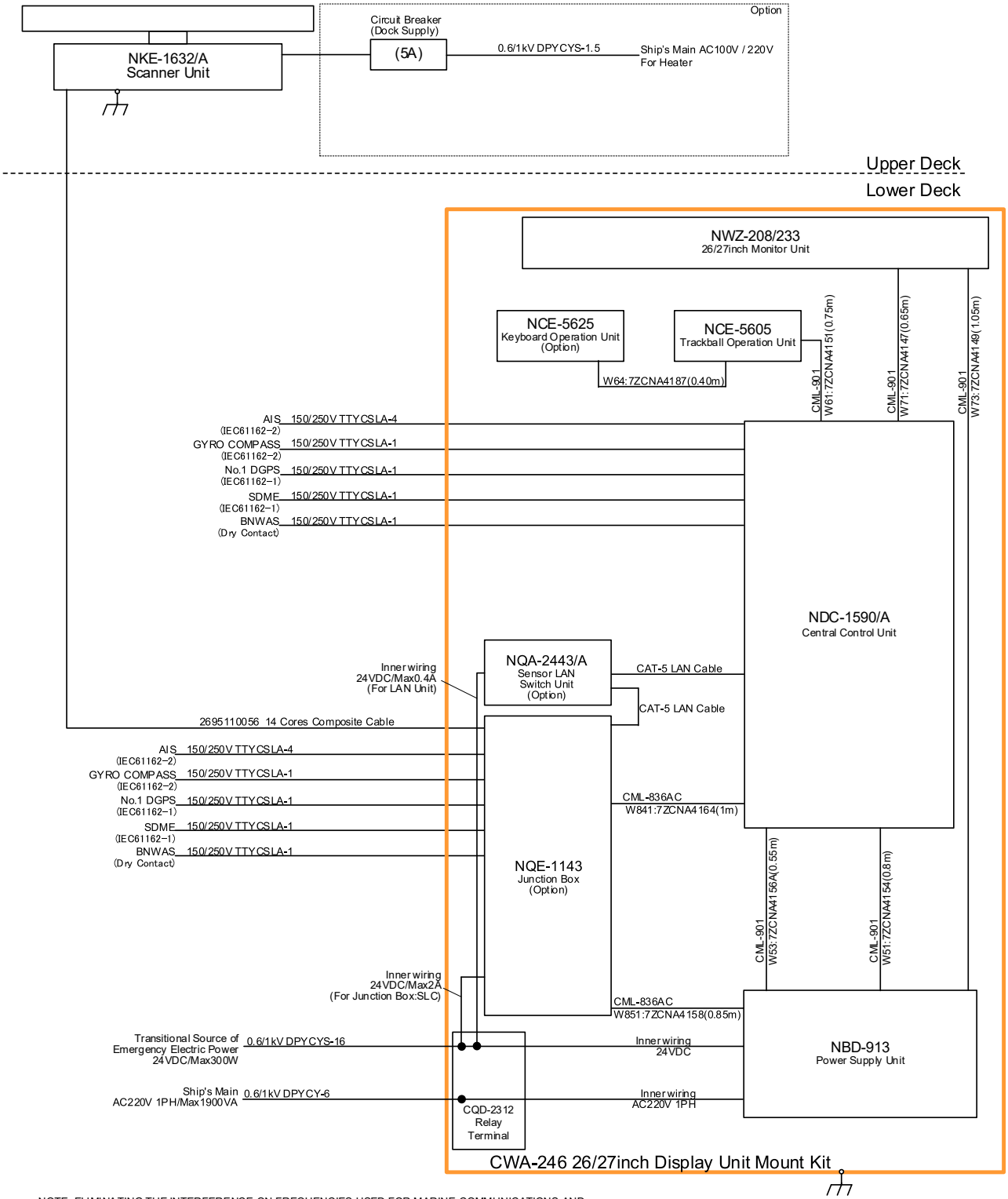
6.2.9 JMR-9230-S3



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

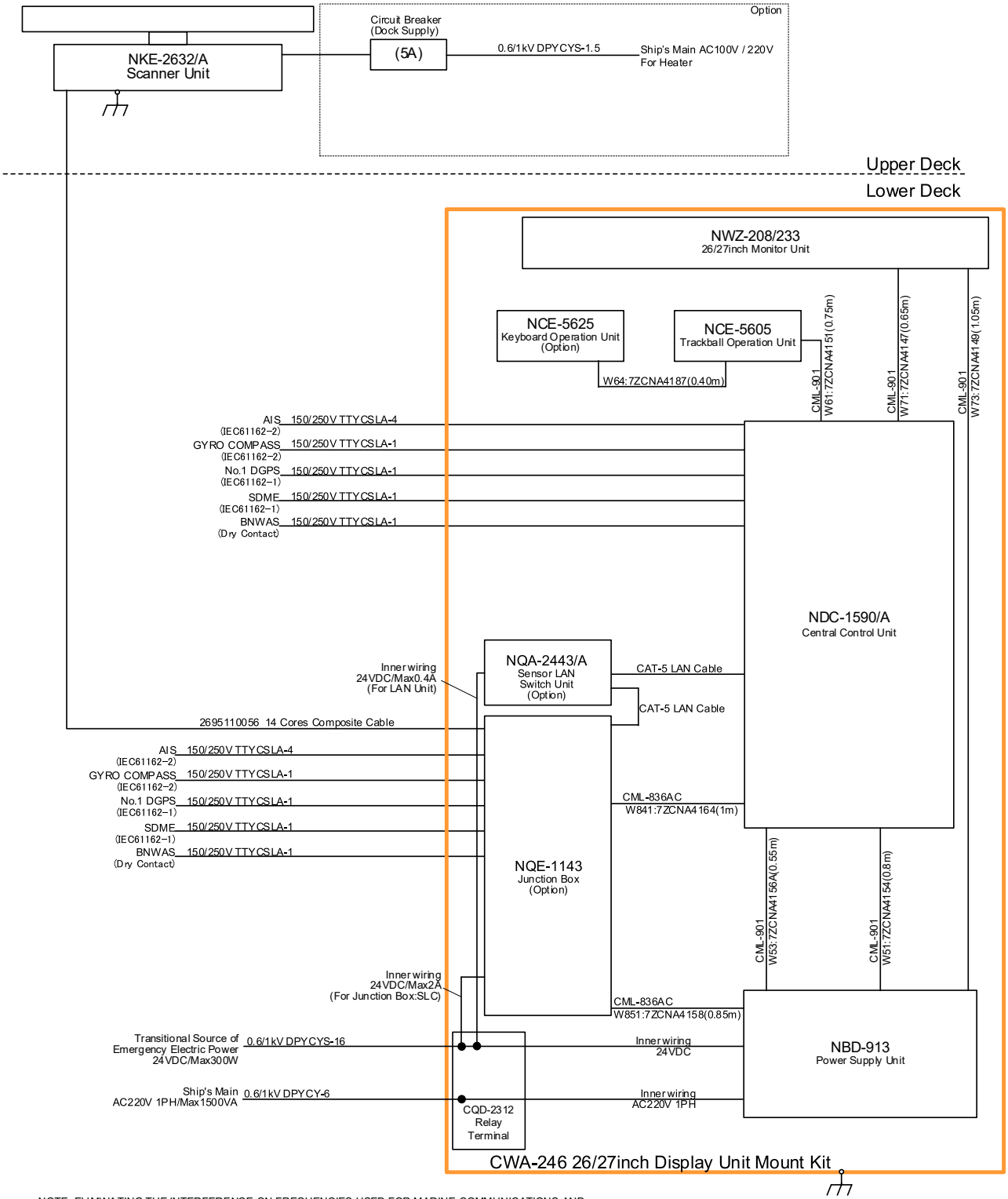
6.2.10 JMR-9272-S



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

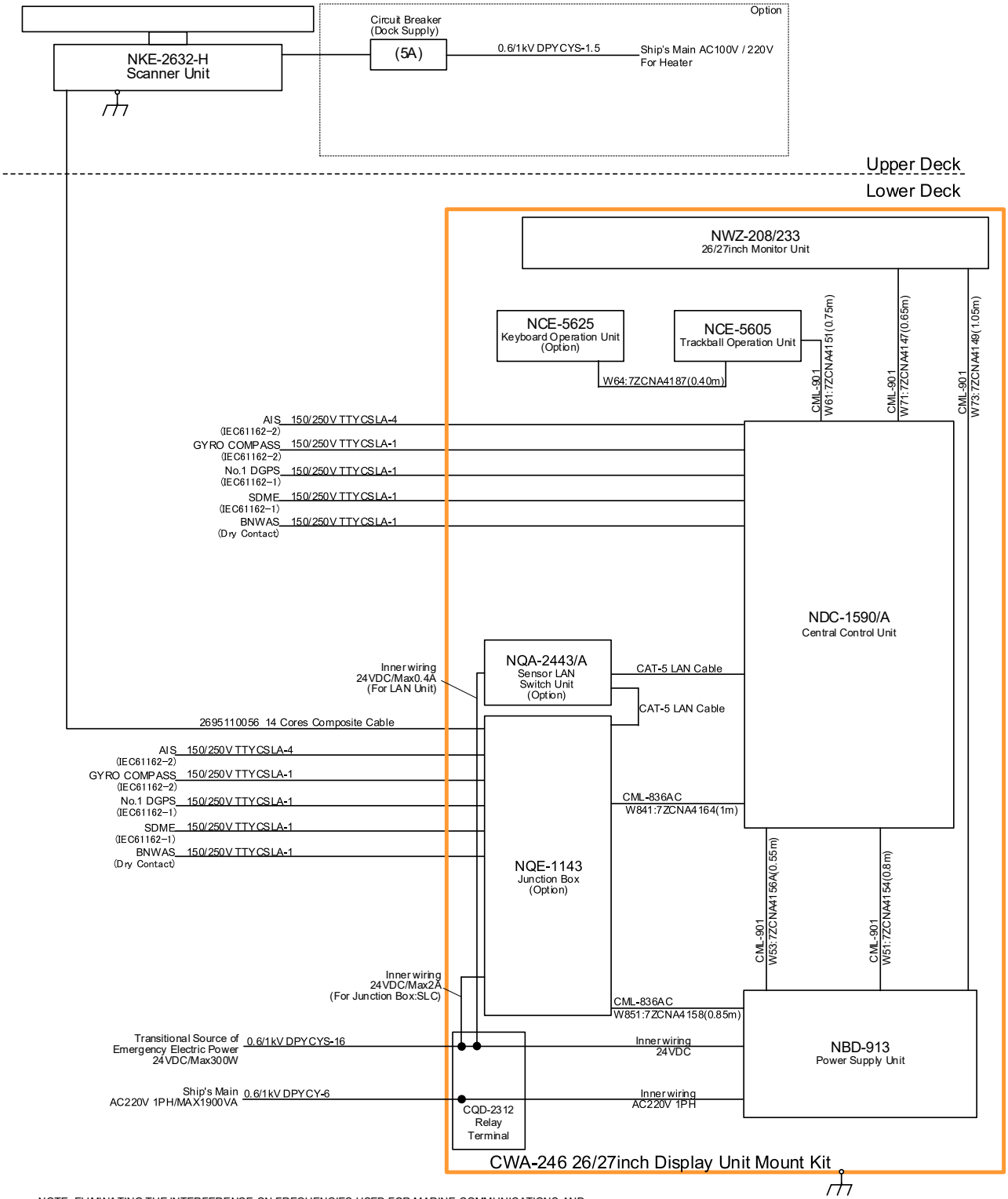
6.2.11 JMR-9282-S



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

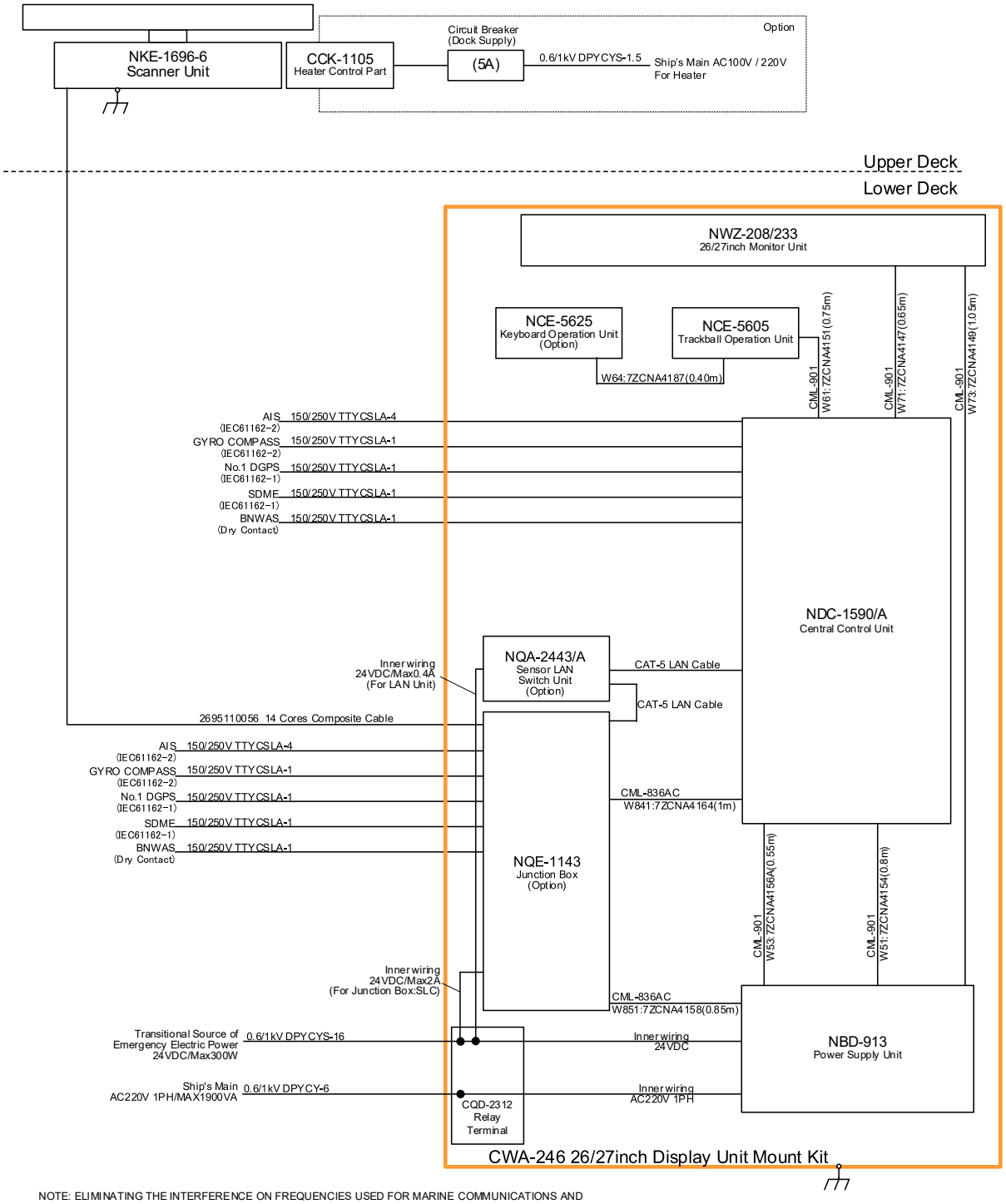
6.2.12 JMR-9282-SH



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

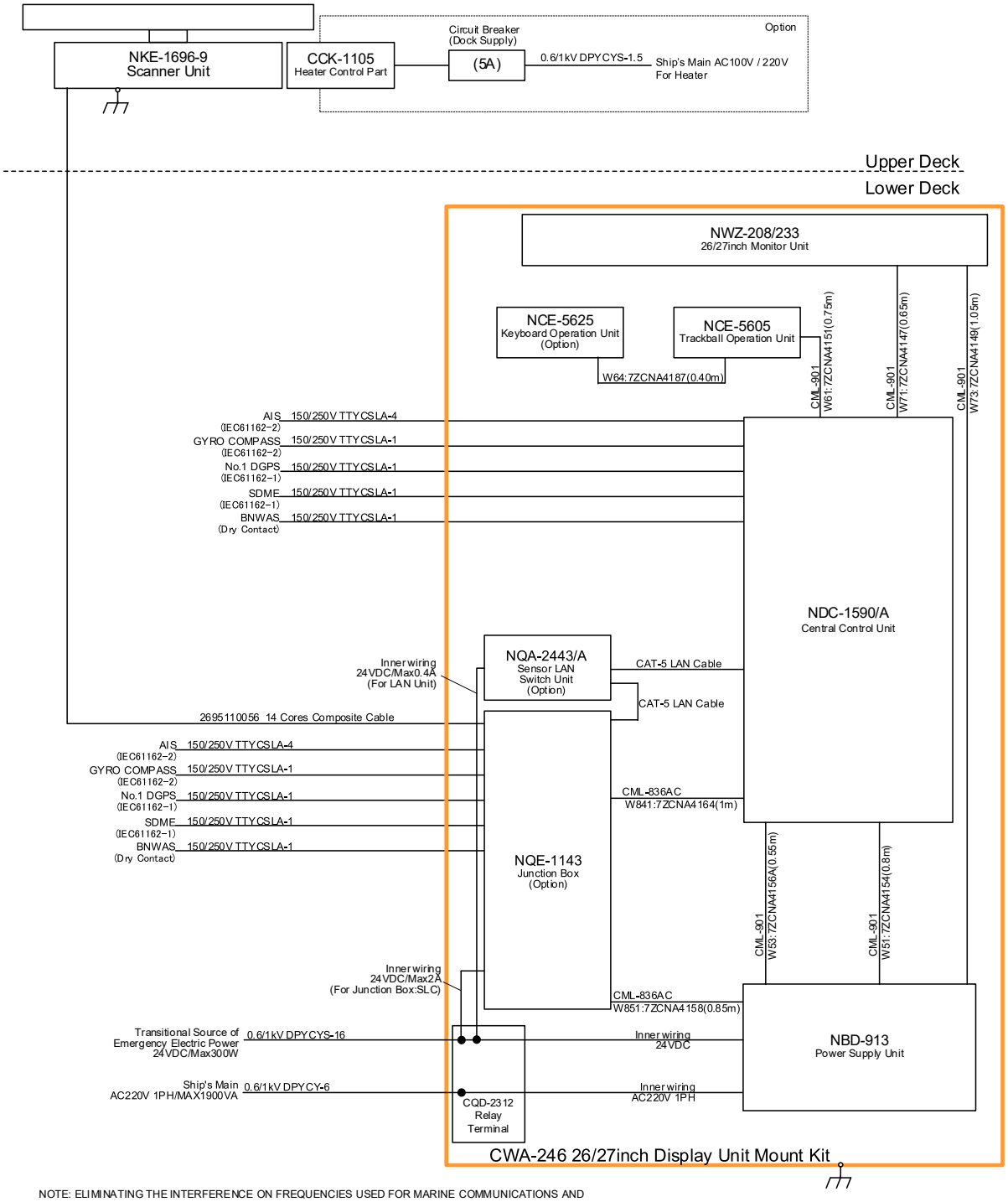
6.2.13 JMR-9296-6X



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

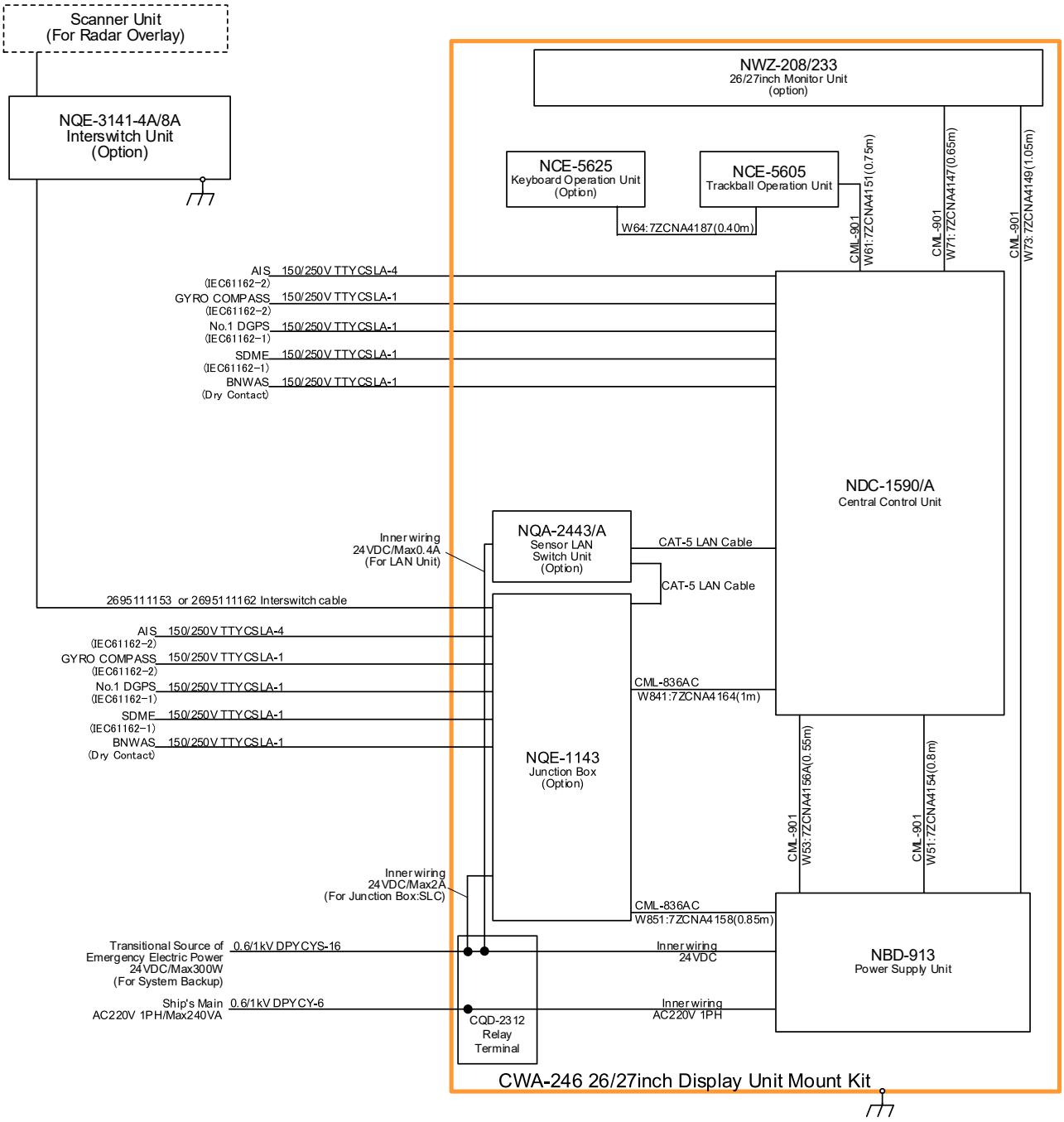
6.2.14 JMR-9296-6X



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

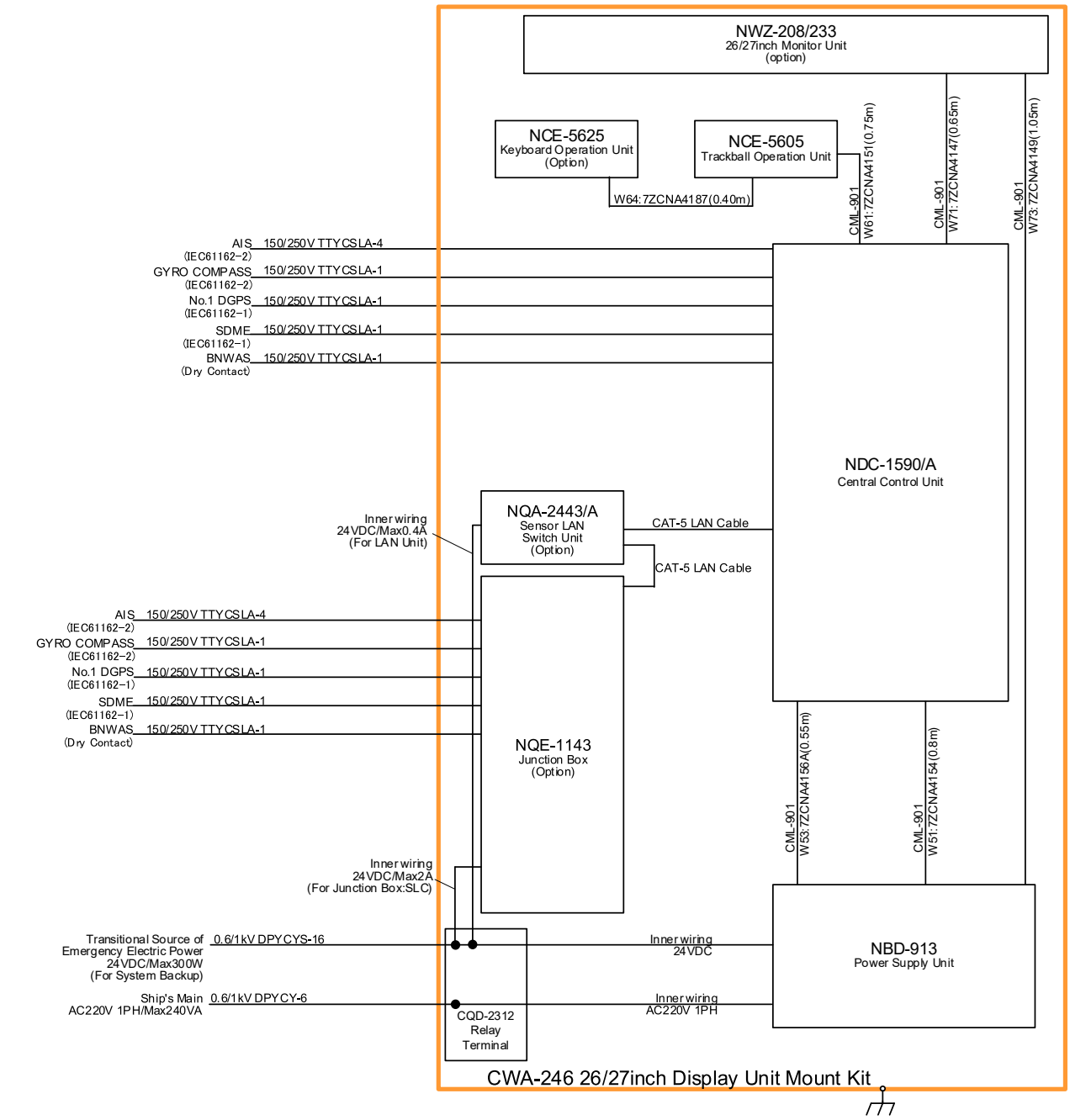
6.2.15 JAN-9201



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

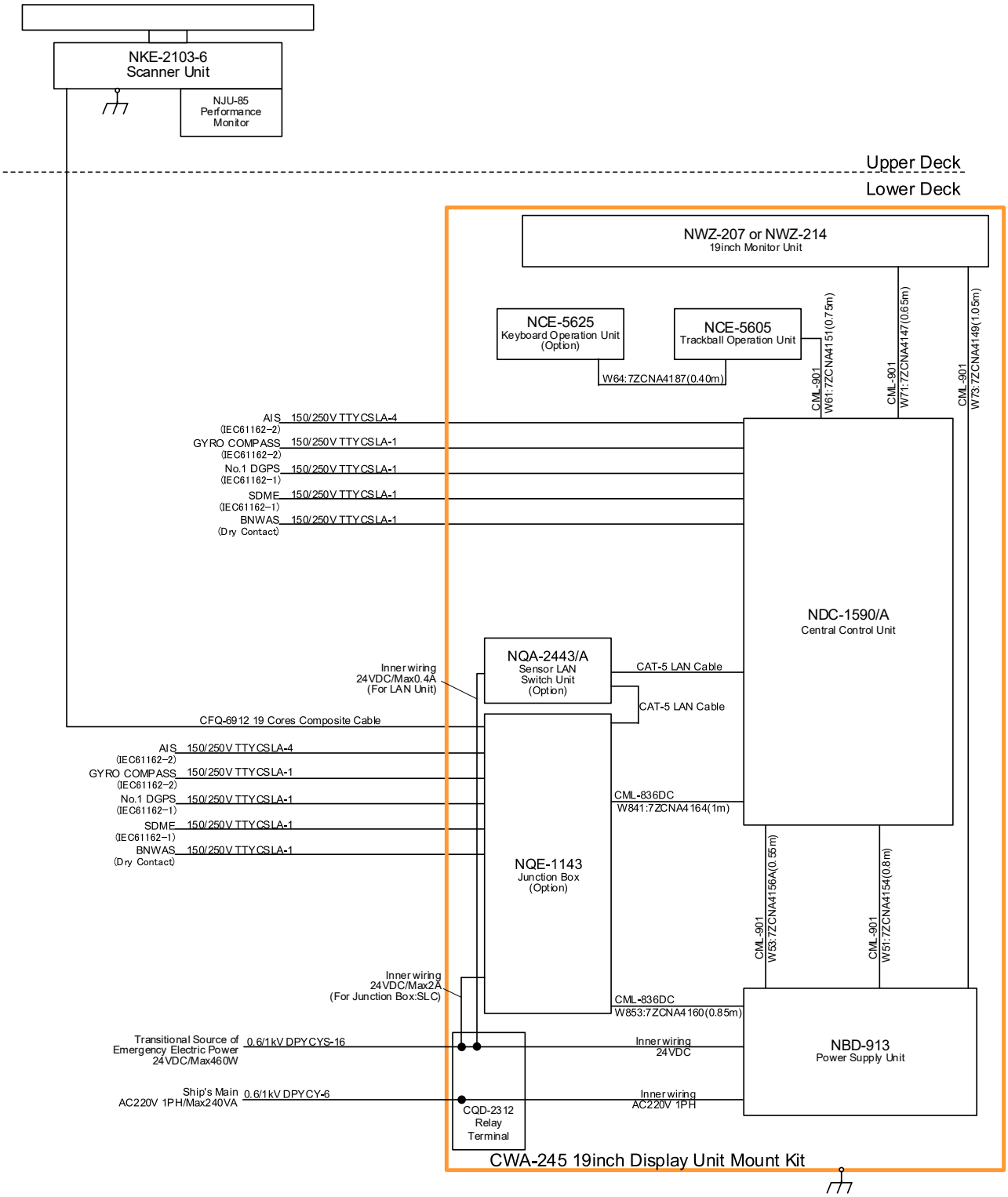
6.2.16 JAN-9202



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

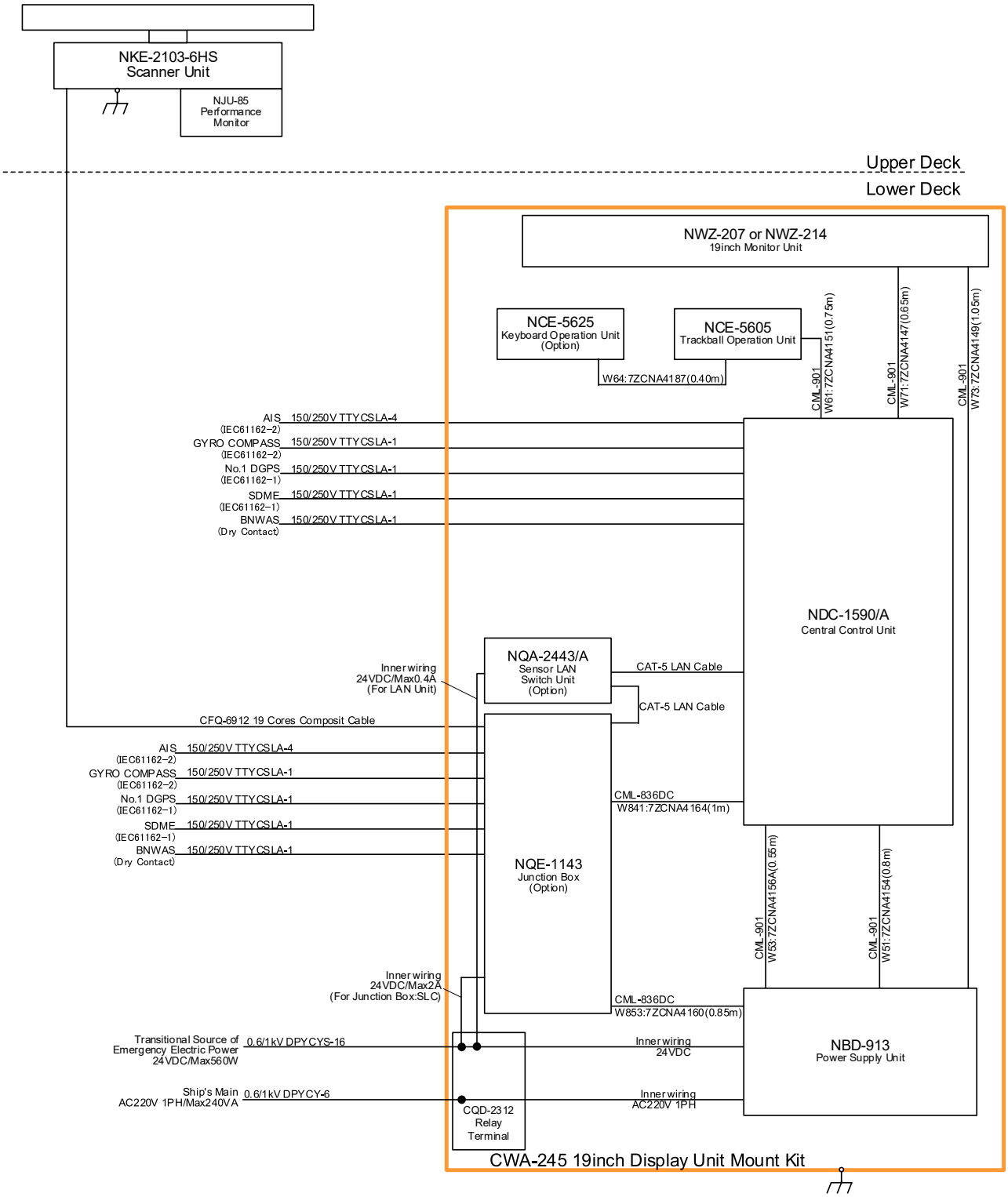
6.2.17 JMR-7210-6X



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-7210-6X RADAR

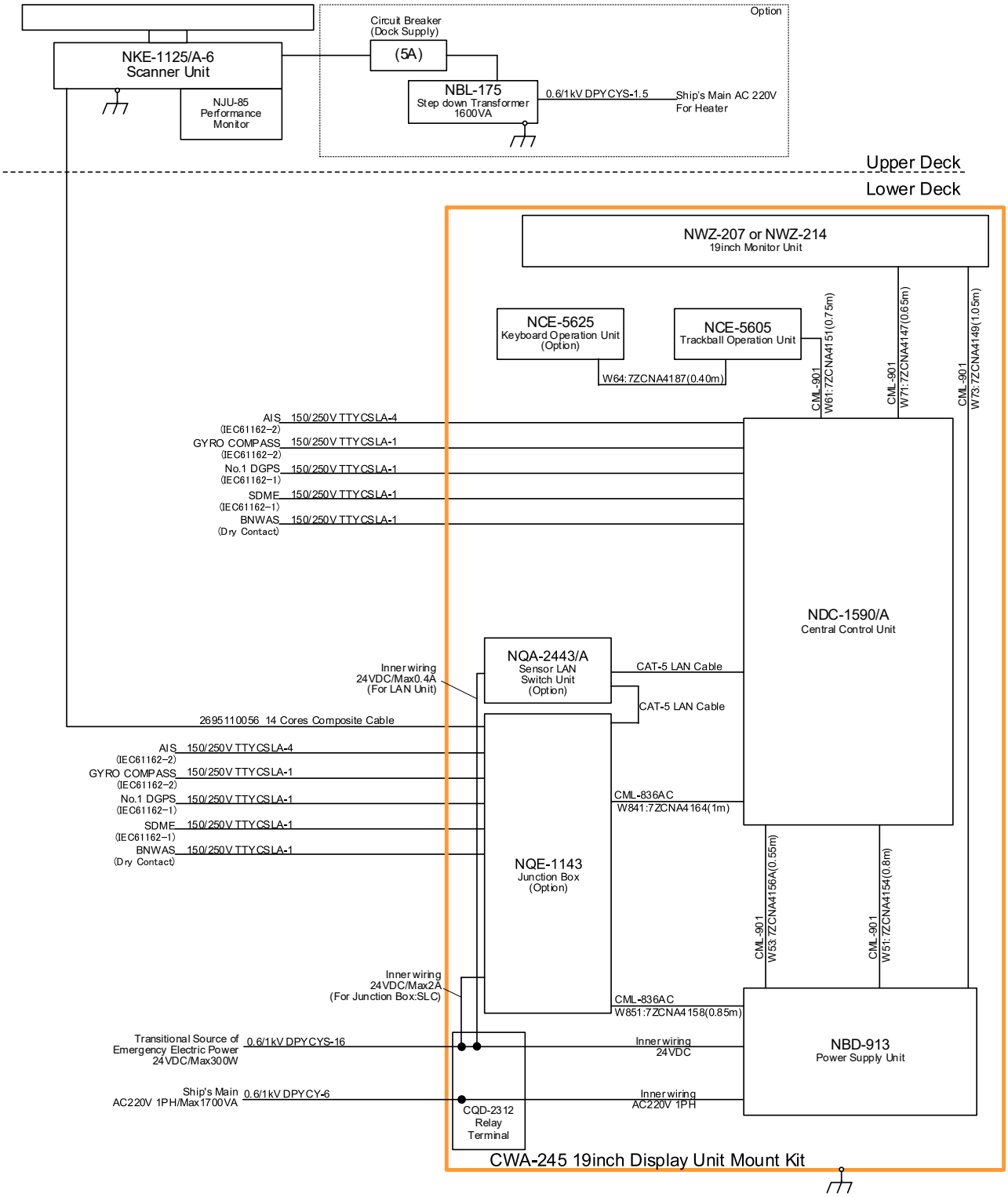
6.2.18 JMR-7210-6XH



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-7210-6XH RADAR

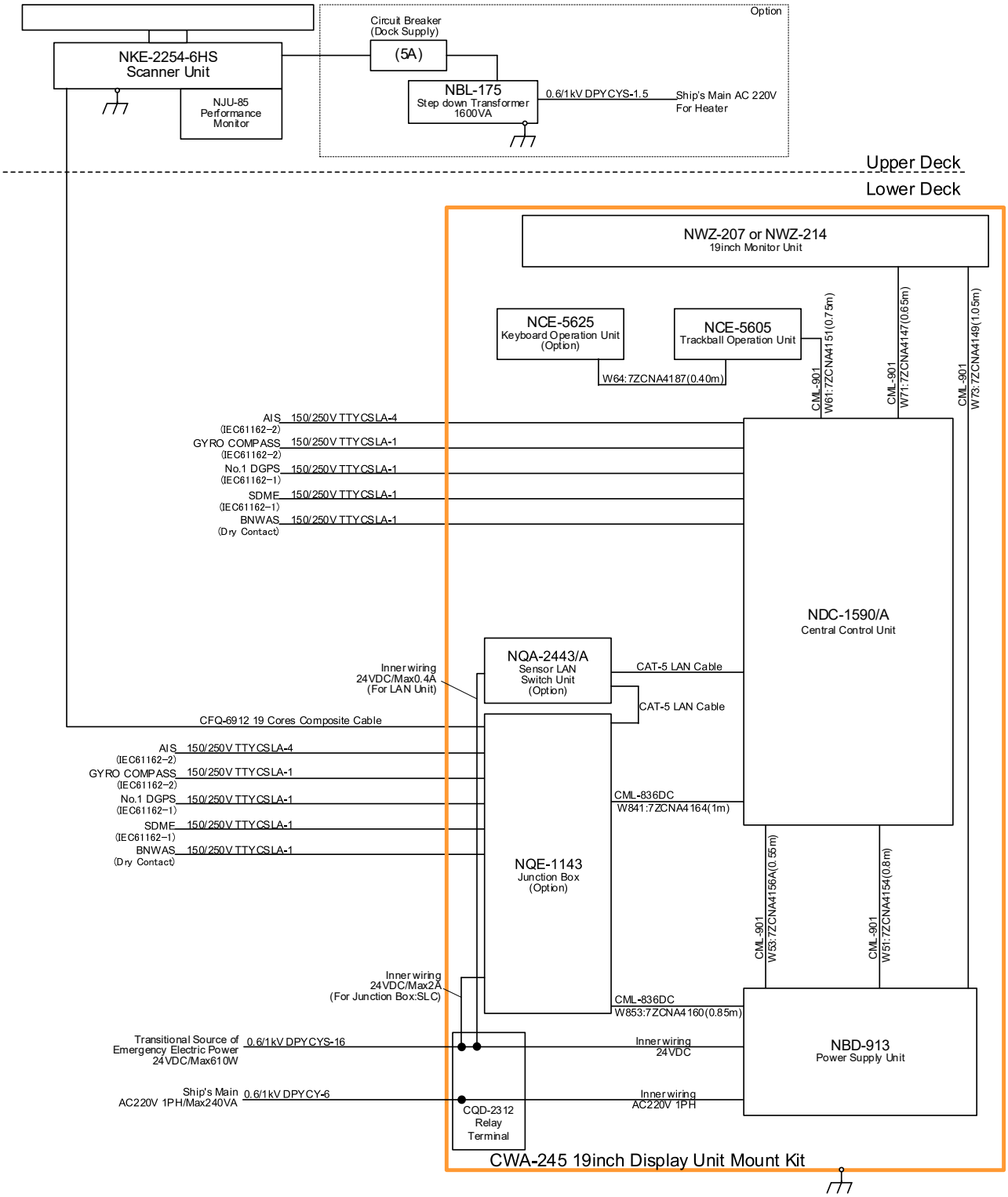
6.2.19 JMR-7225-6X



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

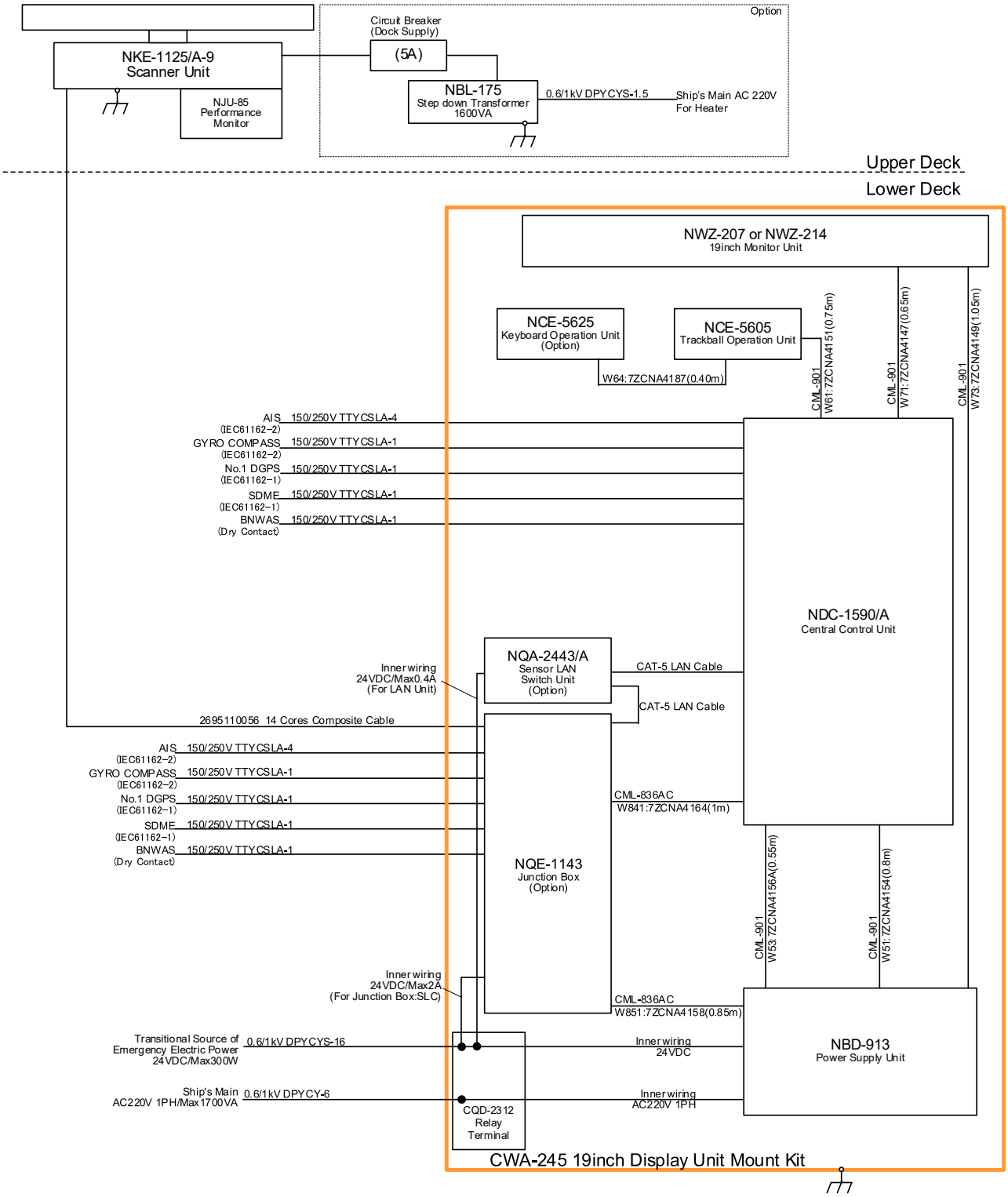
6.2.20 JMR-7225-6XH



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

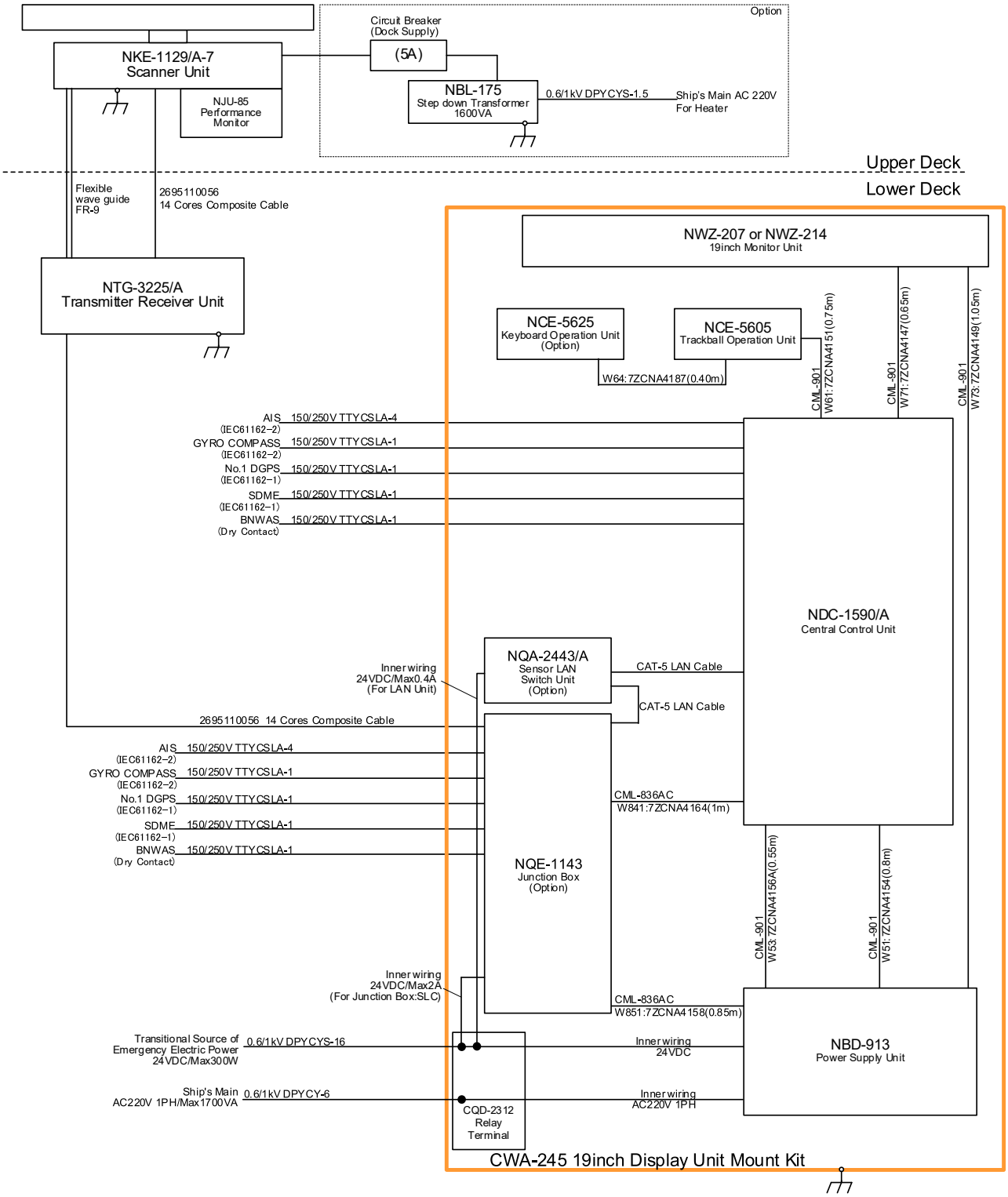
6.2.21 JMR-7225-9X



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

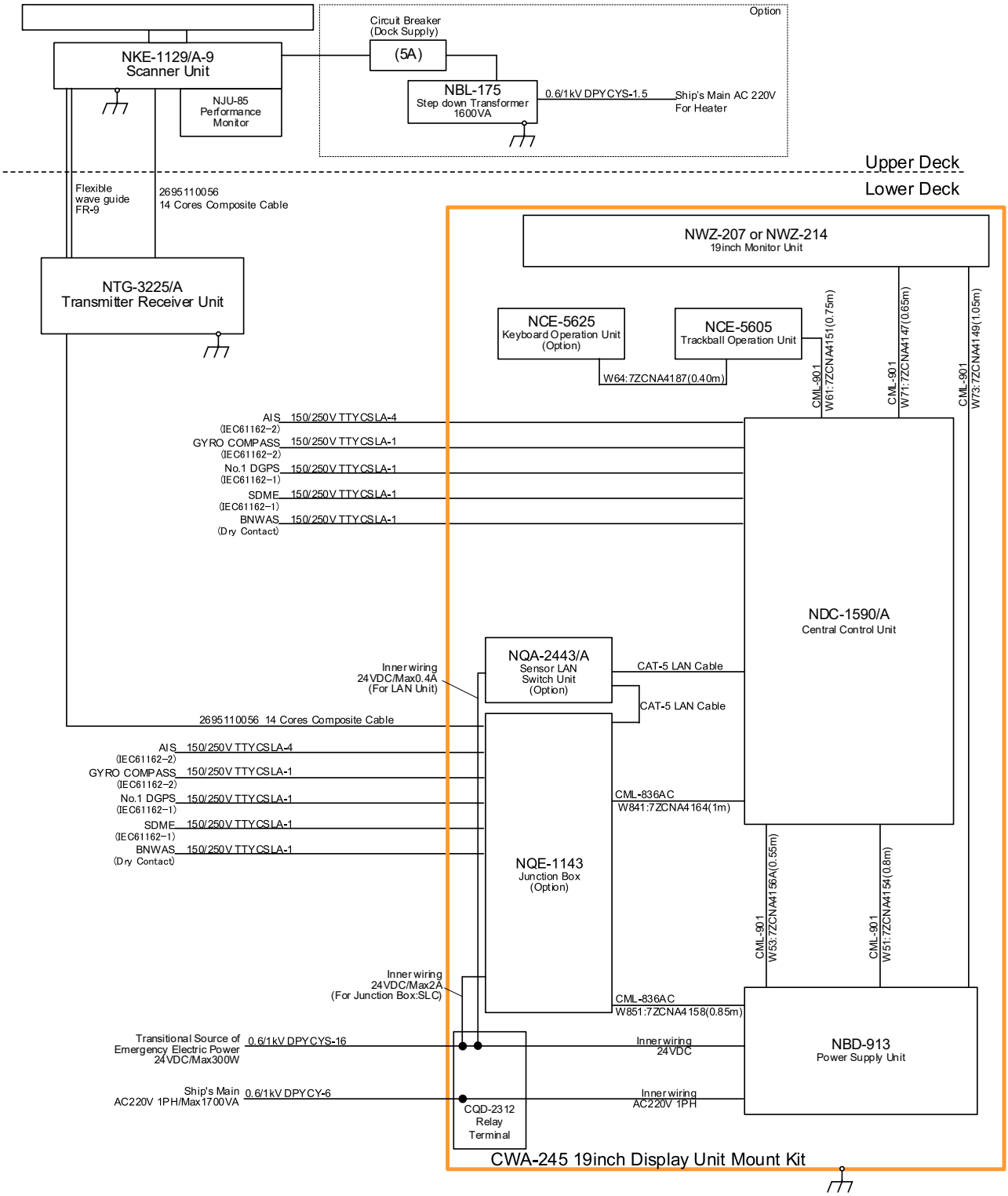
6.2.22 JMR-7225-7X3



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

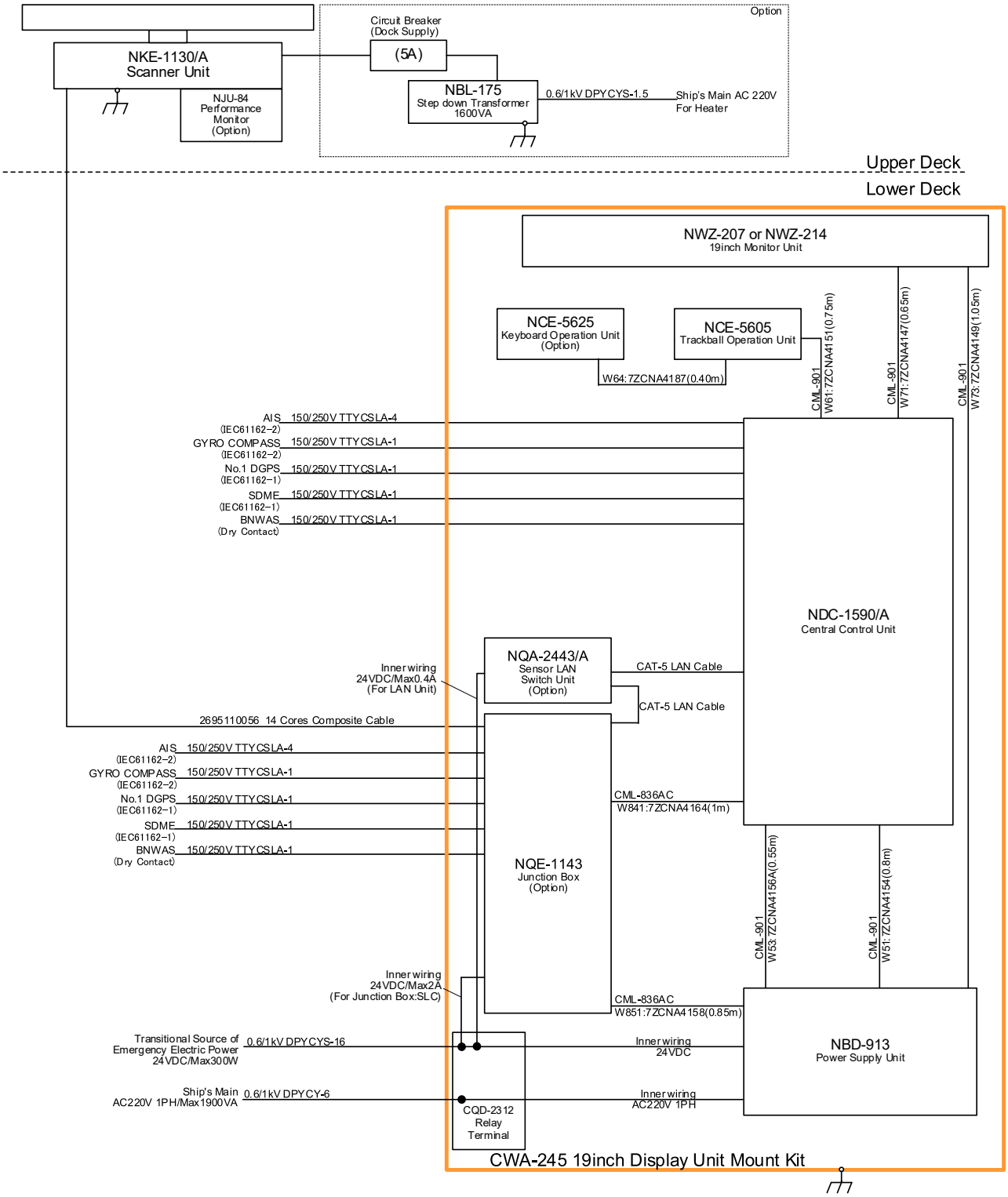
6.2.23 JMR-7225-9X3



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

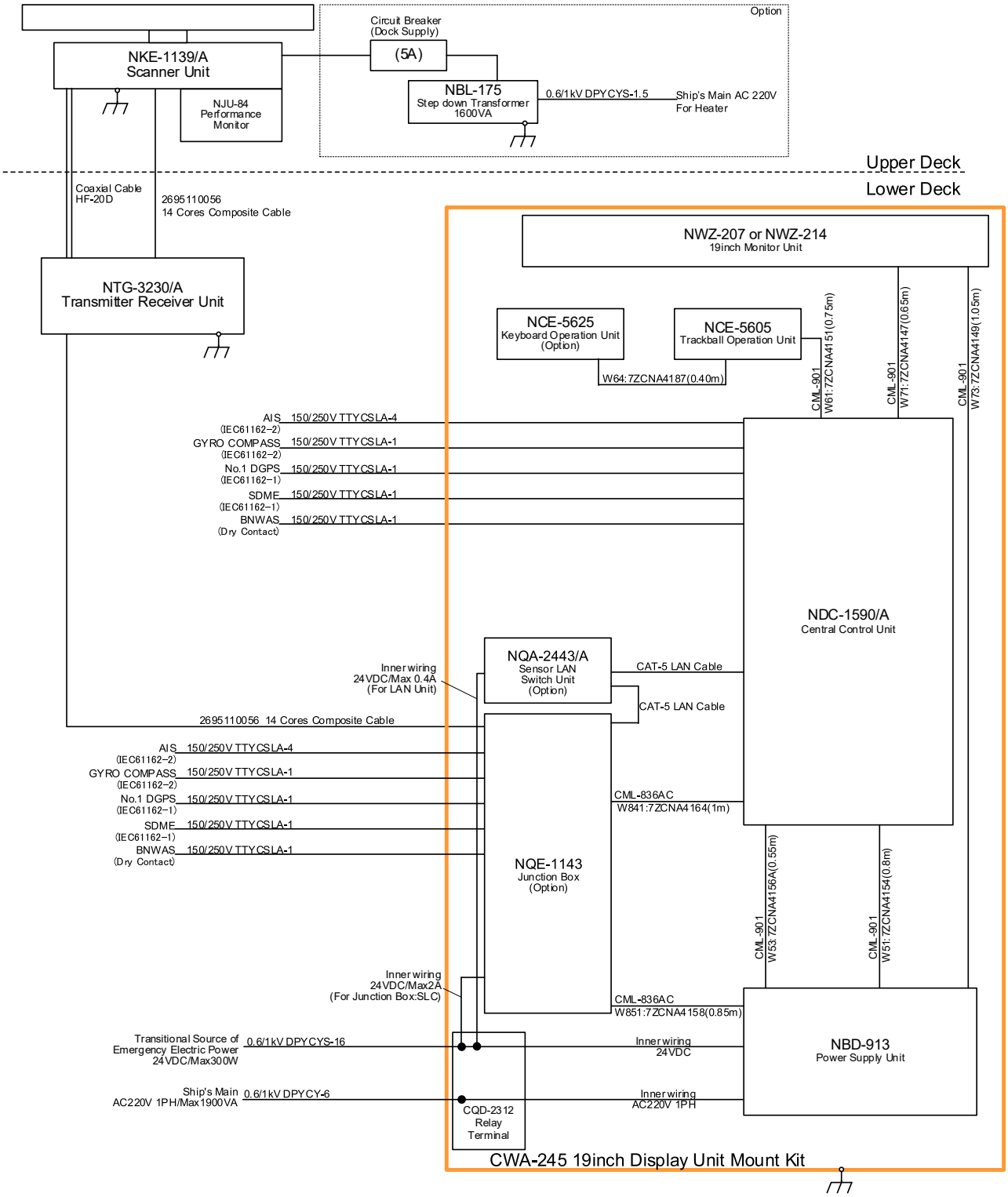
6.2.24 JMR-7230-S



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

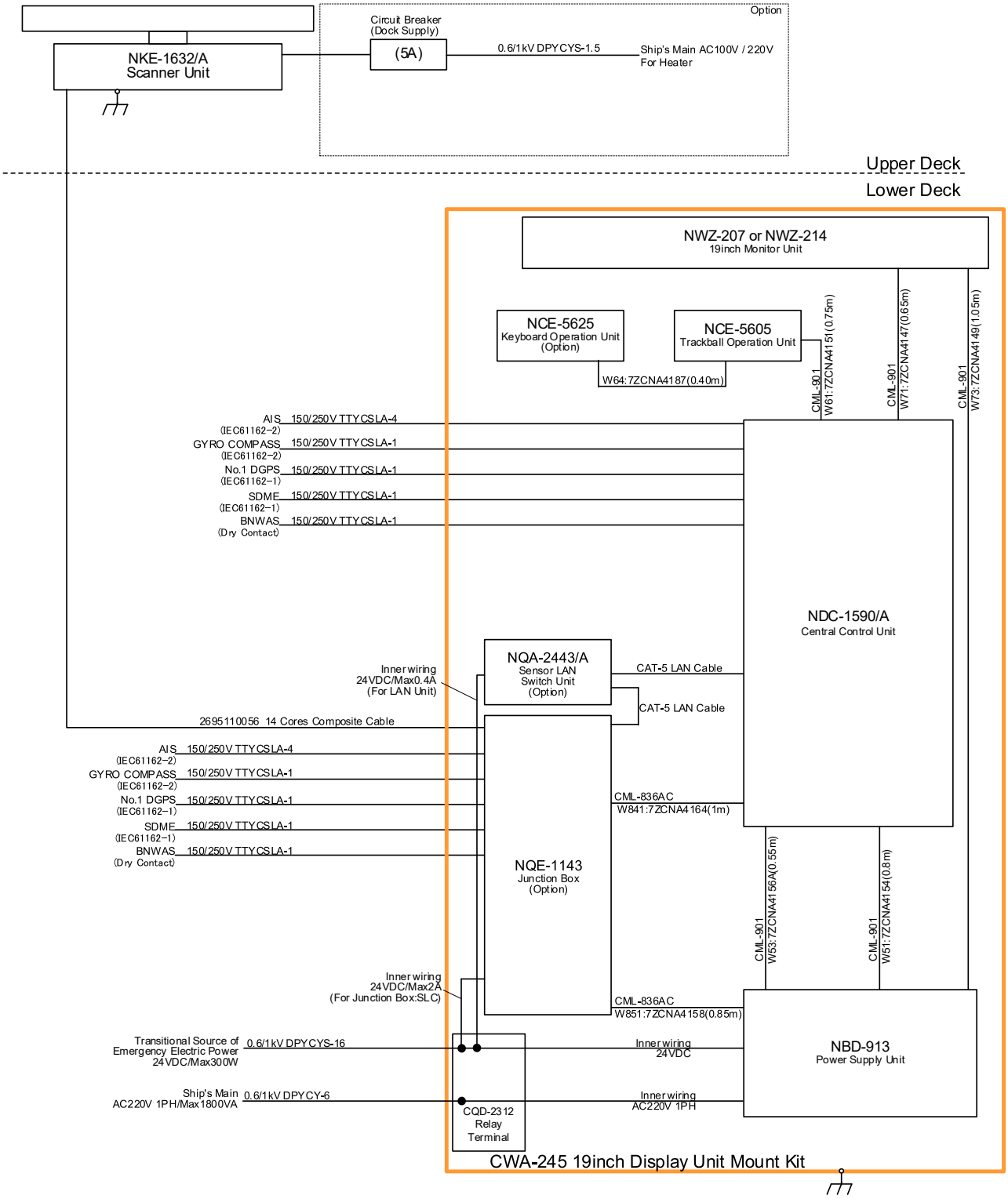
6.2.25 JMR-7230-S3



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

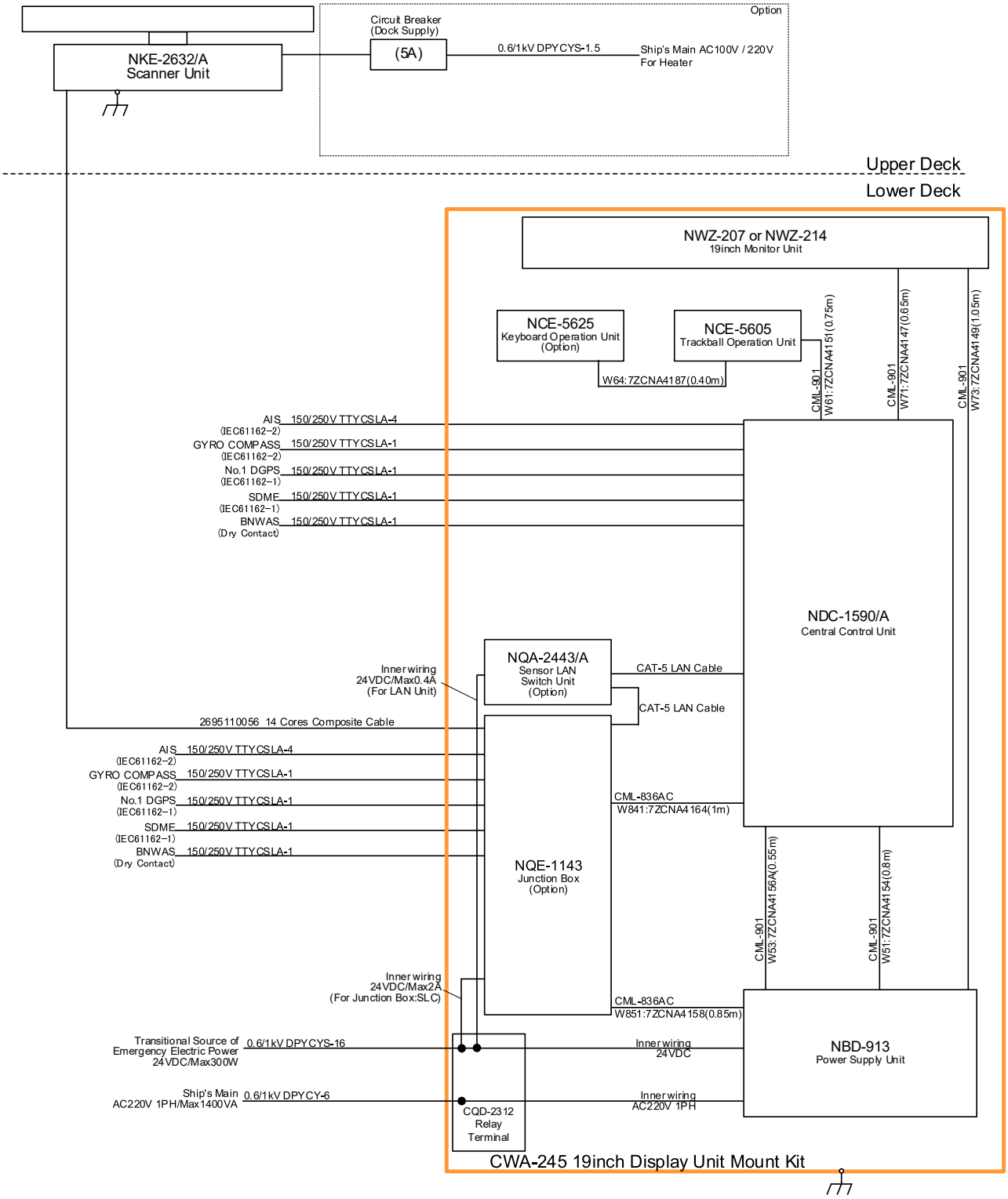
6.2.26 JMR-7272-S



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

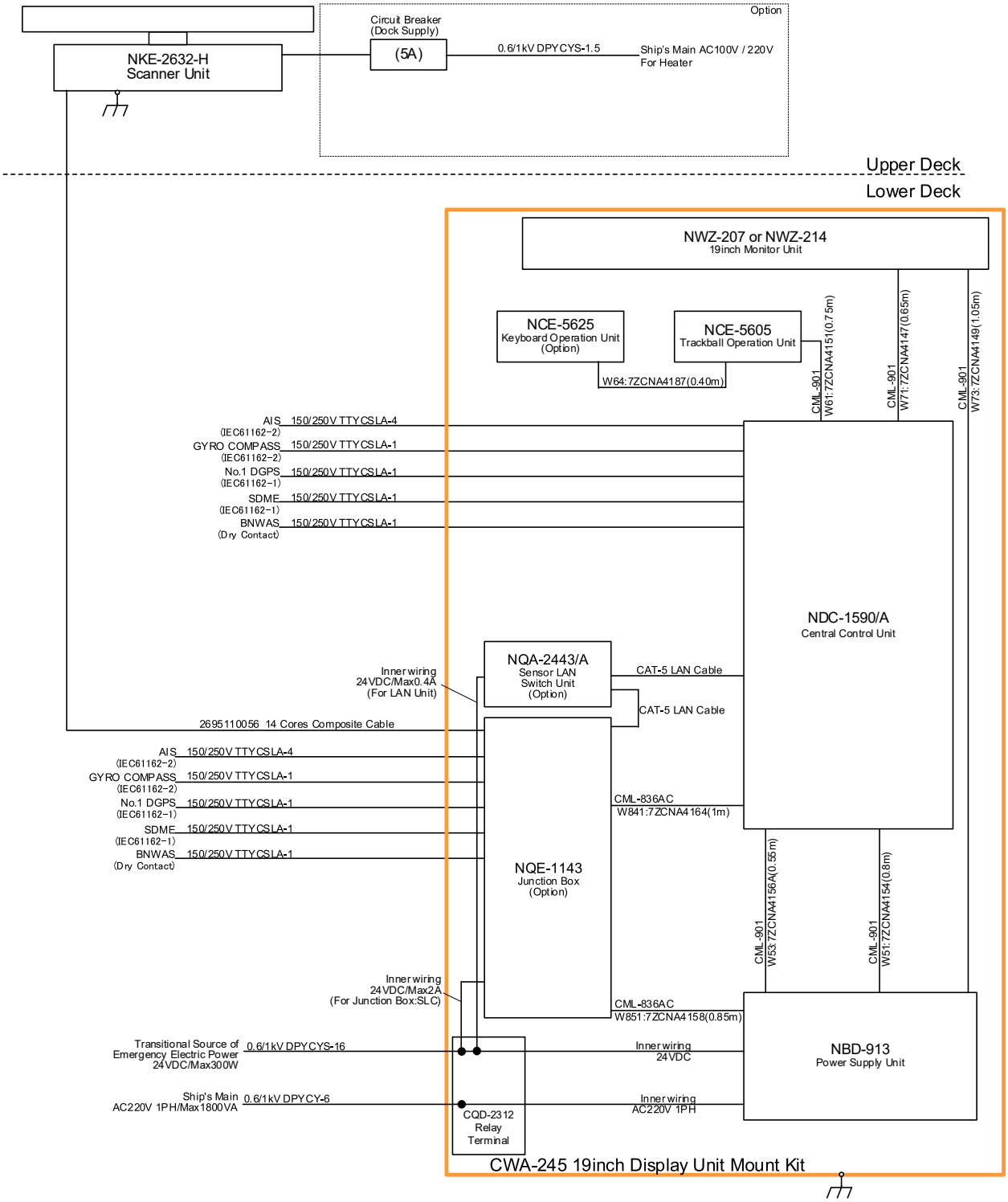
6.2.27 JMR-7282-S



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

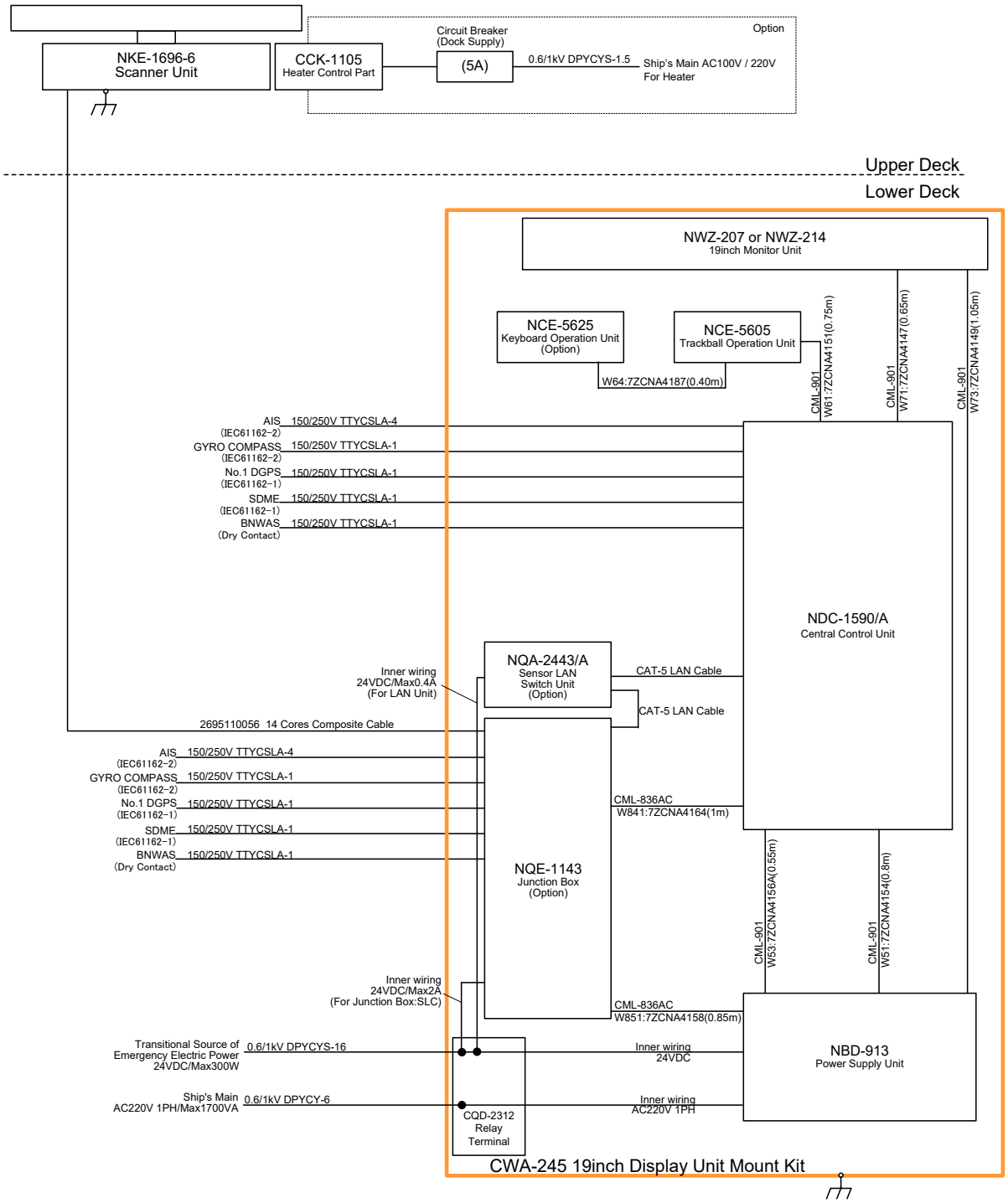
6.2.28 JMR-7282-SH



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

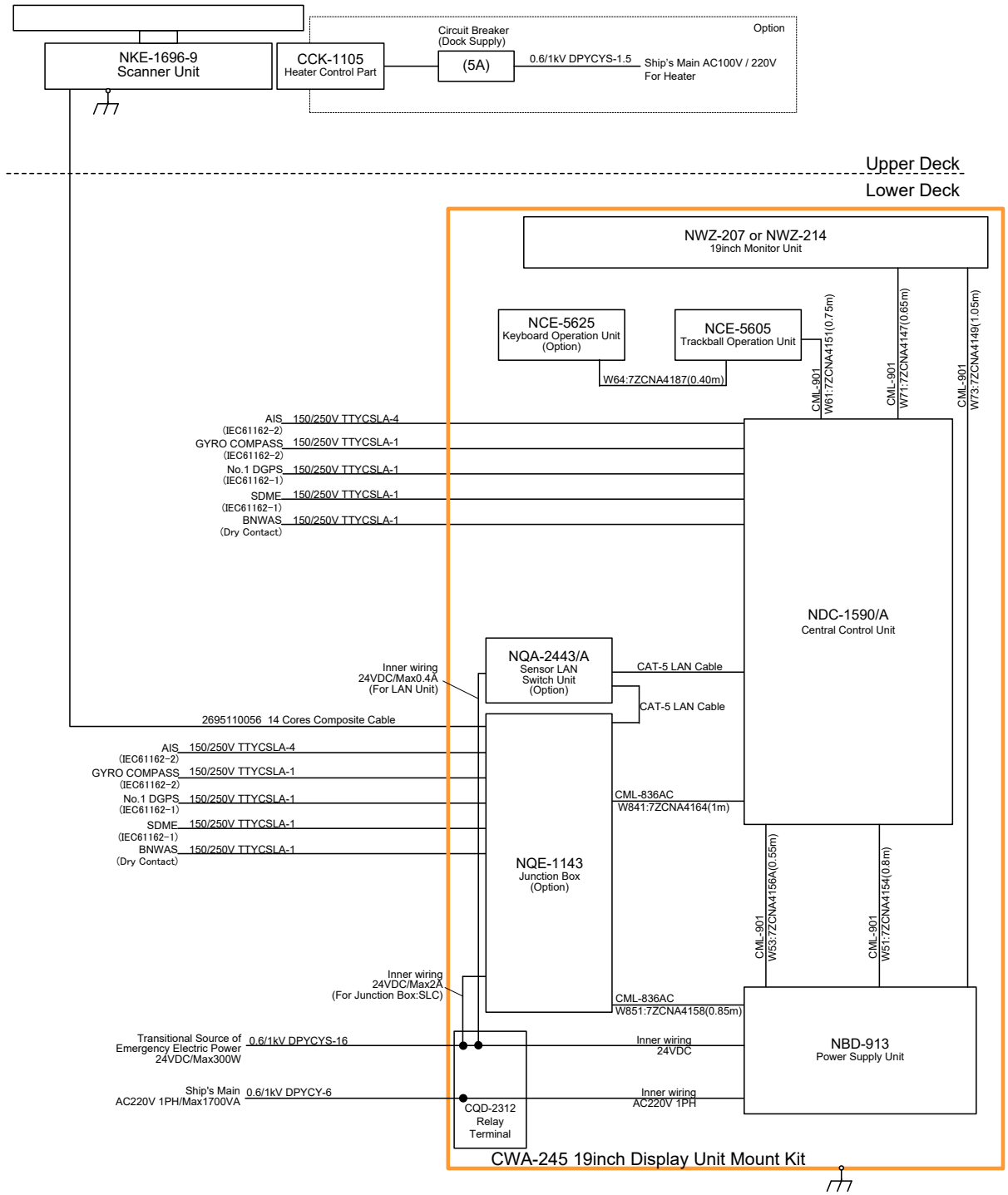
6.2.29 JMR-7296-6X



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

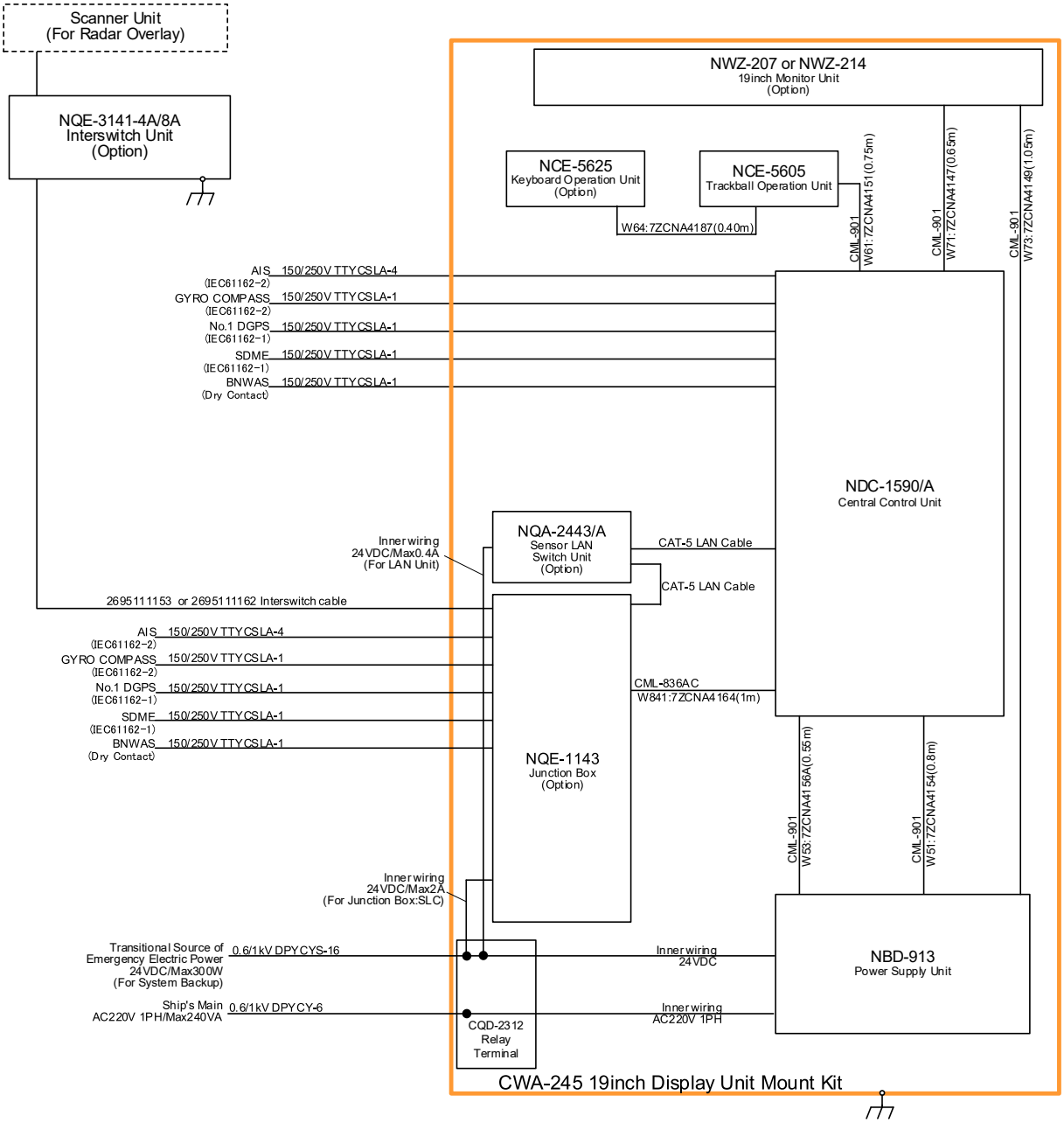
6.2.30 JMR-7296-9X



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

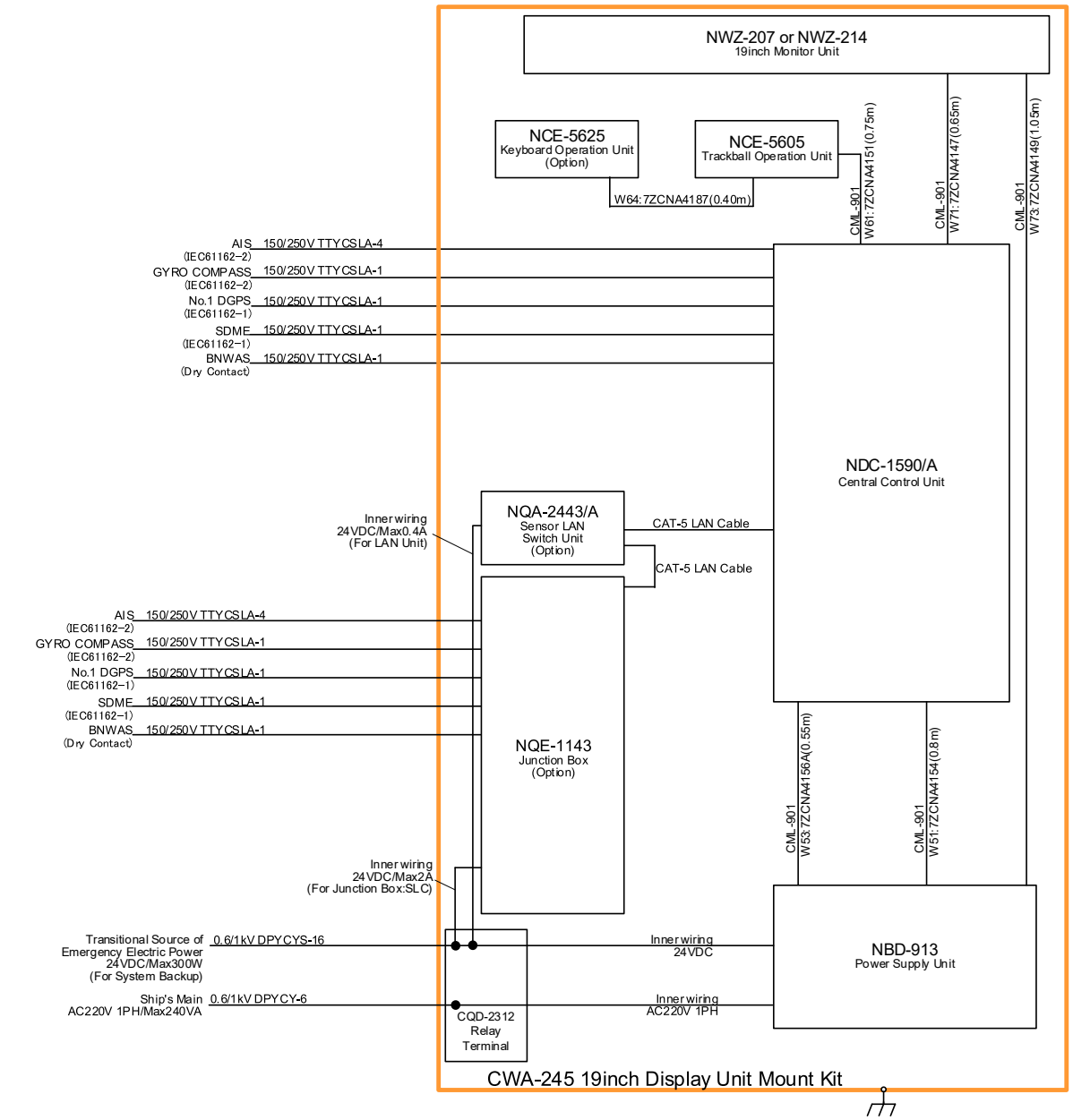
6.2.31 JAN-7201



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

6.2.32 JAN-7202

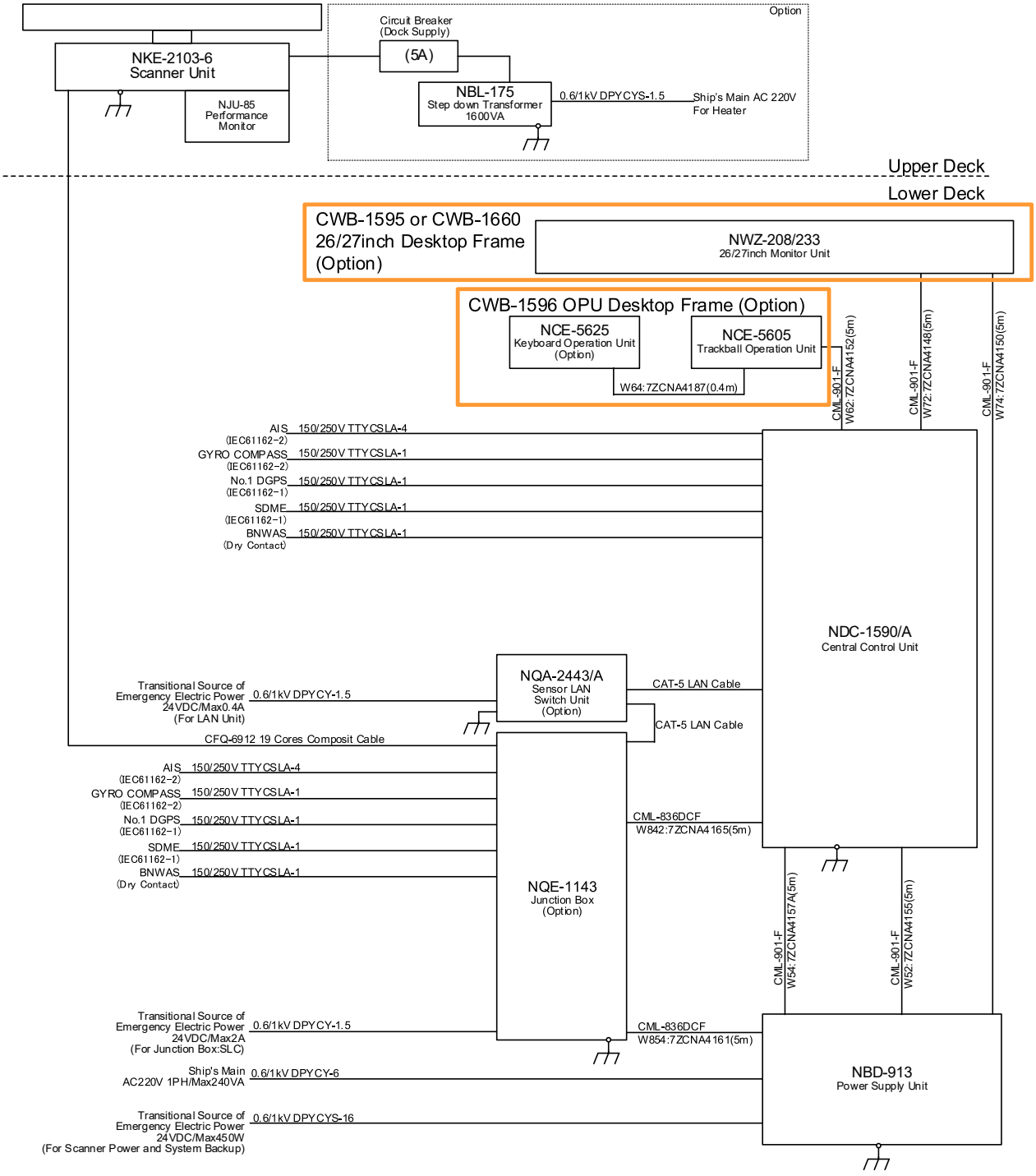


NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER etc..)
ESPECIALLY INTER-WIRING 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

