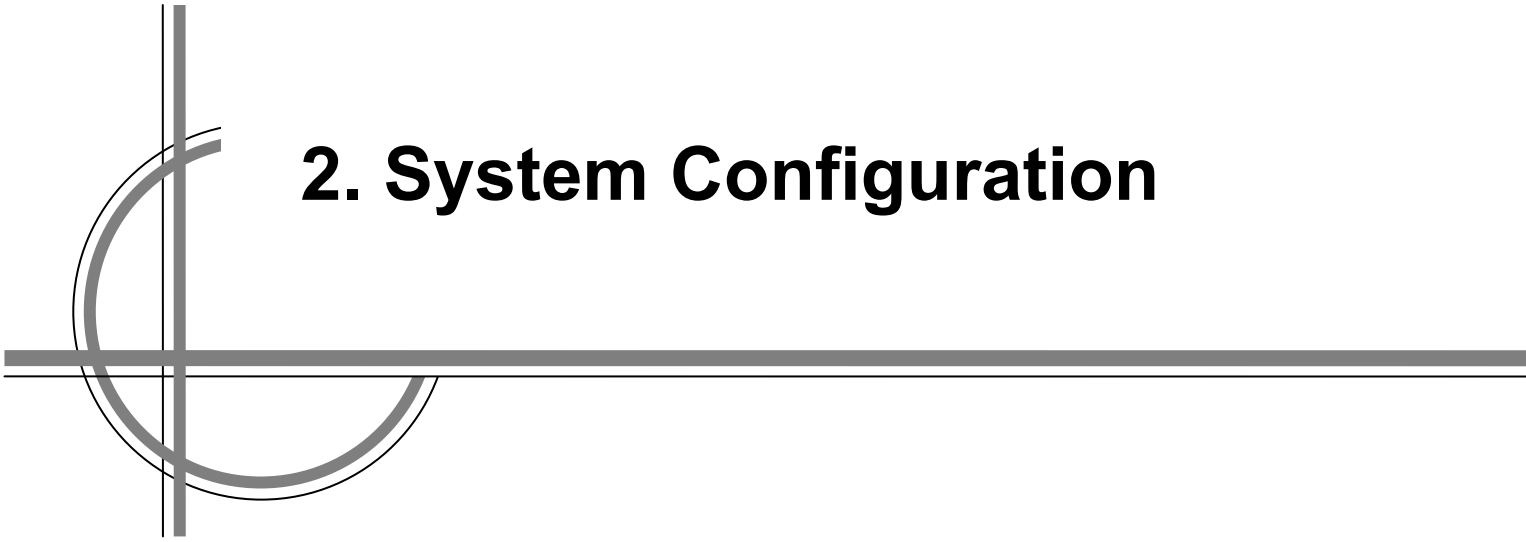


2. System Configuration

Chapter 2. System Configuration

2.1 Components

A list of components and optional accessories is shown below.

Components of the Display Unit

Table 2.1.1 The list of components of the Display Unit

Unit			Type name	Q'ty	Remarks
LCD monitor		(JMR-92XX/JAN-92XX)	NWZ-208	1	26inch LCD monitor
		(JMR-72XX/JAN-72XX)	NWZ-207		19inch LCD monitor
Touch Panel monitor		(JMR-92XX/JAN-92XX)	NWZ-208-TP		Option 26inch
		(JMR-72XX/JAN-72XX)	NWZ-207-TP		Option 19inch
Control Unit			NCM-928	1	Standard Equipment
	Power Supply Unit		NBD-913	1	Standard Equipment
	Central Control Unit		NDC-1590	1	Standard Equipment
		8GB System SSD	CDD-752	1	Included in the NDC-1590
		256GB Data SSD	CDD-753	1	
		DVD Drive	CDD-754	1	
		HASP	CYC-344	1	
		e-Token	CYC-735	1	
		Central Processing Circuit	CDC-1410	1	
		CCU Interface Circuit	CMH-2406	1	
		CCU Interface Terminal	CQD-2286	1	
		CCU Interconnection	CML-902	1	
		COM Express Board	CMC-1406	1	
		WES7P Licence	CYC-847	1	
		TMSL Licence	CYC-848	1	
	Trackball Operation Unit		NCE-5605	1	Standard Equipment
		Operation Circuit A	CCK-1050	1	Inclueded in the NCE-5605
		Trackball	CCK-1060	1	
		Operation Circuit SW	CCK-1069	1	
		Operation Circuit CN	CCK-1070	1	
		TOPU Interconnection	CMD-1103	1	
Keyboard Operation Unit			NCE-5625	1	Option(NCE-5625 or CWB-1593)
		Operation Circuit B	CCK-1059	1	Included in the NCE-5625
		Option Keyboard	CCK-1061	1	
		KOPU Interconnection	CMD-1106	1	
Large Tray			CWB-1593	1	Option(NCE-5625 or CWB-1593)
UPS		QUINT-PS/1AC/24DC/20	-	1	Option
		QUINT-BAT/24DC/3.4AH	-	1	
		QUINT-DC-UPS/QUINT20	-	1	
		ME-MAX-NEF/QUINT20	-	1	
Junction Box			NQE-1143	1	Option
		Serial LAN Circuit	CMH-2370	max 2	Option
		Analog Option Circuit	CMJ-560	1	Option
		Gyro Interface Circuit	CMJ-554	1	Option
		Radar Interface Circuit	CQD-2273	1	Option
		Scanner AC Power Cable	CML-836AC	1	Any one of these cables include to the CQD-2273
		Scanner AC Power Cable(F)	CML-836ACF		
		Scanner DC Power Cable	CML-836DC		
		Scanner DC Power Cable(F)	CML-836DCF		
Sensor LAN Switch Unit			NQA-2443	max 2	Option In case of standalone type 26inch:max 2 19inch:only 1
		16Port Switch HUB	CQL-221	1	Included in the NQA-2443
		Sensor LAN Switch Interconnection	CML-841	1	

Table 2.1.2 The list of components of the Display Unit

Unit		Type name	Q'ty	Remarks
Stand-alone type Frame & Cables	26inch Display Mount Kit	CWA-246	1	For 26inch Monitor
	19inch Display Mount Kit	CWA-245		For 19inch Monitor
	Display Unit Interconnection	CML-901	1	Cables for stand-alone
	Relay Terminal	CQD-2312	1	For AC/DC Power distribution
	Touch Panel Interconnection	CML-839	1	Option
Desktop type Frame & Cables	26inch Desktop Frame	CWB-1595	1	For 26inch Monitor
	19inch Desktop Frame	CWB-1594		For 19inch Monitor
	OPU Desktop Frame	CWB-1596	1	For operation unit
	Display Unit Interconnection(F)	CML-901-F	1	Longer than CML-901
	Touch Panel Interconnection(F)	CML-839-F	1	Option
Flush-mount type Cables	Display Unit Interconnection(F)	CML-901-F	1	Longer than CML-901
	Touch Panel Interconnection(F)	CML-839-F	1	Option
Interswitch Unit	4ch	NQE-3141-4A	1	Option
	8ch	NQE-3141-8A	1	Option
Power Control Unit		NQE-3167	1	Option
Digital Signal Converter	32ch	NCT-82	1	Option
	64ch	NCT-83	1	Option
Buzzer Unit		CGC-25	1	Option TCS Buzzer
Remote monitor display connection	RGB Video Distribution Amplifier	VAC-2001HB-A	1	Option
	Monitor Extension Kit	CFQ-5957	1	Option
Cover	(JMR-92XX/JAN-92XX)	CWB-1621	1	Option
	(JMR-72XX/JAN-72XX)	CWB-1619		
Hood	(JMR-92XX/JAN-92XX)	CWB-1620	1	Option
	(JMR-72XX/JAN-72XX)	CWB-1618		Option
Accessory	CD Cleaner	7ZZNA0426B	1	Packing 1 box
Spare Parts	NBD-913 Spare Parts	7ZXNA4021	1	Packing 1 box
	CMH-2370 Spare Parts	7ZXNA4020	1	Option
	CMJ-554 Spare Parts	7ZXNA4022	1	Option
	7HPNA4003 Printer spare parts	7ZXNA4011	1	Option
	NCT-82/83 Spare Parts	7ZXNA4017	1	Option
Printer	Printer	7HPNA4003	1	Option
	L-Type Stopper(Printer fixture)	QL-58	1	

Manuals

Table 2.1.3 The list of Manuals

Model	Title	Code	Remarks
JMR-7200/9200 Series	JMR-7200/9200 Series Marine Radar Equipment Instruction Manual <Basic Operation> (1/3) *English	7ZPNA4446*1	Standard Equipment
	JMR-7200/9200 Series Marine Radar Equipment Instruction Manual <Function> (2/3) *English	7ZPNA4447*1	Standard Equipment
	JMR-7200/9200 Series Marine Radar Equipment Instruction Manual <Reference> (3/3) *English	7ZPNA4448*1	Standard Equipment
	JMR-7200/9200 Series Marine Radar Equipment Quick Operation Guide *English	7ZPNA4395*1	Standard Equipment
	JMR-7200/9200 Series JAN-7201/9201 Marine Radar Equipment ECDIS Additional Manual for Chart Installation *English	7ZPNA4461*1	Option
	JMR-7200/9200 Series JAN-7201/9201 JAN-7202/9202 Marine Radar Equipment ECDIS Conning Display Installation Manual *English	7ZPNA4466*1	Option
	JMR-7200/9200 Series JAN-7201/9201 JAN-7202/9202 Marine Radar Equipment ECDIS Conning Display Field Service Manual *English	7ZPNA4467*1	Option
JAN-7201/9201	JAN-7201/9201 ECDIS Instruction Manual <Basic Operation> (1/3) *English	7ZPNA4449*1	Standard Equipment
	JAN-7201/9201 ECDIS Instruction Manual <Function> (2/3) *English	7ZPNA4450*1	Standard Equipment
	JAN-7201/9201 ECDIS Instruction Manual <Reference> (3/3) *English	7ZPNA4451*1	Standard Equipment
	JAN-7201/9201 ECDIS Quick Operation Guide *English	7ZPNA4405*1	Standard Equipment
	JMR-7200/9200 Series JAN-7201/9201 Marine Radar Equipment ECDIS Additional Manual for Chart Installation *English	7ZPNA4461*1	Option
	JAN-7201/9201 ECDIS Additional Manual for Automatic Sailing YOKOGAWA Autopilot PT500A TCS model Category B/C *English	7ZPNA4462*1	Option
	JAN-7201/9201 ECDIS Additional Manual for Automatic Sailing TOKYO KEIKI Autopilot PR-6000/9000 TCS model Category B/C *English	7ZPNA4463*1	Option
	JAN-7201/9201 ECDIS Type Specific ECDIS Training Reference for TCS *English	7ZPNA4464*1	Option
	JMR-7200/9200 Series JAN-7201/9201 JAN-7202/9202 Marine Radar Equipment ECDIS Conning Display Installation Manual *English	7ZPNA4466*1	Option
	JMR-7200/9200 Series JAN-7201/9201 JAN-7202/9202 Marine Radar Equipment ECDIS Conning Display Field Service Manual *English	7ZPNA4467*1	Option
JAN-7202/9202	JAN-7202/9202 Conning Display Instruction Manual *English	7ZPNA4452*1	Standard Equipment
	JMR-7200/9200 Series JAN-7201/9201 JAN-7202/9202 Marine Radar Equipment ECDIS Conning Display Installation Manual *English	7ZPNA4466*1	Option
	JMR-7200/9200 Series JAN-7201/9201 JAN-7202/9202 Marine Radar Equipment ECDIS Conning Display Field Service Manual *English	7ZPNA4467*1	Option

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

Radar Antenna Types and Specifications

Table 2.1.4 The list of Radar Antenna Types and Specifications

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

General Type Name

Table 2.1.5 The list of General Type Name

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

* JMR-9272-S and JMR-9282-S/SH are Solid state RADARs.

Option list of radar antenna

Table 2.1.6 Option list of radar antenna

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

Note:

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

Reference:

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

(Example) NKE-1130-1D

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

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

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

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

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

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

Coaxial cable	Length	Type name of JRC
HF-20D	30MT	HF-20D (30MT)

2.2 Power System Diagram

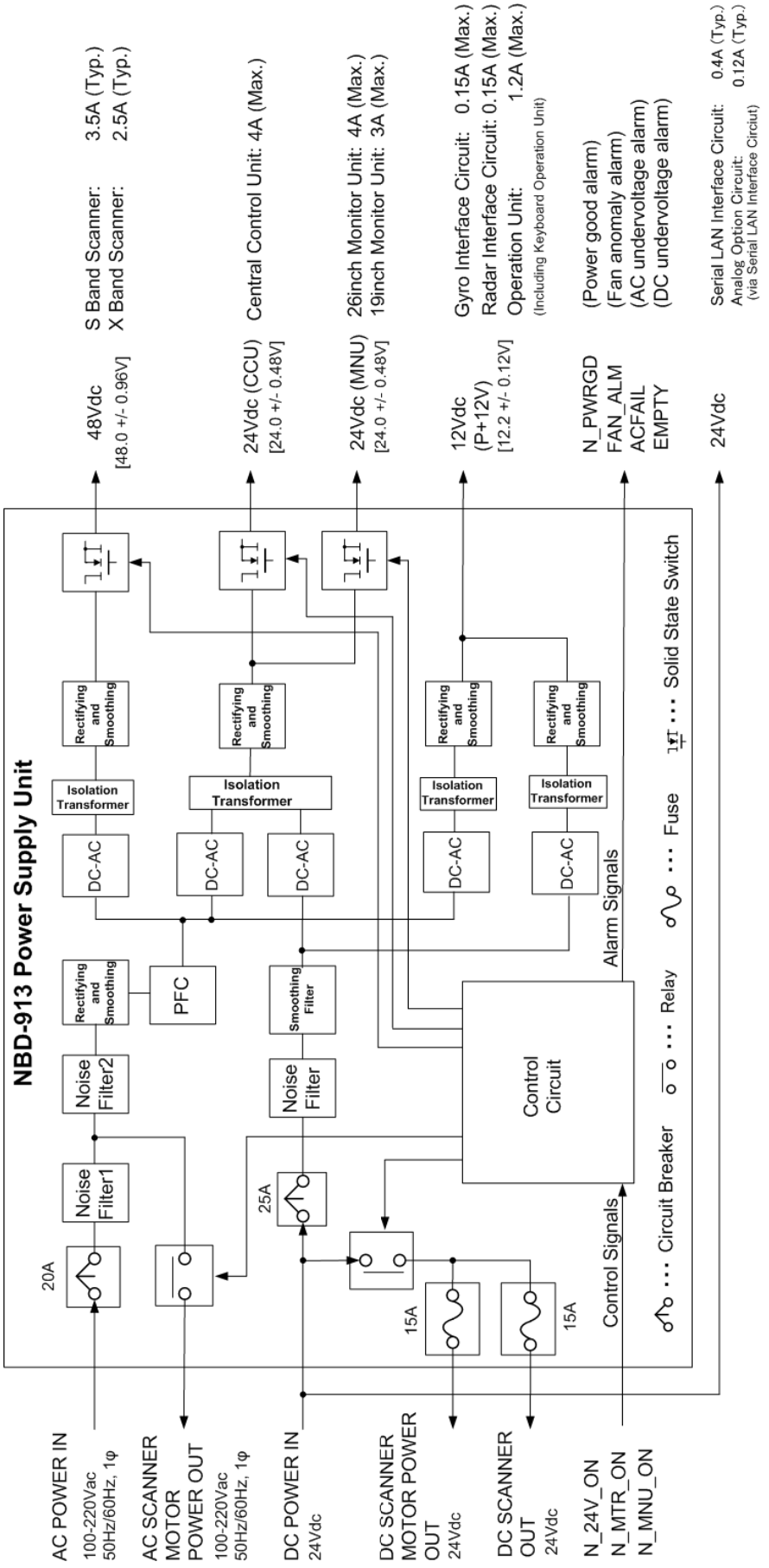


Fig. 2.2.1 The Power System Diagram

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

GENERAL SPECIFICATION	NBD-913: Power Supply Unit
AC Input	
Voltage	100 to 115VAC, 50/60Hz, single phase
	220 to 240VAC, 50/60Hz, single phase
Voltage Range	85 to 264VAC
Overvoltage Protection	295VAC ±2V
Input Current	Max 6.8A(100VAC) / 3.4A(220VAC)
Over current Protection	YES
DC Input	
Voltage	24VDC
Voltage Range	21.6 to 31.2VDC
Overvoltage Protection	42V
Input Current	Max 16A
Over current Protection	YES
Rated Output	
Output 1	12.0V ±0.24V 2A
Output 2A (for CCU)	24.0V ±0.48V 4A
Output 2B (for MNU)	24.0V ±0.48V 6A
Output 3 (for TXRX)	48.0V ±0.96V 4A
Mechanical	
Dimension	Width 400 x Depth 240 x Height 85 (mm)
Mass	4.2kg
FAN	2
Environment	
Operational Temperature	-15°C to +55°C
Operational Humidity	40°C RH 93%
Vibration	Sweep 2Hz to 13.2Hz at ± 1mm, 13.2Hz to 100Hz at 7m/s2 and for 2h on each resonance, otherwise 2h at 30Hz in all three axes
EMC	IEC60945-Ed4.0
Ingress Protection Rating	IP20

The power system diagram is shown in Fig. 2.2.1.

