8.4.4 Replacement of LCD Monitor

Replacement of LCD monitor must be made by specialized service personnel.

For details, refer to Service Manual.

8.4.4.1 Display Unit NCD-4990

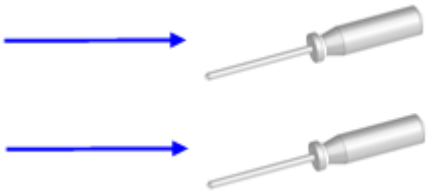
CAUTION
Do not touch the LCD screen directly with your fingers.

CAUTION
Do not touch the AR filter directly with your fingers.

CAUTION
Perform the replacement work on a soft cloth to avoid damage to the LCD screen and other parts.

[Required tools]

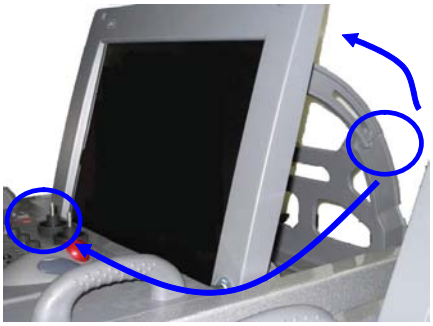
- A Phillips screwdriver for 4 mm screws
- A Phillips screwdriver for 6 mm screws



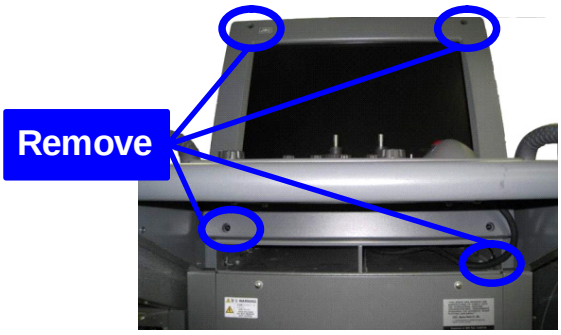
[Disassembly]

1) *Remove the tilt fixing handle (standalone type only).*

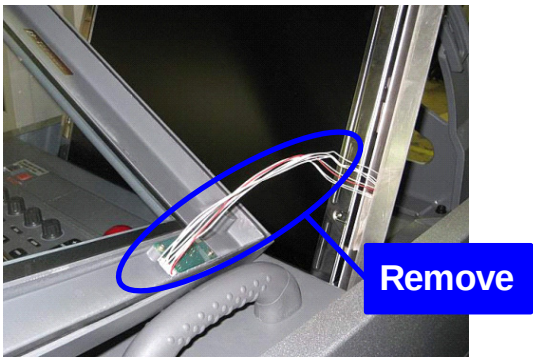
2) *Tilt up the screen as much as you can (standalone type only).*



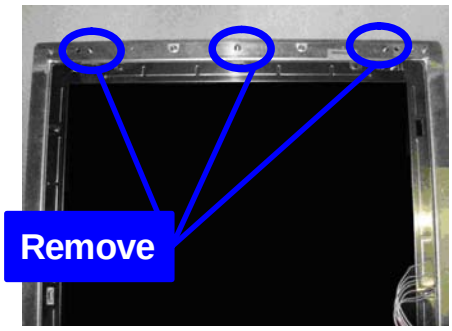
3) *Remove the screws (M6) from the four corners and displace the face cover.*

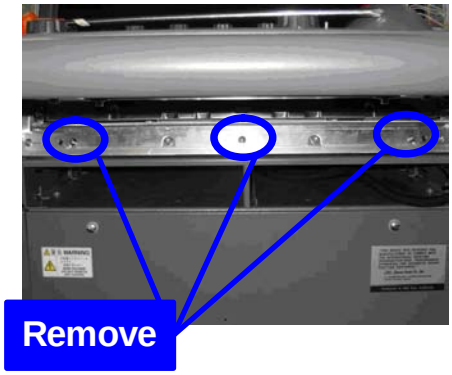


4) *LRemove the LCD operation circuit cables and remove the face cover.*



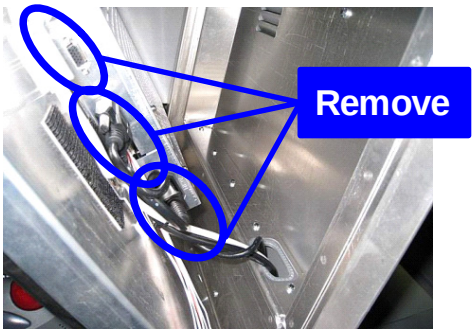
5) *Remove six M4 screws.*





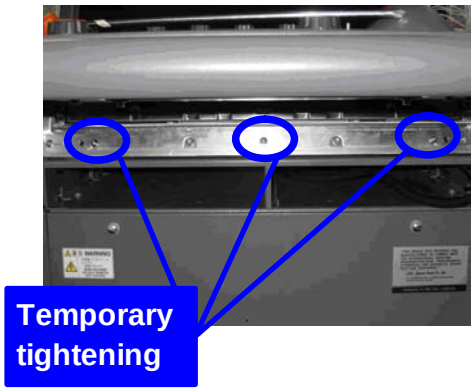
6) *Displace the module and remove the three cables.*

7) *Remove the LCD module.*



[Assembly]

1) *Tighten the lower three M4 screws halfway.*



2) *Connect the cables to the LCD module.*

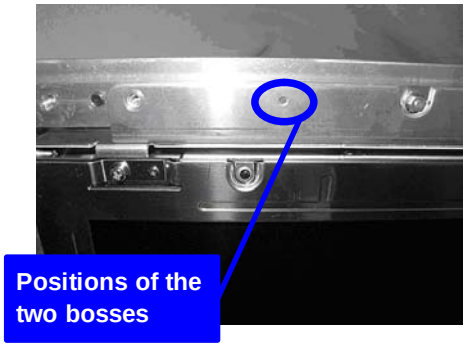
3) *Align the module to the lower three screws and insert it downward.*

4) *Check the positions of the two bosses and ensure that appropriate space is maintained under the LCD module. Tighten the six screws evenly.*

5) *Connect the LCD operation circuit cables and attach the face cover.*

6) *Tighten the screws at the four corners.*

7) *Attach the tilt fixing handle.*



[Operation Check]

1) *After completing the replacement procedures, start the system to make sure that images are displayed properly.*

2) *Turn the brightness knob to make sure the brightness can be changed between the minimum and the maximum levels.*

8.4.5 Replacement of Backup Battery

Replacement of backup battery must be made by specialized service personnel.

For details, refer to Service Manual.

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

8.4.5.1 About the Battery Alarm

If Battery Low is appeared at the lower-right of the display when start up the radar system, the battery has not enough time left to live. We recommend to replace the battery.

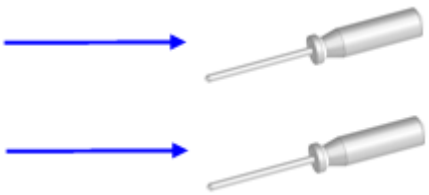
If Battery Dead is appeared at the lower-right of the display when start up the radar system, the battery has no time left to live. There is a necessary to replace the battery. In This condition, this radar system is restored configuration information from flash memory and normal operation is available. However, you turned of the radar system before saving to flash memory, the configuration information is maybe lost. In this case, you must setup the configuration again.

About disposal of used battery, refer to Section 10.2.

8.4.5.2 How to Replacement of Backup Battery

[Required tools]

- A flat tip screwdriver for 6 mm screws
- A Phillips screwdriver for 4 mm screws
- A flat tip nonconductive screwdriver for 3 mm screws



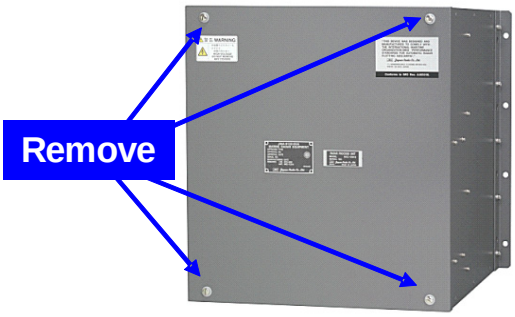
[Disassembly]

1) *Remove the four fixing screws to remove the cover from the display unit (NCD-4990).*

(A flat tip screwdriver for 6 mm screws)

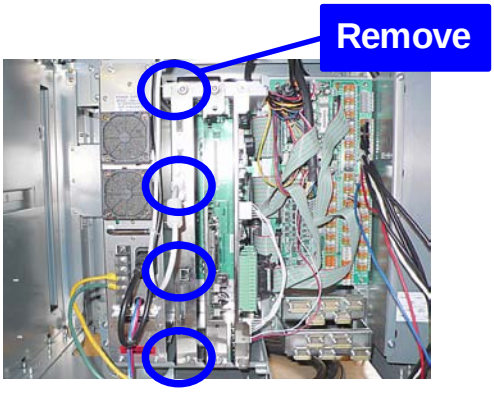
For standalone type NCD-4990

For tabletop type: NDC-1399-9



2) *Remove the cable connected to the radar processing circuit board.*

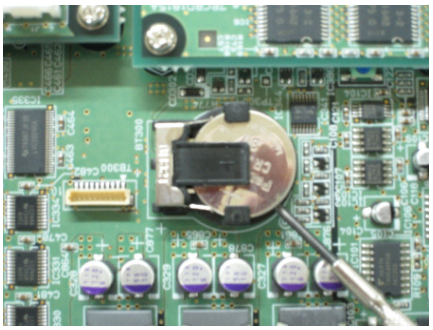
The radar processing circuit is the first board from the left.



3) *Remove the two fixing screws (M4).*

4) *Pull out the board to the front.*

5) *Insert the flat tip* ***nonconductive*** *screwdriver for adjustment or some stick between the battery and the battery holder and lift the battery up.*



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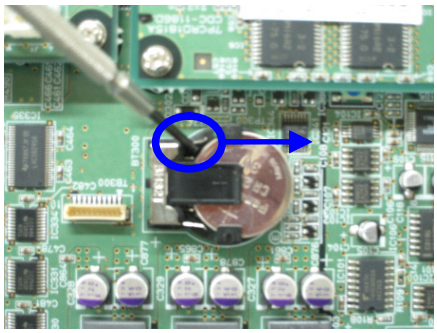
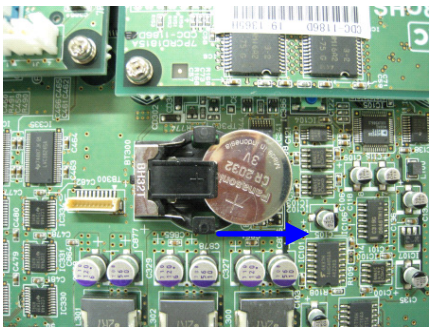
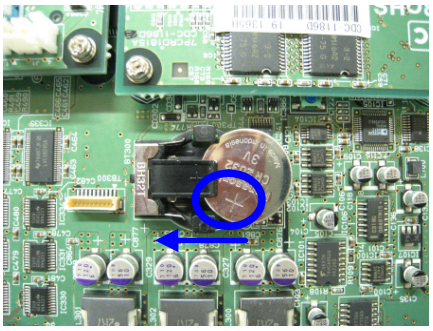
6) *Insert the flat tip* ***nonconductive*** *sscrewdriver for adjustment or some stick to the location shown in the figure below and slide the battery sideways to remove the battery.*





[Assembly]



1) *Check the polarity of the battery. Make sure that the battery's positive (+) side is facing up.*
2) *Slide the battery sideways into the battery holder.*
3) *Make sure that the battery is inserted fully.*

[Check Item]

1) *Check that no error message comes up.*
2) *Check that the system starts up normally.*

[Notes]

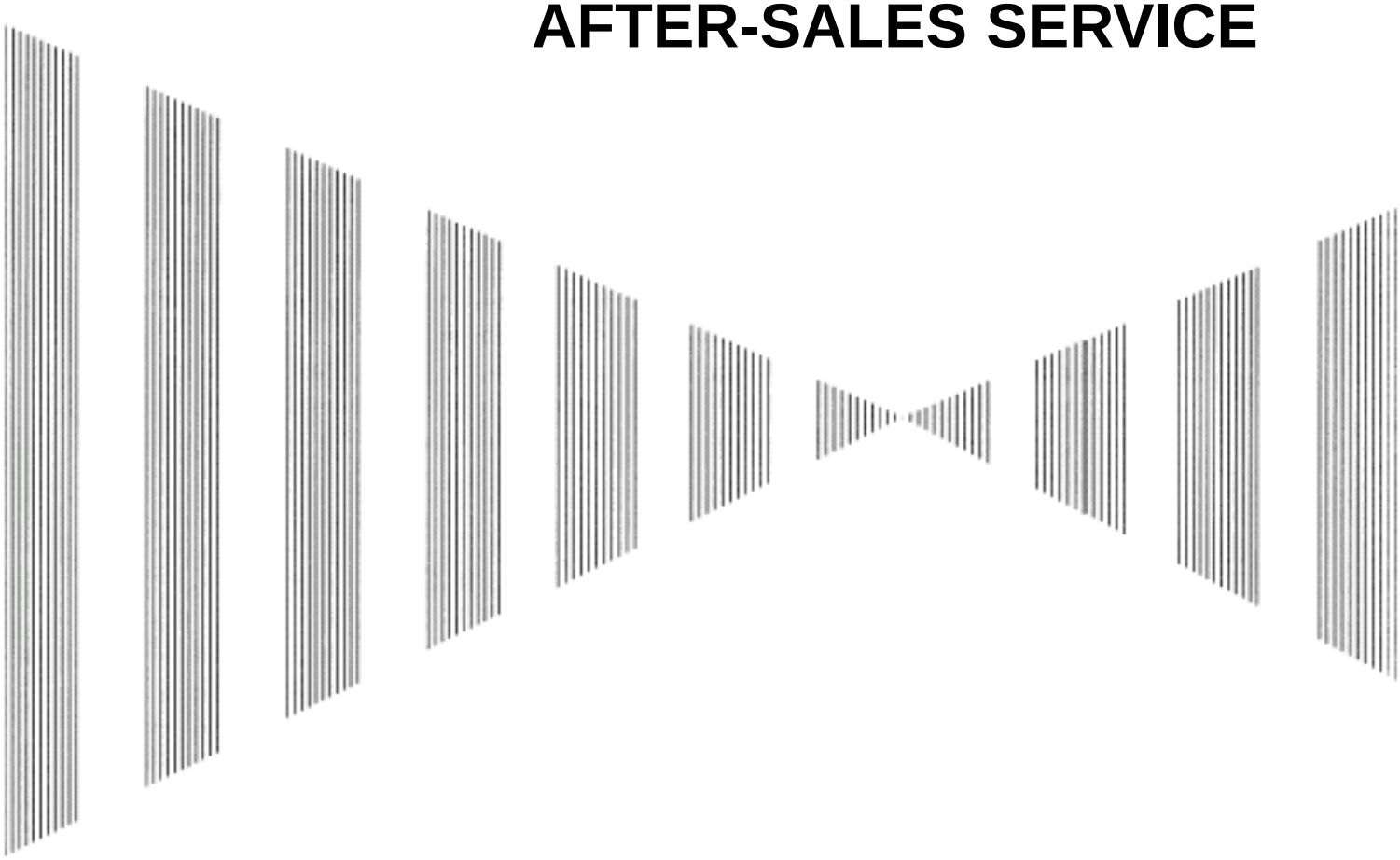
CAUTION
If you installed the battery with the wrong polarity, remove the battery immediately and do not use the same battery again.

CAUTION
During the procedures, do not put the battery on any circuit board or conductive item.

CAUTION
To dispose of a used battery, follow the instructions provided in Section 10.2 "DISPOSAL OF USED BATTERIES".

CAUTION
To disassemble of a used battery, have to use non-conductive tool.

SECTION 9
TROUBLE SHOOTING AND AFTER-SALES SERVICE



TROUBLE SHOOTING AND AFTER-SALES SERVICE

9.1 FAULT FINDING

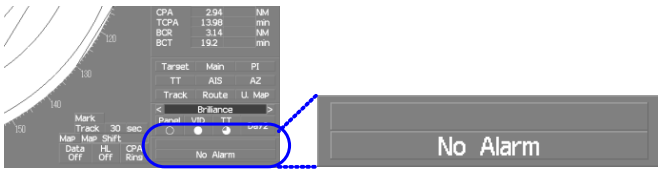
In case of semiconductor circuits, it is deemed that there are few cases in which the used semiconductor devices have inferior quality or performance deterioration except due to insufficient design or inspection or by other external and artificial causes. In general, the relatively many causes are disconnection in a high-value resistor due to moisture, a defective variable resistor and poor contact of a switch or relay.

Some troubles are caused by defective parts, imperfect adjustment (such as tuning adjustment) or insufficient service (such as poor cable contact). It will also be effective to check and readjust these points.

9.1.1 List of Alarms and other Indications

The system automatically recognizes an internal alarm and displays the alarm message. If an event which is not trouble but must be reported to the operator occurs, the system notifies the operator of the event.

Error message and alarm are displayed in the lower right of the display. For more details refer to page2-31 Alarm.



This section gives the list of alarms displayed by the system and other display lists.

Table9-1 : List of System Error Message

Message	Description
TXRX (SSW Off)	Scanner: Safety switch OFF.
TXRX (AZI)	Scanner: BP error.
TXRX (HL)	Scanner: HL error.
TXRX (MHV)	Scanner: Modulator's high voltage alarm.
TXRX (Data)	Scanner: No communication, communication mismatched, checksum error, or collision.
TXRX (Heater)	Scanner: Magnetron heater voltage error.
TXRX (Reverse)	Scanner: Reverse rotation.

Table9-1：List of System Error Message

Message	Description
TXRX (Video)	Scanner: VIDEO error.
TXRX (Trigger)	Scanner: TRIGGER error..
TXRX (Fan 1)	Scanner: FAN 1 error.
TXRX (Fan 2)	Scanner: FAN 2 error.
TXRX (Motor)	Scanner: Motor current error.
Keyboard (Data)	Operation unit: Communication error or checksum error.
Keyboard2 (Data)	Second operation unit: Communication error or checksum error.
GYRO I/F (Data)	GYRO I/F: No communication or checksum error.
GYRO I/F (GYRO)	GYRO I/F: GYRO error (error bit detected).
GYRO I/F (Log)	GYRO I/F: Log error (error bit detected).
GPS (Status)	GPS status error.
Position (Data)	Latitude / longitude data: No communication or data error.
Date (Data)	Date data: No communication or data error.
Speed (Log)	1-axis log: No communication or data error.
Speed (2AXW)	2-axis log (speed over water): No communication or data error.
Speed (2AXG)	2-axis log (speed over ground): No communication or data error.
Speed (GPS)	GPS speed: No communication or data error.
PROC (Interrupt)	Process unit: Interrupt error.
PROC (AZI)	Process unit: AZI error.
PROC (HL)	Process unit: HL error.Error during interrupt from ASIC1 to RADAR DSP.
ASIC1 to RADAR	VIDEO error.
PROC (Video)	Trigger error.
PROC (Trigger)	Heading data: No communication or data error.
Heading (Data)	Water depth: No communication or data error.
Depth (Data)	Water temperature: No communication or data error.
TEMP. (Data)	Wind direction/velocity: No communication or data error.
Wind (Data)	Tidal current: No communication or data error.
Current (Data)	Rate of Turn: No communication or data error.
ROT (Data)	Rudder Sensor Angle: No communication or data error.
RSA (Data)	APB: No communication or data error.
Autopilot (Data)	LCD monitor: Fan error.
Fan (LCD)	RADAR Process Unit Interconnection: Fan error.
Fan (Power)	Power Supply: Fan error.
Fan (PROC)	Scanner: Safety switch OFF.

Table9-2：List of Notification

Message	Description
CCRP Changed	CCRP is automatic changed.
Weather INFO	Weather information is received.
Copying	Display is capturing to file.

Table9-2：List of Notification

Set GYRO	Requires setting of true bearing.
TM Reset	Use care of resetting TM.
POSN Reset	Change the latitude and longitude sentence.

Table9-3：List of Target Tracking Alarms and AIS Function Alarms

メッセージ	内　　容
CPA/TCPA	There is a dangerous target.
Trial	There is a dangerous target, when trial maneuver is active.
New Target	Acquisition or activation of a target in the automatic acquisition / activation zone.
Lost	Failure in tracking the target that has been under tracking. Failure in receiving AIS target data for a specified time.
REF Target	Decrease in the reference target accuracy.
MAX Target	The maximum number of targets is under acquisition.
95% Capacity	Over 95% of the maximum number of targets to be tracked.
AIS Max Target	Maximum number of AIS targets.
AIS 95% Capacity	Over 95% of the maximum number of AIS targets.
AIS ACT MAX	Maximum number of AIS targets to be activated.
AIS ACT 95% Capacity	Over 95% of the maximum number of AIS targets to be activated.
TT (Boot)	Target tracking unit start failure.
TT (Data)	The target tracking unit is malfunctioning.
AIS (Data)	AIS: No communication or communication error.
AIS PROC (Data)	AIS processing circuit: No communication or communication error.
AIS Alarm *[i]**	AIS alarm (Up to 10 alarm messages can be displayed.).

i. *** is a 3-digit number which is Local Alarm No in the ALR sentence.

Table9-4：List of Route Messages and Warnings

Message	Description
Arrival	Arrive at way point.
Break Off(WPT)	Out of the way point.
Approach	Approach the route.
Cross Track Error	Go off the route.

Table9-5：List of Operational Error Messages and Warnings

Message	Description
No Position Data	Mark or line input when the latitude and longitude is invalid.
No Heading Data	Target tracking operation or TM selection when bearing data is invalid.
Out of Range	Out of target acquisition range.

Table9-5：List of Operational Error Messages and Warnings

Invalid Range	TM selection due to TM-disabled range (96 nm). Zooming in a ZOOM-disabled range (0.125 nm).
MAX Point	Tried to enter navigation information beyond the specified.
Can't Transmit	Tried to transmit within 5 second after standby or when the transmitter-receiver has any trouble.
Invalid Data	Tried to enter any data beyond its range.
Invalid Connection	The operator set performance monitor to on without selecting straight.
No Card	Card not detected yet.
Card Full	Card capacity insufficient.
Format Card	Unformatted card.
Invalid Card	Invalid card.
Read Failed	Read failure.
Write Failed	Write failure.
Delete Failed	Deletion failure.
Format Failed	Format failure.
Copy Failed	Copy failure.
Not Allowed	General operation error.
No Object	No object at the cursor-specified position.
Slave Mode	Operation of a menu for the scanner unit when the slave mode is active.

Table9-6：List of Conditions Messages

Message	Description
GPS (HDOP)	The HDOP level is increased (Decrease in the GPS accuracy.).
MON Test	Performance monitor is active.
Scanner Rotating	The scanner is rotating (When transmitter is standby state.).
Battery Low	battery is weakening.
Battery Dead	The battery is dead.

Table9-7：List of Interswitch Alarms and Messages

Message	Description
Master Range CHG	The range of the own display unit has changed due to change in the range of the master display unit.
ISW Complete	The switchover of the Interswitch ended normally.
ISW Busy	Access to the ISW menu was made during interswitching.
TXRX Standby	The scanner unit is in the standby mode.
ISW Straight	Failed in straight connection when the Interswitch system stops operating.
ISW Standby	The Interswitch recovered normally.
ISW Time Out	Failed in switching.
ISW Error	The interswitch is disabled.

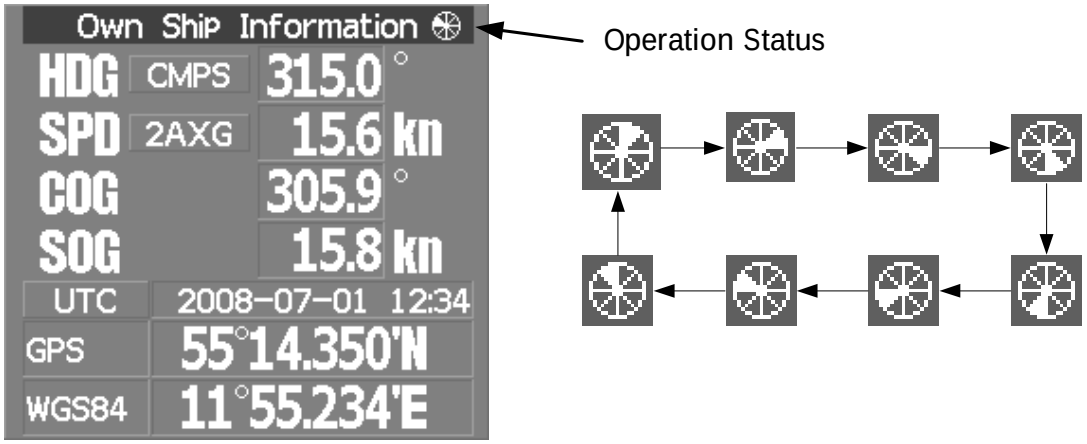
Table9-7 : List of Interswitch Alarms and Messages

Pattern CHG Failed	Connection change failed.
Connection Masked	Inhibition of control / connection is set.
Master Standby	The master display unit does not transmit any signals.
ISW (Data)	No communication, data mismatched, or checksum error.
Update ISW Software	Tried to enter new TXRX function, when interswitch software used old version.

9.1.2 Operation Checking

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

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



9.1.3 Fuse Checking

Melted fuses are caused by any clear cause. When a fuse is replaced, it is necessary to check the related circuits even if there is no trouble. In checking, note that there is some dispersion in the fusing characteristics. Table 9-8 shows a list of fuses used in the equipment.

Table9-8 : Fuse List

Location	Parts#	Current Rating	Protection Circuit	Type
AC/DC Converter	F501	10A	Motor	ST6-10AN1
GYRO Interface circuit	F1～F4	0.5A	GYRO Interface circuit	MF60NR250V0.5

9.2 TROUBLE SHOOTING

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

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

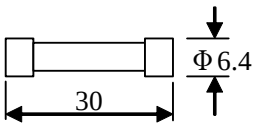
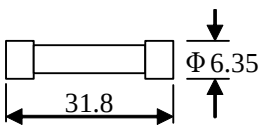
1 Poor Contact in Terminal Board of Inter-Unit Cables

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

2 Poor Contact of Connector within Unit

This radar equipment is provided with Table 9-9 standard spares.

Table9-9：7ZXRD0025

Name	Type/Code	Shape (mm)	In use	Spare	Parts #	Location
Fuse	MF60NR250V0.5 (5ZFGD00006)		4	12	F1～F4	GYRO I/F CMJ-462E
Fuse	ST6-10AN1 (5ZFCA00053)		1	3	F501	AC/DC Converter NBA-5135

9.2.1 Special Parts

NKE-2103

Table9-10：NKE-2103 (JMA-9110-6XA/6XAH、JMA-7110-6XA/6XAH)

Parts No.	Name	Type	Manufacture	Location	Code
V101	Magnetron	MAF1565N	NJRC	Scanner Unit	5VMAA00102
A101/A102	Circulator	FCX68	Toshiba	Scanner Unit	6AJRD00001
A301	Diode Limiter	NJS6930	NJRC	Scanner Unit	5ATBT00006

NKE-1125/2254

Table9-11：NKE-1125/2254 (JMA-9122-6XAH/9XA/6XAH、JMA-7122-6XA/9XA/6XAH)

Parts No.	Name	Type	Manufacture	Location	Code
V101	Magnetron	M1568BS	NJRC	Scanner Unit	5VMAA00106
A101/A102	Circulator	NJC3901M	NJRC	Scanner Unit	5AJBV00007
A301	Diode Limiter	NJS6930	NJRC	Scanner Unit	5ATBT00006

NTG-3225

Table9-12：NTG-3225 (JMA-9123-7XA/9XA、JMA-7123-7XA/9XA)

Parts No.	Name	Type	Manufacture	Location	Code
V101	Magnetron	M1568BS	NJRC	Transmitter Receiver Unit	5VMAA00106
A101/A102	Circulator	NJC3901M	NJRC	Transmitter Receiver Unit	5AJBV00007
A301	Diode Limiter	NJS6930	NJRC	Transmitter Receiver Unit	5ATBT00006

NKE-1130

Table9-13：NKE-1130 (JMA-9132-SA、JMA-7132-SA)

Parts No.	Name	Type	Manufacture	Location	Code
V101	Magnetron	M1555	NJRC	Scanner Unit	5VMAA00106
A101/A102	Circulator	NJC3316	NJRC	Scanner Unit	5AJBV00007
A301	Diode Limiter	NJS6318	NJRC	Scanner Unit	5ATBT00006

NTG-3230

Table9-14：NTG-3230 (JMA-9133-SA、JMA-7133-SA)

Parts No.	Name	Type	Manufacture	Location	Code
V101	Magnetron	M1555	NJRC	Transmitter Receiver Unit	5VMAA00104
A101	Circulator	NJC3317	NJRC	Transmitter Receiver Unit	5AJBV00009
A301	TR Limiter	TL378A	NJRC	Transmitter Receiver Unit	5VLAA00037

9.2.2 Circuit Block to be Repaired

Table9-15：Circuit Block to be Repaired (JMA-9110-6XA/6XAH)

Location	Circuit Block	Type	Remarks
SCANNER UNIT	GEARED MOTOR	7BDRD0048	DC brushless motor (common with HS)
SCANNER UNIT	MODULATOR CIRCUIT	CME-363	Excluding Magnetron
SCANNER UNIT	RECEIVER UNIT	NRG-610	Including CAE-529-1
SCANNER UNIT	POWER SUPPLY CIRCUIT	CBD-1783	
SCANNER UNIT	ENCODER	CHT-71A	
SCANNER UNIT	MOTOR CONTROL POWER SUPPLY	CBD-1779	
SCANNER UNIT	FAN	7BFRD0002	
RADAR PROCESS UNIT	RADAR PROCESS CIRCUIT	MDLW11900	With mounting bracket
RADAR PROCESS UNIT	AIS PROCESS CIRCUIT	CDC-1325	
RADAR PROCESS UNIT	ARPA PROCESS CIRCUIT	CDC-1186D	
RADAR PROCESS UNIT	GYRO I/F CIRCUIT	CMJ-462E	
RADAR PROCESS UNIT	TERMINALBOARD CIRCUIT	CQD-2097	
RADAR PROCESS UNIT	MOTHERBOARD CIRCUIT	CQC-1192	
RADAR PROCESS UNIT	FAN (RPU)	109R0612S4D13	
RADAR PROCESS UNIT	POWER SUPPLY	CBD-1661	
RADAR PROCESS UNIT	FAN (PSU)	7BFRD0006	
OPERATION UNIT	OPERATION CIRCUIT A	CCK-973	
OPERATION UNIT	OPERATION CIRCUIT B	CCK-974	
OPERATION UNIT	OPERATION CIRCUIT D	CCK-976	
OPERATION UNIT	TRACKBALL	5EZLY00003	
OPERATION UNIT	LCD PANEL	7WSRD0002A	23.1-inch LCD
OPERATION UNIT	LCD OPERATION CIRCUIT	CCK-972	

Table9-16：Circuit Block to be Repaired (JMA-9122-6XA/9XA)

Location	Circuit Block	Type	Remarks
SCANNER UNIT	GEARED MOTOR	MDBW10822	For 100/220VAC
SCANNER UNIT	ENCODER	CHT-71A	
SCANNER UNIT	AC220V MOTOR DRIVER	7EPRD0034	For 220VAC
SCANNER UNIT	AC100V MOTOR DRIVER	7EPRD0035	For 100VAC
SCANNER UNIT	PERFORMANCE MONITOR	NJU-85	
SCANNER UNIT	HEATER CONTROL PART	CHG-216	Option (AC100V)
SCANNER UNIT	BREAK CIRCUIT	CFA-253	
SCANNER UNIT	BREAK CONTROL CIRCUIT	CCB-655	
SCANNER UNIT	BREAK CIRCUIT A	CFA-259	
SCANNER UNIT	BREAK CIRCUIT B	CFA-260	
SCANNER UNIT	T/R CONTROL CIRCUIT	CMC-1205R	
SCANNER UNIT	MODULATOR UNIT	NMA-550	Including CPA-264 Including CMB-404 Including CFR-229 Excluding Magnetron
SCANNER UNIT	MODULATOR CIRCUIT	CPA-264	
SCANNER UNIT	RECEIVER UNIT	NRG-162A	Including CMA-866A
SCANNER UNIT	POWER SUPPLY CIRCUIT	CBD-1682A	
SCANNER UNIT	RELAY FILTER CIRCUIT	CSC-656	
SCANNER UNIT	FAN	7BFRD0002	
RADAR PROCESS UNIT	RADAR PROCESS CIRCUIT	MDLW11900	With mounting bracket
RADAR PROCESS UNIT	AIS PROCESS CIRCUIT	CDC-1325	
RADAR PROCESS UNIT	ARPA PROCESS CIRCUIT	CDC-1186D	
RADAR PROCESS UNIT	GYRO I/F CIRCUIT	CMJ-462E	
RADAR PROCESS UNIT	TERMINALBOARD CIRCUIT	CQD-2097	
RADAR PROCESS UNIT	MOTHERBOARD CIRCUIT	CQC-1192	
RADAR PROCESS UNIT	FAN (RPU)	109R0612S4D13	
RADAR PROCESS UNIT	POWER SUPPLY	CBD-1661	
RADAR PROCESS UNIT	FAN (PSU)	7BFRD0006	
OPERATION UNIT	OPERATION CIRCUIT A	CCK-973	
OPERATION UNIT	OPERATION CIRCUIT B	CCK-974	
OPERATION UNIT	OPERATION CIRCUIT D	CCK-976	
OPERATION UNIT	TRACKBALL	5EZLY00003	
MONITOR UNIT	LCD PANEL	7WSRD0002A	23.1-inch LCD
MONITOR UNIT	LCD OPERATION CIRCUIT	CCK-972	

Table9-17：Circuit Block to be Repaired (JMA-9122-6XAH)

Location	Circuit Block	Type	Remarks
SCANNER UNIT	GEARED MOTOR	7BDRD0045A	For 100/220VAC
SCANNER UNIT	ENCODER	CHT-71A	
SCANNER UNIT	MOTOR CONTROL POWER CIRCUIT	CBD-1779	
SCANNER UNIT	BREAK CIRCUIT	CFA-257	
SCANNER UNIT	PERFORMANCE MONITOR	NJU-85	
SCANNER UNIT	HEATER CONTROL PART	CHG-216	Option (AC100V)
SCANNER UNIT	POWER SUPPLY CIRCUIT	CBD-1682A	
SCANNER UNIT	T/R CONTROL CIRCUIT	CMC-1205R	
SCANNER UNIT	MODULATOR UNIT	NMA-550	Including CPA-264 Including CMB-404 Including CFR-229 Excluding Magnetron
SCANNER UNIT	MODULATOR CIRCUIT	CPA-264	
SCANNER UNIT	RECEIVER UNIT	NRG-162A	Including CMA-866A
SCANNER UNIT	FAN	7BFRD0002	
RADAR PROCESS UNIT	RADAR PROCESS CIRCUIT	MDLW11900	With mounting bracket
RADAR PROCESS UNIT	AIS PROCESS CIRCUIT	CDC-1325	
RADAR PROCESS UNIT	ARPA PROCESS CIRCUIT	CDC-1186D	
RADAR PROCESS UNIT	GYRO I/F CIRCUIT	CMJ-462E	
RADAR PROCESS UNIT	TERMINALBOARD CIRCUIT	CQD-2097	
RADAR PROCESS UNIT	MOTHERBOARD CIRCUIT	CQC-1192	
RADAR PROCESS UNIT	FAN (RPU)	109R0612S4D13	
RADAR PROCESS UNIT	POWER SUPPLY	CBD-1661	
RADAR PROCESS UNIT	FAN (PSU)	7BFRD0006	
OPERATION UNIT	OPERATION CIRCUIT A	CCK-973	
OPERATION UNIT	OPERATION CIRCUIT B	CCK-974	
OPERATION UNIT	OPERATION CIRCUIT D	CCK-976	
OPERATION UNIT	TRACKBALL	5EZLY00003	
MONITOR UNIT	LCD PANEL	7WSRD0002A	23.1-inch LCD
MONITOR UNIT	LCD OPERATION CIRCUIT	CCK-972	

Table9-18：Circuit Block to be Repaired (JMA-9123-7XA/9XA)