6.3 General System Diagram of Desktop Type

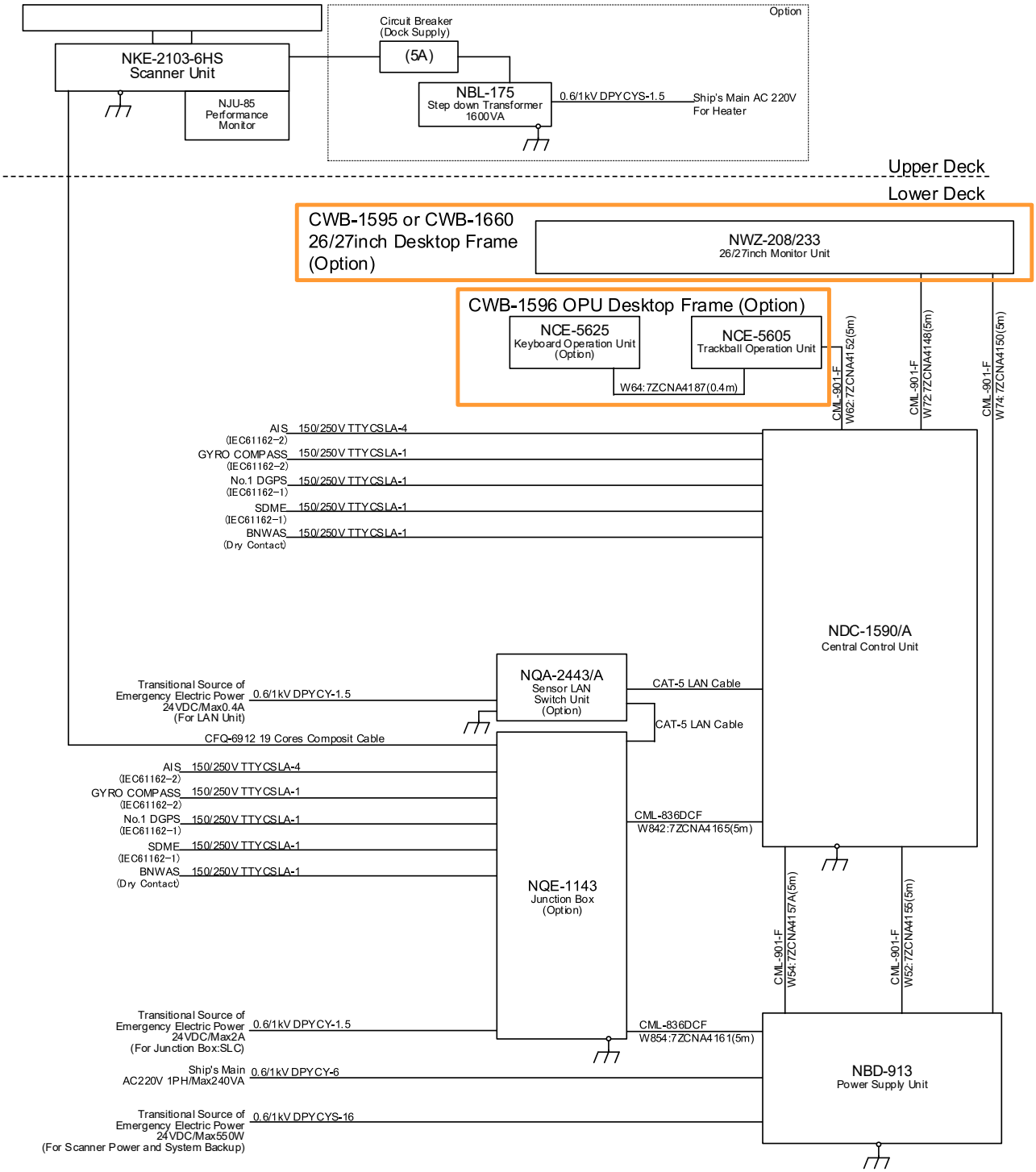
6.3.1 JMR-9210-6X



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

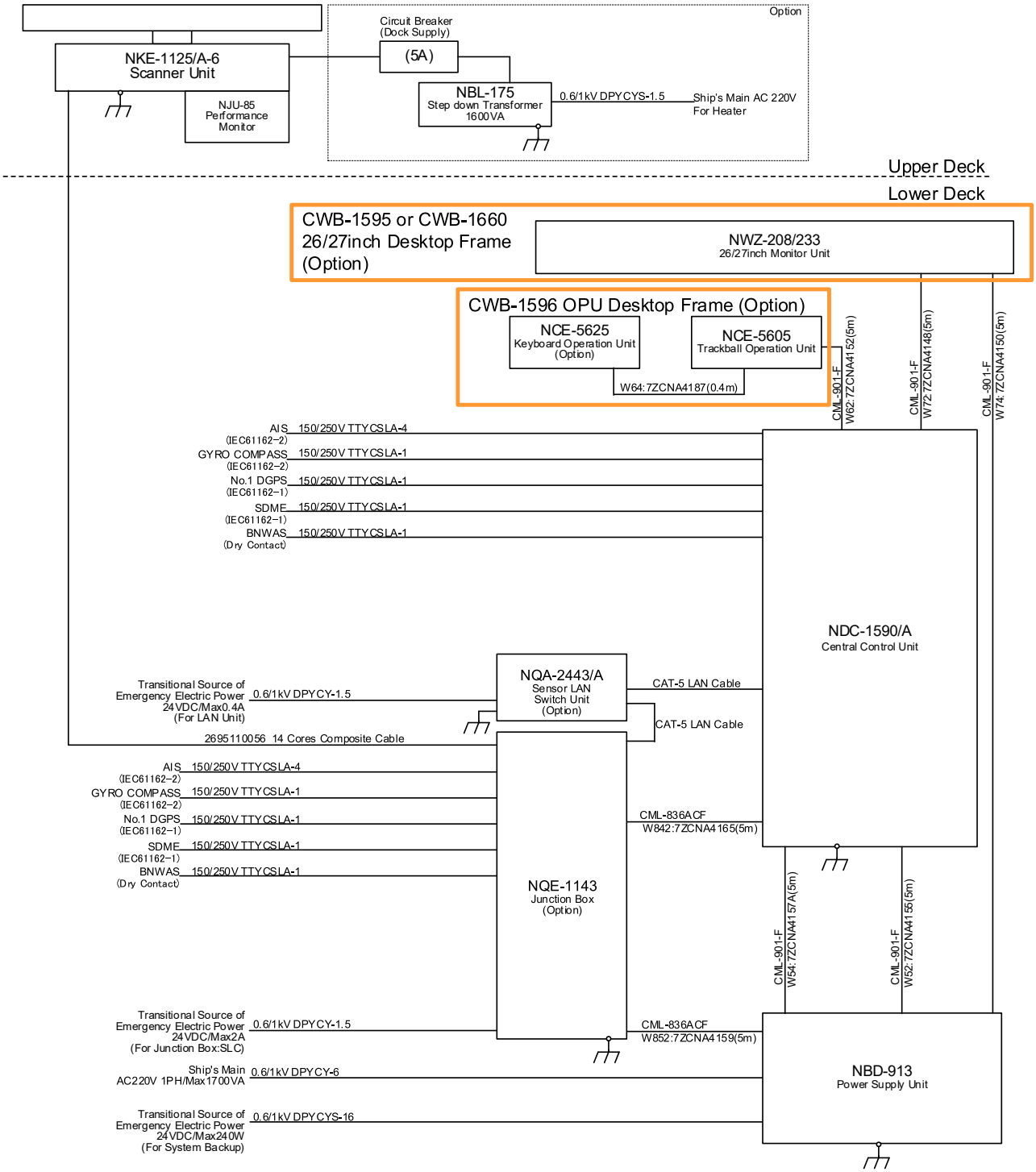
6.3.2 JMR-9210-6XH



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

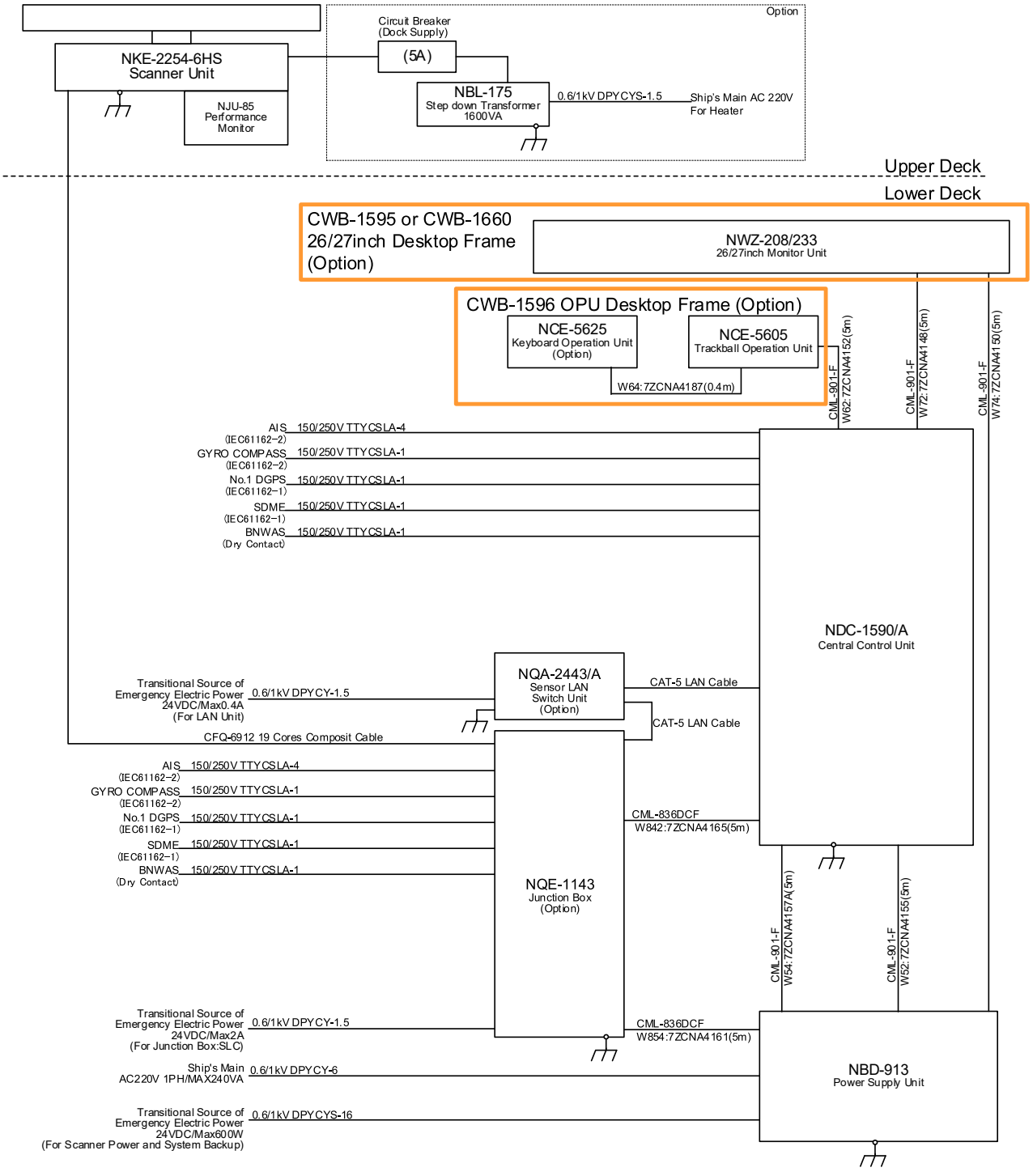
6.3.3 JMR-9225-6X



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

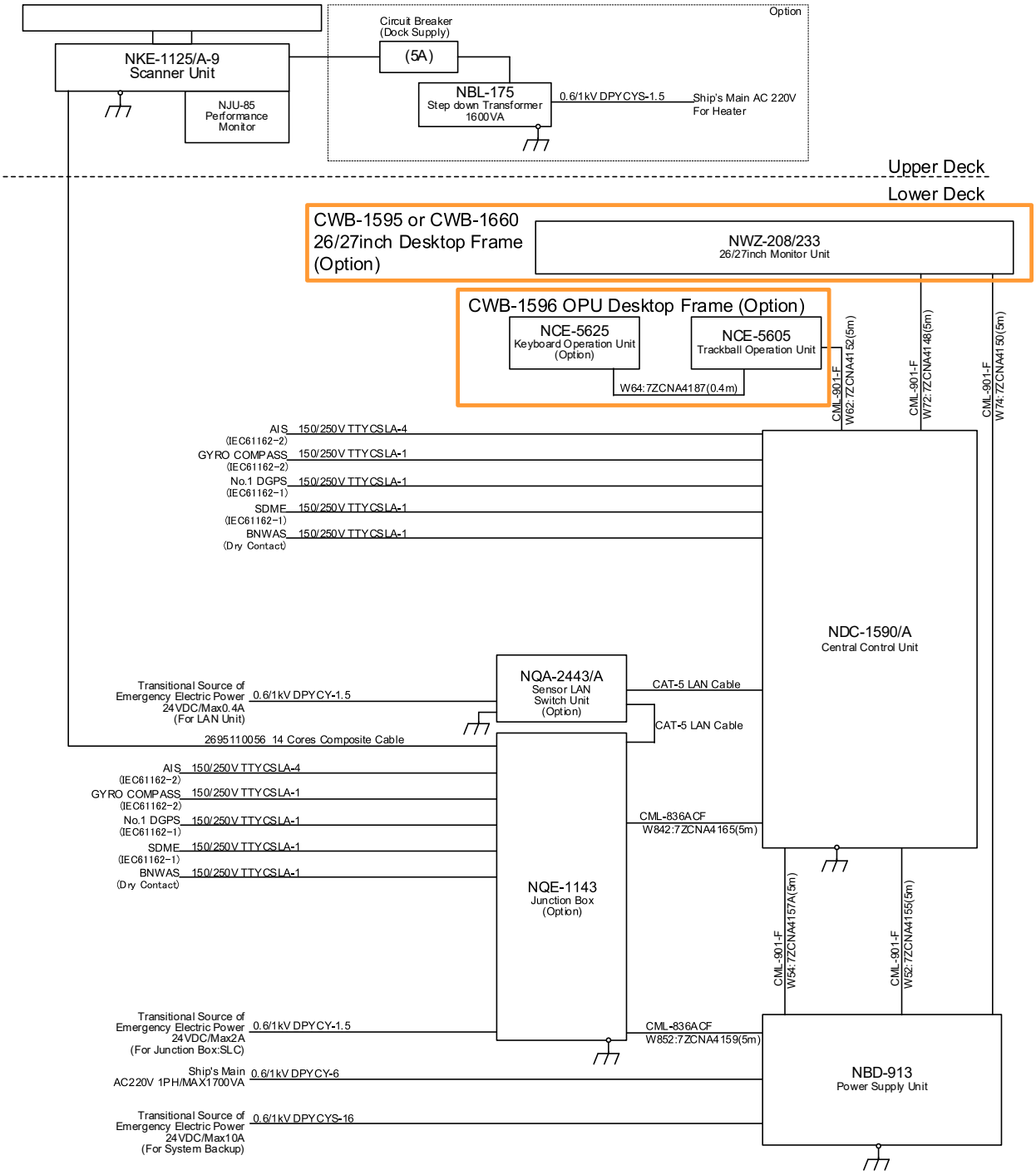
6.3.4 JMR-9225-6XH



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

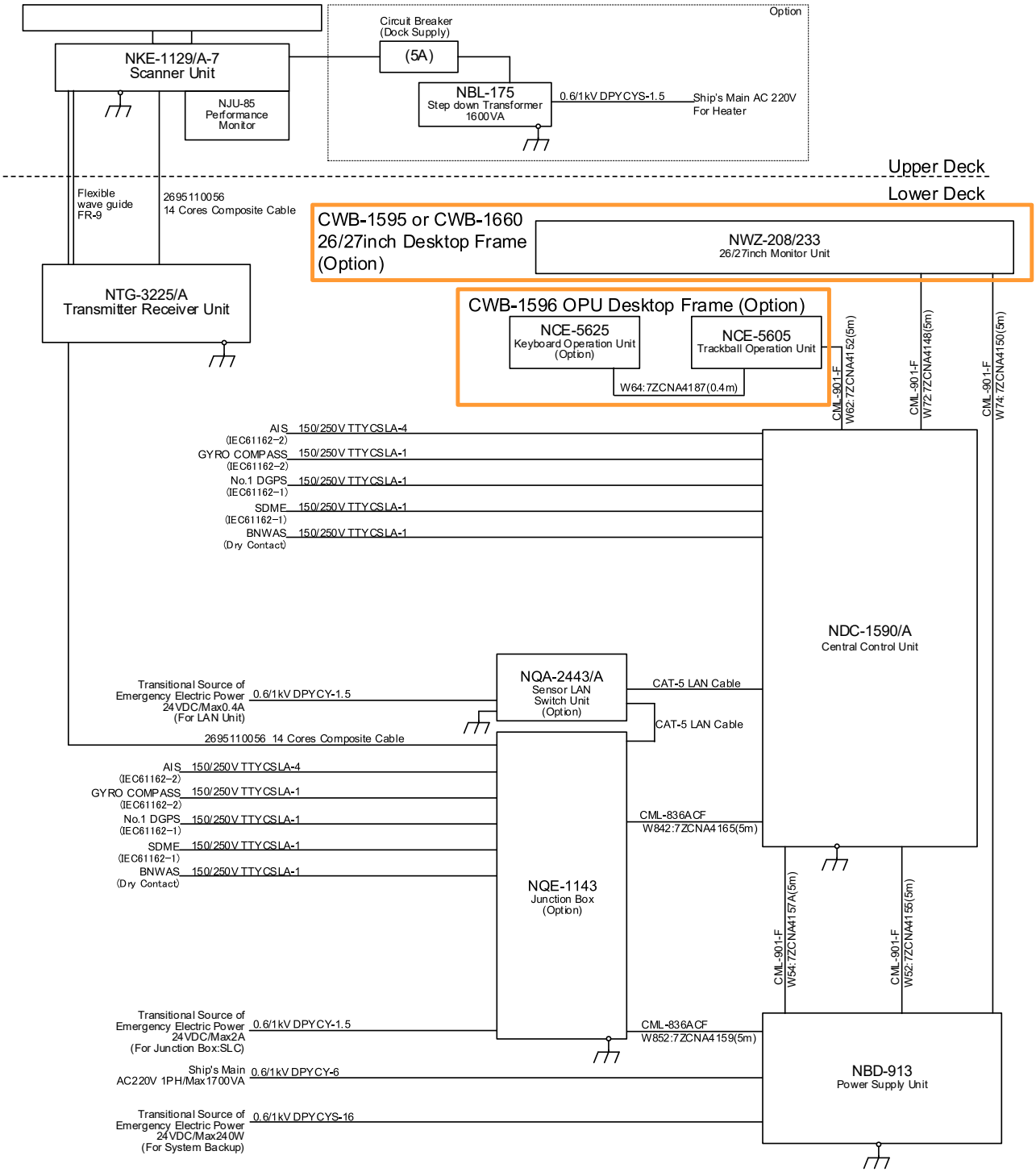
6.3.5 JMR-9225-9X



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

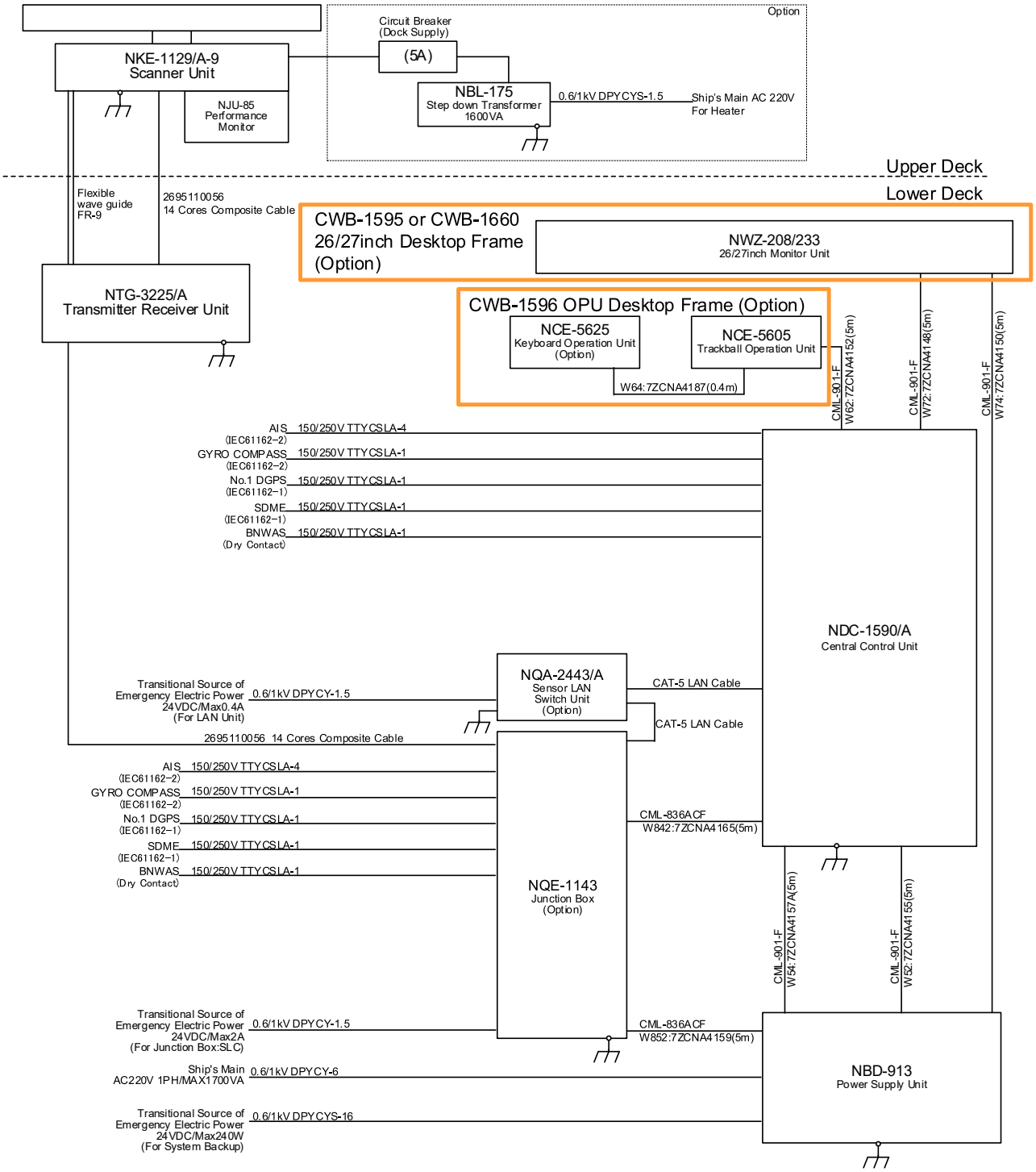
6.3.6 JMR-9225-7X3



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

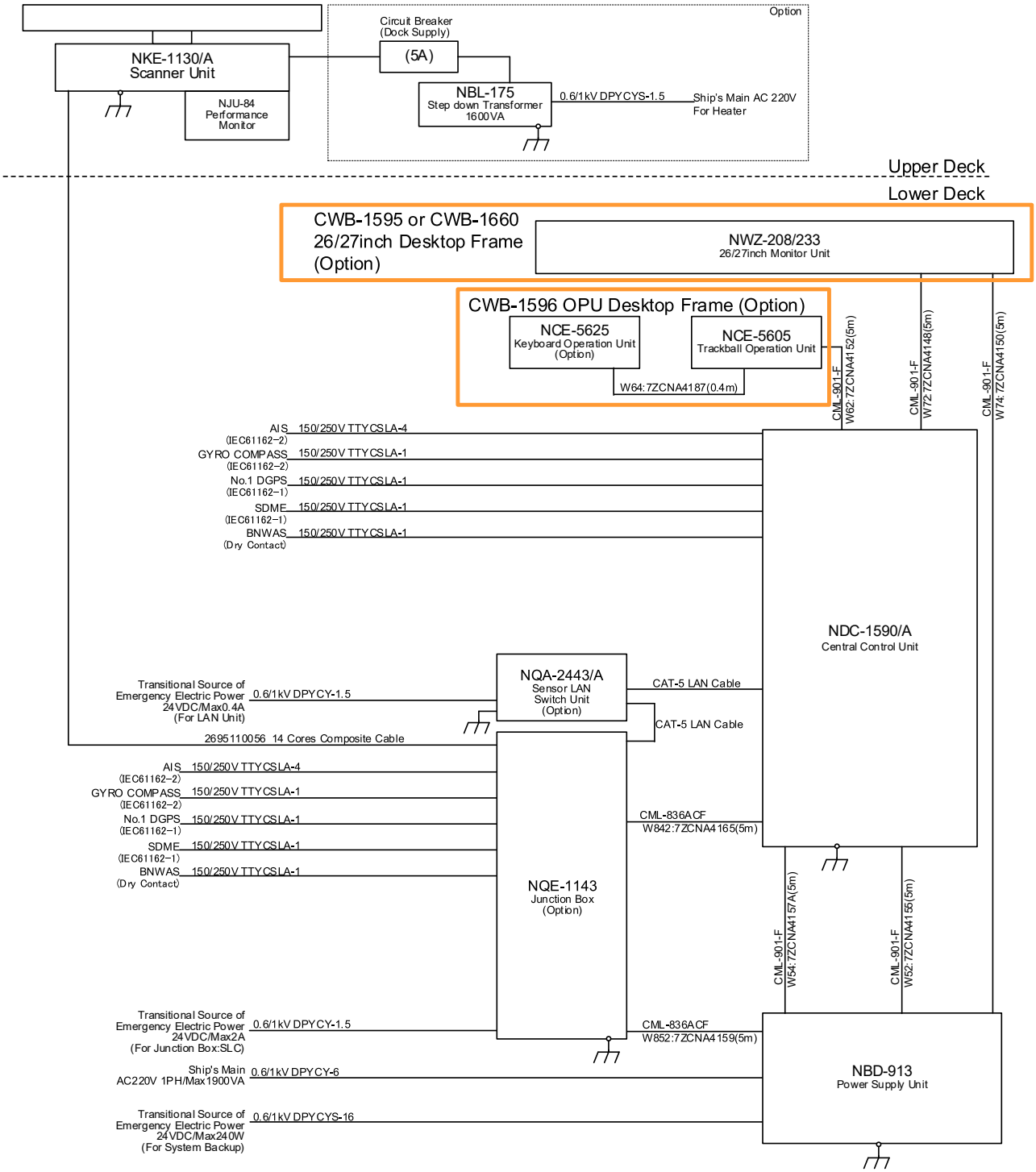
6.3.7 JMR-9225-9X3



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

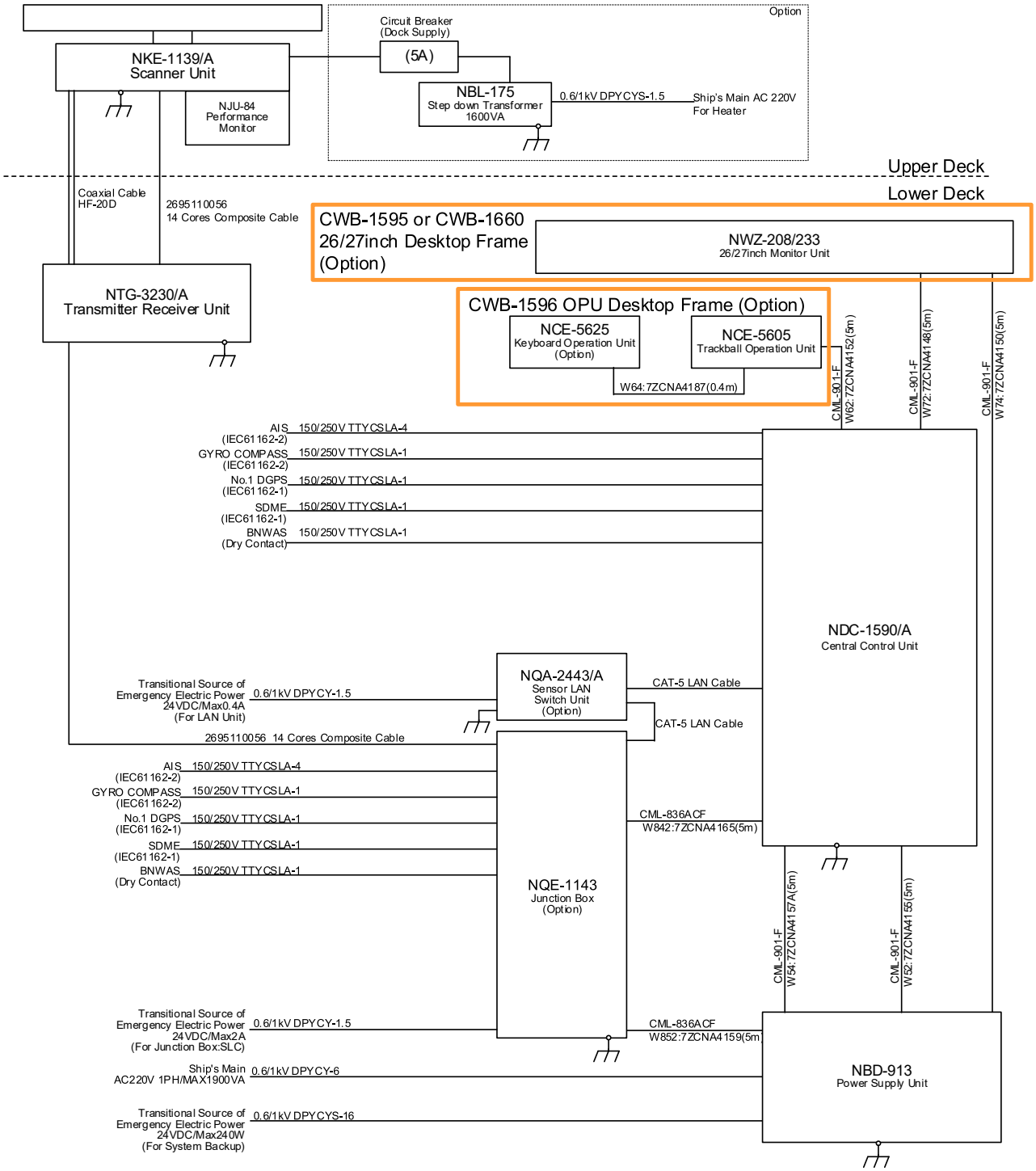
6.3.8 JMR-9230-S



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

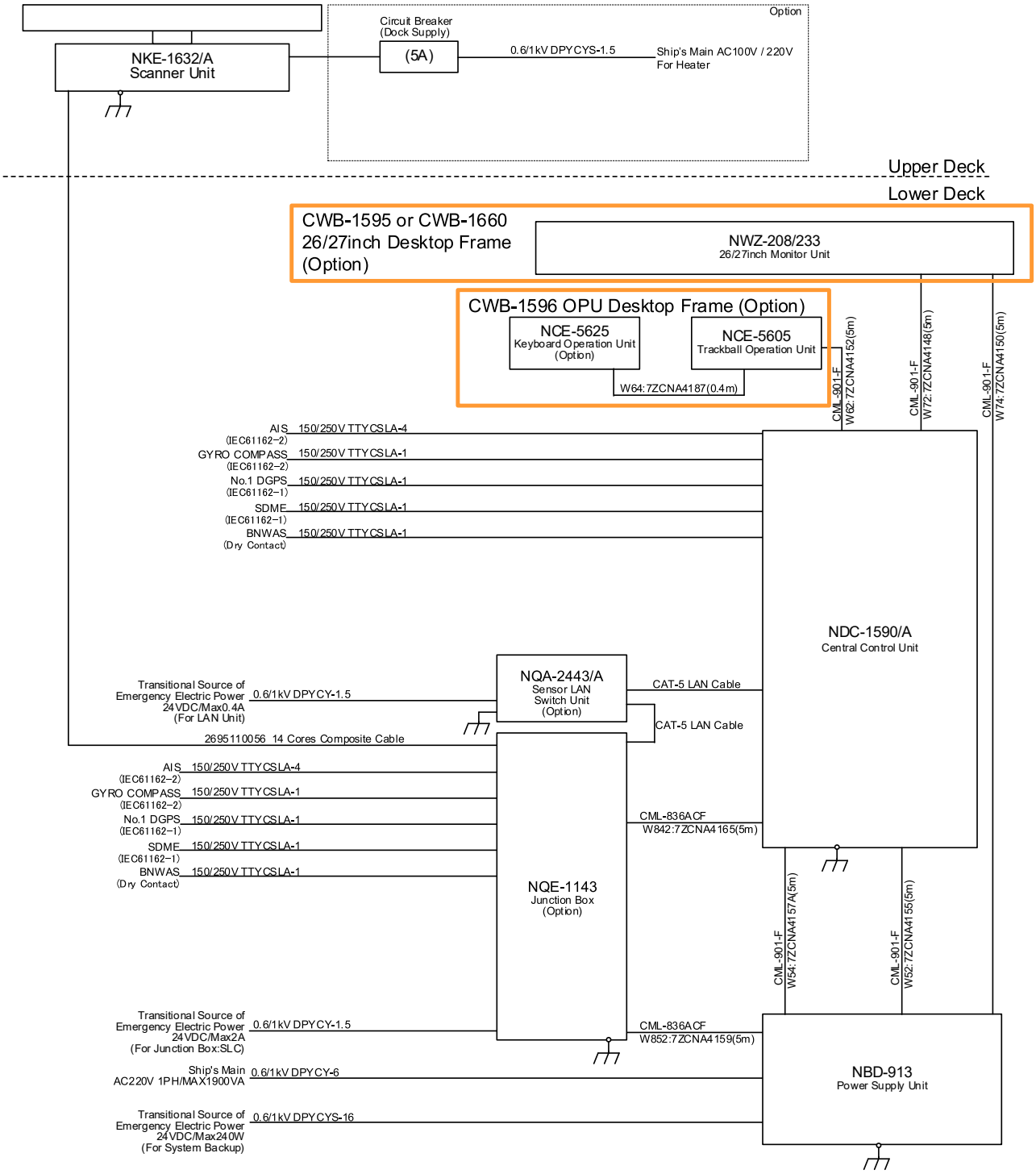
6.3.9 JMR-9230-S3



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

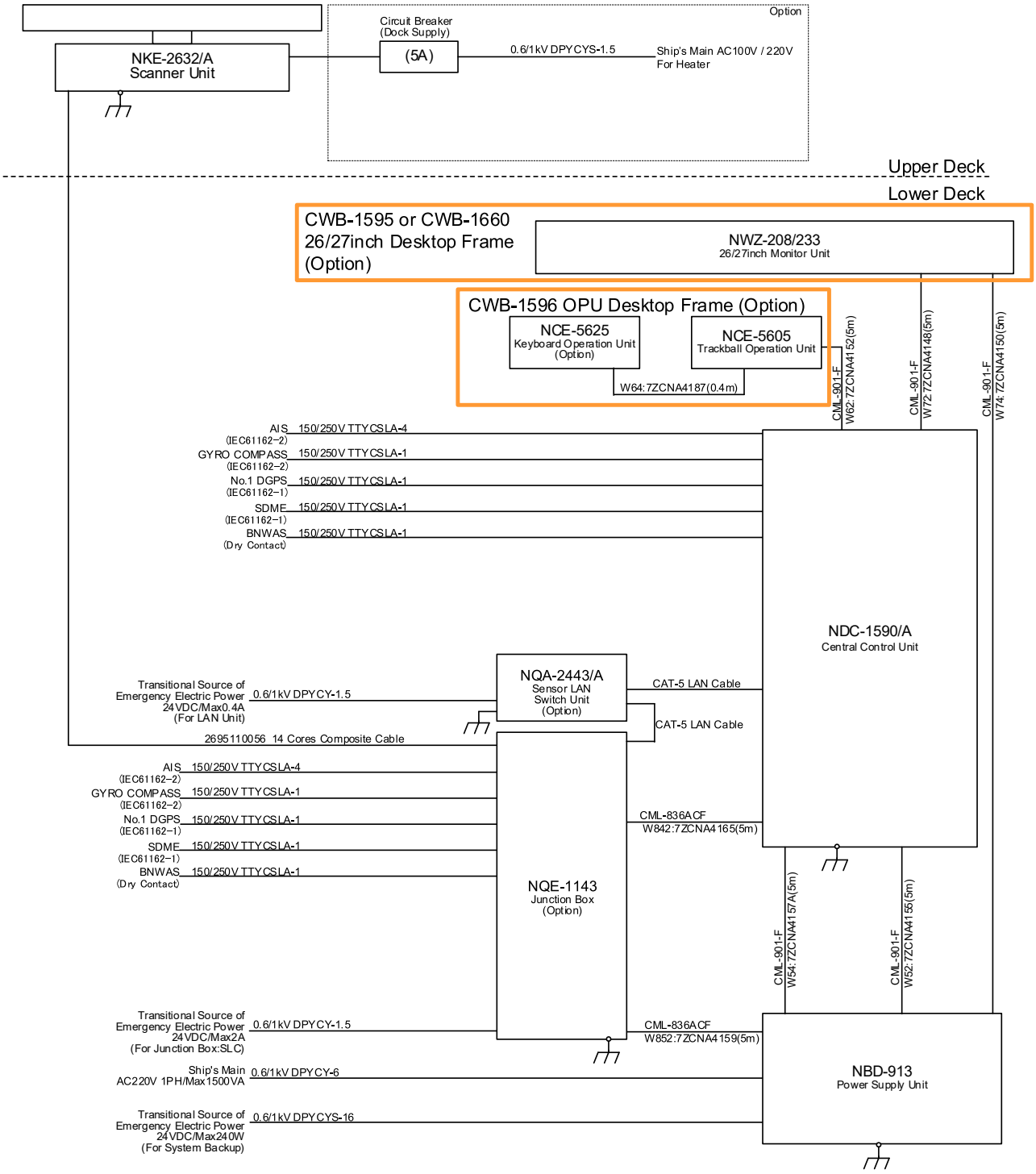
6.3.10 JMR-9272-S



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

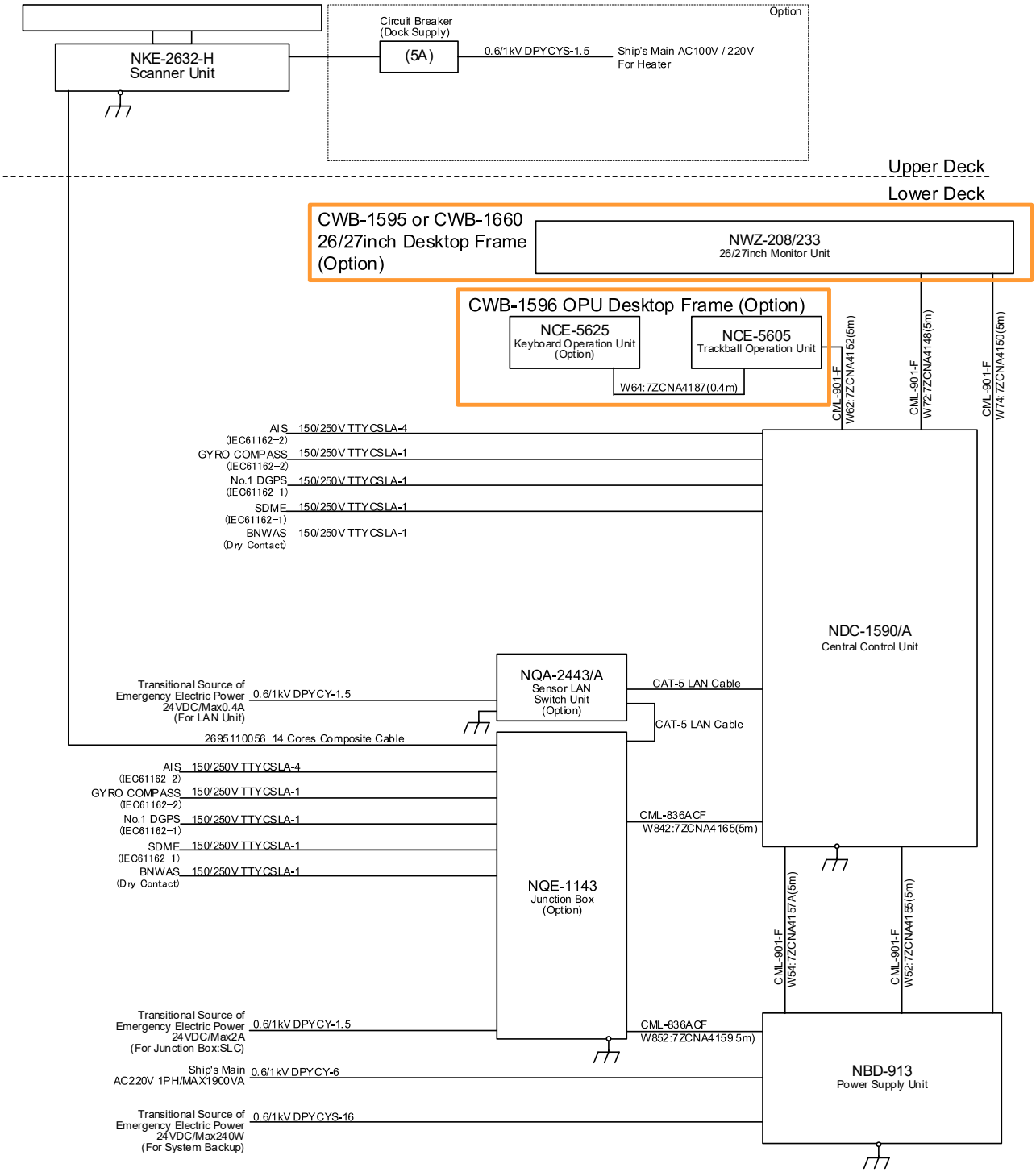
6.3.11 JMR-9282-S



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

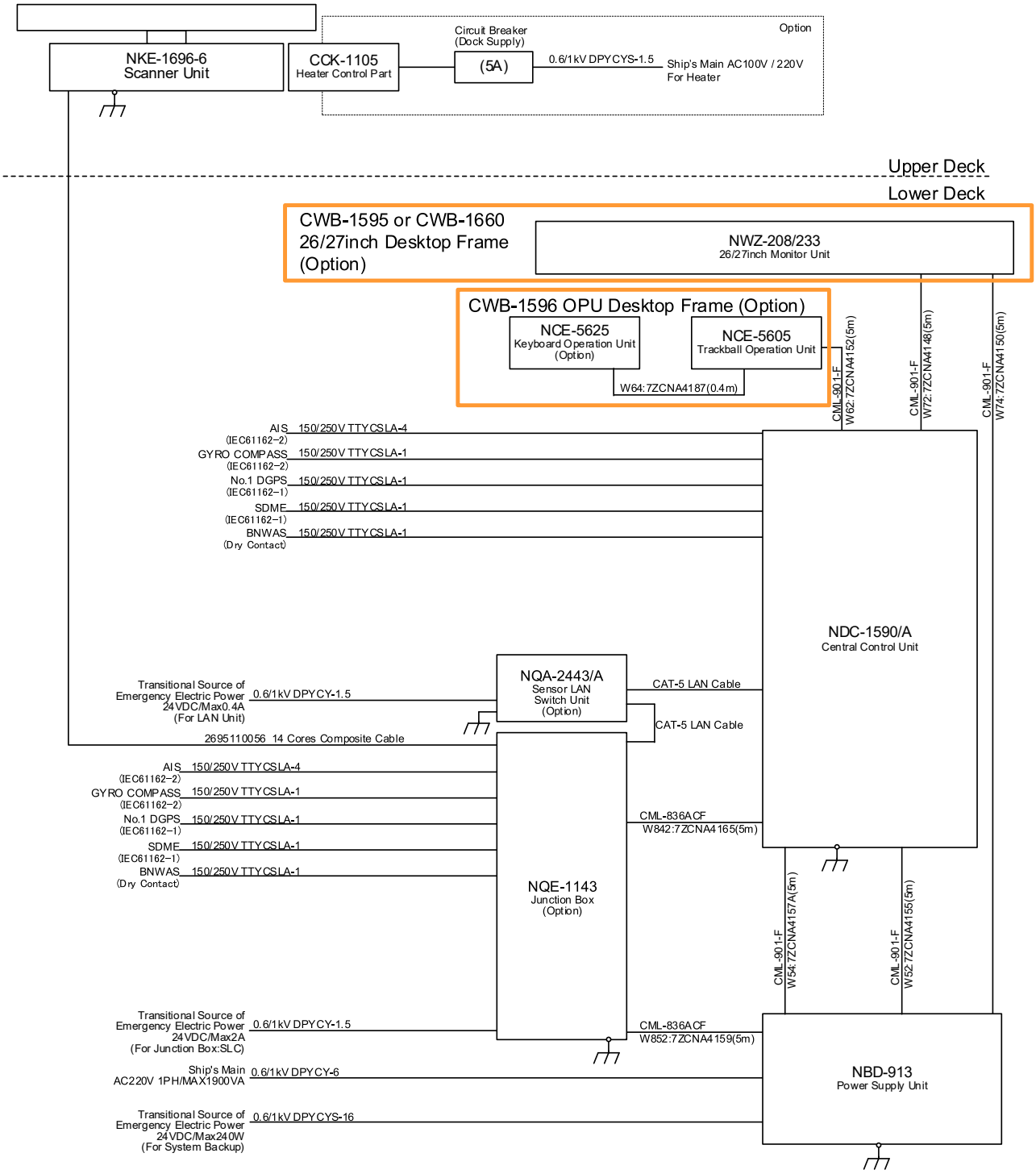
6.3.12 JMR-9282-SH



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

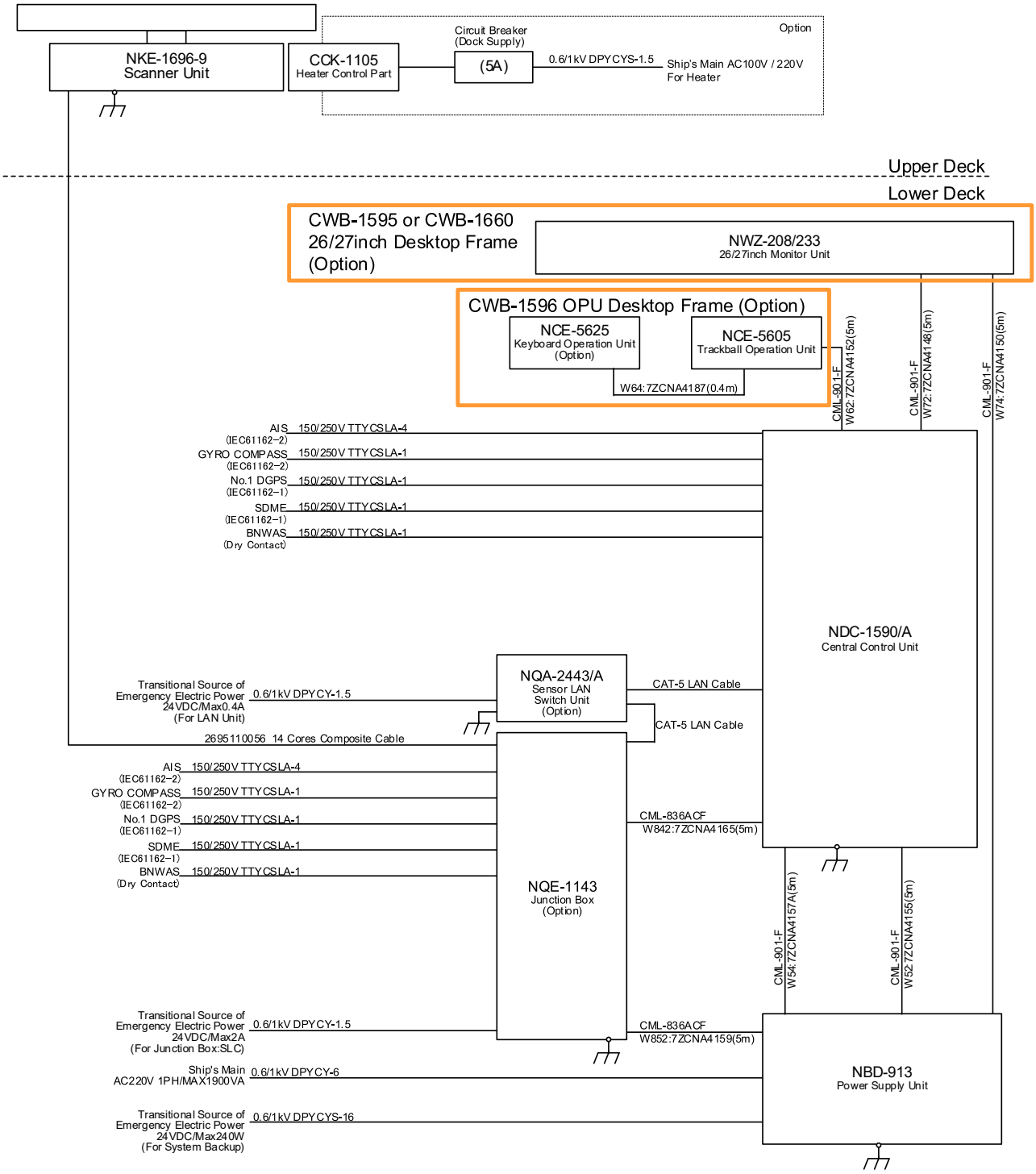
6.3.13 JMR-9296-6X



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

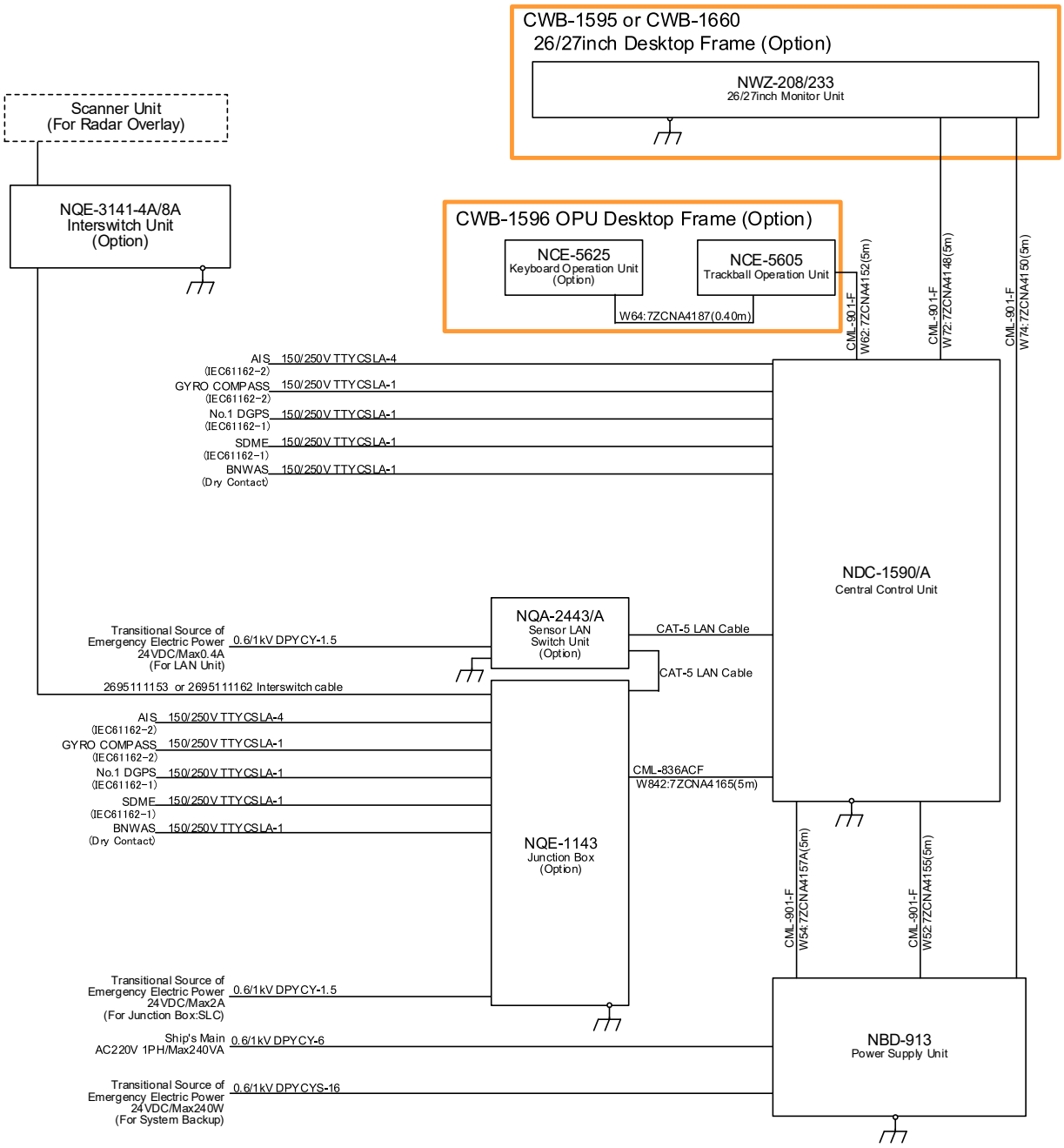
6.3.14 JMR-9296-9X



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

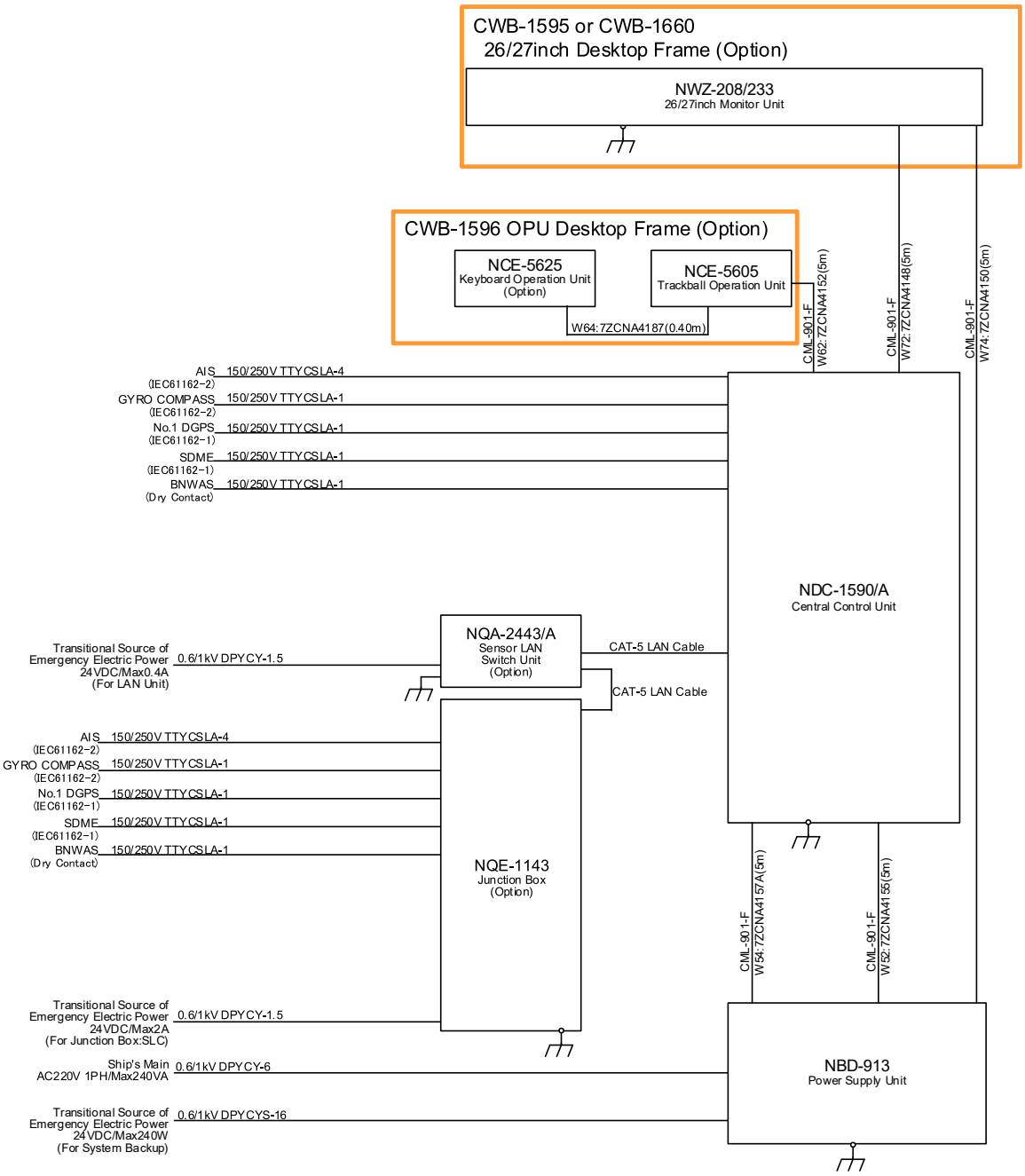
6.3.15 JAN-9201



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

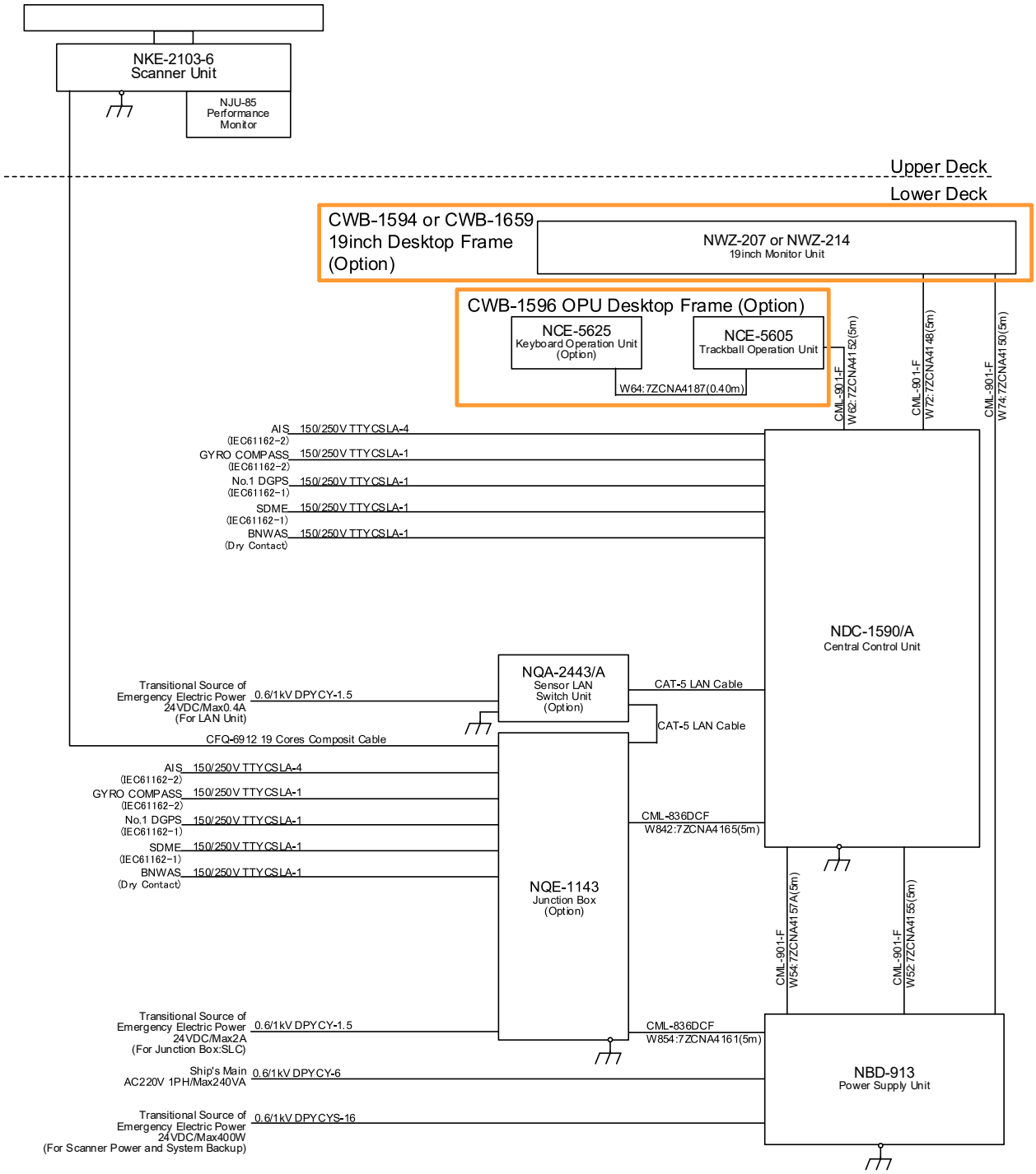
6.3.16 JAN-9202



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

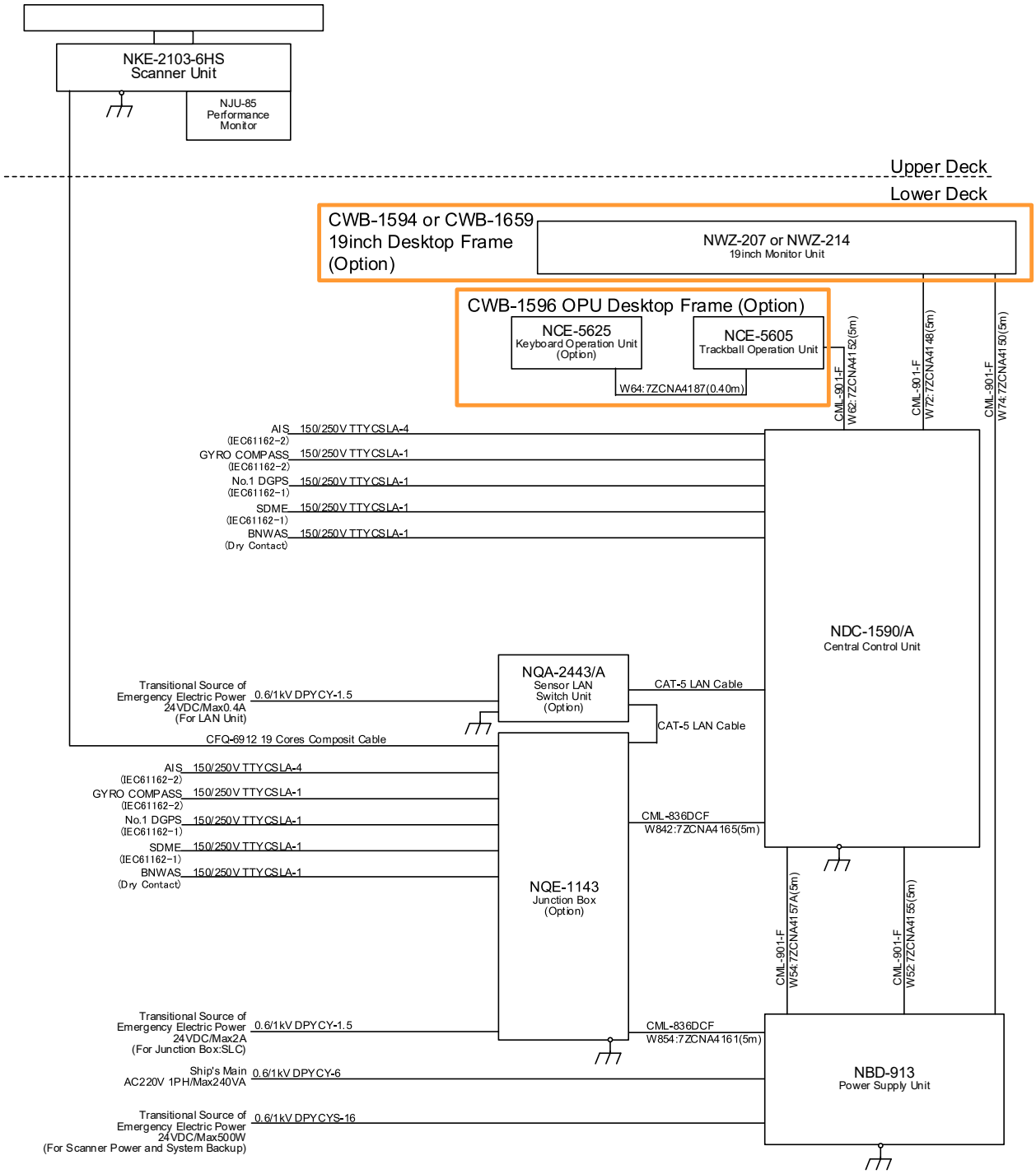
6.3.17 JMR-7210-6X



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-7210-6X RADAR

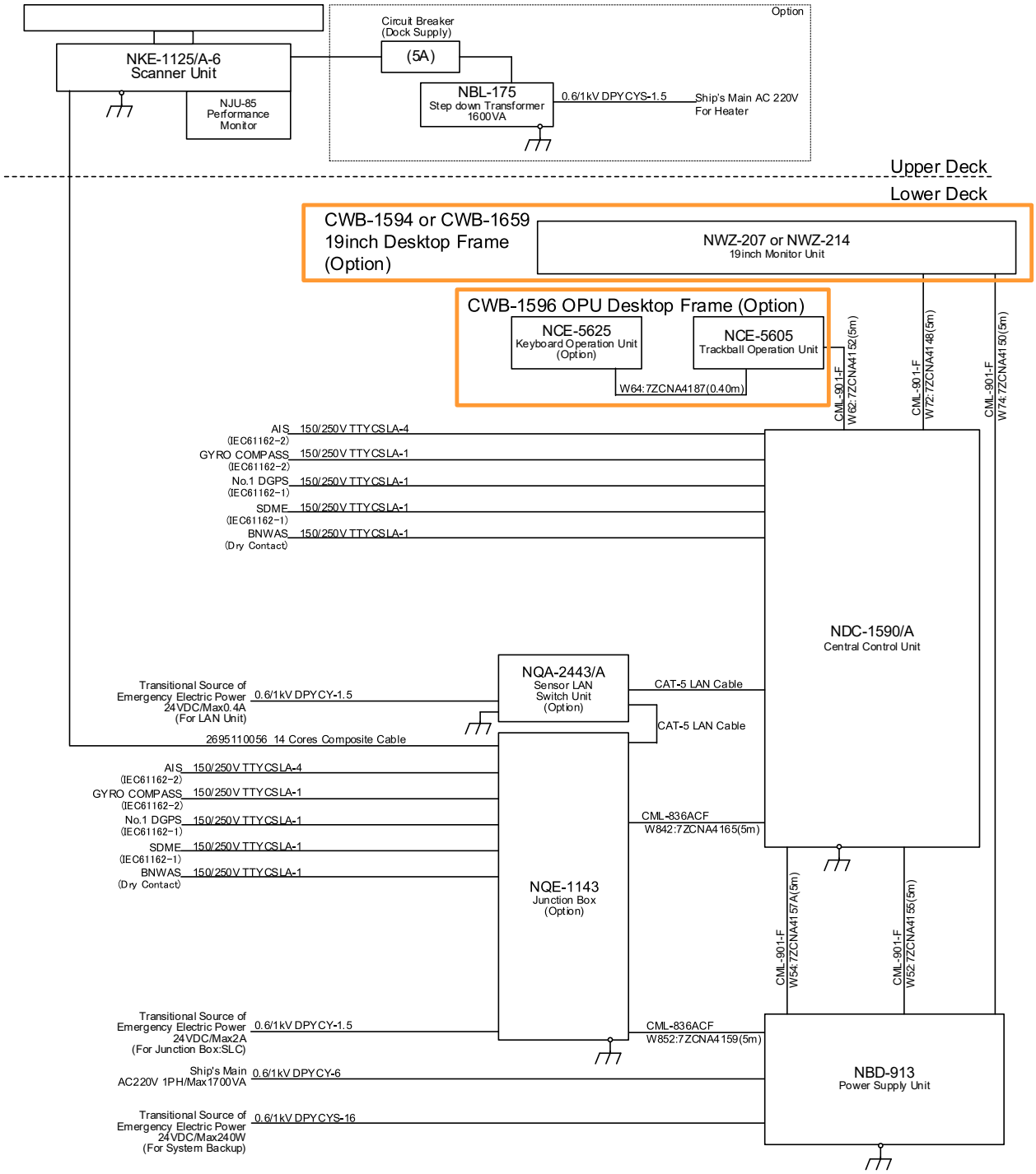
6.3.18 JMR-7210-6XH



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-7210-6XH RADAR

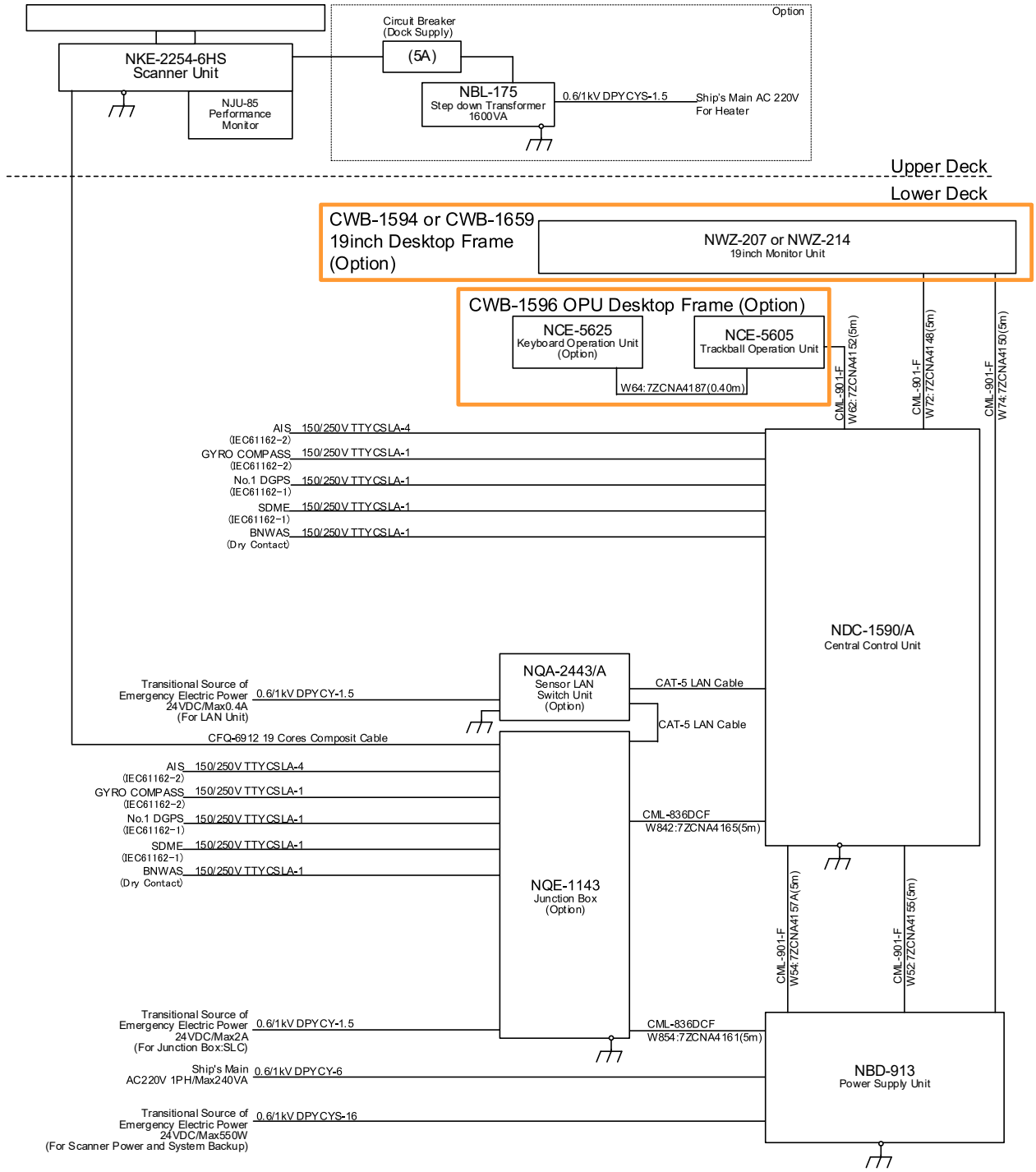
6.3.19 JMR-7225-6X



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

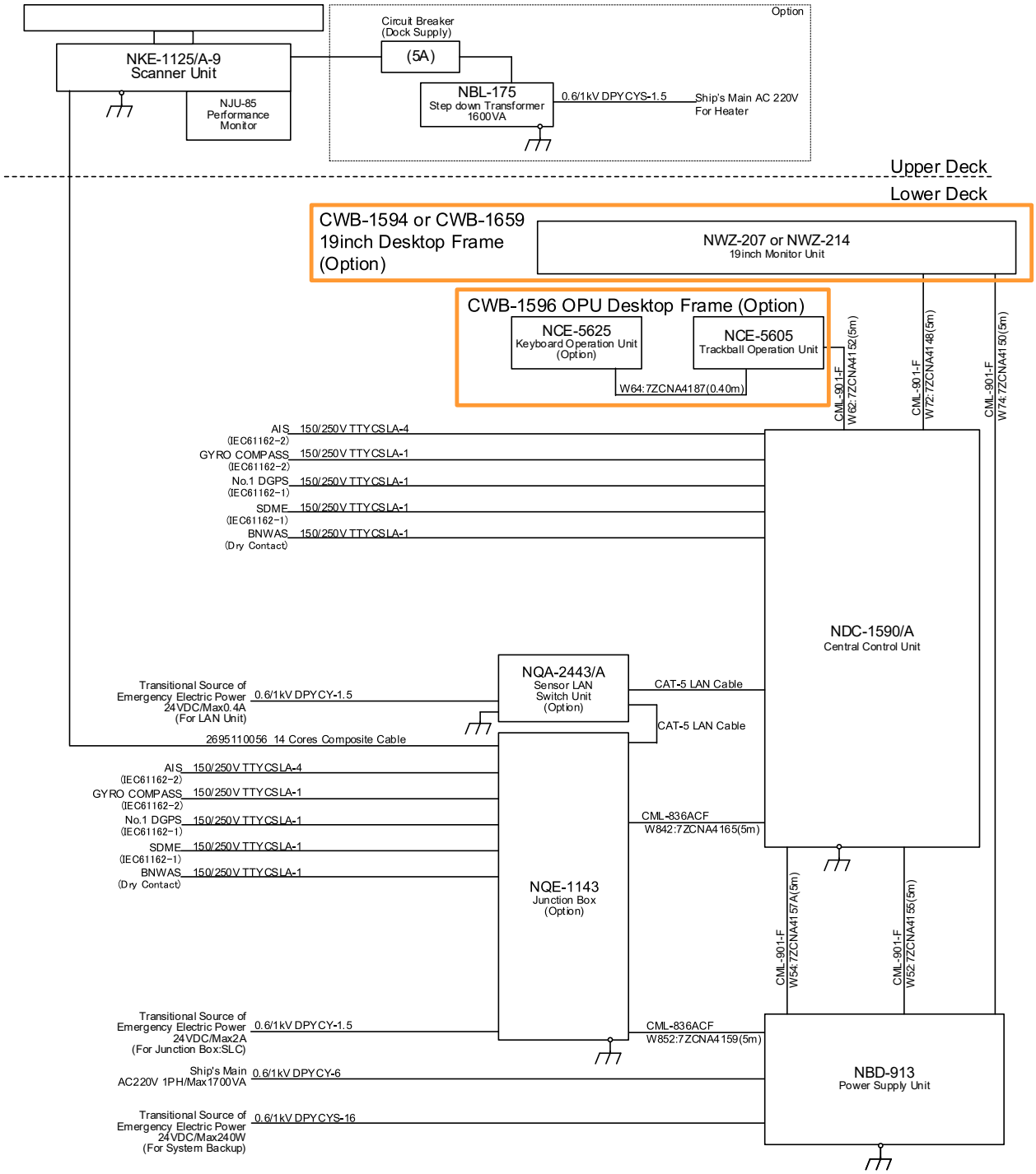
6.3.20 JMR-7225-6XH



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

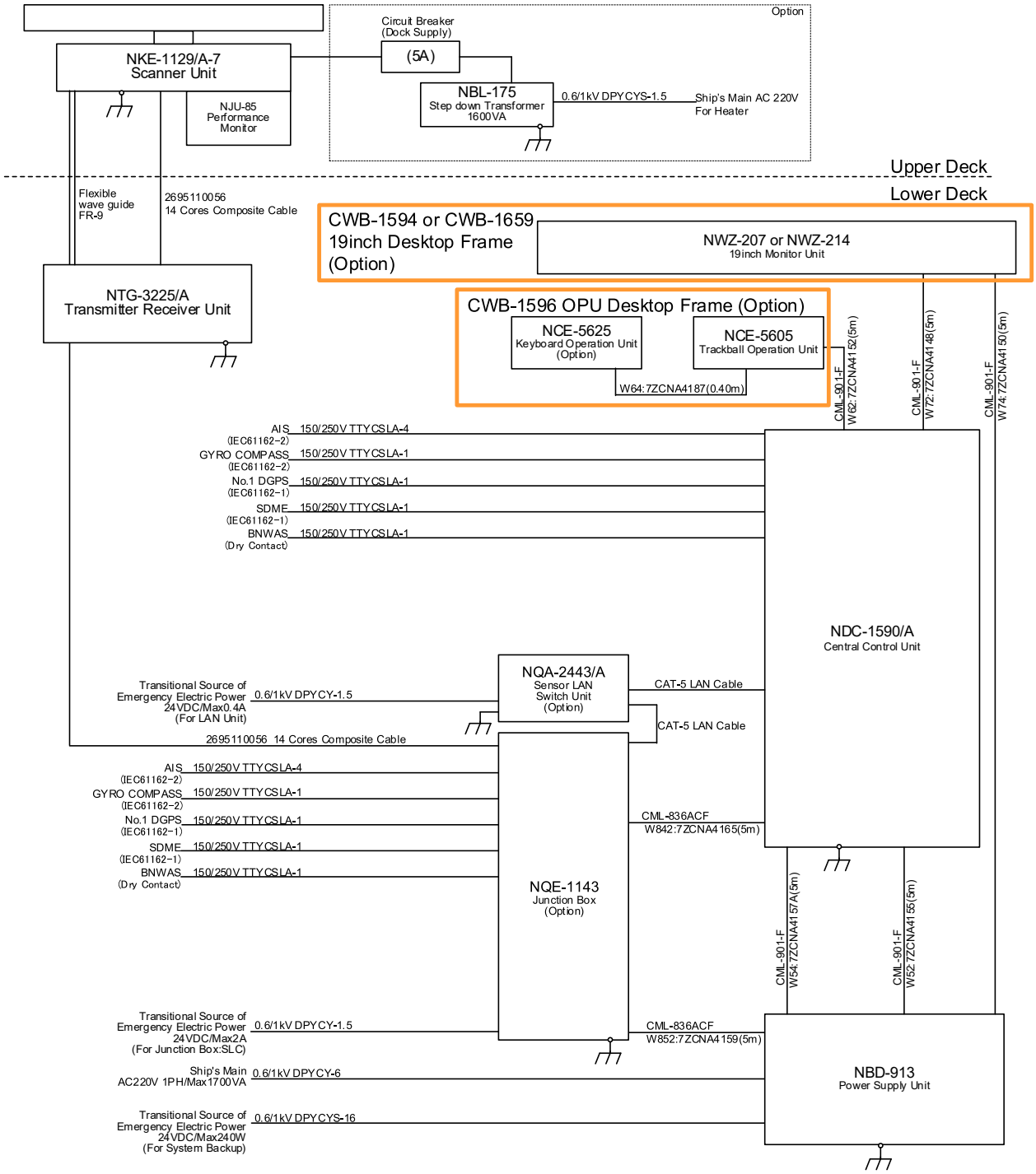
6.3.21 JMR-7225-9X



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

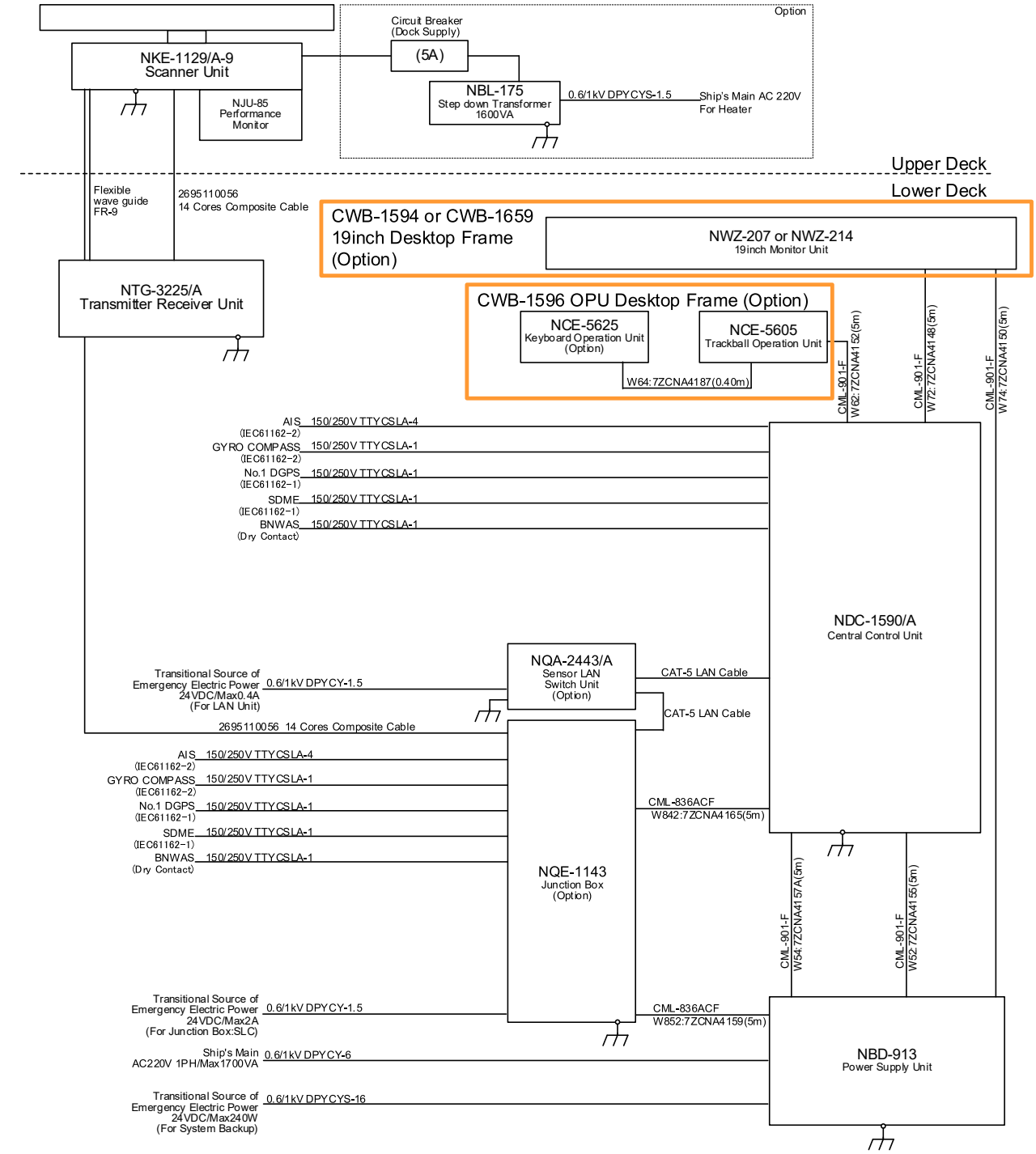
6.3.22 JMR-7225-7X3



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

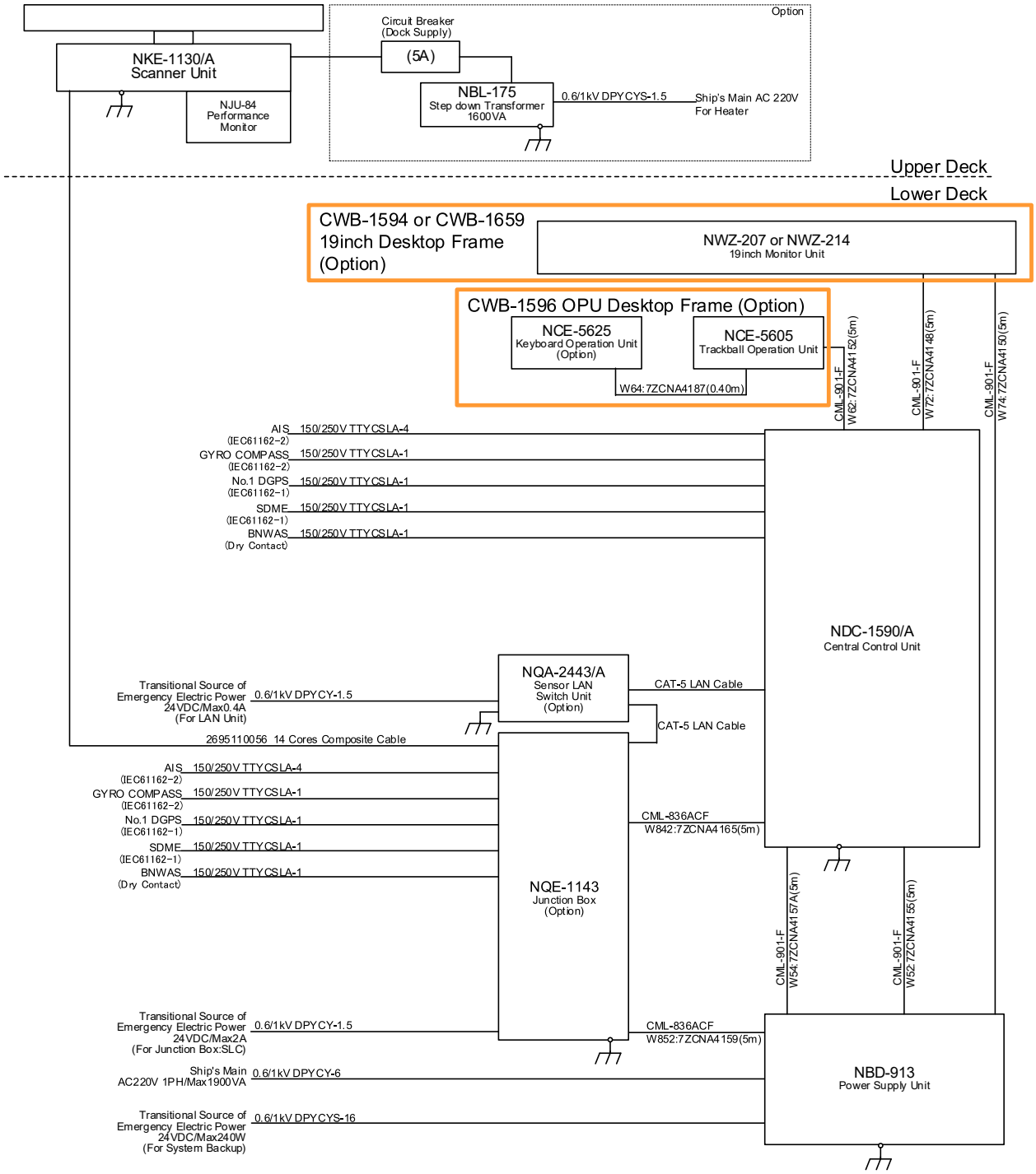
6.3.23 JMR-7225-9X3



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

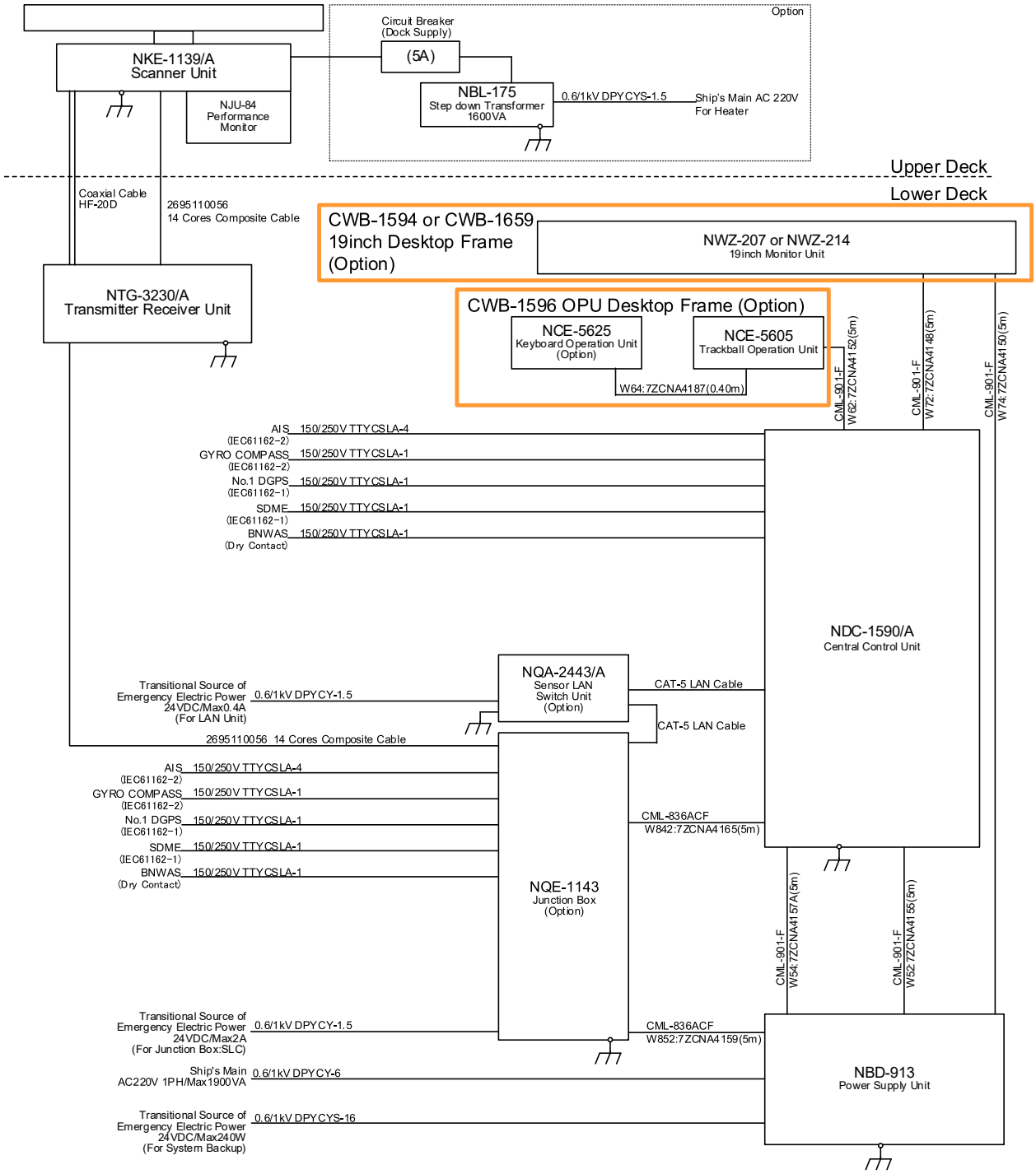
6.3.24 JMR-7230-S



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

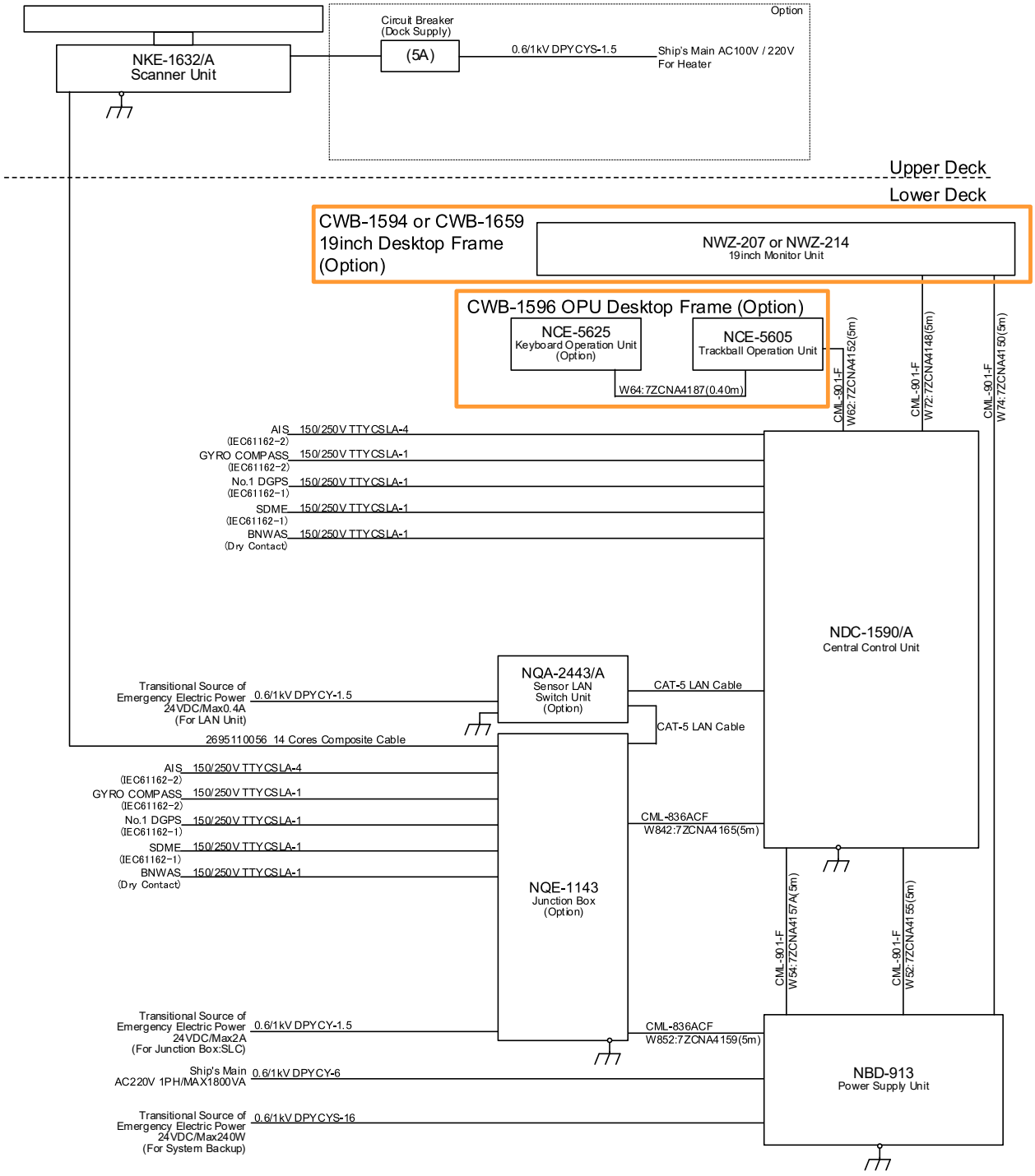
6.3.25 JMR-7230-S3



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

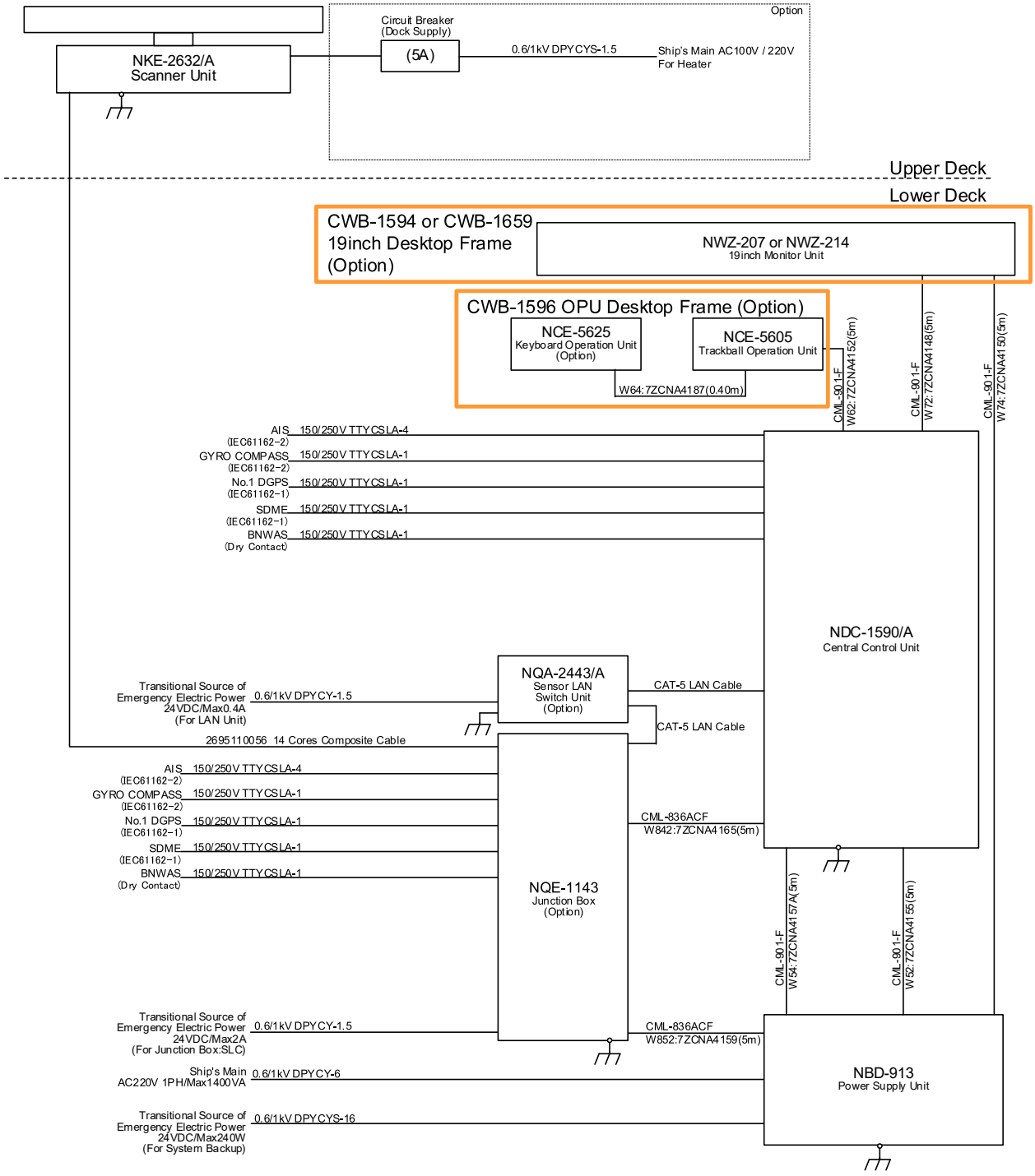
6.3.26 JMR-7272-S



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

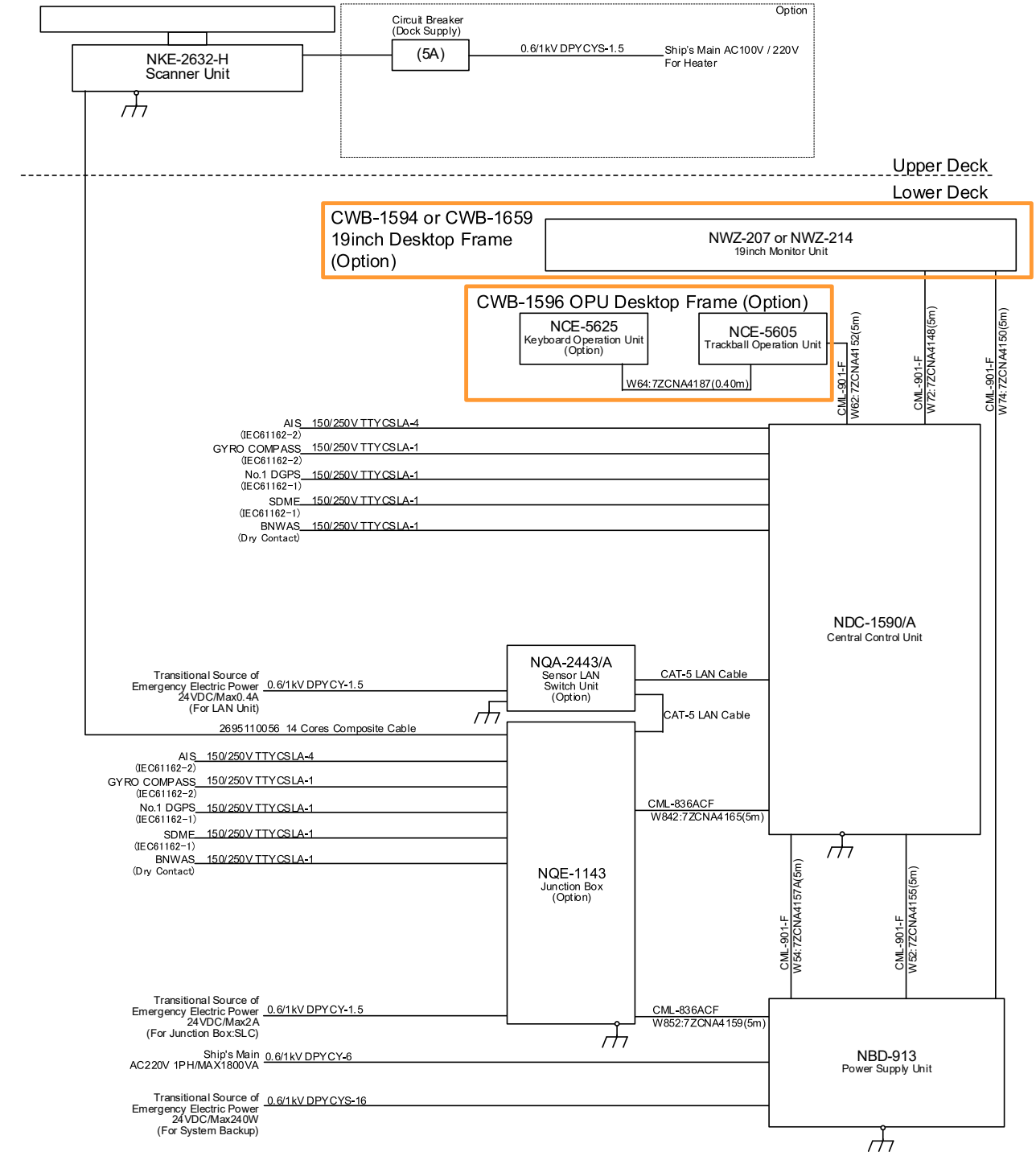
6.3.27 JMR-7282-S



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

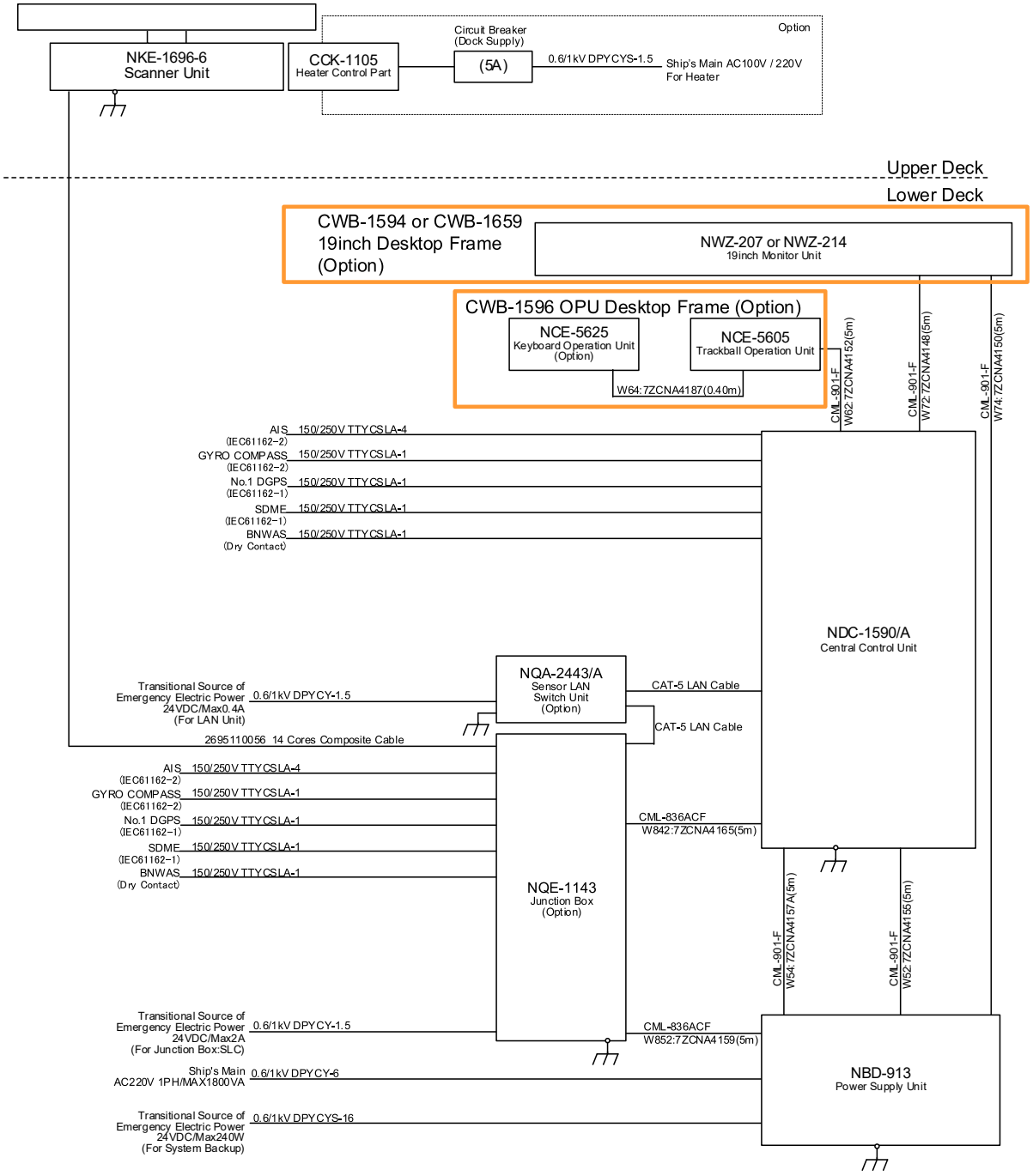
6.3.28 JMR-7282-SH



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

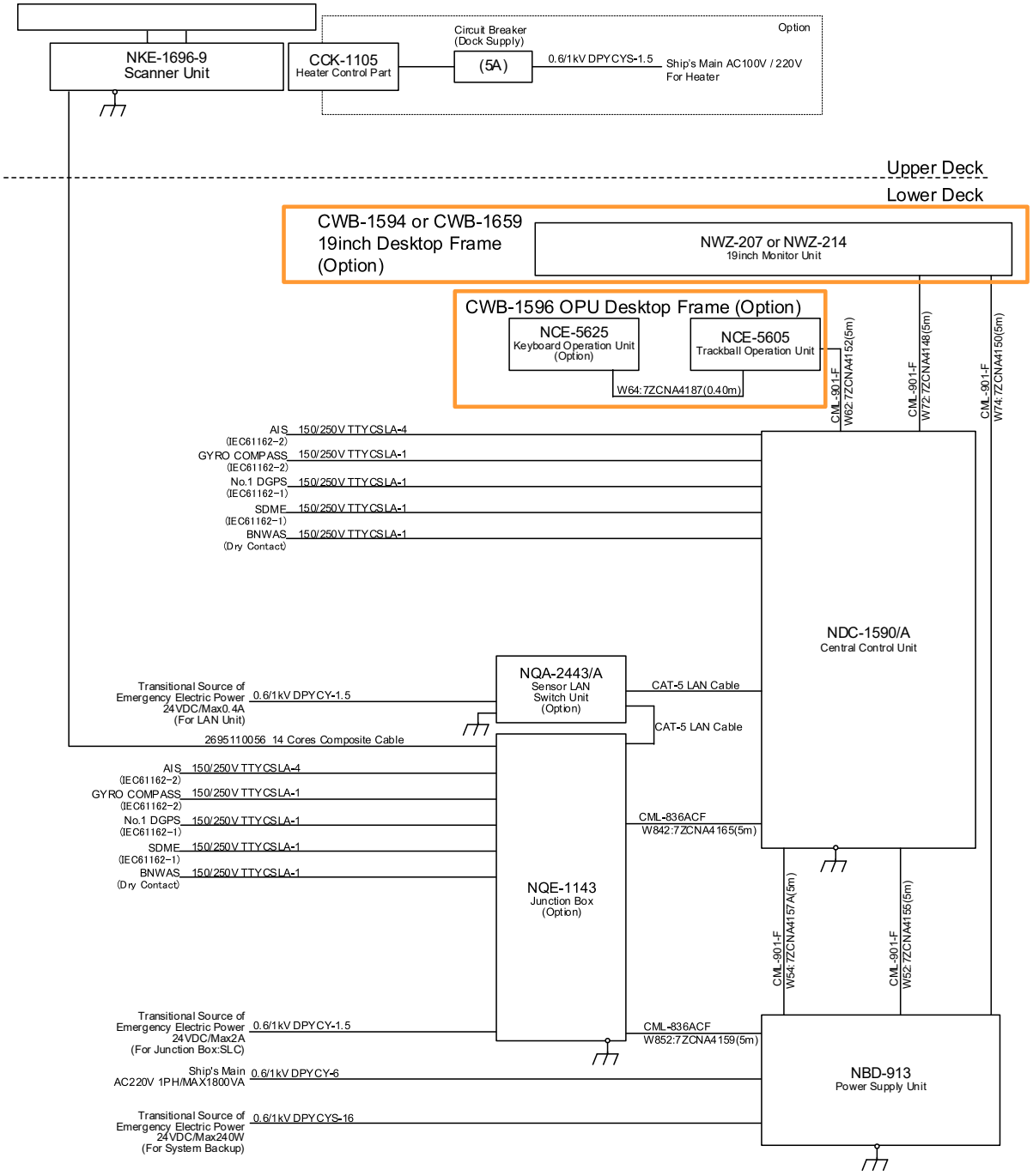
6.3.29 JMR-7296-6X



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

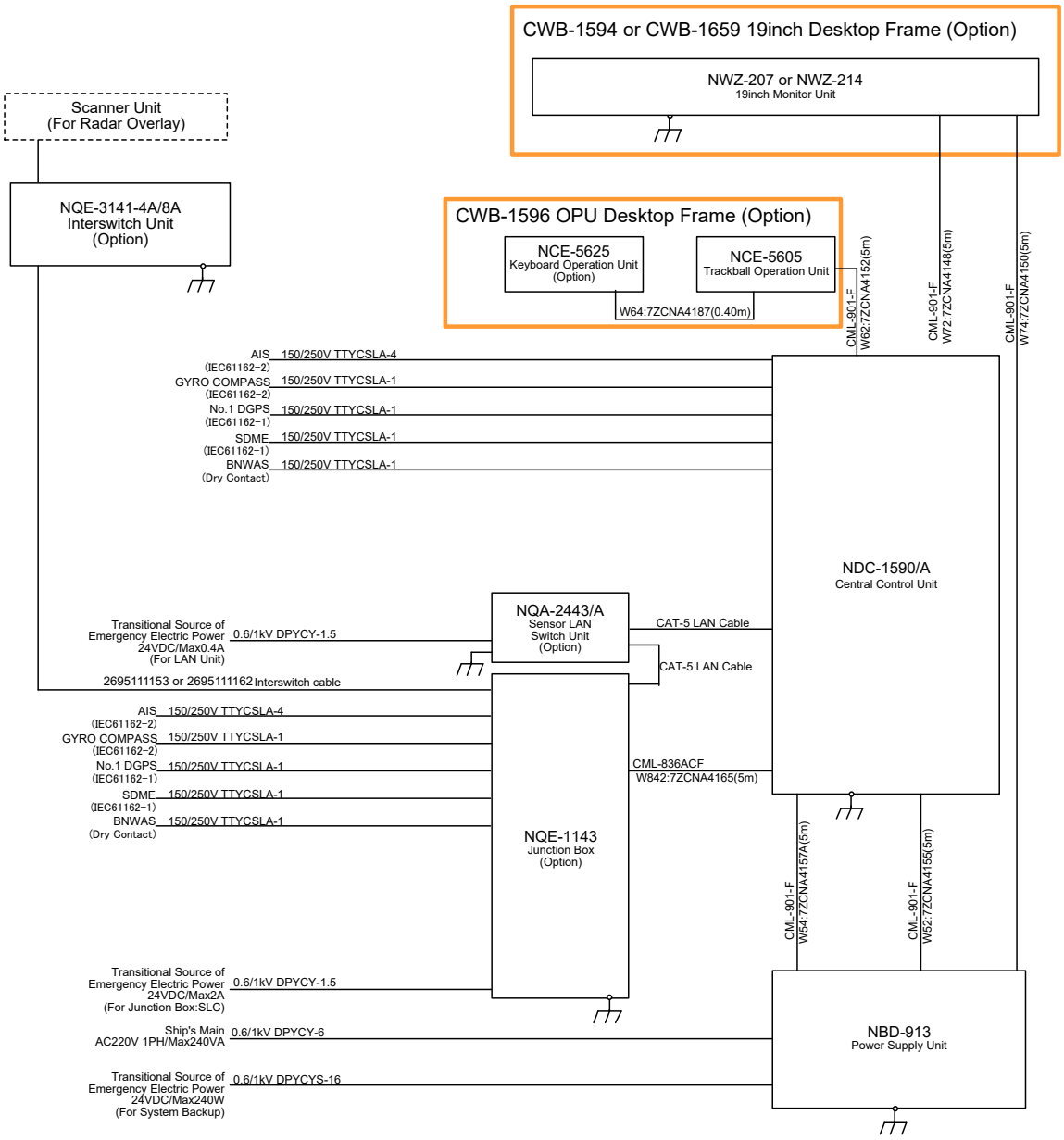
6.3.30 JMR-7296-9X



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

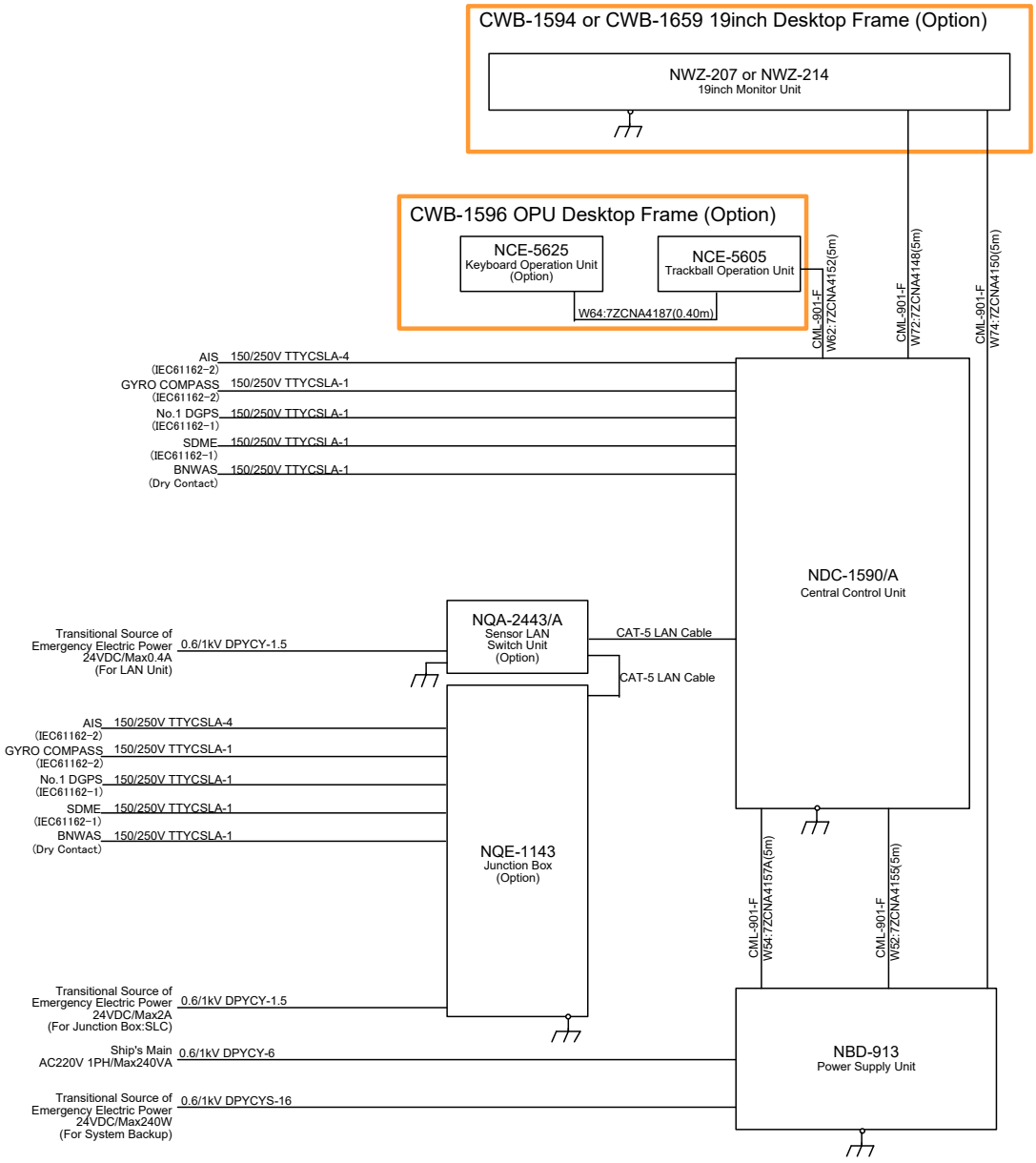
6.3.31 JAN-7201



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

6.3.32 JAN-7202

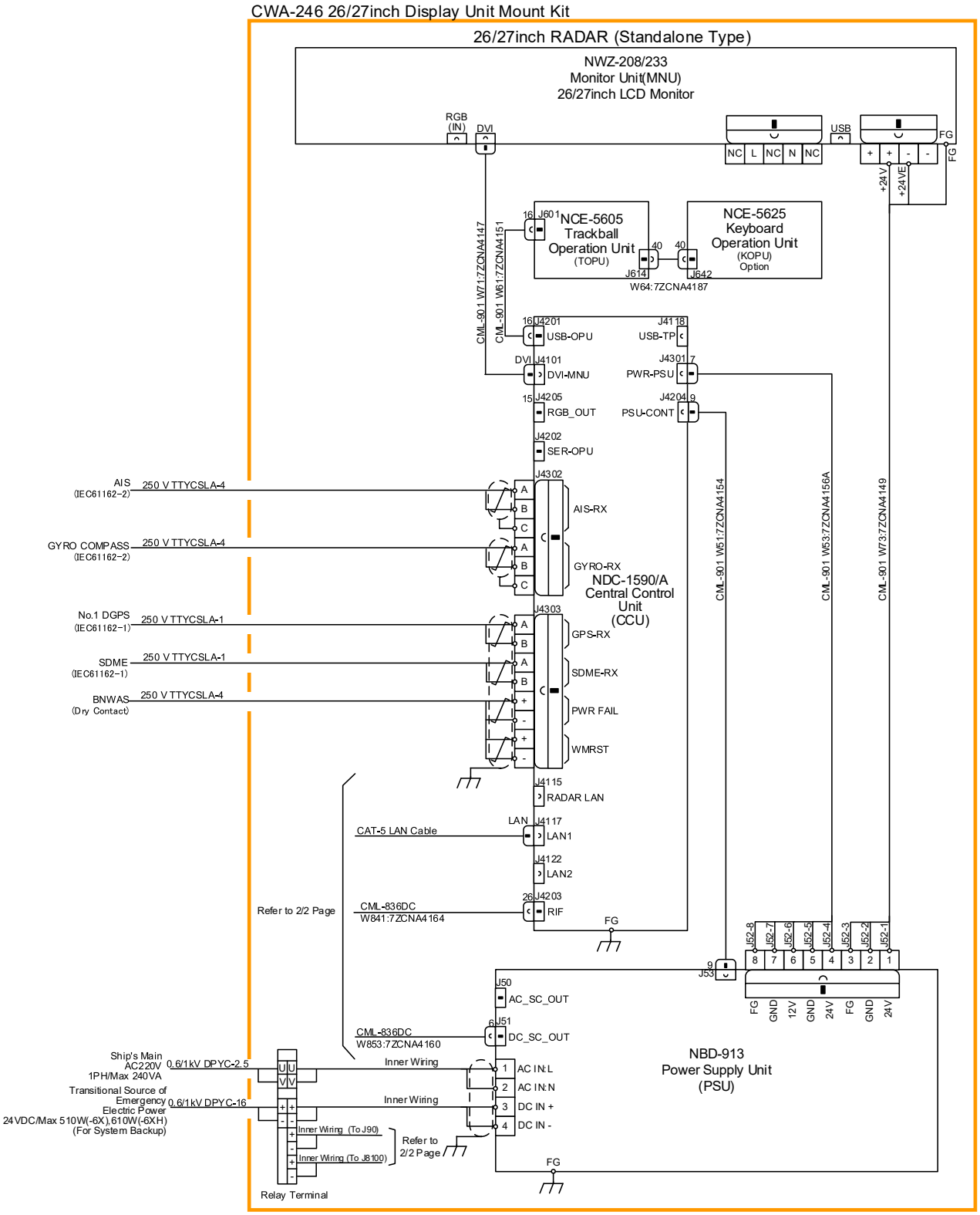


NOTE: ELIMINATING THE INTERFERENCE ON FREQUENCIES USED FOR MARINE COMMUNICATIONS AND NAVIGATION DUE TO OPERATION OF THE RADAR,
ALL CABLES OF THE RADAR ARE TO BE RUN AWAY FROM THE CABLES OF RADIO EQUIPMENT.
(ex. RADIOTELEPHONE, COMMUNICATIONS RECEIVER and DIRECTION FINDER. etc..)
ESPECIALLY INTER-WIRING CABLES BETWEEN SCANNER UNIT AND DISPLAY UNIT OF THE RADAR SHOULD NOT BE RUN PARALLEL WITH THE CABLES OF RADIO EQUIPMENT.

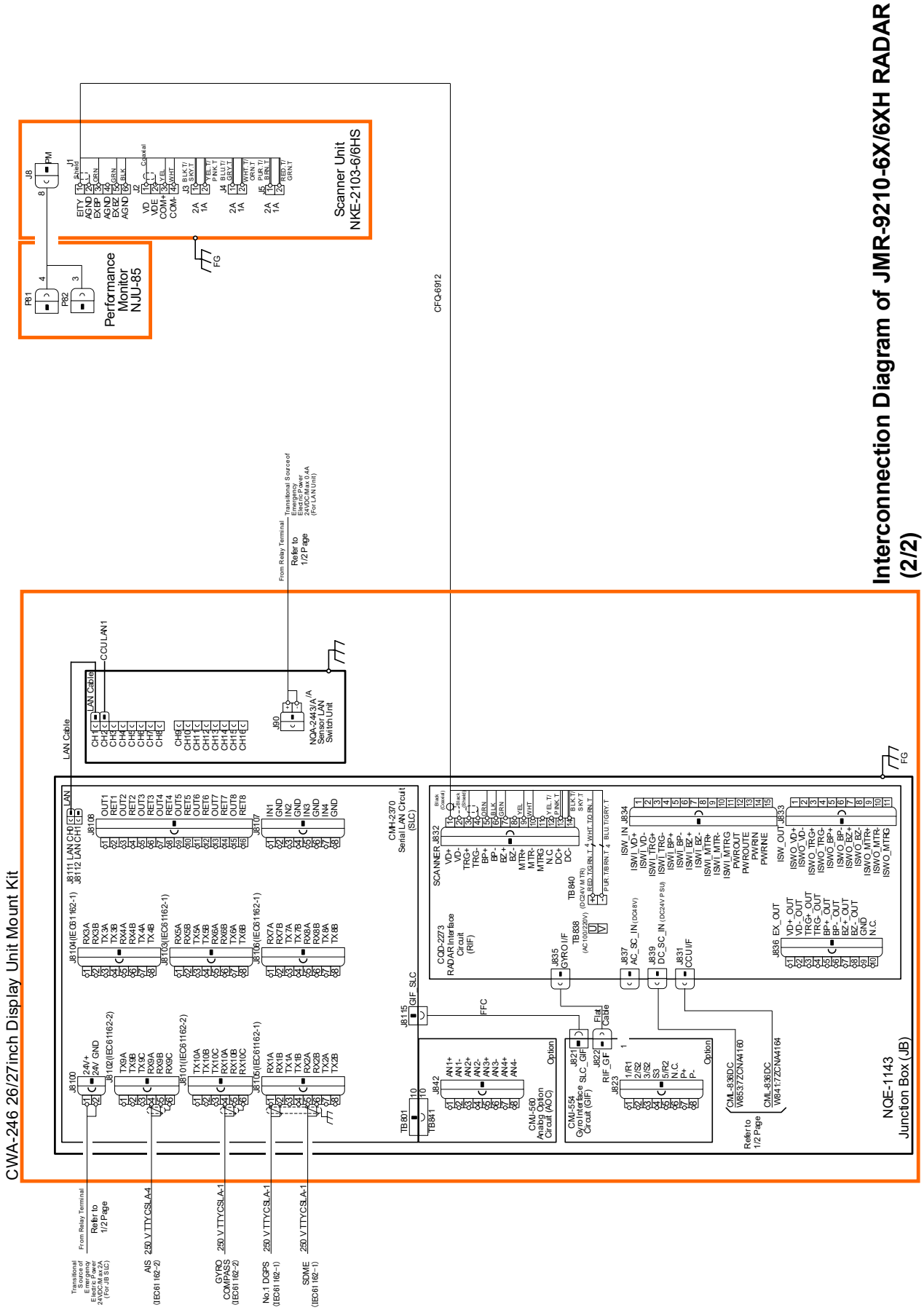
General System Diagram of JAN-7202 CONNING

6.4 Interconnection Diagram of Standalone Type

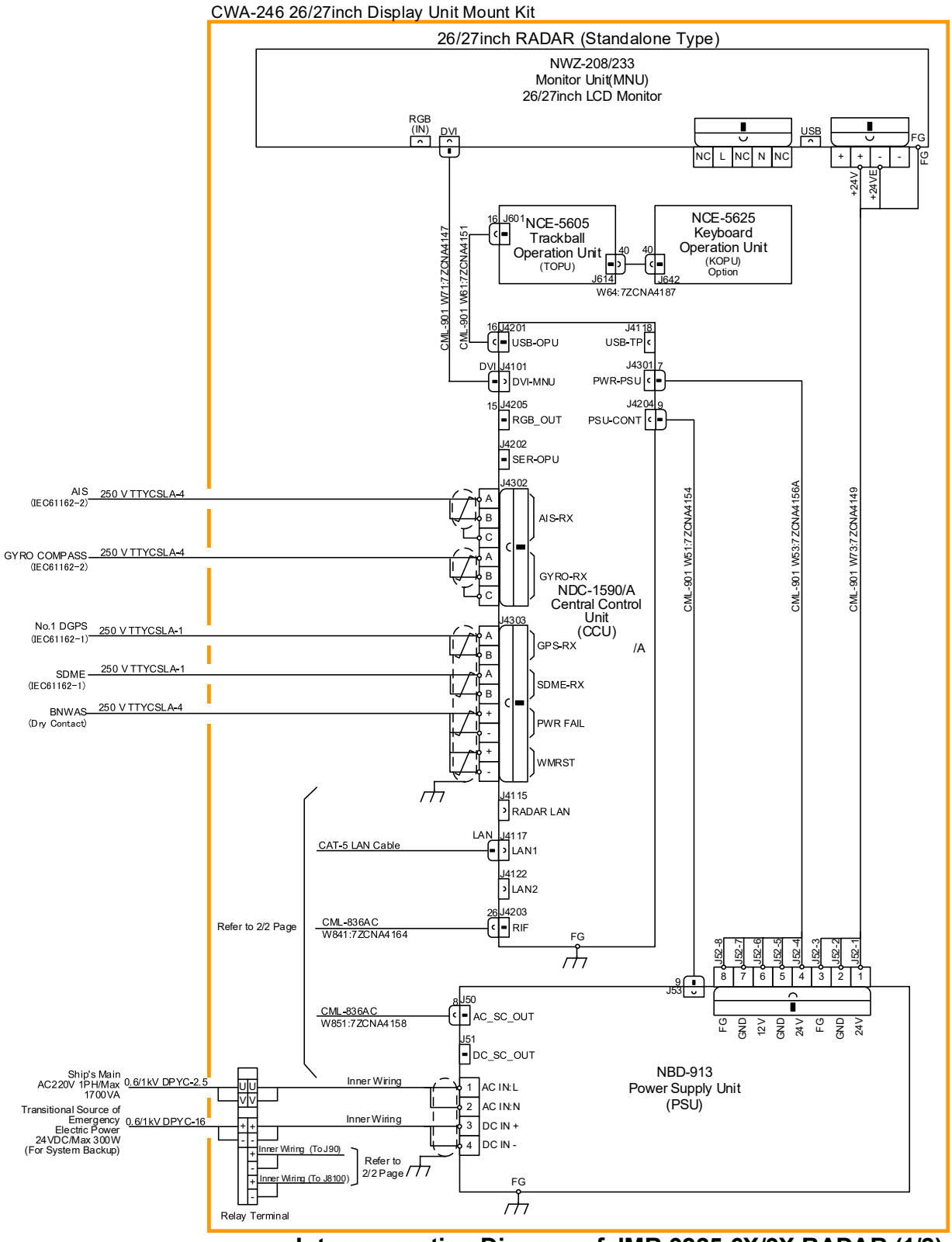
6.4.1 JMR-9210-6X/6XH



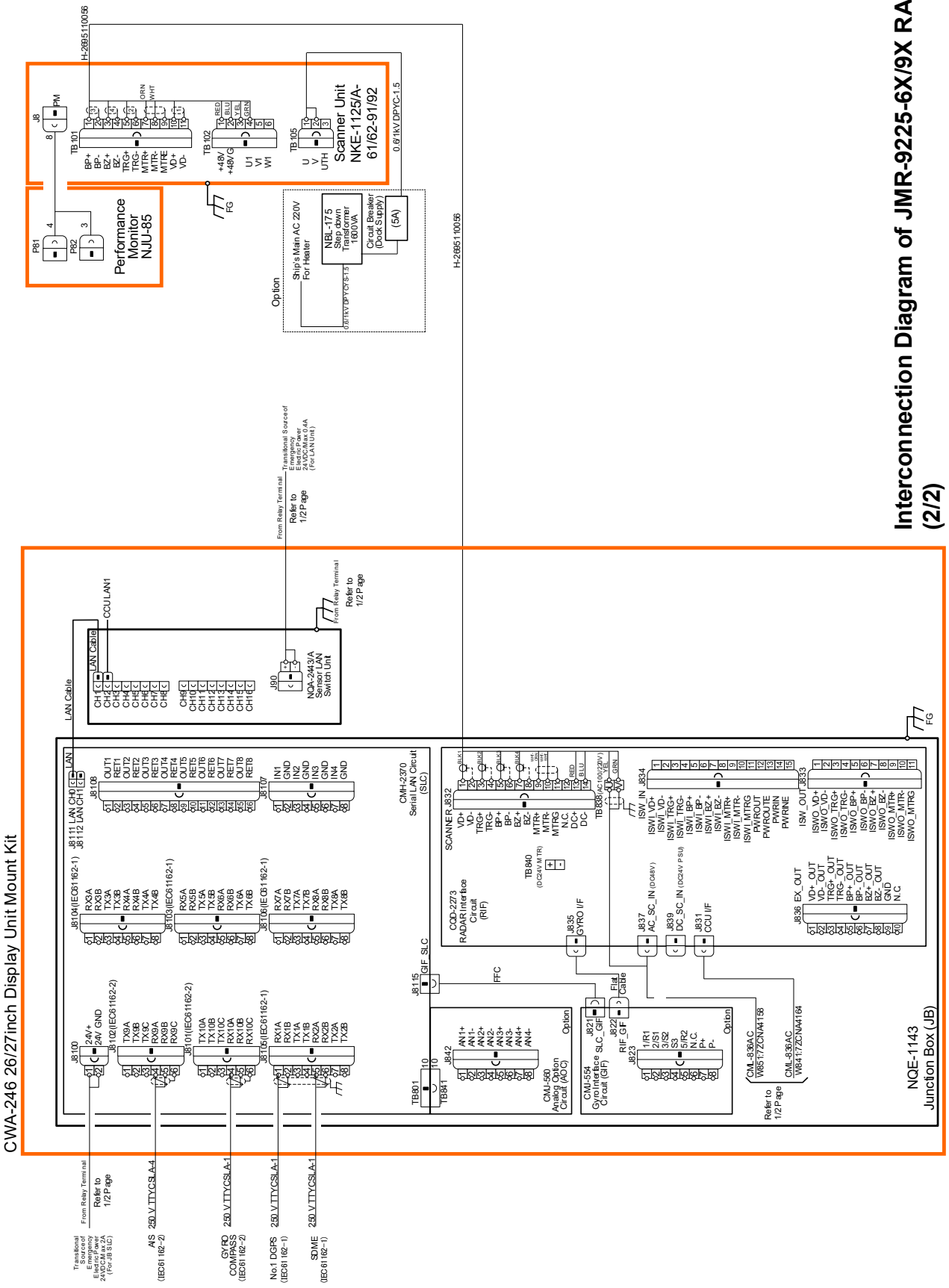
Interconnection Diagram of JMR-9210-6X/6XH RADAR (1/2)


Interconnection Diagram of JMR-9210-6X/6XH RADAR (2/2)
Scanner Unit NKE-2103-6/6HS
Performance Monitor NJU-85
CFQ-6912
CWA-246 26/27inch Display Unit Mount Kit
NQE-1143 Junction Box (JB)
CCU LAN1
LAN Cable
NQA-2443/A /A Switching Hub LAN Switch Unit
CMH-2370 Serial LAN Circuit (SLC)
COD-2273 RADAR Interface Circuit (RIF)
CMJ-554 Gyro Interface SLC_GIF Circuit (GIF)
CMJ-560 Analog Option Circuit (AOC)
CML-836DC
Transitional Source of Emergency Electric Power 24VDC/Max.2A (For JB S/C)
From Relay Terminal
Refer to 1/2 Page
AIS (IEC61162-2)
GYRO COMPASS (IEC61162-2)
No.1 DGPS (IEC61162-1)
SDME (IEC61162-1)
250 V TTYCSLA-A
Transitional Source of Emergency Electric Power 24VDC/Max.0.4A (For LAN Unit)

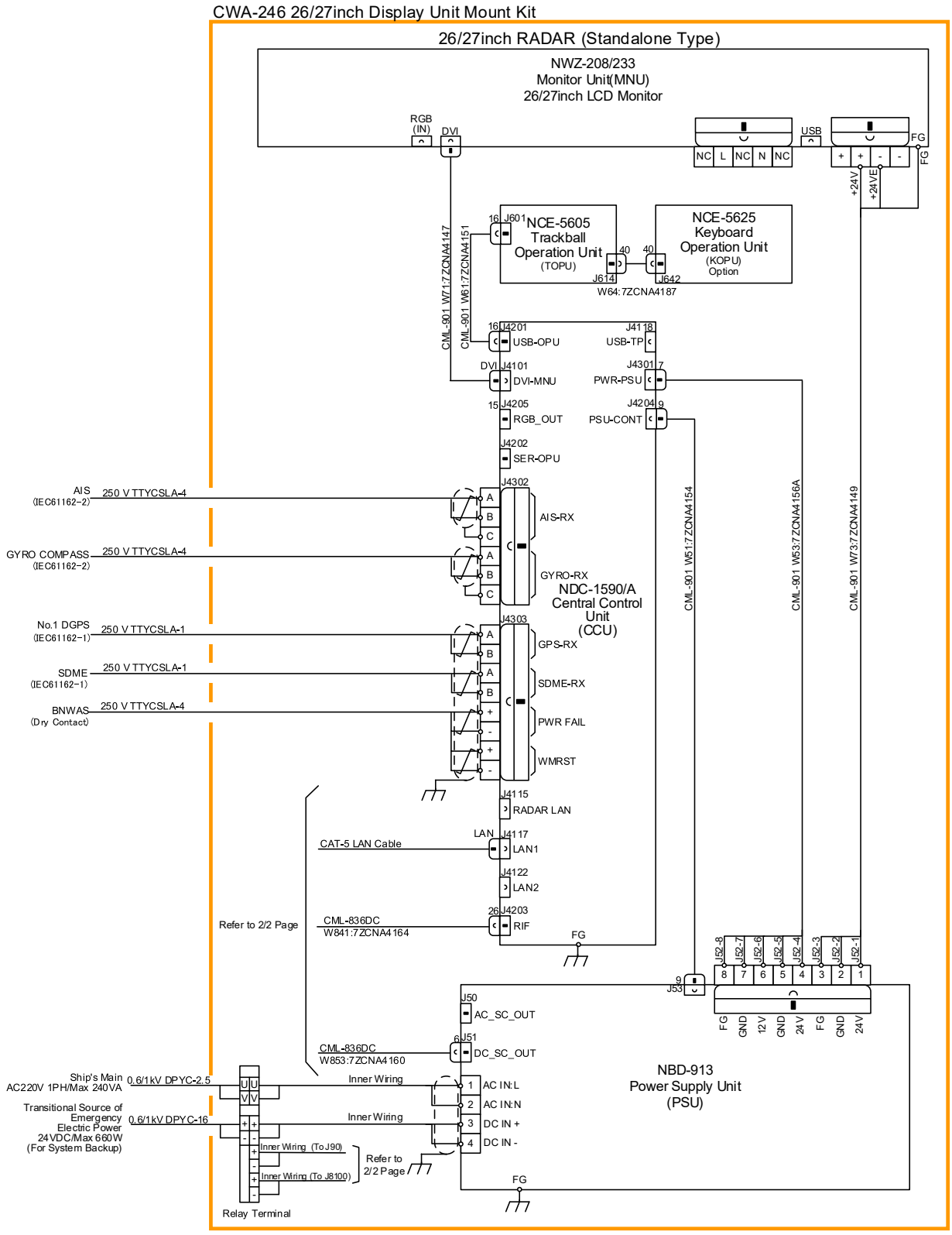
6.4.2 JMR-9225-6X/9X



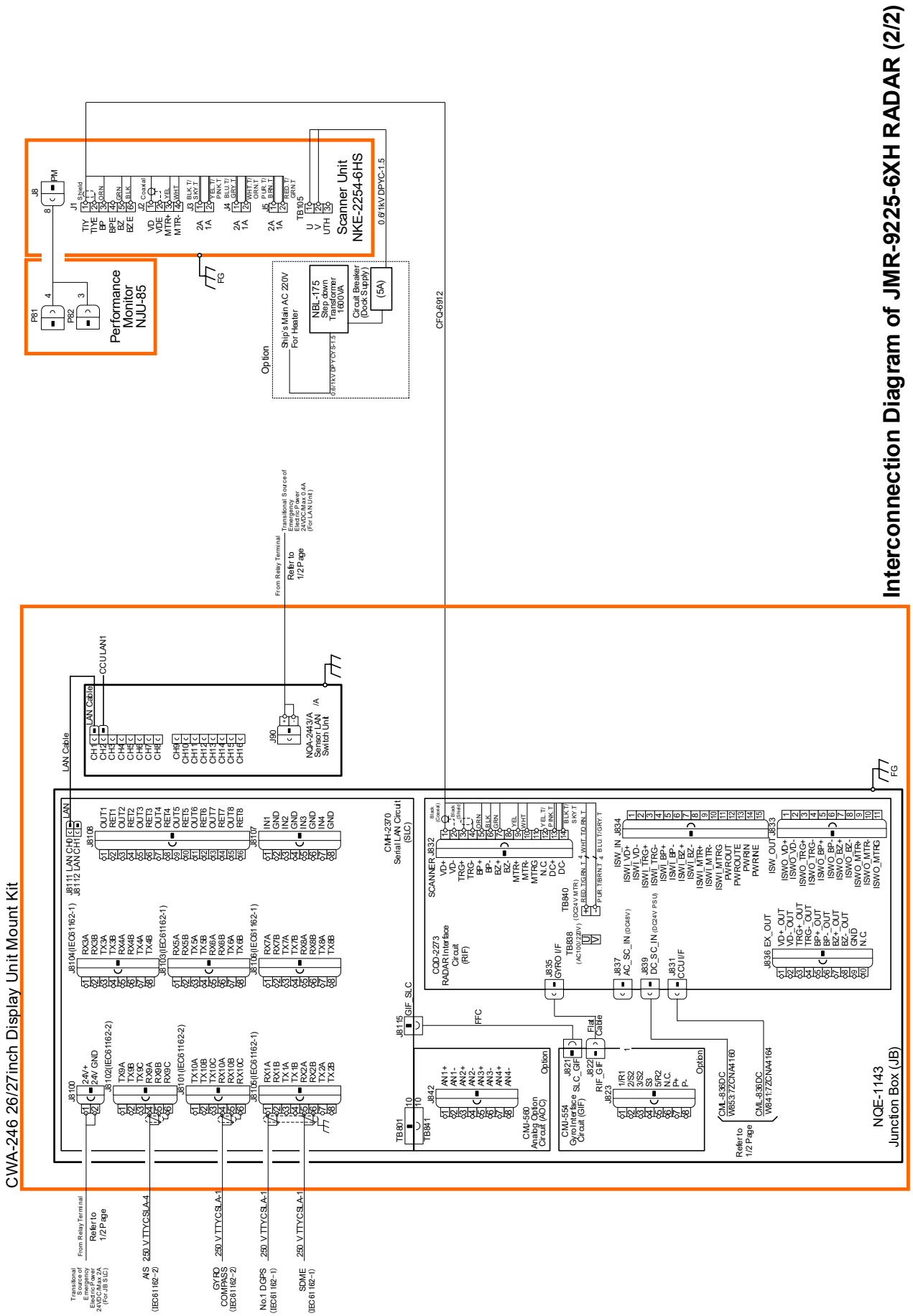
Interconnection Diagram of JMR-9225-6X/9X RADAR (1/2)


