JFS-280

SCANNING SONAR

INSTRUCTION
MANUAL

JRC *Japan Radio Co., Ltd.*

A. General Information

(Before you begin)

1. Cautions for high voltage

High voltages from hundreds volts to tens of thousands volts are to be applied to the electronic equipment such radio and radar devices. You do not face any danger during normal operation, but sufficient cares are 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. When you touch any parts inside these devices, before doing so, you should make it a rule to turn off the power switch to prevent such an accident caused by electric shock, and discharge capacitors with a wire surely earthed on an end and make sure that internal parts are no longer charged. Furthermore, when doing so, wearing dry cotton gloves protect you from such danger. It is also necessary to put one of your hands in the pocket and not to use both your hands at the same time.

It is also important to select a stable foothold always to prevent secondary accidents once you were electrically shocked. If you are injured from electric shock, you disinfect the burn sufficiently and give medical treatment to it promptly.

2. What to do for Electric Shock

When finding a victim of electric shock, you should call a person(s) near there, and turn off the power source and earth the circuit immediately. If it is impossible for you to turn off the circuit immediately, you should 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.

First-aid treatments

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

(1) Tell the accident to persons near there loudly and ask them to gather

(2) Do not touch the victim confusedly as result of the accident, or rescuer may also get an electric shock.

(3) Turn off the power source calmly and move the victim away quietly from the electric line. (make sure whether places near there is safe.)

(4) Try to contact persons or offices concerted (Clinic, hospital, doctor, emergency call, etc.)

(5) Lay the victim on his back and loosen his necktie, clothes, belt, etc.

(6) - a   Feel the victim's pulse.
   - b   Fell the victim's 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.

(7) 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.)

(8) Then, clean the victim's mouth so that foaming mucus does not accumulate inside the mouth.

3. When pulse is beating but breathing has stopped Give a (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 the victim's jaw upward to open his throat wide (to spread his airway).

(3) Pinch the victim's nostrils and take a deep breath, cover the victim's mouth completely with yours and blow into the victim's mouth strongly. Take a deep breath again and blow into the victim's mouth. Continue this 10 to 15 times a minute (blocking his nostrils).

(4) Practicing artificial respiration, carefully watch whether the victim has recovered his natural breathing, soon after the victim recovered, stop respiration.

(5) If it is difficult to open the victim's mouth, insert a rubber or vinyl tube into one of the victim's nostrils and take a deep breath and blow into it, blocking the victim's other nostril and mouth completely.

(6) When the victim recovers consciousness, the victim may try to stand up suddenly, but let the victim lie calmly and serve the victim with a cup of hot coffee or tea and keep the victim warm and quiet. (Never give him alcoholic drinks.)

Method of mouth-to-mouth respiration by raising head

①
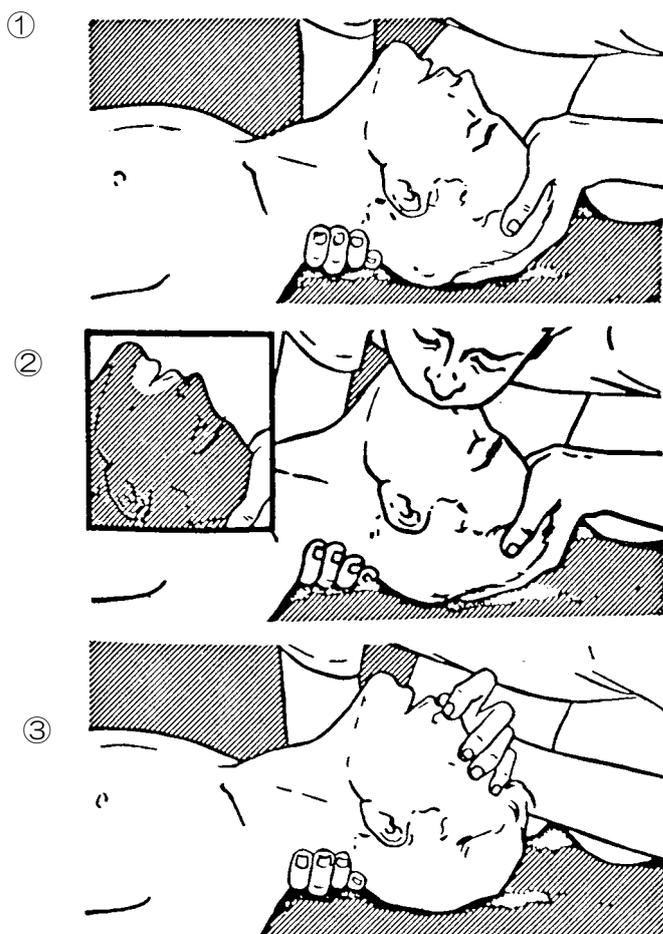
(1) Raise the victim's head. Support his forehead with one of your hand and his neck with the other hand. → ①
When you tilt his head backward, the victim, in most cases, opens his mouth to the air. This makes mouth-to-mouth respiration easy.

②

(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

(3) Blow into lung.
Blowing into mouth until his breast swells. Blow into his mouth as quickly as possible 10 times at first.

Fig. 1 Mouth-to-mouth respiration

4. When both pulse and breathing have stopped
Give a (Cardiac massage). Fig. 2

When 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 2 cm (Repeat compressing his beast 50 times / minute or so).
(Cardiac massage)

(2) In case of one rescuer,
Repeat cardiac massages about 15 times and blow into his mouth 2 times quickly, and repeat his combination.
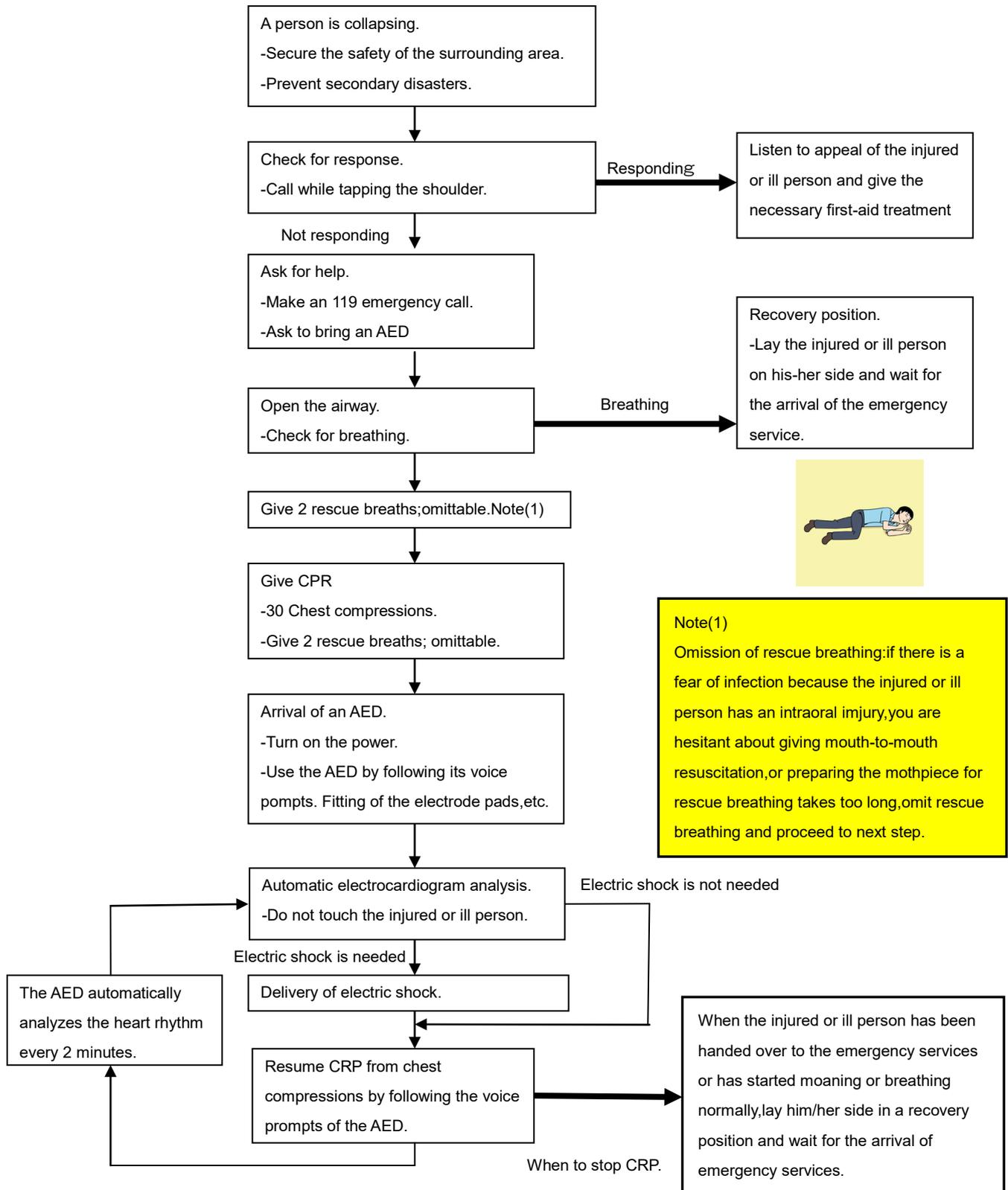
(3) In case of two rescuers,
One person repeats cardiac massages 15 times while the other person blow into his mouth once, and they shall repeat this combination. (Perform the cardiac massage and mouth-to-mouth respiration)

(4) Examine his pupils and his pulse sometimes. When the both have returned to normal, stop he artificial respiration, serve him with a cup of hot coffee or tea and keep him warm and calm while watching him carefully. (Never give him alcoholic drinks.)
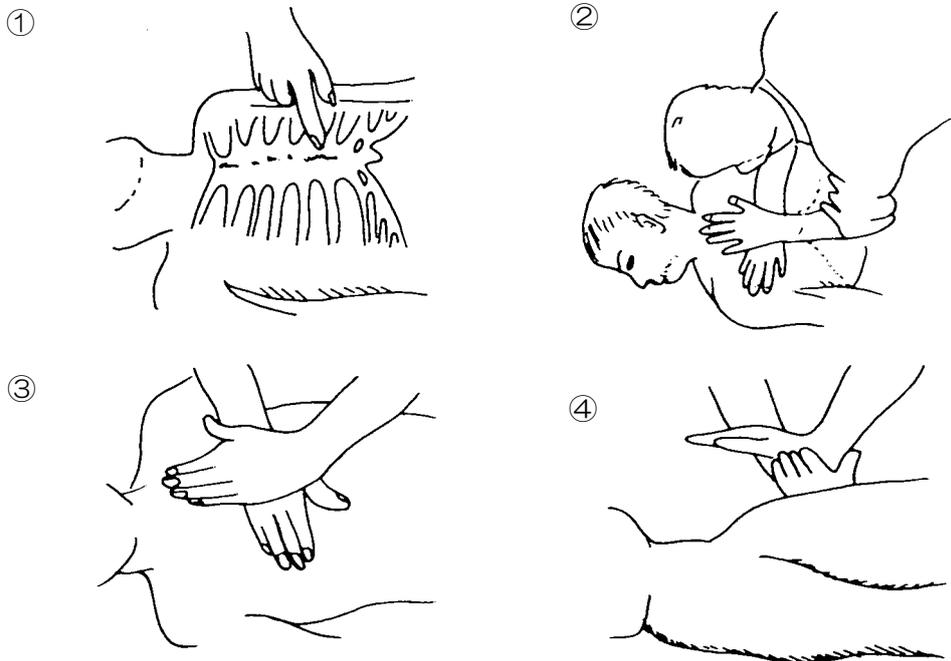
Fig. 2 Cardiac massage

5. Procedure for cardiopulmonary resuscitation using the AED (flow chart)

A person is collapsing.

-Secure the safety of the surrounding area.

-Prevent secondary disasters.

Check for response.

-Call while tapping the shoulder.

Responding → Listen to appeal of the injured or ill person and give the necessary first-aid treatment

Not responding

Ask for help.

-Make an 119 emergency call.

-Ask to bring an AED

Open the airway.

-Check for breathing.

Breathing → Recovery position.

-Lay the injured or ill person on his-her side and wait for the arrival of the emergency service.

Give 2 rescue breaths;omittable.Note(1)

Give CPR

-30 Chest compressions.

-Give 2 rescue breaths; omittable.

Arrival of an AED.

-Turn on the power.

-Use the AED by following its voice pompts. Fitting of the electrode pads,etc.

Automatic electrocardiogram analysis.

-Do not touch the injured or ill person.

Electric shock is not needed

Electric shock is needed

Delivery of electric shock.

The AED automatically analyzes the heart rhythm every 2 minutes.

Resume CRP from chest compressions by following the voice prompts of the AED.

When to stop CRP.

When the injured or ill person has been handed over to the emergency services or has started moaning or breathing normally,lay him/her side in a recovery position and wait for the arrival of emergency services.

Note(1)

Omission of rescue breathing:if there is a fear of infection because the injured or ill person has an intraoral imjury,you are hesitant about giving mouth-to-mouth resuscitation,or preparing the mothpiece for rescue breathing takes too long,omit rescue breathing and proceed to next step.

6. Procedure for cardiopulmonary resuscitation (CPR) using the AED (Automated External Defibrillator)

1. Check the scene for safety to prevent secondary disasters
a) Do not touch the injured or ill person in panic when an accident has occurred. (Doing so may cause electric shock to the first-aiders.)
b) Do not panic and be sure to turn off the power. Then, gently move the injured or ill person to a safe place away from the electrical circuit.

2. Check for responsiveness
a) Tap the shoulder of the injured or ill and shout in the ear saying, "Are you OK?"
b) It the person opens his/her eyes or there is some response or gesture, determine it as "responding." But, if there is no response or gesture, determine it as "not responding."

3. If responding
a) Give first-aid treatment.

4. If not responding
a) Ask for help loudly. Ask somebody to make an emergency 119 call and bring an AED.
  1) Somebody has collapsed. Please help.
  2) Please call 119.
  3) Please bring an AED.
  4) If there is nobody to help, call 119 yourself.

5. Open the airway
a) Touch the forehead with one hand. Lift the chin with the two fingers of the middle finger and forefinger of the other hand and push down on the forehead as you lift the jaw to bring the chin forward to open the airway. If neck injury is suspected, open the airway by lifting the lower jaw.

6. Check for breathing

a) After opening the airway, check quickly for breathing for no more than 10 seconds. Put your cheek down by the mouth and nose area of the injured or ill person, look at his/her chest and abdomen, and check the following three points.
   1) Look to see if the chest and abdomen are rising and falling.
   2) Listen for breathing.
   3) Feel for breath against your cheek.
b) If the injured or ill person is breathing, place him/her in the recovery position and wait for the arrival of the emergency services.
   1) Position the injured or ill person on his/her side, maintain a clear and open airway by pushing the head backward while positioning their mouth downward. To maintain proper blood circulation, roll him/her gently to position them in the recovery position in the opposite direction every 30 minutes.

Roll gently in the oppsite direction every 30 minutes.
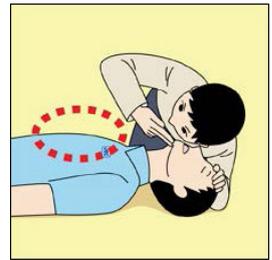
7. Give 2 rescue breaths (omittable)

a) If opening the airway does not cause the injured or ill person to begin to breathe normally, give rescue breaths.
b) If there is a fear of infection because the injured or ill person has an intraoral injury, you are hesitant about giving mouth-to-mouth resuscitation, or getting and preparing the mouthpiece for rescue breathing takes too long, omit rescue breathing and perform chest compressions.
c) When performing rescue breathing, it is recommended to use a mouthpiece for rescue breathing and other protective devices to prevent infections.
d) While maintaining an open airway, pinch the person's nose shut with your thumb and forefinger of the hand used to push down the forehead.
e) Open your mouth widely to completely cover the mouth of the injured or ill person so that no air will escape. Give rescue breathing twice in about 1 second and check if the chest rises.

CPR mask

mouthpiece for rescue
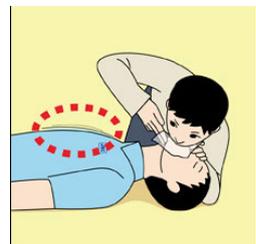
8. Cardiopulmonary resuscitation (CPR) (combination of chest compressions and rescue breaths)
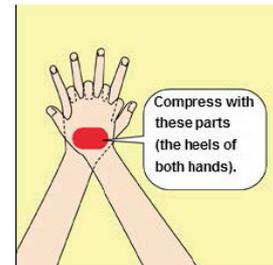
a) Chest compressions
   1) Position of chest compressions
   - Position the heel of one hand in the center of the chest, approximately between the nipples, and place your other hand on top of the one that is in position.
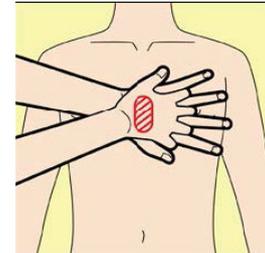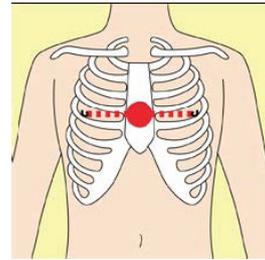
2) Perform chest compressions
   - Perform uninterrupted chest compressions of 30 at the rate of about 100 times per minute. While locking your elbows positioning yourself vertically above your hands.
   - With each compression, depress the chest wall to a depth of approximately 4 to 5 cm.

b) Combination of 30 chest compressions and 2 rescue breaths
   1) After performing 30 chest compressions, give 2 rescue breaths. If rescue breathing is omitted, perform only chest compressions.
   2) Continuously perform the combination of 30 chest compressions and 2 rescue breaths without interruption.
   3) If there are two or more first-aiders, alternate with each other approximately every two minutes (five cycles of compressions and ventilations at a ratio of 30:2) without interruption.
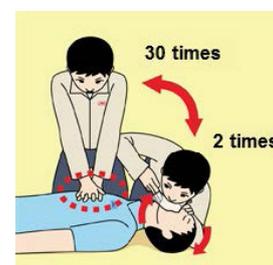
9. When to stop cardiopulmonary resuscitation (CPR)

a) When the injured or ill person has been handed over to the emergency services

b) When the injured or ill person has started moaning or breathing normally, lay him/her on his/her side in a recovery position and wait for the arrival of emergency services.

10. Arrival and preparation of an AED

a) Place the AED at an easy-to-use position. If there are multiple first-aiders, continue CPR until the AED becomes ready.

b) Turn on the power to the AED unit. Depending on the model of the AED, you may have to push the power on button, or the AED automatically turns on when you open the cover.

c) Follow the voice prompts of the AED.

11. Attach the electrode pads to the injured or ill person's bare chest

a) Remove all clothing from the chest, abdomen, and arms (male or emale).

b) Open the package of electrode pads, peel the pads off and securely place them on the chest of the injured or ill person, with the adhesive side facing the chest. If the pads are not securely attached to the chest, the AED may not function. Paste the pads exactly at the positions indicated on the pads, if the chest is wet with water, wipe dry with a dry towel and the like, and then paste the pads. If there is a pacemaker or implantable cardioverter defibrillator (ICD), paste the pads at least 3cm away from them. If a medical patch or plaster is present, peel it off and then paste the pads. If the injured or ill person's chest hair is thick, paste the pads on the chest hair once, peel them off to remove the chest hair, and then paste new pads.

c) Some AED models require to connect a connector by following voice prompts.

d) The electrode pads for small children should not be used for children over the age of 8 and for adults.
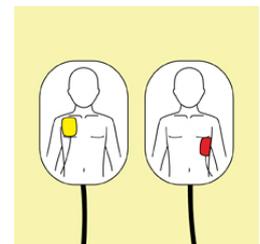
12. Electrocardiogram analysis
a) The AED automatically analyzes electrocardiograms. Follow the voice prompts of the AED and ensure that nobody is touching the injured or ill person while you are operating the AED.
b) On some AED models, you may need to push a button to analyze the heart rhythm.

13. Electric shock (defibrillation)
a) If the AED determines that electric shock is needed, the voice prompt saying, "Shock is needed" is issued and charging starts automatically.
b) When charging is completed, the voice prompt saying, "Push the shock button" is issued and the shock button flashes.
c) The first-aider must get away from the injured or ill person, make sure that no one is touching him/her, and then press the shock button.
d) When electric shock is delivered, the body of the injured or ill person may jerk.

Press the shock button.
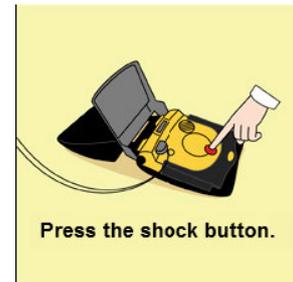
14. Resume cardiopulmonary resuscitation (CPR).
Resume CPR consisting of 30 chest compressions and 2 rescue breaths by following the voice
Prompts of the AED.

15. Automatic electrocardiogram analysis
a) When 2 minutes have elapsed since you resumed cardiopulmonary resuscitation (CPR), the AED automatically analyzes the electrocardiogram.
b) If you suspended CPR by following voice prompts and AED voice prompt informs you that shock is needed, give electric shock again by following the voice prompts. If AED voice prompt informs you that no shock is needed, immediately resume CPR.

16. When to stop CPR (Keep the electrode pads on.)
a) When the injured or ill person has been handed over to the emergency services
b) When the injured or ill person has started moaning or breathing normally, lay him/her on his/her side in a recovery position and wait for the arrival of emergency services.

7. Observance of Safety Routine Rules at Work

1	**Working clothes**	Wear long sleeve jacket and button the wristbands, regardless of heat and cold, and not be untidily dressed.
		Wear safety hat/helmet, safety belt, gaiters and a hard hat, a security zone, a gaiter, safety shoes at the shipyard in particular
2	Protective goods	Make sure of safety before use of protective goods.
	Safety belt	Use a safety belt above the height of 2 m
		Put a sling hook of safety belt on place 2 m higher than waist
	Safety hat or helmet	At work at higher places or in shipyards, wear safety hat or helmet and tighten a chin belt.
		Gap between inner clothes of helmet and helmet is at least 25 mm.
	Protective glasses and earplug	Put on **dust-proof glasses against dust while grinding or chipping** and put on earplug at noisy places.
3	Check / maintenance of appliance / tools	Check your own tools by yourself before use of it and make sure whether it is safe.
		Use proper tools and do not use temporary tools.
4	Clear and put up in order	Always clear up things around you and set up it in order and clear up after work is finished.
5	Passage	Do not pass through under Cargo handling places and container yards and Crane etc.
		Walk along the proper passage in shipyards or customer's yards etc.
6	Work at high places	Use a safety belt surely.
		Be careful enough not to drop your tools below.
7	Transportation	Do not lift heavy equipment etc. over 30 kg alone.
		While transporting by crane onboard ships, on windy days, obey orders of site supervisors.
		While climbing up or down ladders, with tools etc. in knapsack, use both hands.
8	Work onboard ships carrying dangerous cargos (Tanker etc.)	Do not transmit radio waves during cargo handling.
		Do not put on hobnailed shoes.
		Do not smoke at nonsmoking areas.
9	Work at ship's bottom	Notify to vessel, open the hatch of manhole for ventilation more than 24hours ago of start work.
		Make sure whether gaser are not exist by using gas (oxygen etc) measuring devices.
		Don't use the fire. As a poisonous gas may be generated.
		At least two persons work together for emergency case.
		Use worklights with metal-protective gaurd and bring flashlight(s).
10	Work in shipyards	Take safety lectures of each shipyard and work in accordance with shipyard safety rules.
11	Group work	Before starting work, decide a leader of work and obey his orders.
		Work together in harmony communicating with each other if dangerous situation may exist.
12	Use of mobile phone	If use of mobile phone onboard ships carrying dangerous cargo etc. is restricted, obey rules of the ship.
		Do not use mobile phone during driving. If telephoning is needed, use hands-free phone not to disturb driving.

		If a mobile phone is used at high place, fall-preventing mechanism is applied to it.
13	Driving a car	Check a car before driving brake, lights, remaining amount of gasoline.
		Observance of traffic rules Use sheet belts and keep regulation speed.
		Drive into company's facilities or factory Indicate Driving-Permission-in-yard and keep the company's traffic rules.
14	Use of data terminal equipment	Use a camera after obtaining permission. (In particular onboard ships carrying dangerous cargos, use flash after obtaining permission.)
		While downloading data from VDR etc. and updating software of AIS, ECDIS and others, be careful of management of PC and media and data in PC etc are possibly minimized not to lose data brought in.
		Data PC is always check and scan for protect from PC virus.
15	Smoking	Do not smoke in smoking-restricted areas, and neither smoking while walking nor working with a cigarette in your mouth is never permitted.
		Be fully careful of the fire after smoking.

8. Things taken into account at work

There are many things to know at work at radio stations. The followings below are especially important.

8-1 Observance of Radio regulations and rules concerned

You should not only observe the regulations and rules above, but you should also observe rules of each port or each ship. Especially onboard ships which carry dangerous cargos, when fire work is carried out and radio waves are transmitted or work is done on open deck such as compass deck, permission should be obtained before work is started.

8-2 No permission to transmit radio waves by unqualified persons

When transmissions of radio waves are needed during repairing or maintenance, work should be carried out under observation of ship's qualified persons.

8-3 Dummy antenna may be used during adjustment of transmitters if possible.

8-4 Whatever equipment may be operated, distress signals should not be transmitted even through dummy antenna. (Note 1)

If distress signals were transmitted by accident, nearby Competent Authority's Radio station or Coast Radio Stations should be immediately informed of what happed.

Contents to be informed

1) Ship's name

2) Call sign

3) the time of transmission and the time of ceasing transmitting

4) the reason why erroneously transmitted

Note1 : When maintenance or test of EPIRBs is carried out onboard ships, and radio wave shielded confined room such as engine control room etc. should be used not to transmit radio wave outside the ship (If an antenna is there, it should be removed temporally.) and stop transmission soon after test is over.

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MEMO



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Introduction

Thank you for purchasing our JFS-280 scanning sonar.
This system has an omni-directional scanning sonar equipped with an all-directional stabilizing function.

● Carefully read this instruction manual so you can operate the system correctly before you start.

● Keep this instruction manual in a safe place so you can refer to it as needed.

It will be useful should you happen to not understand while you are using the system or if problems occur.

●Before Operation●

Pictorial Indication

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

Please understand them before you read this manual:

⚠ DANGER	This indication is shown where any person is supposed to be imminent of danger to which the person owes the death or the serious injury if this indication is neglected and this equipment is not operated correctly.
⚠ WARNING	This indication is shown where any person is supposed to be in danger of being killed or seriously injured if this indication is neglected and this equipment is not operated correctly.
⚠ CAUTION	This indication is shown where any person is supposed to be injured or any property damage is supposed to occur if this indication is neglected and this equipment is not operated correctly.

Examples of pictorial indication

The △ mark represents CAUTION (including DANGER and WARNING).
Detailed content of CAUTION ("Electric Shock" in the example on the Electric left.) is shown in the mark.
The ⊘ mark represents prohibition.
Detailed content of the prohibited action ("Disassembling Prohibited" in Disassembling the example on the left) is shown in the mark.
The ● mark represents instruction.
Detailed content 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.

●Precaution upon Equipment Operation●

⚠ **DANGER**

Never attempt to check or repair the inside of the equipment.
Checking or repair by an unqualified person may cause a fire or an electric shock.
Contact our head office, or a nearby branch or local office to request servicing.

Electric shock prevention by high voltage unit

① There is a part where a high voltage is used, and maintain and check after turning off the power switch without fail when you check the inside.

② Wash the salinity of the hand and drop it when you check. Moreover, change it for the dry one when the work clothes and shoes, etc. have been wet.

③ It loudly informs everyone of it without panicking, and there must be danger that I also get an electric shock when touching directly, and the power switch must be cut or it begins must to help by cutting the board, and it must revive afterwards when you discover the person who got an electric shock by any chance by artificial respiration and a general technique.

⚠**WARNING**

Do not place a glass or cup containing water, etc., or a small metal object on this equipment.
If water or such object gets inside, a fire, an electric shock, or a malfunction may occur.

Do not operate pulling out the power plug or do not switch by a wet hand.
It may cause the electric shock.

Do not damage, and process the power cable. A heavy thing is put, heated, pulled or is bended strongly, and moreover, the power cable may be damaged, and it may cause a fire and the electric shock.