Location	Circuit Block	Type	Remarks
SCANNER UNIT	GEARED MOTOR	MDBW10822	For 100/220VAC
SCANNER UNIT	ENCODER	CHT-71A	
SCANNER UNIT	AC220V MOTOR DRIVER	7EPRD0034	For 220VAC
SCANNER UNIT	AC100V MOTOR DRIVER	7EPRD0035	For 100VAC
SCANNER UNIT	PERFORMANCE MONITOR	NJU-85	
SCANNER UNIT	HEATER CONTROL PART	CHG-216	Option (AC100V)
SCANNER UNIT	BREAK CIRCUIT	CFA-253	
SCANNER UNIT	BREAK CONTROL CIRCUIT	CCB-655	
SCANNER UNIT	BREAK CIRCUIT A	CFA-259	
SCANNER UNIT	BREAK CIRCUIT B	CFA-260	
TRANSMITTER RECEIVER UNIT	T/R CONTROL CIRCUIT	CMC-1205R	
TRANSMITTER RECEIVER UNIT	MODULATOR UNIT	NMA-552	Including CPA-264 Including CMB-405 Including CFR-229 Excluding Magnetron
TRANSMITTER RECEIVER UNIT	MODULATOR CIRCUIT	CPA-264	
TRANSMITTER RECEIVER UNIT	RECEIVER UNIT	NRG-162A	Including CMA-866A
TRANSMITTER RECEIVER UNIT	POWER SUPPLY CIRCUIT	CBD-1682A	
TRANSMITTER RECEIVER UNIT	RELAY FILTER CIRCUIT	CSC-656	
RADAR PROCESS UNIT	RADAR PROCESS CIRCUIT	MDLW11900	With mounting bracket
RADAR PROCESS UNIT	AIS PROCESS CIRCUIT	CDC-1325	
RADAR PROCESS UNIT	ARPA PROCESS CIRCUIT	CDC-1186D	
RADAR PROCESS UNIT	GYRO I/F CIRCUIT	CMJ-462E	
RADAR PROCESS UNIT	TERMINALBOARD CIRCUIT	CQD-2097	
RADAR PROCESS UNIT	MOTHERBOARD CIRCUIT	CQC-1192	
RADAR PROCESS UNIT	FAN (RPU)	109R0612S4D13	
RADAR PROCESS UNIT	POWER SUPPLY	CBD-1661	
RADAR PROCESS UNIT	FAN (PSU)	7BFRD0006	
OPERATION UNIT	OPERATION CIRCUIT A	CCK-973	
OPERATION UNIT	OPERATION CIRCUIT B	CCK-974	
OPERATION UNIT	OPERATION CIRCUIT D	CCK-976	
OPERATION UNIT	TRACKBALL	5EZLY00003	
MONITOR UNIT	LCD PANEL	7WSRD0002A	23.1-inch LCD
MONITOR UNIT	LCD OPERATION CIRCUIT	CCK-972	

Table9-19：Circuit Block to be Repaired (JMA-9132-SA)

Location	Circuit Block	Type	Remarks
SCANNER UNIT	GEARED MOTOR	MDBW10823	For 100/220VAC
SCANNER UNIT	ENCODER	CHT-71A1	
SCANNER UNIT	AC220V MOTOR DRIVER	7EPRD0034	For 220VAC
SCANNER UNIT	AC100V MOTOR DRIVER	7EPRD0035	For 100VAC
SCANNER UNIT	PERFORMANCE MONITOR	NJU-84	
SCANNER UNIT	HEATER CONTROL PART	CHG-215	Option (AC100V)
SCANNER UNIT	BREAK CIRCUIT	CFA-255	
SCANNER UNIT	BREAK CONTROL CIRCUIT	CCB-655	
SCANNER UNIT	BREAK CIRCUIT A	CFA-261	
SCANNER UNIT	BREAK CIRCUIT B	CFA-262	
SCANNER UNIT	T/R CONTROL CIRCUIT	CMC-1205R	
SCANNER UNIT	MODULATOR UNIT	NMA-551	Including CPA-264 Including CMB-406 Including CFR-229 Exluding Magnetron
SCANNER UNIT	MODULATOR CIRCUIT	CPA-264	
SCANNER UNIT	RECEIVER UNIT	NRG-229	
SCANNER UNIT	POWER SUPPLY CIRCUIT	CBD-1682A	
SCANNER UNIT	RELAY FILTER CIRCUIT	CSC-656	
SCANNER UNIT	FAN	7BFRD0002	
RADAR PROCESS UNIT	RADAR PROCESS CIRCUIT	MDLW11900	With mounting bracket
RADAR PROCESS UNIT	AIS PROCESS CIRCUIT	CDC-1325	
RADAR PROCESS UNIT	ARPA PROCESS CIRCUIT	CDC-1186D	
RADAR PROCESS UNIT	GYRO I/F CIRCUIT	CMJ-462E	
RADAR PROCESS UNIT	TERMINALBOARD CIRCUIT	CQD-2097	
RADAR PROCESS UNIT	MOTHERBOARD CIRCUIT	CQC-1192	
RADAR PROCESS UNIT	FAN (RPU)	109R0612S4D13	
RADAR PROCESS UNIT	POWER SUPPLY	CBD-1661	
RADAR PROCESS UNIT	FAN (PSU)	7BFRD0006	
OPERATION UNIT	OPERATION CIRCUIT A	CCK-973	
OPERATION UNIT	OPERATION CIRCUIT B	CCK-974	
OPERATION UNIT	OPERATION CIRCUIT D	CCK-976	
OPERATION UNIT	TRACKBALL	5EZLY00003	
MONITOR UNIT	LCD PANEL	7WSRD0002A	23.1-inch LCD
MONITOR UNIT	LCD OPERATION CIRCUIT	CCK-972	

Table9-20：Circuit Block to be Repaired (JMA-9133-SA)

Location	Circuit Block	Type	Remarks
SCANNER UNIT	GEARED MOTOR	MDBW10823	For 100/220VAC
SCANNER UNIT	ENCODER	CHT-71A1	
SCANNER UNIT	AC220V MOTOR DRIVER	7EPRD0034	For 220VAC
SCANNER UNIT	AC100V MOTOR DRIVER	7EPRD0035	For 100VAC
SCANNER UNIT	PERFORMANCE MONITOR	NJU-84	
SCANNER UNIT	HEATER CONTROL PART	CHG-215	Option (AC100V)
SCANNER UNIT	BREAK CIRCUIT	CFA-255	
SCANNER UNIT	BREAK CONTROL CIRCUIT	CCB-655	
SCANNER UNIT	BREAK CIRCUIT A	CFA-261	
SCANNER UNIT	BREAK CIRCUIT B	CFA-262	
TRANSMITTER RECEIVER UNIT	T/R CONTROL CIRCUIT	CMC-1205R	
TRANSMITTER RECEIVER UNIT	MODULATOR UNIT	NMA-553	Including CPA-264 Including CMB-407 Including CFR-229 Exluding Magnetron
TRANSMITTER RECEIVER UNIT	MODULATOR CIRCUIT	CPA-264	
TRANSMITTER RECEIVER UNIT	RECEIVER UNIT	NRG-229	
TRANSMITTER RECEIVER UNIT	POWER SUPPLY CIRCUIT	CBD-1682A	
TRANSMITTER RECEIVER UNIT	RELAY FILTER CIRCUIT	CSC-656	
RADAR PROCESS UNIT	RADAR PROCESS CIRCUIT	MDLW11900	With mounting bracket
RADAR PROCESS UNIT	AIS PROCESS CIRCUIT	CDC-1325	
RADAR PROCESS UNIT	ARPA PROCESS CIRCUIT	CDC-1186D	
RADAR PROCESS UNIT	GYRO I/F CIRCUIT	CMJ-462E	
RADAR PROCESS UNIT	TERMINALBOARD CIRCUIT	CQD-2097	
RADAR PROCESS UNIT	MOTHERBOARD CIRCUIT	CQC-1192	
RADAR PROCESS UNIT	FAN (RPU)	109R0612S4D13	
RADAR PROCESS UNIT	POWER SUPPLY	CBD-1661	
RADAR PROCESS UNIT	FAN (PSU)	7BFRD0006	
OPERATION UNIT	OPERATION CIRCUIT A	CCK-973	
OPERATION UNIT	OPERATION CIRCUIT B	CCK-974	
OPERATION UNIT	OPERATION CIRCUIT D	CCK-976	
OPERATION UNIT	TRACKBALL	5EZLY00003	
MONITOR UNIT	LCD PANEL	7WSRD0002A	23.1-inch LCD
MONITOR UNIT	LCD OPERATION CIRCUIT	CCK-972	

9.3 AFTER-SALES SERVICE

9.3.1 Keeping period of maintenance parts

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

9.3.2 When you Request for Repair

If you suppose the product may be out of order, read the description in Section 9 carefully and check the suspected point again.

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

Repair within the Warranty Period

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

Repair after the Warranty Period

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

Necessary Information for Repair

- Product name, model, manufacturing date and serial number
- Trouble conditions (as detailed as possible. Refer to "Radar Failure Check List" on page 9-15
- Name of company/organization, address and telephone number

9.3.3 Recommended Maintenance

The performance of the product may deteriorate due to the secular change of the parts used in it, though such deterioration depends upon the conditions of operation. So checkup and maintenance is recommendable for the product in addition to your daily care.

For maintenance, consult with the near-by dealer or our sales department.Such maintenance will be made with charges.

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

Radar Failure Check List

When placing an order for repair of the product, it is requested that you could confirm the check items and fill the results and sent the sheet to our contact. If there is any unclear items, contact the ship on which the product is installed, and give the correct information on the product.

Ship name: _____ Phone: _____ Fax: _____

[i] Radar general model name :JMA- _____ [i]Serial No. : _____

i. Write the full model name correctly

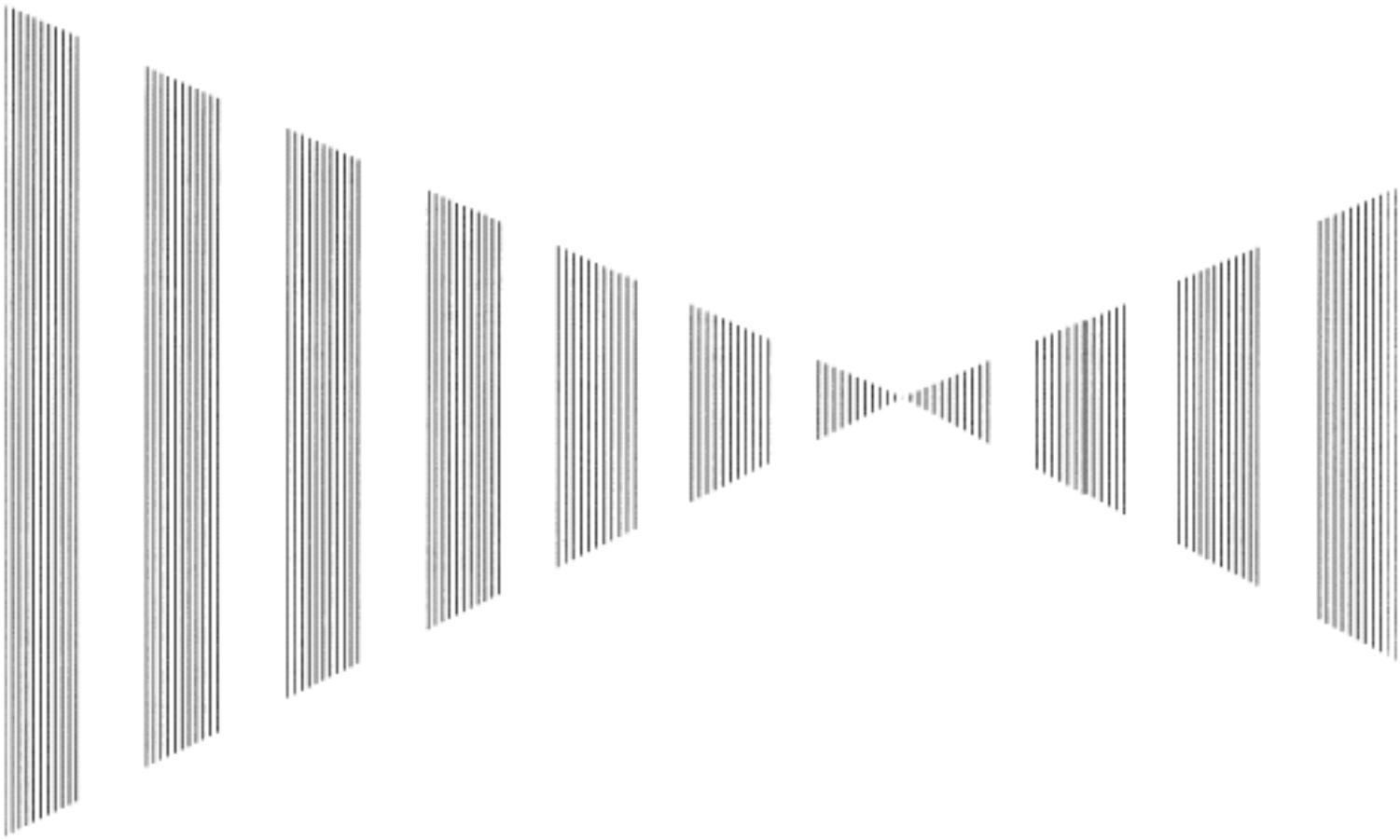
Check the following items in the order of the number, and check the applicable answer between YES or NO.

If the item cannot be determined as YES or NO, explain in detail in the item (18), others.

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

i. If result is NO, then check the fuse. (Refer to Section 9.1.2 "Operation Checking" and Section 9.2 "TROUBLE SHOOTING")
ii. Check these items while transmission is ON.
iii. Functions mentioned in the items (14), (15) and (17) may be optional, answer is not necessary.

SECTION 10
DISPOSAL



DISPOSAL

10.1 DISPOSAL OF THE UNIT

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

10.2 DISPOSAL OF USED BATTERIES

WARNING

When disposing of used lithium batteries, be sure to insulate the batteries by taping the ⊕⊖ terminals.

Otherwise, heat generation, explosion or a fire may occur.

In this unit, Lithium batteries are used for the following parts:

Radar Processing circuit (CDC-1324): BT1 (Maxell: CR2032)

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

10.3 DISPOSAL OF USED MAGNETRON

Magnetron is used in the Scanner （NKE－2103/2254/1125/1130） and Transmitter Receiver Unit (NTG-3225/3230).

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

  For detail, consult with our dealer or business office.

10.4 DISPOSAL OF TR-TUBE

In the case that either mark shown in Fig 10-1 is on the expired TR-tube, Radioisotopes are in the TR-tube.

- Disposal of TR-tube with these marks must be done in accordance with the laws and regulations of the pertaining country. For detail, consult with our dealer or business office.
- Radiation from TR-tube has no effect on the human body.
- Don't take apart TR-tube.

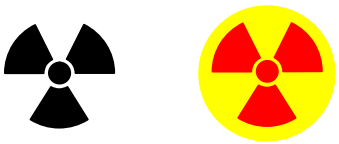


Fig 10-1: Radioisotopes Marks

10.5 ABOUT THE CHINA ROHS

有毒有害物质或元素的名称及含量

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

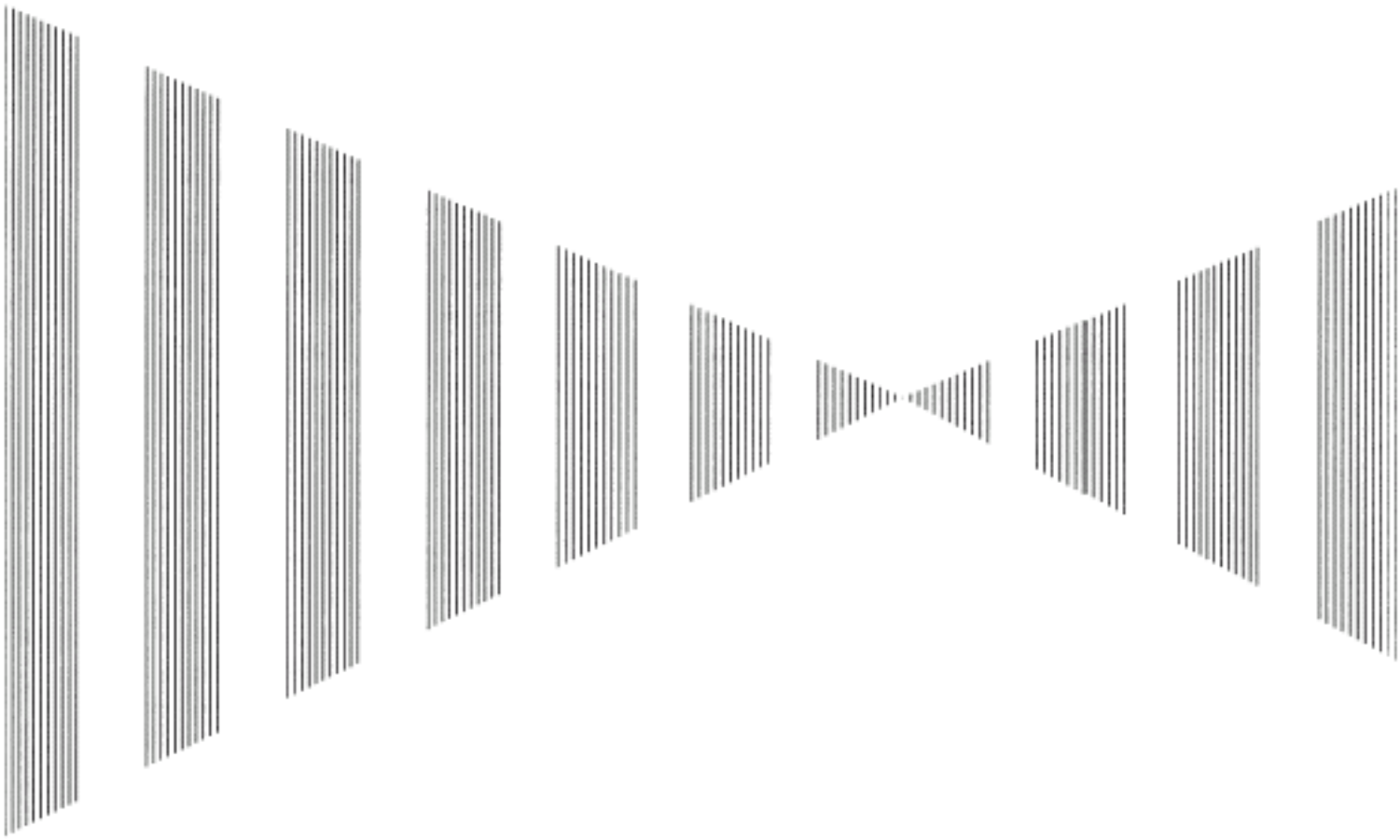
形式名(Type): JMA-9100 Series, JMA-7100Series　　名称(Name): RADAR

部件名称 (Part name)	有毒有害物质或元素 (Toxic and Hazardous Substances and Elements)					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
雷达天线单元 (Scanner Unit)	×	×	○	×	×	×
收发信单元 (Transmitter-receiver Unit)	×	×	×	×	×	×
主船内装置 (Inboard Unit) ・显示装置 (Display Unit) ・键盘装置 (OperationUnit) ・信号处理装置 (RADAR Process Unit)	×	×	×	×	×	×
外部设备 (Peripherals) ・选择 (Options) ・电线类 (Cables) ・手册 (Documennts)	×	×	×	×	×	×

○：表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T11306-2006 标准规定的限量要求以下。
(Indicates that this toxic, or hazardous substance contained in all of the homogeneous materials for this part is below the requirement in SJ/T11363-2006.)

×：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T11363-2006 标准规定的限量要求。
(Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T 11363-2006.)

SECTION 11
SPECIFICATION



SPECIFICATION

11.1 JMA-9133-SA TYPE RADAR

GENERAL SPECIFICATION	
Class of emission	P0N
Display	Color Raster Scan
Screen	23.1inch LCD (Effective diameter of Radar: more than 320mm)
Range Scale	0.125、0.25、0.5、0.75、1.5、3、6、12、24、48、96NM
Range Resolution	less than 30m
Minimum Detection Range	less than 40m
Bearing Accuracy	less than 1°
Bearing Indication	Relative motion mode : N-UP, C-UP and H-UP True motion mode : N-UP and C-UP
Ambient Condition	Temperature SCANNER UNIT -25 to +55℃ (Storage -25 to +70℃) Other Unit -15 to +55℃ Relative humidity 93% at +40℃
Vibration	2 to 13.2Hz Amplitude +/-1mm +/-10% 13.2 to 100Hz Acceleration 7m/s^2
Power Supply Input	AC100 to 115V, 50/60Hz, 1φ or AC220 to 240V, 50/60Hz, 1φ
Power Consumption	Approx.400VA typical Approx. 2000VA at Maximum wind speed
PS Voltage Fluctuation	+/-10% (at the maximum cable length)
Pre Heating Time	Within 4 minute
From STBY to TX	Within 5 sec.
SCANNER UNIT (NKE-1139)	
	See 11.8
TRANSMITTER RECEIVER UNIT (NTG-3230)	
	See 11.15
DISPLAY UNIT (NCD-4990)	
	See 11.17
PERFORMANCE MONITOR (NJU-84)	
	See 11.20
OPTION	
Scanner with Deicing Heater	NKE-1139-D (Only heater collar)
Radar Inter switch	NQE-3141-2A (Maximum 2 Radars) NQE-3141-4A (Maximum 4 Radars)
DISPLAY UNIT (Desktop type)	NCD-4990T
Maximum Cable Length	
SCANNER UNIT to TRANSMITTER RECEIVER UNIT	30m
DISPLAY UNIT to TRANSMITTER RECEIVER UNIT	35m
SAFE DISTANCE FOR STANDARD COMPASS	
SCANNER UNIT	1.4m
TRANSMITTER RECEIVER UNIT	3.9m
DISPLAY UNIT	4.0m

11.2 JMA-9132-SA TYPE RADAR

GENERAL SPECIFICATION	
Class of emission	P0N
Display	Color Raster Scan
Screen	23.1inch LCD (Effective diameter of Radar: more than 320mm)
Range Scale	0.125, 0.25, 0.5, 0.75, 1.5, 3, 6, 12, 24, 48, 96NM
Range Resolution	less than 30m
Minimum Detection Range	less than 40m
Bearing Accuracy	less than 1°
Bearing Indication	Relative motion mode : N-UP, C-UP and H-UP True motion mode : N-UP and C-UP
Ambient Condition	Temperature SCANNER UNIT -25 to +55℃ (Storage -25 to +70℃) Other Unit -15 to +55℃ Relative humidity 93% at +40℃
Vibration	2 to 13.2Hz Amplitude +/-1mm +/-10% 13.2 to 100Hz Acceleration 7m/s^2
Power Supply Input	AC100 to 115V, 50/60Hz, 1φ or AC220 to 240V, 50/60Hz, 1φ
Power Consumption	Approx.400VA typical Approx. 2000VA at Maximum wind speed
PS Voltage Fluctuation	+/-10% (at the maximum cable length)
Pre Heating Time	Within 4 minute
From STBY to TX	Within 5 sec.
SCANNER UNIT (NKE-1130)	
	See 11.9
DISPLAY UNIT (NCD-4990)	
	See 11.17
PERFORMANCE MONITOR (NJU-84)	
	See 11.20
OPTION	
Scanner with Deicing Heater	NKE-1139-D (Only heater collar)
Radar Inter switch	NQE-3141-2A (Maximum 2 Radars) NQE-3141-4A (Maximum 4 Radars)
DISPLAY UNIT (Desktop type)	NCD-4990T
Maximum Cable Length	
SCANNER UNIT to TRANSMITTER RECEIVER UNIT	65m
SAFE DISTANCE FOR STANDARD COMPASS	
SCANNER UNIT	5.1m
DISPLAY UNIT	4.0m

11.3 JMA-9123-7XA/9XA TYPE RADAR

GENERAL SPECIFICATION	
Class of emission	P0N
Display	Color Raster Scan
Screen	23.1inch LCD (Effective diameter of Radar: more than 320mm)
Range Scale	0.125, 0.25, 0.5, 0.75, 1.5, 3, 6, 12, 24, 48, 96NM
Range Resolution	less than 30m
Minimum Detection Range	less than 40m
Bearing Accuracy	less than 1°
Bearing Indication	Relative motion mode : N-UP, C-UP and H-UP True motion mode : N-UP and C-UP
Ambient Condition	Temperature SCANNER UNIT -25 to +55℃ (Storage -25 to +70℃) Other Unit -15 to +55℃ Relative humidity 93% at +40℃
Vibration	2 to 13.2Hz Amplitude +/-1mm +/-10% 13.2 to 100Hz Acceleration 7m/s^2
Power Supply Input	AC100 to 115V, 50/60Hz, 1φ or AC220 to 240V, 50/60Hz, 1φ
Power Consumption	Approx.350VA typical Approx. 1700VA at Maximum wind speed
PS Voltage Fluctuation	+/-10% (at the maximum cable length)
Pre Heating Time	Within 4 minute
From STBY to TX	Within 5 sec.
SCANNER UNIT (NKE-1129-7/9)	
	See 11.10
TRANSMITTER RECEIVER UNIT (NTG-3225)	
	See 11.16
DISPLAY UNIT (NCD-4990)	
	See 11.17
PERFORMANCE MONITOR (NJU-85)	
	See 11.21
OPTION	
Scanner with Deicing Heater	NKE-1139-D (Only heater collar)
Radar Inter switch	NQE-3141-2A (Maximum 2 Radars) NQE-3141-4A (Maximum 4 Radars)
DISPLAY UNIT (Desktop type)	NCD-4990T
Maximum Cable Length	
SCANNER UNIT to TRANSMITTER RECEIVER UNIT	30m
DISPLAY UNIT to TRANSMITTER RECEIVER UNIT	35m
SAFE DISTANCE FOR STANDARD COMPASS	
SCANNER UNIT	1.05m
TRANSMITTER RECEIVER UNIT	2.8m
DISPLAY UNIT	4.0m

11.4 JMA-9122-6XA/9XA TYPE RADAR

GENERAL SPECIFICATION	
Class of emission	P0N
Display	Color Raster Scan
Screen	23.1inch LCD (Effective diameter of Radar: more than 320mm)
Range Scale	0.125, 0.25, 0.5, 0.75, 1.5, 3, 6, 12, 24, 48, 96NM
Range Resolution	less than 30m
Minimum Detection Range	less than 40m
Bearing Accuracy	less than 1°
Bearing Indication	Relative motion mode : N-UP, C-UP and H-UP True motion mode : N-UP and C-UP
Ambient Condition	Temperature SCANNER UNIT -25 to +55℃ (Storage -25 to +70℃) Other Unit -15 to +55℃ Relative humidity 93% at +40℃
Vibration	2 to 13.2Hz Amplitude +/-1mm +/-10% 13.2 to 100Hz Acceleration 7m/s^2
Power Supply Input	AC100 to 115V, 50/60Hz, 1φ or AC220 to 240V, 50/60Hz, 1φ
Power Consumption	Approx.350VA typical Approx. 1700VA at Maximum wind speed
PS Voltage Fluctuation	+/-10% (at the maximum cable length)
Pre Heating Time	Within 4 minute
From STBY to TX	Within 5 sec.
SCANNER UNIT (NKE-1125-6/9)	
	See 11.11
DISPLAY UNIT (NCD-4990)	
	See 11.17
PERFORMANCE MONITOR (NJU-85)	
	See 11.21
OPTION	
Scanner with Deicing Heater	NKE-1139-D (Only heater collar)
Radar Inter switch	NQE-3141-2A (Maximum 2 Radars) NQE-3141-4A (Maximum 4 Radars)
DISPLAY UNIT (Desktop type)	NCD-4990T
Maximum Cable Length	
SCANNER UNIT to TRANSMITTER RECEIVER UNIT	65m
SAFE DISTANCE FOR STANDARD COMPASS	
SCANNER UNIT	2.4m
DISPLAY UNIT	4.0m

11.5 JMA-9122-6XAH TYPE RADAR

GENERAL SPECIFICATION	
Class of emission	P0N
Display	Color Raster Scan
Screen	23.1inch LCD (Effective diameter of Radar: more than 320mm)
Range Scale	0.125, 0.25, 0.5, 0.75, 1.5, 3, 6, 12, 24, 48, 96NM
Range Resolution	less than 30m
Minimum Detection Range	less than 40m
Bearing Accuracy	less than 1°
Bearing Indication	Relative motion mode : N-UP, C-UP and H-UP True motion mode : N-UP and C-UP
Ambient Condition	Temperature SCANNER UNIT -25 to +55℃ (Storage -25 to +70℃) Other Unit -15 to +55℃ Relative humidity 93% at +40℃
Vibration	2 to 13.2Hz Amplitude +/-1mm +/-10% 13.2 to 100Hz Acceleration 7m/s^2
Power Supply Input	AC100 to 115V, 50/60Hz, 1φ or AC220 to 240V, 50/60Hz, 1φ
Power Consumption	Approx.350VA typical Approx. 1000VA at Maximum wind speed
PS Voltage Fluctuation	+/-10% (at the maximum cable length)
Pre Heating Time	Within 4 minute
From STBY to TX	Within 5 sec.
SCANNER UNIT (NKE-2254-6HS)	
	See 11.11
DISPLAY UNIT (NCD-4990)	
	See 11.17
PERFORMANCE MONITOR (NJU-85)	
	See 11.21
AC-DC CONVERTER (NBA-5135)	
	See 11.22
OPTION	
Scanner with Deicing Heater	None
Radar Inter switch	NQE-3141-2A (Maximum 2 Radars) NQE-3141-4A (Maximum 4 Radars)
DISPLAY UNIT (Desktop type)	NCD-4990T
Maximum Cable Length	
SCANNER UNIT to TRANSMITTER RECEIVER UNIT	65m
SAFE DISTANCE FOR STANDARD COMPASS	
SCANNER UNIT	2.4m
DISPLAY UNIT	4.0m

11.6 JMA-9110-6XA TYPE RADAR

GENERAL SPECIFICATION	
Class of emission	P0N
Display	Color Raster Scan
Screen	23.1inch LCD (Effective diameter of Radar: more than 320mm)
Range Scale	0.125, 0.25, 0.5, 0.75, 1.5, 3, 6, 12, 24, 48, 96NM
Range Resolution	less than 30m
Minimum Detection Range	less than 40m
Bearing Accuracy	less than 1°
Bearing Indication	Relative motion mode : N-UP, C-UP and H-UP True motion mode : N-UP and C-UP
Ambient Condition	Temperature SCANNER UNIT -25 to +55℃ (Storage -25 to +70℃) Other Unit -15 to +55℃ Relative humidity 93% at +40℃
Vibration	2 to 13.2Hz Amplitude +/-1mm +/-10% 13.2 to 100Hz Acceleration 7m/s^2
Power Supply Input	AC100 to 115V, 50/60Hz, 1φ or AC220 to 240V, 50/60Hz, 1φ
Power Consumption	Approx.350VA typical Approx. 1000VA at Maximum wind speed
PS Voltage Fluctuation	+/-10% (at the maximum cable length)
Pre Heating Time	Within 4 minute
From STBY to TX	Within 5 sec.
SCANNER UNIT (NKE-2103-6)	
	See 11.13
DISPLAY UNIT (NCD-4990)	
	See 11.17
PERFORMANCE MONITOR (NJU-85)	
	See 11.21
AC-DC CONVERTER (NBA-5135)	
	See 11.22
OPTION	
Scanner with Deicing Heater	None
Radar Inter switch	NQE-3141-2A (Maximum 2 Radars) NQE-3141-4A (Maximum 4 Radars)
DISPLAY UNIT (Desktop type)	NCD-4990T
Maximum Cable Length	
SCANNER UNIT to TRANSMITTER RECEIVER UNIT	65m
SAFE DISTANCE FOR STANDARD COMPASS	
SCANNER UNIT	2.4m
DISPLAY UNIT	4.0m

11.7 JMA-9110-6XAH TYPE RADAR

GENERAL SPECIFICATION	
Class of emission	P0N
Display	Color Raster Scan
Screen	23.1inch LCD (Effective diameter of Radar: more than 320mm)
Range Scale	0.125, 0.25, 0.5, 0.75, 1.5, 3, 6, 12, 24, 48, 96NM
Range Resolution	less than 30m
Minimum Detection Range	less than 40m
Bearing Accuracy	less than 1°
Bearing Indication	Relative motion mode : N-UP, C-UP and H-UP True motion mode : N-UP and C-UP
Ambient Condition	Temperature SCANNER UNIT -25 to +55℃ (Storage -25 to +70℃) Other Unit -15 to +55℃ Relative humidity 93% at +40℃
Vibration	2 to 13.2Hz Amplitude +/-1mm +/-10% 13.2 to 100Hz Acceleration 7m/s^2
Power Supply Input	AC100 to 115V, 50/60Hz, 1φ or AC220 to 240V, 50/60Hz, 1φ
Power Consumption	Approx.350VA typical Approx. 1000VA at Maximum wind speed
PS Voltage Fluctuation	+/-10% (at the maximum cable length)
Pre Heating Time	Within 4 minute
From STBY to TX	Within 5 sec.
SCANNER UNIT (NKE-2103-6HS)	
	See 11.14
DISPLAY UNIT (NCD-4990)	
	See 11.17
PERFORMANCE MONITOR (NJU-85)	
	See 11.21
AC-DC CONVERTER (NBA-5135)	
	See 11.22
OPTION	
Scanner with Deicing Heater	None
Radar Inter switch	NQE-3141-2A (Maximum 2 Radars) NQE-3141-4A (Maximum 4 Radars)
DISPLAY UNIT (Desktop type)	NCD-4990T
Maximum Cable Length	
SCANNER UNIT～DISPLAY UNIT	65m
SAFE DISTANCE FOR STANDARD COMPASS	
SCANNER UNIT	2.4m
DISPLAY UNIT	4.0m

11.8 SCANNER UNIT (NKE-1139)

SCANNER UNIT NKE-1139	
Dimension	Height 791 x Swing Circle 4000 (mm)
Mass	Approx.150kg
Polarization	Horizontal
Directional Characteristics	Horizontal beam width : 1.9° Vertical beam width : 25° Side lobe Level : below -26dB (within +/-10°) : below -30dB (outside +/-10°)
Revolution	Approx.24rpm
Power Supply for Motor	AC100 - 115V、50/60Hz、1φ or AC220 - 240V、50/60Hz、1φ
Maximum Wind Velocity	51.5m/s (100knots)

11.9 SCANNER UNIT (NKE-1130)

SCANNER UNIT NKE-1130	
Dimension	Height 791 x Swing Circle 4000 (mm)
Mass	Approx.180kg
Polarization	Horizontal
Directional Characteristics	Horizontal beam width : 1.9° Vertical beam width : 25° Side lobe Level : below -26dB (within +/-10°) : below -30dB (outside +/-10°)
Revolution	Approx.24rpm
Power Supply for Motor	AC100 - 115V、50/60Hz、1φ or AC220 - 240V、50/60Hz、1φ
Maximum Wind Velocity	51.5m/s (100knots)
Transmitting Frequency	3050±20MHz
Transmitting Power	30kW
Transmitting Tube	Magnetron[M1555]
TX Pulse width / Repetition Frequency	SP1：0.07μs/2250Hz MP1：0.2μs/2250Hz MP2：0.3μs/1900Hz、MP3：0.4μs/1400Hz LP1：0.8μs/750Hz、LP2：1.0μs/650Hz LP3：1.2μs/510Hz
	0.125、0.25、0.5NM : SP1 0.75NM : SP1/MP1 1.5NM : SP1/MP1/MP2/MP3 3NM : MP1/MP2/MP3/LP1 6NM : MP1/MP2/MP3/LP1/LP2 12NM : MP1/MP2/MP3/LP1/LP2 24NM : MP3/LP1/LP2 48NM : LP2 96NM : LP3
Modulator	Solid State Modulator Circuit
Duplexer	Circulator + Diode Limiter
Front End Module	Built-in
Intermediate Frequency Amplifier	Intermediate Frequency : 60MHz Band Width : 25/8/3MHz Gain : more than 90dB Amplifying Characteristics : Logarithmic Amplifier
Overall Noise Figure	7.5dB (Typical)
Tuning	Manual/AUTO

11.10 SCANNER UNIT (NKE-1129-7/9)

SCANNER UNIT NKE-1129-7/9	
Dimension	7ft Height 536 x Swing Circle 2270 (mm) 9ft Height 536 x Swing Circle 2825 (mm)
Mass	7ft Approx.51kg 9ft Approx.53kg
Polarization	Horizontal
Directional Characteristics	Horizontal beam width : 1.0° (7ft) : 0.8° (9ft) Vertical beam width : 20° Side lobe Level : below -26dB (within +/-10°) : below -30dB (outside +/-10°)
Revolution	Approx.24rpm
Power Supply for Motor	AC100 - 115V、50/60Hz、1φ or AC220 - 240V、50/60Hz、1φ
Maximum Wind Velocity	51.5m/s (100knots)

11.11 SCANNER UNIT (NKE-1125-6/9)

SCANNER UNIT NKE-1125-6/9	
Dimension	6ft Height 536 x Swing Circle 1910 (mm) 9ft Height 536 x Swing Circle 2825 (mm)
Mass	6ft Approx. 55kg 9ft Approx. 60kg
Polarization	Horizontal
Directional Characteristics	Horizontal beam width : 1.2° (6ft) : 0.8° (9ft) Vertical beam width : 20° Side lobe Level : below -26dB (within +/-10°) : below -30dB (outside +/-10°)
Revolution	Approx.24rpm
Power Supply for Motor	AC100 - 115V、50/60Hz、1φ or AC220 - 240V、50/60Hz、1φ
Maximum Wind Velocity	51.5m/s (100knots)
Transmitting Frequency	9410±30MHz
Transmitting Power	25kW
Transmitting Tube	Magnetron[M1568BS]
TX Pulse width / Repetition Frequency	SP1：0.07μs/2250Hz MP1：0.2μs/2250Hz MP2：0.3μs/1900Hz、MP3：0.4μs/1400Hz LP1：0.8μs/750Hz、LP2：1.0μs/650Hz LP3：1.2μs/510Hz

