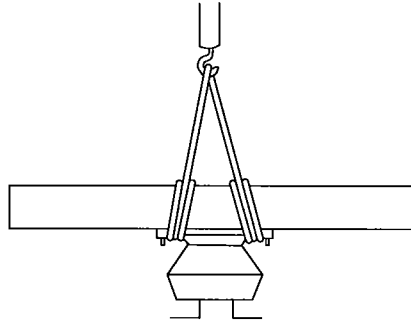


## 2. Suspending the Scanner

The scanner is supplied assembled, with felt wound around the area where the suspension rope will contact it. Engage the sling with the scanner as shown in the following figure.



Scanner Suspension

# CAUTION



If felt is not provided where the rope contacts the scanner, or if the scanner is supported near the both ends of the radiator, you may damage the unit. Be sure to apply the rope to the antenna support.

## 3. Paint

Apply necessarily paint on the fixing legs, bolts, nuts, etc. to prevent corrosion.

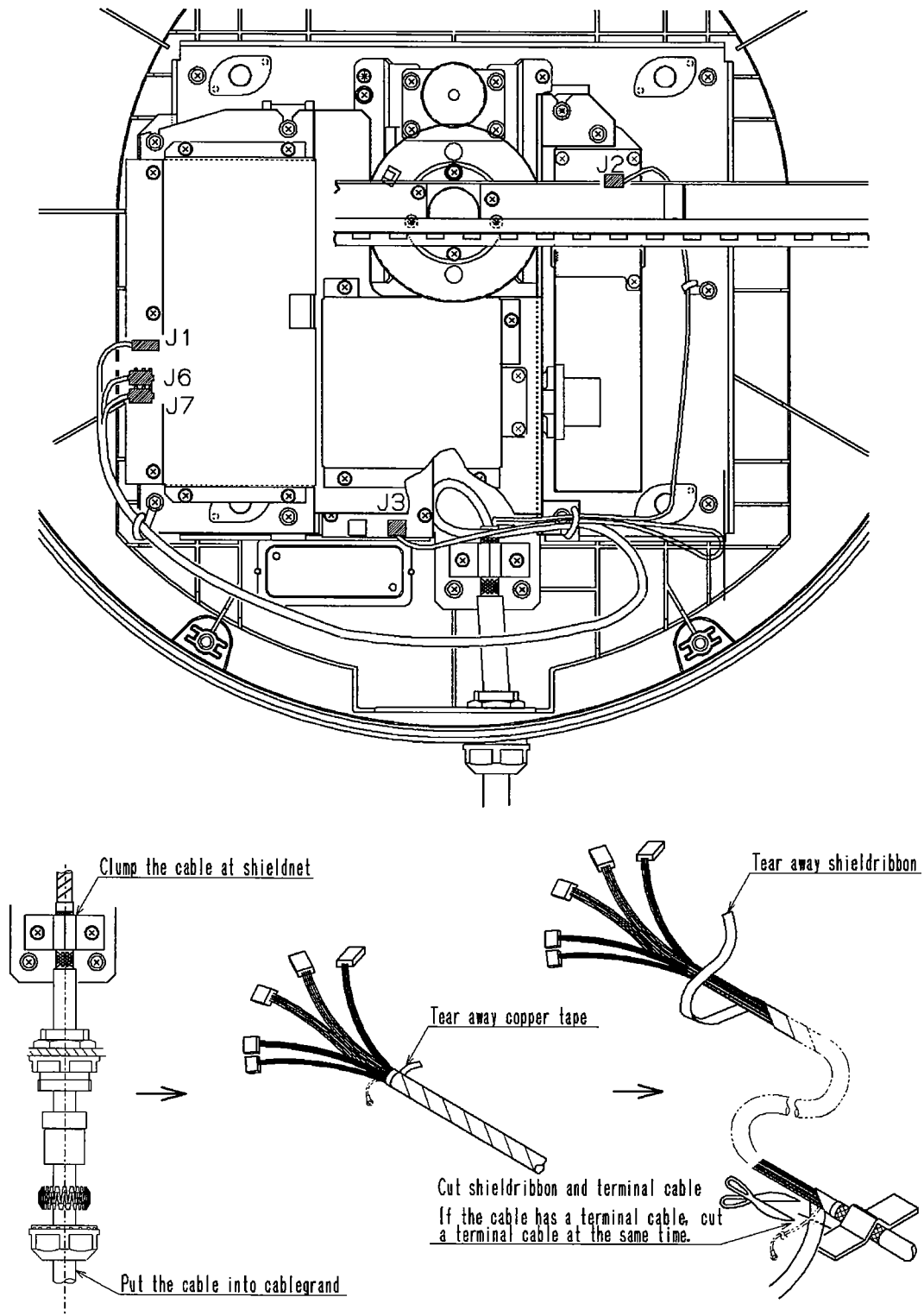
## 4. Magnetism

Place the scanner at least 3m away from the nautical instruments such as the compass or the chronometer to protect these from the effect of the magnetron inside the scanner.

### 9.2.3 Connection of cables to be assembled

#### 1. Radome scanner unit (NKE-2042)

## ASSEMBLING PROCEDURE FOR CABLE



# **CAUTION**

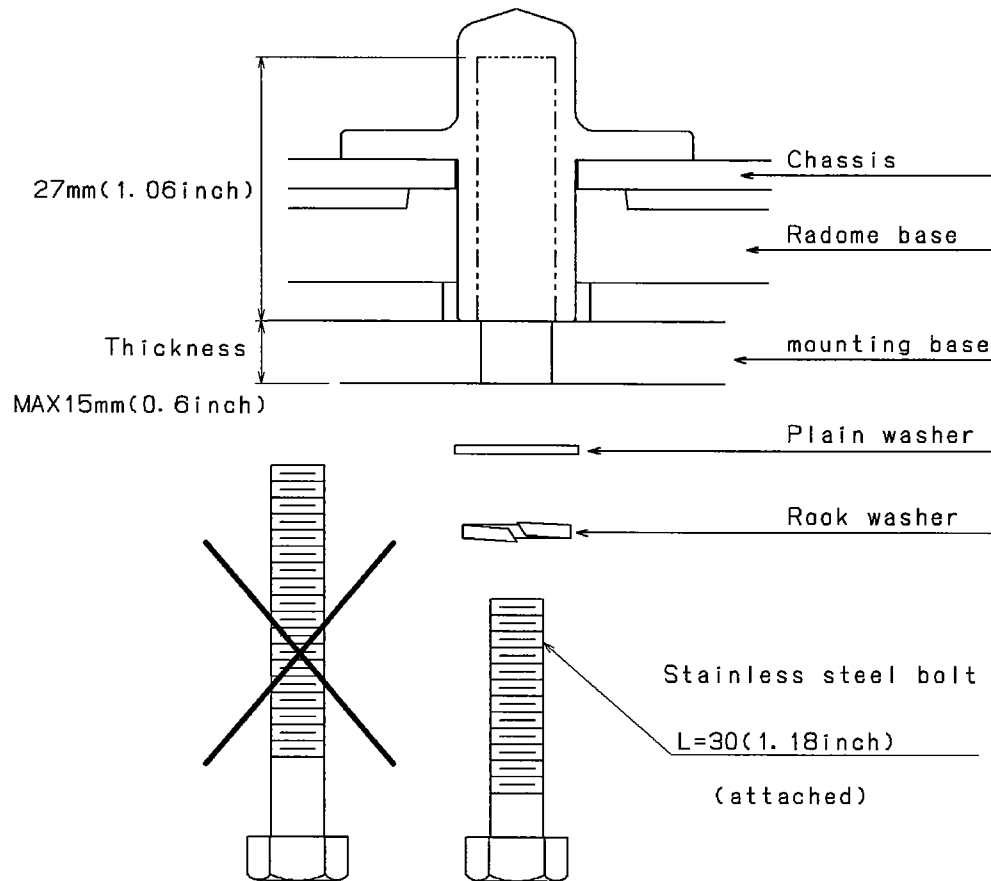


When mounting the scanner unit, please check the maximum length of the holding bolts.

If the bolts are too long, it gives severe damage to inside of the scanner.

When mounting the scanner unit, please use the attached bolts.

The mounting base thickness must not exceed 15mm (0.6inch).

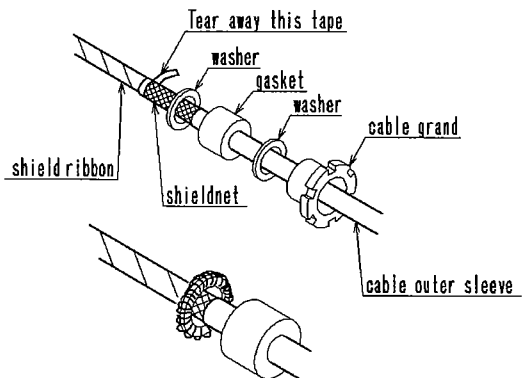


\*FIX THE BOLTS BY USING A STANDARD WRENCH (LENGTH 135mm)  
(TORQUE 2058N-cm)

## 2. Rotary scanner unit (NKE-2062/NKE-2102)

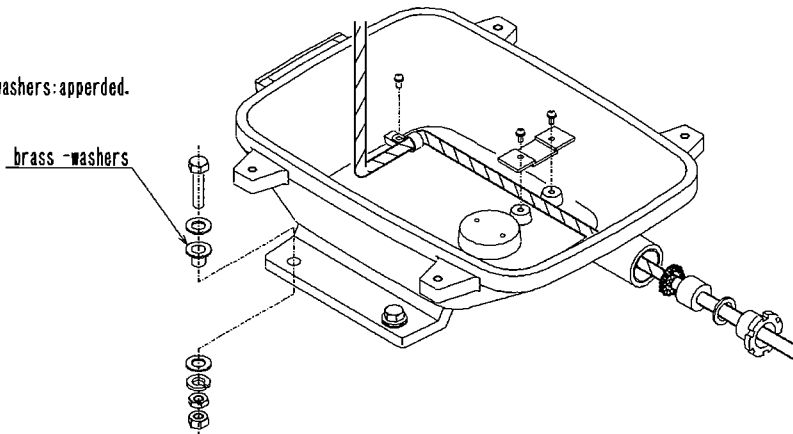
### Instruction for equipment

1. Put the cable into cable gland, washers and gasket.  
Tear away the tape.

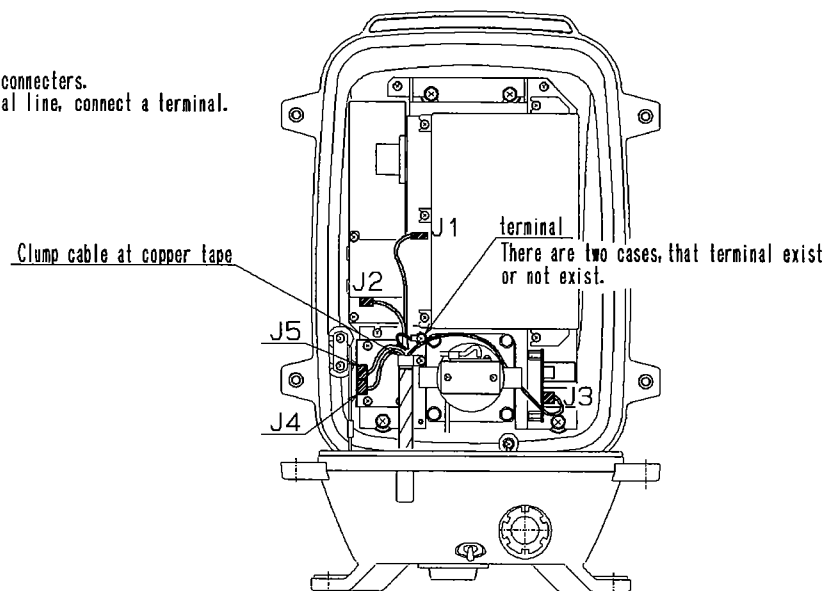


2. Unknot shieldnet and wrap it around a washer.

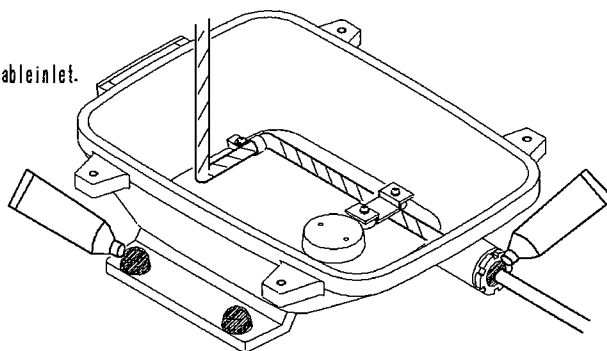
3. Equip the scanner unit with brass washers: appended.