In case water or a metal object gets inside the equipment, turn off the power immediately, and contact our head office, or a nearby branch or local office to request servicing.
Keeping the equipment in operation under such condition may cause a fire, an electric shock or a malfunction.

⚠WARNING

In case you find smoke, strange smell or unusual heat coming from the equipment, turn off the power immediately, and contact our head office, or a nearby branch or local office to request servicing.

Keeping the equipment in operation under such condition may cause a fire or an electric shock.

⚠CAUTION

Caution of installation location

1. Avoid the use of this device in the place where direct sunshine strikes into the equipment for a long time and the temperature become 50°C or more.

2. Do not put this device on an unstable place like on the shaking stand and the inclining place, etc. The device might fall, topple, and it may cause the injury and the breakdown.

3. Avoid use in a place where the spindrift is hit directly and a humid place.

4. Do not put this coolant condition device into the high temperature room suddenly. The high voltage might cause the leak doing and the breakdown by the dewfall. Use it after leaving about 30 minutes for this case.

Caution of a ship bottom and equipment check

1. Connect the ground lead with the ground terminal surely at the installation. When breaking down and leaking electricity, it might cause the electric shock.

2. Remove the power cable correctly. The code might be damaged when power cable is forcibly pulled, and it may cause a fire and the electric shock.

3. Do not turn on the power supply of this device when the ship goes up to the land (like dry dock). It might cause the transducer etc. to break.

4. Turn OFF the power switch of this device without fail for safety, and turn the breaker off when you do not use it for a long time. It might cause a fire.

5. Do not strongly wipe with a dry cloth when you clean the screen. Moreover, do not use gasoline nor thinner, etc. It may cause to hurt the surface of the screen.

Work by two people or more when you exchange LCD. It might be dropped when exchanging alone and it may cause the injury.

Exterior view of the equipment

Sub display
NWZ-207

Sub keyboard
NCH-578

Display
NWZ-207

24V DC

Keyboard
NCH-578

100V AC

AC/DC
Rectifier

5m (STD)

5m (STD)

Speaker

Processor
NJC-31

Gyro I/F

TX/RX unit
NTB-23

24V DC

100V AC

100V AC

AC/DC
Rectifier

AC/DC
Rectifier

30m (STD)

24V DC

Hoisting device
NKF-2800

100V AC

AC/DC
Rectifier

10m
(Fix)

10m
(Fix)

24V DC

Storage tank

Transducer
CHG-2800
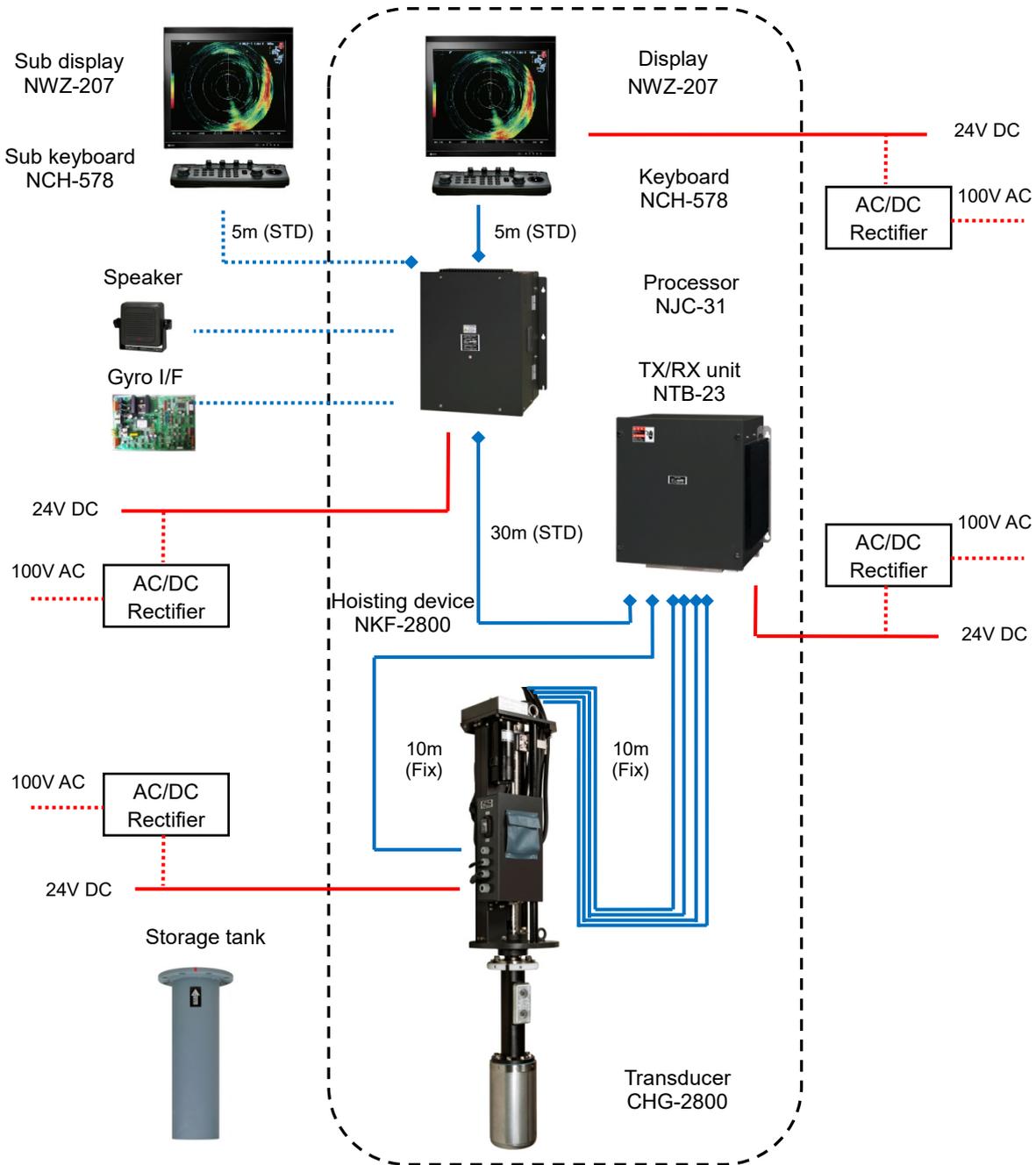
Glossary

Hoisting device: A device to raise and lower the transducer. Also called a hull unit.

Extend: To move the transducer from the storage tank to outside the hull of the ship.

Storage: To move the transducer from outside the hull of the ship to the storage tank.

True bearing: Indicates the direction given that true north is set as the top of the screen.

Heading: Indicates the direction given that the direction of the ship is set as the top of the screen.

Tilt angle: Function that changes the orientation of the sound waves being transmitted and received in a vertical orientation from the horizontal.

Speed over ground: Speed of the ship calculated from the speed and the direction in relation to the seabed.

Speed relative to water: Speed of the ship calculated from the direction of the current at a set depth, the logs, and the current meter.

Log: Short form of speed log.

TX PRR: Transmission pulse repetition rate.

Clutter: Various noises, from under the sea and the surface of the sea, that should be removed.

ADC: Acronym for analog to digital converter, which controls the conversion of analog signals to digital signals.

AGC: Automatic Gain Control. A function that automatically lowers the gain when the signal is too strong.

RM: Relative Motion. The display for relative motion in which the position of your own ship is fixed and all targets move in relation to your own ship.

TVG: Time Varied Gain. A function that uses the gain and the dampening characteristics of time to restore sound wave signals that have been damped by time.

STC: Sensitivity Time Control. A function similar to TVG that is used for short distances.

RCG: Acronym for Reverberation Control of Gain. This process stops the increase in gain on the TVG curve, if an extremely strong echo is received, such as interference waves from another ship's sonar, given that the RGG is on at the time.

Hoisting device safety

• Resistance to ship's speed

Do not exceed the speeds shown in the table below while using the hoisting device.

If you use the hoist while the ship is travelling faster than these speeds, the hoist may break and cause an accident.

Hoisting operation	'Rising' 16 knots or lower	Maximum resistance to ship's speed	18 knots
	'Lowering' 16 knots or lower		

• Replace the zinc plate, which is for preventing electrolytic corrosion, every year.

Always take measures to prevent electrolytic corrosion. If you do not prevent electrolytic corrosion, there may be severe consequences, such as the transducer may fall out or sea water may get into the dome.

To prevent accidents at sea

If the transducer or hoisting device is damaged in a maritime accident, the sonar may become inoperable, which may pose a problem for work and safety aboard ship.

Also, repairs and replacement of the transducer or hoisting device is very expensive and time consuming.

To prevent this kind of accident from happening, do the following operations, in the situations described below, to store the transducer.

1.   Conditions
  (1)   When there are many things floating or drifting in the sea
  (2)   When a group of ships is gathering nets and the light ship comes out of the gathered nets
  (3)   In shallow waters, where there may be ropes or wires strung across the sea
  (4)   While the ship is anchored

2.   Transducer storage operations
  (1)   Press the [SHED] key on the keyboard to store the transducer.
  (2)   When the transducer is rising, the hoisting mark on the top right of the screen turns red and the outline flashes.
  (3)   The transducer is stored, and when it reaches the upper limit, a storage finished message appears in the middle of the screen and the hoisting mark becomes green.

Contents

1 Overview of the equipment

Contents

1.1   Functions

This omni-directional scanning sonar uses a high-resolution, super-luminous color LCD display unit to vividly display schools of fish. It is equipped with a transducer operating on newly developed digital technology for transmitter/receivers that broadly improves detection performance. This sonar operates on 24 VDC and is built for small boats with an all-directional stabilizer function.

1.1.1   System functions

Major functions of the JFS-280 series
- All-directional stabilizer function (±20° Pitching & Rolling)
- Full screen display function
- Off center function
- Automatic tilt angle function
- Fish school alarm function
- Audio combination screen function
- Fish-Finder image combination screen function
- Fish image settings function
- Ship's speed triggered auto retract function

1.2　**Features**

Detection distance is greatly improved

Greatly improves measures against noise caused by interference from other boats and detection performance by using a newly developed transducer and a transmitter/receiver unit that runs on digital technology.

Omni-directional stabilizer function can handle the rocking in small boats

Runs on digital technology to boost tracking of fish schools with a stabilizer function that can handle ±20° rocking in all directions.

Uses DC power as available on small boats

The entire system, 'the hoisting device,' the transmitter/receiver unit, the signal processor, and the display unit, runs on DC, so it can be installed on small boats that do not have AC power with no added equipment.

Super luminous and high resolution large screen is easy to see

New model LCD display unit provides super luminous, high resolution reproduction

Easy operation

Transmitter/receiver settings can be optimized by just using the fish image settings, even while the area and conditions of the sea are changing.

32-color display makes concentrations of fish easy to understand

Super clear imaging in 32 colors provides easy-to-understand displays of fish school distributions and concentrations.

Superior operability

Settings can be stored in memory so that it is possible to quickly match the settings to fishing locations.

Expandable system

The system can be expanded to two units because it is composed of a display unit, a keyboard, and a processor.

1.3　Configuration

Configuration of sonar

JFS-280 standard equipment

Name	Model number	Q'ty	Onboard power supply	Remarks
Display	NWZ-207	1	24 VDC/3 A	Cable for 19-inch color LCD monitor is sold separately
Keyboard	NCH-578	1		Cable included 5 m
Processor	NJC-31	1	24 VDC/3 A	
Transmitter/receiver unit	NTB-23	1	24 VDC/13 A	
Hoisting device	NKF-2800	1	24 VDC/5 A	600-mm stroke
Commu. cable	CFQ-5546	1		30 m (from processor to transmitter/receiver unit)
Hoist cable	CFQ-5552	1		10 m (from hoist to transmitter/receiver unit)
Installation materials		1		
Spare parts		1		
Instruction manual		1		

JFS-280 optional equipment

Name	Model number	Q'ty	Onboard power supply	Remarks
Speaker	6USFD00010	1		
Frame for desktop	CWB-1594	1		
Gyro I/F	CMJ-304E	1		Synchronization and stepping support
Sub display	NWZ-207	1	24 VDC/3 A	19-inch color LCD monitor
Sub keyboard	NCH-578	1		Cable included 5 m
Storage Tank	MPBX31141	1		
AC/DC rectifier	5EPUA00030	1	AC100V	24 VDC 25 A (600 W) output

1.4   **Structural diagrams**

CUTOUT DIMENSIONS

355 ±0.3

170 ±0.15

170 ±0.15

406.4 ±1

336 ±1

6-φ6 or M5

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

MASS   APPROX.   6   kg

UNIT   mm

WITHOUT DESIGN PANEL FIXING HOLES POSITION

355 ±0.3

170 ±0.15

170 ±0.15

6-φ6 ±0.15

FIXING HOLES

4-M4 VESA HOLES

100 ±0.2

100 ±0.2

75

279

(75)

97.5

(25)

332 ±0.3

(25)

30

30

MIN. 100

(13.3)

74.5

(19)

13.5

402.4 ±0.4

(13.3)

DESIGN PANEL

DESIGN PANEL

DESIGN PANEL

382

429

45
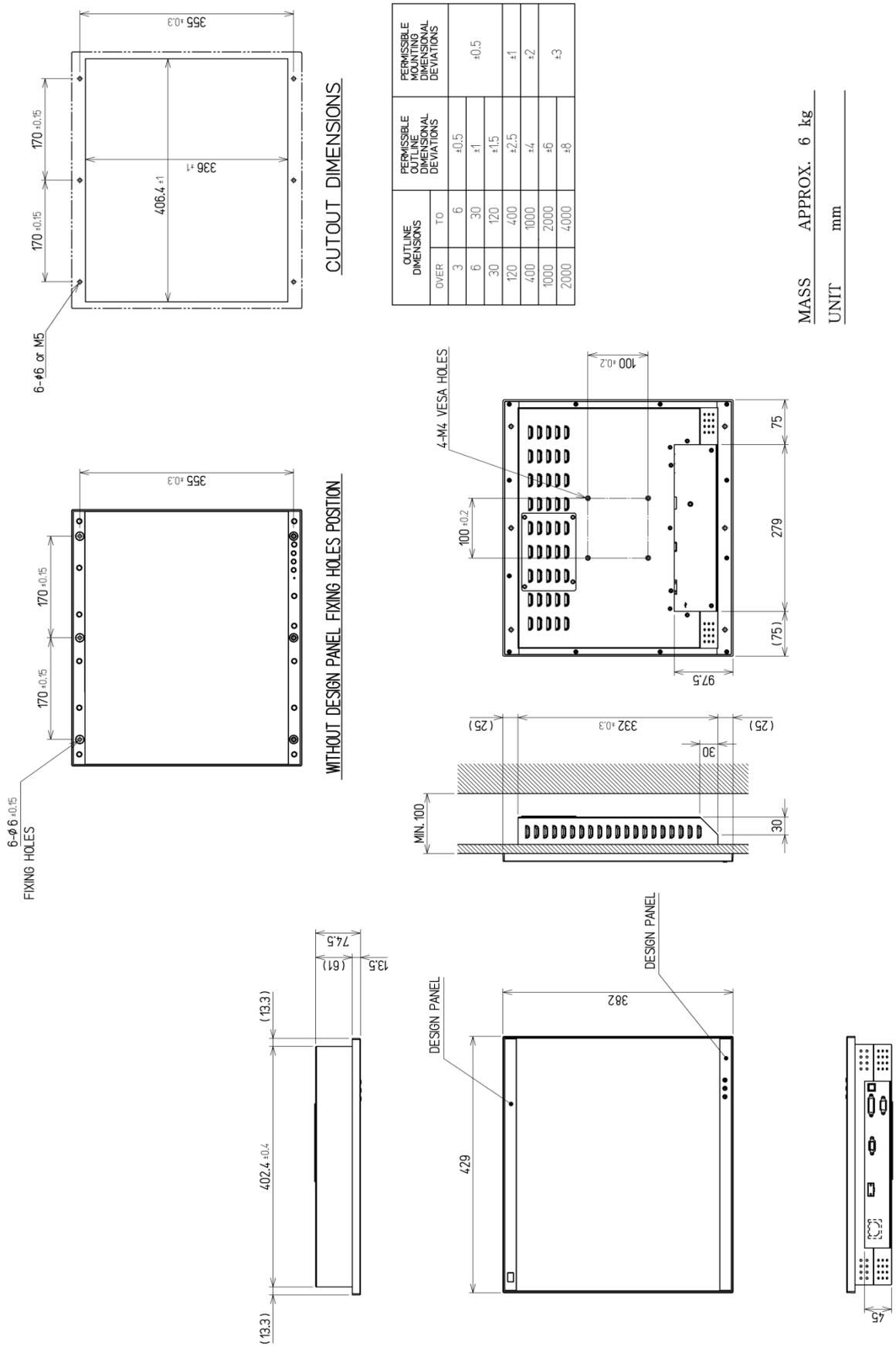
Diagram 1.1. Exterior view of the NWZ-207 display unit

COLOR : N2.5 HN2001G
MASS : approx. 1.3 kg
(Including the 5m cable)

CABLE INLET
Position of the tape
4×M4×5.8
Option(PS2) INLET
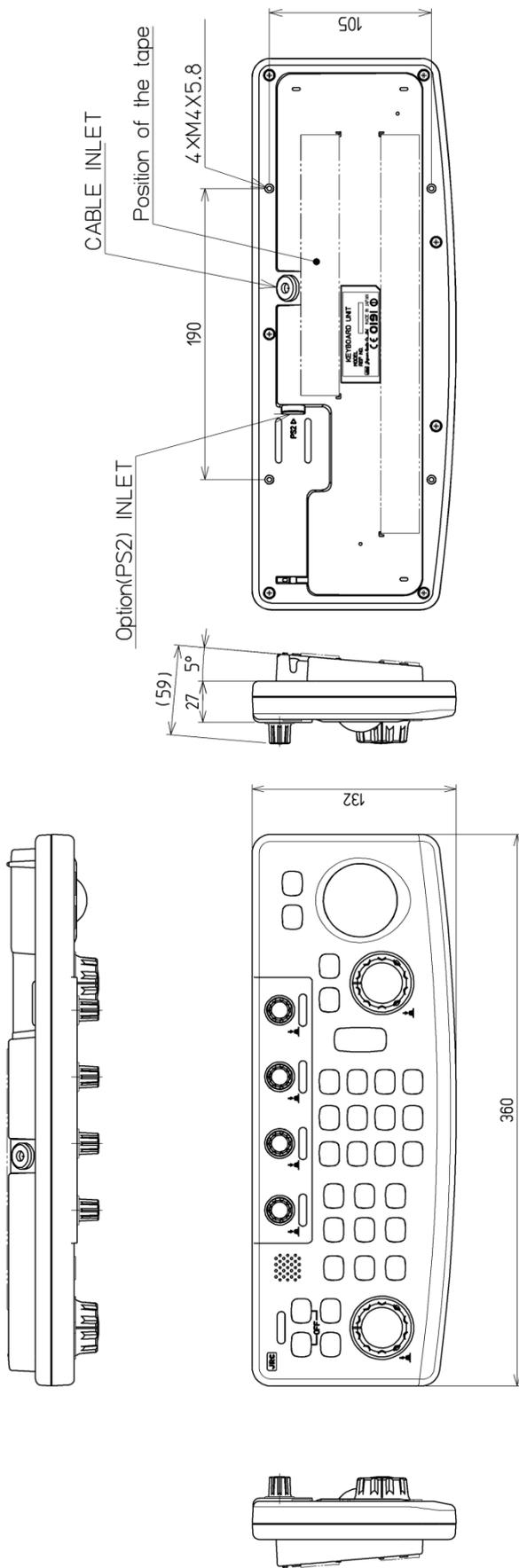
OUTLINE DIMENSIONS		PERMISSIBLE DIMENSIONAL DEVIATIONS
OVER	TO	
	30	±1
30	120	±1.5
120	400	±2.5
400	1000	±4
1000	2000	±6
2000	3000	±8

Diagram 1.2. Exterior view of the NCH-578 keyboard
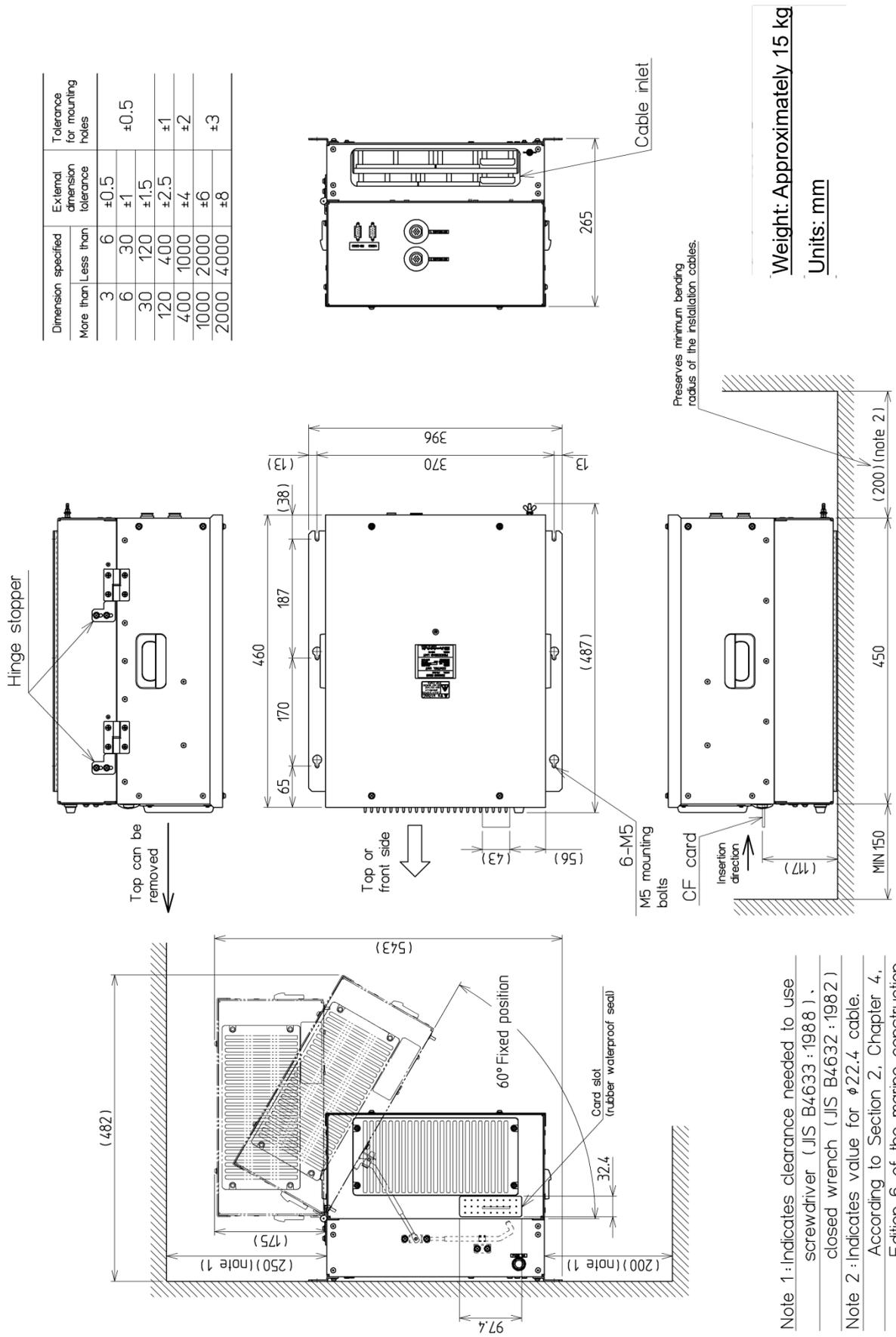
Diagram 1.3. Exterior view of the NJC-31 processor

344

(14)

21

436

9

(15)

67.5

453
<Setting bolt pitch>

370

<Setting bolt pitch>

487

480

Weight: Approximately 34 kg

Units: mm
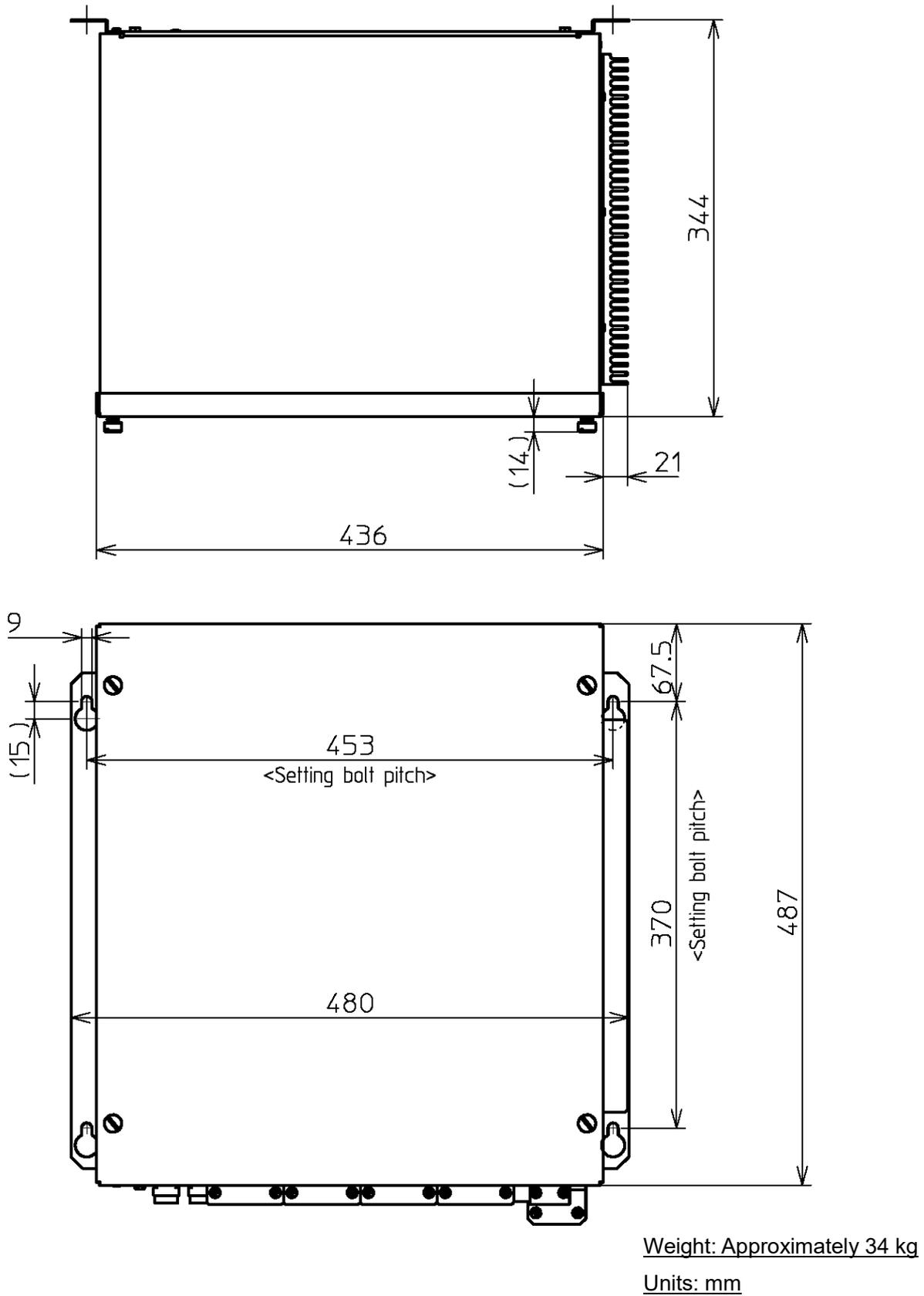
Diagram 1.4. Exterior view of NTB-23 transmitter/receiver unit

UNLESS OTHERWISE SPECIFIED

DIMENSION SPECIFIED	TOLERANCE
0 TO 16	±1
OVER 16 TO 50	±2
OVER 50 TO 250	±4
OVER 250 TO 1000	±8
OVER 1000 TO 3000	±12

NO	ITEM	QTY	MATERIAL	REMARKS
1	RETRACTION TANK	1	SM400	OPTION 46kg
2	HOIST ASSEMBLY	1	SS400	
3	TRANSDUCER	1		φ60.5
4	MAIN SHAFT	1	SUS304	
5	CONTROL BOX	1	SPCC	
6				
7	V PACKING	3	NBR	JISB2403
8	PACKING	1	CR	
9				
10	BOLTS	8	SUS304	M20X80
11	NUTS	8	SUS304	M20
12	NUTS	8	SUS304	M20
13	SPRING WASHER	8	SUS304	M20
14				

COLOUR : MUNSELL N2.5
MASS : 110kg

BOTTOM PLATE
STREAMLINE COVER (SHIPYARD)
REINFORCING DOUBLING (SHIPYARD)
MANUAL HANDLE
CABLE INLET
BOW

φ216, 750, φ343, φ297, φ196, 1625, 600 STROKE, 10
R2~3(ALL AROUND)(SHIP YARD)
1000 MIN, (244)

B5 Motor break knob
(Except to use manual handle always keep break knob operating condition.)