0.125、0.25、0.5NM	: SP1
0.75NM	: SP1/MP1
1.5NM	: SP1/MP1/MP2/MP3
3NM	: MP1/MP2/MP3/LP1
6NM	: MP1/MP2/MP3/LP1/LP2
12NM	: MP1/MP2/MP3/LP1/LP2
24NM	: MP3/LP1/LP2
48NM	: LP2
96NM	: LP3

Modulator	Solid State Modulator Circuit
Duplexer	Circulator + Diode Limiter
Front End Module	Built-in
Intermediate Frequency Amplifier	Intermediate Frequency : 60MHz Band Width : 25/8/3MHz Gain : more than 90dB Amplifying Characteristics : Logarithmic Amplifier
Overall Noise Figure	7.5dB (Typical)
Tuning	Manual/AUTO

11.12 SCANNER UNIT (NKE-2254-6HS)

SCANNER UNIT NKE-2254-6HS	
Dimension	Height 536 x Swing Circle 1910 (mm)
Mass	Approx. 55kg
Polarization	Horizontal
Directional Characteristics	Horizontal beam width : 1.2° Vertical beam width : 20° Side lobe Level : below -26dB (within +/-10°) : below -30dB (outside +/-10°)
Revolution	Approx.24rpm
Power Supply for Motor	DC24V
Maximum Wind Velocity	51.5m/s (100knots)
Transmitting Frequency	9410 ± 30MHz
Transmitting Power	25kW
Transmitting Tube	Magnetron[M1568BS]
TX Pulse width / Repetition Frequency	SP1：0.07μs/2250Hz MP1：0.2μs/2250Hz MP2：0.3μs/1900Hz、MP3：0.4μs/1400Hz LP1：0.8μs/750Hz、LP2：1.0μs/650Hz LP3：1.2μs/510Hz
	0.125、0.25、0.5NM : SP1 0.75NM : SP1/MP1 1.5NM : SP1/MP1/MP2/MP3 3NM : MP1/MP2/MP3/LP1 6NM : MP1/MP2/MP3/LP1/LP2 12NM : MP1/MP2/MP3/LP1/LP2 24NM : MP3/LP1/LP2 48NM : LP2 96NM : LP3
Modulator	Solid State Modulator Circuit
Duplexer	Circulator + Diode Limiter
Front End Module	Built-in
Intermediate Frequency Amplifier	Intermediate Frequency : 60MHz Band Width : 25/8/3MHz Gain : more than 90dB Amplifying Characteristics : Logarithmic Amplifier
Overall Noise Figure	7.5dB (Typical)
Tuning	Manual/AUTO

11.13 SCANNER UNIT (NKE-2103-6)

SCANNER UNIT NKE-2103-6HS	
Dimension	Height 458 x Swing Circle 1910 (mm)
Mass	Approx. 40kg
Polarization	Horizontal
Directional Characteristics	Horizontal beam width : 1.2° Vertical beam width : 20° Side lobe Level : below -26dB (within +/-10°) : below -30dB (outside +/-10°)
Revolution	Approx.24rpm
Power Supply for Motor	DC24V
Maximum Wind Velocity	51.5m/s (100knots)
Transmitting Frequency	9410 ± 30MHz
Transmitting Power	10kW
Transmitting Tube	Magnetron[MAF1565N]
TX Pulse width / Repetition Frequency	SP1 : 0.08μs/2250Hz MP1 : 0.25μs/1700Hz MP2 : 0.5μs/1200Hz LP1 : 0.8μs/750Hz、LP2 : 1.0μs/650Hz
	0.125、0.25、0.5NM : SP1 0.75NM : SP1/MP1 1.5NM : SP1/MP1/MP2 3NM : MP1/MP2LP1 6NM : MP1/MP2/LP1/LP2 12NM : MP1/MP2/LP1/LP2 24NM : MP2/LP1/LP2 48NM : LP2 96NM : LP2
Modulator	Solid State Modulator Circuit
Duplexer	Circulator + Diode Limiter
Front End Module	Built-in
Intermediate Frequency Amplifier	Intermediate Frequency : 60MHz Band Width : 20/6/3MHz Gain : more than 90dB Amplifying Characteristics : Logarithmic Amplifier
Overall Noise Figure	7.5dB (Typical)
Tuning	Manual/AUTO

11.14 SCANNER UNIT (NKE-2103-6HS)

SCANNER UNIT NKE-2103-6HS	
Dimension	Height 458 x Swing Circle 1910 (mm)
Mass	Approx. 40kg
Polarization	Horizontal
Directional Characteristics	Horizontal beam width : 1.2° Vertical beam width : 20° Side lobe Level : below -26dB (within +/-10°) : below -30dB (outside +/-10°)
Revolution	Approx.24rpm
Power Supply for Motor	DC24V
Maximum Wind Velocity	51.5m/s (100knots)
Transmitting Frequency	9410±30MHz
Transmitting Power	10kW
Transmitting Tube	Magnetron[MAF1565N]
TX Pulse width / Repetition Frequency	SP1：0.08μs/2250Hz MP1：0.25μs/1700Hz MP2：0.5μs/1200Hz LP1：0.8μs/750Hz、LP2：1.0μs/650Hz
	0.125、0.25、0.5NM : SP1 0.75NM : SP1/MP1 1.5NM : SP1/MP1/MP2 3NM : MP1/MP2LP1 6NM : MP1/MP2/LP1/LP2 12NM : MP1/MP2/LP1/LP2 24NM : MP2/LP1/LP2 48NM : LP2 96NM : LP2
Modulator	Solid State Modulator Circuit
Duplexer	Circulator + Diode Limiter
Front End Module	Built-in
Intermediate Frequency Amplifier	Intermediate Frequency : 60MHz Band Width : 20/6/3MHz Gain : more than 90dB Amplifying Characteristics : Logarithmic Amplifier
Overall Noise Figure	7.5dB (Typical)
Tuning	Manual/AUTO

11.15 TRANSMITTER RECEIVER UNIT (NTG-3230)

SCANNER UNIT NTG-3230	
Dimension	:Width 615 x Depth 365 x Height 615 (mm)
構造	Wall Mount, Drip Proof
Mass	Approx.33kg
Transmitting Frequency	3050±20MHz
Transmitting Power	30kW
Transmitting Tube	Magnetron [M1555]
TX Pulse width / Repetition Frequency	SP1：0.07μs/2250Hz MP1：0.2μs/2250Hz MP2：0.3μs/1900Hz、MP3：0.4μs/1400Hz LP1：0.8μs/750Hz、LP2：1.0μs/650Hz LP3：1.2μs/510Hz

0.125、0.25、0.5NM	：SP1
0.75NM	：SP1/MP1
1.5NM	：SP1/MP1/MP2/MP3
3NM	：MP1/MP2/MP3/LP1
6NM	：MP1/MP2/MP3/LP1/LP2
12NM	：MP1/MP2/MP3/LP1/LP2
24NM	：MP3/LP1/LP2
48NM	：LP2
96NM	：LP3

Modulator	Solid State Modulator Circuit	
Duplexer	Circulator + TRHPL	
Front End Module	Built-in	
Intermediate Frequency Amplifier	Intermediate Frequency	：60MHz
	Band Width	：25/8/3MHz
	Gain	：more than 90dB
	Amplifying Characteristics	：Logarithmic Amplifier
Overall Noise Figure	7.5dB (Typical)	
Tuning	Manual/AUTO	

11.16 TRANSMITTER RECEIVER UNIT (NTG-3225)

SCANNER UNIT NTG-3225	
Dimension	:Width 460 x Depth 227 x Height 461 (mm)
構造	Wall Mount, Drip Proof
Mass	Approx.15kg
Transmitting Frequency	9410±30MHz
Transmitting Power	25kW
Transmitting Tube	Magnetron[M1568BS]
TX Pulse width / Repetition Frequency	SP1：0.07μs/2250Hz MP1：0.2μs/2250Hz MP2：0.3μs/1900Hz、MP3：0.4μs/1400Hz LP1：0.8μs/750Hz、LP2：1.0μs/650Hz LP3：1.2μs/510Hz

0.125、0.25、0.5NM	: SP1
0.75NM	: SP1/MP1
1.5NM	: SP1/MP1/MP2/MP3
3NM	: MP1/MP2/MP3/LP1
6NM	: MP1/MP2/MP3/LP1/LP2
12NM	: MP1/MP2/MP3/LP1/LP2
24NM	: MP3/LP1/LP2
48NM	: LP2
96NM	: LP3

Modulator	Solid State Modulator Circuit
Duplexer	Circulator + Diode Limiter
Front End Module	Built-in
Intermediate Frequency Amplifier	Intermediate Frequency : 60MHz Band Width : 25/8/3MHz Gain : more than 90dB Amplifying Characteristics : Logarithmic Amplifier
Overall Noise Figure	7.5dB (Typical)
Tuning	Manual/AUTO

11.17 DISPLAY UNIT (NCD-4990)

DISPLAY UNIT NCD-4990	
Dimension	Width 700 x Depth 850 x Height 1100 (mm)
Structure	Self-Standing, Drip Proof
Mass	Approx.130kg
Screen	23.1inch Color LCD (Effective Diameter, more than 320mm)
Viewing Distance	1m from the center of Display
Range Scale	0.125, 0.25, 0.5, 0.75, 1.5, 3, 6, 12, 24, 48, 96NM
Range Marker	0.025, 0.05, 0.1, 0.25, 0.5, 1, 2, 4, 8, 16NM
Range Accuracyr	Less than 1% of the Range Scale in use, or 30m whichever is larger
Variable Range Marker	2 (VRM1/VRM2)
VRM Scale	0.000 to 100.0nm, Numerical Indication in 4 digits
Bearing Scale	360° in 1° step
Off Center	Within 66% of Radius, except 96nm range
Trackball Cursor	Built-in (Target Range, Relative/True bearing Presentation)
Electronic Bearing Lines	2 (EBL1/EBL2) (on Center/Floating)
EBLBearing Indication	000.0° to 359.9° Numerical Indication in 4 digits
Tuning Indication	Bar graph
Marking Function	Electronic Mark (Maximum 20 points)
Heading Line Indication	Electronic
True Motion Unit	Built in (0.25, 0.5, 0.75, 1.5, 3, 6, 12, 24 and 48nm)
Anti Sea Clutter (SEA)	Manual/AUTO
Anti Rain Clutter (SEA)	Manual/AUTO
Display mode	North-up / Head-up / Course-up
Trails Indication	Off/0.25/0.5/1/3/6/10/15min and Continues
Video Process (PROC)	Built in (Scan correlation / Remain)
Interference Rejection (IR)	Built in (Off / Low / Middle / High)
Auto-acquisition Zone (AZ)	Sector (2)
User Map[i]	Built in, Mark and Line (20,000 points)
Self diagnostic function	Built in
Own Ship's Track Indication[i]	Built in
Parallel Index Line (PI)	Built in
AIS Indication	Built in Display 300 Activate 100 Association function:Built in
Interfacing	Slave Display (TRG, VD, BP, BZ) GPS IEC61162-1(NMEA0183) LOG GYRO AIS IEC61162-2 Inter Switch (OPTION) Radar Buoy External Alarm output
Receivable Signal	

	Receive capability Port:	NAV1/ALM/ARPA/JARPA at terminal board TB4501 COM port (D-Sub 9 PIN)	
	Navigation equipment IEC61162-1/2	Longitude/Latitude	GGA>RMC>RMA>GNS>GLL
		Waypoint	RMB>BWC(BWR)
		COG/SOG	RMC > RMA > VTG
		SPEED	VBW
		Day/Time information	ZDA
		Alarm acknowledge	ACK
		Rate of Turn	ROT
		Rudder	RSA
	Bearing signal	GYRO-SYNC	360x, 180x, 90x, 36x(GYRO I/F)
		GYRO-STEP	360x, 180x, 90x, 36x(GYRO I/F)
		IEC61162-2 38400bps	THS>HDT over 40Hz (HDG port at terminal board TB4501)
		IEC61162-1[ii]	HDT>HDG>HDM>VHW (HDG port at terminal board TB4501)
	Speed signal	LOG-SYNC	360x, 180x, 90x, 30x(GYRO I/F)
		LOG-PULSE	800, 400, 200, 100(GYRO I/F)
	External event mark	Contact input (EVENT port at terminal board TB4601)	
	Radar buoy	Negative input (RBVD port at terminal board TB4401)	
	Depth	IEC61162-1/JRC	DPT>DBS>DBT>DBK, JRC format
	Water temperature	IEC61162-1/JRC	MTW, JRC format
	Tendency	IEC61162-1/JRC	CUR, JRC format
	Wind	IEC61162-1	MWV>MWD
	AIS	IEC61162-2	VDM,VDO (AIS port at terminal board TB 4601)
	Acknowledge	Contact input (SYSACK, ARPAACK, PWRACK port at terminal board TB4601)	
Sendable Signal			
	Slave video	Radar video: TIY, VD, BP(2048p), BZ (Terminal board TB4401)	
	Send capability Port	NAV1, NAV2, ALM, ARPA, JARPA port at terminal board TB4303. COM port (D-Sub 9 PIN)	
	Navigation information IEC61162-1/2	Radar system data	RSD
		Own ship data	OSD
		Tracking target data	TTM,TLL,TTD,TLB,JRC-ARPA
		AIS target data	TTM,TLL,TTD,TLB
		Alarm	ALR
		Auto pilot	APB
		Bearing of destination	BOD
		Latitude/Longitude data	GGA,GLL,RMC
		Waypoint	RMB,BWC
		COG/SOG	VTG
		Cross track error	XTE
		Heading data	HDT,THS
	External alarm	Default setting	normally closed contact

	Maximum current	200mA (SYSALM, ALPAALM, PWRALM port at terminal board TB4601)
Acknowledge	Contact output (ACKOUT port at terminal board TB4401)	
Watchman reset	Contact output (WMRST port at terminal board TB4401)	
Remote maintenance	JRC format (MNT port at terminal board TB4601)	
AIS alarm acknowledge	ACK (AIS port at terminal board TB4601)	
External monitor	Multi scan monitor	Analog RGB, HD15pin Connector 2 port

i. Only with Navigation Equipment is connected.
The Speed measuring accuracy of speed sensor shall confirm to IMO Resolution MSC.96(72).
The measuring accuracy of GPS shall confirm to IMO Resolution MSC.112(73).

ii. Can't be use for target tracking.

11.18 Target Tracking Function

Target Tracking Function					
Available range scale	All range				
Acquisition	Acquisition mode	Manual/AUTO（AUTO mode uses Auto-acquisition Zone）			
	Manual Cancellation	Any one Target or All targets at once			
Tracking	Number of Target	100 Targets (AUTO Tracking)			
	Maximum tracking range	32nm (Available all range scale)			
Presentation	Display mode	TM (True Motion) / RM (Relative Motion)			
	Azimuth mode	North-up / Head-up / Course-up			
	Vector mode	True/Relative Display			
	Vector Length	Variable, 1 to 60 min. (1min. step)			
	Past Position	True/Relative Display Number of Dots…10 points Display Interval Time…0.5 / 1 / 2/ 4 min			
	Time to Display Vector	Within 1min			
	Time to Stabilize Vector	Within 3min			
Alarm	Auto-acquisition Zone	2 (sector)			
	Setting Range	AZ1 (0.5～32NM),AZ2 (0.5～32NM)			
	Alarm Indication	Symbol on Display, Visible / Audible Alarm			
Safe Limits （CPA／TCPA）	Setting Condition	CPA LIMIT	0.1 to 9.9NM		
		TCPA LIMIT	1 to 99 minute		
	Setting Condition	Safe Target	CPA＞CPA LIMIT		
			0＞TCPA		
			TCPA＞TCPA LIMIT		
		Danger Target	CPA≦CPA LIMIT		
			0≦TCPA≦TCPA LIMIT		
	Alarm Indication	Status	Symbol	Alarm	Audible
		Safe Target	○(wht)	OFF	OFF
		Danger Target	○(red)	CPA/TCPA	ON
	Lost Target	Symbol on Display Visible / Audible Alarm			
Data Indication	Target Data	Simultaneous and Continuous Display for 4 Targets True Bearing, Range, True Course, True Speed,CPA,TCPA,BCR,BCT			
	Own Ship's Data	Course and Speed			
Trial Maneuver	Manual Setting				
	Trial Course	0° to 359.9°			
	Trial Speed	0 to 100 kn			
Accuracy of Display	Complied with IMO Requirement				
System Failure Alarm	Visible / Audible Alarm				
Speed Input	Manual/AUTO (LOG)				

11.19 AIS FUNCTION

AIS機能

Available range scale: All range

Activation	Activation mode	Manual/AUTO（AUTO mode uses Auto-activation Zone）	
	Manual Cancellation	Any one Target	
Presentation	Number of Activated Target	100 Targets	
	Number of Target	300 Targets (sleeping target and activated target)	
	Past Position	True/Relative Display	
		Number of Dots…10 points	
		Display Interval Time…0.5 / 1 / 2/ 4 min	
		Display Interval distance…0.1 / 0.2 / 0.5/ 1 NM	
	Message	Broadcast Message, Addressed Message	
	Display mode	TM (True Motion) / RM (Relative Motion)	
	Azimuth mode	North-up / Head-up / Course-up	
	Vector mode	True/Relative Display	
	Vector Length	Variable, 1 to 60 min. (1min. step)	
Alarm	Auto-activation Zone	2 (Sector)	
	Setting Range	AZ1(0.5 to 32nm), AZ2(0.5 to 32nm)	
	Alarm Indication	Symbol on Display, Visible / Audible Alarm	
Safe Limits （CPA／TCPA）	Setting Condition	CPA LIMIT	0.1 to 9.9NM
		TCPA LIMIT	1 to 99min

Alarm Condition

Safe Target	CPA > CPA LIMIT
	0 > TCPA
	TCPA > TCPA LIMIT
Danger Target	CPA ≦ CPA LIMIT
	0 ≦ TCPA ≦ TCPA LIMIT

Alarm Indication

Status	Symbol	Alarm	Audible
Safe Target	△(wht)	OFF	OFF
Danger Target	△(red)	CPA/TCPA	ON

	Lost Target	Symbol on Display Visible / Audible Alarm
Data Indication	Target Data	Simultaneous and Continuous Display for 2 Targets
	simple display	Ship's Name, Call Sign, MMSI, Course, Speed, CPA and TCPA
	detail display	Ship's Name, Call Sign, MMSI, Course, Speed, CPA, TCPA, Bearing, Range, Ship's Heading Bearing, Rate of Turn, Latitude, Longitude, Destination and Navigation Status
	Own Ship's Data	The ship's name, call sign, MMSI, course, speed, ship's heading bearing, rate of turn, latitude, longitude, destination and navigation status of own ship
Trial Maneuver	Manual Setting	
	Trial Course	0° to 360°
	Trial Speed	0 to 100 kn

Accuracy of Display	Complied with IMO Requirement
System Failure Alarm	Visible / Audible Alarm
Speed Input	Auto (LOG)

11.20 PERFORMANCE MONITOR (NJU-84)

PERFORMANCE MONITORNJU-84	
Dimension	Width 130 x Depth 180 x Height 70 (mm)
Mass	Approx.0.7kg
Operating Frequency	3050 ± 30MHz

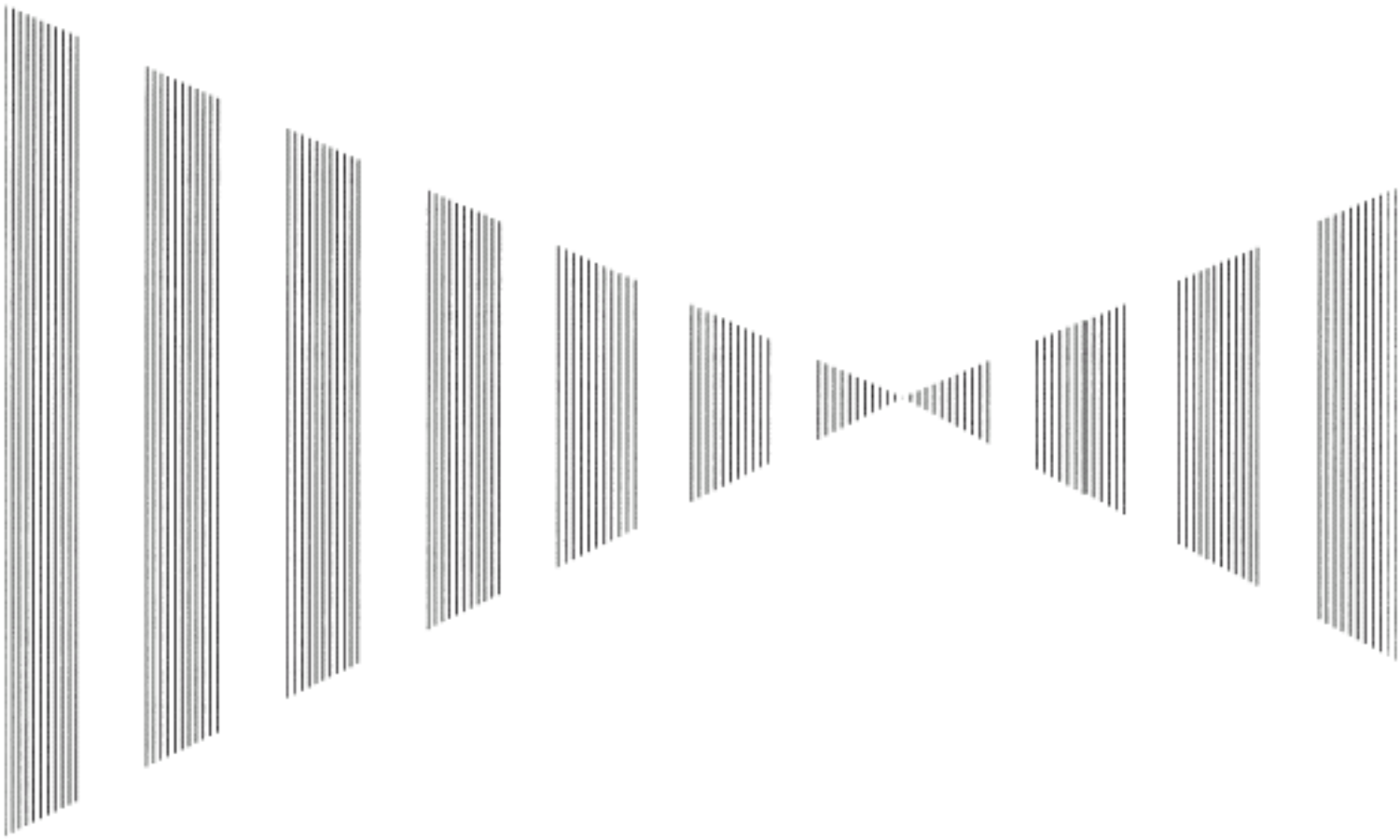
11.21 PERFORMANCE MONITOR (NJU-85)

PERFORMANCE MONITORNJU-85	
Dimension	Width 130 x Depth 149 x Height 70 (mm)
Mass	Approx.0.7kg
Operating Frequency	9410 ± 30MHz

11.22 AC-DC CONVERTER (NBA-5135)

AC-DC CONVERTERNBA-5135	
Dimension	Width 315 x Depth 385 x Height 99 (mm)
Mass	Approx.5kg
Power supply Input	AC100 to 240V, 50/60Hz, 1φ
Output Voltage	DC24V +/-5%
Output Current	12A max

Appendix A
NQE-3141 Interswitch Unit



NQE-3141 Interswitch Unit

A.1 OVERVIEW

A.1.1 Overview

Interswitch NQE-3141 is equipment that enables free changeover between radar display units installed on the bridge and antenna units having different characteristics.

If display unit is turned off or malfunctioned, the scanner unit can be controlled by other display unit.

If interswitch unit had malfunctioned, the radar system is switched to standalone mode.

Up to 8 units can be changed over.

When the connected scanner is changed, following setting values are automatically loaded.

Tune Adjustment	Section 7.1.3 "Tuning (Tune Adjustment)"
Bearing Adjustment	Section 7.1.4 "Bearing Adjustment"
Range Adjustment	Section 7.1.5 "Range Adjustment"
Antenna Height	Section 7.1.8 "Antenna Height Setting (Antenna Height)"
Antenna installation location	Section 7.1.9 "Setting of CCRP (CCRP Setting)"
Sector Blank	Section 7.2.2 "Sector Blank Setting (Sector Blank)"
TNI Blank	Section 7.2.3 "TNI Blank Setting (TNI Blank)"
Performance monitor adjustment	Section 7.3.4 "Adjustment of Performance Monitor"
PRF Fine Tuning	Section 3.8.3 "Set Scanner Unit (TXRX Setting)"

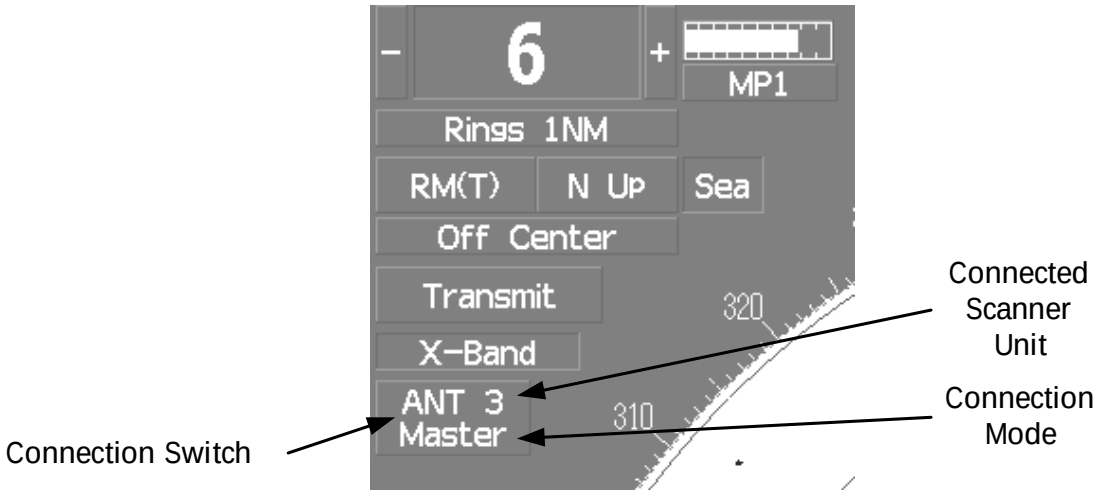
A.1.2 Interswitch Setup

Connection modes can be changed simply by changing the interswitch connection (upper left of the display).

A master display unit is always necessary for establishing a slave connection.

Before a slave display unit can be placed in transmission state, the master display unit must be placed in transmission state.

upper left of the display



The upper stand indicates the number of the connected scanner unit.

The lower stand indicates the connection mode.

Master :Mode in which the scanner unit can be controlled by the display unit

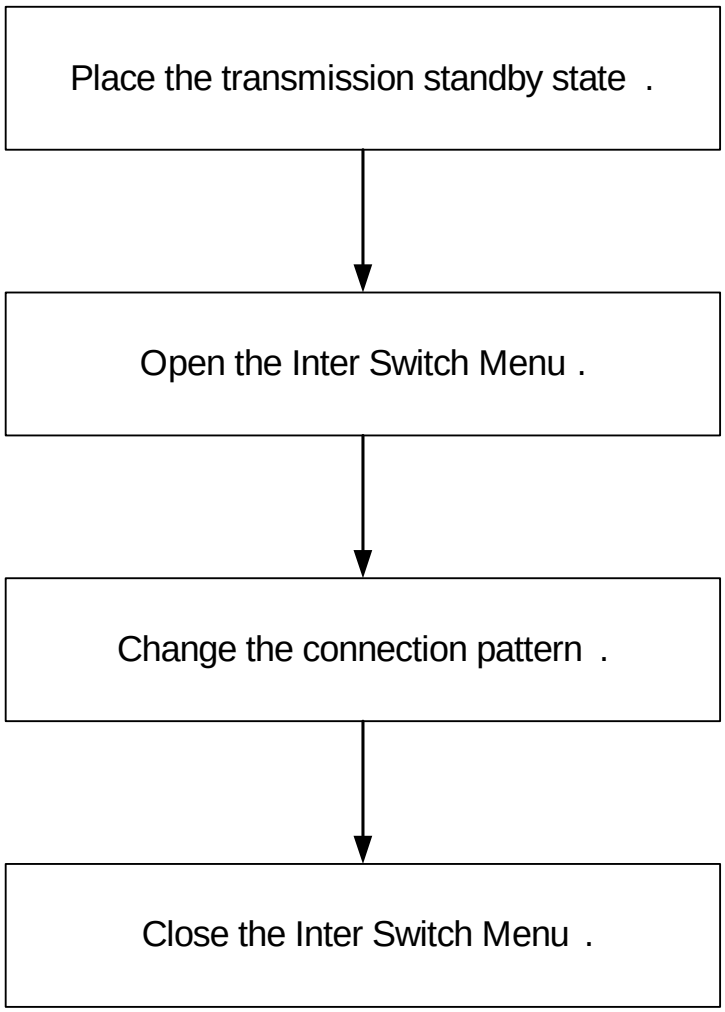
Slave :Mode in which the scanner unit cannot be controlled[i]

i. When Slave is selected, transmission / standby and pulse length cannot be changed. The available range is also limited.

A.2 INTERSWITCH OPERATION

Follow the flowchart below to change the current interswitch connection pattern.

A.2.1 Operation Flow



A.2.2 Inter Switch Menu

The Inter Switch Menu can be opened only when the transmission standby state.

Procedures

1) **Press the [TX/STBY] key to stop transmitting.**

The transmission standby state will be placed.

2) **Move the cursor onto the Interswitch connection change (upper left of the display), and left-click.**

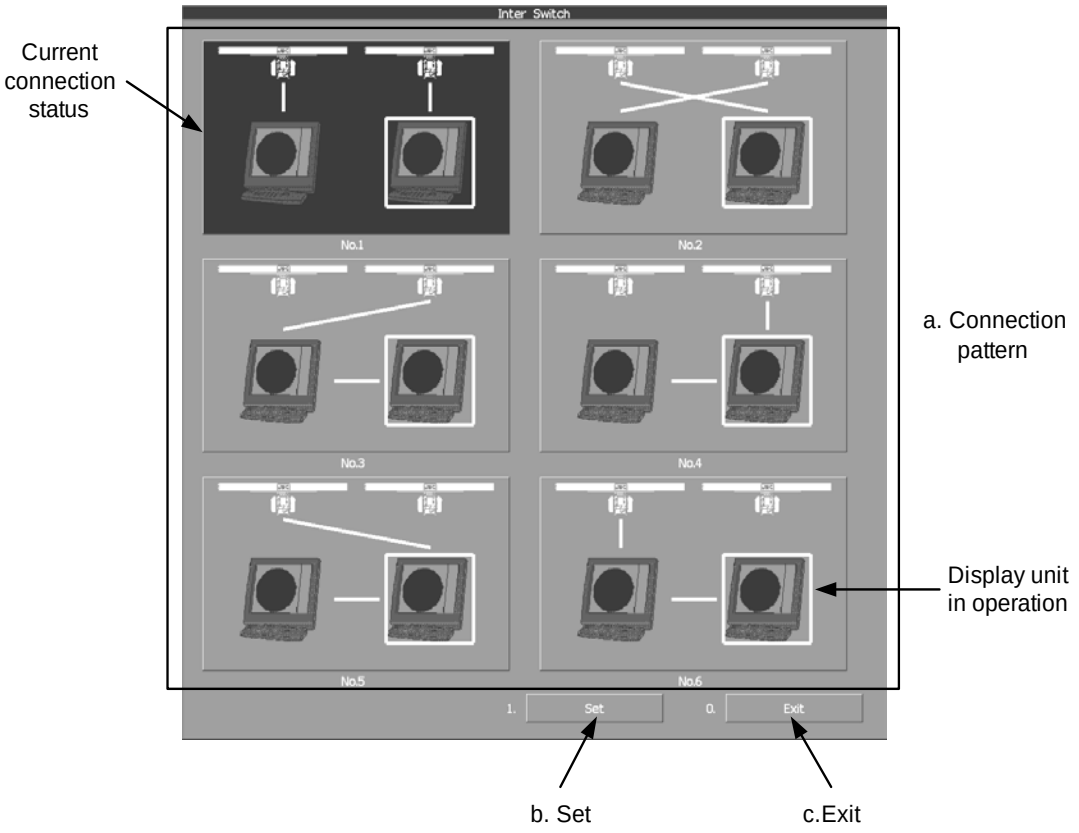
The Inter Switch Menu will appear.

Exit

1) **Left-click the** 0.Exit **button.**

The Inter Switch Menu will close.

Inter Switch Menu (with 2 Display Units)



a. Connection pattern

If this button is clicked, the connection pattern is selected.

The display unit in operation is enclosed in a square ☐.

The background of the current connection pattern display is highlighted.

b. Set

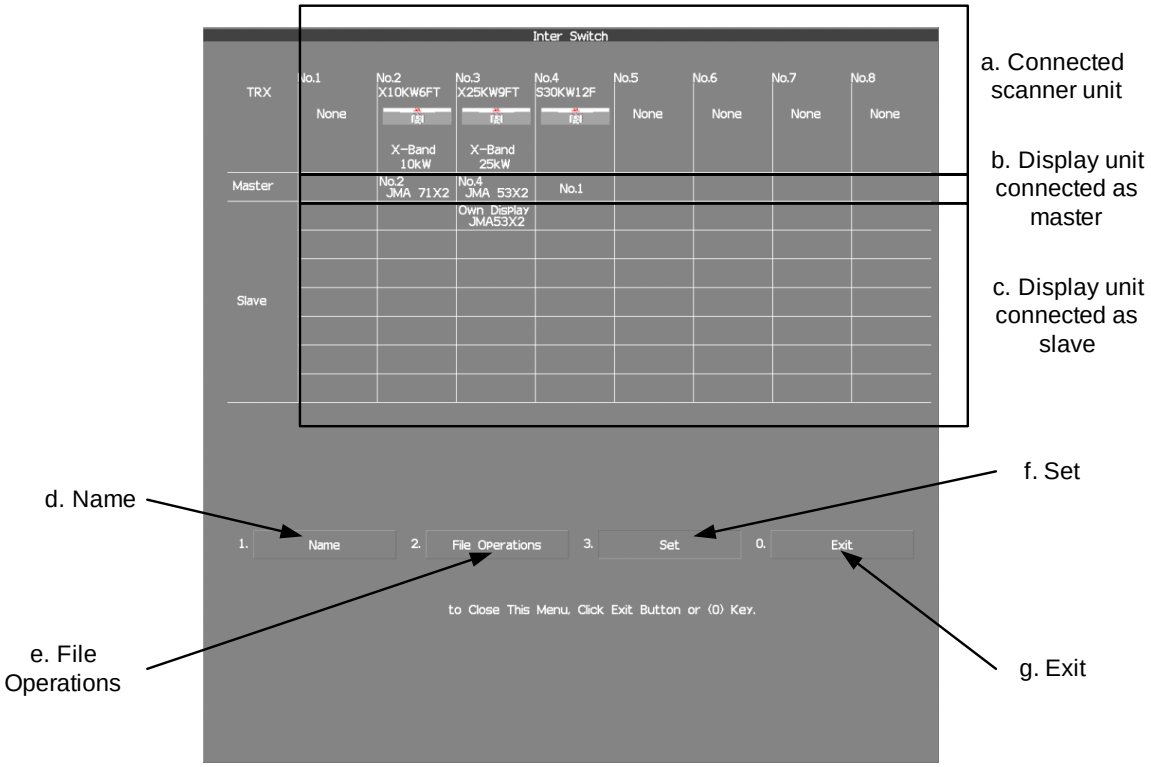
If this button is clicked, the change of connection is determined.

c. Exit

If this button is clicked, the Inter Switch Menu is closed .

> If only 2 display units are installed but the interswitch is set for 3 or more display units, the Inter Switch Menu for 3 or more display units will appear.

Inter Switch Menu (with 3 or More Display Units)



a. Connected scanner unit

In mode for naming a display unit or antenna unit, clicking on a unit opens the name input window.

b. Display unit connected as master

c. Display unit connected as slave

If this button is clicked, select / cancel the display unit.

If this button is clicked in the naming a display unit or scanner unit mode , the name input window is opened .

d. Name

If this button is clicked, set to the display or scanner unit rename mode.

e. File Operations

If this button is clicked, the File Operations menu is opened.。

f. Set

If this button is clicked, the change of connection is determined.

g. Exit

If this button is clicked, the Inter Switch Menu is closed .

A.2.3 Change of Connection Pattern (with 2 Display Units)

If two display units are installed, a connection pattern needs to be selected.

Procedures

1) **Open the Inter Switch menu (with 2 Display Units).**

2) **Move the cursor onto the Connection pattern** (see Section A.2.2 "Inter Switch Menu" and Section a. "Connection pattern") **to be changed , and left-click.**

The connection pattern will be selected, and 3. Set (Section b. "Set") will blink.

3) **Left-click the** 3. Set **button.**

The connection pattern will be changed.

A.2.4 Change of Connection Pattern (with 3 or More Display Units)

If three or more display units are installed, the layout of connection patterns needs to be set.