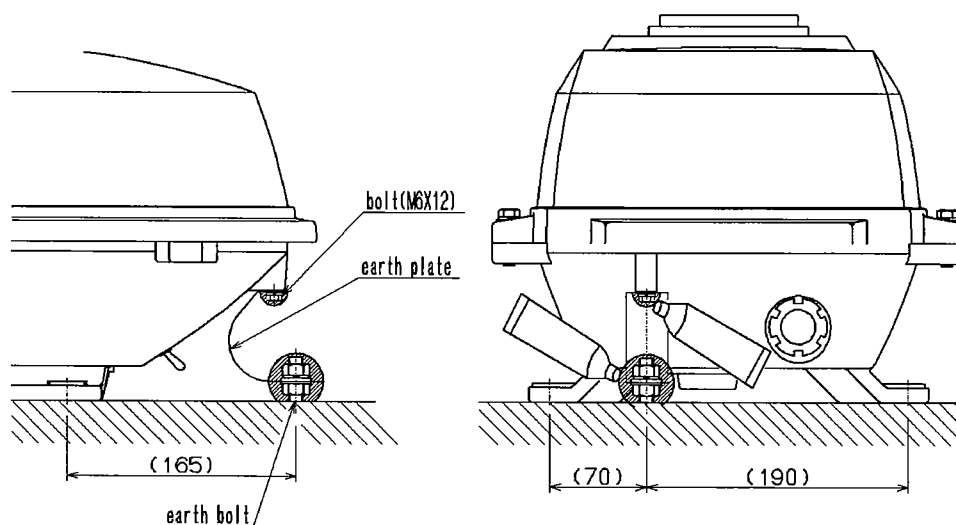
4. Clump the cable, connect 5 connectors.  
If the cable has the terminal line, connect a terminal.



5. Apply silicone sealant around the bolts and into the cable inlet.






6. Bolt the earth plate to mountbase and scanner.  
Apply silicone sealant around the bolts.



## 9.3 *Installing an Indicator Unit*

### 9.3.1 Specifying the installation position

 <b>CAUTION</b>	
	<p>Provide a distance of 1m or more between a processing unit and a magnetic compass. If a processing unit is installed in a position too close to a magnetic compass, it may affect the magnetic compass.</p>
	<p>Install a processing unit in the location that is not affected by seawater. The processing unit is not waterproof.</p>

An indicator unit comprises the following three components.

Processing unit NDC-1260 : Box of an A4 size

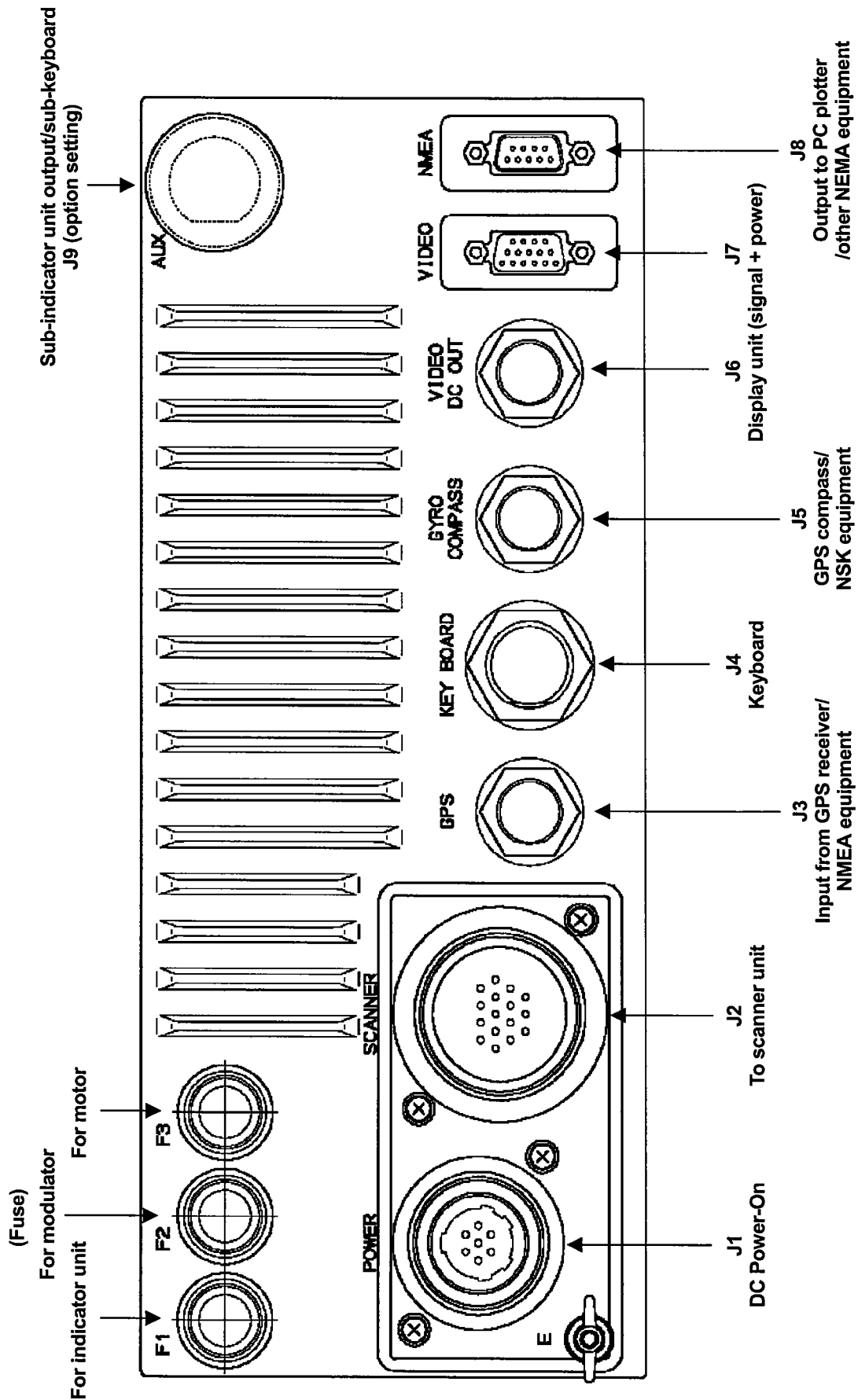
Keyboard unit NCE-7640 : Keyboard with knobs or keys

Display unit NWZ-146 : LCD display unit that is packed separately from a processing unit and a keyboard unit

### 9.3.2 Installation method

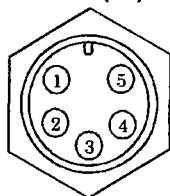
- (a) Install an indicator unit in such a way that can be observed by users easily.
- (b) Install the indicator unit giving consideration to maintenance after installation.

### 9.3.3 Rear of the processing unit



### 9.3.4 Signals of option connectors

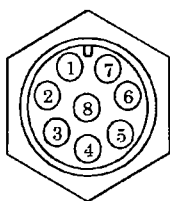
#### GPS connector (J3)



To GPS or NMEA equipment

- (1) +12V : Power for GPS receiver
- (2) GND : Power GND for GPS receiver
- (3) NAVCOM : Signal GND
- (4) NAVRX : Input from receiving signals from GPS
- (5) NAVTX : Output of transmitting signals to GPS

#### Connector for GPS compass/NSK equipment (J5)



To GPS compass or NSK unit

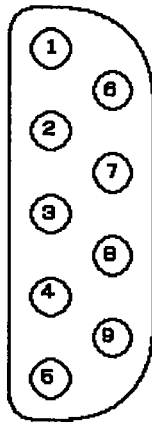
- (1) NSKT<sub>X</sub>- : Output of receiving signals from NSK+
- (2) NSKT<sub>X</sub>+ : Output of receiving signals from NSK-
- (3) NSKR<sub>X</sub>+ : Input of receiving signals from NSK+
- (4) NSKR<sub>X</sub>- : Input of receiving signals from NSK-
- (5) GND : Power GND for NSK
- (6) ALM+ : Dry contact output 1
- (7) ALM- : Dry contact output 2
- (8) +5V : Power for NSK (+5V)

Use the following plug connectors, P3 and P5, for J3 and J5.

Connector	Type	JRC code
P3 (for J3)	LTWD06BFFA-L180	5JCDX00014
P5 (for J5)	LTWD08BFFA-L180	5JCDX00015



### Connector for signal output to PC plotter/NMEA equipment (J8)



To PC plotter or NMEA equipment

(1) NC	: Unused
(2) RSRXD	: RXD signal input (reserved)
(3) RSTXD	: NMEA signal output
(4) NC	: Unused
(5) GND	: Signal GND
(6) NC	: Unused
(7) RSRTS	: RTS signal output (reserved)
(8) RSCTS	: CTS signal input

(2) RSRXD and (7) RSRTS are used for special purposes.

NMEA signals are output from (3) RSTXD and RS232C output is set at short circuit between 1 and 2 of power terminal block jumper TB1, and RS422 (NEMA0183) is set at short circuit between 2 and 3. To connect J8 and a PC plotter (RS232C port), use a commercial cross type DSUB9-pin cable (for RS232C).

To connect J8 to different NMEA equipment, also obtain a commercial DSUB9-pin connector.

In this case, make sure that the jumper of power terminal block TB1 is set between 2 and 3 (RS422 level).

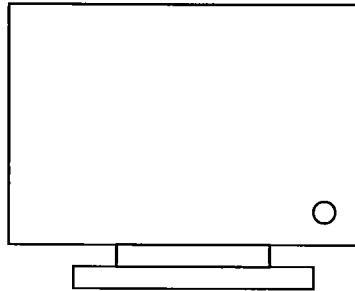
### 9.3.5 Installing and display unit

Display unit NWZ-146 is connected with two cables.

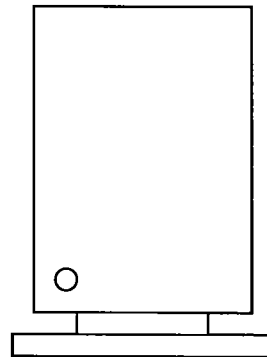
#### 1. Setting vertically or horizontally

A display unit can be installed vertically or horizontally.

When changing the orientation of a display unit from vertically to horizontally or vice versa, remove the four small screws from the rear of the display unit and install it with the required orientation as shown below.



Horizontal installation



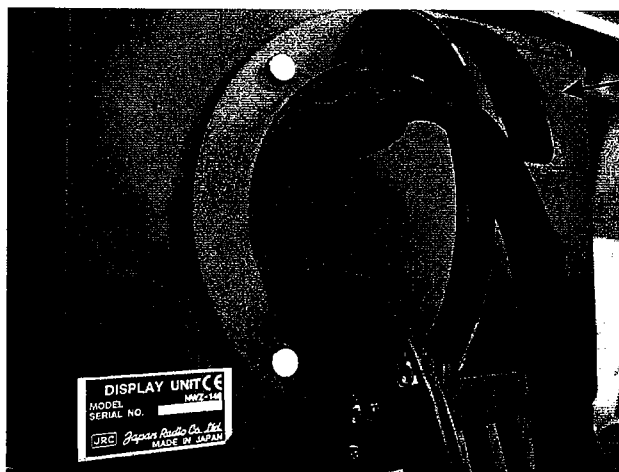
Vertical installation

(o: Brightness adjustment knob)

#### 2. Connecting cables

Connect two cables from the processing unit.

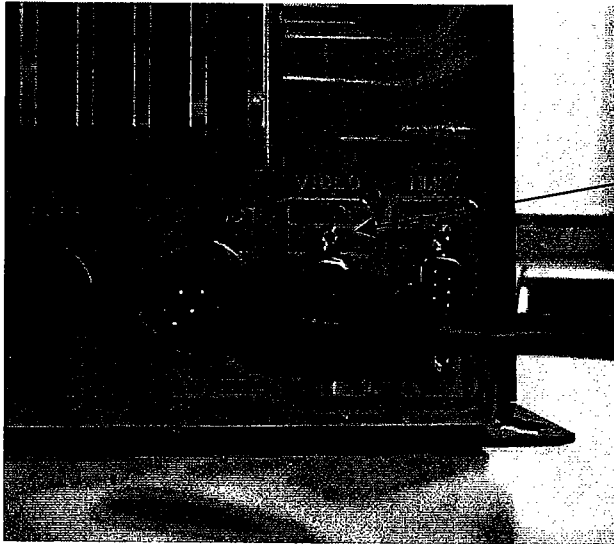
One cable is used as a video cable and the other is used as a power cable. As shown in the photograph below, insert the two cables at the rear of the display unit, turn the plugs until they stop, and check that the cables do not come off even if they are pulled.



Connection on the display unit side :  
Make sure that the cables do not come off even if they are pulled.

Connect two cables from the processing unit.

As shown in the photograph below, insert the power cable connector at the rear of the processing unit and turn the plug until it stops, and check that the cable does not come off even if it is pulled.

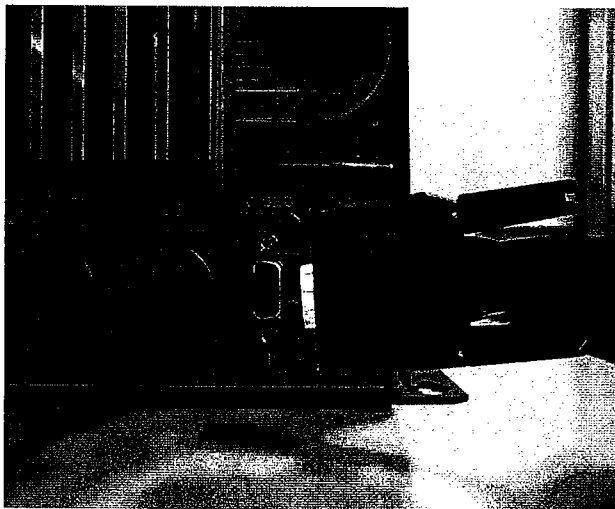


Connection 1 of the processing unit:

Power cable

Check that the cable does not come off even if it is pulled.