A INSTALLATION
1.AFTER CHOICE OF SETTING POSITION,MAKE A HOLE OF 220 ON BOTTOM PLATE.(IN CASE OF DOUBLE BOTTOM,ALSO ON INTERNAL BOTTOM PLATE)
2.WELD RETRACTION TANK TO SHIP'S BOTTOM PLATE SO AS ITS FLANGE BECOME HORIZONTAL WHEN SHIP SAIL NORMALLY AND PROTRUDED PART SHOULD BE ATTACHED A STREAMLINE COVER ROUND THE TANK.(ATTENTION TO BOW DIRECTION)
3.IF NECESSARY REINFORCING DOUBLING SHOULD BE MADE BY SHIPYARD.
4.MAKE THE REINFORCING RIB AROUND THE RETRACTION TANK BY SHIPYARD.

B MOUNTING OF HULL UNIT
1.CLEAN FLANGE SURFACE OF HOUSING,APPLY FLUID SEALANT ON IT AND PUT THE PACKING.
2.FIX HULL UNIT ASSEMBLY OF WHICH MARK IN BOW DIRECTION AND TIGHTEN BOLTS FIRMLY.
3.TO PREVENT VIBRATION OF HULL UNIT,FIX IT WITH MOUNTING HOLE OF TOP PLATE BY LINKING TO WALL WITH STAY(PROVIDED BY SHIPYARD)
4.IN THE CASE OF FIBERGLASS HULL INSTALLATION,THE HOIST SHOULD BE ISOLATED ELECTRICALLY FROM THE SHIP'GROUND OR EARTHED TO THE ANODE PLATE,REQUIRING PRECAUTIONS TO PREVENT GALVANIC CORROSION.
5.AFTER INSTALLATION,ALWAYS KEEP MOTOR BREAK OPERATING CONDITION

C MAKE SONAR COMPARTMENT FOR EASY ACCES AND WATER PROOF
1.WALL OF SONAR COMPARTMENT SHOULD HAVE SAME THICKNESS WITH BOTTOM PLATE.
2.IN SONAR COMPARTMENT PROVIDE LIGHTING AND STEPS FOR INSPECTION.
3.EVERY CABLE SHOULD BE LAYED IN TUBE AND WATER PROOFED.
4.MAKE ENTRANCE MANHOLE AND COVER SHOULD BE WATER PROOF.

REMARK
1.RESERVE SPACE FOR MAINTENANCE IN THE AREA ENCLOSED BY TWO DOT CHAIN LINE.
2.BOW DIRECTION IS FIXED IN ARROW INDICATION.

Diagram 1.5. Exterior view of the NKF-2800 hoisting device

1.5 Overall system diagram

Sonar system diagram•••••••••••Diagram 1.6

Display
NWZ-207
(19 inch LCD)

Keyboard
NCH-578

RGB Cable 5m

Cable 5m

24VDC 3A *DPYC-2.5

Sub display
NWZ-207
(19 inch LCD)

24VDC 3A *DPYC-2.5

RGB Cable 5m

Sub display
NCH-578

Cable 5m

Speaker
6USFD00010

Processor
NJC-31

Gyro I/F
CMJ-304E

*MVVS20/0.18X6   Fish-Finder Trigger, Signal

*MVVS20/0.18X4   NET meter Trigger, 4-input

*TTYCS-1   GPS compass or GPS

*TTYCS-1   Log, Current meter

*TTYCS-1   Temperature meter

*TTYCS-1   Depth meter

*MVVS20/0.18X6   Gyro (Sync, Step)

Rectifier
5EPUA00030

100VAC 1Φ

24VDC 3A *DPYC-2.5

CFQ-5546 30m

TX/RX unit
NTB-23

CN1~CN4   CFQ-5553-1 10m

CN5~CN8   CFQ-5553-2 10m

CN9~CN12   CFQ-5553-3 10m

CN13~CN16 CFQ-5553-4 10m

Hoisting
device
NKF-2800

Rectifier
5EPUA00030

100VAC 1Φ

24VDC 13A *DPYC-6.0

CFQ-5552 10m

24VDC 5A *DPYC-2.5
(Max.30A at start SHED and FALL)

Option

Rectifier
5EPUA00030

100VAC 1Φ

Storage tank
MPBX31141

*Yard supply

Diagram 1.6 Overall system diagram

2   Names and Functions of Parts

Contents

2

2.1 Names of On-screen Functions

There are two types of screen displays: full screen, "Information Display: [OFF]" (diagram 1), and normal screen, "Information Display: [ON]" (diagram 2). When shipped from the factory, the default is set to full screen. The information display shows measured data and data from external devices to help find schools of fish.

2.1.1 Full screen "Information display: [OFF]"
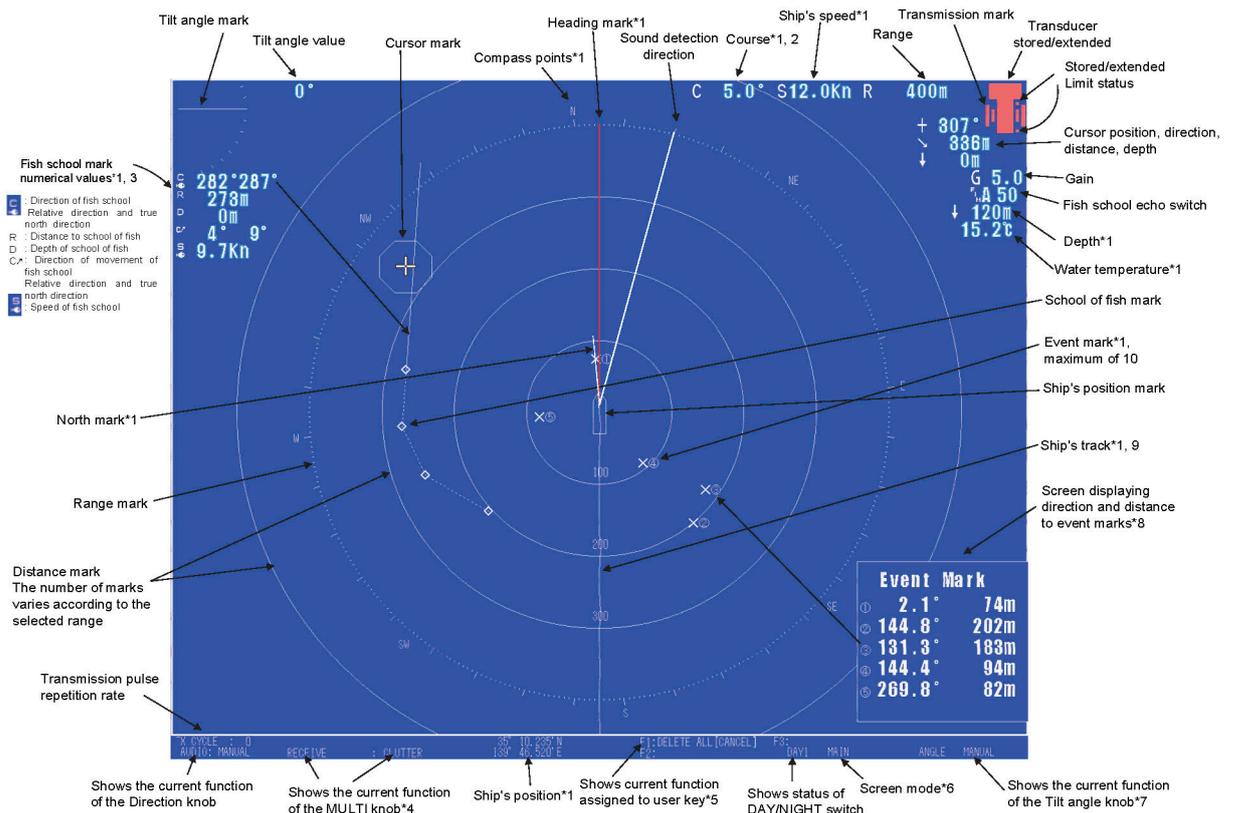
Diagram 1. Full screen "Information display: [OFF]"

*1: To display this, you need the sensors for direction, position, ship's speed, water temperature, and depth.

*2: You can select the ship's speed sensor.

*3: There are three types of direction displays: relative, north direction, and relative + north direction. Refer to section 6.6.1.5

*4: A maximum of eight MULTI knobs can be registered. Refer to item 4.3.4 for how to register and clear them.

*5: Three user keys can be registered: F1, F2, and F3. Refer to item 4.3.3 for how to register and clear them.

*6: Normally it is possible to display MAIN and to display SUB as an option.

*7: Can be switched from manual to automatic. Refer to section 4.4 for the operations.

*8: To display the Direction DISTANCE of the EVENT MARK, you need to set it in the INFORMATION menu. Refer to sections 6.4.1.6, 6.4.2.6, and 6.4.3.6.

*9: The TRACK LINE can be recorded for a maximum of 2 hours. It is deleted if the power is turned to "Off". It cannot be stored to memory.

2.1.2 Normal screen "Information display: [ON]"

Tilt angle value
Sound detection direction
School of fish mark
Compass points*1
Heading mark*1
Ship's speed*1
Course*1, 2
Transmission mark
Range
Transducer stored/extended
Stored/extended Limit status
Ship's information display
Tilt angle mark

Fish school mark numerical values*1, 3
- S : Direction of fish school Relative direction and true north direction
- R : Distance to school of fish
- D : Depth of school of fish
- C↗ : Direction of movement of fish school Relative direction and true north direction
- : Speed of fish school

Cursor position, direction, distance, depth
Fish school echo switch

Water temperature*1
Depth*1
Year, month, date, hours, minutes, seconds*1
Ship's position*1
Current information display
Event mark*1, maximum of 10
Water temperature depth display
Water temperature depth graph*1
Cursor mark
Screen displaying direction and distance to event marks*8
Ship's track*1, 9

North mark*1
Ship's position mark
Range mark
Distance mark The number of marks varies according to the selected range
Transmission pulse repetition rate

Shows the current function of the Direction knob
Shows the current function of the MULTI knob*4
Ship's position*1
Shows current function assigned to user key*5
Shows status of DAY/NIGHT switch
Screen mode*6
Shows the current function of the Tilt angle knob*7

Diagram 2. Normal screen "Information display: [ON]"

*1: To display this, you need the sensors for direction, position, ship's speed, water temperature, and depth.

*2: You can select the ship's speed sensor.

*3: There are three types of direction displays: relative, north direction, and relative + north direction. Refer to section 6.6.1.5

*4: A maximum of eight MULTI knobs can be registered. Refer to item 4.3.4 for how to register and clear them.

*5: Three user keys can be registered: F1, F2, and F3. Refer to item 4.3.3 for how to register and clear them.

*6: Normally it is possible to display MAIN and to display SUB as an option.

*7: Can be switched from manual to automatic. Refer to section 4.4 for the operations.

*8: To display the Direction DISTANCE of the EVENT MARK, you need to set it in the INFORMATION menu. Refer to sections 6.4.1.6, 6.4.2.6, and 6.4.3.6.

*9: The TRACK LINE can be recorded for a maximum of 2 hours. It is deleted if the power is turned to "Off". It cannot be stored to memory.

2.1.3   Transducer status display

Status display area

The storage status is shown in green.

Outline of the status display area

Transducer position display area

Both of the storage status switches are shown in green.
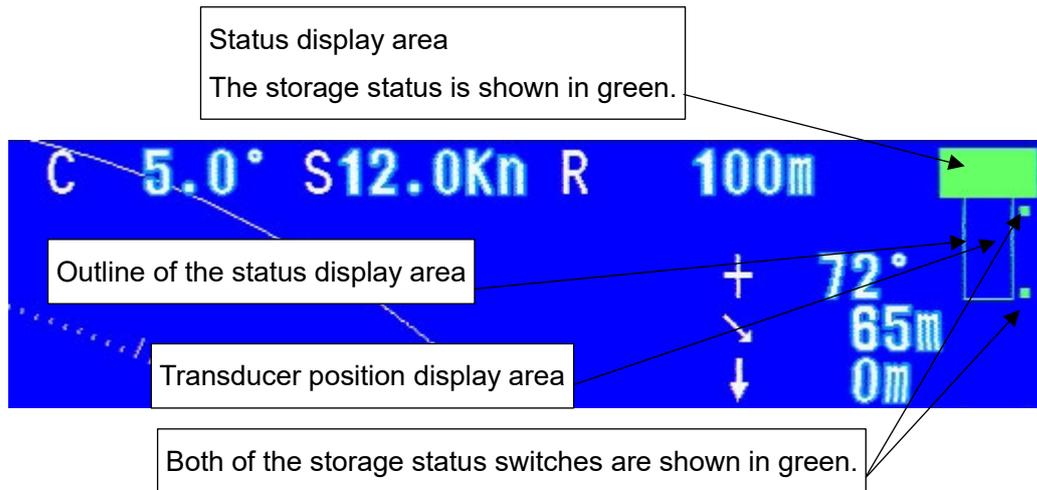
Example of transducer status display

Operation status	Storing	Extension operation starts	Extending	Extension complete
Hoisting buzzer	OFF	ON	ON	OFF
Stored → Extended				
On-screen display	No display	DOWN	DOWN	FALL FINISH
Operation status	Extending	Storage operation starts	Storing	Storage complete
Hoisting buzzer	OFF	ON	ON	OFF
Extended → Stored				
On-screen display	No display	UP	UP	SHED FINSH

2 Names and Functions of Parts

Example of status display when an abnormality occurs

Condition	① Power is turned on	② Power is turned on	③ Power is turned on	④ When extending/retracting
Display example Upper = Retraction limit Lower = Extension limit				
Explanation of status	Retraction limit (Disconnected) Extension limit (Disconnected)	Retraction limit (Disconnected) Extension limit (Connected)	Retraction limit (Connected) Extension limit (Connected)	
Explanation of operations	Retraction operation starts automatically. If the retraction limit does not change to "Connected" within 45 seconds, the top and bottom frames flash, which indicates hoisting is abnormal.	Retraction starts automatically while extended. If the retraction limit does not change to "Connected" within 45 seconds, the top and bottom frames flash, which indicates hoisting is abnormal.	Hoisting abnormal is displayed at startup.	If operations do not finish within 45 seconds when doing retraction or extension operations, while either extended or retracted, it indicates hoisting is abnormal.
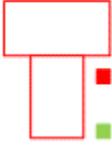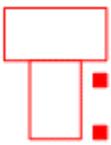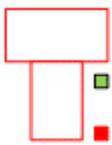
If a hoisting abnormal indication appears, immediately set the power to "Disconnected" and check the hoisting device.

2.2　Names and Functions of the Keyboard
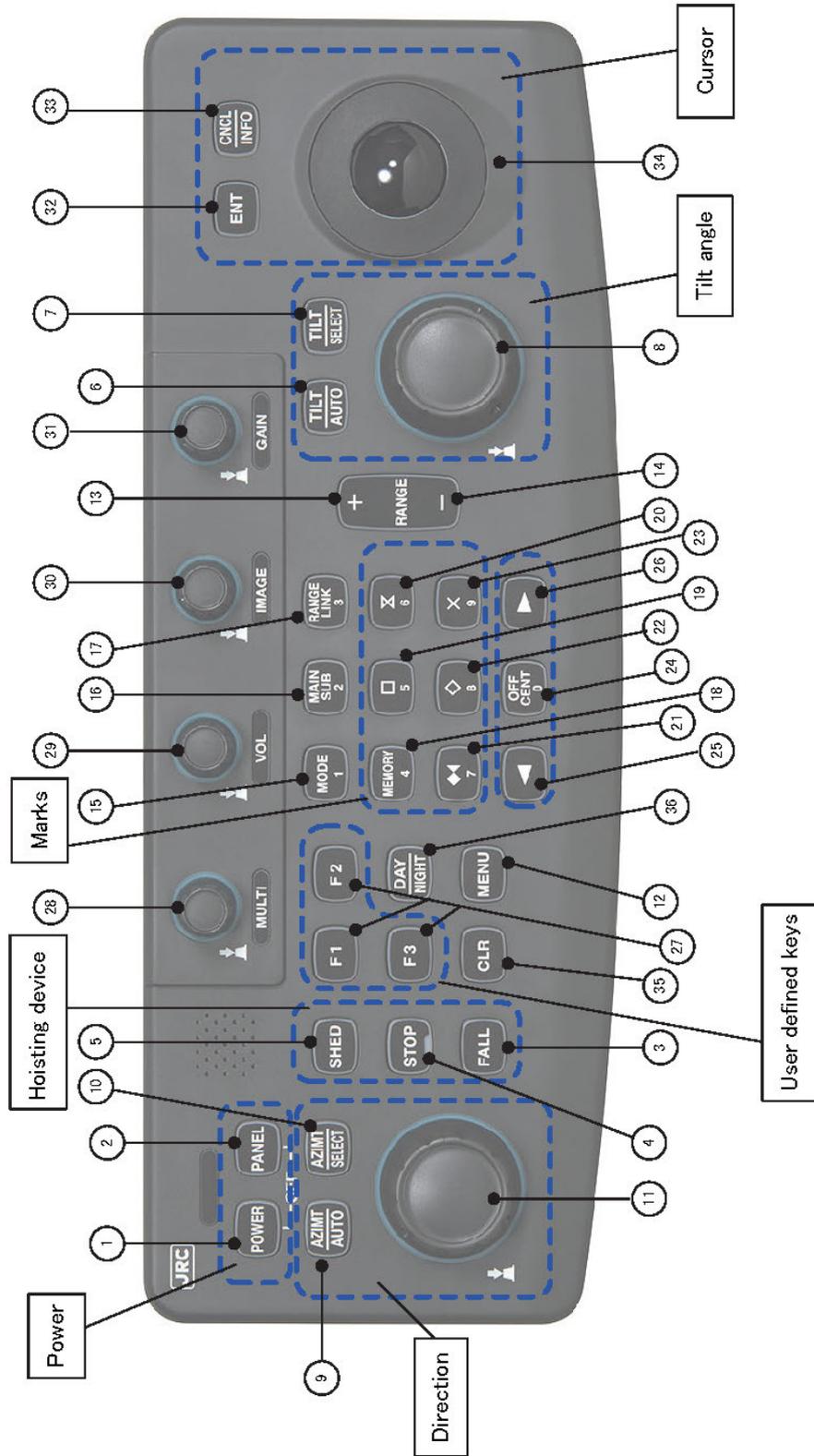
Diagram 2. Controls

① [POWER] key

Use this key when the power is off to turn the power on.

<Power off>	Press and hold the [POWER] key and the [PANEL] key at the same time for about one second. When you hear the confirmation beep, release your fingers from the keys. The transducer retracts if it is extended, and then the power turns off.
<Forced power off>	Press and hold the [POWER] key and the [PANEL] key at the same time for about seven seconds continuously. The power turns off even if the transducer is extended.
	Note: If you do a forced power off while the transducer is extended, you will need to confirm that the oscillator is stored by turning the power back on or by manually storing the transducer from the hoisting device.

② [PANEL] key

Every time this key is pressed the panel lighting gets incrementally brighter. When the brightest level is reached, the setting returns to the dimmest setting.

There are five levels between dimmest and brightest.

③ [FALL] key

Press this key for about five seconds to start extending the transducer.

④ [STOP] key

This equipment does not have a stop function.

⑤ [SHED] key

Press this key to store the transducer.

⑥ [TILT AUTO] key

Press this key to switch between automatic and manual tilt.

Each time the key is pressed the function changes: Auto -> Manual -> Auto .

The automatic tilt angle operation can only be done in the main image.

The tilt angle in the main image switches between linked and not linked operations in the sub image.

⑦ [TILT SELECT] key

If you press this key during automatic tilt, you can switch the setting for automatic range width and the settings for center tilt with the [Tilt angle] knob.

⑧ **[Tilt angle] knob**

You can change the tilt angle with this knob.

You can set the width and center when set to automatic. The tilt angle locks if you press and hold this key. To release the lock, press and hold the [Tilt angle] key again.

⑨ **[AZIMT AUTO] key**

Press this key to switch between automatic and manual direction.

Each time the key is pressed the function changes: | Auto | -> | Manual | -> | Auto | .

⑩ **[AZIMT SELECT] key**

Each time you press this key, you can switch the setting for automatic range width and the settings for center tilt. (when using automatic direction)

⑪ **[Direction] key**

Turn this knob to change the direction of the sound detection.

You can set the width and center when doing automatic sound detection.

⑫ **[Menu] key**

Press this key to open the menu.

When the menu is open, press this button again to close the menu, regardless of the current menu level.

⑬ **[RANGE +] key**

Press this button to increase the range one step (the image scales down).

⑭ **[RANGE -] key**

Press this button to decrease the range one step (the image scales up).

⑮ **[MODE/1] key**

Press this key to switch between display modes.

Each time the key is pressed the display changes: | normal screen | -> | fish finder screen | -> | sound detection screen | .

To select the screen you want to display, go to the "DISPLAY MODE" menu -> "SPLIT DISPLAY" "AUDIO, F/F" menu to set the display screen to "On". The screen you select is displayed.

(The fish finder is only displayed if it is connected.)

⑯ **[MAIN SUB/2] key**

This equipment does not have a main/sub function.

Use the number [2] key, while the menu is open, to do operations.

⑰ **[RANGE LINK/3] key**

Press this key to switch between linked and not linked operations.

Use the number [3] key, while the menu is open, to do operations.

⑱ **[MEMORY/4] key**

Takes a screenshot of the current screen.

Only one screen can be saved. The memory is deleted when the power is turned off.

If you want to keep a screenshot, you can insert a CF card and save the screenshot there. CF cards are options. Contact your retailer.

Use the number [4] key, while the menu is open, to do operations.

⑲ **[□/5] (net depth) key**

Press this key to display a □ mark at the ship's position. From then on, the □ mark is automatically displayed at the ship's position each time the ship advances the distance set for the net depth recorder interval.

Also, a window opens when the net info graph is displayed or is set to display automatically.

In addition, pressing and holding this key removes all the marks.

When the marks are removed, the net info graph window also closes. (When the window display is displayed, it is normally displayed, but the marks in the graph also disappear.)

Use the number [5] key, while the menu is open, to do operations.

⑳ **[✕/6] (buoy) key**

Press this key to display a ✕ mark at the ship's position. (A maximum of 10 can be displayed. If you press the ✕ key too many times, the oldest ✕ mark is removed and a new ✕ mark is added.)

If you place the cursor on a ✕ mark and click it, that mark disappears.

Also, pressing and holding this key opens the CNCL menu.

Use the number [6] key, while the menu is open, to do operations.

㉑ **[◆◀/7] (fish school size)**

Press this key to display a mark indicating the size of the school of fish (octagon of the size selected in the menu) in the middle of which is displayed the calculated value for the level.

When the fish school size display window is displayed or is set to display automatically, this window opens and the level of distribution is shown in a graph.

If there is no target lock key, press this key twice to start tilt angle tracking mode. The mark changes to a ▢ and the tilt angel changes automatically according to the ship's movements. Tilt angle and range operations cannot be done at this time. Also, automatic tracking is canceled if the system enters tilt angle tracking mode while doing automatic tracking.

Press and hold the key to end tilt angle tracking. Marks that have been released change to ⊠.

Marks are released if they go off screen.

If you press the □ mark again during tilt angle tracking, the previous mark is deleted and tilt angle tracking is released. The new fish school size mark appears at the cursor's current position. Even if the cursor is in the same position as the previous mark, a mark is displayed in that position.

In addition, pressing and holding this key removes all the fish school size marks. The fish school size mark is deleted and the fish school size window closes at the same time when the display is set to automatic display.

Tracking is released if tilt angle tracking mode is on.

Use the number [7] key, while the menu is open, to do operations.

㉒ [◇/8] (school of fish) key

Press this key to display a ◇ mark at the cursor's position.

By placing these marks along the movement of the school of fish, you can display the distance and direction from your own ship to the last mark, as well as the calculated speed and direction in which the school of fish is moving. By setting the menus, you can display the directions as relative, north direction, or relative + north direction. For details, refer to the Operation settings and the Screen settings sections.

(A maximum of 10 can be displayed. If you press the ◇ key too many times, the oldest ◇ mark is removed and a new ◇ mark is added.)

Also, pressing and holding this key opens the CNCL menu.

Use the number [8] key, while the menu is open, to do operations.

㉓ [×/9] (event) key

Press this key to display a × mark at the cursor's position.

By setting the event mark to automatic or to display, the event mark appears in the information displays and the display mode menus, so you can display the direction and distance from your own ship with the marks from 1 to 5. For details, refer to the Operation settings and the Information display sections. The newest number is ①, and after one time the number ① changes to ②. (A maximum of 10 can be displayed. If you press the × key too many times, the oldest × mark is removed and a new × mark is added.)

If you place the cursor on an × mark and click it, that mark disappears.

Also, pressing and holding this key opens the CNCL menu.

Use the number [9] key, while the menu is open, to do operations.

㉔ [OFF CENT/0] key

Press this key to switch between center and off center.

Press the [OFF CENT] key again to switch from off center to center.

Also, by pressing and holding this key, the current display becomes off centered. If the cursor is within the range edge, even when centered, the position of the cursor becomes off centered. However, it moves a distance of 2/3 of the largest range ring.

With the menu settings, you can switch the "CURSOR POSITION" and the "Registered Position" at the position in which you press and hold this key.

To set a registered position, use the menus to change off center to a registered position, move the cursor to the position to which you want to move your own ship's position, and then press and hold the [OFF CENT] key to register it. After it is registered, when you press and hold the [OFF CENT] key, while your own ship is in the center position, your own ship's position moves so it is centered in the registered position.

For details, refer to the Operation settings and the Display modes and Off center sections.

Use the number [0] key, while the menu is open, to do operations.

㉕ [◄] (rotate left) key

You can use this key to set the off center position by pressing it within five seconds after the [OFF CENT] key has been pressed. Each time you press this key, the off center direction rotates to the right (counterclockwise) 30°. If the [OFF CENT] key has not been pressed, or if five seconds have elapsed since the [OFF CENT] key was pressed, you can change the Tx pulse repetition rate. The Tx pulse repetition rate increases by 20 each time it is pressed.

It moves an item or a selection up one level, while the menu is open.

When numbers are being input, the number is reduced by one.

㉖ [►] (rotate right) key

You can use this key to set the off center position by pressing it within five seconds after the [OFF CENT] key has been pressed. Each time you press this key, the off center direction rotates to the left (counterclockwise) 30°.

If the [OFF CENT] key has not been pressed, or if five seconds have elapsed since the [OFF CENT] key was pressed, you can change the Tx pulse repetition rate. The Tx pulse repetition rate decreases by 20 each time it is pressed.

It moves an item or a selection up one level, while the menu is open.

When numbers are being input, the number is reduced by one.

㉗ [F1], [F2], [F3], (user defined) keys

The user defined keys, [F1] to [F3], can be assigned special functions, such as menu items or functions, so you can open the desired menu in one operation or execute a function on a menu by pressing a single button. To register a menu item, select the menu item you want to register, then press and hold the number you want to register [F1 to F3] on that item to open the registration menu. Do the registration according to the on-screen procedure. To delete a registration, use [REGISTRATION CANCEL] for menus and other items. For details, refer to the Operation and registration and User defined key registration sections.

Refer to the list of menus section for details about keys that can be registered as user keys.

㉘ [MULTI] (multiple function) knob

Turn this knob to the right (clockwise) while an item is selected in an open menu to move the selected item to the bottom. It will return to the top item after it reaches the very bottom. Conversely, it will return to the bottom item after it reaches the very top.

When a menu is open, an item is selected, and something is selected or a value has been input, that selection or value will change. Turning it to the right (clockwise) moves the selection down or increases the number.

You can set an item by pressing the knob while the desired item is selected.

