

JMA-610

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**RIVER RADAR  
EQUIPMENT**

**INSTRUCTION  
MANUAL**



*Japan Radio Co., Ltd.*



# PREFACE

Thank you very much for purchasing the JRC marine radar equipment, JMA-610.

This equipment is a river radar equipment designed to obtain safe operation of ships.

This equipment consists of a radar signal processing unit, a LCD display unit and a scanner unit as its main units.




- Before operating the equipment, be sure to read this instruction manual carefully for correct operation.
- Maintain this instruction manual so that operators can refer to it at anytime.

Refer to this manual when any inconvenience or defect occurs.

# ●BEFORE OPERATION●

## Pictorial Indication

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

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

## Examples of Pictorial Indication



Electric Shock

The  $\triangle$  mark represents CAUTION (including DANGER and WARNING). Detailed contents of CAUTION (“Electric Shock” in the example on the left.) is shown in the mark.



Disassembling Prohibited

The  $\otimes$  mark represents prohibition. Detailed contents of the prohibited action (“Disassembling Prohibited” in the example on the left.) is shown in the mark.



Disconnect the power plug

The  $\bullet$  mark represents instruction. Detailed contents of the instruction (“Disconnect the power plug “ in the example on the left.) is shown in the mark.

## Warning Label

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

## ● PRECAUTIONS ●

# DANGER



**Never conduct inspection or repair work of equipment components.**

**Inspection or repair work by uncertified personnel may result in fire hazard or electrocution.**

**For inspection and repair work of equipment components, consult with our branch office, branch shop, sales office, or our distributor in your district.**



**When conducting maintenance, make sure to turn the main power off.**

**Failure to comply may result in electrocution.**



**Turn off the main power before cleaning the equipment. Especially when a rectifier is used, make sure to turn it off since voltage is still outputted from the rectifier even after the indicator and the radar are turned off. Failure to comply may result in equipment failure, or death or serious injury due to electric shock.**



**When conducting maintenance work on the antenna, make sure to turn its main power off.**

**Failure to comply may result in electrocution or injuries.**



**Make sure to turn off the antenna operation switch.**

**Failure to comply may result in injuries caused by physical contact with the rotating antenna.**

# WARNING



When conducting maintenance work, make sure to turn off the power and unplug the power line of the processor so that the power supply to the equipment is completely cut off.

Some equipment components can carry electrical current even after the power switch is turned off, and conducting maintenance work without unplugging the power connector may result in electrocution, equipment failure, or accidents.



Never carry out internal inspection or repair work of the equipment by users.

Inspection or repair work by unauthorized personnel may result in fire hazard or electric shock.

Ask the nearest branch, business office or a dealer for inspection and repair.



Turn off the main power before maintenance work. Otherwise, an electric shock may result.



Turn off the main power before cleaning the equipment. Especially, make sure to turn off the indicator if a rectifier is used. Otherwise, equipment failure, or death or serious injury due to electric shock may result, because voltage is outputted from the rectifier even when the radar is not operating.



Turn off the main power source before starting maintenance. Otherwise, an electric shock or injury may be caused.



Turn off the main power if you need to be near the scanner unit for maintenance or inspection purposes. Direct exposure to electromagnetic waves at close range in death or serious injury.

# WARNING



**Set the safety switch for stopping the scanner unit to the OFF position.**

**Otherwise, an accidental contact with the rotating scanner unit may cause injury.**



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



**Never carry out internal inspection or repair work of the equipment by users.**

**Inspection or repair work by unauthorized personnel may result in fire hazard or electric shock.**

**Ask the nearest branch, business office or a dealer for inspection and repair.**



**Turn off the main power before maintenance work.**

**Otherwise, an electric shock may result.**



**Turn off the main power before cleaning the equipment.**

**Especially, make sure to turn off the indicator if a rectifier is used. Otherwise, equipment failure, or death or serious injury due to electric shock may result, because voltage is outputted from the rectifier even when the radar is not operating.**



**Turn off the main power source before starting maintenance.**

**Otherwise, an electric shock or injury may be caused.**



**Turn off the main power if you need to be near the scanner unit for maintenance or inspection purposes.**

**Direct exposure to electromagnetic waves at close range in death or serious injury.**

# WARNING



Set the safety switch for stopping the scanner unit to the OFF position.

Otherwise, an accidental contact with the rotating scanner unit may cause injury.



When disposing of used lithium batteries, be sure to insulate the batteries by taping  $\oplus$  and  $\ominus$  terminals. Otherwise, heat generation, explosion or a fire may occur.

# CAUTION



A malfunction may occur if the power in the ship is instantaneously interrupted during operation of the radar. In this case, the power should be turned on again.



When using the [SEA] function, never set the suppression level too high canceling out all image noises from the sea surface at close range.

Detection of not only echoes from waves but also targets such as other ships or dangerous objects will become inhibited.

When using the [SEA] function, make sure to choose the most appropriate image noise suppression level.



When using the [RAIN] function, never set the suppression level too high canceling out all image noises from the rain or snow at the close range.

Detection of not only echoes from the rain or snow but also targets such as other ships or dangerous objects will become inhibited.

When using the [RAIN] function, make sure to choose the most appropriate image noise suppression level.



# CAUTION



The accuracy from the vectors are depending on the accuracy from the (D)GPS sensors.

With longer vectors, the accuracy will be lower.

The vectors are calculated with the situation at that time.

When there will be some changed influence from wind, water current etc, are not shown before the vessel is influenced by this.



Do not put watches, clocks, or magnetic cards close to the modulator unit since this unit holds magnetrons having strong magnetic force. Failure or data destruction of the above devices may result.



Turn off the main power source before replacing parts. Otherwise, an electric shock or trouble may be caused.



Before replacing the magnetron, turn off the main power source and wait for 5 minutes or more until the high voltage circuits are discharged.

Otherwise, an electric shock may be caused.



Take off your wrist watch when bringing your hands close to the magnetron.

Otherwise, your watch may be damaged because the magnetron is a strong magnet.



Two or more persons shall replace the liquid crystal monitor.

If only one person does this work, he may drop the LCD, resulting in injury.



Even after the main power source is turned off, some high voltages remain for a while.

Do not contact the inverter circuit in the LCD with bare hands. Otherwise, an electric shock may be caused.

# ◆◆◆PRECAUTIONS BEFORE OPERATION◆◆◆

## ■ Cautions for high voltage

High voltages from hundreds volts to tens of thousands volts are to be applied to the electronic equipment such as radio and radar devices. You do not face any danger during normal operation, but sufficient care is required for maintenance, inspection and adjustment of their internal components. (Maintenance, check-up and adjustment of the inside of the equipment are prohibited except by maintenance specialists.)

High voltages of tens of thousands volts are so dangerous as to bring an instantaneous death from electric shock, but even voltages of hundred volts may sometimes lead to a death from electric shock. To prevent such an accident, make it a rule to turn off the power switch, discharge capacitors with a wire surely earthed on one end, make sure that internal parts are no longer charged before you touch any parts inside these devices. At the time, wearing dry cotton gloves ensures you further to prevent such danger. It is also a necessary caution to put one of your hands in the pocket and not to use your both hands at the same time.

It is also important to select a stable foothold always to prevent additional injuries once you were shocked by electricity. If you were injured from electric shock, disinfect the burn sufficiently and get it taken care of promptly.

## ■ What to do in case of electric shock

When finding a victim of electric shock, turn off the power source and earth the circuit immediately.

If it is impossible to turn off the circuit, move the victim away promptly using insulators such as dry wood plate and cloth without touching the victim directly.

In case of electric shock, breathing may stop suddenly if current flows to the respiration center in the brain. If the shock is not so strong, artificial respiration may recover breathing. When shocked by electricity, the victim will come to look very bad with weak pulse or without beating, resulting in unconsciousness and rigidity. In this case, it is necessary to perform an emergency measure immediately.

# ◆◆◆FIRST-AID TREATMENTS◆◆◆

## ☆First-aid treatments

As far as the victim of electric shock is not in dangerous condition, do not move him and practice artificial respiration on him immediately. Once started, it should be continued rhythmically.

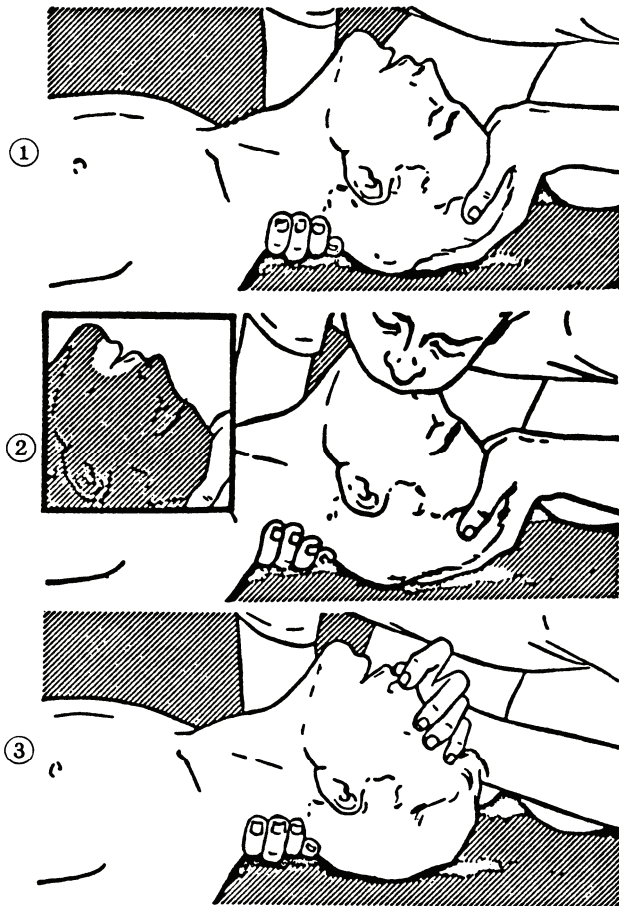
- (1) Do not touch the victim confusedly as a result of the accident, but the rescuer may also get an electric shock.
- (2) Turn off the power source calmly and move the victim away quietly from the electric line.
- (3) Call a physician or ambulance immediately or ask someone to call a doctor.
- (4) Lay the victim on his back and loosen his necktie, clothes, belt, etc.
- (5)
  - a. Examine the victim's pulse.
  - b. Examine his heartbeat bringing your ear close to his heart.
  - c. Examine his breathing bringing the back of your hand or your face close to his face.
  - d. Check the size of the pupils of his eyes.
- (6) Open the victim's mouth and take out artificial teeth, cigarette or chewing gum if any. Keep his mouth open, stretch his tongue and insert a towel or the like in his mouth to prevent the tongue from suffocating. (If it is hard to open his mouth due to set teeth, open it with a screwdriver and insert a towel in this mouth.)
- (7) Then, wipe his mouth so that foaming mucus does not accumulate inside.

## ☆When pulse is beating but breathing has stopped

(Mouth-to-mouth respiration) Fig. 1

- (1) Tilt the victim's head back as far as this face looks back. (A pillow may be inserted his neck.)
- (2) Push his jaw upward to open his throat wide (to spread his airway).
- (3) Pinch the victim's nostrils and take a deep breath, block his mouth completely with yours and blow into his mouth strongly. Take a deep breath again and blow into his mouth. Continue this 10 to 15 times a minutes (blocking his nostrils).
- (4) Carefully watch that he has recovered his natural breathing and atop practicing artificial respiration.
- (5) If it is difficult to open the victim's mouth, insert a rubber or vinyl tube into one of his nostrils and blow into it blocking the other nostril and his mouth completely.
- (6) When the victim recovers consciousness, he may try to stand up suddenly, but let him lie calmly and serve him with a cup of hot coffee or tea and keep him warm and quiet. (Never give him alcoholic drinks.)

### Method of mouth-to-mouth respiration by raising head



- (1) Raise the victim's head. Support his forehead with one of your hand and his neck with the other hand. →①  
When you tilt his head backward, the victim, in most cases, opens his mouth to the air. This makes mouth-to mouth respiration easy.
- (2) Cover his mouth as widely as possible with yours and press your cheek against his nose →②  
or, pinch his nostrils with your fingers to prevent air from leaking. →③
- (3) Blow into his lungs. Continue blowing into his mouth until his breast swells. Blow into his mouth as quickly as possible for the first 10 times.

Fig. 1 Mouth-to mouth respiration

## ☆When both pulse and breathing have stopped

Perform the (Cardiac massage) Fig. 2 and (Mouth-to-mouth respiration) Fig. 1

When no pulse has come not to be felt, his pupils are open and no heartbeat is heard, cardiac arrest is supposed to have occurred and artificial respiration must be performed.

- (1) Place your both hands, one hand on the other, on the lower one third area of his breastbone and compress his breast with your elbows applying your weight on his breast so that it is dented about 2cm (Repeat compressing his breast 50 times or so a minutes). (Cardiac massage)
- (2) In case of one rescuer,  
Repeat cardiac massages about 15 times and blow into his mouth 2 times quickly, and repeat this combination.  
In case of two rescuers,  
One person repeats cardiac massages 15 times while the other person blow into his mouth twice, and they shall repeat this combination. (Perform the cardiac massage and mouth-to-mouth respiration)
- (3) Examine his pupils and his pulse sometimes. When the both have returned to normal, stop the artificial respiration, serve him with a cup of hot coffee or tea and keep him warm and calm while watching him carefully. Commit the victim to a medical specialist depending on his condition. (Never give him alcoholic drinks.) To let him recover from the mental shock, it is necessary for persons concerned to understand his situations and the necessary treatment.