Insert the signal cable at the rear of the processing unit, turn the two knobs with plugs until they stop, and check that the cable does not come off even if it is pulled.



Connection 1 of the processing unit:

Signal cable

After inserting a signal cable, fix the cable firmly by turning the knob of the cable until it stops. Check that the cable does not come off even if it is pulled.

### 9.3.6 Installing a keyboard unit

A keyboard unit can be installed at any location within a distance of 5m with a processing unit.

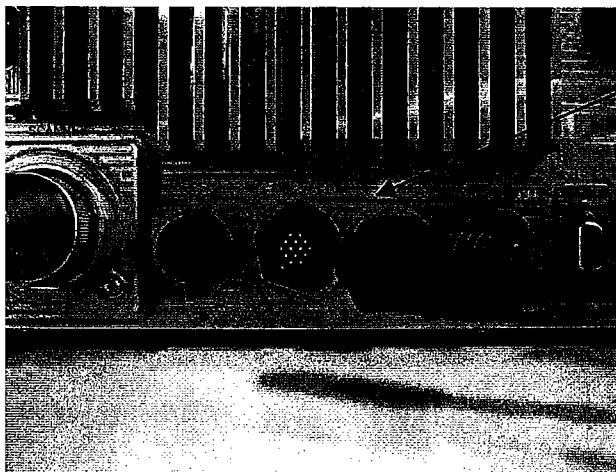


The cable is attached to the keyboard unit.

### Connecting a cable

Connect one cable to a processing unit.

Turn the insertion plug at the rear of the processing unit to the full position and check that the cable does not come off even if it is pulled.

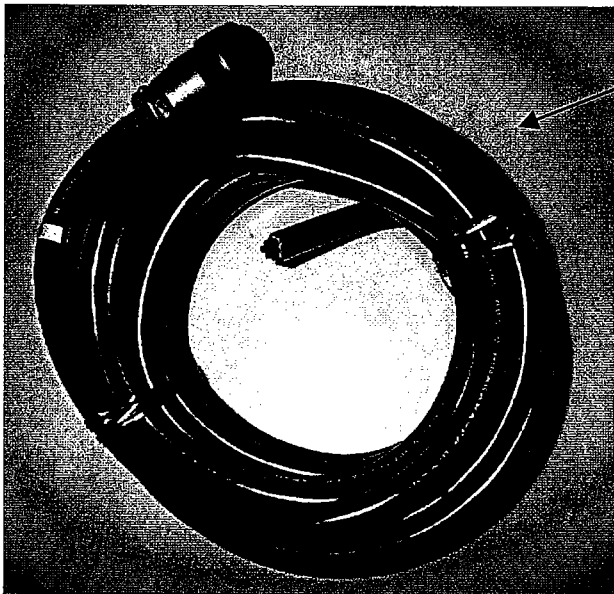


Check that the cable does not come off even if it is pulled.

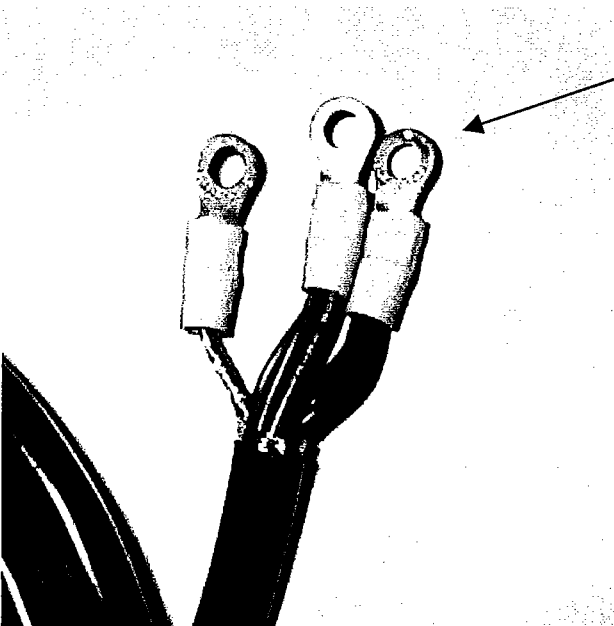
### 9.3.7 Attaching a power cable (CFQ-6911-5)

A power cable of 5m length with a connector is attached to this radar equipment.

Color	Number of element wires/ diameter (mm)	Cross section (mm <sup>2</sup> )	Polarity
Red	50/0.18	1.25	+
Red	50/0.18	1.25	+
Red	50/0.18	1.25	+
Black	50/0.18	1.25	-
Black	50/0.18	1.25	-
Black	50/0.18	1.25	-

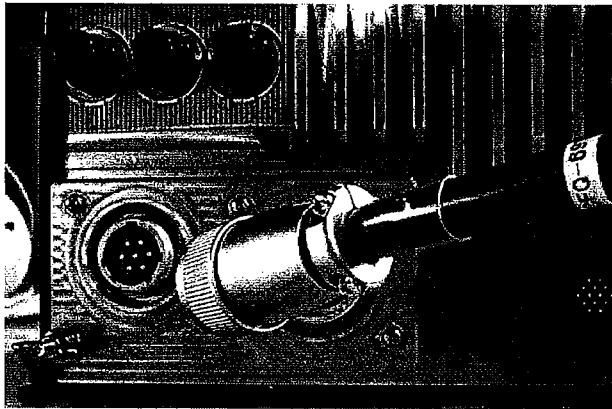


CFQ-6911-5 cable  
Cable length 5m



#### Cable process method

1. Crimp three black cables together.
2. Crimp three red cables together in the same way.
3. Crimp the shielding cable.
4. Install the red cables on the + side of the ship's power supply, the black cables on the - side of the ship's power supply, and the shielding cable in the hull's earth.



Inset cable CFQ-6911-5 into processing unit J1.

## Caution

- Incorrect connection between the ship's power supply or the rectifier and the power cable may cause an equipment failure.

### Selecting a cable when a long power cable is required

- The input voltage to an indicator is determined by subtracting the voltage drop up to the power cable from the ship's power supply voltage.  
Therefore, if the power cable is too thin or too long, the voltage drops substantially, preventing the radar from functioning at its full capacity. Use the following guideline for selecting a power cable.

- Take the voltage fluctuation rate into consideration when determining a voltage ( $V_s$ ) value of the ship's power supply.
- Use the following formula for calculating a voltage drop ( $V$ ).

$$V=2LRKI$$

L : Cable length

R : Direct current resistance at 20°C ( $\Omega/m$ )

K : Conductor resistance temperature counting (=1.22)

I : Maximum peak current (A)

- Various cable direct current resistances (R) and allowable current ( $I_{max}$ )

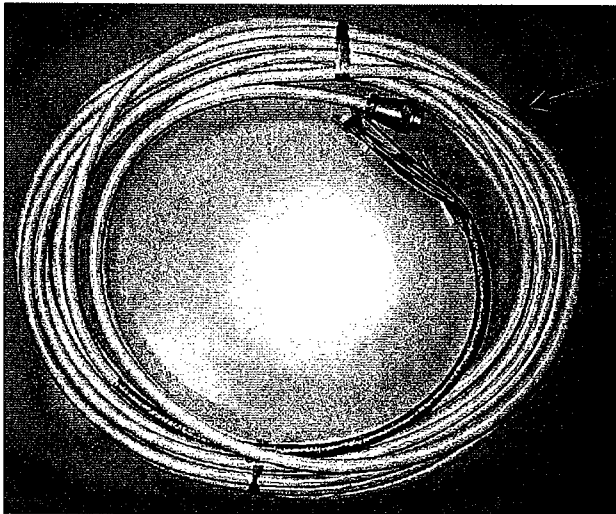
Cable type	R (20°C)	$I_{max}$ (45°C continuously)
CVVS2 x 1.25	16.7 $\Omega/km$	13A
CVVS2 x 2.0	9.42 $\Omega/km$	19A
CVVS2 x 3.5	5.30 $\Omega/km$	26a

Provide a sufficient extra current value to  $I_{max}$  when selecting cables.

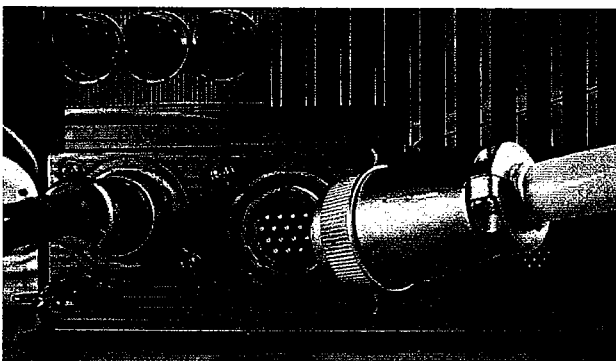
### 9.3.8 Attaching a cable between a processing unit and a scanner unit (CFQ-6912-20/30)

- (a) Use this cable for connecting a processing unit and a scanner unit.
- (b) Use a cable with the following connector for this radar equipment.

Cable length	JRC code	Remarks
20m	CFQ-6912-20	Standard
30m	CFQ-6912-30	Option



Cable CFQ-6912-20/30  
Connector on both sides



Insert cable CFQ-6912-20/30  
in processing unit J2

After inserting the cable, push the cable to the end.

**Connection table of cable CFQ-6912-20/30**

Pin number	Color	Wire material	Signal name
1	Blue thick, gray thick	AWG16	2A
2	Purple thick, brown thick	AWG16	2A
3	White thick, orange thick	AWG16	1A
4	Red thick, green thick	AWG16	1A
5	Black thick, blue thick	AWG16	2A
6	Black	AWG22	GND
7	Drain wire (coaxial) (drain wire: Shielding, braided shielding)	AWG24	VDE
8	—	—	+12V
9	Yellow thick, pink thick	AWG16	1A
10	Coaxial cable core	AWG24	VD
11	Yellow	AWG24 twisted pair	COM+
12	Green	AWG24	BZ
13	White	AWG24 twisted pair	COM—
14	Drain wire (shielding) (drain wire: coaxial, braided shielding)	AWG24	TIE
15	Shielding wire core	AWG24	TI
16	Orange medium	AWG22	BP
Cover	Braided shielding (drain wire, coaxial, drain wire shielding)		

\* Cable shape: 14mm ± 0.5mm

## Caution

- A cable is not connected to pin number 8, however, +12V is output to the processing unit side. This voltage (+12V) is used when an external simulator is connected.

The explanation up to this section covers the method in standard configuration. The next section describes cable attaching methods when optional equipment is connected.



### 9.3.9 Connecting a GPS receiver and NMEA equipment

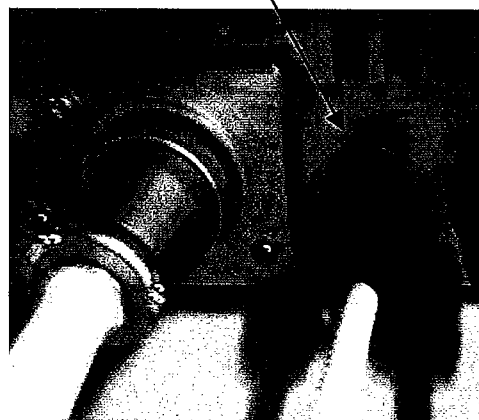
#### 1. Connecting GPS receiver of JRC

A cable of a GPS receiver such as GPS100/DGPS212 can be connected by directly inserting the cable to the J3 connector.

GPS100 manufactured by JRC



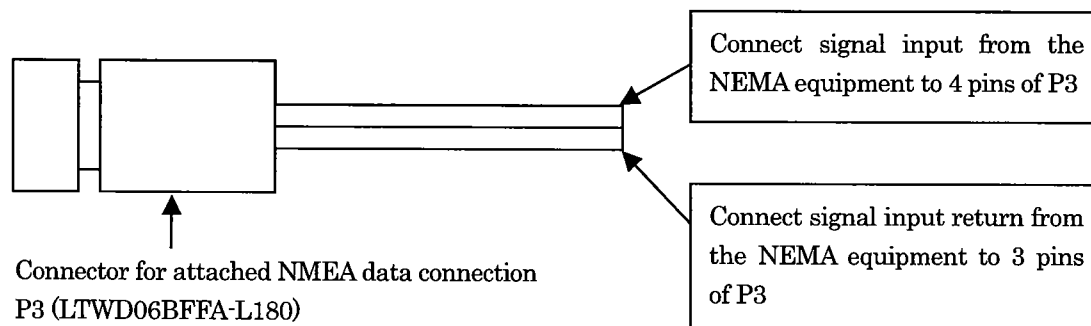
Insert a cable in J3 from GPS.