If no menu is open, the MULTI knob changes the value of items that have been pre-set.

Pressing this knob changes the registered items in sequence.

Also, go to the menu you want to register, and press and hold this knob to open the MULTI knob registration menu. Do the registration according to the on-screen procedure. To delete a registration, use [REGISTRATION CANCEL] for menus and other items. For details, refer to the Operation and registration and MULTI knob registration sections.

Refer to the section about the list of menus for details about keys that can be registered to the multi knob.

㉙ [VOL] knob

Turn this knob to adjust the volume.

Turning it to the right (clockwise) increases the volume.

Also, pressing the knob adjusts the buzzer's volume through the five levels below.

Lowest -> Low -> Medium -> Loud -> Loudest -> Lowest
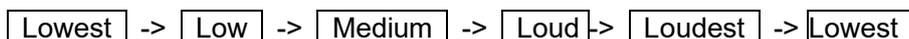
㉚ [IMAGE] knob

Turn this knob to the left or right to change the setting from A to E or E to A.

Alternatively, press this knob to change the numbers to the right of the letters A to E to red numbers in 5 steps ranging from 00 to 99. They change to A00, A05, A10, ...A90, A99, B00, B05, ... , ... E99.

You can save the set values related to the images on the display unit and the transmitter/receiver unit in five sets A, B, C, D, and E.

For each set value, fine adjustments of values, such as for clutter, can be done by changing the numbers 00 through 99. Refer to the section about the list of menus for details about how to make settings.

㉛ [GAIN] knob

Turn this knob to adjust reception sensitivity. Turn it to the right to increase sensitivity.

Sensitivity can be adjusted from 0.0 to 10.0 in 0.1 increments.

㉜ [ENT] key

Use this key to set menu selections or numbers that have been input.

㉝ [CNCL/INFO] key

Use this key to cancel the input of values and to cancel selections in menus.

It operates as the [INFO] key if you press it while no menus are open.

Every time you press this key, the information screen changes from displayed to hidden.

㉞ Trackball

Use the trackball to move the cursor to any position. Use it to do settings in all the modes.

It can be used to specify the off center position.

㉟ [CLR] key

Press this key to turn off the alarm sound when an alarm occurs.

When multiple alarms occur, you need to press this key for each one.

㊱ [DAY/NIGHT] key

This key switches the screen to preset colors and brightness.

3 Operating procedures

Contents

3

3.1　Work flow

> ## Precautions
>
> ● **Do not place anything on the controls.**
>
>   **Especially do not put anything hot on the controls, as it may deform them.**
>
> ● **Do not hit the controls, trackball, or knobs.**
>
>   **Doing so may damage them.**

Turning on the power and extending the transducer

↓

Setting the image range

↓

Storing the transducer and turning off the power
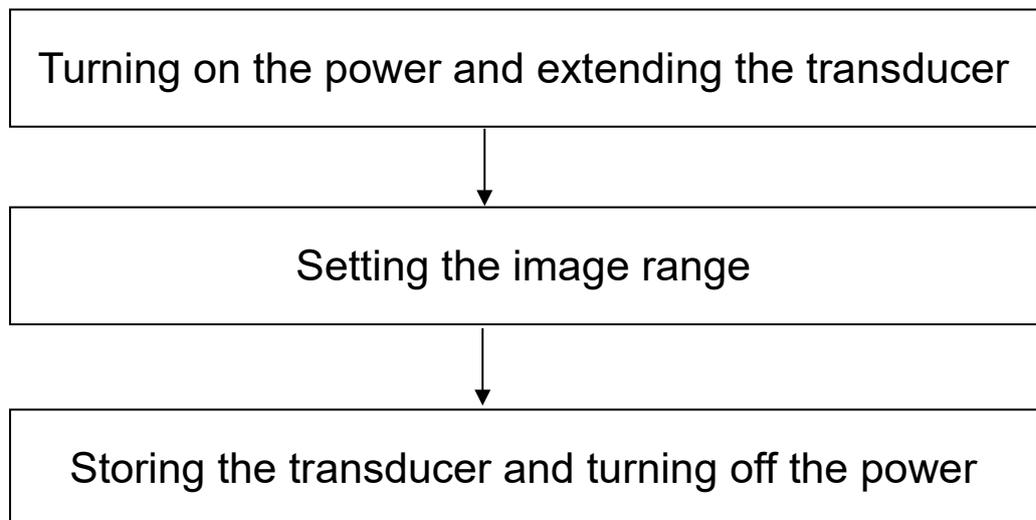
The various operations are explained next.

3.1.1　Turning on the power and extending the transducer

```
┌─ Precautions ──────────────────────────────────────────┐
│                                                          │
│  ● Wait about two seconds after turning off the power    │
│    before turning the power back on.                     │
│                                                          │
│  ● Confirm that the ship's speed is under 15 knots and   │
│    that the depth of the water is at least 3 meters      │
│    before you press the [FALL] key. Not doing so could   │
│    result in damage to the hoisting device.              │
│                                                          │
│  ● The sonar may malfunction if the ship's power supply  │
│    is cut off briefly while the sonar is operating. If   │
│    this happens, turn the sonar off and then back on     │
│    again.                                                │
│                                                          │
└──────────────────────────────────────────────────────────┘
```

Operating procedure

1. Press the [POWER] key.

   The system's power turns on and the normal screen is displayed.

   Confirm that the hoisting device mark is completely green.

   Confirm that the hoisting device is stored.
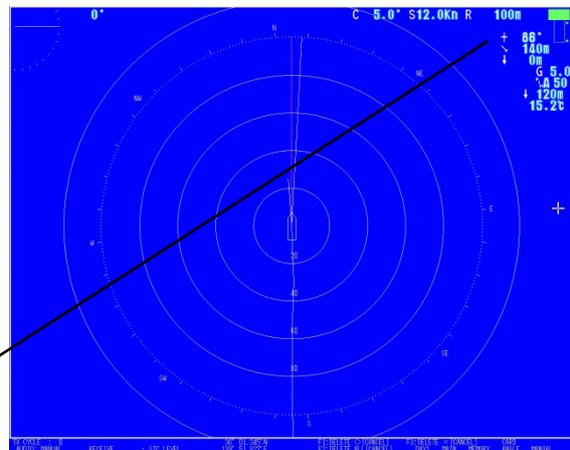
Example of normal screen

2. Press and hold the [FALL] button of the hoisting device for about five seconds. The text [DOWN] appears in the center of the screen and the hoisting device buzzer sounds for five seconds and then the transducer starts being extended.

The extension finishes in about 30 seconds and then the buzzer stops. The transducer mark is completely red, and at the same time, transmissions are started automatically by the "AUTO-TX" operation. (Refer to

2.1.3 Examples of transducer status display for details about the status display.)

Precautions

● **To prevent accidental operations, it does not extend if the button is pressed only briefly.**

● **The storage (up) operation starts after the [SHED] button is pressed and then released.**

3

Stopping extension/storage operations

The sonar's hoisting device cannot be stopped while extending or storing.

3.1.2 Setting the image range: [RANGE], [Tilt angle], and [GAIN]

1. Press the [RANGE +] key and the [RANGE -] key to change the scan range.

   Press the [RANGE +] key to increase the range.

   Press the [RANGE -] key to decrease the range.

   The range can be switched between 16 ranges. You can also select from four types of ranges.

   Refer to the other initial settings and range setting items for details about range settings.

2. Set the tilt angle with the [Tilt angle] knob.

   Turn it to the left (counterclockwise) to make the sonic beam's tilt angle shallower (toward the sea's surface).

   Turn it to the right (clockwise) to make the sonic beam's tilt angle deeper (toward the sea floor).

   The tilt angle can be incremented in steps of 1° from -5° to 60°.
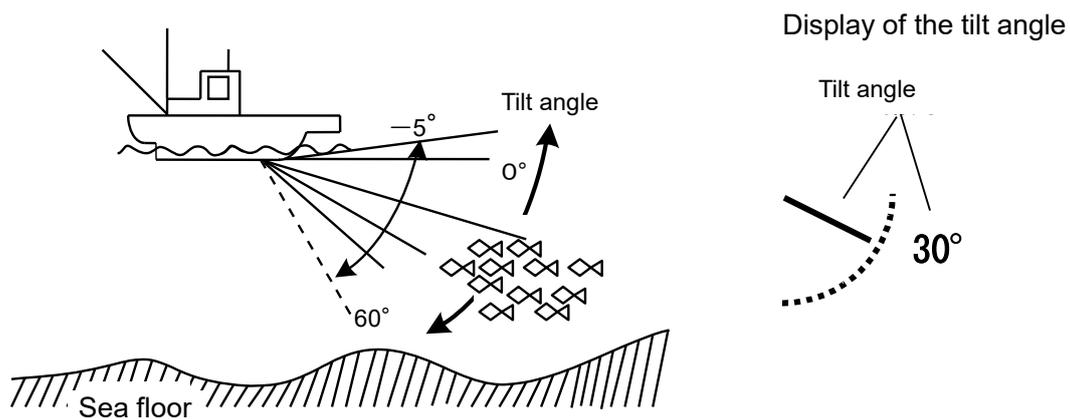
- Changing the tilt angle allows you to detect schools of fish from the surface to the floor of the sea.
- To set the tilt angle, consider the depth of your target fish, the depth of the water and the speed of your ship when you are fishing.

3. Turn the [GAIN] knob to adjust the image's output.

   Turn it to the right (clockwise) to raise the gain.

   Turn it to the left (clockwise) to lower the gain.

- Consider the noise and the type of fish you are trying to catch when you set the gain.

3.1.3   Storing the transducer and turning off the power

End

1. Press the [SHED] key.

   The hoisting mark appears on the screen while the hoisting device buzzer buzzes for five seconds, after which the transducer is stored (raised). The hoisting mark turns green and the status display area flashes. Storage is complete after about 30 seconds. "Storage complete" appears on the screen for a few seconds.

   (Refer to 2.1.3 Examples of transducer status displays for details about the status display.)

2. Press and hold the [POWER] key and the [PANEL] key at the same time. After the beep, release the key. The system automatically enters the "Shutdown" state, and then, after a few seconds, the power turns off automatically.

Precautions

● The ship's speed must be below 15 knots to retract the transducer with the hoisting device.

● When the transducer is extended, pressing the [POWER] key and the [PANEL] key at the same time stores the transducer, and after it is stored automatically turns off the power. However, to be safe, store the transducer before turning off the power.

● If the power does not turn off, press and hold the [POWER] key and the [PANEL] key together for at least about seven seconds. This forces the power to turn off.

● If you force the power to turn off but the transducer does not retract, first check that the hoisting device is not malfunctioning. Then press the [POWER] key again to start the system and check that the transducer retracts.

   Before you turn on the power to start the system, be sure there are no people around the hoisting device. The hoisting device starts storing (raising) the transducer, if it is extended, when you turn on the power.

● If the hoisting device does not store the transducer, refer to the section on repairing malfunctions in the hoisting device to store it. If you cannot store the transducer even after repairing the malfunction, contact your retailer or a service representative.
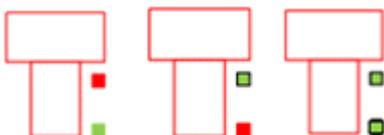
3.2 Menu Configuration

The sonar has many functions that are not on the controls that you can use by using the menu settings.

You can improve the functionality of the sonar by setting it according to what you want to do.

The following is a list of the items that make up the menu.

Menu:	Collection of selectable items for each function.
Top menu:	The menu at the top of the hierarchy.
Submenu:	Menus that are nested in a higher menu.
Menu page:	Menus located on the same level of the hierarchy.
Menu title:	Description of the menu.
Menu history:	History of the titles of submenus that have been accessed.
Menu item:	Functions on menus that can be selected.
Item name:	Description of menu items.
Item value:	Values set for menu items.
Pulldown list:	List used for selecting values for menu items.
Input screen:	Screen in which values for menu items are input.
TIME SET:	Screen for inputting the time setting.
RANGE SETTING:	Screen for inputting the range setting.
COLOR SETTING:	Screen for inputting the color settings for the sonar and fish finder images.

3.2.1 About Menus

In the hierarchy of menus, the highest menu is the top menu. Menus that can be accessed from the top menu are submenus. Menus on the same level that move you to a page are called menu pages.

Press the [MENU] key to open the menus on the right side of the screen.
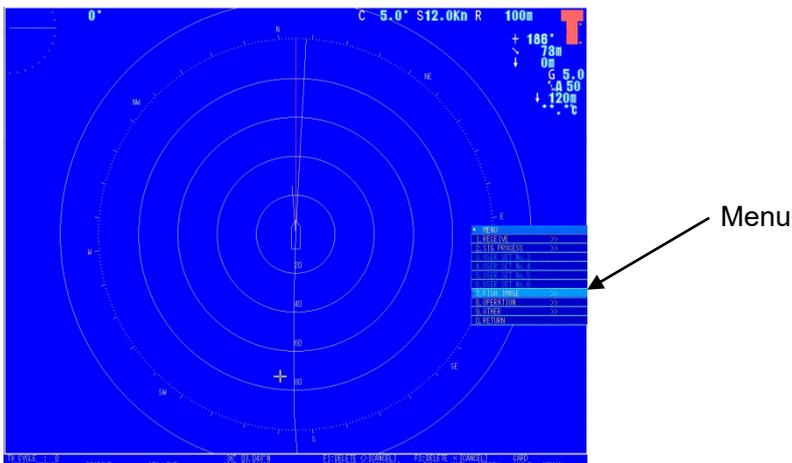
Menu

Menu screen
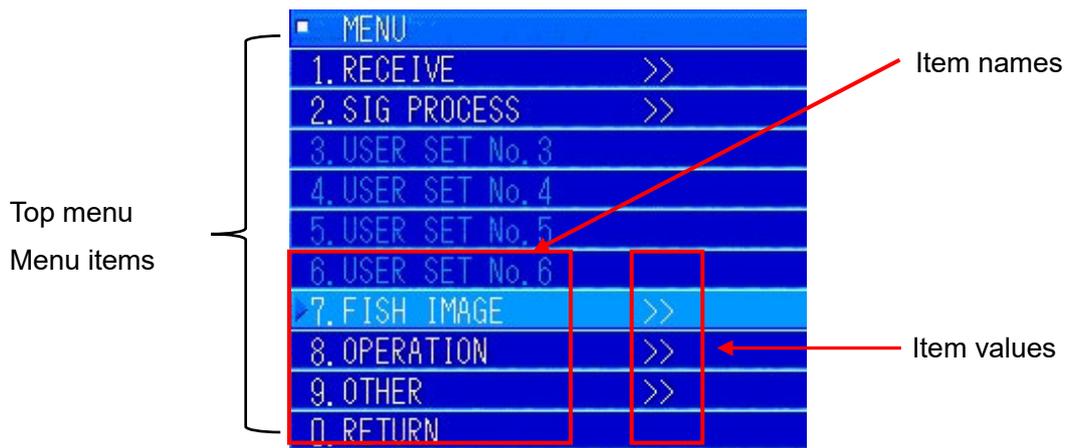
Menu items consist of item names (left side) and item values (right side).

Each menu item is assigned a function that is executed when the item is selected. The types of functions are shown below.

● Move between menus (up or down the hierarchy or within levels)   》

● Selecting pulldown lists   ▼

● Input window display   N/A

Menu title

The title of the menu that is currently open is displayed.

Menu history

If submenus have been accessed, the titles of the higher menus are displayed.

If you return to a higher menu, the menu history display goes back up one level.
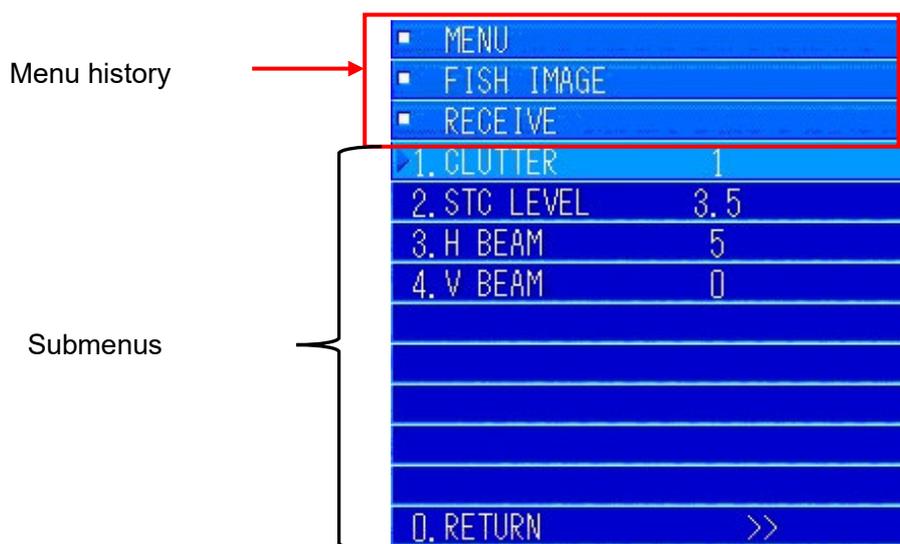
Menu items

Shows the items that can be selected in the menu. Menu items consist of a name "Item name" and a value that is set "Item value".

Item name   Item value

1. CLUTTER   1
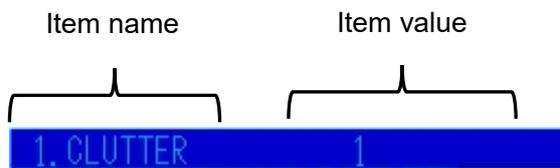
Example of menu item before selection

The currently selected item is highlighted. The assigned function is called up by setting it.

▶1. CLUTTER   1

Example of menu item when selected

Some operations cannot be done until all conditions have been met, depending on the items selected for the menu item. For example, the display shown below is when a fish finder is not connected.

```
▪  MENU
▪  OTHER
▪  INITIAL
   1. RANGE              >>
   2. SENSOR             >>
 ▶ 3. CONNECTION         >>
   4. FISH FAINDER       >>          ◀──────── Operation prohibited
   5. FISH IMAGE         ON ▼
   6. ADJUST             >>
   7. UNIT SET           >>


   0. RETURN             >>
```

Example of menu item that is prohibited

In the above case, the fish finder (device for finding fish) is connected as in the system diagram and item 3 is CONNECTION → SENSOR CONNECTION.

1. When fish finder is set to "Connected", the prohibited operations are enabled as shown below.

```
▪ MENU
▪ OTHER
▪ INITIAL
▪ CONNECTION
▪ SENSOR CONNECTION
 1. F/F 1        CONNECT ▼
 2. F/F 2    1. NO-CONNECT
 3. NET 1    2. CONNECT
 4. NET 2        CONNECT ▼
 5. NET 3        CONNECT ▼
 6. NET 4     NO-CONNECT ▼


 0. RETURN       >>
```

```
▪ MENU
▪ OTHER
▪ INITIAL
▪ CONNECTION
▪ SENSOR CONNECTION
 1. F/F 1        CONNECT ▼
 2. F/F 2        CONNECT ▼
 3. NET 1        CONNECT ▼
 4. NET 2        CONNECT ▼
 5. NET 3        CONNECT ▼
 6. NET 4     NO-CONNECT ▼


 0. RETURN       >>
```

```
▪ MENU
▪ OTHER
▪ INITIAL
 1. RANGE            >>
 2. SENSOR           >>
 3. CONNECTION       >>
 4. FISH FAINDER     >>
 5. FISH IMAGE       ON ▼
 6. ADJUST           >>
 7. UNIT SET         >>


 0. RETURN           >>
```

The item displayed and operation that is selected are different depending on the type of item. The types of items and their operations are shown below.

(1)   Moving between menus (accessing menus up or down the hierarchy and switching menu pages)
Selecting an item moves you to a submenu or returns you to the menu from which you accessed it.

Press the [MENU] key to open the menus.
When there is a ≫ mark in the item value, it moves you to the next menu.
In the example on the left, select [7] or press the [MULTI] Knob, then press [ENT] to move to the "FISH IMAGE" submenu.

Move to the "FISH IMAGE" submenu.
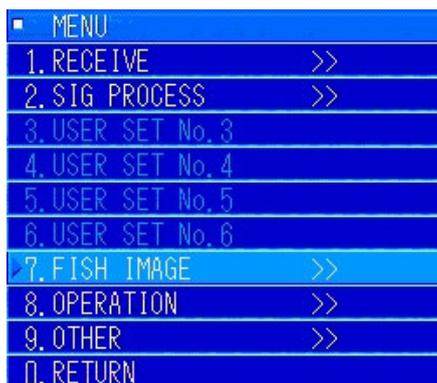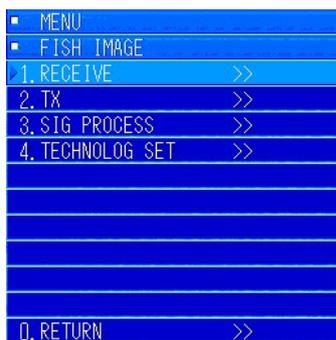
When "0. RETURN" is selected. Returns you to the previous menu.

6. NEXT   ≫

Example of menu items: "Switching menu pages"

0. RETURN   ≫

Example of menu items: "Returns you from the submenu reached by "Next"".

(2) Selecting pulldown lists

A list of selectable items is displayed if this item is selected. Selecting an item from the list opens a pull down list into which entries can be made.

The currently selected value and a " ▼ " indicating it is possible to make an entry on the pull down list appear.

Pull down menu example

Pulldown list example

In the example on the left, selecting "3. TX MODE" with the [3] key or the [MULTI] knob opens the pull down menu. The number of menus varies depending on the item.

In this example, "1. OMNI" is currently selected. To change it, press the [2] key or select it and then press the [MULTI] knob.

(3) Input window display

By selecting this item, an input window for setting the various items is displayed. Item values are shown as blank spaces.

● Time setting
● Sonar range setting
● Fish finder range setting
● Sonar display color setting
● Fish finder display color setting

Plus other functions

Example of menu item

(Time setting input example)

(Color setting input)

Input screen example
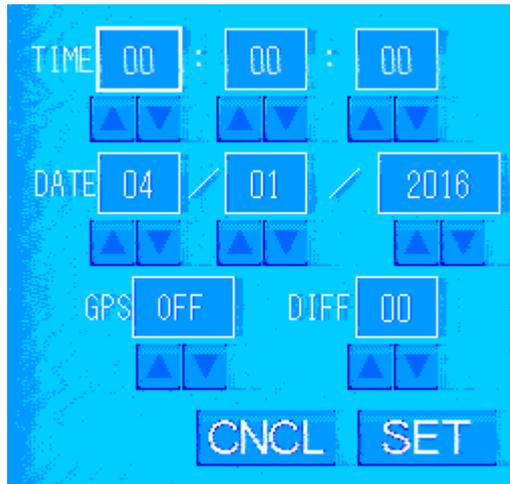
Time setting input screen
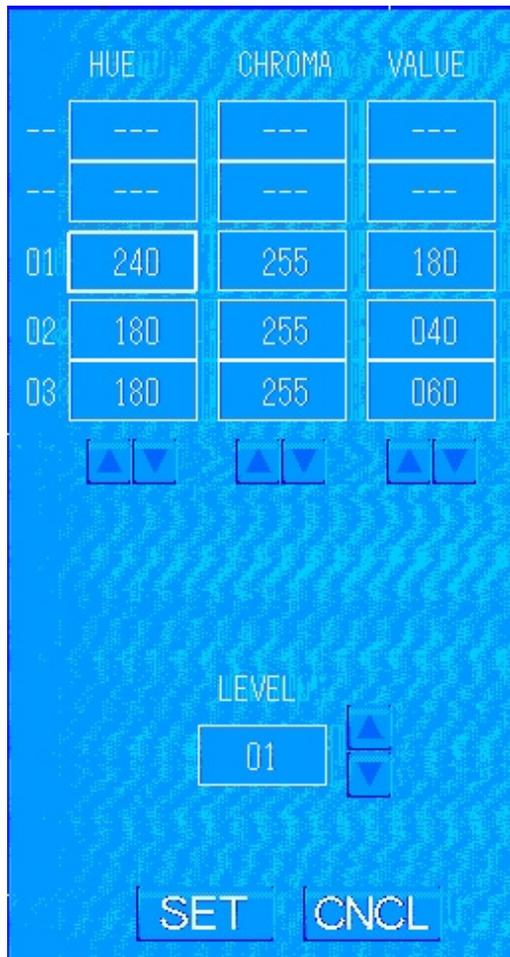
Color setting input screen
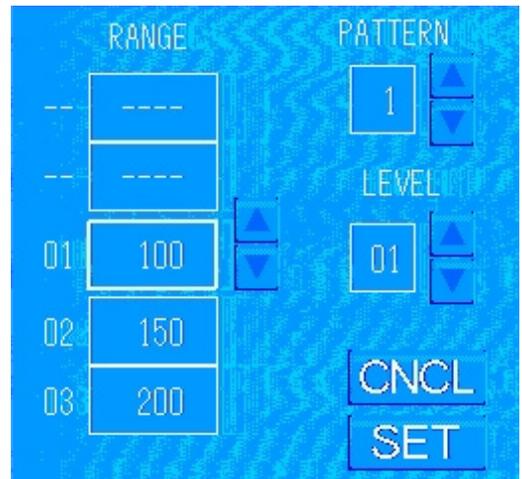
Range setting input screen

3.2.2   **Basic Menu Operations**

The menu can be operated in the following ways.

● The MULTI knob can be used to select items and increase or decrease values.

● The number keys from [0] to [9] can be used to select items and input values.

● The [◄] and [►] keys can be used to select items and increase or decrease values.

● The cursor (trackball) can be used to select items and to input values by using the number keys on the screen to increase or decrease values in value input dialog menus.

Opening menus

Press the [MENU] key to open menus.

Closing menus directly

Press the [MENU] key again to close menus.

You can close the menus from any position in the menu hierarchy.

Closing menus

Return to the first menu, select "RETURN", and set it to close the menus.

If you are in the menu hierarchy, to return to the first menu, repeatedly select and set "RETURN".

Opening the menu on the next level (lower level)

The menus are in a hierarchical structure. You can move to a lower level by pressing the number, [1] to [9], that corresponds to the item number of the menu you want to go to. You can also rotate the MULTI knob to select an item and then press the MULTI knob, or press the [◄] or [►] keys to move to a lower level.

Menu items show "▼" or "$\gg$" if there are selections to display.

Returning to the previous menu (higher level) in the hierarchy

Select and set "RETURN" on the menu to go back to the previous level. You can also press the [0] key or the [CNCL] key on the menu to return to the previous level.

3.2.3 Selecting Items

You can use the number keys, arrow keys, MULTI knob , or cursor (trackball) to select items.

Selecting items with the MULTI knob

(1)   Press the [MENU] key and, while the menu is displayed, rotate the MULTI knob to highlight and move through the items. Select the item you want, and press the [MULTI] knob to set the item.

Turn it to the right to move upward. The selection cycles to the top and then back to the bottom.

Turn it to the left to move downward. The selection cycles to the bottom and then back to the top.

The following is an example of the first menu screen when the [MENU] key is pressed.
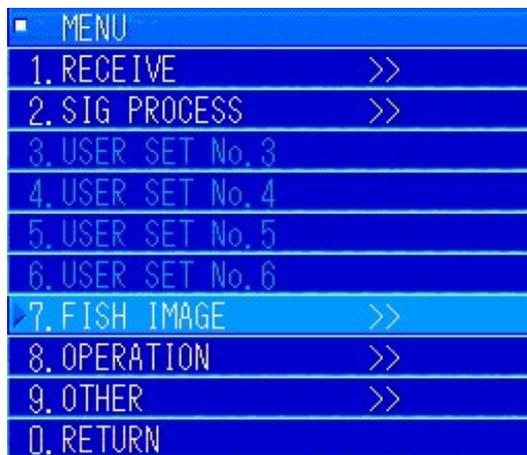
You can add from 1 to 6 menus with the user settings.

←Highlighted item

Top level of a menu

(2)   To select a value or item from a pull down list, use the same procedure as in step (1) to select it and set it.

(3)   If you press the [CNCL] key in step (2), the selection is cancelled and changes to the previously selected item.

(4)   Press the [ENT] key or the [MULTI] knob to set the selected value.

(5)   The set value is reflected on the screen while the selection is selected, depending on the menu item.

(6)   To change an item that you just set, press the [MULTI] knob, while it is still selected, and make a selection to open the [ENT] menu.