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

Table 2.2.2 The list of PSU input section

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

Table 2.2.3 The list of PSU output section

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

PSU Input Section

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

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

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

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

The control signals are the follows:

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

PSU Output Section

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

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

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

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

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

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

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

The alarm signals are the follows:

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

2.3 Function System Diagrams

2.3.1 Scanner unit / transmitter-receiver unit

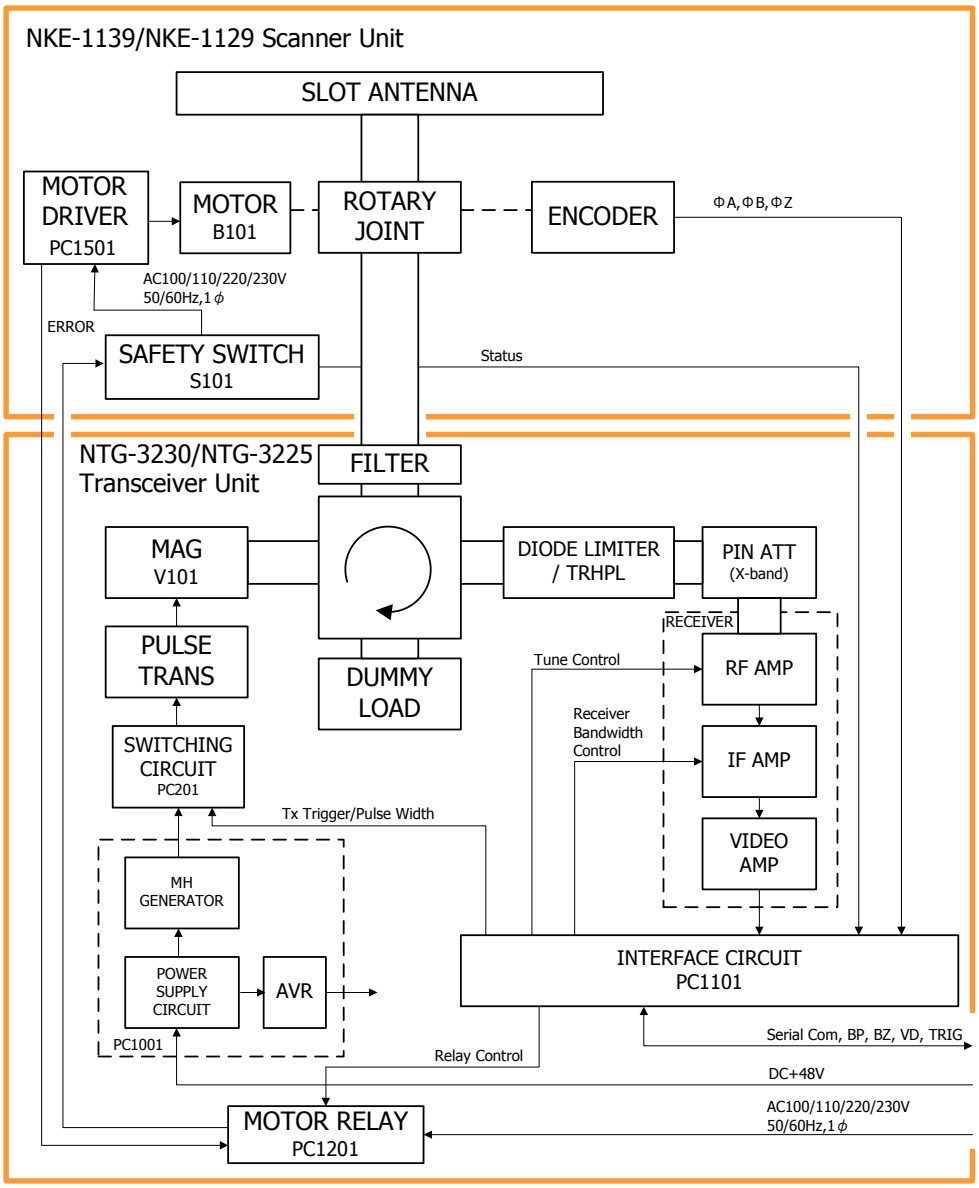


Fig. 2.3.1 Function Diagram of 3-unit Scanner/Transmitter-Receiver unit

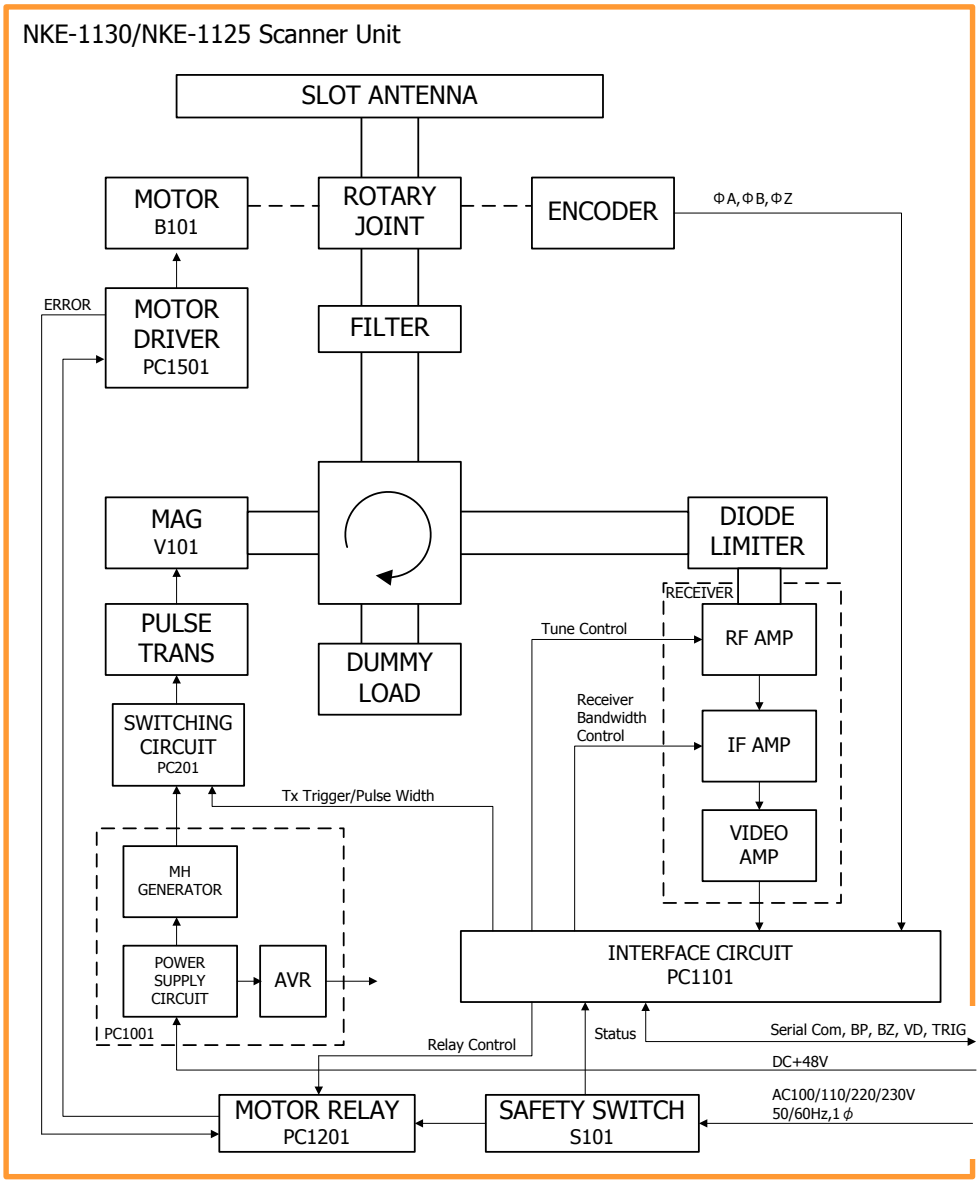
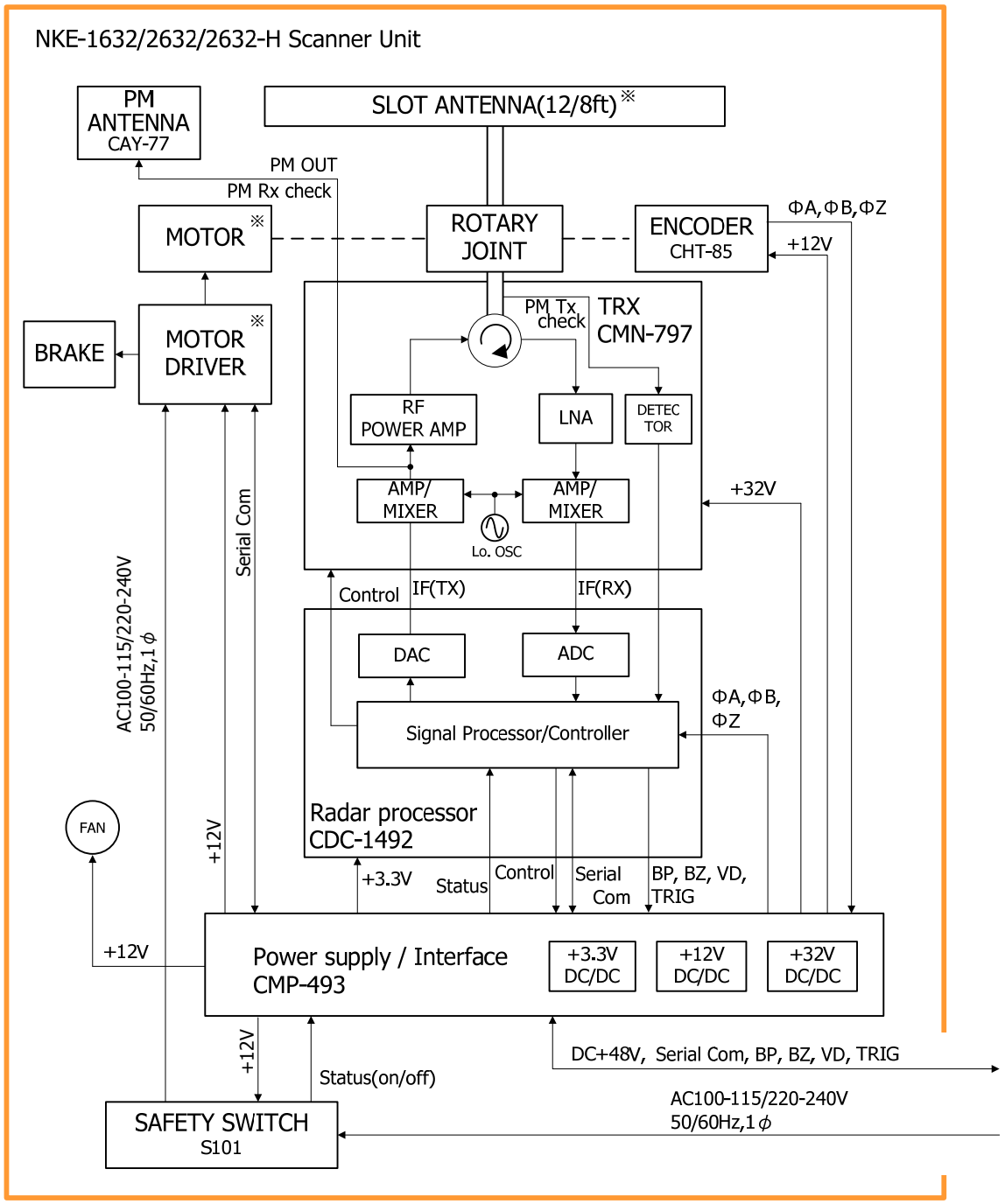


Fig. 2.3.2 Function Diagram of 2-unit Scanner/Transmitter-Receiver unit



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

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

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

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

Magnetron Scanner Unit

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

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

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

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

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

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

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

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

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

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

Solid state Scanner Unit

Fig. 2.3.3 shows the Function diagram of Solid state scanner unit.

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

When the +48V power supply in the display unit starts, the power supply circuit in the solid state scanner unit activates and power is supplied to each circuits of it. Once the power supply starts, the CPU in the Radar processor unit CDC-1492 starts and performs initial settings. Then it waits for a communication signal to be sent from the display unit. Solid state scanner does not need preheating. When it receives the communication signal from the display unit, a communication link is established, and the scanner units are subsequently controlled from the display unit.

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

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

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

TRX module performs time division transmission control. That allows P0N narrow pulse width signal to be used for detection at the range scale which would be the blind echo in the main-bang of Q0N wide pulse width signal. Transmission RF signal is amplified to approx.250W peak-power by the power amplifier unit constituted of RF FETs, and it is outputs as the transmission signal from TRX module via circulator. This signal is input to the antenna port via coaxial cable, and then it is transmitted into the air from the antenna.

A part of the signal is reflected from a target and received by the antenna. The signal received by the antenna propagates the coaxial cable which is the same as transmitting, and it is input to receiver unit of the TRX module as the reception signal via the circulator.

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

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

The performance monitor function that monitors the degradation state of transmission and reception performance of the radar equipment is follows. In order to monitor the transmission system, the level detector unit monitors the output level of the power amplifier unit. In order to monitor the reception system, the radar antenna monitors the reception level of the PM signal which is emitted to the air by the TRX module via the PM antenna CAY-77.

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

2.3.2 Display unit

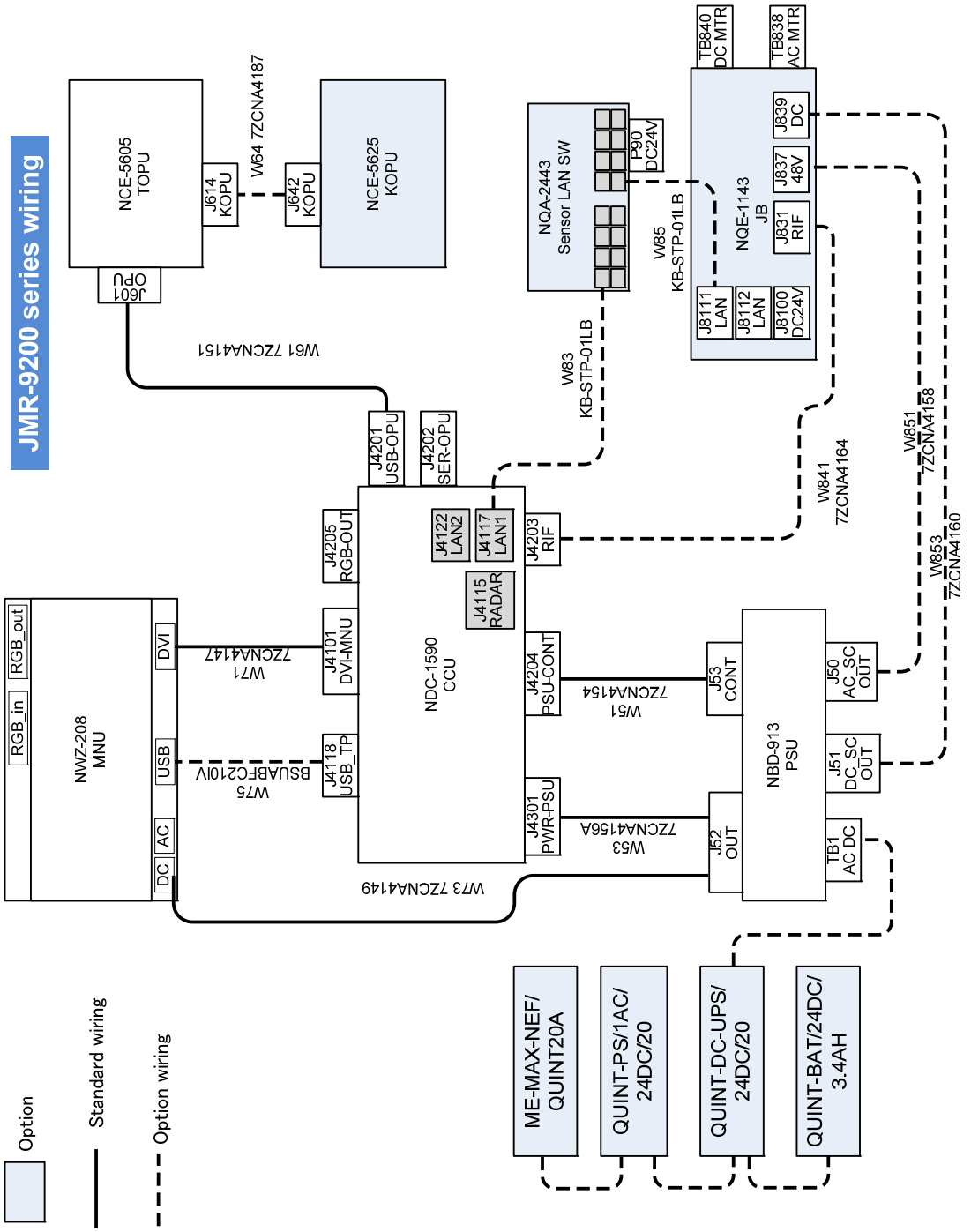


Fig. 2.3.4 Block diagram of Display unit (26inch)

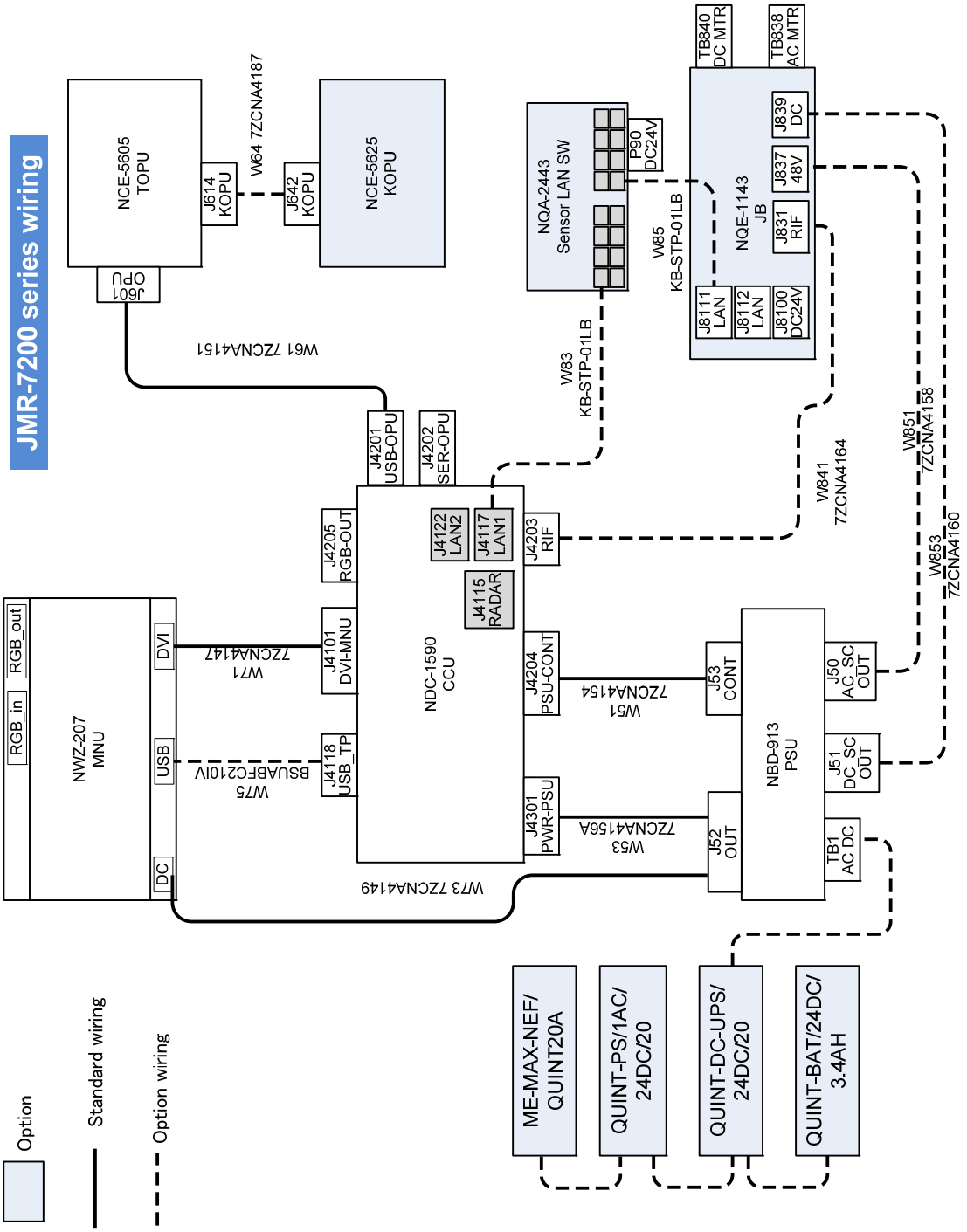


Fig. 2.3.5 Block diagram of Display unit (19inch)

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

Display Unit is composed of following units:

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

(*) Option.