Procedures

1) **Open the Inter Switch Menu (with 3 or More Display Units).**

2) **Move the cursor onto the display unit** (Section b. "Display unit connected as master" or Section c. "Display unit connected as slave") **to be changed , and left-click.**

The selected display unit will be highlighted.

To deselect the display unit, left-click key again.

3) **Move the cursor to the change-destination display unit, and left-click.**

he selected display unit in step 2 will be switched to the change-destination display unit, and 3. Set (Section f. "Set") will blink.

If the change destination is empty, control will move and 3. Set will blink.

4) **Left-click the 3. Set button.**

The connection pattern will be changed.

> A master display unit is always necessary for establishing a slave connection.

A

A.2.5 Operating Connection Pattern Files (File Operations)

Frequently used connection patterns can be read easily by saving interswitch connection patterns.

[1] Loading connection patterns (Load)

Procedures

1) **Open the Inter Switch Menu (with 3 or More Display Units).**

2) **Left-click the** 2. File Operation **button.**

The File Operations menu will appear.

3) **Left-click the** 3. Load **button.**

Currently saved connection patterns in memory will be listed.

4) **Left-click the button corresponding to the file to be loaded.**

Confirmation Window will appear.

5) **Left-click the** 1. Yes **to load.**

The connection pattern will be changed.

[2] Saving connection patterns (Save)

Procedures

1) **Open the Inter Switch Menu (with 3 or More Display Units).**

2) **Left-click the** 2. File Operation **button.**

The File Operations window will appear.

3) **Left-click the** 2. Save **button.**

The Save menu will appear.

Currently saved connection patterns in memory will be listed.

4) **Left-click the button corresponding to the file to be saved.**

The Input File Name window will appear.

5) **Enter the file name to be saved.**

Up to 8 characters can be entered.For the input method on the character input screen, see Section 3.3.4.7 "Entering a character".

The connection pattern will be saved when the name is input.

[3] Erasing a connection pattern (Erase)

Procedures

1) **Open the Inter Switch Menu (with 3 or More Display Units).**

2) **Left-click the** 2. File Operation **button.**

The File Operations window will appear.

3) **Left-click the** 3. Erase **button.**

The Erase menu will appear.

The list of connection patterns stored in the memory will be displayed.

4) **Left-click the button corresponding to the file to be erased.**

Confirmation Window will appear.

5) **Left-click the** 1. Yes **to load.**

The selected connection pattern is erased and the file name is deleted from the list.

A.2.6 Names of Display Units and Scanner Units

The display units and antenna units can be named.

Procedures

1) **Open the Inter Switch Menu (with 3 or More Display Units).**

2) **Left-click the** 1. Name **button.**

"Name" will be highlighted, indicating that the rename mode is activated.

3) **Move the cursor to the display unit** (Section b. "Display unit connected as master" or Section c. "Display unit connected as slave") **or scanner unit** (Section a. "Connected scanner unit") **to be renamed , and left-click.**

he Input IND Name or the Input TXRX Name window will appear.

4) **Input a new unit name.**

Up to 8 characters can be input as a unit name. For the input method on the character input menu, see Section 3.3.4.7 "Entering a character".

The selected display unit or antenna unit will be renamed when the new name is input.

A.3 REFERENCE

A.3.1 Preheat Time after Change of Connection Pattern

After the current interswitch connection pattern has been changed, operation needs to wait until the system is ready. This is because the preheat time varies depending on the previous connection of the scanner unit and display unit.

The wait time is necessary for protecting the electronic tubes that emit radio waves.

a) When not changed to a new connection pattern	Preheating not required
b) When changed to a new connection pattern and an scanner unit had been used before the change	Preheating not required
c) When changed to a new connection pattern and an scanner unit had not been used before the change	Preheating required

A.3.2 Notes on Changing Connection Pattern

An attempt to change to another connection pattern immediately after the completion of connection pattern change may fail.

This is because internal processing still needs some preparation time upon completion of connection pattern change. Let several seconds pass between connection pattern change operations.

A.3.3 Notes on Connecting Slave Display Unit

Before a slave display unit can be placed in transmission state, the master display unit must be placed in transmission state. If the master display unit is moved from the transmission state to the transmission standby state, the slave display unit is forcibly placed in transmission standby state. When they are in transmission standby state, TXRX Standby is shown in the alarm indication (lower right of the display), and the alarm sounds.

A slave display unit cannot control tune. Tune is controlled by the master display unit. Slave is shown in the transmitter pulse length (upper left of the display).

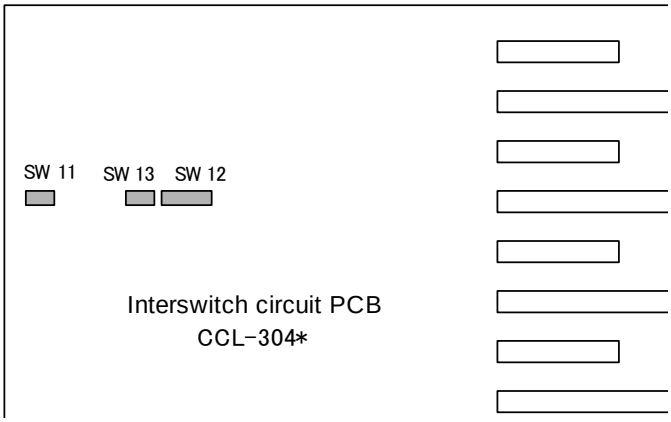
Range change for a slave display unit is limited by the range and pulse length / repetition frequency of the master display unit. As a rule, a greater range than the range of the master display unit cannot be set for a slave display unit. However, if the transmitter pulse length of a slave display unit is identical to the master display unit's and the repetition frequency is within the master display unit's, a greater range than the master display unit's can be selected for the slave display unit. When the master display unit narrows the range or changes the transmitter

pulse length, the range of the slave display unit may be forcibly changed. In this case, Master Range CHG is shown in the alarm indication (lower right of the display), and the alarm sounds.

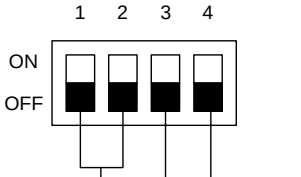
A.3.4 Setting at Installation

Setting of the interswitch circuit (CCL-304*)

The settings of the DIP switches SW11 to SW13 are shown below.



1) **SW11 setting (extension mode and master/slave settings)**



Extension mode setting

4	Description
ON	Extension mode
OFF	Normal mode

Set the switch to OFF if the number of connected display units is four or less.

Master/slave setting

3	Description
ON	Slave
OFF	Master

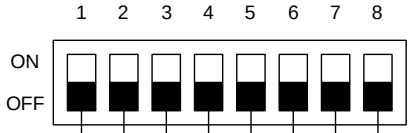
Set the switch to ON if the slave ISW PCB is selected in extension mode.

Unused

1, 2	Description
ON	Unused
OFF	Unused

Set the switch to OFF in normal state.

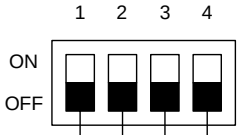
2) SW12 setting (radar connection settings)



Radar connection settings

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

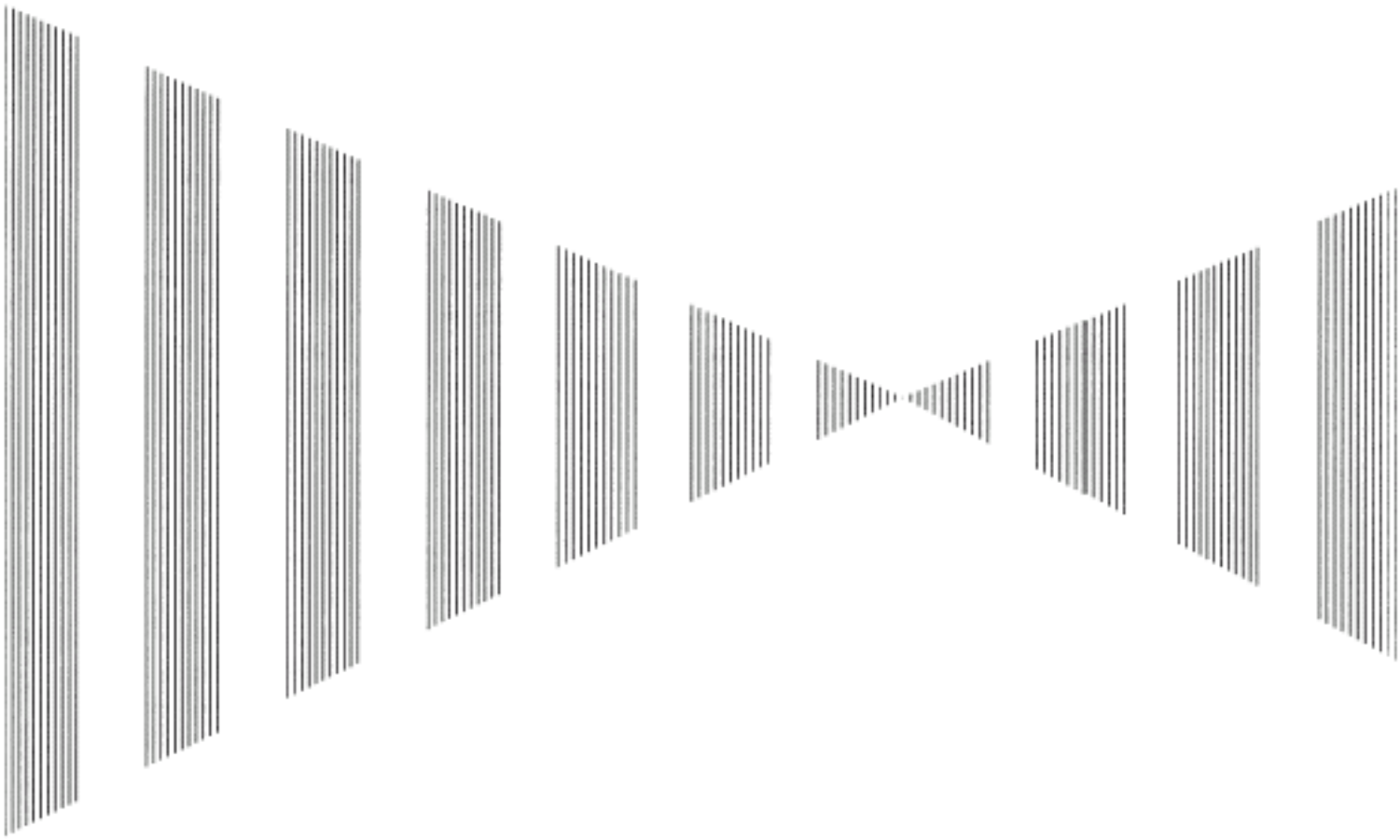
3) SW13 (unused)



1,2,3,4	Unused (All OFF)

Before the DIP switches of the interswitch circuit can be set, the interswitch breaker must be turned off in order to ensure safety operation.

Appendix B
DRAWINGS



DRAWINGS

B.1 Interconnection Diagram of Display Unit

B.1.1 NCD-4990

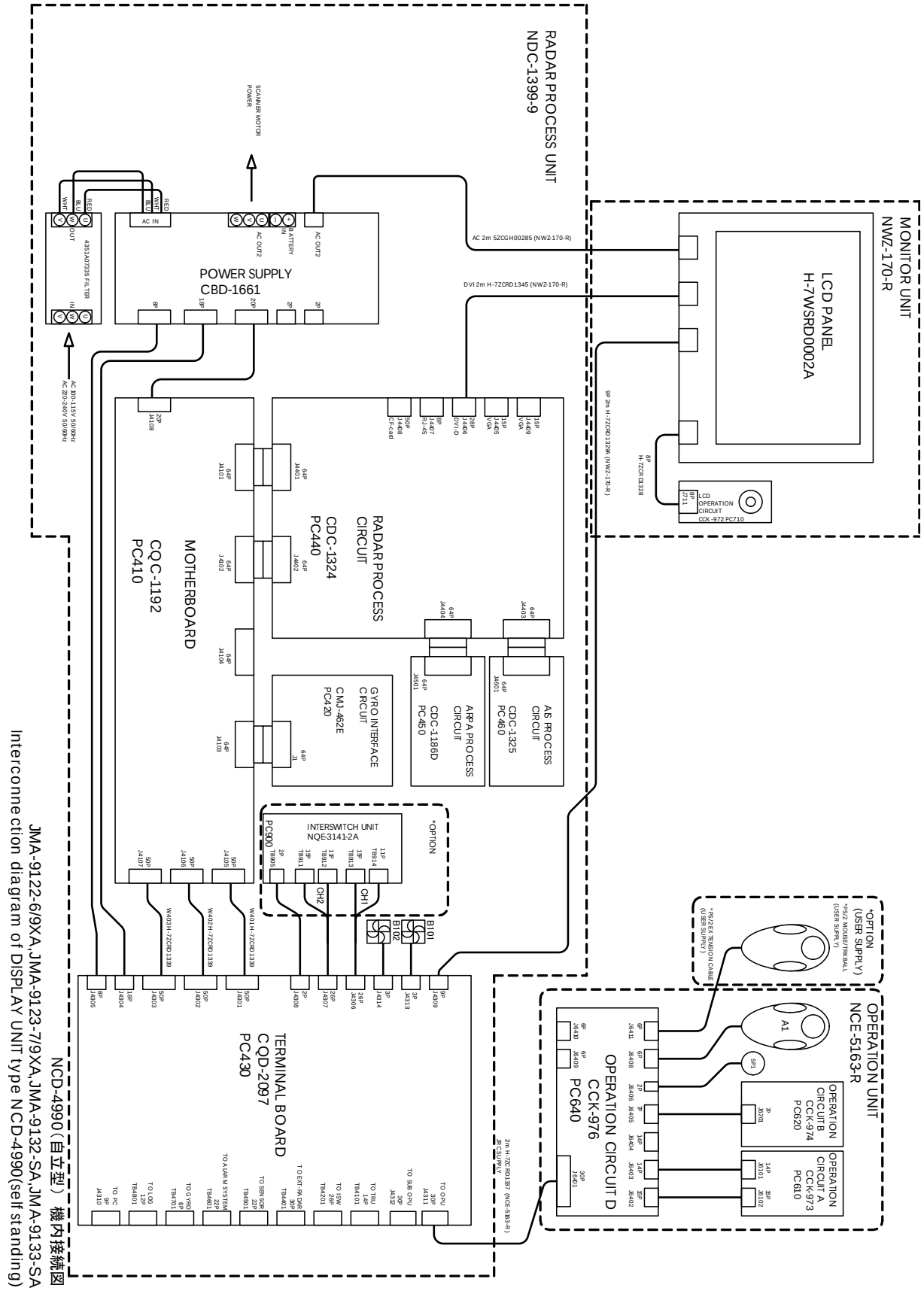
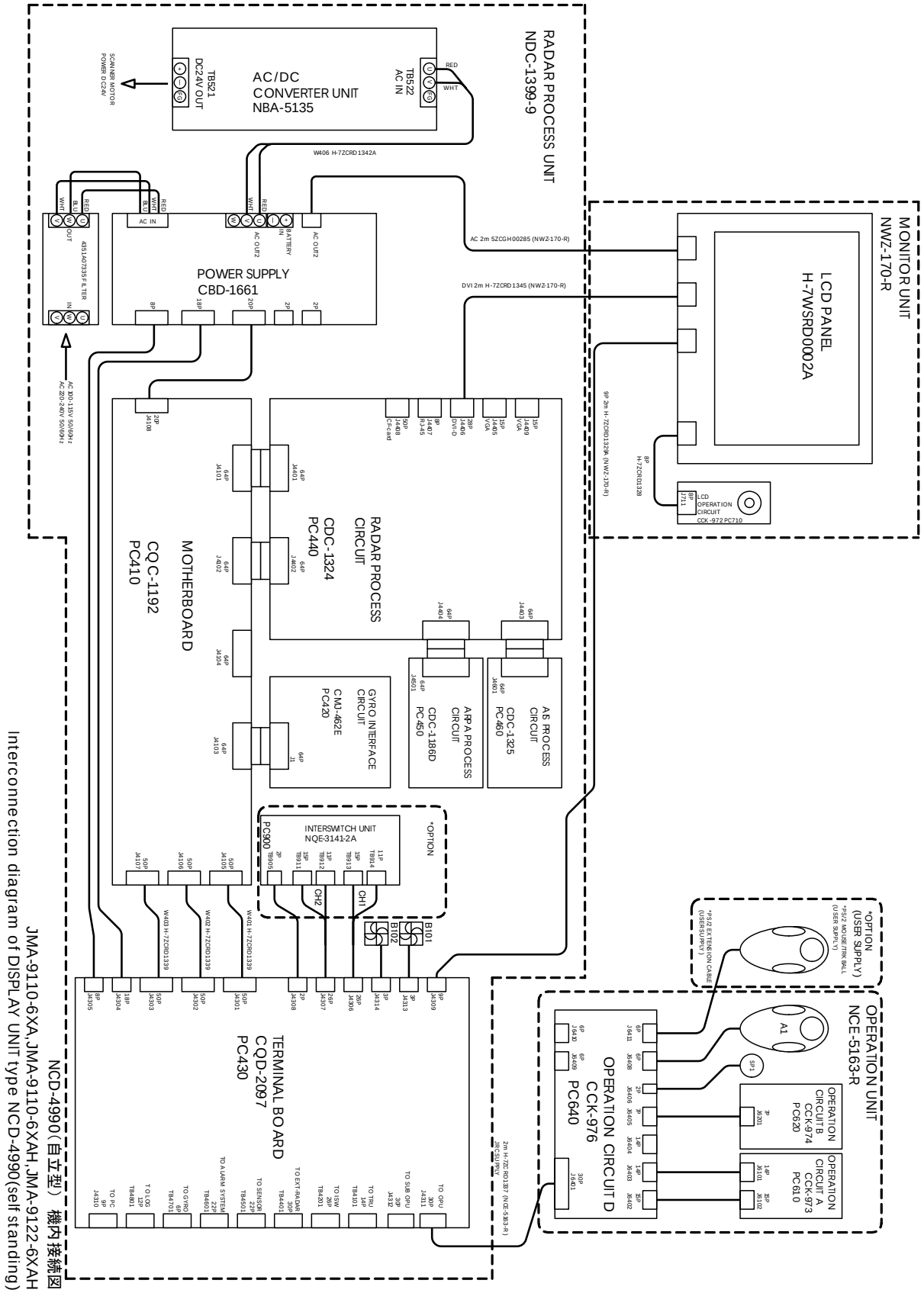


Fig B-1: *Interconnection Diagram of NCD-4990*

B.1.2 NCD-4990 w/NBA-5135



NCD-4990(自立型) 機内接続図
JMA-9110-6XA,JMA-9110-6XAH,JMA-9122-6XAH
Interconnection diagram of DISPLAY UNIT type NCD-4990(self standing)

Fig B-2: *Interconnection Diagram of NCD-4990 w/NBA-5135*

B

B.1.3 NCD-4990T

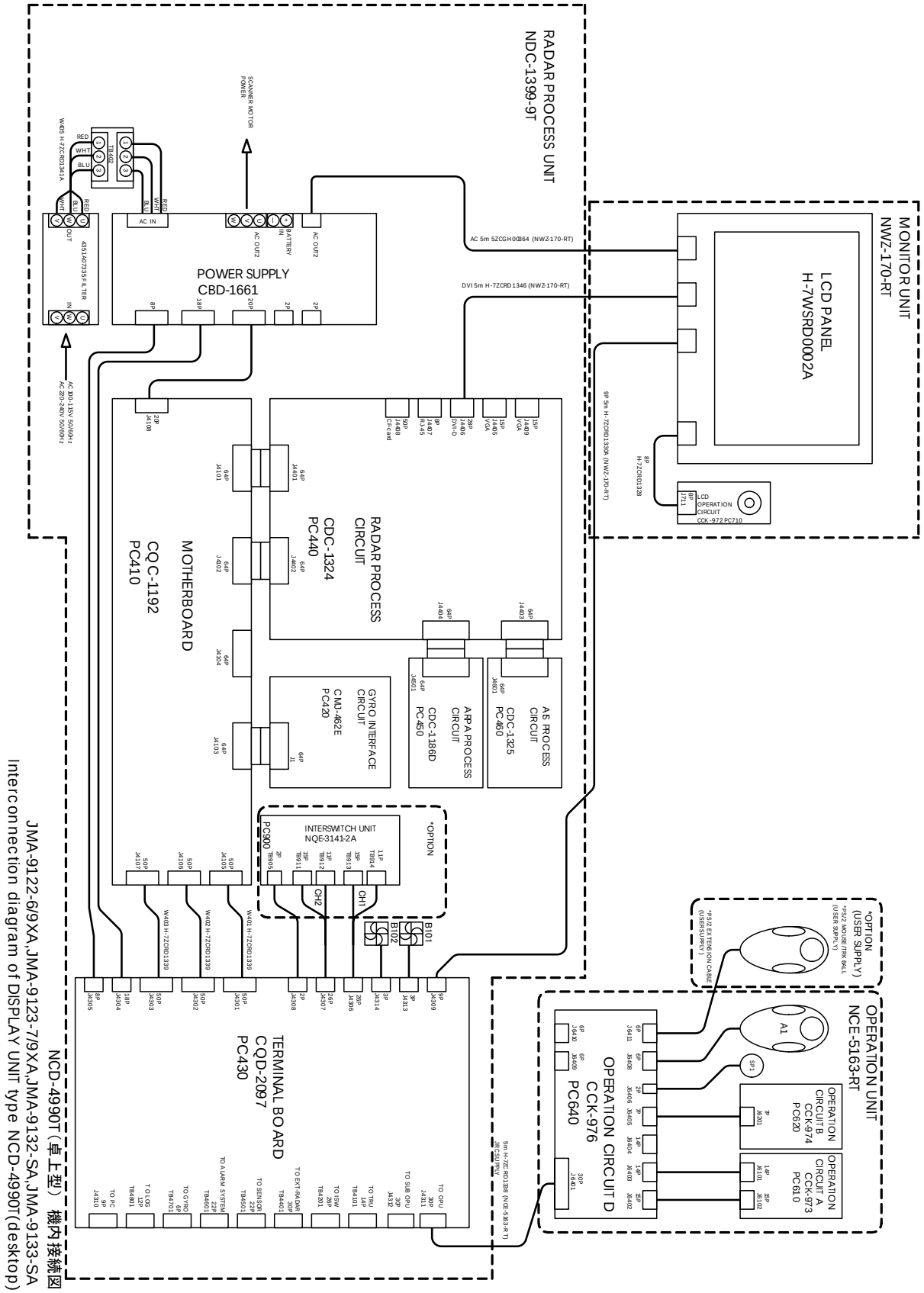
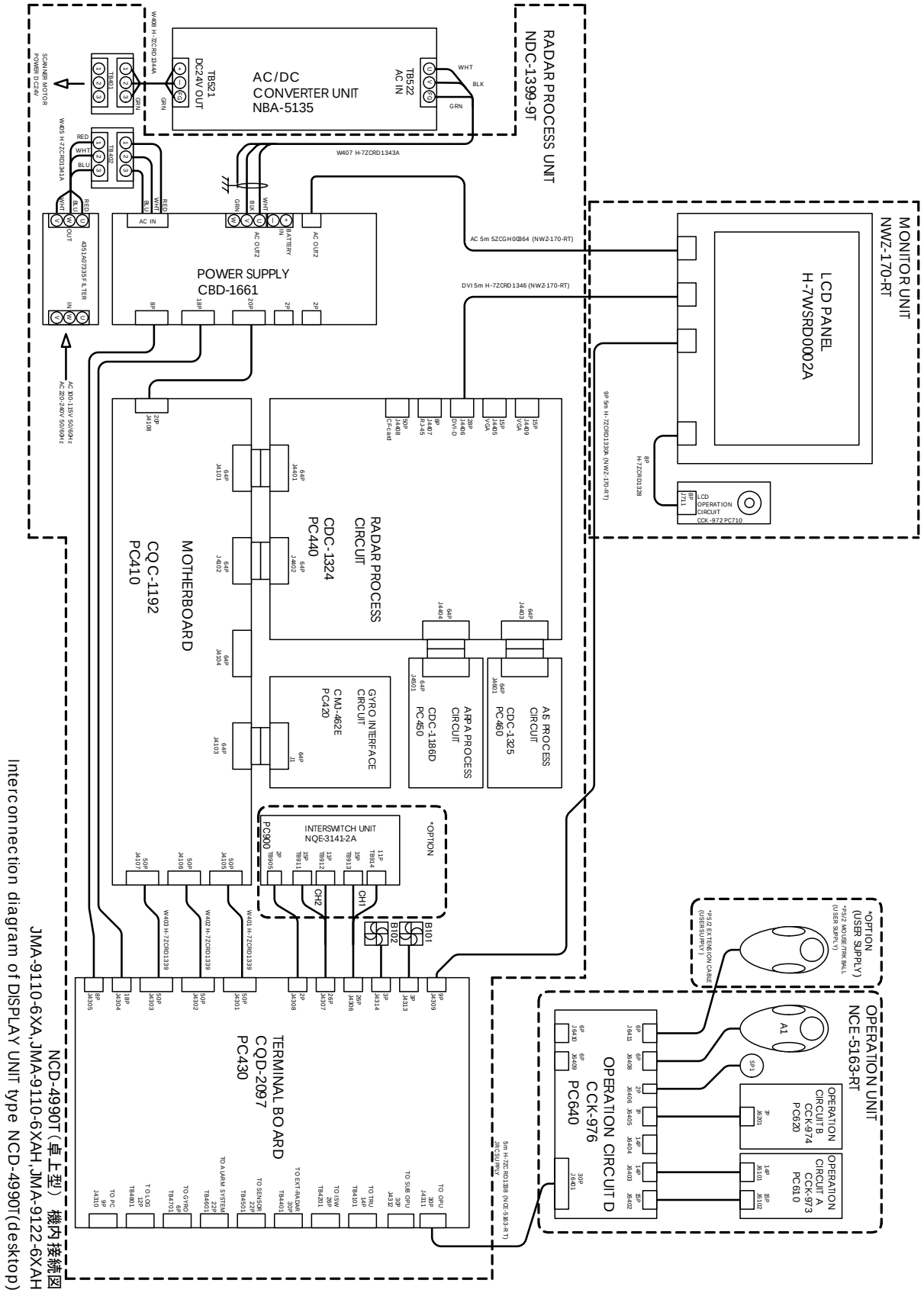


Fig B-3: *Interconnection Diagram of NCD-4990T*

B.1.4 NCD-4990T w/NBA-5135



NCD-4990T（卓上型）機内接続図
JMA-9110-6XA,JMA-9110-6XAH,JMA-9122-6XAH
Interconnection diagram of DISPLAY UNIT type NCD-4990T(desktop)

Fig B-4: *Interconnection Diagram of NCD-4990T w/NBA-5135*

B.1.5 NWZ-170-R

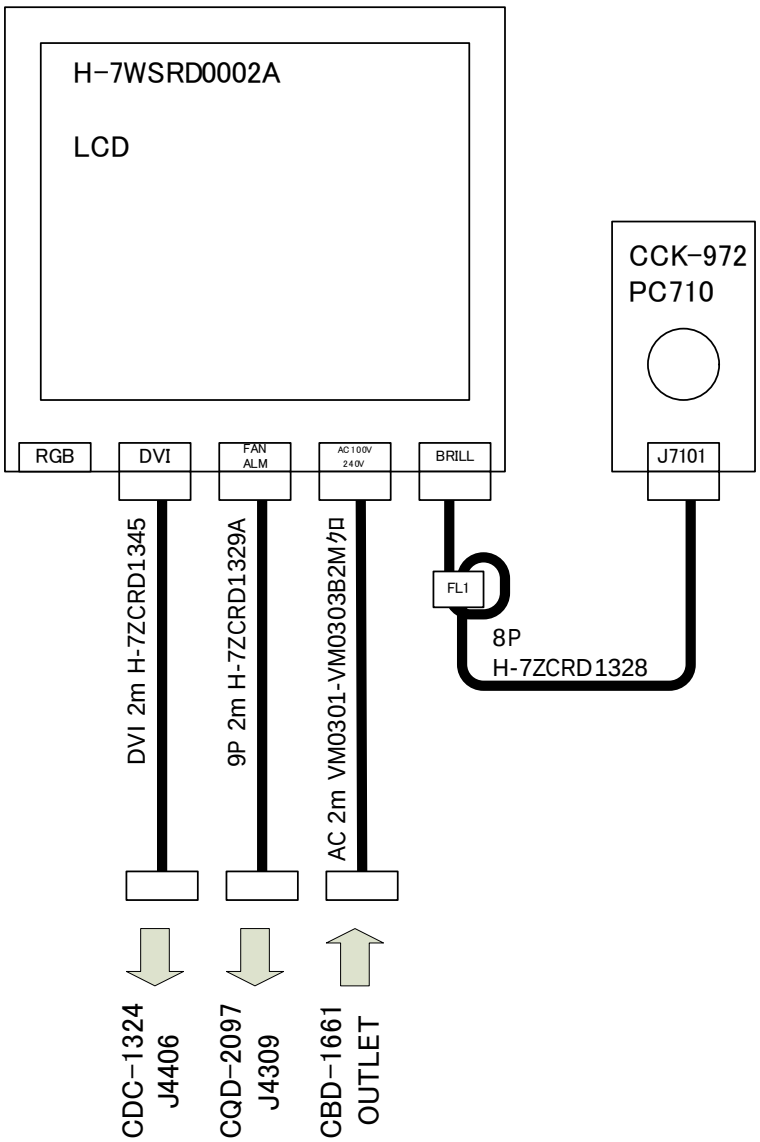
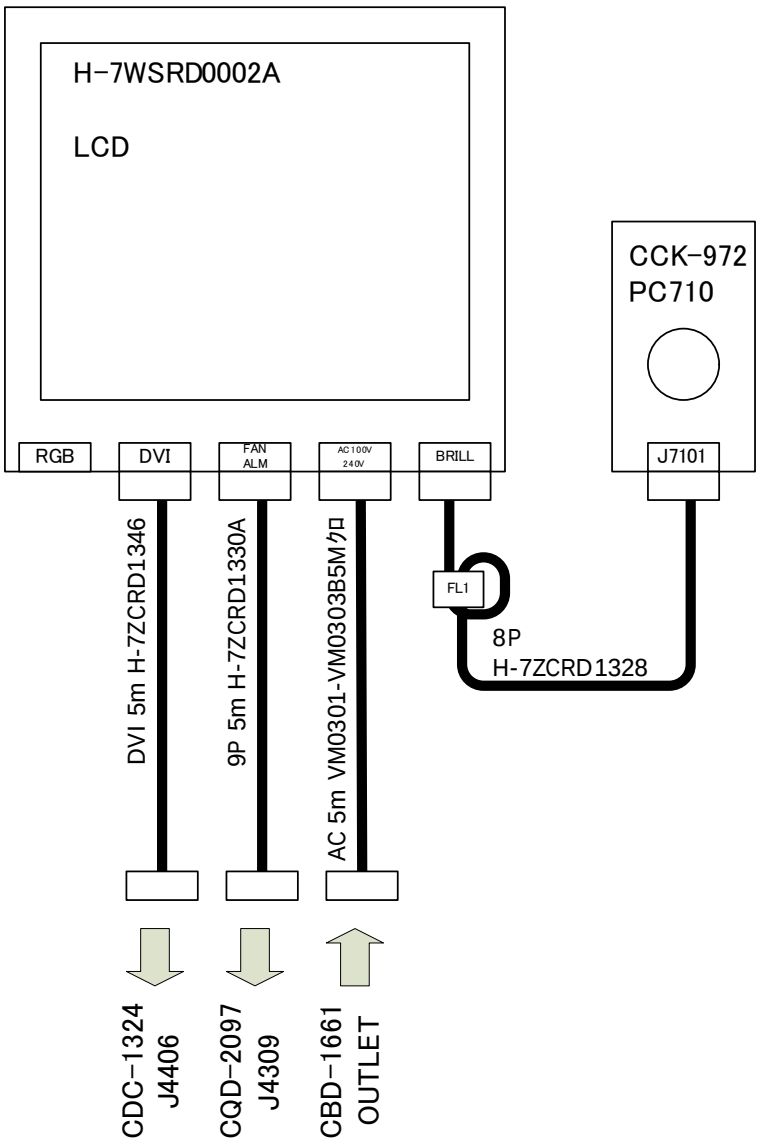


Fig B-5: *Interconnection Diagram of NWZ-170-R*

B.1.6 NWZ-170-RT



CML-764-RT (NWZ-170-RT)

Monitor Unit Interconnection

Fig B-6: *Interconnection Diagram of NWZ-170-RT*

B.1.7 NCE-5163-R

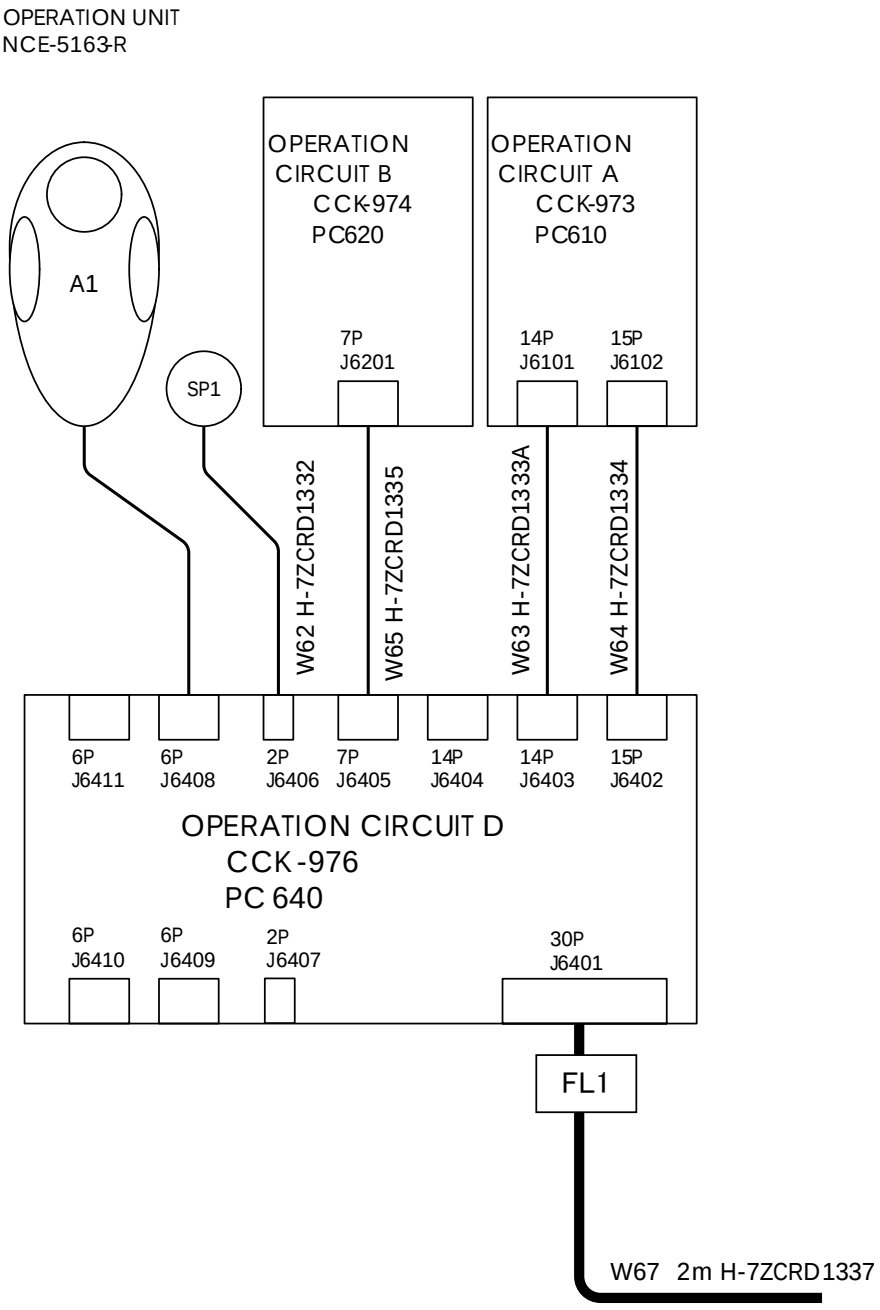
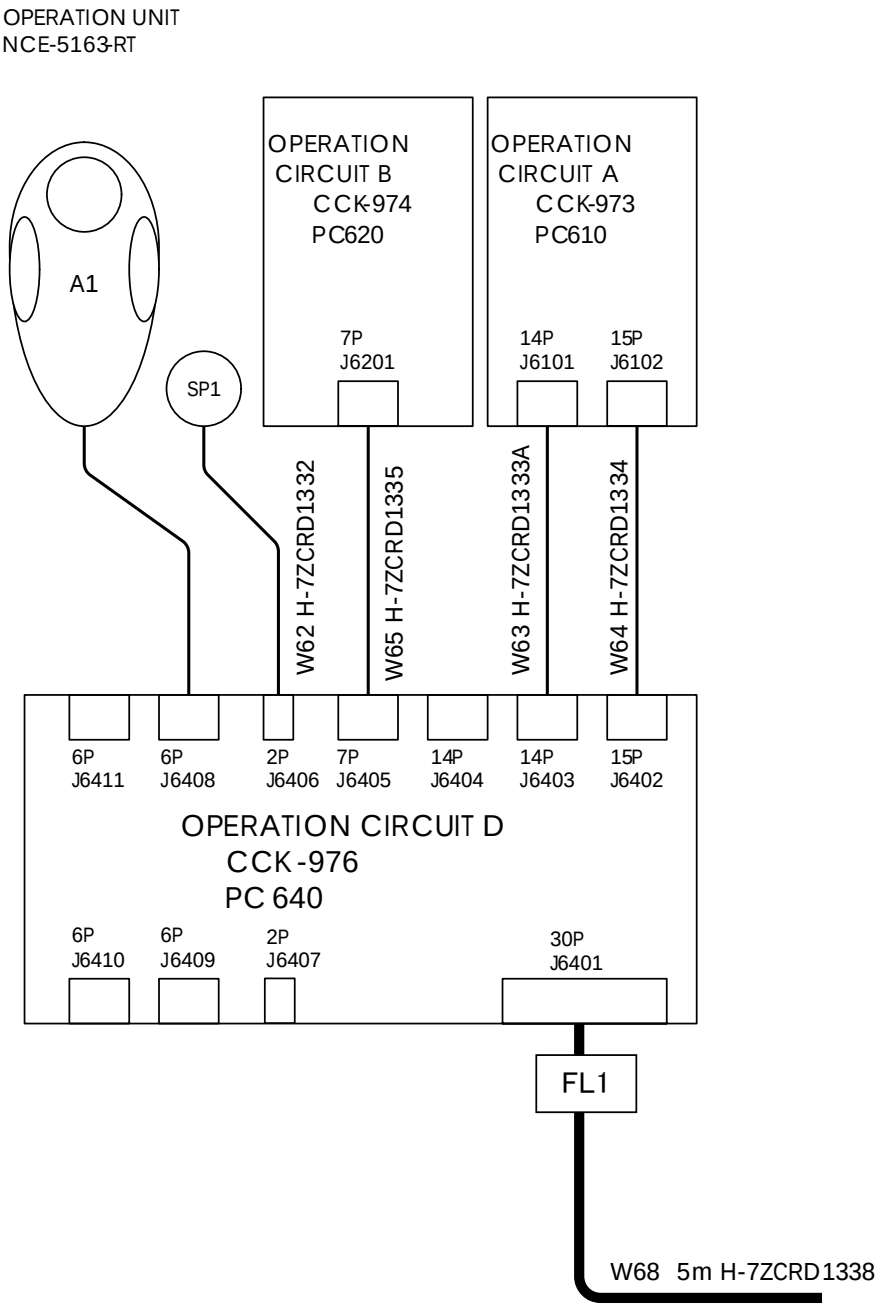