Interconnection Diagram of JMR-9225-6X/9X RADAR (2/2)
Scanner Unit NKE-1125/A-61/62-91/92
Performance Monitor NJU-85
Option
Ship's Main AC 220V For Heater
NBL-175 Step down Transformer 1600VA
Circuit Breaker (Dock Supply) (5A)
NQA-2443/A Smart LAN Switch Unit
CCU LAN1
LAN Cable
CWA-246 26/27inch Display Unit Mount Kit
NQE-1143 Junction Box (JB)
CMH-2370 Serial LAN Circuit (SLC)
SCANNER J832
COD-227 3 RADAR Interface Circuit (RIF)
GYRO I/F
CCU I/F
AC_SC_IN (DC48V)
DC_SC_IN (DC24V PSU)
ISW_IN J834
ISW_OUT J833
ISWO_OUT J836
CMJ-554 Gyro Interface Circuit (GIF)
CMJ-560 Analog Option Circuit (AOC)
CML-836/AC
Refer to 1/2 Page
From Relay Terminal
Transitional Source of Emergency Electric Power 24VDC/Max 0.4A (For LAN Unit)
AIS (IEC61162-2)
GYRO COMPASS (IEC61162-2)
No.1 DGPS (IEC61162-1)
SDME (IEC61162-1)
250 V TTYCSLA-4
250 V TTYCSLA-1

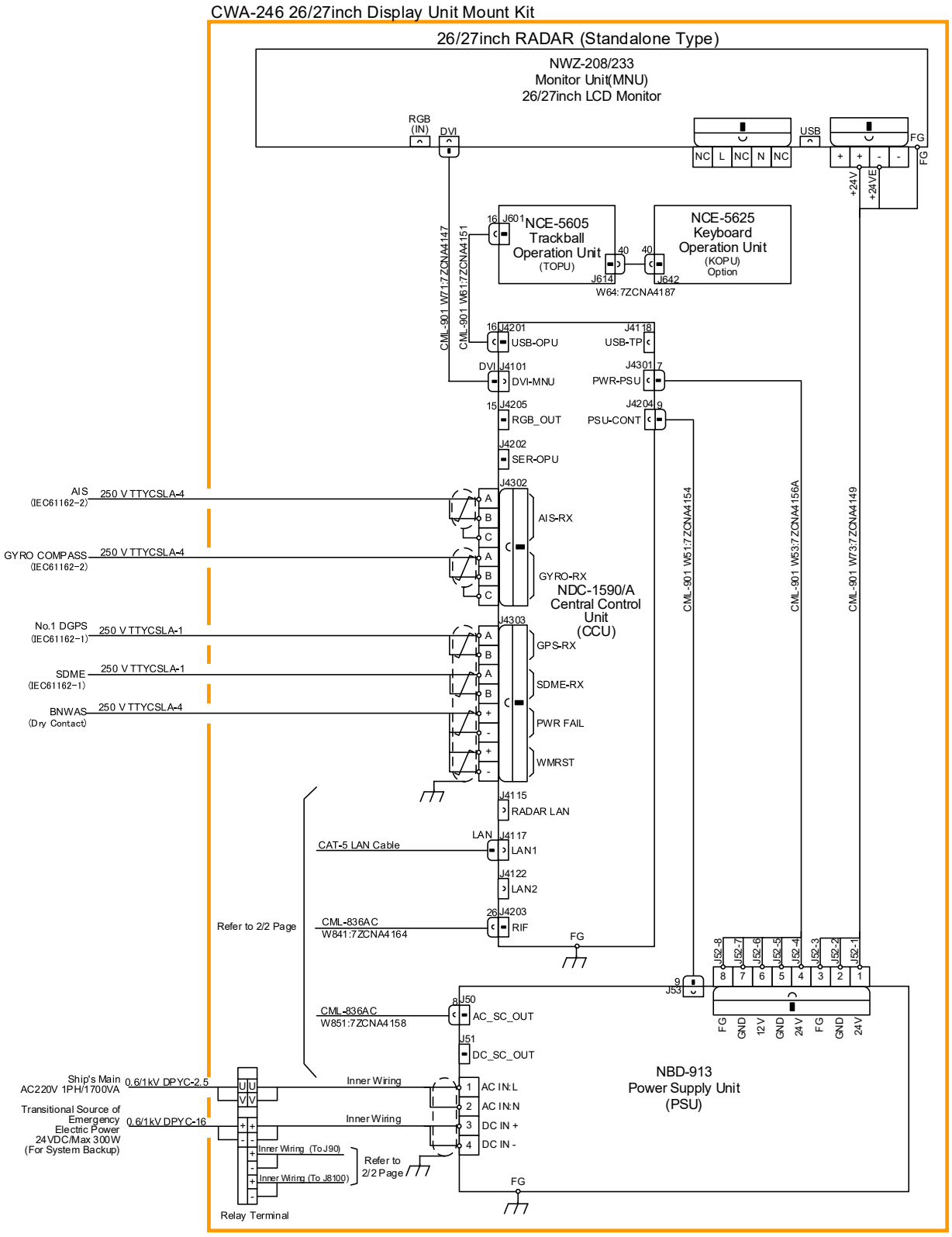
6.4.3 JMR-9225-6XH



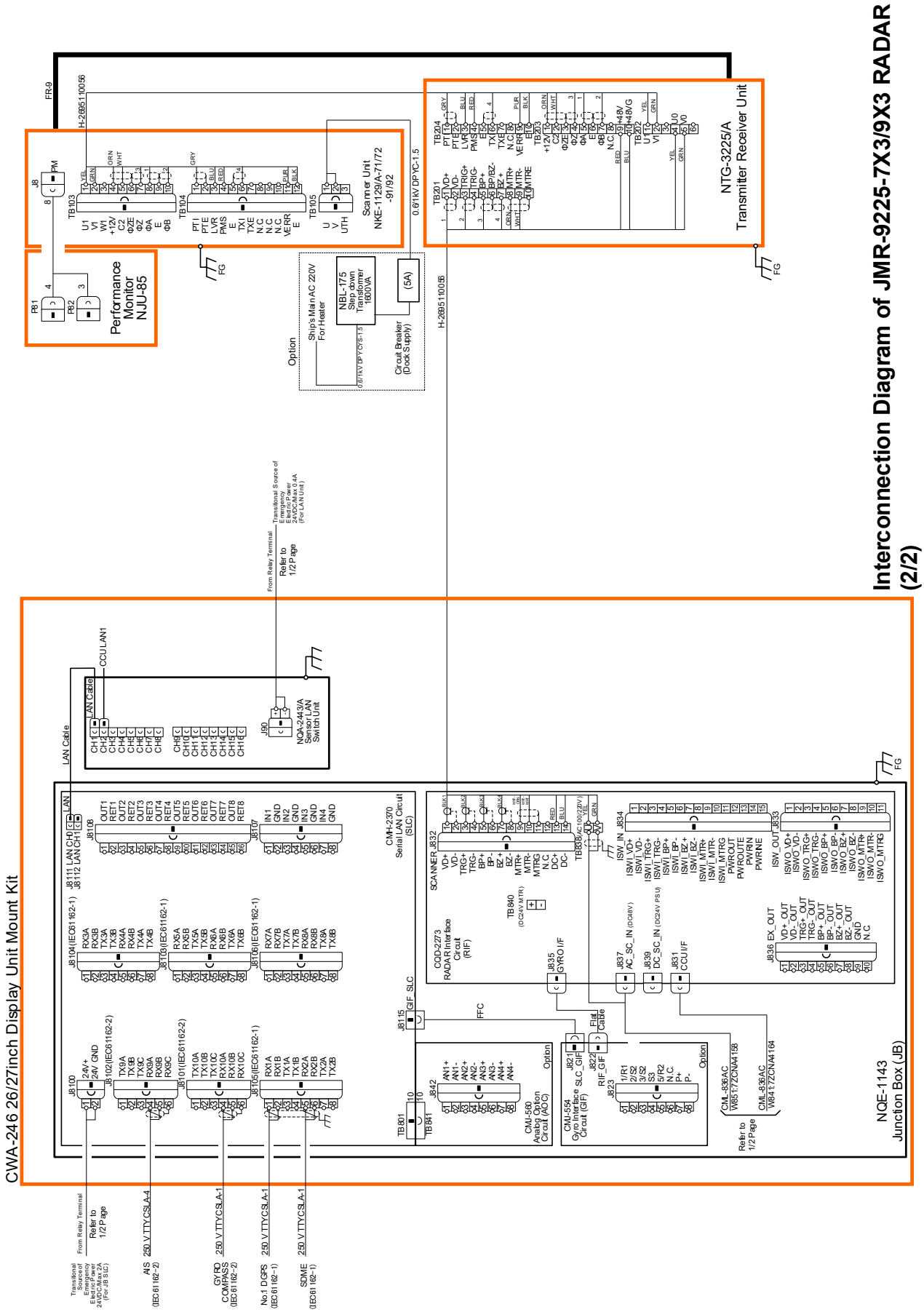
Interconnection Diagram of JMR-9225-6XH RADAR (1/2)


Interconnection Diagram of JMR-9225-6XH RADAR (2/2)
CWA-246 26/27inch Display Unit Mount Kit
Performance Monitor NJU-85
Scanner Unit NKE-2254-6HS
0.6/1kV DPYC-1.5
CFQ-6912
Option
Ship's Main AC 220V For Heater
NBL-175 Step down Transformer 1600VA
Circuit Breaker (Dock Supply) (5A)
0.6/1kV DPYC/CY/S-1.5
LAN Cable
CCU LAN1
NQA-2443/A Sensor LAN Switch Unit
From Relay Terminal
Refer to 1/2 Page
Transitional Source of Emergency Electrical 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-836DC
CML-836DC
NQE-1143 Junction Box (JB)
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

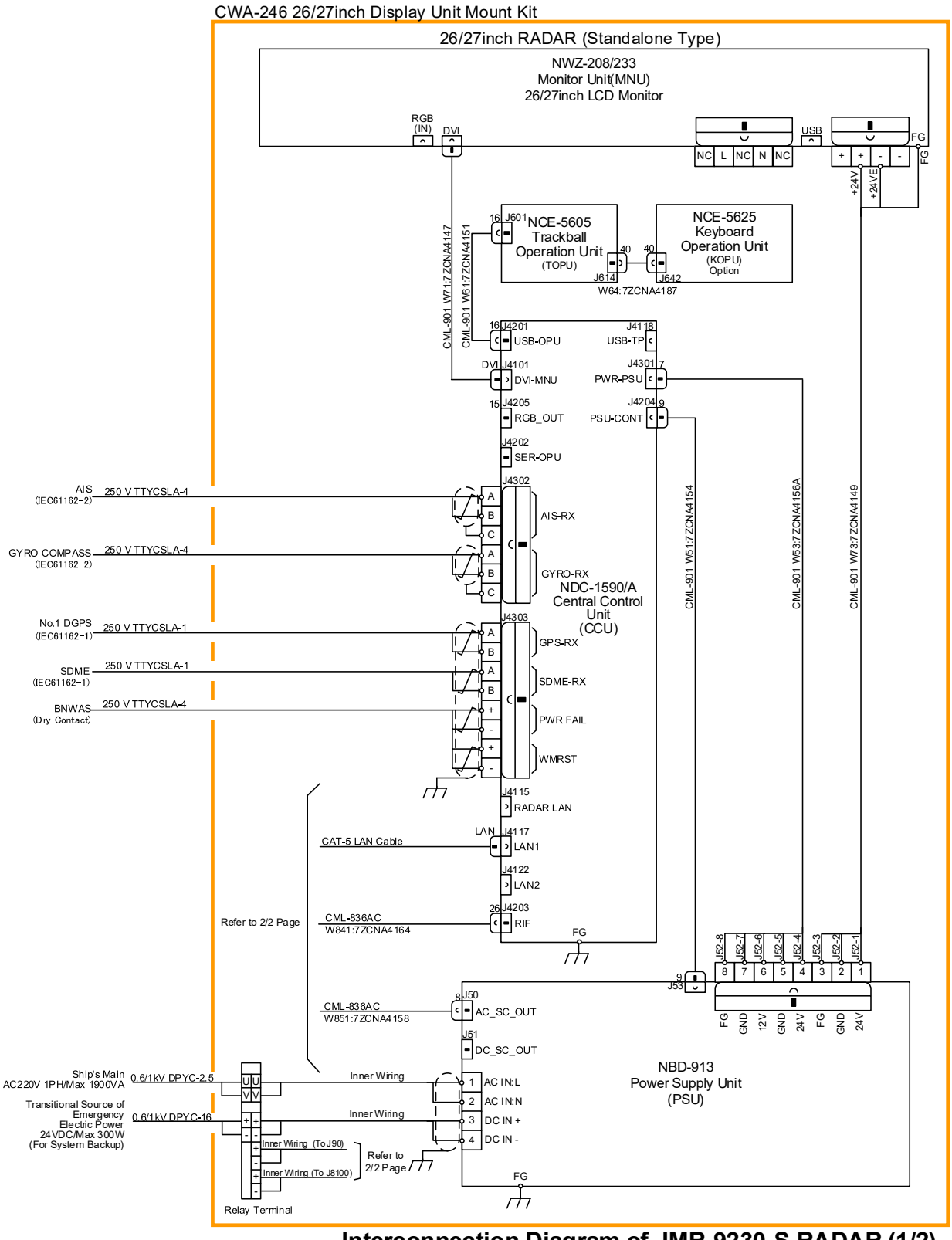
6.4.4 JMR-9225-7X3/9X3



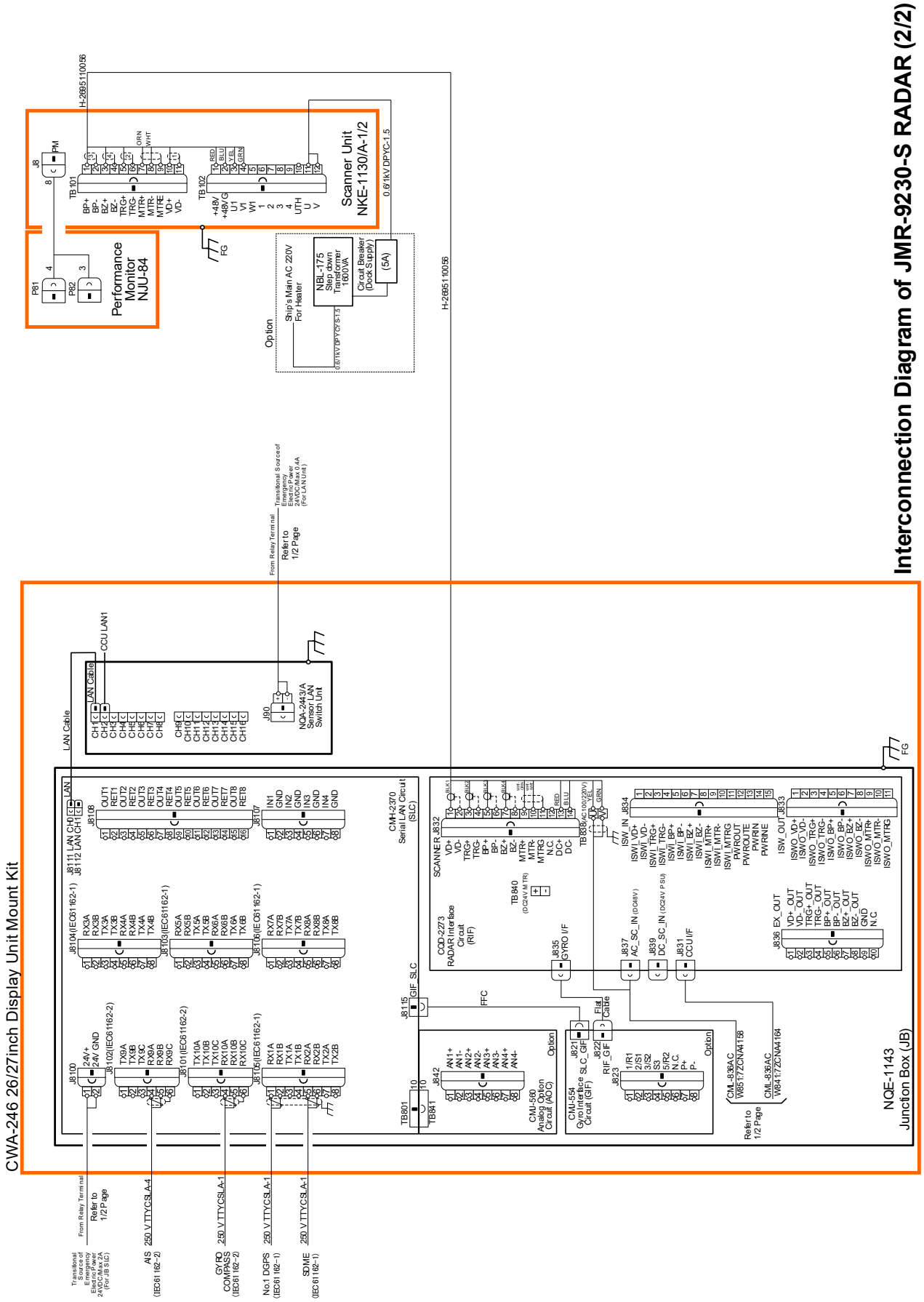
Interconnection Diagram of JMR-9225-7X3/9X3 RADAR (1/2)


Interconnection Diagram of JMR-9225-7X3/9X3 RADAR (2/2)
NTG-3225/A Transmitter Receiver Unit
Scanner Unit NKE-1129/A-71/72 -91/92
Performance Monitor NJU-85
CWA-246 26/27inch Display Unit Mount Kit
NQE-1143 Junction Box (JB)
NBL-475 Step-down Transformer 1600VA
Ship's Main AC 220V For Heater
Circuit Breaker (Dock Supply)
Option
NOA-2443/A Sensor LAN Switch Unit
CCU LAN1
LAN Cable
CMH-2370 Serial LAN Circuit (SLC)
SCANNER J832
CQD-2273 RADAR Interface Circuit (RIF)
CMU-554 Gyro Interface SLC_GIF Circuit (GIF)
CMU-560 Analog Option Circuit (AOC)
GYRO COMPASS (IEC61162-2)
No.1 DGPS (IEC61162-1)
SDME (IEC61162-1)
AIS (IEC61162-2)
Refer to 1/2 Page
From Relay Terminal
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)

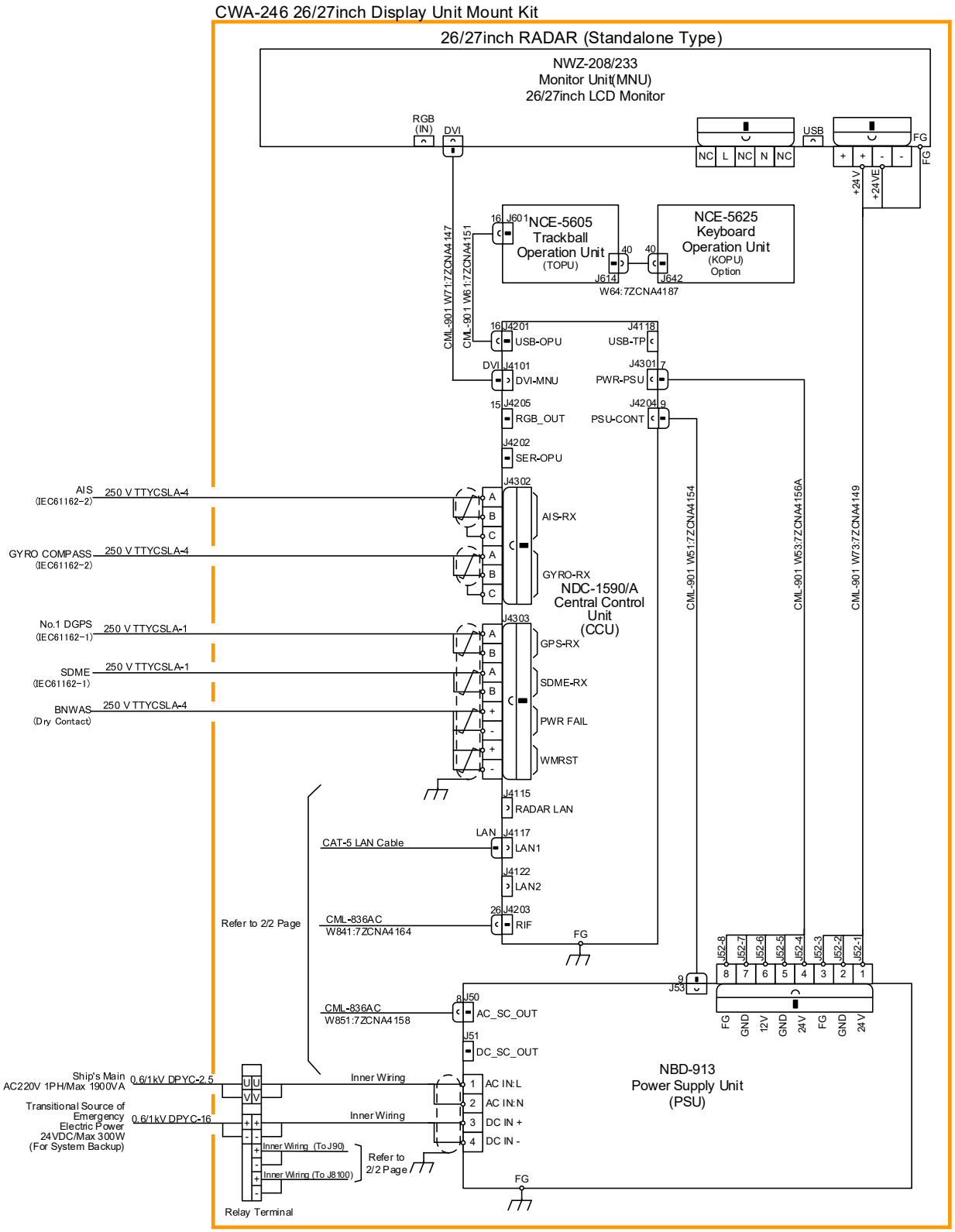
6.4.5 JMR-9230-S



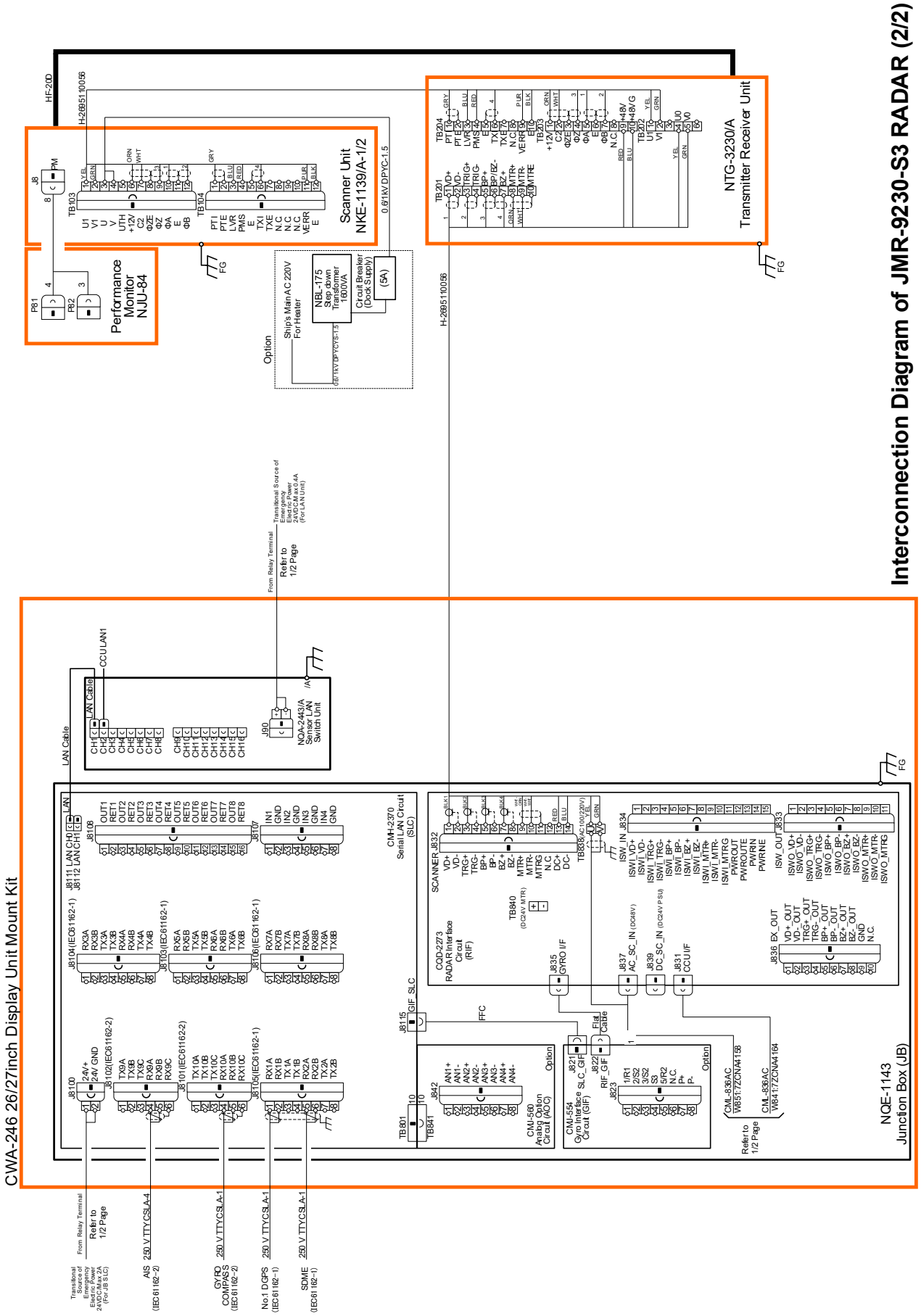
Interconnection Diagram of JMR-9230-S RADAR (1/2)


Interconnection Diagram of JMR-9230-S RADAR (2/2)
CWA-246 26/27inch Display Unit Mount Kit
NQE-1143
Junction Box (JB)
Scanner Unit
NKE-1130/A-1/2
Performance Monitor
NJU-84
NBL-175
Step down Transformer
1600VA
Circuit Breaker (Dock Supply)
(5A)
Ship's Main AC 220V For Heater
Option
NQA-2443/A
Sensor LAN Switch Unit
LAN Cable
CCU LAN1
From Relay Terminal
Refer to 1/2 Page
Transitional Source of Emergency Electrical Power 24VDC/Max 0.4A (For LAN Unit)
Transitional Source of Emergency Electrical 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-1
250 V TTYCSLA-4
COD-2273 RADAR Interface Circuit (RIF)
CMH-2370 Serial LAN Circuit (SLC)
CMJ-554 Gyro Interface Circuit (GIF)
CMJ-560 Analog Option Circuit (AOC)
SCANNER_J832
ISW_IN_J834
ISW_OUT_J833
GYRO I/F
AC_SC_IN (DC48V)
DC_SC_IN (DC24V PSU)
CCU I/F
Flat Cable
FFC
GIF_SLC
RIF_GIF
Option
H-26951100S6
0.6*1kV DPYC-1.5
0.6/1kV DPYC/S-1.5
CML-836AC
W8617ZCN4164
W8617ZCN4168

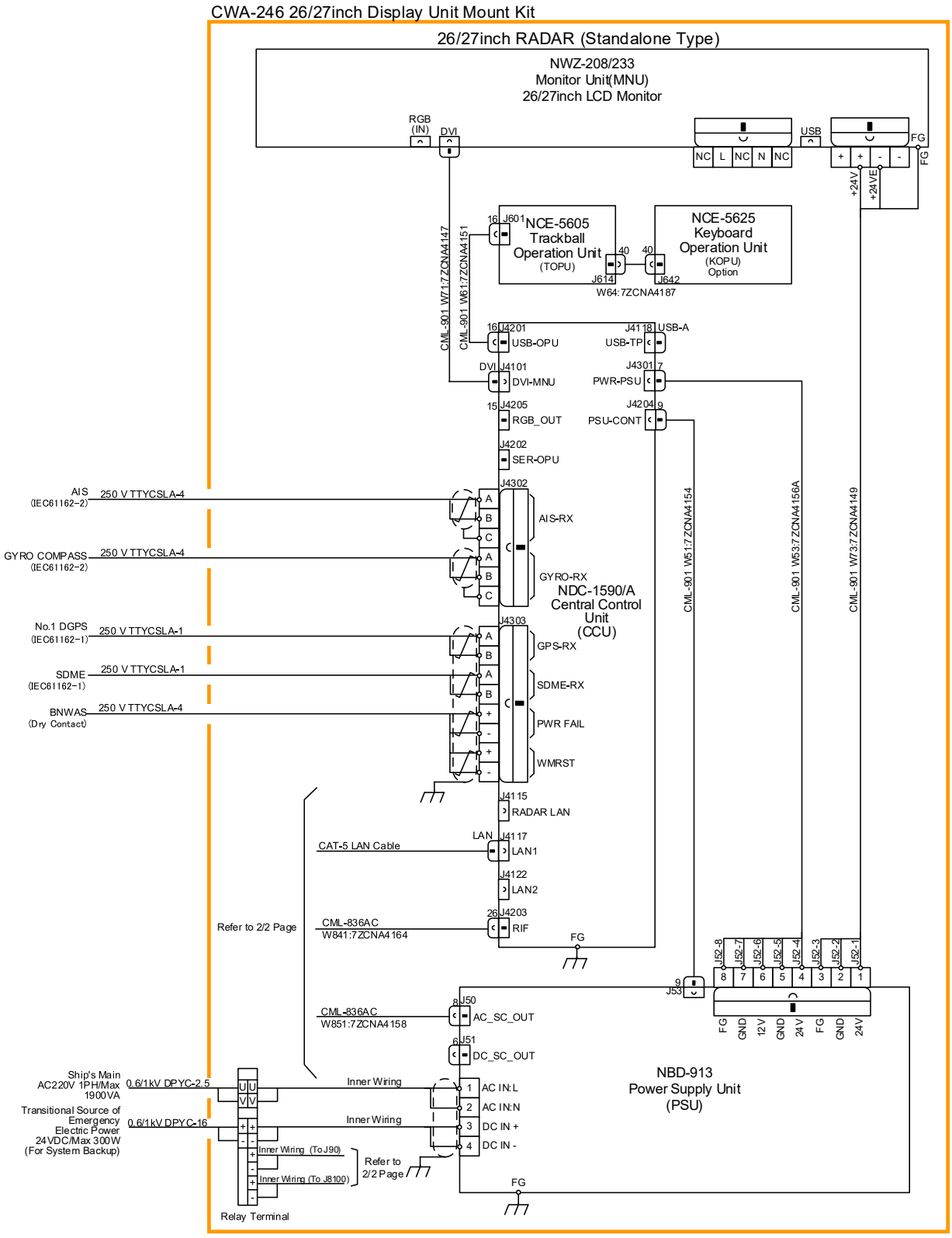
6.4.6 JMR-9230-S3



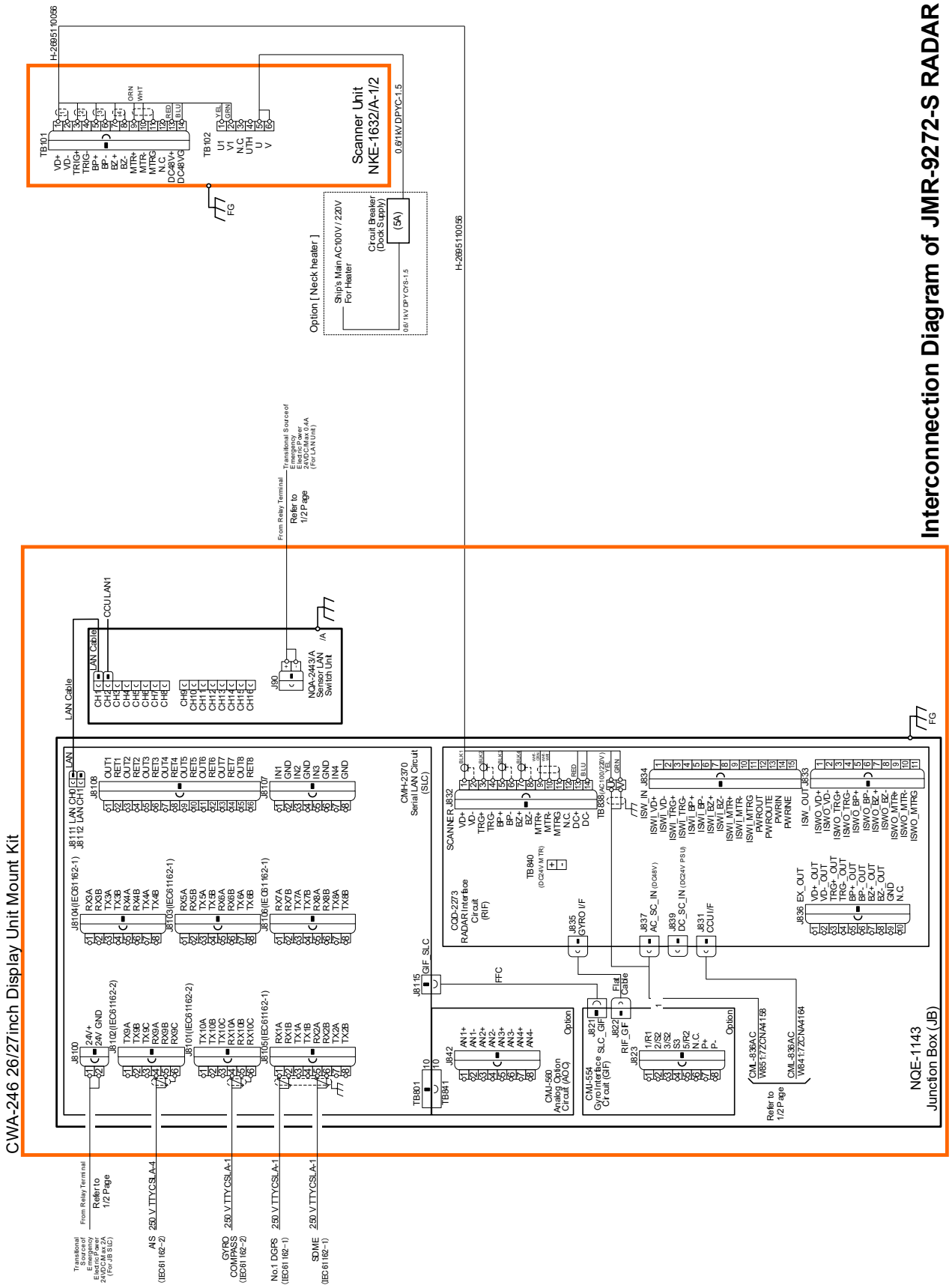
Interconnection Diagram of JMR-9230-S3 RADAR (1/2)


Interconnection Diagram of JMR-9230-S3 RADAR (2/2)
CWA-246 26/27inch Display Unit Mount Kit
NQE-1143
Junction Box (JB)
Scanner Unit
NKE-1139/A-1/2
NTG-3230/A
Transmitter Receiver Unit
Performance Monitor
NJU-84
NBL-175
Step down Transformer
1800VA
Circuit Breaker
(Dock Supply)
(5A)
Option
Ship's Main AC 220V
For Heater
NQA-2443/A
Sensor LAN
Switching
Hub Unit
LAN Cable
CCU LAN1
From Relay Terminal
Refer to
1/2 Page
Transitional Source of Emergency Electric Power
24VDC/Max.0.4A
(For LAN Unit)
Transitional Source of Emergency Electric Power
24VDC/Max.2A
(For JB S.C)
AIS
(IEC61162-2)
GYRO COMPASS
(IEC61162-2)
No.1 DGPS
(IEC61162-1)
SDME
(IEC61162-1)
250 V TTYCS3-A-1
250 V TTYCS3-A-4
COD-227/3
RADAR Interface Circuit
(RIF)
CMI-2370
Serial LAN Circuit
(SLC)
CMU-554
Gyro Interface SLC_GIF
Circuit (GIF)
CMU-560
Analog Option
Circuit (AOC)
CML-836AC
CML-836AC
Refer to
1/2 Page
H-2695110/56
0.6/1kV DPYC-1.5
0.6/1kV DPYCYS-1.5

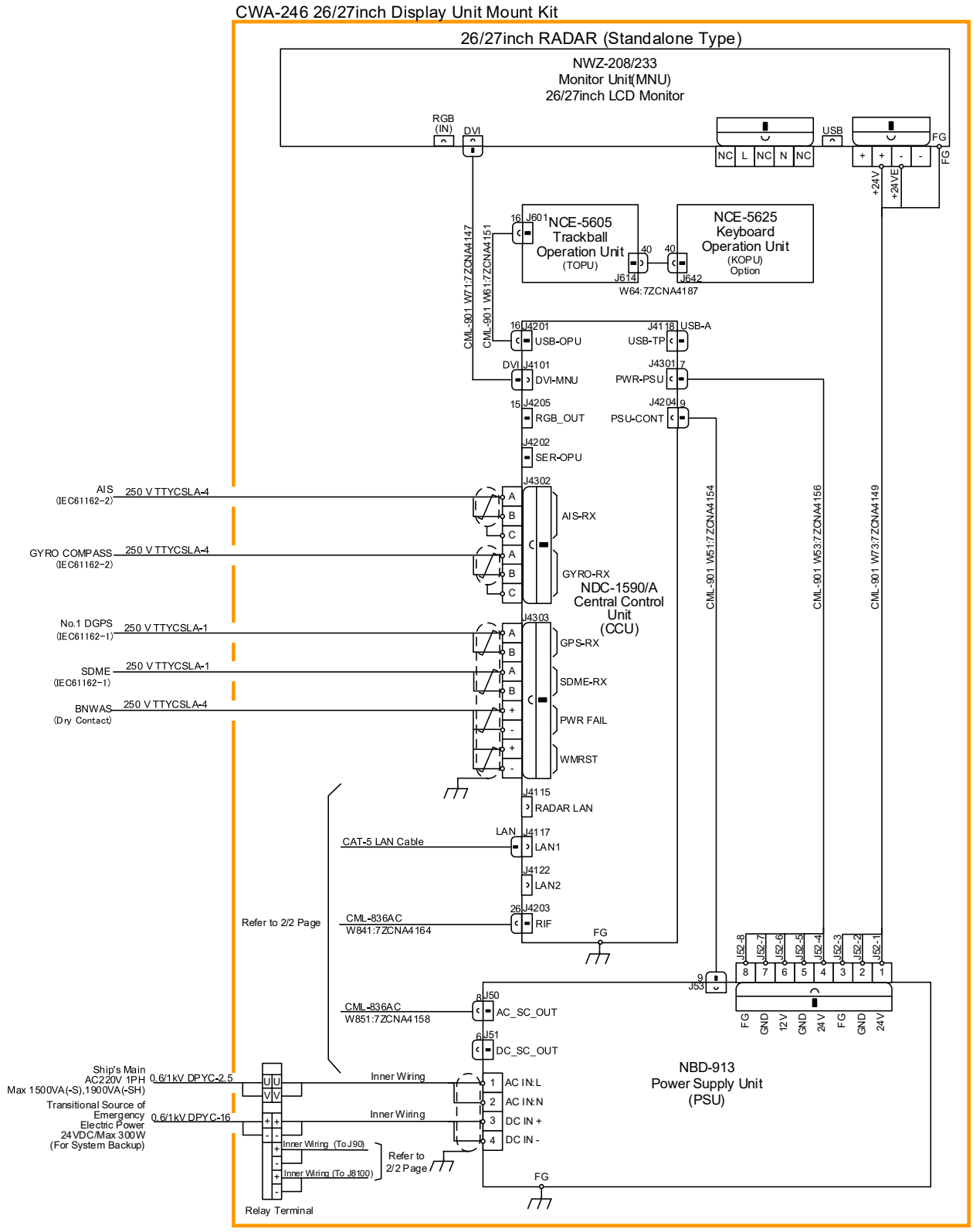
6.4.7 JMR-9272-S



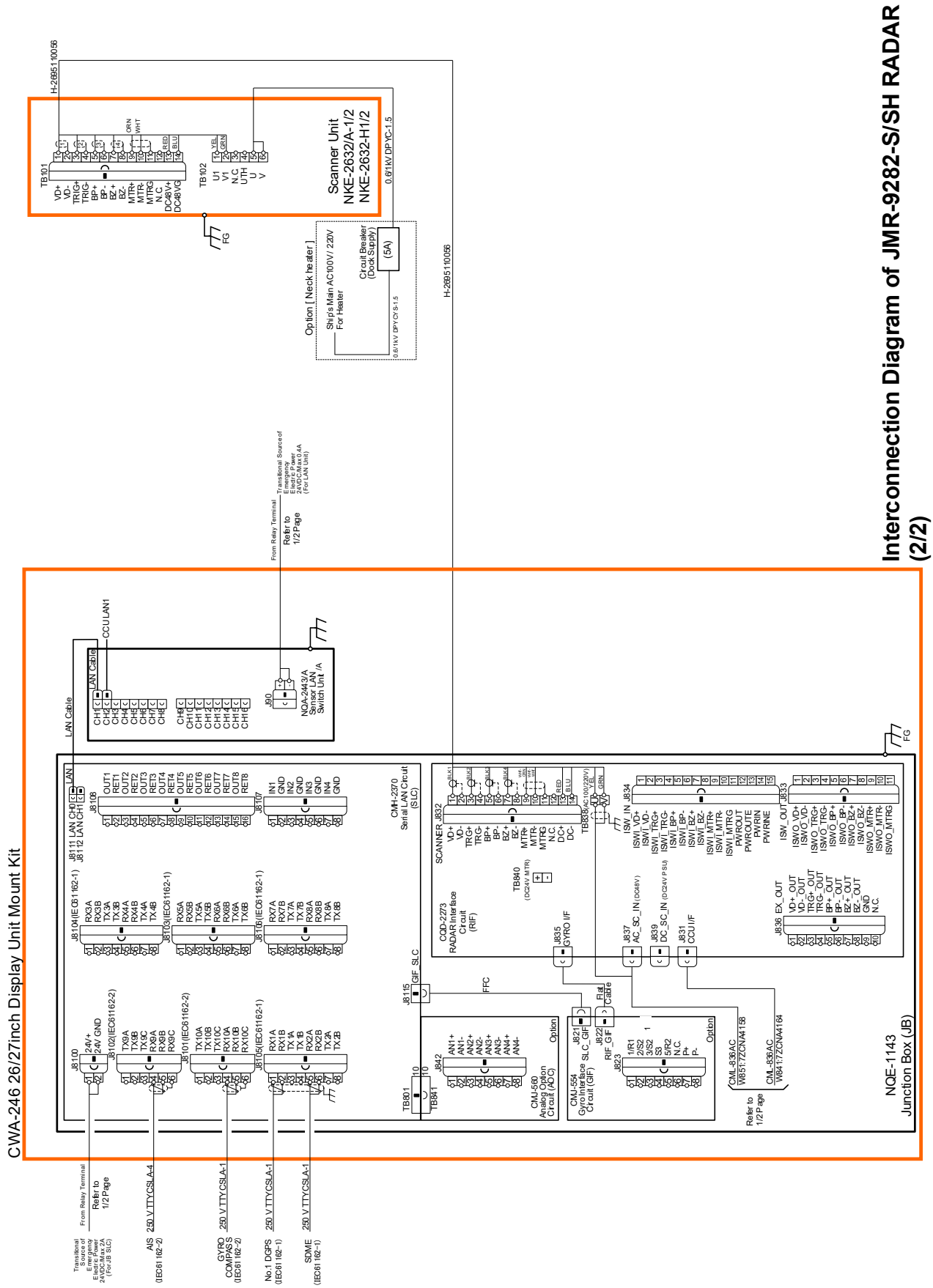
Interconnection Diagram of JMR-9272-S RADAR (1/2)


Interconnection Diagram of JMR-9272-S RADAR (2/2)
CWA-246 26/27inch Display Unit Mount Kit
NQE-1143
Junction Box (JB)
Scanner Unit
NKE-1632/A-1/2
H-28851100/56
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/FS-1.5
TB101
TB102
FG
From Relay Terminal
Refer to
1/2 Page
Transitional Source of Emergency Electrical Power
24VDC/Max 0.4A
(For LAN Unit)
LAN Cable
CCU LAN1
NQA-2443/A
Sensor LAN
Switch Unit
J90
J8104(IEC61162-1)
J8103(IEC61162-1)
J8106(IEC61162-1)
J8101(IEC61162-2)
J8102(IEC61162-2)
J8105(IEC61162-1)
J8100
J8108
J8107
J8111 LAN CH1
J8112 LAN CH2
CMH-2370
Serial LAN Circuit
(SLC)
SCANNER J832
COD-2273
RADAR Interface
Circuit
(RIF)
TB840
J835
GYRO I/F
J837
AC_SC_IN (DC48V)
J839
DC_SC_IN (DC24V PS1,2)
J831
CCU I/F
J836 EX_OUT
J833 ISW_OUT
J834 ISW_IN
J8115 GIF_SLC
FFC
Flat Cable
TB801
J842
CMJ-560
Analog Option
Circuit (AOC)
Option
J821
GIF_SLC
J822
RIF_GIF
J823
CMJ-554
Gyro Interface
Circuit (GIF)
Option
CML-836AC
W8517ZCN4158
CML-836AC
W8411ZCN4164
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

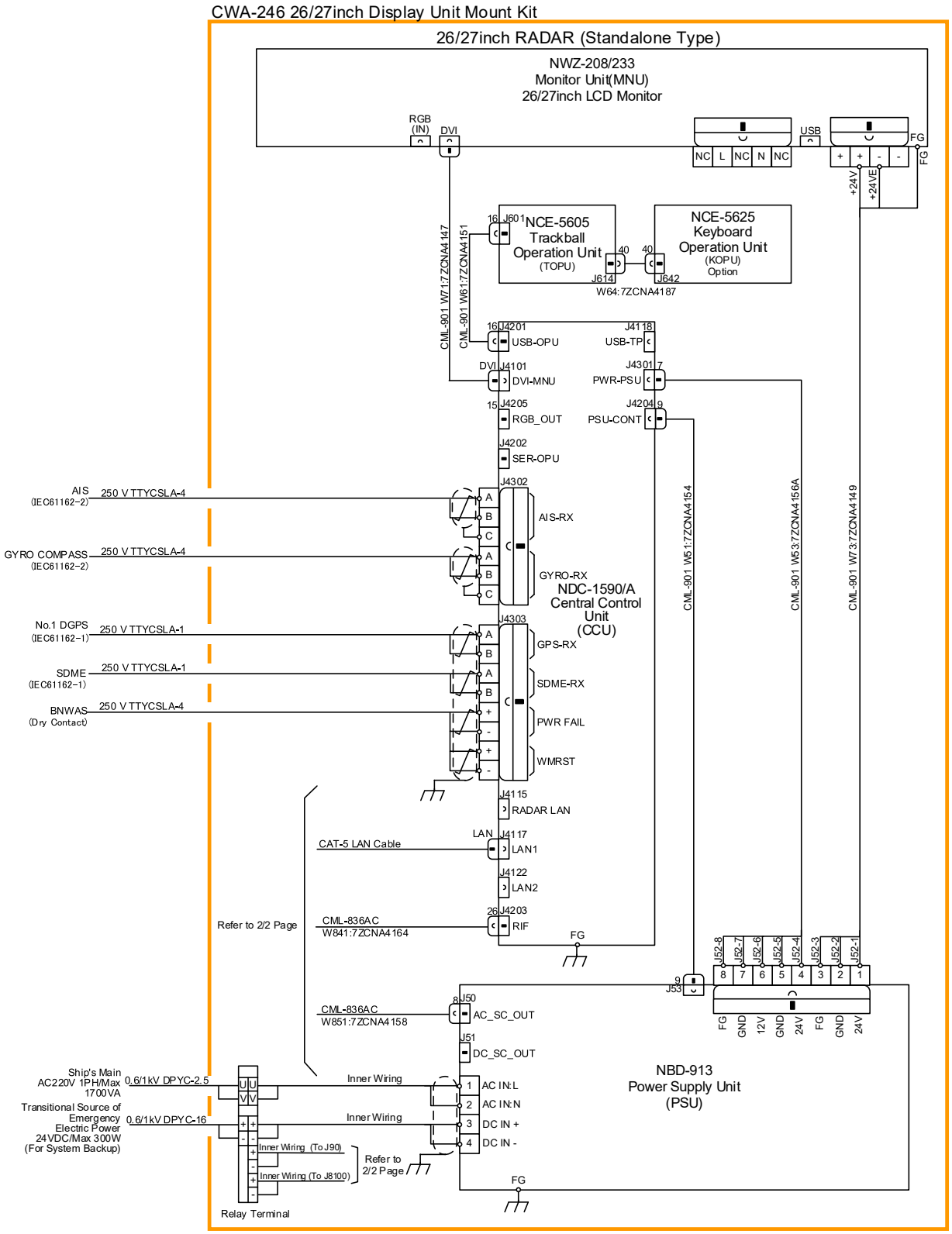
6.4.8 JMR-9282-S/SH



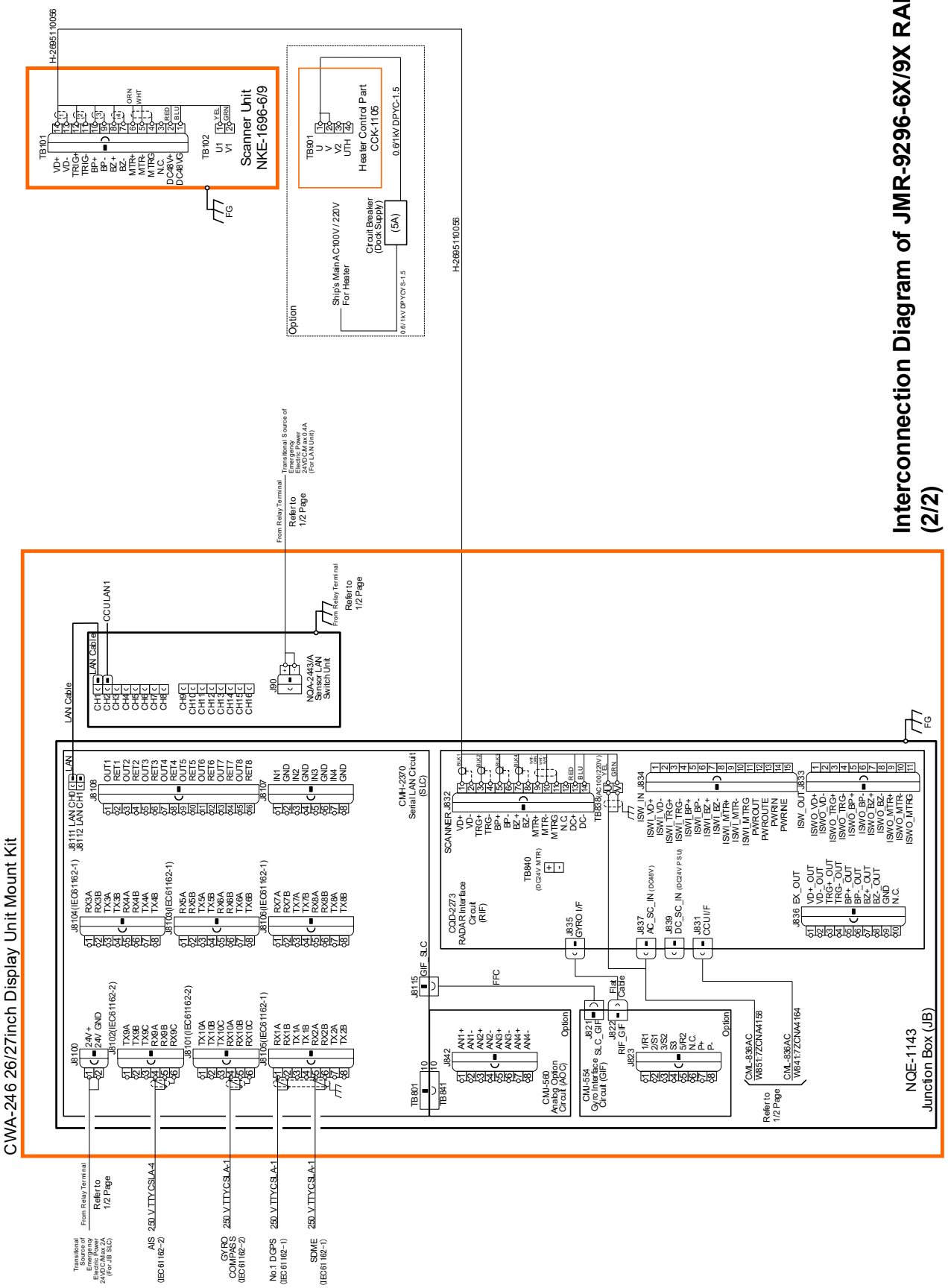
Interconnection Diagram of JMR-9282-S/SH RADAR (1/2)


Interconnection Diagram of JMR-9282-S/SH RADAR (2/2)
CWA-246 26/27inch Display Unit Mount Kit
NQE-1143 Junction Box (JB)
Scanner Unit NKE-2632/A-1/2 NKE-2632-H1/2
TB101
TB102
H-2895110056
0.6/1kV DPYC-1.5
Option [Neck heater]
Ship's Main AC100V / 220V For Heater
Circuit Breaker (Dock Supply) (5A)
0.6/1kV DPYCY-S-1.5
From Relay Terminal
Refer to 1/2Page
Transitional Source of Emergency Electric Power 24VDC/Max.0.4A (For LAN Unit)
LAN Cable
CCU LAN1
LAN Cable
NOA-2443/A Sensor LAN Switch Unit /A
J80
J8111 LAN CH1
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
CQD-2273 RADAR Interface Circuit (RIF)
TB840
TB888
J835 GYRO I/F
J837 AC_SC_IN (DC48V)
J839 DC_SC_IN (DC24V PSU)
J831 CCU I/F
ISW_IN J834
ISW_OUT J833
J836 EX_OUT
J8115 GIF_SLC
FFC
Flat cable
J821 SLC_GIF
J822 RIF_GIF
J823
TB801
TB841
J842
CMJ-560 Analog Option Circuit (AOC)
CMJ-554 Gyro Interface Circuit (GIF)
CML-836AC W8511-7ZCNA138
CML-836AC W8417-7ZCNA4164
Refer to 1/2 Page
FG
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

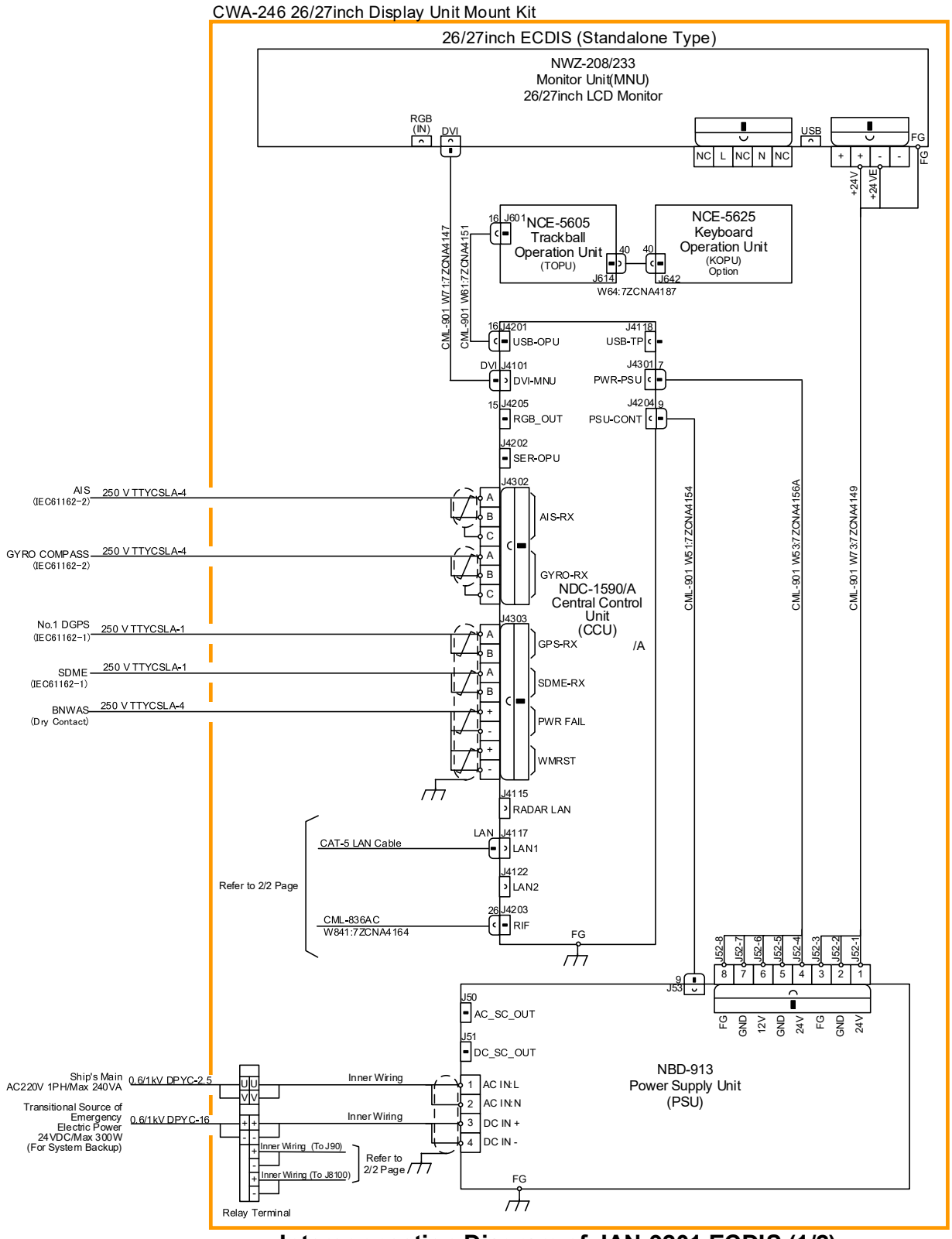
6.4.9 JMR-9296-6X/9X



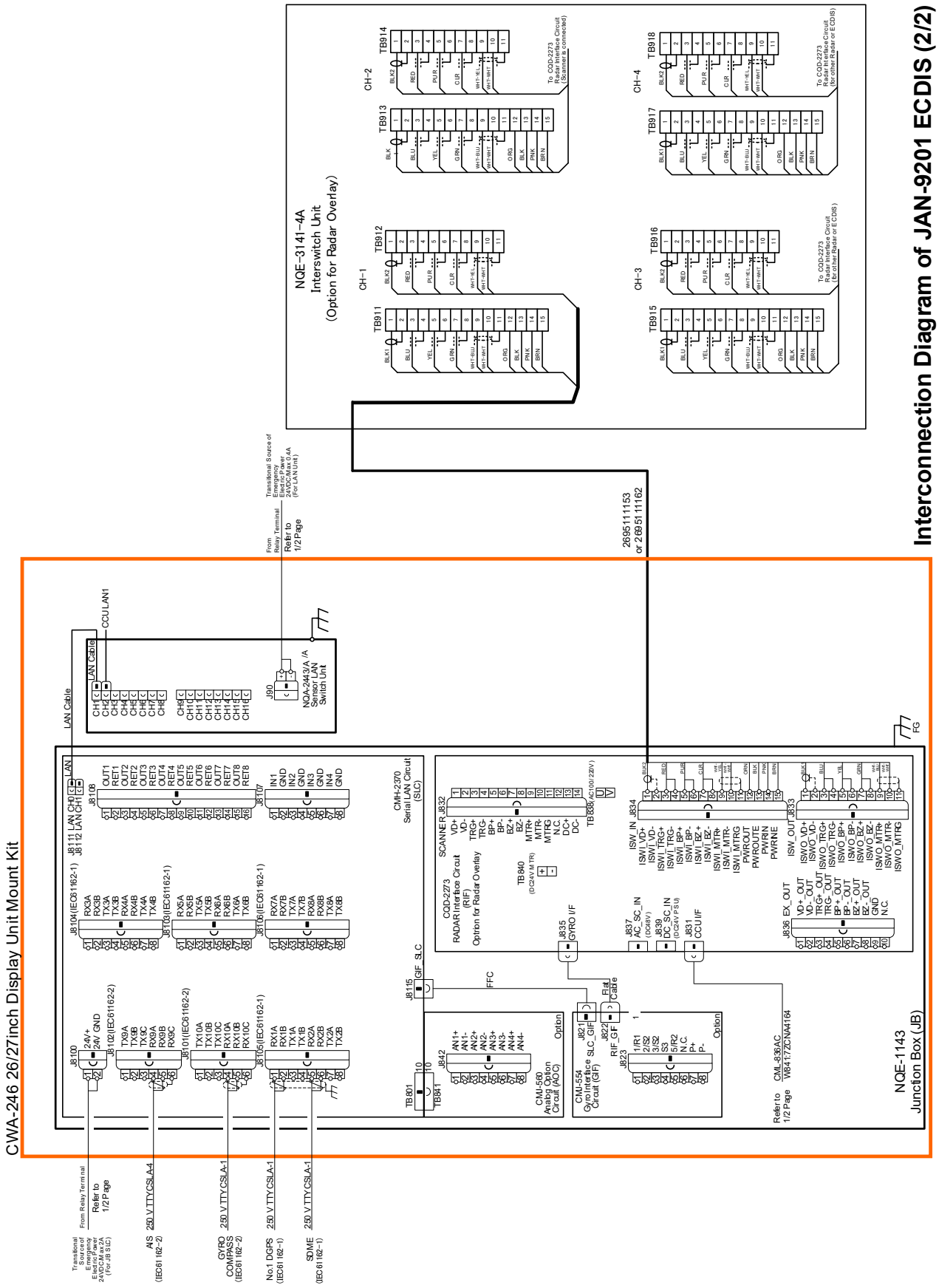
Interconnection Diagram of JMR-9296-6X/9X RADAR (1/2)


Interconnection Diagram of JMR-9296-6X/9X RADAR (2/2)
CWA-246 26/27inch Display Unit Mount Kit
Scanner Unit NKE-1696-6/9
Heater Control Part CCK-1105
Ship's Main AC100V / 220V For Heater
Circuit Breaker (Dock Supply)
(5A)
Option
NQE-1143 Junction Box (JB)
NOA-2443/A Sensor LAN Switch Unit
LAN Cable
CCU LAN1
COD-227/3 RADAR Interface Circuit (RIF)
SCANNER J832
CMI-2370 Serial LAN Circuit (SLC)
CMJ-554 Gyro Interface SLC_GIF Circuit (GIF)
CMJ-560 Analog Option Circuit (AOC)
GYRO I/F
CCU I/F
AC_SC_IN (DC24V)
DC_SC_IN (DC24V PSU)
ISW_IN J834
ISW_OUT J833
EX_OUT J836
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)
25D.V.TTYCSLA-1
25D.V.TTYCSLA-4
Transitional Source of Emergency Electric Power 24VDC,Max.0.4A (For LAN Unit)
H-26951100/6
0.6/1kV DPYCY-S-1.5

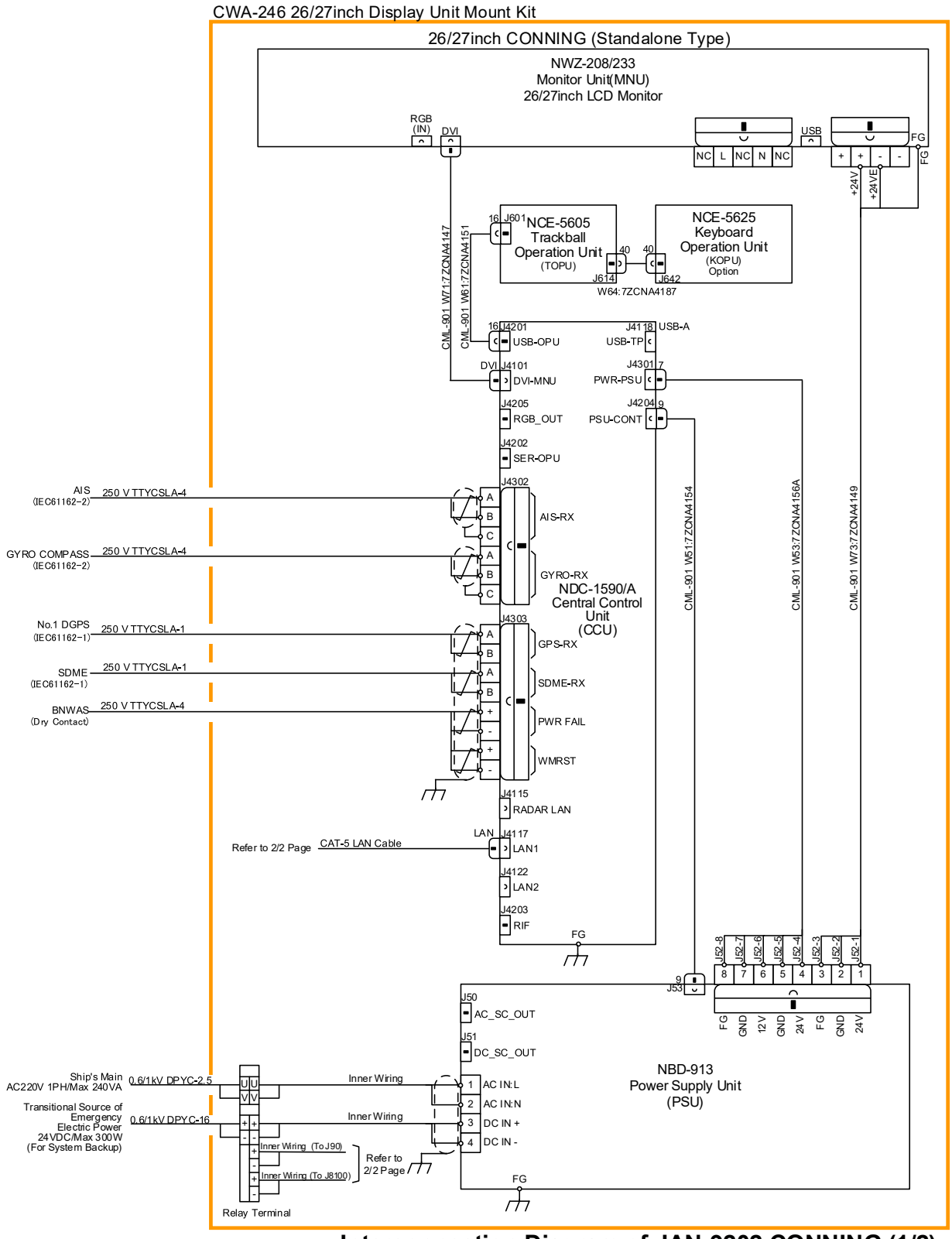
6.4.10 JAN-9201



Interconnection Diagram of JAN-9201 ECDIS (1/2)

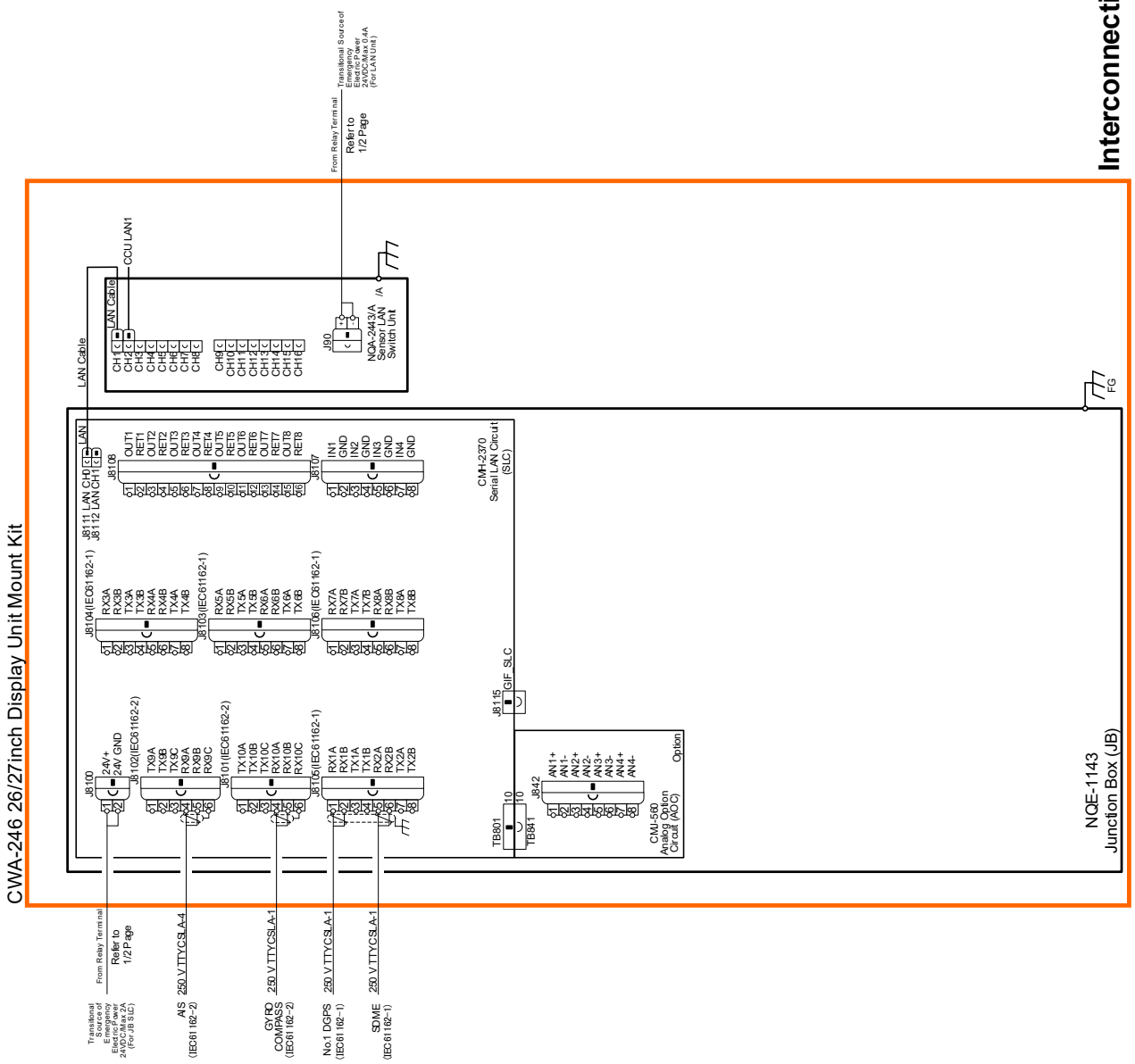

Interconnection Diagram of JAN-9201 ECDIS (2/2)
CWA-246 26/27inch Display Unit Mount Kit
NQE-3141-4A
Interswitch Unit
(Option for Radar Overlay)
CH-1
CH-2
CH-3
CH-4
TB911
TB912
TB913
TB914
TB915
TB916
TB917
TB918
To CQD-2273
Radar Interface Circuit
(Scanner is connected)
To CQD-2273
Radar Interface Circuit
(for other Radar or ECDIS)
NQA-2443A /A
Serial LAN
Switch Unit
J90
LAN Cable
CCU LAN1
From
Relay Terminal
Refer to
1/2 Page
Transitional Source of
Emergency
Electric Power
24VDC/Max 0.4A
(For LAN Unit)
2695111153
or 2695111162
J8111 LAN CH2
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)
CQD-2273
RADAR Interface Circuit
(RIF)
Option for Radar Overlay
SCANNER J832
TB840
(DC24V MTR)
TB838(AC100/220V)
J834
J833
J835
GYRO I/F
J837
AC_SC_IN
(DC48V)
J839
DC_SC_IN
(DC24V FSU)
J831
CCU I/F
J836 EX_OUT
ISW_OUT J833
ISW_IN J834
J8115
GIF_SLC
FFC
J842
CMU-580
Analog Option
Circuit (AOC)
Option
CMU-554
GyroInterface SLC_GIF
Circuit (GIF)
J821
J822
Flat
Cable
RIF_GIF
J823
Option
TB801
TB841
CML-836AC
Refer to
1/2 Page
W6417ZCNA4164
NQE-1143
Junction Box (JB)
FG
AIS
(IEC61162-2)
GYRO
COMPASS
(IEC61162-2)
SDME
(IEC61162-1)
No.1 DGPS
(IEC61162-1)
250 V TTYCSLA-4
250 V TTYCSLA-1
250 V TTYCSLA-1
250 V TTYCSLA-1
From Relay Terminal
Refer to
1/2 Page
Transitional Source of
Emergency
Electric Power
24VDC/Max 2A
(For JB SLC)

6.4.11 JAN-9202

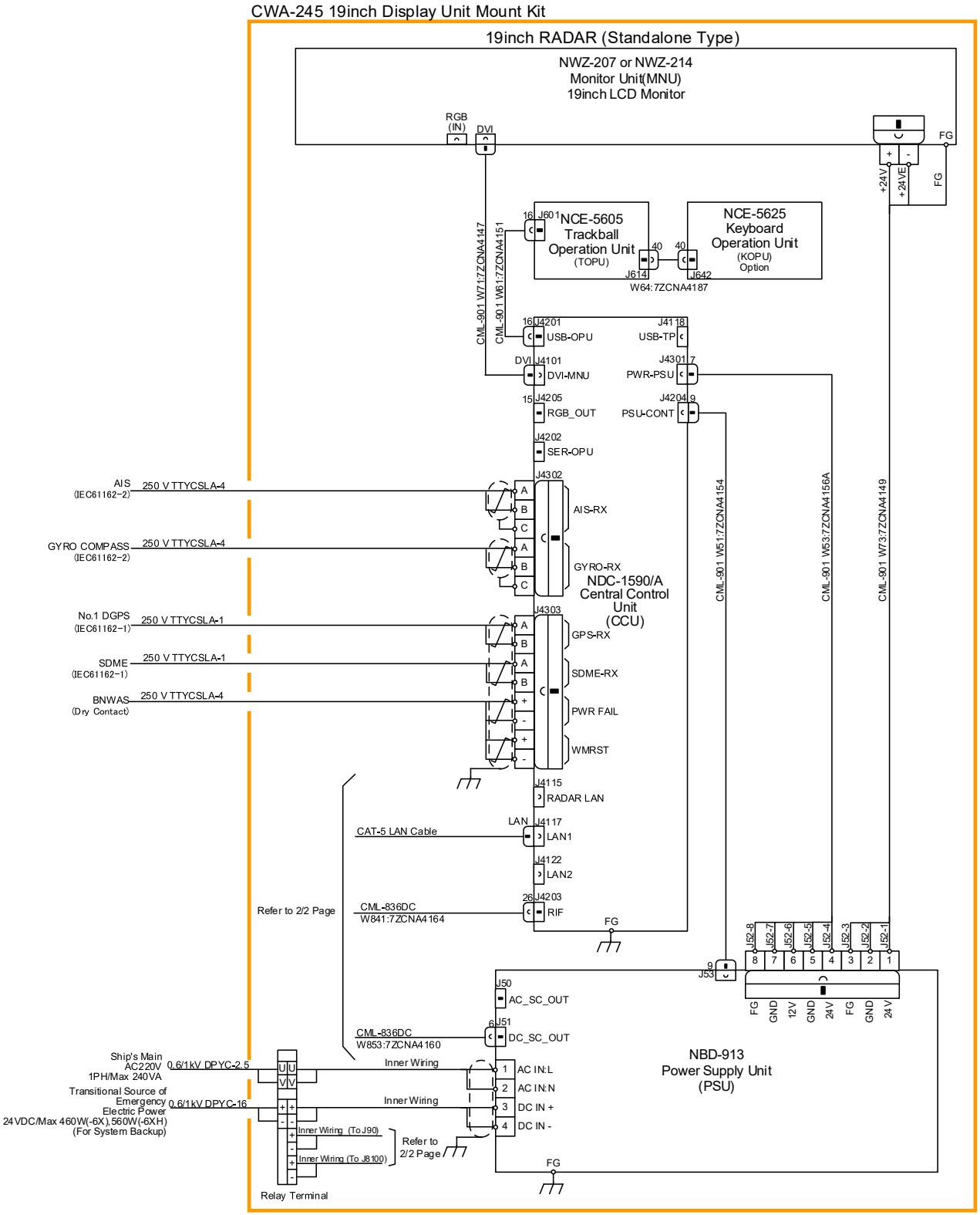


Interconnection Diagram of JAN-9202 CONNING (1/2)

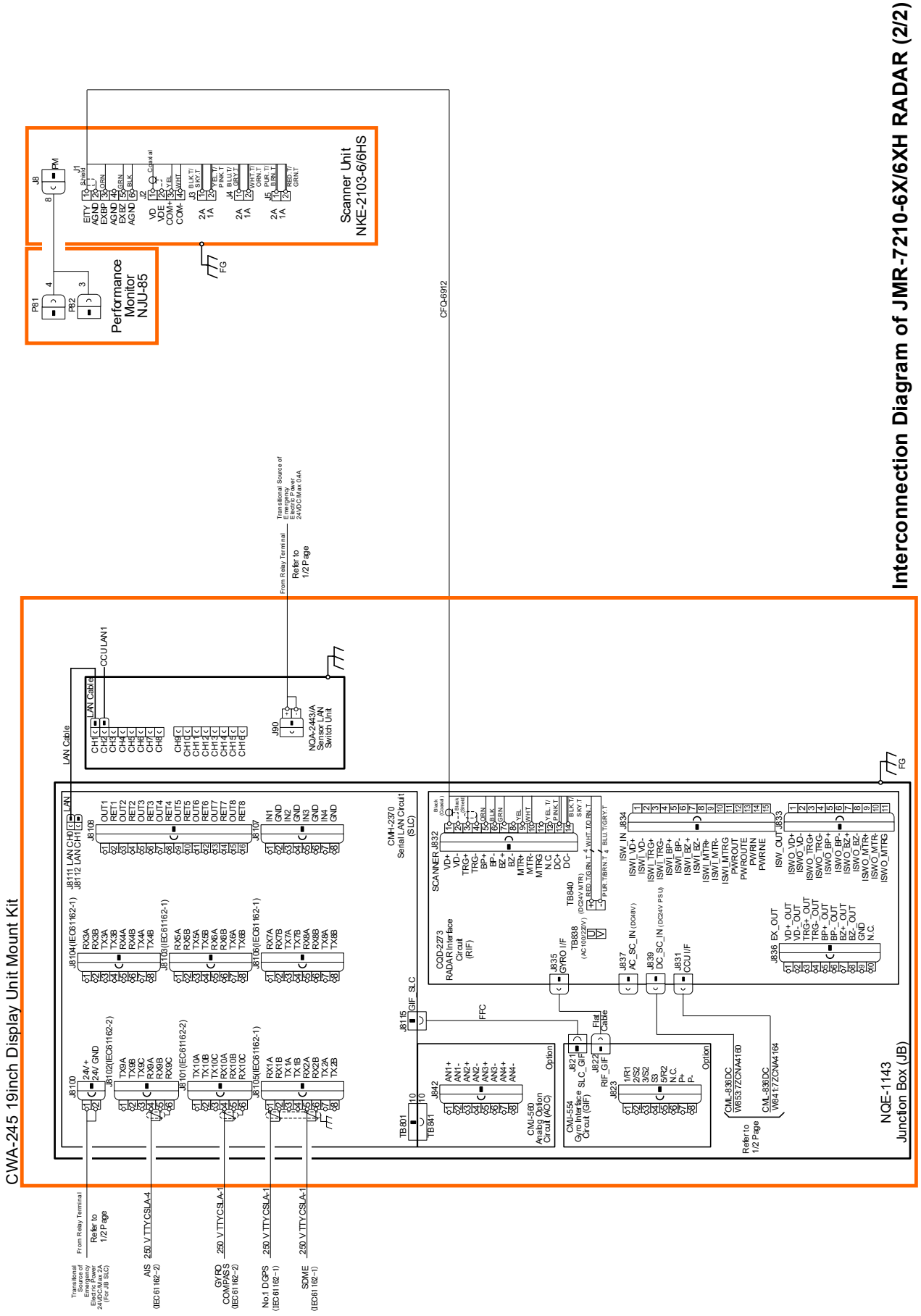
Interconnection Diagram of JAN-9202 CONNING (2/2)



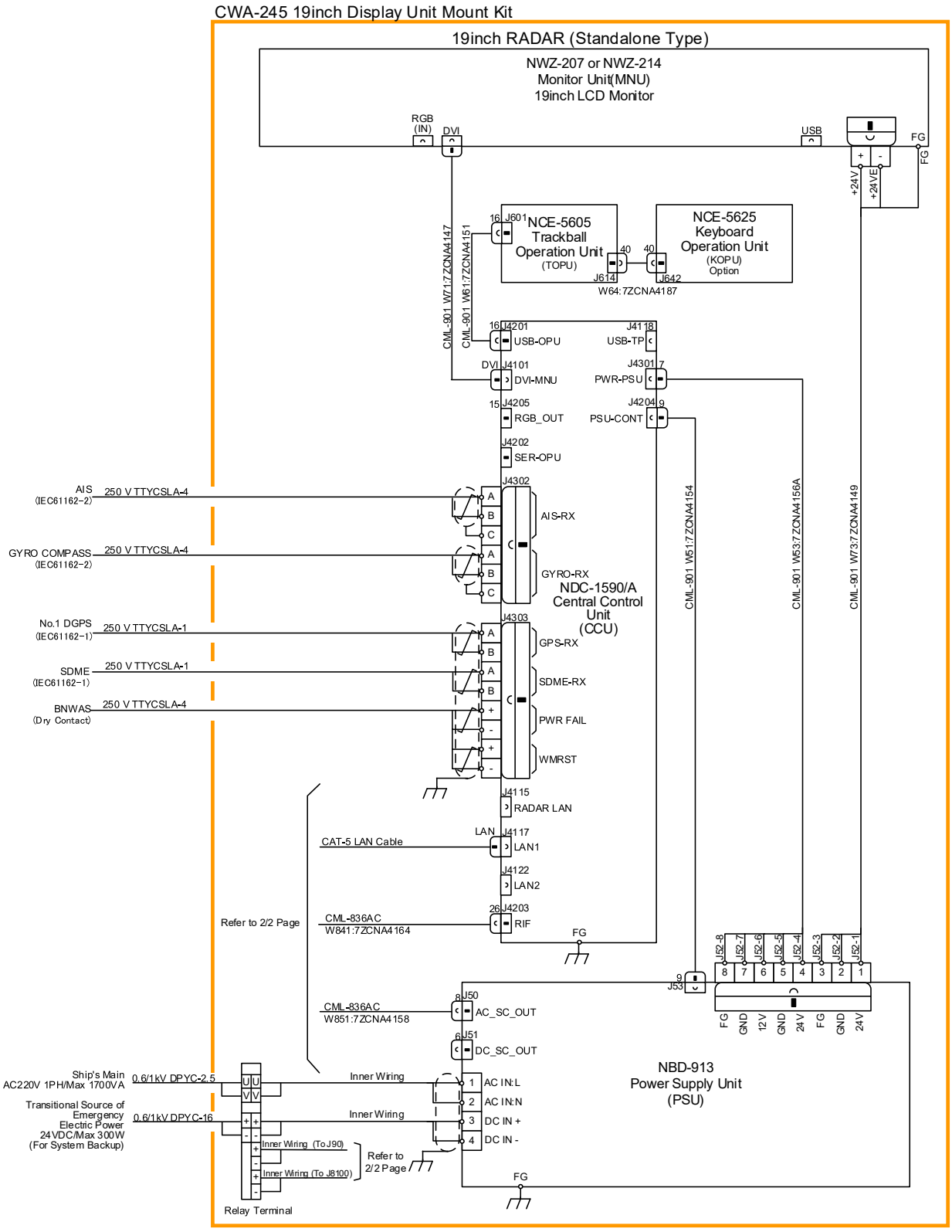
6.4.12 JMR-7210-6X/6XH



Interconnection Diagram of JMR-7210-6X/6XH RADAR (1/2)

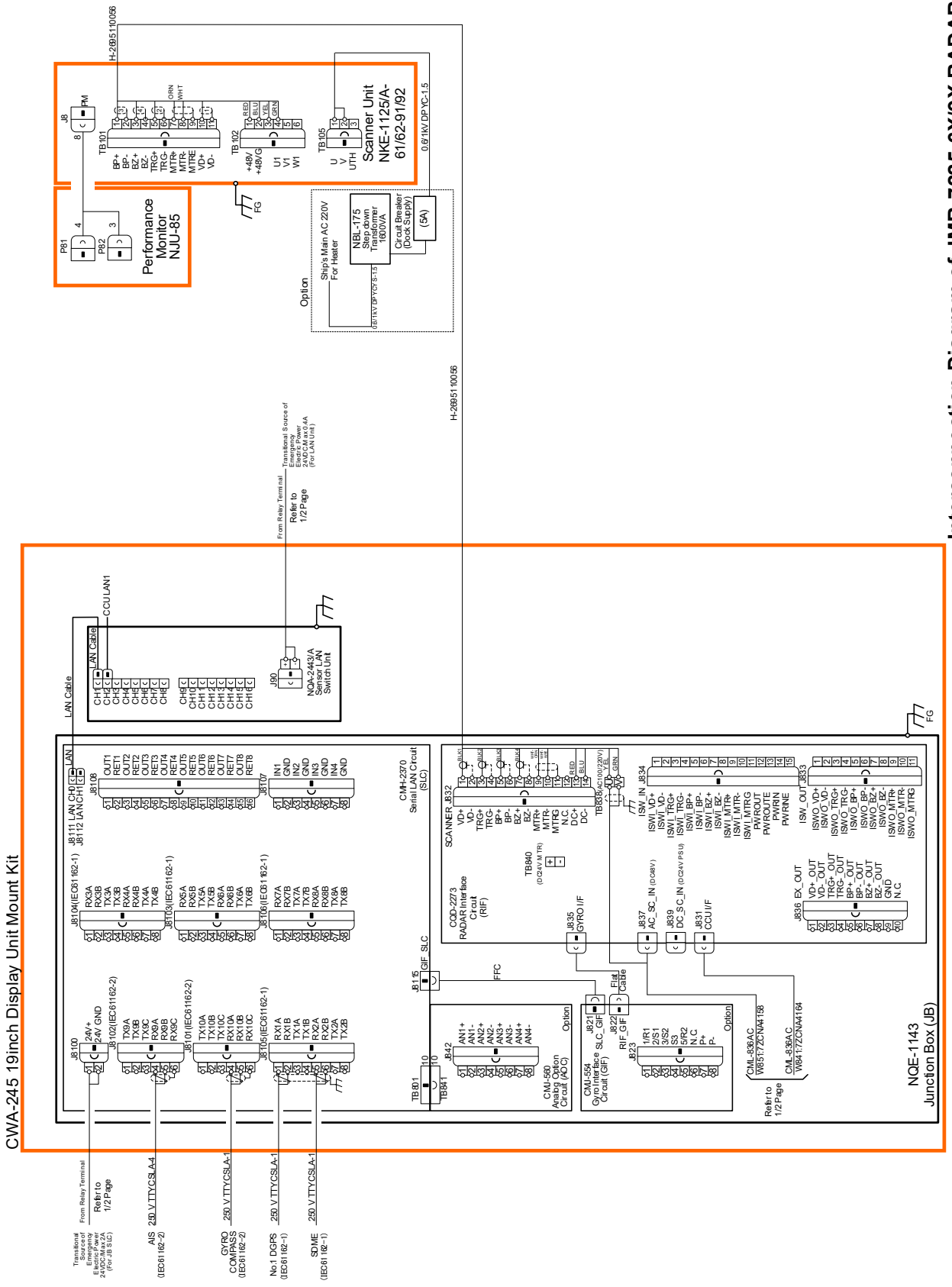

Interconnection Diagram of JMR-7210-6X/6XH RADAR (2/2)
CWA-245 19inch Display Unit Mount Kit
Scanner Unit
NKE-2103-6/6HS
Performance Monitor
NJU-85
CFQ-6912
LAN Cable
CCU LAN1
NQA-2443/A
Sensor LAN
Switch Unit
NQE-1143
Junction Box (JB)
CMH-2370
Serial LAN Circuit
(SLC)
CQD-2273
RADAR Interface
Circuit
(RIF)
CMU-560
Analog Option
Circuit (AOC)
CMU-554
Gyro Interface
Circuit (GIF)
CML-836DC
CML-836DC
Refer to
1/2 Page
From Relay Terminal
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 TTY CSLA-4
250 V TTY CSLA-1
FG

6.4.13 JMR-7225-6X/9X

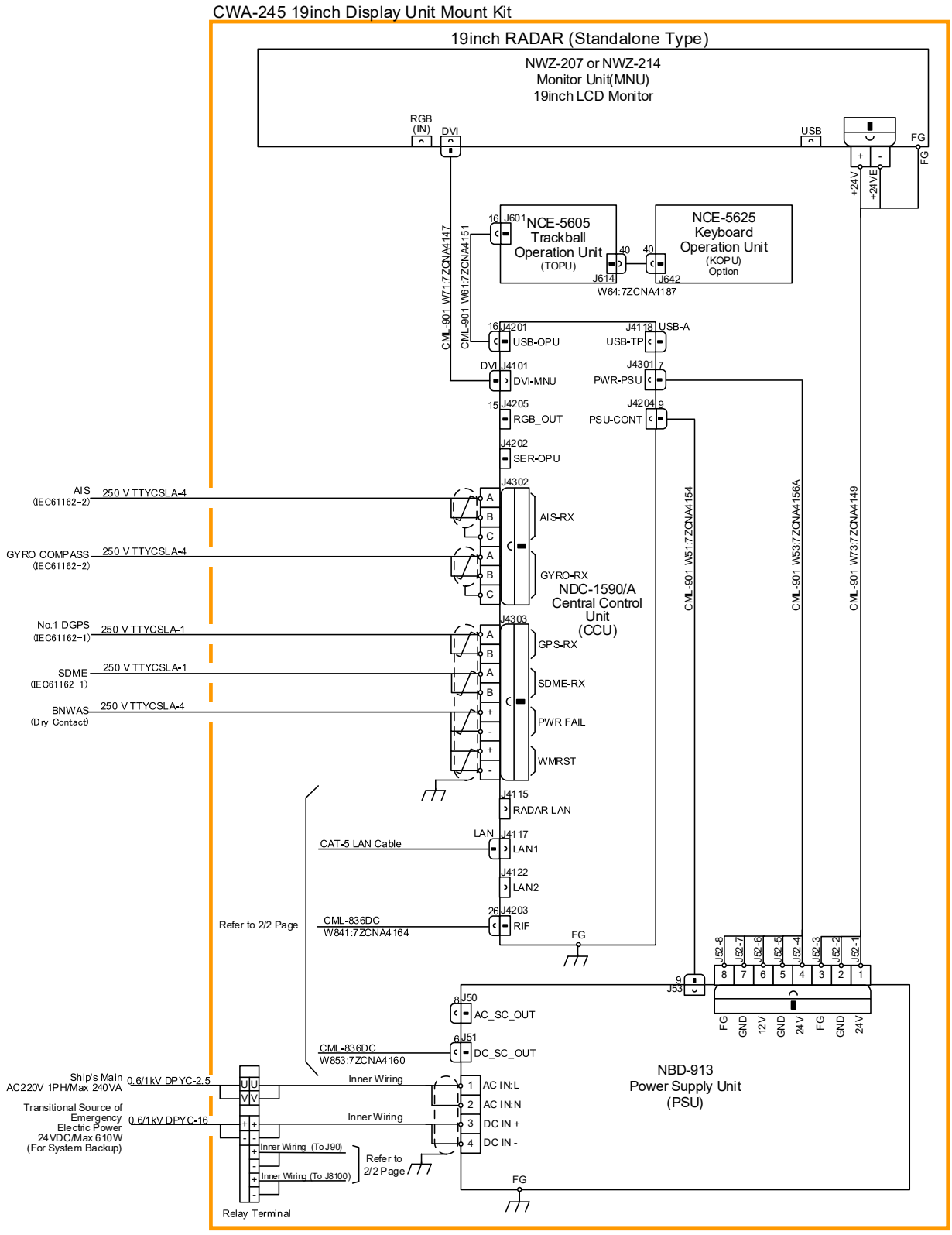


Interconnection Diagram of JMR-7225-6X/9X RADAR (1/2)

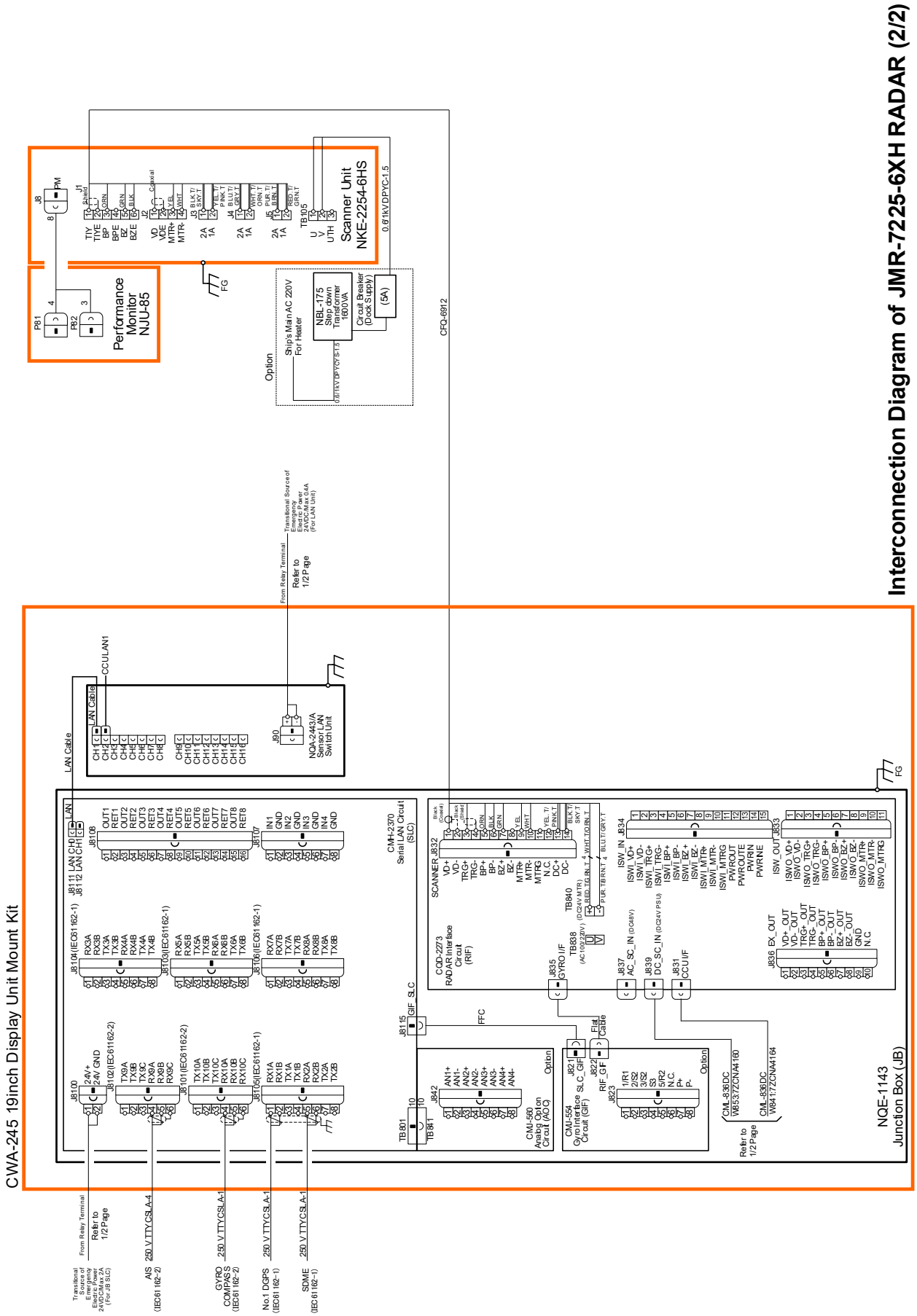
Interconnection Diagram of JMR-7225-6X/9X RADAR (2/2)



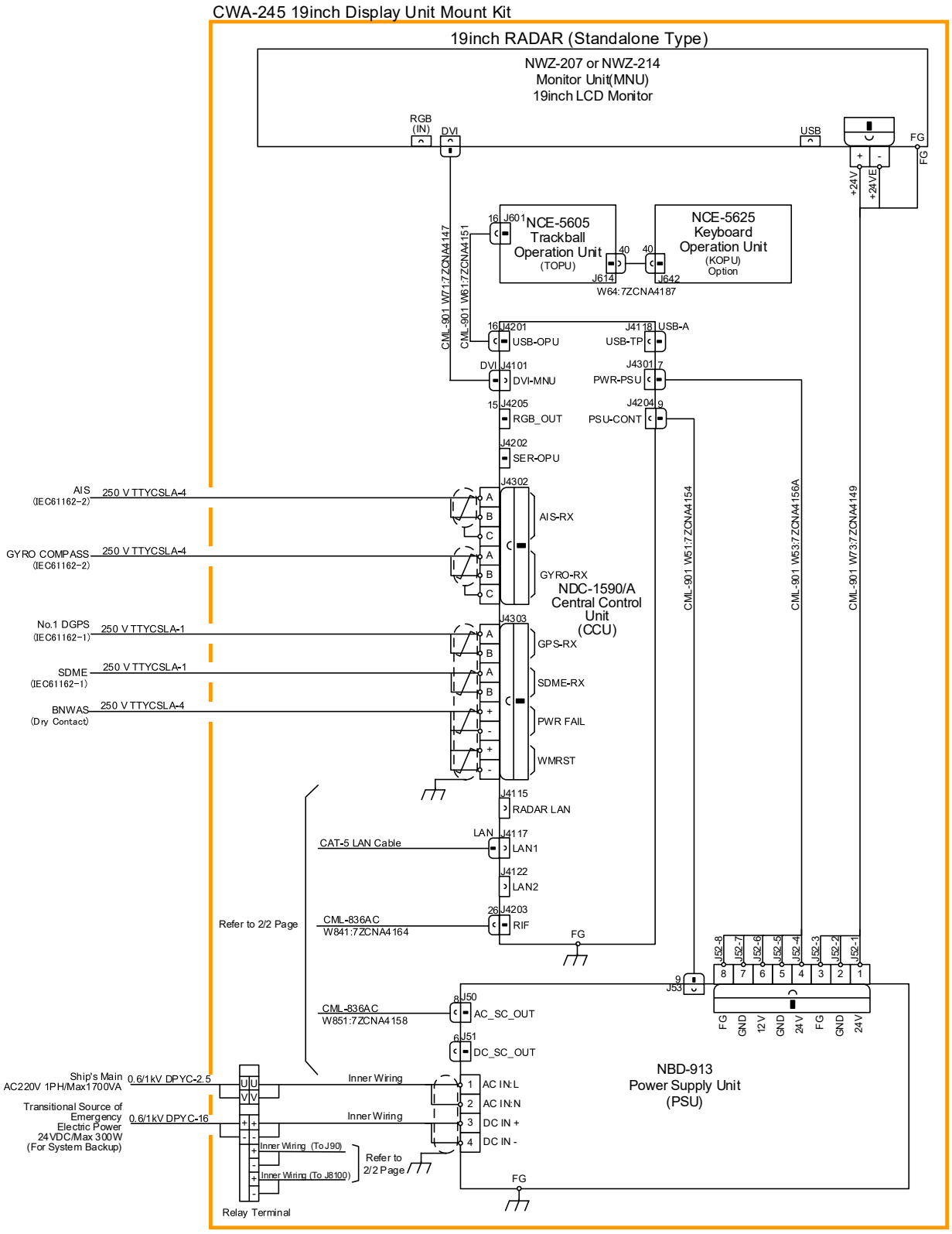
6.4.14 JMR-7225-6XH



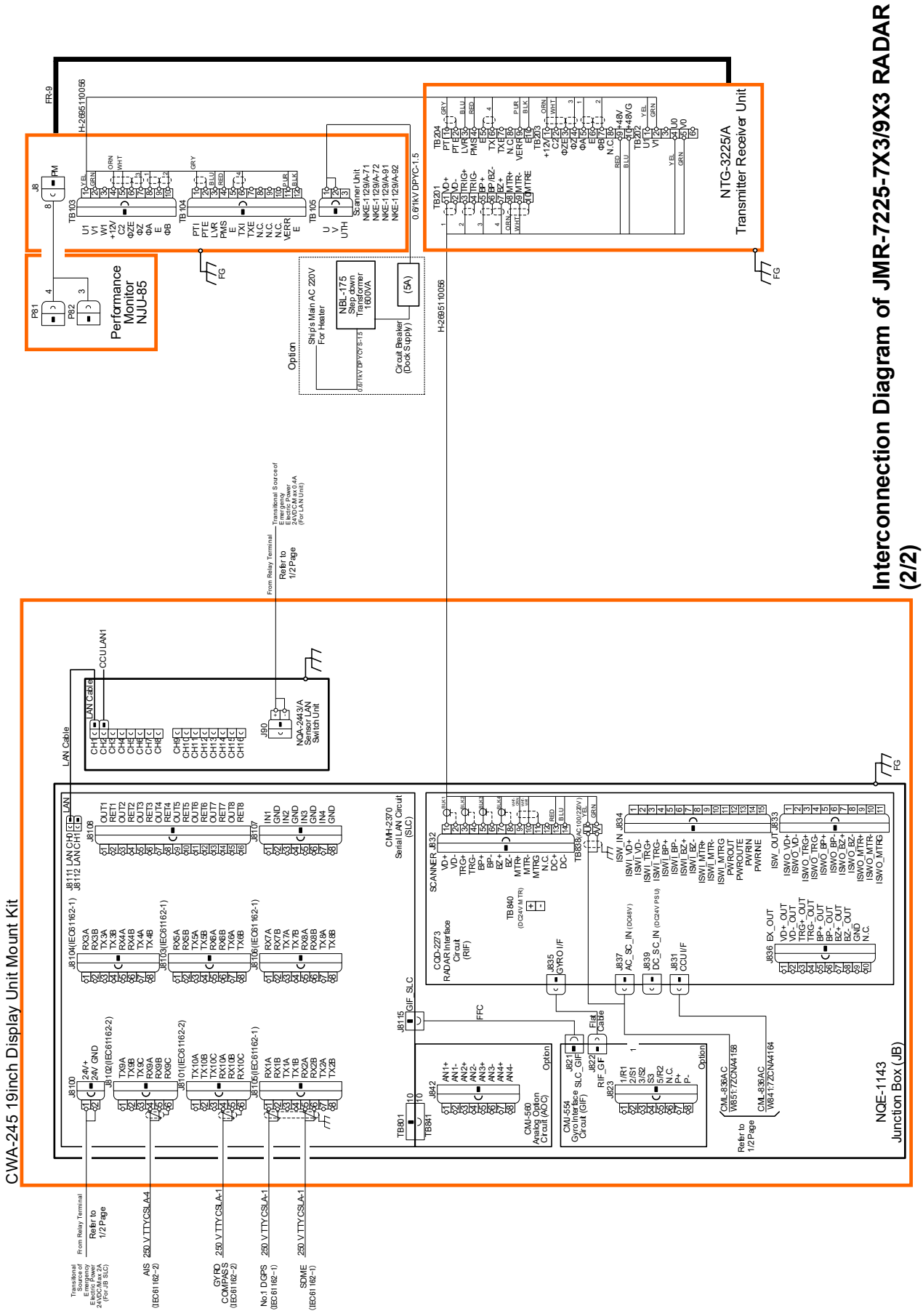
Interconnection Diagram of JMR-7225-6XH RADAR (1/2)


Interconnection Diagram of JMR-7225-6XH RADAR (2/2)
Scanner Unit
NKE-2254-6HS
Performance Monitor
NJU-85
Ship's Main AC 220V
For Heater
NBL-175
Step down Transformer
1600VA
Circuit Breaker
(Dock Supply)
(5A)
Option
CFQ-6912
CWA-245 19inch Display Unit Mount Kit
NQE-1143
Junction Box (JB)
NOA-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 0.4A (For LAN Unit)
Transitional Source of Emergency Electric Power 24VDC/Max 2A (For JB SLC)
CMH-2370
Serial LAN Circuit (SLC)
CQD-2273
RADAR Interface Circuit (RIF)
CMU-560
Analog Distribution Circuit (ADC)
CMU-554
Gyro Interface Circuit (GIF)
CIM-836DC
CIM-836DC
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
Refer to 1/2 Page

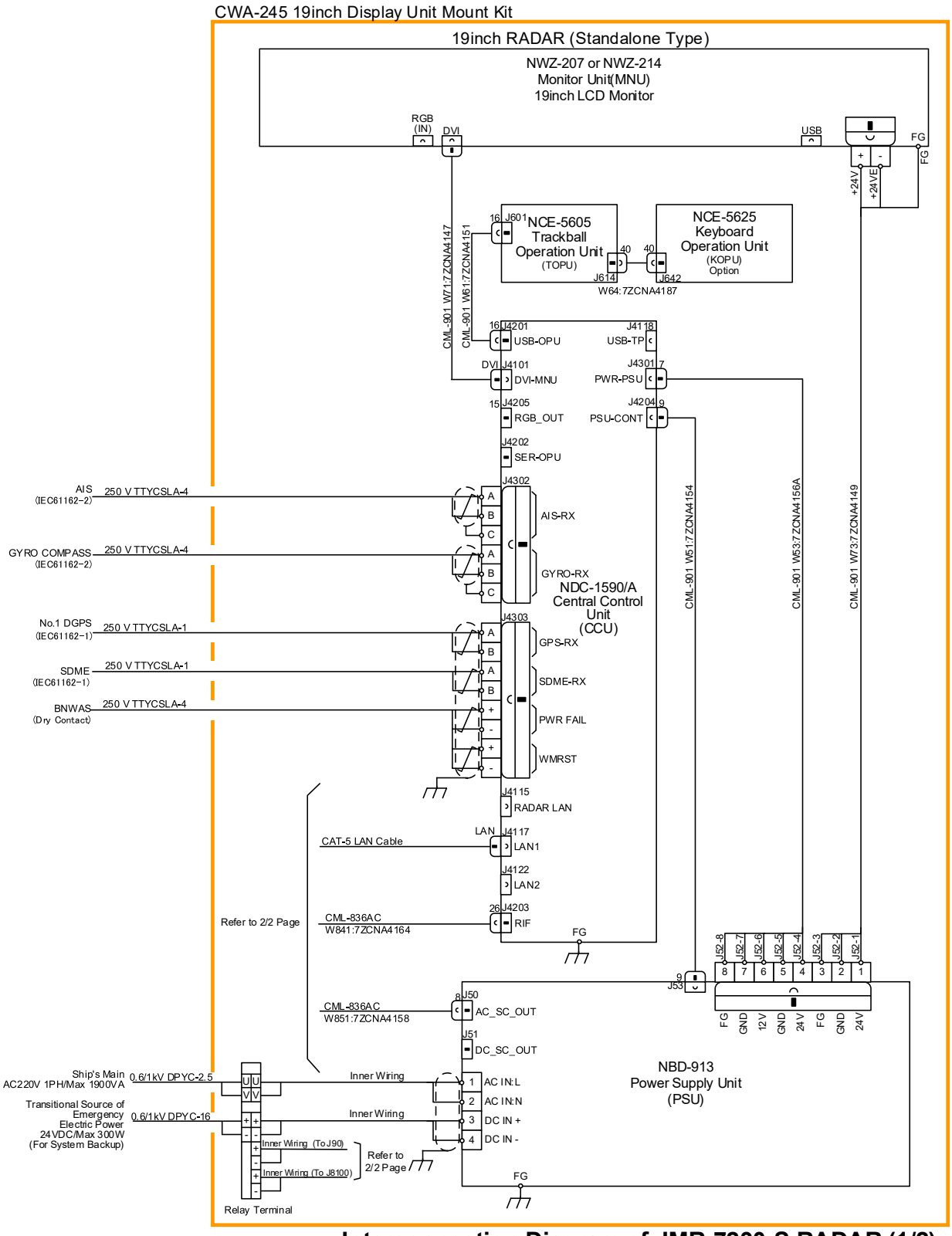
6.4.15 JMR-7225-7X3/9X3



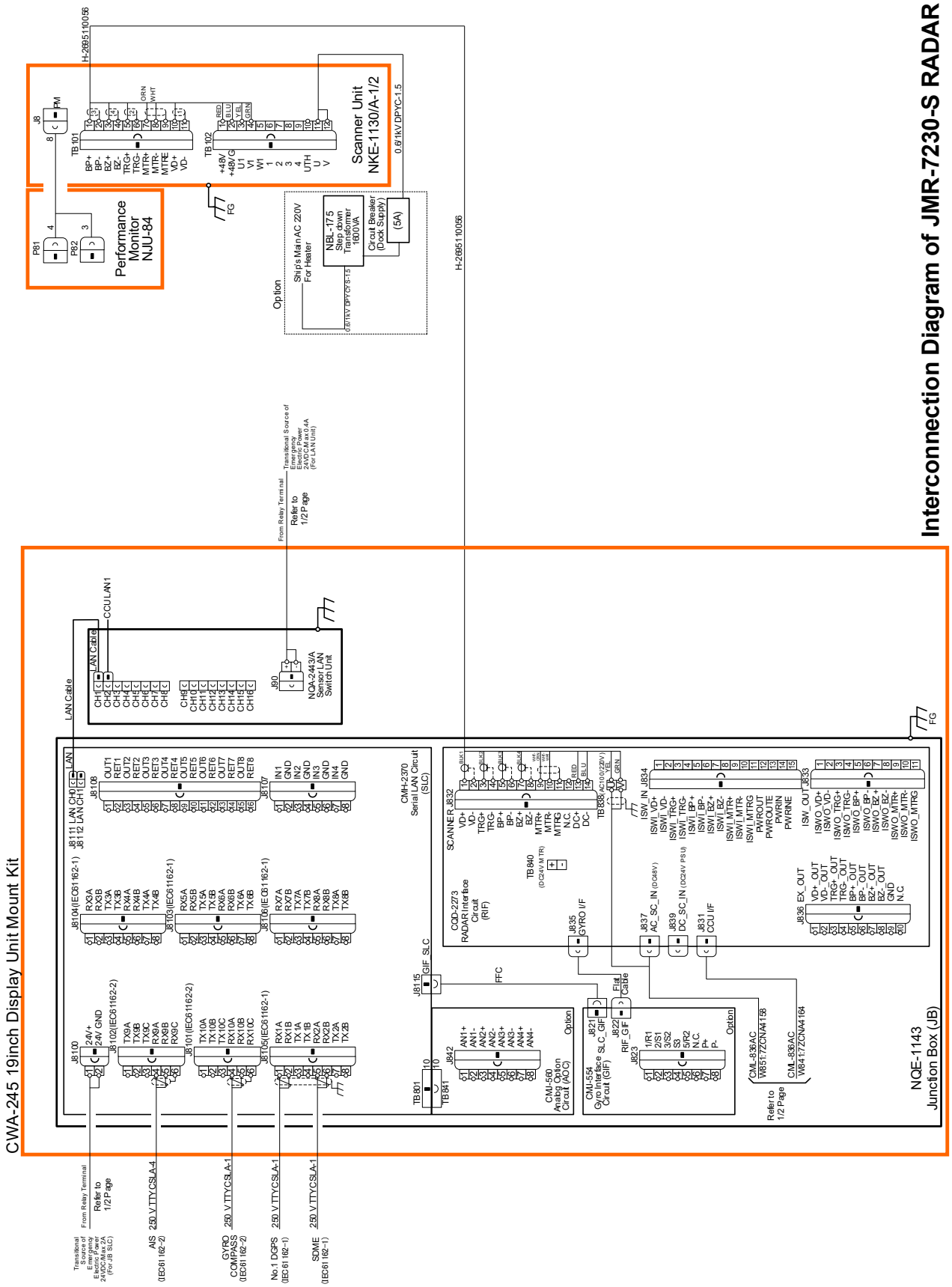
Interconnection Diagram of JMR-7225-7X3/9X3 RADAR (1/2)


Interconnection Diagram of JMR-7225-7X3/9X3 RADAR (2/2)
NTG-3225/A Transmitter Receiver Unit
Performance Monitor NJU-85
NBL-175 Step-down Transformer 1600VA
Ship's Main AC 220V For Heater
Circuit Breaker (Dock Supply)
(5A)
Option
0.6/1kV DPYC-1.5
H-26B511005/6
Scanner Unit NKE-1129A-71 NKE-1129A-72 NKE-1129A-91 NKE-1129A-92
CWA-245 19inch Display Unit Mount Kit
NQE-1143 Junction Box (JB)
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 0.4A (For LAN Unit)
CQD-2273 RADAR Interface Circuit (RIF)
CIH-2370 Serial LAN Circuit (SLC)
CMJ-554 Gyro Interface Circuit (GIF)
CMJ-560 Analog Option Circuit (AOC)
CML-836A/C W8511ZCNA4158
CML-836A/C W8411ZCNA4164
SCANNER J832
ISW_IN J834
ISW_OUT J833
AC_SC_IN (DC48V)
DC_SC_IN (DC24V PSU)
CCU I/F
GYRO I/F
EX_OUT J836
AIS (IEC61162-2)
GYRO COMPASS (IEC61162-2)
No.1 DGPS (IEC61162-1)
SDME (IEC61162-1)
250 V TTYCSLA-4
250 V TTYCSLA-1