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

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

Starting the system

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

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

Circuit functions

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

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

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

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

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

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

Basic radar operations

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

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

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

Interswitch Function

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

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

2.4 I/O Specifications

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

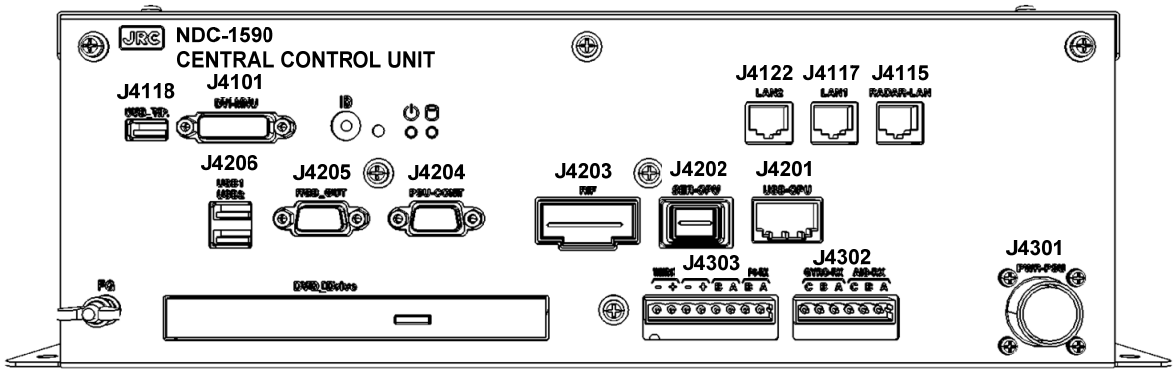


Fig. 2.4.1 CCU front view

Table 2.4.1 CCU I/O specifications 1

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

Table 2.4.2 CCU I/O specifications 2

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

Table 2.4.3 CCU I/O specifications 3

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

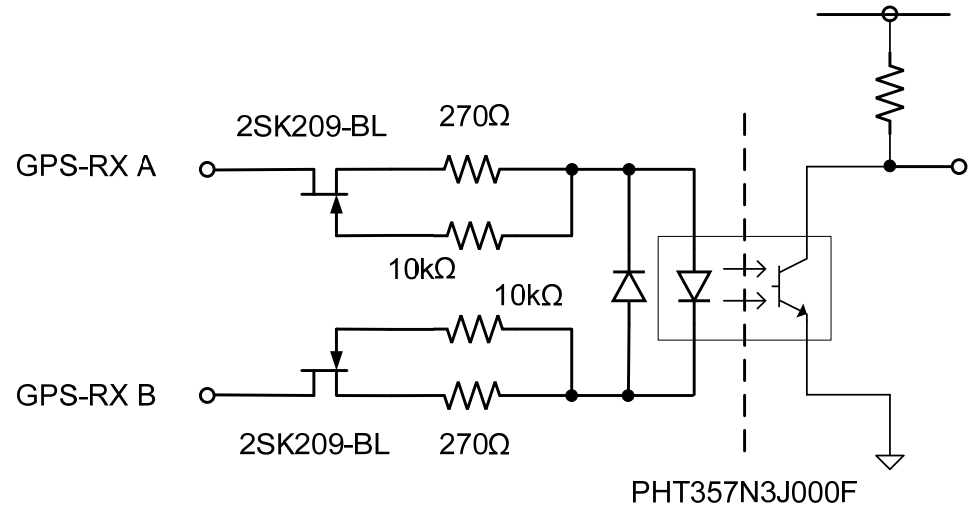


Fig. 2.4.2 CCU GPS-RX detail

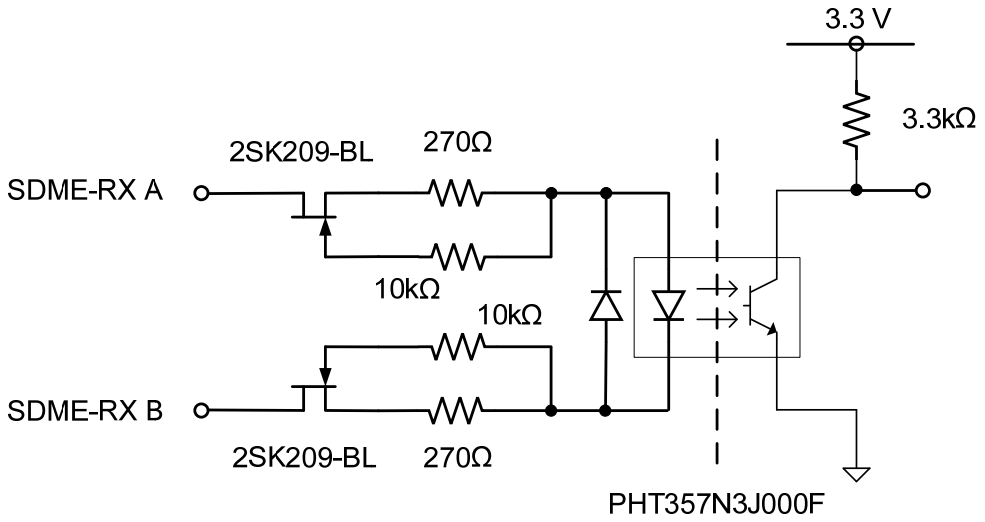
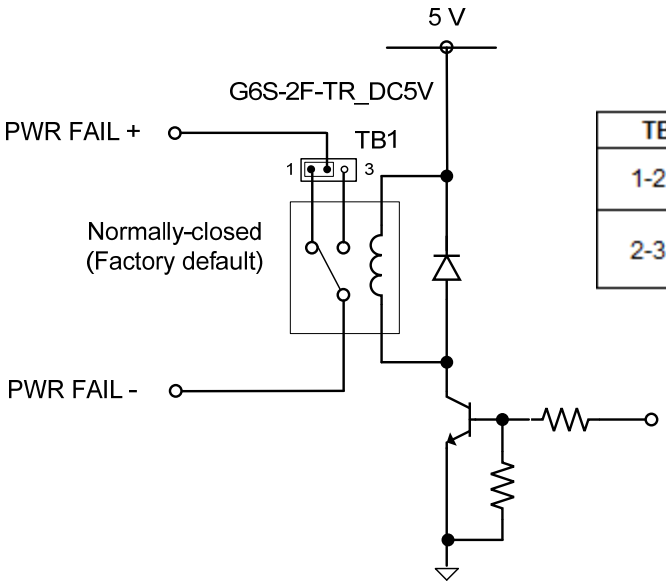
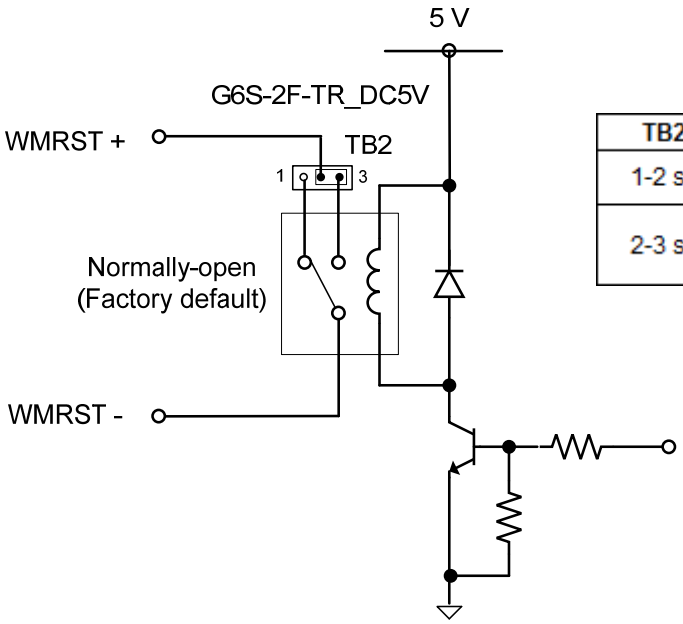


Fig. 2.4.3 CCU SDME-RX detail



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

Fig. 2.4.4 CCU PWR FAIL detail

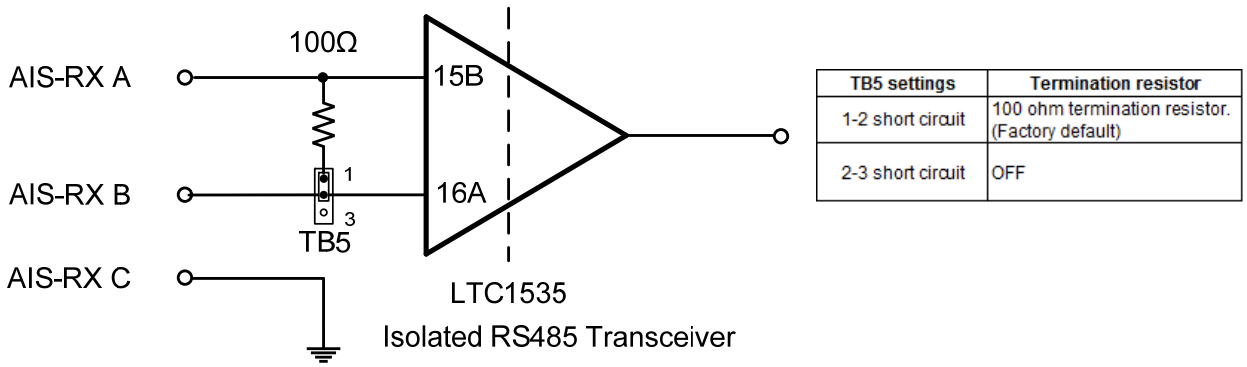


TB2 settings	Description
1-2 short circuit	Normally-closed
2-3 short circuit	Normally-open (Factory default)