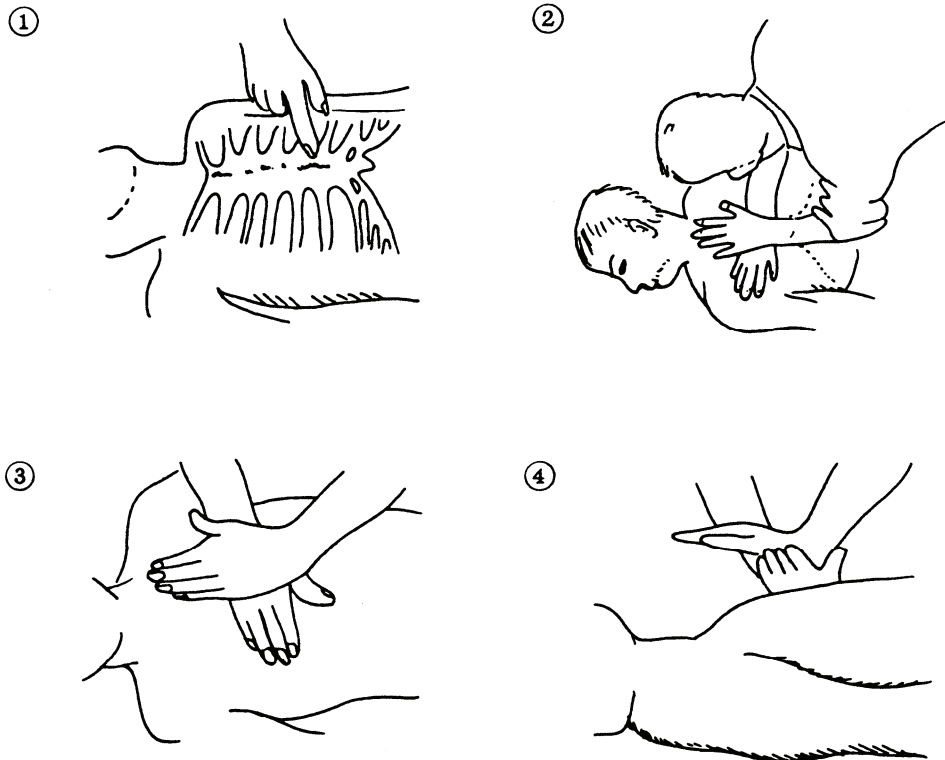


Fig. 2 Cardiac massage

<b>FCC Part 15.19 Warning Statement- (Required for all Part 15 devices)</b>
THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS: (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRE OPERATION.
<b>FCC Part 15.21 Warning Statement-</b>
NOTE: THE GRANTEE IS NOT RESPONSIBLE FOR ANY CHANGES OR MODIFICATIONS NOT EXPRESSLY APPROVED BY THE PARTY RESPONSIBLE FOR COMPLIANCE. SUCH MODIFICATIONS COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.
<b>FCC Part 15.105(b) Warning Statement- (ONLY Required for 15.109-JBP devices)</b>
NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: <ul style="list-style-type: none"><li>- Reorient or relocate the receiving antenna.</li><li>- Increase the separation between the equipment and receiver.</li><li>-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.</li><li>-Consult the dealer or an experienced radio/TV technician for help.</li></ul>
<b>IC RSS-GEN, Sec 7.1.3 Warning Statement- (Required for license-exempt devices)</b>
<b>ENGLISH:</b> This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.
<b>FRENCH:</b> Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.
<b>IC RSS-GEN, Sec 7.1.2 Warning Statement- (Required for Transmitters)</b>
<b>ENGLISH:</b> Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.
<b>FRENCH:</b> Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

**IC RSS-GEN, Sec 7.1.2 Warning Statement-  
(Required for Transmitters w/ detachable antennas)**

**ENGLISH:**

This radio transmitter (identify the device by certification number, or model number if Category II) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

- 6ft antenna NAX-16B-6, 29.2(dBi) 1.2° (horizontal) 20.9° (vertical)
- 7ft antenna NAX-16A-7, 29.2(dBi) 1.0° (horizontal) 24.0° (vertical)
- 9ft antenna NAX-16A-9, 30.2(dBi) 0.8° (horizontal) 25.0° (vertical)

**FRENCH:**

Le présent émetteur radio (identifier le dispositif par son numéro de certification ou son numéro de modèle s'il fait partie du matériel de catégorie I) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

**IC RSS-102, Sec 2.6 Warning Statements**

**ENGLISH:**

The applicant is responsible for providing proper instructions to the user of the radio device, and any usage restrictions, including limits of exposure durations. The user manual shall provide installation and operation instructions, as well as any special usage conditions, to ensure compliance with SAR and/or RF field strength limits. For instance, compliance distance shall be clearly stated in the user manual.

**English:**

The user manual of devices intended for controlled use shall also include information relating to the operating characteristics of the device; the operating instructions to ensure compliance with SAR and/or RF field strength limits; information on the installation and operation of accessories to ensure compliance with SAR and/or RF field strength limits; and contact information where the user can obtain Canadian information on RF exposure and compliance. Other related information may also be included.

**French :** Le mode d'emploi des appareils destinés à l'utilisation contrôlée doit aussi inclure des informations sur les caractéristiques de fonctionnement de l'appareil; les instructions de fonctionnement pour assurer la conformité avec SAR et / ou les limites d'intensité de champ RF; informations sur l'installation et l'exploitation d'accessoires pour assurer le respect des SAR et / ou les limites d'intensité de champ RF; et les coordonnées où l'utilisateur peut obtenir des informations sur l'exposition canadienne de radiofréquences et la conformité. Autres renseignements connexes peuvent également être inclus.

# GLOSSARY

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This section describes the main terms used for this equipment and general related maritime terms.

**AZI MODE (Azimuth Stabilization MODE):**

Bearing display mode

**Anti-clutter rain (FTC):**

Rain/snow clutter suppression

**Anti-clutter sea (STC):**

Sea clutter suppression

**BRG:**

Bearing

**COG (Course Over Ground):**

Course relative to the ground.

**CUP (Course-Up):**

Own ship's course is pointed to the top center of the radar display.

**EBL (Electronic Bearing Line):**

An electronic bearing line originated from own ship's position.

**ENH (Enhance):**

A target can be enlarged.

**GND:**

Stabilization relative to the ground.

**GPS (Global Positioning System):**

The position of a GPS receiver can be determined by the signals from GPS satellites.

**HDG (Heading):**

Own ship's heading bearing.

The display ranges from 000 to 360 degrees as scanned clockwise.

**HL (Heading Line):**

Ship's heading line

**HUP (Head-Up):**

Own ship's heading line is always pointed to the top center of the radar display.

**IR (Interference Rejector):**

Radar interference rejector

**MRK (Mark):**

Reflection plot

**NM (Nautical Mile):**

1NM=1852m

**NUP (North-Up):**

The north is always pointed to the top center of the radar display.

**PIN:**

Information set by the user (personal code)

**Relative Vector:**

A target's movement predicted relative to own ship.

**RR (Range Rings):**

Fixed range ring

**RM (Relative Motion):**

Relative motion presentation

Own ship's position is fixed and other targets move relative to own ship.

**SCANNER:**

Antenna

**SEA:**

Sea clutter suppression

**SOG (Speed Over Ground):**

Speed relative to the ground.

**TM (True Motion):**

True motion presentation

A presentation in which own ship and any other target move depending on their individual movements.

**TRAILS:**

Function of displaying tracks of other ships.

**True Vector:**

A target's true movement predicted as the result of entering own ship's direction and speed.

**VRM:**

Variable Range Marker



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# CONTENTS

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PREFACE.....	i
BEFORE OPERATION.....	ii
PRECAUTIONS.....	iii
GLOSSARY.....	xv

## 1. GENERAL AND EQUIPMENT COMPOSITION

1.1 FUNCTIONS.....	1-1
1.1.1 FUNCTION OF THIS SYSTEM.....	1-1
1.2 FEATURES.....	1-2
1.3 CONFIGURATION.....	1-3
1.4 EXTERIOR DRAWINGS.....	1-4
1.5 GENERAL SYSTEM DIAGRAMS.....	1-8

## 2. NAMES AND FUNCTIONS OF CONTROL PANEL SWITCHES AND FUNCTIONS OF SOFTWARE BUTTONS

2.1 NAMES AND FUNCTIONS OF CONTROL PANEL.....	2-2
2.2 MENU LIST.....	2-6
2.3 NAMES AND FUNCTIONS OF ON-SCREEN CONT.....	2-17

## 3. BASIC OPERATION

3.1 FLOW OPERATION.....	3-1
3.1.1 POWER ON AND START THE SYSTEM.....	3-2
3.1.2 OBSERVE AND ADJUST VIDEO.....	3-3
3.1.3 ACQUIRE AND MEASURE DATA.....	3-3
3.1.4 END THE OPERATION AND STOP THE SYSTEM.....	3-4
3.2 MENU COMPOSITION.....	3-5
3.3 PREPARATION.....	3-9
3.3.1 ADJUST DISPLAY BRILLIANCE [BRILL].....	3-9
3.3.2 ADJUST OPERATION PANEL BRILLIANCE [PANEL].....	3-9

3.3.3	SWITCH DAY/NIGHT MODE [DAY/NIGHT] .....	3-9
3.3.4	ADJUST BRILLIANCE OF INFORMATION ON RADAR DISPLAY (BRILLIANCE SETTING) .....	3-10
3.3.5	ADJUST SOUND VOLUME (BUZZER VOLUME).....	3-10
3.3.6	RESET ALARM BUZZER [ALARM ACK].....	3-11
3.3.7	SET DISPLAY COLOR .....	3-11
3.4	BASIC OPERATIONS .....	3-12
3.4.1	START TRANSMISSION [TX] .....	3-12
3.4.2	STOP TRANSMISSION [STBY] .....	3-12
3.4.3	CHANGE RANGE (OBSERVATION RANGE SCALE) [+RANGE-] .....	3-13
3.4.4	TUNE .....	3-13
3.4.5	CONTROL SENSITIVITY [GAIN] .....	3-14
3.4.6	SUPPRESS SEA CLUTTER [SEA] .....	3-14
3.4.7	SUPPRESS RAIN/SNOW CLUTTER [RAIN] .....	3-15
3.4.8	REJECT RADAR INTERFERENCE [IR].....	3-16
3.4.9	HIDE/DISPLAY RANGE RINGS (RINGS) .....	3-16
3.4.10	HIDE SHIP'S HEADING LINE (HL OFF).....	3-17
3.5	GENERAL OPERATIONS .....	3-18
3.5.1	MOVE CROSS CURSOR MARK BY TRACKBALL.....	3-18
3.5.2	USE EBLs (ELECTRONIC BEARING LINES) [EBL1/EBL2].....	3-18
3.5.3	USE VRMS (VARIABLE RANGE MARKERS) [VRM1/VRM2].....	3-20
3.5.4	USE P-LINES (PARALLEL INDEX LINES) [P-LINE] .....	3-22
3.5.5	MOVE OWN SHIP'S DISPLAY POSITION [OFF CENT].....	3-23
3.5.6	DISPLAY OTHER SHIPS' TRAILS [TRAILS].....	3-23
3.5.7	DISPLAY OWN VECTOR [OWN VECT].....	3-25
3.5.8	EDITING OWN MARK.....	3-26
3.5.9	TIME ZONE SETTING .....	3-34
3.5.10	LOCAL TIME SETTING.....	3-35
3.5.11	CHANGE THE UNIT OF RATE OF TURN.....	3-36
3.5.12	DISPLAY AIS LABEL .....	3-37
3.5.13	ECHO EXPANSION SWITCH .....	3-37
3.6	DISAPLAY USER MAP .....	3-38
3.6.1	EDIT USER MAP .....	3-38
3.6.2	CORRECT POSITION ON USER MAP (SHIFT) .....	3-41
3.6.3	CORRECT POSITION ON USER MAP (SHIFT CLEAR).....	3-41
3.6.4	SET USER MAP DISPLAY (MARK DISPLAY SETTING).....	3-42
3.6.5	OPERATE USER MAP FILE (FILE OPERATIONS) .....	3-52
3.7	SCREEN CAPTURE .....	3-63
3.7.1	SCREEN CAPTURE SETTING (SELECT CARD SLOT).....	3-63

---

3.7.2	SCREEN CAPTURE SETTING (SAVE FILE) .....	3-65
3.7.3	SCREEN CAPTURE SETTING (ERASE FILE) .....	3-66
3.7.4	SCREEN CAPTURE SETTING (AUTO CAPTURE).....	3-67
3.7.5	SCREEN CAPTURE SETTING (AUTO CAPTURE MODE).....	3-68
3.7.6	SCREEN CAPTURE SETTING (AUTO CAPTURE INTERVAL).....	3-69
3.7.7	SCREEN CAPTURE SETTING (AUTO FILE ERASE).....	3-70
3.7.8	SCREEN CAPTURE SETTING (MANUAL CAPTURE).....	3-71
3.8	USER SETTING .....	3-72
3.8.1	USER SETTING (LOAD USER SETTING).....	3-72
3.8.2	USER SETTING (SAVE USER SETTING).....	3-73
3.8.3	USER SETTING (ERASE USER SETTING).....	3-74
3.9	FORMAT CARD.....	3-75
3.9.1	FORMAT CARD (SELECT CARD SLOT).....	3-75
3.10	AIS FUNCTION .....	3-76
3.10.1	VESSEL NAME LIST .....	3-76
3.10.2	VESSEL INFORMATION .....	3-76
3.10.3	DISPLAY THE VESSEL NAMES ON THE SCREEN .....	3-77
3.10.4	AIS SETTING MENU .....	3-77
3.10.5	AIS SYMBOL .....	3-78

## **4. MEASUREMENT OF RANGE AND BEARING**

4.1	MEASUREMENT BY TRACKBALL .....	4-1
4.2	MESAUREMENT BY RANE RINGS.....	4-2
4.3	MESAUREMENT BY EBLS AND VRMS .....	4-3

## **5. TRUE AND FALSE ECHOES ON DISPLAY**

5.1	RADAR WAVE WITH THE HORIZON .....	5-2
5.2	STRENGTH OF REFLECTION FROM THE TARGET .....	5-4
5.3	SEA CLUTTERS.....	5-5
5.4	FALSE ECHOES .....	5-6
5.5	DISPLAY OF RADAR TRANSPONDER (SART) .....	5-9

## **6. MAINTENANCE**

6.1	ROUTINE MAINTENANCE .....	6-1
6.2	MAINTENANCE ON EACH UNIT.....	6-2

## **7. TROUBLE SHOOTING**

7.1	FAULT FINDING.....	7-3
7.2	TROUBLE SHOOTING .....	7-4
7.3	REPLACEMENT OF MAJOR PARTS .....	7-7

## **8. AFTER-SALES SERVICE**

## **9. DISPOSAL**

9.1	DISPOSAL OF THE UNIT .....	9-1
9.2	DISPOSAL OF USED BATTERIES.....	9-2
9.3	DISPOSAL OF USED MAGNETRON .....	9-3

## **10. SPECIFICATIONS**

10.1	JAM-610 TYPE RADAR .....	10-1
10.2	SCANNER (NKE-316).....	10-2
10.3	CONTROL UNIT (NDC-1486) .....	10-3
10.4	INPUT SIGNAL .....	10-4
10.5	OUTPUT SIGNAL .....	10-5
10.6	STANDARD EQUIPMENT COMPOSITION .....	10-5
10.7	DISTANCE BETWEEN UNITS.....	10-5