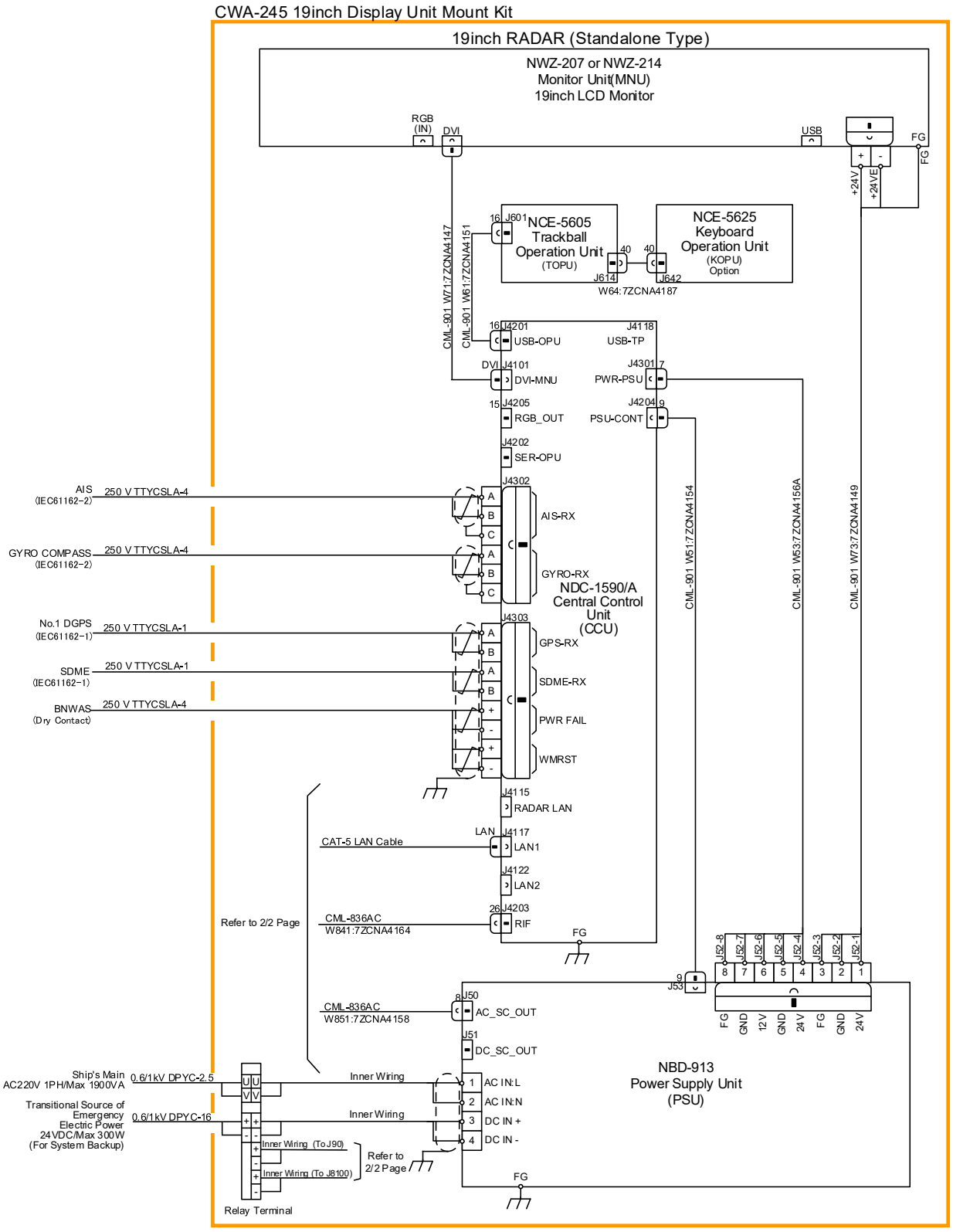
6.4.16 JMR-7230-S



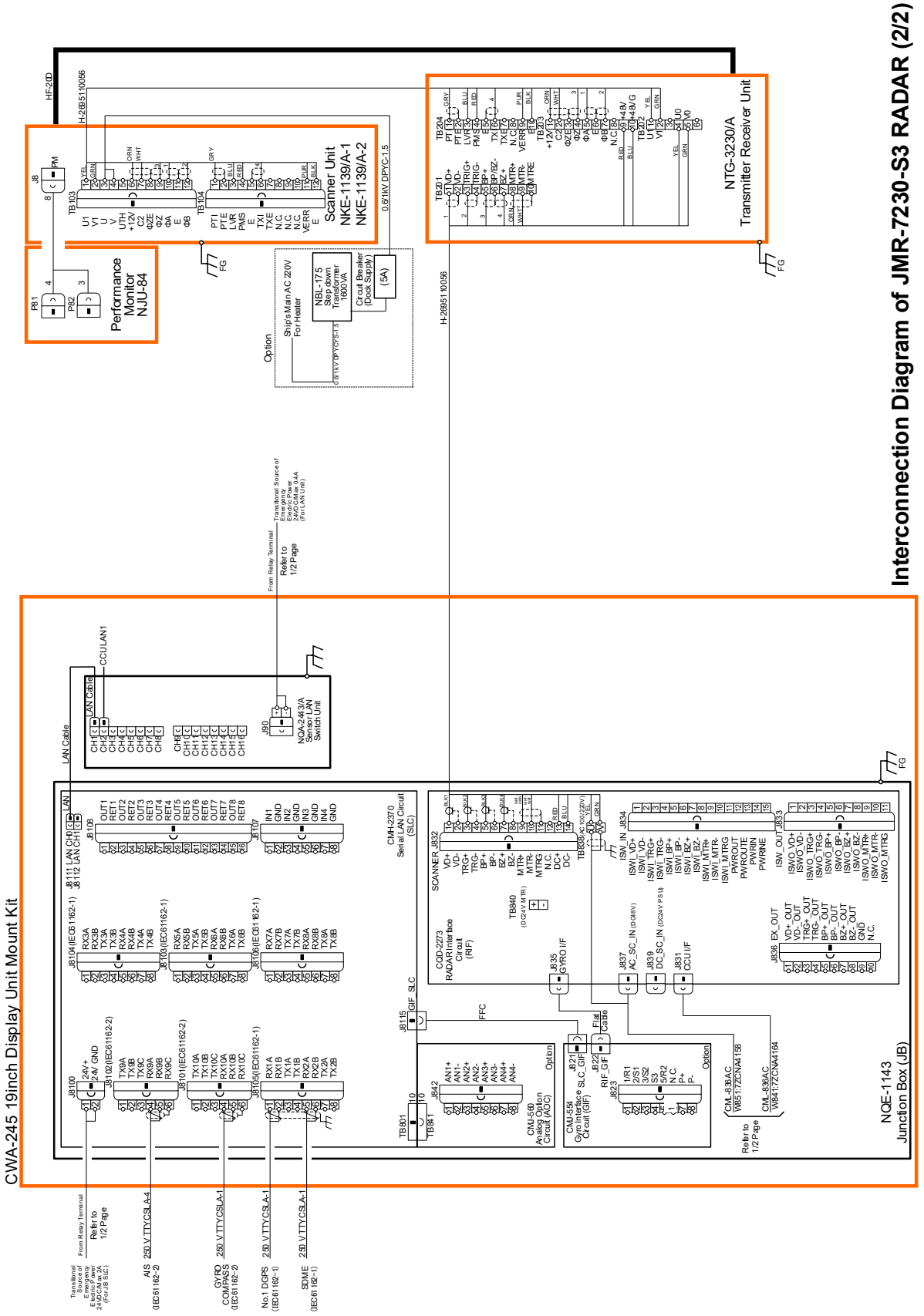
Interconnection Diagram of JMR-7230-S RADAR (1/2)


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/A-1/2
Performance
Monitor
NJU-84
NQA-2443A
Sensor LAN
Switch Unit
NBL-175
Step down
Transformer
1800VA
Circuit Breaker
(Dock Supply)
(5A)
Ship's Main AC 220V
For Heater
Option
LAN Cable
CCU LAN1
H-26951100/56
H-26951100/56
0.6*1kV DPYC-1.5
0.6/1kV DPYC/S-1.5
From Relay Terminal
Refer to
1/2 Page
Transitional Source of Emergency Electrical Power 24VDC/Max 2A (For JB SLC)
Transitional Source of Emergency Electrical Power 24VDC/Max 0.4A (For LAN Unit)
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
SCANNER J832
COD-2273
RADAR Interface
Circuit
(RIF)
CMH-2370
Serial LAN Circuit
(SLC)
CMU-554
Gyro Interface
Circuit (GIF)
CMU-560
Analog Option
Circuit (AOC)
CML-836AC
W8517ZCNA4188
CM-836AC
W8417ZCN44164
Refer to
1/2 Page
FFC
Flat
Cable

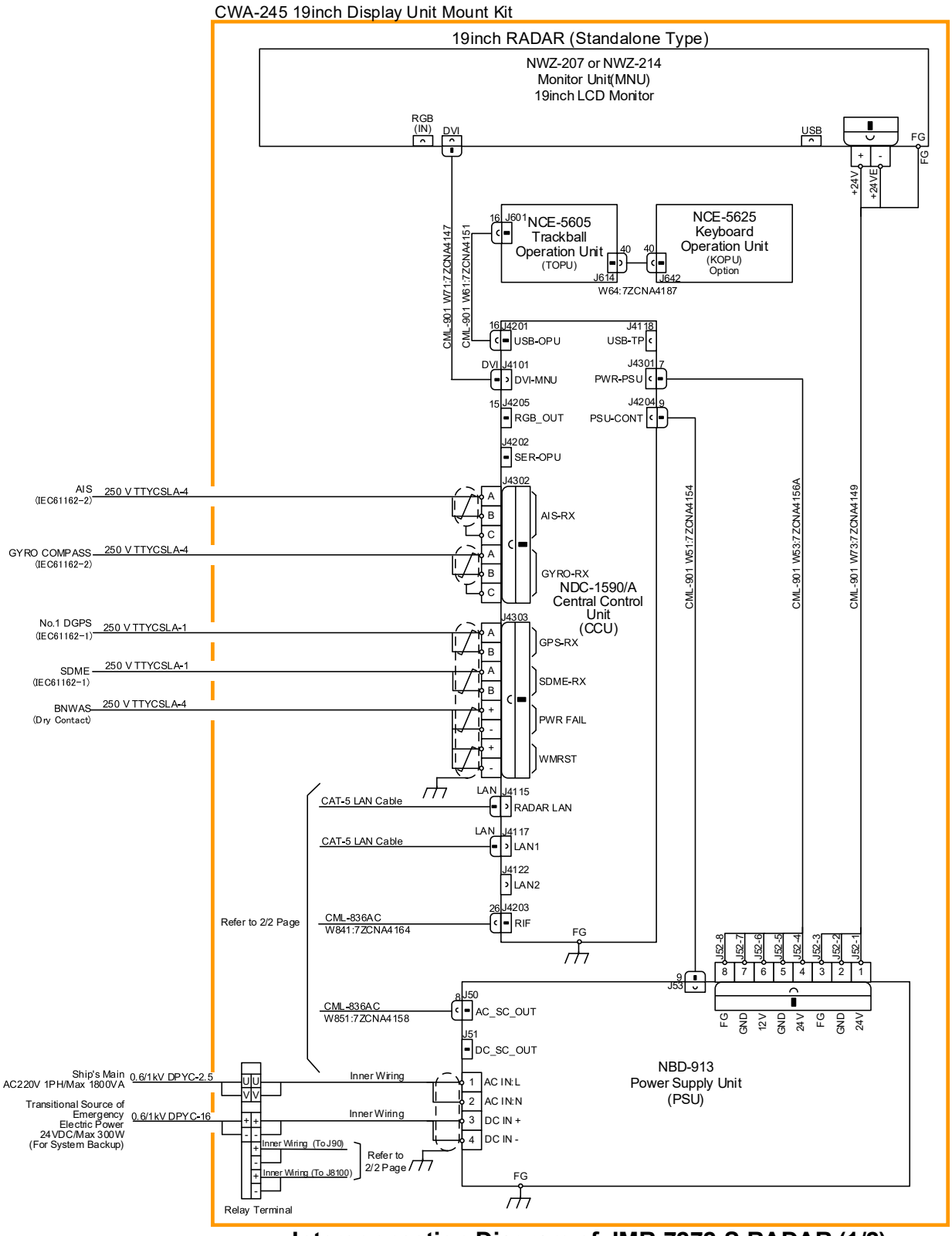
6.4.17 JMR-7230-S3



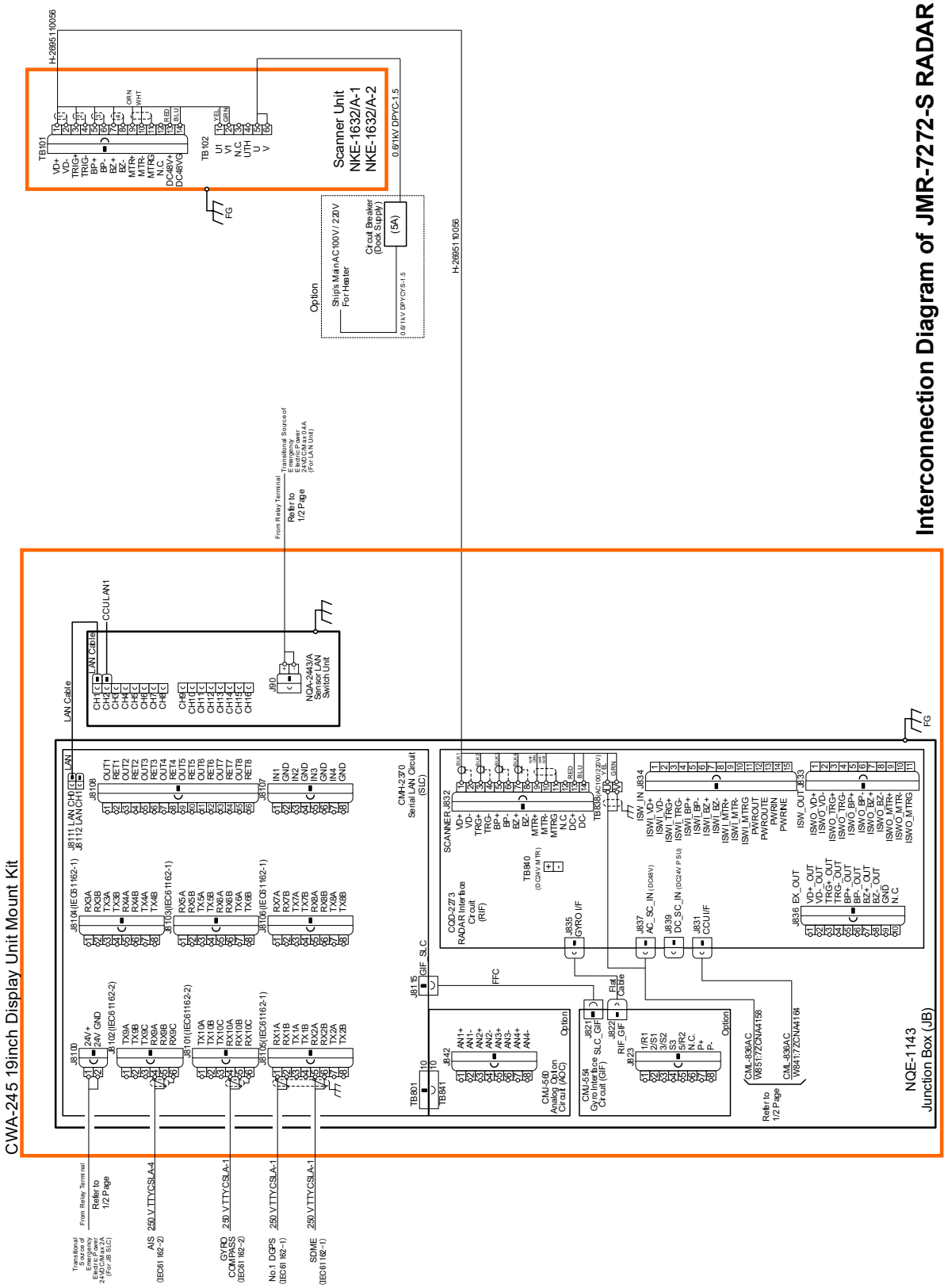
Interconnection Diagram of JMR-7230-S3 RADAR (1/2)


Interconnection Diagram of JMR-7230-S3 RADAR (2/2)
CWA-245 19inch Display Unit Mount Kit
NQE-1143
Junction Box (JB)
Scanner Unit
NKE-1139/A-1
NKE-1139/A-2
NTG-3230/A
Transmitter Receiver Unit
Performance Monitor
NJU-84
NQA-2443/A
Sensor LAN Switch Unit
Ship's Main AC 220V
For Heater
Option
Circuit Breaker (Dock Supply)
(5A)
0.6/1kV DPYC-1.5
H-28951/10056
HF-21D
LAN Cable
CCU LAN1
From Relay Terminal
Refer to 1/2 Page
Refer to 1/2 Page
Refer to 1/2 Page
Transitional Source of Emergency Electric Power 24VDC/AC 1kVA (For LAN Unit)
Transitional Source of Emergency Electric Power 24VDC/AC 1kVA (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
SCANNER J832
CMH-2370 Serial LAN Circuit (SLC)
CMJ-5681 Analog Option Circuit (AOC)
CMJ-5541 Gyro Interface SLC Circuit (GIF)
CMJ-5681 Analog Option Circuit (AOC)
CIM-836/AC W8511/ZCN4188
CIM-836/AC W8417/ZCN4164
CQD-2273 RADAR Interface Circuit (RIF)
GYRO I/F
CCU I/F
FFC
Flat Cable
GIF SLC
RIF_GIF
SLC_GIF
Option

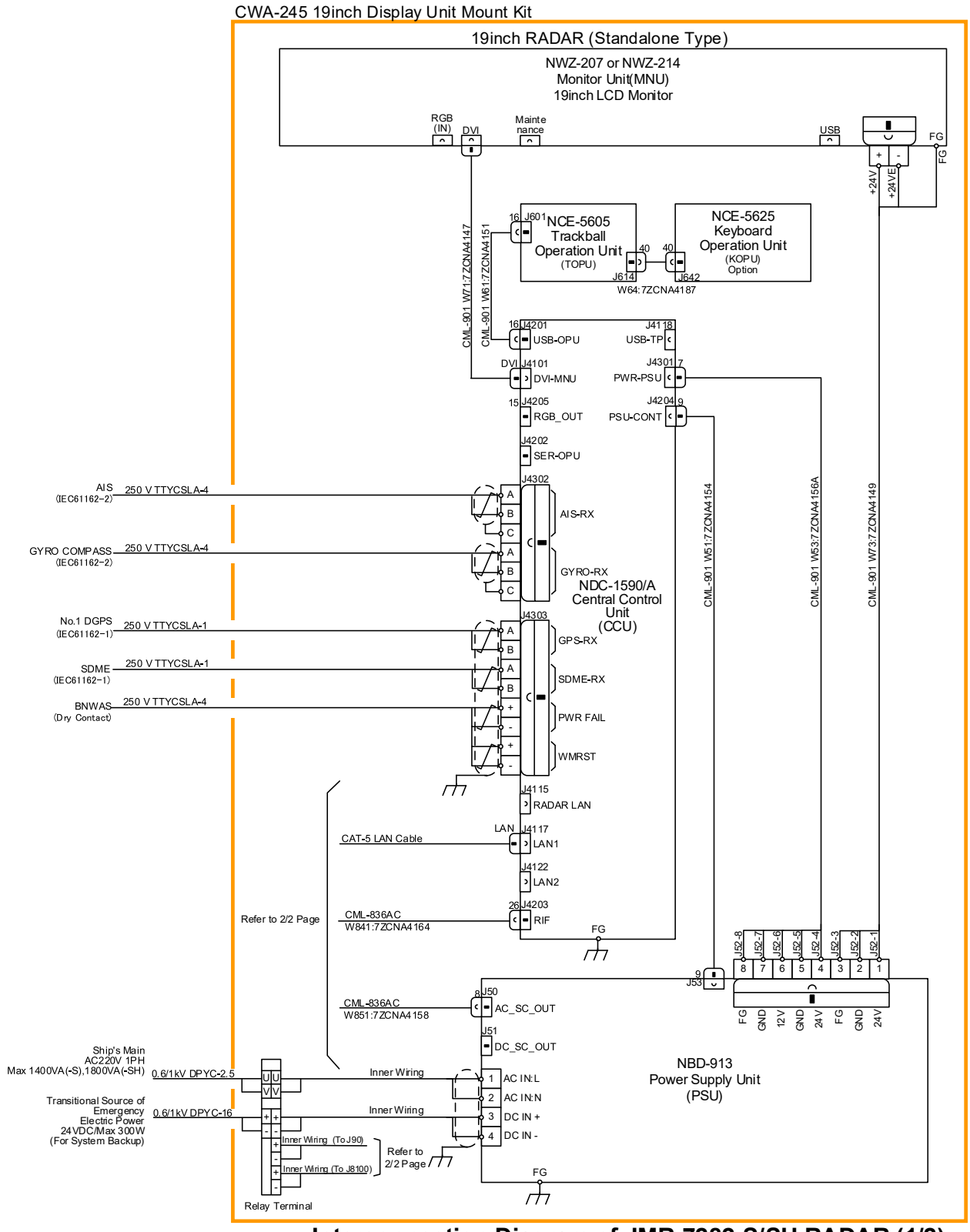
6.4.18 JMR-7272-S



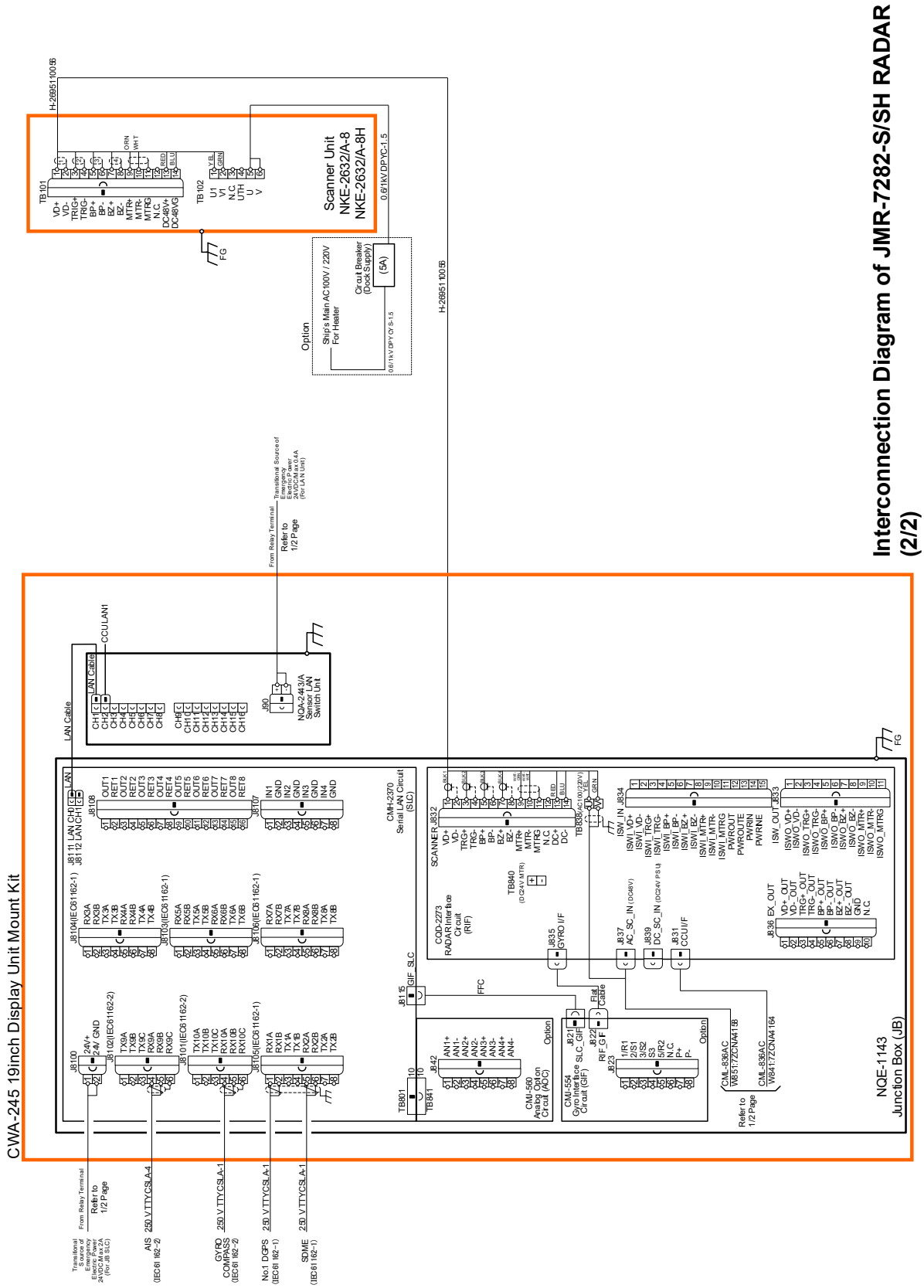
Interconnection Diagram of JMR-7272-S RADAR (1/2)


Interconnection Diagram of JMR-7272-S RADAR (2/2)
CWA-245 19inch Display Unit Mount Kit
NQE-1143
Junction Box (JB)
Scanner Unit
NKE-1632/A-1
NKE-1632/A-2
H-28951 10056
0.6/1kV DPYC/S-1.5
Option
Ships Main AC100V / 220V
For Heater
Circuit Breaker
(Dock Supply)
(5A)
TB101
TB102
FG
LAN Cable
CCU LAN1
NOA-2443/A
Sensor LAN
Switch Unit
J90
From Relay Terminal
Refer to
1/2 Page
Transitional Source of Emergency Electric Power 24VDC/5.4A (For LAN Unit)
CMH-2370
Serial LAN Circuit
(SLC)
SCANNER J832
CCD-2273
RADAR Interface
Circuit
(RIF)
TB840
(DC24V I/F PWR)
J835
GYRO I/F
J837
AC_SC_IN (DC48V)
J839
DC_SC_IN (DC24V P.S.U)
J831
CCU I/F
J836 EX_OUT
ISW_OUT
ISW_IN J834
J833
J810 (IEC61162-1)
J8111 LAN CH0
J8112 LAN CH1
J8108
J8107
J8104 (IEC61162-1)
J8103 (IEC61162-1)
J8102 (IEC61162-2)
J8101 (IEC61162-2)
J8106 (IEC61162-1)
J8105 (IEC61162-1)
J8110
J8115
SLC
FFC
TB801
TB841
J842
CMJ-56B
Analog Option
Circuit (AOC)
CMJ-55A
Gyro Interface
Circuit (GIF)
J821 SLC_GIF
J822 RIF_GIF
J823
Option
CML-836AC
W8517ZCNA4158
CML-836AC
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

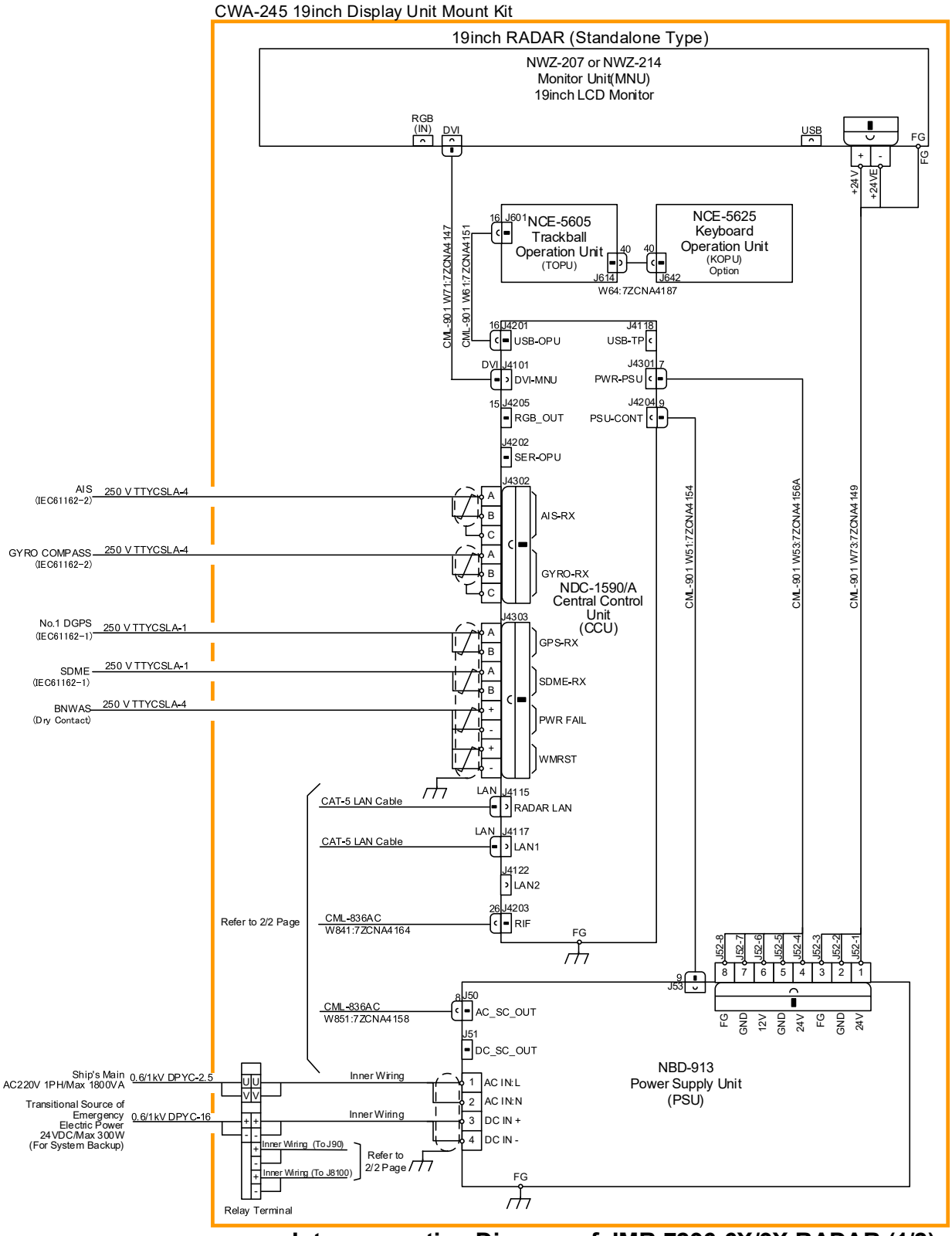
6.4.19 JMR-7282-S/SH



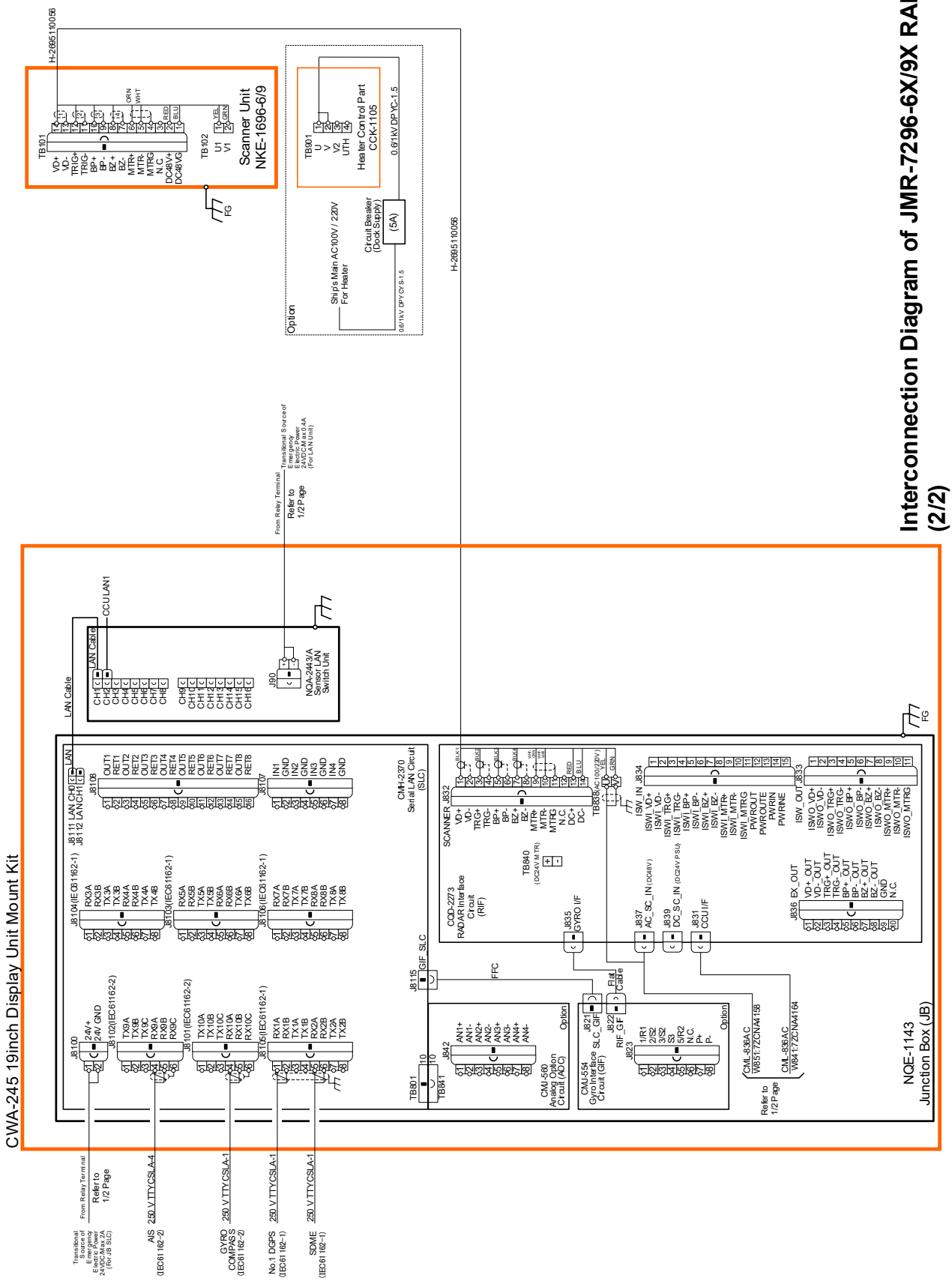
Interconnection Diagram of JMR-7282-S/SH RADAR (1/2)


Interconnection Diagram of JMR-7282-S/SH RADAR (2/2)
Scanner Unit NKE-2632/A-8 NKE-2632/A-8H
TB-101
TB-102
H-26951100-5
0.6/1kV DPYC-1.5
Option
Ship's Main AC100V / 220V For Heater
Circuit Breaker (Dock Supply)
(5A)
0.6/1kV DPY C/ S-1.5
FG
CWA-245 19inch Display Unit Mount Kit
LAN Cable
CCU-LAN1
NQA-2443/A Switching HUB Switch Unit
J80
From Relay Terminal
Refer to 1/2 Page
Transitional Source of Emergency Electrical Power 24VDC/Max10.4A (For LAN Unit)
CMH-2370 Serial LAN Circuit (SLC)
SCANNER J832
COD-2273 RADAR Interface Circuit (RIF)
TB840
J835 GYRO I/F
J837 AC_SC_IN (DC48V)
J839 DC_SC_IN (DC24V FS U)
J831 CCU I/F
J836 EX_OUT
J833
J834
ISW_IN
ISW_OUT
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
FFC
Flat Cable
TB801
TB841
J842
CMU-560 Analog Output Circuit (AOC)
Option
CMH-554 Gyro Interface Circuit (GIF)
J821 SLC_GIF
J822 RIF_GIF
J823
CML-836AC W8517ZCNA418
CML-836AC W8417ZCNA4164
Refer to 1/2 Page
NQE-1143 Junction Box (JB)
Transitional Source of Emergency Electrical 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

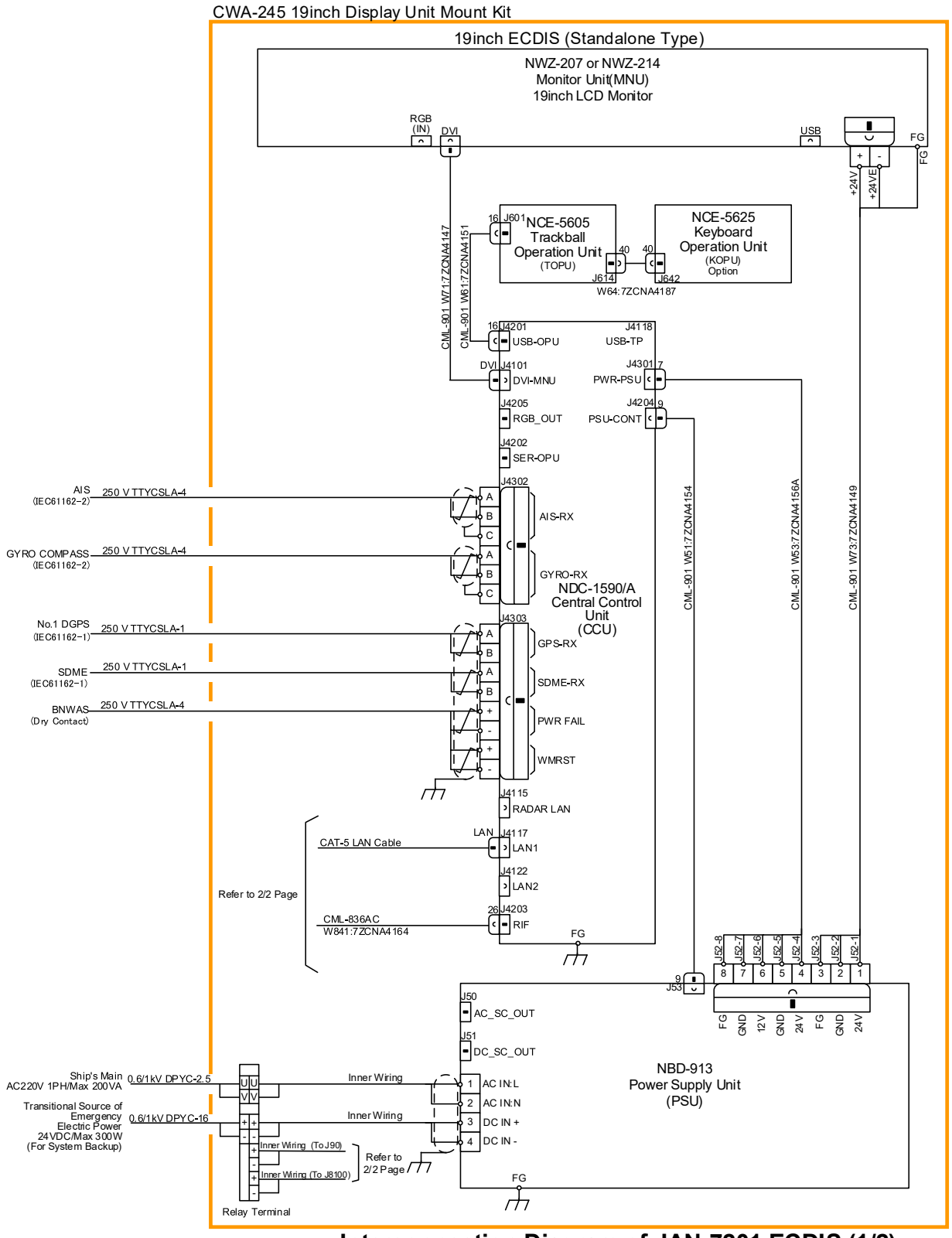
6.4.20 JMR-7296-6X/9X



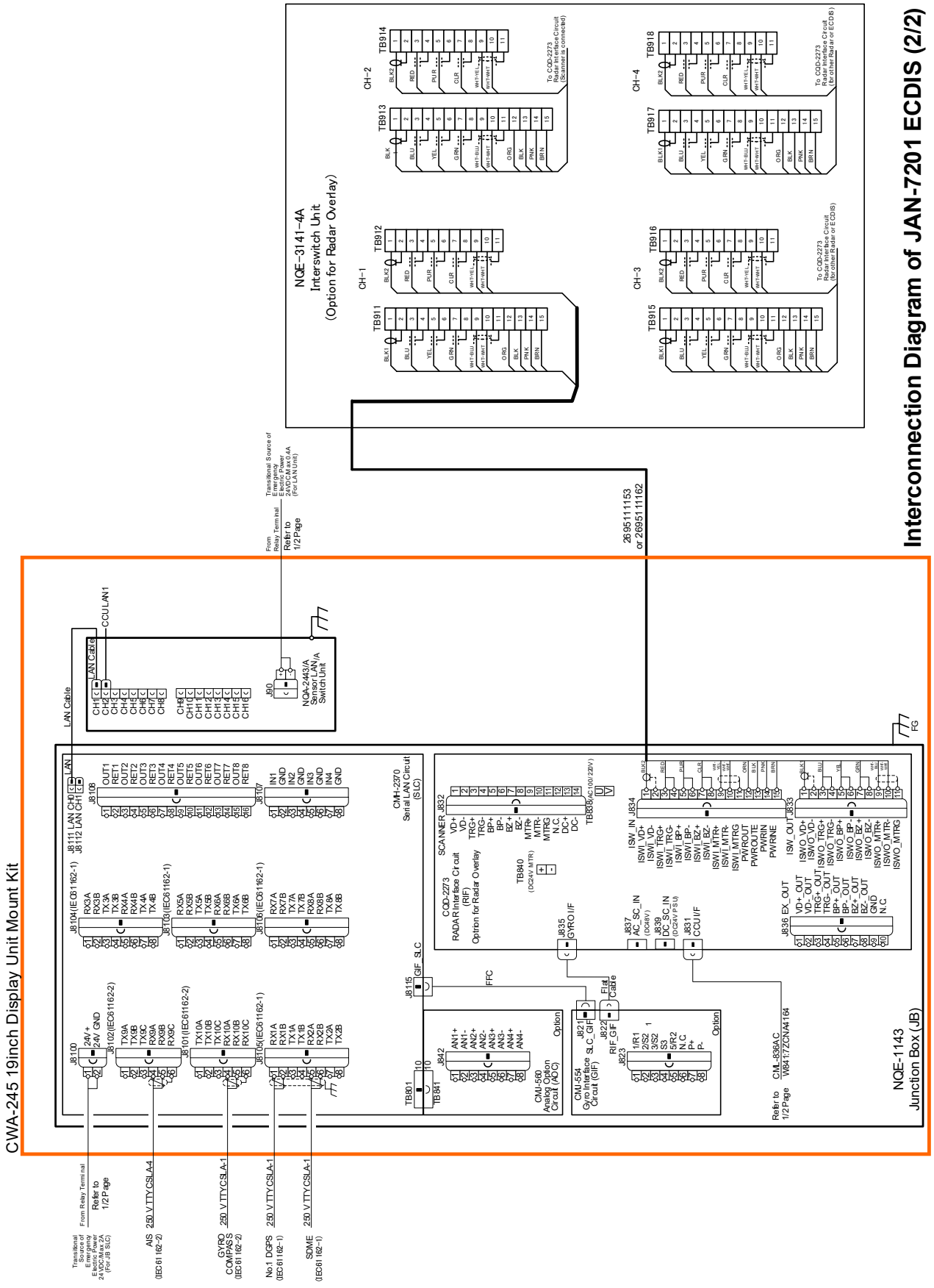
Interconnection Diagram of JMR-7296-6X/9X RADAR (1/2)


Interconnection Diagram of JMR-7296-6X/9X RADAR (2/2)
CWA-245 19inch Display Unit Mount Kit
NQE-1143 Junction Box (JB)
Scanner Unit NKE-1696-6/9
Heater Control Part CCK-1105
Option
Ship's Main AC100V / 220V For Heater
Circuit Breaker (Dock Supply)
(5A)
0.6/1kV DPYC-1.5
H-2695110056
TB101
TB102
TB901
FG
LAN Cable
CCU LAN1
NQA-2443/A Sensor LAN Switch Unit
J90
From Relay Terminal
Refer to 1/2 Page
Transitional Source of Emergency Electric Power 24VDC Max 0.4A (For LAN Unit)
J8104(IEC61162-1)
J8101(IEC61162-2)
J8106(IEC61162-1)
J8105(IEC61162-1)
J8102(IEC61162-2)
J8100
J8108
J8107
J8111 LAN CH1
J8112 LAN CH2
CMH-2370 Serial LAN Circuit (SLC)
SCANNER_J832
CQD-2273 RADAR Interface Circuit (RIF)
TB840
TB838
J835 GYRO I/F
J837 AC_SC_IN
J839 DC_SC_IN
J831 CCU I/F
J834 ISW_IN
J836 EX_OUT
J833 ISW_OUT
J8115 GIF_SLC
FFC
J821 SLC_GIF
J822 RIF_GF
Flat Cable
TB801
TB841
J842
CMU-560 Analog Option Circuit (AOC)
CMU-554 Gyro Interface Circuit (GIF)
J823
CML-836AC W851:7ZCNA188
CML-836AC W841:7ZCNA4164
Refer to 1/2 Page
GYRO COMPASS (IEC61162-2)
AIS (IEC61162-2)
No.1 DGPS (IEC61162-1)
SDME (IEC61162-1)
250 V TTYCSLA-4
250 V TTYCSLA-1

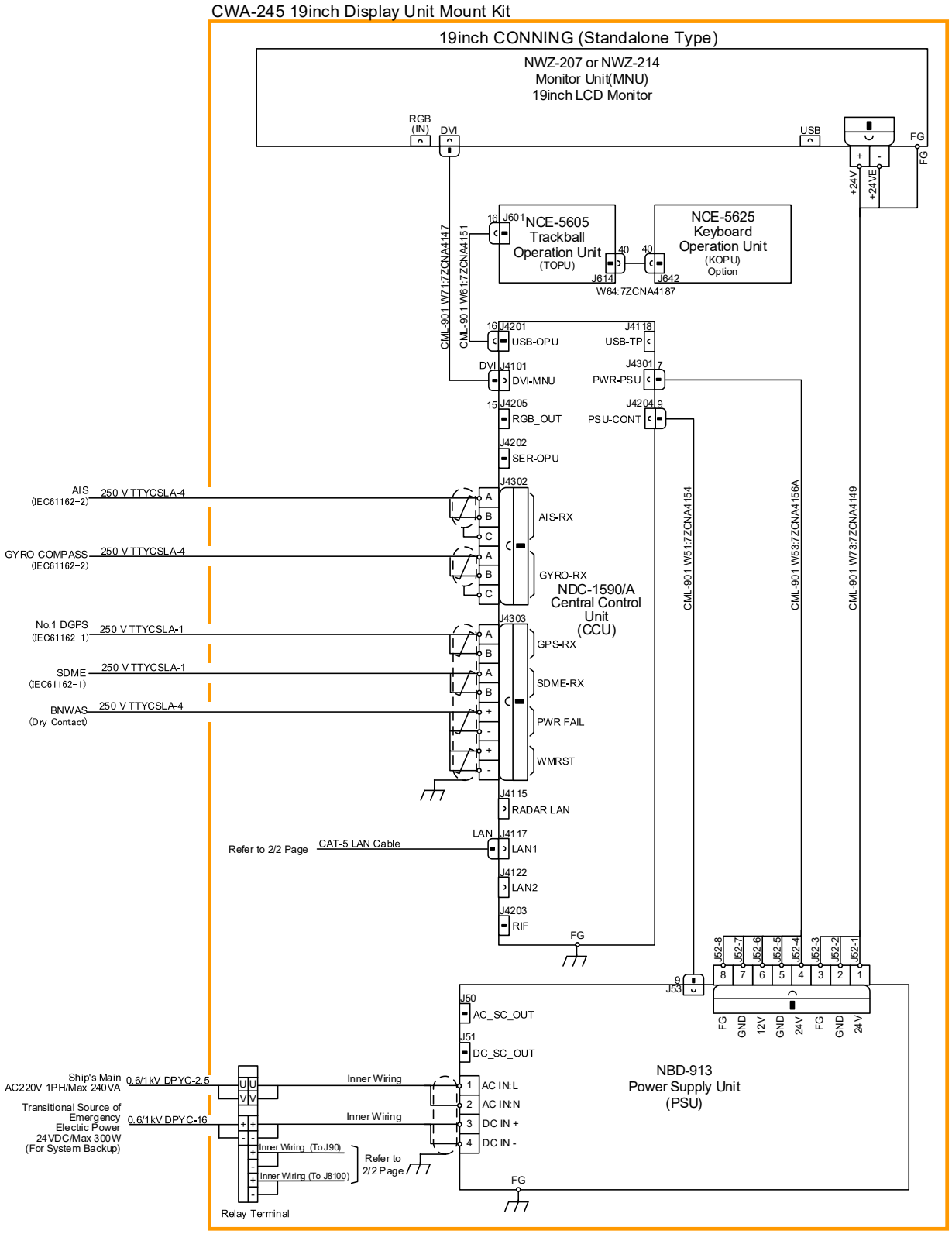
6.4.21 JAN-7201



Interconnection Diagram of JAN-7201 ECDIS (1/2)

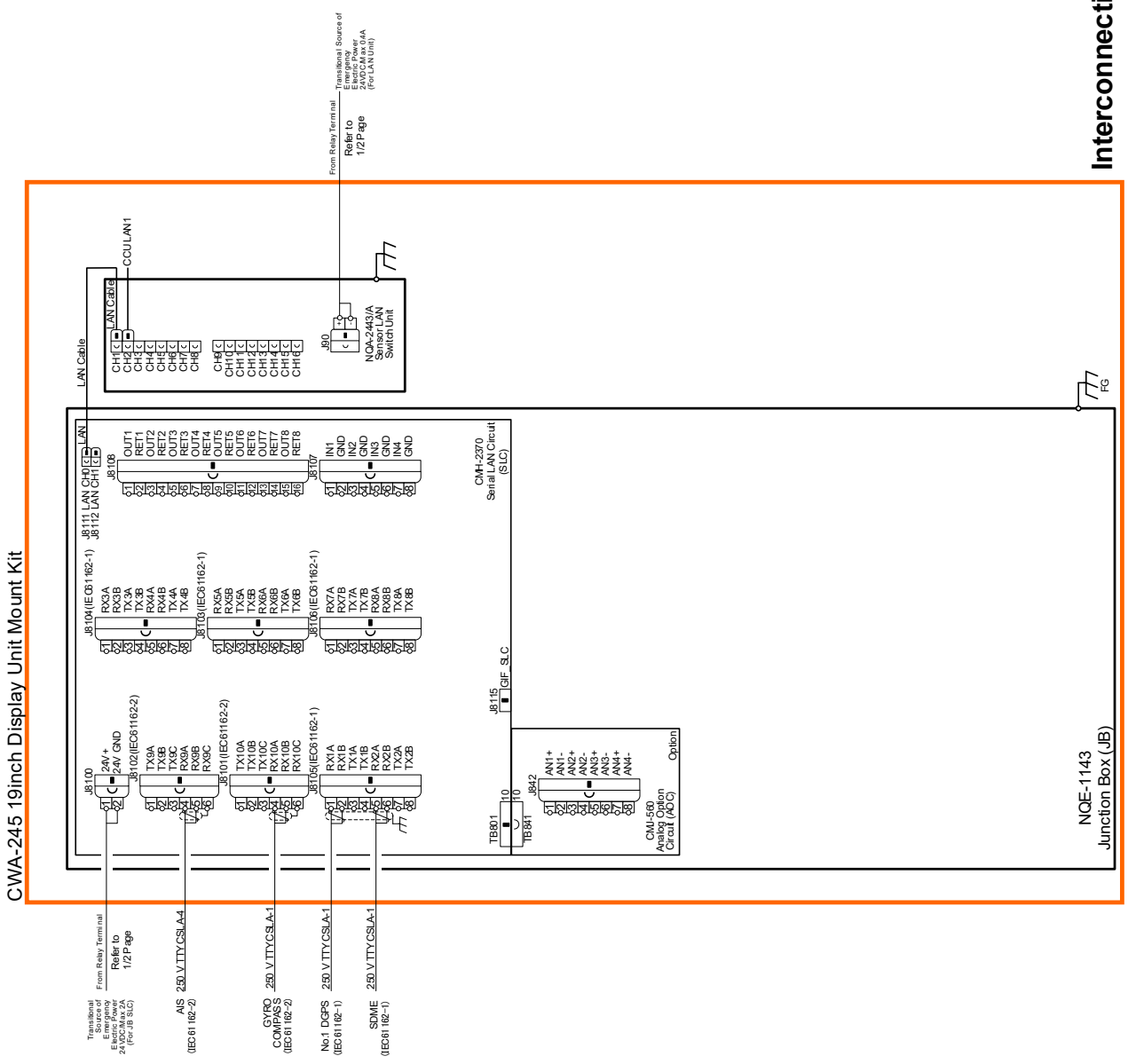

Interconnection Diagram of JAN-7201 ECDIS (2/2)
CWA-245 19inch Display Unit Mount Kit
NQE-1143
Junction Box (JB)
NQE-3141-4A
Interswitch Unit
(Option for Radar Overlay)
NQA-2443/A
Sensor LAN/A
Switch Unit
LAN Cable
CCU LAN1
2695111153
or 2695111162
From Relay Terminal
Refer to 1/2 Page
Transitional Source of Emergency Electrical Power 24VDC/Max.0.4A (For LAN Unit)
Transitional Source of Emergency Electrical Power 24VDC/Max.2A (For JB SLC)
AIS (IEC61162-2)
GYRO COMPASS (IEC61162-2)
No.1 DGPS (IEC61162-1)
SDME (IEC61162-1)
250 V TTY CSLA-4
250 V TTY CSLA-1
CH-1
CH-2
CH-3
CH-4
To COD-2273 Radar Interface Circuit (Scanner is connected)
To COD-2273 Radar Interface Circuit (for other Radar or ECDIS)
CMH-2370 Serial LAN Circuit (SLC)
COD-2273 RADAR Interface Circuit (RIF) Option for Radar Overlay
CMU-554 Gyro Interface Circuit (GIF)
CMU-560 Analog Option Circuit (AOC)
CM-836A/C
W84 17ZCNA4164
Refer to 1/2 Page
FFC
Flat Cable

JAN-7202



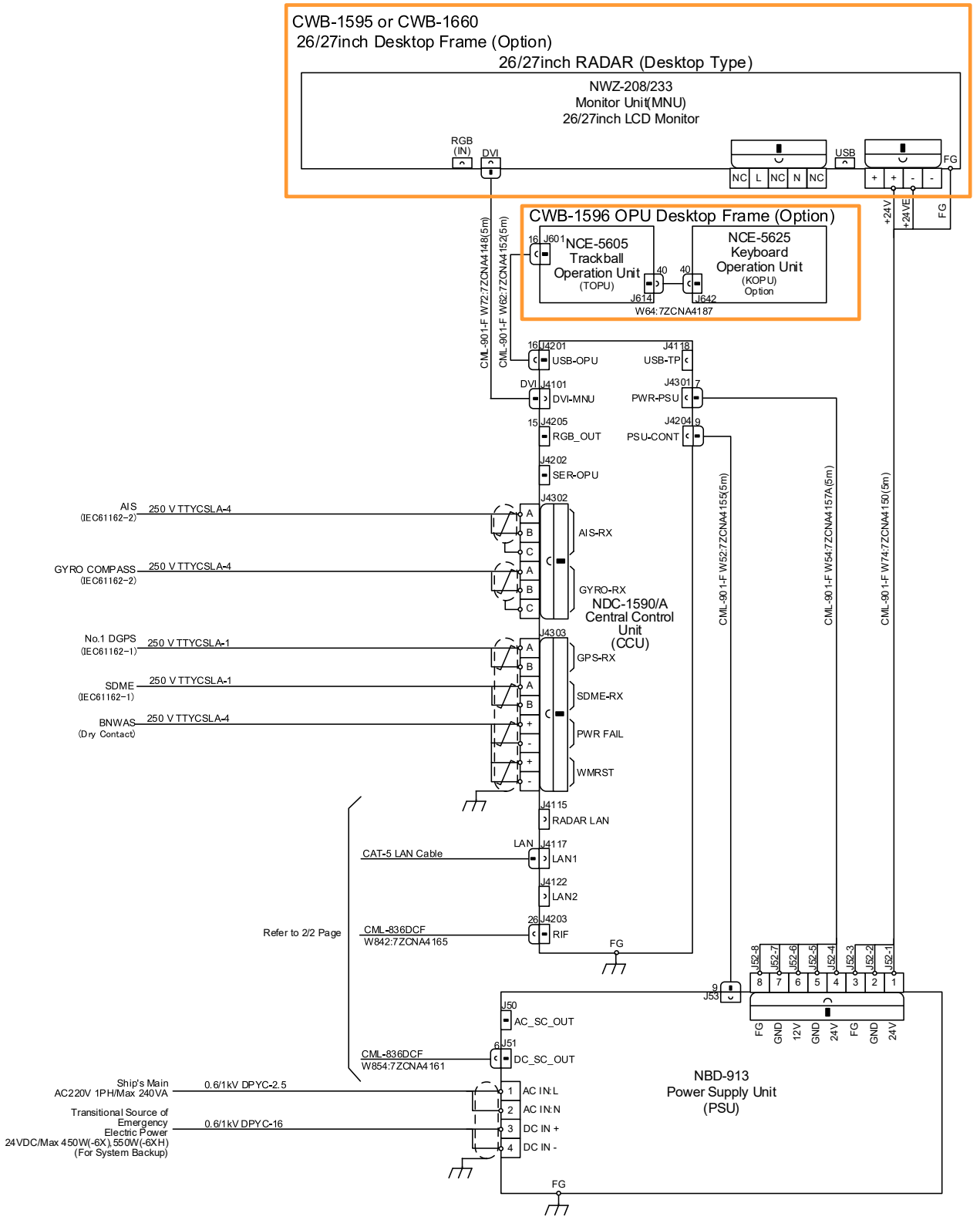
Interconnection Diagram of JAN-7202 CONNING (1/2)

Interconnection Diagram of JAN-7202 CONNING (2/2)



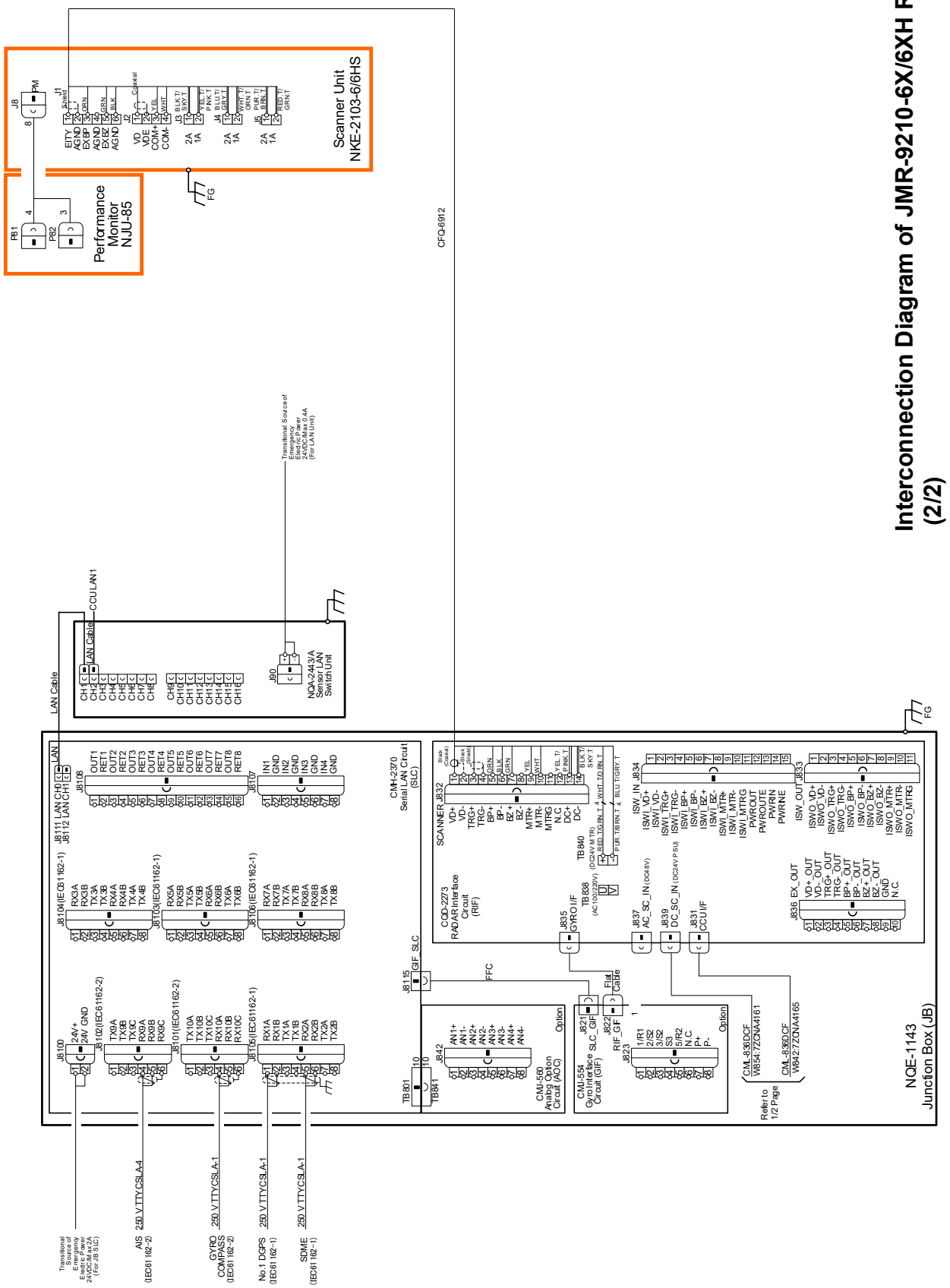
6.5 Interconnection Diagram of Desktop Type

6.5.1 JMR-9210-6X/6XH

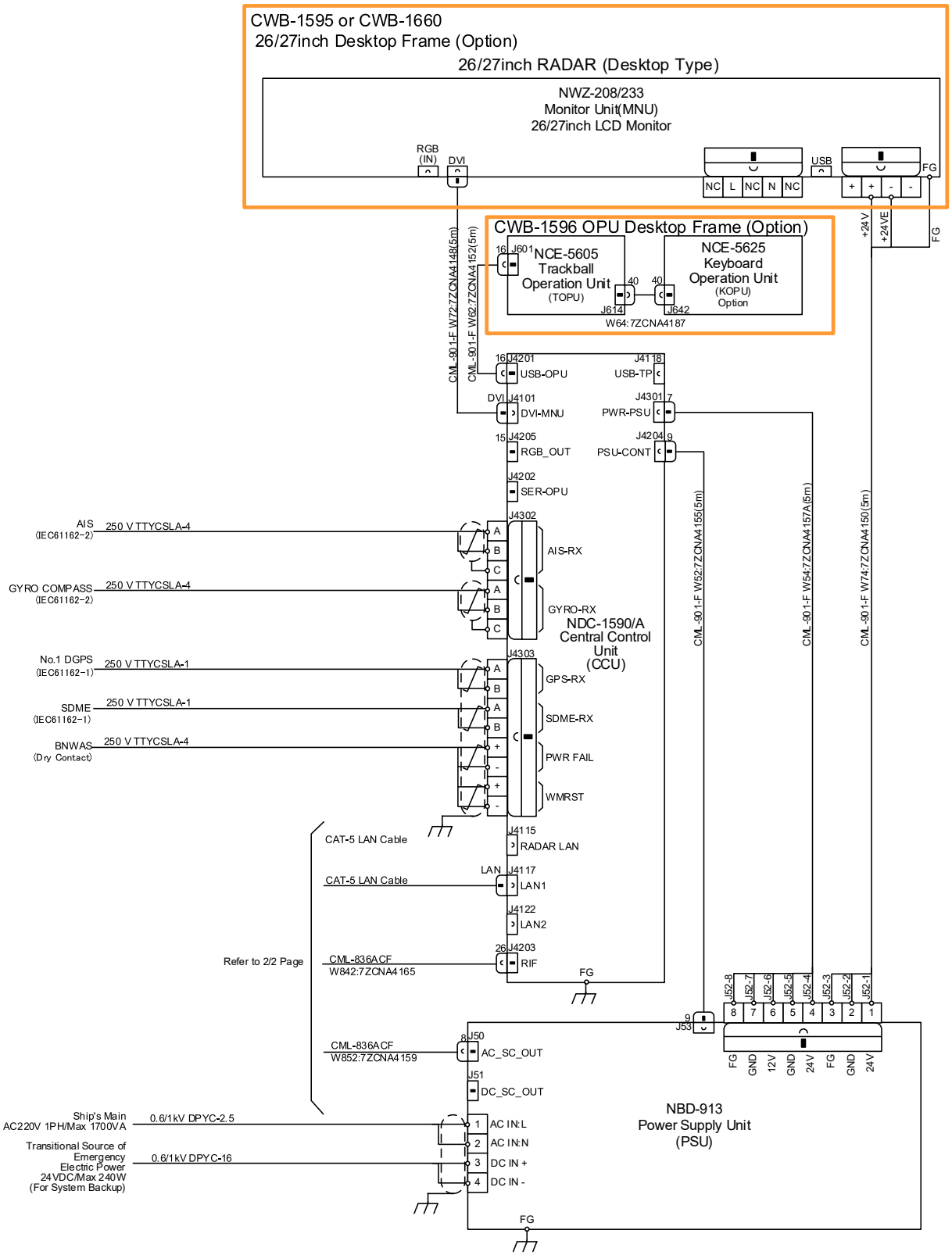


Interconnection Diagram of JMR-9210-6X/6XH RADAR (1/2)

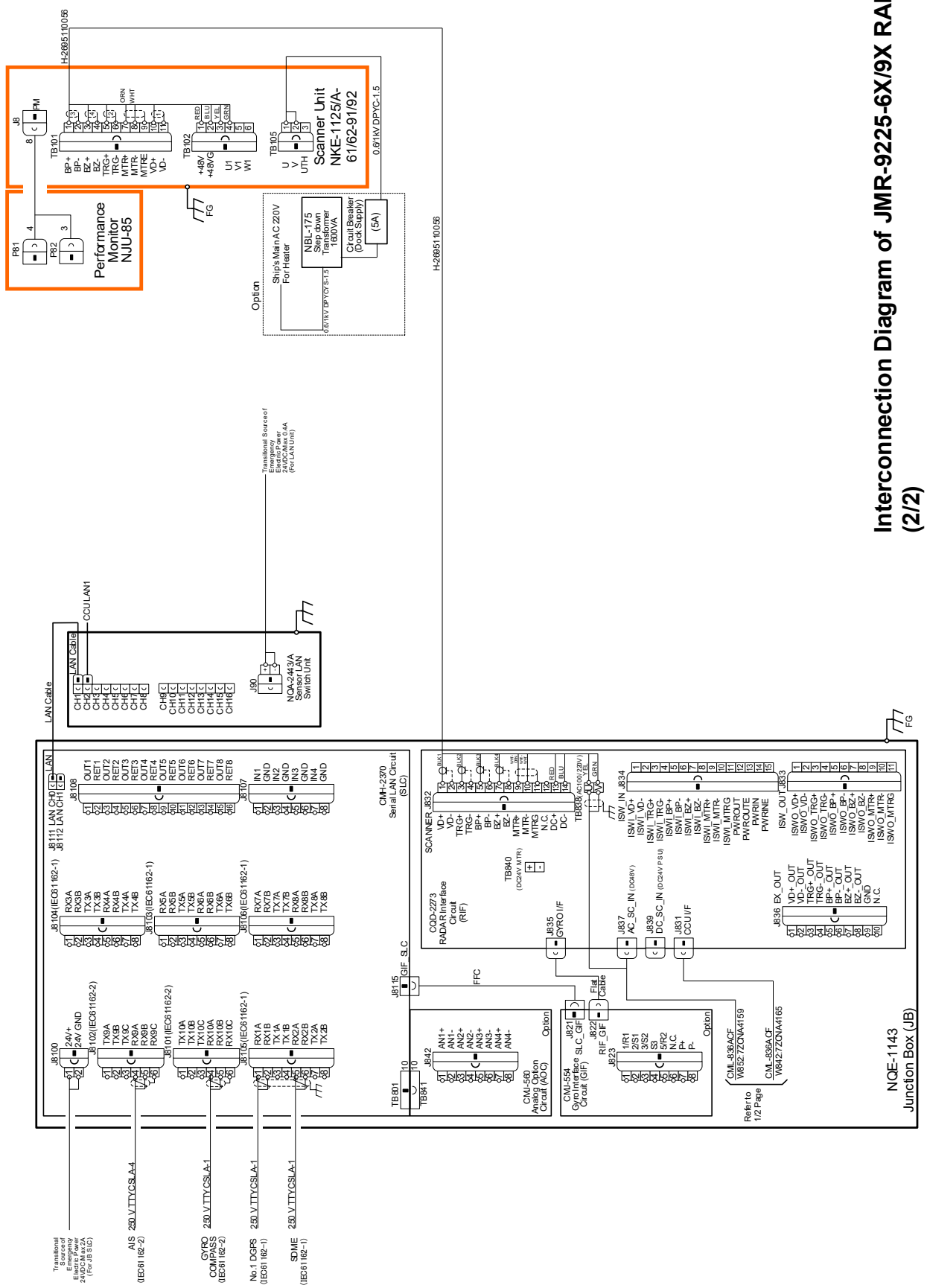
Interconnection Diagram of JMR-9210-6X/6XH RADAR (2/2)



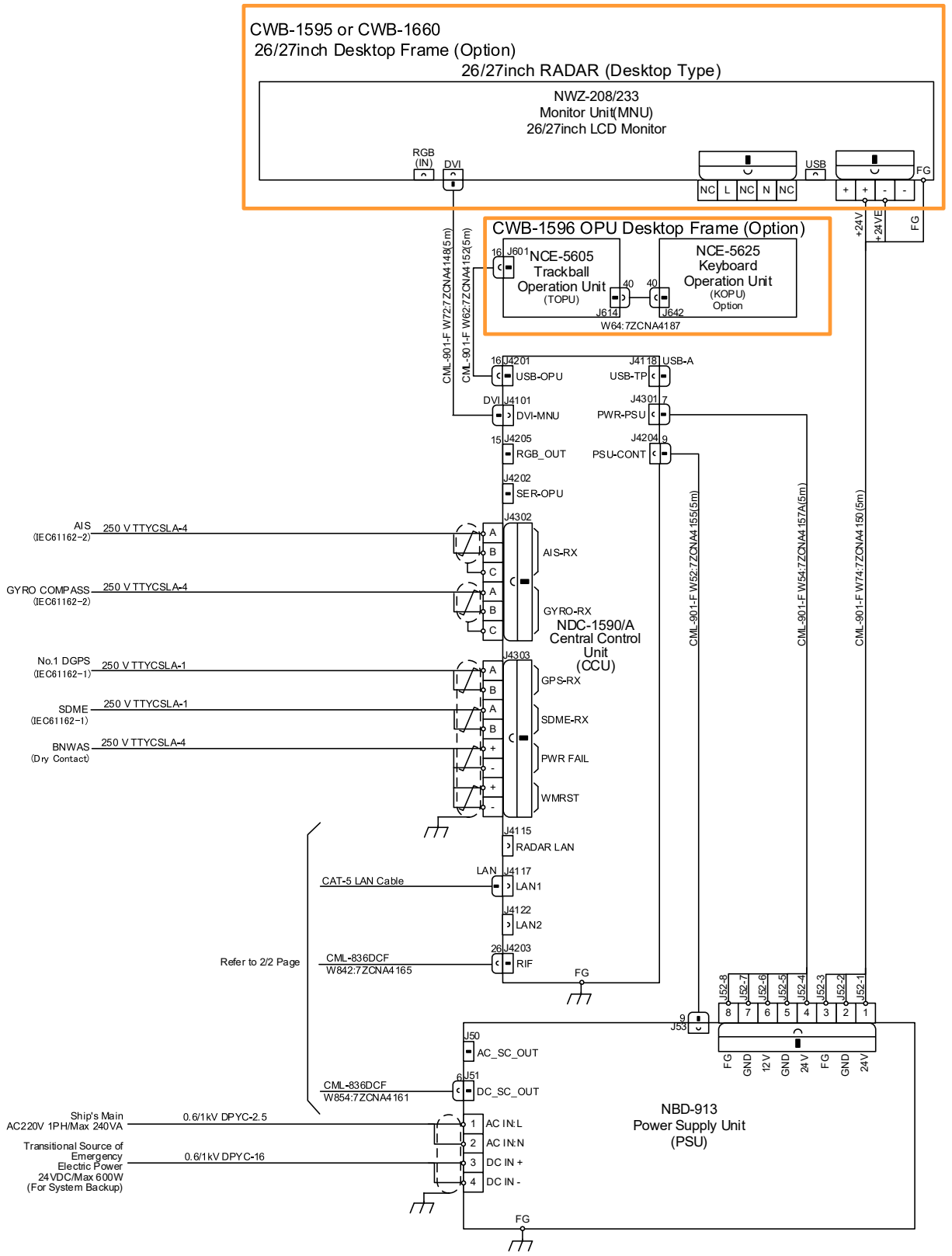
6.5.2 JMR-9225-6X/9X



Interconnection Diagram of JMR-9225-6X/9X RADAR (1/2)

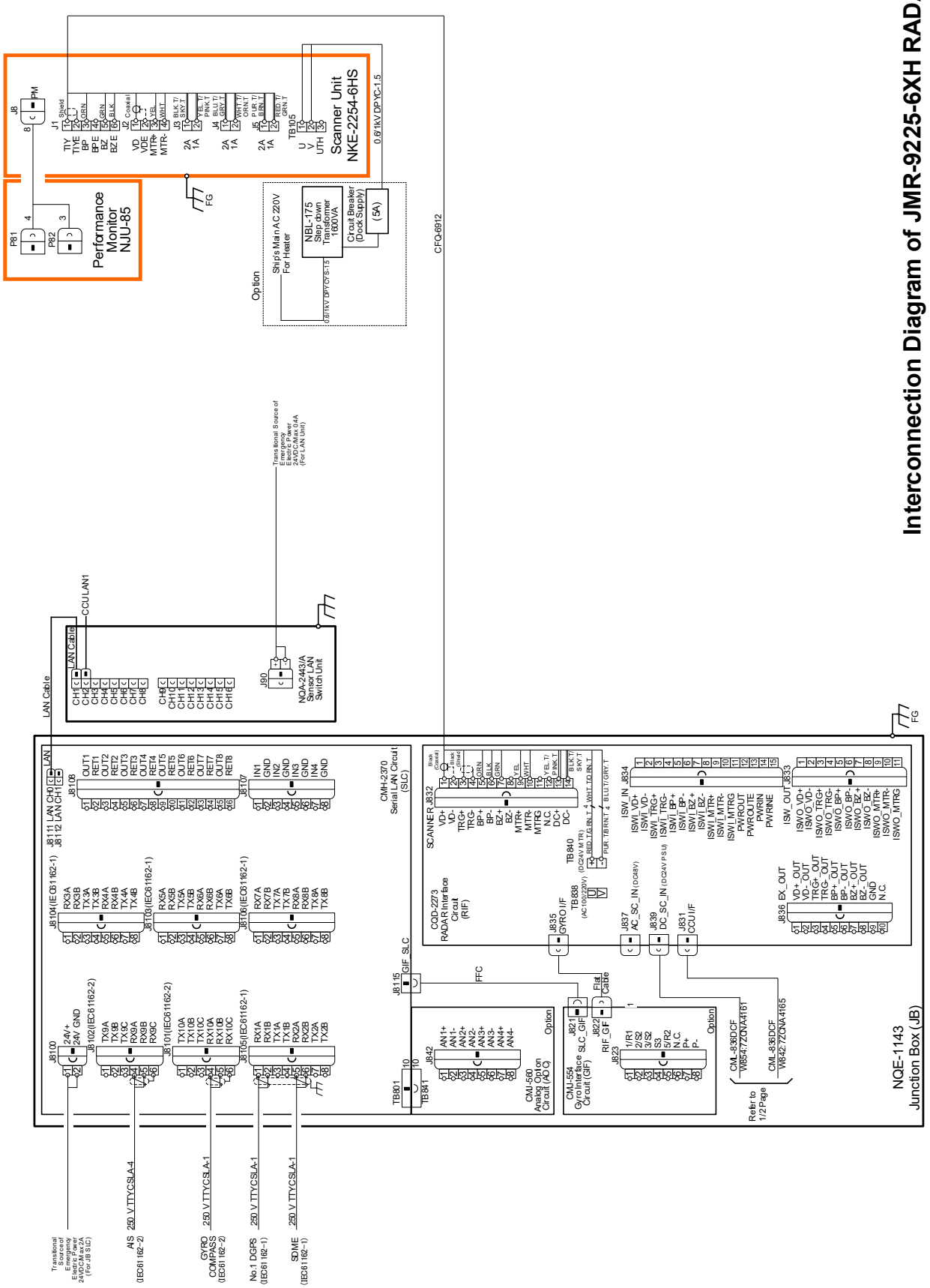

Interconnection Diagram of JMR-9225-6X/9X RADAR (2/2)
Scanner Unit NKE-1125/A-61/62-91/92
Performance Monitor NJU-85
Option
Ship's Main AC 220V For Heater
NBL-175 Step-down Transformer 1800VA
Circuit Breaker (Dock Supply) (5A)
NQA-2443/A Sensor LAN Switch Unit
CCU LAN1
LAN Cable
NQE-1143 Junction Box (JB)
COD-2273 RADAR Interface Circuit (RIF)
CMH-2370 Serial LAN Circuit (SLC)
CMU-560 Analog Option Circuit (AOC)
CMU-554 Gyro Interface Circuit (GIF)
CIM-836/ACF W842:7ZDNA4165
CIM-836/ACF W852:7ZDNA4159
Refer to 1/2 Page
GYRO COMPASS (IEC61162-2)
AIS (IEC61162-2)
No.1 DGPS (IEC61162-1)
SDME (IEC61162-1)
250 V TTYCSLA-4
250 V TTYCSLA-1
Transitional Source of Emergency Electrical Power 24VDC Max 2A (For JB SLC)
Transitional Source of Emergency Electrical Power 24VDC Max 4A (For LAN Unit)
0.6/1kV DPYCY-1.5
0.6/1kV DPYCY-S-1.5
H-2695110056

6.5.3 JMR-9225-6XH

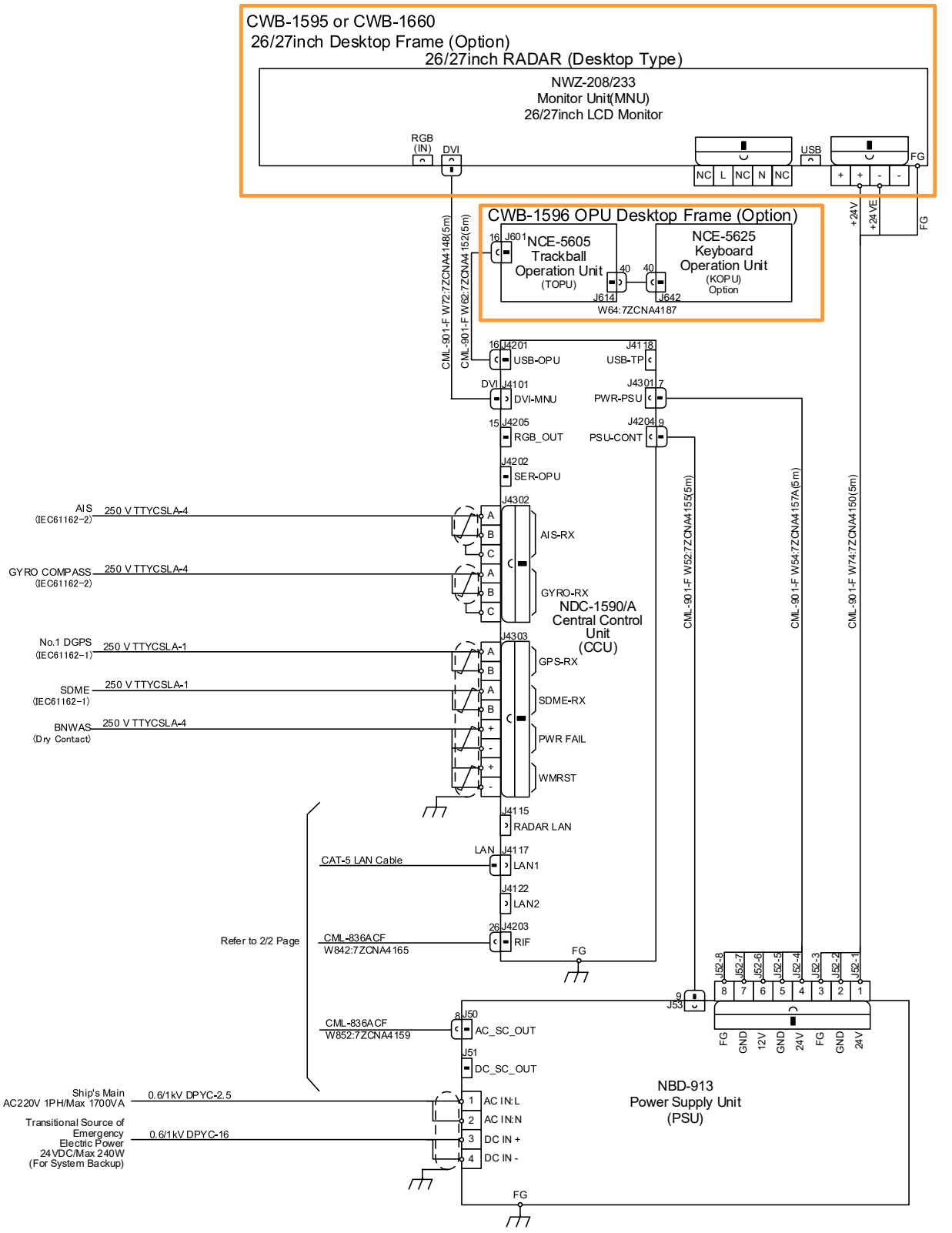


Interconnection Diagram of JMR-9225-6XH RADAR (1/2)

Interconnection Diagram of JMR-9225-6XH RADAR (2/2)

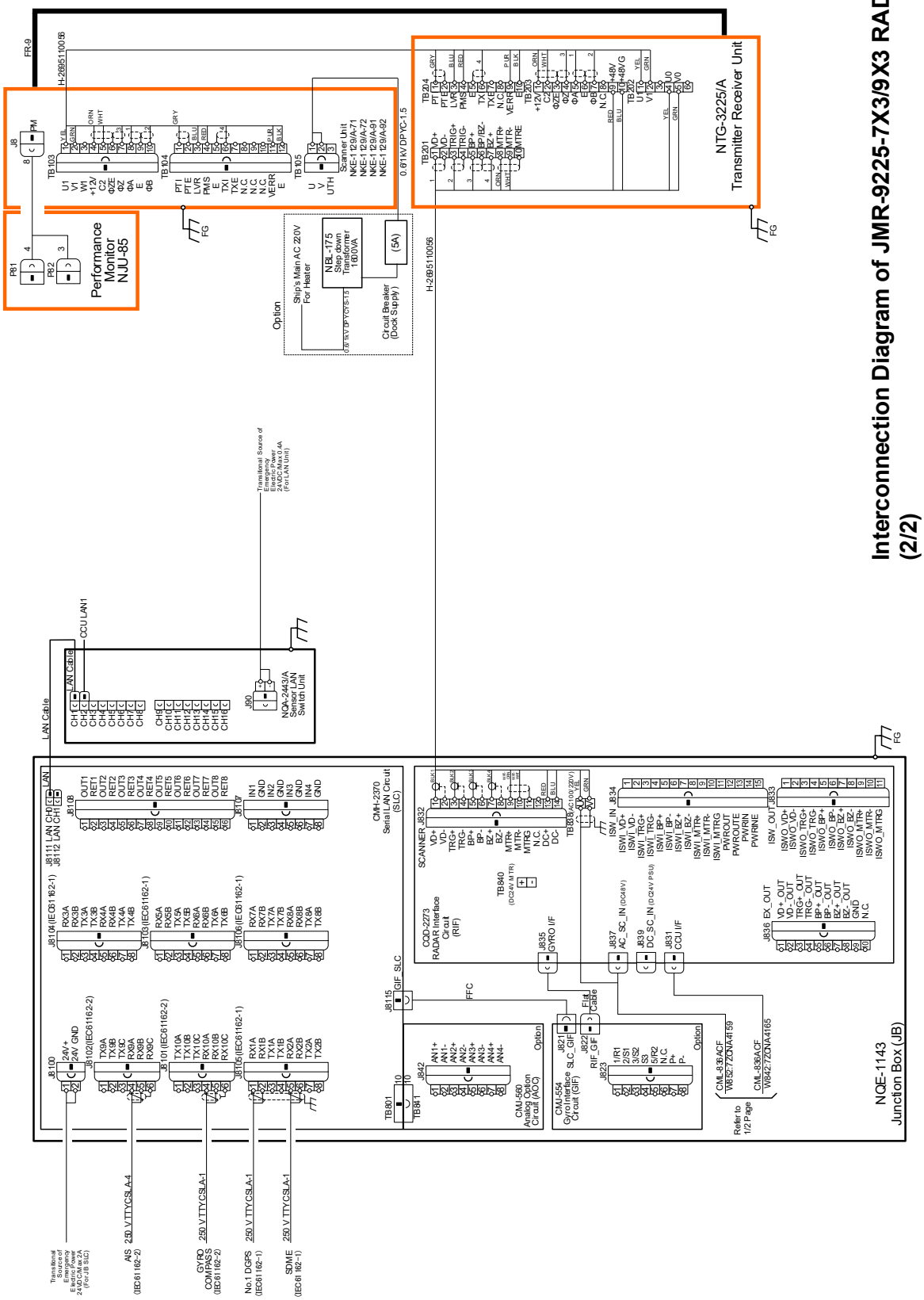


6.5.4 JMR-9225-7X3/9X3

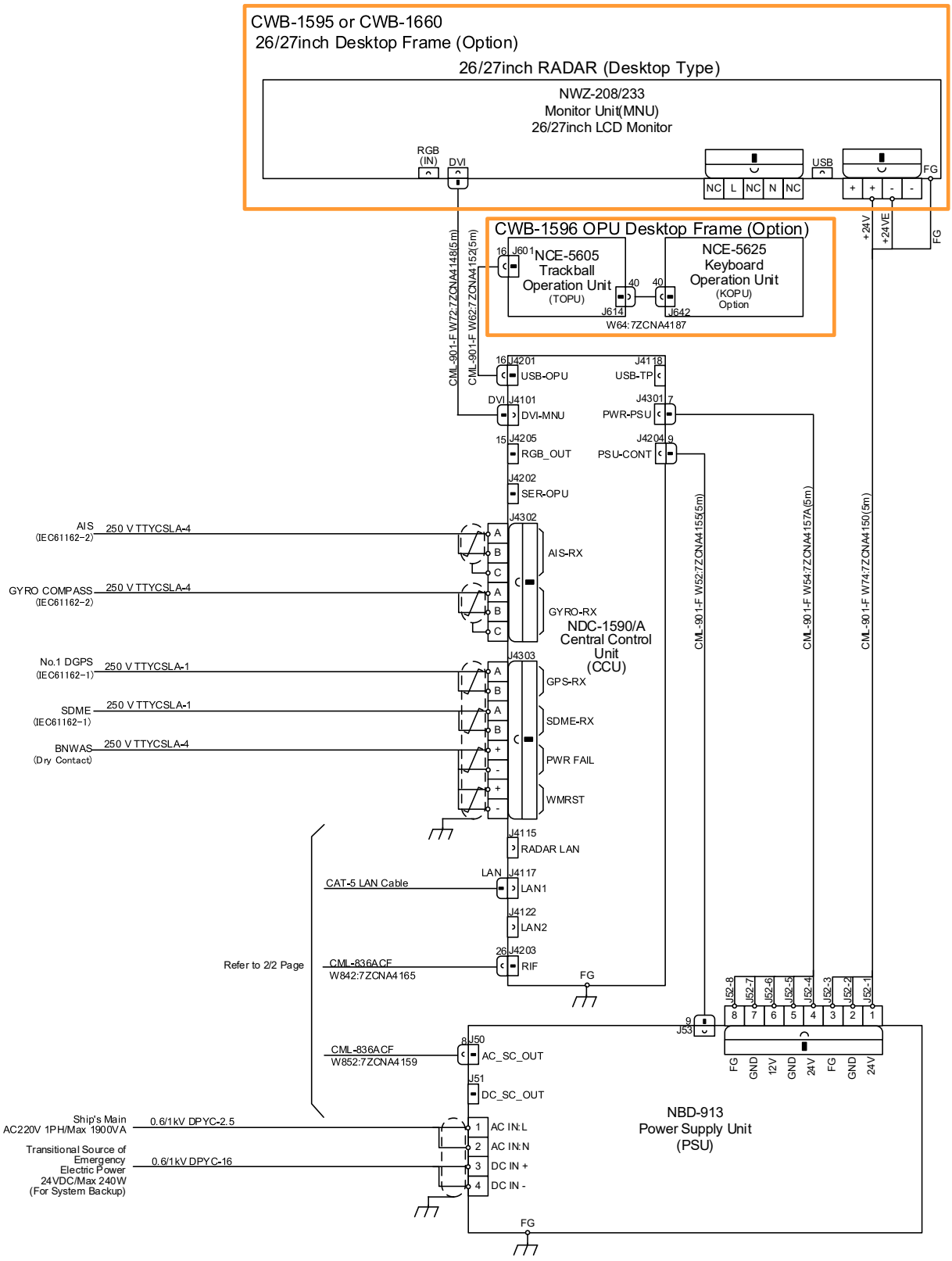


Interconnection Diagram of JMR-9225-7X3/9X3 RADAR (1/2)

Interconnection Diagram of JMR-9225-7X3/9X3 RADAR (2/2)

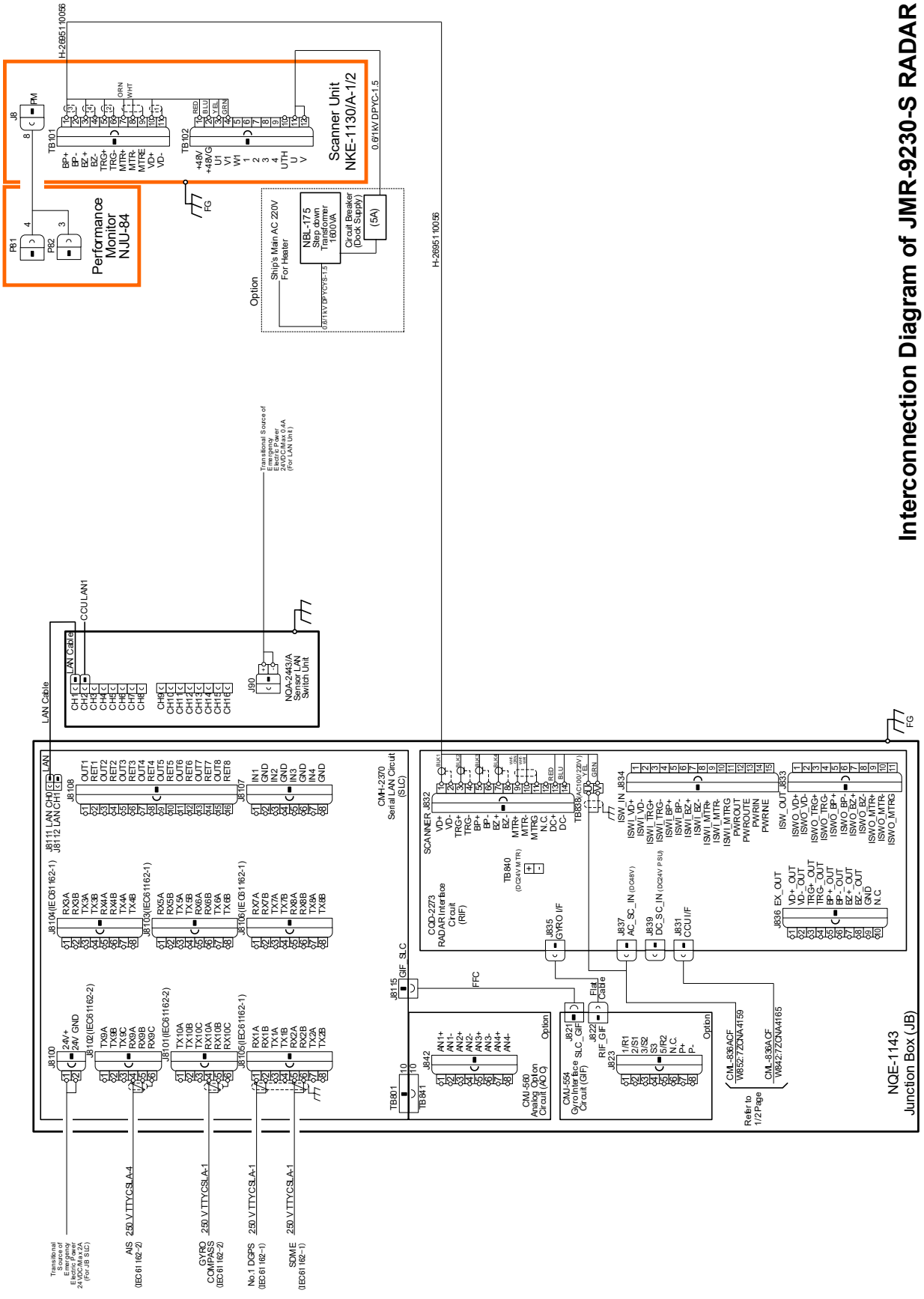


6.5.5 JMR-9230-S

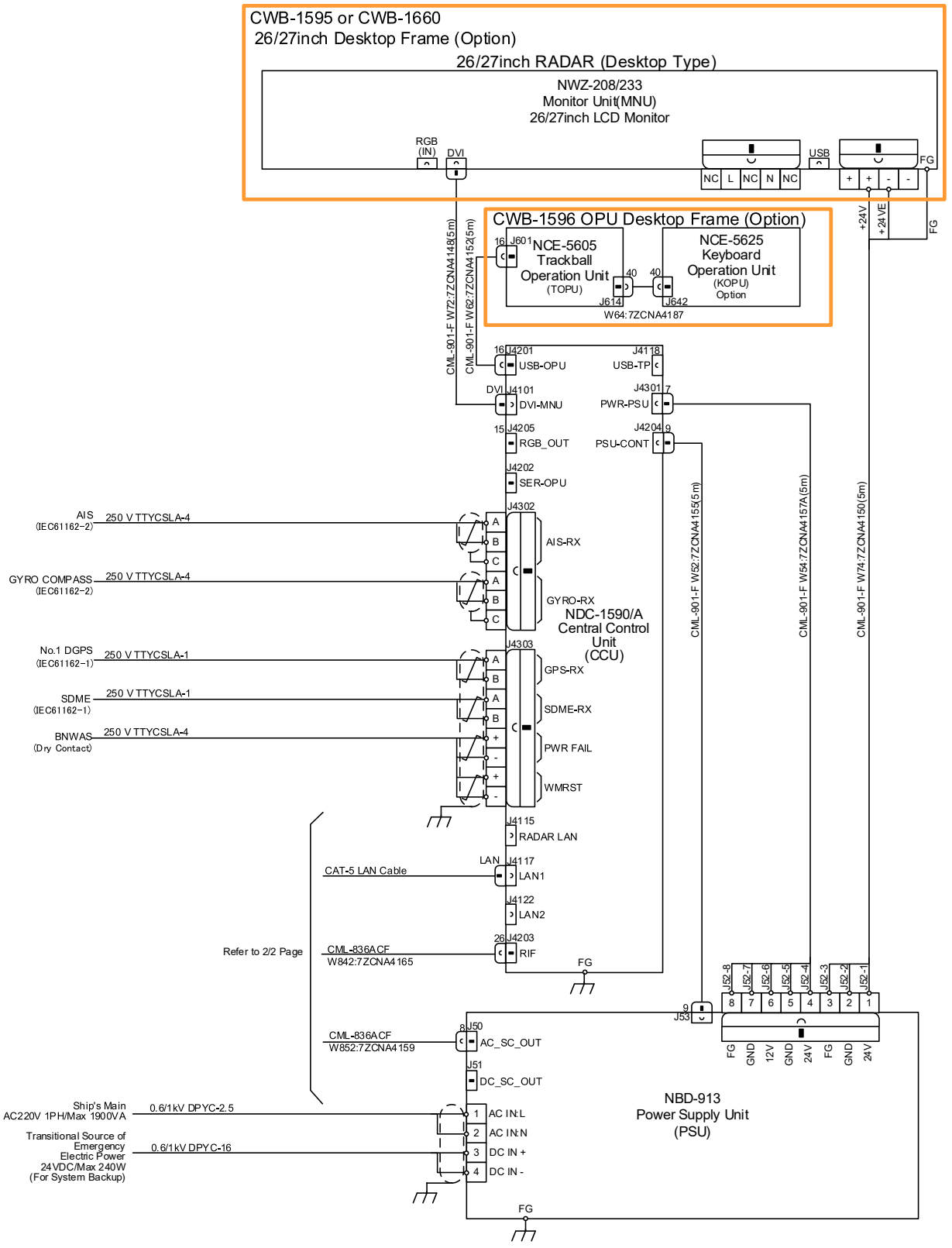


Interconnection Diagram of JMR-9230-S RADAR (1/2)

Interconnection Diagram of JMR-9230-S RADAR (2/2)

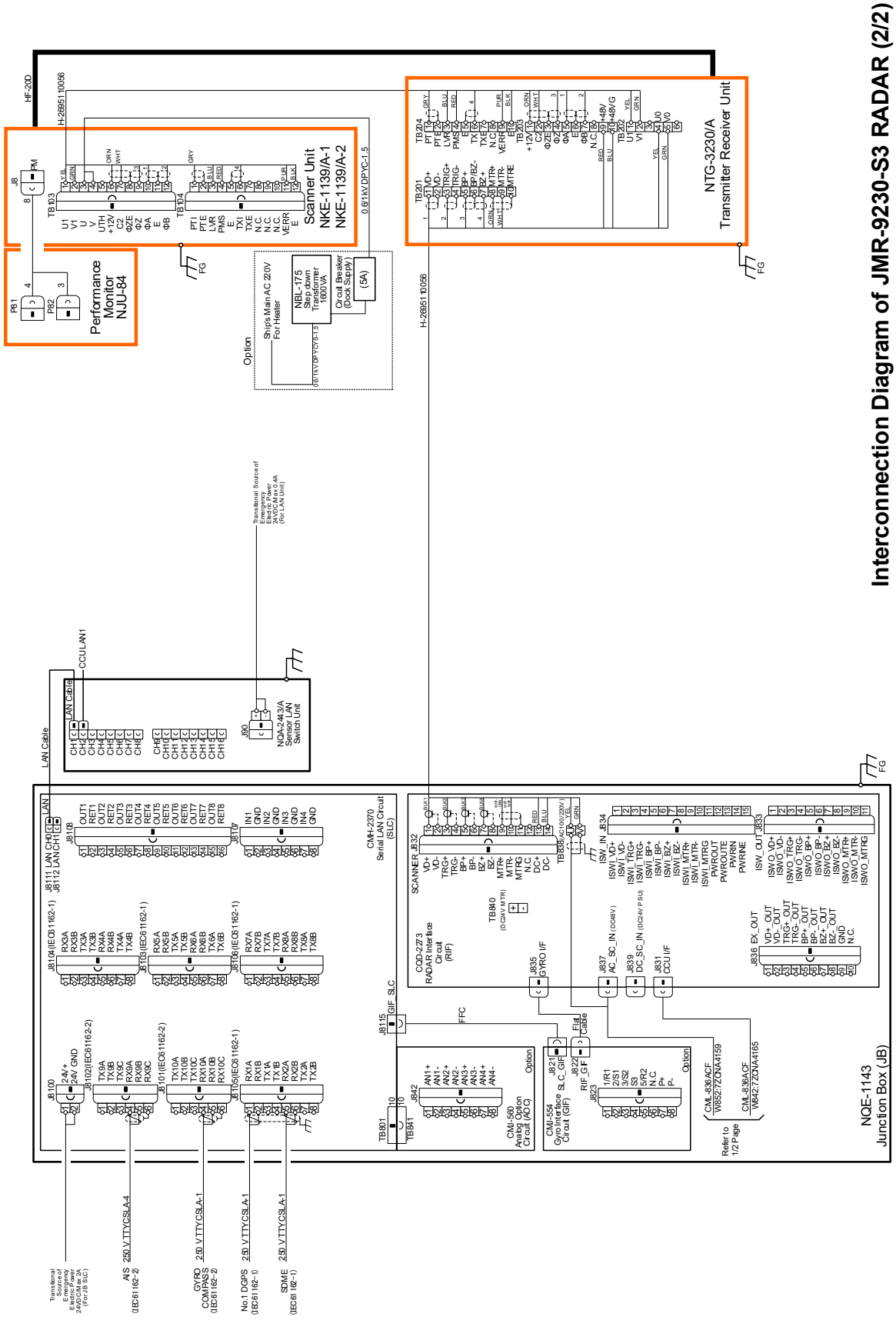


6.5.6 JMR-9230-S3

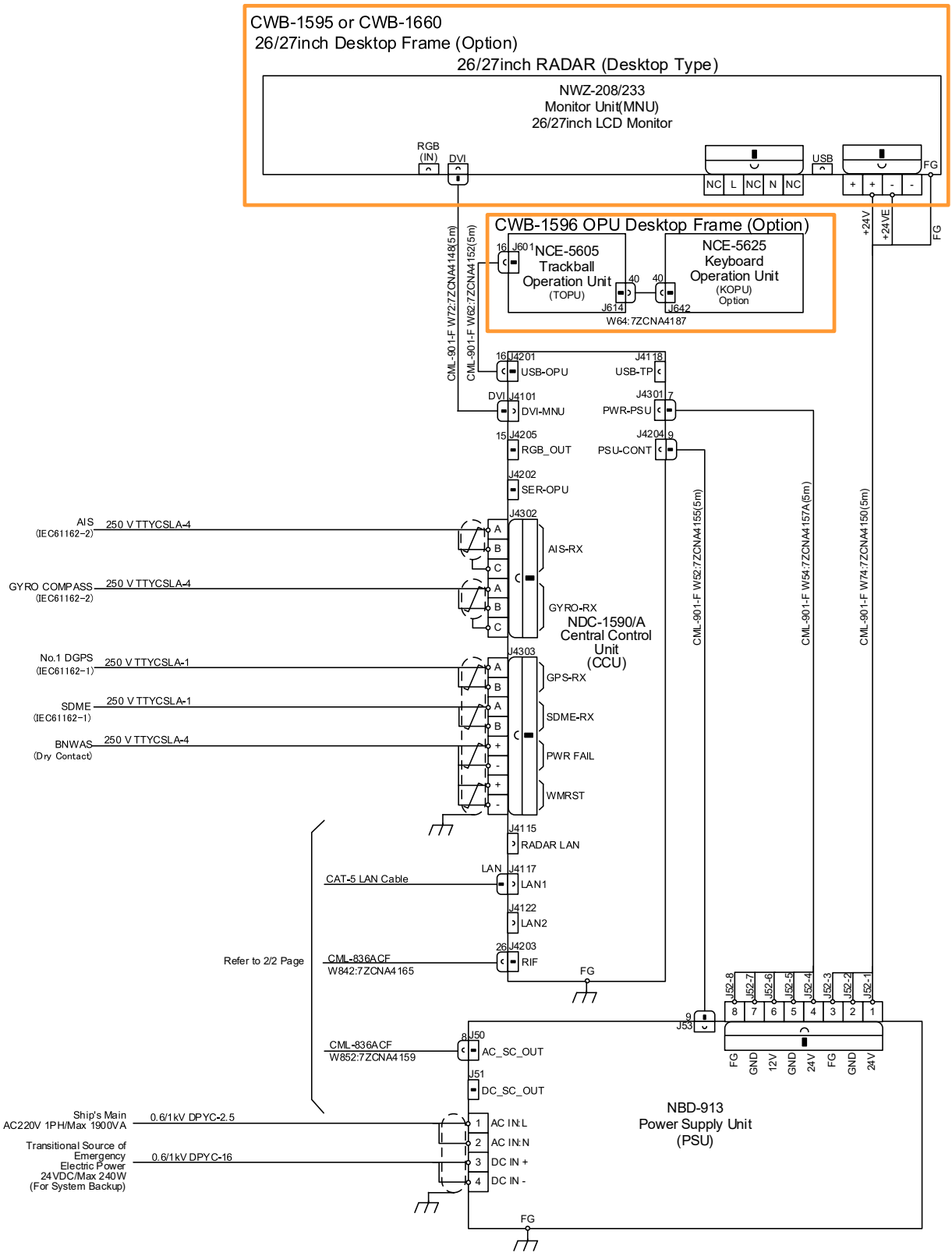


Interconnection Diagram of JMR-9230-S3 RADAR (1/2)

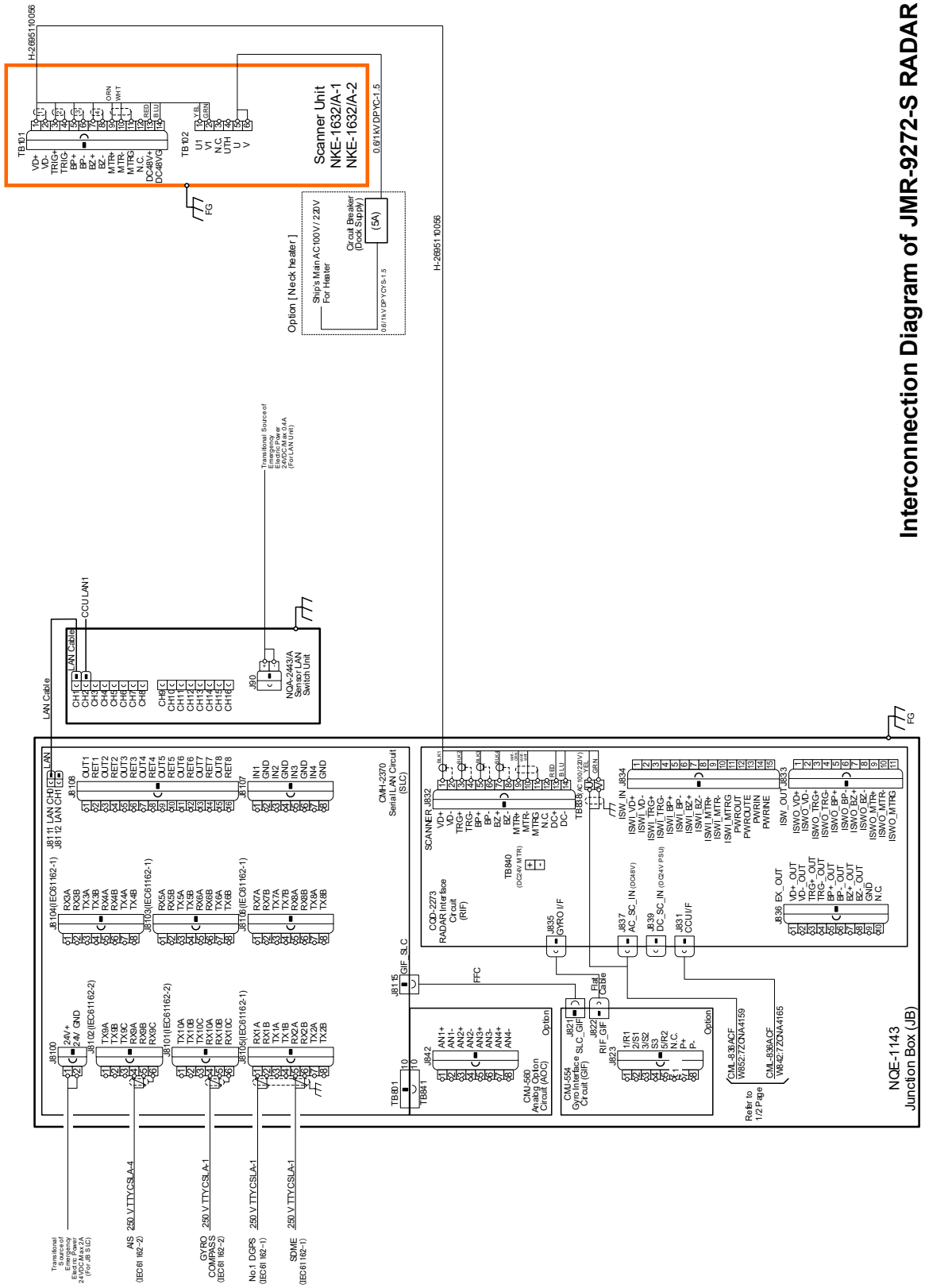
Interconnection Diagram of JMR-9230-S3 RADAR (2/2)



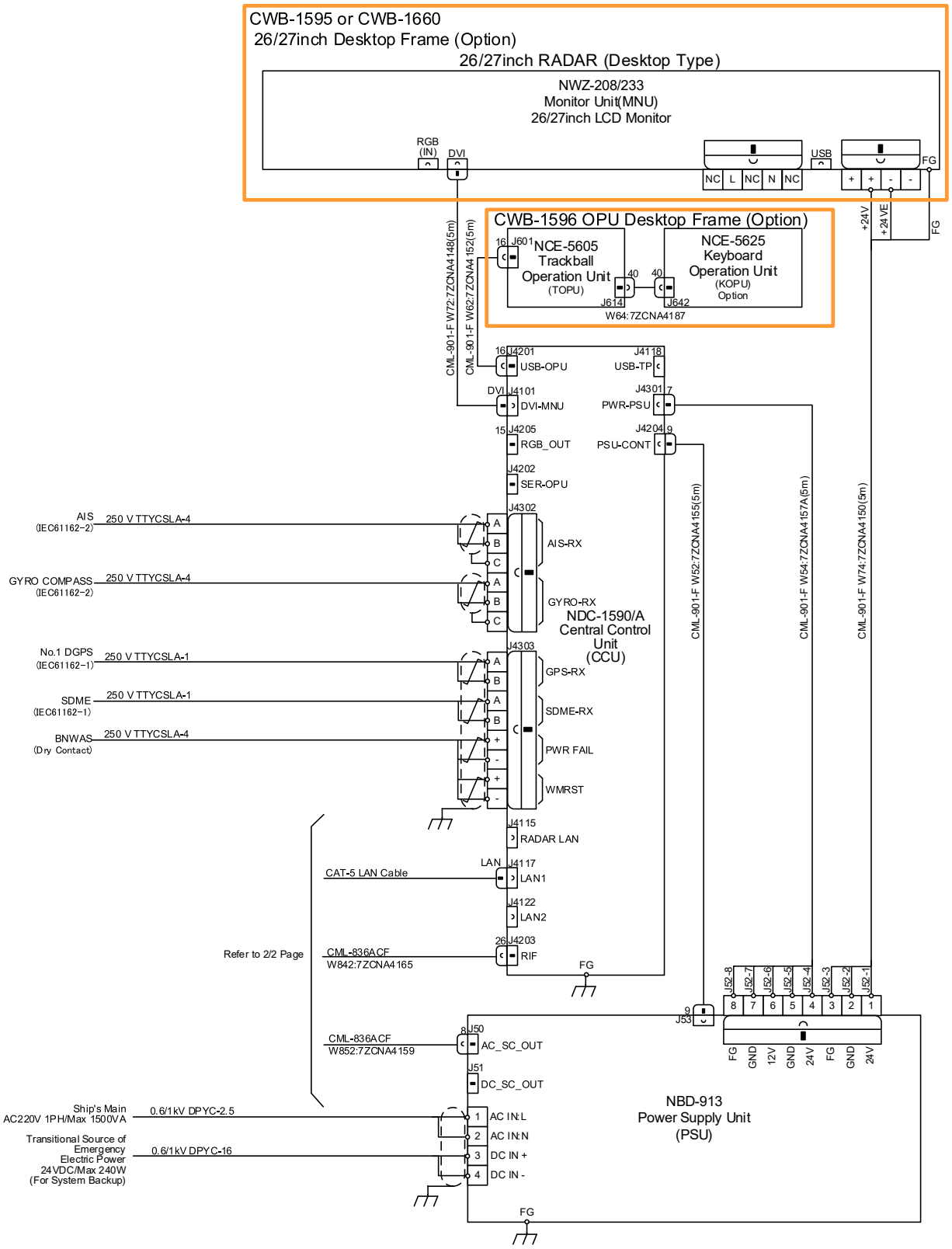
6.5.7 JMR-9272-S



Interconnection Diagram of JMR-9272-S RADAR (1/2)

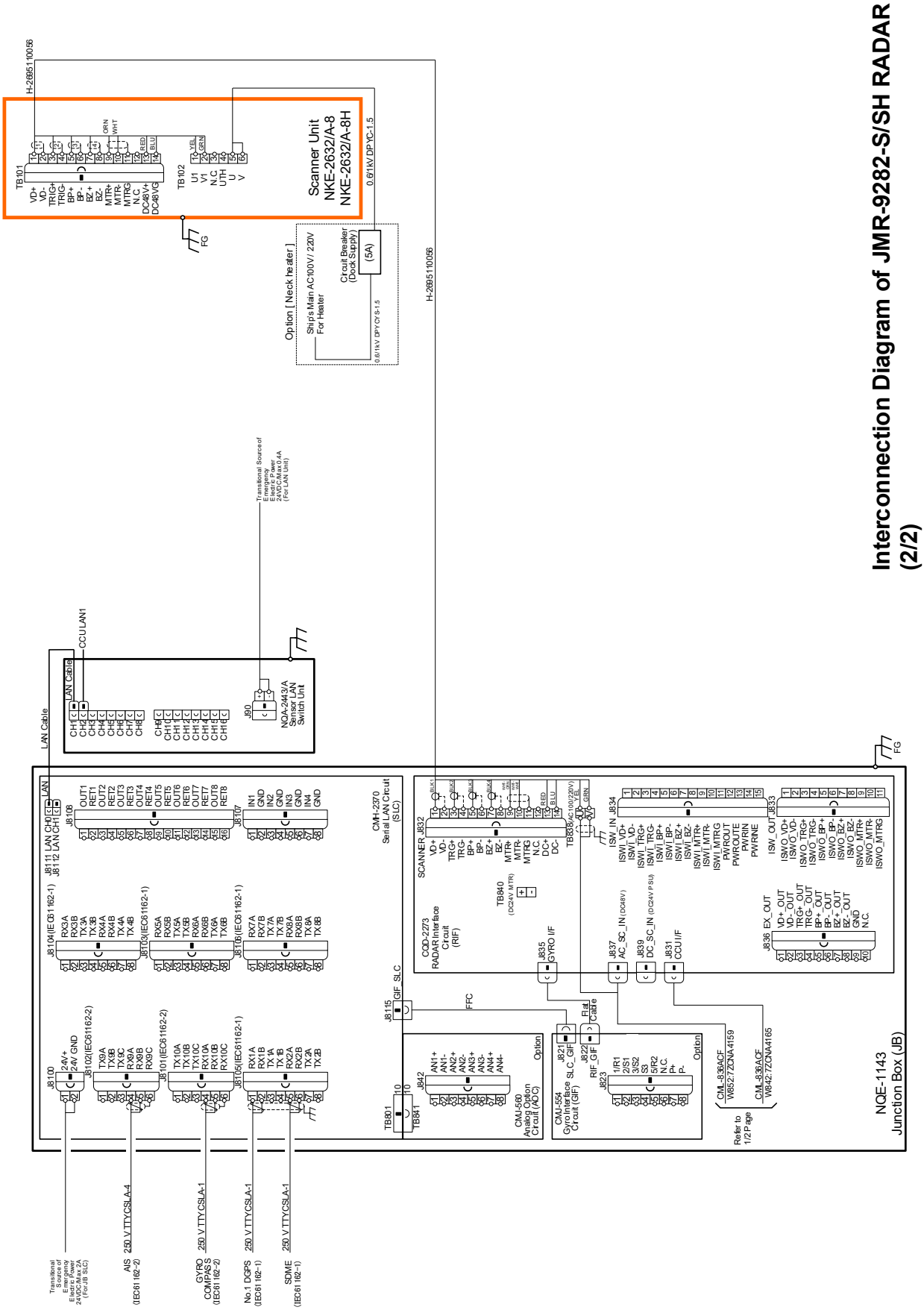

Interconnection Diagram of JMR-9272-S RADAR (2/2)
Scanner Unit
NKE-1632/A-1
NKE-1632/A-2
H-269511056
0.6/1kV DPYC-1.5
TB101
TB102
Option [Neck heater]
Ship's Main AC100V / 220V
For Heater
Circuit Breaker
(Dock Supply)
(5A)
0.6/1 kV DPYC/S-1.5
CCU LAN1
LAN Cable
NQA-2443/A
Sensor LAN
Switch Unit
Transitional Source of
Electric Power
EC/IEC 60945 4.6.4
(For LAN Unit)
NQE-1143
Junction Box (JB)
CMH-2370
Serial LAN Circuit
(SLC)
SCANNER J832
CCD-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
J836 EX_OUT
J833 ISW_OUT
J834 ISW_IN
J8100
J8102(IEC61162-2)
J8101(IEC61162-2)
J8105(IEC61162-1)
J8104(IEC61162-1)
J8103(IEC61162-1)
J8106(IEC61162-1)
J8111 LAN CH0
J8112 LAN CH1
J8108
J8107
J815
GIF SLC
FFC
Flat Cable
J842
CMJ-560
Analog Option
Circuit (AOC)
Option
J821
J822
RIF GIF
J823
CMJ-554
Gyro Interface
Circuit (GIF)
Option
CML-838/ACF
W852.7ZONA4159
CML-838/ACF
W842.7ZONA4165
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
Electrical Power
24VDC Max 4A
(For JB SLC)
FG