Fig. 2.4.5 CCU WMRST detail

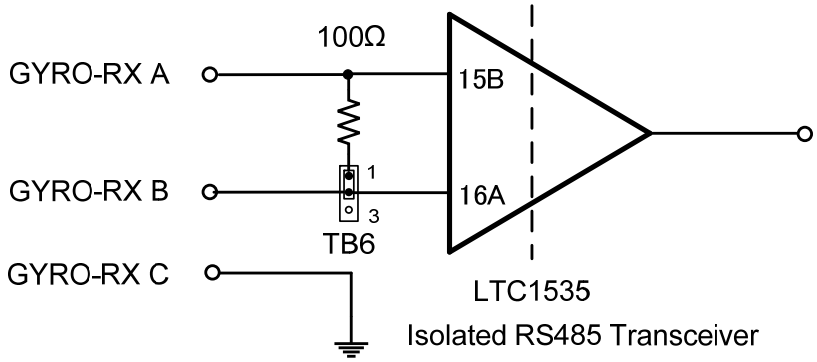
Table 2.4.4 CCU I/O specifications 4

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



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

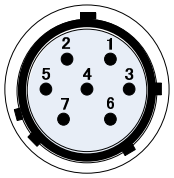
Fig. 2.4.6 CCU AIS-RX detail



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

Fig. 2.4.7 CCU GYRO-RX detail

Table 2.4.5 CCU I/O specifications 5

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

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

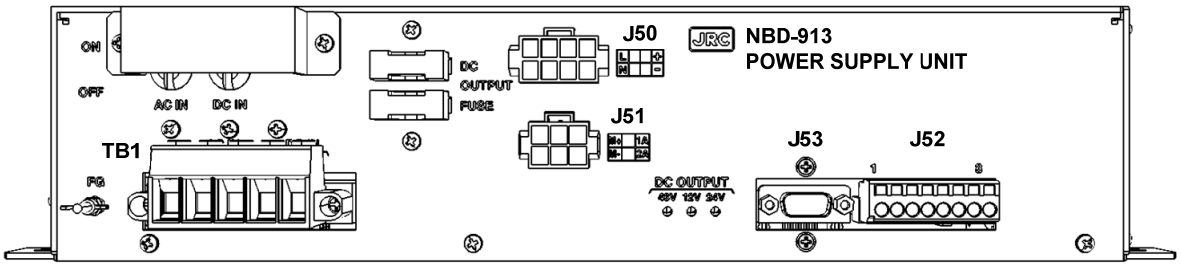


Fig. 2.4.8 PSU front view

Table 2.4.6 PSU I/O specifications 1

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

Table 2.4.7 PSU I/O specifications 2

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

Table 2.4.8 PSU I/O specifications 3

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

2.4.3. SLC : Serial LAN Interface Circuit CMH-2370

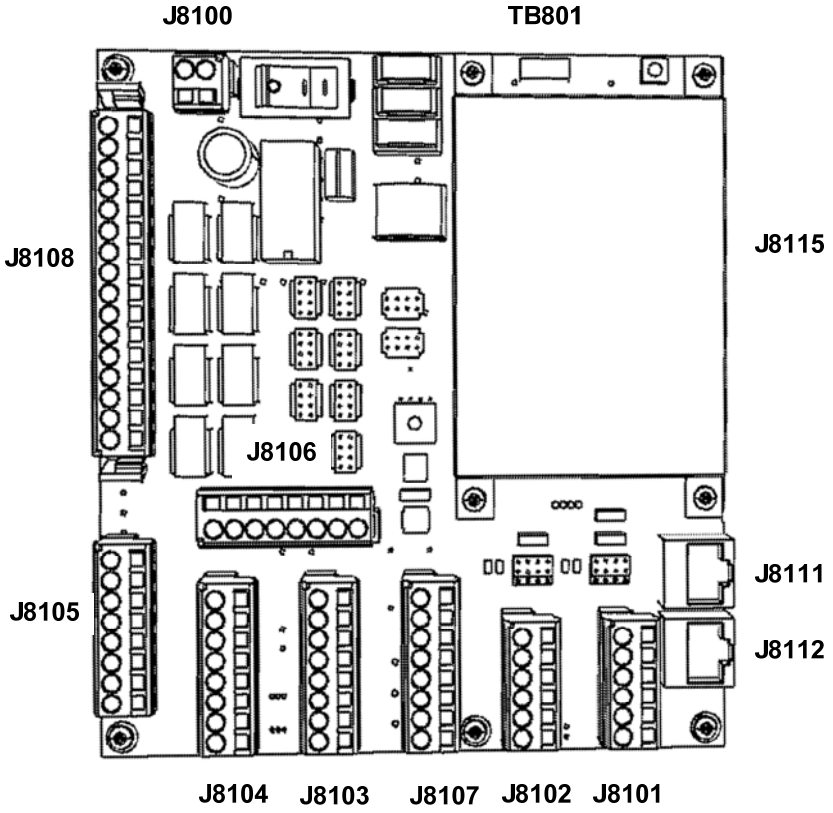


Fig. 2.4.9 SLC top view

Table 2.4.9 SLC I/O specifications 1

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

Table 2.4.10 SLC I/O specifications 2

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

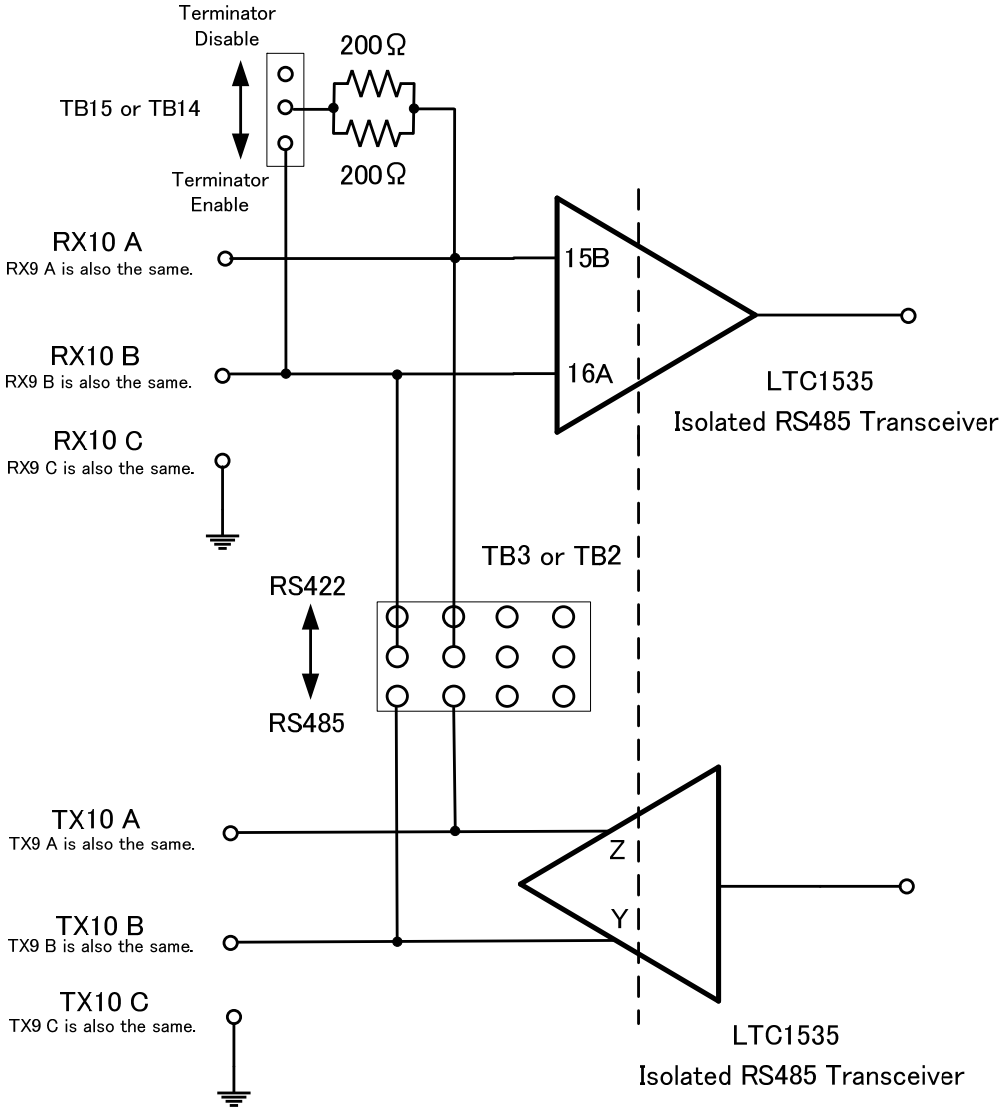


Fig. 2.4.10 SLC IEC61162-2 TXRX detail

Table 2.4.11 SLC I/O specifications 3

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

Table 2.4.12 SLC I/O specifications 4

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

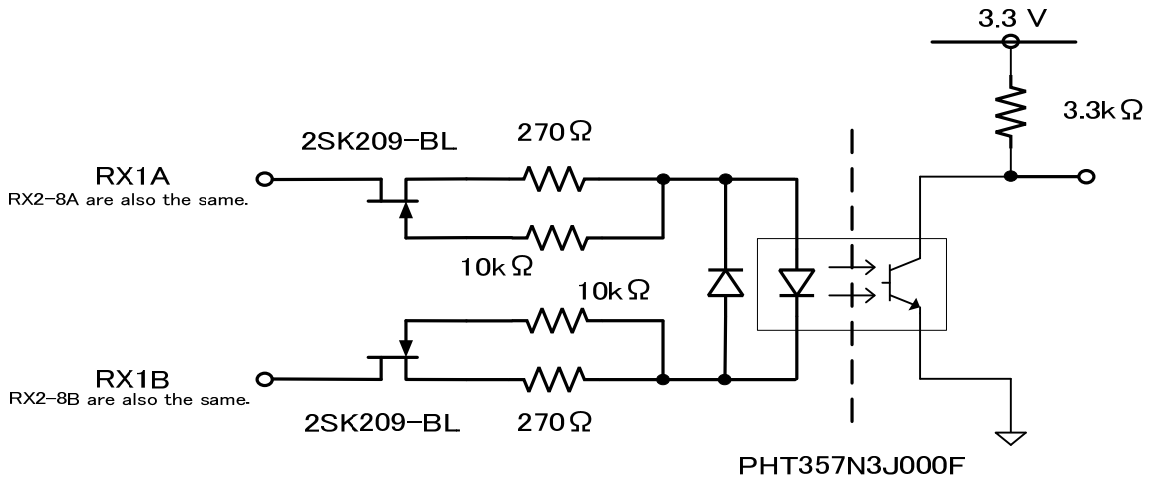


Fig. 2.4.11 SLC IEC61162-1 RX1 detail

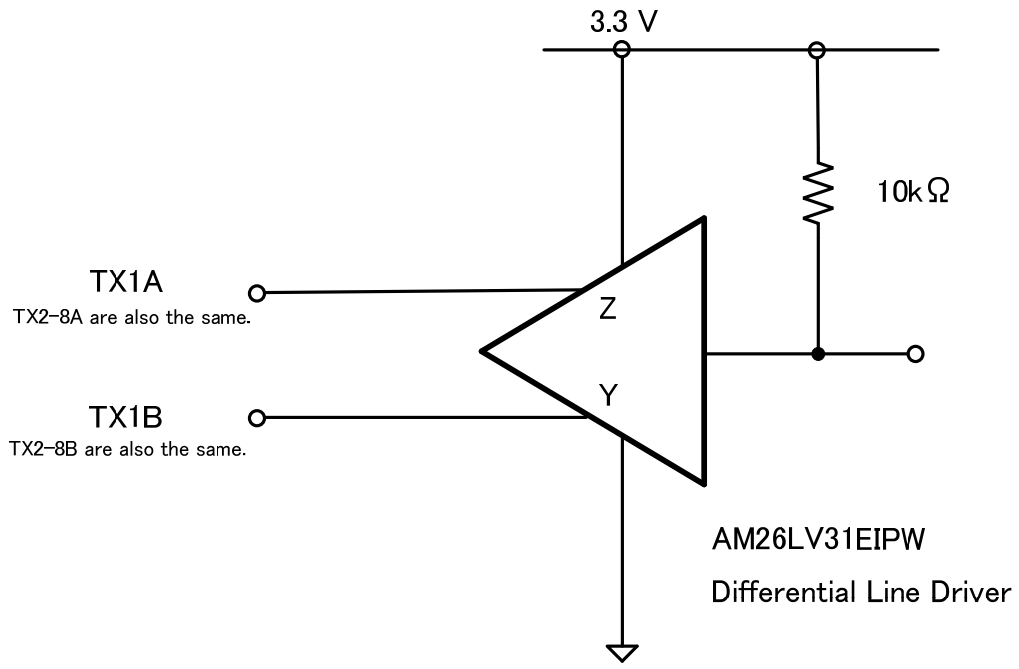


Fig. 2.4.12 SLC IEC61162-1 TX1 detail

Table 2.4.13 SLC I/O specifications 5

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

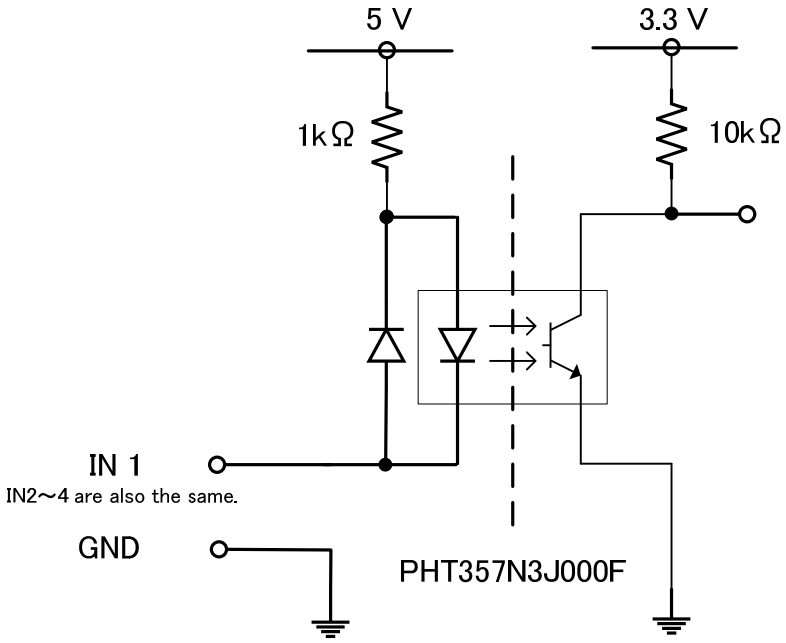


Fig. 2.4.13 SLC Contact In detail

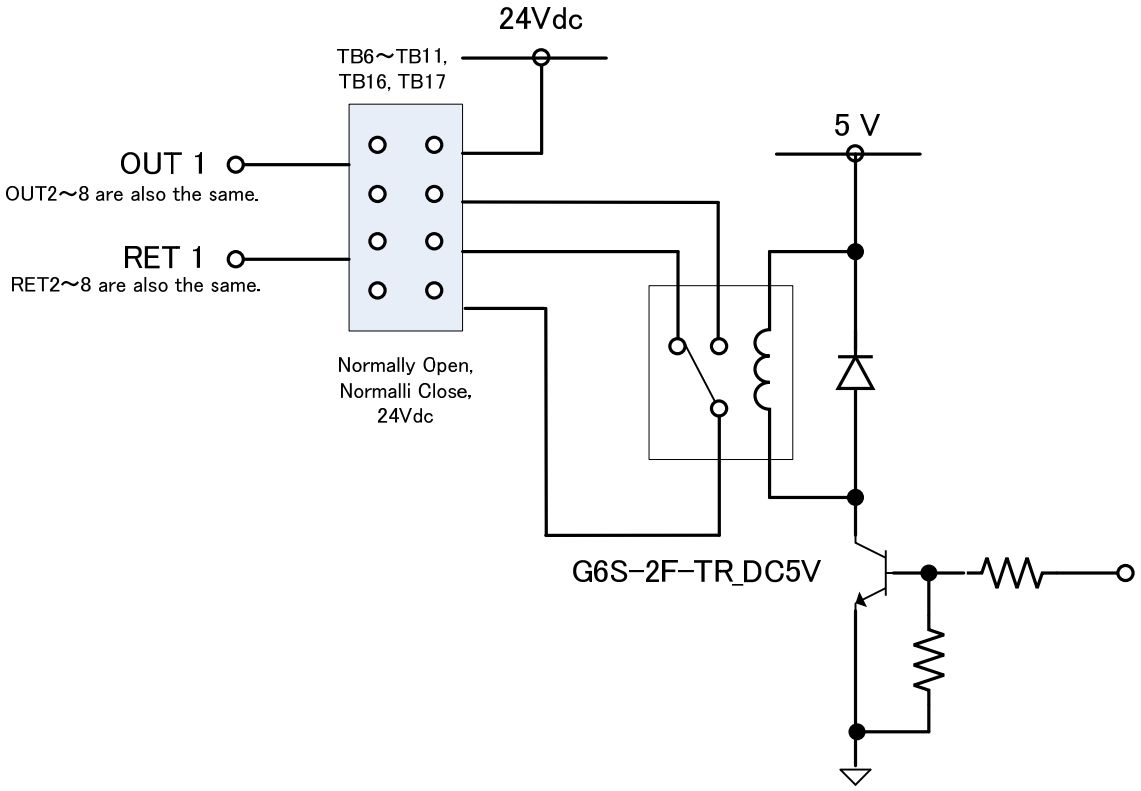
Table 2.4.14 SLC I/O specifications 6

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

Table 2.4.15 SLC I/O specifications 7

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

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



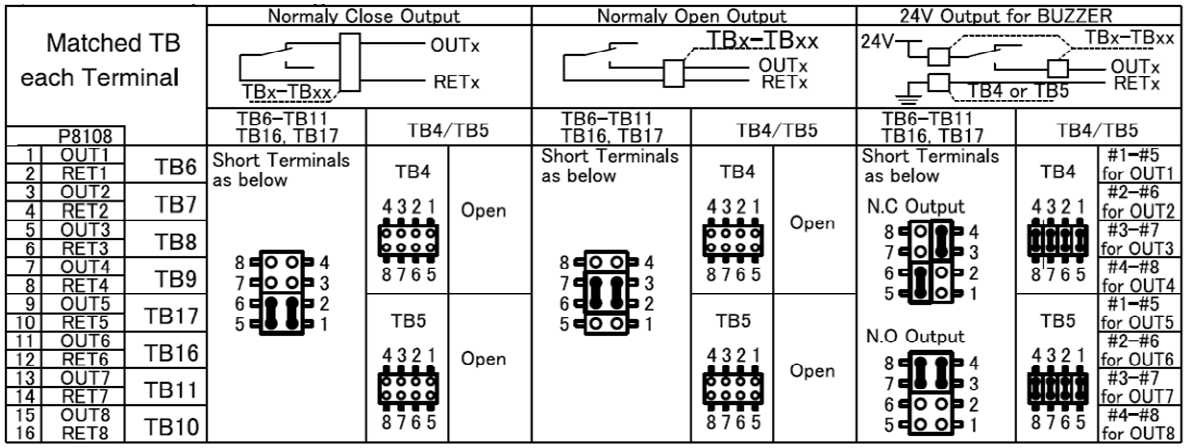


Fig. 2.4.14 SLC Contact Out detail.

Table 2.4.16 SLC I/O specifications 8

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

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

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

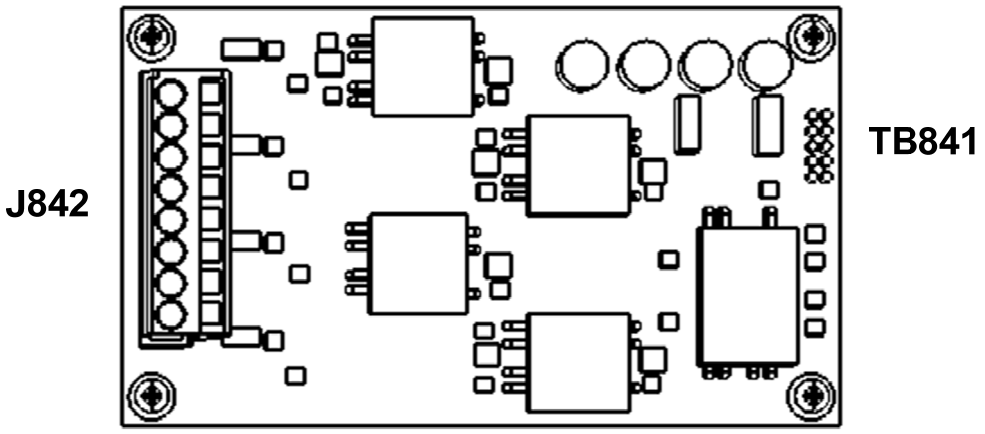


Fig. 2.4.15 AOC top view

Table 2.4.17 AOC I/O specifications 1

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

Table 2.4.18 AOC I/O specifications 2

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

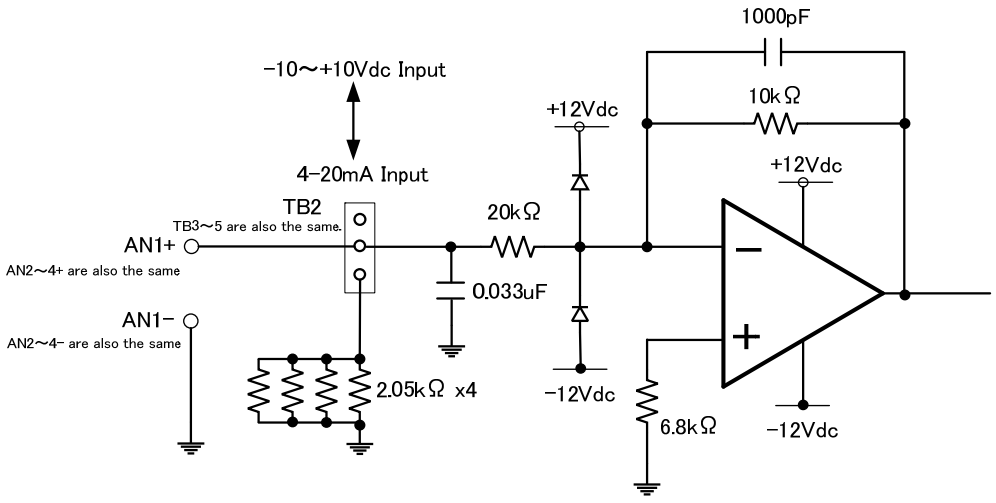


Fig. 2.4.16 AOC input detail.