(7)   Instead of pressing the [MULTI] key, you can do the same operation, by pressing the [ENT] key, if the cursor has not been moved.

The following is an example of inputting changes to numerical values that are set from pulse length selection.
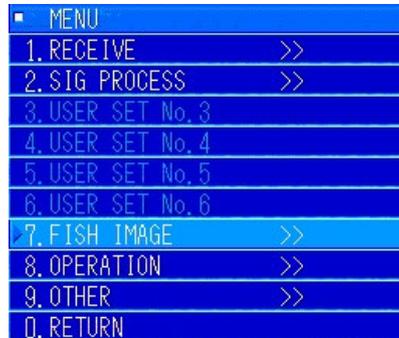
Press the [MENU] key to display the menus.

While "7" is selected, press the [MULTI] knob [image].
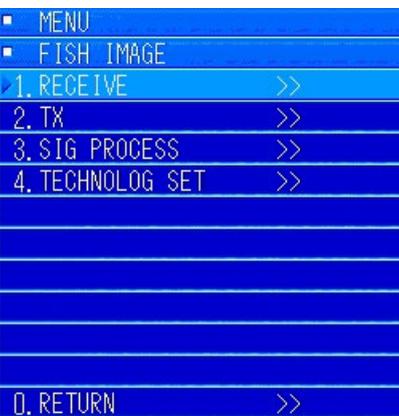
The hierarchy for "FISH IMAGE" is displayed. While "1" is selected, press the [MULTI] knob [image] again to display the "RECEIVE" hierarchy.
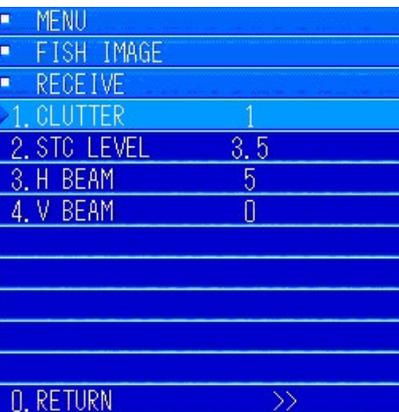
The hierarchy for "RECEIVE" is displayed.

Next, if you press the [MULTI] knob, the "CLUTTER" menu item appears. If you turn the [MULTI] knob to the right and left at this stage, the values will increase and decrease.

▶1. CLUTTER   1   1

Turn the [MULTI] knob to the right to set "3".

▶1. CLUTTER   1   3

[image] Press the [MULTI] knob to set it.

1. CLUTTER   3

Pressing [MENU] closes the "menu" screen.

Precautions

Be careful that you do not move the cursor outside the menu frame while using the [MULTI] knob to do a sequence of operations. Also, be sure that the cursor is outside the menu frame when you press the [ENT] key or [MULTI] knob to set a value or item.

Selecting items with the cursor (trackball)

(1) Press the [MENU] key to open the "Menu", and align the cursor with the item to select to highlight the item. Press the [ENT] key to set the item.

(2) To select a value or item that you want to select from a pull down list, use the same procedure as in step (1) to select it and set it. The selected value is shown in the item and the setting is reflected on the screen or the transmitter/receiver unit.

(3) Depending on the menu item, the setting is reflected on the screen if the cursor is positioned on the menu item.

(4) To change the item you have just set, move the cursor again. Because the item is selected when the cursor highlights it, move the cursor to re-select the item and press the [ENT] key.

(5) If you do not move the cursor and press the [ENT] key, the item where the cursor is located is set. You can select the same item again by pressing the [MULTI] key without moving the cursor.

(6) While the "Menu" is displayed, use the [MULTI] knob or the [▶] key or the [◀] key to move a selection. Confirm that the item you want to set is selected.

(7) Pressing the [MULTI] knob does the same operation as the [ENT] key.

Selecting items with the number keys

(1)　　Press the [MENU] key and, while the "Menu" is open, press the number key that corresponds to the item number to select and set at the same time. A pull down list opens, depending on the item.

(2)　　If you press the number key for the selected value or item number when a pulldown list is displayed, the selected item is set, the pulldown list closes, and the selected value is displayed.

(3)　　To change an item that you just set, press the [ENT] key or the number key for the item number, while it is still selected, to open a pulldown menu.

The following is an example of inputting changes to numerical values that are set from pulse length selection.

```
■  MENU
1. RECEIVE          >>
2. SIG PROCESS      >>
3. USER SET No. 3
4. USER SET No. 4
5. USER SET No. 5
6. USER SET No. 6
7. FISH IMAGE       >>
8. OPERATION        >>
9. OTHER            >>
0. RETURN
```
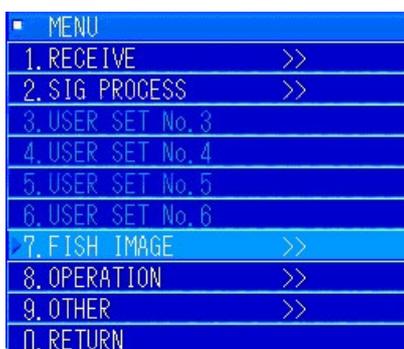
Press the [MENU] key to display the menus.

Press the [7] key to open the "FISH IMAGE" hierarchy.

```
■  MENU
■  FISH IMAGE
1. RECEIVE          >>
2. TX               >>
3. SIG PROCESS      >>
4. TECHNOLOG SET    >>



0. RETURN           >>
```

The hierarchy for "FISH IMAGE" is displayed.
Press the [2] key to display the "TX" hierarchy.

```
■  MENU
■  FISH IMAGE
■  TX
1. TX POWER         10
2. PLUSE LENGTH     10
3. TX MODE         OMNI ▼
4. V BEAM           0
5. SHADING          0
6. TX PRR           0


0. RETURN           >>
```
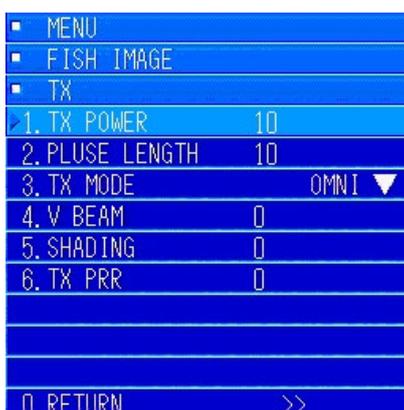
The hierarchy for "TX" is displayed.

Press the [2] key top open the PLUSE LENGTH menu item showing the currently set value is "10". Press the [2] and the [0] keys to set the pulse length to 20 and then press the [ENT] key to set the pulse length to 20. Next, press the [MENU] key to close menus.

2. PLUSE LENGTH   10   10 ←10 is set.
2. PLUSE LENGTH   10   20 ←Input 20.
2. PLUSE LENGTH   20   ←Set with the [ENT] key.

Selecting items with the arrow keys

(1)   While a "Menu" is open, press the [◄] or [►] button to select, highlight, and move an item. Move to the item you want, press the [ENT] key to set the item.
      The [◄] key moves to the previous item (upper) and the [►] key moves to the next (lower) item.
   A pull down list opens, depending on the item.

(2)   To select a value or item that you want to select from a pull down list, use the same procedure as in step (1) to select it and set it.

(3)   If you press the [CNCL] key in step (2), the selection is cancelled and changes to the previously selected item.

(4)   Press the [ENT] key to set the selected value.

(5)   The setting is reflected on the screen while the selection is selected, depending on the menu item.

(6)   When changing an item that you just selected that is still selected, pressing the [ENT] key opens alternative input menus.

(7)   Pressing the [MULTI] knob does the same operation as the [ENT] key.

Example of moving with the arrow keys

Press the [►] key three times to move to item 4. [V BEAM].

Example of moving inside a selection

Pressing the [ENT] key opens the selection menu. In the selection window, every time you press the [►] key the selection moves down. Every time you press the [◄] key the selection moves up.

Precautions

Move the cursor out of the menu frame when doing a sequence of operations using the [►] or [◄] keys. The cursor position has priority if it is inside the frame.

3.2.4　**Entering values**

The menu items in which numbers are entered are highlighted when they are in the number input mode.

To input numbers, you can use the number keys, arrow keys, or MULTI knob.

The number input mode is indicated by highlighting, as in the following example, which shows the item name and the item value. The right side of the item value appears white and the inside the item value and the same value are shown.

The various methods to input numbers can be used to change the numbers.

Number input mode example
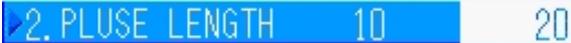
Item names	Item value	Item changed value
	(value before change)	(value that you intend to change)

Inputting numbers with the MULTI knob

(1)　While a "Menu" is open, turning the [MULTI] knob highlights the selected items. Select the item you want, and press the [MULTI] knob or press the [ENT] key to activate number input mode.

(2)　Turn the [MULTI] knob to the right to increase the value one step. Turn it to the left to decrease the value one step.

(3)　If the number exceeds the upper or lower limits, a buzzer sounds and the value does not change. For items with specified input values, if the value is outside the upper or lower limits, the operation cannot be done. When this happens, a buzzer sounds to indicate the value is outside the upper or lower limit.

(4)　For items in which negative numbers can be input, turn the [MULTI] knob to the left to reduce the value one step at a time in the negative direction.

(5)　To redo a setting, press the [CNCL] key to return to the initial value and the status to step (1).

(6)　When the value reaches the desired value, press the [MULTI] knob or the [ENT] key to set the value and reflect it.

(7)　Turning the [MULTI] knob while inputting values with the number keys does the status operations (2) to (6) using the values that are currently input.

(8)　Each time a value is changed the screen reflects the change, depending on the item. However, if you do not do step (6), the values are not set.

Inputting numbers with the number keys

(1)   The number keys from [0] to [9] can be used to input values in value input mode while a "Menu" is open.

(2)   While value input mode is on, pressing a number key reflects the changed value in the item.

(3)   Each time a number key is pressed, the number moves one decimal point to the left so the number that is pressed appears in the first decimal place. If the value exceeds the decimal places that can be input, the extra numbers are invalid. If a value has already been entered, input a 0 if you want to input a value that has fewer digits than the maximum.

Example: When setting [CLUTTER].

The following shows how to change an initial value of 1 to 0.

Initial value = 1 changed to 0

▸1. CLUTTER	1	1

Use the number keys to input 0.

▸1. CLUTTER	1	10

Use the number keys to input 0.

▸1. CLUTTER	1	00

Press the [ENT] to set the value

▸1. CLUTTER	0	

Example: To set 255 when 128 is already set in a 3-digit setting.

"128"→"255"		"128"→"010"	
[ENT] key	Display (set value)	[ENT] key	Display (set value)
Initial status	128	Initial status	128
[2]	282	[0]	280
[5]	825	[1]	801
[5]	255	[0]	010

(4)   For values that include a decimal point, always input to the value below the decimal point, because the decimal place is in a fixed position.

Example: To change a 000.0 setting to 123.0 in a 4-digit input.

[ENT] key	Display (set value)
Initial status	000.0
[1]	000.1
[2]	001.2
[3]	012.3
[0]	123.0

(5)   To redo a setting, press the [CNCL] key. The number input mode is canceled and the initial value that was set is displayed and the entire item is highlighted.

(6)   After you have input the value, press the [ENT] key to set the value.

Precautions

You cannot set negative values by using this method. To do so, use the [MULTI] knob or use the "Arrow" keys to do the setting.

Setting values with the arrow keys

(1)   You can increase or decrease the value of items with the [◄] and [►] keys by moving to a screen in which item values can be changed while a "Menu" is displayed.
Set the value that you want to set and press the [ENT] key or the [MULTI] knob to set the value.
Example: When setting [CLUTTER].
The following shows how to change an initial value of 1 to 0.
Initial value = 1 changed to 0

►1. CLUTTER   1   0

Press the [◄] key one time to set the value to "0".

►1. CLUTTER   0   0

Press the [ENT] key or the [MULTI] knob to set it.

►1. CLUTTER   0

(2)   Each time a value is changed the screen reflects the change, depending on the item. However, if you do not press the [ENT] key or the [MULTI] knob, the values are not set.

3.3   Getting Started

3.3.1   Adjusting the screen brightness
Operating procedure

Turn the [BRILL] knob on the bottom right side of the display to the left or right to adjust the screen so it is easier to see.

Press [BRILL▶] to brighten the entire screen.

Press [BRILL◀] to dim the entire screen.

[BRILL] key

Brightness adjustment button   Power button
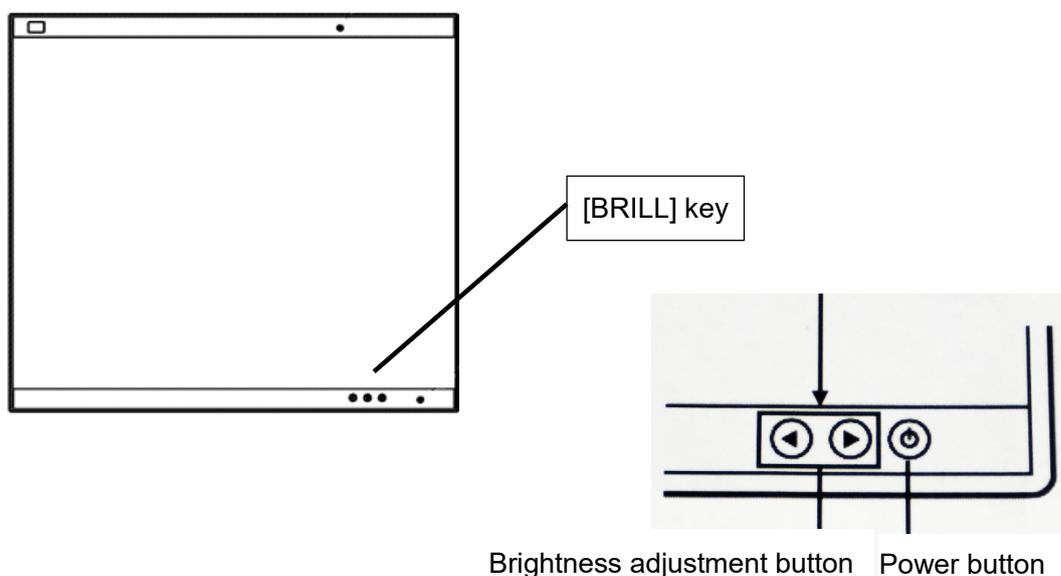
3.3.2   Adjusting the Operation Panel Brightness
Operating procedure

Press the [PANEL] key.

Press the [PANEL] key up to five times to increase the brightness through five levels. Press it again to return to the least bright setting.

Note that the light of the [PANEL] key is not related to the panel brightness adjustment.

3.3.3   Switching between Day and Night Mode
Operating procedure

Each time the [DAY/NIGHT] key is pressed, the mode changes from

Day 1 → Day 2 → Night 1 → Night 2 → Day 1. The current mode is shown at the bottom of the screen.

F3:DELETE × [CANCEL]   CARD
DAY1   MAIN   MEMORY   ANGLE   MANUAL

3.3.4   Adjusting the Volume (Option)

Operating procedure (Speakers are options. : 6USFD00010)

Turn the [VOL] knob to the left or right to adjust the volume.

Turn it to the right to increase the volume and turn it to the left to decrease the volume.

3.3.5　　Adjusting the Buzzer Sound

Operating procedure

You can adjust the sound of the buzzer of the controls by pressing the [VOL] knob.

Each time you press the [VOL] knob, you can adjust the buzzer's volume through five levels.

Each time it is pressed it cycles as shown below.

Lowest → Low → Medium → Loud → Loudest → Lowest
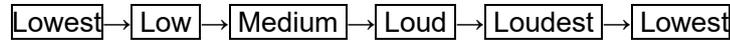
3.3.6　　Stopping the Fish Finder Alarm

Operating procedure

Press the [CLR] key.

The alarm stops.

3.3.7　　Setting the Display Colors

Operating procedure

You can set the sonar display to a maximum of 32 colors and the fish finder to a maximum of 16 colors. It is possible to select color patterns and colors for the text from the available colors.

You can select the sonar imaging and fish finder imaging by pressing the [MENU] key "OPERATION" → "SCREEN SETTING" → "COLOR SELECT".

You can select "M0/M1/M2/M3/U1/U2/U3/U4" for the color pattern of the images and "White/Green/Yellow/Black" for the text.

You can change each of the 32 colors for the sonar image display and the 16 colors for the fish finder image display individually with the "SONAR COLOR" settings in the "F/F COLOR" setting menu.

The initial values set for the sonar image are shown below.

3.3.8　　　TRACK LINE

Operating procedure

Press the keys "8 → 6 → 2 → 5" to go to TRACK LINE settings

It is possible to select from three modes, "Hide, 1 hour, and 2 hours" for the track line.

Press the [MENU] key to open the menus.

Turn the [MULTI] knob to move to "8. OPERATION" and press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "6. SCREEN SETTING" and press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "2. MARK" and press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to select "5. TRACK LINE" and press the [MULTI] knob to select "1. Hide", "2. 1H", or "3. 2H" from the pulldown menu.

The initial value set for the track line is "2H" (two hours).
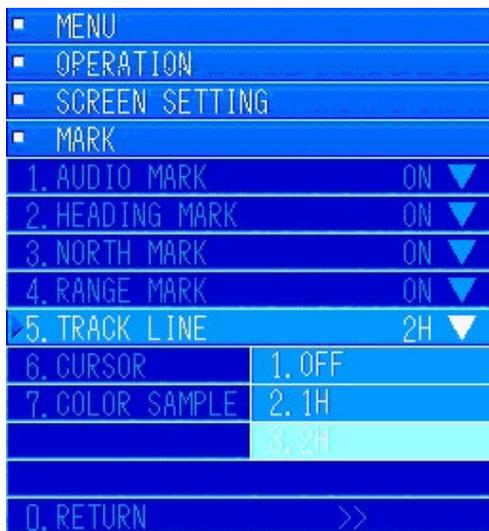
3.3.9　　　Sonar range setting

Operating procedure

The sonar range has four preset range types. The following table shows the settings from 1 to 4. Press the [MENU] key and select "OTHER" → "INITIAL" → "RANGE SETTING" → "SONAR RANGE", and then select from the pull down menu. You can change to any of the various ranges from 1 to 4 from the menus; "OTHER" → "INITIAL" → "RANGE SETTING" → "RANGE" → "SONAR". **For details on the operating procedure, refer to the Initial Settings section.** The initial value set for the sonar range is "RANGE 1".

MENU「9」→「1」→「1」→「3」→「1」SONAR RANGE SET				
RANGE No.	RANGE 1	RANGE 2	RANGE 3	RANGE 4
1	100	100	100	100
2	150	150	200	150
3	200	200	300	200
4	250	250	400	250
5	300	300	500	300
6	350	350	600	350
7	400	400	700	400
8	450	450	800	450
9	500	500	900	500
1 0	550	550	1000	600
1 1	600	600	1100	700
1 2	650	700	1200	800
1 3	700	800	1300	900
1 4	750	900	1400	1200
1 5	800	1000	1500	1500
1 6	1000	1200	1600	2000

Precaution

You need to input a password to set the "INITIAL" internal menus. For details, refer to the Operation section.

3.3.10 **Stabilize**

Operating procedure

Press the keys "7 → 4 → 4 → 1" to go to STABILIZE settings

This sonar has an omni-directional stabilizer function.

You can set the stabilizer function to "ON" or "OFF". It is normally set to "ON".

Press the [MENU] key to open the menus.

Turn the [MULTI] knob to move to "7. FISH IMAGE" and press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "4. TECHNOLOG SET" and press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "4. TX/RX CALIB" and press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to go to "1. STABILIZE" and open the "Pulldown list".
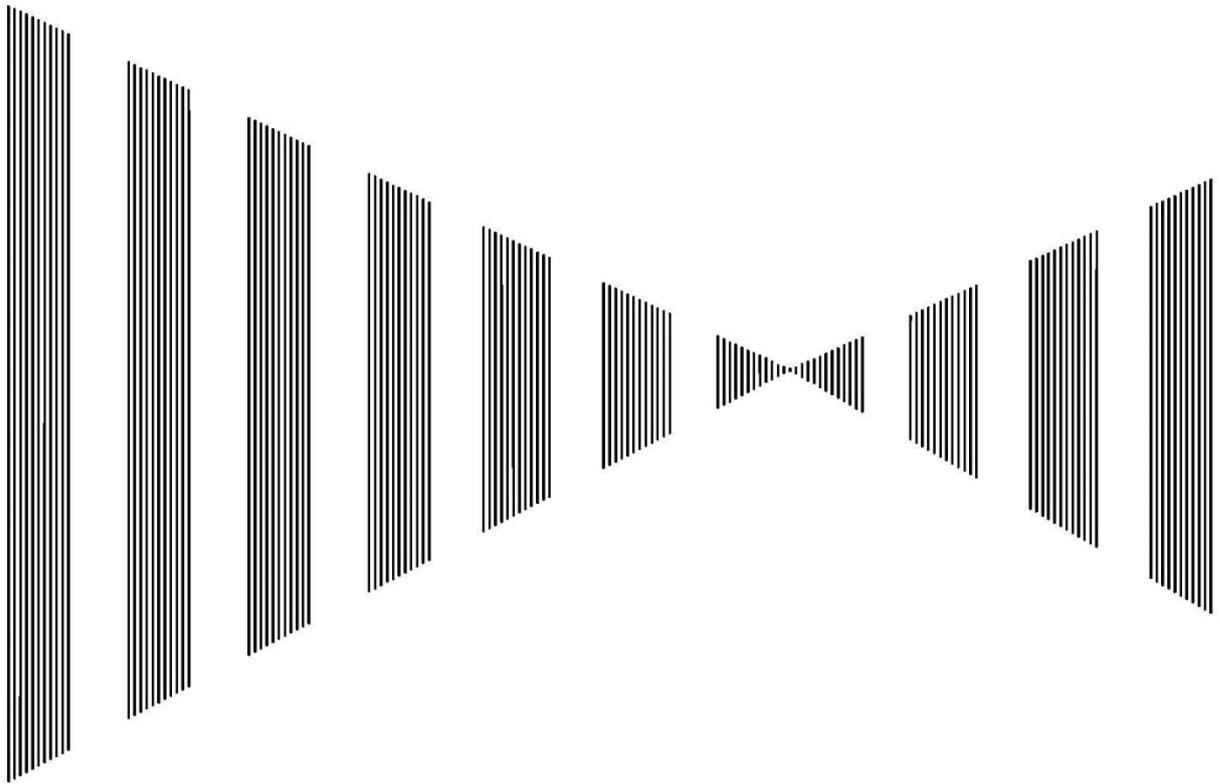
The initial value is set to "ON".

To turn [STABILIZE] "OFF", select "1. Off" from the pulldown menu and press the [MULTI] knob to select it.

Note) We recommend that this be set to "ON" unless the stabilizer sensor is malfunctioning.

3

4   Operations

Contents

4

4.1 Operations

4.1.1 Tilt angle

Operating Procedure

You can change the tilt angle from -5° to 60° by turning the [TILT ANGLE] knob. Turn the knob to the right to make the tilt angle deeper and turn it to the left to make it shallower.
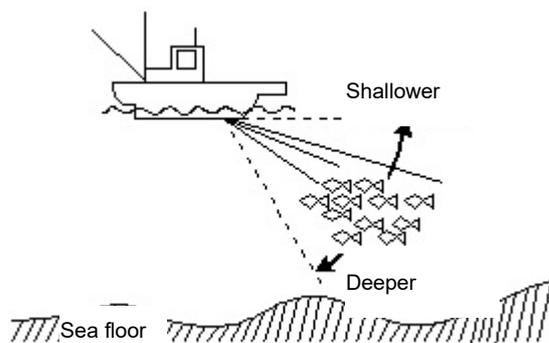
Use this to adjust the tilt angle according to the depth at which the schools of fish are distributed and the distance from your ship to the schools of fish.

Schools of fish that are deep under the surface of the sea can be detected from far away with a shallow tilt angle. However, as they come closer to the ship, you need to make the tilt angle deeper.

You will not be able to see schools of fish that are very deep at the same tile angle as they approach your ship.

School of fish found far away
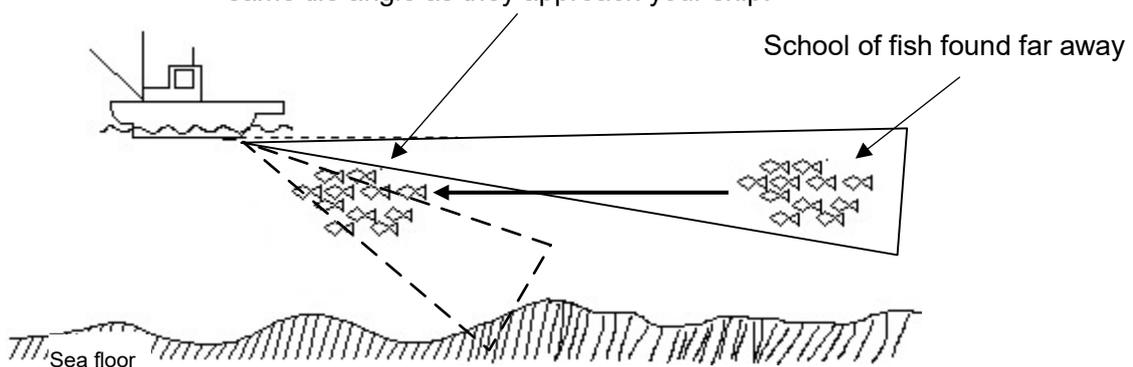
Precautions

The sound waves that are emitted from the sonar have a tendency to spread. You can search a wider range because the width of the emitted sound waves expand as they move away from your ship. Because of this, you can see schools of fish that are deep under the surface of the sea. As the fish approach your ship the angle of the cone of the emitted sound waves narrows. Because of this, the fish will leave the range of detectability as the tilt angle becomes shallower. It may be necessary to deepen the tilt angle according to the depth of the school of fish.

4.1.2 Automatic Tilt Angle Settings
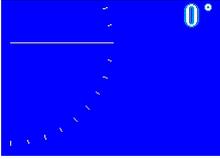
Manual Tilt Angle Settings

When doing manual tilt angle, the tilt angle display shows 0°.
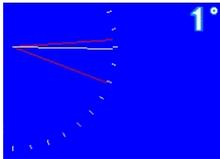
Automatic Tilt Angle Settings

 You can change the tilt angle automatically by pressing the [TILT AUTO] key.

Press the [TILT AUTO] key to switch to "AUTO TILT". Then press the [TILT AUTO] key again to change to "MANUAL TILT".
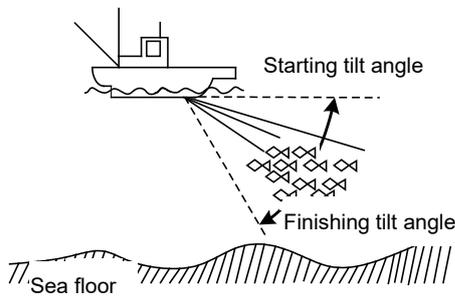
You can search for schools of fish vertically in a wide range by using auto tilt to automatically scan the width of the range that has been set as the center of the tilt angle set for the current manual tilt angle.

Also, by pressing the [TILT SELECT] key, you can switch the [Tilt Angle] knob settings for auto width (width of the automatic range) and the settings for automatic centering (center tilt).

In Auto Centering: Turning the [Tilt Angle] knob to the right (clockwise) lowers the center value of the auto tilt angle by 1°. (towards the sea floor)

Also, automatic centering is not recorded if the power is turned off, so the center value is always set manually at first.

The center moves without changing the range of the automatic tilt angle.
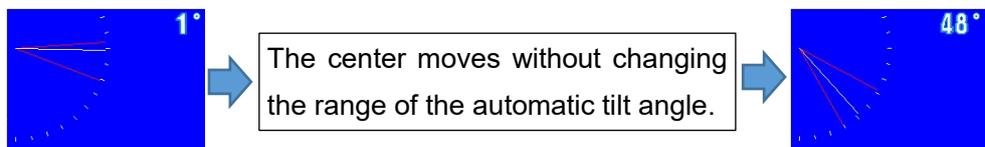
In Auto Range: Turning the [Tilt Angle] knob to the right (clockwise) widens the width of the automatic tilt angle by 2°. Turning it to the left (counterclockwise) narrows it by 2°.

Also, the automatic width is recorded, even if the power is turned off.

You can change the width of the automatic tilt angle to "1/2/5".