6.5.8 JMR-9282-S/SH

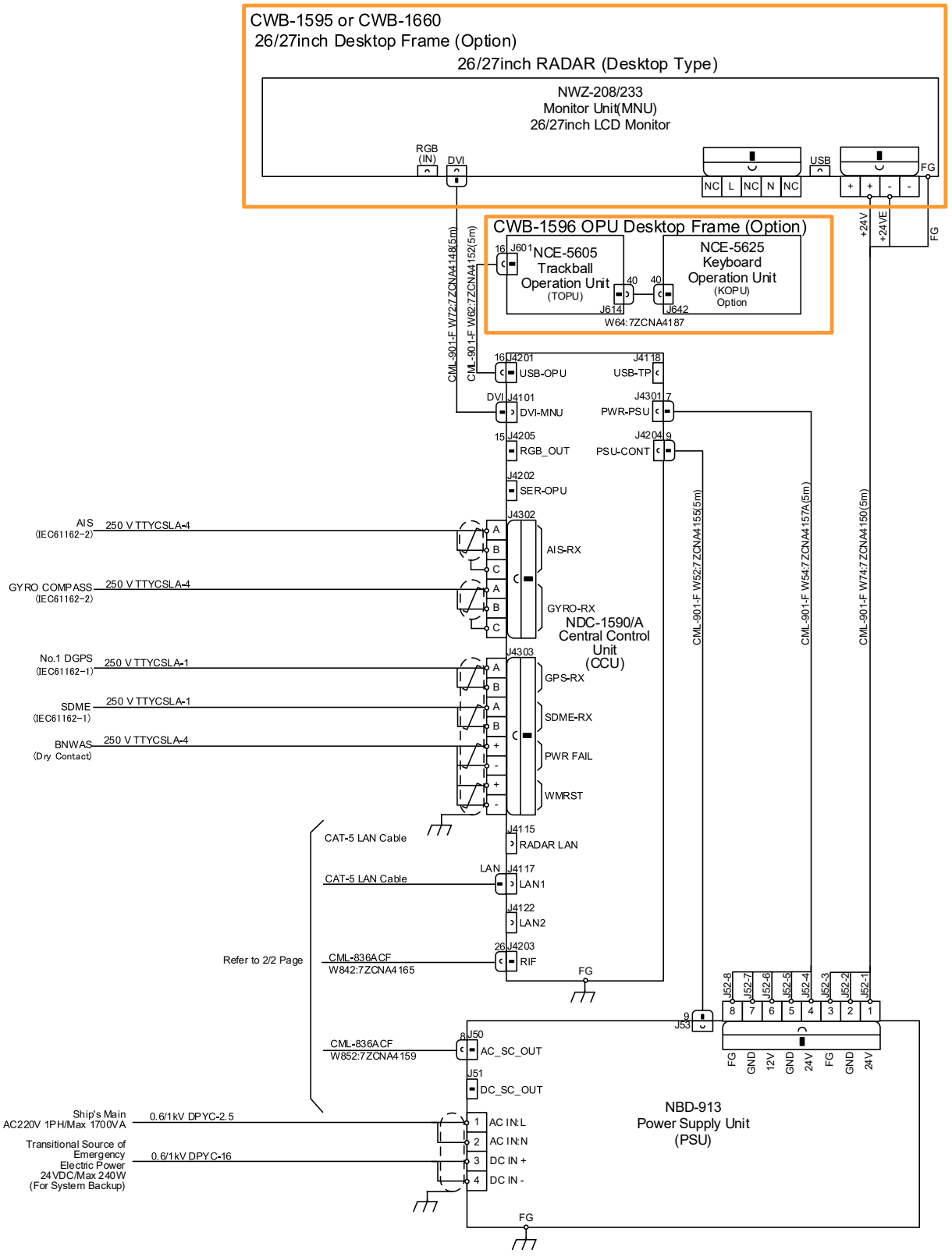


Interconnection Diagram of JMR-9282-S/SH RADAR (1/2)

Interconnection Diagram of JMR-9282-S/SH RADAR (2/2)

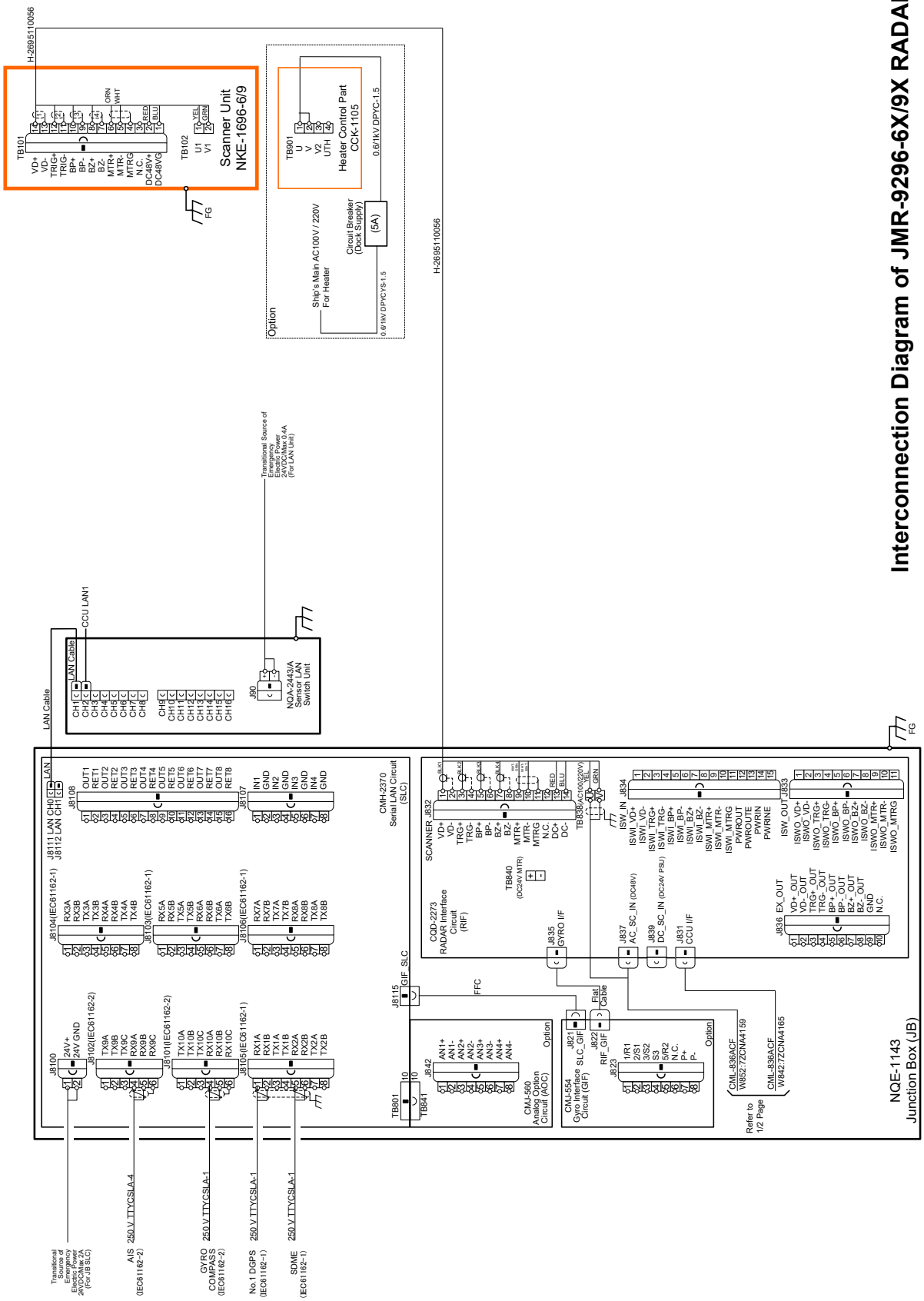


6.5.9 JMR-9296-6X/9X

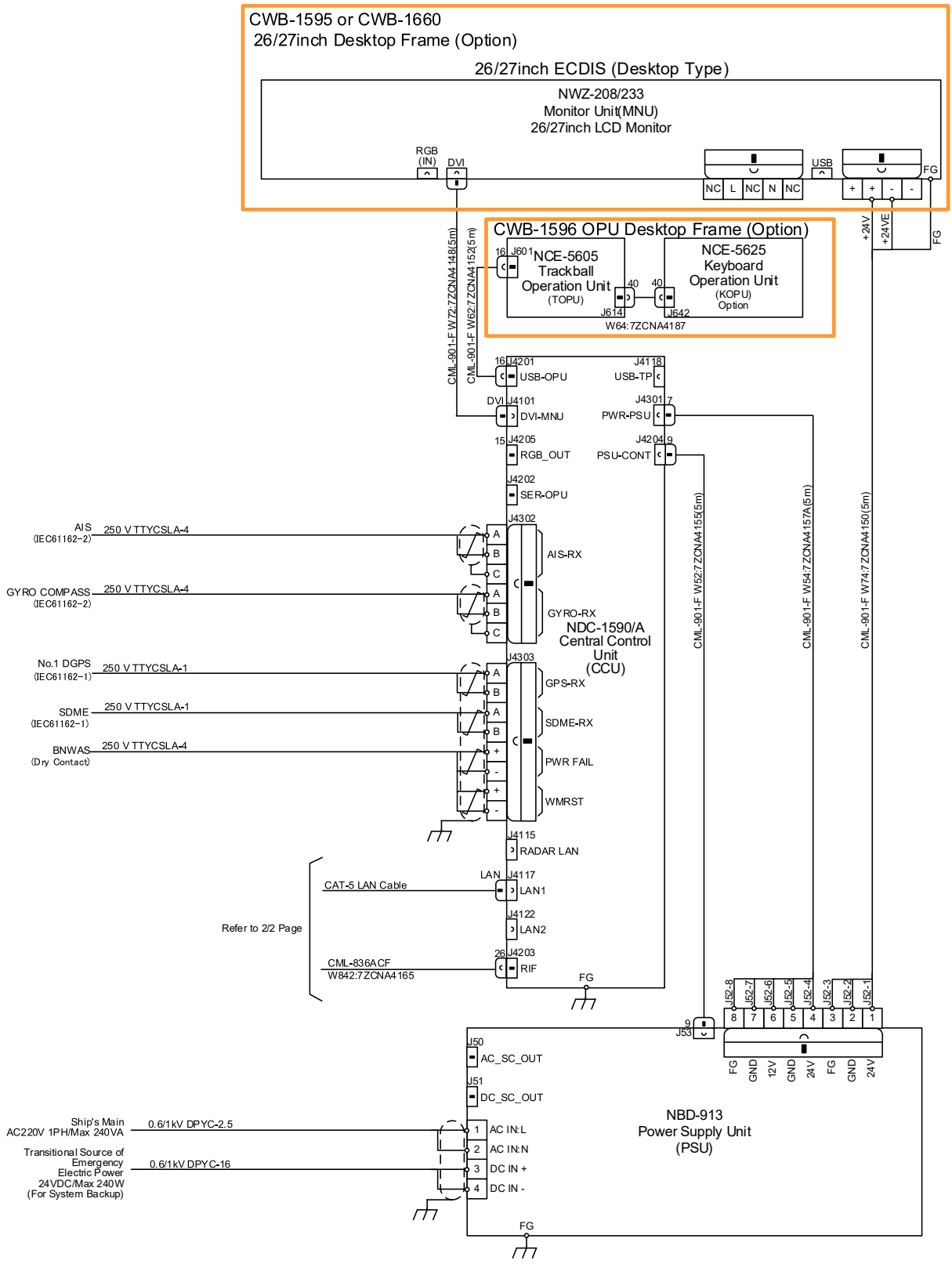


Interconnection Diagram of JMR-9296-6X/9X RADAR (1/2)

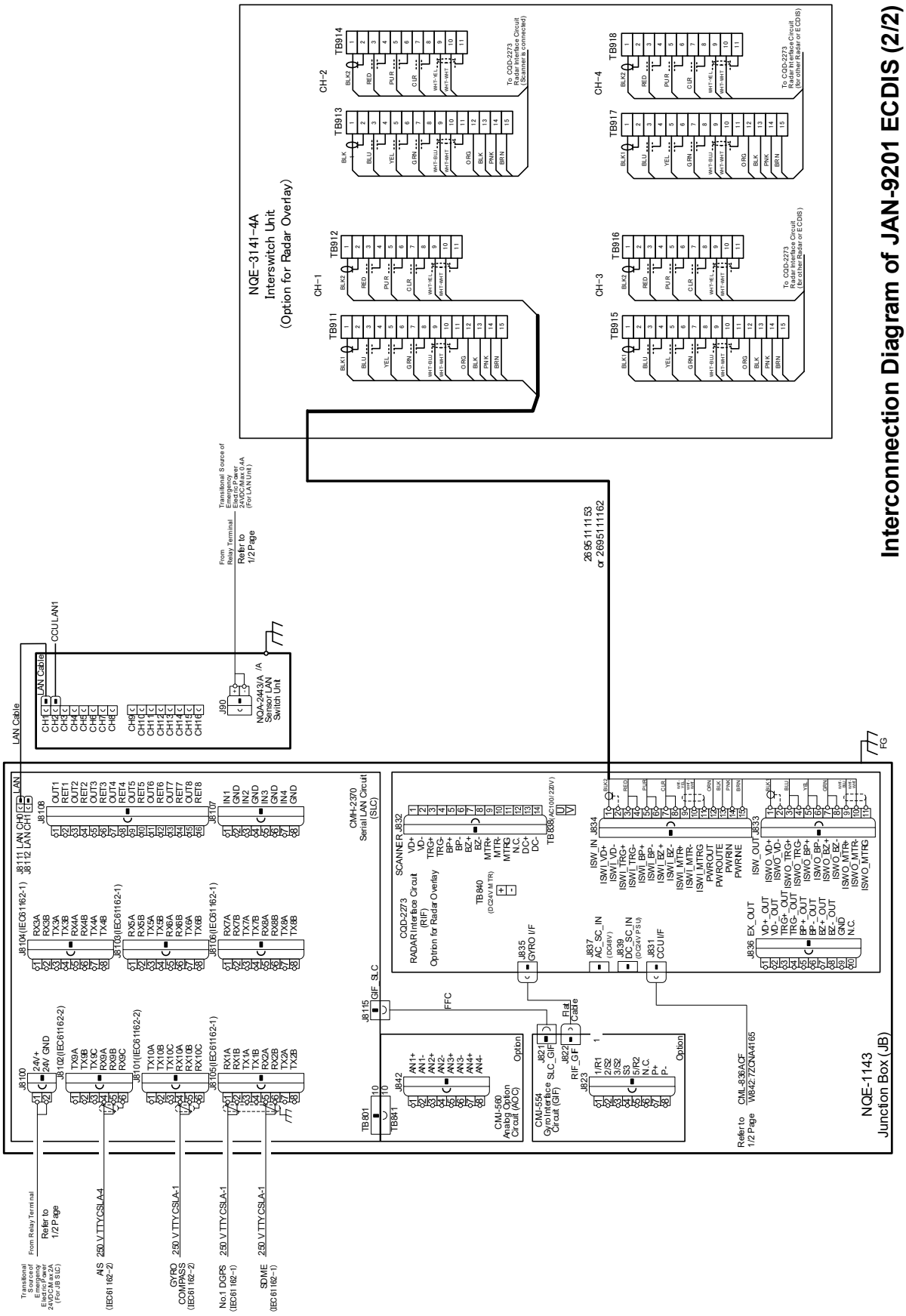
Interconnection Diagram of JMR-9296-6X/9X RADAR (2/2)



6.5.10 JAN-9201

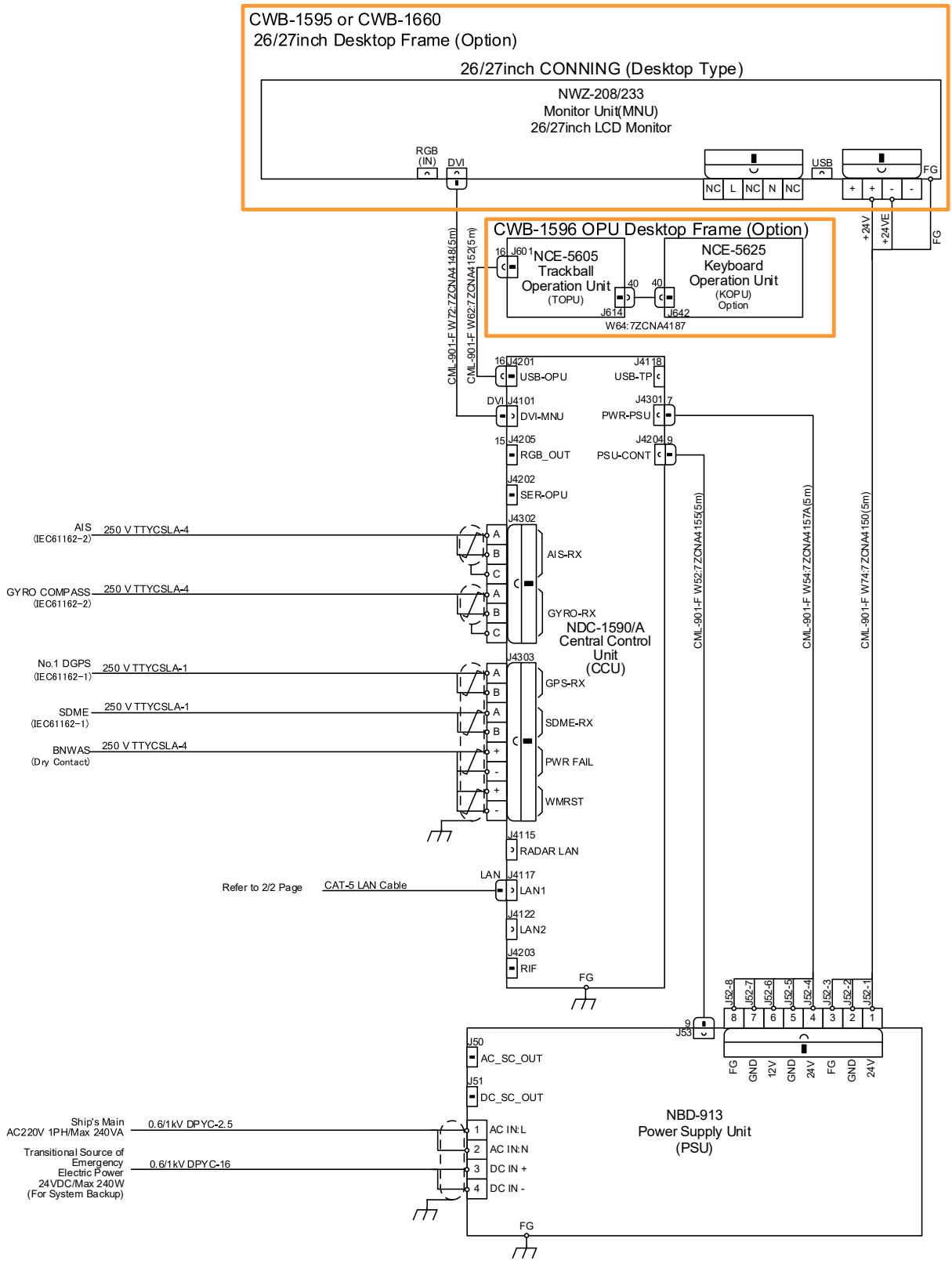


Interconnection Diagram of JAN-9201 ECDIS (1/2)



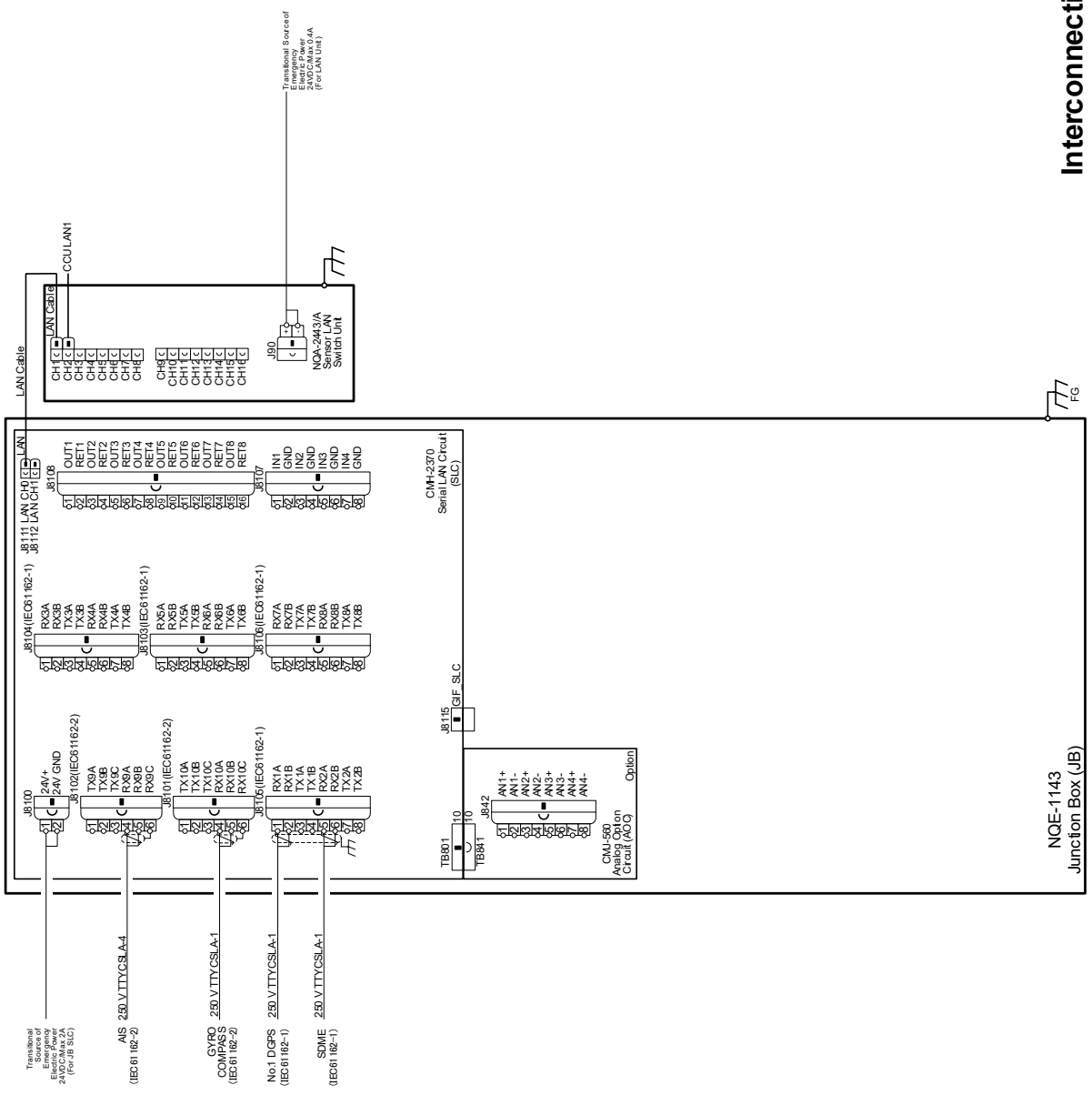
Interconnection Diagram of JAN-9201 ECDIS (2/2)

6.5.11 JAN-9202

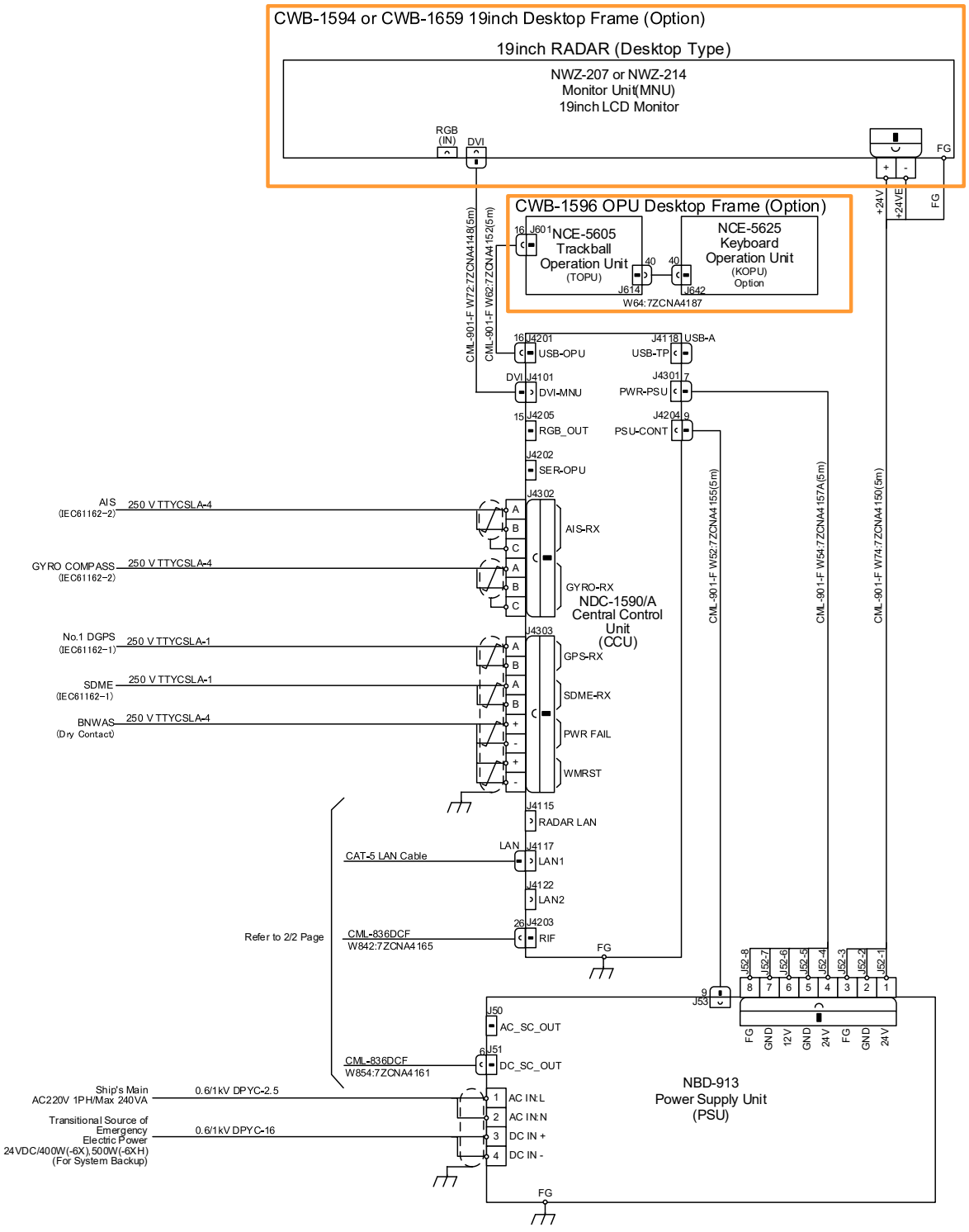


Interconnection Diagram of JAN-9202 CONNING (1/2)

Interconnection Diagram of JAN-9202 CONNING (2/2)

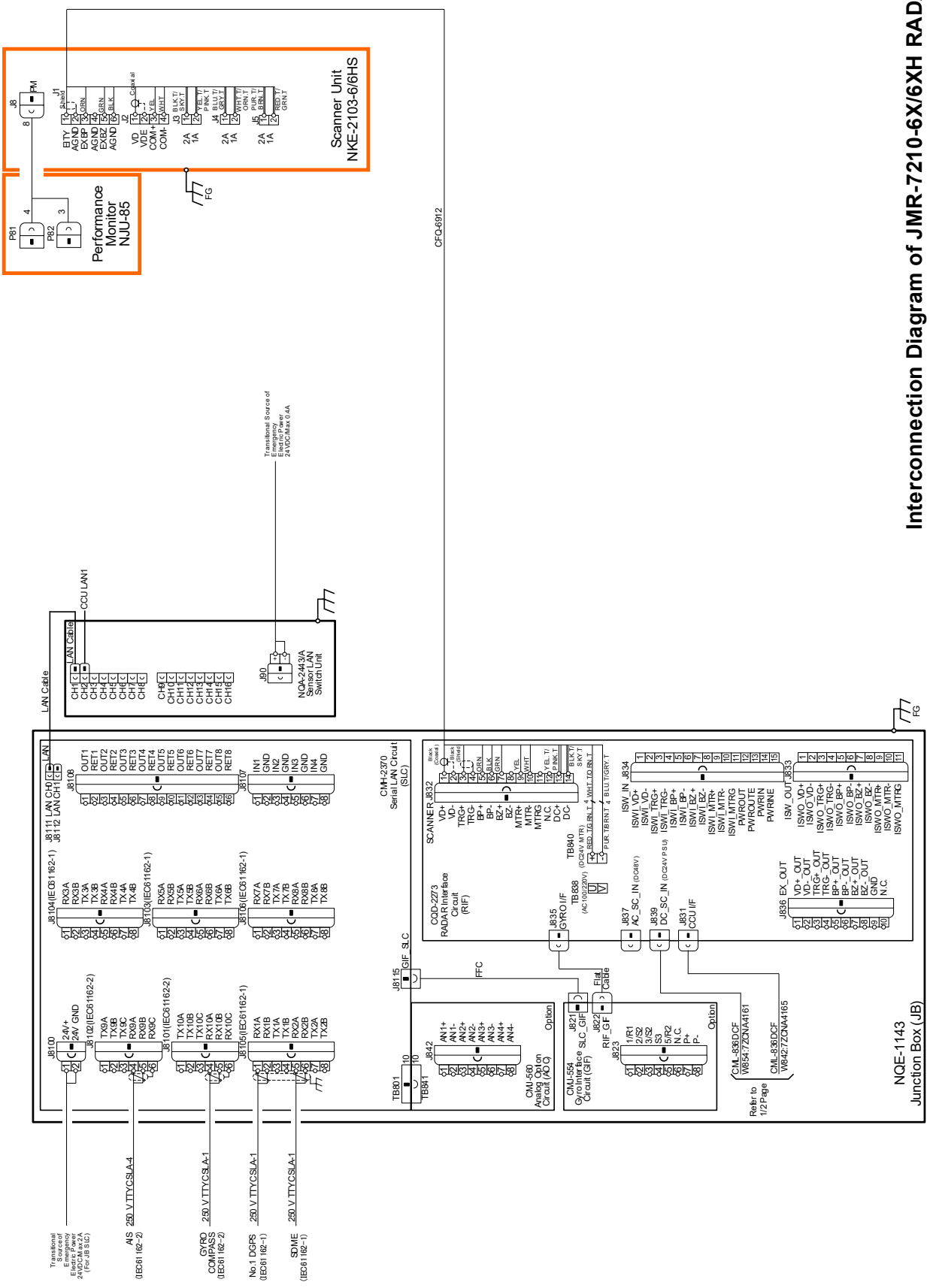


6.5.12 JMR-7210-6X/6XH

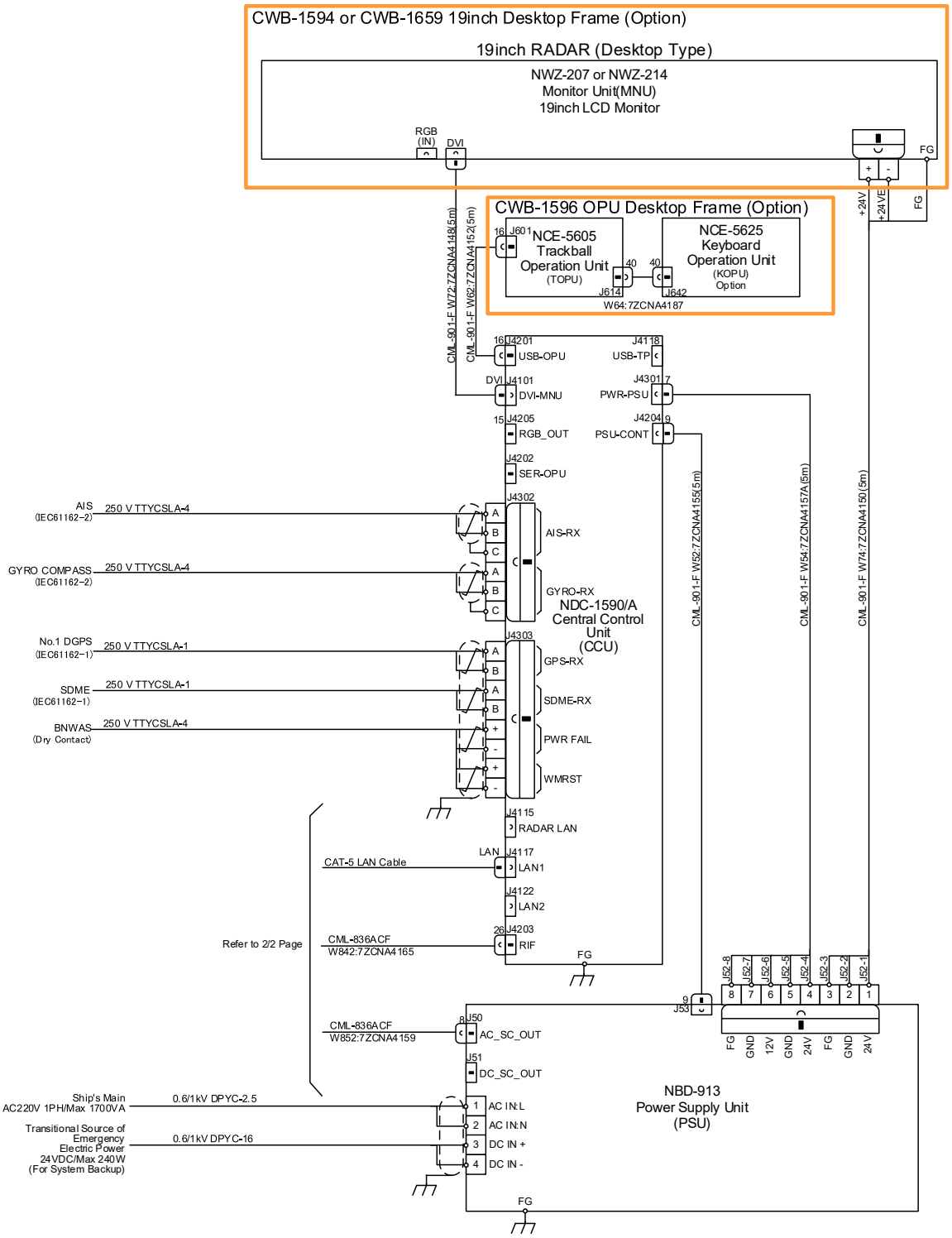


Interconnection Diagram of JMR-7210-6X/6XH RADAR (1/2)

Interconnection Diagram of JMR-7210-6X/6XH RADAR (2/2)

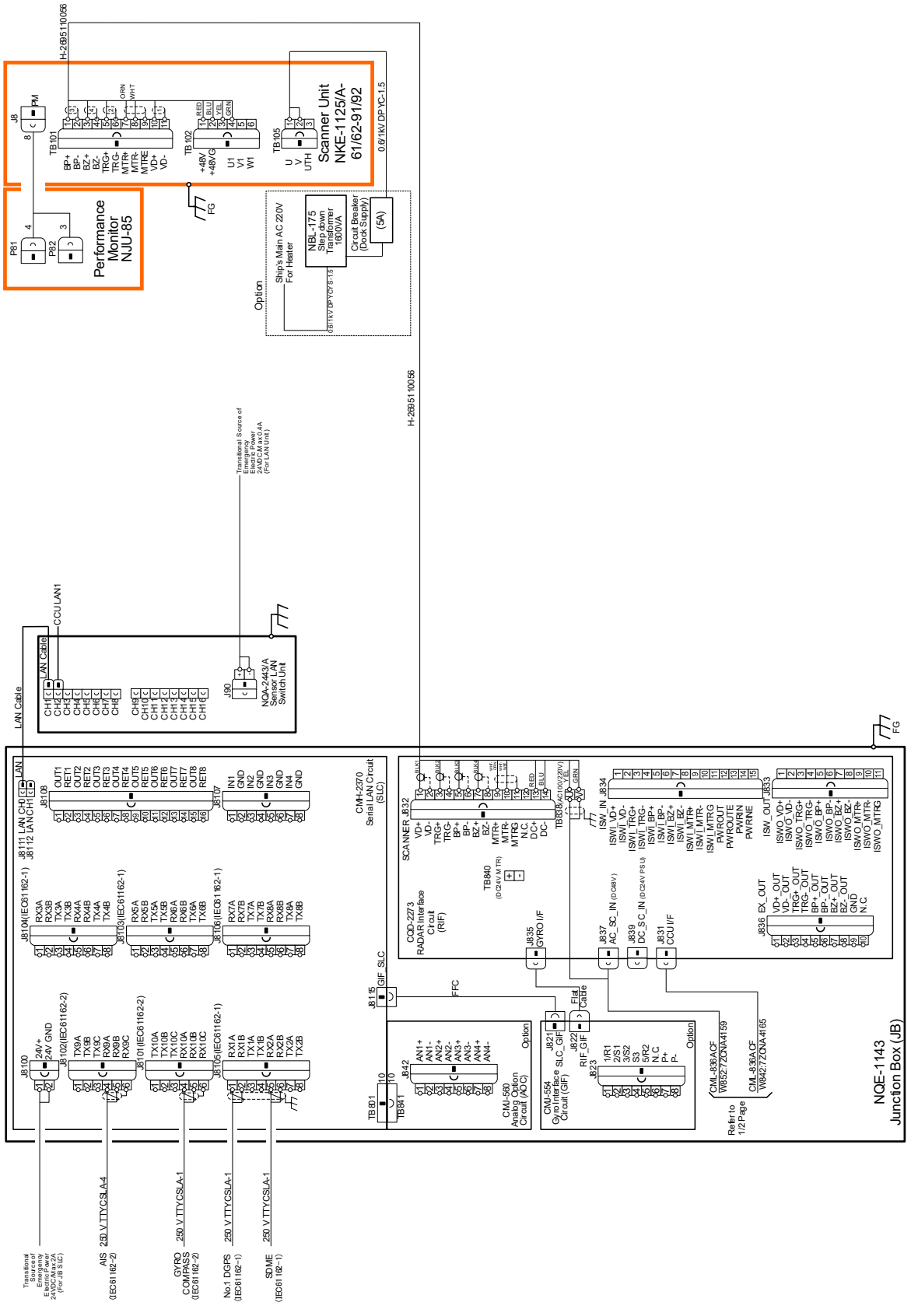


6.5.13 JMR-7225-6X/9X

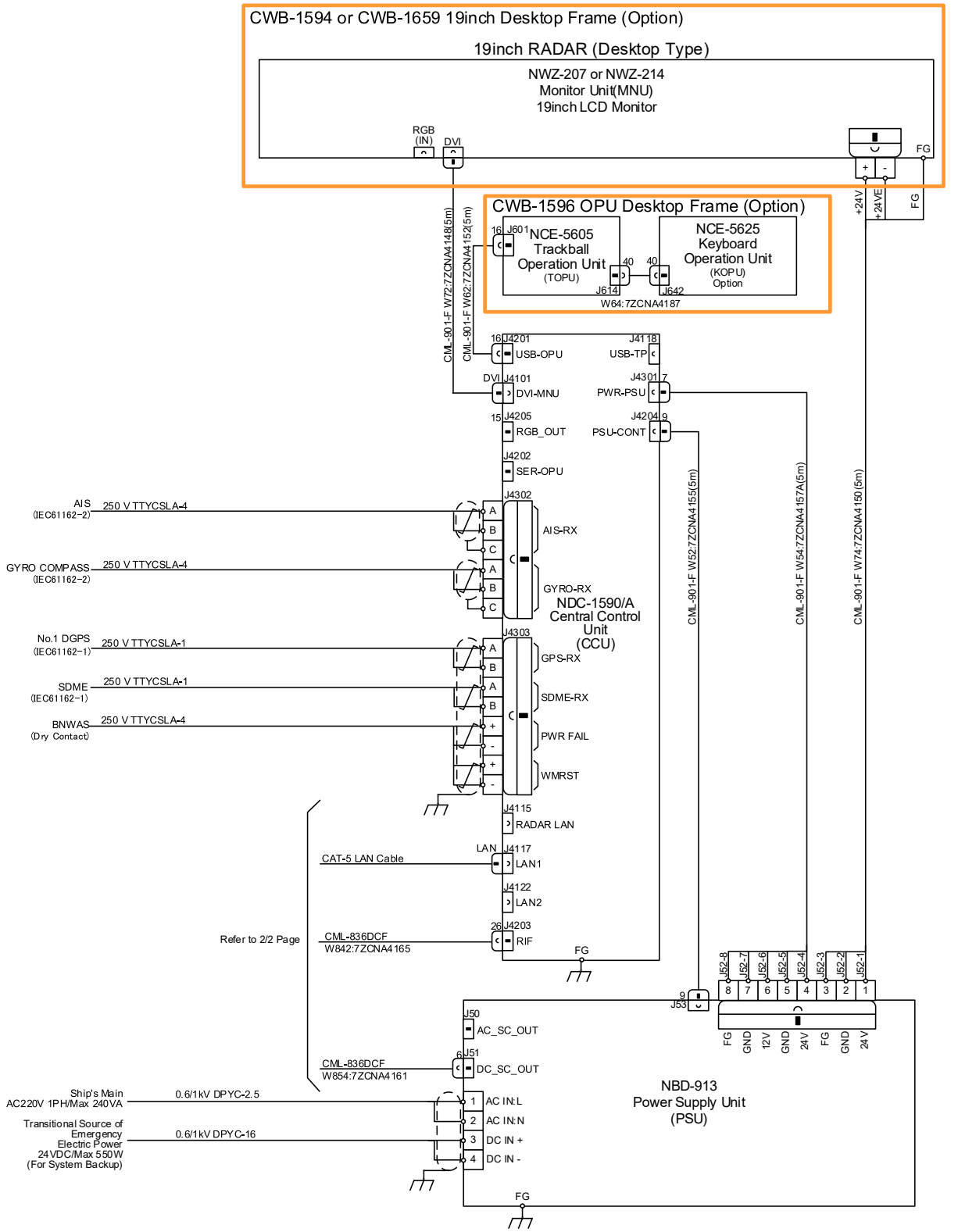


Interconnection Diagram of JMR-7225-6X/9X RADAR (1/2)

Interconnection Diagram of JMR-7225-6X/9X RADAR (2/2)

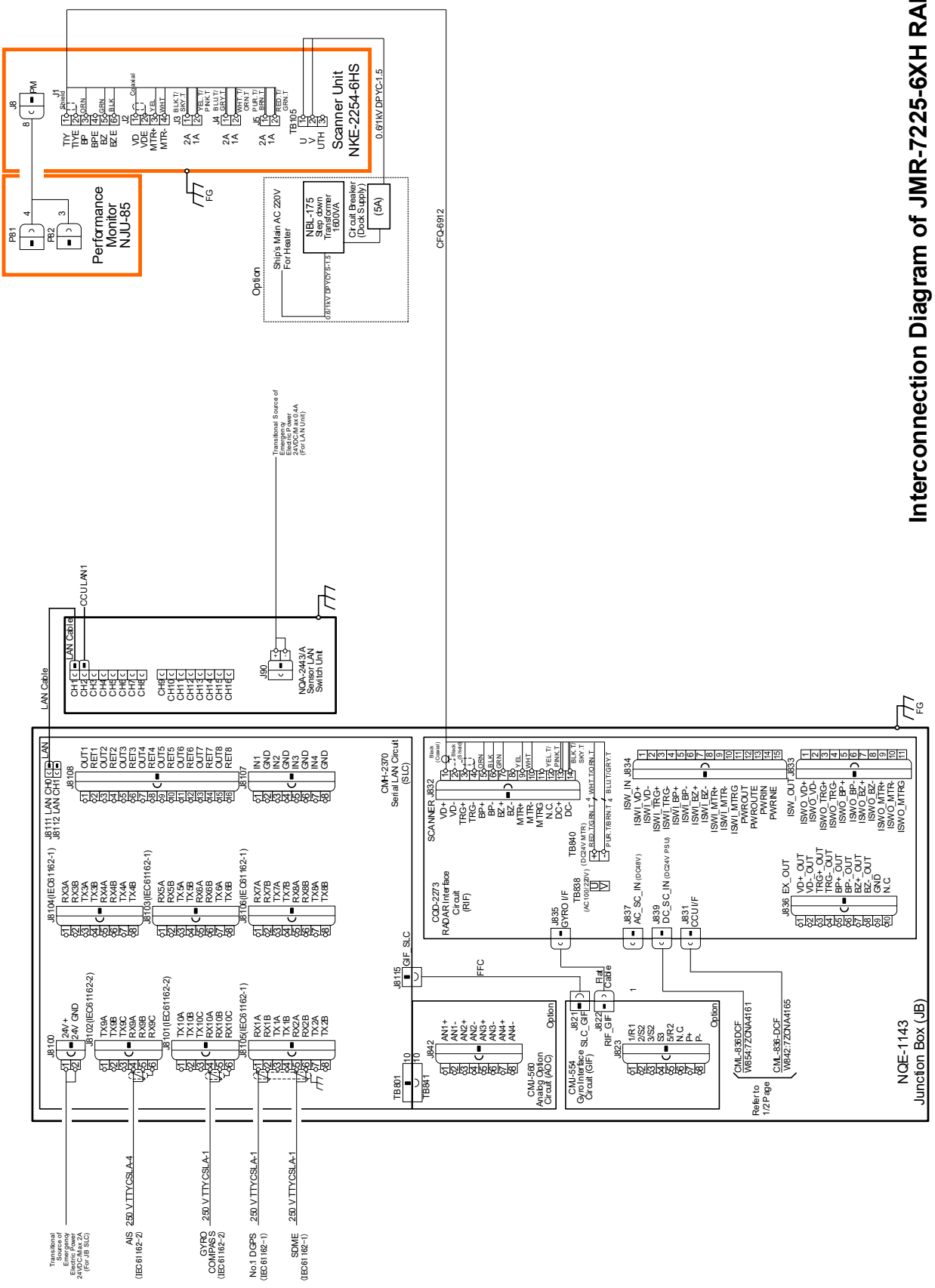


6.5.14 JMR-7225-6XH

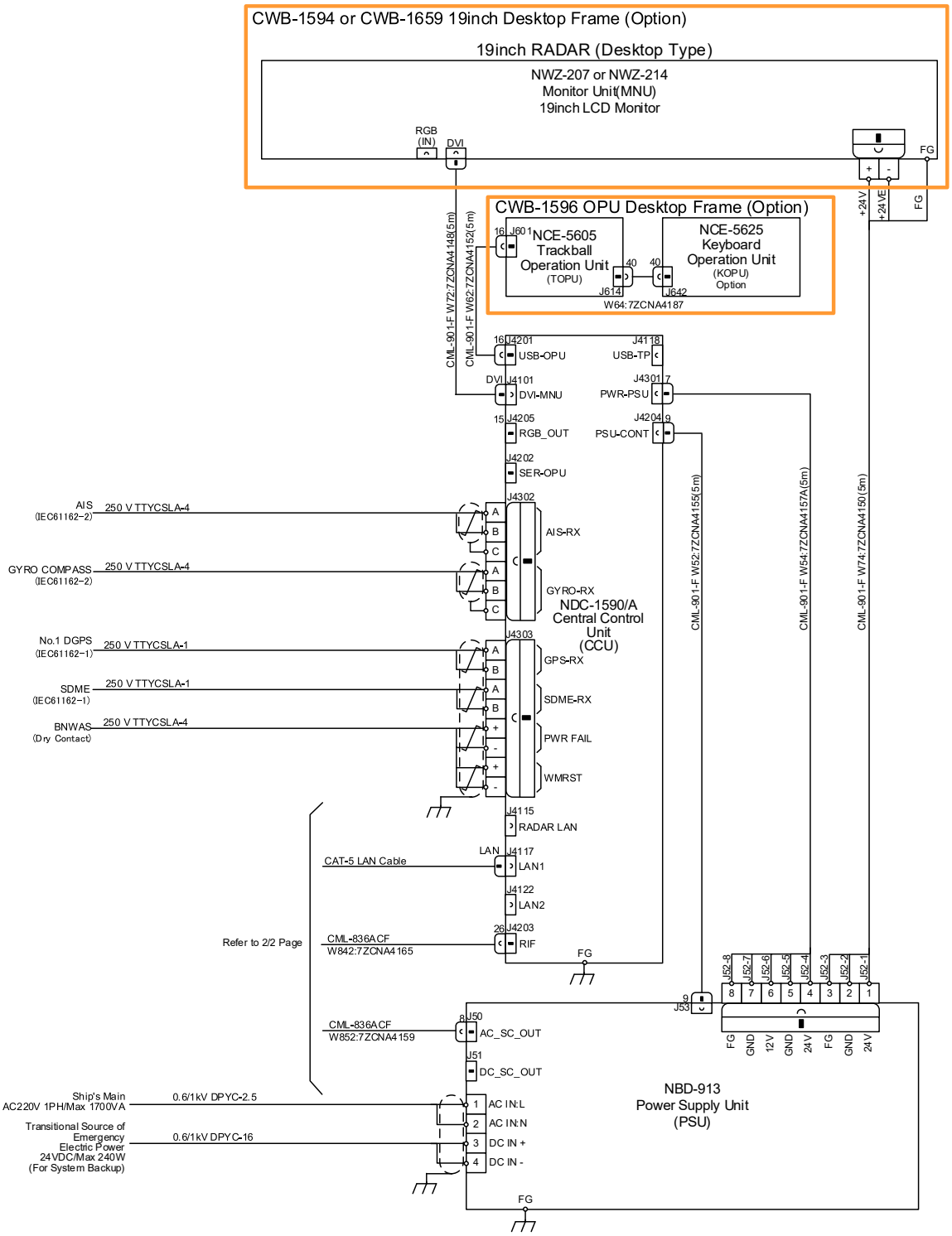


Interconnection Diagram of JMR-7225-6XH RADAR (1/2)

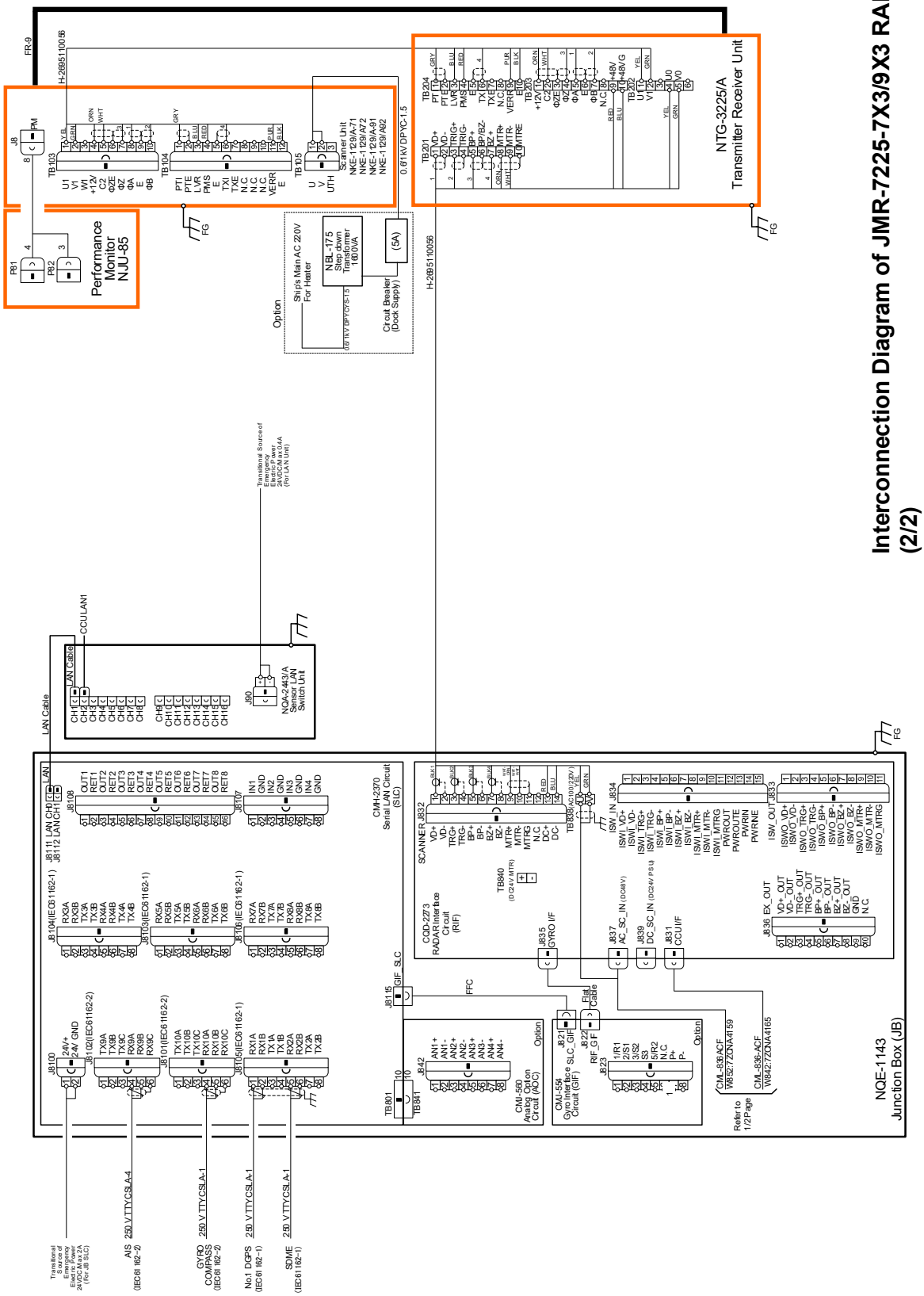
Interconnection Diagram of JMR-7225-6XH RADAR (2/2)



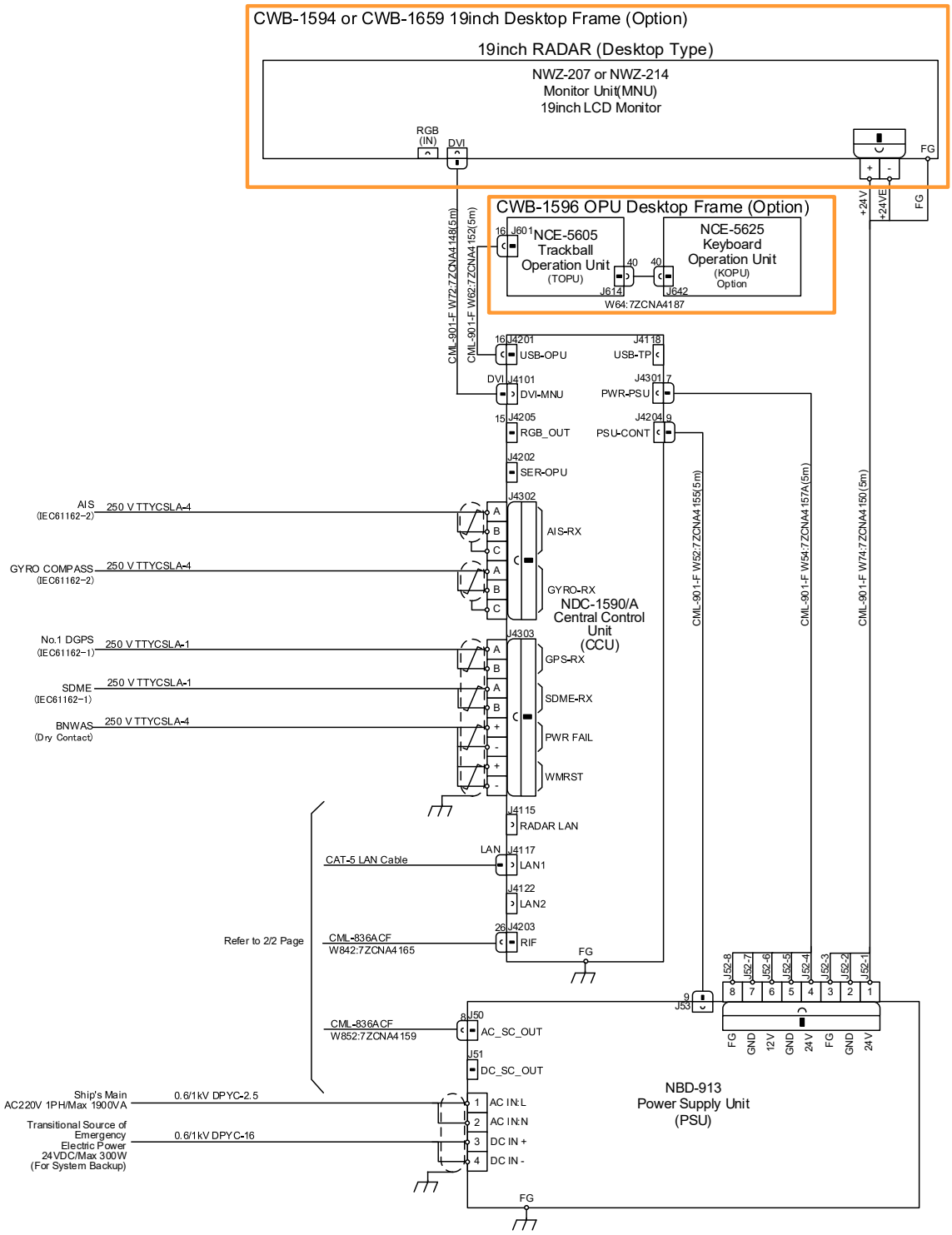
6.5.15 JMR-7225-7X3/9X3



Interconnection Diagram of JMR-7225-7X3/9X3 RADAR (1/2)

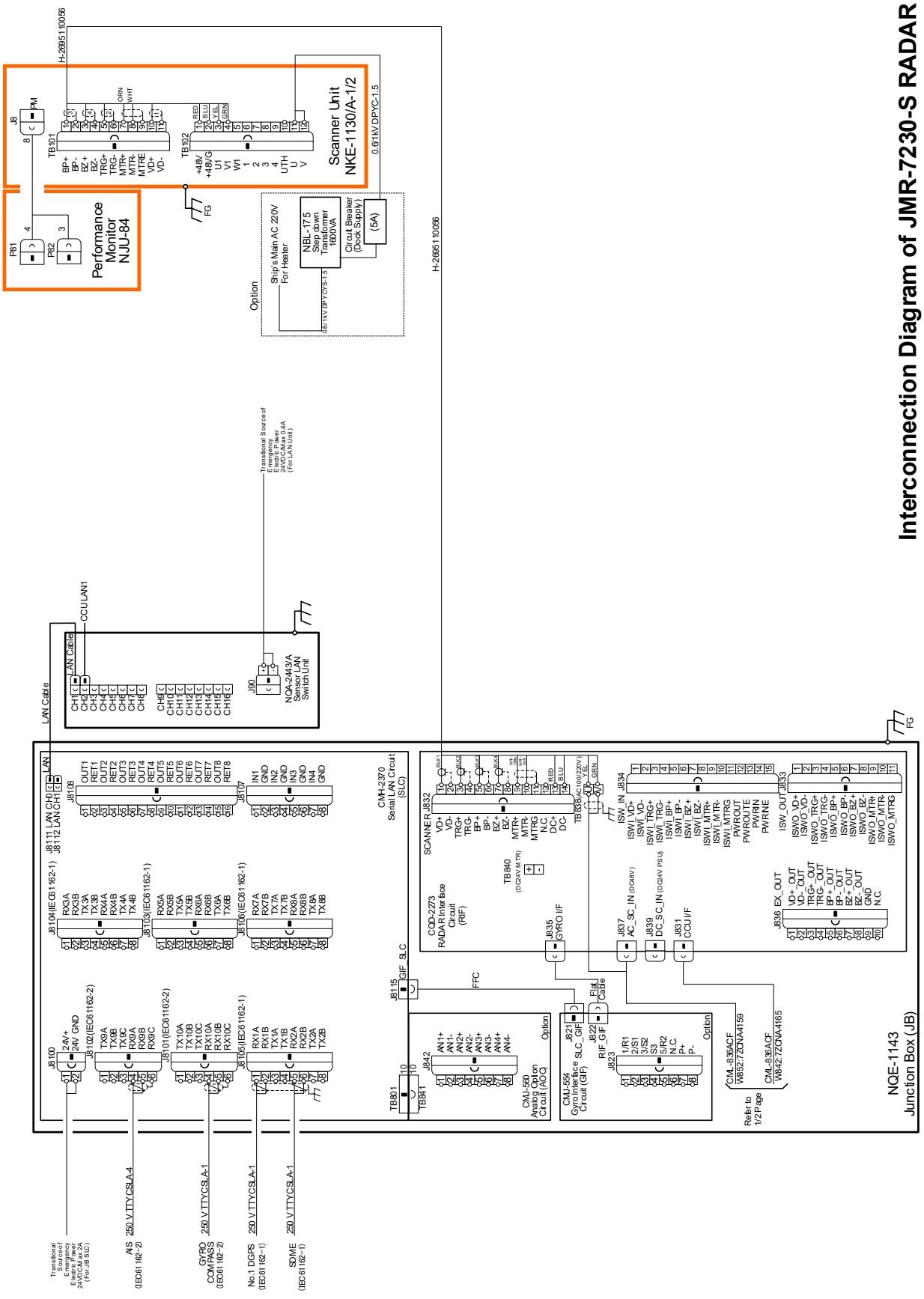

Interconnection Diagram of JMR-7225-7X3/9X3 RADAR (2/2)
NTG-3225/A
Transmitter Receiver Unit
Performance Monitor NJU-85
Scanner Unit
NKE-1219/A71
NKE-1219/A72
NKE-1219/A91
NKE-1219/A92
0.6/1KV DPYC-1.5
H-2895110056
Option
Ship's Main AC 220V For Heater
NBL-47.5 Step-down Transformer 1800VA
Circuit Breaker (Dock Supply)
(5A)
Transitional Source of Emergency Electrical Power 24VDC Max 10A (For LAN Unit)
LAN Cable
CCU LAN1
NQA-2443/A Network LAN Switch Unit
NQE-1143 Junction Box (JB)
COD-2273 RADAR Interface Circuit (RIF)
CMH-2370 Serial LAN Circuit (SLC)
CMJ-594 Gyro Interface SLC_GIF Circuit (GIF)
CMU-560 Antenna Junction Circuit (AJC)
CML-838-ACF W8527ZDNA4159
CML-838-ACF W8427ZDNA4165
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
FFC
Flat cable

6.5.16 JMR-7230-S

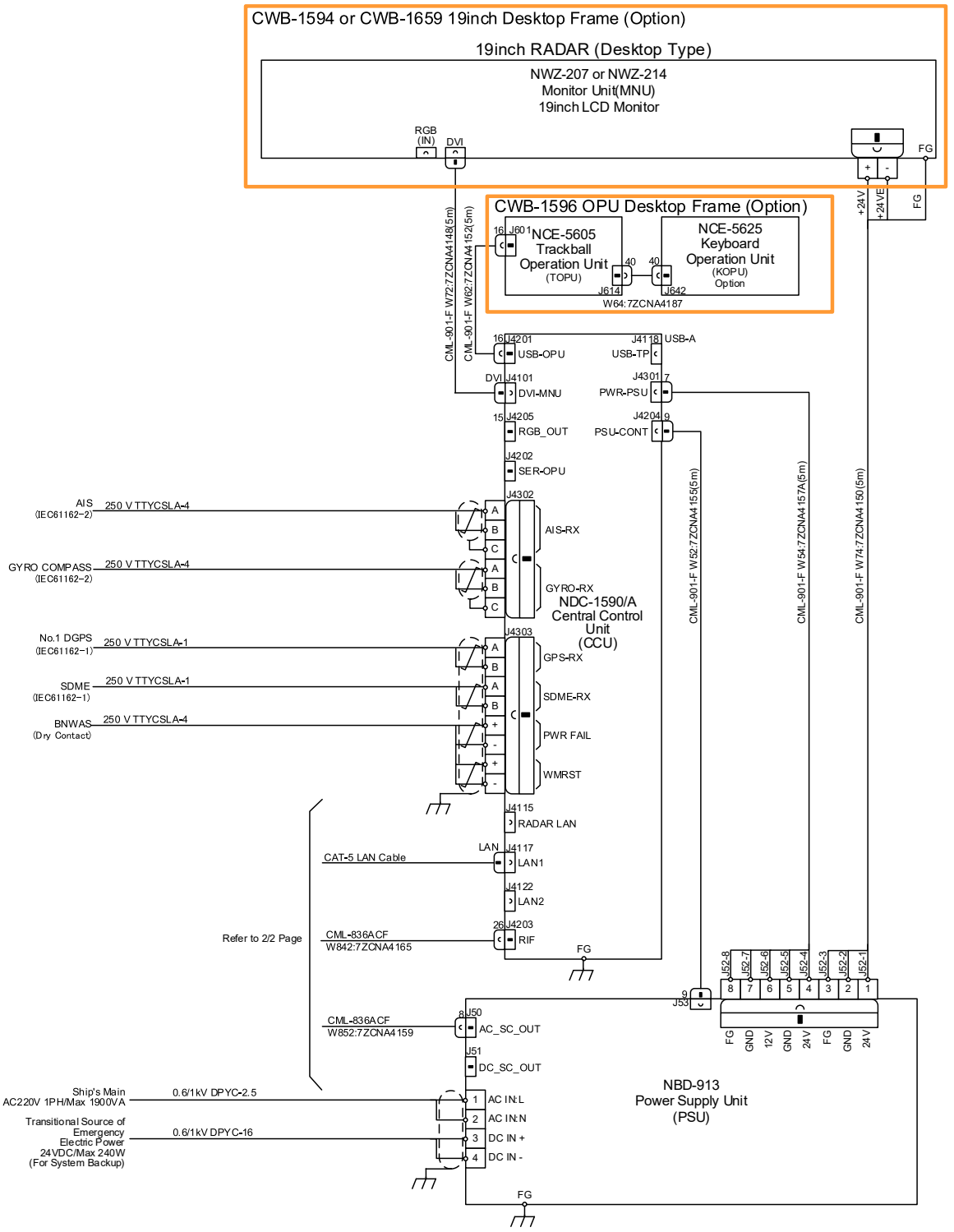


Interconnection Diagram of JMR-7230-S RADAR (1/2)

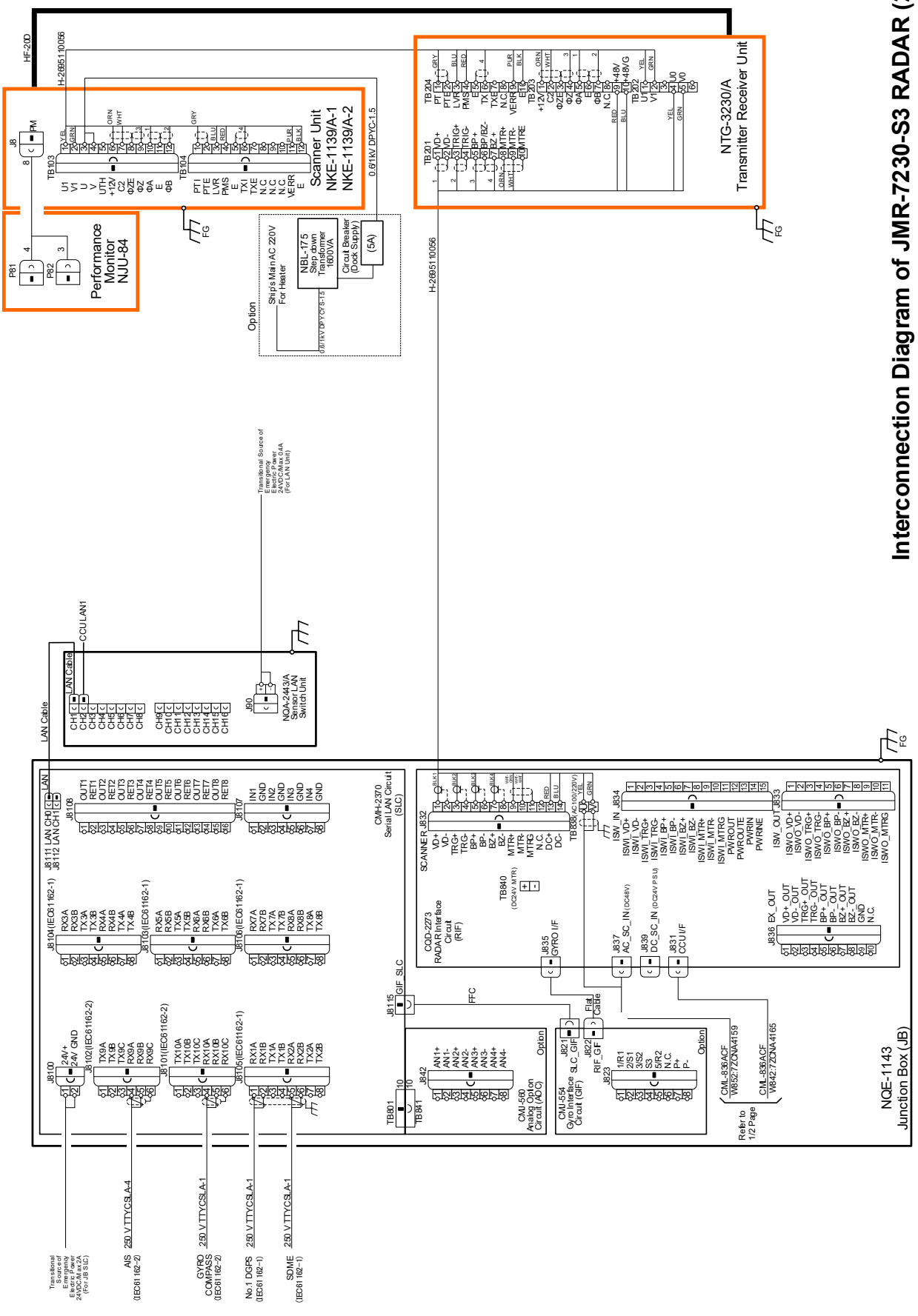
Interconnection Diagram of JMR-7230-S RADAR (2/2)



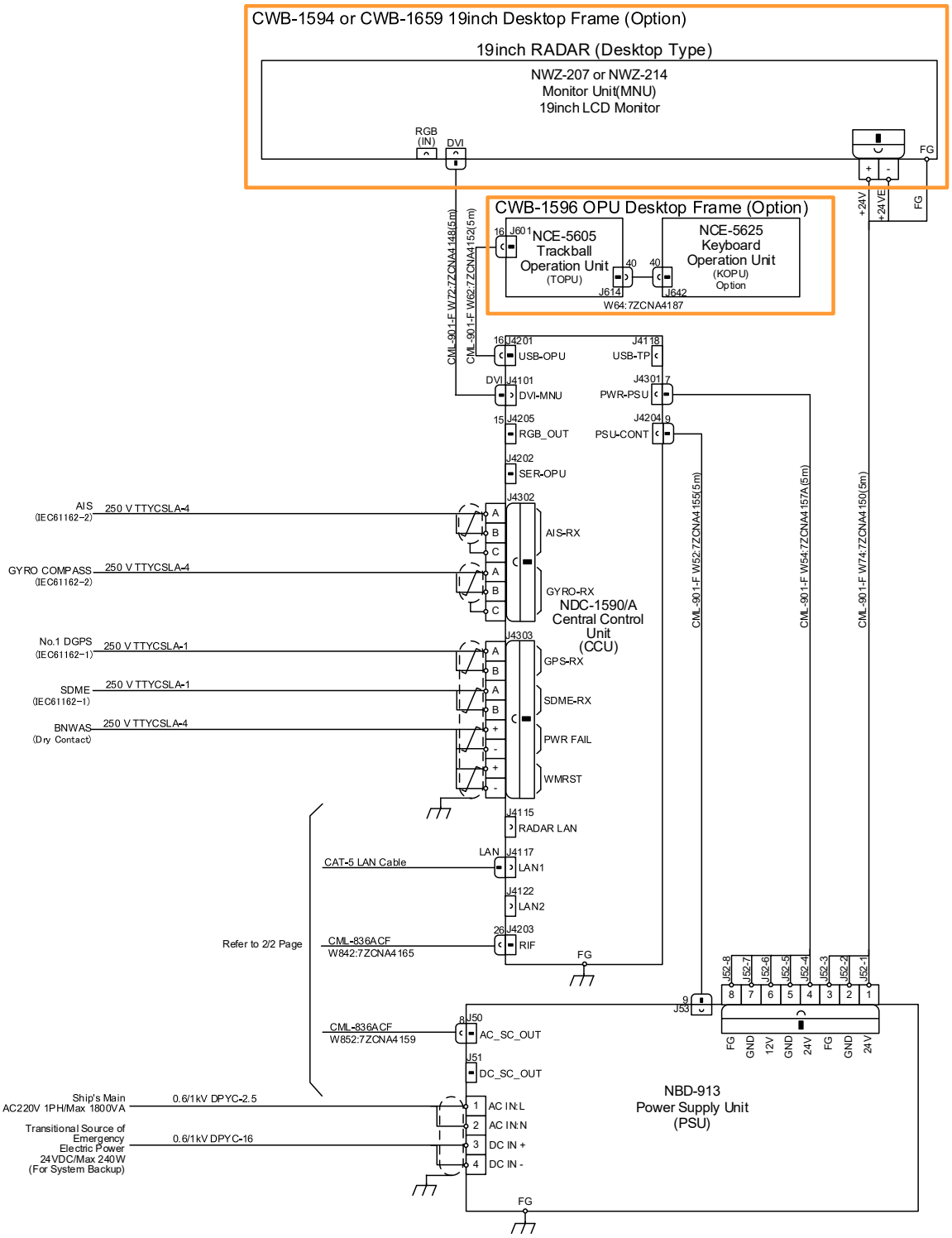
6.5.17 JMR-7230-S3



Interconnection Diagram of JMR-7230-S3 RADAR (1/2)

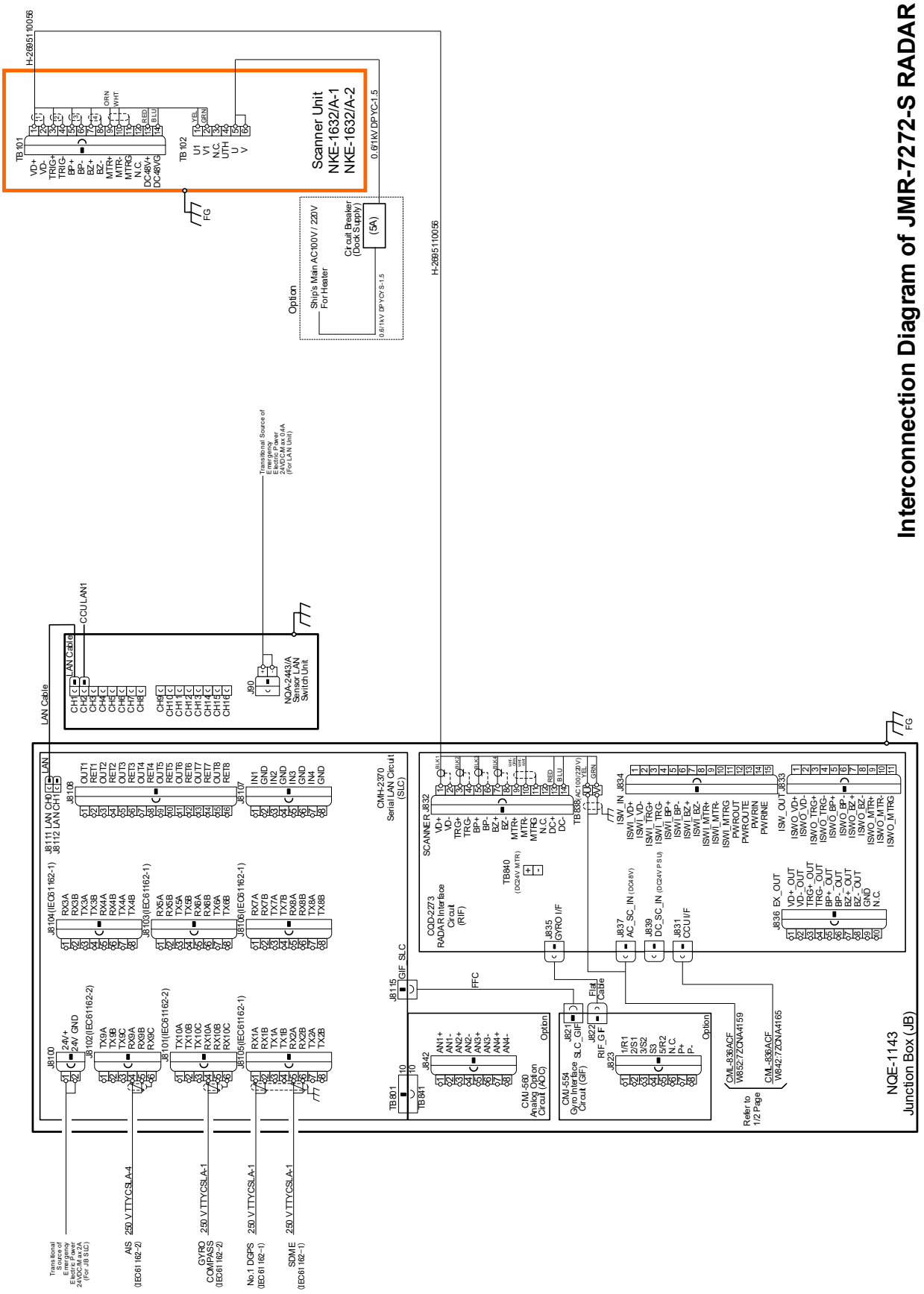

Interconnection Diagram of JMR-7230-S3 RADAR (2/2)
HF-200
H-2695110056
Scanner Unit
NKE-1139/A-1
NKE-1139/A-2
Performance Monitor
NJU-84
NTG-3230/A
Transmitter Receiver Unit
0.6/1kV DPYC-1.5
Option
Ship's Main AC 220V
For Heater
NBL-175
Step-down Transformer
1800VA
Circuit Breaker
(Dock Supply)
(5A)
CCU LAN1
LAN Cable
NQA-2443/A
Sensor LAN
Switch Unit
Transitional Source of Emergency Electric Power 24VDC Max 2A (For LAN Unit)
NQE-1143
Junction Box (JB)
SCANNER J832
COD-2273
RADAR Interface
Circuit
(RIF)
CMH-2370
Serial LAN Circuit
(SLC)
CMU-554
Gyro Interface
Circuit (GIF)
CMU-560
Analog Option
Circuit (ADC)
CIML-836ACF
W8352-7ZCNA4159
CIML-836ACF
W8342-7ZCNA4165
Refer to 1/2 Page
AIS
(IEC61162-2)
CYRO 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

6.5.18 JMR-7272-S

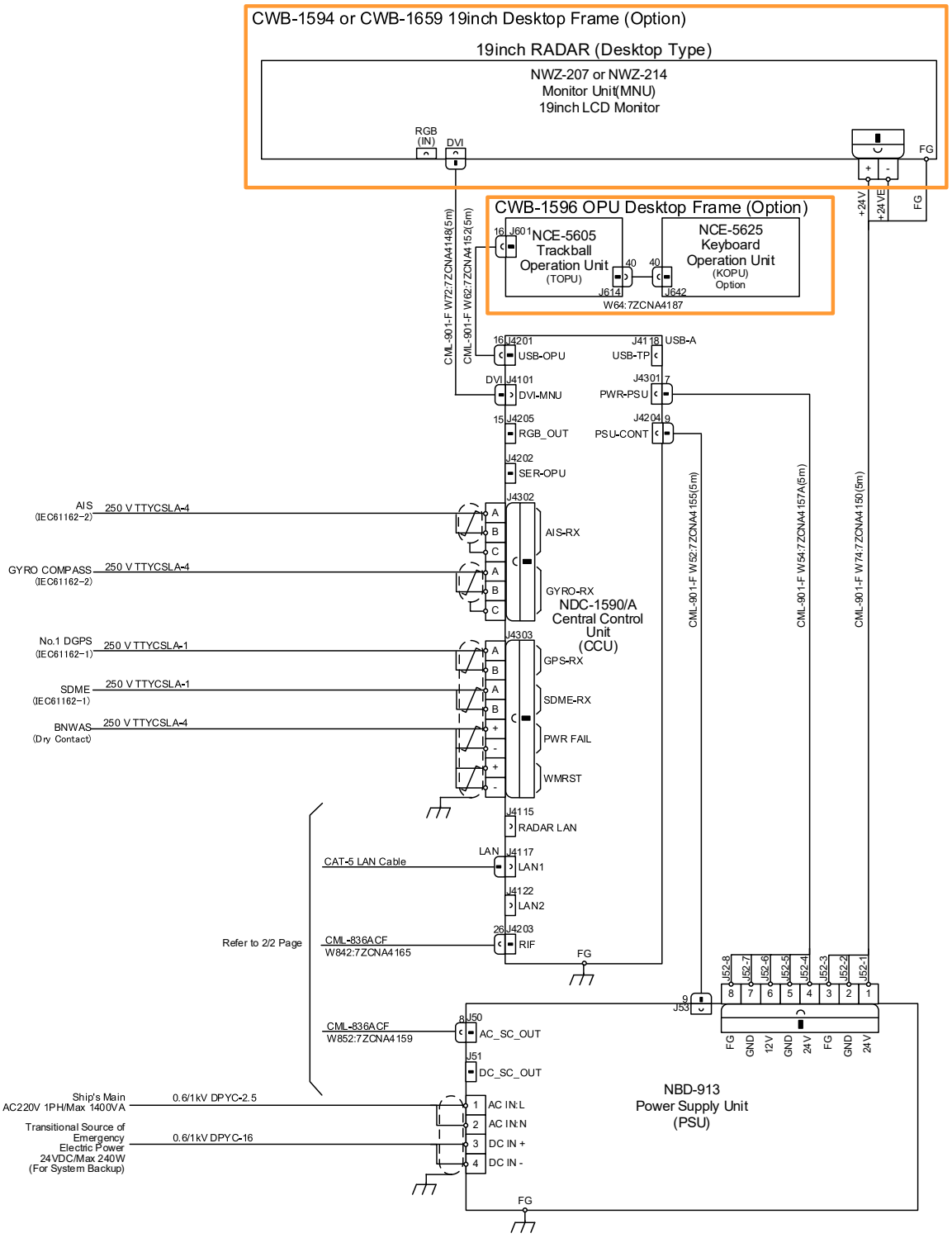


Interconnection Diagram of JMR-7272-S RADAR (1/2)

Interconnection Diagram of JMR-7272-S RADAR (2/2)

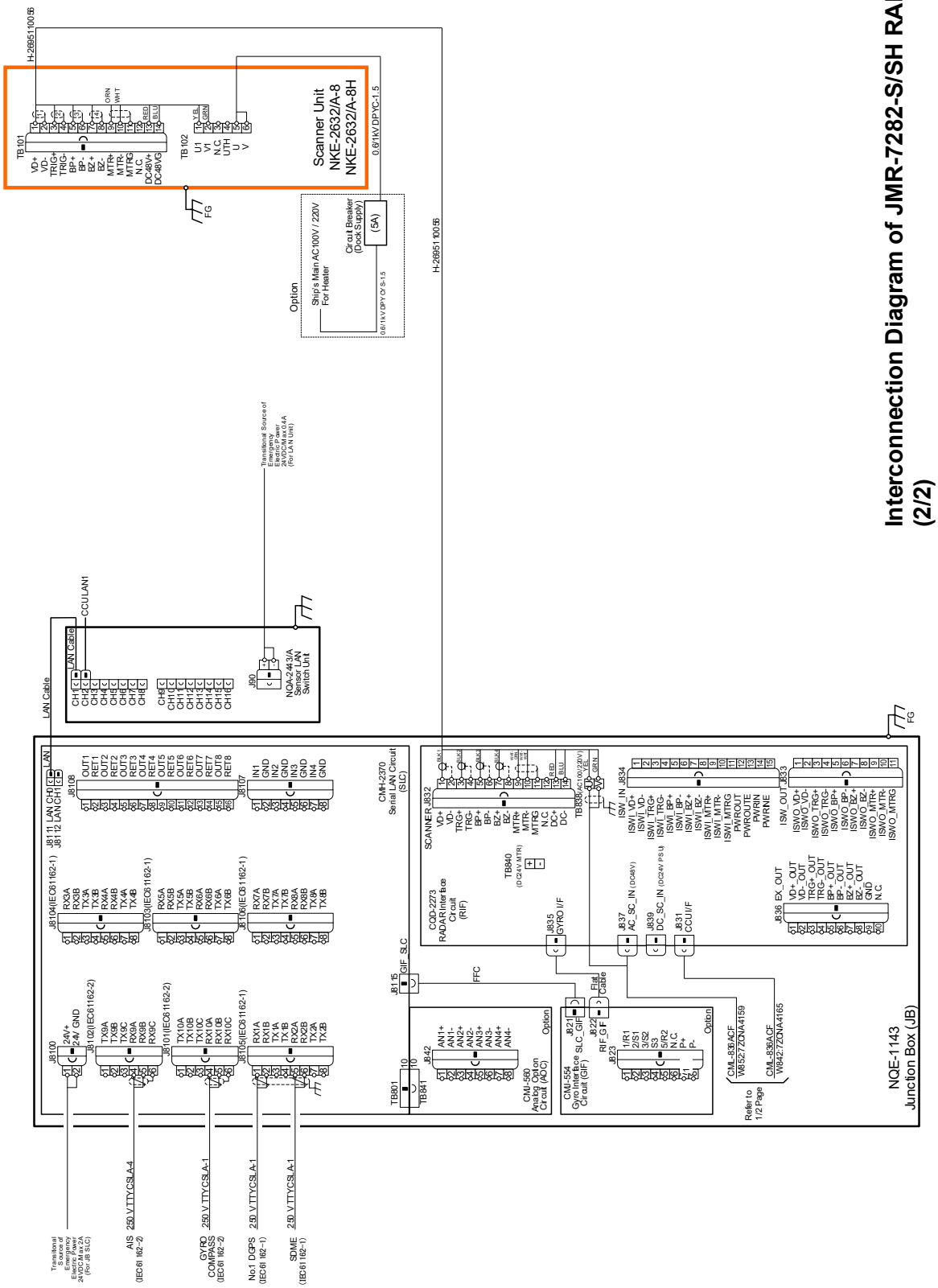


6.5.19 JMR-7282-S/SH

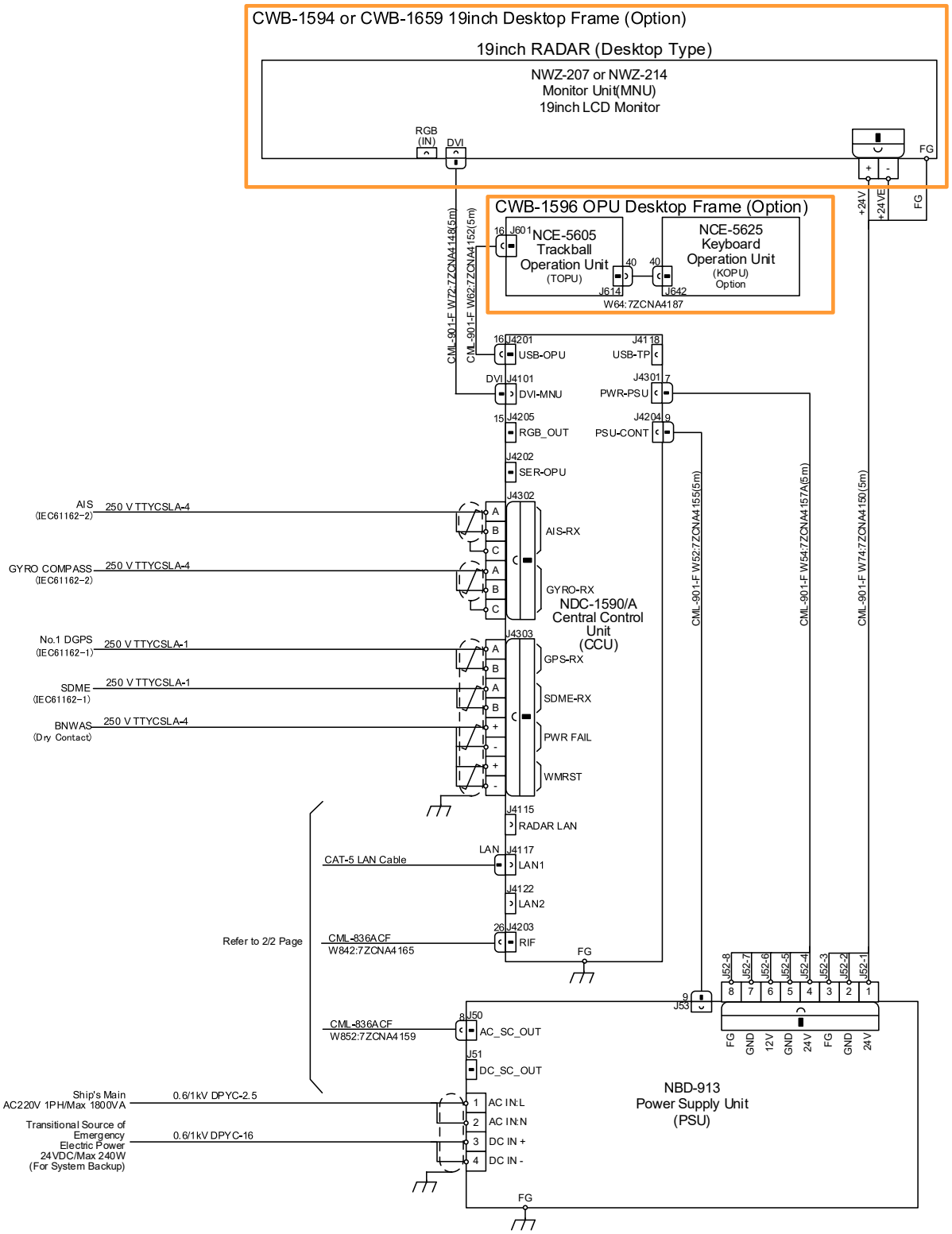


Interconnection Diagram of JMR-7282-S/SH RADAR (1/2)

Interconnection Diagram of JMR-7282-S/SH RADAR (2/2)

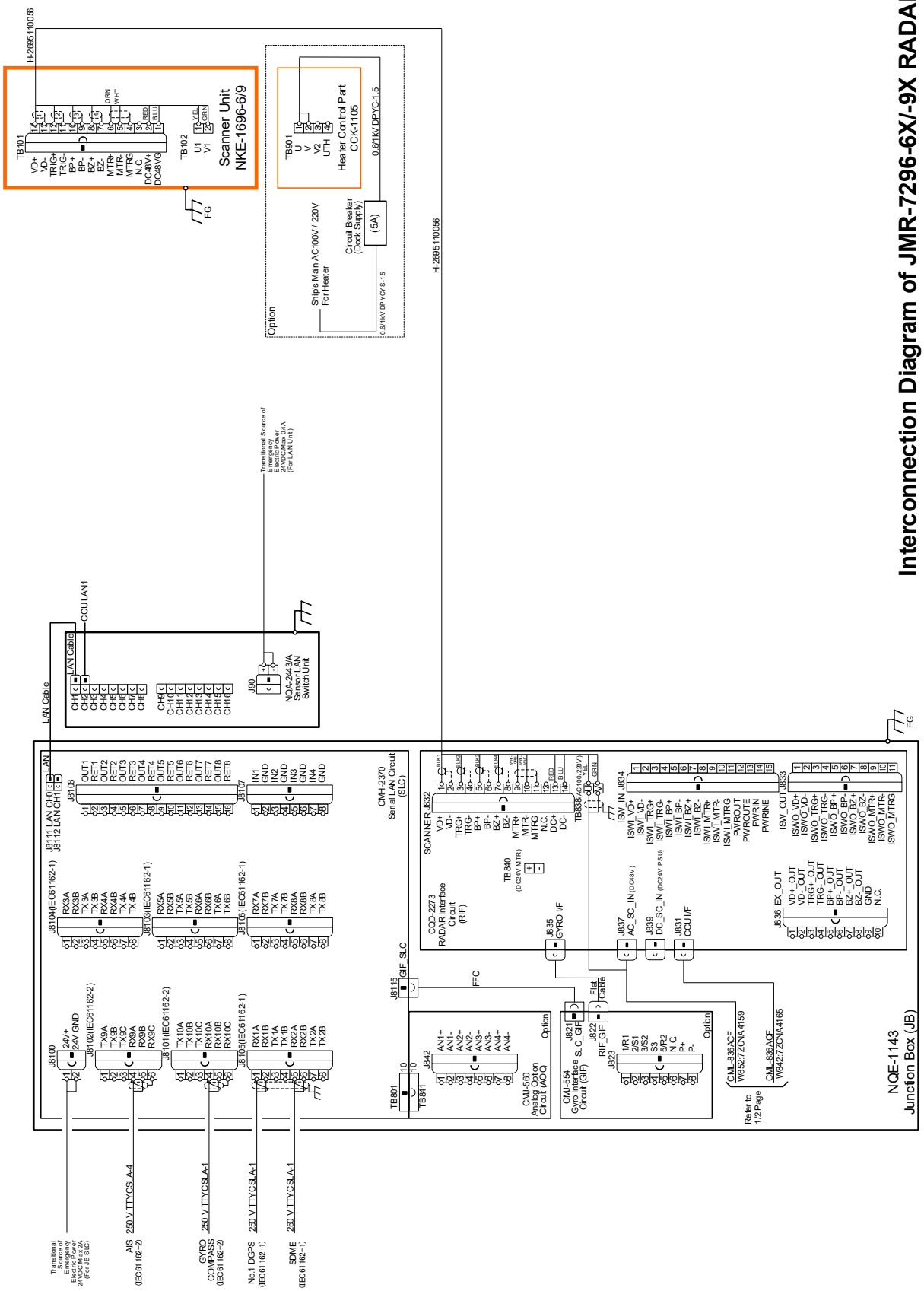


6.5.20 JMR-7296-6X/9X

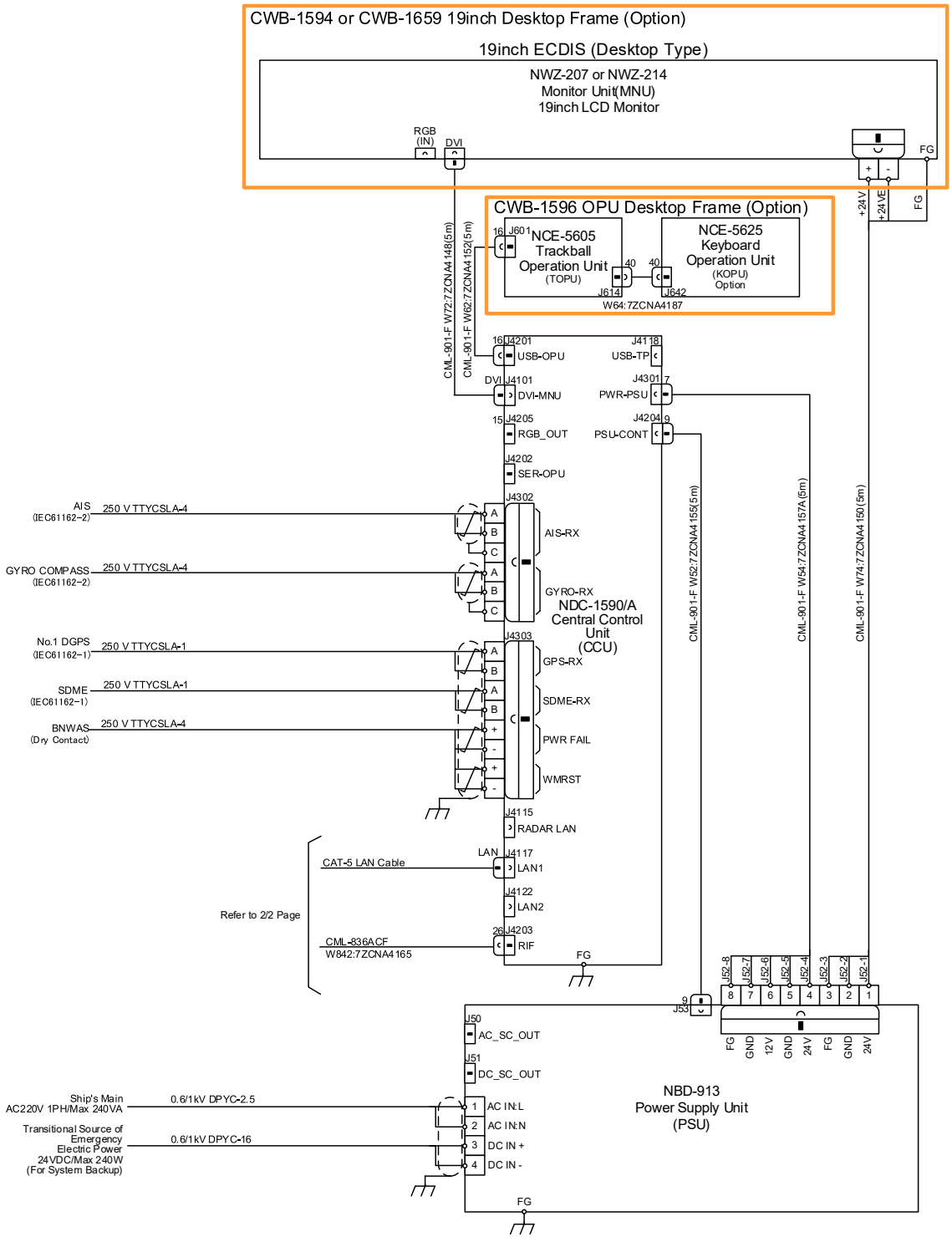


Interconnection Diagram of JMR-7296-6X/9X RADAR (1/2)

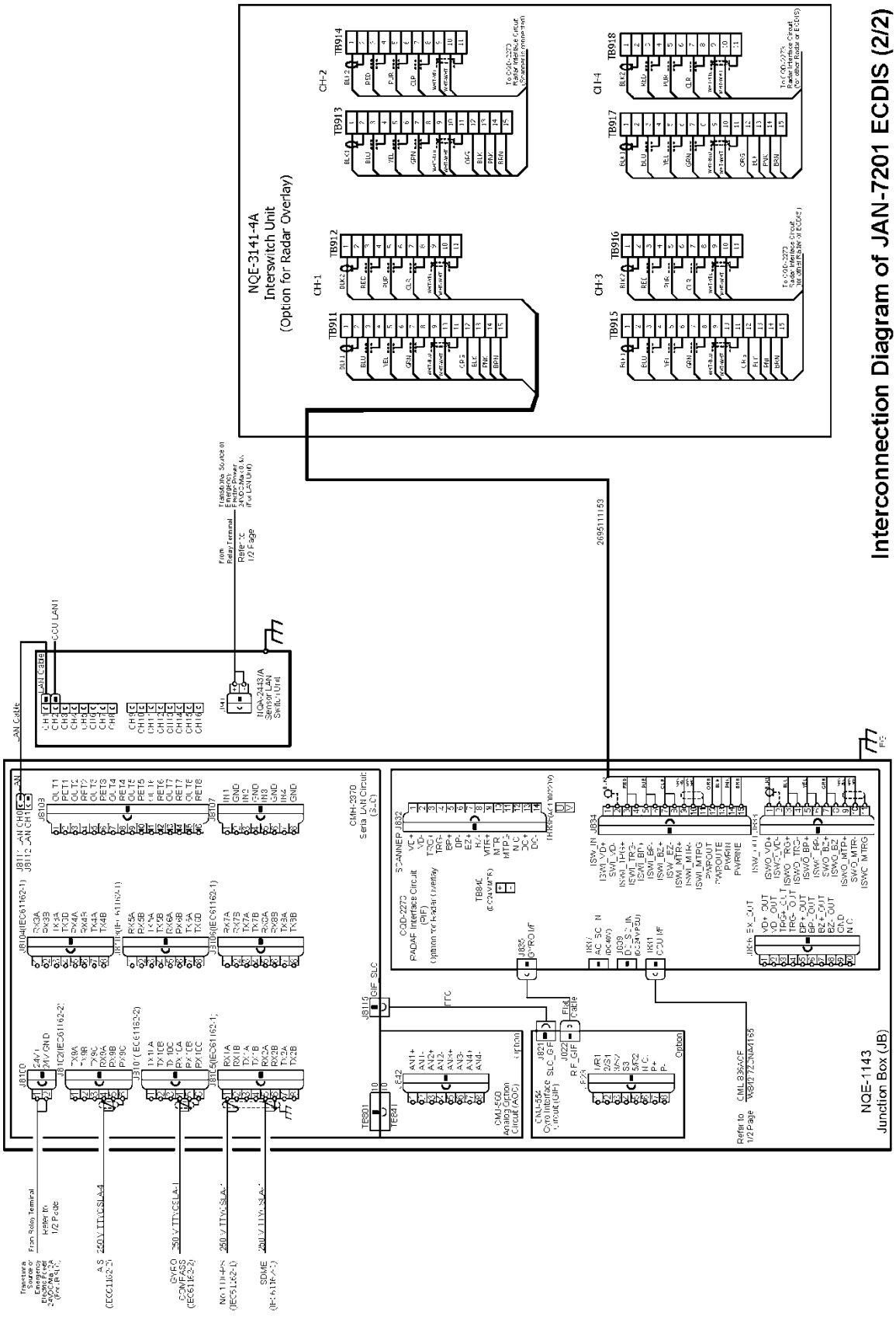
Interconnection Diagram of JMR-7296-6X/-9X RADAR (2/2)



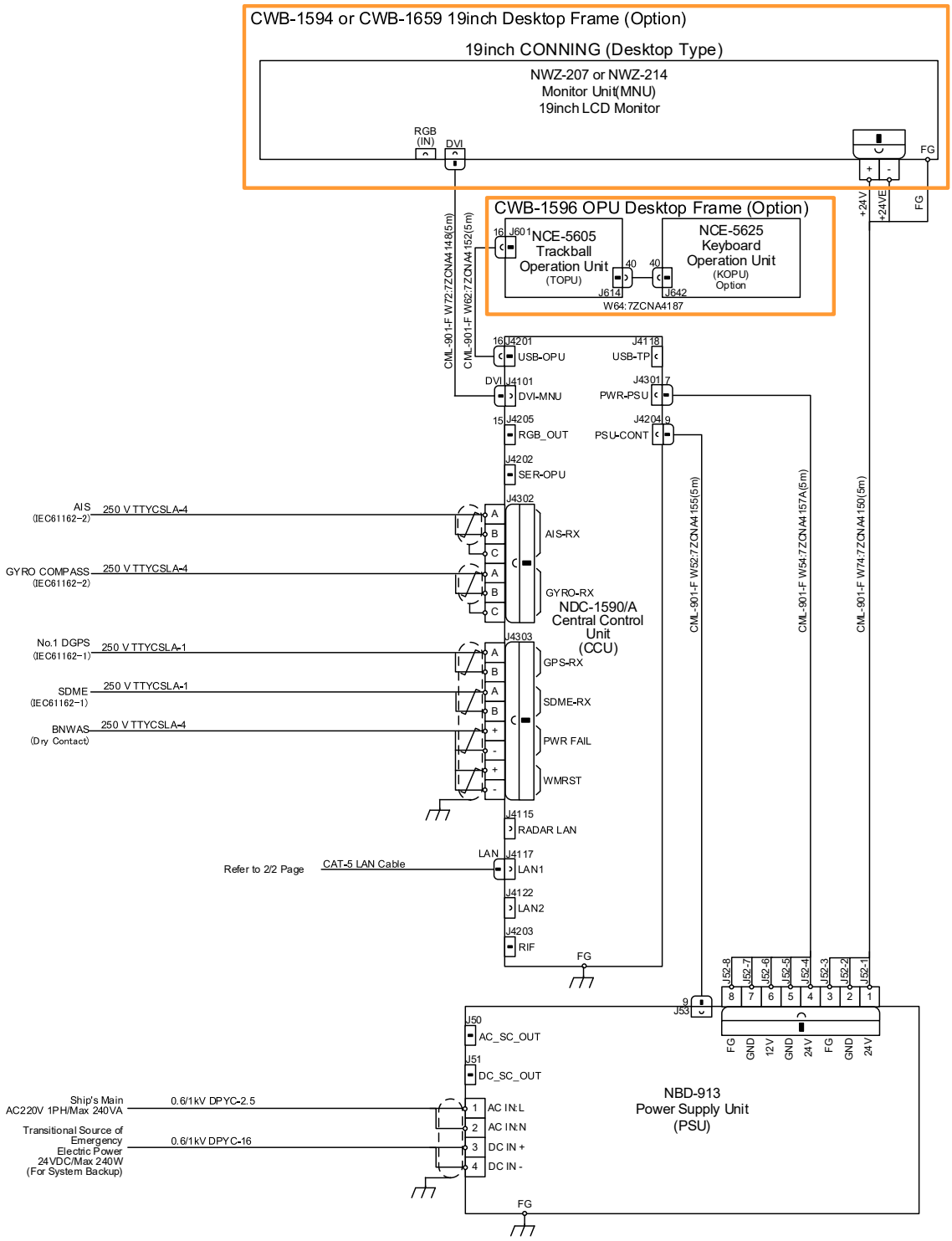
6.5.21 JAN-7201



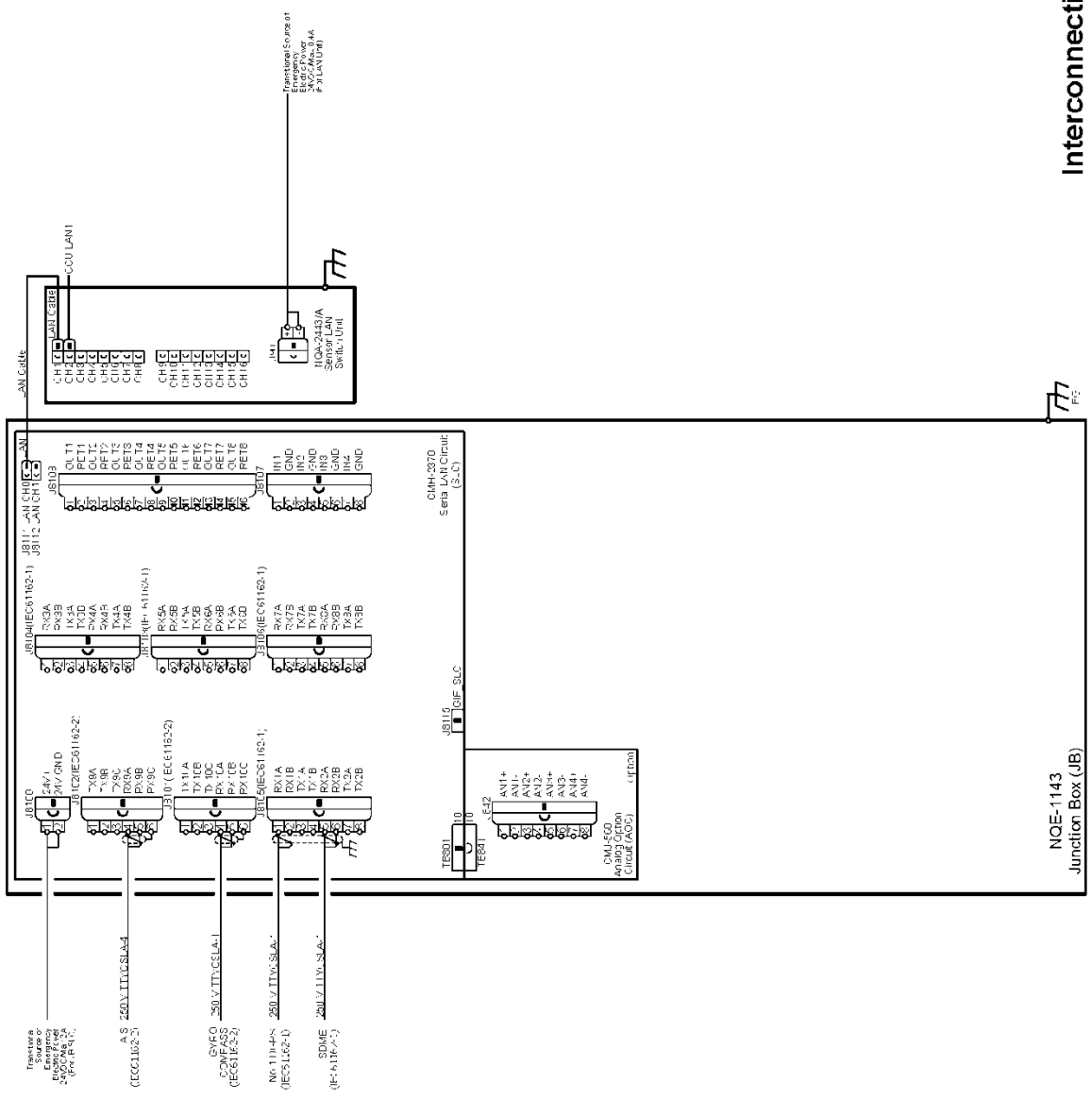
Interconnection Diagram of JAN-7201 ECDIS (1/2)


Interconnection Diagram of JAN-7201 ECDIS (2/2)
NQE-3141-4A
Interswitch Unit
(Option for Radar Overlay)
CH-1
CH-2
CH-3
CH-4
TB911
TB912
TB913
TB914
TB915
TB916
TB917
TB918
To COD-2272
Radar Interface Circuit
(Or other Radar or ECDIS)
NQE-1143
Junction Box (JB)
LAN Cable
CCU LAN1
HOA-2443/A
Sensor LAN
Switching Unit
From
Radar Terminal
Refer to
1/2 Page
2695111153
COD-2272
RADAR Interface Circuit
(RIF)
CMH-2370
Serial LAN Circuit
(SLC)
CMU-554
Gyro Interface
Circuit (GIF)
CMU-560
Analog Option
Circuit (AOC)
Option
Refer to
1/2 Page

6.5.22 JAN-7202

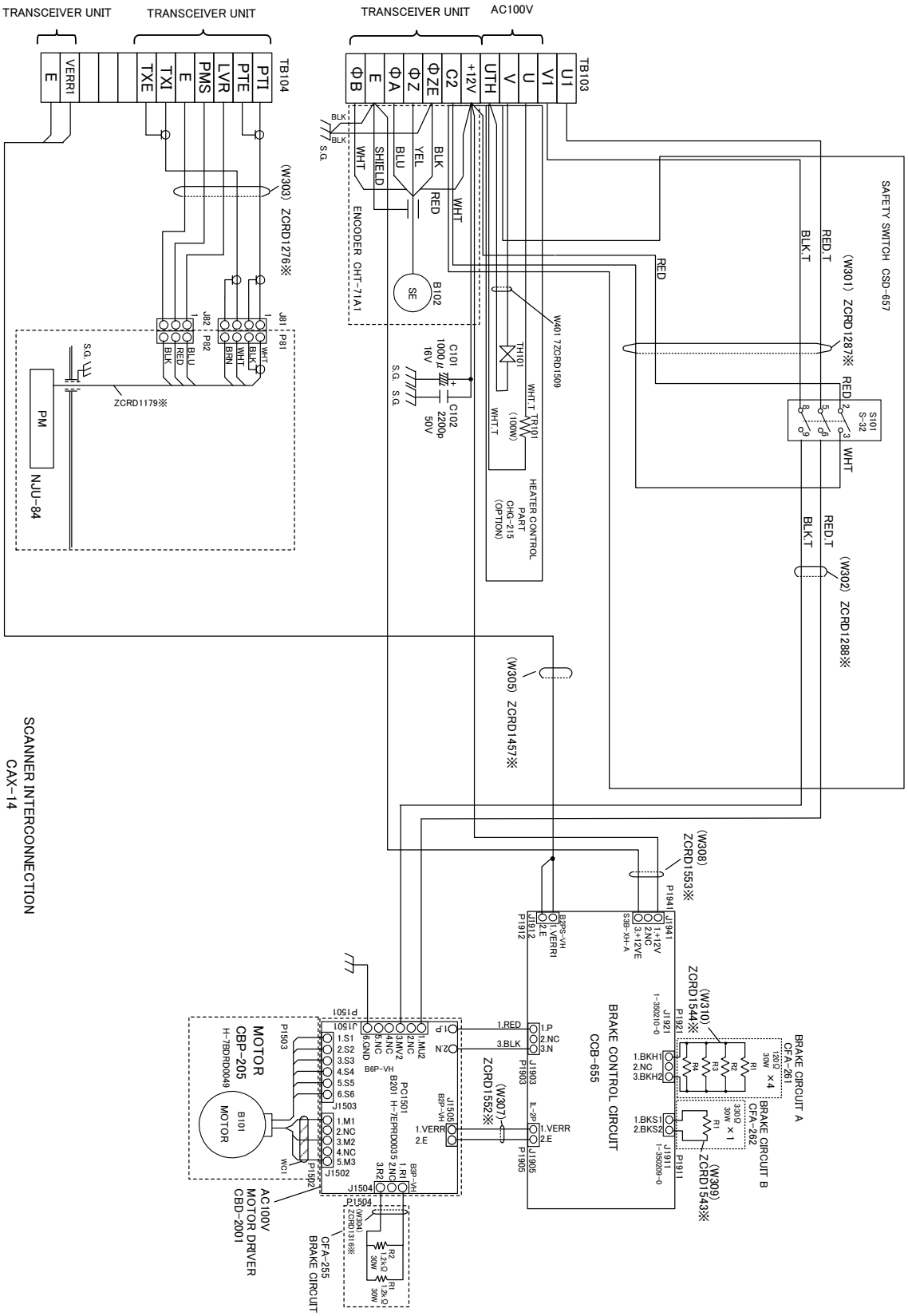


Interconnection Diagram of JAN-7202 CONNING (1/2)


Interconnection Diagram of JAN-7202 CONNING (2/2)
NQE-1143
Junction Box (JB)
CCU LAN1
LAN Cable
LAN Cable
J8110
J8111 LAN CH1
J8112 LAN CH1
J8103
J8104(IEC61162-1)
J8105(IEC61162-1)
J8106(IEC61162-1)
J8107
J8108
J8109(IEC61162-2)
J8110(IEC61162-2)
J8111(IEC61162-2)
J8112
J8113
J8114
J8115
J8116
J8117
J8118
J8119
J8120(IEC61162-2)
J310 (IEC61162-2)
CMH-2370
Serial LAN Circuit
(S-C)
GNSS
(IEC61162-2)
GYRO
COMPASS
(IEC61162-2)
SDME
(IEC61162-2)
NAVTEX
(IEC61162-1)
Transient Source of
Emergency
Electrical Power
24VDC Max. 0.4A
(For LAN HUB)
IHOA-2443/A
Sensor LAN
Switching Unit
GNF SLC
TE801
TE841
J842
DMU-500
Analog Option
Circuit (AOC)
Option
AN1+
AN1-
AN2+
AN2-
AN3+
AN3-
AN4+
AN4-
24V
0V/GND
TX1A
TX1B
TX2A
TX2B
RX1A
RX1B
RX2A
RX2B
TX3A
TX3B
RX3A
RX3B
TX4A
TX4B
RX4A
RX4B
TX5A
TX5B
RX5A
RX5B
TX6A
TX6B
RX6A
RX6B
TX7A
TX7B
RX7A
RX7B
IN1
GND
IN2
GND
IN3
GND
IN4
GND
CH1
CH2
CH3
CH4
CH5
CH6
CH7
CH8
CH9
CH10
CH11
CH12
CH13
CH14
CH15
CH16