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

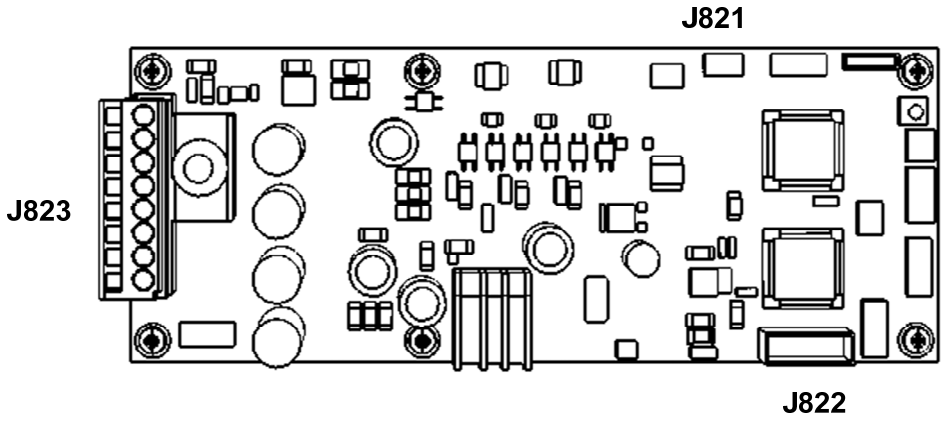


Fig. 2.4.17 GIF top view

Table 2.4.19 GIF I/O specifications 1

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

Table 2.4.20 GIF I/O specifications 2

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

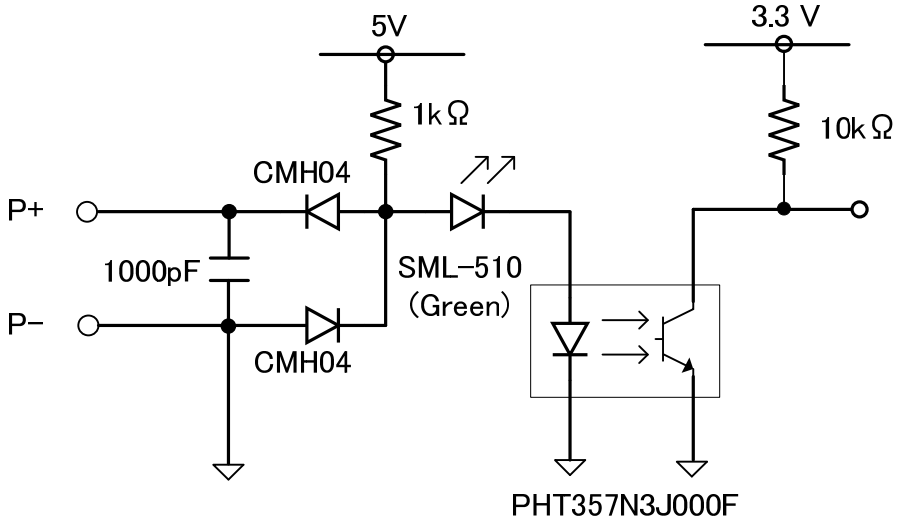


Fig. 2.4.18 GIF Log Input detail.

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

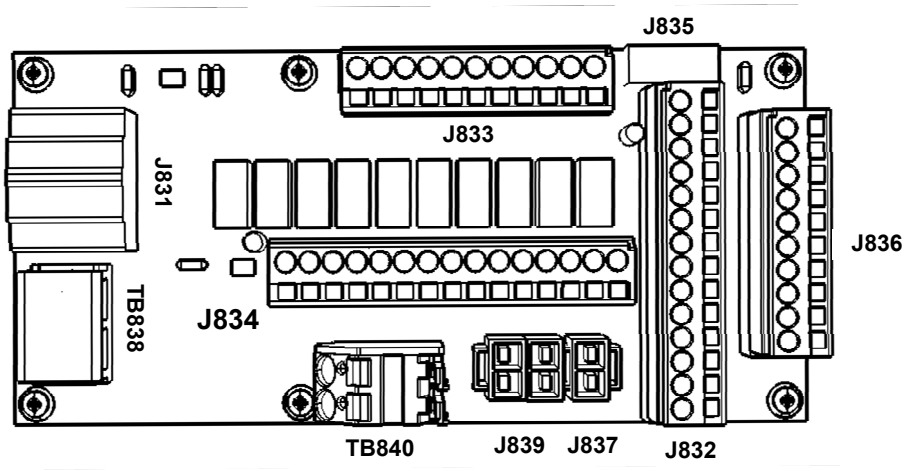


Fig. 2.4.19 SLC Contact In detail

Table 2.4.21 RIF I/O specifications 1

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

Table 2.4.22 RIF I/O specifications 2

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

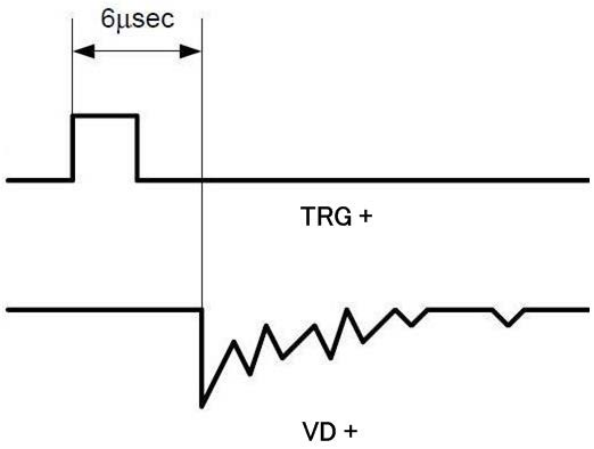


Fig. 2.4.20 RIF VD TRG signals detail

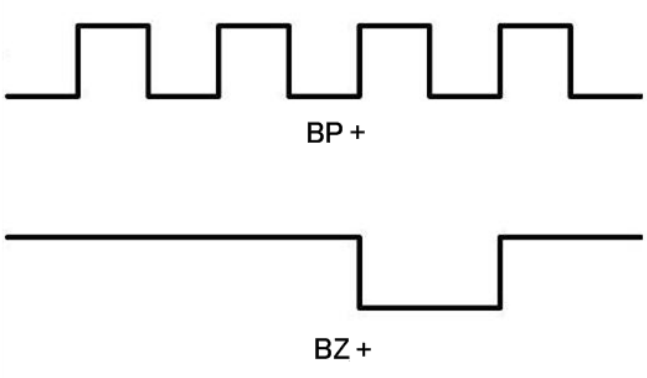


Fig. 2.4.21 RIF BP BZ signals detail

Table 2.4.23 RIF I/O specifications 3

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

Table 2.4.24 RIF I/O specifications 4

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

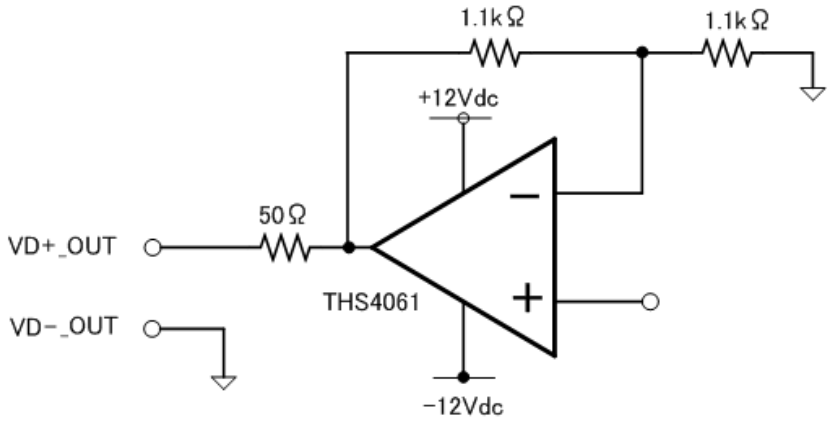


Fig. 2.4.22 RIF VD_OUT detail

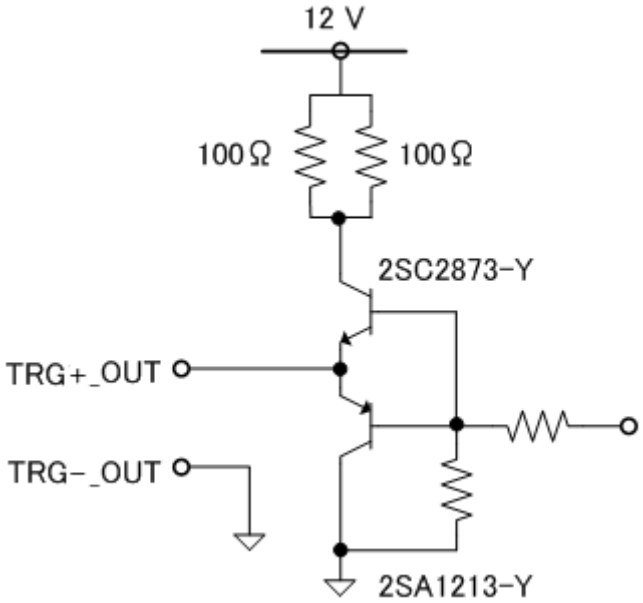


Fig. 2.4.23 RIF TRG_OUT detail

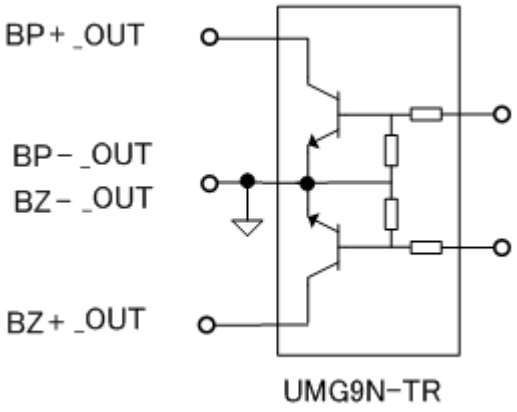


Fig. 2.4.24 RIF BP BZ_OUT detail

2.5 DIP-SW and Jumper Pin Settings

2.5.1. Setting for CQD-2273 Radar Interface Circuit

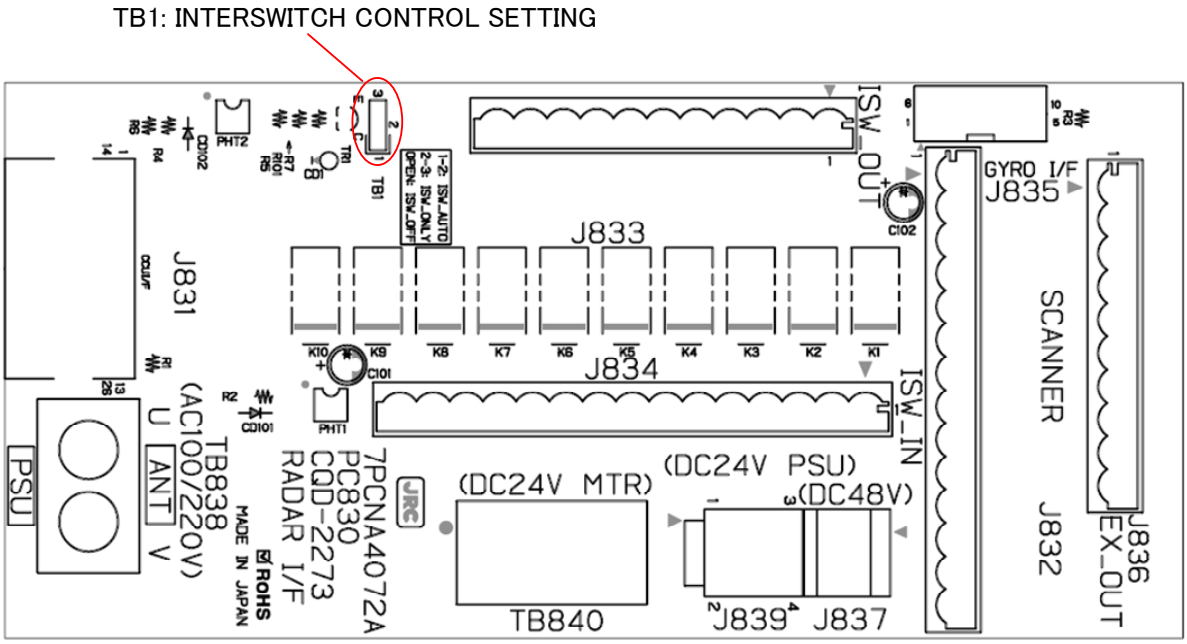


Fig. 2.5.1 CQD-2273 Radar Interface Circuit

Table. 2.5.1 Radar Interface Circuit TB1 Settings

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

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

• It may cause a lower radar system performance.

Connection procedure with Scanner Units

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

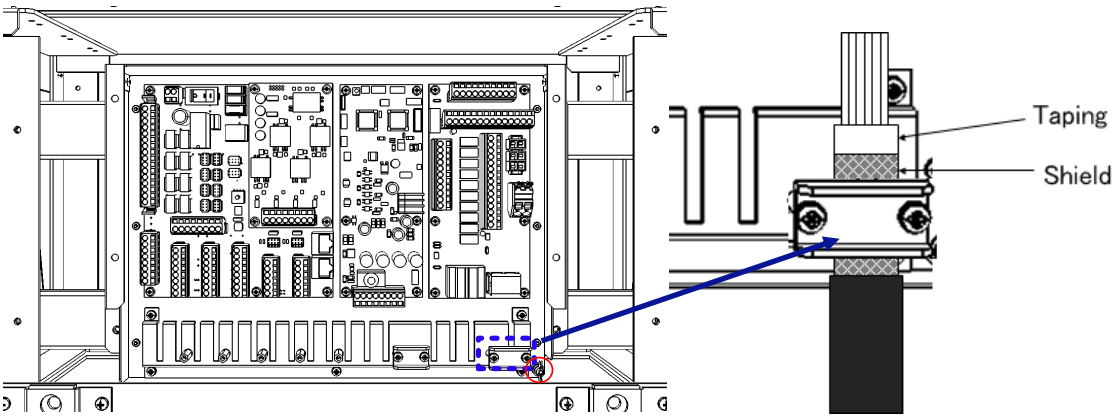
   J832: Radar signals. TB838: AC motor power. TB840: DC motor power.

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

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

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

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



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

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

2.5.2. Settings for CMJ-554 Gyro Interface Circuit

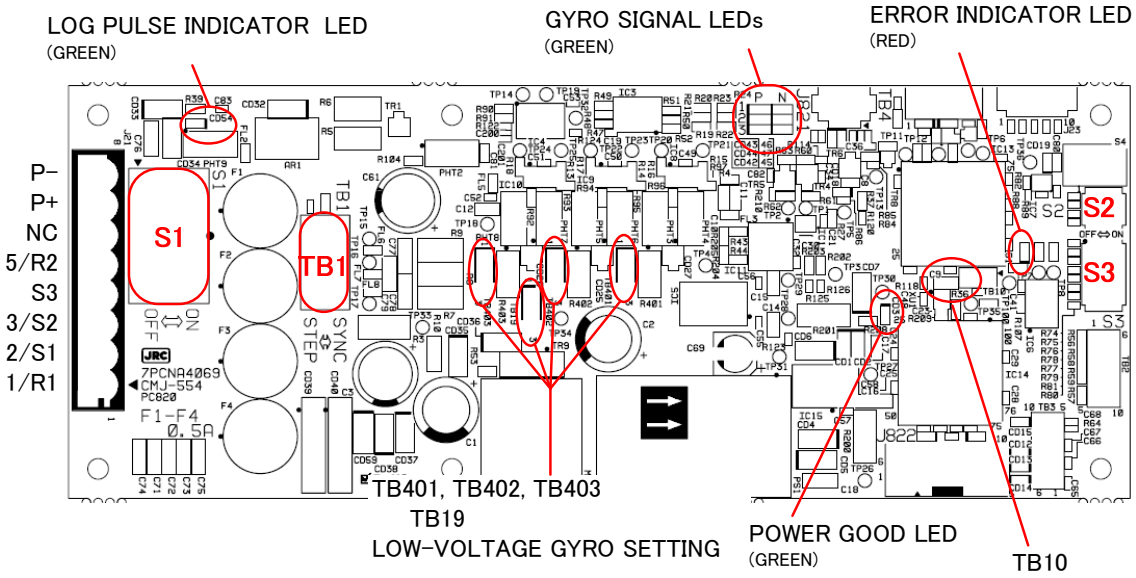


Fig. 2.5.2 CMJ-554 Gyro Interface circuit

Table. 2.5.2 GIF TB1 settings

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

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

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

Table. 2.5.4 GIF TB10 settings

TB10 Settings	Description
SHORT CIRCUIT	Factory default
OPEN	Not allowed

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

• It may cause a lower radar system performance.

Table. 2.5.5 GIF S1 settings

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

Table. 2.5.6 GIF S2 settings

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

Table. 2.5.7 GIF S3 settings

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

Connection procedure with Gyro Compass

1. Turn S1 off

Gyro Compass and Gyro Interface Circuit will be disconnected.

2. Switch TB1 for the type of your Gyro Compass

Synchro type Gyro Compass: Set TB1 to “SYNC”

Step type Gyro Compass: Set TB1 to “STEP”

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

S2-1 : Gyro type (STEP / SYNC)

S2-2/3 : Gyro speed ratio

S2-4 : The direction of rotation

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

S2-6 : Log alarm (ON / OFF)

S2-7/8 : Log settings

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

1-2 SHORT CIRCUIT: Factory default.

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

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

Table. 2.5.8 GIF input section

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

6. Turn S1 on

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

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

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

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

Table. 2.5.9 Setting examples for some gyro compasses

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

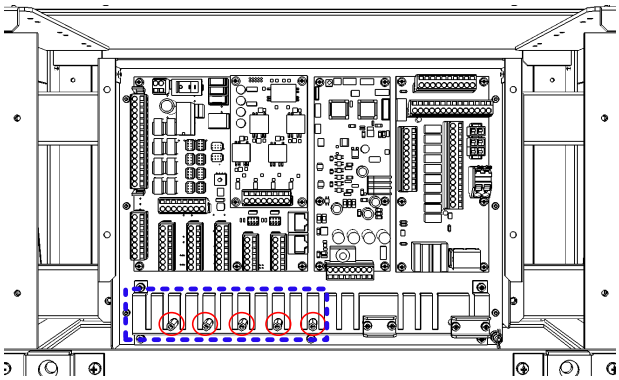
*: Numeric Number

2.5.3. Settings for CMH-2370 Serial LAN Interface Circuit

IEC61162-1 Connections

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

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



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

Table. 2.5.10 Terminal Assign of J8103-J8106

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

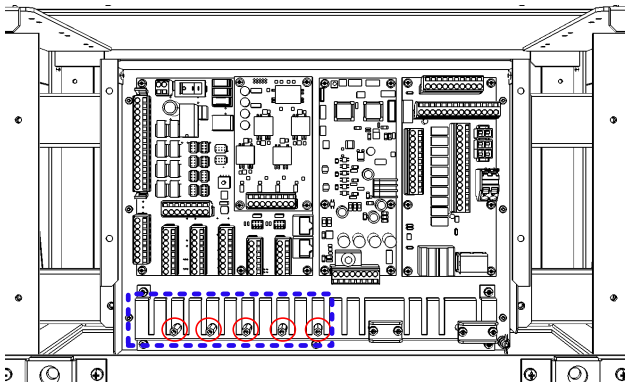
IEC61162-2 Connections

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

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

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

(Recommended crimp terminals V5.5)



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

Table. 2.5.11 Terminal Assign of J8101 and J8102

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

ex. Data communication example of AIS:

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

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

Communication Type and termination

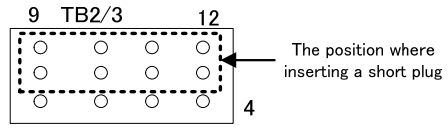
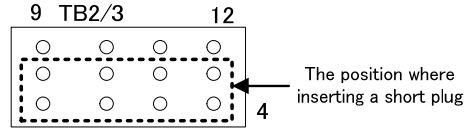
Communication type of IEC61162-2 can be selected full duplex (IEC61162-2) mode or half duplex (RS-485) mode by TB2 and TB3 setting on CMH-2370.