Fig B-7: *Interconnection Diagram of NCE-5163-R*

B.1.8 NCE-5163-RT

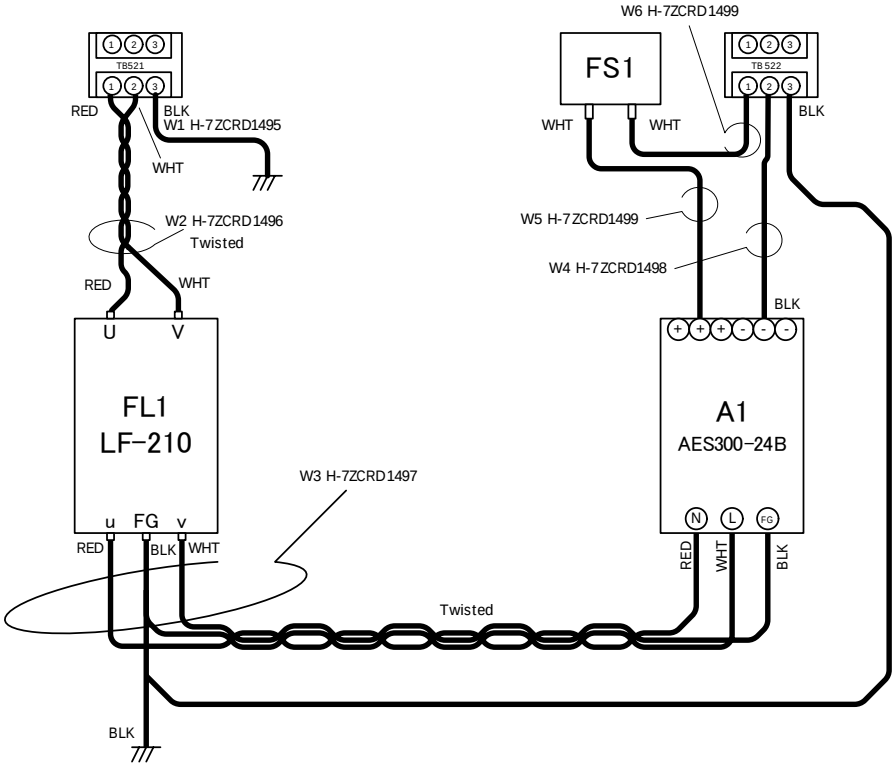


CMD-996-RT (NCE-5163-RT)

Operation Unit Interconnection

Fig B-8: *Interconnection Diagram of NCE-5163-RT*

B.1.9 NBA-5135



CBD-1684A (NBA-5135)

AC/DC Converter Interconnection

Fig B-9: *Interconnection Diagram of NBA-5135*

B.2 Power System Daigram of Display Unit

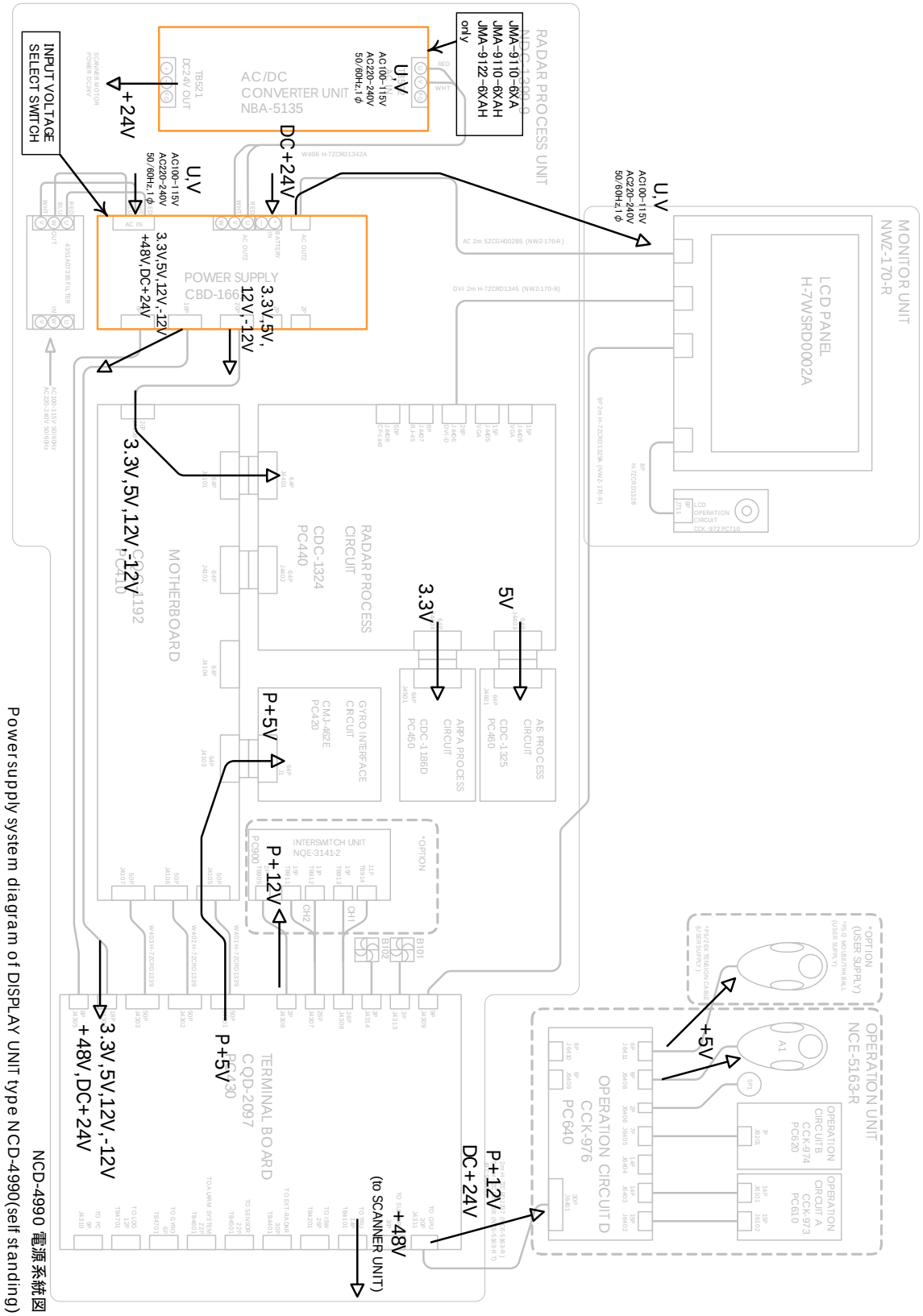
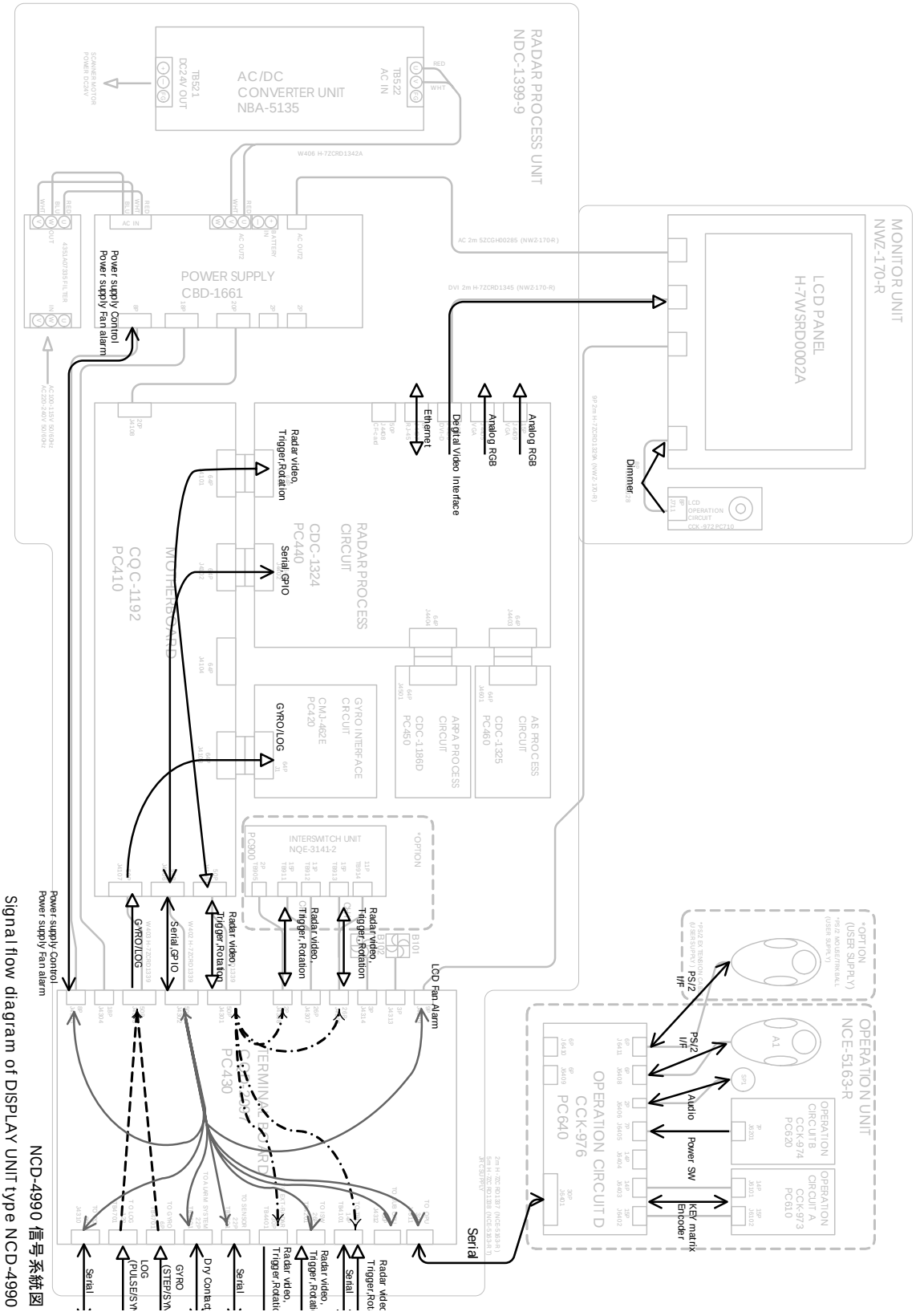


Fig B-10: *Power System Diagram of NCD-4990/T*

B.3 Signal Flow Diagram of Display Unit



Signal flow diagram of DISPLAY UNIT type NCD-4990

NCD-4990 信号系統図

Fig B-11: *Signal Flow Diagram of NCD-4990/T*

B.4 Primary Power System Diagram

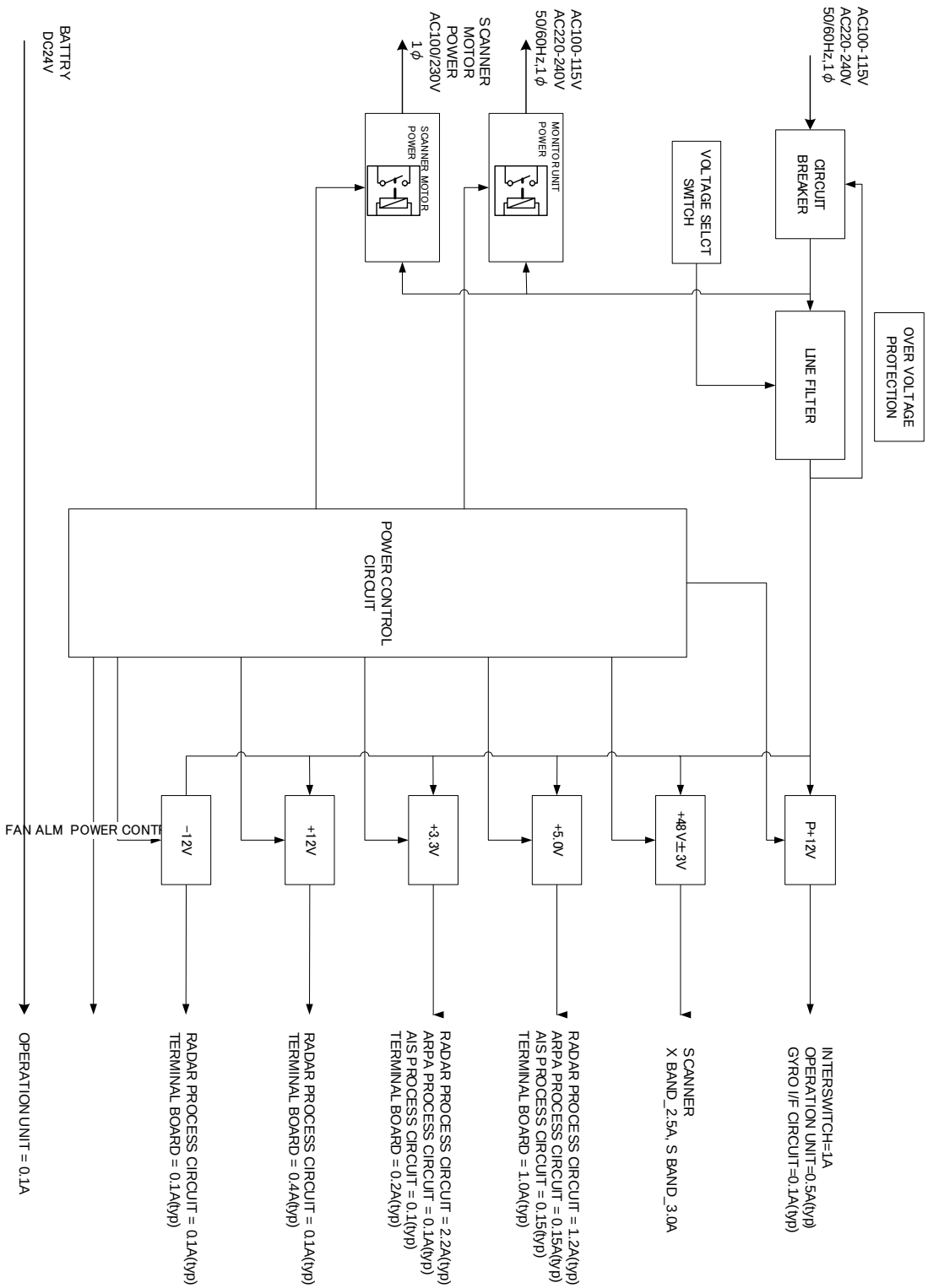


Fig B-12: *Primary Power System Diagram*

B.5 Block Diagram of Scanner Unit

B.5.1 NKE-2103

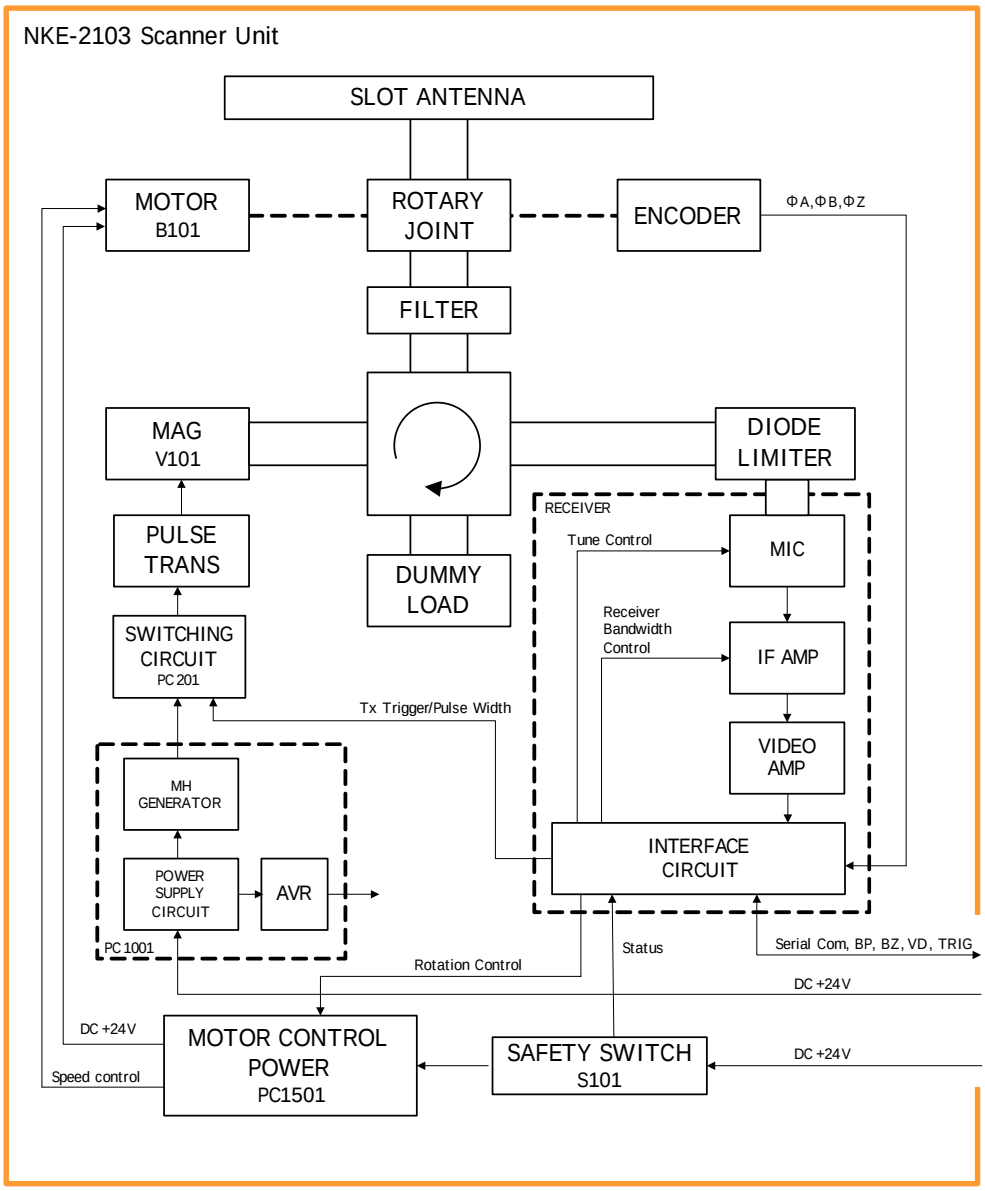


Fig B-13: *Block Diagram of NKE-2103*

B.5.2 NKE-2254

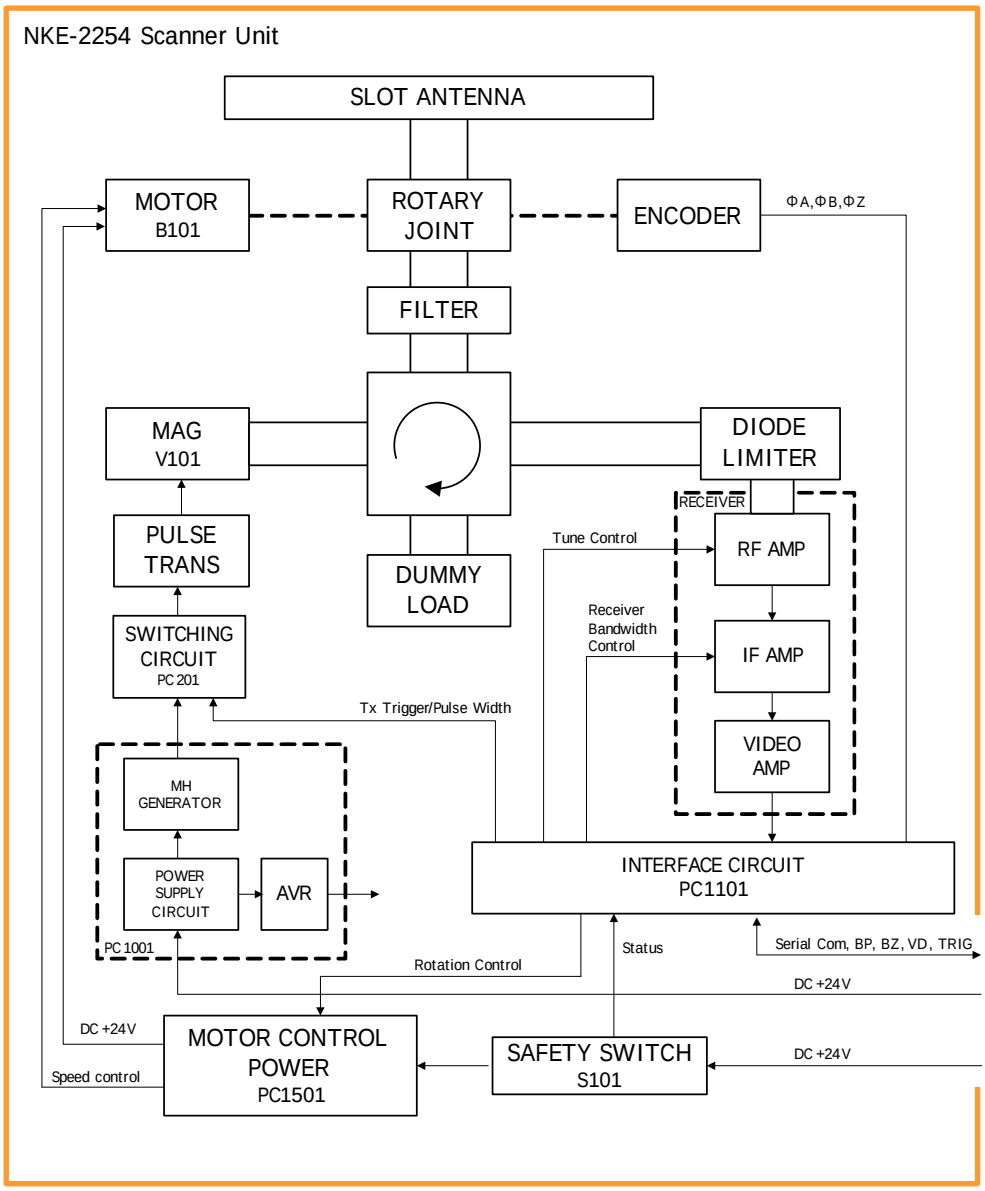


Fig B-14: *Block Diagram of NKE-2254*

B.5.3 NKE-1125/NKE-1130

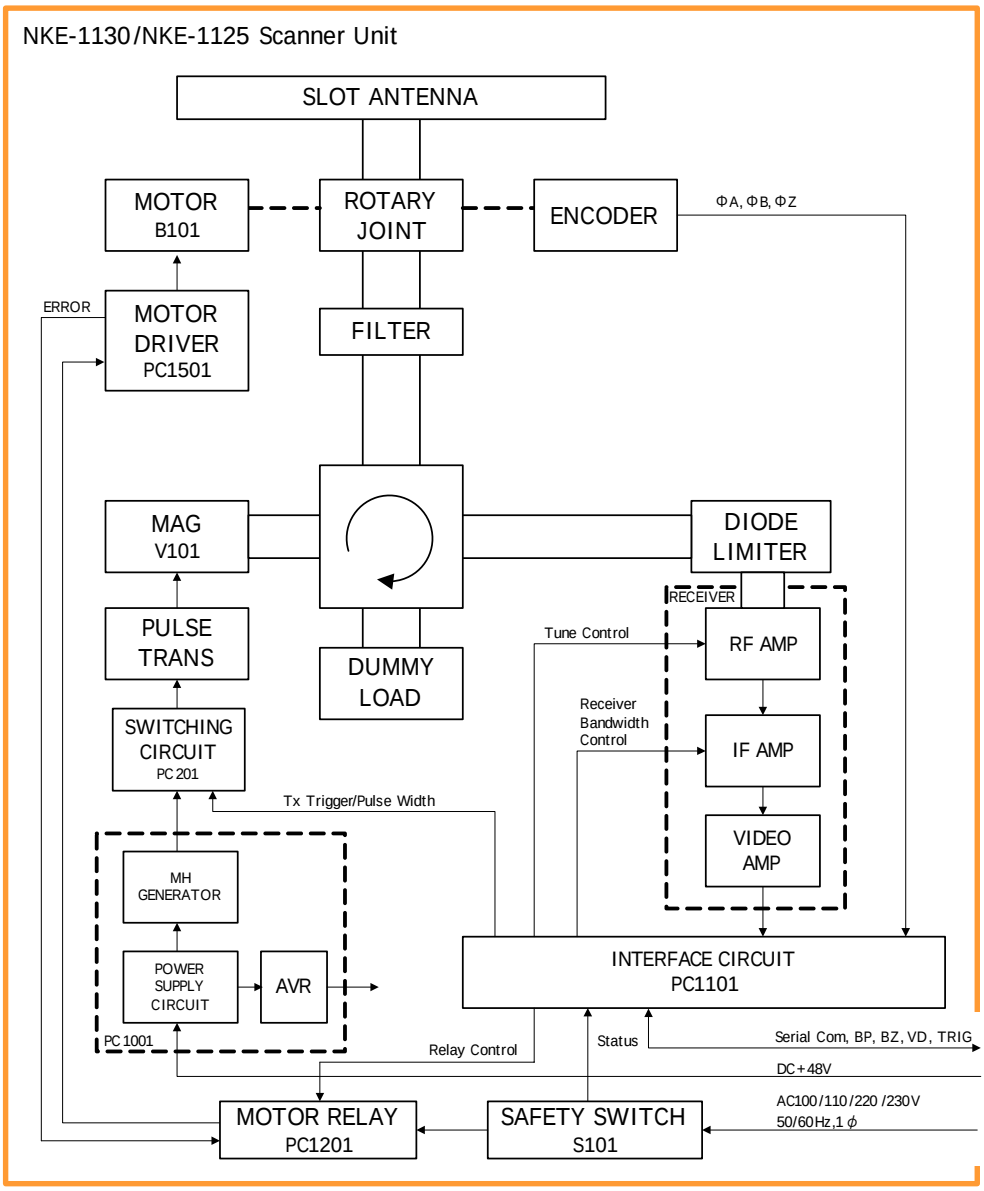


Fig B-15: *Block Diagram of NKE-1125/NKE-1130*

B.5.4 NKE-1129, NTG-3225 / NKE-1139, NTG-3230

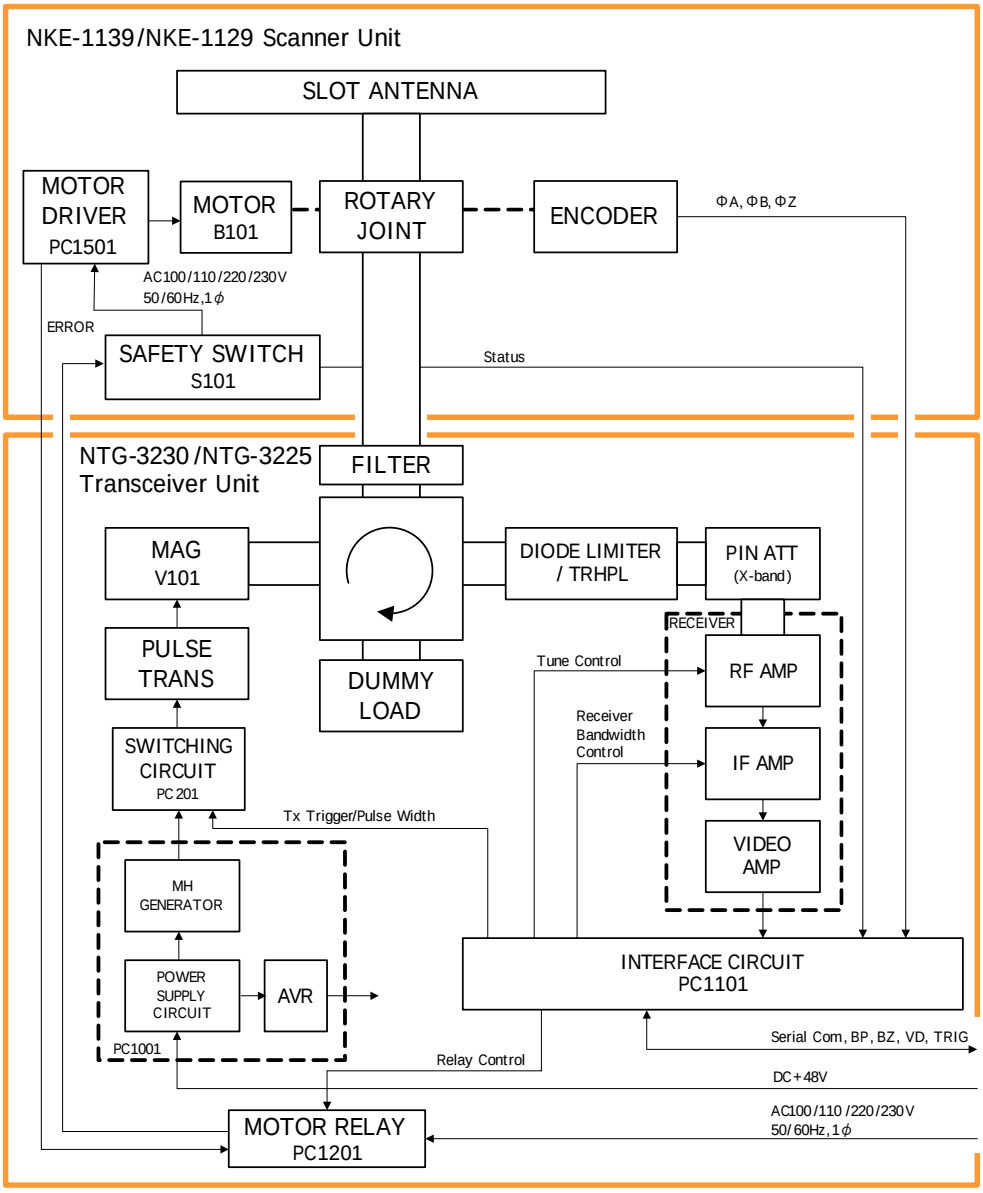


Fig B-16: *Block Diagram of NKE-1129, NTG-3225 / NKE-1139, NTG-3230*

B.6 Interconnection Diagram of Scanner Unit

B.6.1 NKE-2103

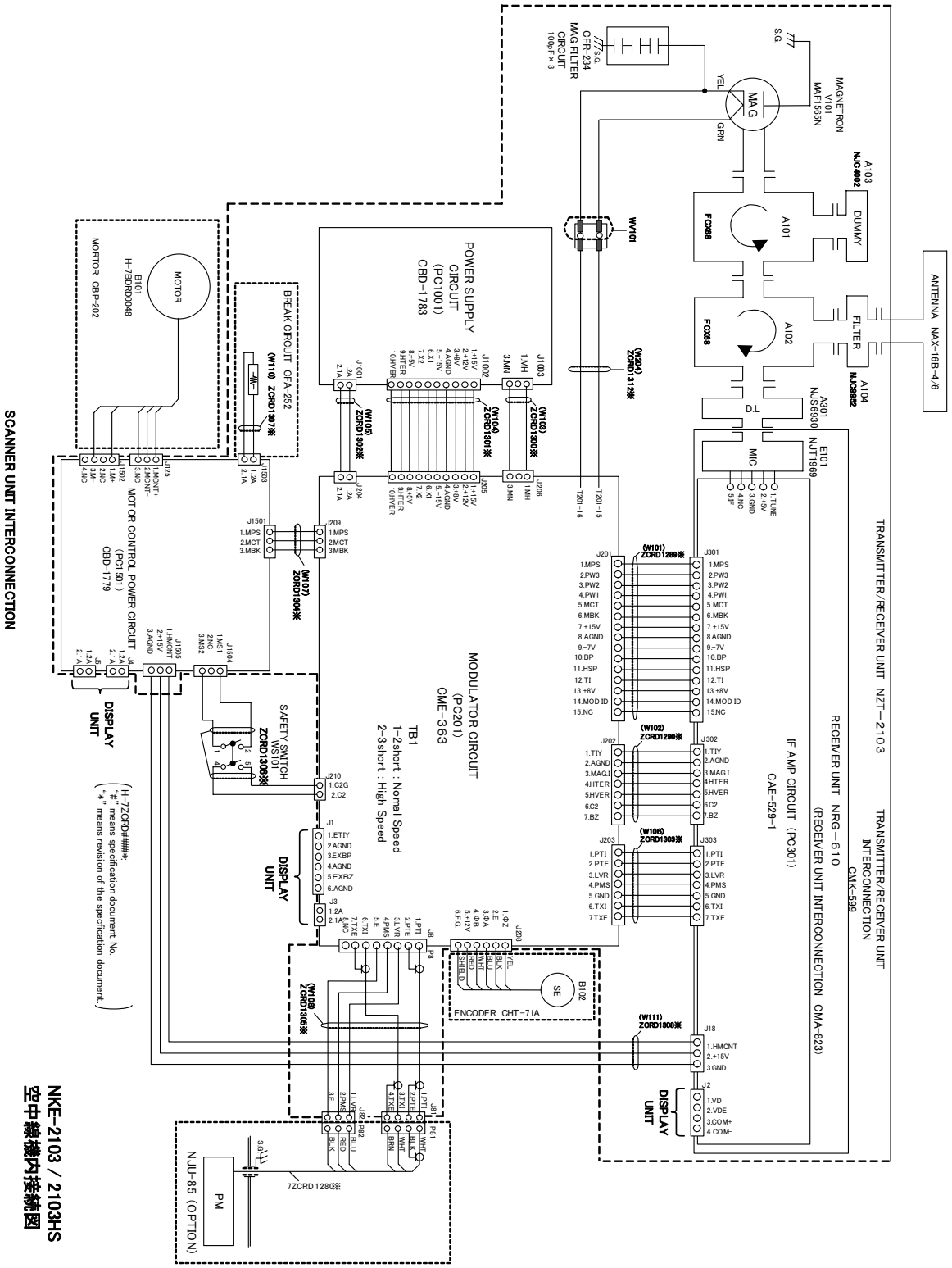


Fig B-17: *Interconnection Diagram of NKE-2103*

B.6.2 NKE-2254

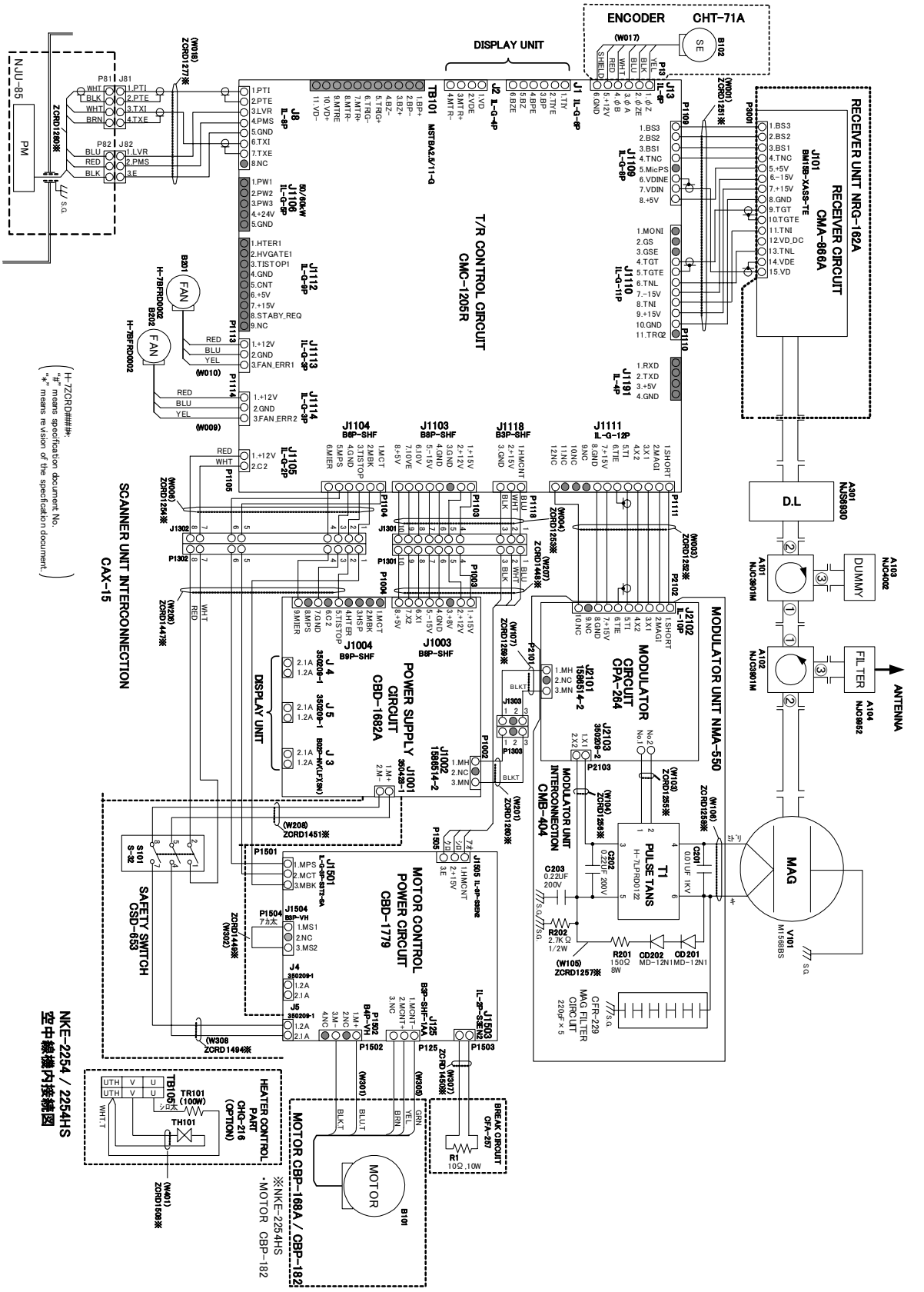


Fig B-18: *Interconnection Diagram of NKE-2254*

B.6.3 NKE-1125 (AC110V)