## **APPENDIX**

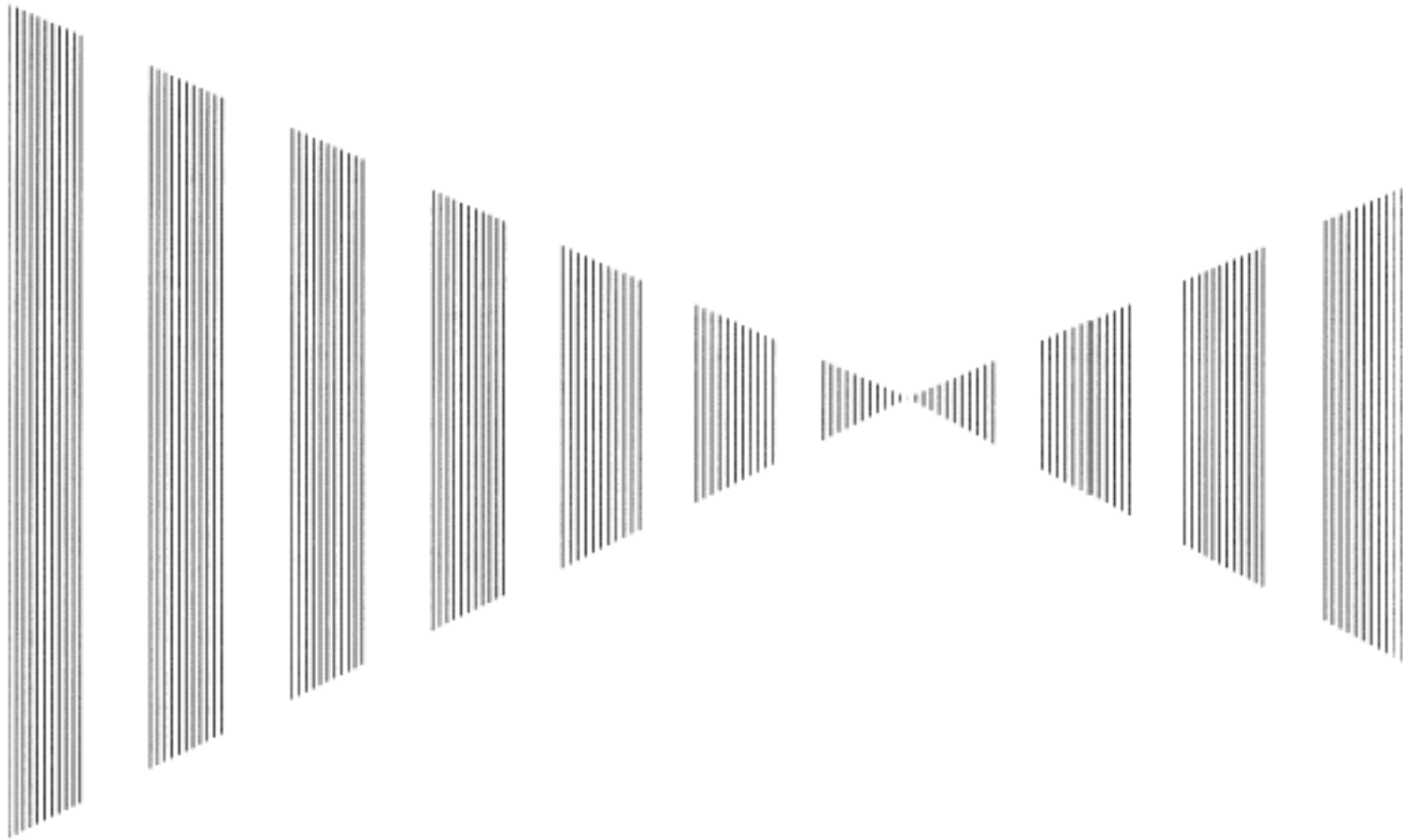
FIG.1	BLOCK DIAGRAM OF JMA-610
FIG.2	TERMINAL DIAGRAM OF JMA-610
FIG.3	PRIMARY POWER SUPPLY BLOCK OF JMA-610
FIG.4	INTERNAL CONNECTION DIAGRAM OF SCANNER UNIT NKE-316
FIG.5	INTERNAL CONNECTION DIAGRAM OF CONTROL UNIT NCM-883

<b>1</b>	<b>GENERAL AND EQUIPMENT COMPOSITION</b>
<b>2</b>	<b>NAMES AND FUNCTIONS OF CONTROL PANEL SWITCHES AND FUNCTIONS OF SOFTWARE BUTTONS</b>
<b>3</b>	<b>BASIC OPERATION</b>
<b>4</b>	<b>MEASUREMENT OF RANGE AND BEARING</b>
<b>5</b>	<b>TRUE AND FALSE ECHOES ON DISPLAY</b>
<b>6</b>	<b>MAINTENANCE</b>
<b>7</b>	<b>TROUBLE SHOOTING AND ADJUSTMENT</b>
<b>8</b>	<b>AFTER-SALES SERVICE</b>
<b>9</b>	<b>DISPOSAL</b>
<b>10</b>	<b>SPECIFICATIONS</b>
<b>APPENDIX</b>	

<b>1</b>
<b>2</b>
<b>3</b>
<b>4</b>
<b>5</b>
<b>6</b>
<b>7</b>
<b>8</b>
<b>9</b>
<b>10</b>
<b>APPENDIX</b>



# SECTION 1 GENERAL AND EQUIPMENT COMPOSITION



<b>1.1</b>	<b>Functions.....</b>	<b>1-1</b>
<b>1.1.1</b>	<b>Function of This System.....</b>	<b>1-1</b>
<b>1.2</b>	<b>Features.....</b>	<b>1-2</b>
<b>1.3</b>	<b>Configuration .....</b>	<b>1-3</b>
<b>1.4</b>	<b>Exterior Drawings.....</b>	<b>1-4</b>
<b>1.5</b>	<b>General System Diagrams .....</b>	<b>1-8</b>

---

# 1.1 FUNCTIONS

This equipment is a high-performance radar equipment consisting of a scanner unit, a transmitter-receiver unit and a high resolution color LCD display unit.

## 1.1.1 Function of This System

The JMA-610 series is a color radar system.

The main functions include:

- sensitivity adjustment
- sea clutter and rain/snow clutter suppression
- interference reflector
- bearing and range measurement using a cursor, fixed/variable range markers, and electronic bearing line
- own track display



# 1.2 FEATURES

## **Realization of Large, Easy-to-see Screen with High Resolution**

The 19-inch color LCD with high resolution of  $1280 \times 1024$  pixels can display radar images of 270 mm or more in diameter. Even short-range targets can also be displayed as high-resolution images.

## **Target Detection by Latest Signal Processing Technology**

The system employs the latest digital signal processing technology to eliminate undesired clutter from the radar video signals that are obtained from the receiver with a wide dynamic range, thus improving the target detection.

## **Easy Operation with GUI**

All the radar functions can be easily controlled by simply using the trackball and two switches to operate the buttons shown on the radar display.

## **Improved Day/Night Mode**

Two types of background colors are available in each Day/Night mode (total 4 background colors). Each background color can be reproduced to be suited for the user's operating environment by simple key operation. The radar echoes and a variety of graphics can also be represented in different colors, ensuring easy-to-see displays.

## **Compact Design and Low Power Consumption**

Since an LCD has been implemented as the display device, the weight of the display is greatly reduced and the power consumption is lowered in comparison with the conventional radar equipment.

# 1.3 CONFIGURATION

## Scanners and Transmitted Output Powers

SCANNER TYPE		TRANSMITTED OUTPUT POWER	BAND
JMA-610-7	7 FT SLOT ANTENNA	6 KW	X

## Radar Configuration and Ship's Mains

RADAR MODEL	SCANNER UNIT	CONTROL UNIT	SHIP'S MAINS
JMA-610-7	NKE-316	NCM-883	24 VDC

### Notes:

1. An optional rectifier is necessary for using Ship's Mains 100/110/115/200/220/230 VAC.
2. The control unit NCM-883 has a separate structure consisting of the following:  
Processor                      NDC-1486  
Operation panel                NCE-7882A

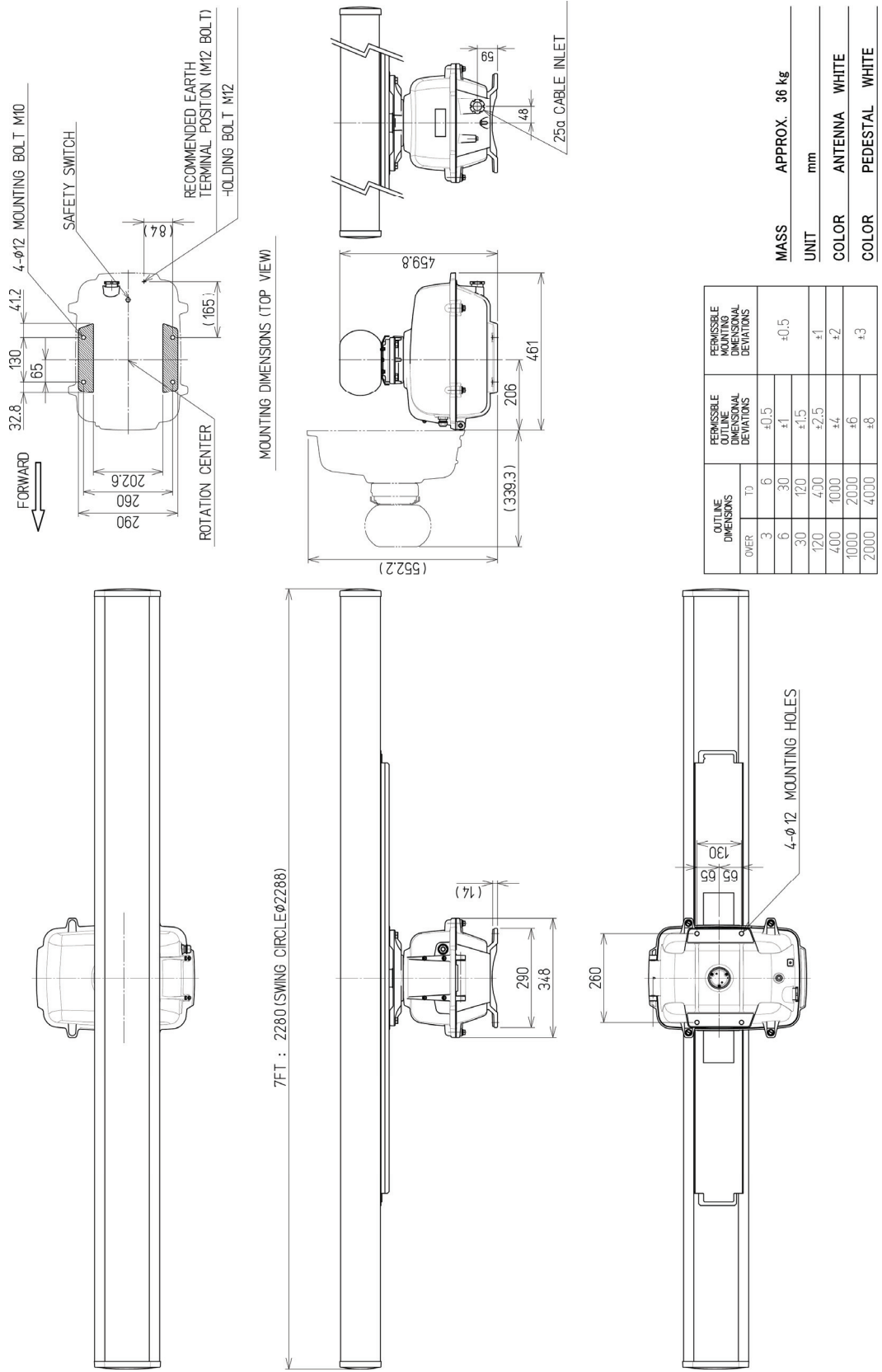
# 1.4 EXTERIOR DRAWINGS

Fig. 1.1 Exterior Drawing of Scanner Unit, Type NKE-316

Fig. 1.2 Exterior Drawing of Processing Unit, Type NDC-1486

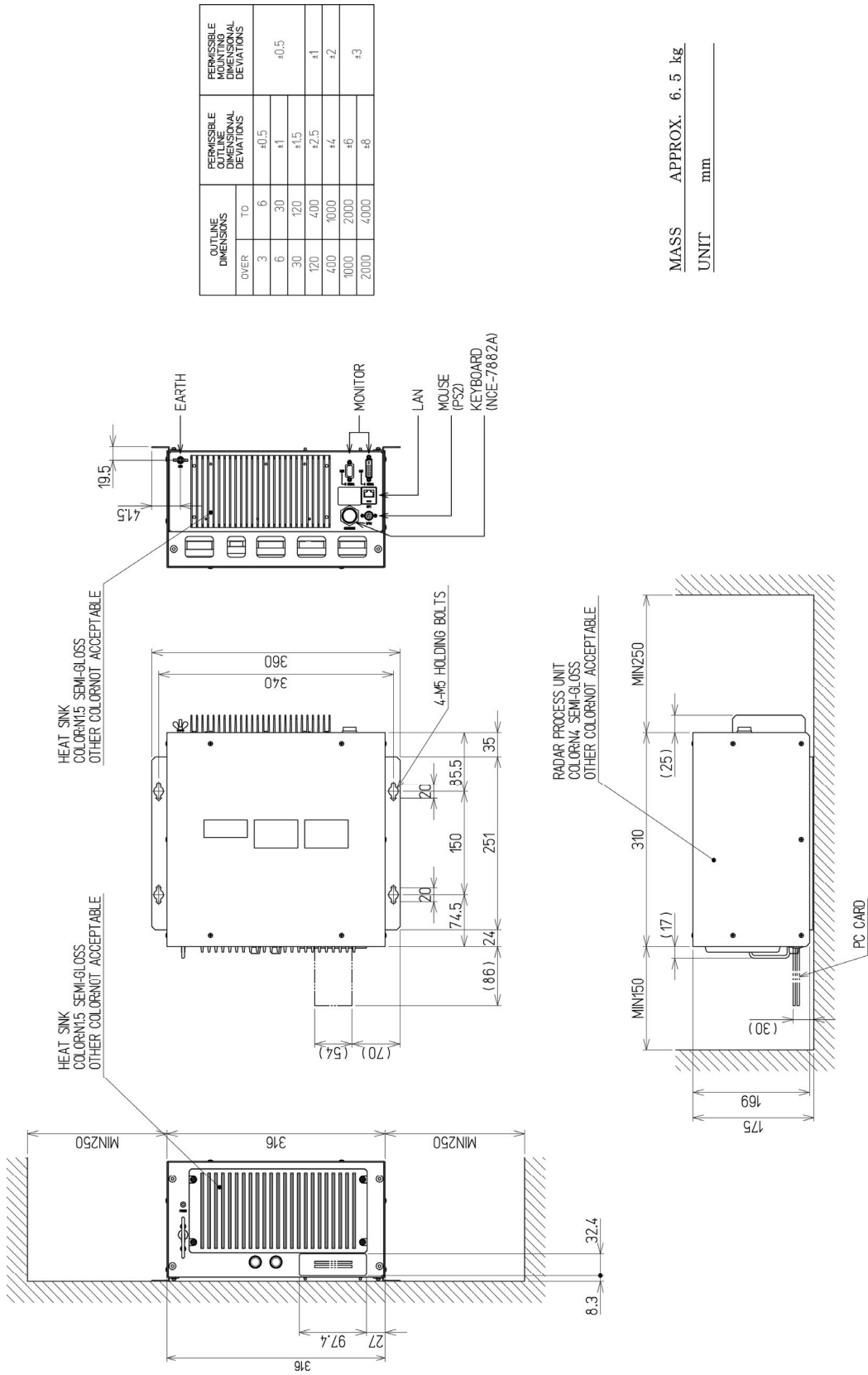
Fig. 1.3 Exterior Drawing of Operating Unit, Type NCE-7882A