#### 2. Connecting another manufacturer's GPS receiver or NMEA data output equipment

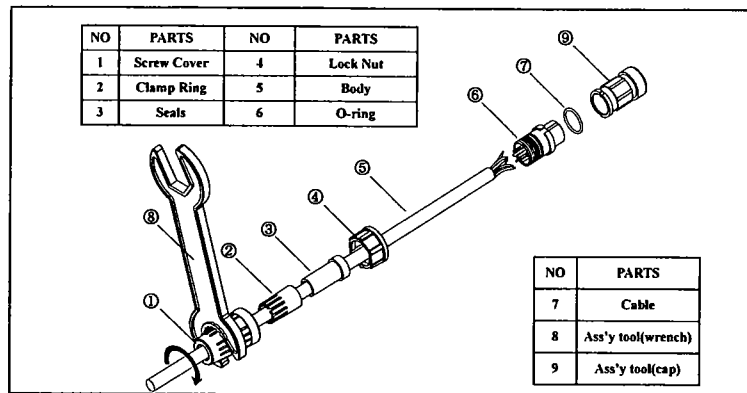
When connecting NMEA data from the NMEA data output equipment of JRC other than those indicated above or other manufacturer's GPS, use 6-pin connector P3 for J3 (LTWD06BFFA-L180).

Connect signal output to pin 4 from the NEMA equipment and signal return from the NEMA equipment to pin 3.

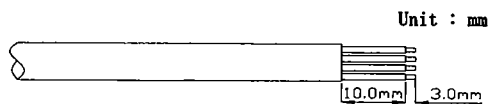


**Method of assembling and connecting P3 (LTWD06BFFA-L180) and P5 (LTWD08BFFA-L180) that are attached**

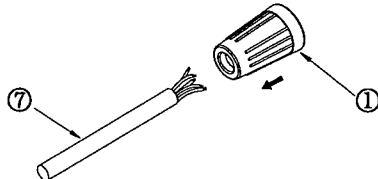
**THE INSTRUCTION FOR FIELD INSTALLATION CONNECTOR**



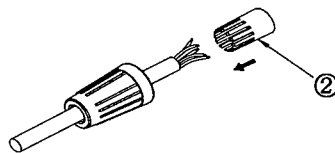
**Step 1: Strip cable sheath & insulation.**



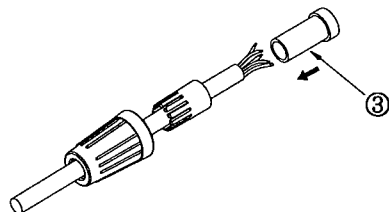
**Step 2: Insert screw cover ① into cable.**



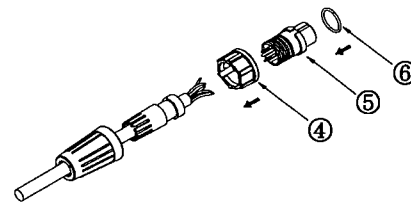
**Step 3: Insert clamp ring ② into cable.**



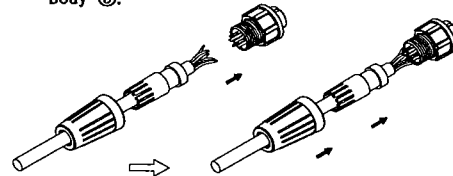
**Step 4: Insert seal ③ into cable.**



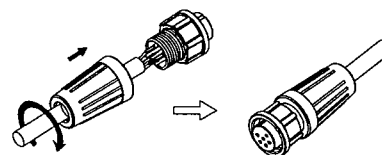
**Step 5: Insert lock nut ④ into cable, and then insert O-ring ⑥ into connector body ⑤.**



**Step 6: Solder conductors to allocated contacts, then screw or install every part into connector body ⑤.**



**Step 7: Tighten screw cover with hand tool (Optional) or your hand while holding Ass'y tool (Optional)**



**Note: 1. Ass'y tool (cap) help to ensure good locking of screw cover into the connector body.  
2. Ass'y Hand Tools (cap & wrench) are sold separately.**

### 3. NMEA0183 standard input/output sentences

#### ●Input sentences

NORMAL INPUT	
\$xxGGA	Global Positioning System Fix Data
\$xxGLL	Geographic Position - Latitude/Longitude
\$xxVTG	Course Over Ground and Ground Speed
\$xxRMC	Recommended Minimum Specific GNSS Data
\$xxBWC	Bearing and Distance to Waypoint
\$xxRMB	Recommended Minimum Navigation Information
HIGH RATE INPIUT (Use only heading information)	
\$xxHDG	Heading, Deviation and Variation
\$xxHDM	Heading - Magnetic
\$xxHDT	Heading - True
\$xxVHW	Water Speed and Heading

#### ●Output sentences

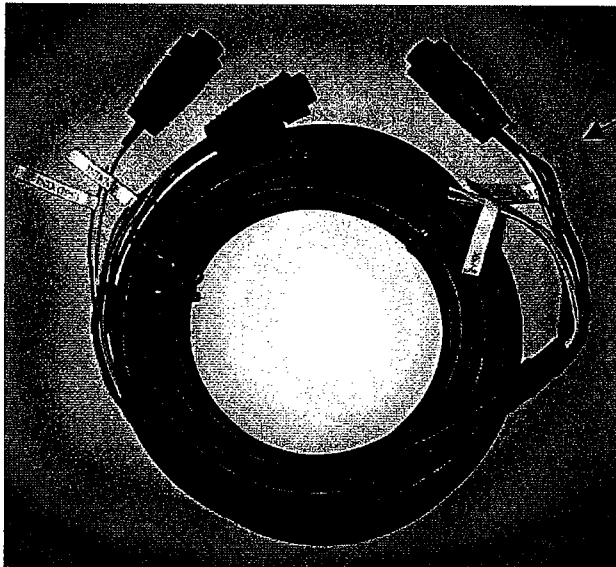
\$GPGGA	Global Positioning System Fix Data <b>Necessary to connect the GPS112 or DGPS212</b>
\$GPGLL	Geographic Position - Latitude/Longitude <b>Necessary to connect the GPS112 or DGPS212</b>
\$GPRMC	Recommended Minimum Specific GNSS Data <b>Necessary to connect the GPS112 or DGPS212</b>
\$GPVTG	Course Over Ground and Ground Speed <b>Necessary to connect the GPS112 or DGPS212</b>
\$RAOSD	Own Ship Data
\$RARSD	Radar System Data
\$RATTM	Tracked Target Messege

### 9.3.10 Connecting a GPS compass (JLR-10)

A MARPA unit, which is an optional unit, can be used by connecting GPS compass JLR-10 of JRC.

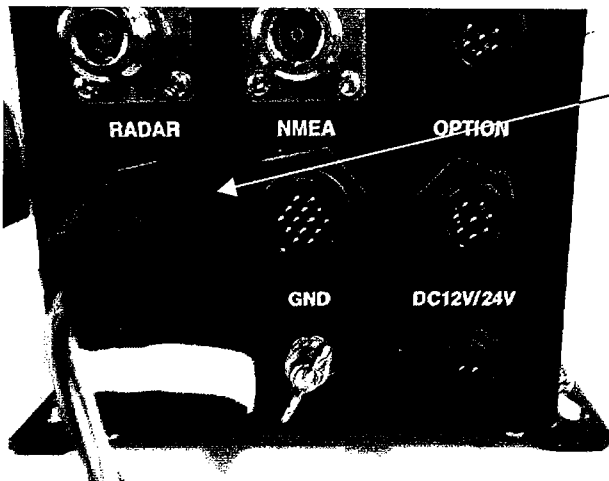
#### 1. Using a dedicated cable

JLR-10 can be connected easily by using the CFQ-6934 dedicated cable of JRC. This cable enables not only receiving of azimuth information from JLR-10 but also receiving of longitude and latitude information as NMEA data.



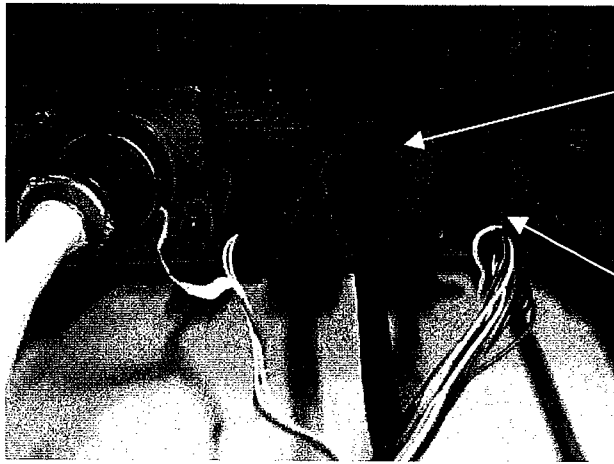
**Photograph 1**

JLR-10/NSK unit dedicated  
connection cable :  
CFQ-6934



**Photograph 2**

Insert the 8-pin connector of  
CFQ-6934 with COMPAS  
(RADAR) label attached to the  
"RADAR" connector of JLR-10.



**Photograph 3**

Insert the 6-pin connector of CFQ-6934 with GPS (IND) label attached to the connector of processing unit J3.

Insert the 9-pin connector of CFQ-6934 with NSK(IND) label attached to the connector of processing unit J5.

To input NMEA data such as position information from the GPS equipment of JRC or a different manufacturer by acquiring azimuth data from JLR-10, connect a cable from GPS equipment using the connection method that is described in 9.3.9, "Connecting a GPS receiver and NMEA equipment" or using a reserved cable, P3. Do not use the cable from JLR-10, which is inserted in GPS(J3) input, as shown in Photograph 3.

## 2. When not using a dedicated cable

To connect azimuth information data from a GPS compass, use J5 8-pin connector P5 (LTWD09BFFA-L180) that is included in the main unit package.

See below for the connection method.

Signal name	GPS compass connector side	Connector of the equipment
Compass data input+	NC	J5-1
Compass data input-	NC	J5-2
Compass data output+	RADAR-4	J5-3
Compass data output-	RADAR-3	J5-4
GND	RADAR-5	J5-5

The above information is related to the connection of azimuth data for JLR-10 only. For position information, use the method that is described in 9.3.9, "Connecting a GPS receiver and NMEA equipment".

### 9.3.11 Connecting an electromagnetic compass

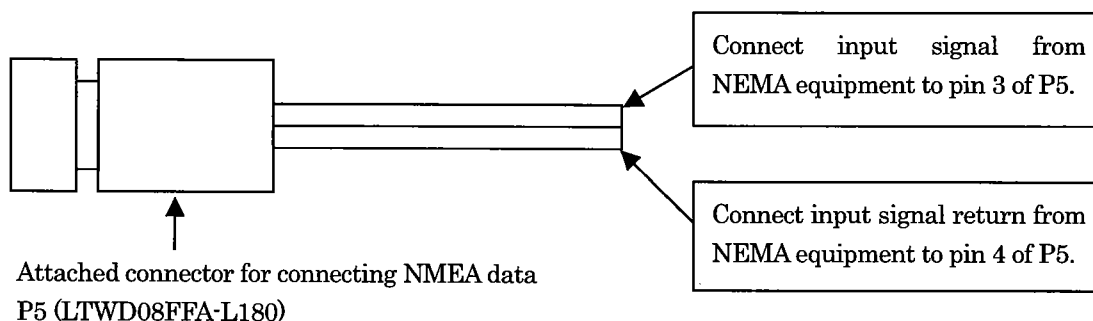
## Caution

- Make correctly connection between the output of ship's power and rectifier unit, and power cable.  
If neither connection nor voltage is right, it may cause an equipment failure.

Azimuth information can be input to a radar indicator unit if the electromagnetic compass is equipped with a NMEA0183 output pin. (An electromagnetic compass without NMEA0183 output pin cannot be connected.)

To connect azimuth information data from an electromagnetic compass, use 8-pin connector P5 for J5 (LTWD09BFFA-L180).

For the connection, connect NEMA0183+ from the electromagnetic compass to pin 3 and NEMA0183- from the electromagnetic compass to pin 4.



*Note:*

*The data that can be input from a magnetic compass is NMEA-0183 (HDT/HDM/HDG format).*

## Caution

- For data input from a magnetic compass, operation is not enabled even if optional MARPA is connected.  
The data input from GPS compass or gyro is required.

### 9.3.12 Connecting gyro

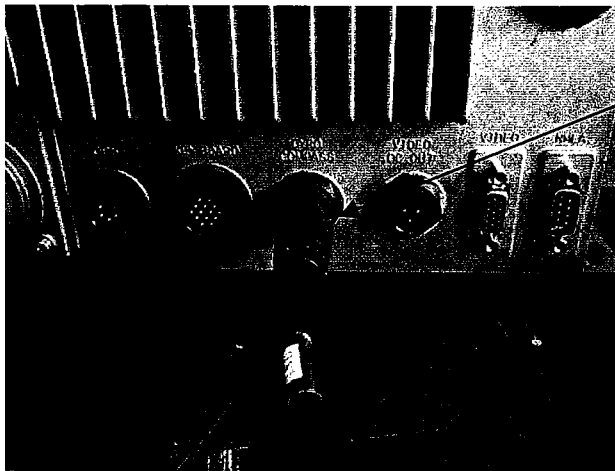
By purchasing an optional item, NSK Unit NCT-4106, gyro and electromagnetic log can be connected.