The range widens without changing the center of the automatic tilt angle.
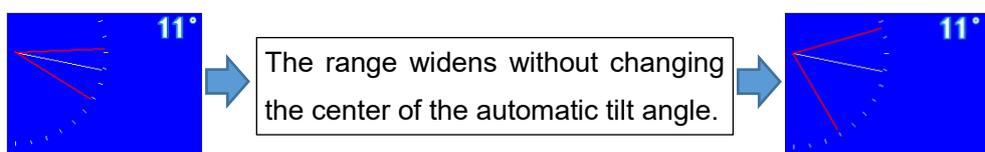
4.1.3 Manual Sound Detection

You can listen to the sound of the image that is shown on the screen. It is possible to understand whether or not a school of fish exists, and its density, from the sound, without looking at the image.

Operating Procedure

To align the direction at which you want to hear the audio, turn the [DIRECTION] knob on the controls to the left or right. The AUDIO MARK is shown on the screen as a white line.

Set whether to show or hide the AUDIO MARK by selecting [MARK] in OPERATION - SCREEN SETTING. The initial value is set to "SHOW".

The initial value of the Direction steps of the [DIRECTION] knob is set to 3°.

To change it, refer to the MENU OPERATION, SPLIT DISPLAY SET, and AUDIO sections.

To adjust the volume of the audio, turn the [VOL] knob on the controls to the left or right.

AUDIO MARK
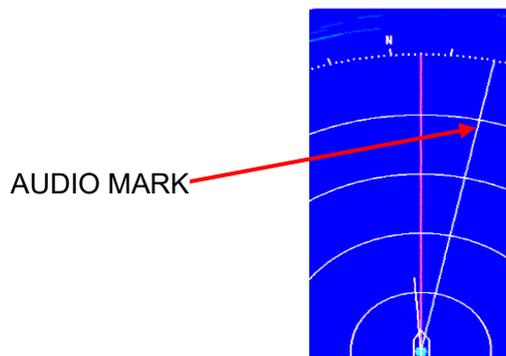
4.1.4 Automatic Sound Detection

Set the direction range of the screen and move the temporary step value that was set so you can listen to the sound of the image as the directions move.

Operating Procedure

Turn the [DIRECTION] knob to set the direction of the center.

Press the [AZIMT AUTO] key to display the direction range line on the screen.

You can adjust the width of the direction range and the center direction each time you press the [AZIMT AUTO] key.

Press the [AZIMT AUTO] key to move to range selection.

Turn the [DIRECTION] knob to the right to widen the range.

You can change the center position by pressing the [AZIMT AUTO] key again.
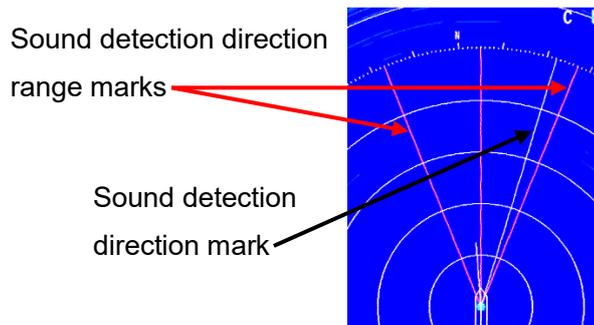
To cancel automatic sound detection, press the [AZIMT AUTO] key again to move to manual sound detection.

Sound detection direction range marks

Sound detection direction mark

Example of setting automatic sound detection

Sound detection
direction
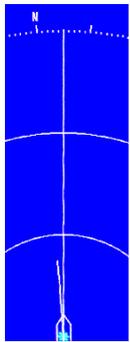
Press the [AZIMT AUTO] key.
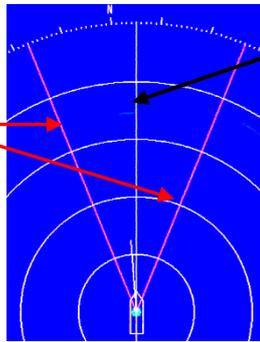
Sound detection direction
moves automatically

Shows the
range

Direction
moves
automatically
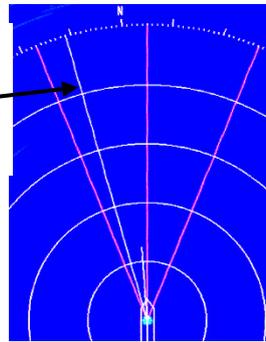
Example of automatic sound detection range settings

Automatic sound detection
direction is moving
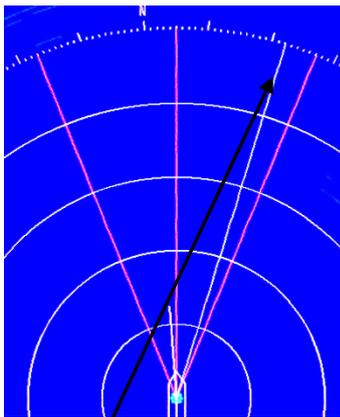
Press the [DIRECTION] knob to maximize
the automatic sound detection range

Sound detection direction
moves automatically
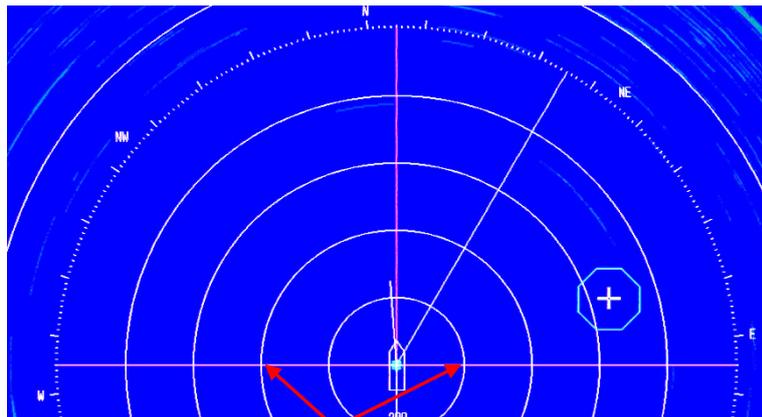
Maximum range (180° left to right) of
automatic sound detection

The initial value of one step of the sound detection direction is set to 3°. You can change the steps to "1/2/3/4/5/10".

4.1.5 Transmission pulse repetition rate

If there are many ships around, you may receive interference from other sonars or fish finders that are using the same frequency as you.

In addition, if you are using a short range setting, the previous transmission image may, on rare occasions, appear on the screen. This may be improved by changing the transmission pulse repetition rate.

Example: Image of interference

Ring shaped interference wave from other ships
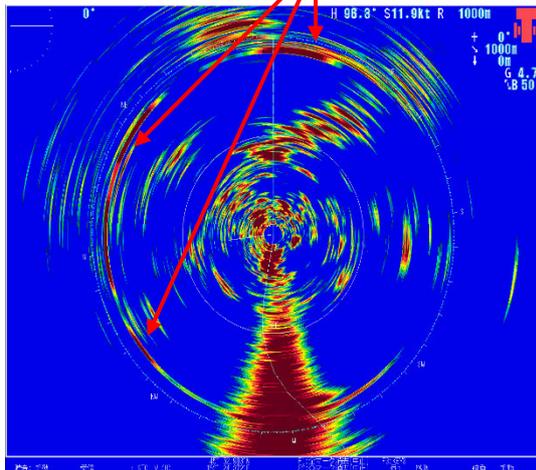
Example of changing the transmission pulse repetition rate so it does not appear in the image
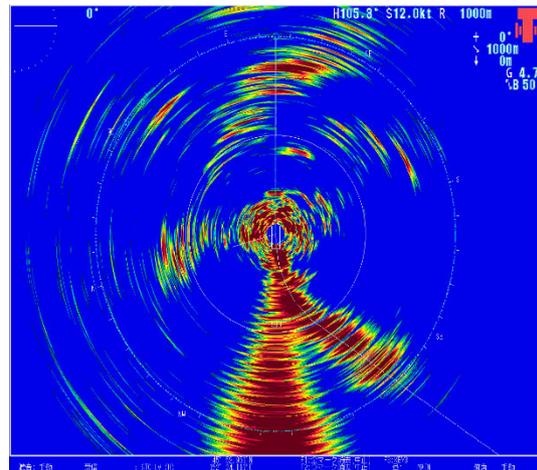
Example: False echo image of the sea floor in shallow waters

If the sea floor is at 800 m, it appears in the image if the range is set to 1000 m.
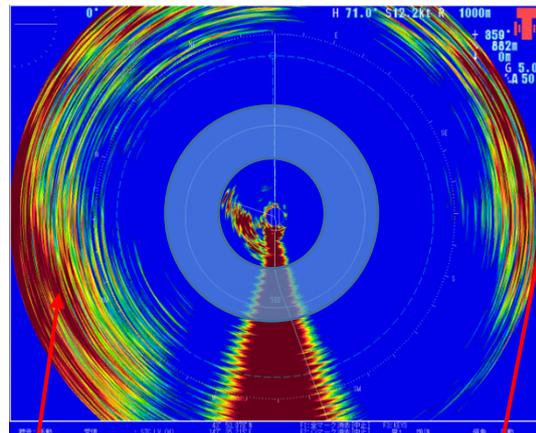
Images that do not appear at a 500 m range appear at a 1000 m range.
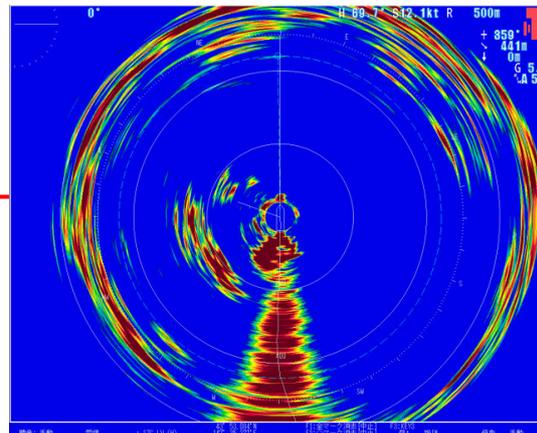
Image of shallow sea floor   An image appears where there is actually no image. [FALSE]

Slowing the transmission pulse repetition rate eliminates the false echo.
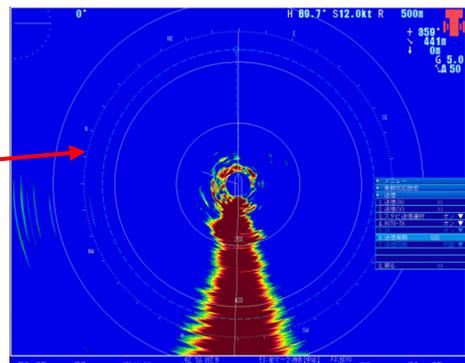
Changes to the transmission pulse repetition rate are done in two ways: directly on the controls or by opening the menus and doing the settings.

Operating Procedure

Procedure to change the transmission pulse repetition rate by using the [◄] and [►] keys on the controls.

Every time you press the [►] key, the value increases by 20. Press the [◄] key to reduce the value by 20. You can change the setting range from 0 to 100.

The transmission pulse repetition rate is shown at the bottom left of the screen.

 You can set 100 by pressing [►] five times.

Procedure to change the transmission pulse repetition rate from the menus.

Press the [MENU] key and select "FISH IMAGE" → "TX" → "TX PRR" and then turn the [MULTI] knob to the left or right. Use the number keys to input a number.

You can input values in steps of 1 from [MENU].

4.1.6 Cursor Movements and Operations

The cursor mark is used to specify positions in various operations.

The cursor mark is moved to positions by moving the trackball.

You can change the shape of the cursor mark in [MENU]. The shape also changes automatically, depending on the cursor's position.

There are three shapes, , , and , from which you can select in [MENU].

Use a cursor mark shape that is easy to see.

The initial value is set to "FRAMED".

If is selected, the cursor appears as a large "+" mark when it is being moved.

The cursor while it is stopped is . The cursor while it is moving is

If [MENU] is displayed. The cursor changes to the shape for selecting items in [MENU]. When it is this shape, the cursor position in the upper right changes to "****" so the cursor position is not shown.
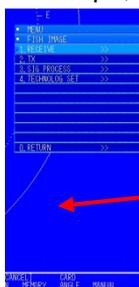
Moving the cursor position inside "MENU" or up and down the [MENU] display while [MENU] is shown changes the shape of the cursor and the position does not show.
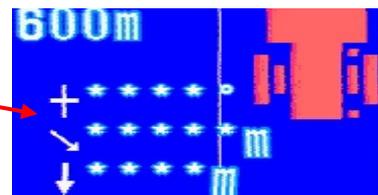
The cursor returns to its normal shape when [MENU] closes or the cursor position moves out of the [MENU] display area.

If you move the cursor position to within the [MENU] display, the color of the menu item at the cursor's position changes to the selected color. If you press the [ENT] key, a submenu appears on the left side of the menu screen.
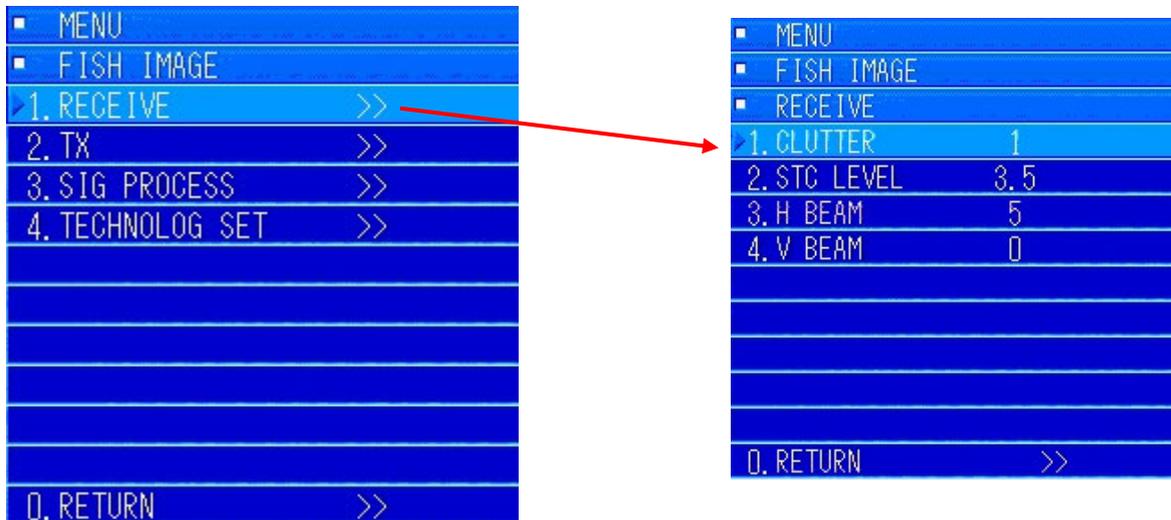
4.1.7 Off Center Display

This function shifts the display of the position of your own ship in the screen. If you want to scan the area in front of the ship or to widen the area you want to see on the port or starboard side, press the [OFF CENT] key. You can now change the position of your own ship.

There are three types of off center function. Pressing the [OFF CENT] key gives 30° steps off center, pressing and holding the [OFF SET] key moves the "CURSOR", and "MEMORY POINT". To change the [OFF CENT] function after pressing and holding the button, press the "MENU" key, select "OPERATION" → "DISPLAY MODE" → "OFF CENT", and then select either "CURSOR POSITION" or "MEMORY POSITION". The initial value is set to "CURSOR POSITION".

When the [OFF CENT] key is pressed, the range of motion of your own ship, in relation to the set range, moves to a maximum of 3/4 of the position. If you short-press the [OFF CENT] key, it moves to 3/4 of the position of the set range. If you use the "CURSOR POSITION" or the "MEMORY POSITION", it moves from the center of the screen to 3/4 position of the set range, which can be any setting.
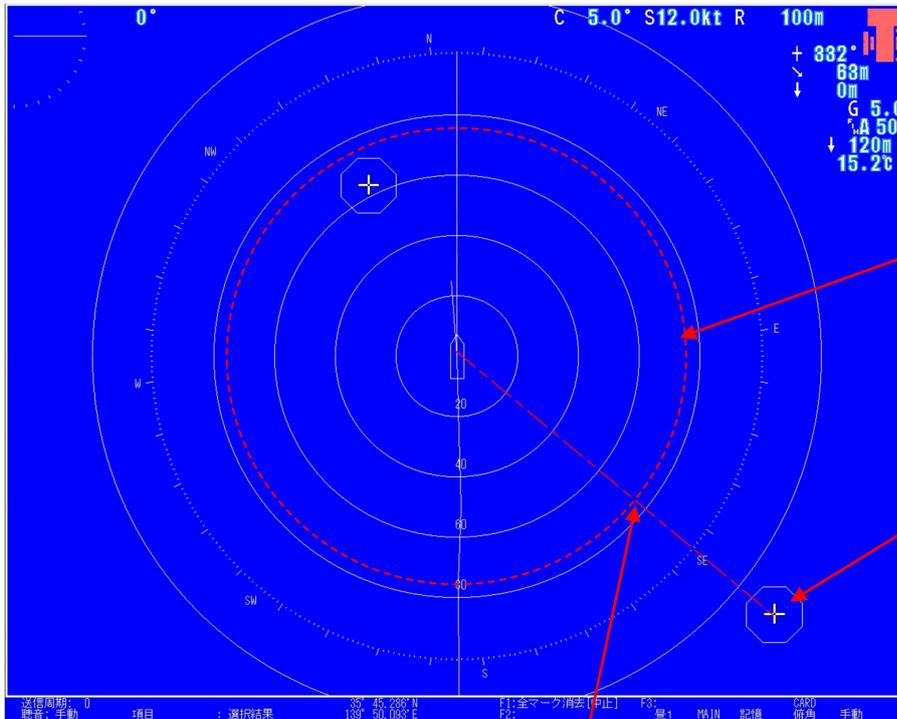
Maximum off center position

Position B

When you long-press the [OFF CENT] key, your own ship's position moves to the maximum off center position, where it intersects a straight line between the cursor position and the center position of the screen cursor position, if the cursor position is in the "B position".

● "30° step off center"

Operating Procedure
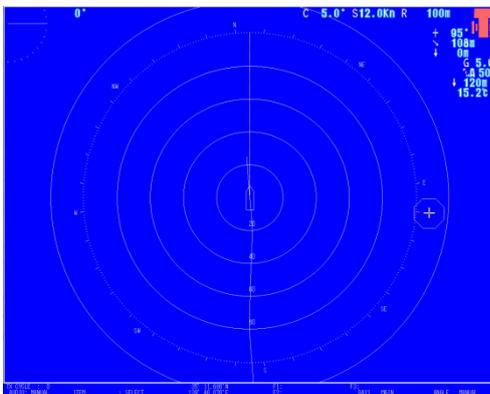
The screen on the left is in the center position.

The off center moves to 3/4 of the position of the range. Example: If the range is 100 meters. It can move 75 meters from the center position.
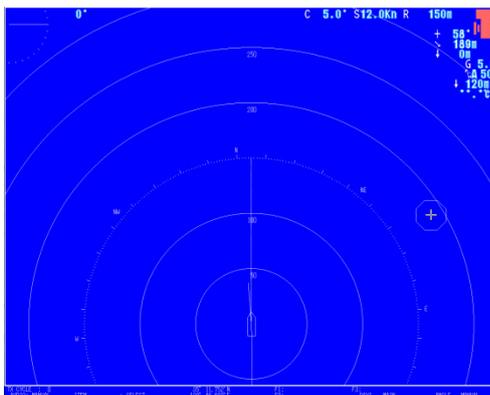
If you press the [OFF CENT] key, it moves to the off center position.

If you press the [▶] key within 10 seconds after pressing the [OFF CENT] key, your own ship's position moves in 30° steps in a clockwise direction. If you press the [◀] key, your own ship's position moves in 30° steps in a counterclockwise direction.

● Off center move to cursor position

Operating Procedure Press the keys "8 → 2 → 4" to go to OFF CENTER settings

Press the [Menu] key.

Turn the [MULTI] knob to move to "8. OPERATION" and press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "2. DISPLAY MODE" and press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob and confirm that the setting for "4. OFF CENTER" is "CURSOR POSITION". (The initial value is set to CURSOR POSITION.)

Move cursor

The ship's position moves

Procedure to move off center to the cursor position

Move the cursor to the position you want to move your own ship.

Long-press the [OFF CENT] key.

Your own ship moves to the cursor position.

To cancel off center, press [OFF CENT] and your own ship will return to the center of the screen.
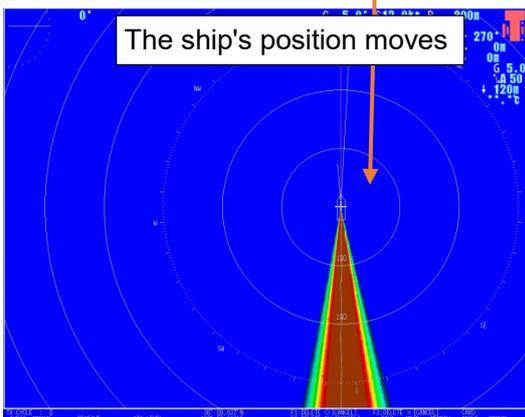
If off center is set to the cursor position, every time you want to move the off center position to the cursor position, long-press the [OFF CENT] key.

● "Off center move to registered position"

Press the keys "8 → 2 → 4" to go to OFF CENTER settings

Press the [MENU] key to open the menus.

Turn the [MULTI] knob to move to "8. OPERATION" and press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "2. DISPLAY MODE" and press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "4. OFF CENTER" and press the [MULTI] key to open the pulldown list. Select "2. MEMORY POINT" from the menu and press the [MULTI] knob to set it.

Move the cursor to the position you want to register as off center.

Long-press the [OFF CENT] key to register.

Procedure to register off center and procedure to move off center

Move the cursor to the position you want to register.

Long-press the [OFF CENT] key.

The center of your own ship moves to the cursor position and is registered.

If you press the [OFF CENT] key, your own ship's position moves to the center of the screen.

The next time you press [OFF CENT], your own ship will move to the registered position.
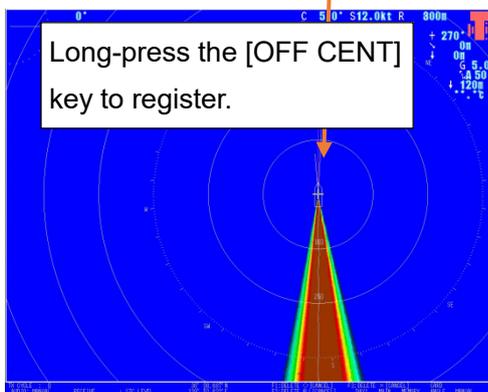
4.1.8 Operating and Clearing Alarms

In the menu settings, you can turn the alarm on and specify the ANGLE, DISTANCE, AREA SIZE, LEVEL, AMOUNT, and LOST COUNT on the screen display so that if a school of fish is detected within this area an alarm sounds. You can turn off the alarm by pressing the [CLR] key.

The initial settings are set to "ALARM = Off", "ANGLE = 90°", "DISTANCE = 300", "AREA SIZE = Mid", "LEVEL - 15", "AMOUNT = low", and "LOST COUNT = low.

Operating Procedure **Press the keys "8 $\rightarrow$ 1 $\rightarrow$4 $\rightarrow$ 1" to go to ALARM settings**
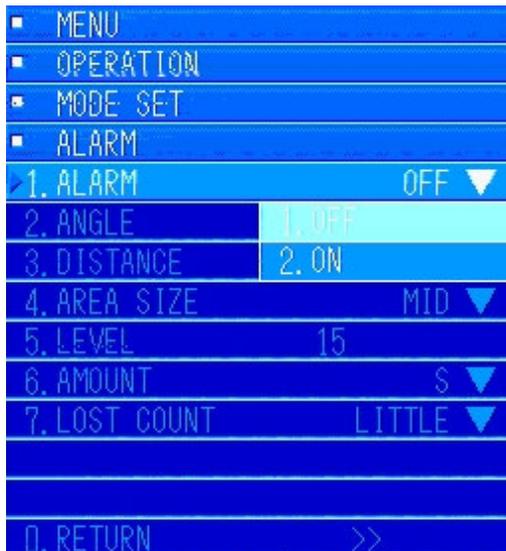
Press the [MENU] key to open the menus.

Turn the [MULTI] key to move to "8. OPERATION" and press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "1. MODE SET" and press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "4. ALARM" and press the [MULTI] key to open the submenu. Turn the [MULTI] knob to move to "1. ALARM" and press the [MULTI] key to display the pulldown menu.

Turn the [MULTI] knob to move to "2. ON" and press the [MULTI] knob to select.

"ALARM" changes to "ON" in the submenu.

When you turn "ALARM" to "On", the alarm setting range appears on screen.

Alarm Setting Range

4.1.9 Automatic Tracking Operation [◆◀]

Operating Procedure

If you put the cursor on the image of a school of fish and then press the [◆◀] key twice, the

direction, tilt angle, and distance from your own ship, at the time the school of fish were marked, are used to calculate the tracking function operations.
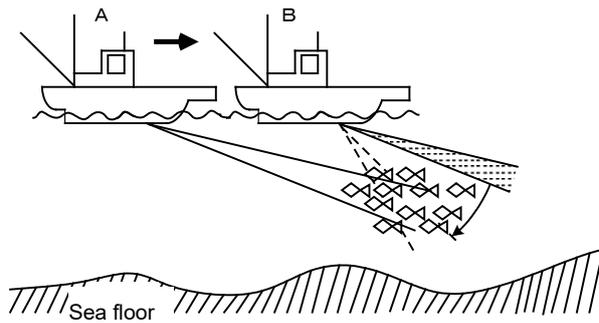
A school of fish found from position A cannot be found from position B as the ship moves forward because the fish are outside the sonic beam. While the automatic tracking function is operating, the tilt angle is changed as the ship moves forward so the sonic beam does not lose the target.

To turn off the automatic tracking function, press the [◆◀] key.

*Note: ● The range and tilt angle cannot be operated while the automatic tracking function is operating.

*Note: ● You must connect the ship's speed and direction sensors to operate the auto tracking function.

4.2 Split Display

By pressing the [MODE] key, you can display the fish finder images and the sound detection images on the screen.

The sound detection display and fish finder display are disabled in the initial settings. To enable them, do the settings for each one.

You also need to connect the signal from the fish finder to display the fish finder images.

After connecting it, you need to set the connection in "INITIAL" in the "MENU". Contact your retailer or a service representative to do the settings.

Precautions

- The display of fish finder images are not guaranteed for all commercially available fish finders.
- Some fish finders cannot be connected due to their construction or specifications.
- If you want to connect a fish finder, contact your retailer or a service representative.

4.2.1 Sound Detection Display

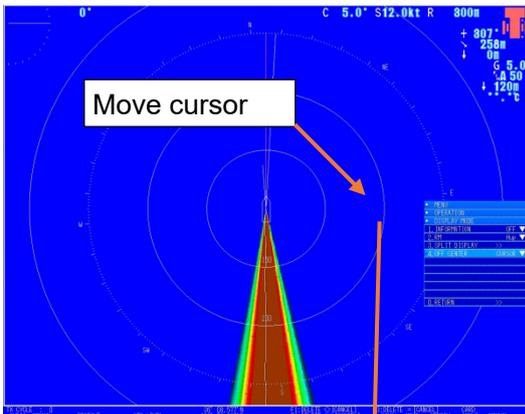**Operating Procedure** Press the keys "8 → 2 → 3 → 1" to go to AUDIO settings
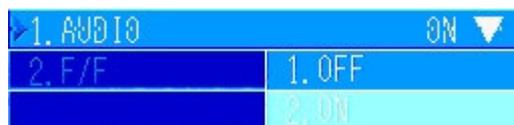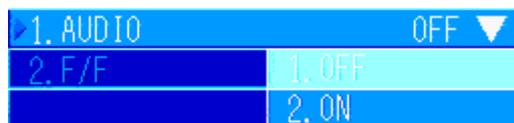
Press the [MENU] key. The menu opens.

Turn the [MULTI] knob to move to "8. OPERATION" and press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "2. DISPLAY MODE" and press the [MULTI] knob to open the submenu. Turn the [MULTI] knob to move to "3. SPLIT DISPLAY" and press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "1. AUDIO" and press the [MULTI] knob to display the pulldown menu.

The initial setting is "OFF".

Turn the [MULTI] knob to move to "2. ON" and press the [MULTI] knob to select.

"1. AUDIO" has been set to enabled.