Fig. 1.4 General System Diagram of Radar, Type JMA-610-7



Unit mm

Fig. 1.1 Exterior Drawing of Scanner Unit, Type NKE-316

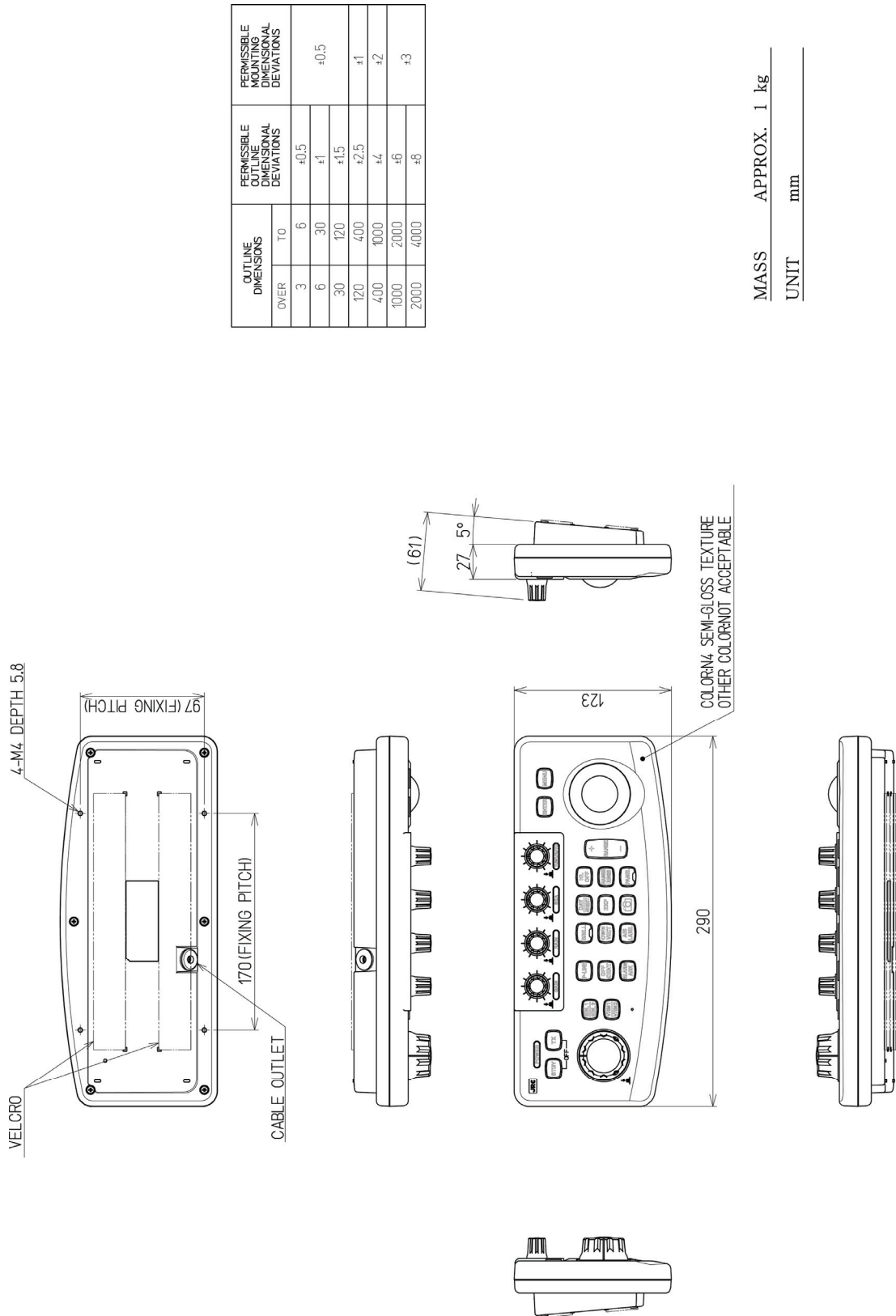


OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
OVER	TO		
3	6	+0.5	
6	30	+1	+0.5
30	120	+1.5	
120	400	+2.5	+1
400	1000	+4	+2
1000	2000	+6	+3
2000	4000	+8	

MASS APPROX. 6.5 kg  
UNIT mm

Unit mm

Fig. 1.2 Exterior Drawing of Processing Unit, Type NDC-1486



OUTLINE DIMENSIONS		PERMISSIBLE OUTLINE DIMENSIONAL DEVIATIONS	PERMISSIBLE MOUNTING DIMENSIONAL DEVIATIONS
OVER	TO		
3	6	+0.5	±0.5
6	30	±1	
30	120	±1.5	±1
120	400	±2.5	
400	1000	±4	±2
1000	2000	±6	
2000	4000	±8	±3

MASS APPROX. 1 kg  
 UNIT mm

Unit mm

Fig. 1.3 Exterior Drawing of Operating Unit, Type NCE-7882A

# 1.5 GENERAL SYSTEM DIAGRAMS

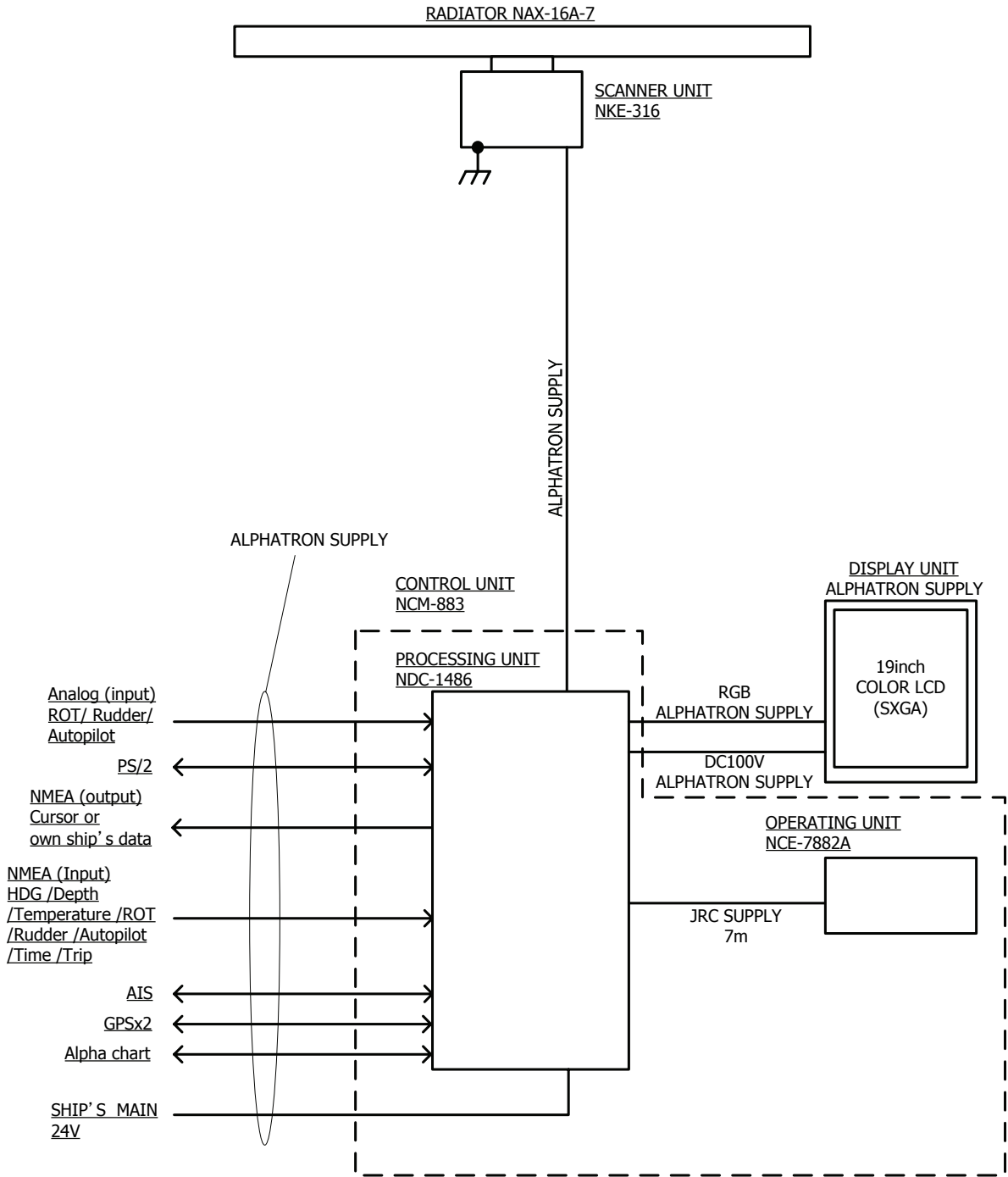


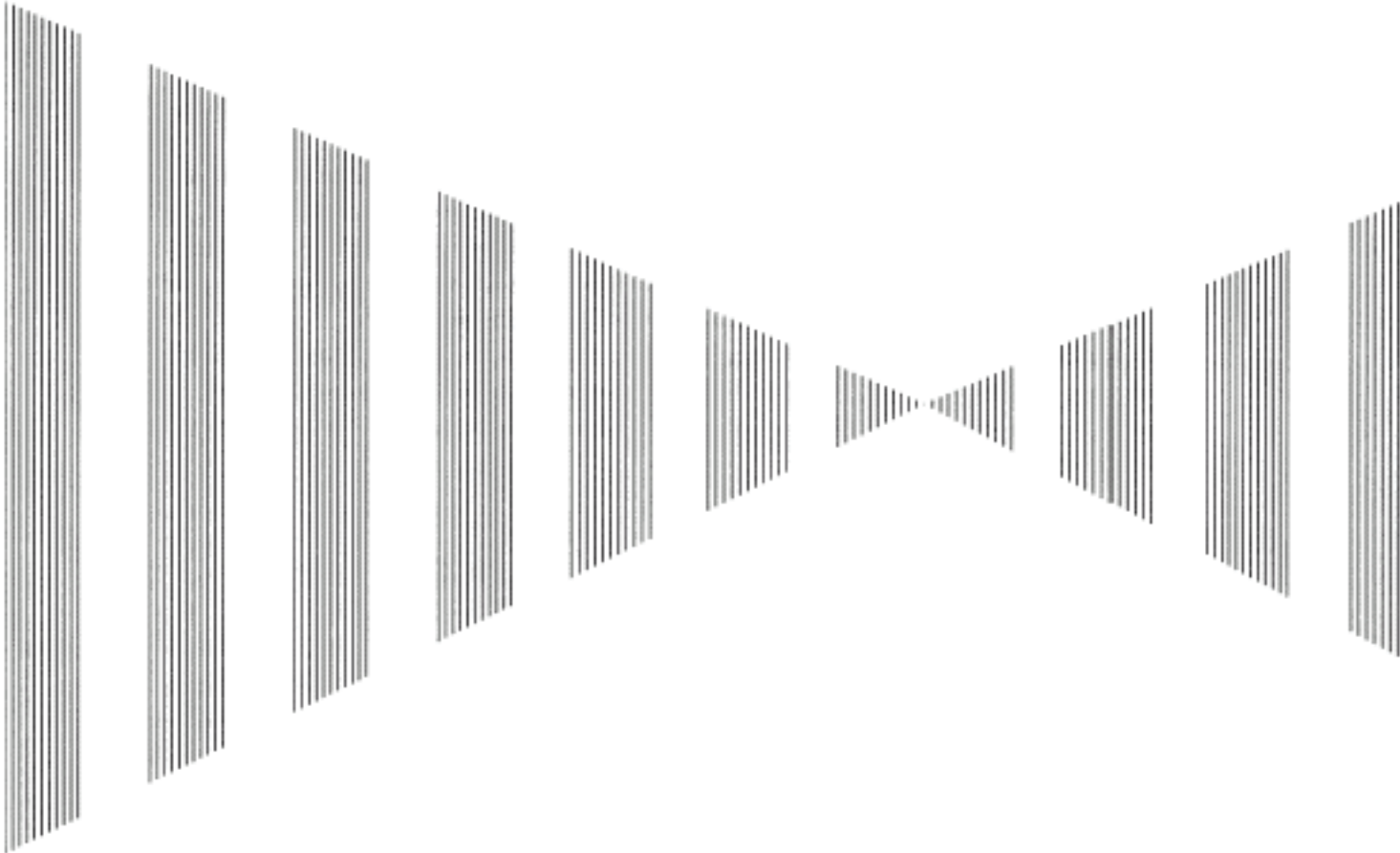
FIG. 1.4 GENERAL SYSTEM DIAGRAM OF RADAR, TYPE JMA-610-7

**Note:** Eliminating the interference on frequencies used for marine communications and navigation due to operation of the radar.  
 All cables of the radar are to be run away from the cables of radio equipment.  
 (Ex. Radiotelephone. Communications receiver and direction finder, etc.)  
 Especially inter-wiring cables between scanner unit and display unit of the radar should not be run parallel with the cables of radio equipment.