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

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

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

Table. 2.5.12 Setting of communication type

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

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

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

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

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

Table. 2.5.13 Short terminal to select communication type

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

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

LAN Connection

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

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

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

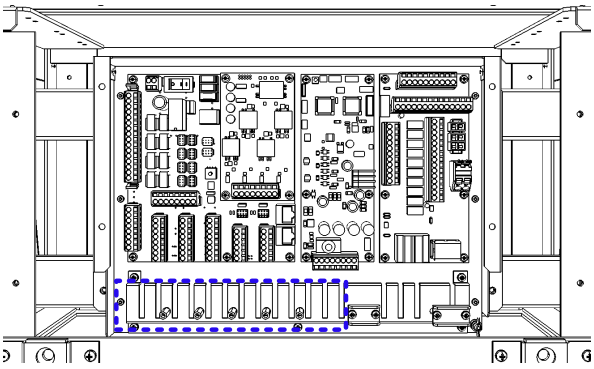
Either J8111 or J8112 selected by S4 will be used as an active LAN port.

And, you can select the data format either IEC61162-450 or JRC Formant by S4.

To set S4, refer to **Table. 2.5.14**.

The location of J8111, J8112 and S4, refer to **Fig. 2.5.5**

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



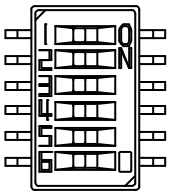


Fig. 2.5.3
Outline of S4

Table. 2.5.14 SLC S4 setting table

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

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

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

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

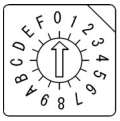


Fig. 2.5.4 Outline of S3

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

Table. 2.5.15 IP Address setting table

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

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

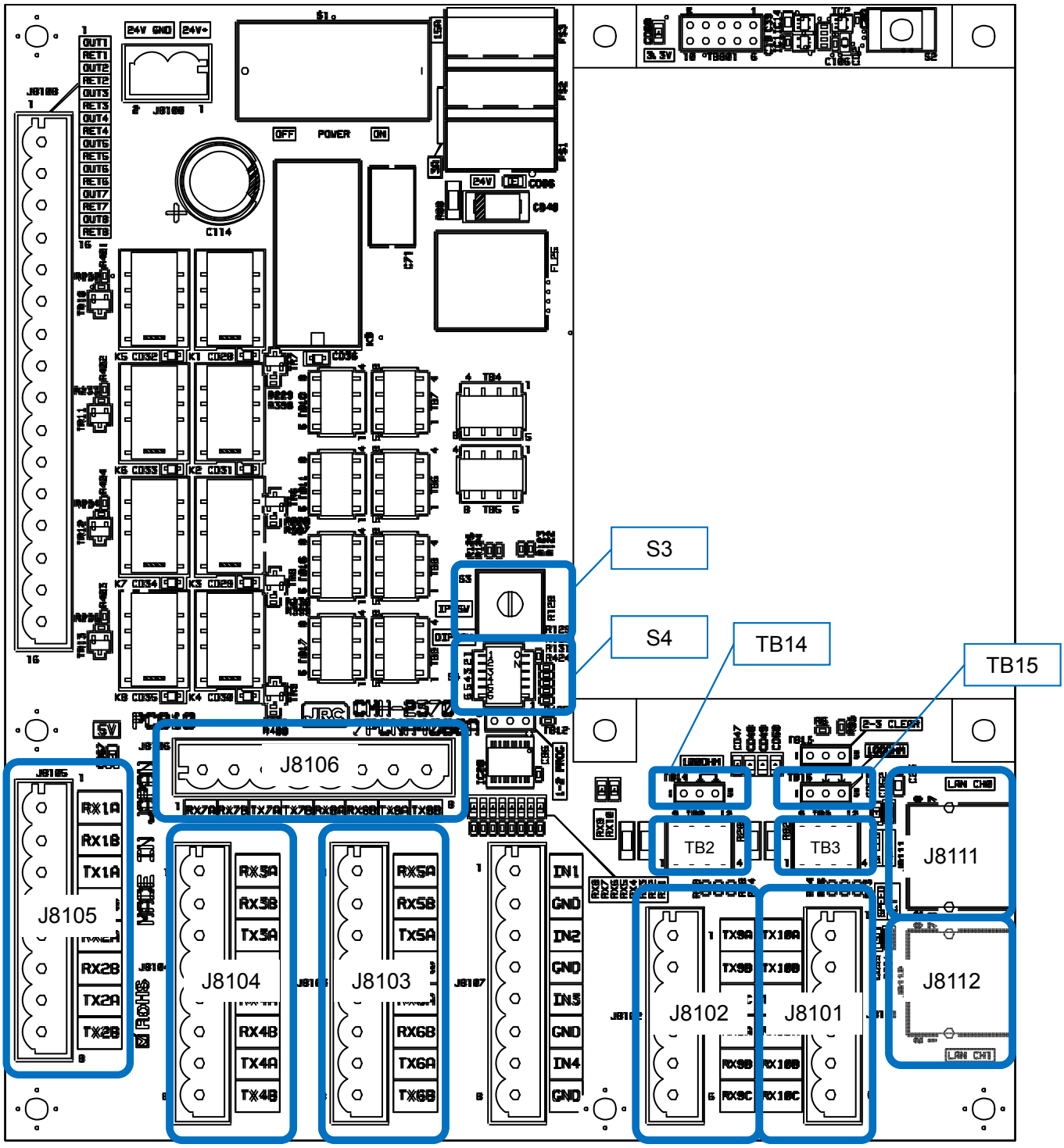


Fig. 2.5.5 Connector location of CMH-2370 Serial LAN interface circuit

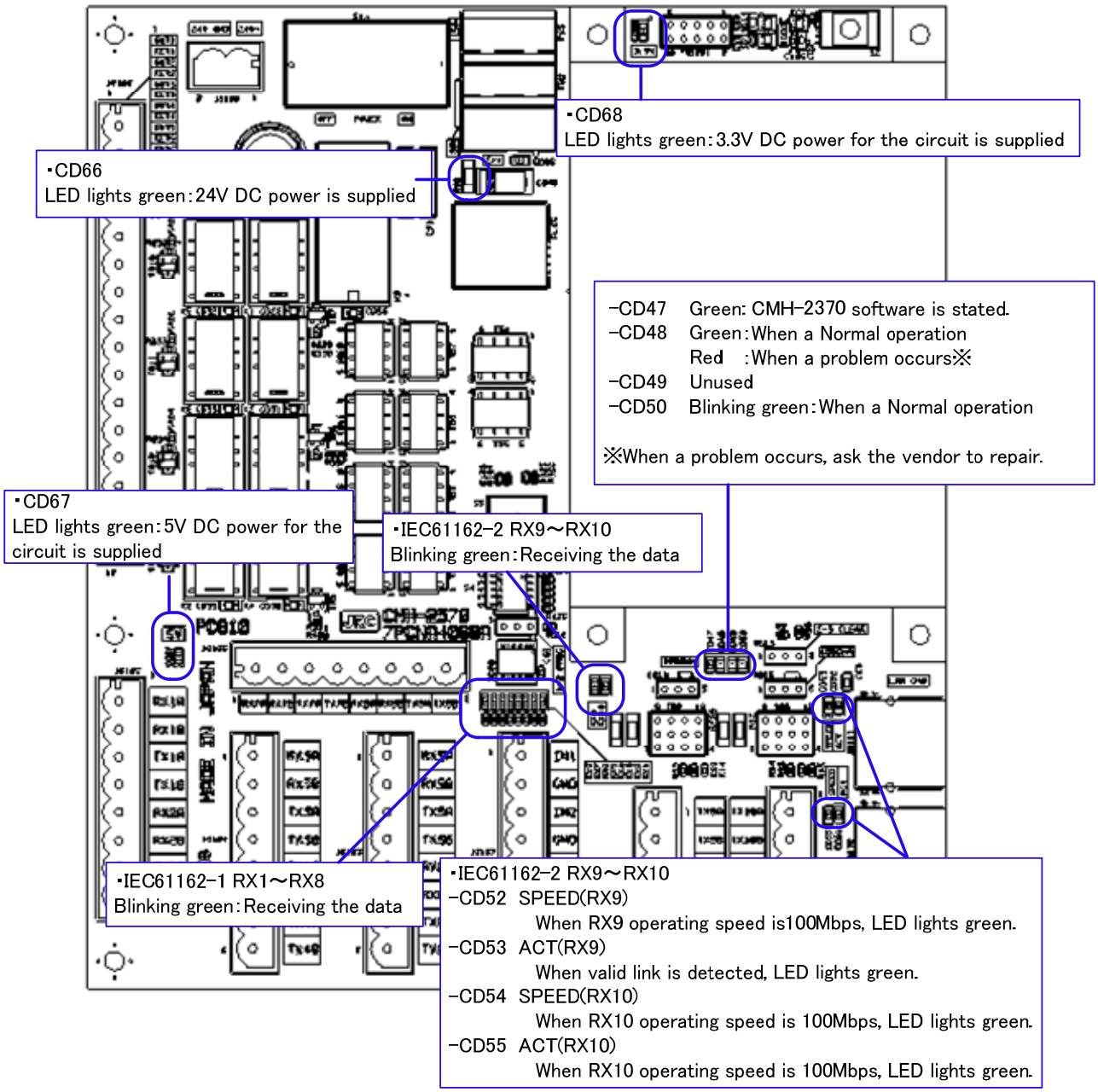


Fig. 2.5.6 LED Indication of CMH-2370 Serial LAN interface circuit

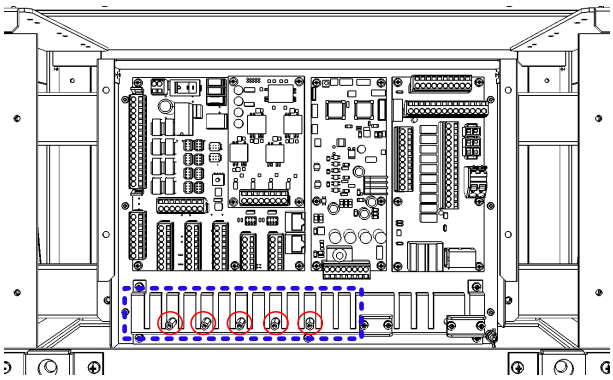
Contact Input/Output

Contact Input

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

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

- See **Fig. 2.5.9** Dry Contact Connector and TB location on CMH-2370about location of J8107 on CMH-2370.
- To configure the port, refer to **Chapter 4 of Installation Manual.**
- Fix the signal cable with the clamp surrounded by the dotted line in the figure below.
- Connect the cable shield to the hex spacer surrounded by the circle in the figure below.
  (Recommended crimp terminals V5.5)



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

Table. 2.5.16 Terminal Assign of J8107

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

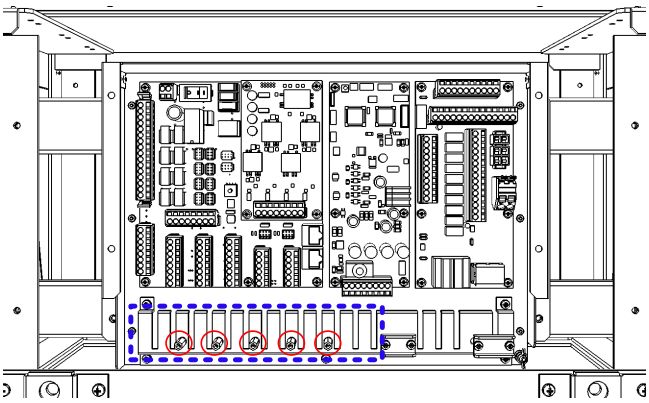
Do not apply a voltage signal to contact input ports. Because they have pulled up to 5V with 1k ohm internally, connecting a voltage signal may cause malfunction.

Contact Output

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

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

(Recommended crimp terminals V5.5)



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

Table. 2.5.17 Terminal Assign of J8108

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

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

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

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

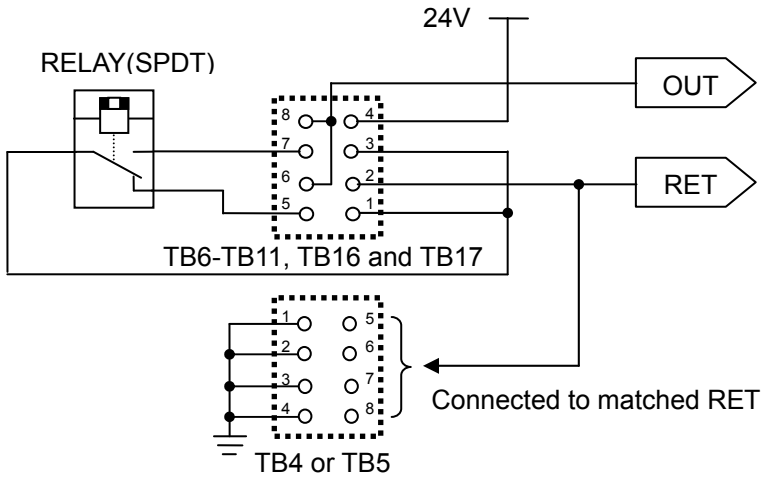


Fig. 2.5.7 Output port circuit diagram

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

Table. 2.5.18 Matched TB for OUT setting

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

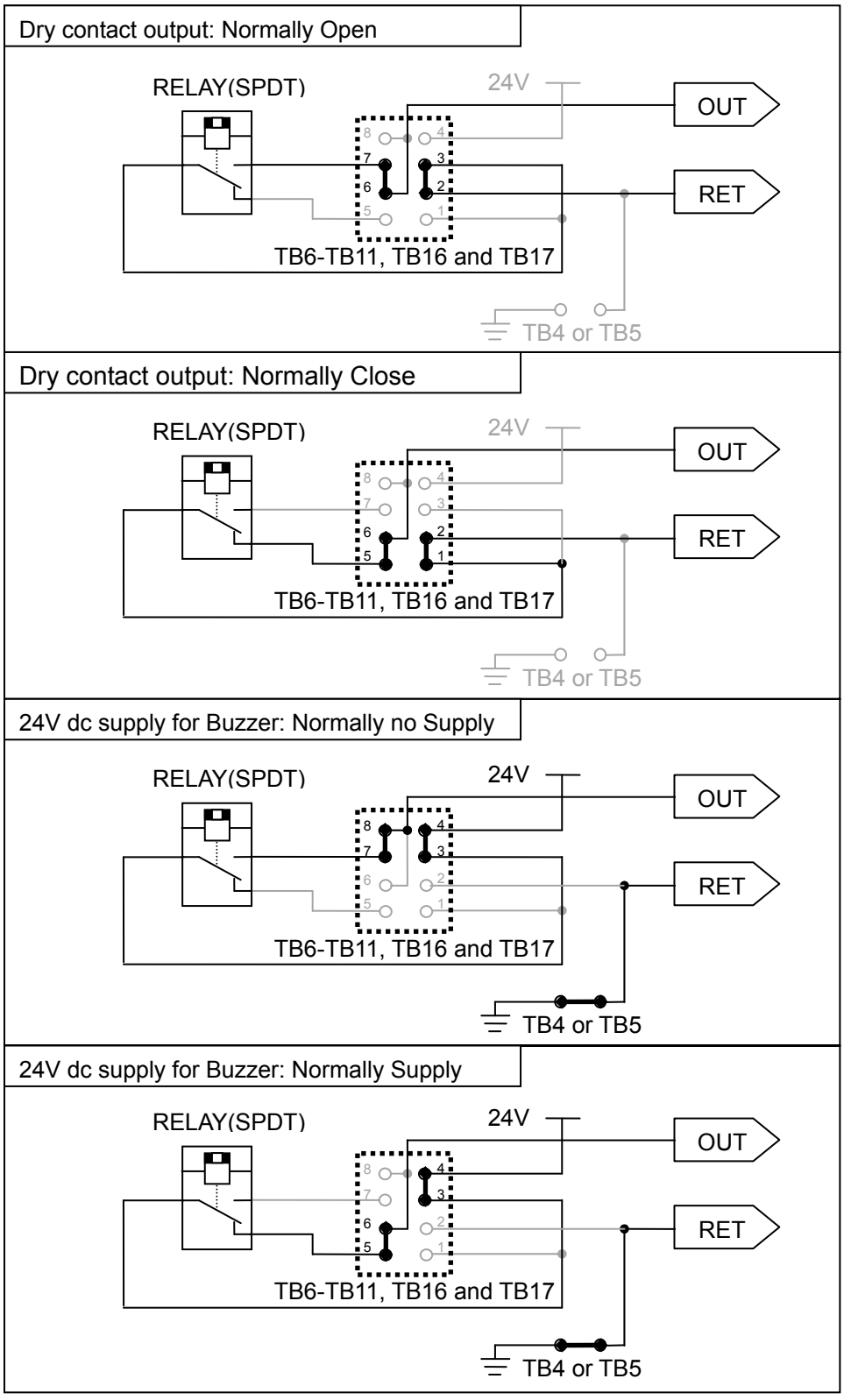


Fig. 2.5.8 Output port setting by TB

⚠ Maximum current of RELAY is 2A.