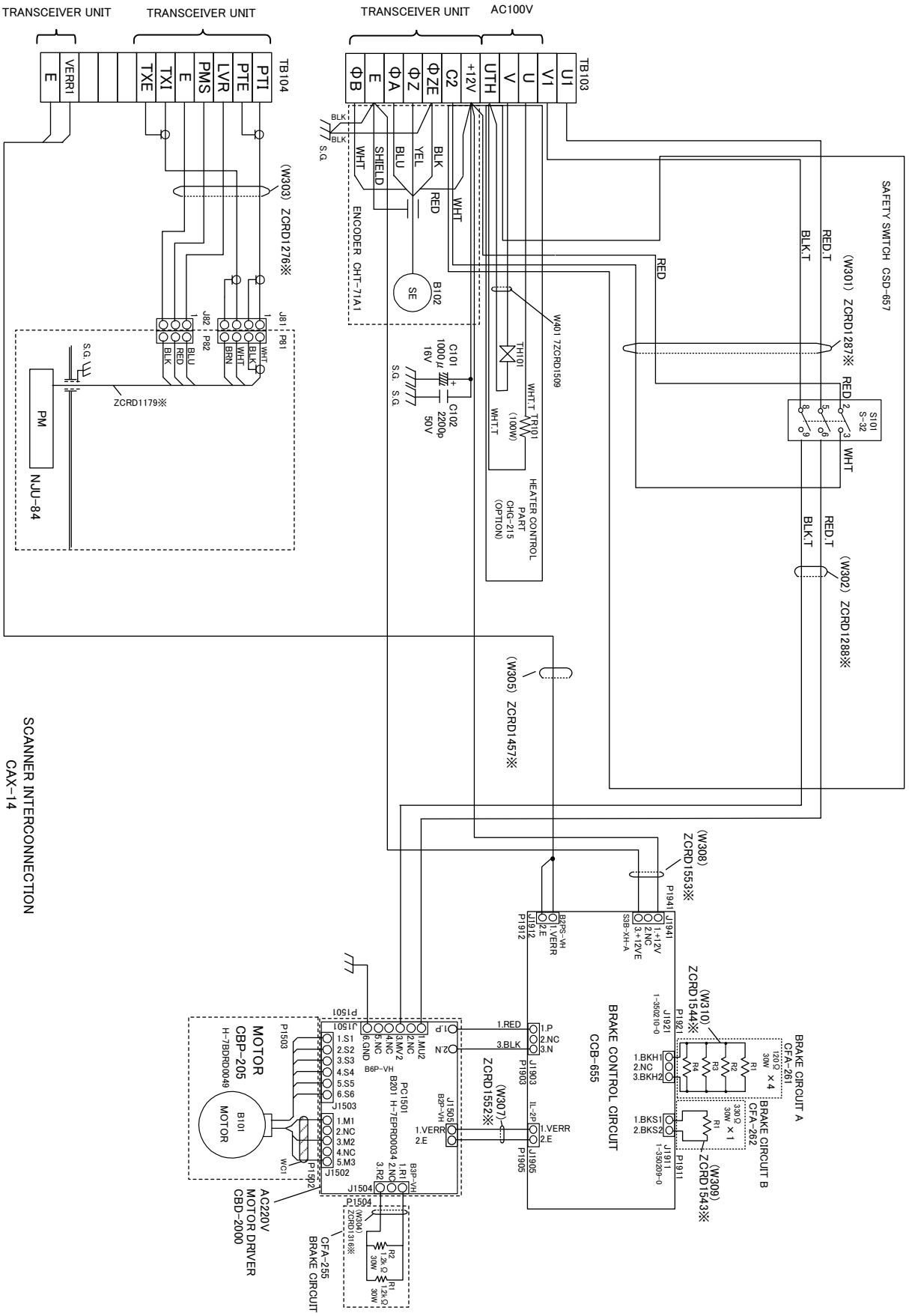
6.6 Radar Antenna Interconnection Diagram

6.6.1 NKE-1139 (AC110V)



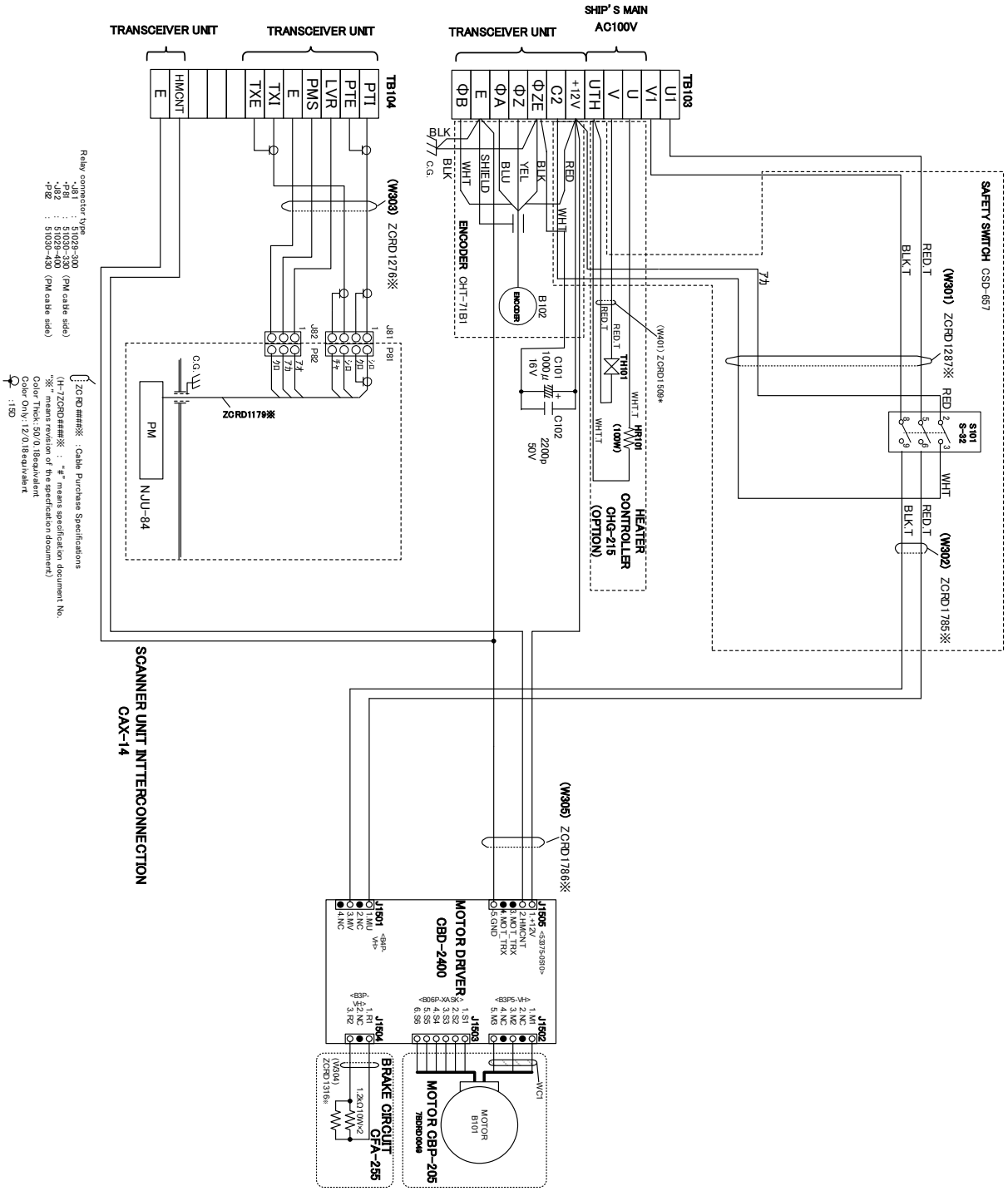
NKE-1139PM (AC100V) ｽｷｬﾝﾄﾞ､ｽﾕﾆｯﾄ
空中線機内接続図

6.6.2 NKE-1139 (AC220V)

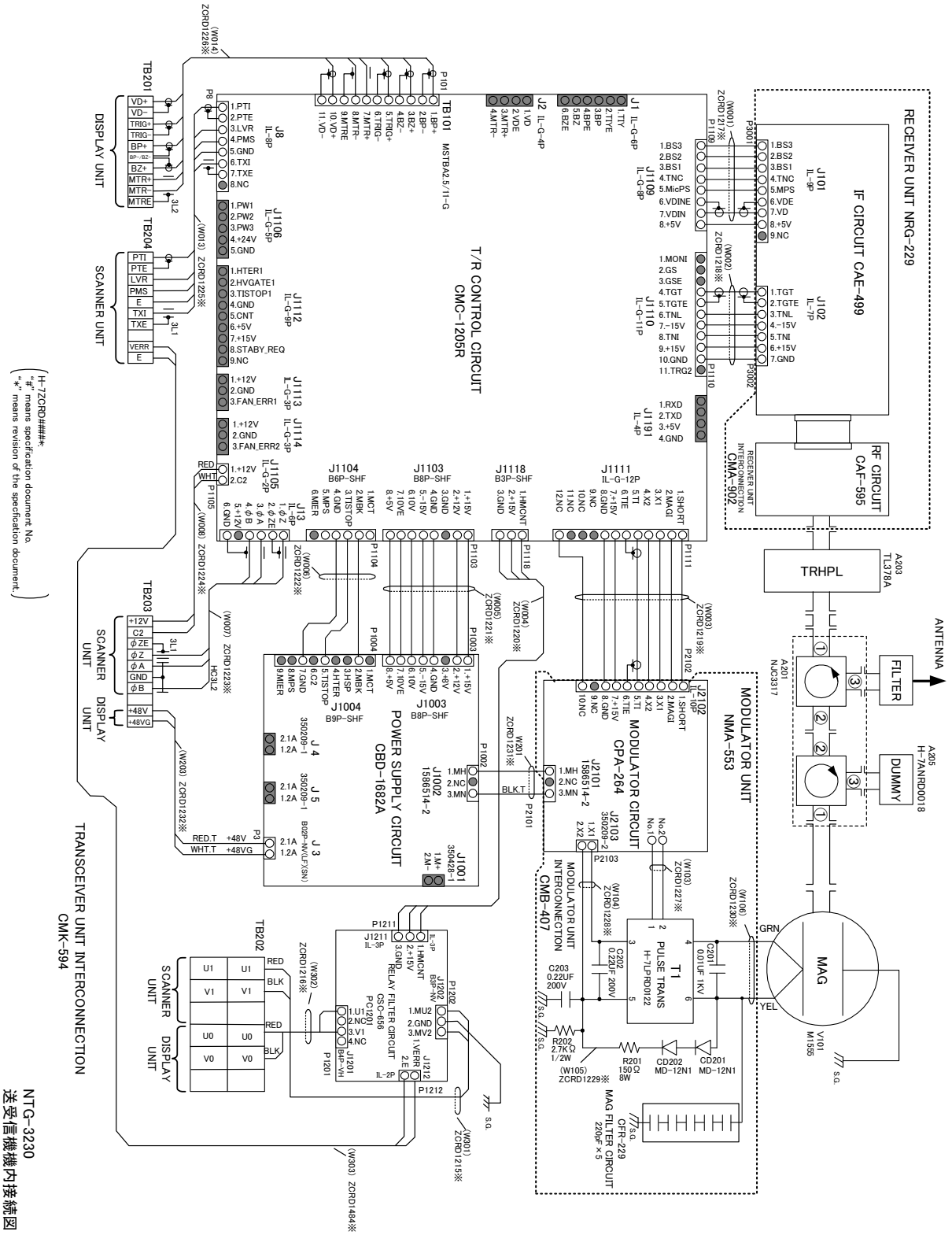


NKE-1139PM (AC220V) Sﾊﾝﾄﾞ, 3ユニット
空中線機内接続図

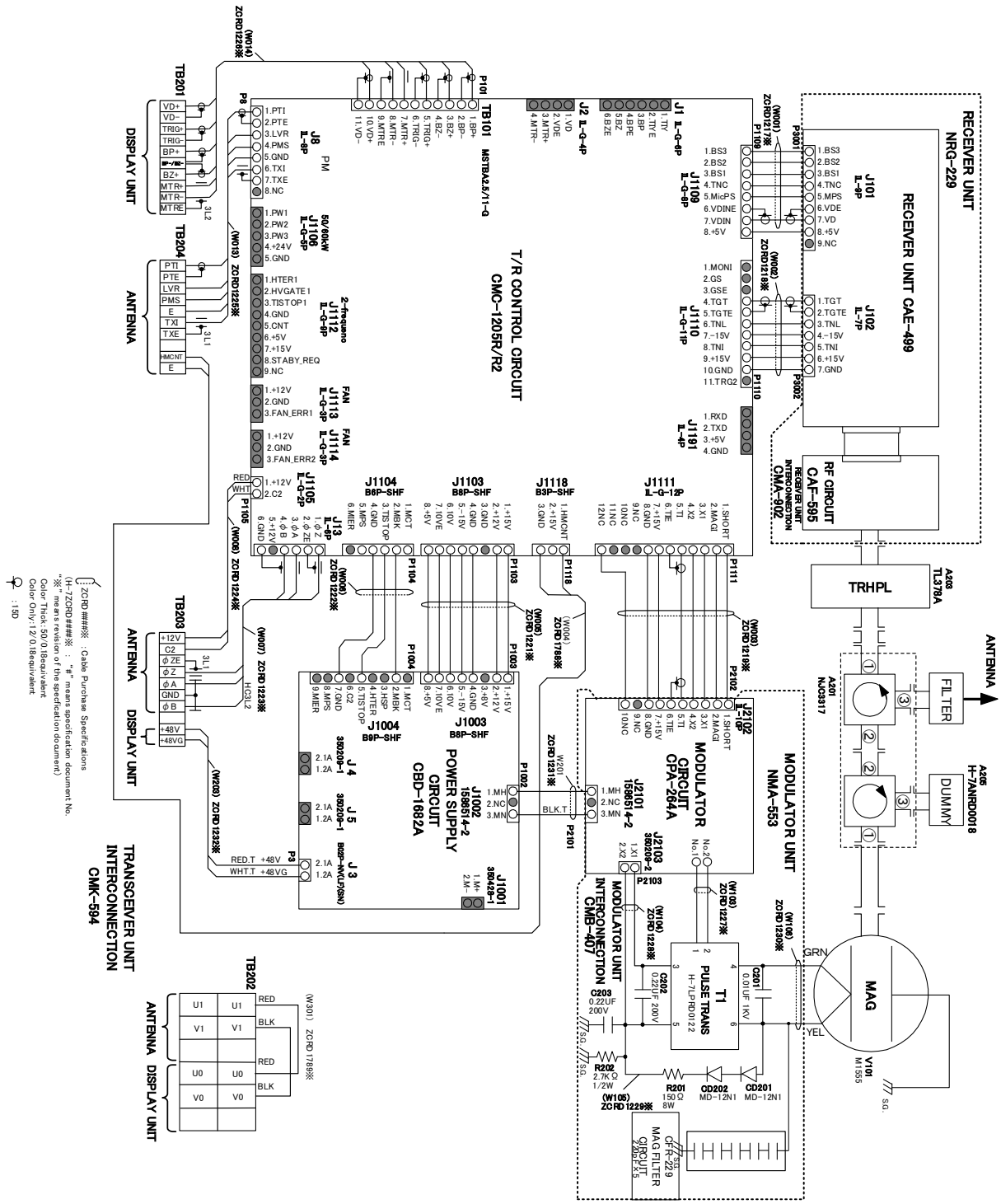
6.6.3 NKE-1139A(AC110/220V)



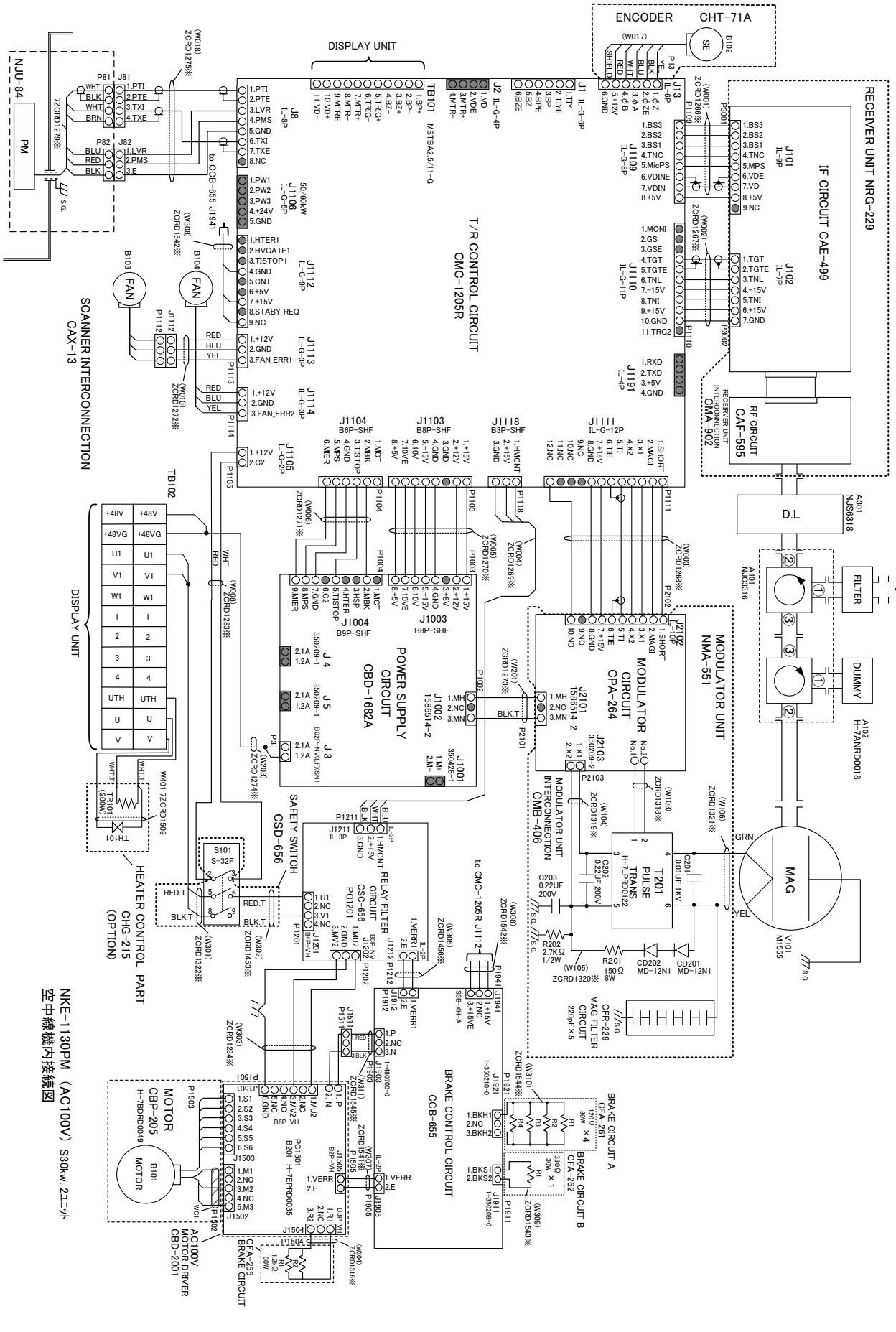
6.6.4 NTG-3230


RECEIVER UNIT NRG-229
IF CIRCUIT CAE-499
RF CIRCUIT CAF-595
RECEIVER UNIT INTERCONNECTION CMA-902
T/R CONTROL CIRCUIT CMC-1205R
TRHPL
ANTENNA
FILTER
DUMMY
MAG
MODULATOR UNIT NMA-553
MODULATOR CIRCUIT CPA-264
MODULATOR UNIT INTERCONNECTION CMB-407
POWER SUPPLY CIRCUIT CBD-1682A
PULSE TRANS H-7LPRD022
MAG FIL.TER CIRCUIT
RELAY FILTER CIRCUIT
DISPLAY UNIT
SCANNER UNIT
TRANSCEIVER UNIT INTERCONNECTION CMK-594
NTG-3230
送受信機機内接続図

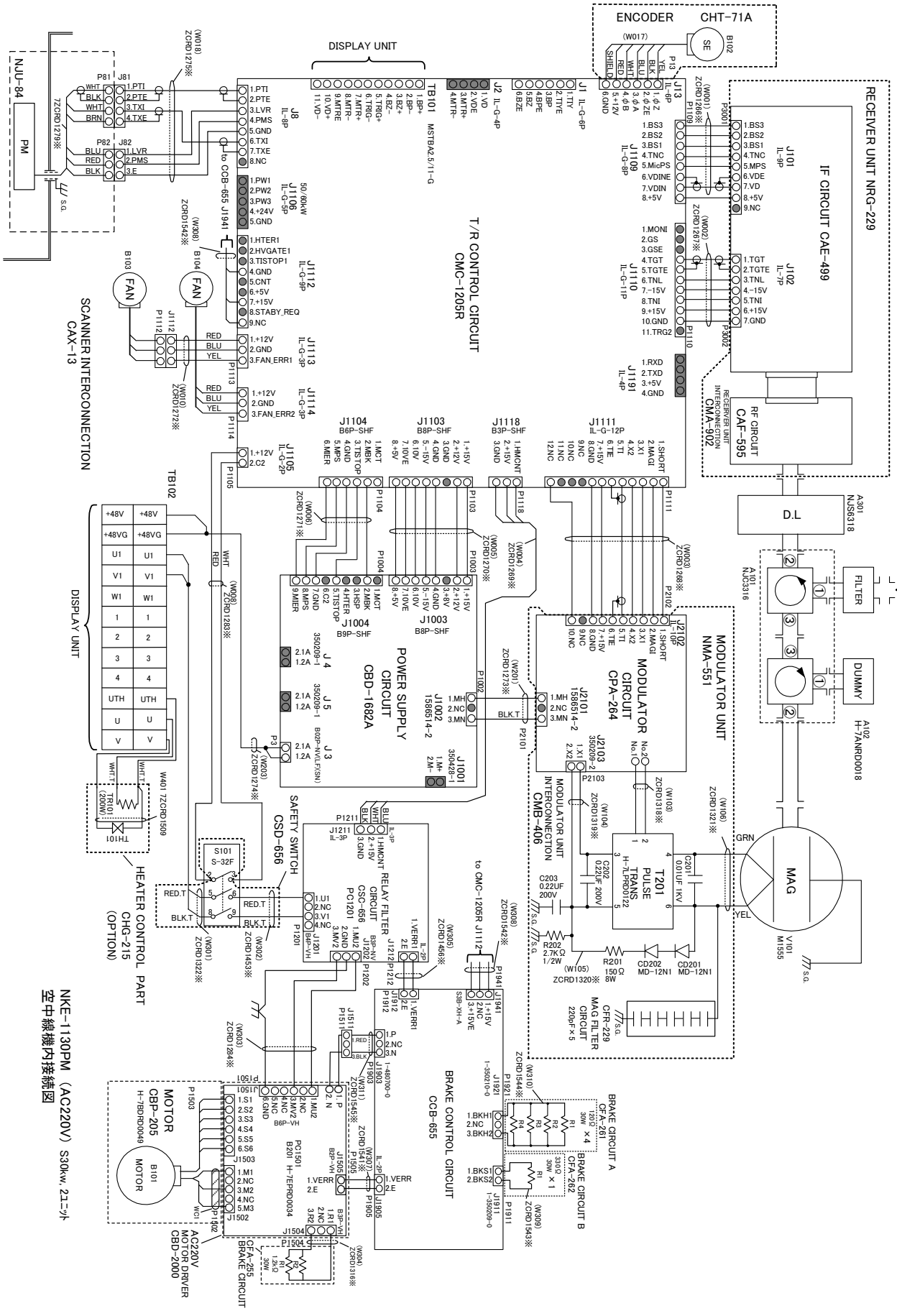
6.6.5 NTG-3230A



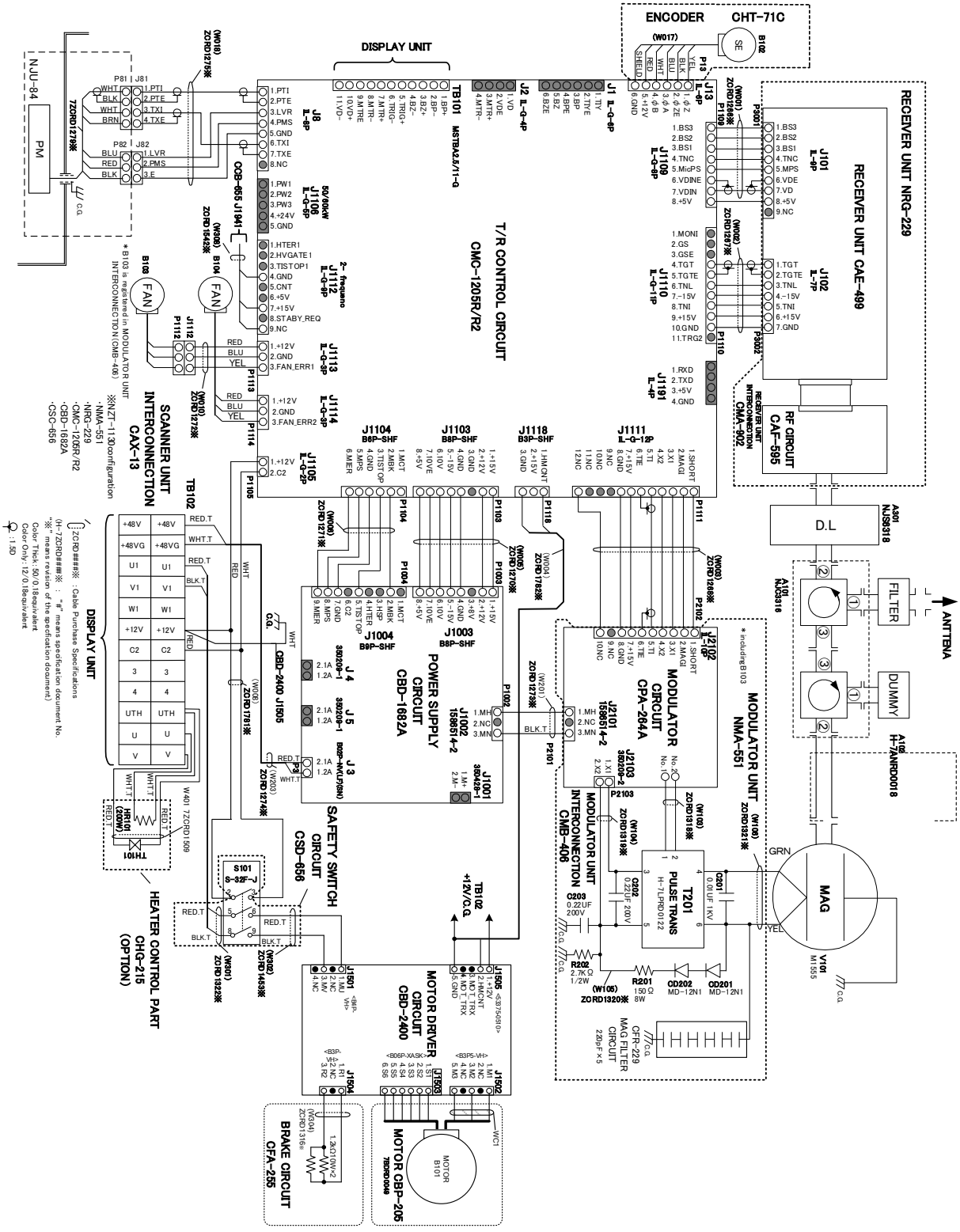
6.6.6 NKE-1130 (AC110V)


NKE-1130PM (AC100V) S30kw, 2ユニット
空中線機内接続図
ENCODER CHT-71A
SE
B102
(W017)
DISPLAY UNIT
RECEIVER UNIT NRG-229
IF CIRCUIT CAE-499
J101 IL-9P
J102 IL-7P
RF CIRCUIT CAF-595
RECEIVER UNIT INTERCONNECTION CMA-902
T/R CONTROL CIRCUIT CMC-1205R
TB101 MSTBA2.5/11-G
J8 IL-8P
J1106 IL-G-5P
J1112 IL-G-9P
J1113 IL-G-3P
J1114 IL-G-3P
J1105 IL-G-2P
J1104 B6P-SHF
J1103 B8P-SHF
J1118 B3P-SHF
J1111 IL-G-12P
J1109 IL-G-8P
J1110 IL-G-11P
J1191 IL-4P
J2 IL-G-4P
J1 IL-G-6P
J13 IL-6P
P3001
P1109
P1110
P3002
P1111
P1118
P1103
P1104
P1105
P1112
P1113
P1114
P1003
P1004
P1002
P2102
P2103
P2101
P1211
P1212
P1912
P1921
P1911
P1941
P1941
P1941

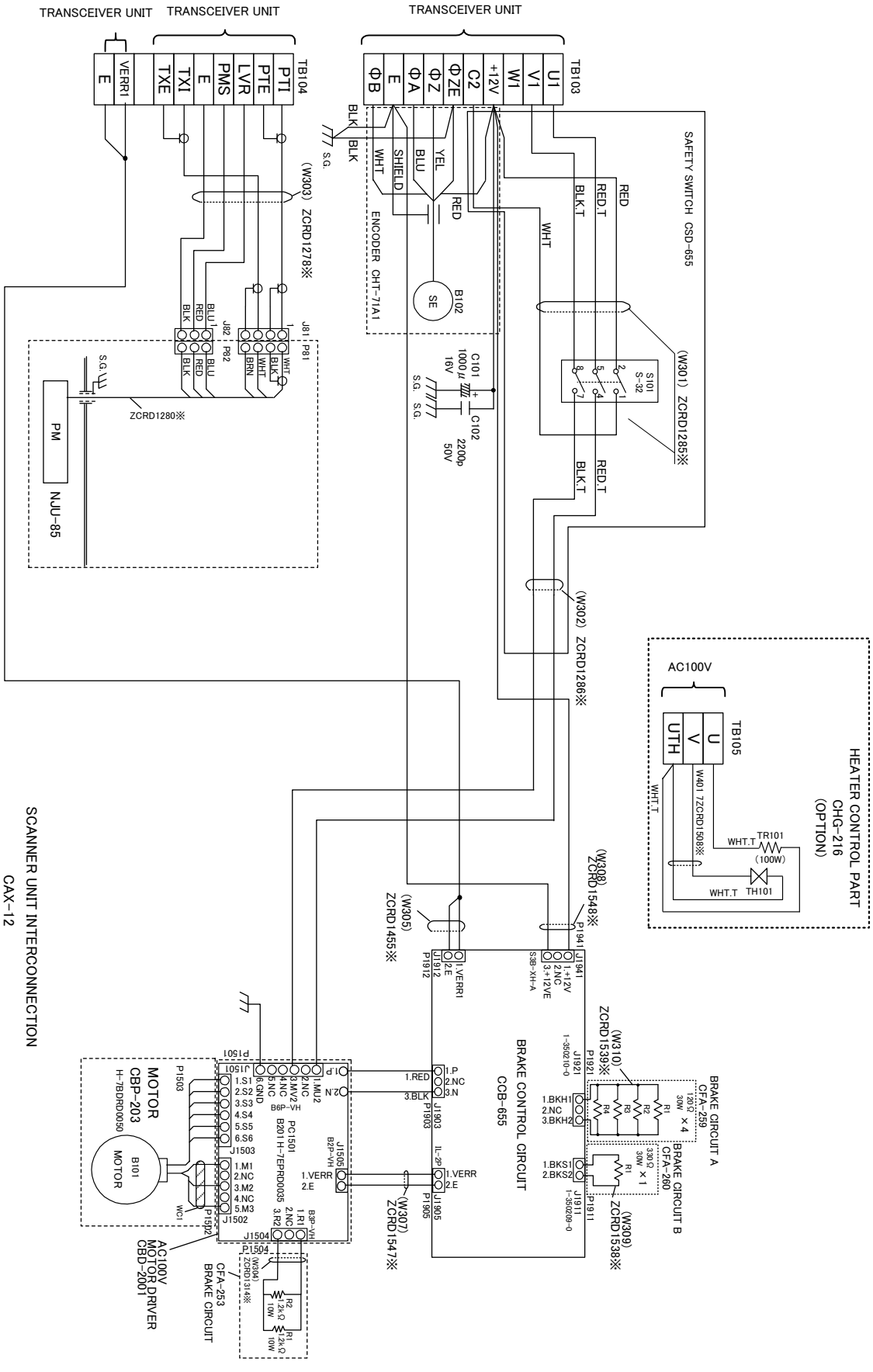
6.6.7 NKE-1130 (AC220V)



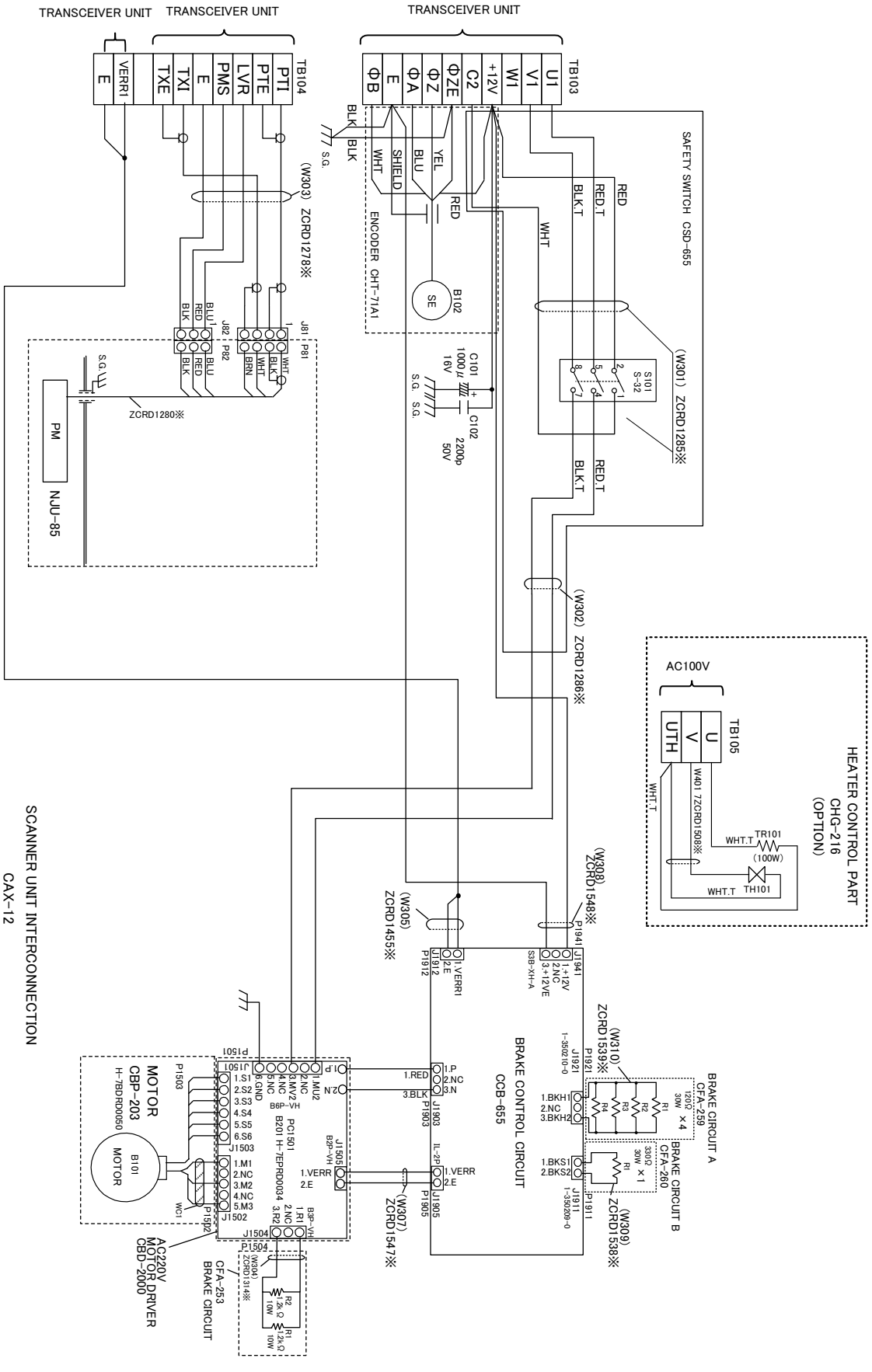
6.6.8 NKE-1130A (AC110/220V)



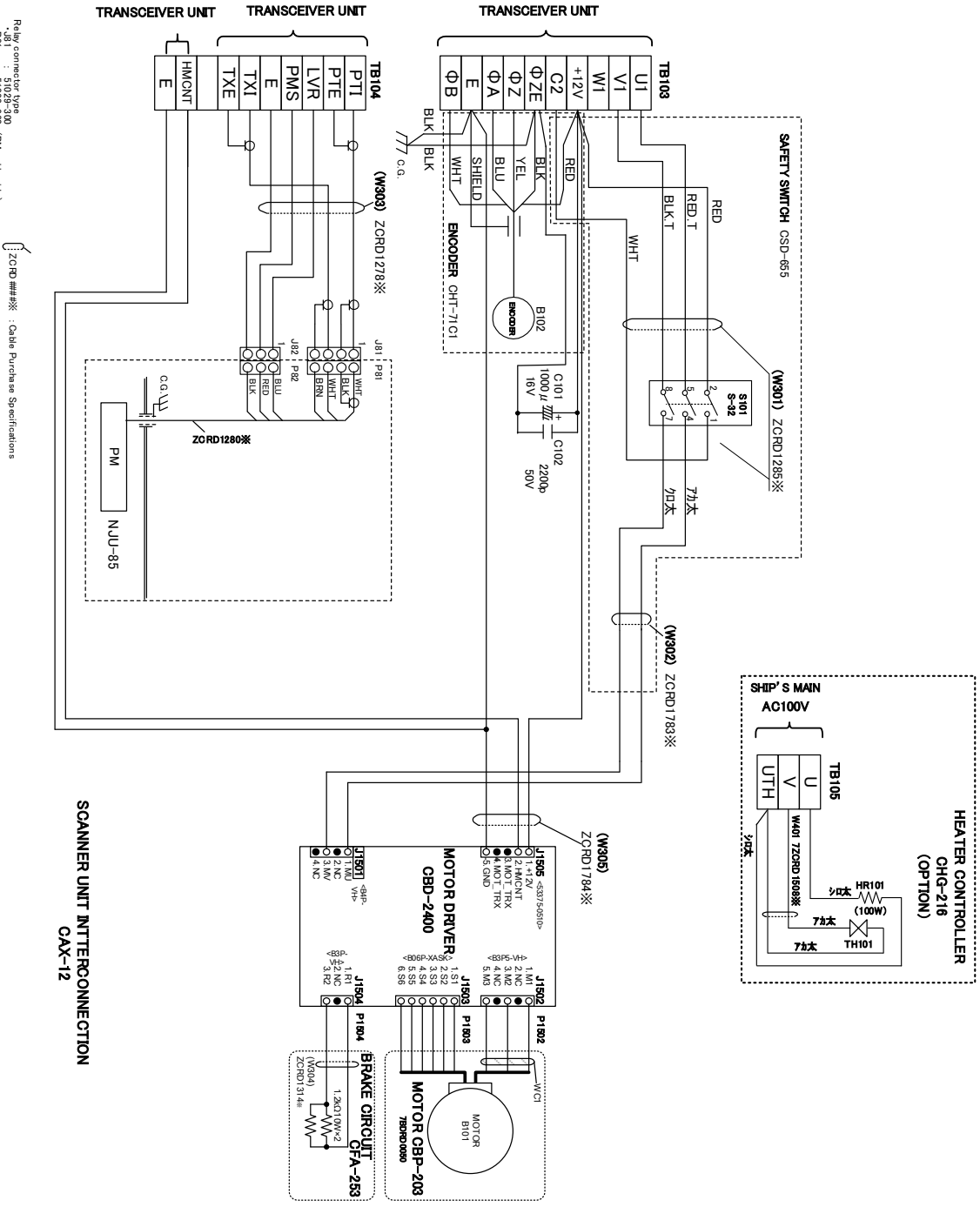
6.6.9 NKE-1129 (AC110V)



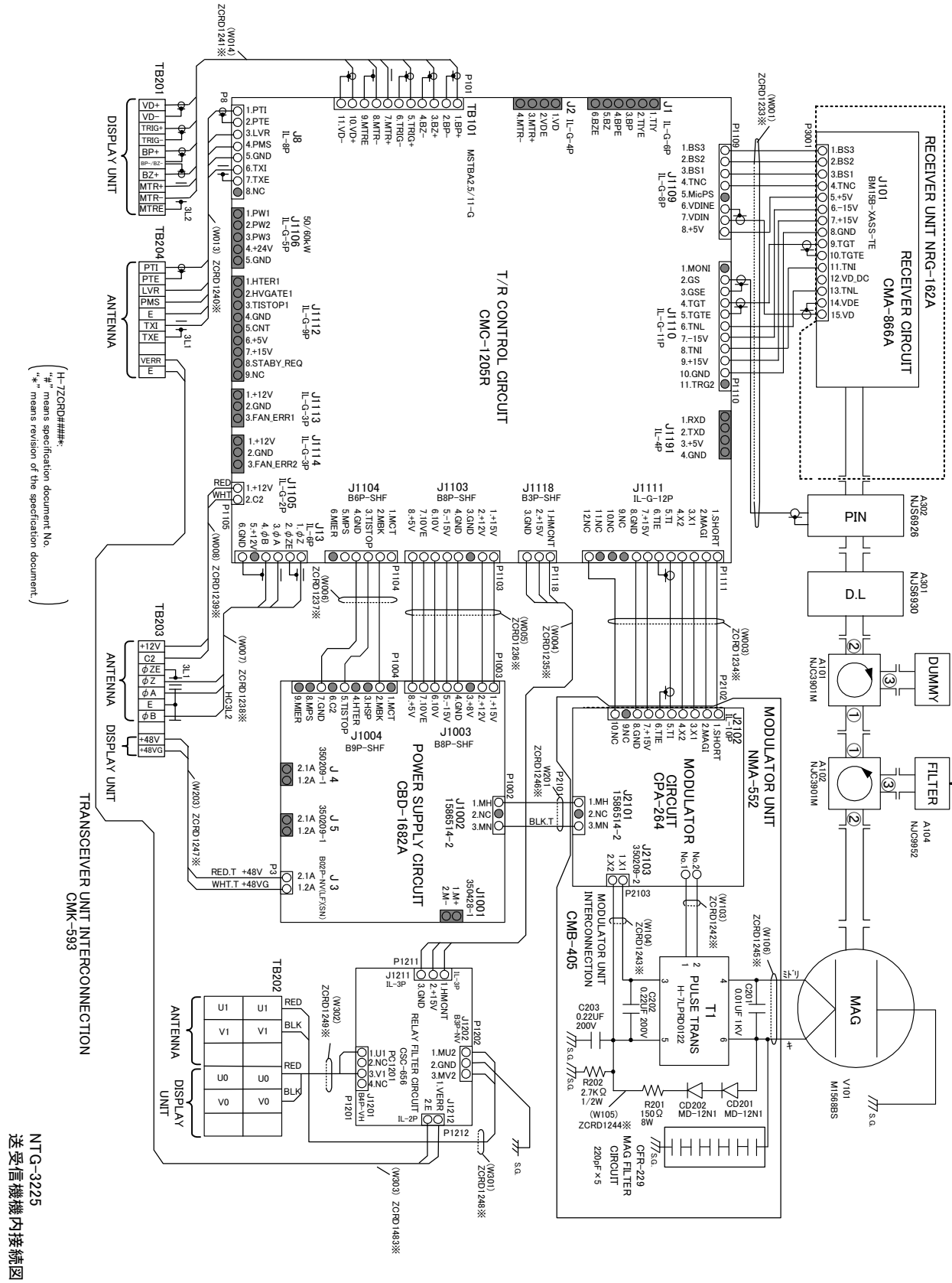
6.6.10 NKE-1129 (AC220V)



6.6.11 NKE-1129A(AC110/220V)

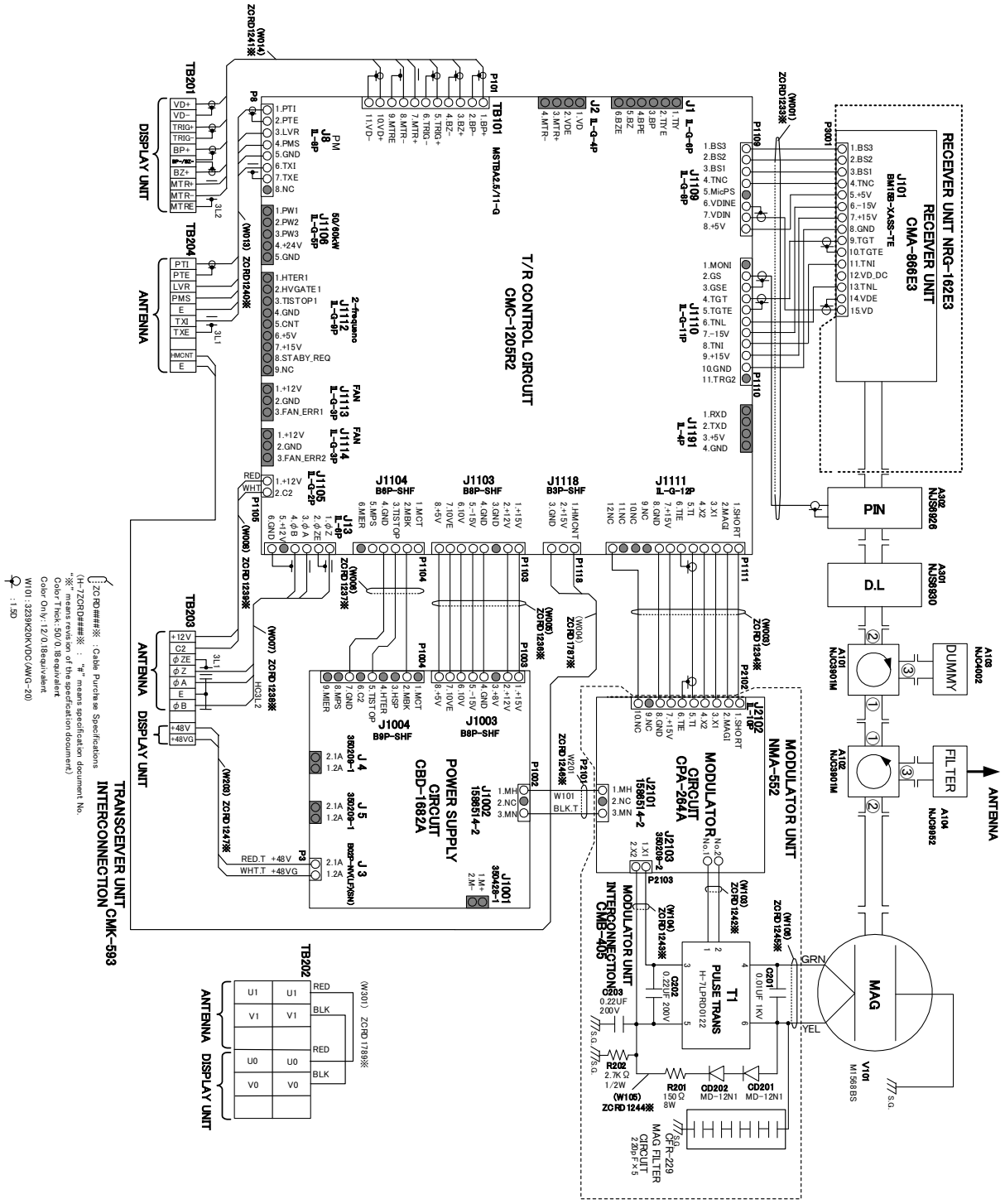


6.6.12 NTG-3225

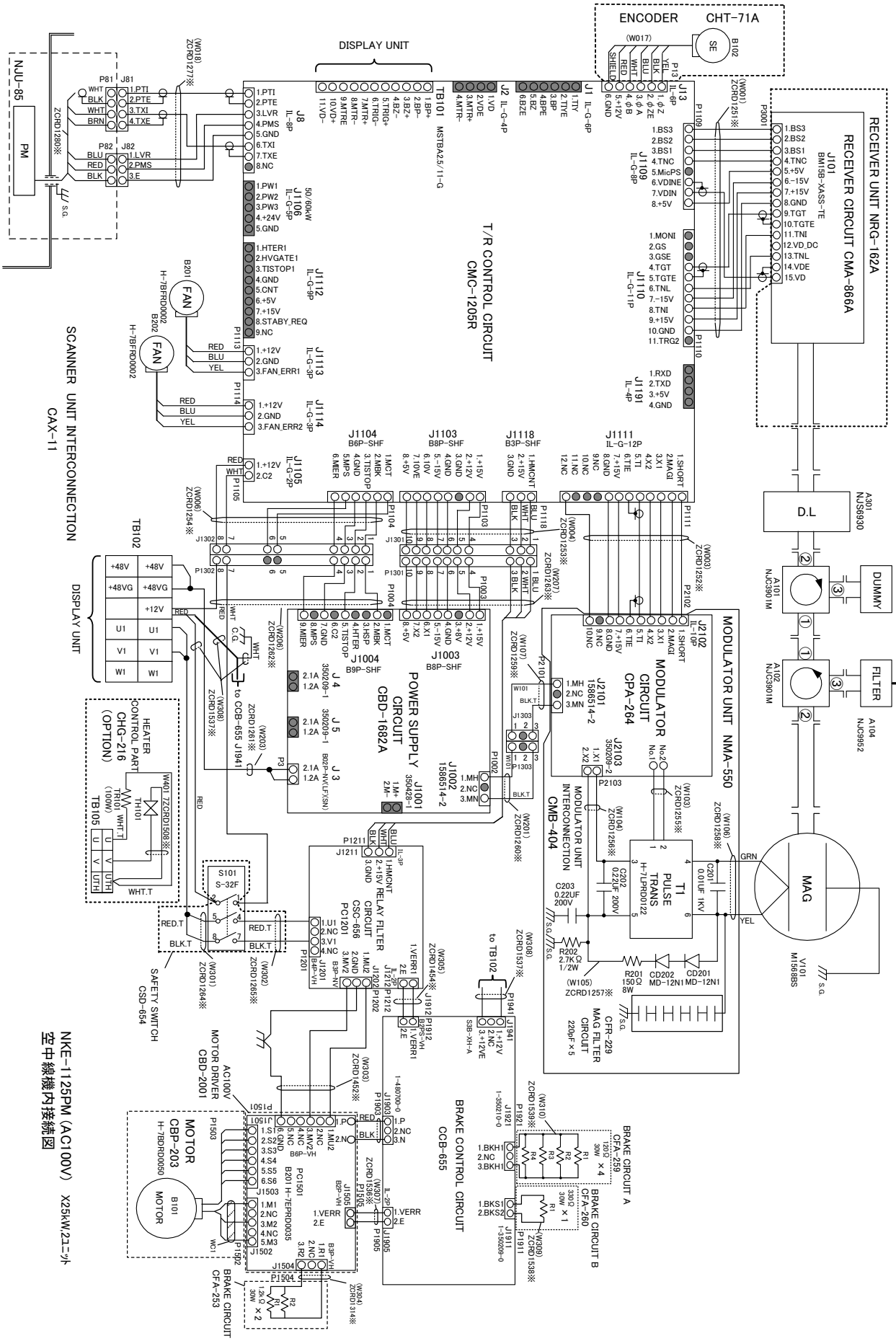


NTG-3225
送受信機機内接続図

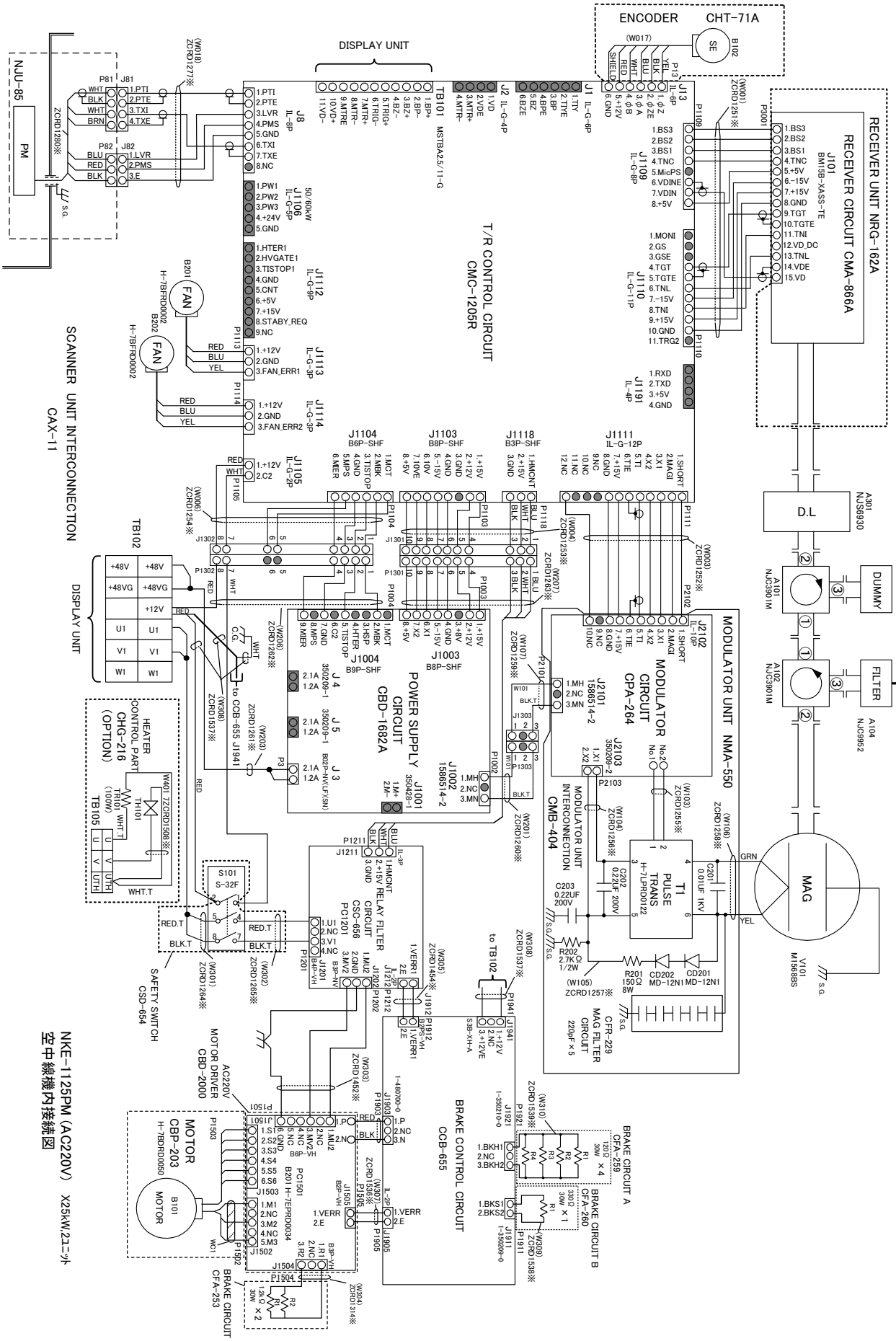
6.6.13 NTG-3225A



6.6.14 NKE-1125 (AC110V)

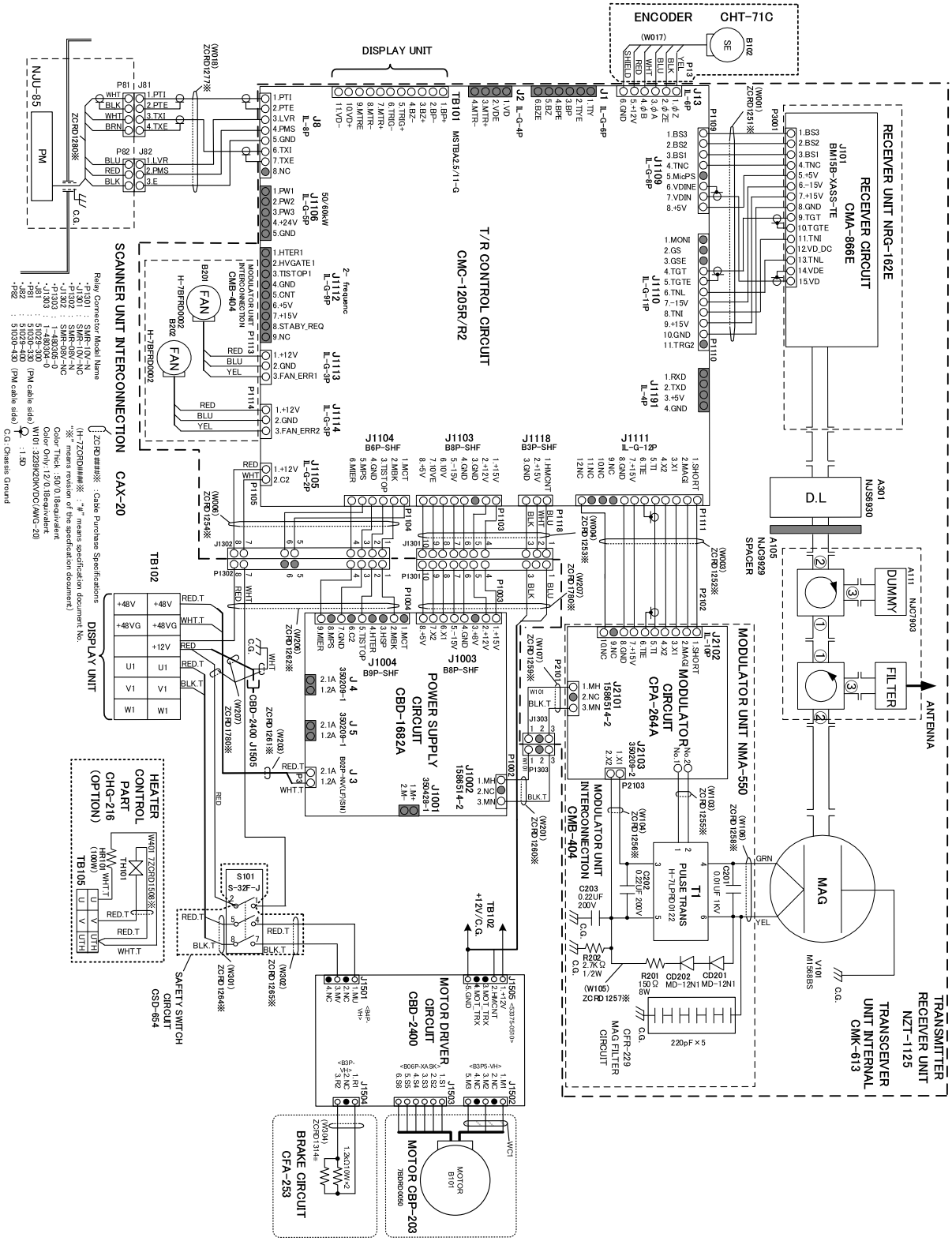


6.6.15 NKE-1125 (AC220V)

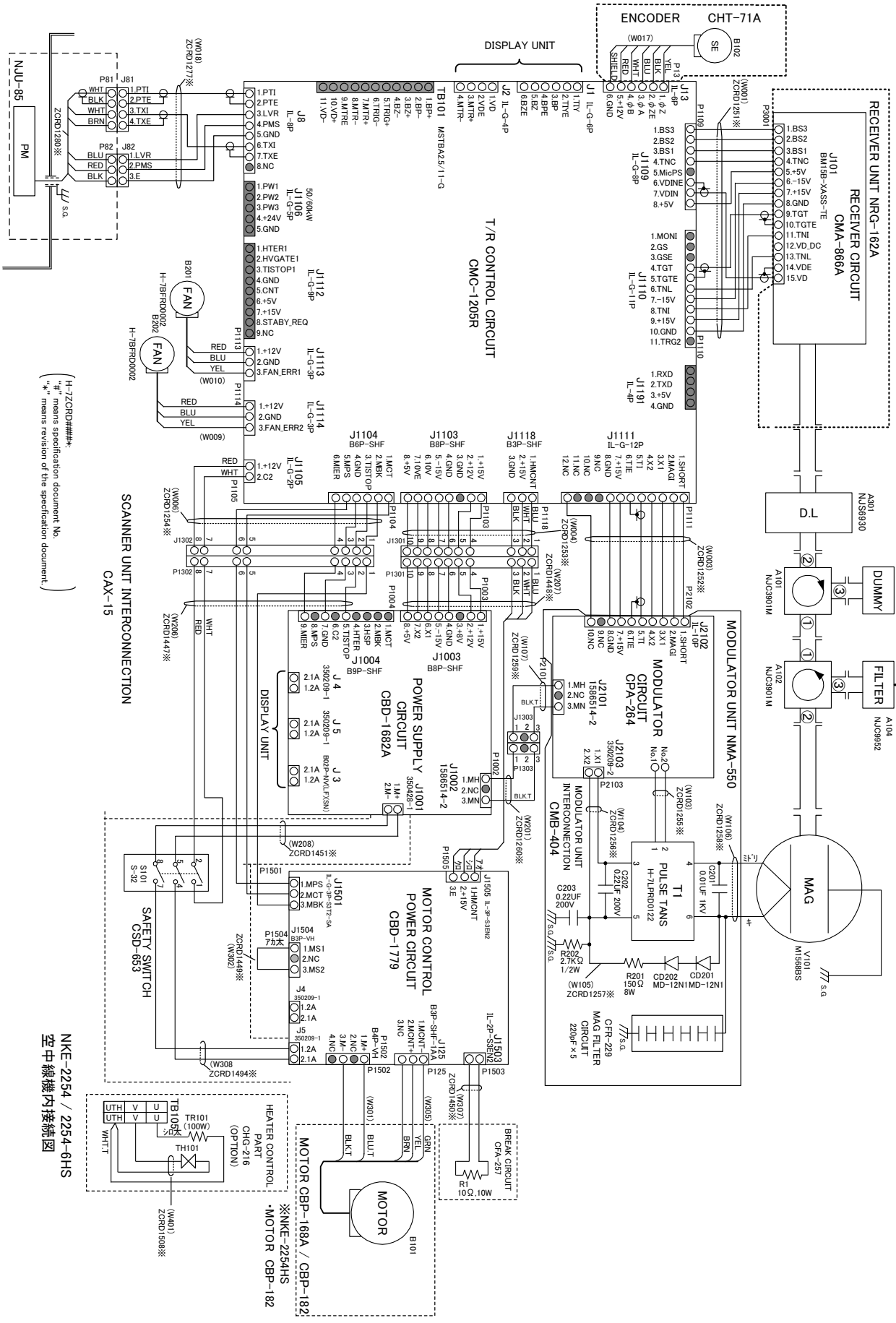


NKE-1125PM (AC220V) X25kW,23ユニット
空中線機内接続図

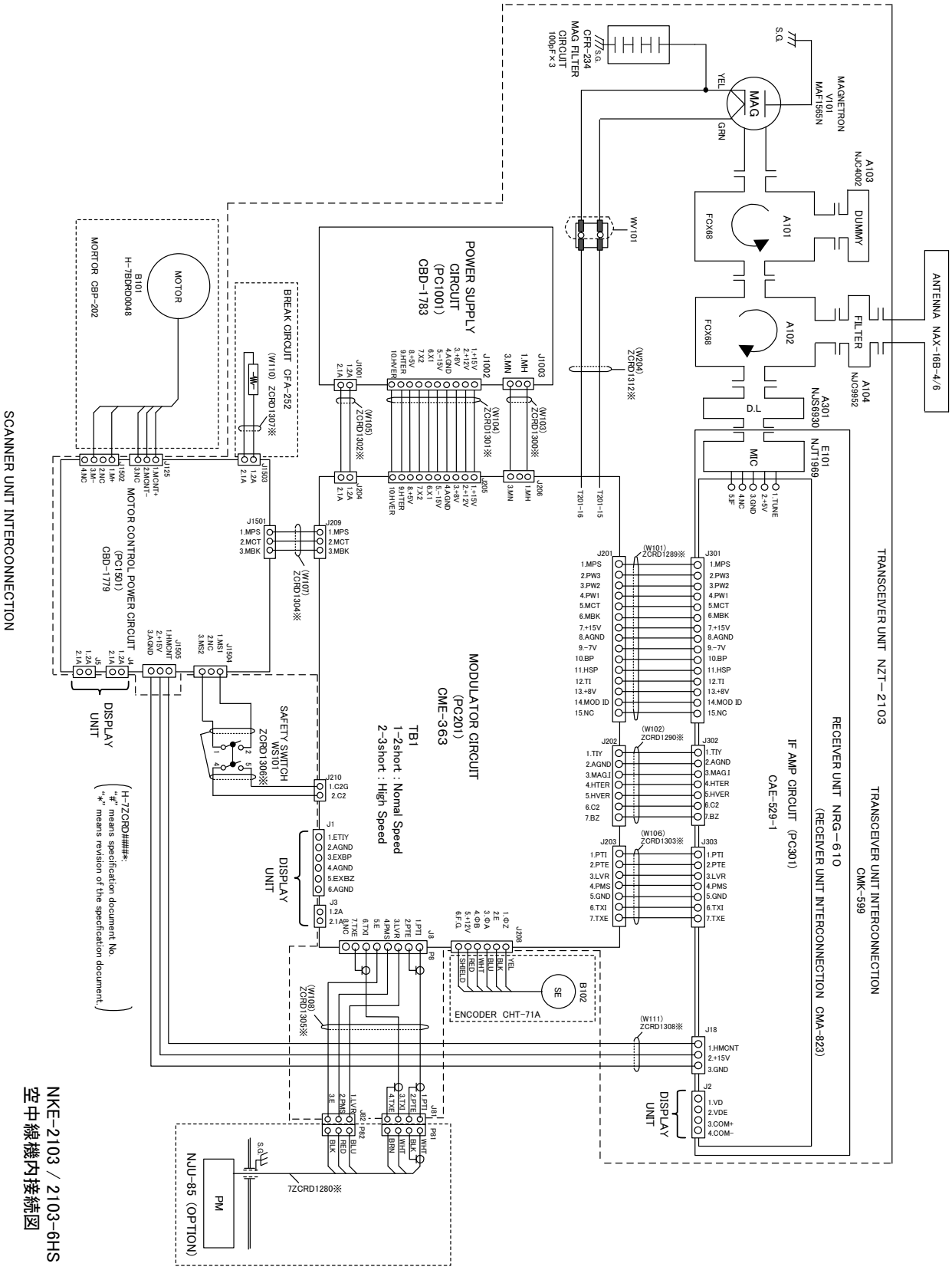
6.6.16 NKE-1125A (AC110/220V)



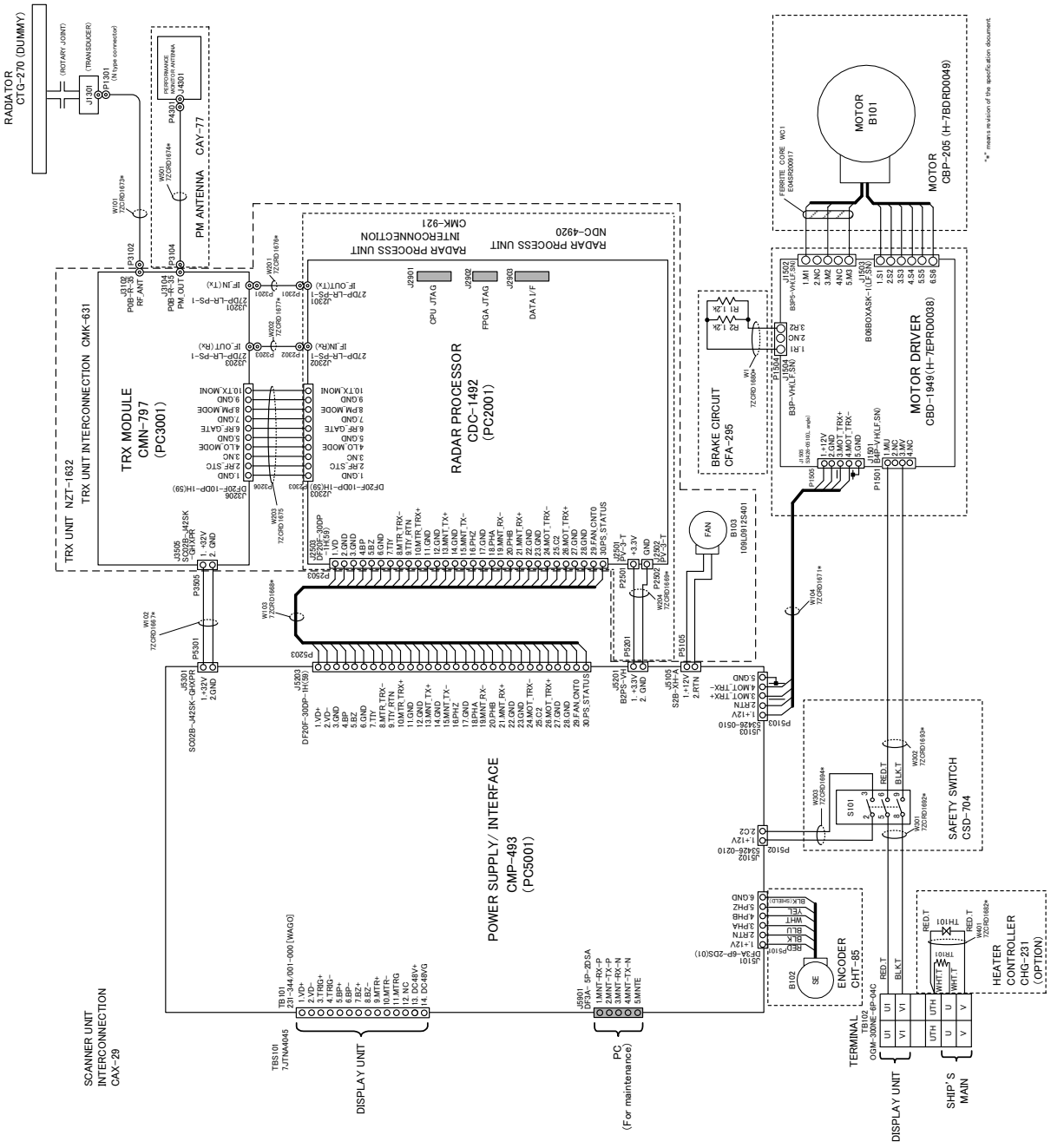
6.6.17 NKE-2254-6HS



6.6.18 NKE-2103-6/6HS

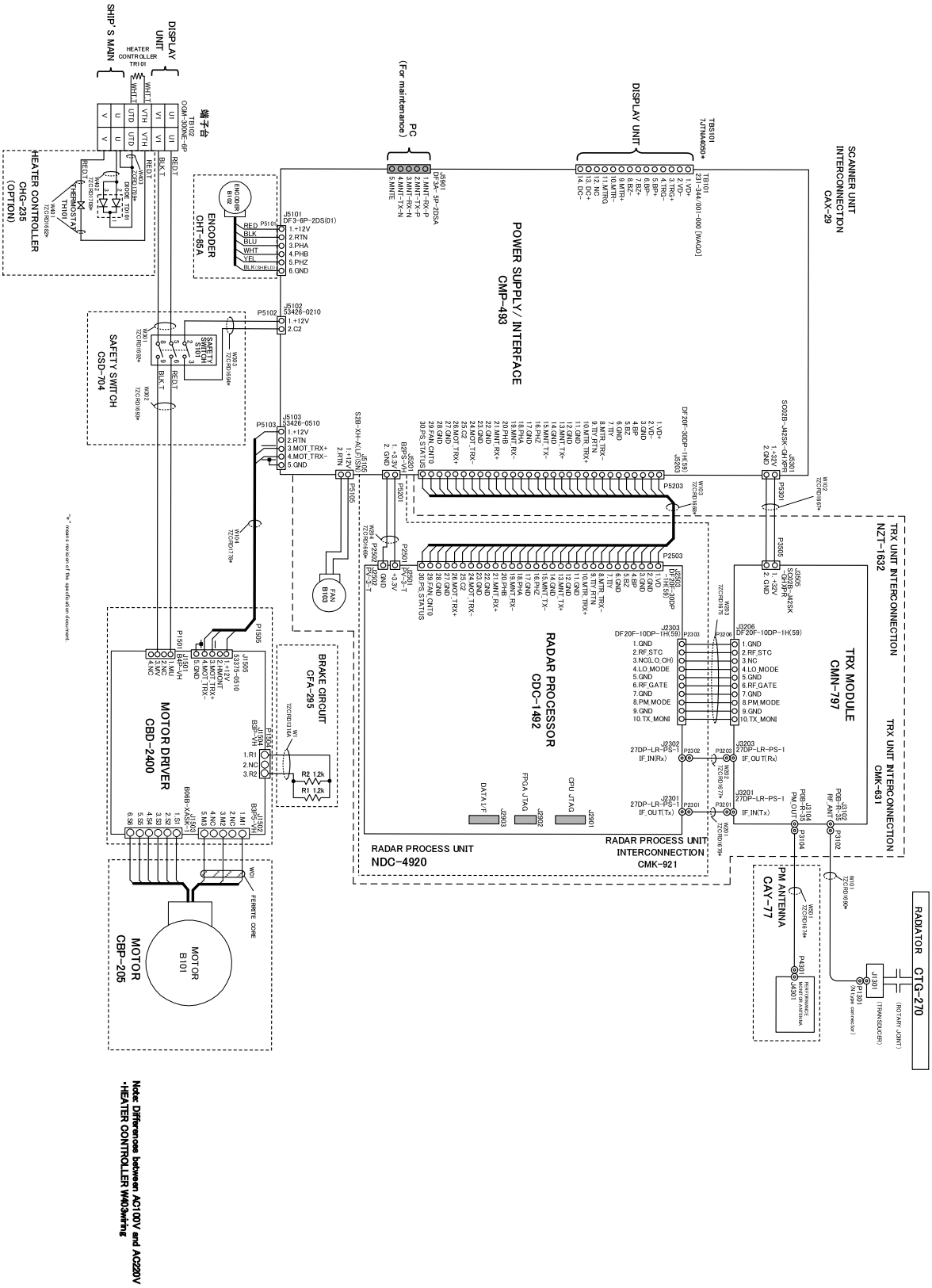


6.6.19 NKE-1632



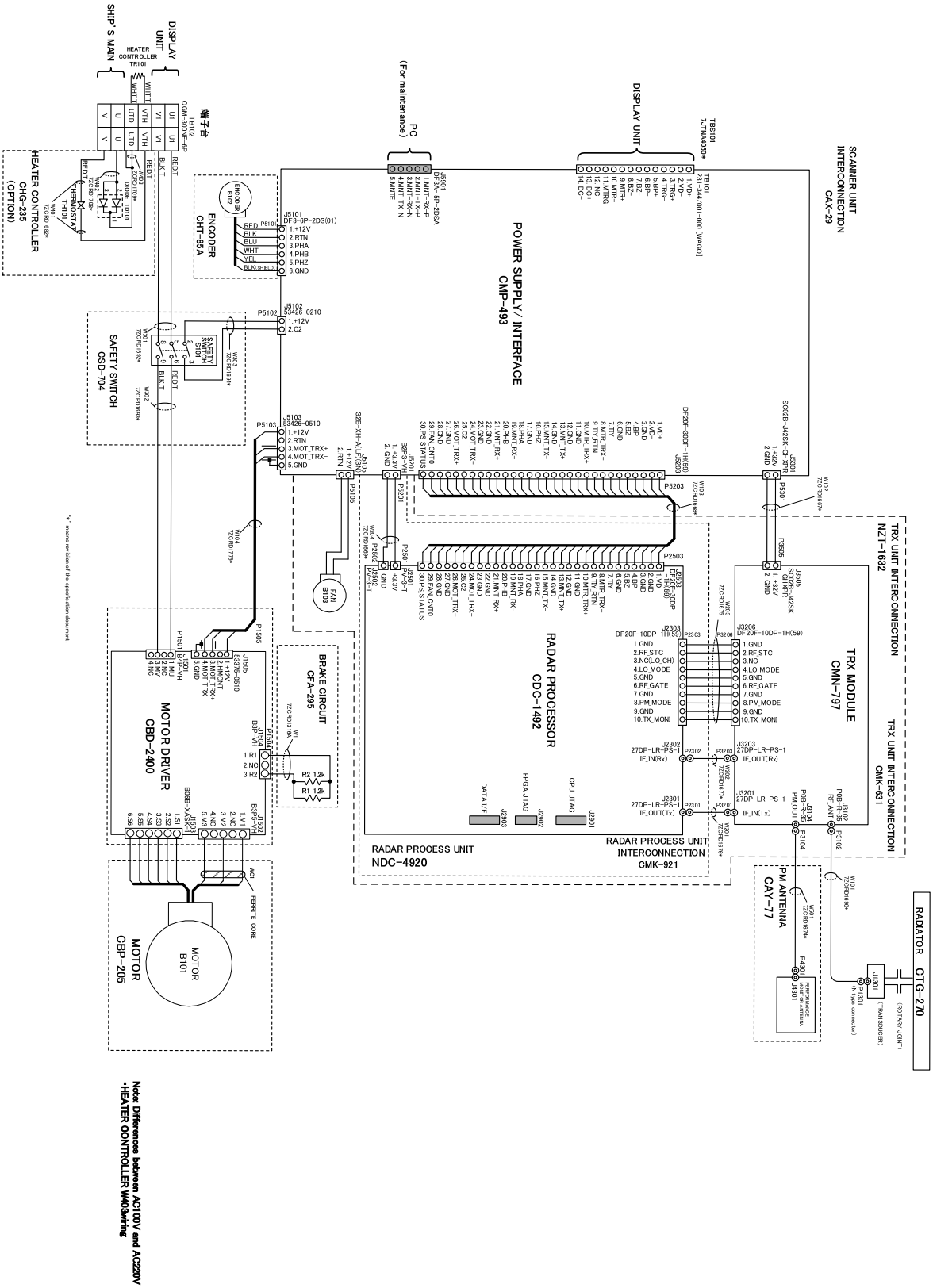
NKE-1632 INTERCONNECTION

6.6.20 NKE-1632A(AC100V)



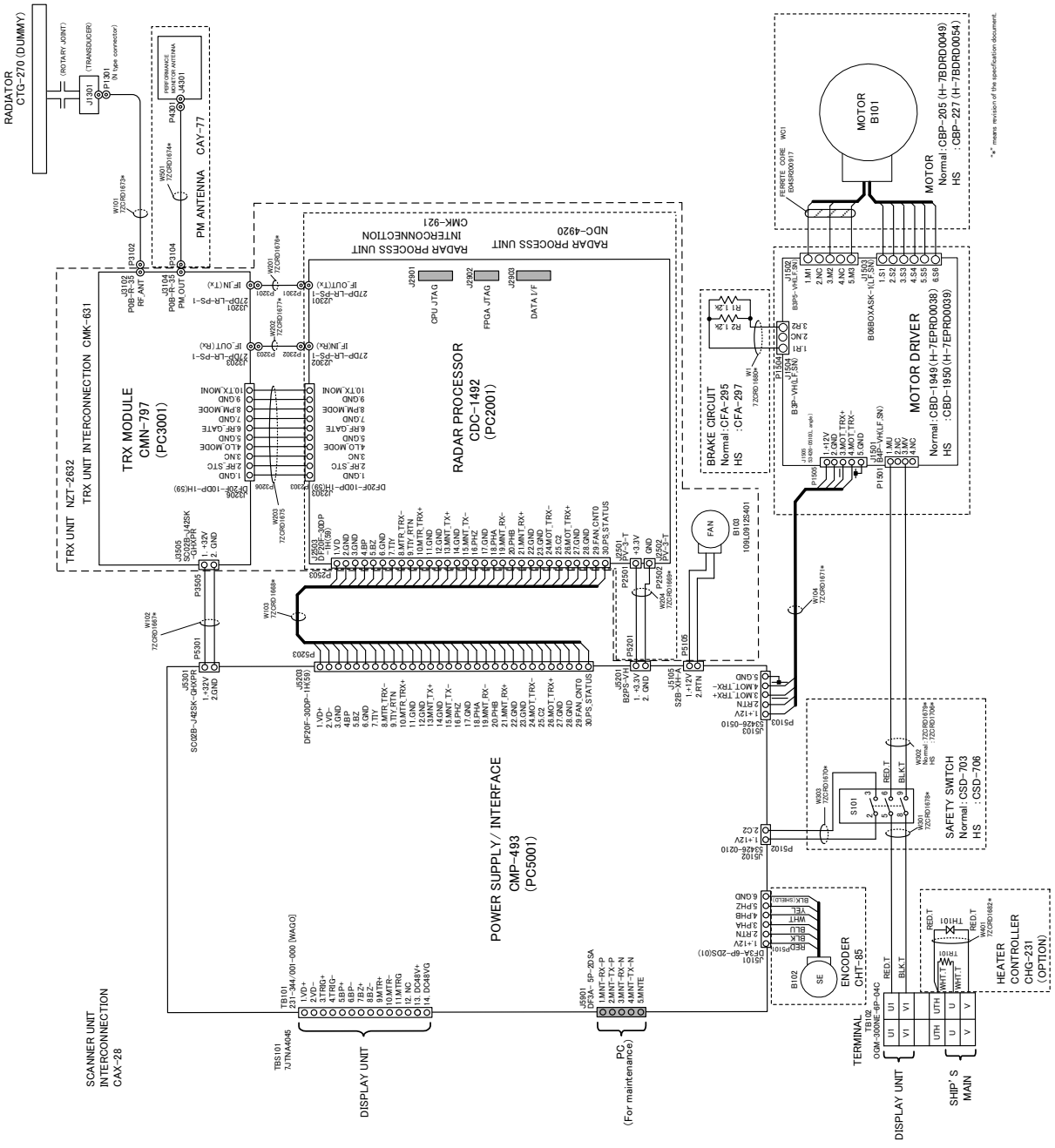
NKE-1632A(AC100V) INTERCONNECTION

6.6.21 NKE-1632A(AC220V)



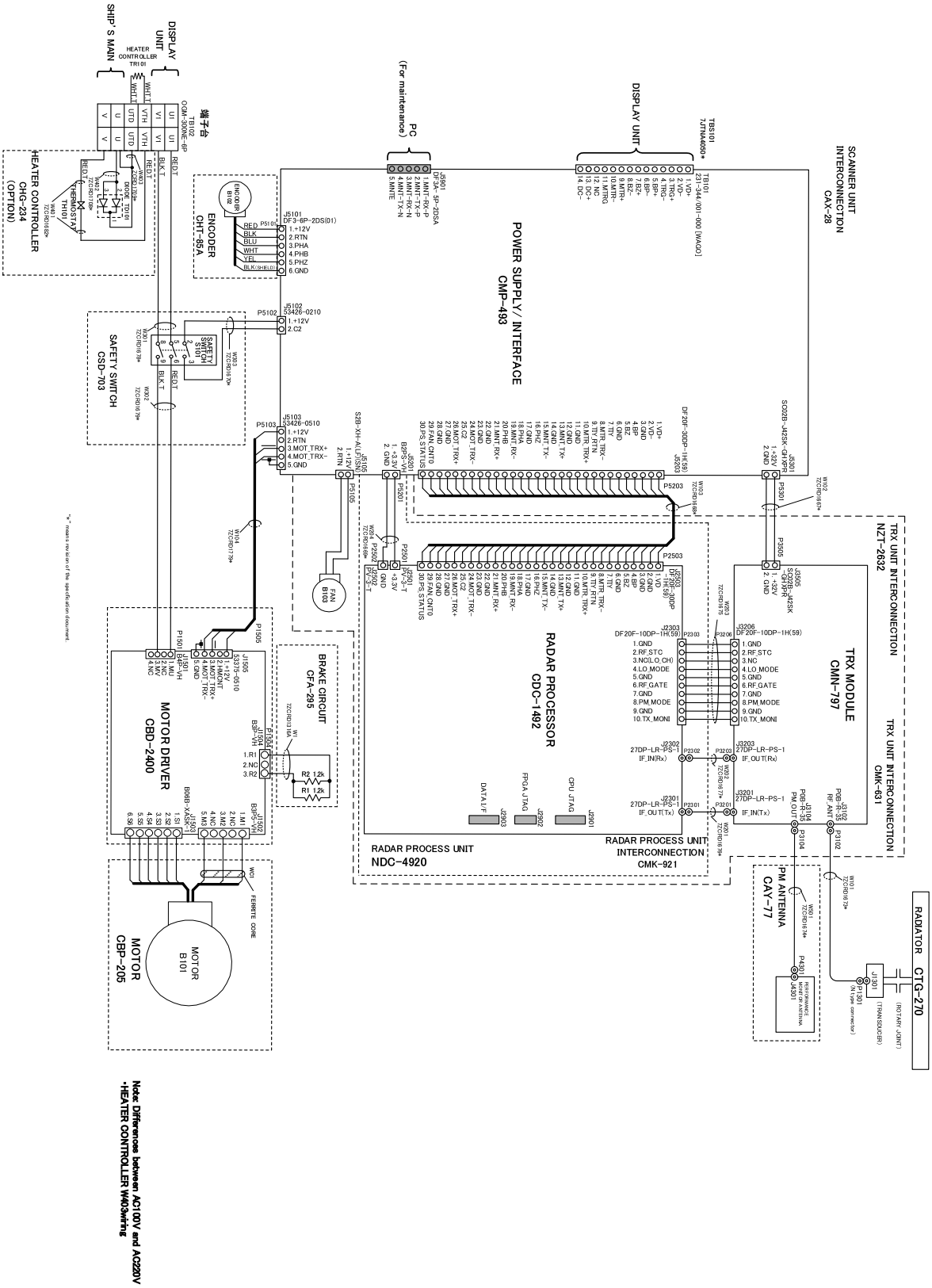
NKE-1632A(AC220V) INTERCONNECTION

6.6.22 NKE-2632/2632-H



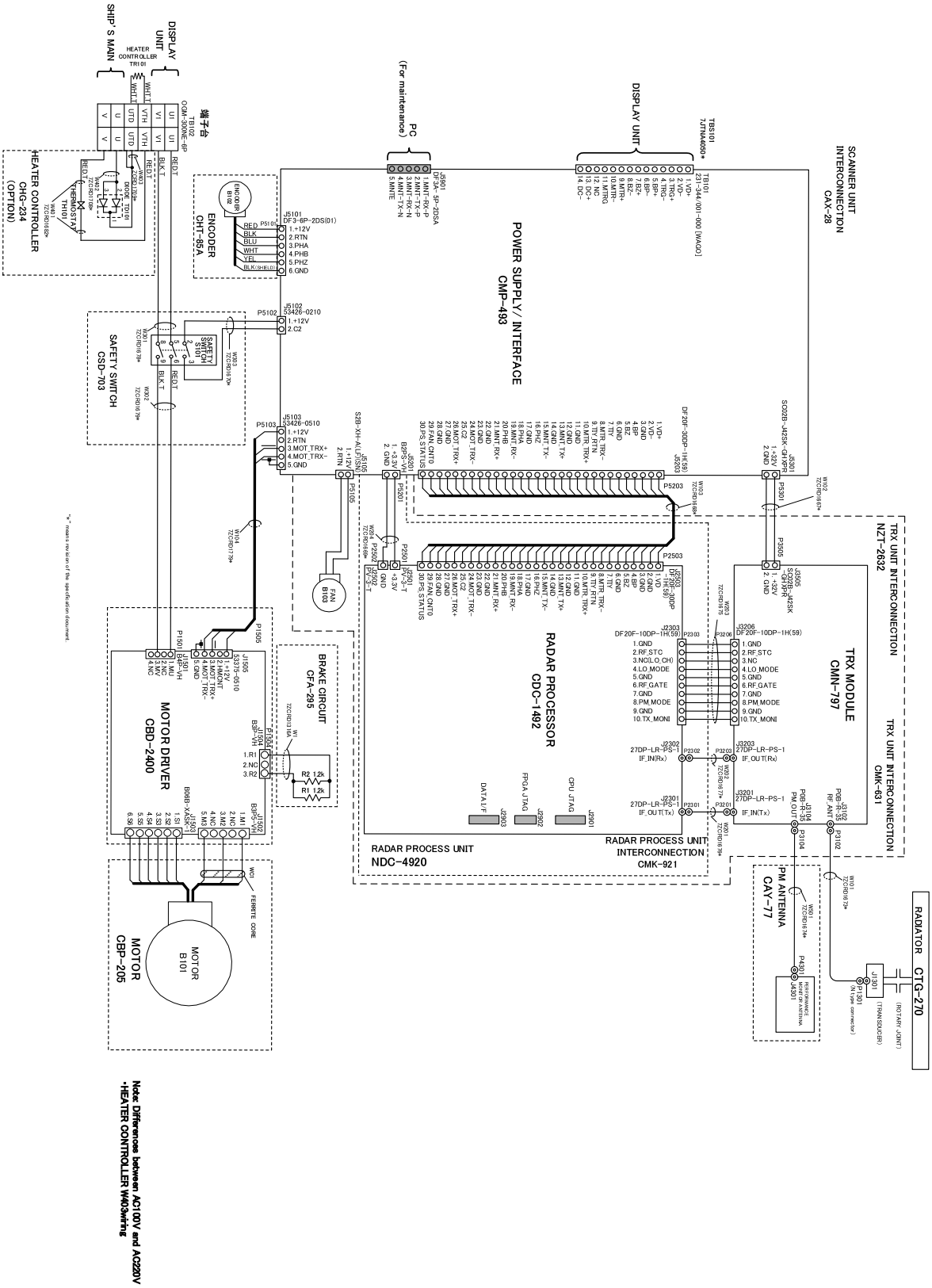
NKE-2632/2632-H INTERCONNECTION

6.6.23 NKE-2632A(AC100V)



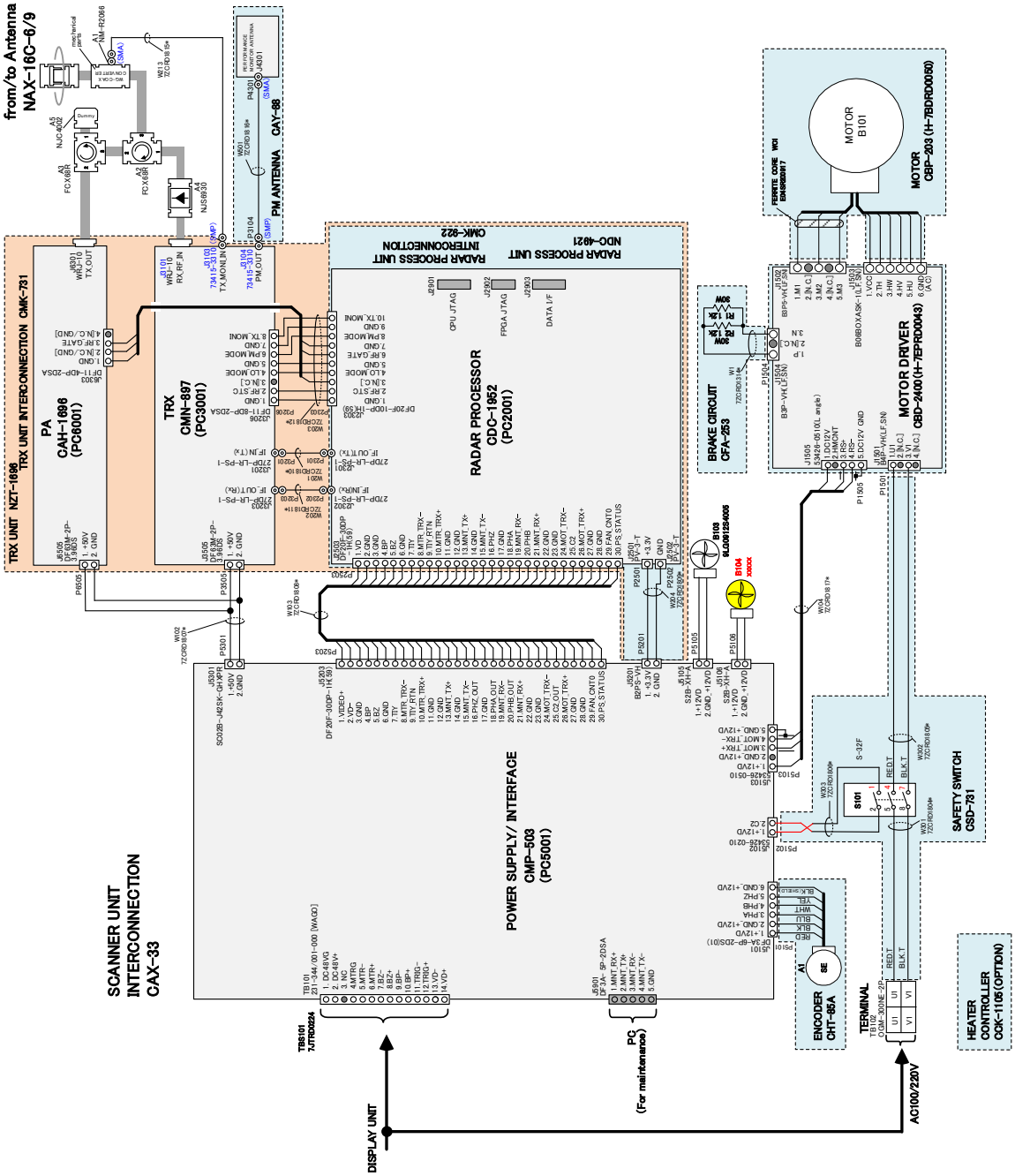
NKE-2632A(AC100V) INTERCONNECTION

6.6.24 NKE-2632 A(AC220V)



NKE-2632A(AC220V) INTERCONNECTION

6.6.25 NKE-1696



6.7 External Input/Output Sentence Format

Note: Use external input/output sentence data after NMEA version 2.1

6.7.1 Receivable signals

6.7.1.1 Ship Heading

$--THS,x.x,a*hh<CR><LF>
1 2 3 4

1. THS Header
2. x.x Heading, degrees true
3. a Mode indicator: A = Autonomous, E = Estimated (dead reckoning) M = Manual input, S = Simulator mode ,V = Data not valid (including standby)
4. hh Checksum

$--HDT, x.x, T*hh<CR><LF>
1 2 3 4

1. HDT Header
2. x.x Heading
3. T Degrees true
4. hh Checksum

6.7.1.2 Ship Heading correction report

$--HCR,x.x,a,a,x.x*hh<CR><LF>
1 2 3 4 5 6

1. HCR Header
2. x.x Heading, degrees true (Value of heading for which this HCR is referenced. This value is not replacing heading value from the THS sentence.)
3. a Mode indicator: A = Autonomous, E = Estimated (dead reckoning), M = Manual input, S = Simulator mode, V = Data not valid (including standby)
4. a Correction state: A = Both Speed/latitude and dynamic correction included in heading, D = Dynamic correction included in heading, S = Speed / latitude correction included in heading, N = No correction included in heading, V = Not available, reporting device does not know about correction state
5. x.x Correction value
6. hh Checksum

6.7.1.3 Course

$--GGA,hhmmss.ss,llll.ll,a,yyyyy.yy,a,x,xx,x.x,x.x,M,x.x,M,x.x,xxxx*hh<CR><LF>

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

1.	GGA	Header
2.	hhmmss.ss	UTC of positioning
3.	llll.ll	Latitude
4.	a	N/S
5.	yyyyy.yy	Longitude
6.	a	E/W
7.	x	GPS Quality indicator: 0 = Invalid, 1 = GPS positioning, 2 = DGPS positioning, 3 = GPS-PPS, 4 = RTK mode (fixed point), 5 = RTK mode (floating point), 6 = Estimated (dead reckoning), 7 = Manual mode, 8 = Simulation mode
8.	xx	Number of satellites in use, 00-12
9.	x.x	Horizontal dilution of precision
10.	x.x	Antenna altitude from mean-sea-level (geoid) (m)
11.	M	Antenna altitude unit; M=meters
12.	x.x	Height difference from WGS-84 earth ellipsoid surface to mean-sea-level surface (m) = Geoidal separation
13.	M	Unit for the height difference from WGS-84 earth ellipsoid surface to mean-sea-level; M=meters
14.	x.x	Age of Differential GPS data (seconds)
15.	xxxx	Differential GPS reference station ID (0000 – 1023)
16.	hh	Checksum

$--RMC,hhmmss.ss,A,llll.ll,a,yyyyy.yy,a,x.x,x.x,xxxxxx,x.x,a,a*hh<CR><LF>

1 2 3 4 5 6 7 8 9 10 11 12 13 14

1.	RMC	Header
2.	hhmmss.ss	UTC of positioning
3.	A	Status; A = Data valid, V = Data not valid
4.	llll.ll	Latitude
5.	a	N/S
6.	yyyyy.yy	Longitude
7.	a	E/W
8.	x.x	Speed over ground (knots)
9.	x.x	Course Over Ground (degrees, true north)
10.	xxxxxx	Date (UTC): ddmmyy
11.	x.x	Magnetic variation (degrees)
12.	a	Magnetic variation direction E/W
13.	a	Mode Indicator; A = Autonomous mode, D = Differential mode, N = Data not valid, E = Estimated (dead reckoning) mode, M = Manual input mode, S = Simulator mode
14.	hh	Checksum

$--RMA, A, llll.ll, a, yyyyy.yy, a, x.x, x.x, x.x, x.x, x.x,a,a*hh<CR><LF>

1 2 3 4 5 6 7 8 9 10 11 12 13 14

1.	RMA	Header
2.	A	Status : A = data valid, V = Station erroneous operation, cycle or SNR warning
3.	llll.ll	Latitude
4.	a	Degrees N/S
5.	yyyyy.yy	Longitude
6.	a	Degrees E/W
7.	x.x	Time difference A, μs
8.	x.x	Time difference B, μs
9.	x.x	Speed over ground, knots
10.	x.x	Course over ground, degrees true
11.	x.x	Magnetic variation
12.	a	Magnetic variation direction E/W
13.	a	Mode indicator: A = Autonomous mode; D = Differential mode; E = Estimated (dead reckoning) mode; M = Manual input mode; S = Simulator mode;N = Data not valid.
14.	hh	Checksum

$-- GNS, hhmmss.ss, llll.ll, a, yyyyy.yy, a, c--c,xx,x.x,x.x,x.x,x.x,x.x,a *hh<CR><LF>
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

1.	GNS	Header
2.	hhmmss.ss	UTC of positioning
3.	llll.ll	Latitude
4.	a	N/S
5.	yyyyy.yy	Longitude
6.	a	Degrees E/W
7.	c—c	Mode indicator: A = Autonomous mode, D = Differential mode, E = Estimated (dead reckoning) mode, F = RTK mode (floating point), M = Manual input mode, N = Correction not valid, P = Precision positioning, R = RTK mode (fixed point), S = Simulator mode
8.	xx	Total number of satellites in use, 00-99
9.	x.x	HDOP
10.	x.x	Antenna altitude, m
11.	x.x	Geoidal separation, m
12.	x.x	Age of differential data, s
13.	x.x	Differential reference station ID
14.	a	Status indicator: S = Safe, C = Caution, U = Unsafe, V = Data not valid
15.	hh	Checksum

$ --GLL,llll.ll,a,yyyyy.yy,a,hhmmss.ss,A,a*hh<CR><LF>
1 2 3 4 5 6 7 8 9

1.	GLL	Header
2.	llll.ll	Latitude
3.	a	N/S
4.	yyyyy.yy	Longitude
5.	a	E/W
6.	hhmmss.ss	UTC of positioning
7.	A	Status; A = Data valid, V = Data not valid
8.	a	Mode Indicator; A = Autonomous mode, D = Differential mode, N = Data not valid, E = Estimated (dead reckoning) mode, M = Manual input mode, S = Simulator mode
9.	hh	Checksum

6.7.1.4 Geodetic positioning system

$ --DTM,ccc,a,x.x,a,x.x,a,x.x,ccc*hh<CR><LF>
1 2 3 4 5 6 7 8 9 10

1.	DTM	Header (Datum Reference)
2.	ccc	Local (geodetic reference) datum code; W84 = WGS84, W72 = WGS72,S85 =SGS85, P90 = PE90, 999 = User defined, IHO datum code
3.	a	Local datum subdivision code
4.	x.x	Latitude offset (minutes)
5.	a	N/S
6.	x.x	Longitude offset (minutes)
7.	a	E/W
8.	x.x	Altitude offset (meters)
9.	ccc	Reference datum code (Geodetic reference system to which being conformed); W84 = WGS84, W72 = WGS72, S85 = SGS85, P90 = PE90
10.	hh	Checksum

$--BLV,hhmmss,ddmm.mm,a,dddmm.mm,a,ddd,T,,ss.s,N,ddd,T,,xxx.x,N,nn,ee.e,xx.x,
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
aaaaaaannaaaaaaaa hh<CR><LF>
17

1. BLV Header
2. hhmmss World standard time
3,4. ddmm.mm,a Positioning ／Latitude ・N/S
5,6. dddmm.mm,a Positioning ／Longitude ・E/W
7,8. ddd,T Buoy drifting course(000~359 degrees)
9,10. ss.s,N Buoy drifting speed(00.0~99.9 kn)
11,12. dd.d,T Buoy orientation(From own ship：000~359 degrees)
13,14 xxx.x,N Buoy distance(From own ship：000.0~999.9 NM)
15. nn Buoy number(00~99)
16. ee.e Battery voltage(24.0V)(Unused)
17. aaaaaaannaaaaaaaa Buoy number(8th and 9th letters)(00~99)
The buy number (15, 17) switches the reference destination in the setting.
18. hh Checksum

6.7.1.5 Date information

$--ZDA,hhmmss.ss,xx,xx,xxxx,xx,xx*hh<CR><LF>
1 2 3 4 5 6 7 8

1. ZDA Header (Time & Date)
2. hhmmss.ss UTC of positioning
3. xx Day (UTC)
4. xx Month (UTC)
5. xxxx Year (UTC)
6. xx Local zone hours, 00 to +13 hrs
7. xx Local zone minutes, 00 to +59
8. hh Checksum

6.7.1.6 COG/SOG

$--RMC,hhmmss.ss,A,llll.ll,a,yyyyy.yy,a,x.x,x.x,xxxxxx,x.x,a,a*hh<CR><LF>

1 2 3 4 5 6 7 8 9 10 11 12 13 14

1. RMC — Header
2. hhmmss.ss — UTC of positioning
3. A — Status; A = Data valid, V = Data not valid
4. llll.ll — Latitude
5. a — N/S
6. yyyyy.yy — Longitude
7. a — E/W
8. x.x — Speed over ground (knots)
9. x.x — Course Over Ground (degrees, true north)
10. xxxxxx — Date (UTC): ddmmyy
11. x.x — Magnetic variation (degrees)
12. a — Magnetic variation direction E/W
13. a — Mode Indicator; A = Autonomous mode, D = Differential mode, N = Data not valid, E = Estimated (dead reckoning) mode, M = Manual input mode, S = Simulator mode
14. hh — Checksum

$--RMA, A, llll.ll, a, yyyyy.yy, a, x.x, x.x, x.x, x.x, x.x,a,a*hh<CR><LF>

1 2 3 4 5 6 7 8 9 10 11 12 13 14

1. RMA — Header
2. A — Status : A = data valid, V = Station erroneous operation, cycle or SNR warning
3. llll.ll — Latitude
4. a — Degrees N/S
5. yyyyy.yy — Longitude
6. a — Degrees E/W
7. x.x — Time difference A, µs
8. x.x — Time difference B, µs
9. x.x — Speed over ground, knots
10. x.x — Course over ground, degrees true
11. x.x — Magnetic variation, degrees E/W
12. a — Degrees E/Wa
13. a — Mode indicator: A = Autonomous mode, D = Differential mode, E = Estimated (dead reckoning) mode, M = Manual input mode, S = Simulator mode, N = Data not valid
14. hh — Checksum

$--VTG,x.x,T,x.x,M,x.x,N,x.x,K,a*hh<CR><LF>

1 2 3 4 5 6 7 8 9 10 11

1. VTG — Header
2. x.x — Course over ground based on true north (degrees)
3. T — Unit of course over ground; T = True
4. x.x — Course over ground based on magnetic north (degrees)
5. M — Unit of course over ground; M = Magnetic
6. x.x — Speed over ground (knots)
7. N — Speed over ground unit; N = knots
8. x.x — Speed over ground (km/h)
9. K — Speed over ground unit; K = km/hr
10. a — Mode Indicator; A = Autonomous mode, D = Differential mode, N = Data not valid, E = Estimated (dead reckoning) mode, M = Manual input mode, S = Simulator mode
11. hh — Checksum

6.7.1.7 Ship speed through water

$--VBW,x.x,x.x,A,x.x,x.x,A,x.x,A,x.x,A*hh<CR><LF>

1 2 3 4 5 6 7 8 9 10 11 12

1. VBW Header
2. x.x Longitudinal water speed (knots)
3. x.x Transverse speed through water (knots)
4. A Status of speed through water; A = Data valid
5. x.x Longitudinal speed over the ground (knots)
6. x.x Transverse speed over the ground (knots)
7. A Status of speed over the ground; A = Data valid
8. x.x Stern transverse speed through water (knots)
9. A Status of stern transverse speed through water; A = Data valid
10. x.x Stern transverse speed over the ground (knots)
11. A Status of stern transverse speed over the ground; A = Data valid, V = Invalid
12. hh Checksum

$--VHW, x.x, T, x.x, M, x.x, N, x.x, K*hh<CR><LF>

1 2 3 4 5 6 7 8 9 10

1. VHW Header
2. x.x Heading, degrees true
3. T T = True
4. x.x Heading, degrees magnetic
5. M M = Magnetic
6. x.x Speed
7. N Knots
8. x.x Speed
9. K km/h
10. hh Checksum

6.7.1.8 Turning speed

$--ROT, x.x, A*hh<CR><LF>

1 2 3 4

1. ROT Header
2. x.x Rate of turn, °/min, "-" = bow turns to port
3. A Status: A = data valid, V = data invalid
4. hh Checksum

6.7.1.9 Water depth

$ --DPT,x.x,x.x,x.x*hh<CR><LF>

1 2 3 4 5

1. DPT Header
2. x.x Water depth relative to the transducer (meters)
3. x.x Offset from transducer (meters)
4. x.x Maximum range scale in use
5. hh Checksum

$ --DBS,x.x,f,x.x,M,x.x,F*hh<CR><LF>

1 2 3 4 5 6 7 8

1. DDBS Header (DBS-Depth from sea surface)
2. x.x Water depth from ship's bottom (feet)
3. f Units (feet)
4. x.x Water depth from ship's bottom (meters)
5. M Units (meters)
6. x.x Water depth from sea surface (fathoms)
7. F Units (fathoms)
8. hh Checksum

$ --DBT,x.x,f,x.x,M,x.x,F*hh<CR><LF>

1 2 3 4 5 6 7 8

1. DBT Header (DBT-Depth from transducer)
2. x.x Water depth from ship's bottom (feet)
3. f Units (feet)
4. x.x Water depth from ship's bottom (meters)
5. M Units (meters)
6. x.x Water depth from sea surface (fathoms)
7. F Units (fathoms)
8. hh Checksum

$ --DBK,x.x,f,x.x,M,x.x,F*hh<CR><LF>

1 2 3 4 5 6 7 8

1. DBK Header (DBK-Depth below keel)
2. x.x Water depth from ship's bottom (feet)
3. f Units (feet)
4. x.x Water depth from ship's bottom (meters)
5. M Units (meters)
6. x.x Water depth from sea surface (fathoms)
7. F Units (fathoms)
8. hh Checksum

6.7.1.10 Wind direction/wind speed

$--MWV, x.x, a, x.x, a, A *hh<CR><LF>

1 2 3 4 5 6 7

1. MWV Header
2. x.x Wind angle, 0° to 359°
3. a Reference, R = relative, T=true
4. x.x Wind speed
5. a Wind speed units, K = km/h, M = m/s, N = knots
6. A Status, A = data valid V= data invalid
7. hh Checksum

$--MWD, x.x,T,x.x,M,x.x,N,x.x,M*hh<CR><LF>
1 2 3 4 5 6

1. MWD Header
2. x.x,T Wind direction, 0° to 359° true
3. x.x,M Wind direction, 0° to 359° magnetic
4. x.x,N Wind speed, knots
5. x.x.M Wind speed, m/s

6.7.1.11 Air temperature

$--XDR, a, x.x, a, c--c,..... a, x.x, a, c--c*hh<CR><LF>
1 2 3 4 5 6 7 8

1. XDR Header
2. a Transducer type, transducer No. 1
3. x.x Measurement data, transducer No. 1
4. a Units of measure, transducer No. 1
5. c--c Transducer No. 1 ID
6. ..... Data from transducers No. 1 to No. n-1
7. a, x.x, a, c--c Transducer No. n
8. hh Checksum

$--MTA,x.x,C*hh<CR><LF>
1 2 3

1. --MTA Header
2. x.x,C Temperature, degrees C
3. hh Checksum

$--MDA,x.x,I,x.x,B,x.x,C,x.x,C,x.x,x.x,x.x,C,x.x,T,x.x,M,x.x,N,x.x,M*hh<CR><LF>
1 2 3 4 5 6 7 8 9 10 11 12 13

1. --MDA Header
2. x.x,I Barometric pressure, inches of mercury
3. x.x,B Barometric pressure, bars
4. x.x,C Air temperature, degrees C
5. x.x,C Water temperature, degrees C
6. x.x Relative humidity, percent
7. x.x Absolute humidity, percent
8. x.x.C Dew point, degrees C
9. x.x.T Wind direction, degrees True
10. x.x.M Wind direction, degrees Magnetic
11. x.x.N Wind speed, knots
12. x.x.M Wind speed, meters/second
13. hh Checksum

6.7.1.12 Water temperature

$-- MTW, x.x, C*hh<CR><LF>
1 2 3

1. MTW Header
2. x.x, C Temperature, degrees C
3. hh Checksum

$--MDA,x.x,I,x.x,B,x.x,C,x.x,C,x.x,x.x,x.x,C,x.x,T,x.x,M,x.x,N,x.x,M*hh<CR><LF>
1 2 3 4 5 6 7 8 9 10 11 12 13

1. MDA Header
2. x.x,I Barometric pressure, inches of mercury
3. x.x,B Barometric pressure, bars
4. x.x,C Air temperature, degrees C
5. x.x,C Water temperature, degrees C
6. x.x Relative humidity, percent
7. x.x Absolute humidity, percent
8. x.x.C Dew point, degrees C
9. x.x.T Wind direction, degrees True
10. x.x.M Wind direction, degrees Magnetic
11. x.x.N Wind speed, knots
12. x.x.M Wind speed, meters/second
13. hh Checksum

6.7.1.13 Atmospheric pressure

$--XDR, a, x.x, a, c--c,..... a, x.x, a, c--c*hh<CR><LF>
1 2 3 4 5 6 7 8

1. XDR Header
2. a Transducer type, transducer No. 1
3. x.x Measurement data, transducer No. 1
4. a Units of measure, transducer No. 1
5. c--c Transducer No. 1 ID
6. ..... Data from transducers No. 1 to No. n-1
7. a, x.x, a, c--c Data from transducer No. n
8. hh Checksum

$--MMB,x.x,I,x.x,B*hh<CR><LF>
1 2 3 4

1. MMB Header
2. x.x,I Barometric pressure, inches of mercury
3. x.x,B Barometric pressure, bars
4. hh Checksum

$--MDA,x.x,I,x.x,B,x.x,C,x.x,C,x.x,x.x,x.x,C,x.x,T,x.x,M,x.x,N,x.x,M*hh<CR><LF>
1 2 3 4 5 6 7 8 9 10 11 12 13

1. MDA Header
2. x.x,I Barometric pressure, inches of mercury
3. x.x,B Barometric pressure, bars
4. x.x,C Air temperature, degrees C
5. x.x,C Water temperature, degrees C
6. x.x Relative humidity, percent
7. x.x Absolute humidity, percent
8. x.x.C Dew point, degrees C
9. x.x.T Wind direction, degrees True
10. x.x.M Wind direction, degrees Magnetic
11. x.x.N Wind speed, knots
12. x.x.M Wind speed, meters/second
13. hh Checksum

6.7.1.14 Humidity

$--XDR, a, x.x, a, c--c,..... a, x.x, a, c--c*hh<CR><LF>
1 2 3 4 5 6 7 8

1. XDR Header
2. a Transducer type, transducer No. 1
3. x.x Measurement data, transducer No. 1
4. a Units of measure, transducer No. 1
5. c--c Transducer No. 1 ID
6. ..... Data from transducers No. 1 to No. n-1
7. a, x.x, a, c--c Data from transducer No. n
8. hh Checksum

$--MHU,x.x,x.x,x.x,C*hh<CR><LF>
1 2 3 4 5

1. MHU Header
2. x.x Relative humidity, percent
3. x.x Absolute humidity, percent
4. x.x,C Dew point, degrees C
5. hh Checksum

$--MDA,x.x,I,x.x,B,x.x,C,x.x,C,x.x,x.x,x.x,C,x.x,T,x.x,M,x.x,N,x.x,M*hh<CR><LF>
1 2 3 4 5 6 7 8 9 10 11 12 13

1. MDA Header
2. x.x,I Barometric pressure, inches of mercury
3. x.x,B Barometric pressure, bars
4. x.x,C Air temperature, degrees C
5. x.x,C Water temperature, degrees C
6. x.x Relative humidity, percent
7. x.x Absolute humidity, percent
8. x.x.C Dew point, degrees C
9. x.x.T Wind direction, degrees True
10. x.x.M Wind direction, degrees Magnetic
11. x.x.N Wind speed, knots
12. x.x.M Wind speed, meters/second
13. hh Checksum

6.7.1.15 AIS

!--VDM,x,x,x,a,s—s,x*hh<CR><LF>
1 2 3 4 5 6 7 8

1. VDM Header
2. x Total number of sentences needed to transfer the message,1 to 9
3. x Sentence number, 1 to 9
4. x Sequential message identifier, 0 to 9
5. a AIS channel
6. s--s Encapsulated ITU-R M.1371 radio message
7. x Number of fill-bits, 0 to 5
8. hh Checksum

!--VDO,x,x,x,a,s--s,x*hh<CR><LF>
1 2 3 4 5 6 7 8

1. VDO Header
2. x Total number of sentences needed to transfer the message, 1 to 9
3. x Sentence number, 1 to 9
4. x Sequential message identifier, 0 to 9
5. a AIS Channel
6. s--s Encapsulated ITU-R M.1371 radio message
7. x Number of fill-bits, 0 to 5
8. hh Checksum

6.7.1.16 Alert

$--ACK,xxx*hh<CR><LF>
1 2 3

1.	ACK	Header
2.	xxx	Unique alarm number (identifier) at alarm source
3.	hh	Checksum

$--ACN,hhmmss.ss,aaa,x.x,x.x,c,a*hh<CR><LF>
1 2 3 4 5 6 7 8

1.	ACN	Header
2.	hhmmss.ss	Time
3.	aaa	Manufacturer mnemonic code
4.	x.x	Alert identifier
5.	x.x	Alert instance
6.	c	Alert command
7.	a	Sentence status flag
8.	hh	Checksum

$--ALC,xx,xx,xx,x.x,aaa,x.x,x.x,x.x,……..,aaa,x.x,x.x,x.x*hh<CR><LF>
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

1.	ALC	Header
2.	xx	Total number of sentences for this message
3.	xx	Sentence number
4.	xx	Sequential message identifier
5.	x.x	Number of alert entries
6.	aaa	Manufacturer mnemonic code
7.	x.x	Alert identifier
8	x.x	Alert instance
9.	x.x	Revision counter
10.	.....	Additional alert entries
11.	aaa	Manufacturer mnemonic code
12.	x.x	Alert identifier
13.	x.x	Alert instance
14.	x.x	Revision counter
15.	hh	Checksum

$--ALF,x,x,x,hhmmss.ss,a,a,a,aaa,x.x,x.x,x.x,x,c---c*hh<CR><LF>
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

1.	ALF	Header
2.	x	Total number of ALF sentences for this message
3.	x	Sentence number
4.	x	Sequential message identifier
5.	hhmmss.ss	Time of last change
6.	a	Alert category
7.	a	Alert priority
8.	a	Alert state
9.	aaa	Manufacturer mnemonic code
10.	x.x	Alert identifier
11.	x.x	Alert instance
12.	x.x	Revision counter
13.	x	Escalation counter
14.	c--c	Alert text
15.	hh	Checksum

$--ARC,hhmmss.ss,aaa,x.x,x.x,c*hh<CR><LF>
1 2 3 4 5 6 7

1.	ARC	Header
2.	hhmmss.ss	Time
3.	aaa	Manufacturer mnemonic code
4.	x.x	Alert identifier
5.	x.x	Alert instance
6.	c	Refused alert command
7.	hh	Checksum

$--HBT,x.x,A,x*hh<CR><LF>
1 2 3 4 5

1.	HBT	Header
2.	x.x	Configured repeat interval
3.	A	Equipment status
4.	x	Sequential sentence identifier
5.	hh	Checksum

$--ALR,hhmmss.ss,xxx,A, A,c--c*hh<CR><LF>
1 2 3 4 5 6 7

1.	ALR	Header
2.	hhmmss.ss	Time of alarm condition change, UTC
3.	xxx	Unique alarm number (identifier) at alarm source
4.	A	Alarm condition (A = threshold exceeded, V = not exceeded)
5.	A	Alarm's acknowledge state, A = acknowledged,V =unacknowledged
6.	c--c	Alarm's description text
7.	hh	Checksum

$--AGL,xx,xx,xx,c—c,ccc,x.x,x.x,...,c—c,c—c,x.x,x.x*hh<CR><LF>
1 2 3 4 5 6 7 8 9 10 11 12 13 14

1.	AGL	Header
2.	xx	Total number of sentences for this message
3.	xx	Sentence number
4.	xx	Sequential message identifier, 00 to 99
5.	c—c	SFI of alert source
6.	ccc	Manufacturer mnemonic code
7.	x.x	Alert identifier
8.	x.x	Alert instance
9.	...	Additional alert entries
10-13.		Alert entry n
14.	hh	Checksum

6.7.1.17 Navtex

$--NRX,xxx,xxx,xx,aaxx,x,hhmmss.ss,xx,xx,xxxx,x.x,x.x,A,c--c*hh<CR><LF>
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

1.	NRX	Header
2.	xxx	Number of sentences 001-999
3.	xxx	Sentence number 001-999
4.	xx	Sequential message id 00-99
5.	aaxx	NAVTEX message code
6.	x	Frequency table index 0-9, 0 = not received over air (for example test messages), 1 = 490 kHz, 2 = 518 kHz, 3 = 4 209,5 kHz, 4 through 9 are reserved for future use
7.	hhmmss.ss	UTC of receipt of message
8.	xx	Day 1-31
9.	xx	Month 1-12
10.	xxxx	Year
11.	x.x	Total number of characters in this series of NRX sentences
12.	x.x	Total number of bad characters
13.	A	Status indication, A = correct message, V = incorrect message
14.	c—c	Message body
15.	hh	Checksum

6.7.1.18 Water current

$--CUR,A,x,x.x,x.x,x.x,a,x.x,x.x,x.x,a,a*hh<CR LF>
1 2 3 4 5 6 7 8 9 10 11 12 13

1.	CUR	Header
2.	A	Validity of the data, A = Valid, V = not valid
3.	x	Data set number, 0 to 9
4.	x.x	Layer number
5.	x.x	Current depth in metres
6.	x.x	Current direction in degrees
7.	a	Direction reference in use, True/Relative T/R
8.	x.x	Current speed in knots
9.	x.x	Reference layer depth in metres
10.	x.x	Heading
11.	a	Heading reference in use, True/Magnetic T/M
12.	a	Speed reference, B= Bottom track, W=Water track, P:=Positioning system
13	hh	Checksum

6.7.1.19 Report route transfer

$--RRT, a, c-c, c-c, c-c, a, a *hh<CR><LF>
1 2 3 4 5 6 7 8

1. RRT Header
2. a Reported transfer type, M = Monitored route, A = Alternate route for editing, Q = Query for transmitting any monitored or alternative route for editing
3. c-c Name of transferred route
4. c-c Version of the transferred route
5. c-c id of current waypoint
6. a File transfer status of transferred route, A = successful reception of the route file transfer, E = error in reception of the route file transfer
7. a Application status of transferred route, A = content of the received route accepted and valid, V = content of received route rejected, P = pending, application level has not yet evaluated the received route, N = not applicable
8. hh Checksum

6.7.1.20 RADAR system data

$--RSD, x.x, x.x,x.x, x.x,x.x, x.x,x.x, x.x,x.x, x.x, x.x, a, a*hh<CR><LF>
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

1. RSD Header
2. x.x Origin 1 range, from own ship
3. x.x Origin 1 bearing degrees from 0°
4. x.x Variable range marker 1 (VRM1), range
5. x.x Bearing line 1 (EBL1), degrees from 0°
6. x.x Origin 2 range
7. x.x Origin 2 bearing
8. x.x VRM 2, range
9. x.x EBL 2, degrees
10. x.x Cursor range, from own ship
11. x.x Cursor bearing, degrees clockwise from 0°
12. x.x Range scale in use
13. x.x Range units, K = km,N = nautical miles, S = statute miles
14. a,a C = Course up, H = Head up, N = North up
15. hh Checksum

6.7.1.21 Own ship data

$--OSD, x.x,A,x.x, a,x.x,a,x.x,x.x,a*hh<CR><LF>
1 2 3 4 5 6 7 8 9 10 11

1. OSD Header
2. x.x Heading, degrees true
3. A Heading status: A = data valid, V = data invalid
4. x.x Vessel course, degrees true
5. a Course reference, B = bottom tracking log, M = manually entered, W = water referenced, R = radar tracking (of fixed target), P = positioning system ground reference.
6. x.x Vessel speed
7. x.x Speed reference, B = bottom tracking log, M = manually entered, W = water referenced, R = radar tracking (of fixed target), P = positioning system ground reference.
8. x.x Vessel set, degrees true
9. x.x Vessel drift (speed)
10. x.x Speed units, K = km/h; N = knots; S = statute miles/h
11. hh Checksum

6.7.1.22 TT data, AIS target data

$--TTM,xx,x.x,x.x,a,x.x,x.x,a,x.x,x.x,a,c--c,a,a,hhmmss.ss,a*hh<CR><LF>
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 1617 18

1. TTM Header
2. xx Target number (1-100)
3. x.x Target distance from own ship
4. x.x Target bearing from own ship (degrees)
5. a Reference of target bearing from own ship; T = True, R = Relative
6. x.x Target speed
7. x.x Target course (degrees)
8. a Reference of target course; T = True, R = Relative
9. x.x Distance of closest-point-of-approach
10. x.x Time to CPA (minutes), "-" = increasing
11. a Speed/distance units (K/N/S)
12. c--c Target name
13. a Target status; L = Lost (tracked target has been lost), Q = Query (target in the process of acquisition), T = Tracking
14. a Reference target; R = Reference (target is a reference used to determined own-ship position or velocity), null = other than reference
15. hhmmss.ss UTC of data
16. a Type of acquisition; A = Auto, M = Manual, R = Reported
17. hh Checksum

$--TLL, xx, llll.ll, a, yyyyy.yy, a, c--c, hhmmss.ss, a, a*hh<CR><LF>
1 2 3 4 5 6 7 8 9

1. TLL Header
2. xx Target number (1-100)
3. llll.ll, NS Target latitude, N/S
4. yyyyy.yy,a Target longitude, E/W
5. c--c Target name
6. hhmmss.ss UTC of data
7. a Target status; L = Lost, Q = Query, T = Tracking
8. a Reference target = R
9. hh Checksum

!--TTD,hh,hh,x,s—s,x*hh<CR><LF>
1 2 3 4 5 6 7

1. TTD Header
2. hh Total hex number of sentences needed to transfer the message, 01 to FF
3. hh Hex sentence number, 01 to FF
4. x Sequential message identifier, 0 to 9
5. s--s Encapsulated tracked target data
6. x Number of fill-bits, 0 to 5
7. hh Checksum

$--TLB,x.x,c--c,x.x,c--c,...x.x,c--c*hh<CR><LF>
1 2 3 4 4 5

1. TLB Header
2. x.x Target number 'n' reported by the device.
3. c--c Label assigned to target 'n'
4. x.x,c--c Additional label pairs
5. hh Checksum

6.7.1.23 Remote control data

JRC format
$PJRC,s--s*hh<CR><LF>
1 2 3

1.	PJRC	Header
2.	s--s	Data field
3.	hh	Checksum

6.7.1.24 Autopilot

$--ROT,x.x1,A2,MV3*hh<CR><LF>
1 2 3 4 5

1.	ROT	Header
2.	x.x1	Commanded heading-to-steer, degrees
3.	A2	Status
4.	MV3	Steering mode, MV=NAV, MA=AUTO, MH=HAND, MN=NFU, MR=REMOTE, MT=RATE, MP=OPTION
5.	hh	Checksum

$--HTD,A, x.x, a, a, a, x.x, x.x, x.x, x.x, x.x, x.x, x.x, a, A, A, A, x.x*hh<CR><LF>
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

1.	HTD	Header
2.	A	Override, A = in use, V = not in use
3.	x.x	Commanded rudder angle, degrees
4.	a	Commanded rudder direction, L/R = port/starboard
5.	a	Selected steering mode, M=Manual, S=Heading Control(Stand Alone) H=Heading Control(External device), T=Track Control, R=Rudder Control, N=NFU(Non Follow up)
6.	a	Turn mode, R = radius controlled, T = turn rate controlled, N = turn is not controlled
7.	x.x	Commanded rudder limit, degrees
8.	x.x	Commanded off-heading limit, degrees
9.	x.x	Commanded radius of turn for heading changes, n.miles
10.	x.x	Commanded rate of turn for heading changes, °/min
11.	x.x	Commanded heading-to-steer, degrees
12.	x.x	Commanded off-track limit, n.miles
13.	x.x	Commanded track, degrees
14.	a	Heading reference in use, T/M
15.	A	Rudder status, A = within limits, V = limit reached or exceeded
16.	A	Off-heading status, A = within limits, V = limit reached or exceeded
17.	A	Off-track status, A = within limits, V = limit reached or exceeded
18.	x.x	Vessel heading, degrees
19.	hh	Checksum

$--ZDL, hhmmss.ss, x.x, a*hh<CR><LF>
1 2 3 4 5

1.	ZDL	Header
2.	hhmmss.ss	Time to point, 00 h to 99 h
3.	x.x	Distance to point, nautical miles
4.	a	Type of point, C = collision, T = turning point, R = reference (general), W = wheel-over
5.	hh	Checksum

6.7.1.25 Engine (propeller) revolution

$--XDR, a, x.x, a, c--c,..... a, x.x, a, c--c*hh<CR><LF>
1 2 3 4 5 6 7 8

1. XDR — Header
2. a — Transducer type, transducer No. 1
3. x.x — Measurement data, transducer No. 1
4. a — Units of measure, transducer No. 1
5. c--c — Transducer No. 1 ID
6. ..... — Data from transducers No. 1 to No. n-1
7. a, x.x, a, c--c — Data from transducer No. n
8. hh — Checksum

$--RPM, a, x, x.x, x.x, A*hh<CR><LF>
1 2 3 4 5 6 7

1. RPM — Header
2. a — Source, shaft/engine S/E
3. x — Engine or shaft number, numbered from centre-line odd = starboard, even = port, 0 = single or on centre-line
4. x.x — Speed, revolutions/min, "-" = counter-clockwise
5. x.x — Propeller pitch, % of maximum, "-" = astern
6. A — Status: A = data valid V = data invalid
7. hh — Checksum

$--PRC,x.x,A,x.x,a,x.x,a,a,x*hh<CR><LF>
1 2 3 4 5 6 7 8 9 10

1. PRC — Header
2. x.x — Lever demand position
3. A — Lever demand status, A = data valid, V = data invalid
4. x.x — RPM demand value
5. a — RPM mode indicator, P = Per cent (%): 0 to 100 % from zero to maximum rpm, R = Revolutions per minute (rpm): “-“ Astern, V = data invalid
6. x.x — Pitch demand value
7. a — Pitch mode indicator, P = Per cent (%): −100 to 0 to 100 % from “full astern” (crash astern) to “full ahead” (navigation full) through “stop engine”, D = degrees: “-“: Astern, V = data invalid
8. a — Operating location indicator, B = Bridge, P = Port wing, S = Starboard wing, C = Engine control room, E = Engine side / local, W = Wing (port or starboard not specified)
9. x — Number of engine or propeller shaft
10. hh — Checksum

6.7.1.26 Engine telegraph

$--ETL,hhmmss.ss,a,xx,xx,a,x*hh<CR><LF>
1 2 3 4 5 6 7 8

1. ETL — Header
2. hhmmss.ss — Event time
3. a — Message type, O = Order, A = Answer-back
4. xx — Position indicator of engine telegraph, 00 = STOP ENGINE, 01 = [AH] DEAD SLOW, 02 = [AH] SLOW, 03 = [AH] HALF, 04 = [AH] FULL, 05 = [AH] NAV. FULL, 11 = [AS] DEAD SLOW, 12 = [AS] SLOW, 13 = [AS] HALF, 14 = [AS] FULL, 15 = [AS] CRASH ASTERN
5. xx — Position indication of sub-telegraph, 20 = S/B (Stand-by engine), 30 = F/A (Full away – Navigation full), 40 = F/E (Finish with engine)
6. a — Operating location indicator, B = Bridge, P = Port wing, S = Starboard wing, C = Engine control room, E = Engine side / local, W = Wing (port or starboard not specified)
7. x — Number of engine or propeller shaft
8. hh — Checksum

6.7.1.27 Rudder angle

$--XDR, a, x.x, a, c--c,..... a, x.x, a, c--c*hh<CR><LF>
1 2 3 4 5 6 7 8

1. XDR Header
2. a Transducer type, transducer No. 1
3. x.x Measurement data, transducer No. 1
4. a Units of measure, transducer No. 1
5. c--c Transducer No. 1 ID
6. ..... Data from transducers No. 1 to No. n-1
7. a, x.x, a, c--c Data from transducer No. n
8. hh Checksum

$--RSA, x.x, A, x.x, A*hh<CR><LF>
1 2 3 4 5 6

1. RSA Header
2. x.x Starboard (or single) rudder
3. A Starboard (or single) rudder sensor status, A = data valid, V = data invalid
4. x.x Port rudder
5. A Port rudder sensor status, A = data valid, V = data invalid
6. hh Checksum

$--ROR,x.x,A,x.x,A,a*hh<CR><LF>
1 2 3 4 5 6 7

1. ROR Header
2. x.x Starboard (or single) rudder order
3. A Status, A = data valid, V = data invalid
4. x.x Port rudder order
5. A Status, A = data valid, V = data invalid
6. a Operating location indicator (as TRC)
7. hh Checksum

6.7.1.28 Azimuth thruster

$---TRD,x,x.x,a,x.x,a,x.x*hh<CR><LF>
1 2 3 4 5 6 7 8

1. TRD — Header
2. x — Number of thruster, bow or stern, Odd = Bow thruster, Even = Stern thrusters
3. x.x — RPM response
4. a — RPM mode indicator, P = Per cent (%): 0 – 100 % from zero to maximum Rpm, R = Revolutions per minute (RPM), V = data invalid
5. x.x — Pitch response value
6. a — Pitch mode indicator, P = Per cent (%), D = Degrees, V = data invalid
7. x.x — Azimuth response
8. hh — Checksum

$--TRC,x,x.x,a,x.x,a,x.x,a,a*hh<CR><LF>
1 2 3 4 5 6 7 8 9 10

1. TRC — Header
2. x — Number of thruster, bow or stern, Odd = Bow thruster, Even = Stern thrusters
3. x.x — RPM demand value
4. a — RPM mode indicator, P = Per cent (%): 0 % – 100 % from zero to maximum rpm, R = Revolutions per minute (RPM), V = data invalid
5. x.x — Pitch demand value
6. a — Pitch mode indicator, P = Per cent (%), D = Degrees (°), V = data invalid
7. x.x — Azimuth demand
8. a — Operating location indicator, B = Bridge, P = Port wing, S = Starboard wing, C = Engine control room, E = Engine side / local, W = Wing (port or starboard not specified)
9. a — Sentence status flag, R = Sentence is a status report of current settings (used for a reply to a query), C = Sentence is a configuration command to change settings. A sentence without “C” is not a command.
10. hh — Checksum

6.7.2 Transmittable signals

6.7.2.1 Report route transfer

See " 6.7.1.19 Report route transfer" in "6.7.1 Receivable signals".