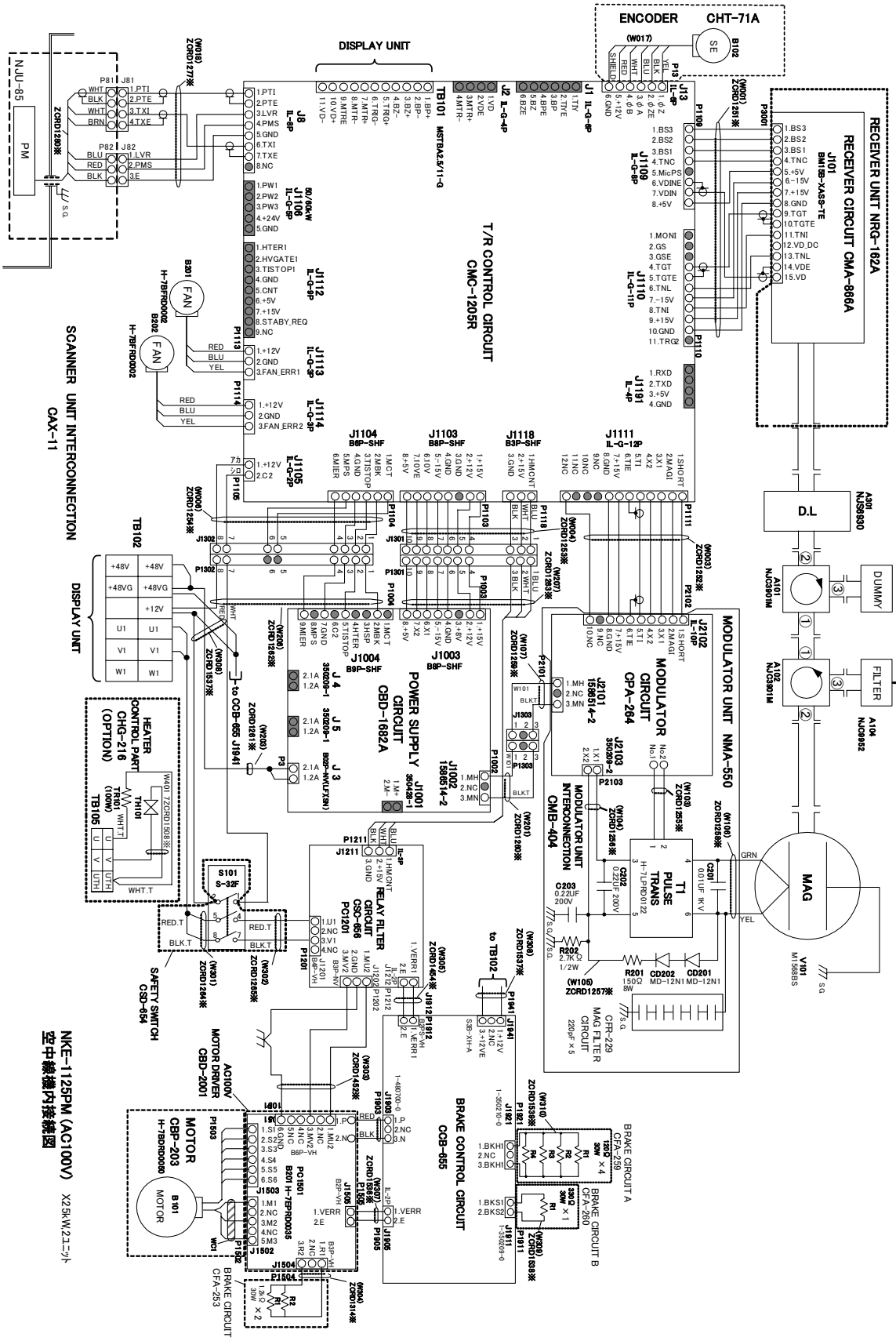


Fig B-19: *Interconnection Diagram of NKE-1125 (AC110V)*

B.6.4 NKE-1125 (AC220V)

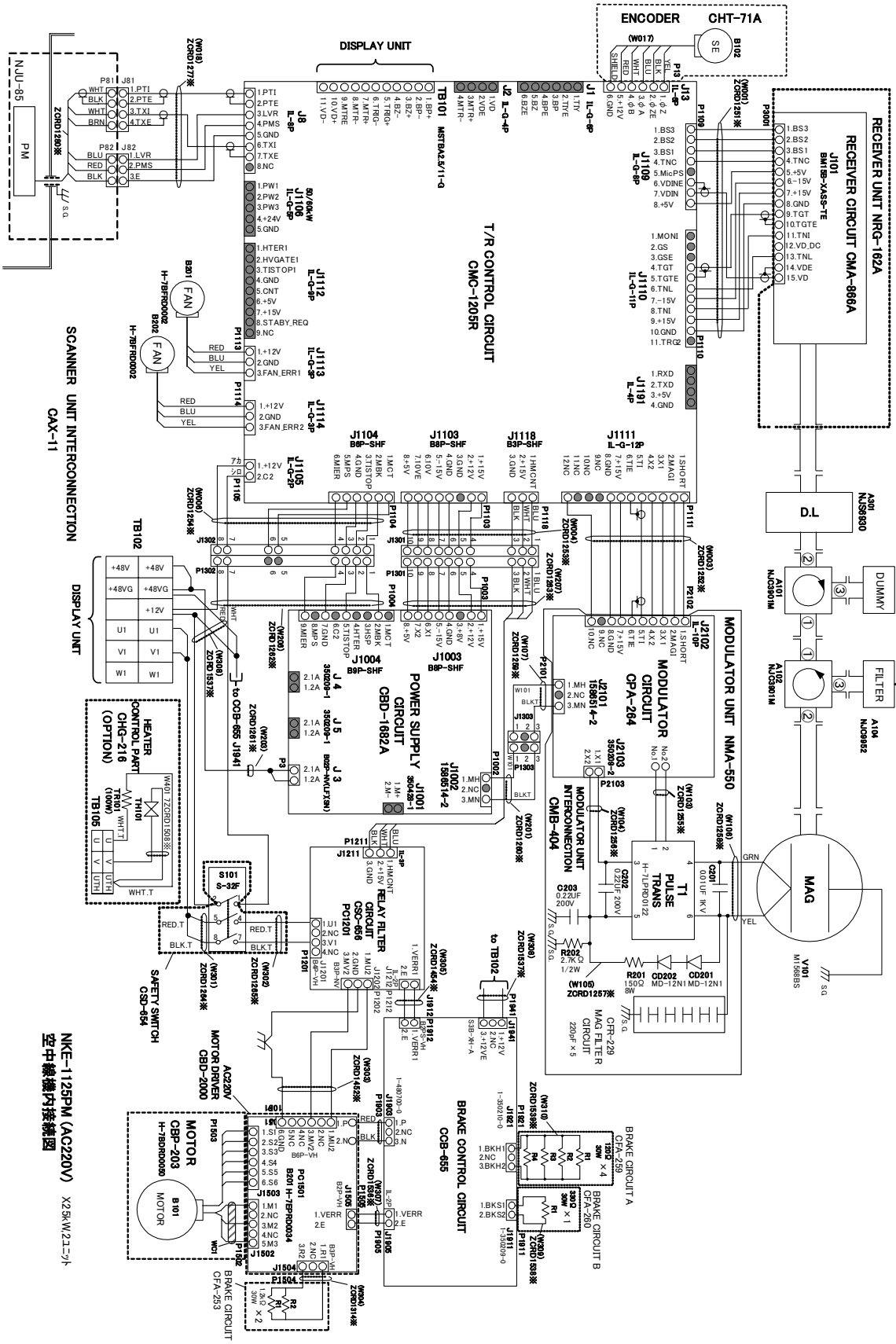


Fig B-20: *Interconnection Diagram of NKE-1125 (AC220V)*

B.6.5 NKE-1129 (AC110V)

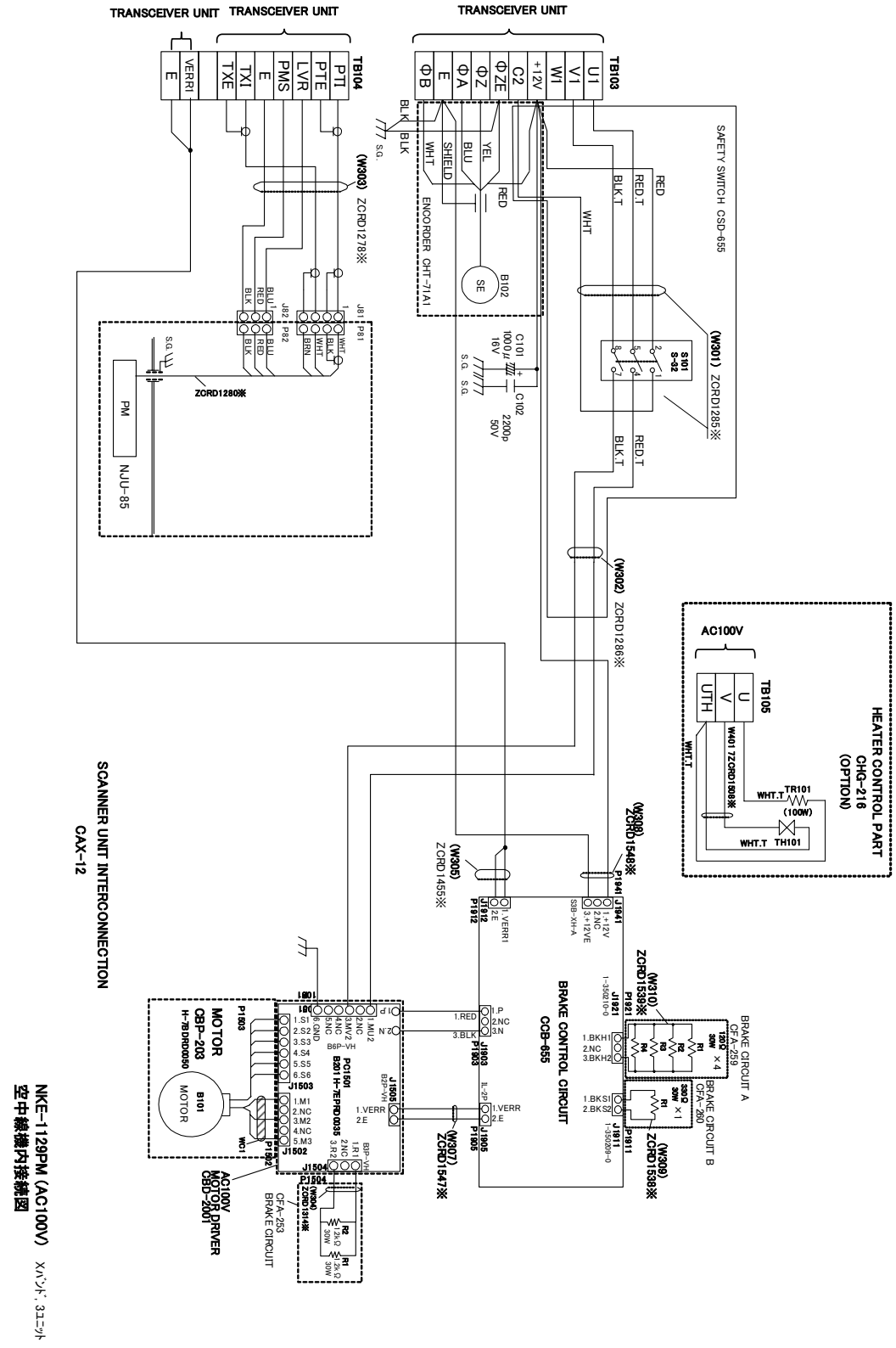


Fig B-21: *Interconnection Diagram of NKE-1129 (AC110V)*

B.6.6 NKE-1129 (AC220V)

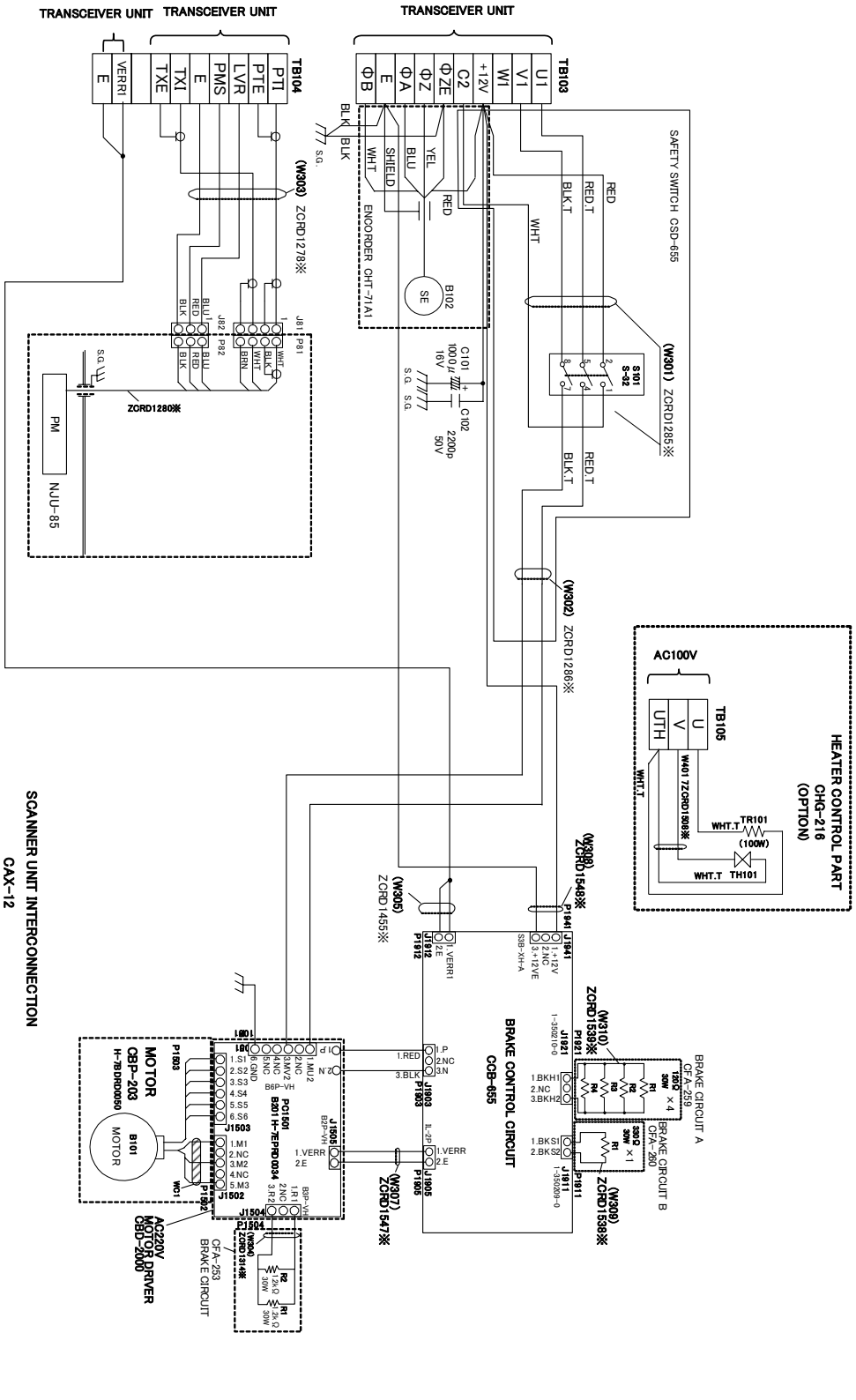


Fig B-22: *Interconnection Diagram of NKE-1129 (AC220V)*

B.6.7 NTG-3225

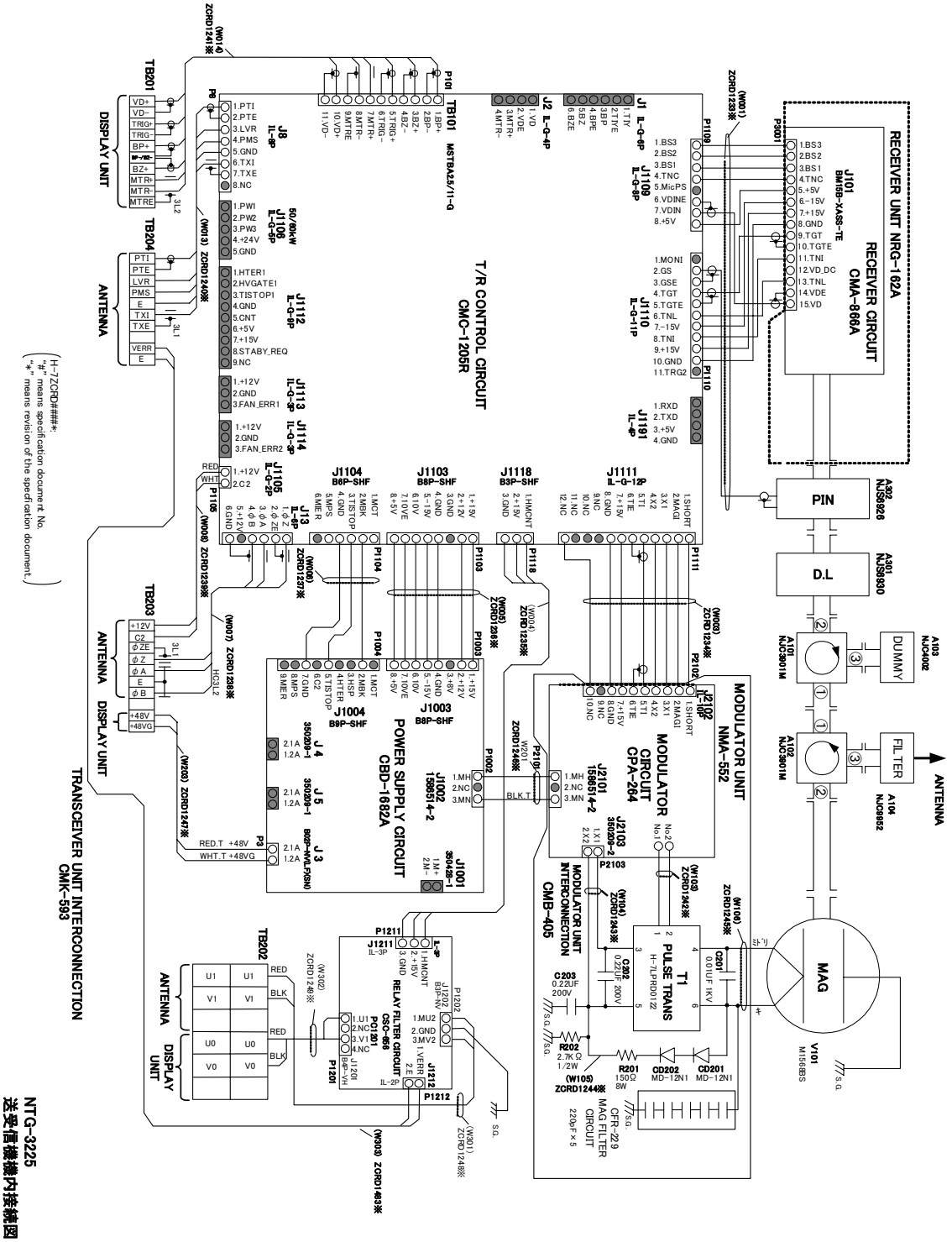


Fig B-23: *Interconnection Diagram of NTG-3225*

B.6.8 NKE-1130 (AC110V)

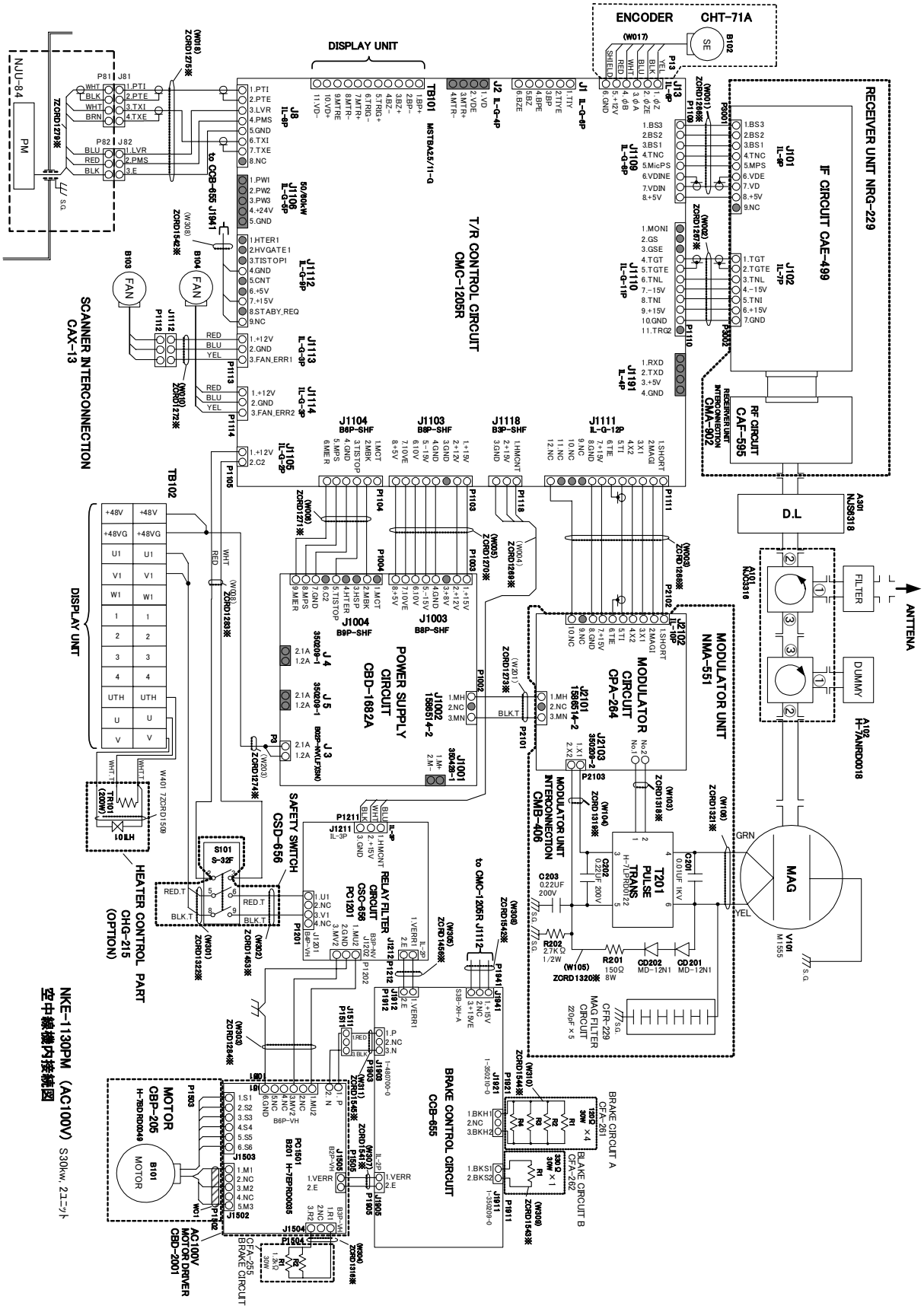


Fig B-24: *Interconnection Diagram of NKE-1130 (AC110V)*

B.6.9 NKE-1130 (AC220V)

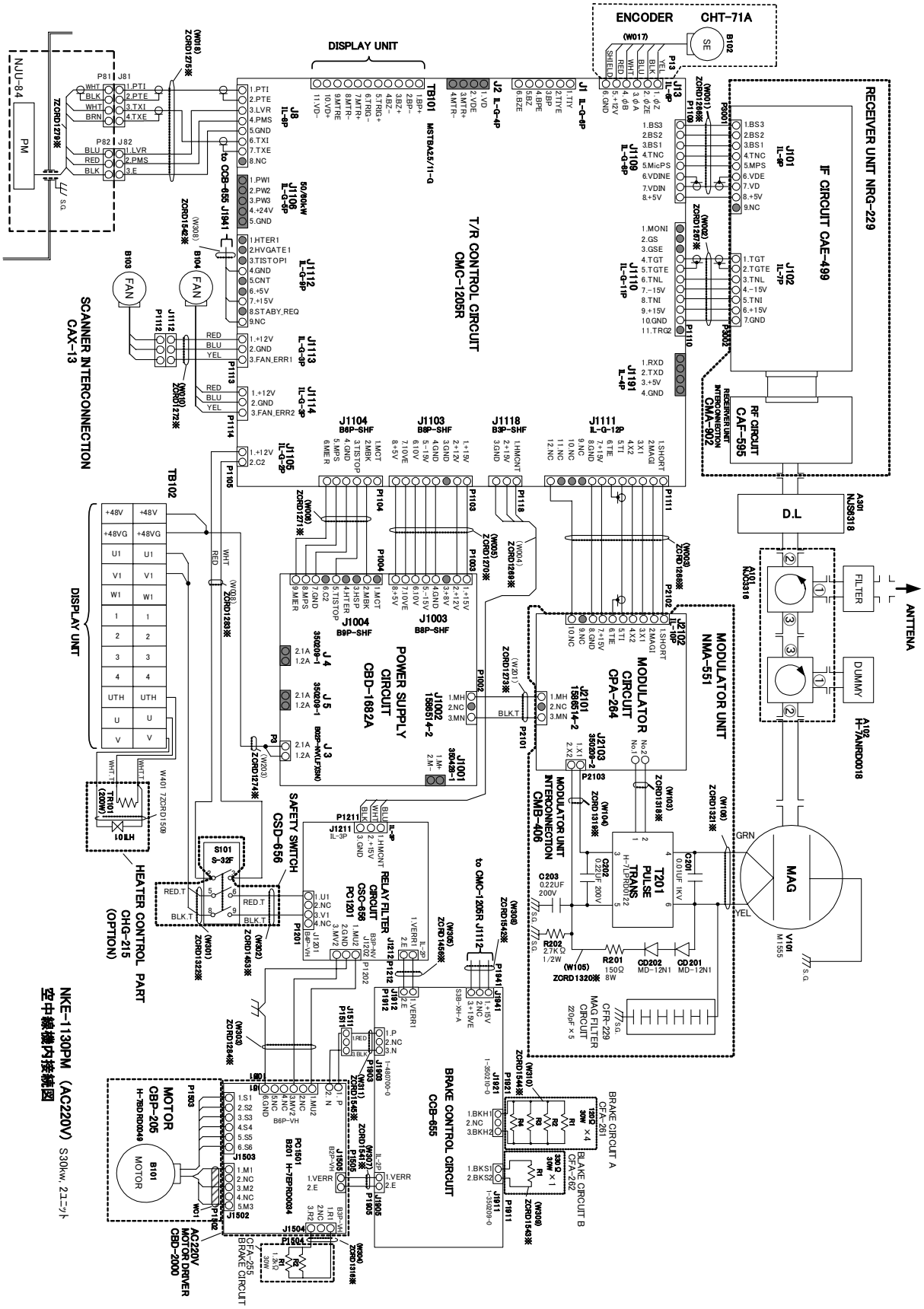


Fig B-25: *Interconnection Diagram of NKE-1130 (AC220V)*

B.6.10 NKE-1139 (AC110V)

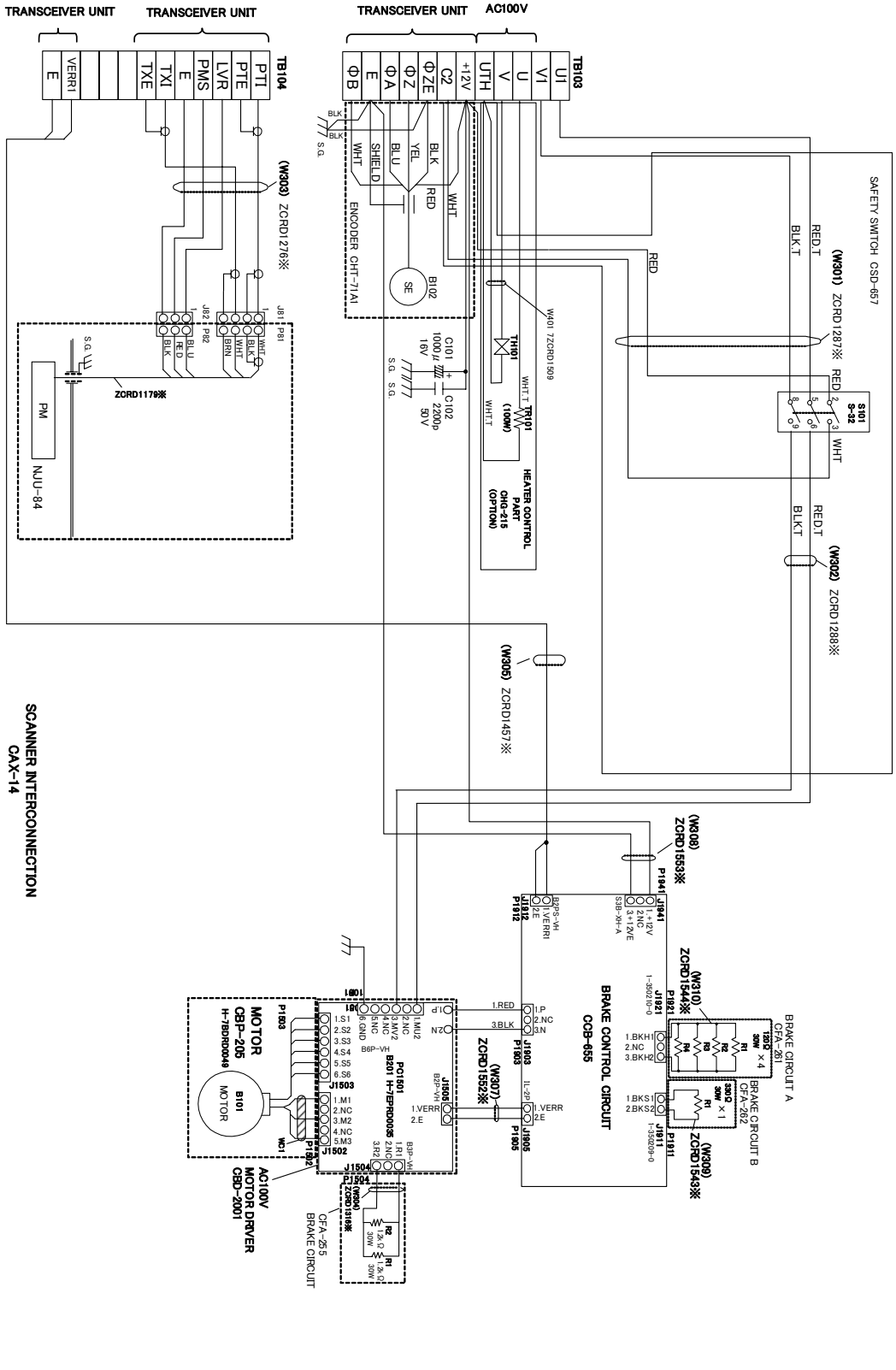


Fig B-26: *Interconnection Diagram of NKE-1139 (AC110V)*

B.6.11 NKE-1139 (AC220V)