For connecting, use the CFQ-6998 dedicated cable of JRC that is enclosed by the NCT-4106 or the CFQ-6934 optional cable.

NCT-4106 can be connected easily with the processing unit by using this cable.

And the NCT-4106 is built in the interface circuit for high capacity external buzzer contact output (dry contact output), a big buzzer can be directly driven.

When CFQ-6998 (an enclosed cabel) is used



**Photograph 1**

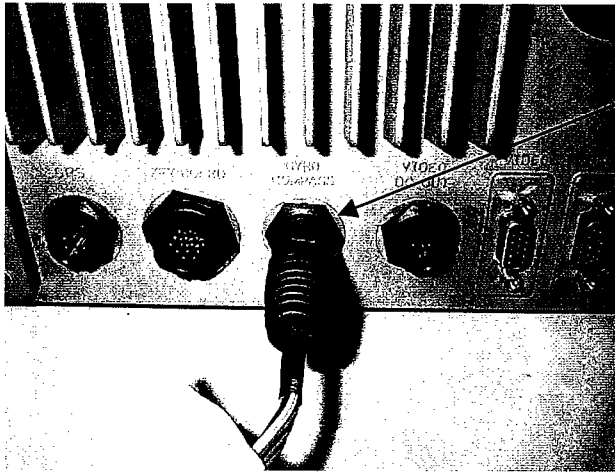
Insert the 8-pin connector (IND) of CFQ-6998 (unit dedicated connection cable that is enclosed by the NCT-4106) to the connector of processing unit J5.



**Photograph 2**

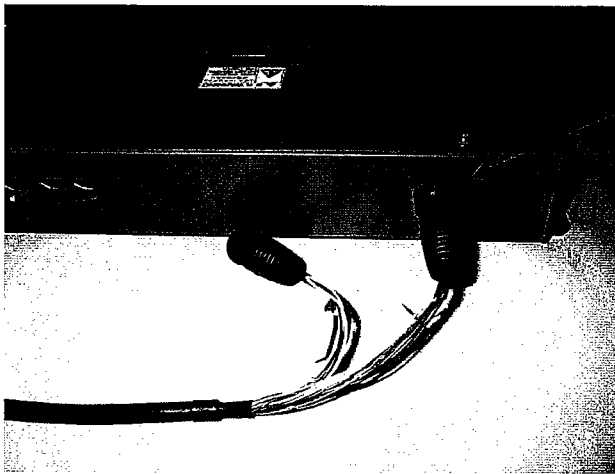
Insert the 8-pin connector (NSK) of CFQ-6998 (unit dedicated connection cable that is enclosed by the NCT-4106) to the connector of NCT 4106.

When CFQ-6934 (an optional cable) is used



**Photograph 1**

Insert the 8-pin connector (IND NSK) of CFQ-6934 (JLR-10/NSK unit dedicated connection cable) to the connector of processing unit J5.



**Photograph 2**

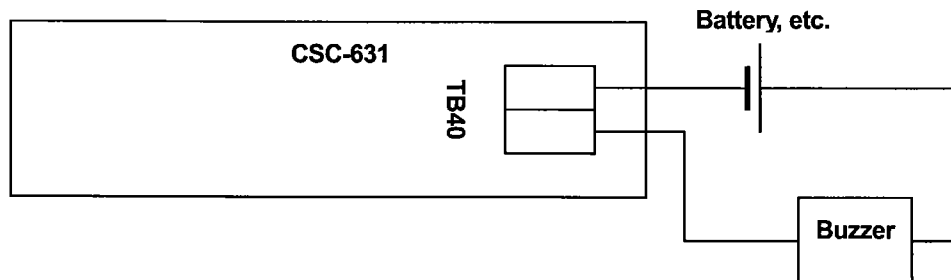
Insert the 8-pin connector (NSK) of CFQ-6934 (JLR-10/NSK unit dedicated connection cable) to the connector of NCT 4106.



## 1. Connections to an external buzzer

TB40 of the built-in PCB CSC-631 has a drycontact output, so that if the connection "TB-40 → Power Supply → Positive terminal of the buzzer → Negative terminal of the buzzer → Power supply ground" is made, then a buzzer can be sounded when there is an alarm from the JMA-5100.

Connection Example

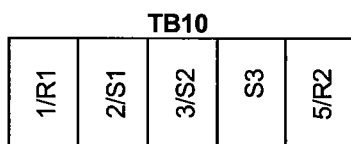


## Caution

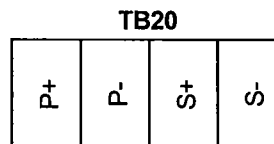
- The maximum contact capacity is:  
10A/250VAC  
10A/30VDC  
Make sure that this capacity is not exceeded.

## 2 Connections to a gyro and log

Connect the signal lines from a gyro and log to the CMJ-304C terminal board, then make the settings on the followings.



Connect the gyro signal line  
(Synchro/Step)



Connect the log signal line  
(Synchro/Step)

CMJ-304C Terminal Board

Although each component of the radar has completely been adjusted in the factory, the adjustments as described in following pages are required after installation.

The NSK unit of the radar can be applied to almost all types of gyrocompasses just by changing the settings of keys (step motor type of 24 to 100VDC and synchro motor type with primary exciting voltages of 50 to 115VAC).

Before turning the power on, follow the procedures below to set switches S1, S2 and S5, and jumper JP1 on the NSK circuit (PC4201) to make them suitable to the type of the gyrocompass.

Since the gyro selection keys on the NSK circuit is set to the 360X synchrogyro before shipment, adjust the keys as follows to suit it to the gyrocompass fitted on the ship. For details, see [Table: Setting Table of Gyro Compass and Gyro Select Switches of NCT-4106].

**(1) Before turning on the system, set the keys and jumper pin on the NSK unit (PC4201) as follows:**

S1 : Select switch to [OFF].

S2 : Gyrocompasses output stepper or synchro signal. So, be sure to check the type of the gyrocompass fitted on the ship before setting S2.

Synchronizing signal ..... Set S2 to the [SYNC] position.

Stepper signal ..... Set S2 to the [STEP] position.

S5 : Set S5 to suite the applicable gyro in accordance with the S5 setting table.

S5-1 : Type

Synchronizing signal ..... [OFF]

Stepper signal ..... [ON]

S5-2, -3 : Gyro ratio

	360X	180X	90X	36X
S5-2	OFF	OFF	ON	ON
S5-3	OFF	ON	OFF	ON

S5-4 : Gyro direction

Normal (clockwise) ..... [OFF]

Reverse (counterclockwise) ... [ON]

S5-5 : Log type

Pulse signal ..... [OFF]

Synchronizing signal ..... [ON]

S5-6 : Not used

S5-7, -8 : Log ratio

	Pulses/nm (Pulse signal)			
	800	400	200	100
	Rotations/nm (Synchro signal)			
	360X	180X	90X	36X
S5-7	OFF	OFF	ON	ON
S5-8	OFF	ON	OFF	ON

S6 : Log test

Select the switch to [NORML] position.

S7 : BSH (IMO) spec

Select the switch to [NORML] position.

JP1 : Gyro type

Synchro signal ..... Select the [SYNC] position.

Stepper signal ..... Select the [STEP] position.

**(2) Connect the gyro signal and log signal cables to the NSK circuit (PC4201).**

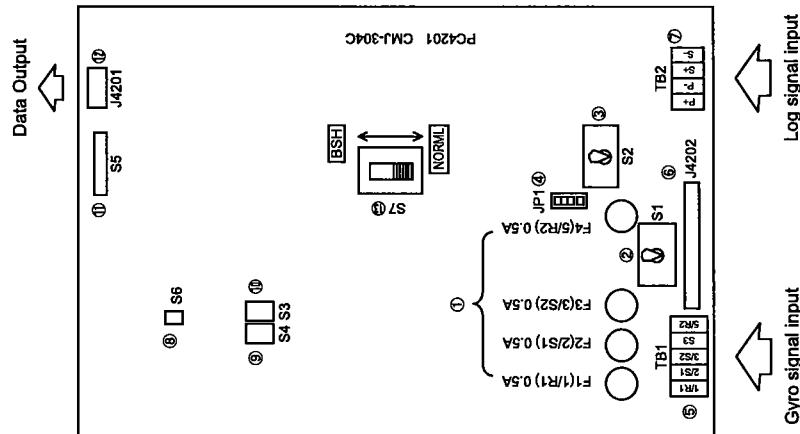
**(3) Set S1 to [ON].**

- \* If radar echoes and the own ship's true bearing indications are displayed in reverse direction after the power is turned on, set S5-4 to [ON].

**[Gyro Log Selection Switches (DIP switch S5)]**

		1	2	3	4	5	6	7	8		
Gyro signal (GYRO SIG.)	SYNC	0									
	STEP	1									
	360X		0	0							
	180X		0	1							
	90X		1	0							
	36X		1	1							
	Gyrational direction (DIRECTION)		Normal (NOR)		0						
			Reverse (REV)		1						
Log signal (LOG SIG.)	Type		PULSE			0					
			SYNCRO			1					
	Pulse number (PULSES/NM)									0	
			800P/360X							0	0
			400P/180X							0	1
			200P/90X				1	0			
			100P/30X				1	1			

NOTE: When removing or touching the PC4201, Set the gyro power supply switch S1 to OFF or cut-off the gyro signal input to TB10 or J4202 in order to prevent damages to ICs and to avoid electrical shocks.



[NSK Log Selection Switches of NCT-4106]

NOTE1: Do not forget to select the switch S1(2) to OFF before performing the connection of gyro.  
If the switch S1(2) is set to ON without the correct setting of S2(3) fuses F1~F4(1) may burn out.  
When setting the switch S1(2) to ON, following settings must be all completed.  
NOTE2: Fuses are F1~F4(1) and are used in each line of gyro signals and exterior power supply line.  
When the fuse has burned out, replace with same type fuse after investigating the cause of burn out.  
Fuse is ME51NN-0.5A.  
NOTE3: Selector of applicable gyro. Setting of S2(3) and S5(1) should be made correctly in accordance with the setting table.  
The revolution direction(bit8) of S5(1)~4 after energized and if the revolution is reversed. If should be changed over.  
NOTE4: S5(1)~5~8 deawing are setting for speed log signals of the ships.  
NOTE5: The electric current for gyro signals is as follows.  
Step Type 100mA(DC24V)  
70mA(DC35V)  
Synchro Type 50mA(AC100V)  
NOTE6: S6(6) Log test switch for 18KT speed Log signal output. Usually set [NORMAL] side.

**SETTING GYRO SWITCH**

a. S5(1) Gyro/Log Type selector switch.  
S5 setting to be mode according to setting table.

ON	1	2	3	4	5	6	7	8
OFF	1	2	3	4	5	6	7	8

ON : 1 } to be specified  
OFF : 0 }

**S5 SETTING TABLE**

GYRO SIGNAL	S5 SETTING TABLE							
	1	2	3	4	5	6	7	8
SYNC 0								
STEP 1								
360X	0	0						
180X	0	1						
90X	1	0						
36X	1	1						
DIRECTION								
Normal(NOR)	0							
Reverse(REV)	1							
LOG SIGNAL								

b. S2(3) Gyro Type Selector

[SYNC] ↔ [STEP]      [STEP] ↔ [STEP]

c. JP1(4) Gyro Type Selector

[SYNC] ↔ [STEP]      [STEP] ↔ [STEP]

d. S3(1), S4(2) is used by Service person

- S3(1) reset the CPU
- S4(2) is setting for "0" degree of the bearing.

e. S1(2) Gyro power supply switch

[ON] ↔ [OFF]

f. S7(3) User Type selection switch

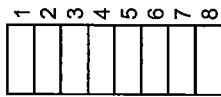
[BSH] side : IMO(BSH) Type Approved RADAR  
[NORMAL] side : Other Conventional RADAR

## Setting the speed log switches

- This radar uses the six types of standard speed log signals listed bellow.  
 Pulse type : 800 pulses/NM, 400 pulses/NM, 200 pulses/NM, 100 pulses/NM  
 Synchro type : 360X/NM, 180X/NM, 90X/NM, 30X/NM  
 Set gyro select switch assembly S5(⑪) using the S5 setting table.
- Connect the speed log signal line to, for the pulse type, the [PULSE] side, or for the synchro type, the [SYNCRO] side, of terminal block TB20 (⑦).

- S5 (⑪): Gyro log select switch assembly  
 Set the switch assembly in accordance with the S5 setting table.

ON  
S5  
OFF



It is described as { ON : 1  
OFF : 0

S5 setting table

		1	2	3	4	5	6	7	8
		0							
Gyro signal (GYRO SIG.)	SYNC	0							
	STEP	1							
	360X	0	0						
	180X	0	1						
	90X	1	0						
	36X	1	1						
Rotational direction	Normal (NORM)			0					
	Reverse (REV)			1					
Type	PULSE			0					
	SYNCRO			1					
Log signal (LOG SIG.)					0				
					800P/360X		0	0	
					400P/180X		0	1	
					200P/90X		1	0	
					100P/30X		1	1	

- S6 (⑧): Log test switch

Setting this switch to the [TEST] position displays 18KT.

Usually, set the switch to [NORML].