6.7.2.2 RADAR system data

See " 6.7.1.20 RADAR system data" in "6.7.1 Receivable signals".

6.7.2.3 Own ship data

See " 6.7.1.21 Own ship data in "6.7.1 Receivable signals".

6.7.2.4 Watch timer reset

$--EVE,hhmmss.ss,c--c,c--c*hh<CR><LF>
1 2 3 4 5

1. EVE Header
2. hhmmss.ss Event time
3. c--c Tag code used for identification of source of event
4. c--c Event description
5. hh Checksum

6.7.2.5 TT data, AIS target data

See "6.7.1.22 TT data, AIS target data in "6.7.1 Receivable signals".

6.7.2.6 AIS remote control data

$--VSD,x.x,x.x,x.x,c--c,hhmmss.ss,xx,xx,x.x,x.x*hh<CR><LF>
1 2 3 4 5 6 7 8 9 10 11

1. VSD Header
2. x.x Type of ship and cargo category, 0 to 255
3. x.x Maximum present static draught, 0 to 25.5 m
4. x.x Persons on-board, 0 to 8 191
5. c--c Destination, 1-20 characters
6. hhmmss.ss Estimated UTC of arrival at destination
7. xx Estimated day of arrival at destination, 00 to 31 (UTC)
8. xx Estimated month of arrival at destination, 00 to 12 (UTC)
9. x.x Navigational status, 0 to 15
10. x.x Regional application flags, 0 to 15
11. hh Checksum

$--AIR,xxxxxxxxx,x.x,x,x.x,x,xxxxxxxxx,x.x,x,a,x.x,x.x,x.x*hh<CR><LF>
1 2 3 4 5 6 7 8 9 10 11 12 13 14

1. AIR Header
2. xxxxxxxxx MMSI of station-1 that sent request for response signal
3. x.x First message number requested from station-1
4. x Message sub-section
5. x.x Second message number requested from station-1
6. x Message sub-section
7. xxxxxxxxx MMSI of station-2 that sent request for response signal
8. x.x First message Number requested from station-2
9. x Message sub-section
10. a Channel of interrogation
11. x.x Message ID1.1, station-1 reply slot
12. x.x Message ID1.2, station-1 reply slot
13. x.x Message ID2.1, station-2 reply slot
14. hh Checksum

$--AIQ,xxx.*hh<CR><LF>
1 2 3

1. --AIQ Header
2. xxx request of static information (VSD, ACA, etc.)
3. hh Checksum

!--ABM,x,x,x,xxxxxxxxx,x,xx,s--s,x*hh<CR><LF>
1 2 3 4 5 6 7 8 9 10

1. AMB Header
2. x Total number of sentences needed to transfer the message,1 to 9
3. x Sentence number, 1 to 9
4. x Sequential message identifier
5. xxxxxxxxx MMSI for the ITU-R M.1371 (6 to 12)
6. x AIS channel for broadcast of the radio message
7. xx ITU-R M.1371 Message ID
8. s--s Encapsulated data
9. x Number of fill-bits, 0 to 5
10. hh Checksum

!--BBM,x,x,x,x,xx,s--s,x*hh<CR><LF>
1 2 3 4 5 6 7 8 9

1. --BBM Header
2. x Total number of sentences needed to transfer the message,1 to 9
3. x Sentence number, 1 to 9
4. x Sequential message identifier, 0 to 9
5. x AIS channel for broadcast of the radio message
6. xx ITU-R M.1371 Message ID
7. s—s Encapsulated data
8. x Number of fill-bits, 0 to 5
9. hh Checksum

6.7.2.7 Remote control data

See "6.7.1.23 Remote control data in "6.7.1 Receivable signals".

6.7.2.8 Alert

See "6.7.1.16 Alert in "6.7.1 Receivable signals".

6.7.2.9 Navtex

$--NRM,x,x,hhhhhhhh,hhhhhhhh,a*hh<CR><LF>

1 2 3 4 5 6 7

1. NRM — Header
2. x — Function code, 0 to 9, 0 – request messages for the given mask,
   1 – set/report the storage mask, 2 – set/report the printer mask,
   3 – set/report the INS mask, 4 to 9 – reserved for future use
3. x — Frequency table index, 1 to 9, 1 = 490 kHz, 2 = 518 kHz, 3 = 4 209,5 kHz,
   4 through 9 are reserved for future use
4. hhhhhhhh — Transmitter coverage area mask
5. hhhhhhhh — Message type mask
6. a — Sentence status flag
7. hh — Checksum

6.7.2.10 Autopilot

Output sentence varies depending on the autopilot.

$--CTS,x.x1,T*hh<CR><LF>

1 2 3 4

1. CTS — Header
2. x.x1 — Commanded heading-to-steer, degrees
3. T — Status, T=True, M=Magnetic (ECDIS can't auto sailing when status is M)
4. hh — Checksum

$--HTR,±x.x2,T*hh<CR><LF>

1 2 3 4

1. HTR — Header
2. ±x.x2 — Turn rate, degree/minitus
3. T — Status, T=True, M=Magnetic (ECDIS can't auto sailing when status is M)
4. hh — Checksum

$--HTC, A, x.x, a, a, a, x.x, x.x, x.x, x.x, x.x, x.x, x.x, a, a*hh<CR><LF>

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

1. HTC — Header
2. A — Override, A = in use, V = not in use
3. x.x — Commanded rudder angle, degrees
4. a — Commanded rudder direction, L/R = port/starboard
5. a — Selected steering mode, M=Manual, S=Heading Control(Stand Alone)
   H=Heading Control(External device), T=Track Control,
   R=Rudder Control, N=NFU(Non Follow up)
6. a — Turn mode, R = radius controlled, T = turn rate controlled,
   N = turn is not controlled
7. x.x — Commanded rudder limit, degrees
8. x.x — Commanded off-heading limit, degrees
9. x.x — Commanded radius of turn for heading changes, n.miles
10. x.x — Commanded rate of turn for heading changes, °/min
11. x.x — Commanded heading-to-steer, degrees
12. x.x — Commanded off-track limit, n.miles
13. x.x — Commanded track, degrees
14. a — Heading reference in use, T/M
15. a — Sentence status, R = Sentence is a status report of current settings,
    C = Sentence is a configuration command to change settings.
16. hh — Checksum

$--XTE, A, A, x.x, a, N, A *hh<CR><LF>
1 2 3 4 5 6 7 8

1.	XTE	Header
2.	A	Status, A = data valid, V = LORAN – C blink or SNR warning, V = general warning flag for other navigation systems when a reliable fix is not available
3.	A	Status: A = data valid V = Loran-C cycle lock warning flag
4.	x.x	Magnitude of cross-track error
5.	a	Direction to steer, L/R
6.	N	Units, nautical miles
7.	A	Mode indicator, A = Autonomous mode, D = Differential mode, E = Estimated (dead reckoning) mode, M = Manual input mode, S = Simulator mode, N = Data not valid
8.	hh	Checksum

$--HSC, x.x, T, , , A*hh<CR><LF>
1 2 3 4 5

1.	HSC	Header
2.	x.x	Commanded heading, degrees true
3.	T	T=True
4.	A	Sentence status flag, A = valid, V = invalid
5.	hh	Checksum

$PJRCI, EI, GAIN, x *hh<CR><LF>
1 2 3

1.	PJRCI	Header
2.	x	Turning Gain, 0 to 4
3.	hh	Checksum

$--PNEY,001,A,A,x.x,L,N,D*hh<CR><LF>
1 2 3 4 5 6 7 8

1.	PNEY	Header
2.	A	EPFS Status of ECDIS, A=valid, V=invalid
3.	A	Loran-C Status, Always - A
4.	x.x	Magnitude of XTD value
5.	L	Direction to steer, L/R, L=PORT, R=STARBOAD
6.	N	Units. Always Nautical Miles - N
7.	D	Mode indicator of EPFS, A = Autonomous mode, D = Differential mode, N = Data not valid, E = Estimated (dead reckoning) mode, M = Manual input mode, S = Simulator mode
8.	hh	Checksum

$--PNEY,002,x.x,N,x.x,E,xxx*hh<CR><LF>
1 2 3 4 5 6 7

1.	PNEY	Header
2.	x.x	Centre of radius point, Latitude,
3.	N	N/S
4.	x.x	Centre of radius point, Longitude
5.	E	E/W
6.	xxx	WP identifier (Number 000-999)
7.	hh	Checksum

$--VBW,x.x,x.x,A,x.x,x.x,A,x.x,A,x.x,A*hh<CR><LF>
See "6.7.1.6 Ship speed through water" in "6.7.1 Receivable signals".

$--VTG,x.x,T,x.x,M,x.x,N,x.x,K,a*hh<CR><LF>
See "6.7.1.5 COG/SOG" in "6.7.1 Receivable signals".

$--GLL,llll.ll,a,yyyyy.yy,a,hhmmss.ss,A,a*hh<CR><LF>
See "6.7.1.2 Course" in "6.7.1 Receivable signals".

$--VHW, x.x, T, x.x, M, x.x, N, x.x, K*hh<CR><LF>
See "6.7.1.6 Ship speed through water" in "6.7.1 Receivable signals".

6.7.2.11 System function ID resolution protocol

\s:ccxxxx*hh\$--SRP,x,hhhhhhhhhhhh,c--c*hh<CR><LF>
1 2 3 4 5

1. SRP Header(SRP: System function ID resolution protocol)
2. x Instance number of redundant alternative
3. hhhhhhhhhhhh MAC address
4. c—c IP address
5. hh Checksum

6.7.2.12 Sentences that can be output by Data Output

$--BWC, hhmmss.ss, llll.ll, a, yyyyy.yy, a, x.x, T, x.x, M, x.x, N, c--c, a*hh<CR><LF>
1 2 3 4 5 6 7 8 9 10

1. BWC Header (BWC-Bearing and distance to waypoint-Great circle)
2. hhmmss.ss UTC of observation
3. llll.ll, a Waypoint latitude, N/S
4. yyyyy.yy, a Waypoint longitude, E/W
5. x.x, T Bearing, degrees true
6. x.x, M Bearing, degrees magnetic
7. x.x, N Distance, nautical miles
8. c--c Waypoint ID
9. a Mode indicator*1
10. hh Checksum

*1 Positioning system mode indicator
A = Autonomous mode
D = Differential mode
E = Estimated (dead reckoning) mode
M = Manual input mode
S = Simulator mode
N = Data not valid

$--DBK,x.x,f,x.x,M,x.x,F*hh<CR><LF>
See "6.7.1.8 Water depth" in "6.7.1 Receivable signals".

$--DPT,x.x,x.x,x.x*hh<CR><LF>
See "6.7.1.8 Water depth" in "6.7.1 Receivable signals".

$--DTM,ccc,a,x.x,a,x.x,a,x.x,ccc*hh<CR><LF>
See "6.7.1.3 Geodetic positioning system" in "6.7.1 Receivable signals".

$--GGA,hhmmss.ss,llll.ll,a,yyyyy.yy,a,x,xx,x.x,x.x,M,x.x,M,x.x,xxxx*hh<CR><LF>
See "6.7.1.2 Course" in "6.7.1 Receivable signals".

$--GLL,llll.ll,a,yyyyy.yy,a,hhmmss.ss,A,a*hh<CR><LF>
See "6.7.1.2 Course" in "6.7.1 Receivable signals".

$--HBT,x.x,A,x*hh<cr><lf>
1 2 3 4 5

1. HBT Header (HBT: Heartbeat supervision sentence)
2. x.x Configured repeat interval*1
3. A Equipment status*2
4. x Sequential sentence identifier*3
5. hh Checksum

*1 Configured autonomous repeat interval in seconds.
*2 Equipment in normal operation A = yes, V = no; This field can be used can be used to indicate the current equipment status. This could be the result of an built-in integrity testing function.
*3 The sequential sentence identifier provides a message identification number beginning from 0.

$--HDG, x.x, x.x, a, x.x, a*hh<CR><LF>

1 2 3 4 5

1. HDG Header (HDG: Heading, deviation and variation)
2. x.x Magnetic sensor heading, degrees
3. x.x, a Magnetic deviation, degrees E/W[*1*3]
4. x.x, a Magnetic variation, degrees E/W[*2*3]
5. hh Checksum

*1 To obtain magnetic heading: add easterly deviation (E) to magnetic sensor reading; subtract westerly deviation (W) from magnetic sensor reading.
*2 To obtain true heading: add easterly variation (E) to magnetic heading; subtract westerly variation (W) from magnetic heading.
*3 Variation and deviation fields will be null fields if unknown.

$--HDT, x.x, T*hh<CR><LF>

See "6.7.1.1 Ship Heading" in "6.7.1 Receivable signals".

$--HSC, x.x, T, x.x, M,a*hh<CR><LF>

1 2 3 4 5

1. HSC Header (HSC: Heading steering command)
2. x.x, T Commanded heading, degrees true
3. x.x, M Commanded heading, degrees magnetic
4. a Sentence status flag[*1]
5. hh Check sum

*1 This field is used to indicate a sentence that is a status report of current settings or a configuration command changing settings.
R = Sentence is a status report of current settings (use for a reply to a query).
C = Sentence is a configuration command to change settings.

$--MDA,x.x,I,x.x,B,x.x,C,x.x,C,x.x,x.x,x.x,C,x.x,T,x.x,M,x.x,N,x.x,M*hh<CR><LF>

See "6.7.1.10 Air temperature" in "6.7.1 Receivable signals".

$--MWV, x.x, a, x.x, a, A *hh<CR><LF>

See "6.7.1.9 Wind direction/wind speed" in "6.7.1 Receivable signals".

$--NSR, a, A, a, A, a, A, a, A, a, A, a, a, A *hh<CR><LF>

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

1. NSR Header (Navigation status report)
2. a Integrity of heading*1
3. A Plausibility of heading*2
4. a Integrity of position*1
5. A Plausibility of position*2
6. a Integrity of STW *1
7. A Plausibility of STW*2
8. a Integrity of SOG and COG*1
9. A Plausibility of SOG and COG*2
10. a Integrity of depth *1
11. A Plausibility of depth*2
12. a Mode of STW*3
13. a Integrity of time*1
14. A Plausibility of time*2
15. hh Checksum

*1 Integrity status:
P = Passed, integrity verification passed
F = Failed, integrity verification not passed
D = Doubtful, integrity verification not possible
N = Not available, reporting device does not support integrity check

*2 Plausibility status:
A = Yes (Plausible)
V = No (Not plausible)
N = Not available, reporting device does not support plausibility check

*3 Mode of STW
W = measured water reference
E = Estimated/calculated from non-water referenced sources
M = Manual input
N = Not available

$--OSD, x.x,A,x.x, a,x.x,a,x.x,x.x,a*hh<CR><LF>
See "6.7.2.2 Own ship data" in "6.7.2 Transmittable signals".

$PJRC,00,yymmdd,hhmmss,HHMMSS,uhhmm*hh<CR><LF>

1 2 3 4 5 6

1. PJRC,00 Header (Date/time data)
2. yymmdd Year/month/day (LMT)
3. hhmmss Hour/minute/second (LMT)
4. HHMMSS Hour/minute/second (UTC)
5. uhhmm Time difference from UTC (uhhmm:minus, hhmm:plus)
6. hh Checksum

$PJRC,01,xx,IIII.III,N,yyyyy.yyy,E,XX*hh<CR><LF>

1 2 3 4 5 6 7 8

1. $PJRC,01 Header (Positioning system)
2. xx Sensor name (DR: Dead Reckoning, LC: LORAN C, OM: OMEGA, TR:NNSS, DE: DECCA, GP:GPS, DG:DGPS, II: Hybrid, VV: No setting)
3. IIII.II Latitude
4. N North latitude/South latitude (N/S)
5. yyyyy.yyy Longitude
6. E East longitude/West longitude (E/W)
7. XX Route sailing algorithm (RL: Rhumb line sailing, GC: Great Circle)
8. hh Checksum

$PJRC,05,hhmm,ddhhmm*hh<CR><LF>

1 2 3 4

1. $PJRC,05 Header
2. hhmm Time required up to the WPT currently headed
3. ddhhmm ETA up to the WPT currently headed
4. hh Checksum

$PJRC,06,xxx,N,xxx.x,xx.x,M,xx.x,M,xxx.x,T,xxx.x,T*hh<CR><LF>

1 2 3 4 5 6 7 8

1. $PJRC,06 Header
2. xx.x, N Planned ship speed
3. xxx.x Planned rate of turn
4. xx.x, M Planned turning radius
5. xx.x, M Reach
6. xxx.x, T Planned course
7. xxx.x, T Angle of the next leg
8. hh Checksum

$PJRC,08,S,S,S,S,S,S,S,S,S,S,S,S,S,S,S,S,S,S*hh<CR><LF>

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

1. $PJRC,08 Header (Alarm/warning information)
2. S Automatic sailing mode (A: Active, V: Inactive)
3. S Automatic sailing status (A: Not available, V: Available)
4. S Off-route alarm (A: Not available, Available)
5. S Heading error alarm (A: Not available, V: Available)
6. S ANTS alarm (A: Not available, V: Available)
7. S Position alarm (A: Not available, V: Available)
8. S Initial setting alarm (A: Not available, V: Available)
9. S Turning status (A: Turning, V: Maintaining the course)
10. S Turning point arrival alarm (A: Arrived, V: Not arrived)
11. S Vigilance alarm (A: Not available, V: Available)
12. S ECDIS abnormality (A: Not available, V: Available)
13. S ARPA seriously dangerous ship alarm (A: Not available, V: No1 available W: No2 available, X: No1 and No2 available)
14. S ARPA dangerous ship alarm (A: Not available, V: No1 available W: No2 available, X: No1 and No2 available)
15. S ARPA guard ring alarm (A: Not available, V: No1 available W: No2 available, X: No1 and No2 available)
16. S ARPA lost target (A: Not available, V: No1 available W: No2 available, X: No1 and No2 available)
17. S RADAR/ARPA abnormality (A: Not available, V: No1 available W: No2 available, X: No1 and No2 available)
18. S Shallow sea alarm (A: Not available, V: Available)
19. hh Checksum

$PJRC,10,xxx.xx,N,bb.bb,N,ss.ss,N*hh<CR><LF>

1 2 3 4 5 6 7 8

1. $PJRC,10 Header (Doppler sonar)
2. xxx.xx Heading position speed over the ground (kt)
3. N Character fixed (N)
4. bb.bb Bow starboard/port direction speed over the ground (kt)
5. N Character fixed (N)
6. ss.ss Stern starboard/port direction speed over the ground (kt)
7. N Character fixed (N)
8. hh Checksum

$PJRC,11,ppp.p,ppp.p,rrr.r,rrr.r,www.w,www.w*hh<CR><LF>

1 2 3 4 5 6 7 8

1. $PJRC,11 Header (thruster data)
2. ppp.p Heading thruster pitch angle (deg)
3. ppp.p Stern thruster pitch angle (deg)
4. rrr.r Heading thruster revolution per minute (rpm)
5. rrr.r Stern thruster revolution per minute (rpm)
6. www.w Heading thruster output (kw)
7. www.w Stern thruster output (kw)
8. hh Checksum

$PJRC,17,ss.s,N,xxx.x,rr.rr,N,dd.dd,N,ccc.c,N,ccc.c,N*hh<CR><LF>

1 2 3 4 5 6 7 8 9 10 11 12 13

1. $PJRC,17 Header (Next sailing route information data)
2. ss.s Planned ship speed (kt)
3. N Character fixed (N)
4. xxx.x Planned rate of turn (deg/min)
5. rr.rr Planned turning radius (Nm)
6. N Character fixed (N)
7. dd.dd Reach (Nm)
8. N Character fixed (N)
9. ccc.c Planned course (deg)
10. N Character fixed (N)
11. ccc.c Planned course after next waypoint (deg)
12. N Character fixed (N)
13. hh Checksum

$PJRC,20,xxxxxxxx,xxxxxxxx,rrr.r,rrr.r,ppp.p,ppp.p,sss.s,sss.s*hh<CR><LF>

1 2 3 4 5 6 7 8 9 10

1. $PJRC,20 Header (Propulsion data)
2. xxxxxxxx Main unit No.1 fuel consumption (*10L)
3. xxxxxxxx Main unit No.2 fuel consumption (*10L)
4. rrr.r Starboard propeller revolution per minute (rpm)
5. rrr.r Port propeller revolution per minute (rpm)
6. ppp.p Starboard propeller pitch angle (deg)
7. ppp.p Port propeller pitch angle (deg)
8. sss.s Starboard propeller slip (%)
9. sss.s Port propeller slip (%)
10. hh Checksum

$- - POS,cc,xx,a,x.x,x.x,x.x,a,x.x,x.x,a*hh<CR><LF>

1 2 3 4 5 6 7 8 9 10 11 12

1. POS Header (POS: Device position and ship dimensions report or configuration command)
2. cc Equipment identification
3. xx Equipment number 00 to 99 *1
4. a Position validity flag *2
5. x.x Position X-coordinate (m) *3
6. x.x Position Y-coordinate (m) *3
7. x.x Position Z-coordinate (m) *3
8. a Ship's width/length Valid/Invalid *2
9. x.x Ship's width (m) *3
10. x.x Ship's length (m) *3
11. a Sentence status flag *4
12. hh Checksum

*1 Equipment number starts from one to maximum same equipment number. (e.g. 1 = Radar 1, 2 = Radar 2) quipment number “0" is used for CCRP position (see IMO MSC.252(83)).

*2 A (Valid) is used for configured device. V (Invalid) is for testing or unconfigured device.

*3 X, Y and Z coordination system

a) Origin (0,0) is located at the centre of the ship's aft most point
b) X-component: positive value (starboard), negative value (port) or zero (centre).
c) Y-component: positive value or zero (forward distance from the ship's stern).
d) Z-component: positive value (height from IMO summer load line)
e) The ship's length corresponds to maximum overall length.

*4 This field is used to indicate a sentence that is a status report of current settings or a configuration command changing settings.

R = Sentence is a status report of current settings (use for a reply to a query).
C = Sentence is a configuration command to change settings.

$--RMB, A, x.x, a, c--c, c--c, llll.ll, a, yyyyy.yy,a,x.x, x.x, x.x, A, a *hh<CR><LF>

1 2 3 4 5 6 7 8 9 10 11 1213 14

1. RMB Header (RMB: Recommended minimum navigation information)
2. A Status: A = data valid, V = navigation receiver warning
3. x.x Cross track error (nautical mile) *2
4. a Direction to steer L/R
5. c--c Origin waypoint ID
6. c--c Destination waypoint ID
7. llll.ll, a Destination waypoint latitude, N/S
8. yyyyy.yy,a Destination waypoint longitude, E/W
9. x.x Range to destination, nautical miles*1
10. x.x Bearing to destination, degrees true
11. x.x Destination closingvelocity, knots
12. A Arrival status A = arrival circle, entered or perpendicular passed, V = not entered or passed
13. A Mode indicator*3
14. hh Checksum

*1 If range to destination exceeds 999.9 nautical miles, display 999.9.
*2 If cross track error exceeds 9.99 nautical miles, display 9.99.
*3 Positioning system mode indicator
A = Autonomous mode
D = Differential mode
E = Estimated (dead reckoning) mode
M = Manual input mode
S = Simulator mode
N = Data not valid

$--RMC,hhmmss.ss,A,llll.ll,a,yyyyy.yy,a,x.x,x.x,xxxxxx,x.x,a,a*hh<CR><LF>
See "6.7.1.2 Course" in "6.7.1 Receivable signals".

$--ROT, x.x, A*hh<CR><LF>
See "6.7.1.7 Turning speed" in "6.7.1 Receivable signals".

$--RSA, x.x, A, x.x, A*hh<CR><LF>

1 2 3 4

1. RSA Header (RSA: Rudder sensor angle)
2. x.x, A Stern (or single) rudder sensor*1, Status A = valid, V = data invalid
3. x.x, A Port rudder sensor*1, Status A = data valid, V = data invalid
4. hh Checksum

*1 Relative measurement of rudder angle without units, "-" = bow turns to port. Sensor output is proportional to rudder angle but not necessarily 1:1.

$--RSD, x.x, x.x,x.x, x.x,x.x, x.x,x.x, x.x,x.x, x.x, x.x, a, a*hh<CR><LF>
See "6.7.2.1 RADAR system data" in "6.7.1 Receivable signals".

$--RTE, x.x, x.x, a, c--c, c--c,..... c--c*hh<CR><LF>

1 2 3 4 5 6 7 8 9

1. RTE Header (RTE: Routes)
2. x.x Total number of sentences being transmitted
3. x.x Sentence number
4. a Message mode: c = complete route, all waypoints,w = working route, first listed waypoint is "FROM", second is "TO" and remaining are rest of route
5. c--c Route identifier
6. c--c Waypoint identifier
7. ..... Additional waypoint identifiers
8. c--c Waypoint "n" identifier
9. hh Checksum

$--THS,x.x,a*hh<CR><LF>

See "6.7.1.1 Ship Heading" in "6.7.1 Receivable signals".

$--VBW,x.x,x.x,A,x.x,x.x,A,x.x,A,x.x,A*hh<CR><LF>

See "6.7.1.6 Ship speed through water" in "6.7.1 Receivable signals".

$--VDR, x.x, T, x.x, M, x.x, N*hh<CR><LF>

1 2 3 4 5

1. VDR Header (VDR: Set and drift)
2. x.x, T Direction, degrees true
3. x.x, M Direction, degrees magnetic
4. x.x, N Current speed, knots
5. hh Checksum

$--VTG,x.x,T,x.x,M,x.x,N,x.x,K,a*hh<CR><LF>

See "6.7.1.5 COG/SOG" in "6.7.1 Receivable signals".

$--VWR,x.x,a,x.x,N,x.x,M,x.x,K*hh<CR><LF>

1 2 3 4 5 6

1. VWR Header (VWR: Relative (Apparent) Wind Speed and Angle)
2. x.x,a Measured wind angle relative to the vessel, 0 to 180°, left/right L/R of vessel heading
3. x.x,N Measured wind Speed, knots
4. x.x,M Wind speed, meters/second
5. x.x,K Wind speed, Km/Hr
6. hh Checksum

$--VWT,x.x,a,x.x,N,x.x,M,x.x,K*hh<CR><LF>

1 2 3 4 5 6

1. VWT Header (VWT: True Wind Speed and Angle)
2. x.x,a Calculated wind angle relative to the vessel, 0 to 180°, left/right L/R of vessel heading
3. x.x,N Calculated wind Speed, knots
4. x.x,M Wind speed, meters/second
5. x.x,K Wind speed, Km/Hr
6. hh Checksum

$--WPL, llll.ll, a, yyyyy.yy, a, c--c*hh<CR><LF>

1 2 3 4 5

1. WPL Header (WPL: Waypoint location)
2. llll.ll, a Waypoint latitude, N/S
3. yyyyy.yy, a Waypoint longitude, E/W
4. c--c Waypoint identifier
5. hh Checksum

$--XDR, a, x.x, a, c--c,..... a, x.x, a, c--c*hh<CR><LF>

See "6.7.1.10 Air temperature" in "6.7.1 Receivable signals".

$--XTE,A,A,x.x,a,N,a*hh<CR> <LF>

1 2 3 4 5 6 7 8

1. XTE Header (XTE: Cross-track error, measured)
2. A Status A = data valid, V = LORAN - C blink or SNR warning, V = general warning flag for other navigation systems when a reliable fix is not available
3. A Status: A = data valid V = Loran-C cycle lock warning flag
4. x.x Magnitude of cross-track error
5. a Direction to steer, L/R
6. N Units, nautical miles
7. a Mode indicator*1
8. hh Checksum

*1 Positioning system mode indicator
A = Autonomous mode
D = Differential mode
E = Estimated (dead reckoning) mode
M = Manual input mode
S = Simulator mode

$--ZDA,hhmmss.ss,xx,xx,xxxx,xx,xx*hh<CR><LF>

See "6.7.1.4 Date information" in "6.7.1 Receivable signals".

$--ZTG, hhmmss.ss, hhmmss.ss, c--c*hh<CR><LF>

1 2 3 4 5

1. ZTG Header (ZTG: UTC and time to destination waypoint)
2. hhmmss.ss UTC of observation
3. hhmmss.ss Time-to-go, hh = 00 to 99
4. c--c Destination waypoint ID
5. hh Checksum

6.8 Setting for the Route Transfer by LAN CONnection with the GPS

6.8.1 How to set the IP address of GPS

1. Refer to "4.20 Equipment Configuration" of the GPS Instruction Manual, and display the equipment configuration menu.
2. Press 9 HOME "IP".

(1) IP ADDRESS Configuration

3. Press 1 MARK "IP ADDR".
4. Press ▲ ▼ to select "INPUT", and press ENT.
5. Enter the IP address with the numeric keypad, and press ENT.

To return the value to the default value, select "DEFAULT" and press ENT.

(2) SUBNET MASK Configuration

6. Press 2 EVENT "SUBNET MASK".
7. Press ▲ ▼ to select "INPUT", and press ENT.
8. Enter the subnet mask with the numeric keypad, and press ENT.

To return the value to the default value, select "DEFAULT" and press ENT.

(3) DEFAULT GATEWAY Configuration

9. Press 3 ⟷ "DEFAULT GATEWAY".
10. Press ▲ ▼ to select "INPUT", and press ENT.
11. Enter the default gateway with the numeric keypad, and press ENT.

To return the value to the default value, select "DEFAULT" and press ENT.

6.8.2 Setting of the LAN for GPS

- LAN configuration can be performed for active route sharing, data route sharing, data output, mutual monitoring, and remote maintenance output.
- In data output, the output NMEA sentence can be selected.
- To share active or data routes, sharing route configuration must be performed.

Set the route sharing setting to "SHARE" for data routes.
When set to "SHARE", data route reception will occur automatically.
For active routes, set the route sharing setting to "SHARE 1", "SHARE 2", "SHARE 3", "SHARE 4" or "SHARE 5".

(1) SHARE1: If the active route is switched on this equipment, the route will automatically be sent out to connected equipment.
When a shared route is received, the route is automatically switched.

(2) SHARE2: If the active route is switched on this equipment, a request is made to the user of the equipment before the route is sent. Transmission of the route to the connected equipment is dependent on the permission of the user.
If the user has not authorized sending, the active route will only be executed on the local equipment.
When a shared route is received, the route is automatically switched.

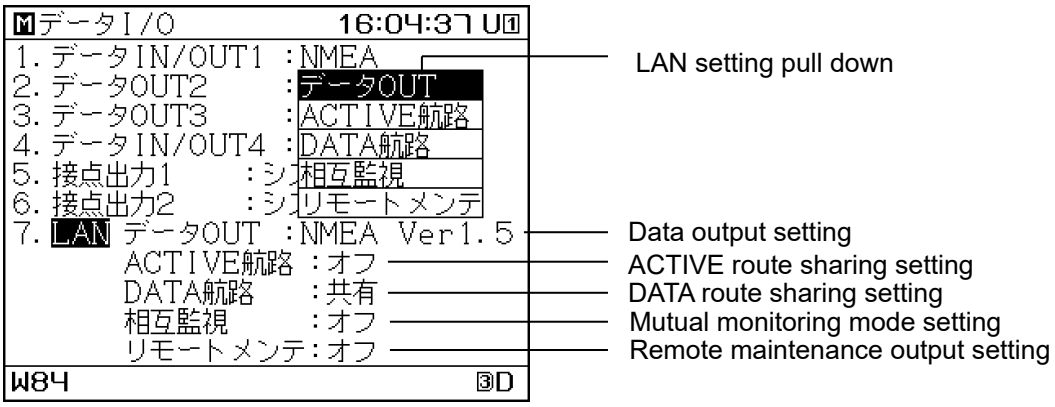
(3) SHARE3: If the active route is switched on this equipment, the route will automatically be sent out to connected equipment.
When a shared route is received, the user is asked whether or not they want to switch routes.
If the user does not authorize route switching, the route will not be switched.

(4) SHARE4: If the active route is switched on this equipment, a request is made to the user of the equipment before the route is sent. Transmission of the route to the connected equipment is dependent on the permission of the user.
If the user has not authorized sending, the active route will only be executed on the local equipment.
When a shared route is received, the user is asked whether or not they want to switch routes.
If the user does not authorize route switching, the route will not be switched.

(5) SHARE5: The active route cannot be sent from this equipment.
When a shared route is received, the route is automatically switched.
The following icon is displayed when active routes are shared.

SHARE1 Icon: 
SHARE2 Icon: 
SHARE3 Icon: 
SHARE4 Icon: 
SHARE5 Icon: 

- To perform mutual monitoring, mutual monitoring mode must be configured. With mutual monitoring mode, when GPS positioning is not being performed, the GPS positioning information from the other equipment can be displayed.
- Remote maintenance output configuration can be used to regularly output data for use in remote maintenance

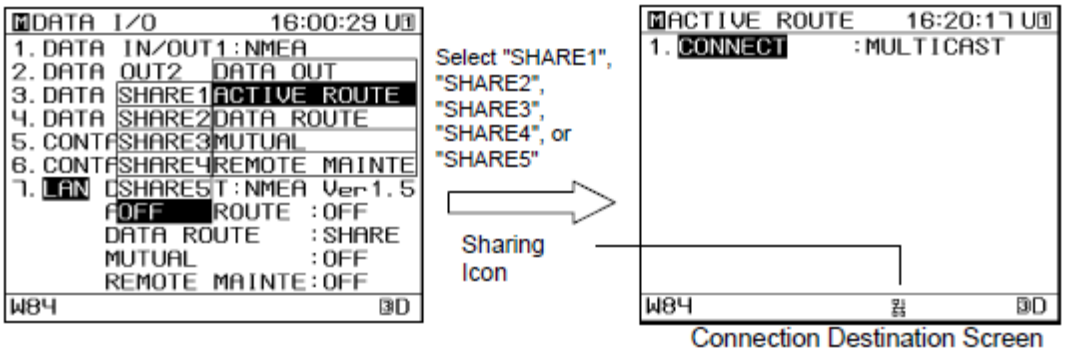


LAN Selection Screen

(1) Active route sharing setting

1. Refer to "4.20 Equipment Configuration" of the GPS Instruction Manual, and display the equipment configuration menu.
2. Press 7 CURS, then 7 CURS, and select "LAN".
3. Press ▲ ▼ to select "ACTIVE ROUTE", and press ENT.
4. Press ▲ ▼ to select "SHARE1", "SHARE2", "SHARE3", "SHARE4", or "SHARE5", and press ENT to display the connection destination screen.

Select "OFF" to disable sharing.



Connection Destination Screen

5. Press 1 MARK "CONNECT", select the destination, and press ENT.

Normally, "MULTICAST" should be selected for the destination.
To send to a specific equipment, select "UNICAST".

6. When "UNICAST" is selected, press 2 EVENT and 3 ⟷ to select the destination IP "2.TO IP" and "3.PORT No.".

6.9 Route Sharing Method among the Devices

The route sharing method varies among the devices (new ECIDS, new RADAR, old ECDIS, old RADAR, GPS).
Also it depends on whether it is old or new route sharing.

Active route and Data route
Active route

- The route currently monitored
- The MFD sends the loaded route and the GPS sends the executed route.

Data route

- Route to send by selecting a route file.
- The MFD sends the selected route file and the GPS sends the route on the selected memory.

Old route sharing and New route sharing
Old route sharing

- ECDIS and RADAR receive the Active route from GPS.
- Only ECDIS sends the Active route to GPS.
- Normal RADAR automatically loads the route when receiving the Active route.
- Only ECDIS sends/receives the Data route to/from GPS.

New route sharing

- The Active route is not received from GPS.
- The device with the TCS privileges sends the Active route to GPS.
- Only ECDIS sends/receives the Data route to/from GPS.

Route sharing patterns
Pattern A ••• Uses the Active route sharing (MFD). Receive side Route Sync = ON: Route AUTO loading
Pattern B ••• Loads the route automatically when received.
Pattern C ••• Uses the GPS route sharing. Receive side Route Sync = OFF: The route is automatically loaded when Active Route is selected for route motinitoring.
Pattern D ••• Uses File Manager.
Pattern E ••• Uses Import and Export of the route plan.
Pattern F ••• Uses Export of the route plan (operated by new ECDIS).
Pattern G ••• Uses Import of the route plan (operated by new ECDIS).
Pattern H ••• Uses the GPS route sharing. A CSV file is output when the route is received.
Pattern I ••• Receives the route loaded by ECDIS.
Pattern J ••• Registers the route on the GPS route list.
Note: When usging the new ECDIS to send Active routes, be sure to set Route Sync = ON on the transmit side new ECDIS.

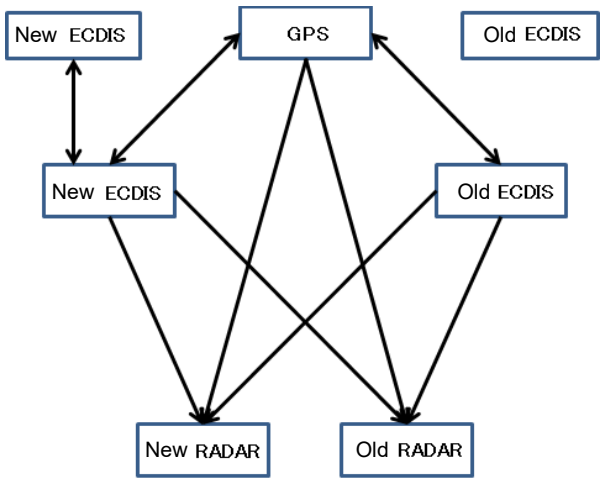
Correspondence relation list for old route sharing

From \ To		new ECDIS	new RADAR	old ECDIS	old RADAR	GPS
new ECDIS	ACTIVE route	A	A,C	×	B	I
	DATA route	D,E	D	F	×	J
old ECDIS	ACTIVE route	×	C	×	B	I
	DATA route	G	×	D	×	J
GPS	ACTIVE route	H	C	H	B	
	DATA route	H	×	H	×	

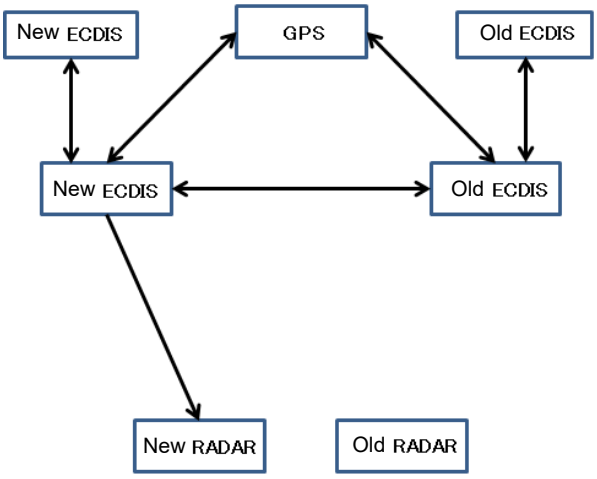
Correspondence relation list for new route sharing

From \ To		new ECDIS	new RADAR	old ECDIS	old RADAR	GPS
new ECDIS	ACTIVE route	A	A	×	×	I
	DATA route	D,E	D	F	×	J
old ECDIS	ACTIVE route	×	×	B	B	I
	DATA route	G	×	D	×	J
GPS	ACTIVE route	×	×	×	×	
	DATA route	H	×	H	×	

Correspondence relation diagram for old route sharing

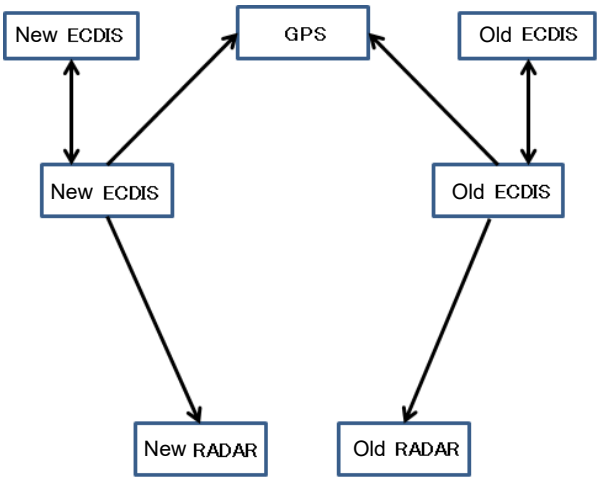


ACTIVE route

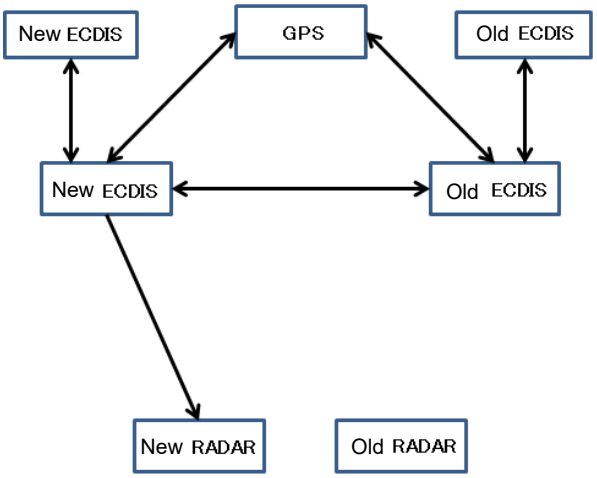


DATA route

Correspondence relation diagram for new route sharing



ACTIVE route

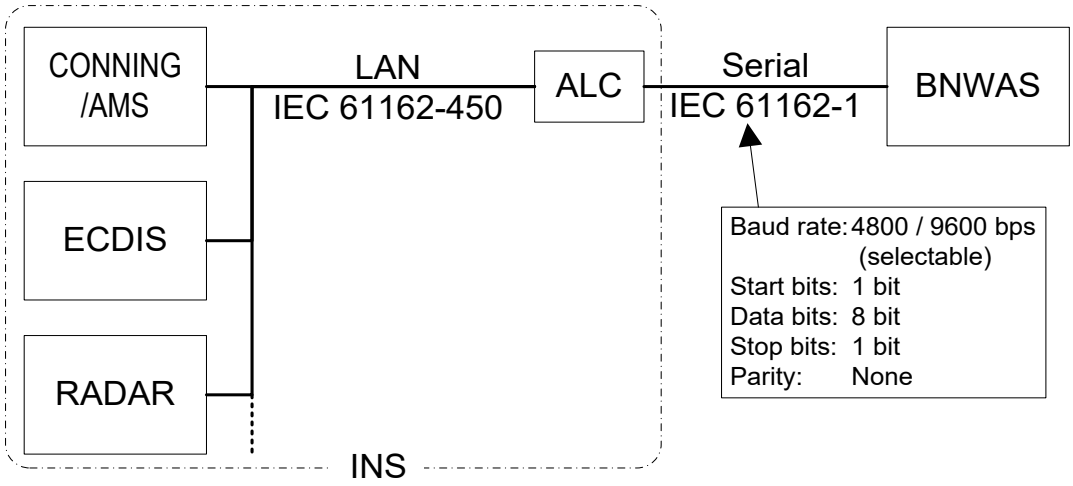


DATA route

6.10 Specification of Alert Communication with BNWAS

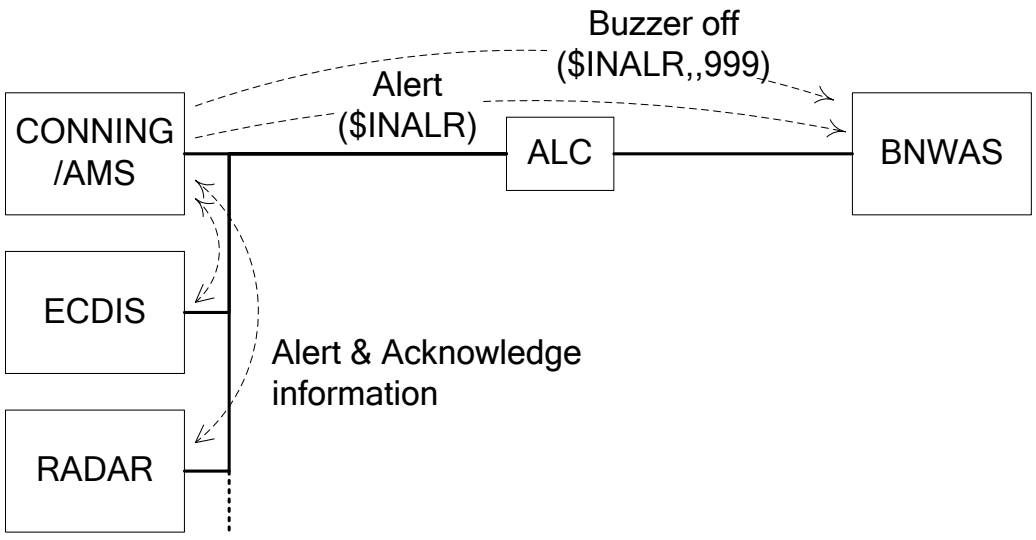
6.10.1 System Block Diagram

6.10.1.1 Connection Diagram

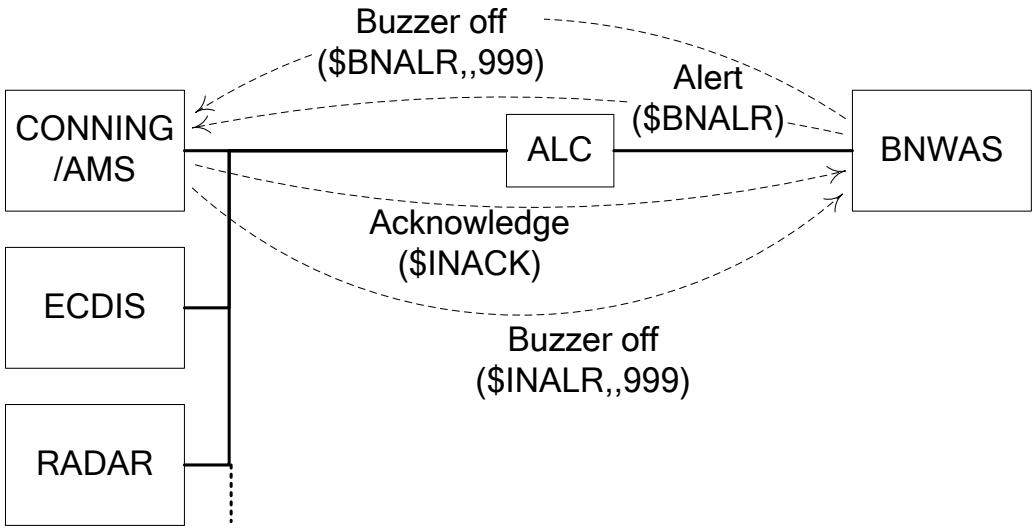


6.10.1.2 Function Diagram

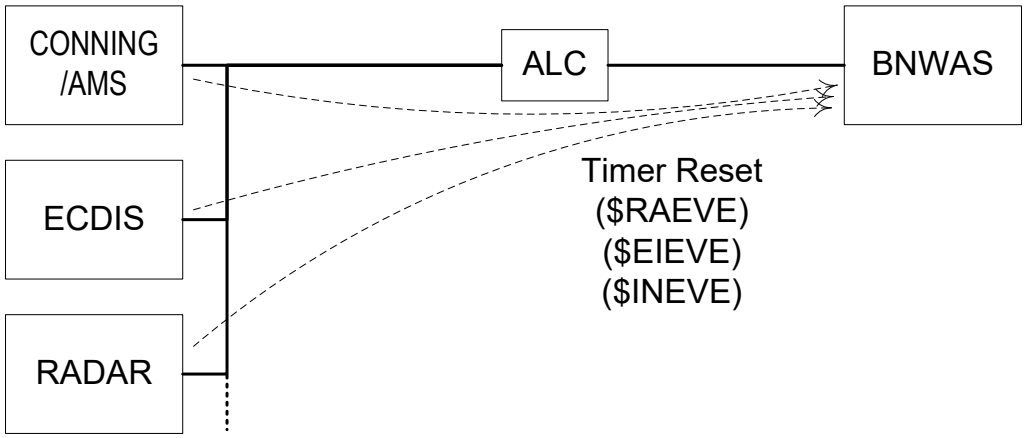
(1). INS Alert and Back-up navigator call



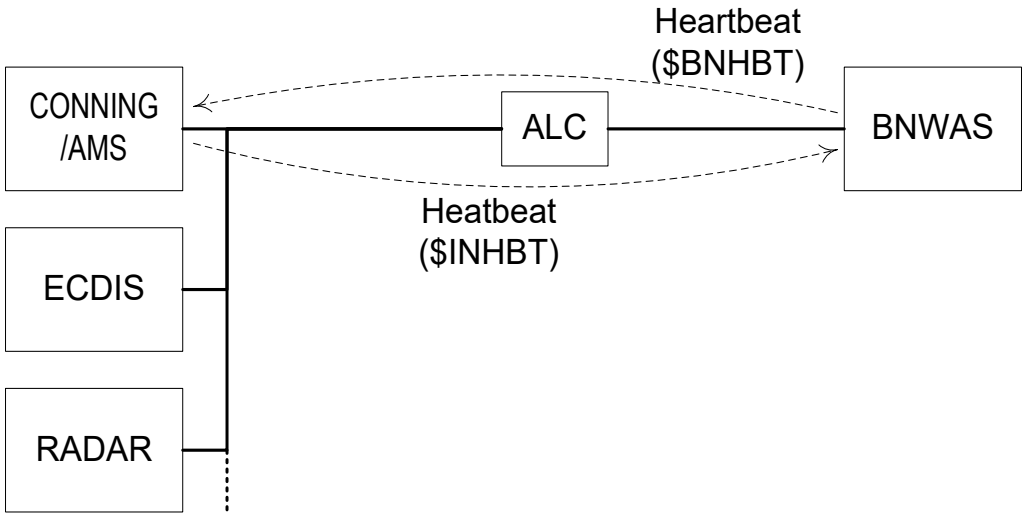
(2). BNWAS alert



(3). Watch Timer Reset

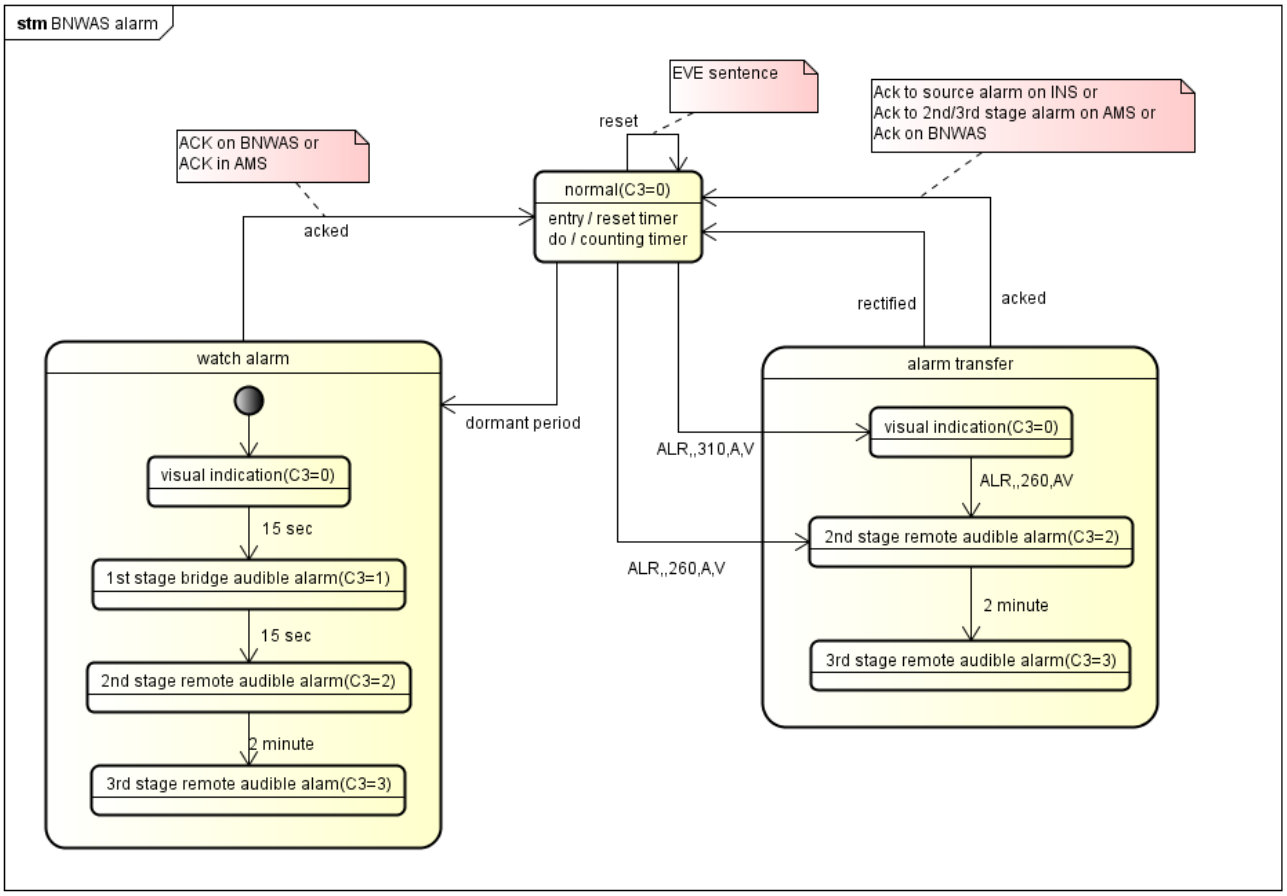


(4). Connection supervision

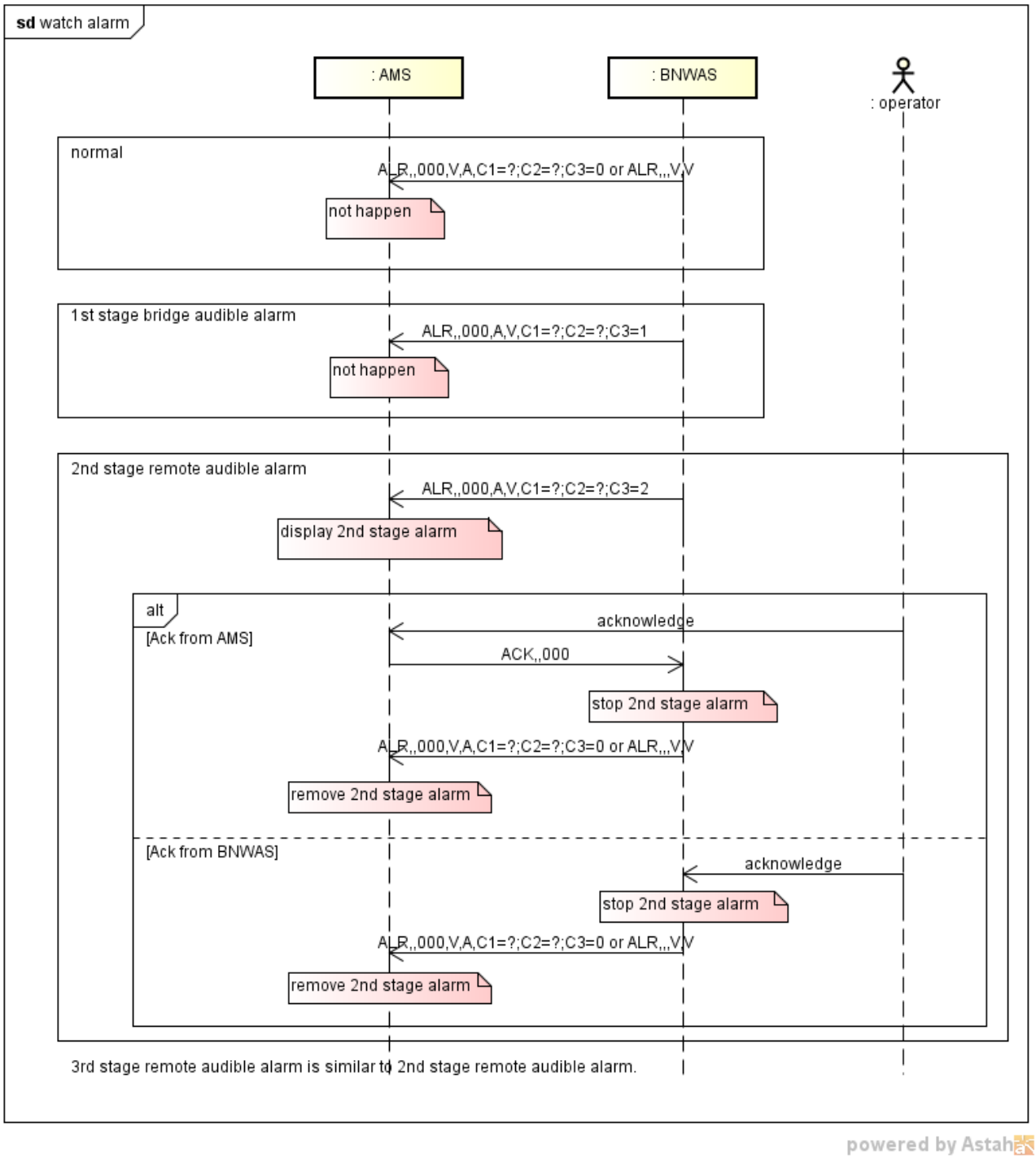


6.10.2 Mechanism

6.10.2.1 BNWAS status

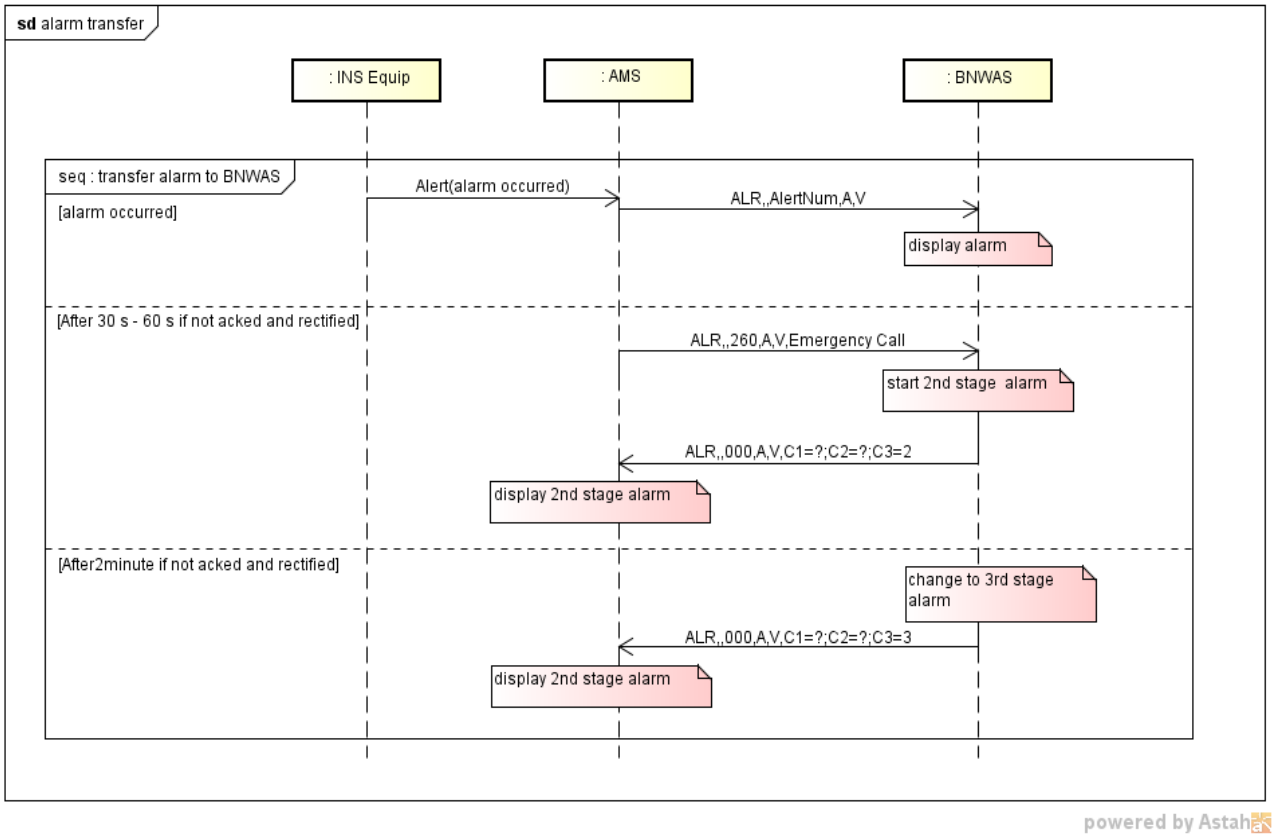


6.10.2.2 Watch alarm

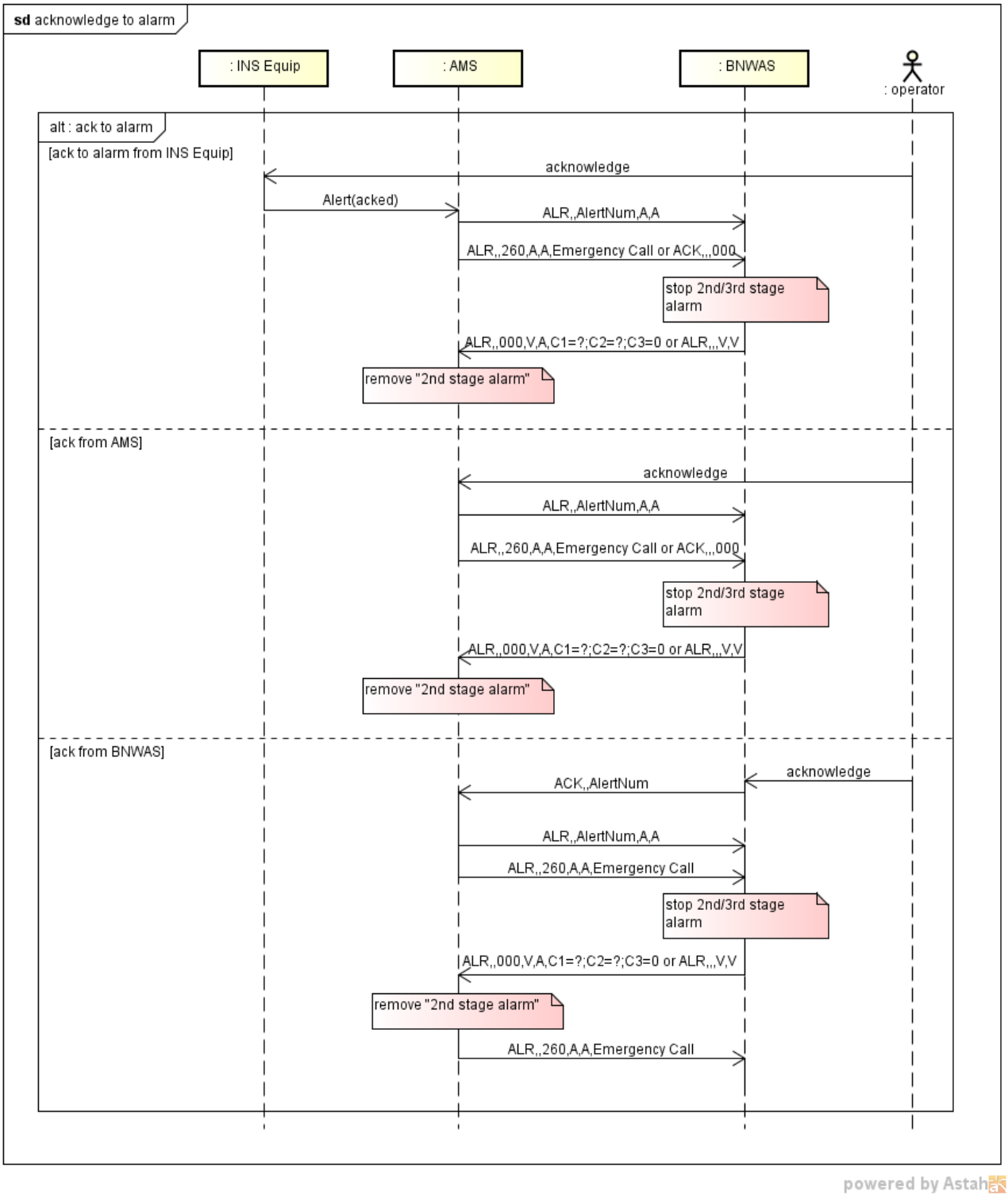


6.10.2.3 Alarm transfer

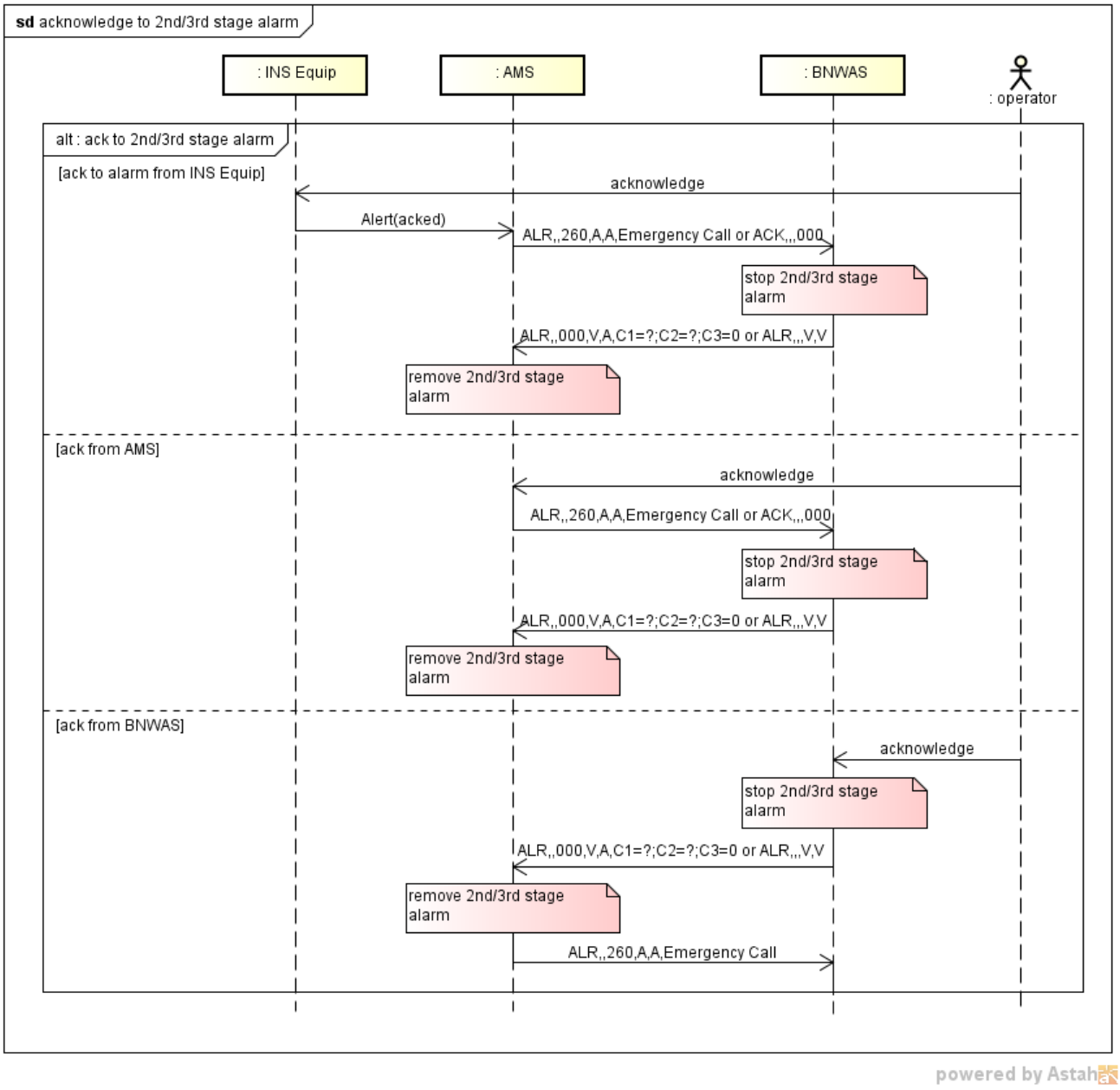
(1). Alarm transfer



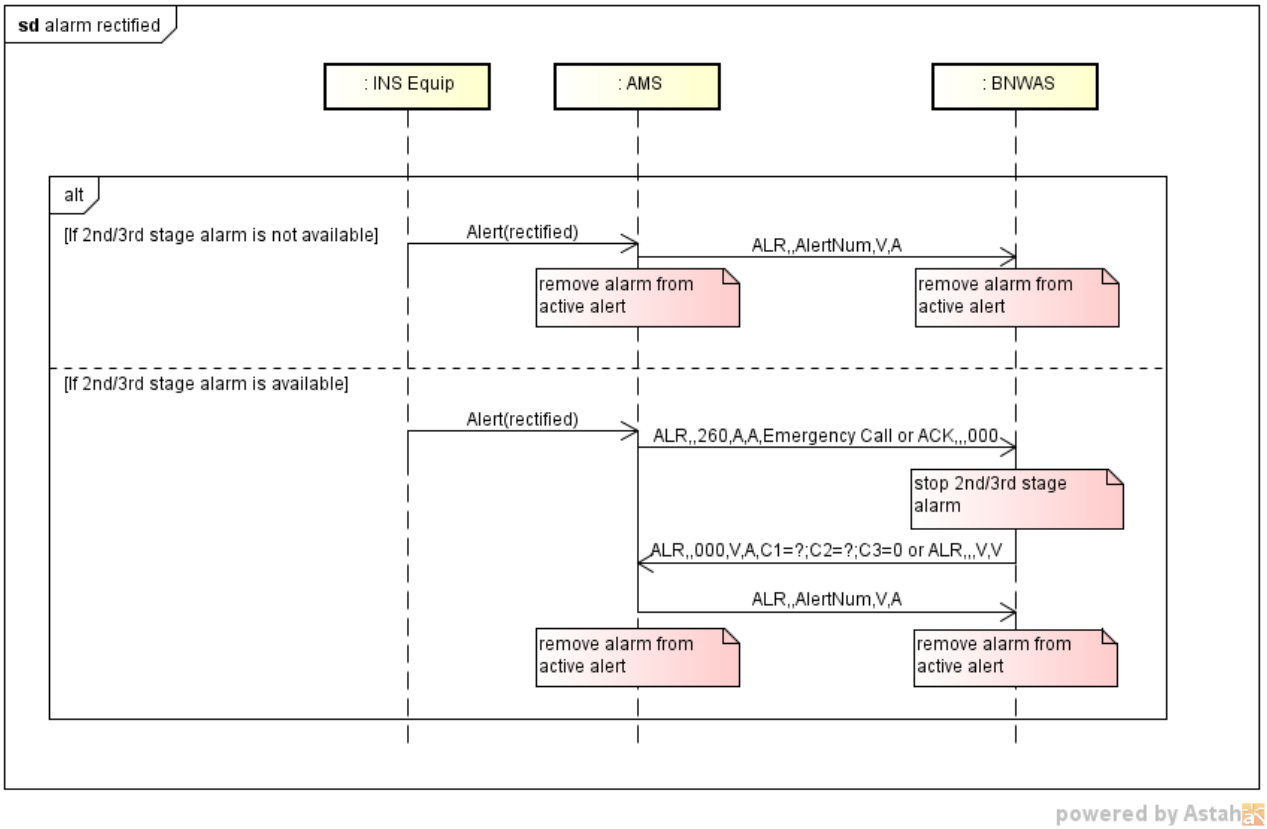
(2). Acknowledge to alert



(3). Acknowledge to 2nd/3rd stage remote audible alert



(4). Rectified


sd alarm rectified
: INS Equip
: AMS
: BNWAS
alt
[If 2nd/3rd stage alarm is not available]
Alert(rectified)
ALR,,AlertNum,V,A
remove alarm from active alert
remove alarm from active alert
[If 2nd/3rd stage alarm is available]
Alert(rectified)
ALR,,260,A,A,Emergency Call or ACK,,,000
stop 2nd/3rd stage alarm
ALR,,000,V,A,C1=?;C2=?;C3=0 or ALR,,,V,V
ALR,,AlertNum,V,A
remove alarm from active alert
remove alarm from active alert
powered by Astah

6.10.2.4 Harbor mode function On / Off

With Harbor mode function On / Off, you can set whether to enable BAM MANNED / UNMANNED switch.
The on / off of the function can be switched by the equipment setting, and this setting is synchronized between the MFDs.
The BAM MANNED / UNMANNED selector switch is displayed when the function is on.



When the selector switch is UNMANNED, alarms are not transferred to BNWAS.
When IAS is connected, IAS will be notified of MANNED / UNMANNED status of WH (Wheel House).

6.10.3 Sentences

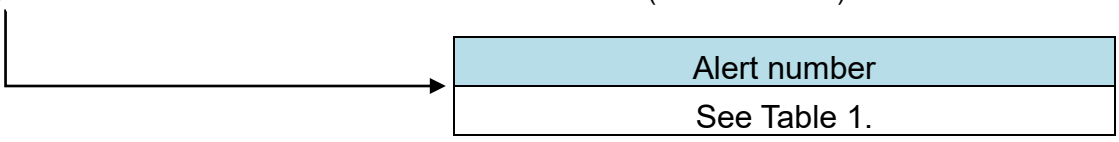
No	mnemonic	Meaning	Remarks
1	ACK	Acknowledge alert	This sentence is used to acknowledge a Category-B alert condition reported by a device.
2	ALR	Set alert state	This sentence is used to report an alert condition on a device and its current state of acknowledgement.
3	EVE	Watch Timer reset	JRC-INS to BNWAS for timer-reset. (IEC 62616/7.4.6)
4	HBT	Heartbeat supervision sentence	This sentence is intended to be used for supervision of a connection between JRC-INS and BNWAS.

6.10.3.1 Talker ID

No.	Source	Talker ID	Remark
1	BNWAS	BN	IEC 61162/Table 4
2	RADAR	RA	IEC 61162/Table 4
3	ECDIS	EI	IEC 61162/Table 4
4	INS/ CONNING/ AMS	IN	IEC 61162/Table 4

6.10.3.2 ACK sentence

$INALR,xxx*hh<CR><LF> (INS -> BMWAS)
$BNALR,xxx*hh<CR><LF> (BNWAS -> INS)



ACK – Acknowledge alarm

Acknowledge device alarm. This sentence is used to acknowledge an alarm condition reported by a device.

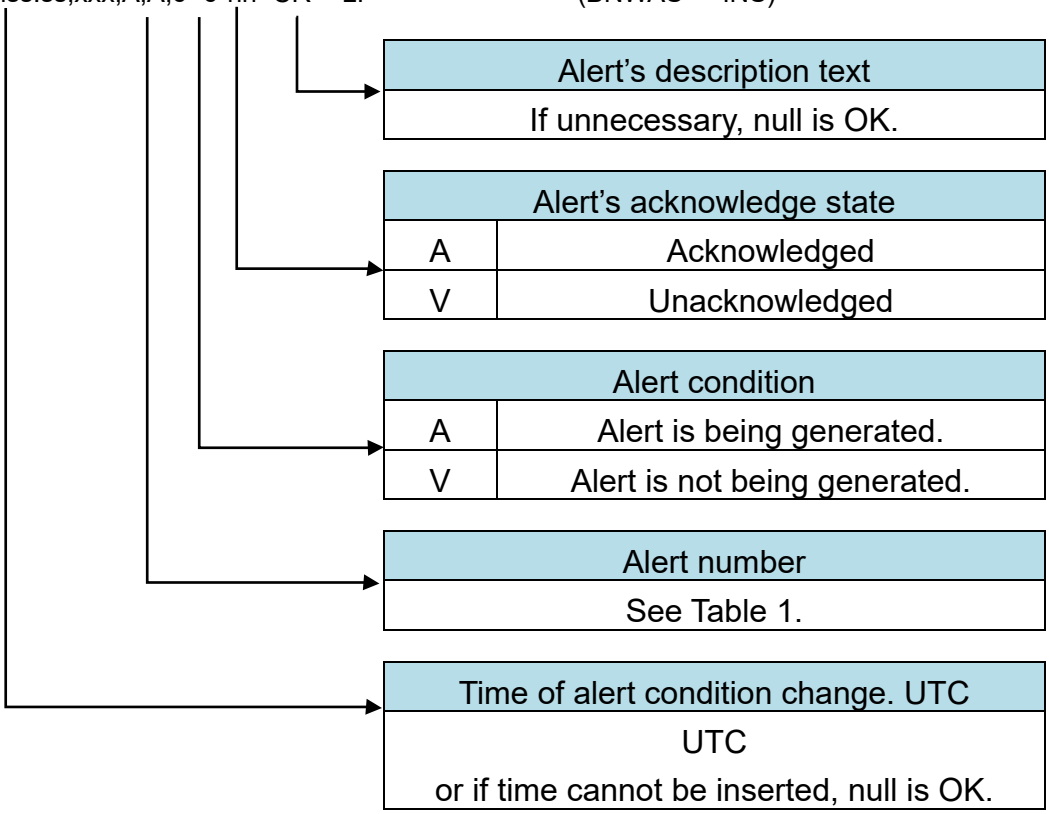
$--ACK,xxx*hh<CR><LF>

Unique alarm number (identifier) at alarm source

6.10.3.3 ALR sentence

Transmit : interval from 1sec to 15sec for BNWAS, from 1 sec to 3 sec for AMS.

$INALR,hhmmss.ss,xxx,A,A,c--c*hh<CR><LF> (INS -> BMWAS)
$BNALR,hhmmss.ss,xxx,A,A,c--c*hh<CR><LF> (BNWAS -> INS)



Alert's description text
If unnecessary, null is OK.

Alert's acknowledge state	
A	Acknowledged
V	Unacknowledged

Alert condition	
A	Alert is being generated.
V	Alert is not being generated.

Alert number
See Table 1.

Time of alert condition change. UTC
UTC or if time cannot be inserted, null is OK.

ALR – Set alarm state

Local alarm condition and status. This sentence is used to report an alarm condition on a device and its current state of acknowledgement.

$--ALR,hhmmss.ss,xxx,A, A,c--c*hh<CR><LF>

- Alarm's description text
- Alarm's acknowledge state, A = acknowledged, V = unacknowledged
- Alarm condition (A = threshold exceeded, V = not exceeded)
- Unique alarm number (identifier) at alarm source
- Time of alarm condition change, UTC

Table 1 - Alert number (sample)

alert number	source	mean	remark
(none)	JRC-INS, BNWAS	no-alerts message	IEC 61924-2/L.1.3
000	BNWAS	Dormant period report	Category-B IEC 62616 Ed1.0/6.2
001	BNWAS	System fail	Category-B
002	BNWAS	Power fail	Category-B
260	AMS	Emergency call (Back-up Navigator Call)	IEC 61924-2/J.2
300	No.1 RADAR	ARPA(CPA/TCPA) alert	Category-A
301	No.1 RADAR	Power & System fail	Category-B
302	No.2 RADAR	ARPA(CPA/TCPA) alert	Category-A
303	No.2 RADAR	Power & System fail	Category-B
304	No.3 RADAR	ARPA(CPA/TCPA) alert	Category-A
305	No.3 RADAR	Power & System fail	Category-B
310	ECDIS	Cross-Track (Off-Track)	Category-A
311	ECDIS	Course Difference (Off course)	Category-A
312	ECDIS	Wheel Over Line (ACCA)	Category-A
313	ECDIS	End Of Track	Category-A
314	ECDIS	Depth below keel	Category-A
315	ECDIS	Power & System fail	Category-B
320	Backup-ECDIS	Cross-Track (Off-Track)	Category-A
321	Backup-ECDIS	Course Difference (Off course)	Category-A
322	Backup-ECDIS	Wheel Over Line (ACCA)	Category-A
323	Backup-ECDIS	End Of Track	Category-A
324	Backup-ECDIS	Depth below keel	Category-A
325	Backup-ECDIS	Power & System fail	Category-B
350	CONNING	Power & System fail	Category-B
360	No.1 DGPS	Power & System fail	Category-B/Warning
361	No.2 DGPS	Power & System fail	Category-B/Warning
362	No.1 Gyro Compass	Power & System fail	Category-B/Warning
363	No.2 Gyro Compass	Power & System fail	Category-B/Warning
364	No.1 Speed Log	Power & System fail	Category-B/Warning
365	No.2 Speed Log	Power & System fail	Category-B/Warning
366	Echo Sounder	Power & System fail	Category-B/Warning
367	AIS	Power & System fail	Category-B/Warning
368	Autopilot	Power & System fail	Category-B/Warning
369	NAVTEX	Power & System fail	Category-B/Warning
370	VDR	Power & System fail	Category-B/Warning
371	Clock	Power & System fail	Category-B/Warning
372	GMDSS	Power & System fail	Category-B/Warning
373	No.1 Main SLC	Power & System fail	Category-B/Warning
374	No.2 Main SLC	Power & System fail	Category-B/Warning
375	No.3 Main SLC	Power & System fail	Category-B/Warning
376	No.1 Sub SLC	Power & System fail	Category-B/Warning
377	No.2 Sub SLC	Power & System fail	Category-B/Warning
378	No.3 Sub SLC	Power & System fail	Category-B/Warning
379	No.1 ALC	Power & System fail	Category-B/Warning
380	No.2 ALC	Power & System fail	Category-B/Warning
381	No.3 ALC	Power & System fail	Category-B/Warning
999	JRC-INS, BNWAS	Buzzer off request	original

6.10.3.4 No-alert message

When there is no alarm, this message will be sent from BNWAS or INS. Sent once every 1 to 15 seconds.

$INALR,,,V,V,*hh<CR><LF> (INS -> BNWAS)
$BNALR,,,V,V,*hh<CR><LF> (BNWAS -> INS)

Note) see IEC 61924-2/L1.3

6.10.3.5 Back-up navigator call

For Back-up navigator call, emergency message sentence will be sent from AMS to BNWAS:

$INALR,,260,A,V,Emergency Call*hh<CR><LF>

For removing Back up navigator call:

$INALR,,260,A,A,Emergency Call*hh<CR><LF>

Note) see IEC 61924-2/J.2

6.10.3.6 Buzzer off request

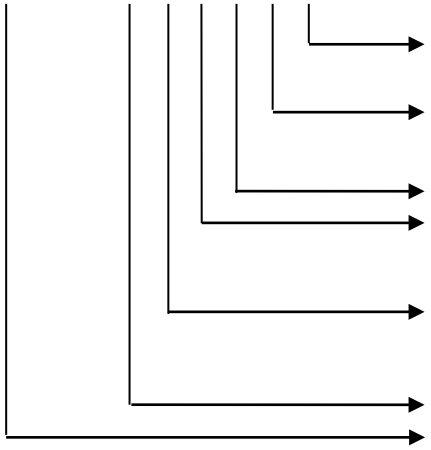
For request buzzer off, this message will be used.

Transmit : 1 time

$INALR,,999,A,A,BZ off*hh<CR><LF> (INS -> BNWAS)
$BNALR,,999,A,A,BZ off*hh<CR><LF> (BNWAS -> INS)

6.10.3.7 Dormant period report

The ALR sentence is used for dormant period report from BNWAS to AMS.
$BNALR, hhmmss.ss, 000, A, A, c1;c2;c3*hh<CR><LF>

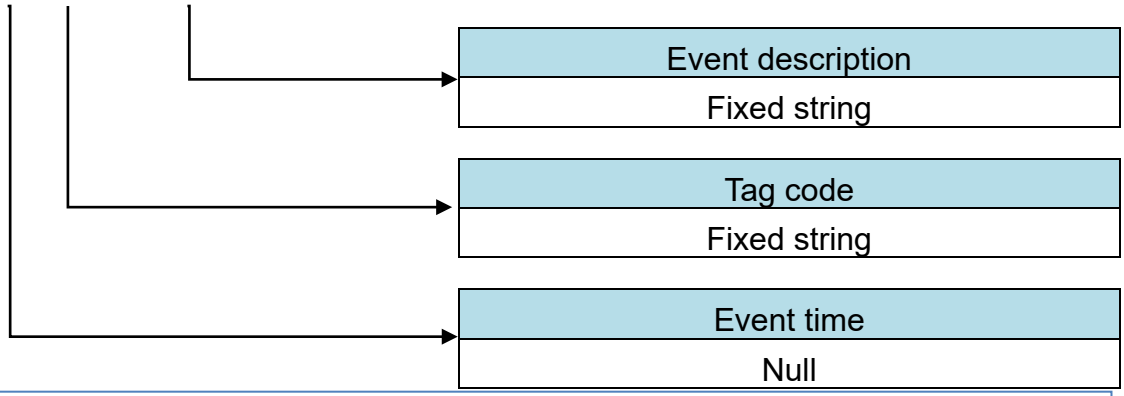


Alarm stage
1, 2 or 3
Dormant period in min
03 - 12
AUT or MAN or OFF
Alarm's acknowledge state
A = Acknowledged
V = Unacknowledged
Dormant period condition
A = Threshold exceeded
V = Not exceeded
Alert number = 000
Time of alert condition change.
UTC or if time cannot be inserted, null is OK.

Example:
$BNALR,,000,A,V,C1=AUT;C2=03;C3=1*hh<CR><LF>
The alarm message shall be sent with any change of the BNWAS settings for mode or dormant period, and with any activated and reset alarm.
2nd and 3rd alarm should be acknowledged by "$INACK,,000*hh<CR>LF>" from AMS.
Note) see IEC 62616 Ed1.0/6.2

6.10.3.8 EVE sentence

For reset of the Watch Timer, EVE sentence will be sent from individual equipment in INS to BNWAS.
Transmit : minimum interval is 1 sec per equipment.
$EIEVE,,BNWAS,Operator activity*hh<CR><LF> (ECDIS -> BNWAS)
$RAEVE,,BNWAS,Operator activity*hh<CR><LF> (RADAR -> BNWAS)
$INEVE,,BNWAS,Operator activity*hh<CR><LF> (CONNING/AMS -> BNWAS)



Event description
Fixed string
Tag code
Fixed string
Event time
Null

EVE – General event message

This sentence is used to transmit events (e.g. actions by the crew on the bridge) with a time stamp.

$--EVE,hhmmss.ss,c--c,c--c*hh<CR><LF>

Event description
Tag code used for identification of source of event (see Note)
Event time (see Note)

NOTE This may be a null field.

see IEC 62616/7.4.6.

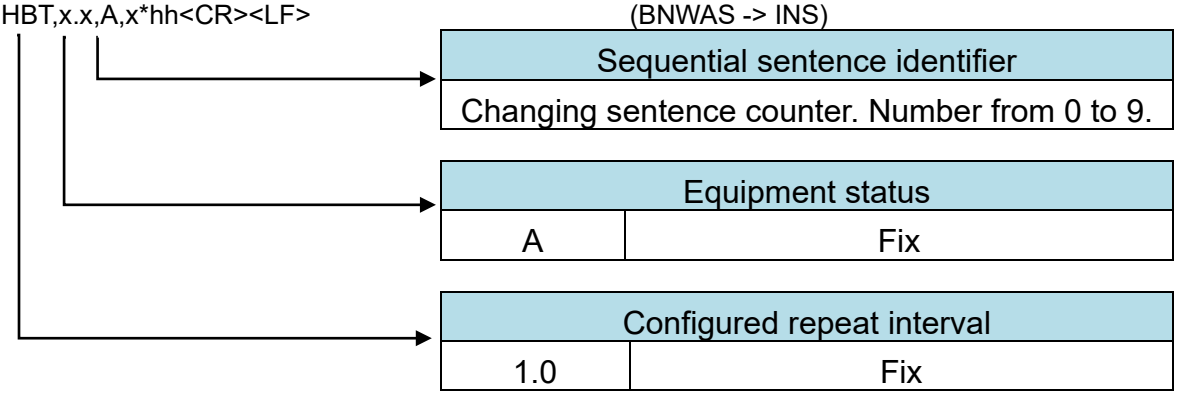
NOTE The sentence EVE (General event message) is designed to transmit actions by the crew on the bridge. The tag code field should be set as “BNWAS” and the event description field should be set as “Operator activity”.

Example $RAEVE,,BNWAS,Operator activity*hh<CR><LF>

6.10.3.9 HBT sentence

This sentence is intended to be used for supervision of a connection between AMS and BNWAS.
Transmit : interval from 1 sec to 3 sec.

$INHBT,x.x,A,x*hh<CR><LF> (INS -> BNWAS)
$BNHBT,x.x,A,x*hh<CR><LF> (BNWAS -> INS)



The sentence is transmitted at regular intervals specified in the corresponding equipment standard. The repeat interval may be used by the receiving unit to set the time-out value for the connection supervision.

$--HBT,x.x,A,x*hh<cr><lf>

Sequential sentence identifier (see Note 3)
Equipment status (see Note 2)
Configured repeat interval (see Note 1)

NOTE 1 Configured autonomous repeat interval in seconds. This field should be set to NULL in response to a query if this feature is supported.

NOTE 2 Equipment in normal operation A = yes, V = no

This field can be used can be used to indicate the current equipment status. This could be the result of an built-in integrity testing function.

NOTE 3 The sequential sentence identifier provides a message identification number from 0 to 9 that is sequentially assigned and is incremented for each new sentence. The count resets to 0 after 9 is used.

6.11 Special instruction for DNVGL class notation NAUT(AW)

6.11.1 Requirement of NAUT(AW)

The following equipment, systems and information shall be integrated for class notations NAUT(AW) according to "Rules for classification: Ships - DNVGL-RU-SHIP-Pt6Ch3, Edition January 2018.

6.11.1.1 TCS

− two EPFS
− two gyro compass
− ECDIS
− radar/chart radar
− heading control system (HCS)
− conning information display (CID)
− CAM.

6.11.1.2 CONNING

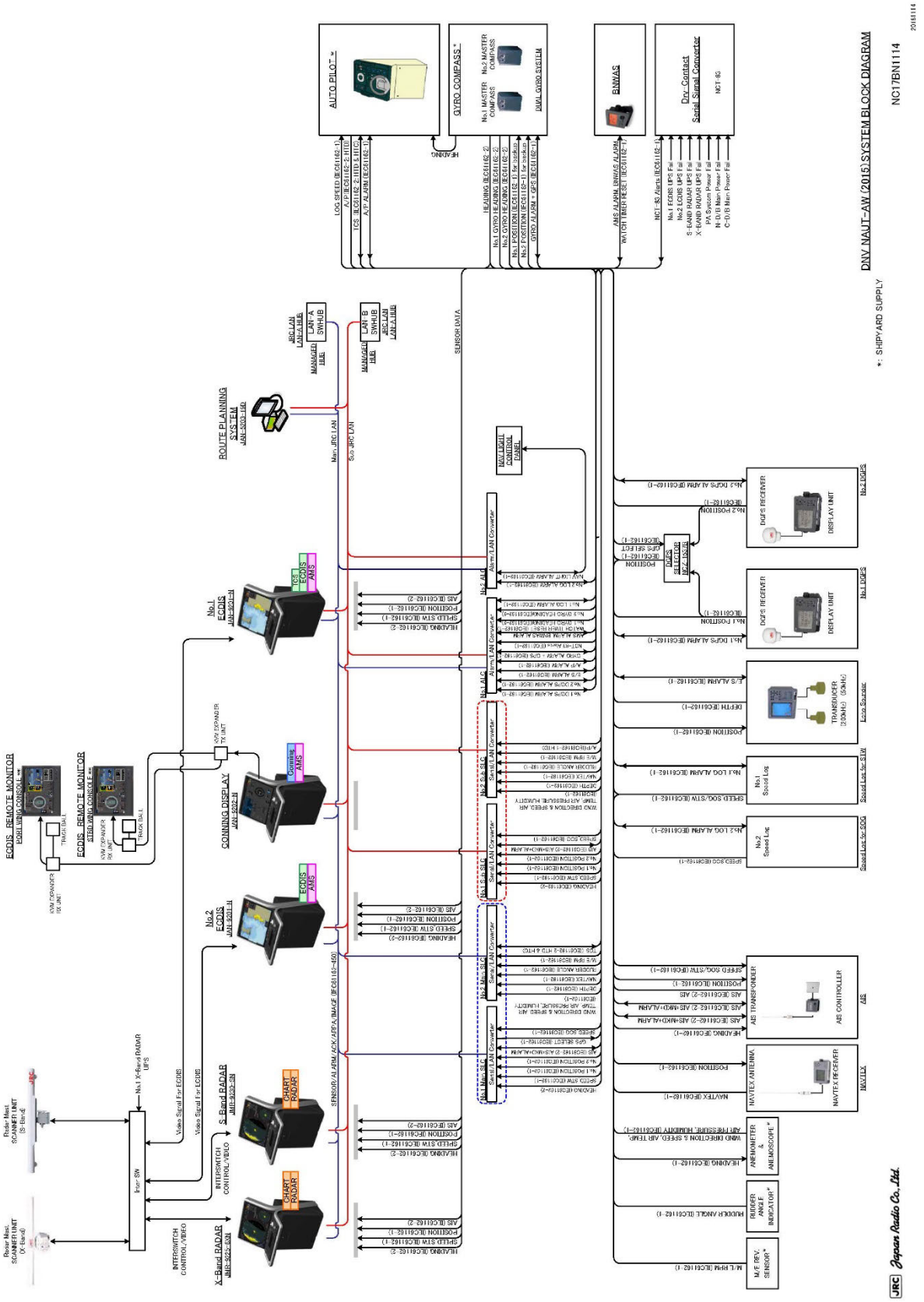
Control system data
a) Present system orders and set-values:
− set heading (heading to steer, e.g. from $..HTC)
− set turn radius (only during turn, i.e. subsequent to WOL)
− rudder angle order
− set speed (only if speed pilot is provided)
− present steering control mode.
b) Corresponding sensor data and actual values:
− heading
− turn rate
− rudder angle
− speed over ground
− longitudinal
− athwart ship
− propeller revolutions
− pitch indication, when relevant
− thruster indication, when relevant.

Voyage plan data
a) General:
− identification (name) of selected route.
b) TO-waypoint:
− number (name) of waypoint
− planned course
− planned turn radius
− bearing to WOP
− time to go to WOL (h,m,s <24h<d,h,m))
− cross-track-limit
− cross-track-distance, XTD (m if <0.5nm).
c) NEXT-waypoint:
− planned course
− distance to WOP.

Wind and current data
a) Graphical and alphanumeric presentation of:
− wind vector (velocity and direction)
− set and drift vector (velocity and direction)
− present and preceding depth sounding(s) (>30min).

6.11.2 System Block Diagram

Minimum system configuration for NAUT-AW as below



Note

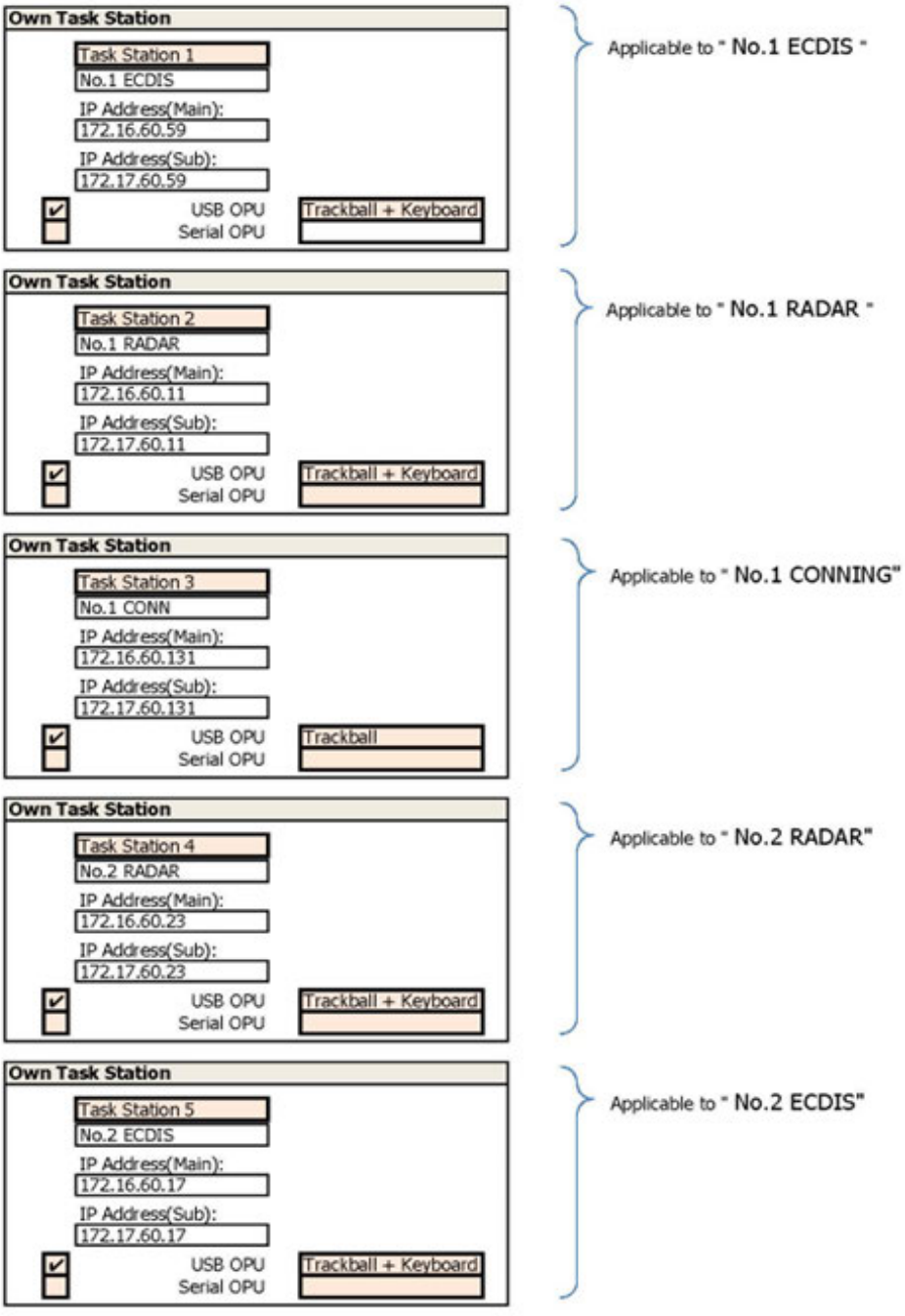
System configuration is different depending on the ship.

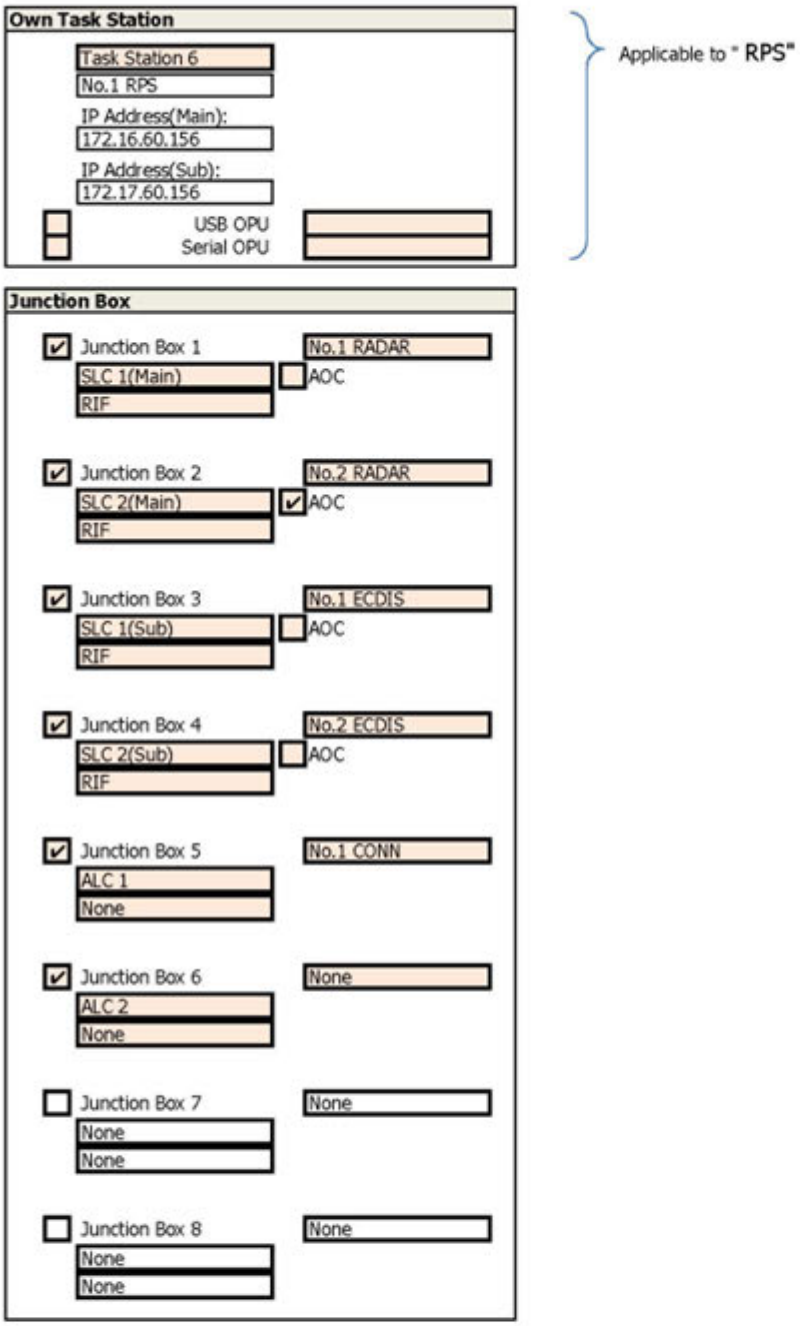
Please Install the equipment according to the installation document of ship.