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

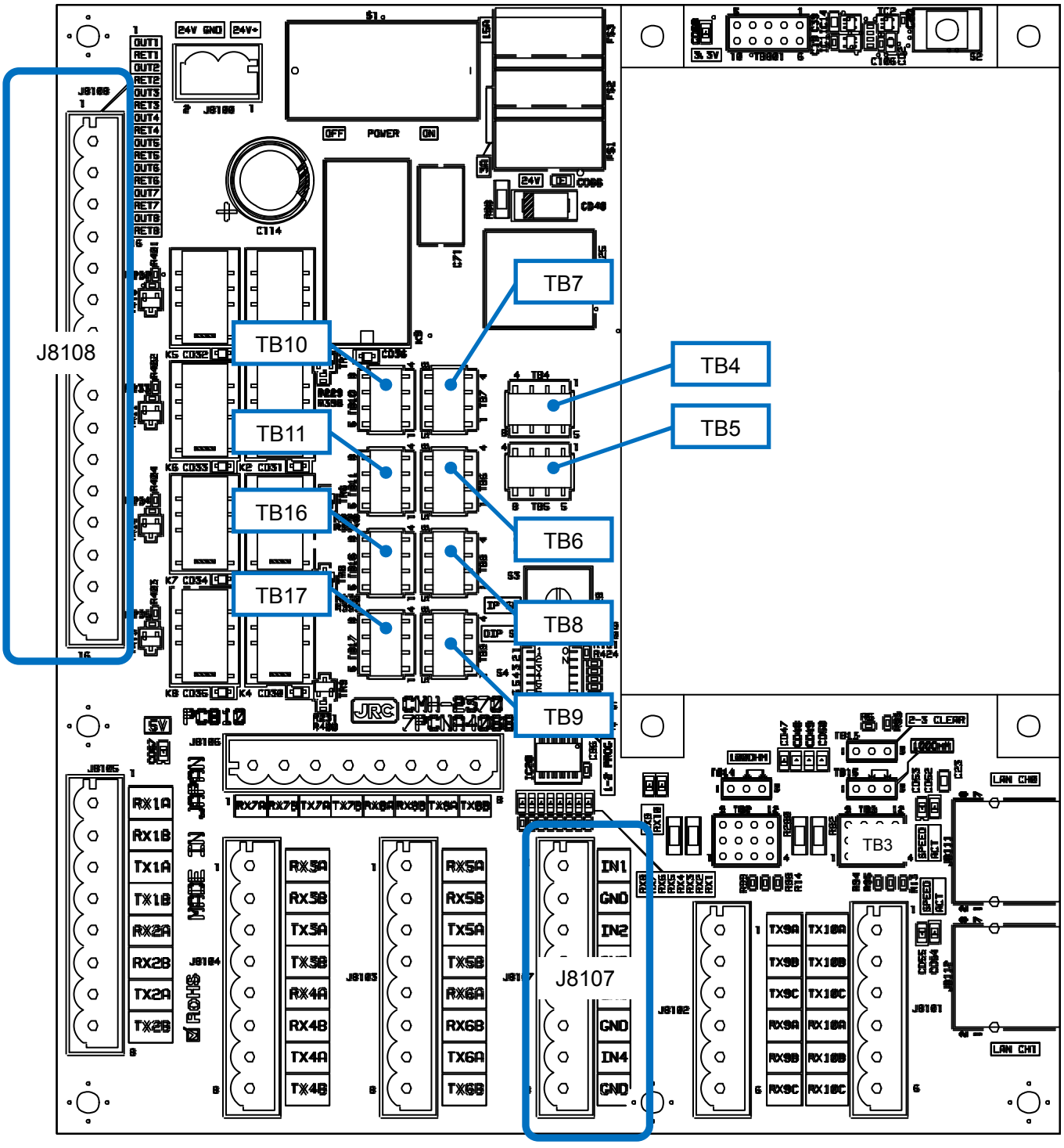


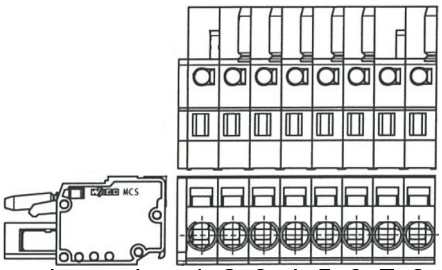
Fig. 2.5.9 Dry Contact Connector and TB location on CMH-2370

2.5.4. Settings for CMJ-560 Analog Option Circuit

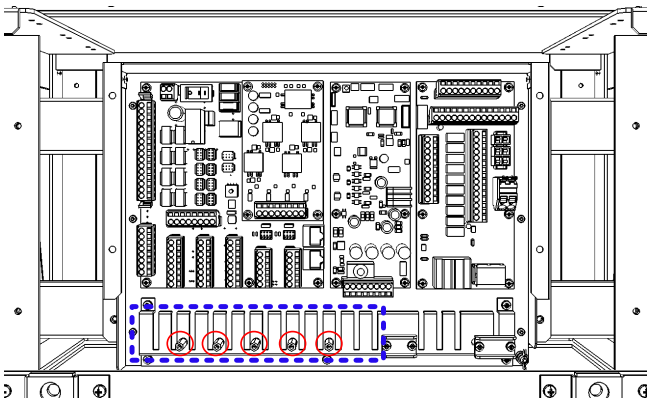
Connect the analog signals from sensors to J842 located on the CMJ-560 Analog Option Circuit:AOC in JUNCTION BOX NQE-1143. AOC has four channel analog signal inputs.

The terminal assign of J842 is shown below.

AOC J842 Connector



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



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

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

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

Settings for voltage signal input

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

・Input Signal Range ：-10V to +10V

Table. 2.5.19 Setting Table of Voltage Signal Input

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

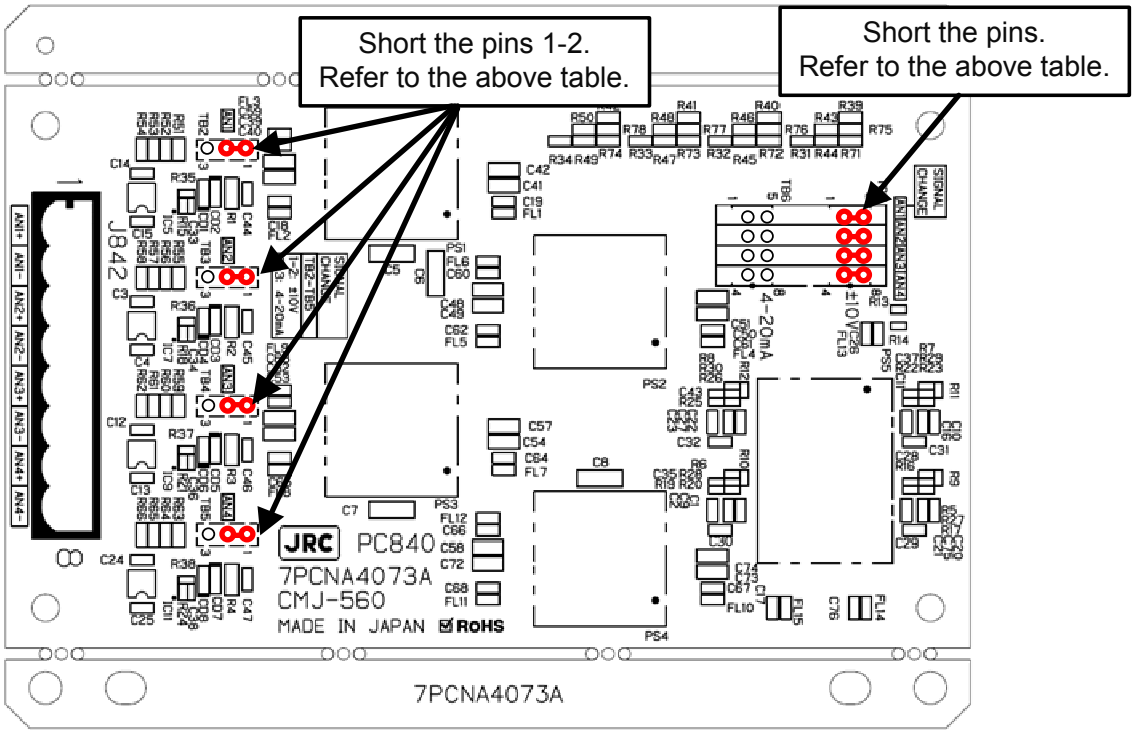


Fig. 2.5.10 Voltage input Settings for CMJ-560 Analog Option Circuit

Current Signal Input

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

・Input Signal Range ：4mA to 20mA

Table. 2.5.20 Setting Table of Current Signal Input

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

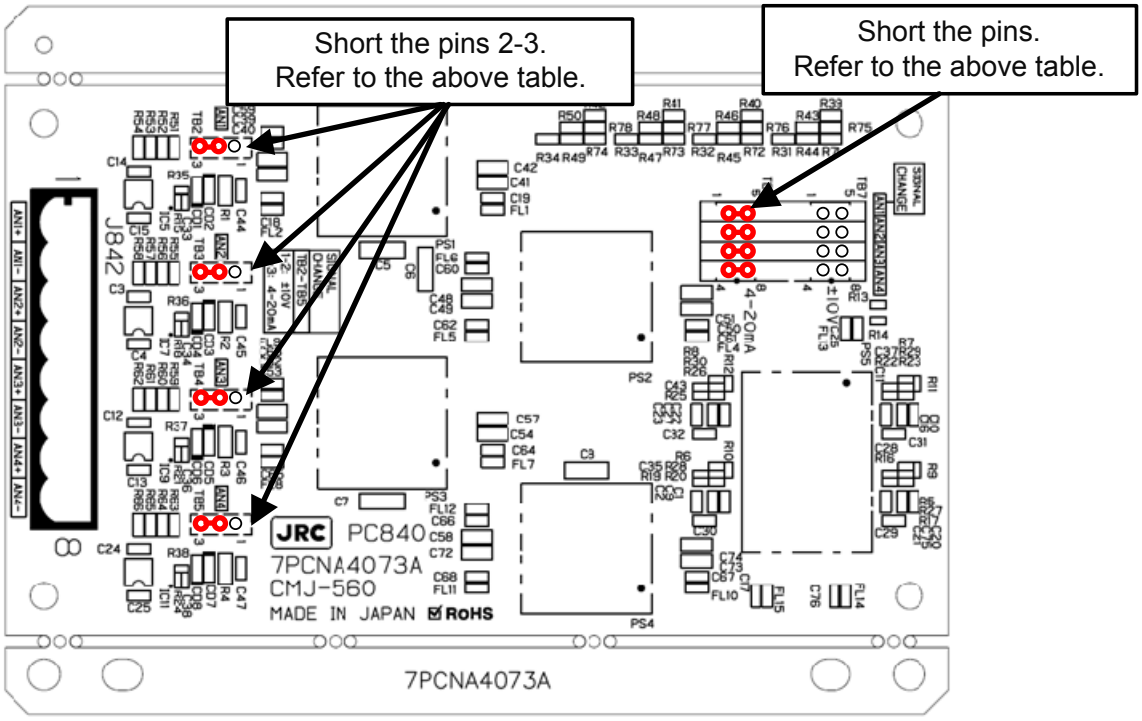


Fig. 2.5.11 Current input settings for CMJ-560 Analog Option Circuit

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

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

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

Settings for ONLY connection of the VGA monitor to CCU.

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

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

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

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

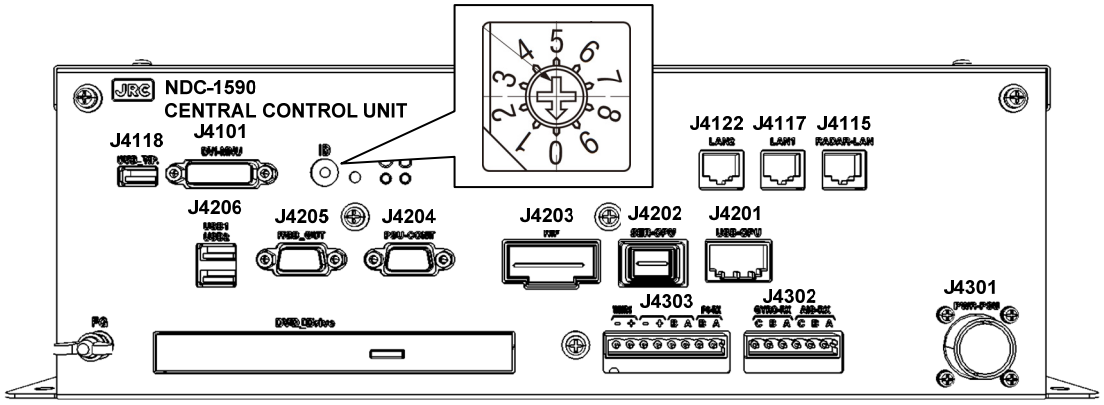


Fig. 2.5.12 ID rotary switch on CCU

NOTE

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

Settings for J4303: WMRST / PWRFAIL contact output.

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

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

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

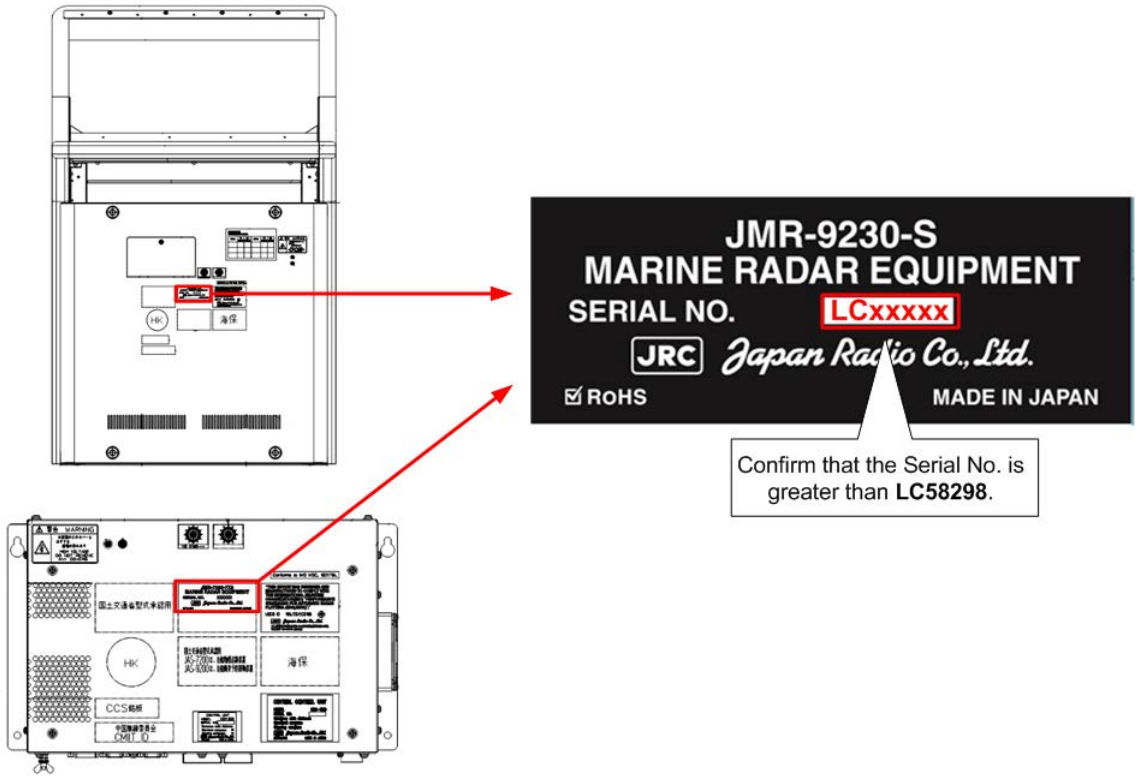
CCU I/F circuit CMH-2406			
J4303	**TB setting**		**Description**
PWRFAIL	TB1	1-2 short circuit	Normally-closed (Factory default)
		2-3 short circuit	Normally-open
WMRST	TB2	1-2 short circuit	Normally-closed
		2-3 short circuit	Normally-open (Factory default)

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

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

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

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



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

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

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

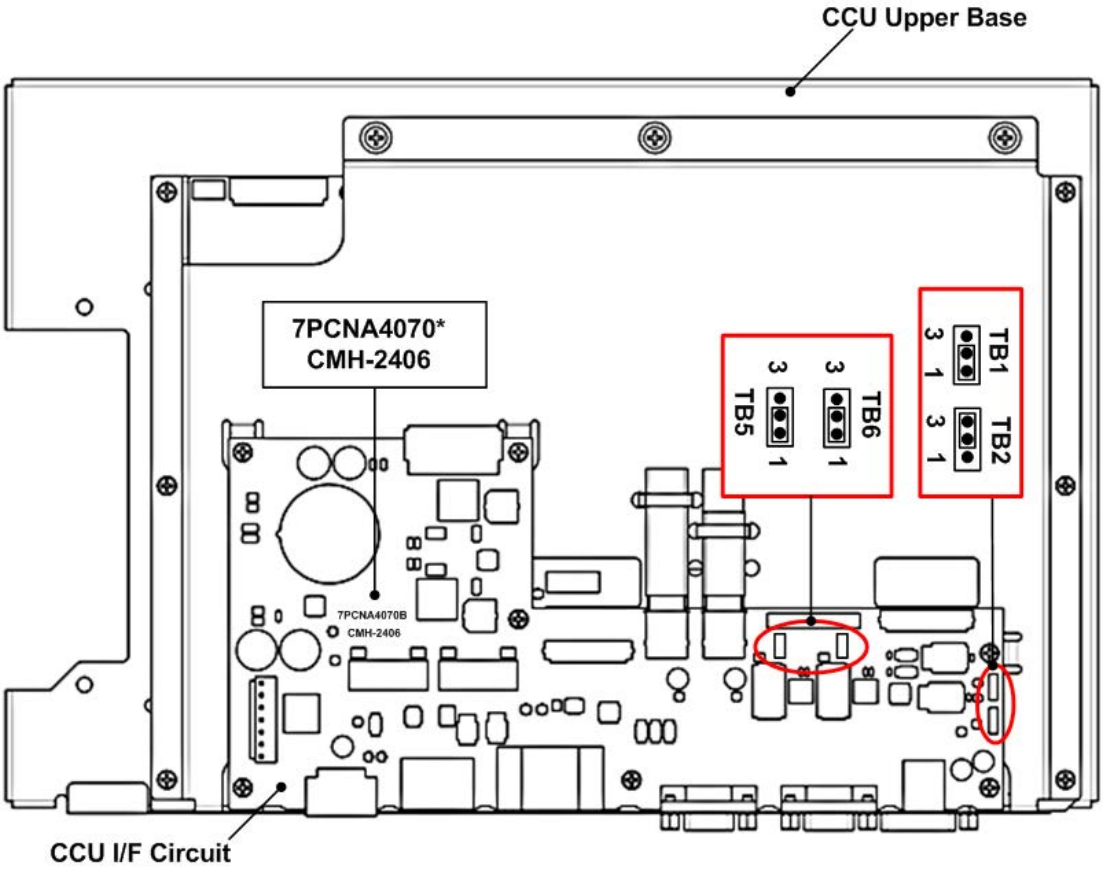


Fig. 2.5.13 CCU Upper base and CCU I/F circuit

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

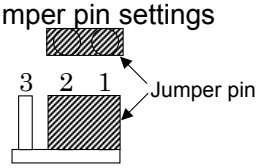
2.5.6. Settings for T/R Control circuit CMC-1205R

[DIP switch types]
- SW1, SW2

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

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

- Jumper pin settings

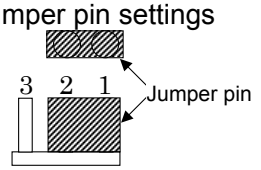


J92,J93,J95,J96: 1-2 short circuit

- DIP switch settings (■ indicates a switch.)