Press the [MENU] key to close "MENU".

The initial values set for the split mode settings are "PARTITION SIZE = Small" and "SPLIT POSITION = Lower left"

The initial values for the display settings are "LENGTH SCALE = Show", "SCROLL = STOP", "SCROLL = Vertical", and "AUDIO STEP = 3".

You can set the "PARTITION SIZE" and the "SPLIT POSITION" with the SPLIT MODE SET settings.

Also, you can set the scroll direction and whether to enable the scales in [AUDIO].

Press the [MODE] key to open the AUDIO screen.
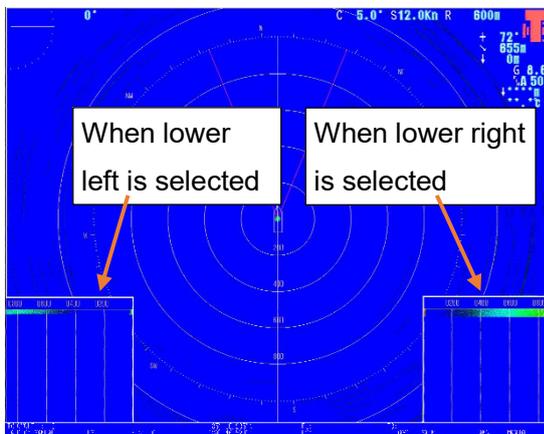
Example: Display position on lower left and on lower right
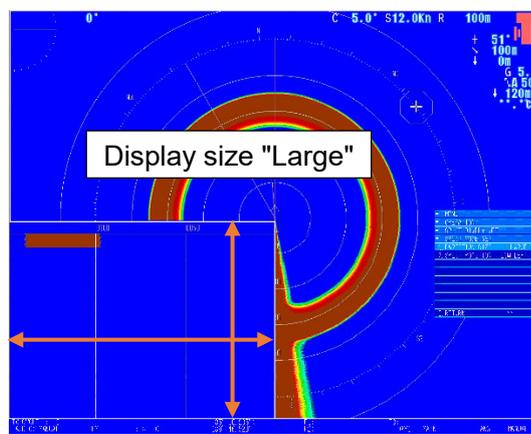
Example: When [PARTITION SIZE] is set to "Large"
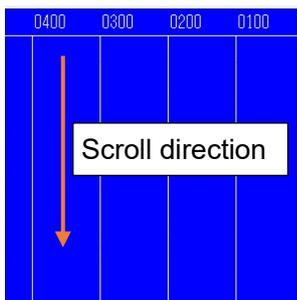
Scroll direction (vertical)
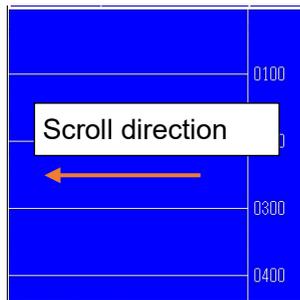
Scroll direction (horizontal)
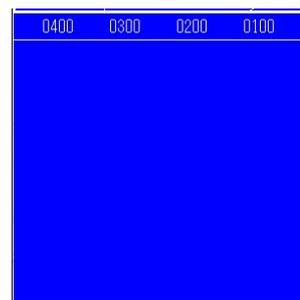
Scale lines (none)

4.2.2 Fish finder display

┌─ **Precautions** ──

● You need to connect the fish finder to display fish finder images.

● Also, after you connect it, your retailer or a service representative must do the initial settings.

● If the initial settings are not done correctly, fish finder images may not display correctly.

└───

Fish finder images vary depending on the number of fish finders that are connected.

To display the fish finder, settings other than just "On" and "Off" are required.

The setting items that must be adjusted after displaying the fish finder are "TRIGGER", "RANGE SETTING", "GAIN", "F/F CLUTTER", "SHIFT", FISH FINDER ADC", "FISH FINDER STC", "FISH FINDER INTERFERENCE", and "STC CURVE".

Use these settings to adjust the image so it is similar to the fish finder that is connected.

Note) Fish finder images that are displayed by a small sonar are not guaranteed to be the same as the images of the fish finder that is connected.

Operating Procedure **Press the keys "8 → 2 → 3 → 2" to go to FISH FINDER settings**
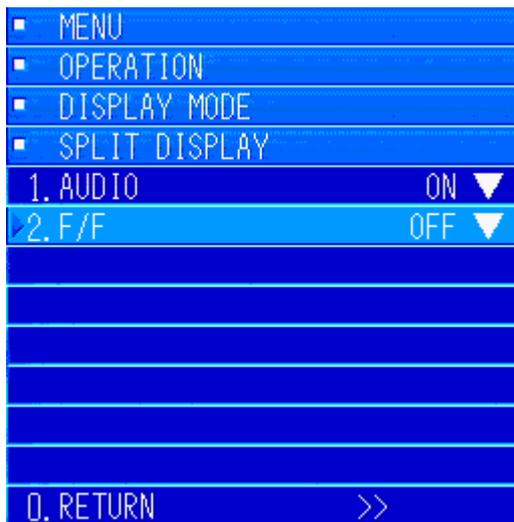
Press the [MENU] key. The menu opens.

Turn the [MULTI] knob to move to "8. OPERATION" and press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "2. DISPLAY MODE" and press the [MULTI] knob to open the submenu. Turn the [MULTI] knob to move to "3. SPLIT DISPLAY" and press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "2. F/F" and press the [MULTI] knob to display the pulldown menu.
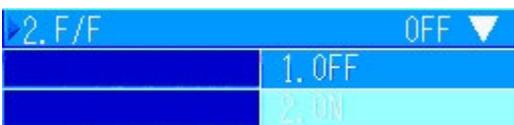
The initial setting is "OFF".

Turn the [MULTI] knob to move to "2. ON" and press the [MULTI] knob to select.

"2. F/F " has been set to ON.

Press the [MENU] key to close "MENU".

The initial settings of the display are "SPLIT POSITION = Left/right", "DIRECTION = Horizontal", and "SCROLL STEP = 1/2"

The position and size of the split display are shared by [AUDIO].

Adjust the settings for "TRIGGER", "RANGE SETTING", "GAIN", "F/F CLUTTER", "SHIFT", FISH FINDER ADC", "FISH FINDER STC", "FISH FINDER INTERFERENCE", and "STC CURVE".

Press the [MODE] key to open the FISH FINDER screen.
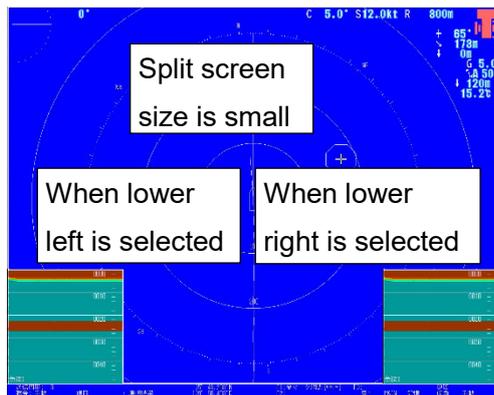
Example: One frequency connection, lower left and lower right display
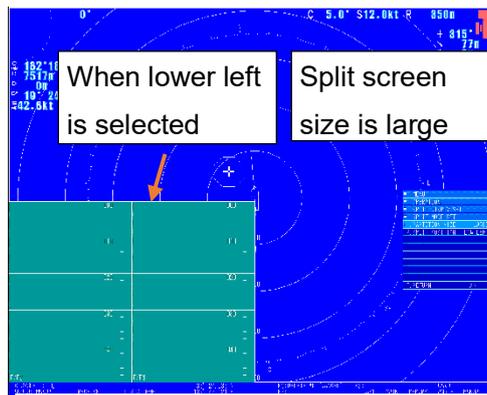
Example: Two frequencies, display is large in lower left
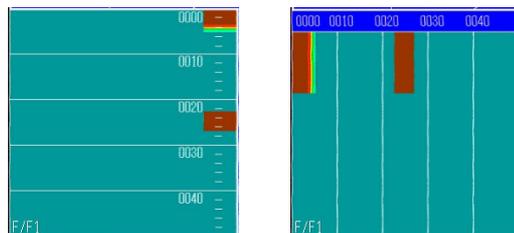
Example: One frequency, horizontal scroll
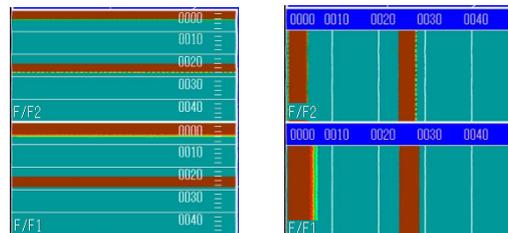
Vertical scroll

Example: Screen split top/bottom, two frequencies, horizontal scroll
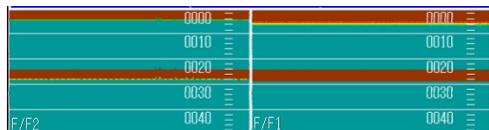
Vertical scroll

Example: Screen split left/right, horizontal scroll
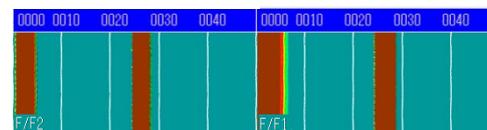
Screen split left/right, vertical scroll

4.3 Registration

You can register three types of procedures for operations or menu items that you use frequently.
Registering a user menu is effective if you want to open a menu item, which may be far down in the hierarchy, with just one click.
The user defined keys [F1 to F3] are effective for functions that you want to turn on or off by pressing a key.
Registering a function to the [MULTI] knob is effective for such functions as adjusting the image.

4.3.1 Registering a user menu [1 to 6]

There are 18 types of menu items that you can register to the user defined menus. This allows you to easily open submenus.
Refer to the list of other menu items regarding the items that can be registered.

Operating Procedure
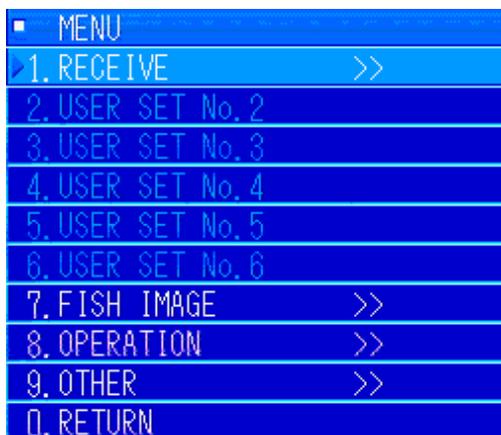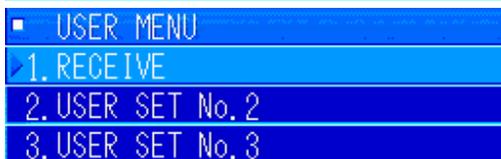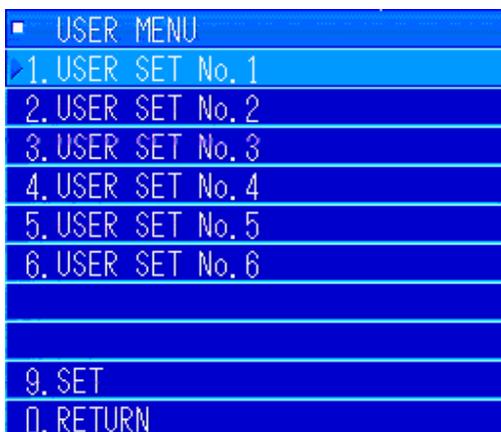
This section explains the operations for the [MULTI] knob.

Example: Explains the procedure for registering the "RECEIVE" menu to a user menu.

Press the [MENU] key to open the menus.

Turn the [MULTI] knob to select "7. FISH IMAGE" and press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "1. RECEIVE".

Refer to the left submenu

After moving to "1. RECEIVE", long-press the [MENU] key.

The "User defined menu registration" screen opens.

Move to the position that you want to register and register it.

If you want to register it to the first one, turn the [MULTI] knob to move to "1. USER SET No. 1".

(You can register a menu to any of the positions from 1 to 6.)

Press the [MULTI] knob to set it to 1.

"1. RECEIVE" has been set.

(Registration is not yet complete)

Turn the [MULTI] knob to move to "9. Register".

Press the [MULTI] knob to complete registration.

Press the [MENU] key to close the menu.

Confirm the registration.

Press the [MENU] key to open "MENU".

If "1. RECEIVE" is registered at the top of the menu, as shown in the example image on the left, then registration is complete.

You can register up to a maximum of six items.

You can also overwrite "1. RECEIVE", which has been registered, with a different item.

Refer to the section on cancelling registration in the initial settings to delete a registration.

4.3.2 Registering the user defined keys [F1], [F2], and [F3]

You can add menu items that you want to use to the [F1], [F2], and [F3] keys on the controls.

There are 15 types of menu items that you can register to the user defined keys.

Refer to the list of other menu items regarding the items that can be registered.

Operating Procedure

The procedure for registering "DELETE ALL" to the [F1] key is explained as an example.

Press the [MENU] key to open "MENU".

Turn the [MULTI] knob to move to "8. OPERATION" and press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "3. DELETE MARK" and press the [MULTI] knob to open the submenu.
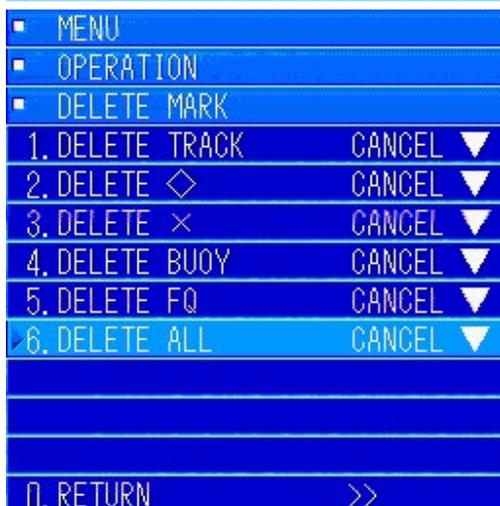
Turn the [MULTI] knob to move to "6. DELETE ALL".

Long-press the [F1] key.
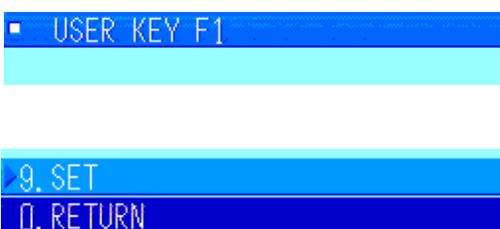
The "F1 user key registration" menu opens.

Turn the [MULTI] knob to move to the "9. REGISTER".

Press the [MULTI] knob to complete registration.

When registration is complete, F1: DELETE ALL appears on screen. Press the [MENU] key to close the menus. The same procedure can be used to overwrite the [F1] key after it has been registered. **Refer to the section on cancelling registration in the initial settings to delete a registration.**

4.3.3 Registering the MULTI knob [1 to 6]

By registering menu items to the [MULTI] knob, you can, while [MENU] is closed, change items and setting values of menu items that have been registered by pressing the [MULTI] knob, without opening [MENU].

There are 41 types of menu items that you can register to the [MULTI] knob.

Refer to the list of other menu items regarding the items that can be registered.

Operating Procedure

This section explains the operations for the [MULTI] knob.

● **Registration procedure**

MENU	
1. RECEIVE	>>
2. SIG PROCESS	>>
3. USER SET No. 3	
4. USER SET No. 4	
5. USER SET No. 5	
6. USER SET No. 6	
7. FISH IMAGE	>>
8. OPERATION	>>
9. OTHER	>>
0. RETURN	

The procedures for registering "RECEIVE" → "CLUTTER" and "STC LEVEL" are explained as an example.

Press [MENU] to open the menu.

Turn the [MULTI] knob to move to "7. FISH IMAGE" and press the [MULTI] knob to open the submenu.

MENU	
■ FISH IMAGE	
1. RECEIVE	>>
2. TX	>>
3. SIG PROCESS	>>
4. TECHNOLOG SET	>>
0. RETURN	>>

Turn the [MULTI] knob to move to "1. RECEIVE".

Press the [MULTI] knob to open the "RECEIVE" submenu.

MENU	
■ FISH IMAGE	
■ RECEIVE	
1. CLUTTER	1
2. STC LEVEL	3.5
3. H BEAM	5
4. V BEAM	0

Turn the [MULTI] knob to move to "1. CLUTTER" to register it.

Long-press the [MULTI] knob.

The "MULTI knob registration" menu opens.

```
■  MULTI KEY
▷1. MULTI No. 1
  2. MULTI No. 2
  3. MULTI No. 3
  4. MULTI No. 4
  5. MULTI No. 5
  6. MULTI No. 6


  9. SET
  0. RETURN
```

Turn the [MULTI] knob to move to "1. MULTI No.1" and press the [MULTI] knob to set "1. CLUTTER". (Registration is not yet complete)

```
■  MULTI KEY
▷1. CLUTTER
```

```
■  MULTI KEY
▷1. CLUTTER
  2. MULTI No. 2
  3. MULTI No. 3
  4. MULTI No. 4
  5. MULTI No. 5
  6. MULTI No. 6



▷9. SET
  0. RETURN
```

Turn the [MULTI] knob to move to "9. SET".
Press the [MULTI] knob to complete registration.
Press [MENU] to close the menu.
Registration is complete. "CLUTTER" is registered in the [MULTI] knob registration area at the bottom of the screen.

```
ITEM          : SELECT
```

```
RECEIVE       : CLUTTER
```

```
■  MENU
■  FISH IMAGE
■  RECEIVE
  1. CLUTTER      2
▷2. STC LEVEL    3.0
  3. H BEAM       5
  4. V BEAM       0









  0. RETURN          >>
```

Next, register "STC LEVEL".
The registration procedure is the same as for "CLUTTER".
Press the [MENU] key to open the menu.
Turn the [MULTI] knob to move to "7. FISH IMAGE" and press the [MULTI] knob to open the submenu.
Turn the [MULTI] knob to move to "1. RECEIVE" and press the [MULTI] knob to open the submenu.
Turn the [MULTI] knob to move to "2. STC LEVEL" to register it.

```
■  MULTI KEY
  1. CLUTTER
▷2. MULTI No. 2
  3. MULTI No. 3
  4. MULTI No. 4
  5. MULTI No. 5
  6. MULTI No. 6


  9. SET
  0. RETURN
```
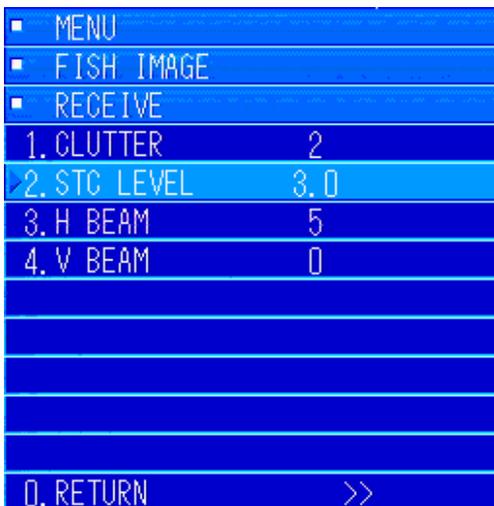
Long-press the [MULTI] knob.
The menu for registering the [MULTI] knob appears.
Turn the [MULTI] knob to move to the number to which you want to register.
This time we will register "STC LEVEL" to "2. MULTI No. 2".
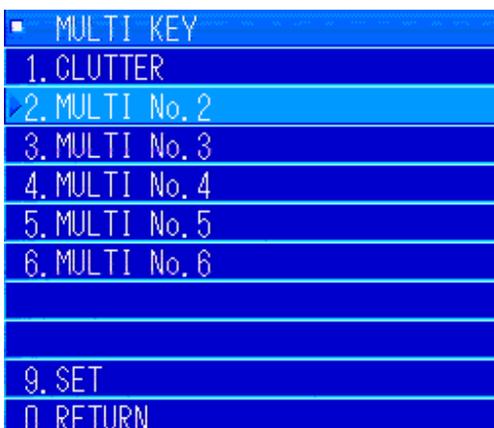
Press the [MULTI] knob to set "STC LEVEL" to "2. MULTI No. 2".
(Registration is not yet complete)

Turn the [MULTI] knob to move to "9. SET" and press the [MULTI] knob to complete registration.
Press the [MENU] key to close the menu.
Registration is complete if when you turn the [MULTI] knob, while "MENU" is closed, the display has changed so that the items registered to the [MULTI] knob appear in order "CLUTTER" → "STC LEVEL".

● How to operate the items registered to the [MULTI] knob

When you turn the [MULTI] knob, while "MENU" is closed, the items registered to the [MULTI] knob appear in their registered order. (If only one item is registered, it does not change.)

When the item you want to operate appears in the registered items, press the [MULTI] knob. The set value and the current value appear in the center of the screen and in the [MULTI] knob registered items. Turn the [MULTI] knob to set a value. If the value that was set and the set value are acceptable, press the [MULTI] knob to accept them.

The procedure to adjust "STC LEVEL", which was registered using the [MULTI] knob, is noted below.

Turn the [MULTI] knob to select "STC LEVEL".
Press the [MULTI] knob. The display changes and the currently set value appears. It also appears in the center of the screen.

Turn the [MULTI] knob to adjust the image, as you are viewing it, to the optimum value. When it is at its optimum value, press the [MULTI] knob.

If you do not set it, the value in the center of the screen disappears and the [MULTI] knob registration area returns to the registration item selection screen.

If you do not set the value, it returns to the value before you operated the [MULTI] knob and then the registration item selection screen opens again.

5 Adjusting How Images Appear

Contents

5.1 Appearance of Images

5.1.1 Tilt Angle and the Appearance of the Sea Floor

1) Characteristics of the image of the sea floor when the tilt angle is between 10° and 15°

The sea floor is displayed in a wide ring shape when the depth is shallow or when the sea floor is flat. The width of the sea floor is displayed as wide and the strength of the color of the sea floor is displayed as weak.

Tilt angle 10° to 15°
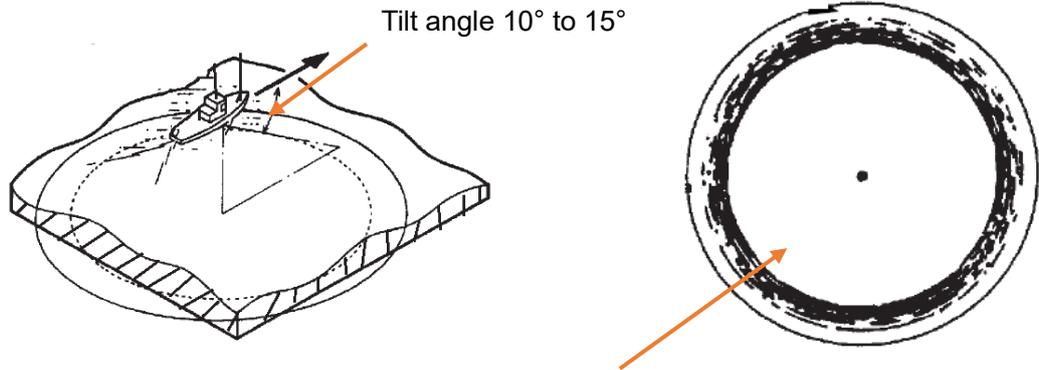
When the tilt angle is shallow, a wide area of the sea floor is displayed, but appears light.

2) Characteristics of the image of the sea floor when the tilt angle is lower than 20°

The sea floor is displayed, as shallower (closer) than that in 1), and the image of the sea floor is displayed as stronger than that in 1).

Tilt angle at least 20°
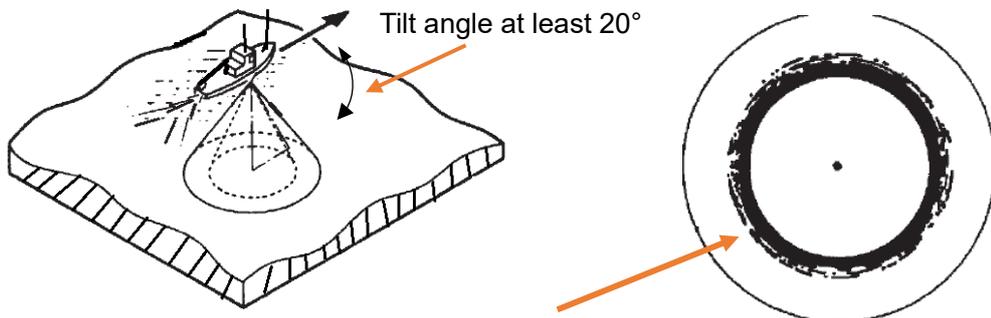
The sea floor is displayed as closer, and the color is displayed as stronger, even when at the same depth as 1). The width is narrow.

3) Characteristics of the image of the sea floor when the sea floor is at an incline
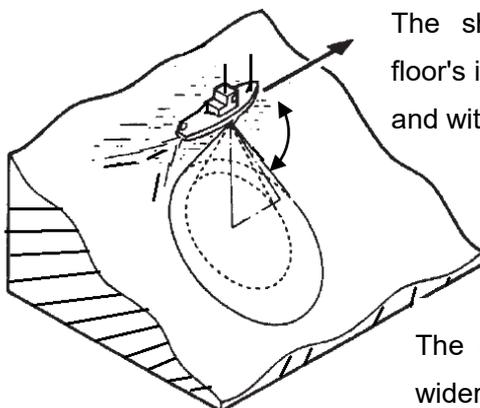
The shallow part of the sea floor's incline is closer, narrower, and with a strong color.
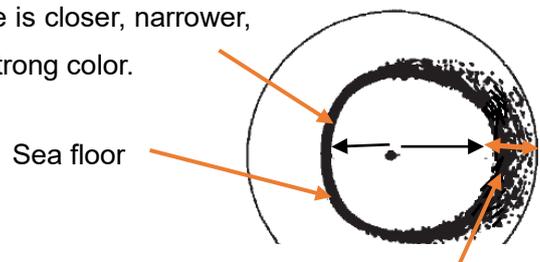
Sea floor

The deep part of the sea floor's incline further, wider, and with a weak color.

5.1.2 Tilt Angle and the Appearance of Images of Schools of Fish

1) Appearance of schools of fish that are at the surface of the sea.

Searches at a tilt angle near 0° to 10°.
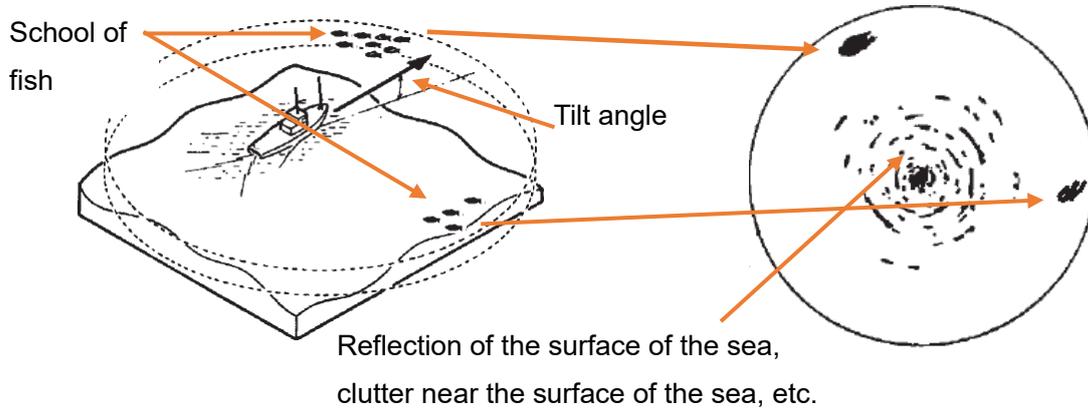
2) Appearance of schools of fish that are distributed from above the sea floor to the middle layer

- When searching at a tilt angle near 30°
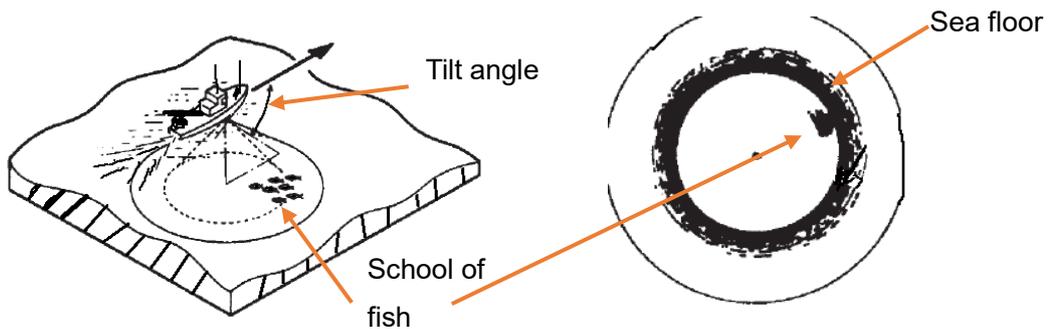
By lowering the tilt angle to search, images of fish schools appear within the sea floor.