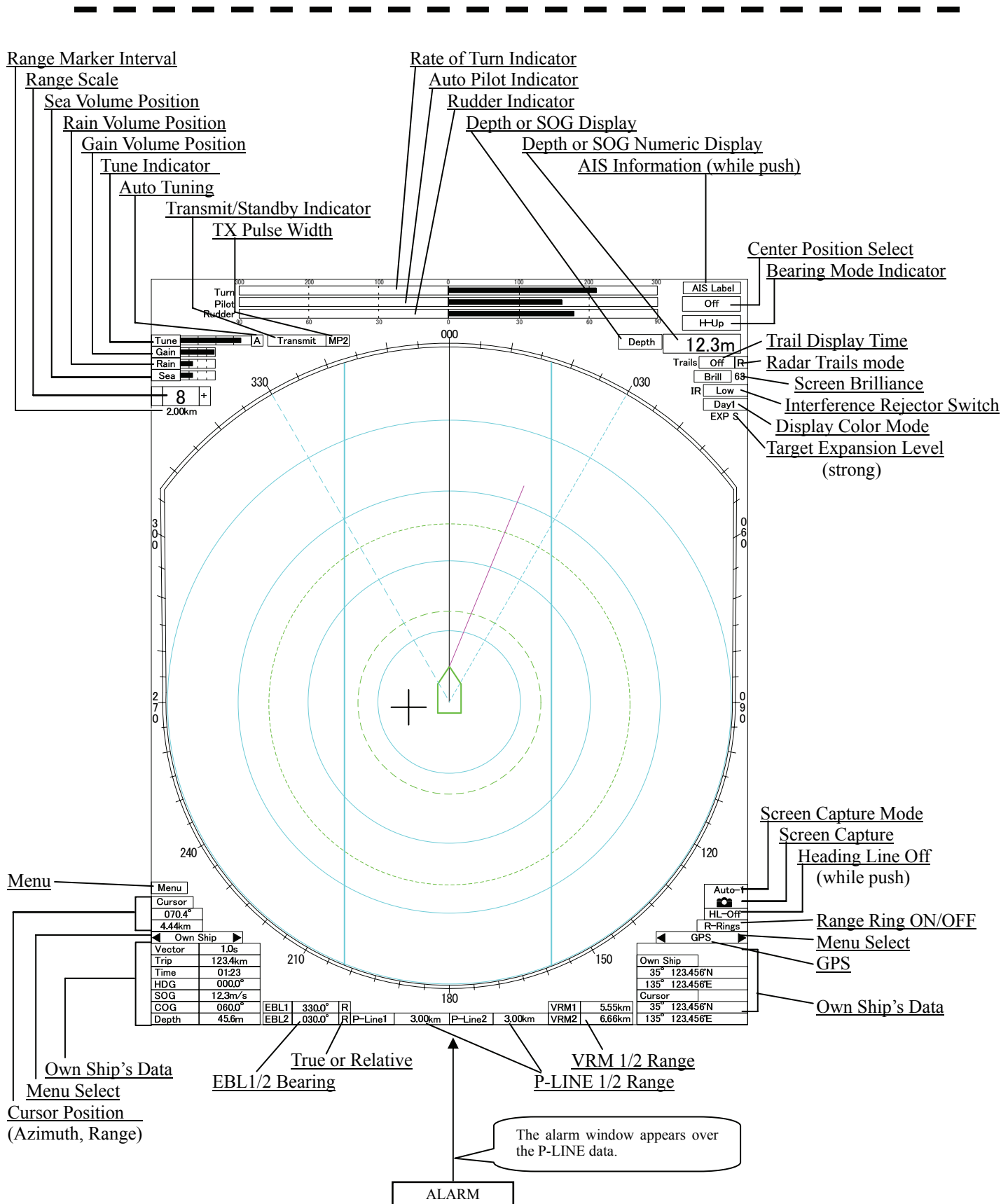




# **SECTION 2 NAMES AND FUNCTIONS OF CONTROL PANEL SWITCHES AND FUNCTIONS OF SOFTWARE BUTTONS**



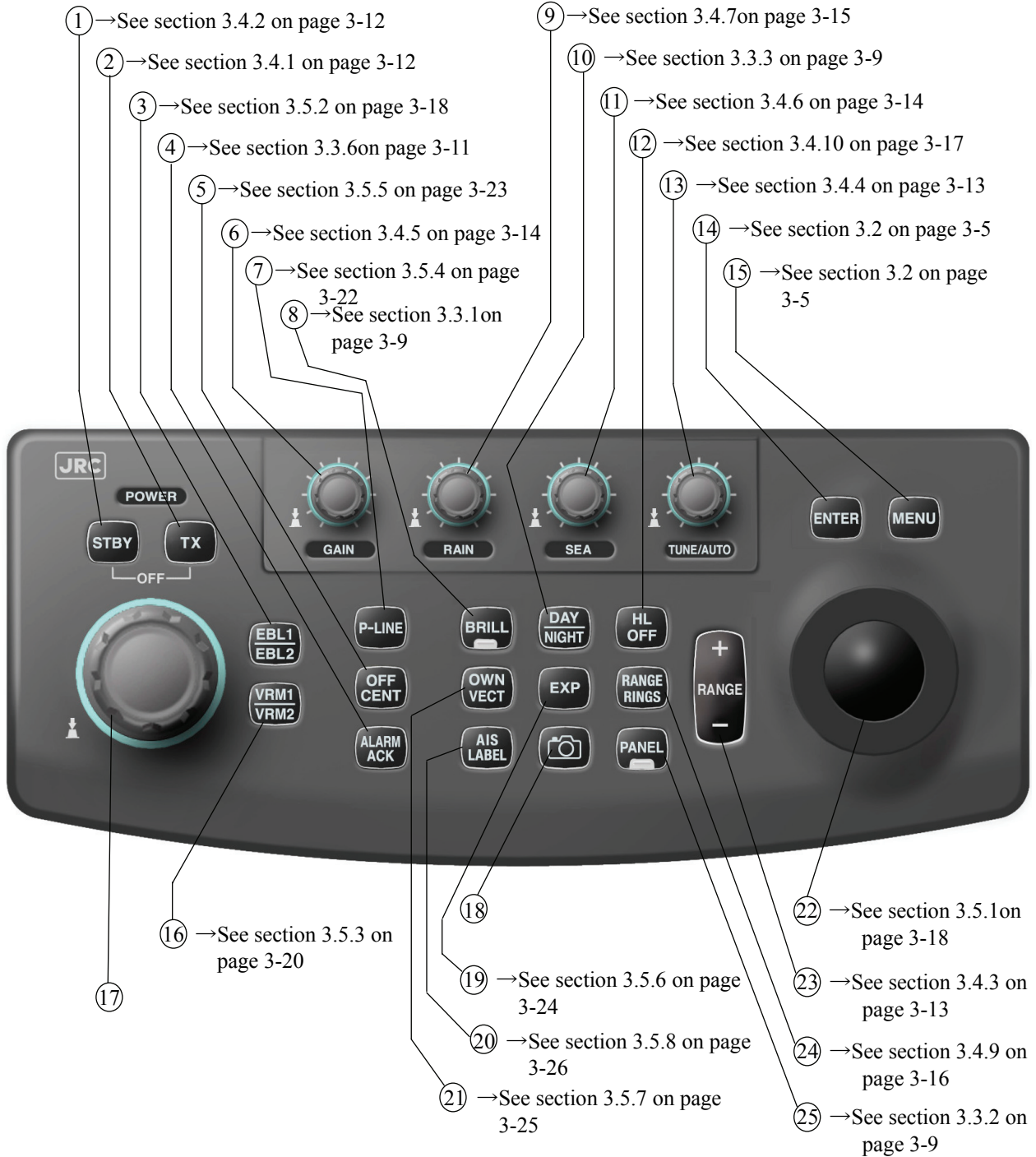
<b>2.1</b>	<b>NAMES AND FUNCTIONS OF CONTROL PANEL.....</b>	<b>2-2</b>
<b>2.2</b>	<b>MENU LIST.....</b>	<b>2-6</b>
<b>2.3</b>	<b>NAMES AND FUNCTIONS OF ON-SCREEN CONT ...</b>	<b>2-17</b>



**Fig 2.1 DISPLAY & READOUTS**

# 2.1 NAMES AND FUNCTIONS OF CONTROL PANEL SWITCHES

## Names and Functions of Control Panel Switches



The following page describe name of buttons. The Sections and page numbers on the above indicate pages where operation procedures and detailed descriptions are provided.

**Fig 2.2 CONTROL PANEL**

- 
- ① **[STBY](standby) Switch**

Use this switch to change the power-off state to the power-on state, or the transmission state to the standby state.  
To turn off the power, press the **[STBY]** switch and **[TX]** switch together.  
-> See section 3.4.2 on page 3-12.
  - ② **[TX](Transmit) Switch**

**[PREHEAT]** at the upper left of the radar display changes to **[STANDBY]** about 90 seconds after the power is turned on.  
Then, press this switch to start transmission.  
-> See section 3.4.1 on page 3-12.
  - ③ **[EBL1/EBL2] (Electric Bearing Line 1/2) Switch**

Use this switch to display and select EBL1/2.  
-> See section 3.5.2 on page 3-18.
  - ④ **[ALARM ACK] (Alarm Acknowledgement) Switch**

Use this switch to acknowledge a failure, target's approach, or collision alarm.  
Press the switch to stop an audible alarm.  
If more than one alarm has occurred, the switch needs to be pressed the number of times equivalent to the number of alarms.  
-> See section 3.3.6 on page 3-11.
  - ⑤ **[OFF CENT] (Off Center) Switch**

Shifts the own ship's position .  
-> See section 3.5.5 on page 3-23.
  - ⑥ **[GAIN] (Receiving Sensitivity) Control**

Controls the radar's receiving sensitivity.  
To get higher sensitivity, turn the control clockwise.  
Suppresses the clutter echo from the sea surface.  
To heighten a suppressing effect, turn the control clockwise.  
The clutter suppression mode switches back and forth between **[MANUAL]** and **[AUTO]** each time the control is pressed.  
-> See section 3.4.5 on page 3-14.
  - ⑦ **[P-LINE] (Parallel Index Line) Switch**

Use this switch to display and select EBL1/2.  
-> See section 3.5.4 on page 3-22.
  - ⑧ **[BRILL] (Operation LCD Brilliance) Switch**

Controls the brilliance of the special LCD monitor.  
-> See section 3.3.1 on page 3-9.
  - ⑨ **[RAIN] (RAIN/SNOW Clutter Suppression) Control**

Suppresses the clutter echo from rain or snow.  
To heighten a suppressing effect, turn the control clockwise.  
To control this suppressing effect using Trackball, press the control.  
-> See section 3.4.7 on page 3-15.
  - ⑩ **[DAY/NIGHT] (DAY/NIGHT MODE) Switch**

Switches the screen color and brilliance according to each setting.  
-> See section 3.3.3 on page 3-9.

- ⑪ **[SEA] (Sea clutter Suppression) Control**  
Suppresses the clutter echo from the sea surface.  
To heighten a suppressing effect, turn the control clockwise.  
To control this suppressing effect using Trackball, press the control.  
-> See section 3.4.6 on page 3-14.
- ⑫ **[HL OFF] (Heading Line Off) Switch**  
Clears the Ship's heading line while this key is being pressed.  
-> See section 3.4.10 on page 3-17.
- ⑬ **[TUNE/AUTO] (Tune Control/Automatic) Control**  
Tunes the receiver of the radar.  
Controls the target on the screen to be seen most clearly.  
To change to automatic mode, press the control.  
-> See section 3.4.4 on page 3-13.
- ⑭ **[ENT] (Enter) Switch**  
Use this switch to determine menu selection or value input.  
Pressing the switch has the same effect as left-clicking the trackball.  
-> See section 3.2 on page 3-5.
- ⑮ **[MENU] (Menu) Switch**  
Opens the menu.  
-> See section 3.2 on page 3-5.
- ⑯ **[VRM1/VRM2] (Variable Range Marker 1/2) Switch**  
Use this switch to display and select EBL1/2.  
-> See section 3.5.3 on page 3-20.
- ⑰ **Jog Dial**  
Use this dial to change the bearing of EBL1/2, the range of VRM1/2 and P-Line 1/2 .
- ⑱ **[CAMERA] (Screen Capture) Switch**  
Radar screen images is downloaded to memory card.
- ⑲ **[EXP] (Echo expansion) Switch**  
Expand the radar echo.  
-> See section 3.5.6 on page 3-24.
- ⑳ **[AIS LABEL] Switch**  
Display the AIS information.  
-> See section 3.5.8 on page 3-26.
- ㉑ **[OWN VECT] (Own Ship's Vector) Switch**  
Use this switch to display the own ship's vector.  
-> See section 3.5.7 on page 3-25.
- ㉒ **Trackball**  
Use this trackball to move the cursor mark to an arbitrary point. The trackball can be used for setting in each mode.  
-> For setting cursor, see section 3.5.1 on page 3-18.
- ㉓ **[+RANGE-] (Range Scale) Switch**  
Expands or shrinks the observation range scale.  
-> See section 3.4.3 on page 3-13.

---

②④ **[RR] (Fixed Range Marker) Switch**

Use this switch to display the fixed range marker.  
-> See section 3.4.9 on page 3-16.

②⑤ **[PANEL] (Operation Panel Brilliance) Switch**

Controls the brilliance for the controls and switches on the operation panel.  
The brilliance changes cyclically each time the switch is pressed.  
-> See section 3.3.2 on page 3-9.