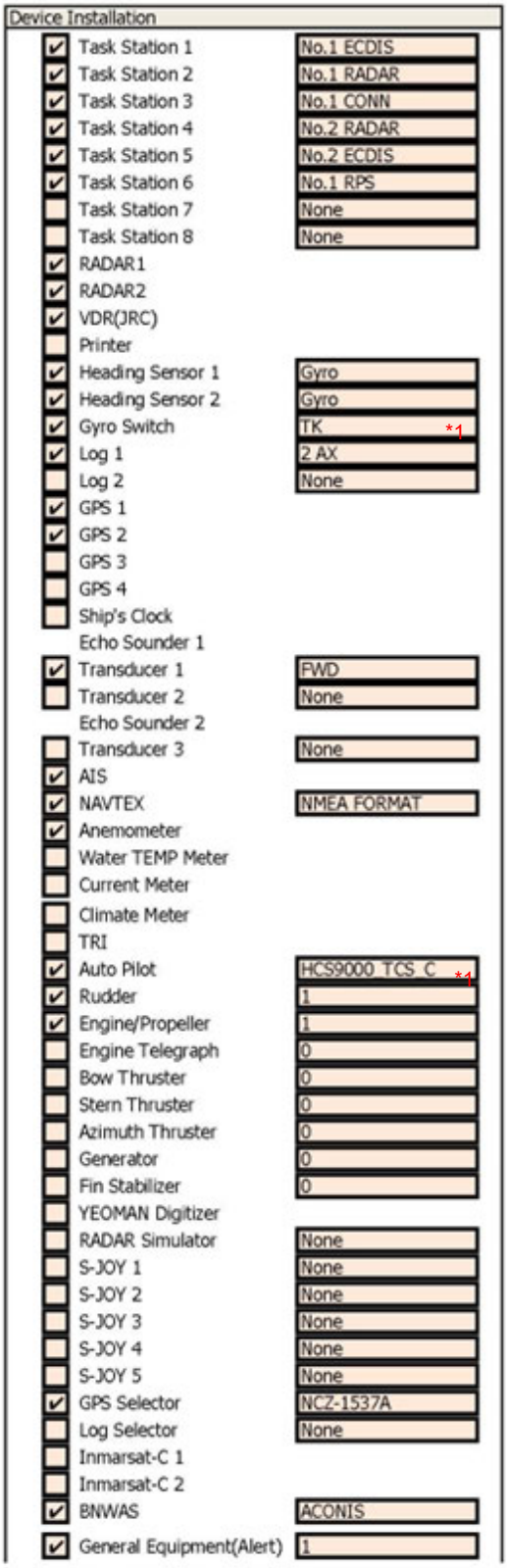
6.11.3 Setting

6.11.3.1 Subsystem Installation

For setting procedure, please refer to 4.4 Subsystem Installation.



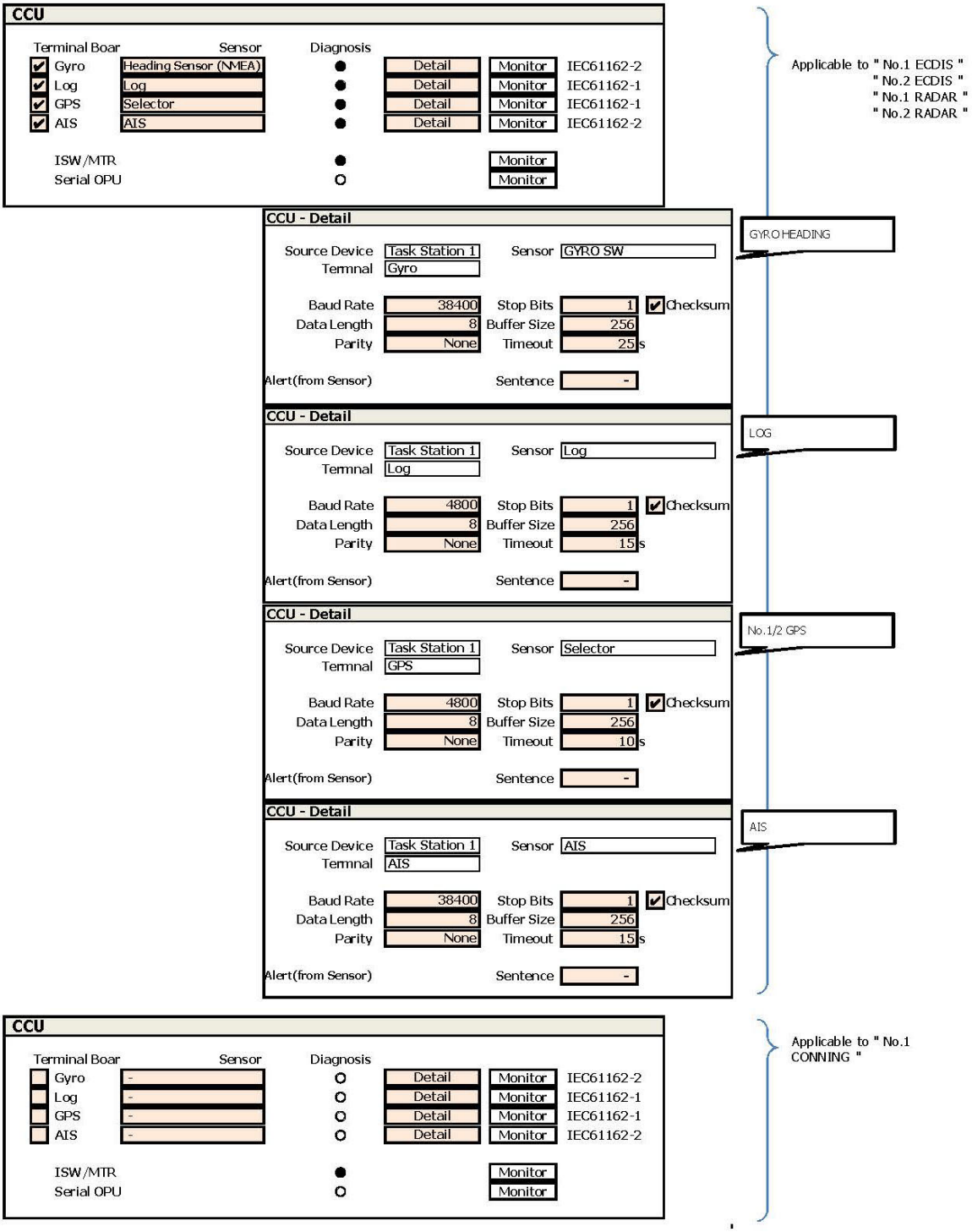

Own Task Station
Task Station 6
No.1 RPS
IP Address(Main):
172.16.60.156
IP Address(Sub):
172.17.60.156
USB OPU
Serial OPU
Applicable to " RPS"
Junction Box
Junction Box 1
SLC 1(Main)
RIF
No.1 RADAR
AOC
Junction Box 2
SLC 2(Main)
RIF
No.2 RADAR
AOC
Junction Box 3
SLC 1(Sub)
RIF
No.1 ECDIS
AOC
Junction Box 4
SLC 2(Sub)
RIF
No.2 ECDIS
AOC
Junction Box 5
ALC 1
None
No.1 CONN
Junction Box 6
ALC 2
None
None
Junction Box 7
None
None
None
Junction Box 8
None
None
None

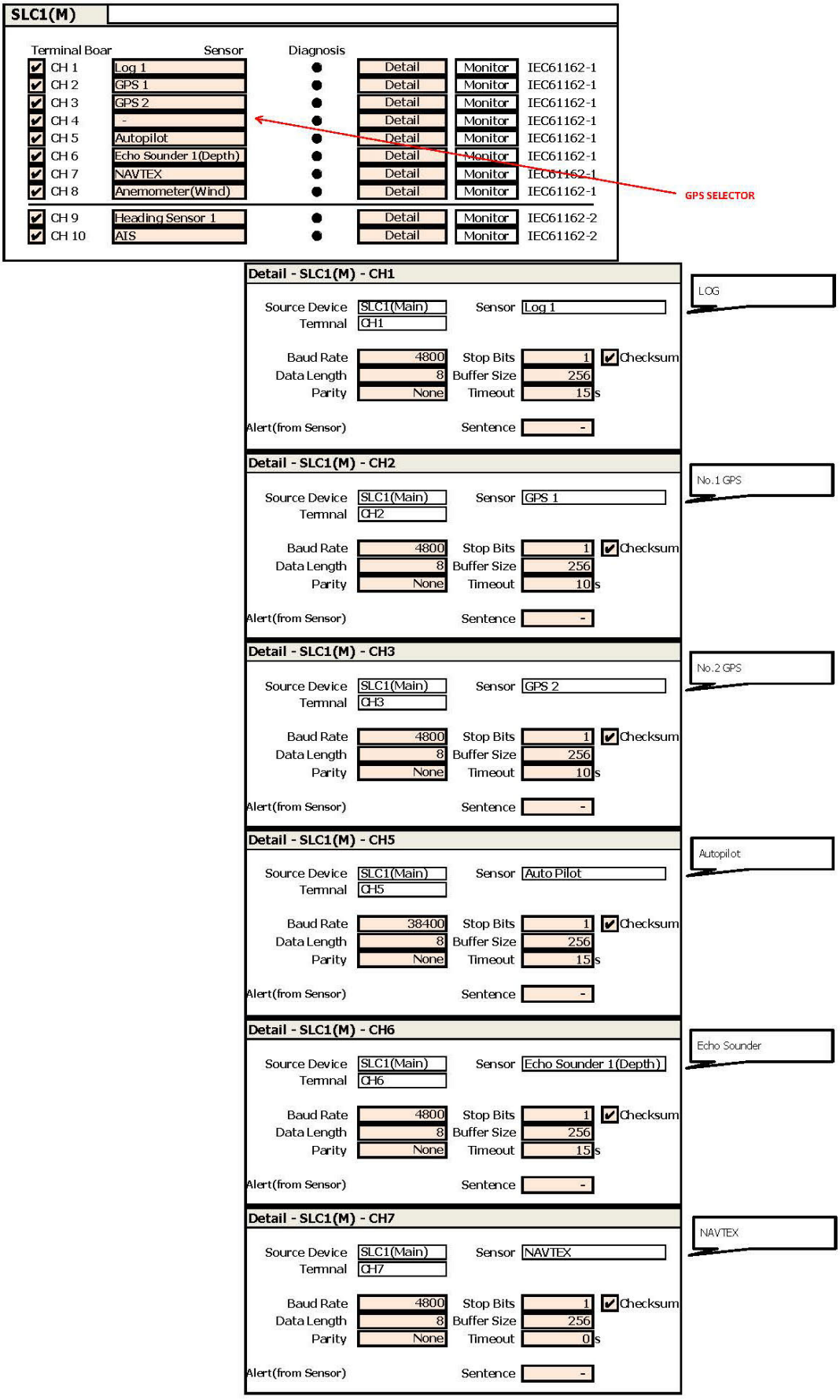


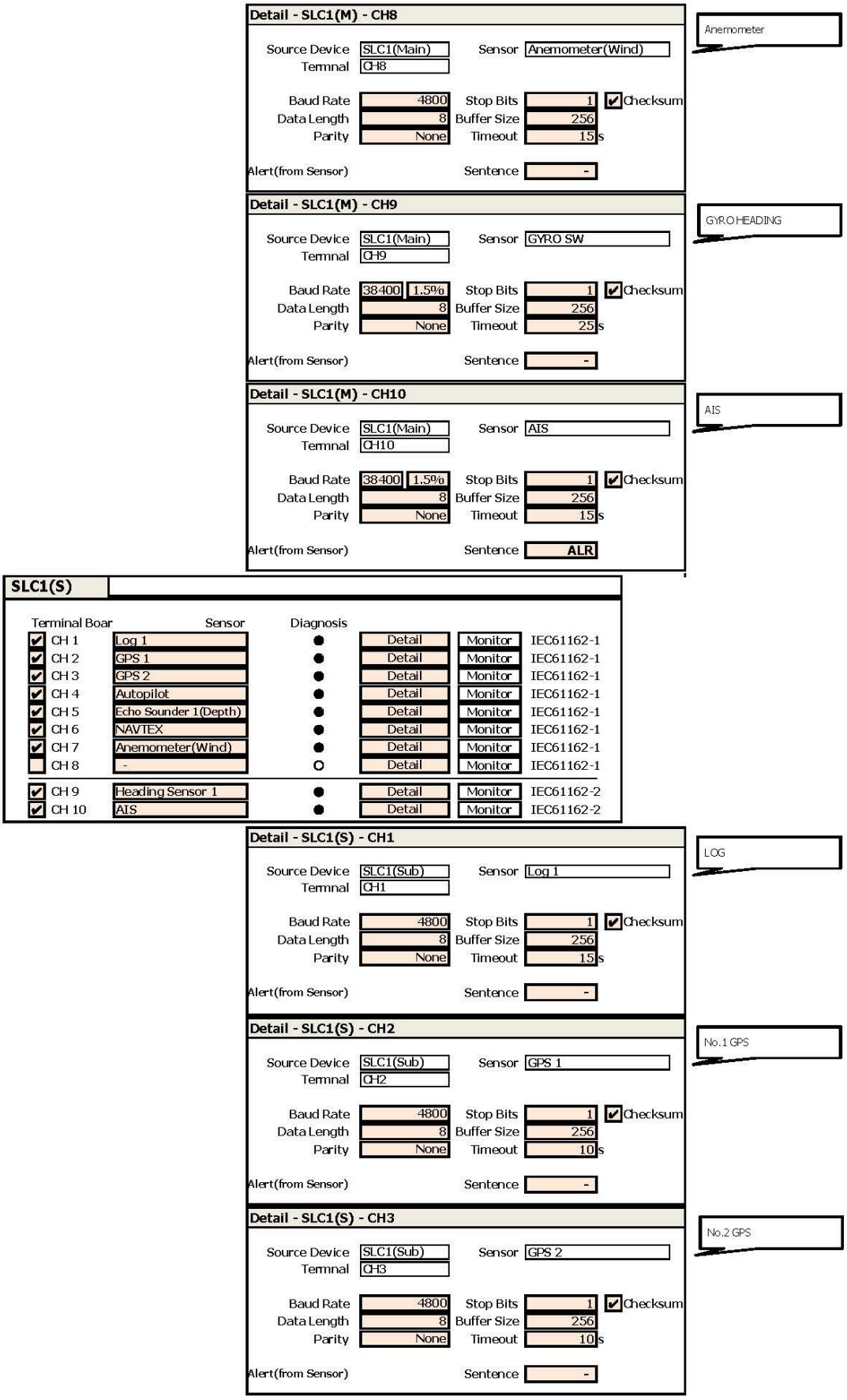
*1 Gyro switch and Auto Pilot setting is difference by install equipment.

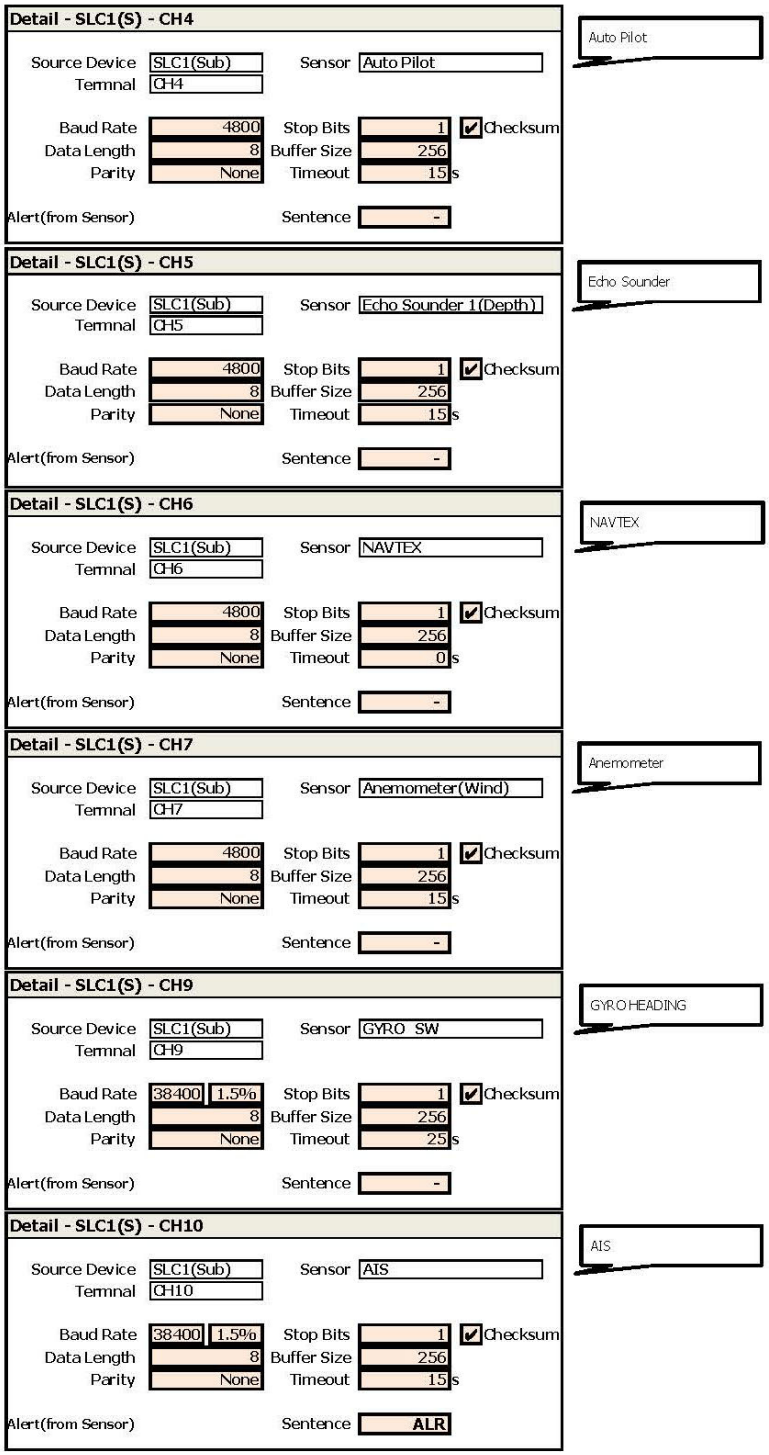
6.11.3.2 Serial Port

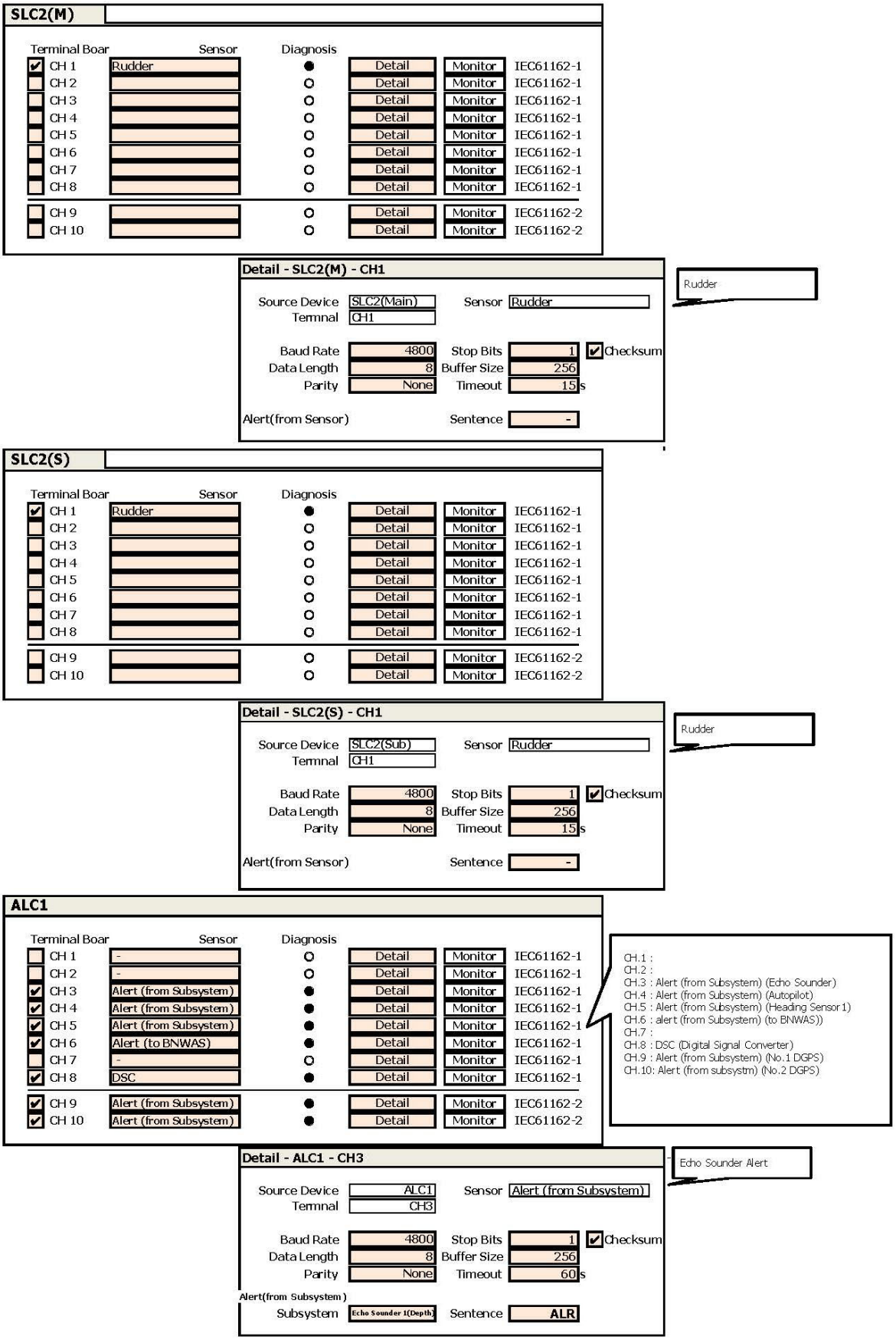
For setting procedure, please refer to 4.6 Setting Up a Serial Port.

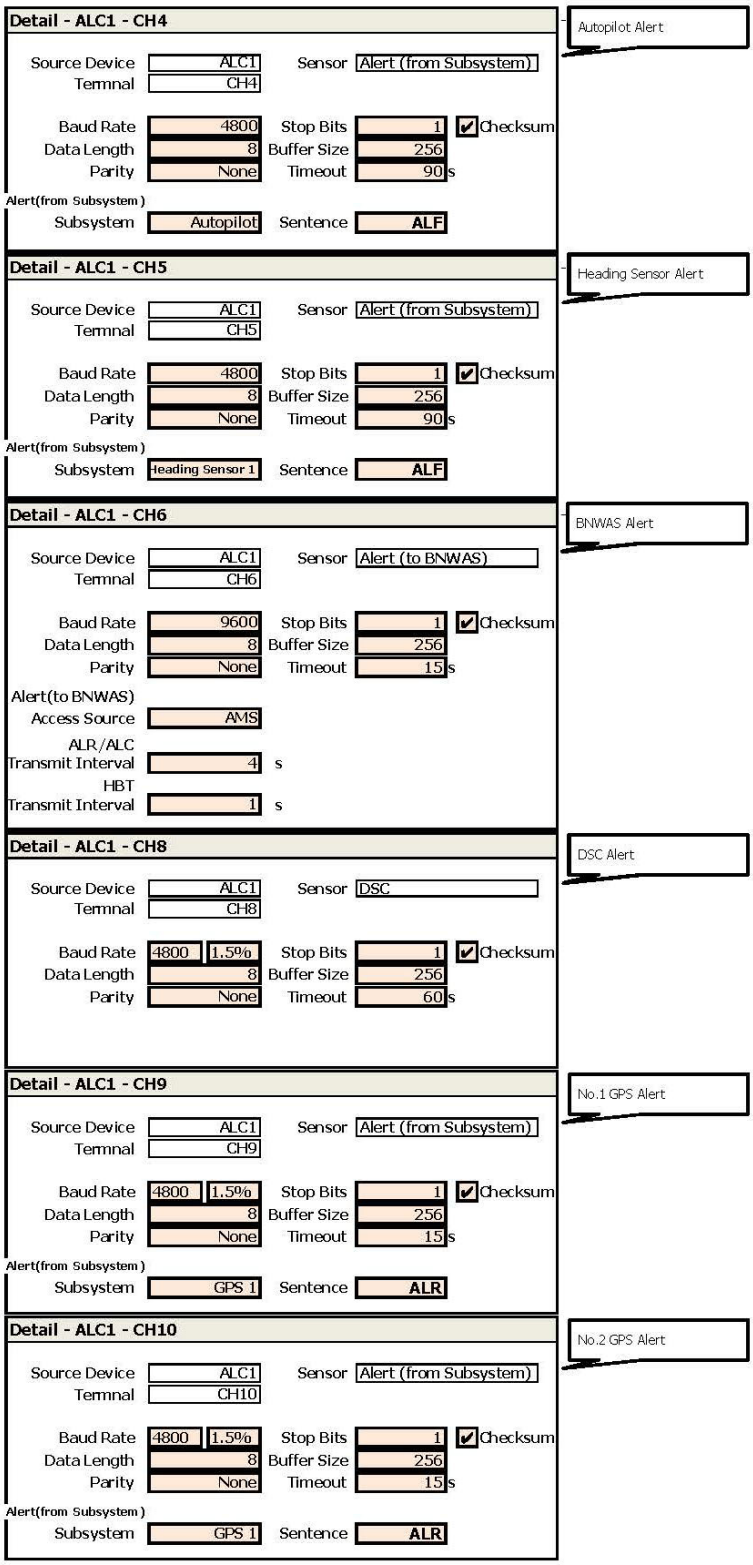


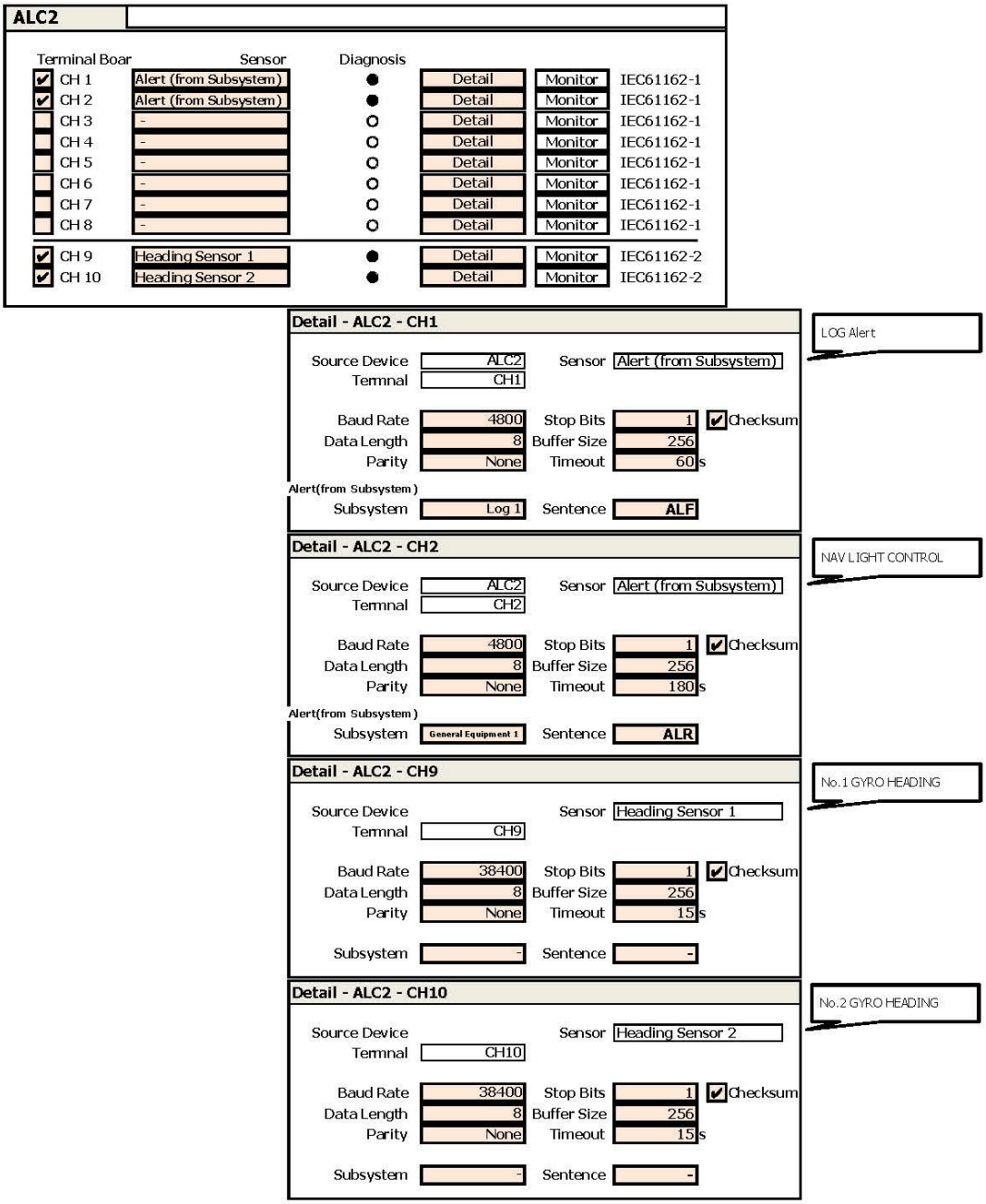

SLC1(M)
Terminal Boar
Sensor
Diagnosis
CH 1 Log 1 Detail Monitor IEC61162-1
CH 2 GPS 1 Detail Monitor IEC61162-1
CH 3 GPS 2 Detail Monitor IEC61162-1
CH 4 - Detail Monitor IEC61162-1
CH 5 Autopilot Detail Monitor IEC61162-1
CH 6 Echo Sounder 1(Depth) Detail Monitor IEC61162-1
CH 7 NAVTEX Detail Monitor IEC61162-1
CH 8 Anemometer(Wind) Detail Monitor IEC61162-1
CH 9 Heading Sensor 1 Detail Monitor IEC61162-2
CH 10 AIS Detail Monitor IEC61162-2
GPS SELECTOR
Detail - SLC1(M) - CH1
LOG
Source Device SLC1(Main) Sensor Log 1
Termnal CH1
Baud Rate 4800 Stop Bits 1 Checksum
Data Length 8 Buffer Size 256
Parity None Timeout 15 s
Alert(from Sensor) Sentence -
Detail - SLC1(M) - CH2
No.1 GPS
Source Device SLC1(Main) Sensor GPS 1
Termnal CH2
Baud Rate 4800 Stop Bits 1 Checksum
Data Length 8 Buffer Size 256
Parity None Timeout 10 s
Alert(from Sensor) Sentence -
Detail - SLC1(M) - CH3
No.2 GPS
Source Device SLC1(Main) Sensor GPS 2
Termnal CH3
Baud Rate 4800 Stop Bits 1 Checksum
Data Length 8 Buffer Size 256
Parity None Timeout 10 s
Alert(from Sensor) Sentence -
Detail - SLC1(M) - CH5
Autopilot
Source Device SLC1(Main) Sensor Auto Pilot
Termnal CH5
Baud Rate 38400 Stop Bits 1 Checksum
Data Length 8 Buffer Size 256
Parity None Timeout 15 s
Alert(from Sensor) Sentence -
Detail - SLC1(M) - CH6
Echo Sounder
Source Device SLC1(Main) Sensor Echo Sounder 1(Depth)
Termnal CH6
Baud Rate 4800 Stop Bits 1 Checksum
Data Length 8 Buffer Size 256
Parity None Timeout 15 s
Alert(from Sensor) Sentence -
Detail - SLC1(M) - CH7
NAVTEX
Source Device SLC1(Main) Sensor NAVTEX
Termnal CH7
Baud Rate 4800 Stop Bits 1 Checksum
Data Length 8 Buffer Size 256
Parity None Timeout 0 s
Alert(from Sensor) Sentence -


Detail - SLC1(M) - CH8
Source Device SLC1(Main)
Sensor Anemometer(Wind)
Termnal CH8
Baud Rate 4800
Stop Bits 1
Checksum
Data Length 8
Buffer Size 256
Parity None
Timeout 15 s
Alert(from Sensor)
Sentence -
Anemometer
Detail - SLC1(M) - CH9
Source Device SLC1(Main)
Sensor GYRO SW
Termnal CH9
Baud Rate 38400 1.5%
Stop Bits 1
Checksum
Data Length 8
Buffer Size 256
Parity None
Timeout 25 s
Alert(from Sensor)
Sentence -
GYRO HEADING
Detail - SLC1(M) - CH10
Source Device SLC1(Main)
Sensor AIS
Termnal CH10
Baud Rate 38400 1.5%
Stop Bits 1
Checksum
Data Length 8
Buffer Size 256
Parity None
Timeout 15 s
Alert(from Sensor)
Sentence ALR
AIS
SLC1(S)
Terminal Boar
Sensor
Diagnosis
CH 1 Log 1 Detail Monitor IEC61162-1
CH 2 GPS 1 Detail Monitor IEC61162-1
CH 3 GPS 2 Detail Monitor IEC61162-1
CH 4 Autopilot Detail Monitor IEC61162-1
CH 5 Echo Sounder 1(Depth) Detail Monitor IEC61162-1
CH 6 NAVTEX Detail Monitor IEC61162-1
CH 7 Anemometer(Wind) Detail Monitor IEC61162-1
CH 8 - Detail Monitor IEC61162-1
CH 9 Heading Sensor 1 Detail Monitor IEC61162-2
CH 10 AIS Detail Monitor IEC61162-2
Detail - SLC1(S) - CH1
Source Device SLC1(Sub)
Sensor Log 1
Termnal CH1
Baud Rate 4800
Stop Bits 1
Checksum
Data Length 8
Buffer Size 256
Parity None
Timeout 15 s
Alert(from Sensor)
Sentence -
LOG
Detail - SLC1(S) - CH2
Source Device SLC1(Sub)
Sensor GPS 1
Termnal CH2
Baud Rate 4800
Stop Bits 1
Checksum
Data Length 8
Buffer Size 256
Parity None
Timeout 10 s
Alert(from Sensor)
Sentence -
No.1 GPS
Detail - SLC1(S) - CH3
Source Device SLC1(Sub)
Sensor GPS 2
Termnal CH3
Baud Rate 4800
Stop Bits 1
Checksum
Data Length 8
Buffer Size 256
Parity None
Timeout 10 s
Alert(from Sensor)
Sentence -
No.2 GPS


Detail - SLC1(S) - CH4
Source Device SLC1(Sub)
Sensor Auto Pilot
Terminal CH4
Baud Rate 4800
Stop Bits 1
Checksum
Data Length 8
Buffer Size 256
Parity None
Timeout 15 s
Alert(from Sensor)
Sentence -
Auto Pilot
Detail - SLC1(S) - CH5
Source Device SLC1(Sub)
Sensor Echo Sounder 1(Depth)
Terminal CH5
Baud Rate 4800
Stop Bits 1
Checksum
Data Length 8
Buffer Size 256
Parity None
Timeout 15 s
Alert(from Sensor)
Sentence -
Echo Sounder
Detail - SLC1(S) - CH6
Source Device SLC1(Sub)
Sensor NAVTEX
Terminal CH6
Baud Rate 4800
Stop Bits 1
Checksum
Data Length 8
Buffer Size 256
Parity None
Timeout 0 s
Alert(from Sensor)
Sentence -
NAVTEX
Detail - SLC1(S) - CH7
Source Device SLC1(Sub)
Sensor Anemometer(Wind)
Terminal CH7
Baud Rate 4800
Stop Bits 1
Checksum
Data Length 8
Buffer Size 256
Parity None
Timeout 15 s
Alert(from Sensor)
Sentence -
Anemometer
Detail - SLC1(S) - CH9
Source Device SLC1(Sub)
Sensor GYRO SW
Terminal CH9
Baud Rate 38400 1.5%
Stop Bits 1
Checksum
Data Length 8
Buffer Size 256
Parity None
Timeout 25 s
Alert(from Sensor)
Sentence -
GYRO HEADING
Detail - SLC1(S) - CH10
Source Device SLC1(Sub)
Sensor AIS
Terminal CH10
Baud Rate 38400 1.5%
Stop Bits 1
Checksum
Data Length 8
Buffer Size 256
Parity None
Timeout 15 s
Alert(from Sensor)
Sentence ALR
AIS


SLC2(M)
Terminal Boar
Sensor
Diagnosis
CH 1 Rudder Detail Monitor IEC61162-1
CH 2 Detail Monitor IEC61162-1
CH 3 Detail Monitor IEC61162-1
CH 4 Detail Monitor IEC61162-1
CH 5 Detail Monitor IEC61162-1
CH 6 Detail Monitor IEC61162-1
CH 7 Detail Monitor IEC61162-1
CH 8 Detail Monitor IEC61162-1
CH 9 Detail Monitor IEC61162-2
CH 10 Detail Monitor IEC61162-2
Detail - SLC2(M) - CH1
Source Device SLC2(Main)
Sensor Rudder
Termnal CH1
Baud Rate 4800
Stop Bits 1
Checksum
Data Length 8
Buffer Size 256
Parity None
Timeout 15 s
Alert(from Sensor)
Sentence -
Rudder
SLC2(S)
Terminal Boar
Sensor
Diagnosis
CH 1 Rudder Detail Monitor IEC61162-1
CH 2 Detail Monitor IEC61162-1
CH 3 Detail Monitor IEC61162-1
CH 4 Detail Monitor IEC61162-1
CH 5 Detail Monitor IEC61162-1
CH 6 Detail Monitor IEC61162-1
CH 7 Detail Monitor IEC61162-1
CH 8 Detail Monitor IEC61162-1
CH 9 Detail Monitor IEC61162-2
CH 10 Detail Monitor IEC61162-2
Detail - SLC2(S) - CH1
Source Device SLC2(Sub)
Sensor Rudder
Termnal CH1
Baud Rate 4800
Stop Bits 1
Checksum
Data Length 8
Buffer Size 256
Parity None
Timeout 15 s
Alert(from Sensor)
Sentence -
Rudder
ALC1
Terminal Boar
Sensor
Diagnosis
CH 1 - Detail Monitor IEC61162-1
CH 2 - Detail Monitor IEC61162-1
CH 3 Alert (from Subsystem) Detail Monitor IEC61162-1
CH 4 Alert (from Subsystem) Detail Monitor IEC61162-1
CH 5 Alert (from Subsystem) Detail Monitor IEC61162-1
CH 6 Alert (to BNWAS) Detail Monitor IEC61162-1
CH 7 - Detail Monitor IEC61162-1
CH 8 DSC Detail Monitor IEC61162-1
CH 9 Alert (from Subsystem) Detail Monitor IEC61162-2
CH 10 Alert (from Subsystem) Detail Monitor IEC61162-2
CH.1 :
CH.2 :
CH.3 : Alert (from Subsystem) (Echo Sounder)
CH.4 : Alert (from Subsystem) (Autopilot)
CH.5 : Alert (from Subsystem) (Heading Sensor1)
CH.6 : alert (from Subsystem) (to BNWAS))
CH.7 :
CH.8 : DSC (Digital Signal Converter)
CH.9 : Alert (from Subsystem) (No.1 DGPS)
CH.10: Alert (from subsystm) (No.2 DGPS)
Detail - ALC1 - CH3
Source Device ALC1
Sensor Alert (from Subsystem)
Termnal CH3
Baud Rate 4800
Stop Bits 1
Checksum
Data Length 8
Buffer Size 256
Parity None
Timeout 60 s
Alert(from Subsystem)
Subsystem Echo Sounder 1(Depth)
Sentence ALR
Echo Sounder Alert


Detail - ALC1 - CH4
Source Device ALC1
Terminal CH4
Sensor Alert (from Subsystem)
Baud Rate 4800
Data Length 8
Parity None
Stop Bits 1
Buffer Size 256
Timeout 90 s
Checksum
Alert(from Subsystem)
Subsystem Autopilot
Sentence ALF
Autopilot Alert
Detail - ALC1 - CH5
Source Device ALC1
Terminal CH5
Sensor Alert (from Subsystem)
Baud Rate 4800
Data Length 8
Parity None
Stop Bits 1
Buffer Size 256
Timeout 90 s
Checksum
Alert(from Subsystem)
Subsystem Heading Sensor 1
Sentence ALF
Heading Sensor Alert
Detail - ALC1 - CH6
Source Device ALC1
Terminal CH6
Sensor Alert (to BNWAS)
Baud Rate 9600
Data Length 8
Parity None
Stop Bits 1
Buffer Size 256
Timeout 15 s
Checksum
Alert(to BNWAS)
Access Source AMS
ALR/ALC Transmit Interval 4 s
HBT Transmit Interval 1 s
BNWAS Alert
Detail - ALC1 - CH8
Source Device ALC1
Terminal CH8
Sensor DSC
Baud Rate 4800 1.5%
Data Length 8
Parity None
Stop Bits 1
Buffer Size 256
Timeout 60 s
Checksum
DSC Alert
Detail - ALC1 - CH9
Source Device ALC1
Terminal CH9
Sensor Alert (from Subsystem)
Baud Rate 4800 1.5%
Data Length 8
Parity None
Stop Bits 1
Buffer Size 256
Timeout 15 s
Checksum
Alert(from Subsystem)
Subsystem GPS 1
Sentence ALR
No.1 GPS Alert
Detail - ALC1 - CH10
Source Device ALC1
Terminal CH10
Sensor Alert (from Subsystem)
Baud Rate 4800 1.5%
Data Length 8
Parity None
Stop Bits 1
Buffer Size 256
Timeout 15 s
Checksum
Alert(from Subsystem)
Subsystem GPS 1
Sentence ALR
No.2 GPS Alert


ALC2
Terminal Boar
Sensor
Diagnosis
CH 1 Alert (from Subsystem) Detail Monitor IEC61162-1
CH 2 Alert (from Subsystem) Detail Monitor IEC61162-1
CH 3 - Detail Monitor IEC61162-1
CH 4 - Detail Monitor IEC61162-1
CH 5 - Detail Monitor IEC61162-1
CH 6 - Detail Monitor IEC61162-1
CH 7 - Detail Monitor IEC61162-1
CH 8 - Detail Monitor IEC61162-1
CH 9 Heading Sensor 1 Detail Monitor IEC61162-2
CH 10 Heading Sensor 2 Detail Monitor IEC61162-2
Detail - ALC2 - CH1
LOG Alert
Source Device ALC2
Sensor Alert (from Subsystem)
Termnal CH1
Baud Rate 4800
Stop Bits 1
Checksum
Data Length 8
Buffer Size 256
Parity None
Timeout 60 s
Alert(from Subsystem)
Subsystem Log 1
Sentence ALF
Detail - ALC2 - CH2
NAV LIGHT CONTROL
Source Device ALC2
Sensor Alert (from Subsystem)
Termnal CH2
Baud Rate 4800
Stop Bits 1
Checksum
Data Length 8
Buffer Size 256
Parity None
Timeout 180 s
Alert(from Subsystem)
Subsystem General Equipment 1
Sentence ALR
Detail - ALC2 - CH9
No.1 GYRO HEADING
Source Device
Sensor Heading Sensor 1
Termnal CH9
Baud Rate 38400
Stop Bits 1
Checksum
Data Length 8
Buffer Size 256
Parity None
Timeout 15 s
Subsystem -
Sentence -
Detail - ALC2 - CH10
No.2 GYRO HEADING
Source Device
Sensor Heading Sensor 2
Termnal CH10
Baud Rate 38400
Stop Bits 1
Checksum
Data Length 8
Buffer Size 256
Parity None
Timeout 15 s
Subsystem -
Sentence -

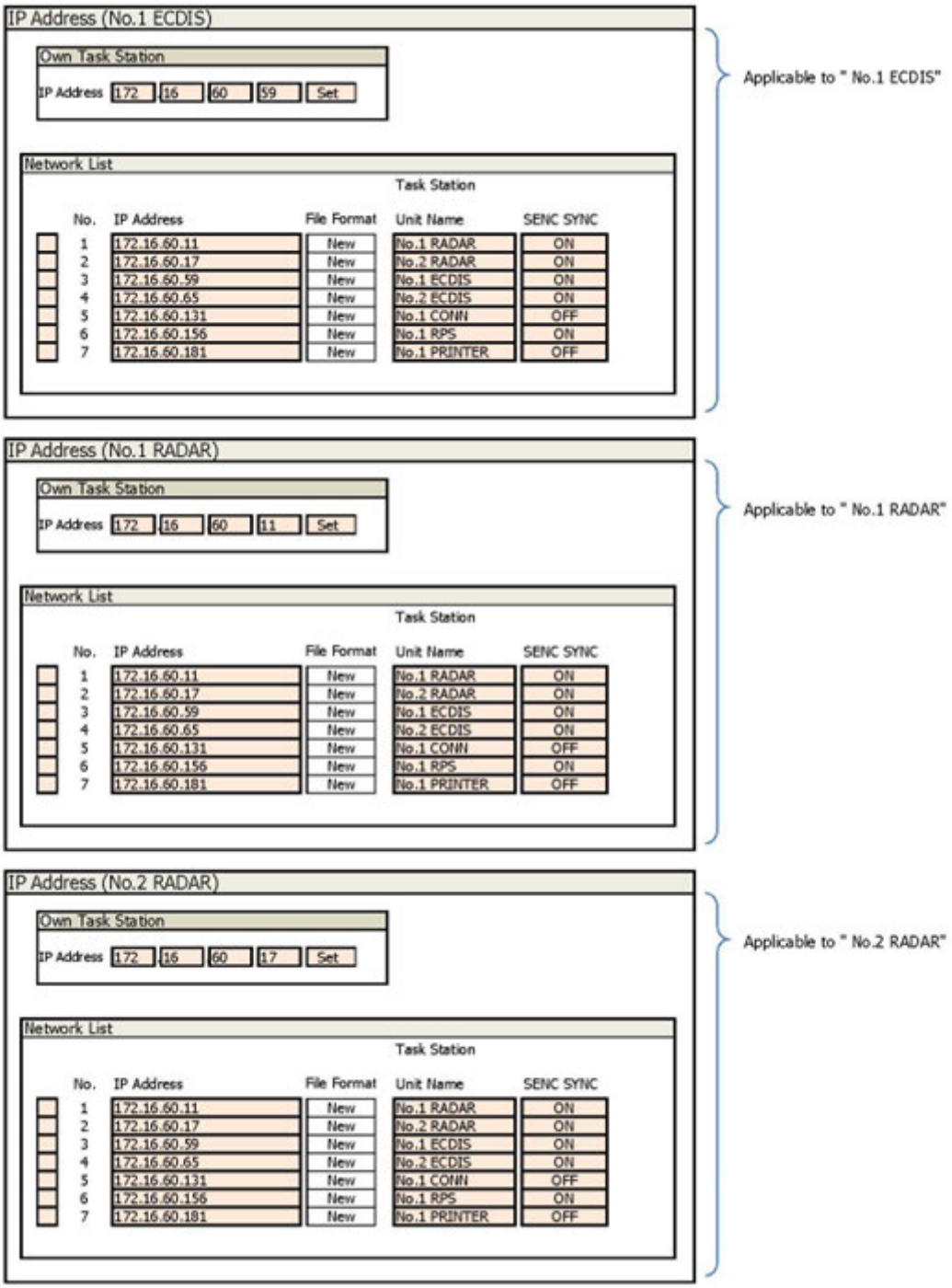
6.11.3.3 System Function

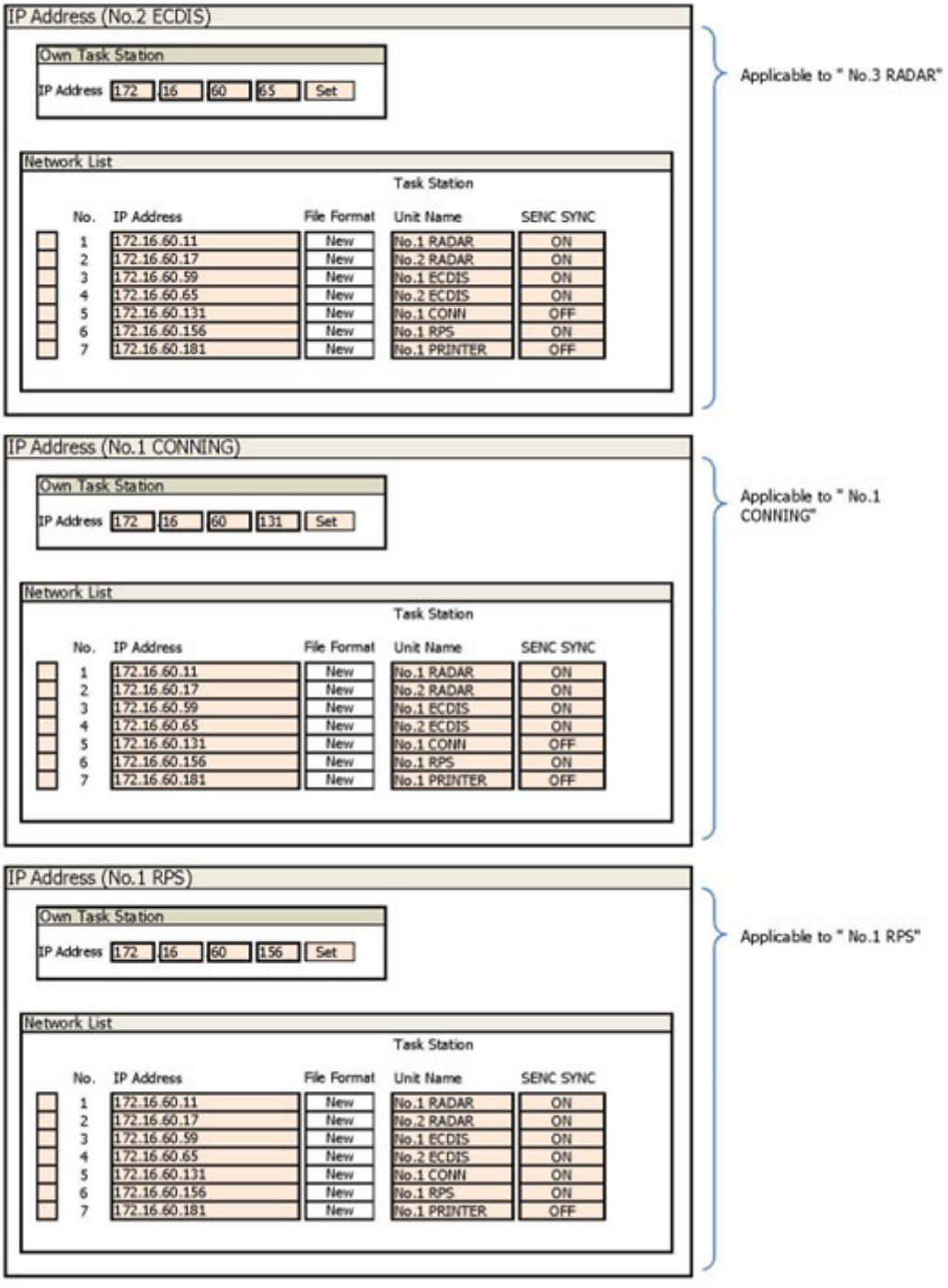
For setting procedure, please refer to 4.7 System Function.

	Equipment	Connection	System Function	SFI		Cluster	Control		Alert		
				Talker	No.		Tx		Tx	Rx	
☐	No.1 RADAR	LAN	RADAR	RA	0002	Nav	TGTD	●	TGTD	CAM1	●
☐	No.2 RADAR	LAN	RADAR	RA	0004	Nav	TGTD	●	TGTD	CAM1	●
☐	No.1 ECDIS	LAN	ECDIS	EI	0001	Nav	NAVD	●	NAVD	CAM1	●
☐	No.1 ECDIS	LAN	CAM	CA	0001	Nav	CAM1	●	CAM1	CAM1	●
☐	No.1 ECDIS	LAN	TCS	TC	0001	Nav	NAVD	●	NAVD	CAM1	●
☐	No.2 ECDIS	LAN	ECDIS	EI	0005	Nav	NAVD	●	NAVD	CAM1	●
☐	No.2 ECDIS	LAN	CAM	CA	0005	Nav	CAM1	●	CAM1	CAM1	●
☐	No.2 ECDIS	LAN	TCS	TC	0005	Nav	NAVD	●	NAVD	CAM1	●
☐	No.1 CONN	LAN	CONNING	II	0003	Nav	MISC	●	MISC	CAM1	●
☐	No.1 CONN	LAN	CAM	CA	0003	Nav	CAM1	●	CAM1	CAM1	●
☐	No.1 RPS	LAN	ECDIS	EI	0003	Nav	NAVD	●	NAVD	CAM1	●
☐	VDR	LAN	VDR	VR	0001	Nav	VDRD	●	VDRD	CAM1	●
☐	Heading Sensor 1	ALC	Gyro,North	HE	1309	Nav	SATD	●	SATD	CAM1	●
☐	Heading Sensor 2	ALC	Gyro,North	HE	1310	Nav	SATD	●	SATD	CAM1	●
☐	Gyro Switch	SLC(Main)	Gyro,North	HE	0009	Nav	SATD	●	SATD	CAM1	●
☐	Gyro Switch	SLC(Sub)	Gyro,North	HE	0009	Nav	SATD	●	SATD	CAM1	●
☐	Log 1	SLC(Main)	Velocity,Do...	VD	0001	Nav	NAVD	●	NAVD	CAM1	●
☐	Log 1	SLC(Sub)	Velocity,Do...	VD	0051	Nav	NAVD	●	NAVD	CAM1	●
☐	Log 1	CCU	Velocity,Do...	---	---	---	---	●	---	---	●
☐	GPS 1	SLC(Main)	GPS	GP	0002	Nav	NAVD	●	NAVD	CAM1	●
☐	GPS 1	SLC(Sub)	GPS	GP	0052	Nav	NAVD	●	NAVD	CAM1	●
☐	GPS 2	SLC(Main)	GPS	GP	0002	Nav	NAVD	●	NAVD	CAM1	●
☐	GPS 2	SLC(Sub)	GPS	GP	0052	Nav	NAVD	●	NAVD	CAM1	●
☐	Echo Sounder 1(T/...	SLC(Main)	Sounder,De...	SD	0003	Nav	NAVD	●	NAVD	CAM1	●
☐	Echo Sounder 1(T/...	SLC(Sub)	Sounder,De...	SD	0053	Nav	NAVD	●	NAVD	CAM1	●
☐	AIS	SLC(Main)	AIS	AI	0010	Nav	TGTD	●	TGTD	CAM1	●
☐	AIS	SLC(Sub)	AIS	AI	0060	Nav	TGTD	●	TGTD	CAM1	●
☐	AIS	CCU	AIS	---	---	---	---	●	---	---	●
☐	NAVTEX	SLC(Main)	Comm.Rece...	CR	0007	Nav	RCON	●	RCON	CAM1	●
☐	NAVTEX	SLC(Sub)	Comm.Rece...	CR	0057	Nav	RCON	●	RCON	CAM1	●
☐	Anemometer 1	SLC(Main)	Weather	WI	0008	Nav	NAVD	●	NAVD	CAM1	●
☐	Anemometer 1	SLC(Sub)	Weather	WI	0058	Nav	NAVD	●	NAVD	CAM1	●
☐	Autopilot	SLC(Main)	Auto Pilot	AG	0005	Nav	NAVD	●	NAVD	CAM1	●
☐	Autopilot	SLC(Sub)	Auto Pilot	AG	0055	Nav	NAVD	●	NAVD	CAM1	●
☐	Rudder	SLC(Main)	S.Gear	SG	0101	Nav	MISC	●	MISC	CAM1	●
☐	Rudder	SLC(Sub)	S.Gear	SG	0151	Nav	MISC	●	MISC	CAM1	●
☐	BNWAS	ALC	BNWAS	BN	1206	Nav	VDRD	●	VDRD	CAM1	●
☐	DSC	ALC	SNGF	SI	1203	Nav	MISC	●	MISC	CAM1	●
☐	SLC 1(Main)	LAN	SNGF	SI	0013	Nav	MISC	●	MISC	CAM1	●
☐	SLC 1(Sub)	LAN	SNGF	SI	0063	Nav	MISC	●	MISC	CAM1	●
☐	SLC 2(Main)	LAN	SNGF	SI	0113	Nav	MISC	●	MISC	CAM1	●
☐	SLC 2(Sub)	LAN	SNGF	SI	0163	Nav	MISC	●	MISC	CAM1	●
☐	ALC 1	LAN	SNGF	SI	1213	Nav	TGTD	●	TGTD	CAM1	●
☐	ALC 2	LAN	SNGF	SI	1313	Nav	TGTD	●	TGTD	CAM1	●

6.11.3.4 Network

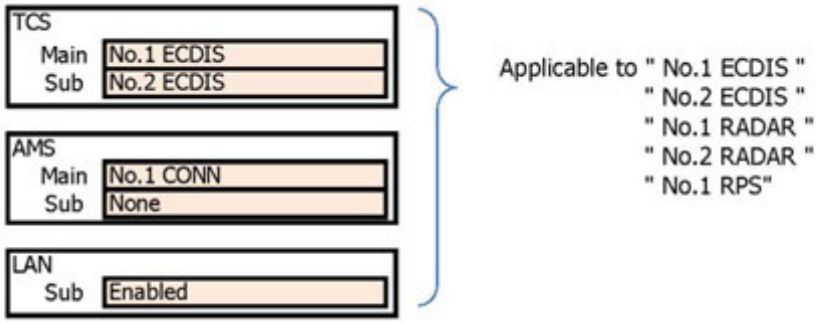
For setting procedure, please refer to 4.12 Network Setting.




IP Address (No.2 ECDIS)
Own Task Station
IP Address 172 16 60 65 Set
Network List
Task Station
No. IP Address File Format Unit Name SENC SYNC
1 172.16.60.11 New No.1 RADAR ON
2 172.16.60.17 New No.2 RADAR ON
3 172.16.60.59 New No.1 ECDIS ON
4 172.16.60.65 New No.2 ECDIS ON
5 172.16.60.131 New No.1 CONN OFF
6 172.16.60.156 New No.1 RPS ON
7 172.16.60.181 New No.1 PRINTER OFF
Applicable to " No.3 RADAR"
IP Address (No.1 CONNING)
Own Task Station
IP Address 172 16 60 131 Set
Network List
Task Station
No. IP Address File Format Unit Name SENC SYNC
1 172.16.60.11 New No.1 RADAR ON
2 172.16.60.17 New No.2 RADAR ON
3 172.16.60.59 New No.1 ECDIS ON
4 172.16.60.65 New No.2 ECDIS ON
5 172.16.60.131 New No.1 CONN OFF
6 172.16.60.156 New No.1 RPS ON
7 172.16.60.181 New No.1 PRINTER OFF
Applicable to " No.1 CONNING"
IP Address (No.1 RPS)
Own Task Station
IP Address 172 16 60 156 Set
Network List
Task Station
No. IP Address File Format Unit Name SENC SYNC
1 172.16.60.11 New No.1 RADAR ON
2 172.16.60.17 New No.2 RADAR ON
3 172.16.60.59 New No.1 ECDIS ON
4 172.16.60.65 New No.2 ECDIS ON
5 172.16.60.131 New No.1 CONN ON
6 172.16.60.156 New No.1 RPS ON
7 172.16.60.181 New No.1 PRINTER OFF
Applicable to " No.1 RPS"

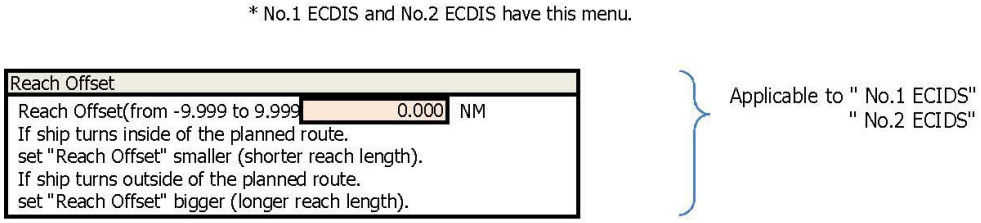
6.11.3.5 Redundancy

For setting procedure, please refer to 4.13 Redundancy Setting.



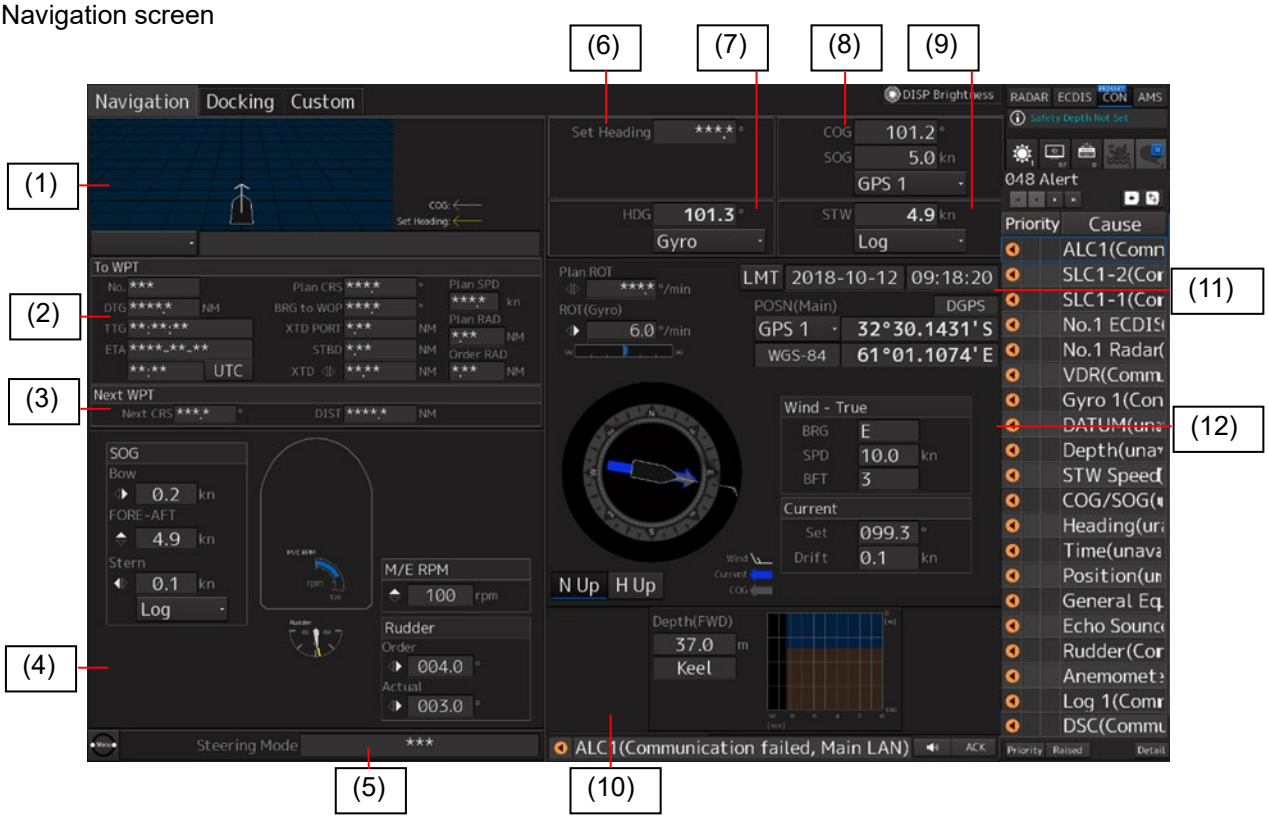
6.11.3.6 Autosail

For setting procedure, please refer to 4.19 Setting Autosail (Automatic Sailing System).



6.11.4 Conning information display – NAUT(AW)

Navigation screen



The items displayed in each block are as follows.

Category		Item	Block No
Control system data	Present system orders and set-values	Set heading	6
		Set turn radius	2
		Rudder angle order	4
		Set speed	2
		Present steering control mode	5
	Corresponding sensor data and actual values	Heading	7
		Turn rate	11
		Rudder angle	4
		Speed over ground	4
		Longitudinal	11
		Athwart ship	4
		Propeller revolutions	5
Voyage plan data	General	Identification (name) of selected route	1
	TO-waypoint	Number (name) of waypoint	2
		Planned course	2
		Planned turn radius	2
		Bearing to WOP	2
		Time to go to WOL	2
		Cross-track-limit	2
		Cross-track-distance, XTD	2
	NEXT-waypoint	Planned course	3
		Distance to WOP	3
Wind and current data		Wind vector	12
		Set and drift vector	12
		Present and preceding depth sounding(s)	10

Note
Navigation screen is different depending on the ship.

6.12 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-233 /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-233 /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-233 /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.
The trackball cannot be moved smoothly.	The trackball is dirty.	Clean the trackball.

Symptom	Cause	Action

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 task is displayed, but it cannot communicate with other devices.	There is no System Function defined for the task.	Define System Function for the task.
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 jumper setting of the serial LAN interface circuit (CMH-2370) is incorrect.	Check the jumper setting by referring to **3.7 Connection with Sensors**.
	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 jumper setting of the serial LAN interface circuit (CMH-2370) is incorrect.	Check the jumper setting by referring to **3.7 Connection with Sensors**.
	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 jumper setting of the serial LAN interface circuit (CMH-2370) is incorrect.	Check the jumper setting by referring to **3.7 Connection with Sensors**.
	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 jumper setting of the serial LAN interface circuit (CMH-2370) is incorrect.	Check the jumper setting by referring to **3.7 Connection with Sensors**.
	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 jumper setting of the serial LAN interface circuit (CMH-2370) is incorrect.	Check the jumper setting by referring to **3.7 Connection with Sensors**.
	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 jumper setting of the serial LAN interface circuit (CMH-2370) is incorrect.	Check the jumper setting by referring to **3.7 Connection with Sensors**.
	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 jumper setting of the serial LAN interface circuit (CMH-2370) is incorrect.	Check the jumper setting by referring to **3.7 Connection with Sensors**.
	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 jumper setting of the serial LAN interface circuit (CMH-2370) is incorrect.	Check the jumper setting by referring to **3.7 Connection with Sensors**.
	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 jumper setting of the serial LAN interface circuit (CMH-2370) is incorrect.	Check the jumper setting by referring to **3.7 Connection with Sensors**.
	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 jumper setting of the serial LAN interface circuit (CMH-2370) is incorrect.	Check the jumper setting by referring to **3.7 Connection with Sensors**.
	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 radar antenna is not recognized	The connection with the radar antenna is abnormal.	Check the connection with the radar antenna.
	Power is not supplied from the PSU to the radar antenna.	Check the power supply wiring between the PSU and the RIF. Check the power supply connection inside of the radar antenna. [Note] For checking wiring inside of the radar antenna, always request the work to the specialized service person. Before starting the work, turn off the power supply of the display unit. Otherwise, an unexpected accident may occur.
	Only AC power is supplied to the PSU. (NKE-2254 or NKE-2103 is connected as the radar antenna)	To connect the NKE-2254 or NKE-2103 radar antenna, 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 radar antenna 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 radar antenna.	The connection with the radar antenna is abnormal.	Check the connection with the radar antenna.
	The connection with the radar antenna is abnormal and overcurrent protection is functioning in the PSU.	Check the connection with the radar antenna and remove the cause of short-circuit.
	DC power is not supplied to the PSU. (NKE-2254 or NKE-2103 is connected as the radar antenna)	To connect the NKE-2254 or NKE-2103 radar antenna, DC power supply must be connected to the PSU.
	The DC24V output fuse is blown out. (NKE-2254 or NKE-2103 is connected as the radar antenna.)	After removing the cause of fuse blow-out, replace the fuse. 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 radar antenna is not displayed.	The connection with the radar antenna is abnormal.	Check the connection with the radar antenna.
	The safety switch of the radar antenna is set to OFF.	Set the safety switch of the radar antenna to ON. [Note] For operating the safety switch of the radar antenna, always request the work to the specialized service person. Before starting the work, turn off the power supply of the display unit. Otherwise, an unexpected accident may occur.
	A solid-state radar antenna is connected.	Preheat count-down is not displayed for a solid-state radar antenna.
	The radar antenna is faulty.	Make a request to the distributor for repair.
	The 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 radar antenna does not rotate even if the [Transmit] button is pressed.	The connection with the radar antenna is abnormal.	Check the connection with the radar antenna.
	The safety switch of the radar antenna is set to OFF.	Set the safety switch of the radar antenna to ON. [Note] For operating the safety switch of the radar antenna, always request the work to the specialized service person. Before starting the work, turn off the power supply of the display unit. Otherwise, an unexpected accident may occur.
	Power is not supplied from the PSU to the radar antenna.	Check the power supply wiring between the PSU and the RIF. Check the power supply connection inside of the radar antenna. [Note] For checking the wiring inside of the radar antenna, always request the work to the specialized service person. Before starting the work, turn off the power supply of the display unit. Otherwise, an unexpected accident may occur.
	The motor driver circuit inside of the radar antenna is not set correctly. (NKE-1632/A, NKE-2632/A, NKE-2632-H, or NKE-1696 is connected as the radar antenna.)	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 radar antenna 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 radar antenna does not rotate due to the protection function.
	The radar antenna 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.
If the power supply is turned off, the track data is cleared without being stored.	The central control unit (NDC-1590/A) is faulty.	Make a request to the distributor for repair.
No radar image is displayed.	The connection with the radar antenna is abnormal.	Check the connection with the radar antenna.
	The GAIN value is set to the minimum.	Set a proper value for GAIN.
	The SEA/RAIN value is set to the maximum.	Set a proper value for SEA/RAIN.
	The magnetron is deteriorated significantly. (Case where a radar antenna 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 radar antenna 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.

Symptom	Cause	Action
Radar images cannot be tuned	The magnetron is deteriorated significantly. (Case where a radar antenna 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 radar antenna is connected.	Tuning bar is not displayed for a solid-state radar antenna.
The azimuth of the radar image is not displayed correctly.	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.

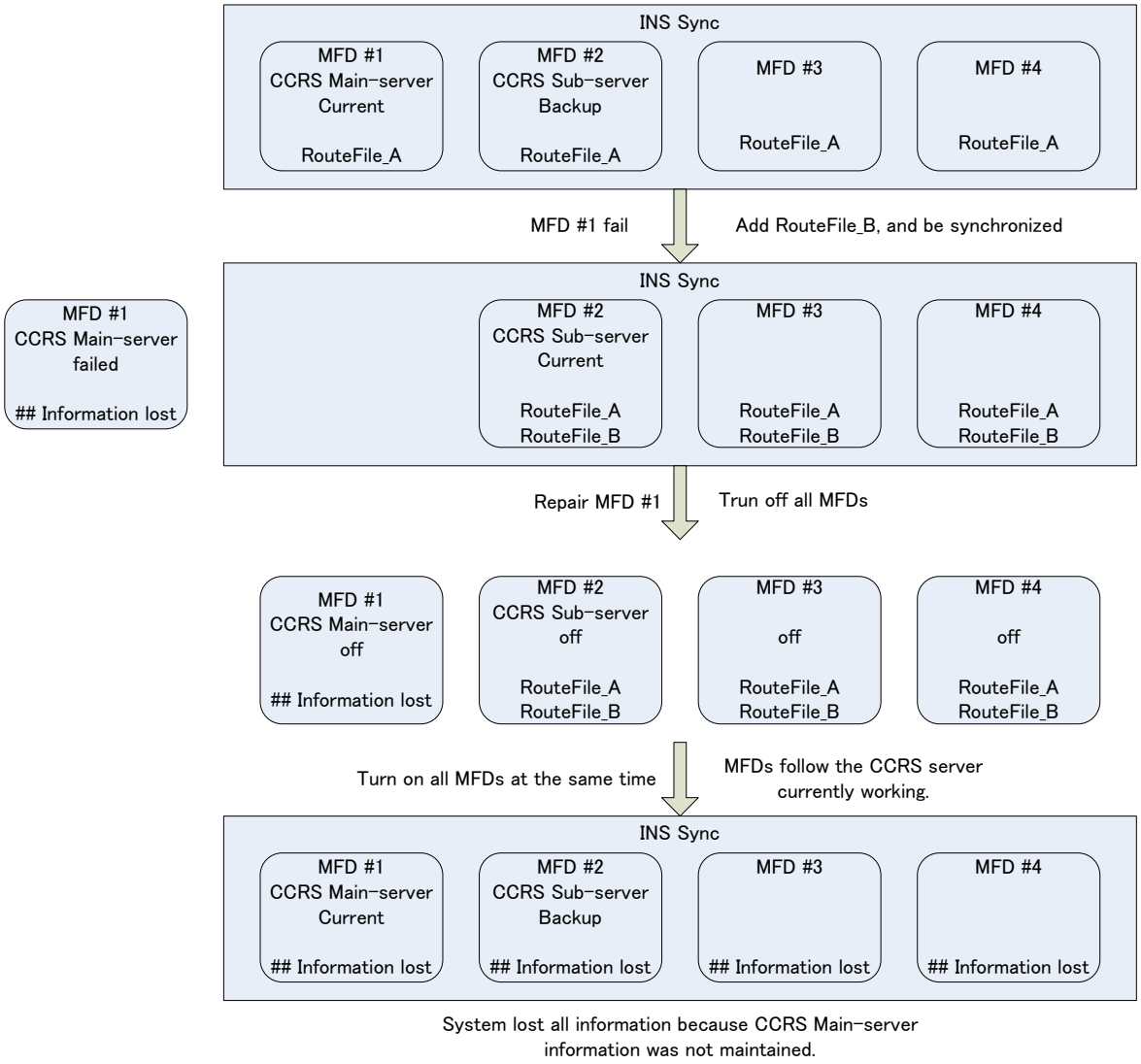
Symptom	Cause	Action
Radar images cannot be overlaid.	There is no optional license for radar overlay.	Make a request to the distributor for repair or additional order, and implement an optional license for radar overlay.
	The connection with the radar antenna is abnormal.	Check the connection with the radar antenna.
	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.

6.13 INS Bootup procedure after CCU/SSD Exchange

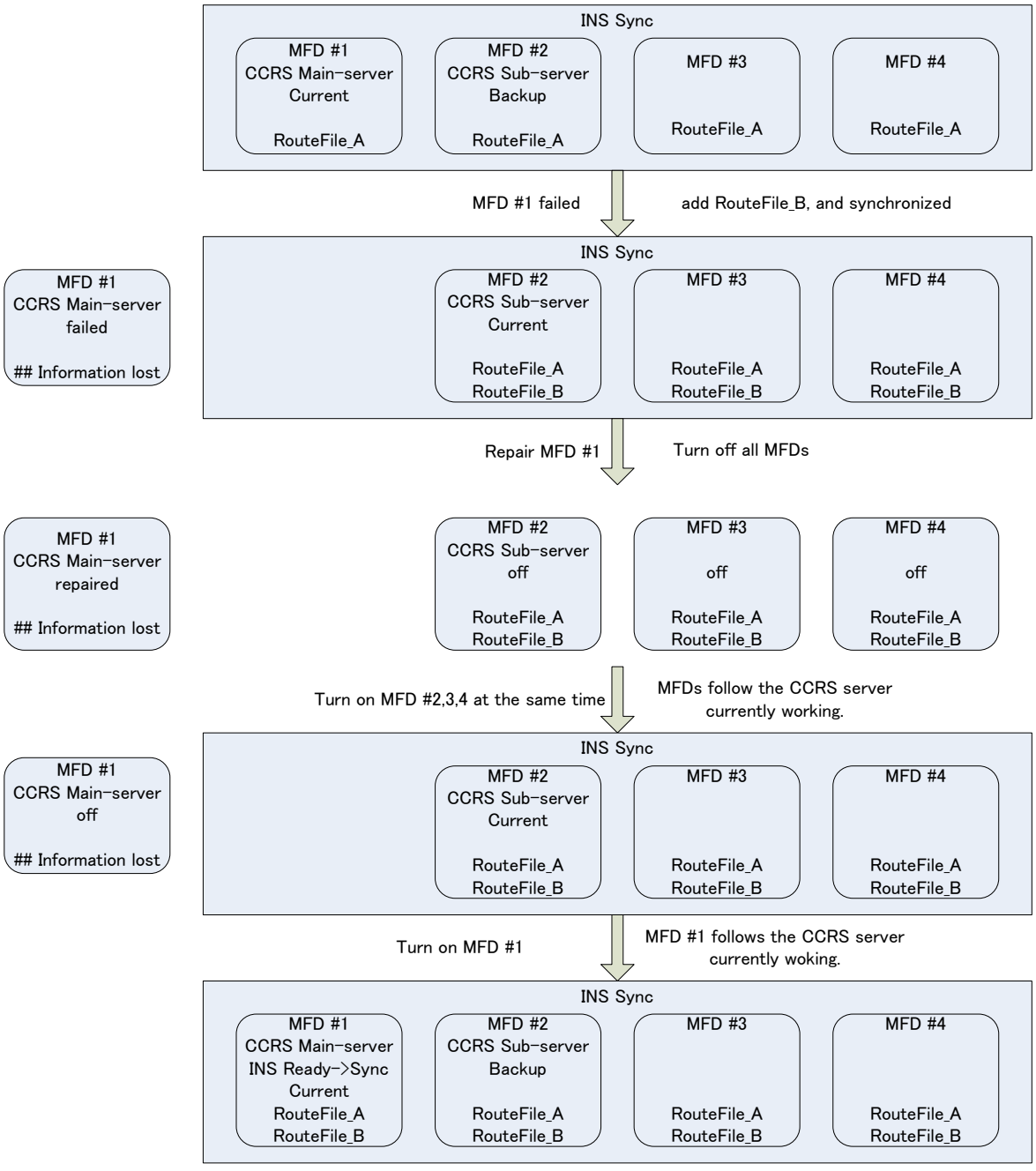
Beware that there is some risk losing information (INS synchronized items, settings an, route plan and others) with INS CCRS mechanism (synchronization) when the all MFDs including repaired MFDs are turned on at the same time. To prevent losing information, after making backup information, follow procedures below;

(1) Turn on all MFDs except for a repaired MFD,
(2) After INS linkage established in MFDs, then turns on the repaired MFD.

The information in the MFDs within INS linkage is synchronized the information stored in CCRS current working server MFD (normally CCRS main-server). The CCRS main-server MFD is repaired (for example, exchanging to initialized SSDs), namely the CCRS main server MFD loses all information for INS synchronization. If the all MFDs including repaired CCRS main-server MFD are turned on at the same time, then all MFD are synchronized the main-server, which means that the system lose the all information synchronized.



When CCRS main-server MFD failed, sub-server MFD takes over the control of INS linkage automatically. After repairing the main-server MFD, when the main-server starts synchronization, the main-server MFD retrieve all information from Sub-server, then the main-server MFD takes over the control again. The procedures above use this INS mechanism.



System preserve all information because CCRS Main-server MFD retrieves information from backup CCRS Sub-server at the state shift from INS Ready to Sync.

Therefore, the procedures that all MFDs except for the repaired MFD are turned on at the same time, and then the repired MFD is turned on and made INS linkage, prevent system information lost. Even through the repaired MFD is CCRS main-server, sub-server or client, the procedures retain the information in INS.

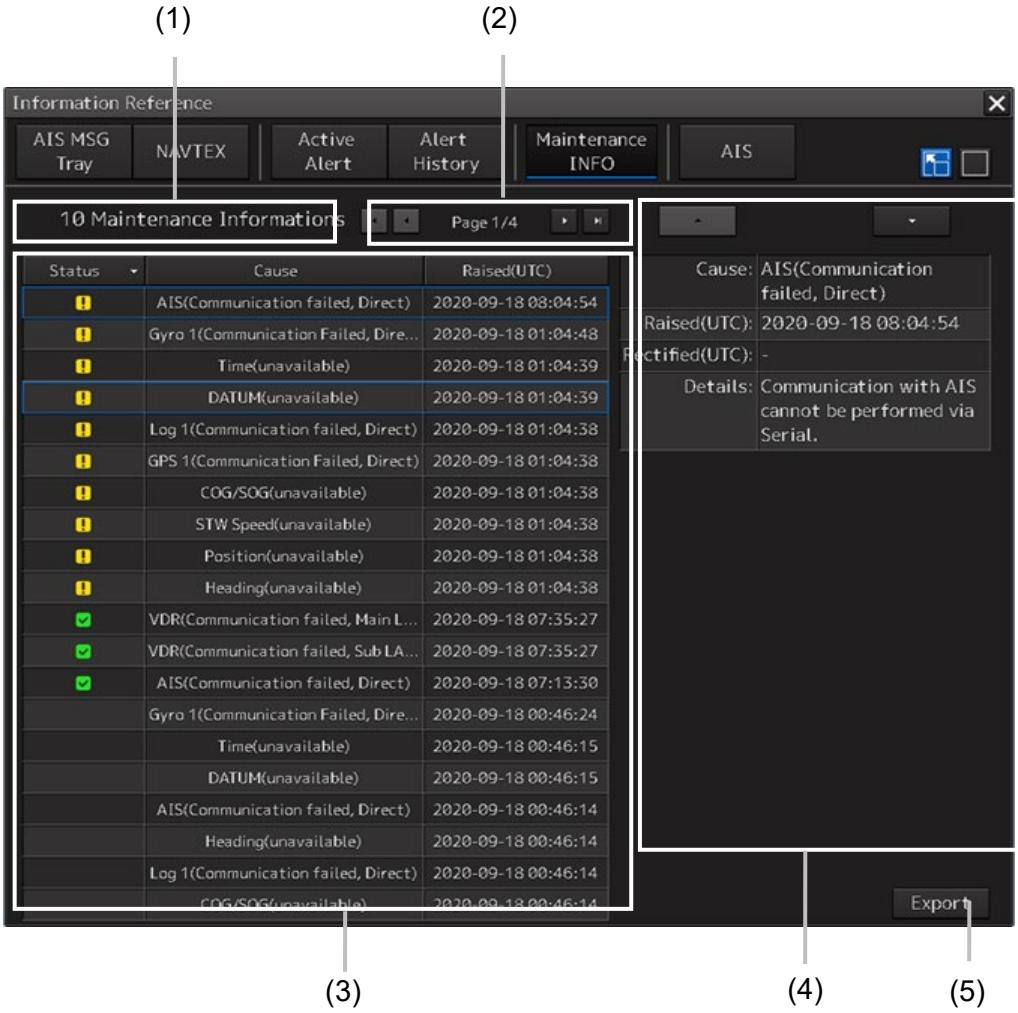
Note:
The information, settings and files, created in the outside of INS linkage is removed when the MFD starts INS linkage, because the MFD is synchronized the with INS current server information.

6.14 Maintenance INFO

6.14.1 Screen items/fields and their function

Maintenance INFO can be confirmed.

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



The screen can be switched to either the standard window or the expanded window.
An example of an expanded window is shown above.
For the screen switching method, refer to "6.14.2 Switching to the standard window or the expanded window."

(1) Number of pieces of maintenance information

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

(2) Active page information

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



(3) Maintenance information list

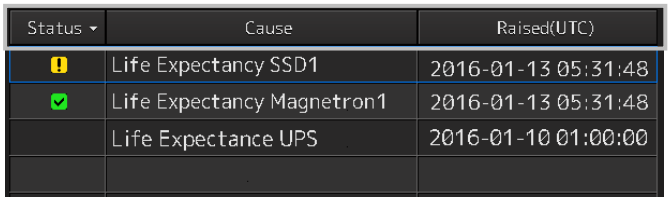
Maintenance information being generated is displayed. Clicking any information selects the information.

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

  : Generated

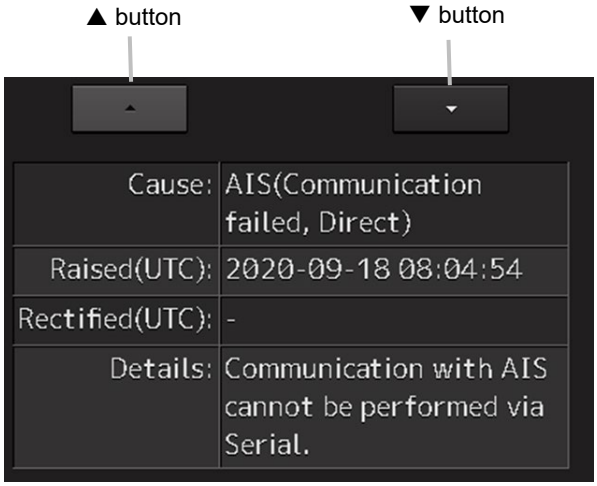
  : Resolved

  Blank: Maintenance information which had been generated before the MFD was restarted
- The [Cause] column shows the names of maintenance information.
- The [Raised(UTC)] column shows the generation time and date (UTC) of maintenance information.
- Clicking any item in the title line rearranges the list with reference to the clicked item.



(4) Detailed maintenance information

Details of the currently selected maintenance information are displayed.



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

[▲] button

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

[▼] button

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

(5) [Export] button

Use this button to export maintenance information.

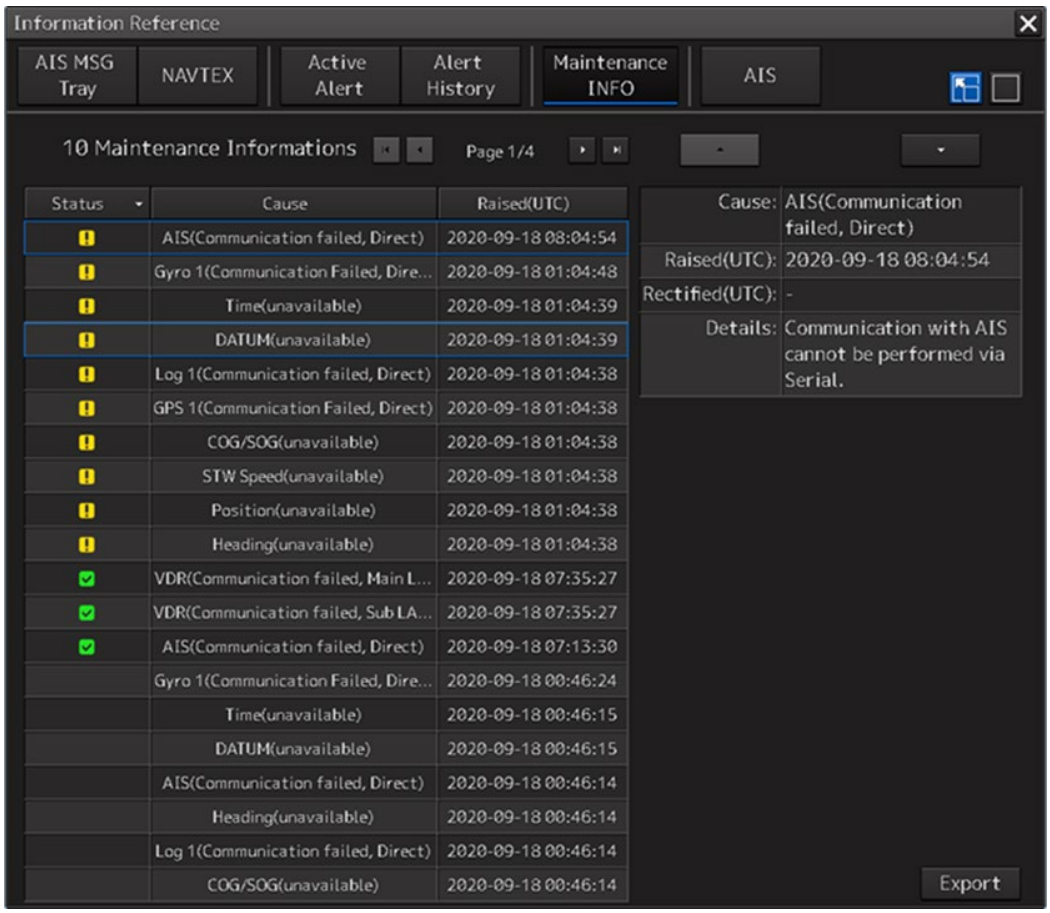
Refer to "6.14.3 Exporting maintenance information."

6.14.2 Switching to the standard window or the expanded window

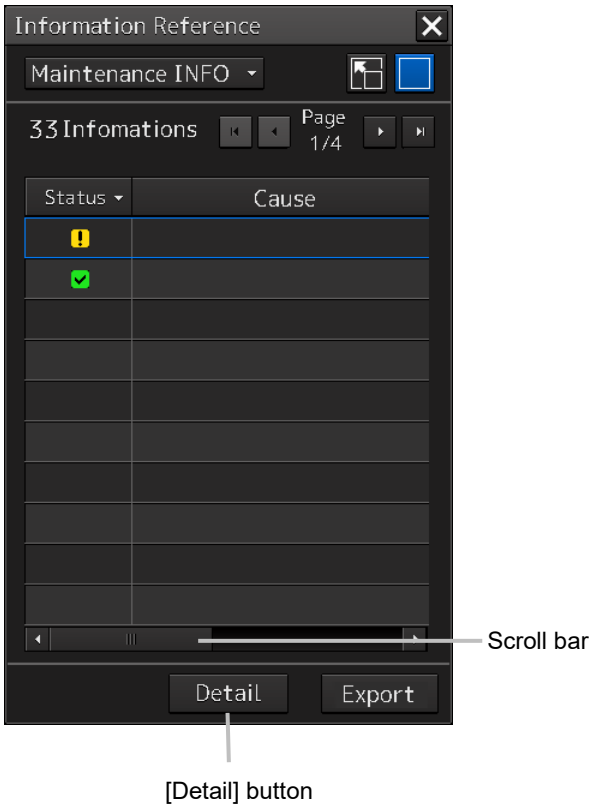
The Maintenance INFO screen can be switched to either the standard window or the expanded window.
To switch to the expanded window, click the list expansion button.
To switch to the standard window, click the list standard button.



[Example of expanded window]



[Example of standard window]



The standard window includes the list screen and the details screen.
To switch to the details screen, click the [Detail] button. Then, the [Detail] button turns into the [List] button.
To switch to the list screen, click the [List] button.

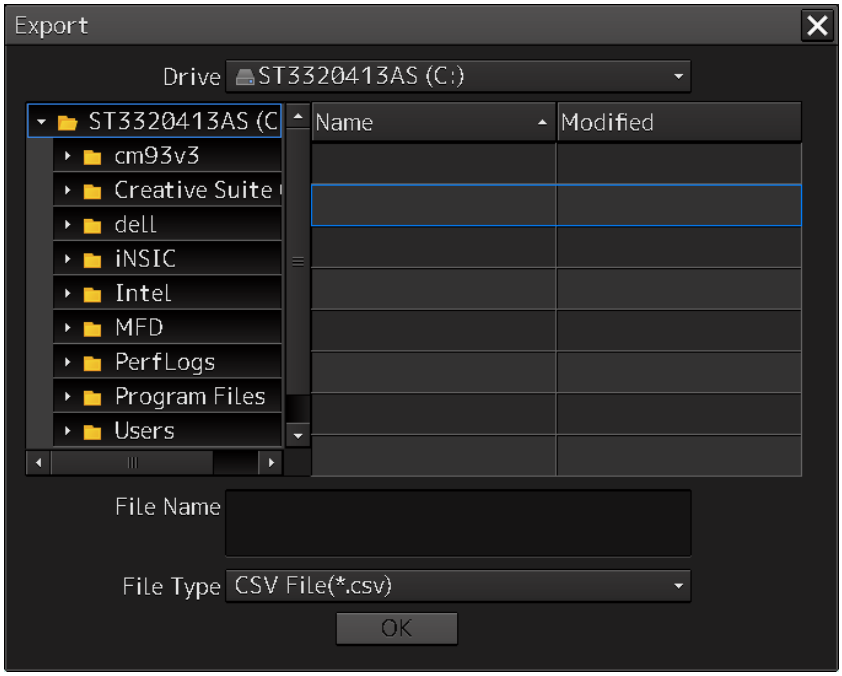
If the screen contents do not fit in the screen width, the scroll bar is displayed.
Dragging the scroll bar displays the contents not currently shown.

Memo
The initial display is shown in the expanded window.

6.14.3 Exporting maintenance information

Maintenance information can be exported as a CSV file to USB memory.
Information to be exported is that in the Cause, Raised(UTC), Rectified(UTC), and Detail fields.

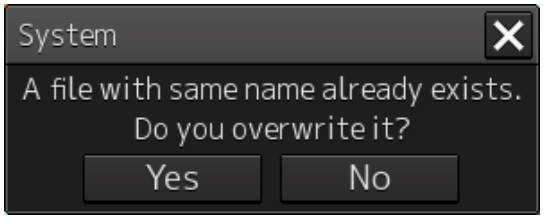
1 Click the [Export] button on the Maintenance INFO screen.
The "Export" dialog box will appear.



2 Specify the Drive (name of the drive for the USB memory) to which information is exported, Folder, and File Name.
Only [CSV File(*.csv)] can be selected for File Type.

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

If a file with the same name exists:
The following pop-up window will appear.



To cancel the export, click the [No] button.
To overwrite the existing file with the same file name, click the [Yes] button.

6.15 Alert List

Alert list for non-INS system

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
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

Task	Cause	Priority	Category	Alert ID	Instance	Alert Title
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
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

Task	Cause	Priority	Category	Alert ID	Instance	Alert Title
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
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

Task	Cause	Priority	Category	Alert ID	Instance	Alert Title
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
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
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

Task	Cause	Priority	Category	Alert ID	Instance	Alert Title
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
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	Communication Lost AP	C	B	3003	2	Lost AP COMM
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

Task	Cause	Priority	Category	Alert ID	Instance	Alert Title
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
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

Alert list for INS system

Task	Cause	Priority	Category	Alert ID	Instance	Alert Title
INS	Collision avoidance function lost	A	B	3007	10	Collision(Lost)
INS	Route monitoring function lost	A	B	3007	11	Route Monitor
INS	Integrity Check(Not Possible)	W	B	3012	2	Integrity check
INS	CCRS(Lost, Main Server)	C	B	3009	10	CCRS(Main)
INS	CCRS(Lost, Sub Server)	C	B	3009	11	CCRS(Sub)
TCS	Early Course Change	W	A	3038	2	ECCW
TCS	Early Course Change	A	A	3037	2	ECCA
TCS	Actual Course Change	W	A	3028	3	ACC
TCS	Wheel Over Line	A	A	3027	3	Wheel Over Line
TCS	End Of Track	W	A	3025	3	End Of Track
TCS	Arrived at LAST WPT	A	A	3024	3	Last WPT
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	POSN(Automatic Changed)	W	B	10156	1	CHG POSN Source
TCS	STW(Automatic Changed)	W	B	10156	2	CHG STW Source
TCS	Course Difference	W	A	3032	1	CRS Difference
TCS	Cross Track(Dev Ex)	A	A	3024	4	Cross Track
TCS	Low Speed	W	B	3065	1	Low Speed
TCS	POSN(Jump)	C	B	3033	4	POSN Jumped
TCS	Track Control Stopped	W	B	3008	4	TCS Stopped
TCS	Track Control Stopped	A	B	3007	4	TCS Stopped
TCS	Track Control Stopped (Reboot)	A	B	3007	3	TCS Stopped
TCS	Change Autopilot Steering Mode	W	B	10206	1	CHG AP Mode
TCS	Lost AP	C	B	3003	2	Lost AP
TCS	Lost JOYSTICK	C	B	3003	4	JOYSTICK Failure
ECDIS	Arrived at WPT	W	A	3038	4	Arrived at WPT
ECDIS	Arrived at WOL	W	A	3038	3	Arrived at WOL
ECDIS	Deviation From Route	A	A	3024	5	DEV From Route
ECDIS	Crossing Safety Contour	A	A	3031	2	Safety Contour
ECDIS	Alarm Area/Object	A	A	3034	0	Alarm Area
ECDIS	Warning Area/Object	W	A	3035	0	Warning Area
ECDIS	Caution Area/Object	C	B	3036	0	Caution Area
ECDIS	Alarm Symbol	A	A	3034	1	Alarm Symbol
ECDIS	Warning Symbol	W	A	3035	1	Warning Symbol
ECDIS	Caution Symbol	C	B	3036	1	Caution Symbol
ECDIS	Traffic Separation Zone	W	A	3035	2	Traffic Separate
ECDIS	Traffic Separation Zone	C	B	3036	2	Traffic Separate
ECDIS	Traffic Crossing	W	A	3035	3	Traffic Crossing
ECDIS	Traffic Crossing	C	B	3036	3	Traffic Crossing
ECDIS	Traffic Roundabout	W	A	3035	4	Roundabout
ECDIS	Traffic Roundabout	C	B	3036	4	Roundabout
ECDIS	Traffic Precautionary	W	A	3035	5	Traffic Caution
ECDIS	Traffic Precautionary	C	B	3036	5	Traffic Caution
ECDIS	Two Way Traffic	W	A	3035	6	Two Way Traffic
ECDIS	Two Way Traffic	C	B	3036	6	Two Way Traffic
ECDIS	Deeper Water Route	W	A	3035	7	Deeper Water
ECDIS	Deeper Water Route	C	B	3036	7	Deeper Water
ECDIS	Recommended Traffic Lane	W	A	3035	8	Recommended Lane
ECDIS	Recommended Traffic Lane	C	B	3036	8	Recommended Lane
ECDIS	Inshore Traffic Zone	W	A	3035	9	Inshore Traffic
ECDIS	Inshore Traffic Zone	C	B	3036	9	Inshore Traffic
ECDIS	Fairway	W	A	3035	10	Fairway

Task	Cause	Priority	Category	Alert ID	Instance	Alert Title
ECDIS	Fairway	C	B	3036	10	Fairway
ECDIS	Restricted Area	W	A	3035	11	Restricted Area
ECDIS	Restricted Area	C	B	3036	11	Restricted Area
ECDIS	Caution Area	W	A	3035	12	Caution Area
ECDIS	Caution Area	C	B	3036	12	Caution Area
ECDIS	Offshore Production Area	W	A	3035	13	Production Area
ECDIS	Offshore Production Area	C	B	3036	13	Production Area
ECDIS	Military Practice Area	W	A	3035	14	Military Area
ECDIS	Military Practice Area	C	B	3036	14	Military Area
ECDIS	Seaplane Landing Area	W	A	3035	15	Seaplane Area
ECDIS	Seaplane Landing Area	C	B	3036	15	Seaplane Area
ECDIS	Submarine Transit Area	W	A	3035	16	Submarine Area
ECDIS	Submarine Transit Area	C	B	3036	16	Submarine Area
ECDIS	Canal	W	A	3035	18	Canal
ECDIS	Canal	C	B	3036	18	Canal
ECDIS	Fishing Ground	W	A	3035	19	Fishing Ground
ECDIS	Fishing Ground	C	B	3036	19	Fishing Ground
ECDIS	Fishing Prohibited	W	A	3035	20	Fishing Prohibit
ECDIS	Fishing Prohibited	C	B	3036	20	Fishing Prohibit
ECDIS	Pipeline Area	W	A	3035	21	Pipeline Area
ECDIS	Pipeline Area	C	B	3036	21	Pipeline Area
ECDIS	Cable Area	W	A	3035	22	Cable Area
ECDIS	Cable Area	C	B	3036	22	Cable Area
ECDIS	Anchorage Area	W	A	3035	23	Anchoragre Area
ECDIS	Anchorage Area	C	B	3036	23	Anchoragre Area
ECDIS	Anchorage Prohibited	W	A	3035	24	Anchor Prohibit
ECDIS	Anchorage Prohibited	C	B	3036	24	Anchor Prohibit
ECDIS	Spoil Ground	W	A	3035	25	Spoil Ground
ECDIS	Spoil Ground	C	B	3036	25	Spoil Ground
ECDIS	Dumping Ground	W	A	3035	26	Dumping Ground
ECDIS	Dumping Ground	C	B	3036	26	Dumping Ground
ECDIS	Cargo Transshipment Area	W	A	3035	28	Cargo Transship
ECDIS	Cargo Transshipment Area	C	B	3036	28	Cargo Transship
ECDIS	Incineration Area	W	A	3035	29	Incineration
ECDIS	Incineration Area	C	B	3036	29	Incineration
ECDIS	Specially Protected Area	W	A	3035	30	Protected Area
ECDIS	Specially Protected Area	C	B	3036	30	Protected Area
ECDIS	Sensitive Sea Area	W	A	3035	31	Sensitive Sea
ECDIS	Sensitive Sea Area	C	B	3036	31	Sensitive Sea
ECDIS	Archipelagic Sea Lane	W	A	3035	32	Archipelagic Sea
ECDIS	Archipelagic Sea Lane	C	B	3036	32	Archipelagic Sea
ECDIS	Marine Farm/Aquaculture	W	A	3035	33	Marine Farm
ECDIS	Marine Farm/Aquaculture	C	B	3036	33	Marine Farm
ECDIS	Obstruction	W	A	3035	35	Obstruction
ECDIS	Under Rater Rock	W	A	3035	36	Under Water Rock
ECDIS	Wreck	W	A	3035	37	Wreck
ECDIS	Buoy/Light	W	A	3035	38	Buoy/Light
ECDIS	Dangerous Symbol	W	A	3035	39	Dangerous Symbol
ECDIS	Spot Sounding	C	B	3036	40	Spot Sounding
ECDIS	AtoN	C	B	3036	41	AtoN
ECDIS	Vertical Clearance	C	B	3036	42	Clearance
ECDIS	To Be Avoided	C	B	3036	43	To Be Avoided
ECDIS	Outside Anchor Watch Area	W	A	3032	3	Outside of ANCH
ECDIS	Outside Anchor Watch Area	A	A	3031	3	Outside of ANCH
ECDIS	Out of Bounds	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

Task	Cause	Priority	Category	Alert ID	Instance	Alert Title
ECDIS	POSN(NON-WGS84)	W	B	3005	100	NON-WGS84
ECDIS	Selected Fix View	C	B	10356	1	Select Fix View
ECDIS	Chart license will expire soon(SSE 20)	C	B	10359	1	Chart License
ECDIS	ARCS Security Failed	W	B	10360	1	ARCS Security
ECDIS	Lost POSN	W	B	3015	2	Lost POSN
ECDIS	Lost HDG	W	B	3015	5	Lost HDG
ECDIS	Lost COG/SOG	W	B	3015	11	Lost COG/SOG
ECDIS	Lost AIS IF	C	B	3003	1	Lost AIS IF
ECDIS	Lost EXT TT1	C	B	3016	13	Lost EXT TT1
ECDIS	Lost EXT TT2	C	B	3016	14	Lost EXT TT2
RADAR	AIS 95% Capacity	C	B	3043	1	AIS 95% Capacity
RADAR	AIS Maximum Capacity	W	A	3042	2	AIS MAX Capacity
RADAR	AIS ACT 95% Capacity	C	B	3043	3	AIS ACT 95%
RADAR	New AIS Target	W	A	3048	1	New AIS Target
RADAR	CPA/TCPA(AIS)	A	A	3044	1	CPA/TCPA(AIS)
RADAR	Lost AIS Target	W	A	3052	1	Lost AIS Target
RADAR(SCG)	TT 95% Capacity	C	B	3043	4	TT 95% Capacity
RADAR(SCG)	TT Maximum Capacity	W	A	3042	5	TT MAX Capacity
RADAR(SCG)	New TT Target	W	A	3048	2	New TT Target
RADAR(SCG)	CPA/TCPA(TT)	A	A	3044	2	CPA/TCPA(TT)
RADAR(SCG)	Lost TT Target	W	A	3052	2	Lost TT Target
RADAR	Lost Reference Target	W	A	3052	3	Lost REF Target
RADAR(SCG)	TT Out Of Range	W	A	3052	4	TT Out of Range
RADAR	POSN(NON-WGS84)	C	B	3006	100	NON-WGS84
RADAR	Out of Bounds	W	A	3065	3	Over 83 Degrees
RADAR(SCG)	Antenna Rotating	C	B	10469	1	ANT Rotating
RADAR(SCG)	Antenna Safety Switch Off	W	B	10600	1	ANT Safety OFF
RADAR(SCG)	Antenna Reverse Rotation	W	B	10601	1	ANT Reverse Rot.
RADAR(SCG)	Antenna Failure	W	B	3062	2	ANT Failure
RADAR	Lost POSN	W	B	3015	1	Lost POSN
RADAR	Lost HDG	W	B	3015	4	Lost HDG
RADAR	Lost STW	W	B	3015	7	Lost STW
RADAR	Lost COG/SOG	W	B	3015	10	Lost COG/SOG
RADAR	Lost AIS IF	W	B	3002	1	Lost AIS IF
RADAR	Lost RADAR Function	W	B	3015	15	Lost RADAR
RADAR	Lost Antenna Control	W	B	3002	3	Lost ANT CTRL
RADAR	Trial	C	B	10475	1	Trial
CAM	AIS(Alert Communication Lost)	C	B	3003	47	Lost AIS
CAM	AIS(Invalid Alert Data)	C	B	3006	47	Invalid AIS
CAM	Autopilot(Alert Communication Lost)	C	B	3003	30	Lost AP
CAM	Autopilot(Invalid Alert Data)	C	B	3006	30	Invalid AP
CAM	BNWAS(Alert Communication Lost)	C	B	3003	50	Lost BNWAS
CAM	BNWAS(Invalid Alert Data)	C	B	3006	50	Invalid BNWAS
CAM	DSC(Alert Communication Lost)	C	B	3003	49	Lost DSC
CAM	DSC(Invalid Alert Data)	C	B	3006	49	Invalid DSC
CAM	Echo Sounder 1(Alert Communication Lost)	C	B	3003	43	Lost ES1
CAM	Echo Sounder 1(Invalid Alert Data)	C	B	3006	43	Invalid ES1
CAM	Echo Sounder 2(Alert Communication Lost)	C	B	3003	44	Lost ES2
CAM	Echo Sounder 2(Invalid Alert Data)	C	B	3006	44	Invalid ES2
CAM	General Equipment1(Alert Communication Lost)	C	B	3003	53	Lost AUX1
CAM	General Equipment1(Invalid Alert Data)	C	B	3006	53	Invalid AUX1
CAM	General Equipment10(Alert Communication Lost)	C	B	3003	62	Lost AUX10
CAM	General Equipment10(Invalid Alert Data)	C	B	3006	62	Invalid AUX10
CAM	General Equipment2(Alert Communication Lost)	C	B	3003	54	Lost AUX2
CAM	General Equipment2(Invalid Alert Data)	C	B	3006	54	Invalid AUX2

Task	Cause	Priority	Category	Alert ID	Instance	Alert Title
CAM	General Equipment3(Alert Communication Lost)	C	B	3003	55	Lost AUX3
CAM	General Equipment3(Invalid Alert Data)	C	B	3006	55	Invalid AUX3
CAM	General Equipment4(Alert Communication Lost)	C	B	3003	56	Lost AUX4
CAM	General Equipment4(Invalid Alert Data)	C	B	3006	56	Invalid AUX4
CAM	General Equipment5(Alert Communication Lost)	C	B	3003	57	Lost AUX5
CAM	General Equipment5(Invalid Alert Data)	C	B	3006	57	Invalid AUX5
CAM	General Equipment6(Alert Communication Lost)	C	B	3003	58	Lost AUX6
CAM	General Equipment6(Invalid Alert Data)	C	B	3006	58	Invalid AUX6
CAM	General Equipment7(Alert Communication Lost)	C	B	3003	59	Lost AUX7
CAM	General Equipment7(Invalid Alert Data)	C	B	3006	59	Invalid AUX7
CAM	General Equipment8(Alert Communication Lost)	C	B	3003	60	Lost AUX8
CAM	General Equipment8(Invalid Alert Data)	C	B	3006	60	Invalid AUX8
CAM	General Equipment9(Alert Communication Lost)	C	B	3003	61	Lost AUX9
CAM	General Equipment9(Invalid Alert Data)	C	B	3006	61	Invalid AUX9
CAM	GPS 1(Alert Communication Lost)	C	B	3003	38	Lost GPS1
CAM	GPS 1(Invalid Alert Data)	C	B	3006	38	Invaid GPS1
CAM	GPS 2(Alert Communication Lost)	C	B	3003	39	Lost GPS2
CAM	GPS 2(Invalid Alert Data)	C	B	3006	39	Invalid GPS2
CAM	GPS 3(Alert Communication Lost)	C	B	3003	40	Lost GPS3
CAM	GPS 3(Invalid Alert Data)	C	B	3006	40	Invalid GPS3
CAM	GPS 4(Alert Communication Lost)	C	B	3003	42	Lost GPS4
CAM	GPS 4(Invalid Alert Data)	C	B	3006	42	Invalid GPS4
CAM	GPS Compass 1(Alert Communication Lost)	C	B	3003	36	Lost SAT-HDG1
CAM	GPS Compass 1(Invalid Alert Data)	C	B	3006	36	Invalid SAT-HDG1
CAM	GPS Compass 2(Alert Communication Lost)	C	B	3003	37	Lost SAT-HDG2
CAM	GPS Compass 2(Invalid Alert Data)	C	B	3006	37	Invalid SAT-HDG2
CAM	Gyro 1(Alert Communication Lost)	C	B	3003	31	Lost GYRO1
CAM	Gyro 1(Invalid Alert Data)	C	B	3006	31	Invalid GYRO1
CAM	Gyro 2(Alert Communication Lost)	C	B	3003	32	Lost GYRO2
CAM	Gyro 2(Invalid Alert Data)	C	B	3006	32	Invaid GYRO2
CAM	Gyro(Alert Communication Lost)	C	B	3003	33	Lost GYRO
CAM	Gyro(Invalid Alert Data)	C	B	3006	33	Invalid GYRO1
CAM	IAS(Alert Communication Lost)	C	B	3003	52	Lost IAS
CAM	IAS(Invalid Alert Data)	C	B	3006	52	Invalid IAS
CAM	Log 1(Alert Communication Lost)	C	B	3003	45	Lost LOG1
CAM	Log 1(Invalid Alert Data)	C	B	3006	45	Invalid LOG1
CAM	Log 2(Alert Communication Lost)	C	B	3003	46	Lost LOG2
CAM	Log 2(Invalid Alert Data)	C	B	3006	46	Invalid LOG2
CAM	Magnetic Compass 1(Alert Communication Lost)	C	B	3003	34	Lost MAG-HDG1
CAM	Magnetic Compass 1(Invalid Alert Data)	C	B	3006	34	Invalid MAG-HDG1
CAM	Magnetic Compass 2(Alert Communication Lost)	C	B	3003	35	Lost MAG-HDG2
CAM	Magnetic Compass 2(Invalid Alert Data)	C	B	3006	35	Invalid MAG-HDG2
CAM	NAVTEX(Alert Communication Lost)	C	B	3003	48	Lost NAVTEX
CAM	NAVTEX(Invalid Alert Data)	C	B	3006	48	Invalid NAVTEX
CAM	No.1 ECDIS(Alert Communication Lost)	C	B	3003	18	Lost ECDIS1
CAM	No.1 ECDIS(Invalid Alert Data)	C	B	3006	18	Invalid ECDIS1
CAM	No.2 ECDIS(Alert Communication Lost)	C	B	3003	19	Lost ECDIS2
CAM	No.2 ECDIS(Invalid Alert Data)	C	B	3006	19	Invaid ECDIS2
CAM	No.3 ECDIS(Alert Communication Lost)	C	B	3003	20	Lost ECDIS3
CAM	No.3 ECDIS(Invalid Alert Data)	C	B	3006	20	Invalid ECDIS3
CAM	No.4 ECDIS(Alert Communication Lost)	C	B	3003	21	Lost ECDIS4

Task	Cause	Priority	Category	Alert ID	Instance	Alert Title
CAM	No.4 ECDIS(Invalid Alert Data)	C	B	3006	21	Invaid ECDIS4
CAM	No.1 Radar(Alert Communication Lost)	C	B	3003	10	Lost RADAR1
CAM	No.1 Radar(Invalid Alert Data)	C	B	3006	10	Invalid RADAR1
CAM	No.2 Radar(Alert Communication Lost)	C	B	3003	11	Lost RADAR2
CAM	No.2 Radar(Invalid Alert Data)	C	B	3006	11	Invalid RADAR2
CAM	No.3 Radar(Alert Communication Lost)	C	B	3003	12	Lost RADAR3
CAM	No.3 Radar(Invalid Alert Data)	C	B	3006	12	Invalid RADAR3
CAM	No.4 Radar(Alert Communication Lost)	C	B	3003	13	Lost RADAR4
CAM	No.4 Radar(Invalid Alert Data)	C	B	3006	13	Invalid RADAR4
CAM	No.5 Radar(Alert Communication Lost)	C	B	3003	14	Lost RADAR5
CAM	No.5 Radar(Invalid Alert Data)	C	B	3006	14	Invalid RADAR5
CAM	No.6 Radar(Alert Communication Lost)	C	B	3003	15	Lost RADAR6
CAM	No.6 Radar(Invalid Alert Data)	C	B	3006	15	Invalid RADAR6
CAM	No.7 Radar(Alert Communication Lost)	C	B	3003	16	Lost RADAR7
CAM	No.7 Radar(Invalid Alert Data)	C	B	3006	16	Invalid RADAR7
CAM	No.8 Radar(Alert Communication Lost)	C	B	3003	17	Lost RADAR8
CAM	No.8 Radar(Invalid Alert Data)	C	B	3006	17	Invalid RADAR8
CAM	No.1 Conning(Alert Communication Lost)	C	B	3003	22	Lost CID1
CAM	No.1 Conning(Invalid Alert Data)	C	B	3006	22	Invalid CID1
CAM	No.2 Conning(Alert Communication Lost)	C	B	3003	23	Lost CID2
CAM	No.2 Conning(Invalid Alert Data)	C	B	3006	23	Invalid CID2
CAM	No.1 Remote-Conning(Alert Communication Lost)	C	B	3003	26	Lost RCID1
CAM	No.1 Remote-Conning(Invalid Alert Data)	C	B	3006	26	Invalid RCID1
CAM	No.2 Remote-Conning(Alert Communication Lost)	C	B	3003	27	Lost RCID2
CAM	No.2 Remote-Conning(Invalid Alert Data)	C	B	3006	27	Invalid RCID2
CAM	No.1 Wing-Conning(Alert Communication Lost)	C	B	3003	24	Lost WCID1
CAM	No.1 Wing-Conning(Invalid Alert Data)	C	B	3006	24	Invalid WCID1
CAM	No.2 Wing-Conning(Alert Communication Lost)	C	B	3003	25	Lost WCID2
CAM	No.2 Wing-Conning(Invalid Alert Data)	C	B	3006	25	Invalid WCID2
CAM	No.1 RPS(Alert Communication Lost)	C	B	3003	28	Lost RPS1
CAM	No.1 RPS(Invalid Alert Data)	C	B	3006	28	Invalid RPS1
CAM	No.2 RPS(Alert Communication Lost)	C	B	3003	29	Lost RPS2
CAM	No.2 RPS(Invalid Alert Data)	C	B	3006	29	Invalid RPS2
CAM	VDR(Alert Communication Lost)	C	B	3003	51	Lost VDR
CAM	VDR(Invalid Alert Data)	C	B	3006	51	Invalid VDR
COMMON	CCRS function lost	A	B	3007	12	CCRS(Lost)
COMMON	HUB(Lost, Main LAN)	C	B	3063	1	HUB(Main)
COMMON	HUB(Lost, Sub LAN)	C	B	3063	2	HUB(Sub)
COMMON	Delivery Failed To VDR	W	B	3002	100	Delivery to VDR
COMMON	System Failure	W	B	3062	1	System Failure
COMMON	AC Power Failure	W	B	3022	1	AC Low Voltage
COMMON	DC Power Failure	C	B	3023	2	DC Low Voltage
COMMON	Test alert	W	B	999	1	Test alert

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