- Light-emitting diode CD22 is provided to check pulse-type log input signals. This LED lights if the log signal level is +2V or more (or under a non-connected status of the log signal line), or it does not light if the log signal level is +2V or less.

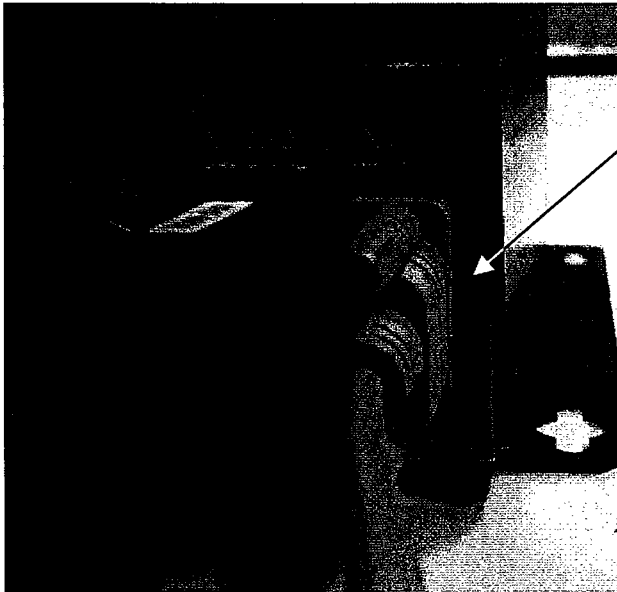


### 9.3.13 Connecting a PC plotter and NMEA equipment

This equipment can output NMEA0183 data to a PC plotter and NMEA equipment. It is possible to select RS232C output and NMEA output (RS422 level) by setting a jumper pin.

#### 1. Outputting NMEA0183 data to a PC plotter (RS232C output)

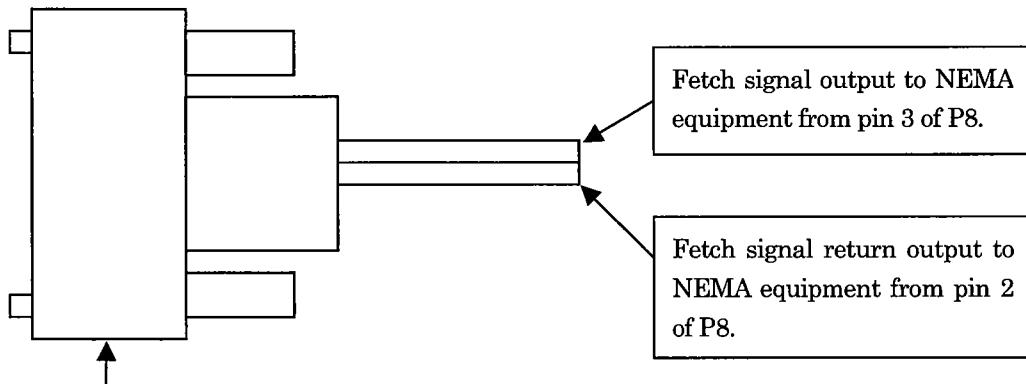
Set JP1 of the CBD-1638 power terminal block to a jumper between 1 and 2 (initial position). Connect a commercial RS232C cross cable (9-pin DSUB female) to this equipment J8 and connect the other side to the COM port of the personal computer.



Connect a commercial 9-pin RS232C cross cable (9-pin DSUB female) to this equipment J8 and connect the other side to the COM port of the personal computer.

#### 2. Outputting NMEA0183 data to NMEA equipment (RS422 output)

Set JP1 of the CBD-1638 power terminal block to a jumper between 2 and 3. Prepare a 9-pin DSUB female connector, connect output from pin 3 to NMEA+signal input of NMEA equipment and output from pin 5 to NMEA-signal input of NMEA equipment.

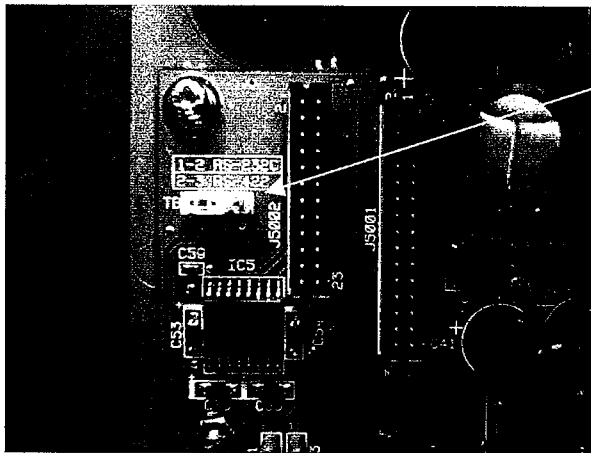


P8: Use a commercial RS232C cross cable by shortening.



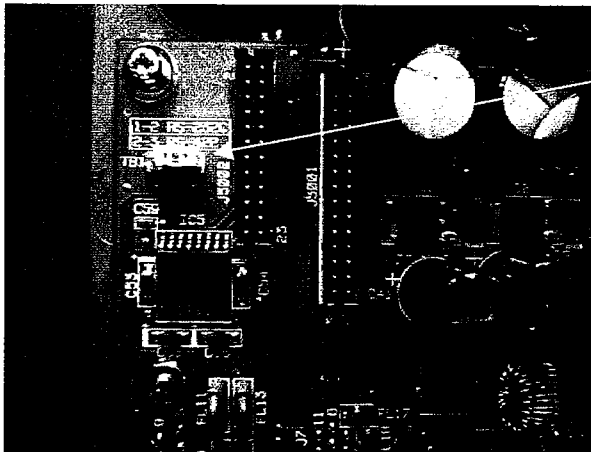
### 3. Switching RS232C/RS422 signal output

Switching signal output from RS232C to RS422 alternately, switch jumper JP1 of power terminal block CBD-1638.



#### RS232C signal output

Jumper set between 1 and 2 of TB1 as shown in the photograph.



#### RS422 signal output

Jumper set between 2 and 3 of TB1 as shown in the photograph.

The TB1 jumper is set between 1 and 2 (RS232C) at factory delivery.

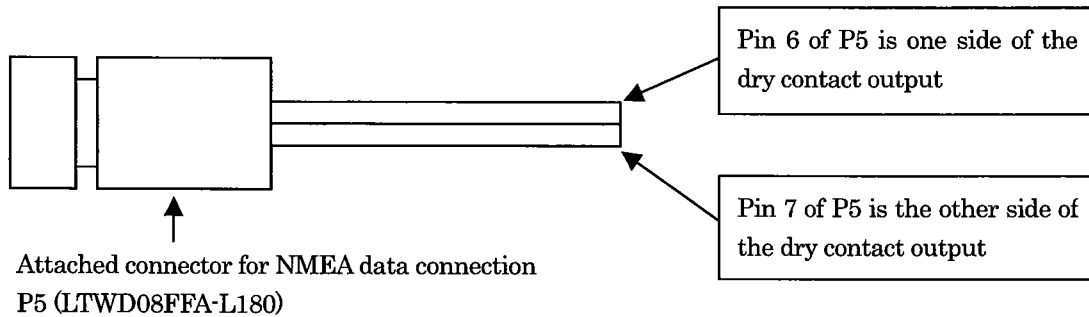
### 9.3.14 Connecting external buzzers

This equipment is equipped with dry contact output for external buzzers.

Dry contact is output from a jumper set between pins 6 and 7 from the 8-pin connector of J5. The contact of the output is a capacity up to 1A/30V.

If a greater current/voltage is applied, install equipment of adequate contact capacity such as relay in the external section.

If the current/voltage exceeds the contact capacity, the contact of this equipment becomes fused and the external buzzer keeps ringing, causing an extremely dangerous situation.



## 9.4 Changing Ship's Power

### CAUTION



Use correct fuse ratings.  
The use of incorrect ratings may cause an equipment failure.

- **Modify the ratings as follows according to the ship's power.**  
(At product delivery, a fuse of 24V is provided.)

#### 1. Display

Three types of fuses, F1, F2, and F3, are available.

- F1 : Fuse for the processing unit (10A)
- F2 : Fuse for scanner unit transmitter-receiver (or less)
- F3 : Fuse for scanner unit motor (or less)

A fuse for a processing unit (F1) is 10A regardless of the input voltage and scanner unit output. A fuse for a modulator (F2) and a fuse for a scanner unit motor (F3) change according to the input voltage as shown in the table below.

When the product is purchased, the 6.3A timelag fuse is inserted in the F2 fuse as the fuse for 12V, and the 5A timelag fuse is inserted in the F3 fuse as the fuse for 12V.

Surely exchange for the fuses suitable for the scanner unit and ship's power by using the table below.

For NKE-2042 (4kw radome type scanner unit), fuse insertion is not necessary since F3 (fuse for motor) is not available.

**List of fuses**

Scanner unit model	Input power voltage	F2		F3	
		Rating	JRC code	Rating	JRC code
NKE-2042 (4kw)	DC12V	6.3A time-lag	5ZFAD00543	—	—
	DC24V/32V	3.15A time-lag	5ZFAD00359	—	—
NKE-2062 (6kw)	DC12V	6.3A time-lag	5ZFAD00543	5A time-lag	5ZFAD00393
	DC24V/32V	3.15A time-lag	5ZFAD00359	5A time-lag	5ZFAD00393
NKE-2102 (10kw)	DC24V/32V	5A time-lag	5ZFAD00393	8A time-lag	5ZFAD00544

#### 2. Scanner unit

No changes are made for a scanner unit.

## **9.5 Checking and Adjustment After Installation**

### **9.5.1 Checking after installation**

- (a) After completion of installation, it is necessary to check if all the operations have been carried out according to the instruction. In particular, check if the cables are connected correctly, each unit is installed properly, there is no water leakage from the scanner unit, and cable shielding braiding is installed correctly.

### **9.5.2 Checking operation**

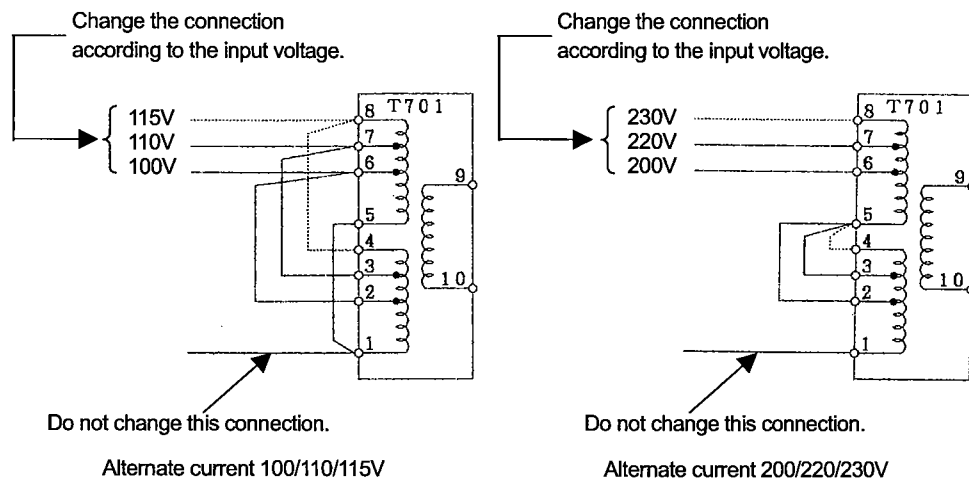
- (a) After checking installation, confirm that the ship's voltage is within the permissible range before checking radar operation.
- (b) After examining the contents of Chapter 3, "Operation Procedures" and confirming that there is no abnormality as a result of radar operation, check that all the keyboard units function normally by actually operating them.
- (c) When re-adjustment is necessary even if the result of operation checking indicates normal, make adjustments as instructed by studying 9.6, "Adjustment".

### **9.5.3 Various adjustments**

- (a) It is absolutely necessary to adjust the azimuth of the radar.
- (b) When the knob is set near the center at tuning or the radar cannot be tuned, make rough tuning adjustments using "Tuning preset" in the initialization menu.
- (c) When the distance on the radar PPI screen and the actual distance do not match, adjust the distance using "0 mile adjustment" in the menu.
- (d) The alarm volume can be adjusted using "Buzzer volume" in the menu.
- (e) STC can be adjusted using "Sea clutter preset" menu.

## 9.5.4 Rectifier

- A rectifier can be used for both of the ship's voltage types, AC100/110/115V and 200/220/230V, however, the input pin connection modes must be changed as shown in the diagram below.



**NBA-797 input pin connection change**

## 9.6 Adjustment

### 9.6.1 General adjustment



#### Adjustment after component replacement

This section describes the adjustment required as a result of replacement of the main components.

- (a) Replacement of magnetron V101 → Tuning preset
- (b) Replacement of front end E101 → Tuning preset

### 9.6.2 Adjusting a scanner unit

Some scanner unit adjustments are necessary, however, no re-adjustments are necessary since the scanner unit is thoroughly adjusted at the factory. However, if adjustments become necessary as a result of the operation checking at inspection or fault repair, make the following adjustments.