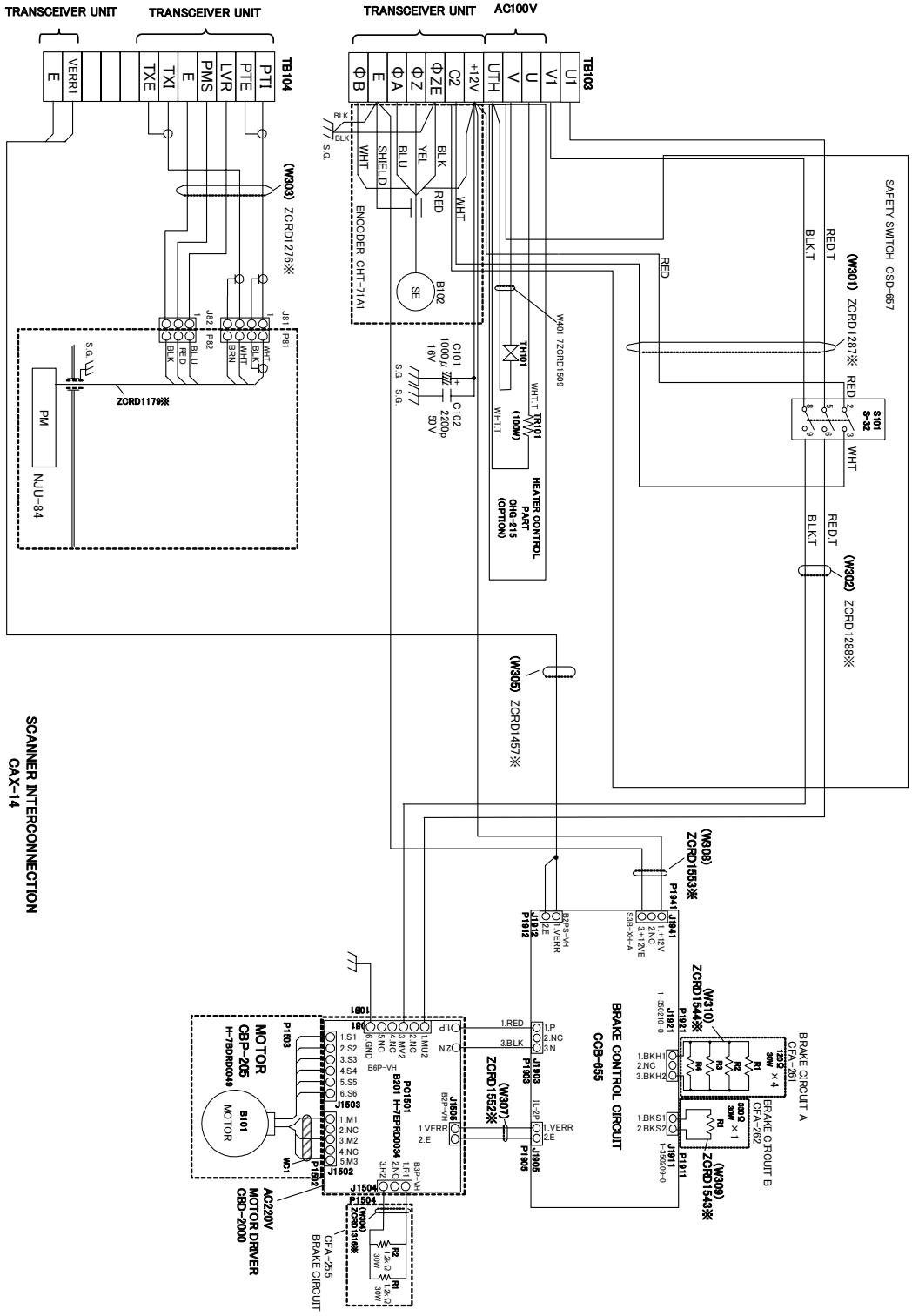


Fig B-27: *Interconnection Diagram of NKE-1139 (AC220V)*

B.6.12 NTG-3230

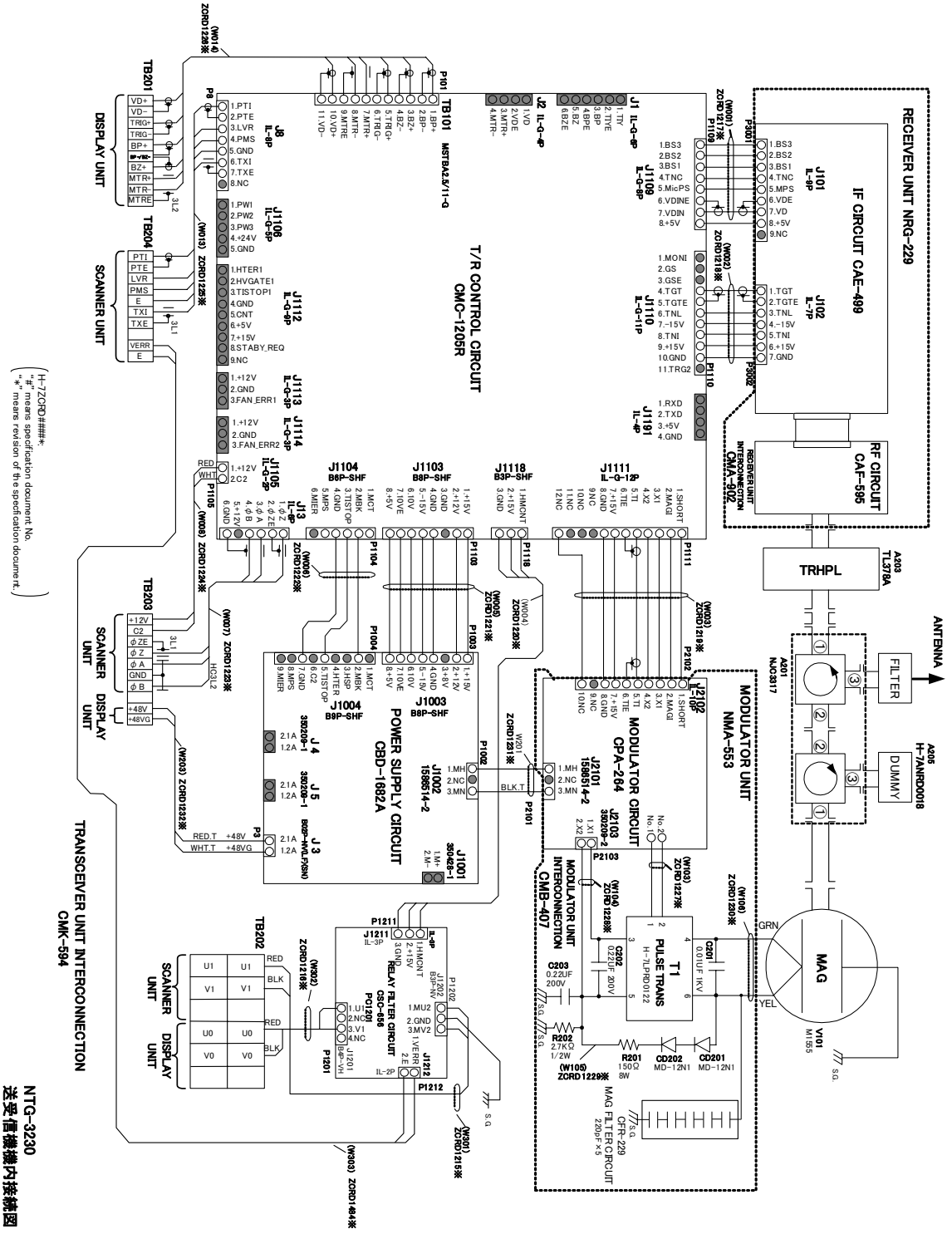


Fig B-28: *Interconnection Diagram of NTG-3230*

B.7 Terminal Board Connection Diagram

B.7.1 JMA-9110-6XA/JMA-9110-6XAH

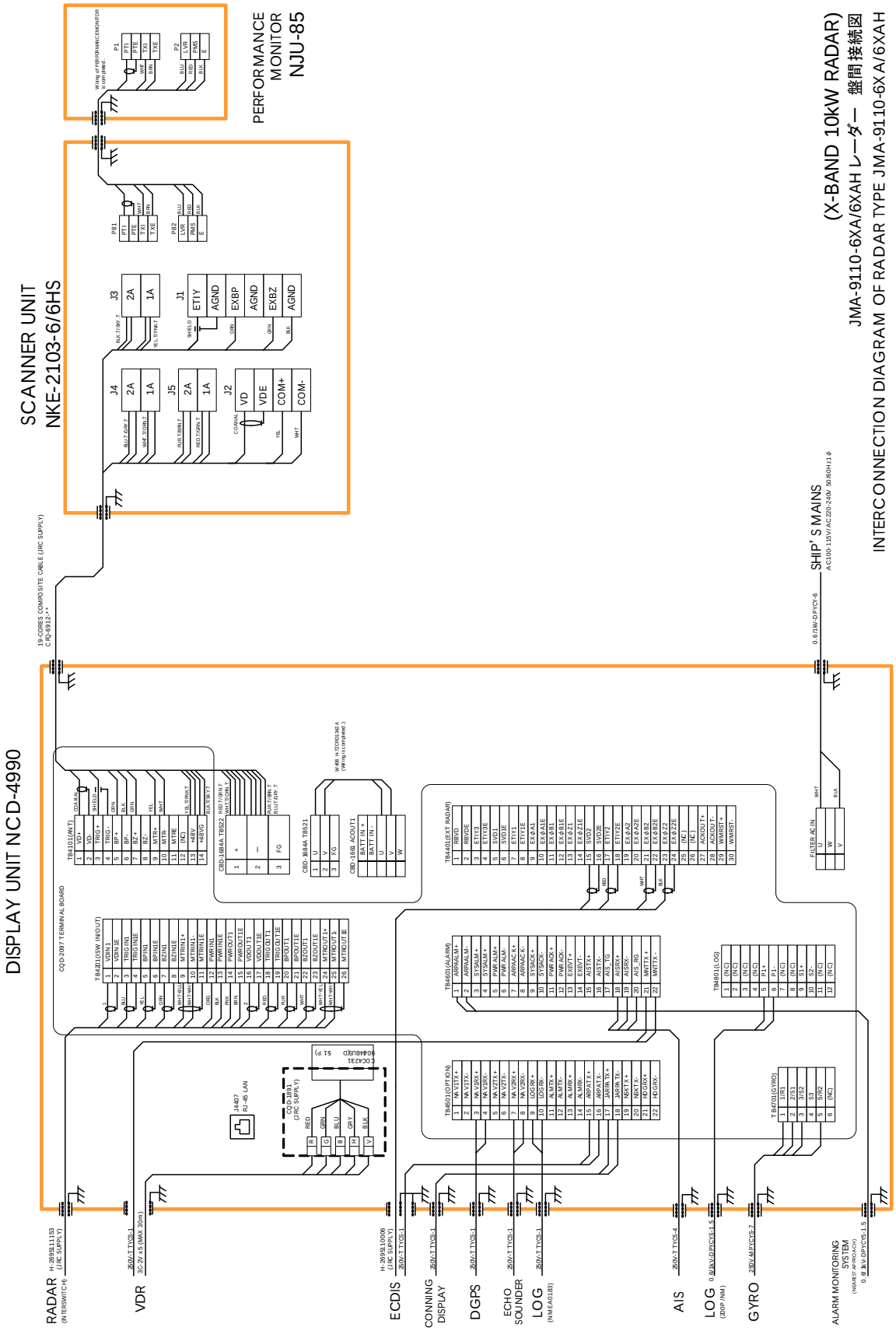


Fig B-29: *Terminal Board Connection Diagram of JMA-9110-6XA/JMA-9110-6XAH*

B.7.2 JMA-9110-6XA/JMA-9110-6XAH (desktop)

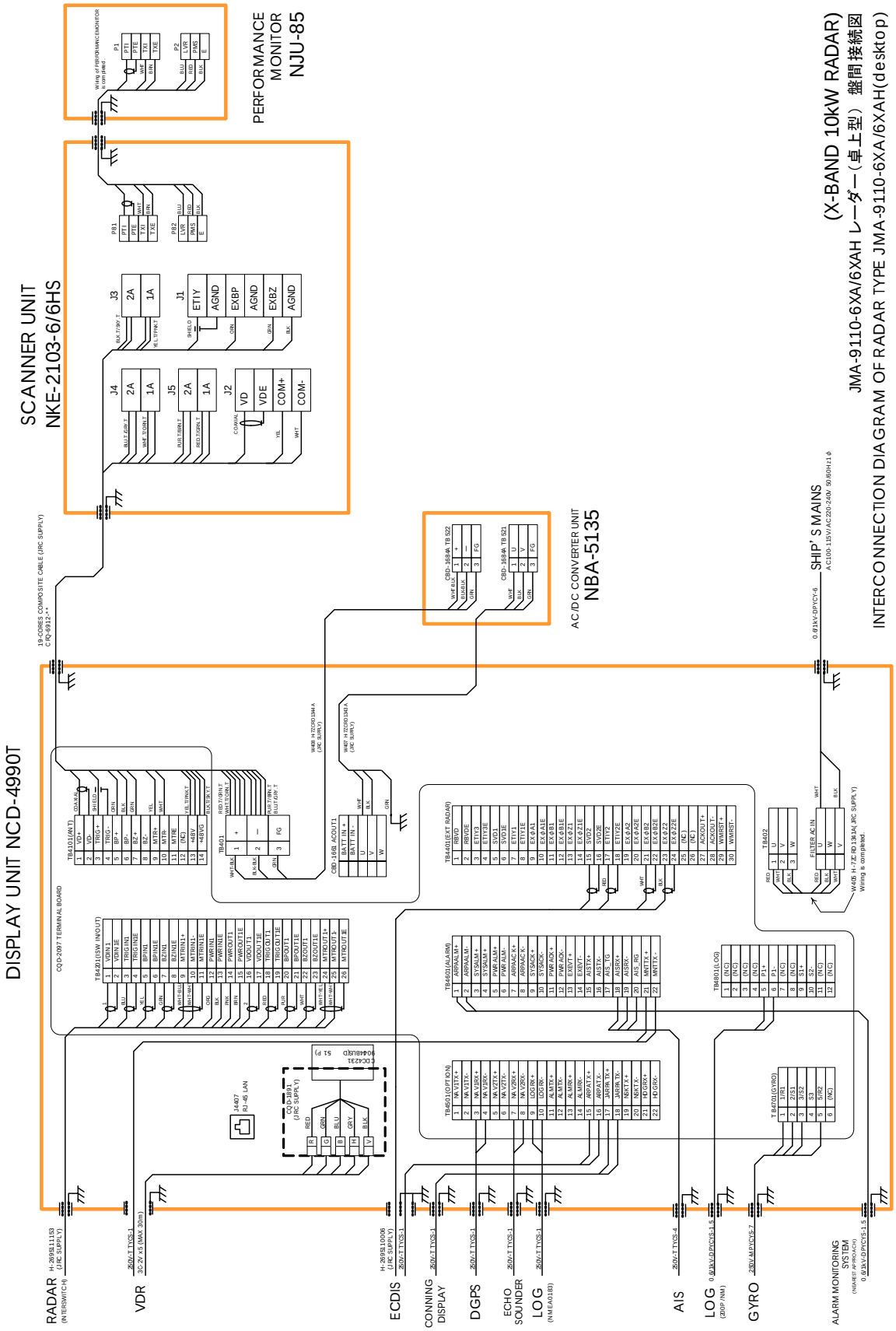


Fig B-30: *Terminal Board Connection Diagram of JMA-9110-6XA/JMA-9110-6XAH (desktop)*

B.7.3 JMA-9122-6XAH

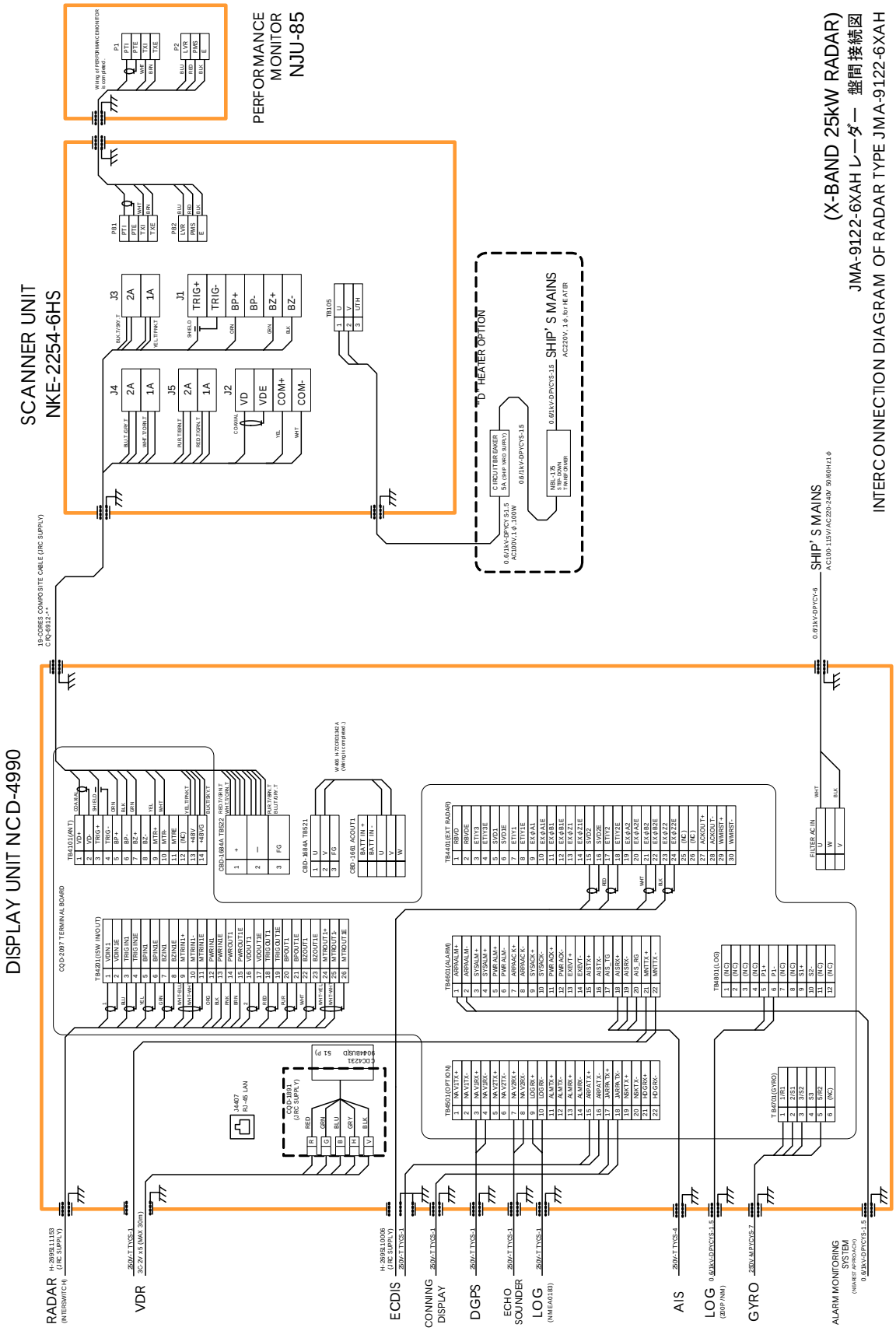


Fig B-31: *Terminal Board Connection Diagram of JMA-9122-6XAH*

B.7.4 JMA-9122-6XAH (desktop)

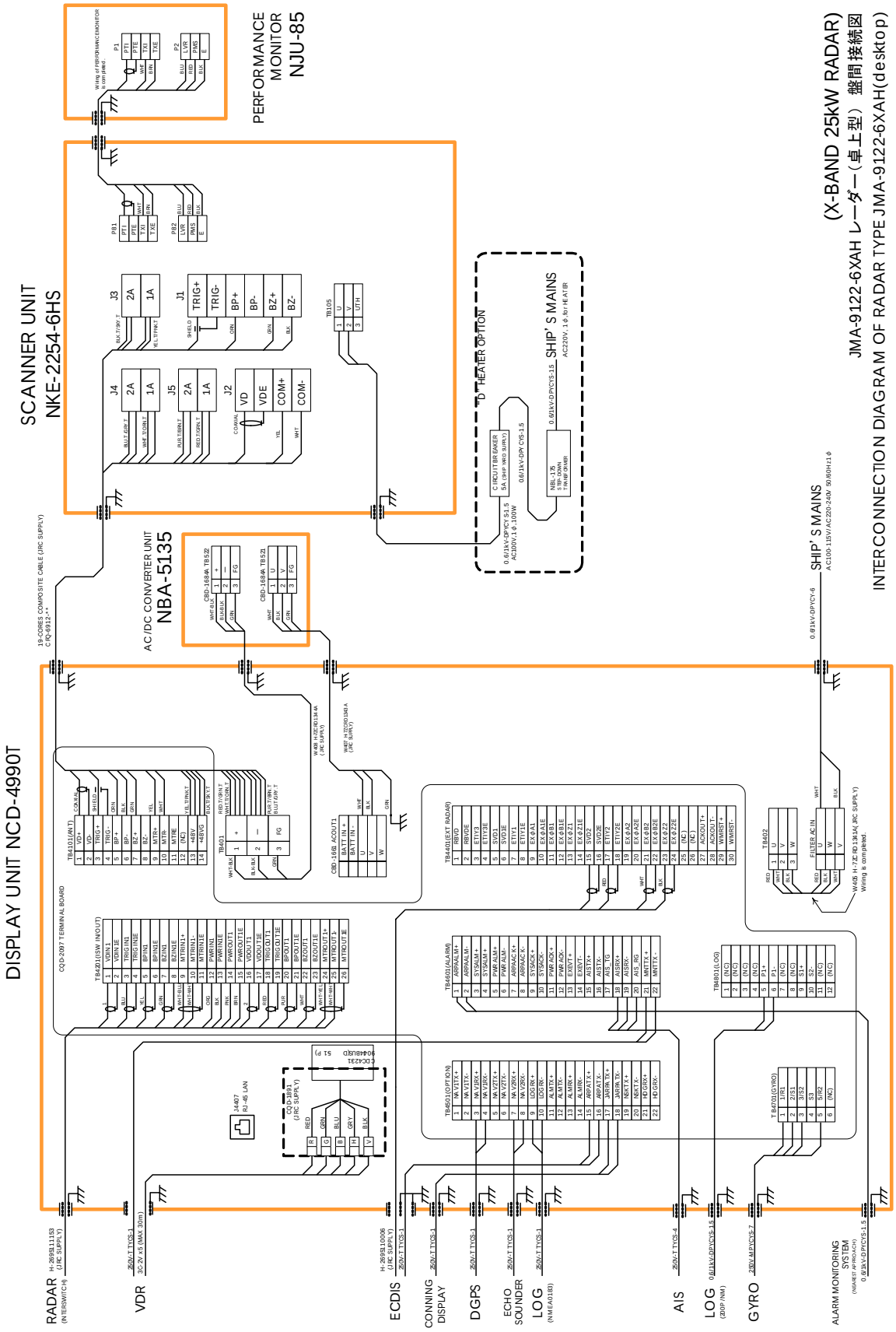


Fig B-32: *Terminal Board Connection Diagram of JMA-9122-6XAH (desktop)*

B.7.5 JMA-9122-6XA/9XA

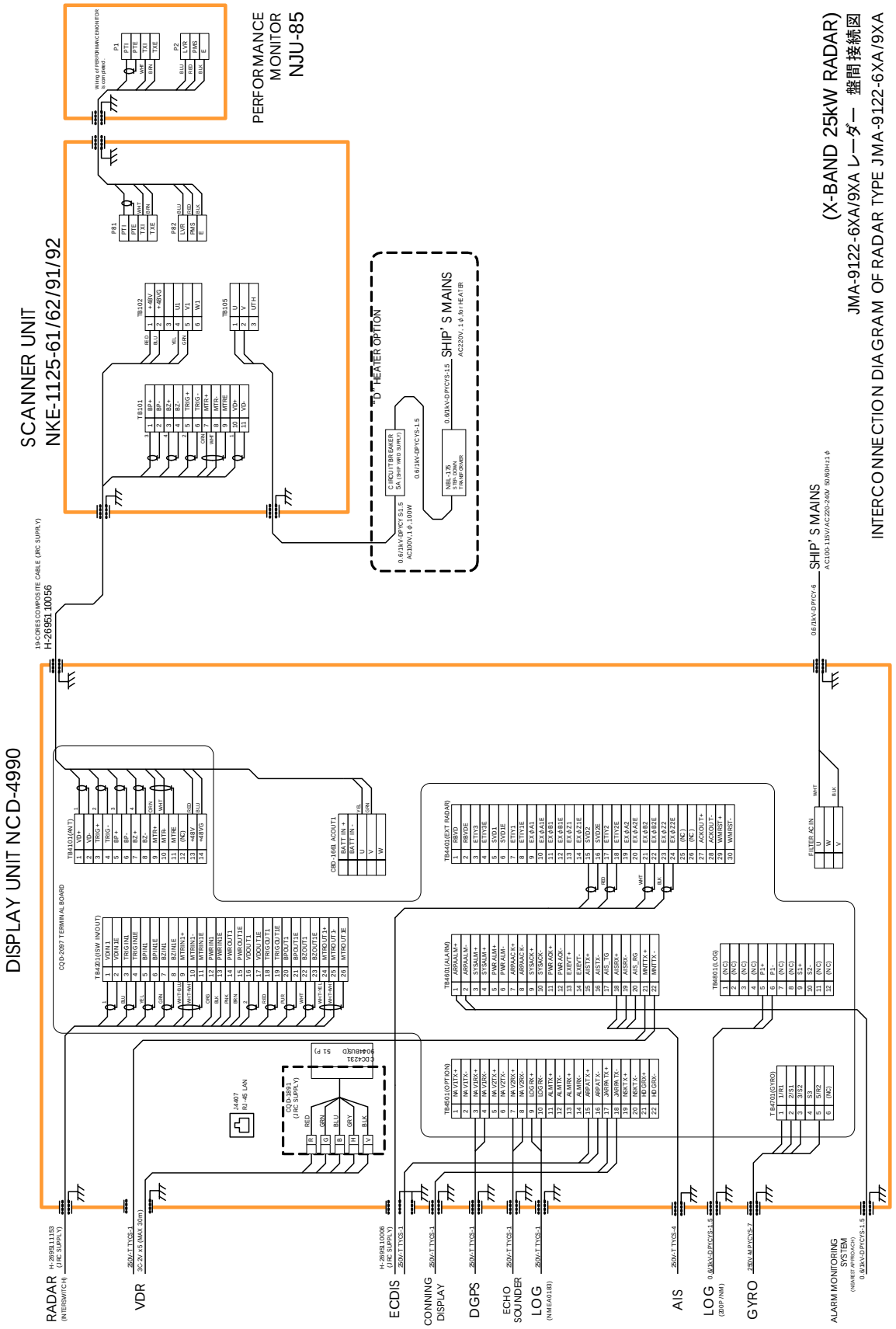


Fig B-33: *Terminal Board Connection Diagram of JMA-9122-6XA/9XA*

B.7.6 JMA-9123-7XA/9XA

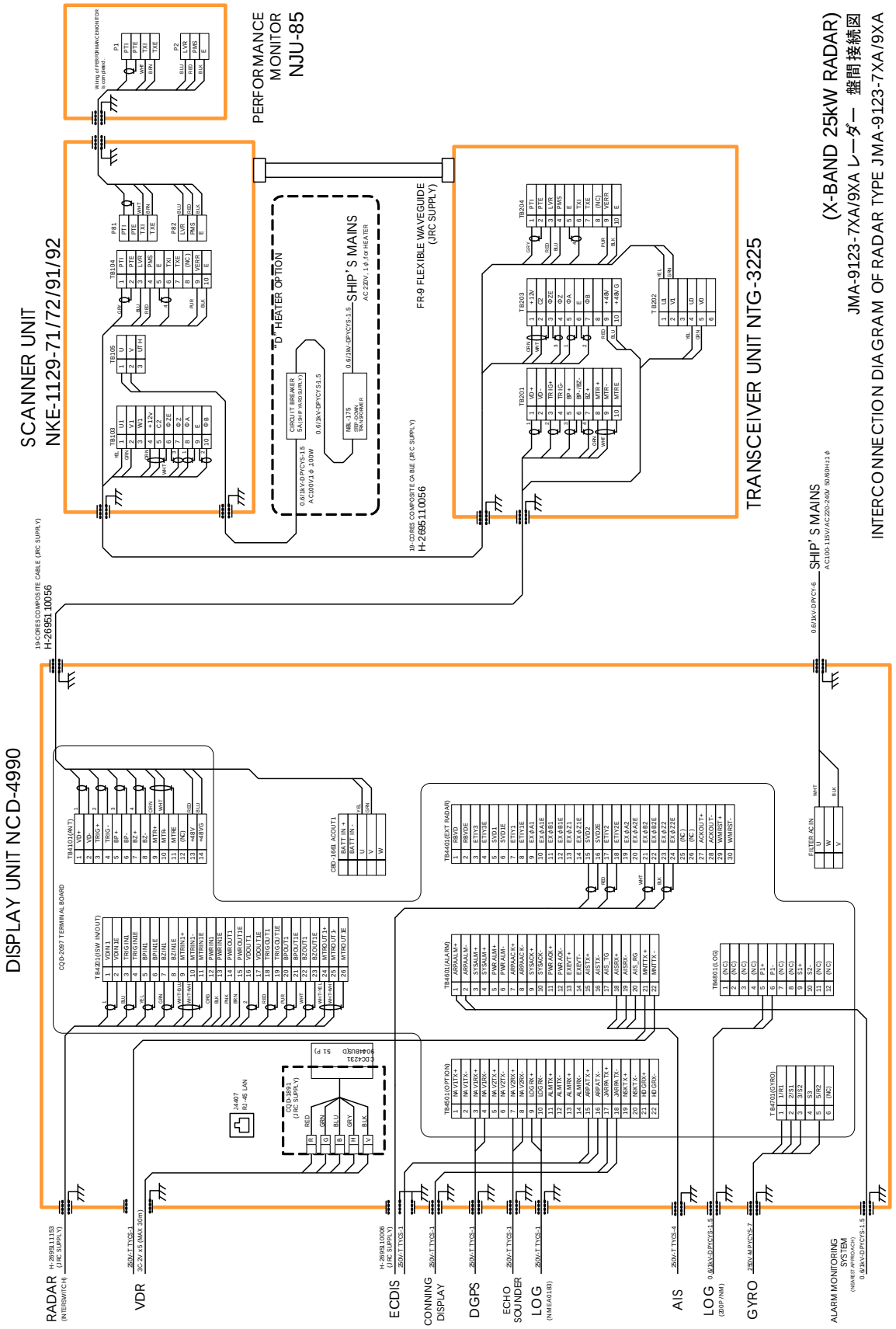


Fig B-34: *Terminal Board Connection Diagram of JMA-9123-7XA/9XA*

B.7.7 JMA-9132-SA

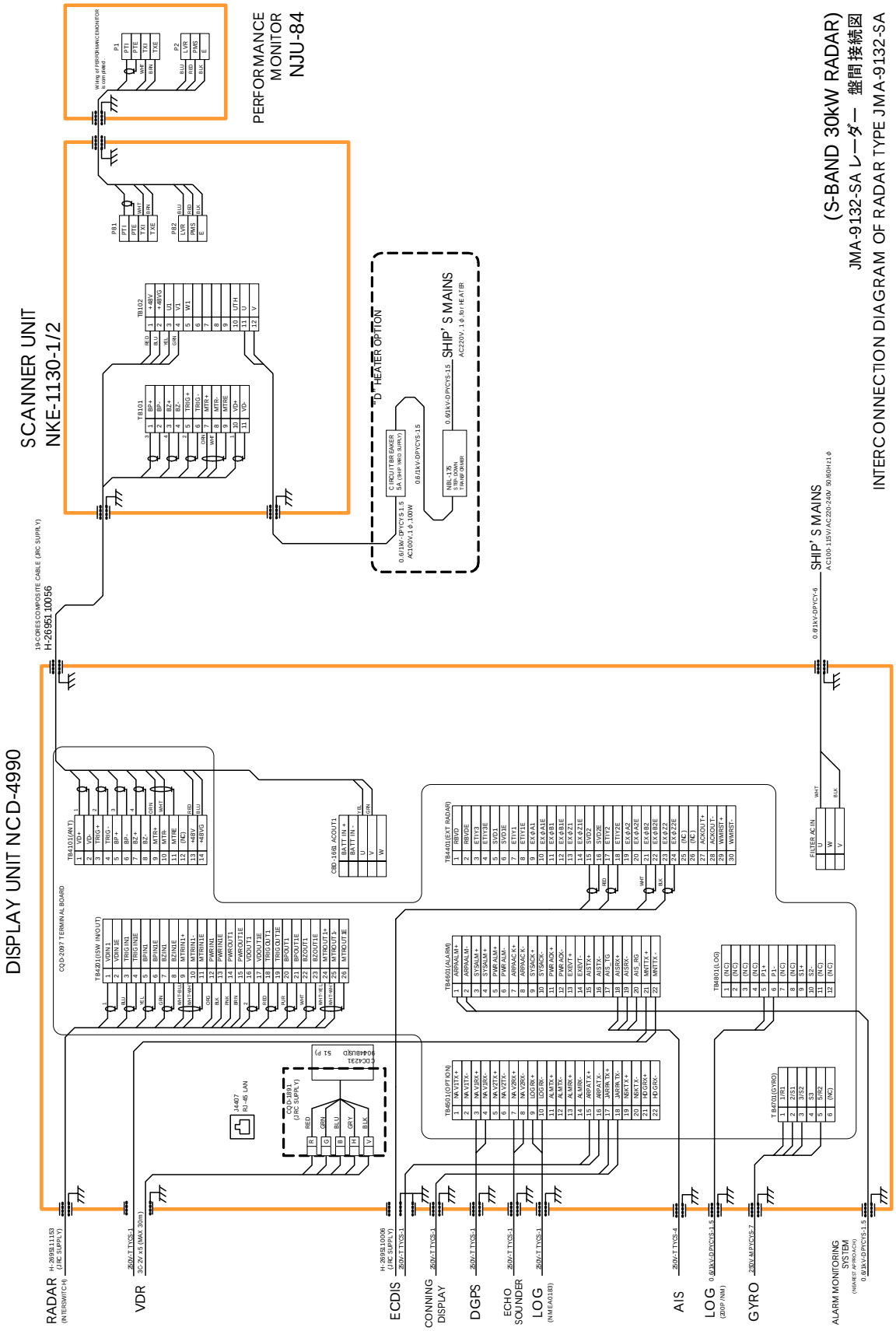


Fig B-35: *Terminal Board Connection Diagram of JMA-9132-SA*

B.7.8 JMA-9133-SA

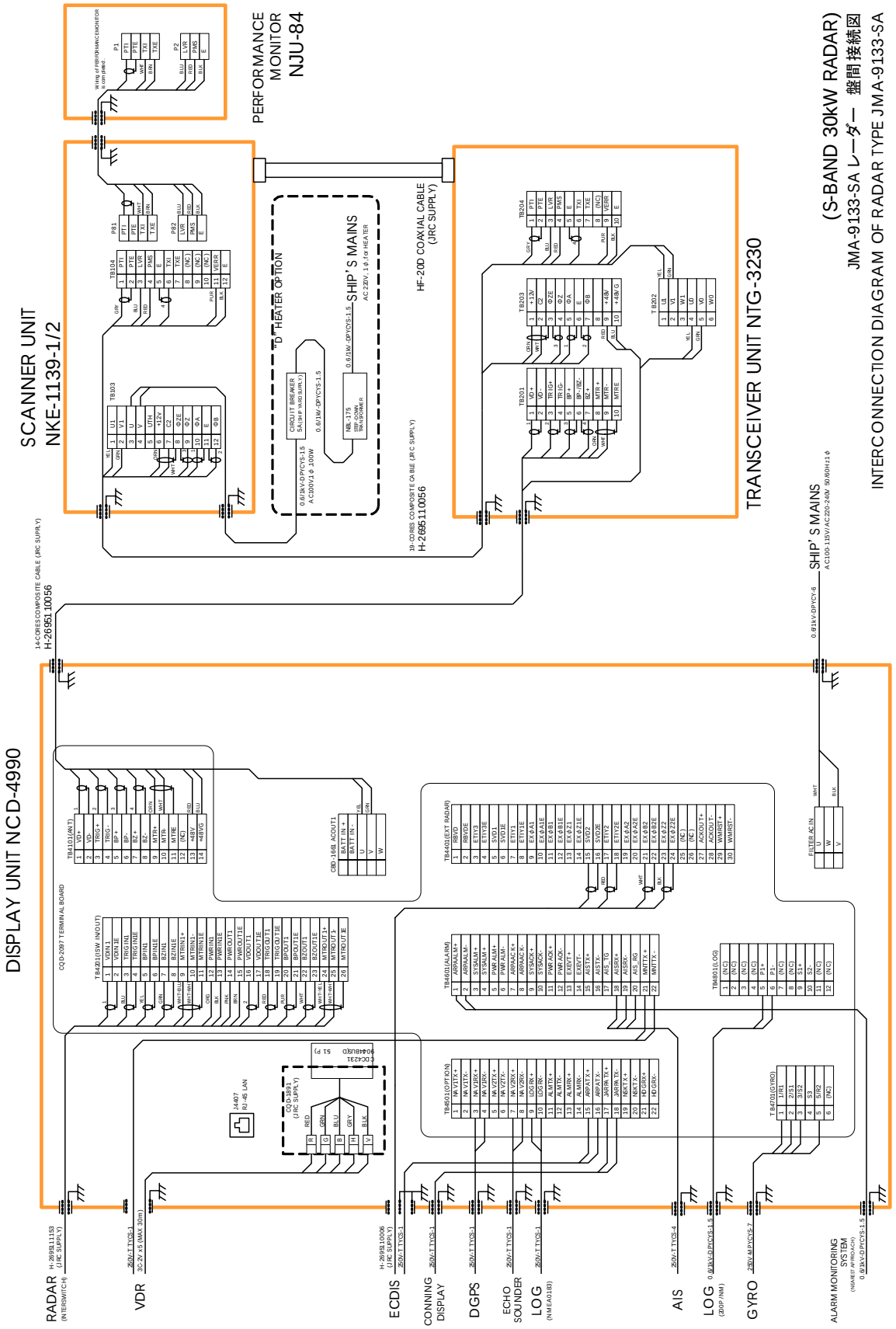
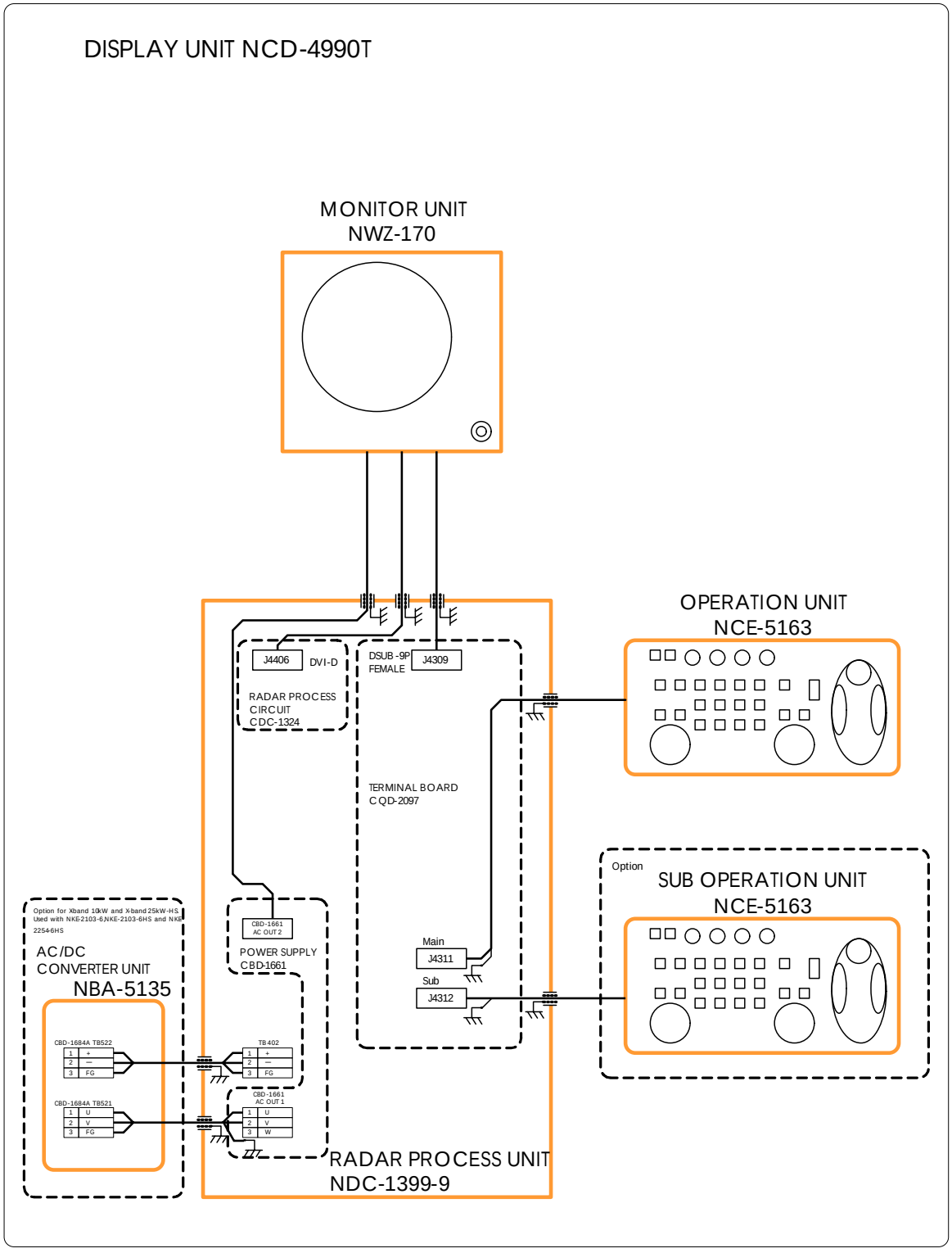