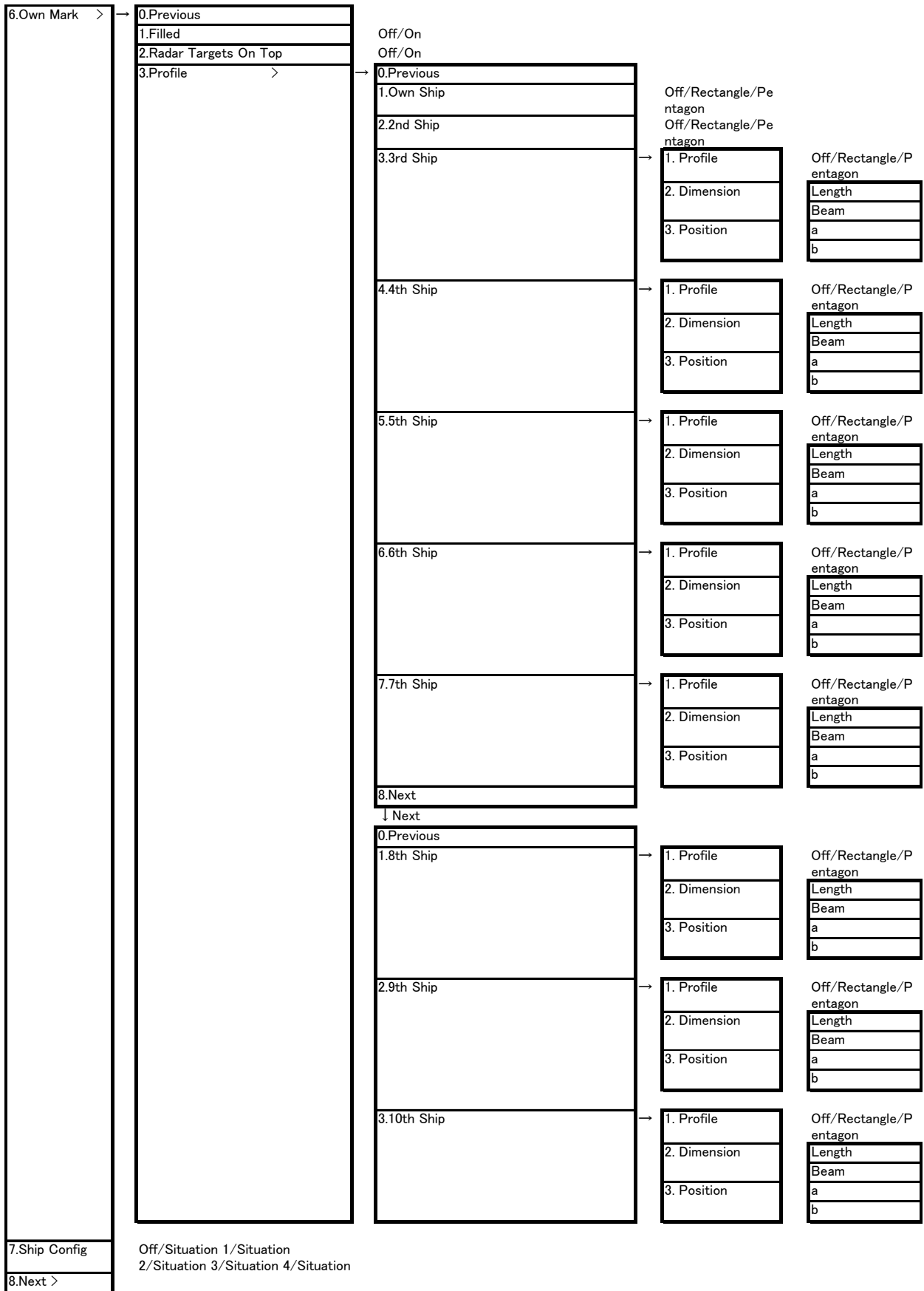
# 2.2 MENU LIST

This radar has 2 kinds of menu as following.

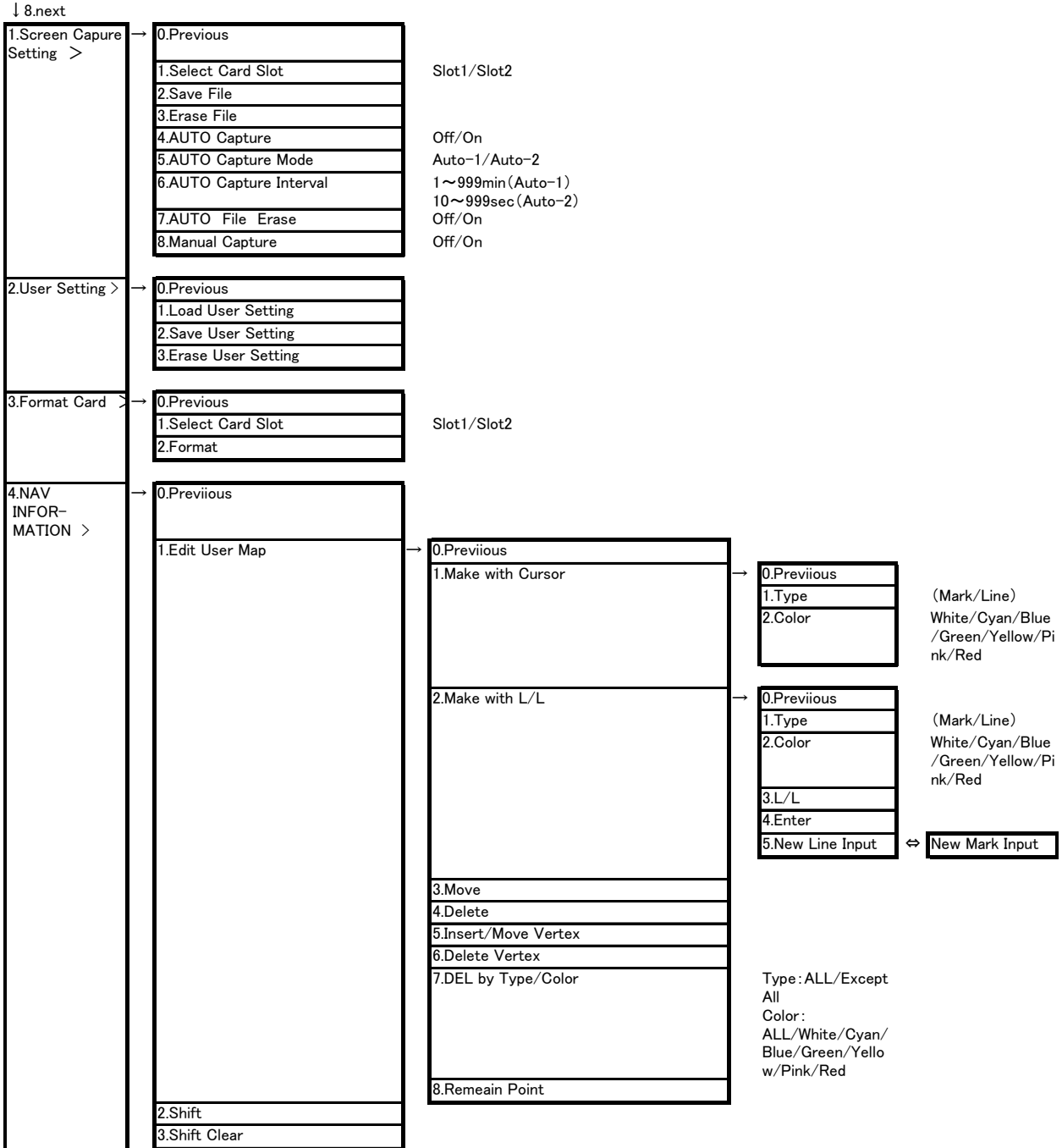
Main Menu : This menu is for all users.

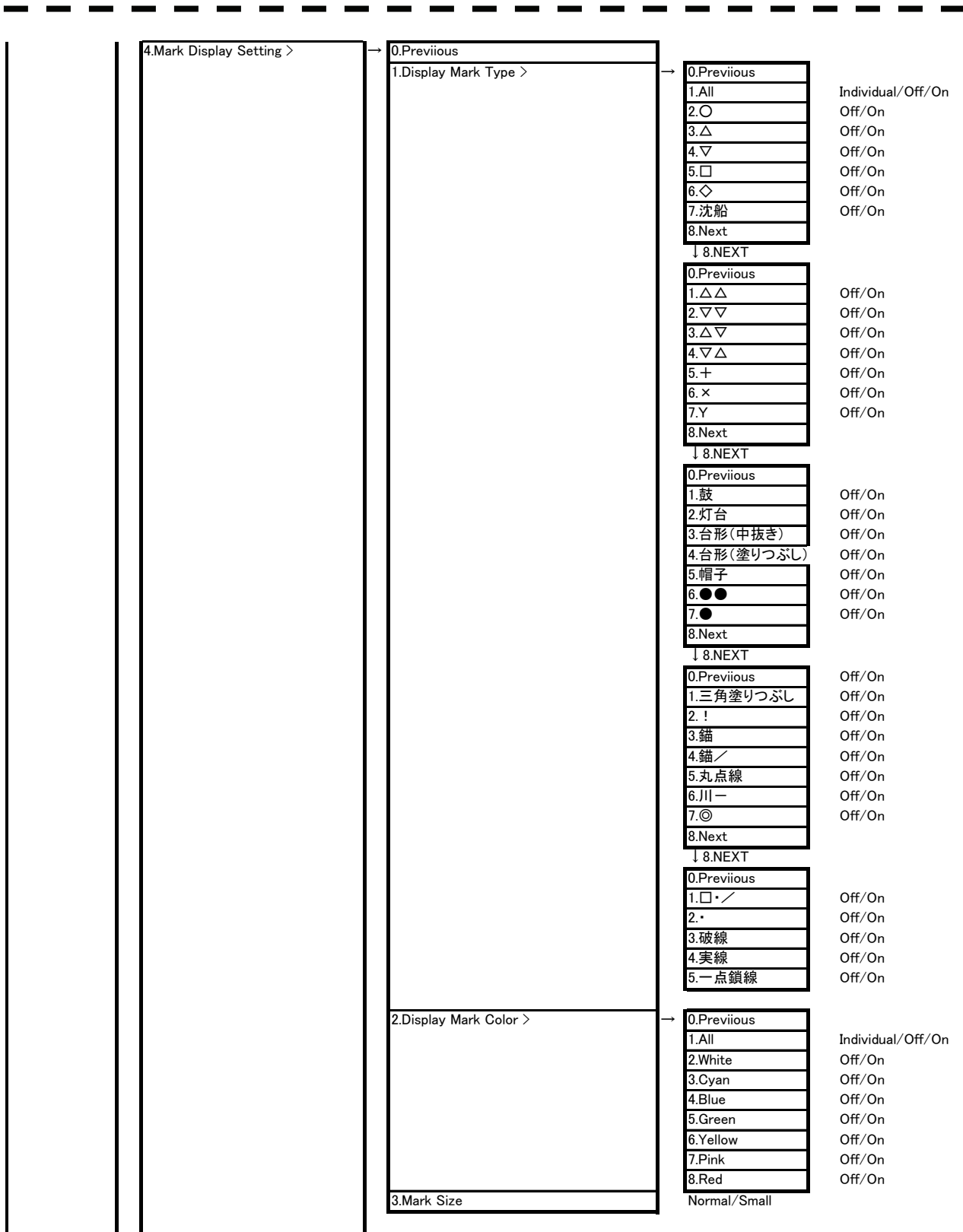
Service Menu : This menu is for initial setting of JMA-610 at installation