 <b>DANGER</b>	
	<div style="text-align: center;"><b>High Voltage</b></div> <p>Since some sections of the modulator (CME-322 or QME-323) generate a high voltage of about 4000V, no one except service engineers are allowed to touch inside of the modulator.</p> <p>There is a risk of dying or getting a serious injury of any person by electric shock.</p>

#### 1. Adjusting AVR output voltage of a modulator

- (a) When the radar is in a transmission mode, set the distance range to 12 nautical miles, connect a voltmeter between J201-13PIN and GND of modulator CME-322 or CME-323, and adjust the voltage to +8(V) at RV2.

#### 2. Adjusting a tuning indication level of a receiver

- (a) Set the tuning mode to manual when it is set to automatic.
- (b) Carry out tuning by setting the distance range to 12 nautical miles or more.

### 9.6.3 Adjusting an indicator unit

Some adjustments are necessary for the indicator unit, however, no re-adjustments are necessary since the indicator unit is thoroughly adjusted at the factory. However, if adjustments become necessary as a result of operation checking at inspection or fault repair, make the following adjustments.

#### Adjusting AVR output

- (a) Connect a calibrated voltmeter (digital display is recommended to eliminate reading error) between TP15 +13V and TP16 GND of power terminal block CBD-1638 and adjust the output to  $+13V \pm 0.1V$ .

## Caution

- Make sure that the scanner unit is connected before adjustment.

## 9.7 Initialization

This section describes how to initialize radar equipment. Initialization of radar equipment is necessary when using it for the first time.

Initialization involves the following tasks.

- 9.7.1 Adjusting a receiver [+RANGE-] [TX/PRF] [AUTO-TUNE] [MENU]
  - 1. Tuning preset
  - 2. Center frequency adjustment
  - 3. Tuning indicator level adjustment
- 9.7.2 Noise level adjustment [MENU]
- 9.7.3 Azimuth adjustment [TM/RM] [AZI MODE] [MENU]
- 9.7.4 0 mile adjustment [TM/RM] [AZI MODE] [MENU]
- 9.7.5 Setting a scanner unit height [MENU]
- 9.7.6 Setting a gyro value [MENU] [AZI MODE]

### Caution

- Initialize radar equipment before using it for the first time.  
Without initialization, radar equipment can neither indicate targets nor measure distances and azimuths.

### Caution

- Do not turn off the power until the following adjustments are completed.  
Otherwise, an error occurs in the memory of the setting values that were adjusted internally and, in the worst case, the equipment may not function.

- The initialization menu "Setting at installation" can be displayed by pressing the [MENU] key in long mode.  
Text "Initialization menu described above" is displayed in the description provided below. This setting indicates the menu indication method.



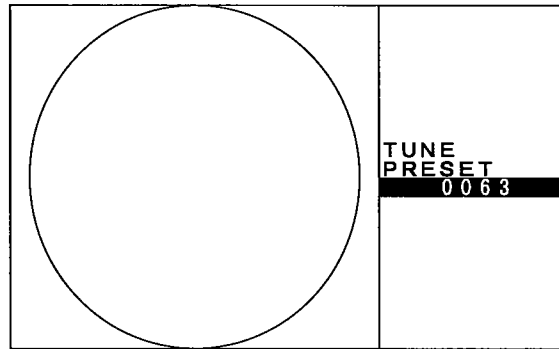
## 9.7.1 Adjusting a receiver [+RANGE-] [TX/PRF] [AUTO-TUNE] [MENU]

### 1. Tuning preset



On this menu, make a rough tuning adjustment. When this menu is displayed, the automatic tuning setting state is temporarily changed to manual tuning setting during adjustment. At completion of adjustment, the mode is reset to automatic tuning setting.

Use the following procedure to perform tuning preset.

- Press the **[+RANGE-]** key and set the range to 24NM.
- Press the **[TX/PRF]** key and send signals for 10 minutes or more.
- Set the **[AUTO-TUNE]** knob to a 12 o'clock position.
- Display the **INSTALLATION** menu by pressing the **[MENU]** key in long mode, select **RADAR**, **RADAR ADJUST**, and **TUNE PRESET**, and press **[JOG DIAL]** or **[ACQ/ENT]**.
- When the following menu is displayed, press **[JOG DIAL]** to maximize the tuning oscillation, and end the operation by pressing **[JOG DIAL]** or **[ACQ/ENT]**.



### 2. Center frequency adjustment

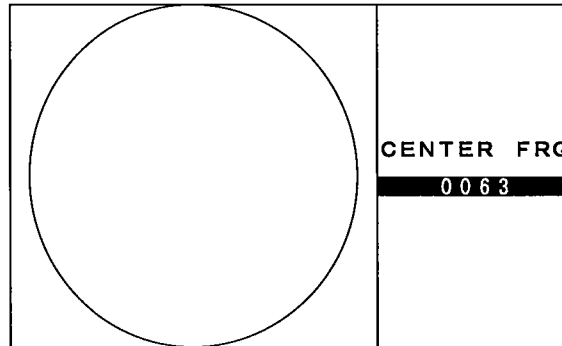
 <b>WARNING</b>	
	This adjustment is a function of adjusting tune indication and peak of echo, it is already made at the factory.
	The default value is 64.
	The settings must not be changed on the spot.
	When the tune indication and peak of echo shift, if the settings are carefully adjusted, you can not get the tuning.
	The gain falls, a collision etc. may occur.

Adjust the frequency so that the image size becomes the maximum when oscillation of the tuning indicator reaches the maximum.

Use the following procedure to set a central frequency.

- Carry out steps from (a) to (c) of "1. Tuning preset".

- (b) Display the **INSTALLATION** menu by pressing the **[MENU]** key in long mode, select **RADAR**, **RADAR ADJUST**, and **CENTER FRQ**, and press **[JOG DIAL]** or **[ACQ/ENT]**.
- (c) Adjust the frequency by changing the value by turning **[JOG DIAL]** to the left or right, and end the operation by pressing **[JOG DIAL]** or **[ACQ/ENT]**.

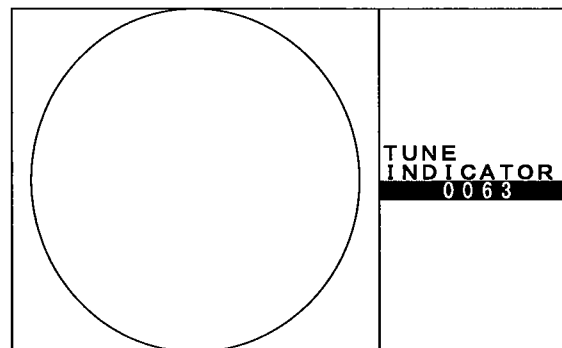


### 3. Tuning indicator level adjustment

Set the scale when the tuning indicator bar has reached the maximum level.

Use the following procedure to adjust a tuning indicator level.

- (a) Carry out steps from (a) to (c) of "1. Tuning preset".
- (b) Display the **INSTALLATION** menu by pressing the **[MENU]** key in long mode, select **RADAR**, **RADAR ADJUST**, and **TUNE INDICATOR**, and press **[JOG DIAL]** or **[ACQ/ENT]**.
- (c) Adjust the indicator level by changing the value by turning **[JOG DIAL]** to the left or right until the tuning indicator indicates 70% to 80% of the tuning indicator area, and end the operation by pressing **[JOG DIAL]** or **[ACQ/ENT]**.



### 9.7.2 Noise level adjustment [MENU]

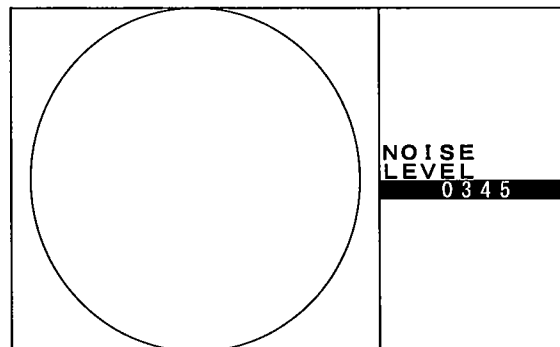
Adjust the base level of the echo that is displayed on the PPI screen.

## Caution

- Since this adjustment is made at the factory before delivery, basically, the settings must not be changed.  
Unnecessary adjustments cause degradation of sensitivity, causing image display abnormality.

Use the following procedure to adjust a nozzle level.

- Display the **INSTALLATION** menu by pressing the **[MENU]** key in long mode, select **RADAR**, **RADAR ADJUST2**, and **NOISE LEVEL**, and press **[JOG DIAL]** or **[ACQ/ENT]**.
- Adjust the noise level that is displayed on the screen by turning **[JOG DIAL]** to the left or right, and end the operation by pressing **[JOG DIAL]** or **[ACQ/ENT]**.

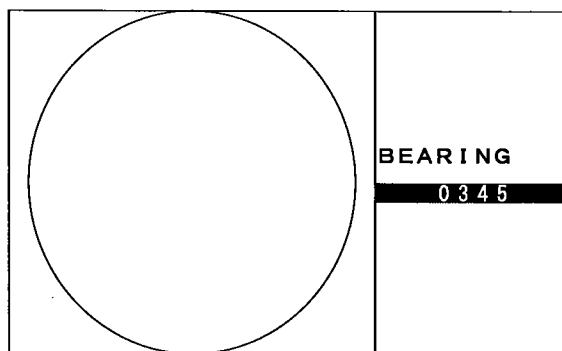


### 9.7.3 Azimuth adjustment [TM/RM] [AZI MODE] [MENU]

This operation is to adjust the azimuth on the PPI screen.

Use the following procedure to adjust the azimuth.

- Select the RM mode by pressing the **[TM/RM]** key.  
When the mode is already set to "RM", this operation is not necessary.
- Select the H-UP mode by pressing the **[AZI MODE]** key.  
When the mode is already set to "H-UP", this operation is not necessary.
- Display the **INSTALLATION** menu by pressing the **[MENU]** key in long mode, select **RADAR**, **RADAR ADJUST**, and **BEARING**, and press **[JOG DIAL]** or **[ACQ/ENT]**.
- When a line for setting an azimuth is displayed, set the azimuth to the established target on the screen by turning **[JOG DIAL]**, and press **[JOG DIAL]** or **[ACQ/ENT]**.
- Move the established target to the right azimuth position on the screen by turning **[JOG DIAL]**, and end the operation by pressing **[JOG DIAL]** or **[ACQ/ENT]**.

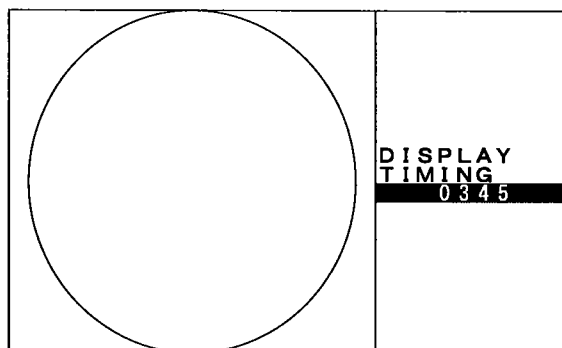


#### 9.7.4 0 mile adjustment [TM/RM] [AZI MODE] [MENU]

This operation is to adjust the distance calibration on the PPI screen.

Use the following procedure for 0 mile adjustment.

- (a) Select the RM mode by pressing the [TM/RM] key.  
When the mode is already set to "RM", this operation is not necessary.
- (b) Select the H-UP mode by pressing the [AZI MODE] key.  
When the mode is already set to "H-UP", this operation is not necessary.
- (c) Set the range to 0.125 miles by pressing the [+RANGE-] key.
- (d) Display the INSTALLATION menu by pressing the [MENU] key in long mode, select RADAR, RADAR ADJUST, and DISPLAY TIMING, and press [JOG DIAL] or [ACQ/ENT].
- (e) Set the target to the right distance position on the screen by turning [JOG DIAL] and end the operation by pressing [JOG DIAL] or [ACQ/ENT].



#### 9.7.5 Setting a scanner unit height [MENU]

Set a height from a surface of the sea to the scanner unit of the radar.

By changing this setting value, the effect of the STC function (sea clutter elimination function) for distances can be changed.

This function is also useful for changing the effect of the [AUTO-SEA] knob.

Use the following procedure to set a scanner unit height.


- (a) Display the INSTALLATION menu by pressing the [MENU] key in long mode, select RADAR, RADAR ADJUST2, and ANTTENA HEIGHT, and press [JOG DIAL] or [ACQ/ENT].

- (b) When the following menu is displayed, select a required setting value from **5m**, **5-10m**, **10-m** by turning **[JOG DIAL]** and end the operation by pressing **[ACQ/ENT]**.




### 9.7.6 Setting a gyro value **[MENU]** **[AZI MODE]**

After connecting an optional NSK unit, set a master gyro value in the NSK unit.



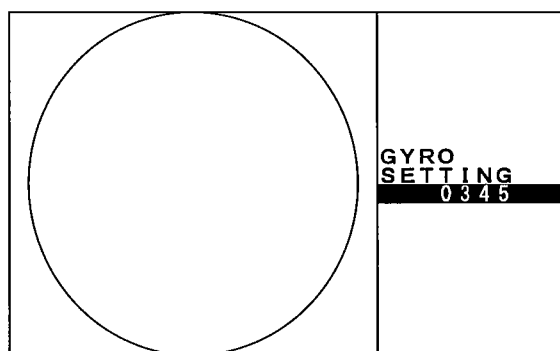
## CAUTION



The GPS compass JLR-10 of JRC always can output absolute azimuth without gyro setting.  
Therefore, do not set a gyro value when connecting JLR-10.