Fig B-36: *Terminal Board Connection Diagram of JMA-9133-SA*

B.7.9 NCD-4990T



JMA-9100 Series RADAR
NCD-4990T 卓上型レーダー指示機　ユニット間接続図
INTERCONNECTION DIAGRAM OF DISPLAY UNIT TYPE NCD-4990T(desktop)

Fig B-37: *Inter-Unit Connection Diagram of NCD-4990T*

B.8 GYRO I/F

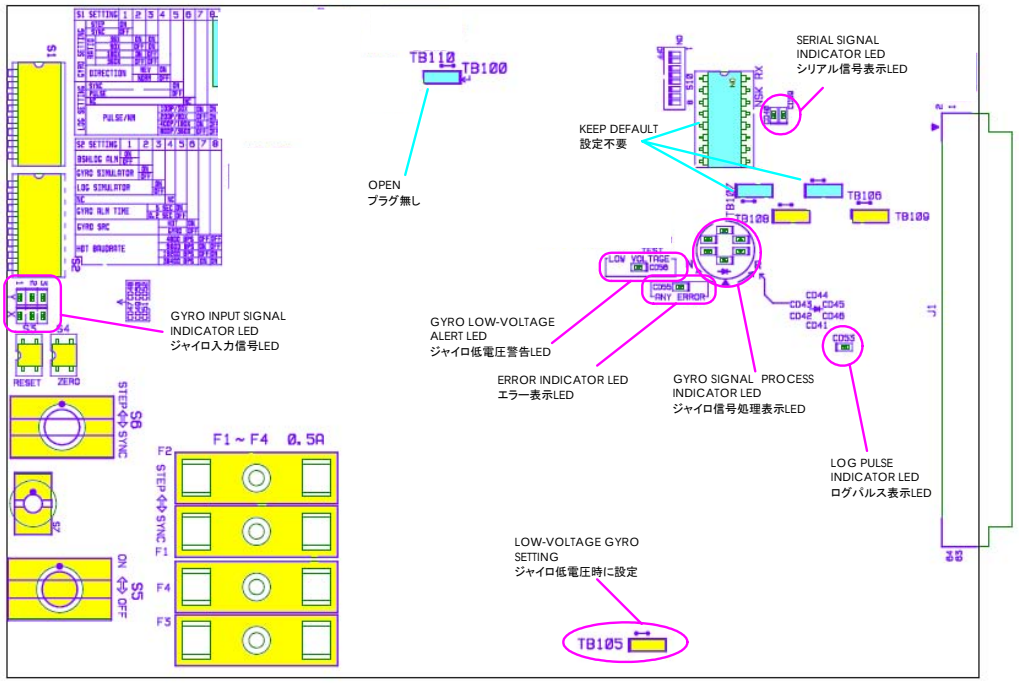


Fig B-38: *Parts Location of CMJ-462E*

TableB-1：Setting Table of CMJ-462E S1/S2

S1 SETTING			1	2	3	4	5	6	7	8
ジャイロ信号 GYRO SETTING	STEP		ON							
	SYNC		OFF							
	RATIO	36X		ON	ON					
		90X		OFF	ON					
		180X		ON	OFF					
		360X		OFF	OFF					
	回転方向 DIRECTION	逆／REV				ON				
		正／NOR				OFF				
ログ信号 LOG SETTING	シンクロ／SYNC						ON			
	パルス／PULSE						OFF			
	未接続／NC							OFF		
	パルス PULSE/NM	100P／30X							ON	ON
		200P／90X							OFF	ON
		400P／180X							ON	OFF
		800P／360X							OFF	OFF

S2 SETTING		1	2	3	4	5	6	7	8
BSHLOG ALM		ON							
		OFF							
GYRO SIMULATOR			ON						
			OFF						
LOG SIMULATOR				ON					
				OFF					
N.C. (No Connection)					OFF				
GYRO ALM TIME	5 SEC					ON			
	0.2 SEC					OFF			
GYRO SRC (Heading Sensor Source)	HDT (NMEA (HDT/THS))						ON		
	GYRO						OFF		
NMEA BAUDRATE	4800 BPS							OFF	OFF
	9600 BPS							ON	OFF
	19200 BPS							OFF	ON
	38400 BPS							ON	ON

TableB-2 : Gyro, Log Settings

Item / Manufactuer	Gyro compasses	Repeater motors (For refernce only)	CMJ-462 Excitation voltate	Gyro select swiches (S1, S6, S7 located on the CMJ-462) S1 setting 1	2	3	4	5	6	7	8	S6, S7 setting
トキメック TOKIMEC (JAPAN)	ES-2/11, GLT-100~103/105/106K/107/1104, NJZ-501 (R501)	Synchro motor INMS (TS63N7E13) (36X)	115 VAC 60Hz	OFF	ON	ON	OFF	Speed log selection				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 TSAN6GE11 (90X)	110 VAC 60Hz	OFF	OFF	ON						SYNC
	GLT-201/202/203, MK-14/14T, MKE-1/14T, MOD-1/2/T, PR-500/2502/2503/2507/2507L /3507/4507/5507, SR-130/140, TG-100/5000	Step motor GA-2001G Drawing#103590810 600 excitation (180X)	70 VDC	ON	ON	OFF	OFF	注) レーダー画像及び COURSEの指示値 が逆転する場合は ONに設定する				STEP
	ES-16 SR-120/220	Step motor GA-2001G	35 VDC									STEP
	CMZ-700D ES-140/160 PR-26**/6*0*/6*7*, SR-140/160 TG-6000/8000	Drawing#103590820 150 excitation (180X)	24 VDC	ON	ON	OFF						
横河電機 YOKOGAWA (JAPAN)	C-1A/2/3/E, HOKUSHIN PLATH-55/C, PLATH HKRK-C3	Synchro motor YM-14 TS-19 (360X)	60 VAC 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)	100 VAC 50/60Hz	OFF	OFF	OFF						SYNC
アーマーブラウン ARMA BROWN (France)	1351, MK-1~7/10/20, MKL-1, NOD-4, NB-23-86, SERIE, SQB-1000	Step motor BZ-2191 (180X)	50 VDC	ON	ON	OFF						STEP
アンシュッツ ANSCHUTZ (Germany)	110-301, 139-31, ANSCHUTZ-1~6/12/14/Z, GM-BH, K8051, NB23-126, Z0658U	Synchro motor NB23-91 (360X)	50 VAC 50Hz	OFF	OFF	OFF						SYNC
プラート社 C. PLATH (Germany)	NAVIGAT 763-331E, PLATH NAVIGAT-II/III	Synchro motor YM14A (360X)	50 VAC 60Hz	OFF	OFF	OFF						SYNC

*: Numeric number

B.9 Inter Switch Unit

B.9.1 Terminal Board Connection Diagram

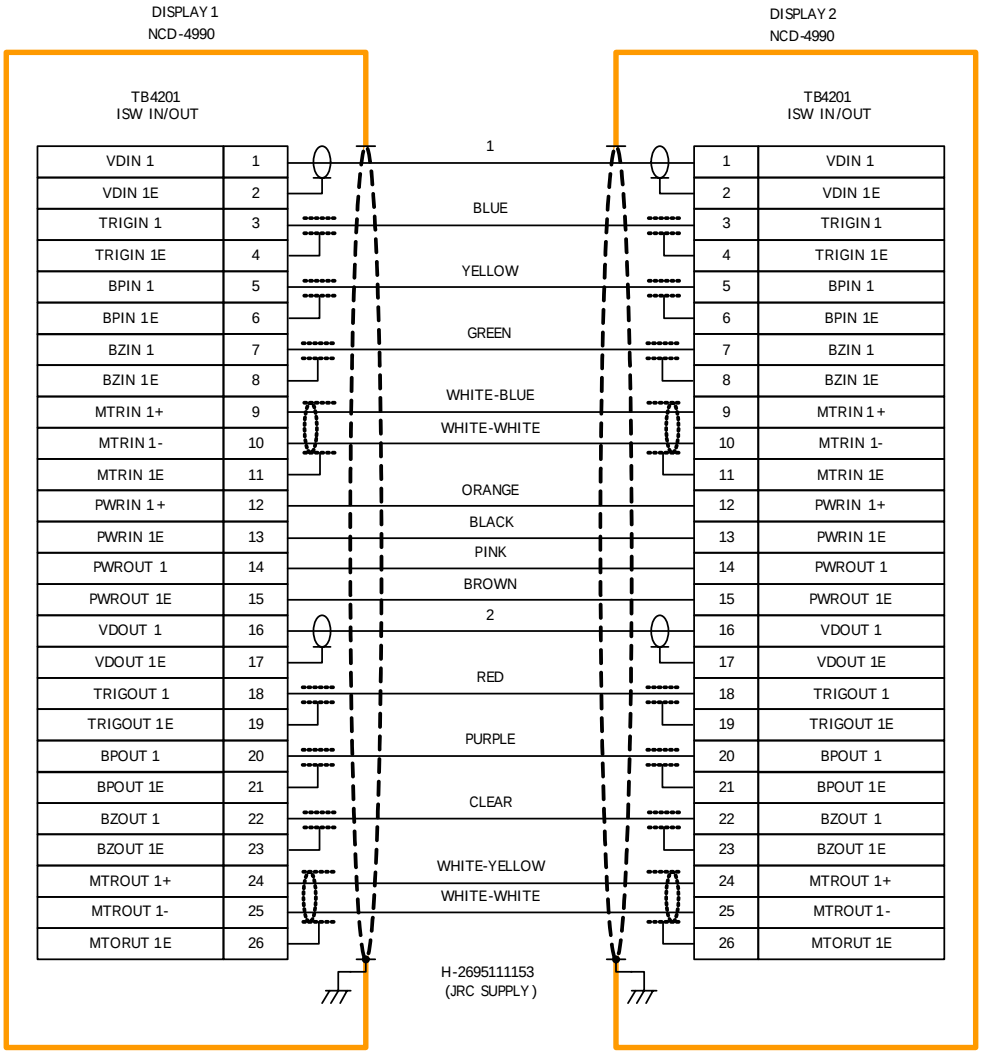


Fig B-39: *Terminal Board Connetion Diagram of NQE-3141-2A*

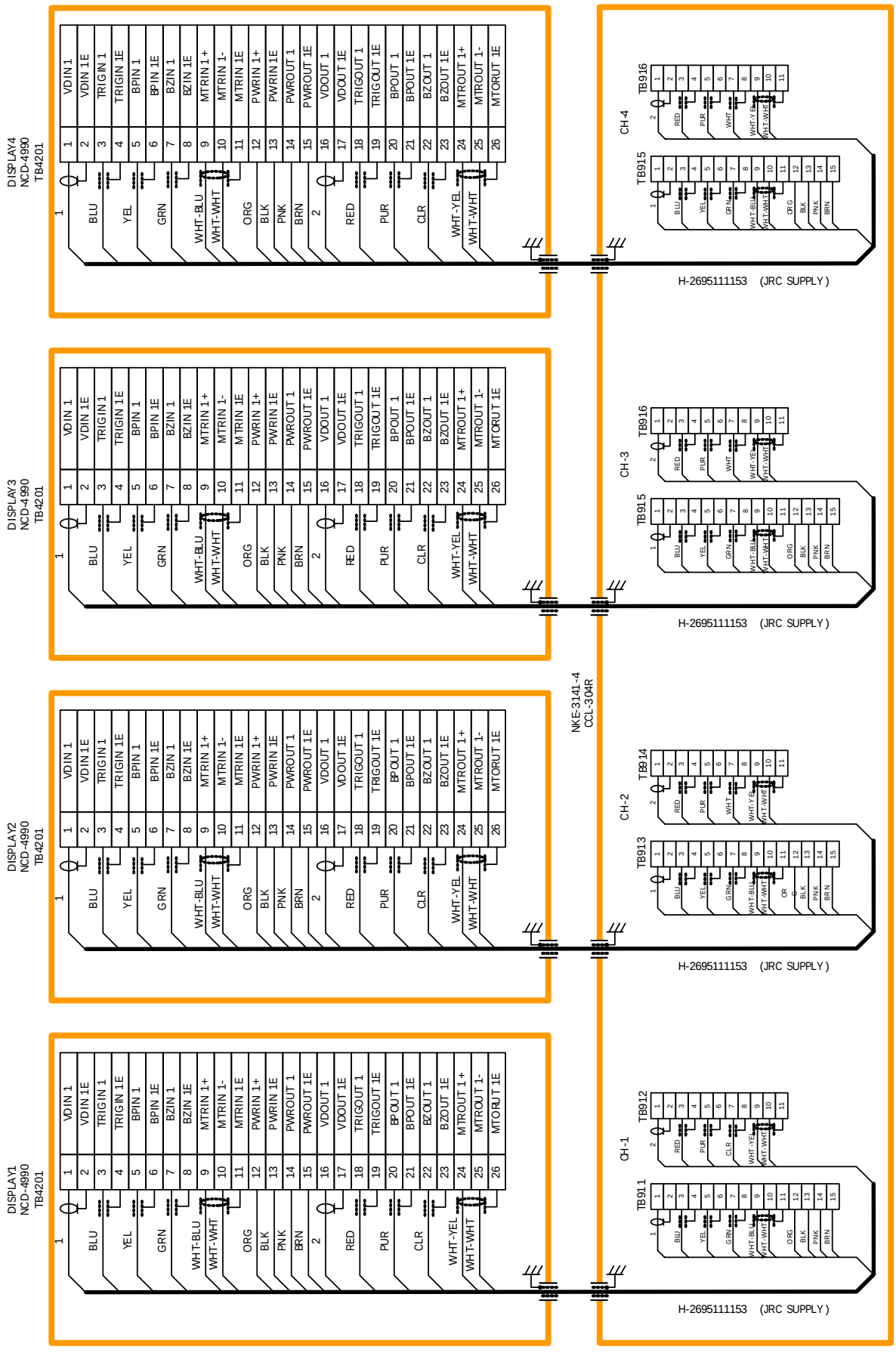


Fig B-40: *Terminal Board Connection Diagram of NQE-3141-4A*

B.9.2 Interconnection Diagram

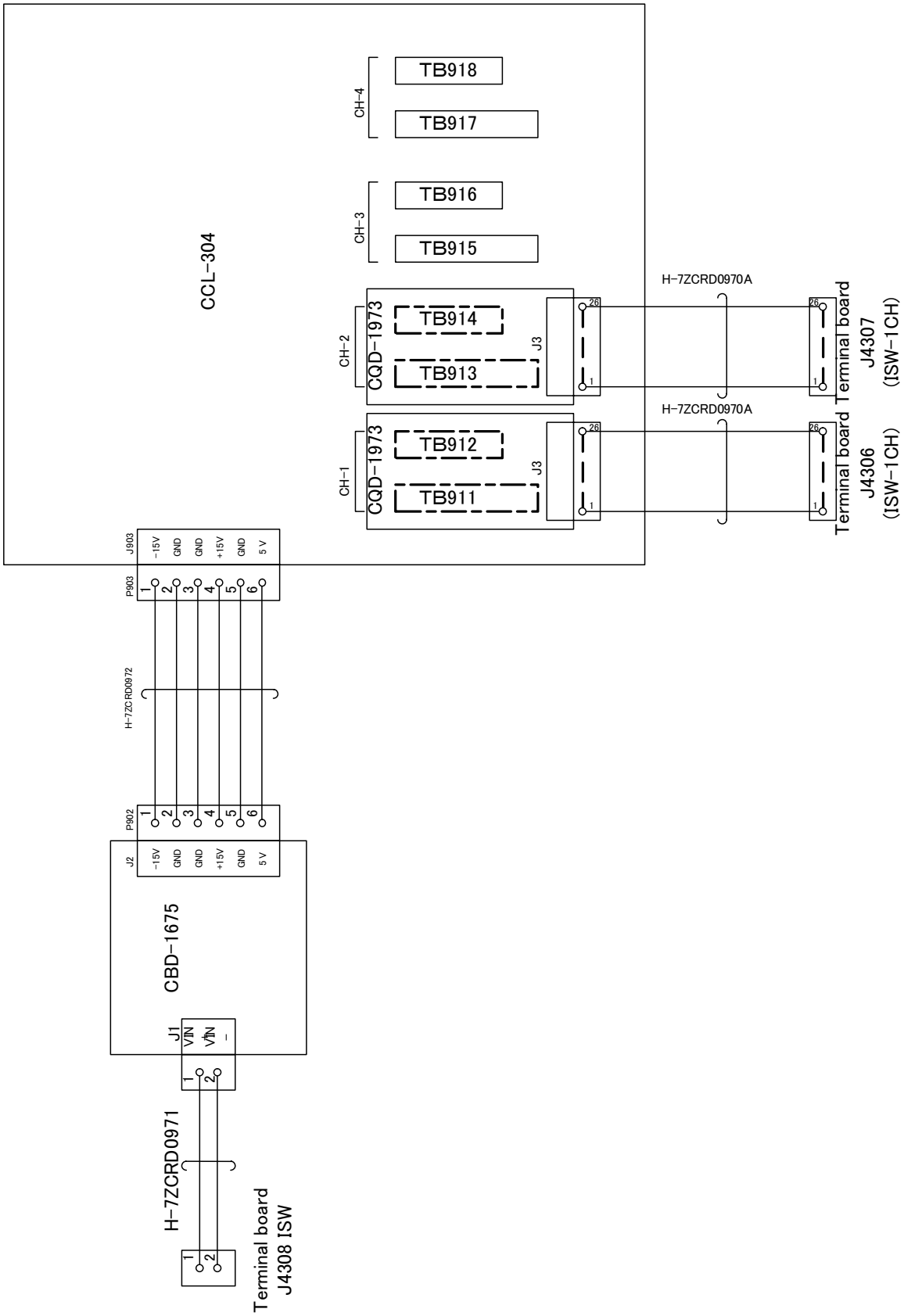


Fig B-41: *Interconnection Diagram of NQE-3141-2A*

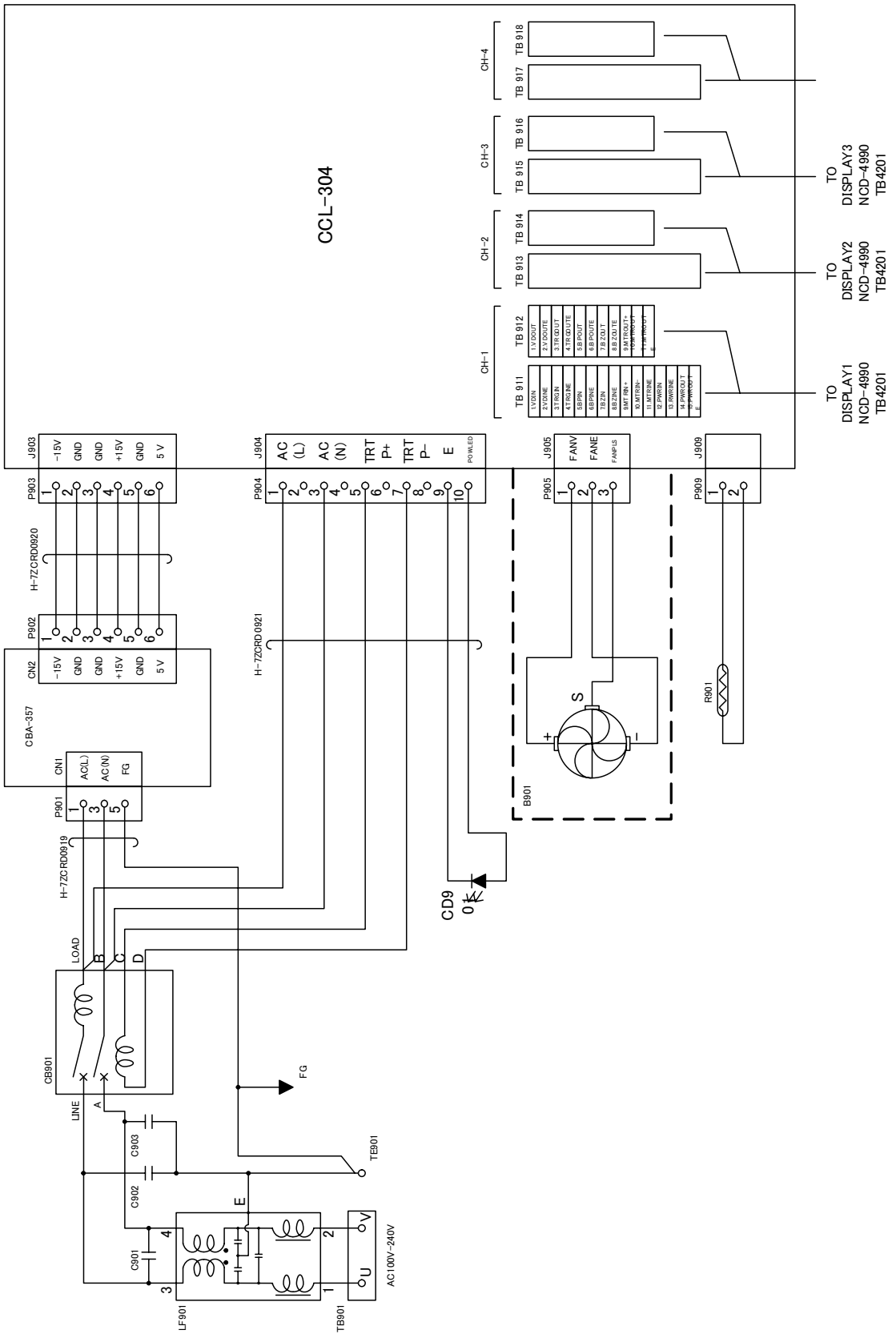
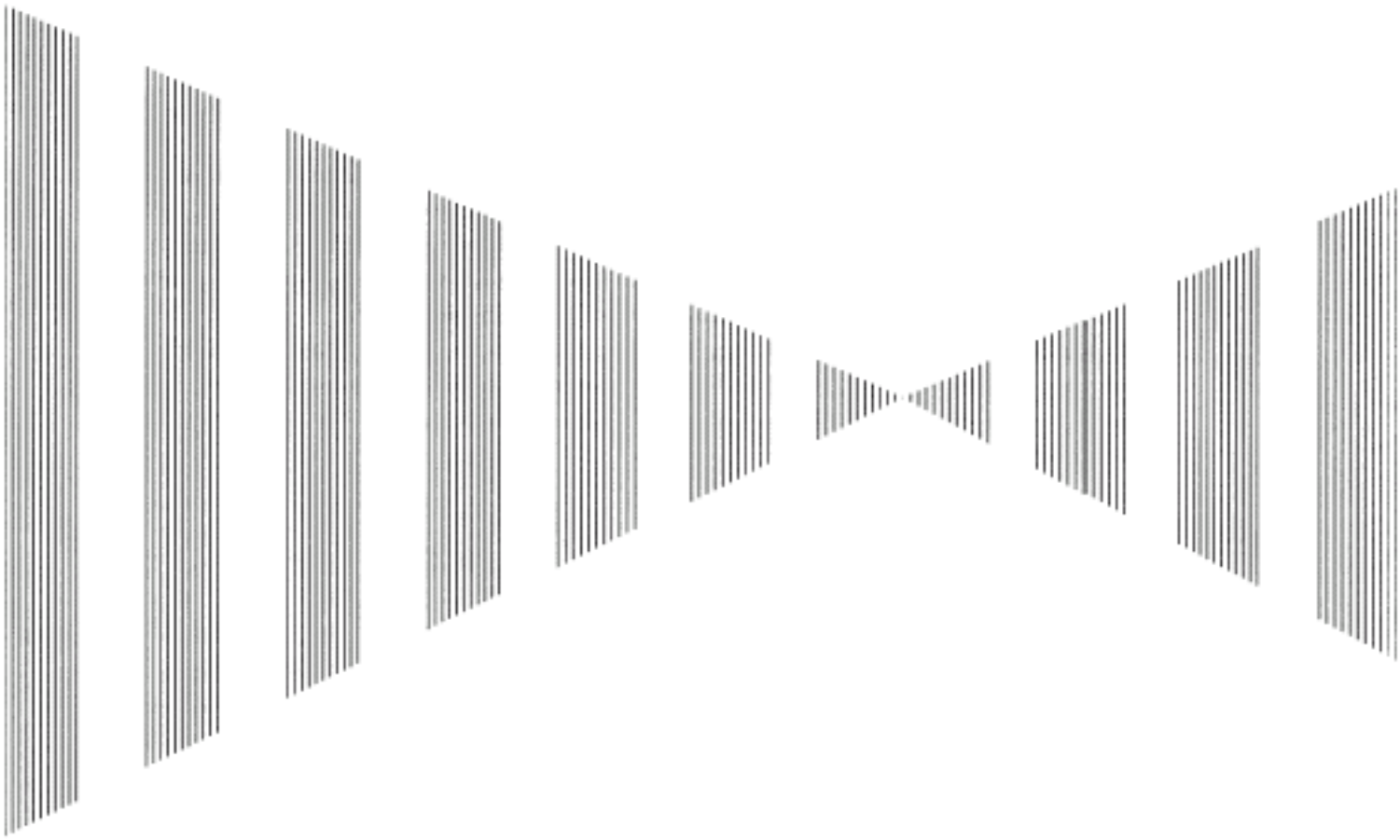


Fig B-42: *Interconnection Diagram of NQE-3141-4A*

B

Appendix C
Menu Index



Menu Index

C.1 Main

C.2 PI

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│ ├ Individual
│ ├ Track
│ └ Equiangular
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│ ├ Individual:Index Line 2
│ ├ Individual:Index Line 3
│ ├ Individual:Index Line 4
│ ├ Individual:Index Line 5
│ ├ Individual:Index Line 6
│ ├ Individual:Index Line 7
│ ├ Individual:Index Line 8
│ ├ Track:Group 1
│ ├ Track:Group 2
│ ├ Track:Group 3
│ ├ Track:Group 4
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│ ├ Equiangular:Group 3
│ └ Equiangular:Group 4
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├ 8. Press EBL Dial to Control PI#[3]
├ 9. Press VRM Dial to Move End Point#[ii]
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│ ├ All:True[4]
│ ├ All:HL
│ ├ Individual:True
│ ├ Individual:HL
│ ├ Individual:Index Line 1
│ ├ Individual:Index Line 2
│ ├ Individual:Index Line 3
│ ├ Individual:Index Line 4
│ ├ Individual:Index Line 5
│ ├ Individual:Index Line 6
│ ├ Individual:Index Line 7
│ ├ Individual:Index Line 8
│ ├ Track:True
│ ├ Track:HL
│ ├ Track:Index Line 1
│ ├ Track:Index Line 2
│ ├ Track:Index Line 3
│ ├ Track:Index Line 4
│ ├ Track:Index Line 5
│ ├ Track:Index Line 6
│ ├ Track:Index Line 7
│ └ Track:Index Line 8
├ 3. Operation Area - *page 4-13*
├⊟4. Display for Individual Line - *page 4-13*

1.The setting items are determined by the setting of Operation Mode.
2.*Operating Mode* : *Control*
3.Displayed only when "3. Control" is Individual.
4.*Operating Mode* : *Reference Bearing*

C

JRC Japan Radio Co., Ltd.

- 1. Index Line 1
- 2. Index Line 2
- 3. Index Line 3
- 4. Index Line 4
- 5. Index Line 5
- 6. Index Line 6
- 7. Index Line 7
- 8. Index Line 8

8. Press EBL Dial to Control PI#[ii]
9. Press VRM Dial to Move End Point#[ii]

C.3 TT

C.4 AIS

C.5 AZ

C.6 Track

C.7 Route

C.8 U.Map

- 1. Own Ship Position - - - *section 3.6.3.1 on page 3-52*
- 2. Edit User Map - - - *section 3.6.3 on page 3-52*
  - 1. Make with Cursor - - - *section 3.6.1.1 on page 3-47*
    - 1. Type
    - 2. Color
  - 2. Make with L/L - - - *section 3.6.1.3 on page 3-49*
    - 1. Type
    - 2. Color
    - 3. L/L
    - 4. Comment
    - 5. Enter
    - 9. New Line Input/9.New Mark Input
  - 3. Move - - - *section 3.6.3.2 on page 3-53*
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  - 6. Delete Vertex - - - *section 3.6.3.6 on page 3-58*
  - 7. Delete by Type by Color - - - *section 3.6.3.7 on page 3-59*
- 3. Shift - - - *section 3.6.4.1 on page 3-60*
- 4. Shift Clear - - - *section 3.6.4.2 on page 3-61*
- 5. Mark Display Setting - - - *section 3.6.2 on page 3-50*
  - 1. Display Mark Type - - - *section 3.6.2.1 on page 3-50*
    - 1. All
    - 2. ○
    - 3. △
    - 4. ▽
    - 5. □
    - 6. ◇
    - 7. Wreck (mark)
    - 8. △△
    - 9. Next
    - 1. ▽▽
    - 2. △▽
    - 3. ▽△
    - 4. ＋
    - 5. ×
    - 6. Y
    - 7. Hand drum (mark)
    - 8. Light house (mark)
    - 9. Next
    - 1. Trapezoid（mark）
    - 2. filled Trapezoid（mark）
    - 3. Hat(mark)
    - 4. ●●
    - 5. ●
    - 6. Filled Triangle(mark)
    - 7. ！
    - 8. anchor(mark)
    - 9. Next
    - 1. slash-anchor(mark)
    - 2. circle-dotted line(mark)
    - 3. non-dangerous wreck(mark)
    - 4. ◎
    - 5. mariner's event mark(mark)
    - 6. ・
    - 7. Wavy line (mark)
    - 8. Solid line (mark)
    - 9. Dashed-dotted line (mark)
  - 2. Display Mark Color - - - *section 3.6.2.2 on page 3-51*
    - 1. All
    - 2. White
    - 3. Cyan
    - 4. Blue

C.9 Serviceman Menu

- 2. TLL(TT)
- 3. TTD(TT)
- 4. TLB(TT)
- 5. OSD
- 6. RSD
- 7. ALR
- 8. ACK
- 9. Next
  - 1. TTM(AIS)
  - 2. TLL(AIS)
  - 3. TTD(AIS)
  - 4. TLB(AIS)
  - 5. Remote Maintenance
  - 6. JRC-ARPA
  - 7. NMEA0183 Output Format
  - 8. NMEA0183 Talker
  - 9. Next
    - 1. NMEA0183 TX Interval
    - 2. APB
    - 3. BOD
    - 4. GGA
    - 5. GLL
    - 6. RMC
    - 7. RMB
    - 8. VTG
    - 9. Next
      - 1. XTE
      - 2. BWC
      - 3. HDT
      - 4. THS
- 7. Line Monitor
  - 1. COMPASS
  - 2. MAINTENANCE/LOG
  - 3. NAV1
  - 4. NAV2
  - 5. ALARM
  - 6. JARPA
  - 7. AIS
  - 8. BRIDGE NET
  - 9. Next
    - 1. ARPA
    - 2. COM
    - 3. TXRX/ISW
    - 4. KEYBOARD1
    - 5. KEYBOARD2
- 6. Alarm System - *section 7.2.9 on page 7-22*
  - 1. Watch Alarm
    - 1. Reset Interval - - - - - - - - - - - - - - - - - *section 7.2.9.1 on page 7-22*
    - 2. Trackball Threshold - - - - - - - - - - - - - - *section 7.2.9.2 on page 7-22*
  - 2. Relay Output - *section 7.2.9.3 on page 7-23*
    - 1. Relay Output Mode
    - 2. TT CPA/TCPA
    - 3. AIS CPA/TCPA
    - 4. New Target
    - 5. Lost
    - 6. RADAR Alarm
  - 3. ALR Output - *section 7.2.9.4 on page 7-23*
    - 1. System Alarm
    - 2. TT/AIS Alarm
  - 4. Sound Output Mode - - - - - - - - - - - - - - - - - *section 7.2.9.6 on page 7-25*
  - 5. External ACK Setting - - - - - - - - - - - - - - - - *section 7.2.9.5 on page 7-24*
    - 1. Critical Alarm
      - 1. Audio
      - 2Indication
      - 3. Acknowledge State
    - 2. Normal Alarm
      - 1. Audio
      - 2. Indication
      - 3. Acknowledge State
- 7. Inter Switch

- 1. ISW Install
- 2. Mask Setting
  - 1. No.1 Connection/No.1 Master
  - 2. No.2 Connection/No.2 Master
  - 3. No.3 Connection/No.3 Master
  - 4. No.4 Connection/No.4 Master
  - 5. No.5 Connection/No.5 Master[1]
  - 6. No.6 Connection/No.6 Master[i]
  - 7. No.7 Connection/No.7 Master[i]
  - 8. No.8 Connection/No.8 Master[i]
- 3. S-ISW TXRX Power Supply

8. Language - *section 7.2.6 on page 7-20*

9. Next

1. Input BP Count - *section 7.2.5.2 on page 7-19*

2. TNI Blank - *section 7.2.3 on page 7-17*
- 1. TNI Blank - *section 7.2.3.1 on page 7-17*
- 2. Make Sector - *section 7.2.3.2 on page 7-17*

3. Device Installation - *section 7.1.6 on page 7-8*
- 1. Gyro
- 2. Compass
- 3. GPS Compass
- 4. LOG
- 5. 2AXW
- 6. 2AXG
- 7. GPS

4. Network
- 1. Network Function
- 2. IP Address

3. Maintenance Menu

1. Safety Switch - *section 7.4.1 on page 7-33*

2. Area Initial - *section 7.4.2 on page 7-34*

1. Partial Master Reset - *section 7.4.2.1 on page 7-34*
- 1. Serviceman Menu
- 2. Except Serviceman Menu
- 3. User Setting
- 4. TT Setting
- 5. AIS Setting
- 6. Day/Night
- 7. JRC Card Copy Record

2. All Master Reset - *section 7.4.2.2 on page 7-34*

3. Internal To Card2 - *section 7.4.3.1 on page 7-35*

4. Card2 To Internal - *section 7.4.3.2 on page 7-35*

5. TXRX Time - *section 7.4.4 on page 7-36*
- 1. Clear TX Time - *section 7.4.4.1 on page 7-36*
- 2. Clear Motor Time - *section 7.4.4.2 on page 7-36*
- 3. TXRX to Display Unit - *section 7.4.4.3 on page 7-37*
- 4. Display Unit to TXRX - *section 7.4.4.4 on page 7-37*

6. String Data Update - *section 7.4.5 on page 7-38*

9. RADAR/TT Initial Setup

1. Signal Processing - *section 7.3.1 on page 7-26*
- 1. Echo Noise Level - *section 7.3.1.1 on page 7-26*
- 2. Setting Mode - *section 7.3.1.2 on page 7-27*

2. TT - *section 7.3.2 on page 7-27*
- 1. Vector Constant - *section 7.3.2.1 on page 7-27*
- 2. Video TD Level - *section 7.3.2.2 on page 7-28*
- 3. Video High Level
- 4. Video Low Level
- 5. Gate Size
- 6. Limit Ring

3. MBS - *section 7.3.3 on page 7-29*
- 1. MBS Level - *section 7.3.3.1 on page 7-29*
- 2. MBS Area - *section 7.3.3.2 on page 7-30*

1.Only for ISW Extended Mode

アスベストは使用しておりません
Not use the asbestos

CODE No.7ZPRD0685

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