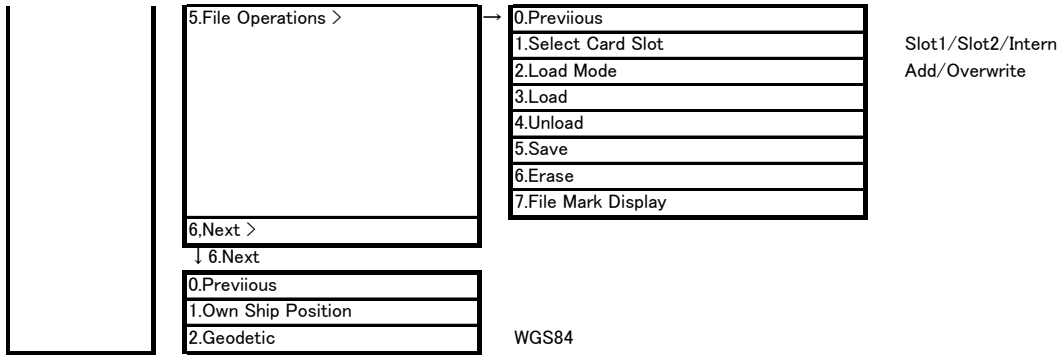
Main Menu																													
0.Exit																													
1.Brilliance >	<table border="1"> <tr><td>0.Previous</td><td></td></tr> <tr><td>1.SHM</td><td>1/2/3/4</td></tr> <tr><td>2.Range Rings</td><td>1/2/3/4</td></tr> <tr><td>3.VRM</td><td>1/2/3/4</td></tr> <tr><td>4.EBL/P-Line</td><td>1/2/3/4</td></tr> <tr><td>5.Bearing Sale</td><td>0/1/2/3/4</td></tr> <tr><td>6.Character</td><td>1/2/3/4</td></tr> <tr><td>7.AIS/Vector</td><td>1/2/3/4</td></tr> <tr><td>8.Next</td><td>1/2/3/4</td></tr> <tr><td>↓ Next</td><td></td></tr> <tr><td>0.Previous</td><td></td></tr> <tr><td>1.Own Mark</td><td>1/2/3/4</td></tr> <tr><td>2.RADAR Video/Trails</td><td>1/2/3/4</td></tr> <tr><td>3.Mark/Line</td><td>1/2/3/4</td></tr> </table>	0.Previous		1.SHM	1/2/3/4	2.Range Rings	1/2/3/4	3.VRM	1/2/3/4	4.EBL/P-Line	1/2/3/4	5.Bearing Sale	0/1/2/3/4	6.Character	1/2/3/4	7.AIS/Vector	1/2/3/4	8.Next	1/2/3/4	↓ Next		0.Previous		1.Own Mark	1/2/3/4	2.RADAR Video/Trails	1/2/3/4	3.Mark/Line	1/2/3/4
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2.Color >	<table border="1"> <tr><td>0.Previous</td><td></td></tr> <tr><td>1.Echo</td><td>Yellow/Green/Amber/White</td></tr> <tr><td>2.Trails</td><td>Green/White/Br.Blue/Yellow/Amber</td></tr> <tr><td>3.Echo Back Ground</td><td>Black/Blue/Dark_Grey</td></tr> <tr><td>4.Data Back Ground</td><td>Black/Grey/Dark_Grey/Br.Blue</td></tr> <tr><td>5.Others</td><td>Green/Amber/White/Yellow</td></tr> <tr><td>6.Own Mark</td><td>Cyan/Grey/Magenta/Green/White</td></tr> <tr><td>7.AIS/Vector</td><td>White/Magenta/Cyan/Br.Blue</td></tr> <tr><td>8.VRM</td><td>Cyan/Green</td></tr> </table>	0.Previous		1.Echo	Yellow/Green/Amber/White	2.Trails	Green/White/Br.Blue/Yellow/Amber	3.Echo Back Ground	Black/Blue/Dark_Grey	4.Data Back Ground	Black/Grey/Dark_Grey/Br.Blue	5.Others	Green/Amber/White/Yellow	6.Own Mark	Cyan/Grey/Magenta/Green/White	7.AIS/Vector	White/Magenta/Cyan/Br.Blue	8.VRM	Cyan/Green										
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8.VRM	Cyan/Green																												
3.Setting >	<table border="1"> <tr><td>0.Previous</td><td></td></tr> <tr><td>1.Buzzer Level</td><td>Off/1/2/3</td></tr> <tr><td>2.Rate Of Turn</td><td>30-0-30/90-0-90/300-0-300</td></tr> <tr><td>3.Expansion</td><td>Off/Fair/Strong</td></tr> </table>	0.Previous		1.Buzzer Level	Off/1/2/3	2.Rate Of Turn	30-0-30/90-0-90/300-0-300	3.Expansion	Off/Fair/Strong																				
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4.AIS Settings >	<table border="1"> <tr><td>0.Previous</td><td></td></tr> <tr><td>1.AIS Function</td><td>Off/On</td></tr> <tr><td>2.AIS Symbol Display</td><td>Off/On</td></tr> <tr><td>3.Vector</td><td>Off/On</td></tr> <tr><td>4.Special AIS Symbols</td><td>Off/On</td></tr> </table>	0.Previous		1.AIS Function	Off/On	2.AIS Symbol Display	Off/On	3.Vector	Off/On	4.Special AIS Symbols	Off/On																		
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5.Date/Time Setting >	<table border="1"> <tr><td>0.Previous</td><td></td></tr> <tr><td>1.Time Zone Setting</td><td></td></tr> <tr><td>2.Local Date</td><td></td></tr> <tr><td>3.Local Time</td><td></td></tr> </table>	0.Previous		1.Time Zone Setting		2.Local Date		3.Local Time																					
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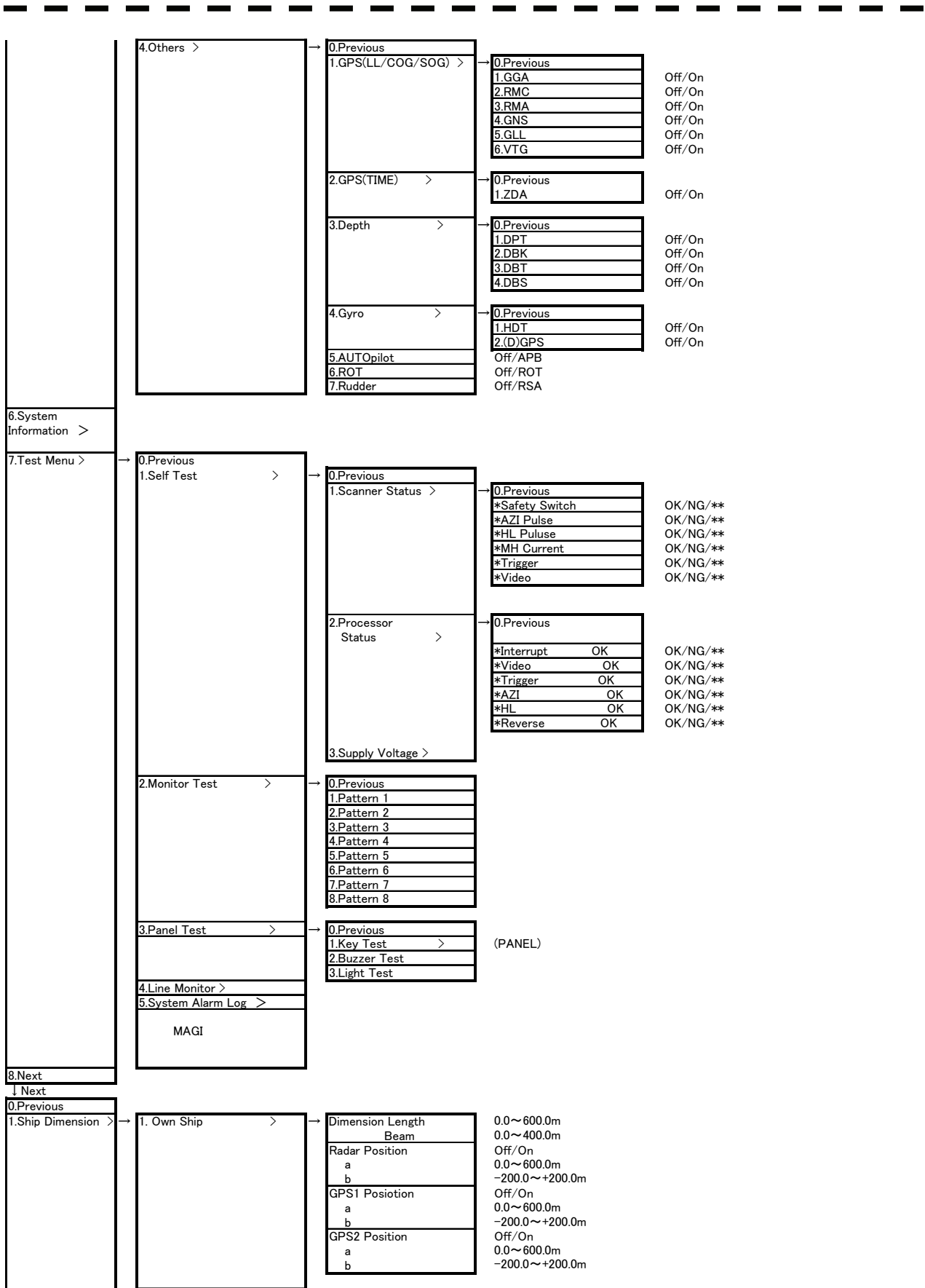


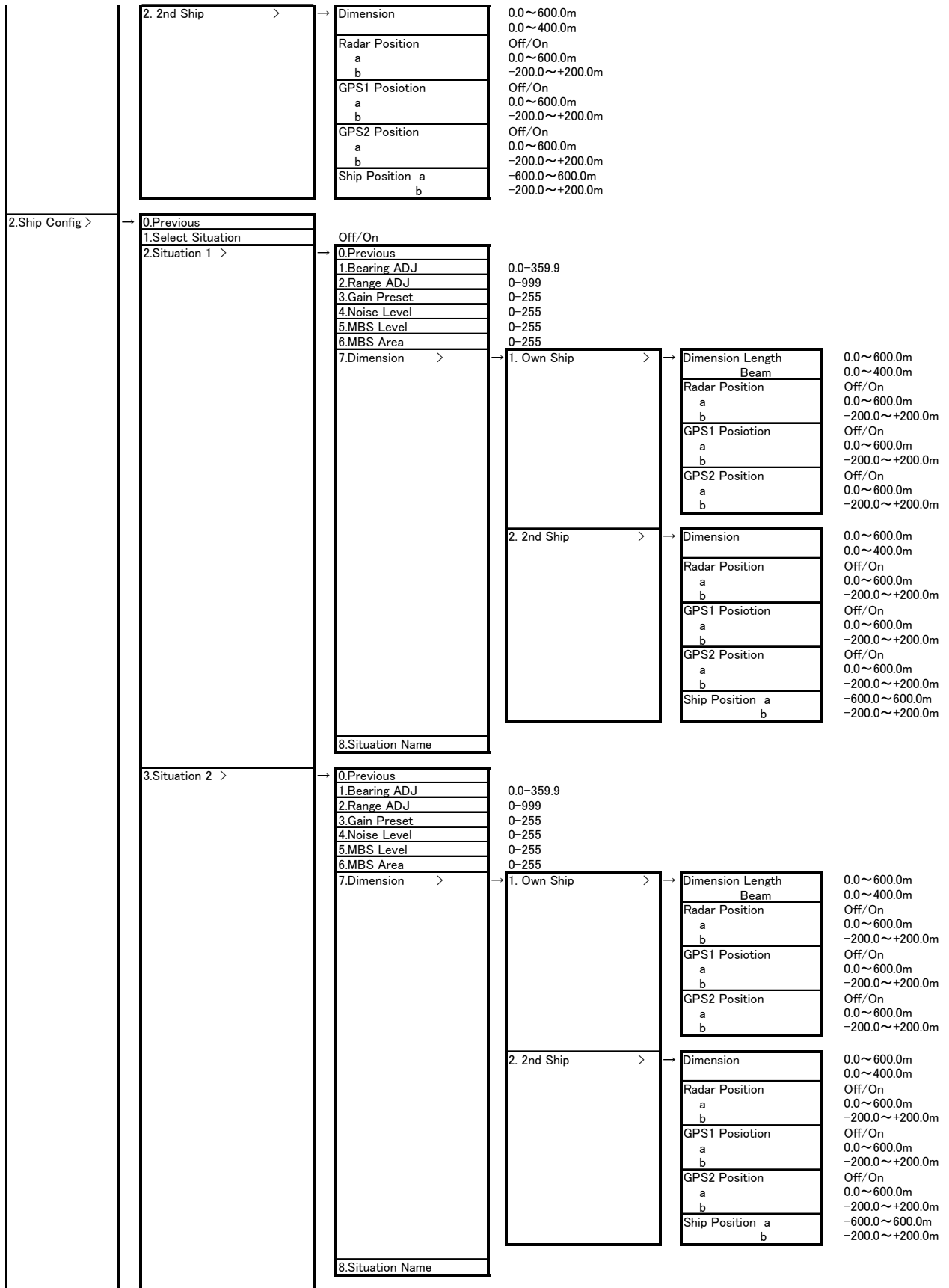
## [Service Menu]

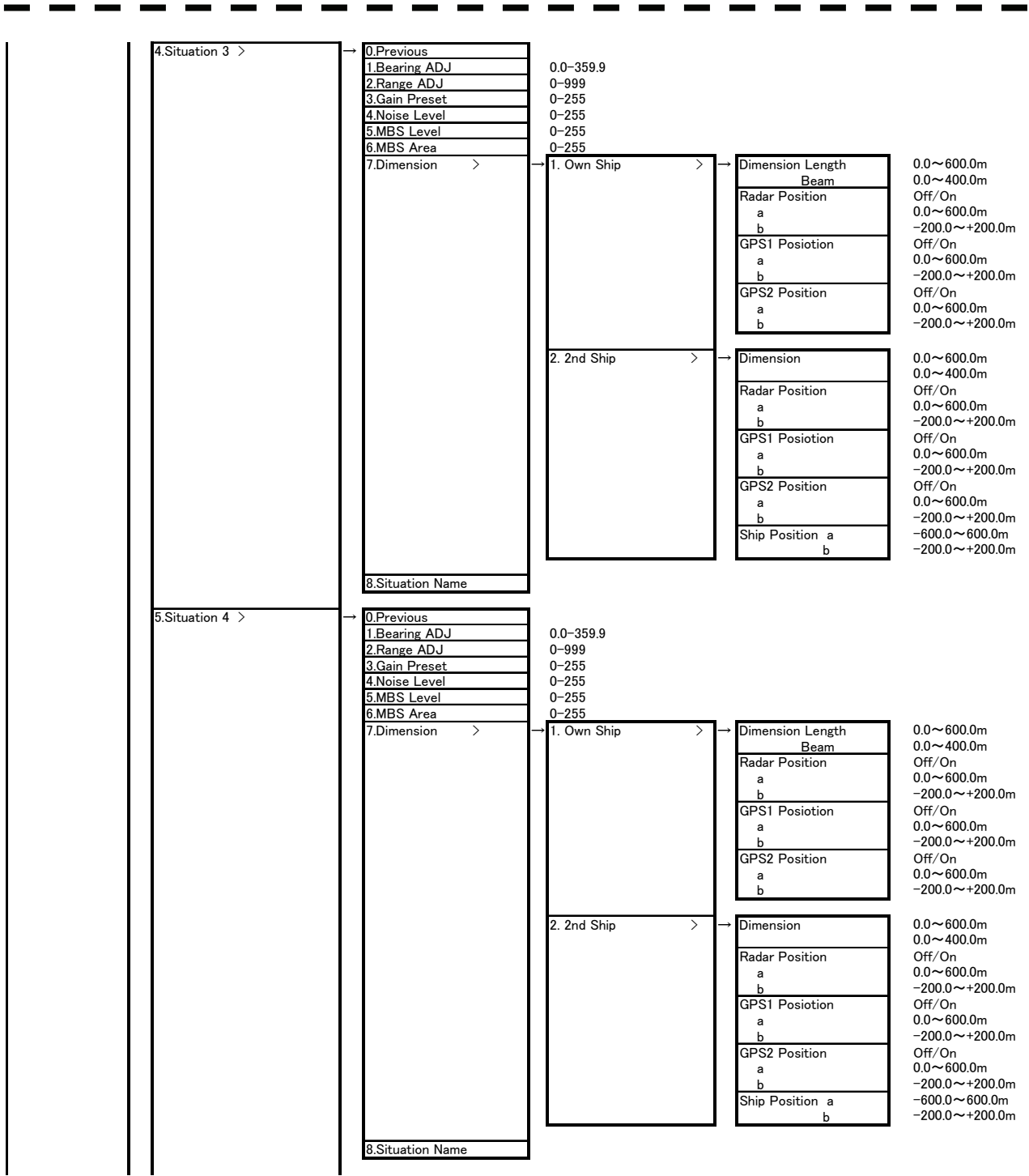
Keep press “MENU” key 5 second or more, and code input “0”, ”enter”  
Then [Service Menu] will be open as follows.