Use the following procedure to set a gyro value.

- (a) Display the **INSTALLATION** menu by pressing the **[MENU]** key in long mode, select **GYRO SETTING**, and press **[JOG DIAL]** or **[ACQ/ENT]**.
- (b) After setting the gyro value that was read from the master gyro by turning **[JOG DIAL]**, end the operation by pressing **[JOG DIAL]** or **[ACQ/ENT]**.



- (c) For operation (a), the menu can be opened directly from **[AZI MODE]**. When the **[AZI MODE]** key is pressed in long mode, the initial menu is displayed. Subsequent operation is the same as for (b).

## 9.8 Various Initial Settings

This section describes the various settings required to facilitate the use of radar such as setting of radar signal processing and setting at connection of various types of navigation equipment.

### 9.8.1 Sensitivity preset [AUTO-SEA] [AUTO-RAIN] [GAIN/PL] [MENU]

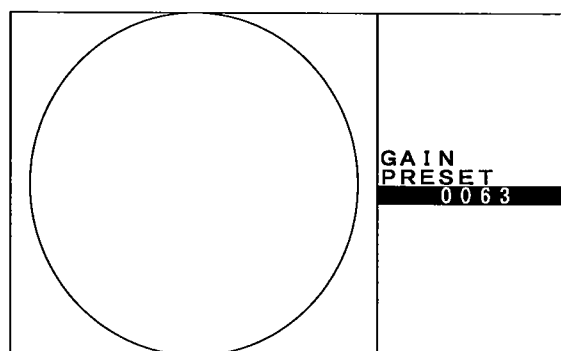
Set the maximum level indicated when the "Sensitivity" knob is used.

Do not change the adjustment unnecessarily. Normally, the level must be set to 255. In this case, no adjustment is necessary.

When adjustment is necessary, carry out the procedure described in 9.7.2, "Noise level adjustment [MENU]" before making further adjustments.

Use the following procedure to carry out sensitivity preset.

- Set the target expansion function to OFF.
- Turn the [AUTO-SEA] knob to the minimum position (anti-clockwise for one full rotation).
- Turn the [AUTO-RAIN] knob to the minimum position (anti-clockwise for one full rotation).
- Turn the [GAIN/PL] knob to the maximum position (clockwise for one full rotation).  
(In this state, the echo is displayed at the highest level on this PPI screen.)
- Display the **INSTALLATION** menu by pressing the [MENU] key in long mode, select **RADAR**, **RADAR ADJUST2**, and **GAIN PRESET**, and press [JOG DIAL] or [ACQ/ENT].
- Adjust the sensitivity level by turning [JOG DIAL] and end the operation by pressing [JOG DIAL] or [ACQ/ENT].



### 9.8.2 Sea clutter preset [+RANGE-] [AUTO-TUNE] [AUTO-SEA] [AUTO-RAIN] [GAIN/PL] [MENU]

Set the maximum control level that is indicated by turning the [AUTO-SEA] knob.

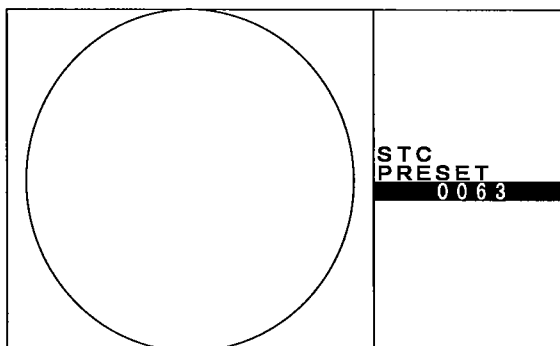
Do not change this setting unnecessarily.

Use the following procedure for executing sea clutter preset.

- Set range to 6NM by using the [+RANGE-] key.
- Adjust the tuning using the [AUTO-TUNE] knob.
- Set the target expansion function to OFF.
- Turn the [AUTO-SEA] knob to the maximum position (clockwise for one full rotation).
- Turn the [AUTO-RAIN] knob to the minimum position (anti-clockwise for one full rotation).
- Turn the [GAIN/PL] knob to the maximum position (clockwise for one full rotation).

(In this state, the echo is displayed at the highest level on this PPI screen.)

- (g) Display the **INSTALLATION** menu by pressing the **[MENU]** key in long mode, select **RADAR**, **RADAR ADJUST2**, and **STC PRESET**, and press **[JOG DIAL]** or **[ACQ/ENT]**.
- (h) Adjust the control level to the level where noise near 6NM is slightly above by turning **[JOG DIAL]** and end the operation by pressing **[JOG DIAL]** or **[ACQ/ENT]**.



### 9.8.3 Control of main bang [+RANGE-] [AUTO-TUNE] [AUTO-SEA] [AUTO-RAIN] [GAIN/PL] [MENU]

This adjustment is to suppress a main bang, which is a reflection signal from a microwave circuit of a waveguide that normally appears as a circular image at the center of the radar screen.

In the optimum adjustment, a faint image of a main bang remains on the screen.

## WARNING

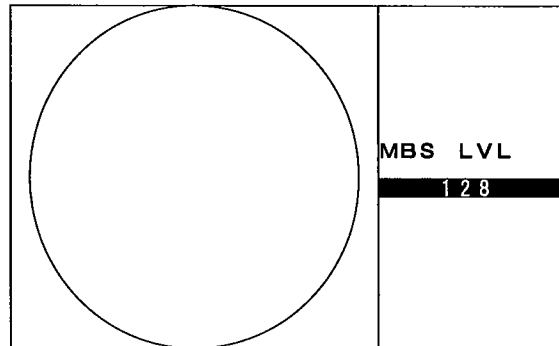


Do not change this adjustment unnecessarily.  
An incorrect adjustment may erase the closest target and a collision may occur.

Use the following procedure to set a main bang suppression level and its range.

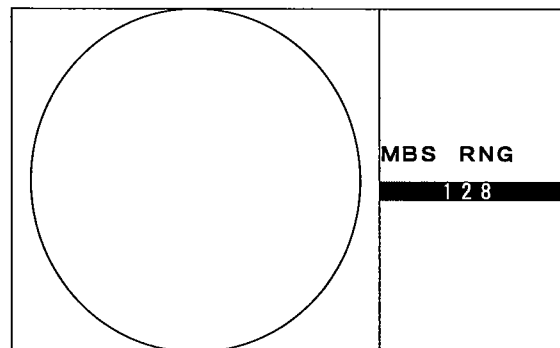
- (a) Set range to 0.125NM by using the **[+RANGE-]** key.
- (b) Adjust the tuning using the **[AUTO-TUNE]** knob.
- (c) Set the target expansion function to OFF.
- (d) Set the correlation processing function to OFF.
- (e) Turn the **[AUTO-SEA]** knob to the center position, and adjust the function strength to the extent that main bang can be identified.
- (f) Turn the **[AUTO-RAIN]** knob to the minimum position (anti-clockwise for one full rotation).
- (g) Turn the **[GAIN/PL]** knob to the maximum position (clockwise for one full rotation).  
(In this state, the echo is displayed at the highest level on this PPI screen.)
- (h) Display the **INSTALLATION** menu by pressing the **[MENU]** key in long mode, select **RADAR**, **RADAR ADJUST2**, and **MBS LVL**, and press **[JOG DIAL]** or **[ACQ/ENT]**.

- (i) Adjust the main bang suppression level by turning **[JOG DIAL]** and erase the main bang. After completion of adjustment of the suppression level, end the operation by pressing **[JOG DIAL]** or **[ACQ/ENT]**.



Consequently, the main bang suppression level has been adjusted.

- (j) Select **[MBS RNG]** by turning **[JOG DIAL]**, set the main bang erasing range and end the operation by pressing **[JOG DIAL]** or **[ACQ/ENT]**.
- (k) Adjust and set the main bang suppression range by turning **[JOG DIAL]** and end the operation by pressing **[JOG DIAL]** or **[ACQ/ENT]**.



Consequently, the main bang suppression range has been adjusted.

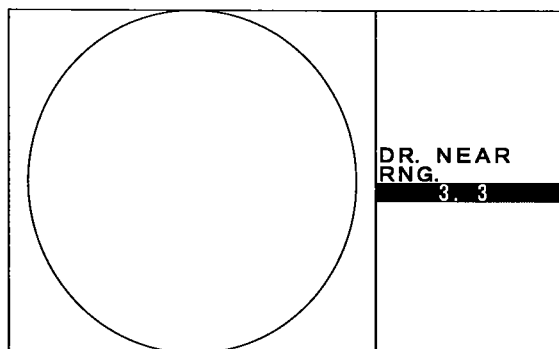
#### 9.8.4 Setting a close range dynamic range [MENU]

Set a range for changing a close range dynamic range. A range from 0.0 to 3.3 miles can be set.

Use the following procedure to set a close range dynamic range.

- (a) Display the **[INSTALLATION]** menu by pressing the **[MENU]** key in long mode, select **[RADAR]**, **[RADAR ADJUST2]**, and **[DR NEAR RNG.]**, and press **[JOG DIAL]** or **[ACQ/ENT]**.
- (b) Adjust the main bang suppression level by turning **[JOG DIAL]** and erase the main bang. After completion of adjustment of the suppression level, end the operation by pressing **[JOG DIAL]** or **[ACQ/ENT]**.





### 9.8.5 Setting a video gradation level [MENU]

Set a video gradation (dynamic range).

The following levels are available:

**NARROW:** Although the video gradation range becomes narrow, the sensitivity increases.  
Suitable for long range.

**NORMAL:** Normal video gradation

**WIDE:** The video gradation range becomes wide, enabling checking of the targets such as sea clutter, rain, and snow more easily.

Use the following procedure to set a video gradation level.

- Display the **INSTALLATION** menu by pressing the **[MENU]** key in long mode, select **[RADAR]**, **[RADAR SETTING]**, and **[VIDEO LATITUDE]**, and press **[JOG DIAL]** or **[ACQ/ENT]**.
- When the following menu is displayed, select **[NORMAL]**, **[NARROW]**, or **[WIDE]** by turning **[JOG DIAL]** and end the operation by pressing **[JOG DIAL]** or **[ACQ/ENT]**.

RADAR SETTING	
VIDEO LATITUDE	NARROW
NORMAL	LEVEL 1
NARROW	OFF
WIDE	OFF
IR SHIFT	OFF
DR RANGE CONT	OFF
TGT EXP LEVEL	LEVEL 1
TGT EXP PROC	OFF
GAIN OFFSET	0

### 9.8.6 Setting video noise suppression display [MENU]

This function enables removal of unnecessary noise such as noise and sea clutter at display of a radar image, by setting a threshold value to suppression of display of a low gradation section (noise components). Noise display suppression increases in the sequence of OFF → LEVEL 1 → LEVEL 2.

The following options are available:

- OFF:** Displays level 0 or higher of 16 levels (all the levels).
- LEVEL 1:** Displays level 4 or higher of 16 levels.
- LEVEL 2:** Displays level 8 or higher of 16 levels.

Use the following procedure to set a video gradation level.

- Display the **INSTALLATION** menu by pressing the **[MENU]** key in long mode, select **RADAR**, **RADAR SETTING**, and **VD NOISE REJ**, and press **[JOG DIAL]** or **[ACQ/ENT]**.
- When the following menu is displayed, select **OFF**, **LEVEL 1**, or **LEVEL 2** by turning **[JOG DIAL]** and end the operation by pressing **[JOG DIAL]** or **[ACQ/ENT]**.

RADAR SETTING	
VIDEO LATITUDE	NARROW
VD NOISE REJ	LEVEL1
OFF	OFF
LEVEL1	OFF
LEVEL2	OFF
DR RANGE CONT	OFF
TGT EXP LEVEL	LEVEL1
TGT EXP PROC	OFF
GAIN OFFSET	0

### 9.8.7 Setting a small target detection mode [MENU]

This function detects a distant faint target on a radar image.

To detect a distant faint target, increase a detection probability by reducing the scanner unit rotation speed and focusing radio waves of the radar to a distant faint target.

#### Note

Since 4kw is a radome type and does not have a motor rotation control function, this function does not operate even if it is set to ON.

Use the following procedure to set a small target detection mode.

- Display the **INSTALLATION** menu by pressing the **[MENU]** key in long mode, select **RADAR**, **RADAR SETTING**, and **S-BUOY DETECT**, and press **[JOG DIAL]** or **[ACQ/ENT]**.
- When the following menu is displayed, select **ON** by turning **[JOG DIAL]** and end the operation by pressing **[JOG DIAL]** or **[ACQ/ENT]**.

RADAR SETTING	
VIDEO LATITUDE	NARROW
VD NOISE REJ	LEVEL1
S-BUOY DETECT	OFF
OFF	OFF
ON	OFF
DR RANGE CONT	OFF
TGT EXP LEVEL	LEVEL1
TGT EXP PROC	OFF
GAIN OFFSET	0