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

- Jumper pin settings

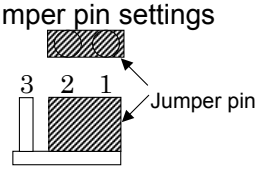


J92,J93,J95,J96: 1-2 short circuit

- DIP switch settings (■ indicates a switch.)

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

- Jumper pin settings

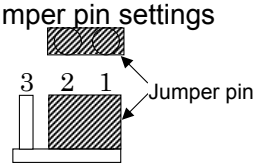


J92,J93,J95,J96: 1-2 short circuit

- DIP switch settings (■ indicates a switch.)

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

- Jumper pin settings

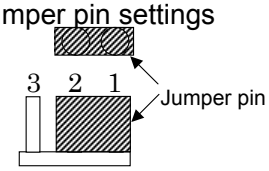


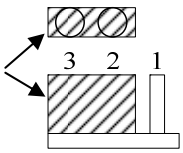
J92,J93,J95,J96: 1-2 short circuit

- DIP switch settings (■ indicates a switch.)

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

- Jumper pin settings



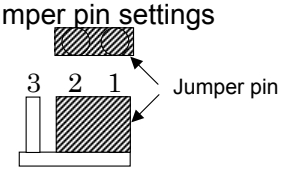


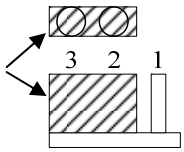
J92,J93 • • 1-2 short circuit J95,J96 • • 2-3 short circuit

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

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

- Jumper pin settings





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

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

2.5.7. Settings for NKE-1632 Scanner Unit

Voltage Selection of Motor Driver Circuit CBD-1949

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

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

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

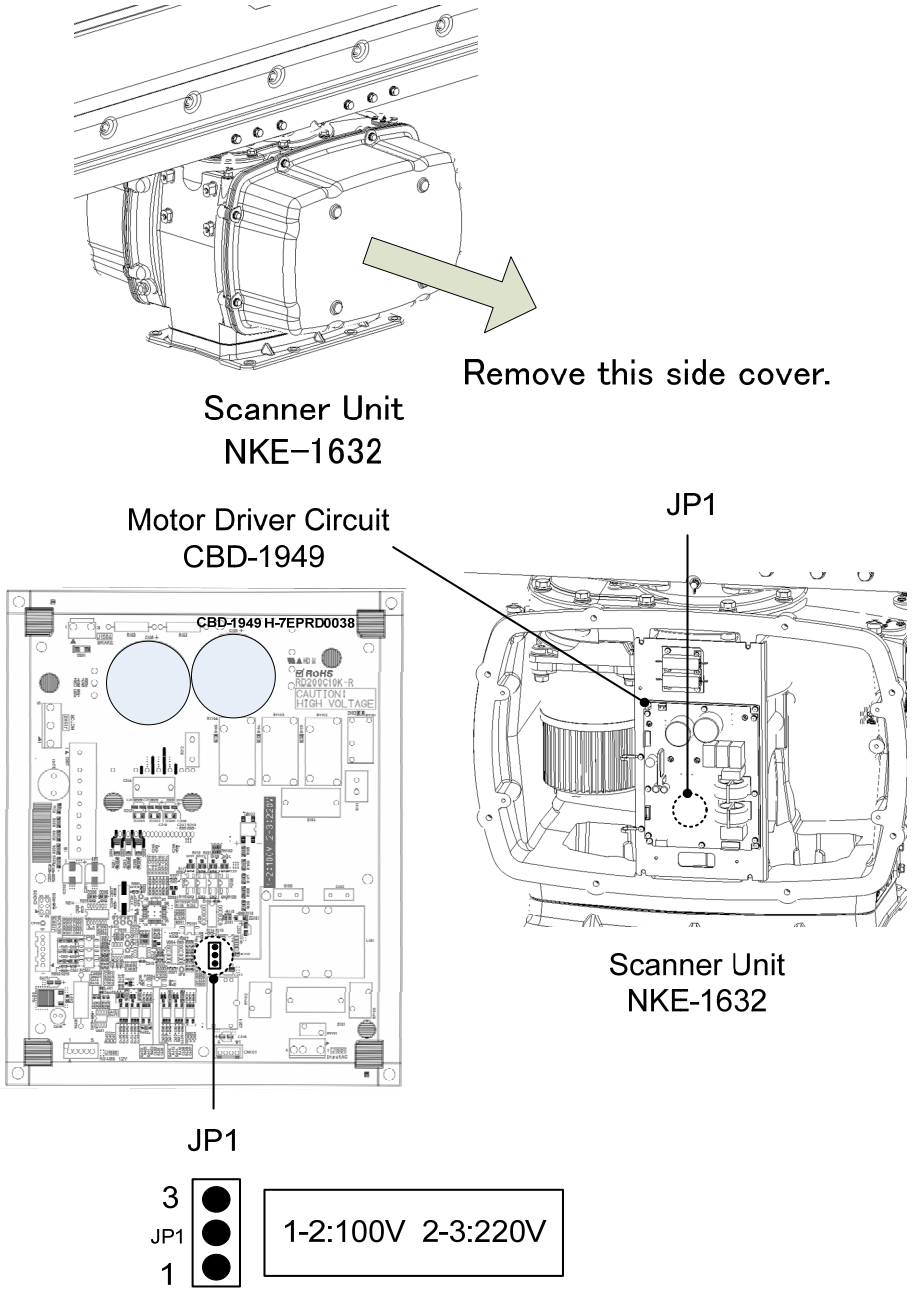


Fig. 2.5.14 Motor Driver Circuit CBD-1949 in NKE-1632

2.5.8. Settings for NKE-2632 Scanner Unit

Voltage Selection of Motor Driver Circuit CBD-1949

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

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

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

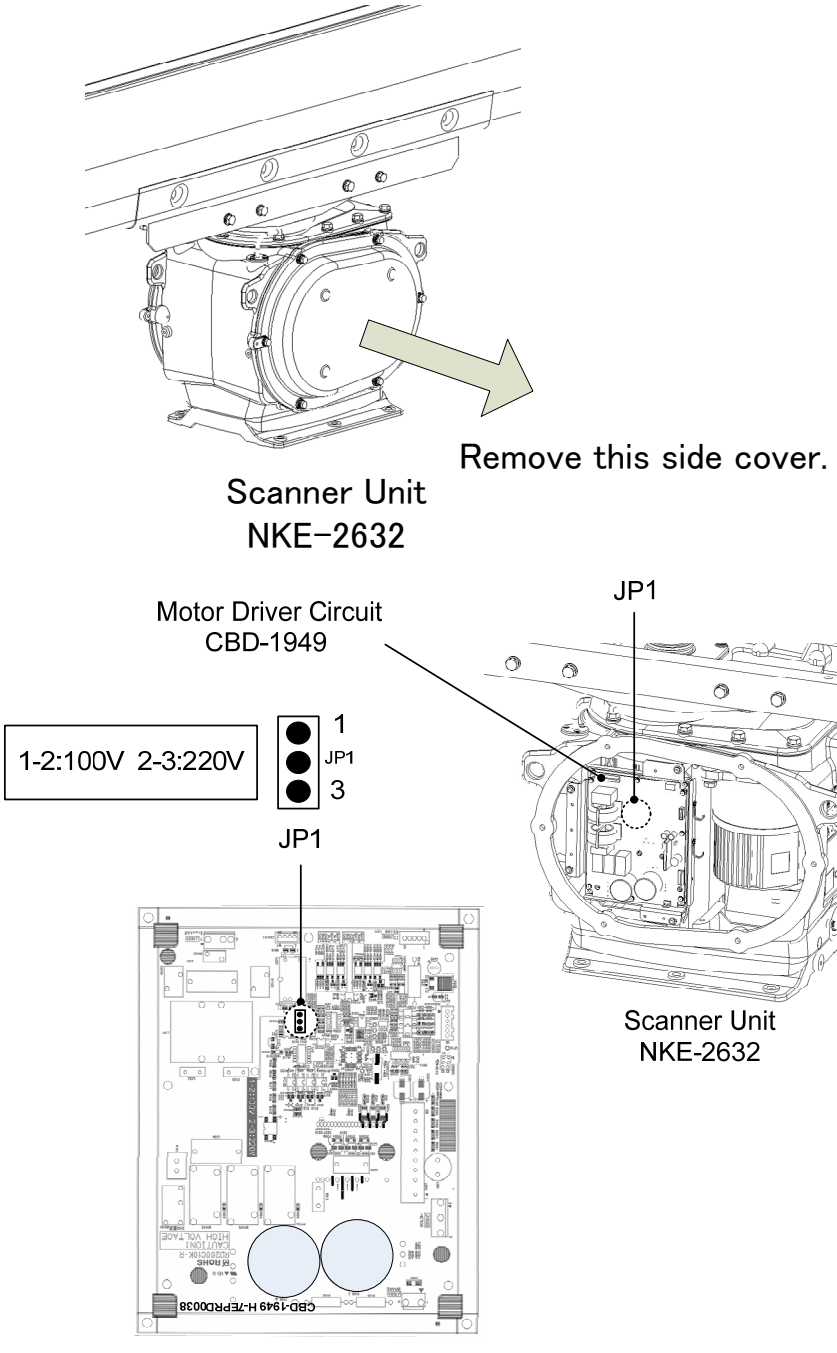


Fig. 2.5.15 Motor Driver Circuit CBD-1949 in NKE-2632

2.5.9. Settings for NKE-2632-H Scanner Unit

Voltage Selection of Motor Driver Circuit CBD-1950

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

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

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

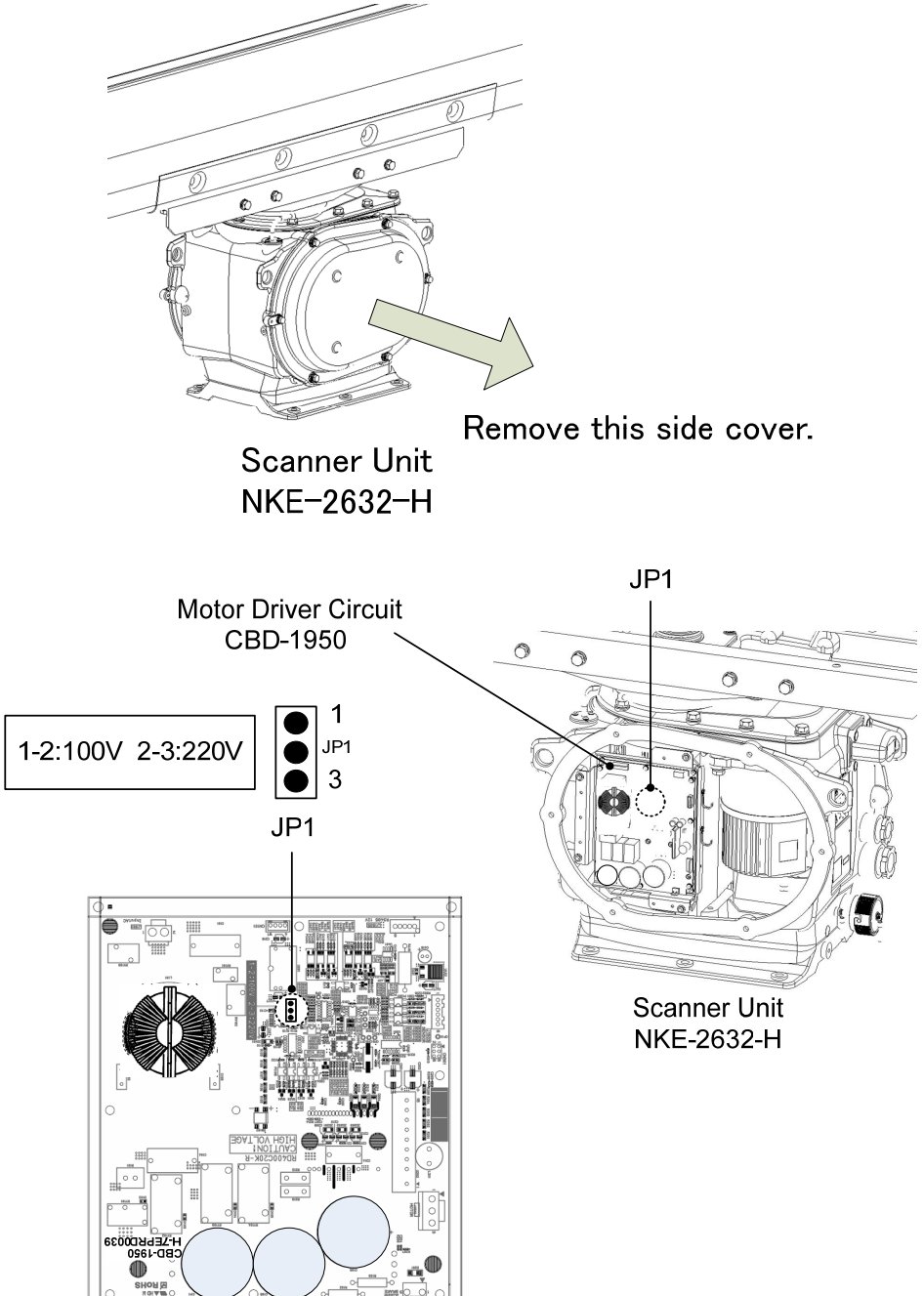


Fig. 2.5.16 Motor Driver Circuit CBD-1950 in NKE-2632-H

2.5.10. Setting for UPS

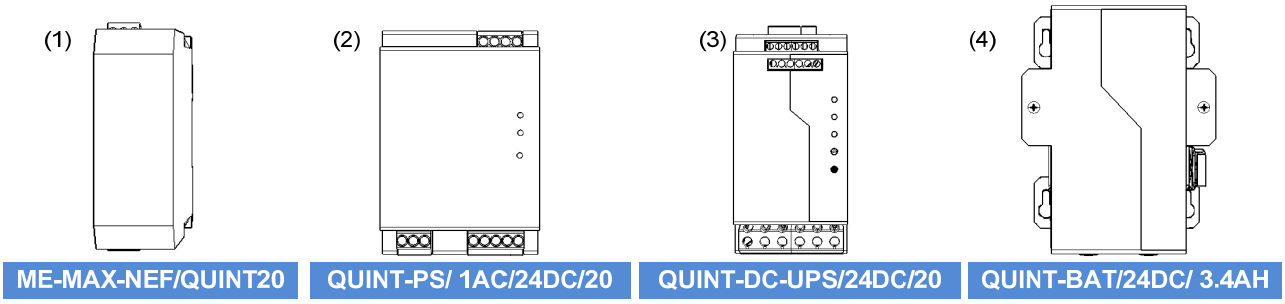


Fig. 2.5.17 UPS components

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

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

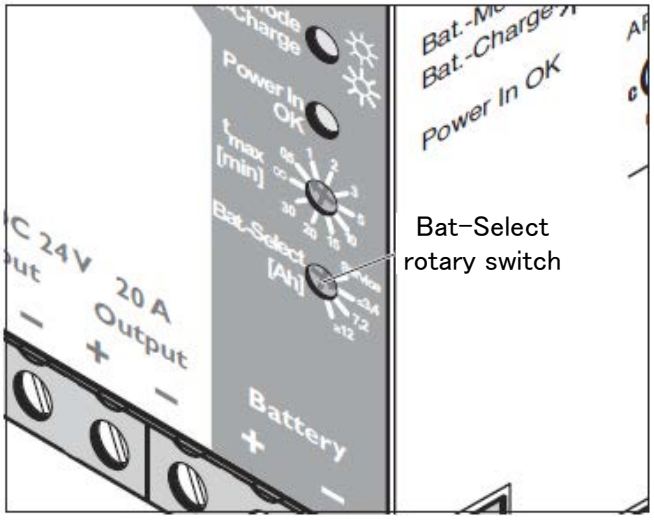


Fig. 2.5.18 QUINT-DC-UPS/24DC/20 Bat-Select rotary switch

2.5.11. Settings for Interswitch

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

4ch Interswitch NQE-3141-4A

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

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

Set all OFF.

2) SW12 setting (radar connection setting)

Radar Connection Setting

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

3) SW13 (unused)

Set all OFF

8ch Interswitch NQE-3141-8A

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

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

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

Radar Connection Setting

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

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

Radar Connection Setting

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