Service Menu																																																					
0.Exit																																																					
1.Equipment Setup >	<table border="1"> <tr><td>0.Previous</td><td></td></tr> <tr><td>1.Heading Mode SEL</td><td>Off/On</td></tr> <tr><td>2.Stern Marker</td><td>Off/0° H-Up On/ 90° H-Up On</td></tr> <tr><td>3.Language Select</td><td>English/Dutch/German/French</td></tr> <tr><td>4.Antenna Speed</td><td>Normal/HS/Composit</td></tr> <tr><td>5.PRF</td><td>High/Low/JammiNG</td></tr> <tr><td>6.Unit Of Range</td><td>Km/nm/sm</td></tr> <tr><td>7.Unit Of Speed</td><td>m/s, km/h, kts</td></tr> <tr><td>8.Next &gt;</td><td> <table border="1"> <tr><td>0.Previous</td><td></td></tr> <tr><td>1.Kind Of Vessel</td><td></td></tr> <tr><td>2.True Trail FUNC.</td><td></td></tr> <tr><td>3.RTH-Up</td><td></td></tr> <tr><td>4.GSFT Soft Key</td><td></td></tr> </table> </td></tr> </table>	0.Previous		1.Heading Mode SEL	Off/On	2.Stern Marker	Off/0° H-Up On/ 90° H-Up On	3.Language Select	English/Dutch/German/French	4.Antenna Speed	Normal/HS/Composit	5.PRF	High/Low/JammiNG	6.Unit Of Range	Km/nm/sm	7.Unit Of Speed	m/s, km/h, kts	8.Next >	<table border="1"> <tr><td>0.Previous</td><td></td></tr> <tr><td>1.Kind Of Vessel</td><td></td></tr> <tr><td>2.True Trail FUNC.</td><td></td></tr> <tr><td>3.RTH-Up</td><td></td></tr> <tr><td>4.GSFT Soft Key</td><td></td></tr> </table>	0.Previous		1.Kind Of Vessel		2.True Trail FUNC.		3.RTH-Up		4.GSFT Soft Key																									
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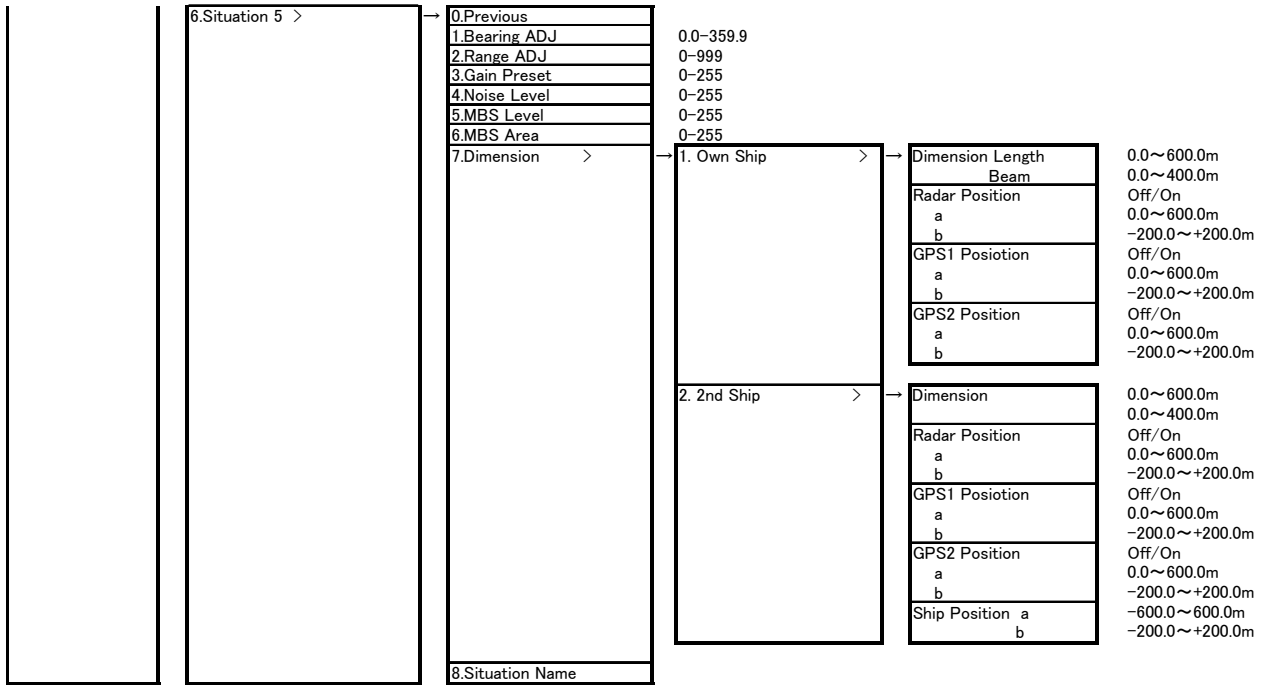
	3.GPS1 WAAS Settings >	0.Previous 1.Mode 2.Ranging 3.NG WAAS 4.WAAS Select Mode 5.WAAS No. 6.Send Data	Beacon/WAAS/AUTO Off/On Use/Not Use Manual/AUTO 120-138 Yes or No
	4.GPS2 Process Setting >	0.Previous 1.Position 2.Geodetic 3.Send Data 4.Next > 1.4.Next 0.Previous 1.Exclusion 2.Antenna Height 3.Fix Mode 4.DOP Level 5.Position Average 6.Master Reset 7.Send Data	00-47 Yes or No 00-32 0-8147m 2D/3D/AUTO Up to 4/Up to 10/Up to 20 LoNG/Standard/None 0-999 1-999 Off/On Yes or No
	5.GPS2 DGPS Setting >	0.Previous 1.Mode 2.Frequency 3.Baud Rate 4.DGPS Mode 5.Send Data	AUTO/Manual 275.0-335.0kHz 50/100/200bps Off/On Yes or No
	6.GPS2 WAAS Setting >	0.Previous 1.Mode 2.Ranging 3.NG WAAS 4.WAAS Select Mode 5.WAAS No. 6.Send Data	Beacon/WAAS/AUTO Off/On Use/Not Use Manual/AUTO 120-138 Yes or No
	7.Sector Blank >	0.Previous 1.Set 2.Make 3.Ent	Off/On
	8.Next ↓ 8.Next		
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	2.Network	1.Network Function 2.IP Address 3.RADR Echo Delivery >	Off/On 0.0.0~255.255.255.255
	3.AIS Limit 5km	0.Previous 1.Echo Delivery Function 2.Multicast Address 3.Output Form 4.Data Format	Off/On 239. 0. 17. 1-8 Quadrant/Octant Normal/Compressed
5.Sensor Setting >	0.Previous 1.ROT >	0.Previous 1.Zero Set Set 2.Gain 3.Display	Set 0-127 Off/On
	2.Rudder >	0.Previous 1.Zero Set Set 2.Gain 3.Display	Set 0-127 Off/On
	3.Autopilot >	0.Previous 1.Display	Off/On











# 2.3

## NAMES AND FUNCTIONS OF ON-SCREEN CONTROLS

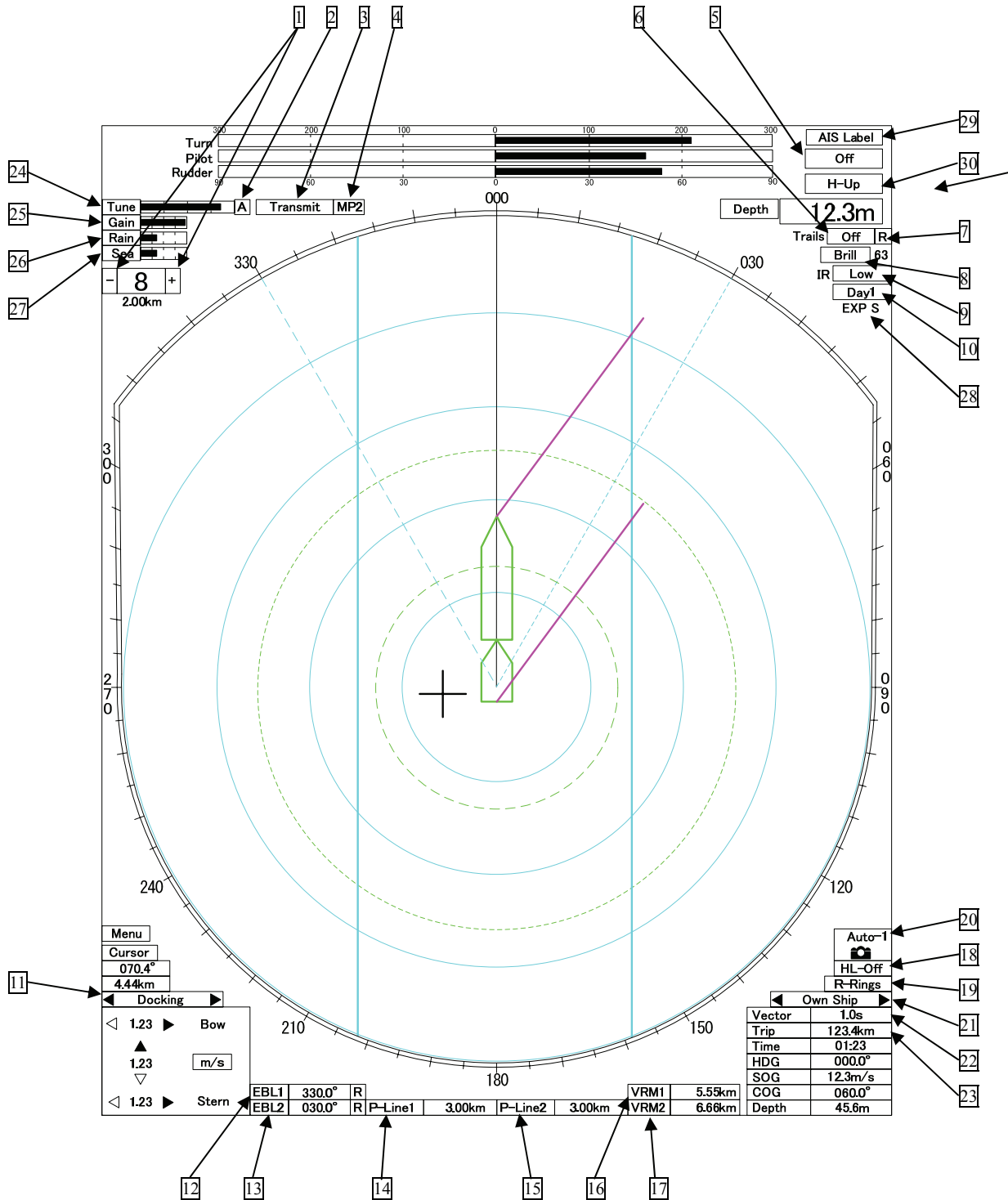
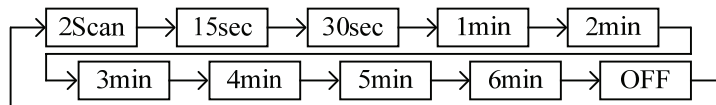


Fig 2.3 On-screen controls

- 1 **[RANGE]**  
A click on “+” will increment the RANGE SCALE.  
A click on “-“ will decrement the RANGE SCALE.
- 2 **[AUTO TUNE]**  
A click on the box will select either Manual tune, “M” or Auto tune, ”A”.
- 3 **[TX/STBY]**  
A click on the box will select either TRANSMIT or STANDBY.
- 4 **[PULSE LENGTH]**  
A click on the box will cycle through the available pulse lengths.
- 5 **[OFF-CENTER]**  
A click on the box will cycle the center mode as follows.



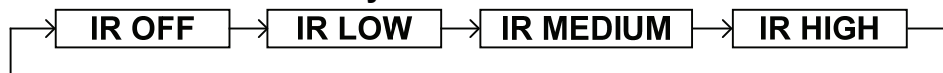
- 6 **[LENGTH OF TRAILS]**  
A click on the box will cycle the length of trails as follows.



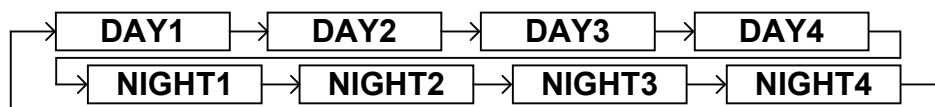
Clicking and holding down the box over 2 seconds will set the trails to OFF.

- 7 **[MODE OF THE TRAILS]**  
A click on the box will select TRUE TRAILS, ”T”, or RELATIVE TRAILS, ”R”.
- 8 **[BRILLIANCE]**  
A click on the box will enable brilliance adjustment.  
The brilliance can be change by [JOG DIAL] or [TRACK-BALL] and [ENTER] key.

- 9 **[INTERFERENCE REJECTION]**  
A click on the box will cycle IR mode as follows.



- 10 **[DAY/NIGHT]**  
A click on the box will cycle the display mode as follows.



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**11** **[DOCKING/AIS/GPS]**  
Select informations from Docking / GPS / AIS / OWN SHIP / OFF.

**12** **13** **[EBL]**  
Refer to Section 3.5.2.

**16** **17** **[VRM]**  
Refer to Section 3.5.3.

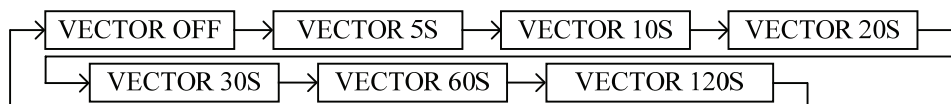
**18** **[HL OFF]**  
With the cursor positioned on the box, pressing and holding the [ENTER] key will remove the HEADING LINE from the display. When the key is released, the line is showed again.

**19** **[RANGE RINGS]**  
A click on the box selects between RANGE RINGS ON and OFF.

**20** **[SCREEN CAPTURE]**  
Click icon ,the screen image is downloaded to memory card.

**21** **[OWN SHIP INFORMATION]**  
Select informations from Docking / GPS / AIS / OWN SHIP / OFF.

**22** **[VECTORS]**  
A click on the box will cycle the vector time as follows.



Pressing and holding down the [ENTER] key on the box over 2 seconds will set the VECTOR OFF.

**23** **[TRIP COUNTER]**  
Pressing and holding down the [ENTR] key on the box will clear the TRIP COUNTER.

**24** **[TUNE]**  
Pressing the [ENTER] key on the box, you can adjust TUNE with [TRACK BALL]. If you want to adjust TUNE with [TUNE] knob, press [TUNE] knob on keyboard.

**25** **[GAIN LEVEL]**  
Pressing the [ENTER] key on the box, you can adjust GAIN with [TRACK BALL]. If you want to adjust GAIN with [GAIN] knob, press [GAIN] knob on keyboard.

**26 [RAIN CLUTTER SUPPRESSION LEVEL]**

Pressing the [ENTER] key on the box, you can adjust RAIN with [TRACK BALL]. If you want to adjust RAIN with [RAIN] knob, press [RAIN] knob on keyboard.

**27 [SEA CLUTTER SUPPRESION LEVEL]**

Pressing the [ENTER] key on the box, you can adjust SEA CLUTTER SUPPRESION LEVEL with [TRACK BALL]. If you want to adjust SEA CLUTTER SUPPRESION LEVEL with [SEA] knob, press [SEA] knob on keyboard.

**28 [TARGET EXPANSION LEVEL.]**

A click on the box will cycle the target expansion level.  
OFF/FAIR/STRONG