Adjust the tilt angle according to the depth of the distribution of the school of fish and the depth of the sea floor, and then search.

- When searching for schools of fish in the middle layer at a tilt angle between 0° and 20°
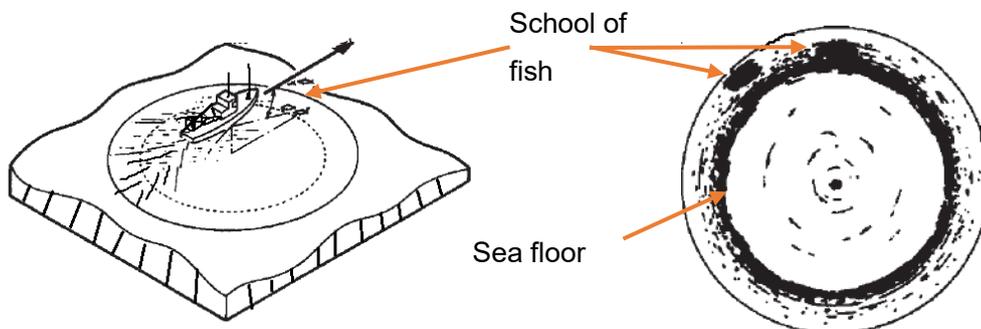
When using a shallower tilt angle, the middle layer echoes may allow you to find fish echoes ahead because the echoes from the sea floor are weaker. The image becomes easier to see than if the tilt angle is lowered.

3) Tilt Angle and the Appearance of the Reflection of the Sea Surface

When searching for schools of fish at the surface, depending on inclement weather and the condition of the sea, detecting an image of a school of fish may become difficult due to the influence of the reflection of the sea surface. In such cases, because the vertical beam is about 10° wide, images of the reflection of the sea surface may be decreased by using the stabilize function and lowering the tilt angle to about 4° or 5°.

Tilt angle 0°

10°

Tilt angle 5°

Reflection of the
sea surface
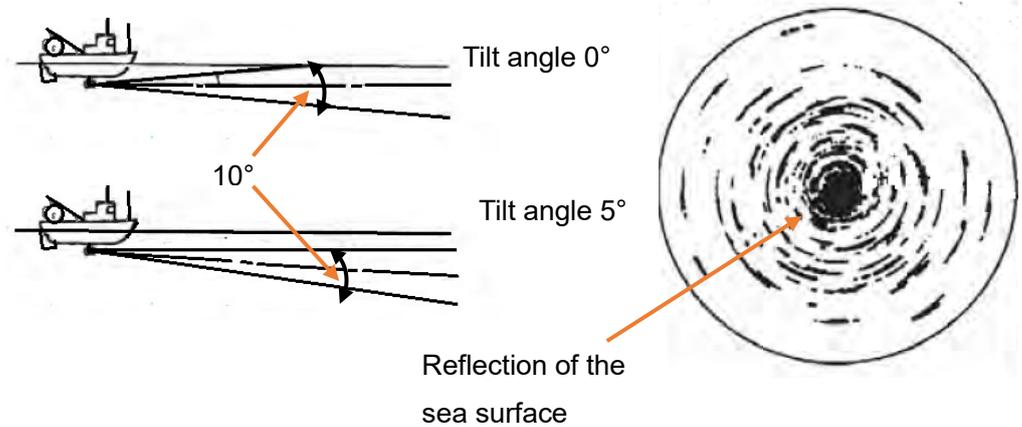
5.1.3 Images and Effects of Own Ship's Wake and the Wakes of Other Ships

1) Example of an image of own ship's wake and the wakes of another ship

Other ship

Wake of other ship

Own ship

Own ship's
propeller noise
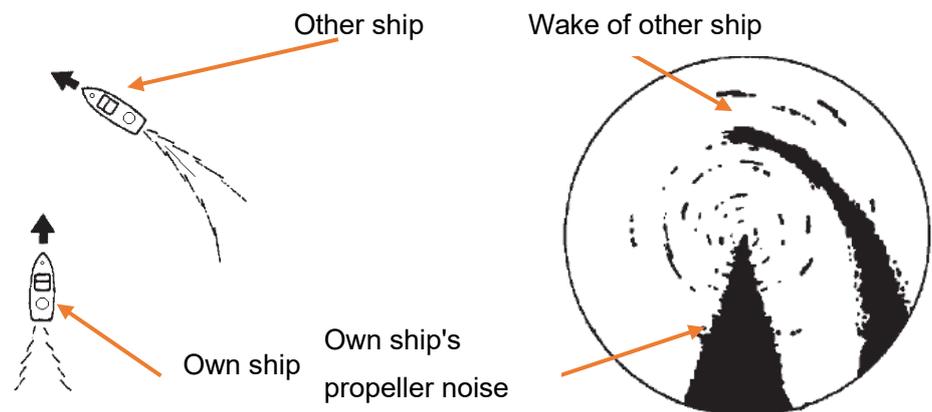
Your own ship's wake and the wakes of other ships have characteristics, such as those in the diagram, and can be easily differentiated from schools of fish.

2) Image of wake affects image of fish school

A large amount of foam is included in wakes. Therefore, wakes may dampen sound waves and reduce long distance sensitivity.

Other ship

Wake of other ship

School
of fish

Own ship

Propeller noise

Fish echoes may be seen after the own ship passes the wake of another ship.
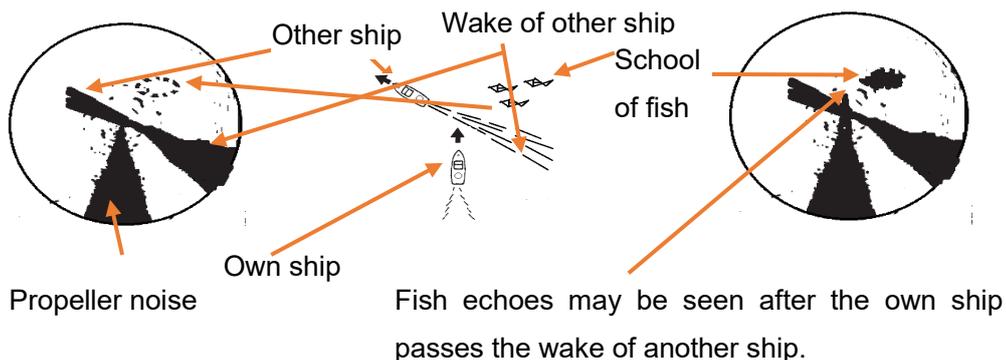
5.2 Settings for Fish Echoes

The fish image setting is a menu for setting the signal process and adjusting the transmitter/receiver unit.

Normally, use the standard setting values. The five types of standard settings, A through E, from the [IMAGE] knob are also included. Before changing the fish image setting menu, we recommend turning the [IMAGE] knob and finding the setting values that fit your work. After doing that, use this menu to make fine adjustments (how to set values is described in the section on using the [MULTI] knob to do settings).

The initial values described in the explanations are the initial values of A that the settings of the [IMAGE] knob displays. [IMAGE] is different for B through E. Refer to the list of menus for details.

5.2.1 Signal Reception Settings

"RX" is a submenu that is mainly used to suppress the reflection of the sea surface during inclement weather or when there is clutter in the sea.

5.2.1.1 Clutter Settings

You can use the clutter settings to suppress noise on the entire screen.

Operating Procedure **Press the keys "7 → 1 → 1" to go to CLUTTER settings**

Press the [MENU] key to display the menus.

Turn the [MULTI] knob to move to "7. FISH IMAGE".

Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "1. RECIEVE".

Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to select "1. CLUTTER".

Press the [MULTI] knob to select.

Turn the [MULTI] knob to adjust the image appropriately.

The setting range for "CLUTTER" is 0 to 10.

Although this normally differs according to the conditions of the sea, use a range between 1 and 5. Increasing this value deletes weak echoes.

Example of adjustment range display for clutter: Settings can be done in steps of 1.

5.2.1.2 STC LEVEL

You can suppress short distance noise.

Operating Procedure Press the keys "7 → 1 → 2" to go to STC LEVEL settings

MENU		
FISH IMAGE		
RECEIVE		
1. CLUTTER	1	
2. STC LEVEL	3.5	0.0
3. H BEAM	5	
4. V BEAM	0	
0. RETURN	>>	

Press the [MENU] key to display the menus.

Turn the [MULTI] knob to move to "7. FISH IMAGE".

Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "1. RECIEVE".

Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to select "2. STC LEVEL".

Press the [MULTI] knob to select.

Turn the [MULTI] knob to adjust the image appropriately.

Do so especially when using a tilt angle set shallower than 10°. When clutter and the reflection of the sea surface become larger due to the effects of inclement weather, and clutter within 160 m of your own ship is stronger, you can suppress the clutter by increasing this value. It is normally used at around 3.0.

The setting range for "STC LEVEL" is 0.0 to 10.0.

Although this normally differs according to inclement weather and the conditions of the sea, use a range between 3.0 and 6.0.

Be aware that increasing this value deletes images close to your own ship.

Example of setting range display for the STC level: Settings can be done in steps of 0.1.

RECEIVE				RECEIVE		
1. CLUTTER	1			1. CLUTTER	1	
2. STC LEVEL	3.5	0.0		2. STC LEVEL	3.5	10.0

5.2.1.3 Settings for the Horizontal Beam

You can change width of the horizontal beam for reception.

Operating Procedure Press the keys "7 → 1 → 3" to go to H BEAM settings

Press the [MENU] key to display the menus.

Turn the [MULTI] knob to move to "7. FISH IMAGE". Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "1. RECIEVE". Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to select "3. H BEAM".

Turn the [MULTI] knob to change and adjust this value.

The horizontal beam is normally used at 5.

The width of the horizontal beam becomes narrower by increasing this value. It becomes wider by decreasing this value.

Increase this value if you want to increase the sharpness of horizontal images.

Be aware that by decreasing this value, horizontal images will blur together.

The setting range for the horizontal beam is 0 to 15.

Example of setting range display for the horizontal beam: Settings can be done in steps of 1.

5.2.1.4 Settings for the Vertical Beam

You can change the width of the vertical beam for reception.

Operating Procedure **Press the keys "7 → 1 → 4" to go to V BEAM settings**

Press the [MENU] key to display the menus.

Turn the [MULTI] knob to move to the "7. FISH IMAGE" position.

Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to the "1. RECIEVE" position.

Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to select "4. V BEAM".

Turn the [MULTI] knob to change and set this value.

The vertical beam is always used at 0.

Turn the [MULTI] knob to change and adjust this value.

The vertical beam is always used at 0.

The vertical beam becomes narrower by decreasing this value. It becomes wider by increasing this value.

Decrease this value if you want to increase the sharpness of vertical images.

Be aware that by increasing this value, vertical images will blur together.

The setting range for the vertical beam is 0 to 15, and can be set in steps of 1.

Adjustment range for the vertical beam

5.2.2 Transmission Settings

The "TX" menu is a submenu to be used to eliminate interference from other ships, suppress reverberation, and suppress false echoes caused by detection performance and shallow sea floors.

5.2.2.1 Transmission Power Settings

You can adjust the power of transmissions. For normal operations, always use a maximum value of 10.

Decreasing this value lowers detection performance.

Precautions

Do not set "TX POWER" to "0". Doing so disables transmissions.

For normal operations, use the TX POWER setting at "10".

However, when another ship sends a request about alleviating interference, change the frequency you are using and reduce the carrier's sound wave pressure level of: the broadband sonar, multi band sonar, and single-band sonar, in this order.

Operating Procedure **Press the keys "7 → 2 → 1" to go to TX POWER settings**

Press the [MENU] key to display the menus.

Turn the [MULTI] knob to move to "7. FISH IMAGE".

Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "2. TX".
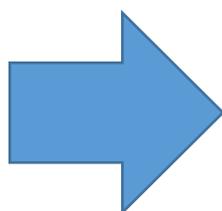
Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to select "1. TX POWER".

Press the [MULTI] knob to confirm the selection.

Turn the [MULTI] knob to adjust.

The setting range for "TX POWER" is 0 to 10, and can be set in steps of 1.

Be aware that by setting the "TX POWER" to 0, transmissions are not output.

For normal operations, use the TX POWER setting at 10.

5.2.2.2 Settings for the Pulse Length

You can set the pulse length of transmission waves. Decrease this value to shorten pulse length. Increase this value to lengthen it.

By shortening the pulse length, you can improve resolution for directional distance; however, the stability of detection performance and images worsens. By lengthening the pulse length, you worsen resolution for directional distance; however, the stability of detection performance and images improves. The initial value is set to 10. Adjust and use according to the types of fish and the conditions of the sea.

Pulse length automatically worsens due to the sonar range that is used. However, the maximum values for the sonar range can be limited by this setting value. The pulse length setting range is set between 1 and 20.

Press the keys "7 → 2 → 2" to go to PULSE LENGTH settings

Press the [MENU] key to display the menus.

Turn the [MULTI] knob to move to "7. FISH IMAGE". Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "2. TX". Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "2. PULSE LENGTH".

Press the [MULTI] knob to open the settings menu.

You can set the values from 1 to 20, in steps of 1, by turning the [MULTI] knob.

After turning the [MULTI] knob to 20, press the [MULTI] knob to set the setting to 20.

5.2.2.3 Transmission Mode Settings

Transmission mode is an item that is set for scalability. It is normally used at "OMNI".

Operating Procedure **Press the keys "7 → 2 → 3" to go to TX MODE settings**

5.2.2.4 Settings for the Width of the Vertical Beam

You can switch the width of the vertical beam for transmission. It can be set between 0 and 3, and each can be set in the order narrowest, narrow, wide, widest. It is normally set to "0".

During inclement weather, the reflection of the sea surface may appear stronger if you widen the width of the vertical beam. If the sea floor is shallow, it becomes difficult to discern schools of fish near the sea floor.

If schools of fish move quickly in a vertical direction, tracking becomes easier if the width of the

beam is widened.

■ MENU	
■ FISH IMAGE	
■ TX	
1. TX POWER	10
2. PLUSE LENGTH	10
3. TX MODE	OMNI ▼
>4. V BEAM	0
5. SHADING	0
6. TX PRR	0
0. RETURN	>>

Press the [MENU] key to display the menus.

Turn the [MULTI] knob to move to "7. FISH IMAGE".

Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "2. TX". Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "4. V BEAM".

■ TX		
1. TX POWER	10	
2. PLUSE LENGTH	10	
3. TX MODE	OMNI ▼	
>4. V BEAM	0	0

Press the [MULTI] knob to open the settings menu. The initial value is set to 0.

You can set the values from 0 to 3, in steps of 1, by turning the [MULTI] knob.

5.2.2.5 Settings for Shading

You can suppress the waveforms of vertical beams for transmission waves. Using 0 generates a sharp beam.

When detection performance is important, use 0.

Changing and adjusting this value between 1 and 2 is effective when it is hard to judge the distinction between images and the reflection of the sea surface, even if you lower the tilt angle during inclement weather and adjust the "STC LEVEL" for the effects of the reflection of the sea surface. Likewise, changing and adjusting this value between 1 and 2 is also effective when the sea floor returns a strong false echo when in shallow sea conditions.

Note) Detection performance may slightly decrease if you increase this value. At the same time, the width of the vertical beam will become slightly wider.

■ MENU	
■ FISH IMAGE	
■ TX	
1. TX POWER	10
2. PLUSE LENGTH	10
3. TX MODE	OMNI ▼
4. V BEAM	0
>5. SHADING	0
6. TX PRR	0
0. RETURN	>>

Press the [MENU] key to display the menus.

Turn the [MULTI] knob to move to "7. FISH IMAGE".

Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "2. TX". Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "5. SHADING".

```
■ MENU
■ FISH IMAGE
■ TX
1. TX POWER          10
2. PLUSE LENGTH      10
3. TX MODE        OMNI ▼
4. V BEAM            0
▶5. SHADING           0          0
```

Press the [MULTI] knob to open the settings menu.

The initial value is set to 0.

You can set the values from 0 to 3, in steps of 1, by turning the [MULTI] knob.

5.2.2.6 Settings for the Transmission Pulse Repetition Rate

If there are many ships around, you may receive interference from other sonars or fish finders that are using the same frequency as you.

In addition, if you are using a short range setting, the previous transmission image may, on rare occasions, appear on the screen. This may be improved by changing the transmission pulse repetition rate.

Operating Procedure **Press the keys "7 → 2 → 6" to go to TX PRR settings**

```
■ MENU
■ FISH IMAGE
■ TX
1. TX POWER          10
2. PLUSE LENGTH      10
3. TX MODE        OMNI ▼
4. V BEAM            0
5. SHADING           0
▶6. TX PRR            0



0. RETURN           >>
```

Press the [MENU] key to display the menus.

Turn the [MULTI] knob to move to "7. FISH IMAGE".

Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "2. TX".

Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "6. TX PRR".

Press the [MULTI] knob to open the settings menu.

The initial value is set to 0.

```
■ MENU
■ FISH IMAGE
■ TX
1. TX POWER          10
2. PLUSE LENGTH      10
3. TX MODE        OMNI ▼
4. V BEAM            0
5. SHADING           0
▶6. TX PRR            0          0
▶6. TX PRR            0         29

▶6. TX PRR           29
```

You can set the values from 0 to 100, in steps of 1, by turning the [MULTI] knob.

Status in which it is set and fixed to 29.

```
TX CYCLE  :   0
AUDIO: MANUAL
```

The settings values also reflect the transmission pulse repetition rate values at the bottom left of the screen.

The transmission pulse repetition rate settings can be adjusted in steps of 1 in "MENU". However, change them in steps of 10 using the [◄] and [►] keys. For example, when it is set to 29 in the menu, if you press the [►] next, it will be set to 39.

5.2.3 Settings for Signal Processing

Signal Processing is the menu that sets the four types of correlation processing for sonar images.

You can make adjustments so that schools of fish are easier to see by changing the settings according to the types of fish, fishing method, and condition of the sea.

5.2.3.1 Settings for Interference

You can eliminate interference from your own ship's ultrasound equipment and interference from the sonars and various ultrasound equipment of other ships. Make adjustments according to the types of fish, fishing method, condition of the sea, port congestion, etc.

Operating Procedure **Press the keys "7 → 3 → 1" to go to INTEFERENCE settings**

Press the [MENU] key and move to "7. FISH IMAGE". Turn the [MULTI] knob to move to "3. SIG PROCESS".

Pressing the [MULTI] knob displays the submenu for SIG PROCESS.

Turn the [MULTI] knob to move to "1. INTEFERENCE". Press the [MULTI] knob to open the menu for entering values.

The initial value is set to 2.
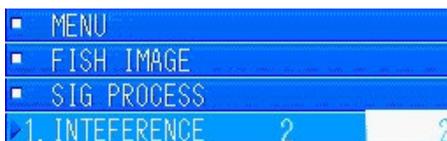
You can set the values from 0 to 20, in steps of 1, by turning the [MULTI] knob.

5.2.3.2 Settings for Signal Processing P

Process the correlations of received signals that correspond to the entire screen for each transmission. Sensitivity to rapidly moving fish decreases if you increase this value. You can display stable images for large schools. Make adjustments according to the types of fish, fishing method, condition of the sea, port congestion, etc.

Operating Procedure **Press the keys "7 → 3 → 2" to go to SIG PROCESS P settings**
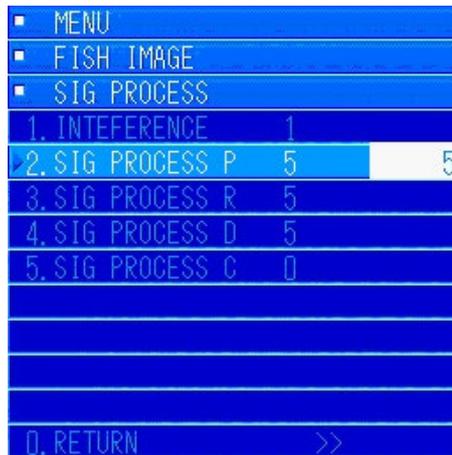
Turn the [MULTI] knob to move to "2. SIG PROCESS P". Press the [MULTI] knob to open the menu for entering values.

The initial value is set to 5.

You can set the values from 0 to 20, in steps of 1, by turning the [MULTI] knob.

5.2.3.3 Settings for Signal Processing R

Process the correlations of received signals for the directional distance. Although stable images can be obtained for the directional distance by increasing this value, the ability to discern small schools of fish decreases. Make adjustments according to the types of fish, fishing method, condition of the sea, port congestion, etc.

Operating Procedure **Press the keys "7 → 3 → 3" to go to SIG PROCESS R settings**

Turn the [MULTI] knob to move to "3. SIG PROCESS R". Press the [MULTI] knob to open the menu for entering values.

The initial value is set to 5.

You can set the values from 0 to 20, in steps of 1, by turning the [MULTI] knob.

5.2.3.4 Settings for Signal Processing D

Process the correlation of received signals for the circumferential distance. Although stable images can be obtained for the circumferential distance by increasing this value, the ability to discern small schools of fish decreases. Make adjustments according to the types of fish, fishing method, condition of the sea, port congestion, etc.

Operating Procedure Press the keys "7 → 3 → 4" to go to SIG PROCESS D settings
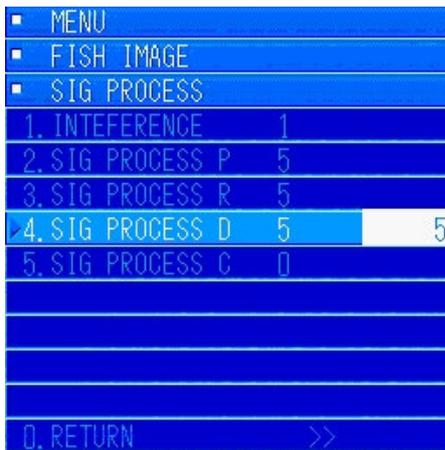
Turn the [MULTI] knob to move to "4. SIG PROCESS D". Press the [MULTI] knob to open the menu for entering values.

The initial value is set to 5.

You can set the values from 0 to 20, in steps of 1, by turning the [MULTI] knob.

5.2.3.5 Settings for Oscillation Processing C

Oscillation Processing C is an item that is set for scalability. It is always set to "0".

Operating Procedure Press the keys "7 → 3 → 5" to go to OSC PROCESS C settings
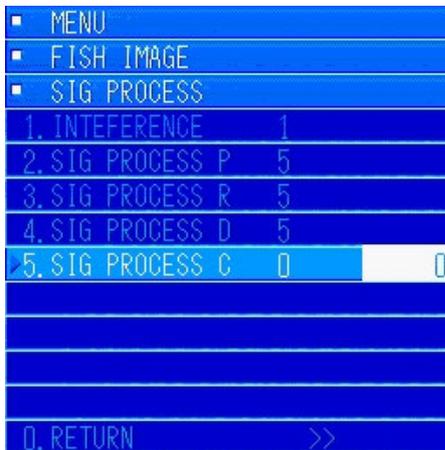
5.2.4 Technological Settings

This is a menu item for doing detailed technological settings for the transponder and the transmitter/receiver unit.

Normally, use the standard setting values the way they are. **This is mainly a setting for the service representative.**

Operating Procedure **Press the keys "7 → 4" to go to TECHNOLOG SET settings**

```
■ MENU
■ FISH IMAGE
1.RECEIVE          >>
2.TX               >>
3.SIG PROCESS      >>
4.TECHNOLOG SET    >>




0.RETURN           >>
```

Press the [MENU] key to display the menus.

Turn the [MULTI] knob to move to "7. FISH IMAGE". Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "4. TECHNOLOG SET". Press the [MULTI] knob to open the submenu.

5.2.4.1 TVG

This is a menu item for doing settings for TVG CURVE, MAX VR, ABS ATT, and MIN VR.

Normally, use the standard setting values the way they are.

Operating Procedure **Press the keys "7 → 4 → 1" to go to TVG settings**

```
■ MENU
■ FISH IMAGE
■ TECHNOLOG SET
1.TVG              >>
2.AGC              >>
3.RX               >>
4.TX/RX CALIB      >>
5.ADC              7




0.RETURN           >>
```

Move to the "TECHNOLOG SET" menu and turn the [MULTI] knob to move to "1.TVG". Press the [MULTI] knob to open the submenu.

Do the settings for submenus 1 through 7.

5.2.4.1.1 MIN VR

This is a menu item for doing settings for MIN VR for the volume of sensitivity.

Normally, use the standard setting values the way they are.

Operating Procedure **Press the keys "7 → 4 → 1 → 1" to go to MIN VR settings**

MENU	
FISH IMAGE	
TECHNOLOG SET	
TVG	
1. MIN VR	128 (80)
2. GOS	0 (0)
3. ABFG	8 (8)
4. MAX GAIN	255 (ff)
5. RX VR	255 (ff)
6. TVG(MID)	10 ▼
7. TVG(FAR)	20 ▼
0. RETURN	>>

In the "TVG" menu, turn the [MULTI] knob to move to "1. MIN VR". Press the [MULTI] knob to open the value input key menu.

The initial setting is set to 128.

The setting range is between 0 and 255, and can be set in steps of 1. The variable range for the volume of sensitivity becomes narrower by increasing this value.

It is normally set to the initial value.

5.2.4.1.2 GOS

Always use GOS at 0.

Operating Procedure **Press the keys "7 → 4 → 1 → 2" to go to GOS settings**

MENU	
FISH IMAGE	
TECHNOLOG SET	
TVG	
1. MIN VR	128 (80)
2. GOS	0 (0)
3. ABFG	8 (8)
4. MAX GAIN	255 (ff)
5. RX VR	255 (ff)
6. TVG(MID)	10 ▼
7. TVG(FAR)	20 ▼
0. RETURN	>>

In the "TVG" menu, turn the [MULTI] knob to move to [2. GOS]. Press the [MULTI] knob to open the value input key menu.

The initial setting is set to 0.

The setting range is between 0 and 15, and can be set in steps of 1. The variable range for the volume of sensitivity becomes narrower by increasing this value.

It is normally set to the initial value.

5.2.4.1.3 ABFG

Always use ABFG at 8.

```
■ MENU
■ FISH IMAGE
■ TECHNOLOG SET
■ TVG
1. MIN VR          128 (80)
2. GOS             0 (0)
>3. ABFG           8 (8)
4. MAX GAIN        255 (ff)
5. RX VR           255 (ff)
6. TVG(MID)            10 ▼
7. TVG(FAR)            20 ▼

0. RETURN              >>
```

In the "TVG" menu, turn the [MULTI] knob to move to [3. ABFG]. Press the [MULTI] knob to open the value input key menu.

The initial setting is set to 8.

The setting range is between 0 and 15, and can be set in steps of 1. The variable range for the volume of sensitivity becomes narrower by increasing this value.

It is normally set to the initial value.

5.2.4.1.4 MAX GAIN

This is a menu for doing settings for regulating the value for the maximum gain.

Normally, use the standard setting values the way they are.

```
■ MENU
■ FISH IMAGE
■ TECHNOLOG SET
■ TVG
1. MIN VR          128 (80)
2. GOS             0 (0)
3. ABFG            8 (8)
>4. MAX GAIN       255 (ff)
5. RX VR           255 (ff)
6. TVG(MID)            10 ▼
7. TVG(FAR)            20 ▼

0. RETURN              >>
```

In the "TVG" menu, turn the [MULTI] knob to move to "4. MAX GAIN". Press the [MULTI] knob to open the value input key menu.

The initial setting is set to 255.

The setting range is between 0 and 255, and can be set in steps of 1. MAX GAIN is regulated by decreasing this value.

It is normally set to the initial value.

5.2.4.1.5 RX VR

Normally, use the initial setting of 255 as it is.

Operating Procedure **Press the keys "7 → 4 → 1 → 5" to go to RX VR settings**

```
■ MENU
■ FISH IMAGE
■ TECHNOLOG SET
■ TVG
1. MIN VR          128 (80)
2. GOS             0 (0)
3. ABFG            8 (8)
4. MAX GAIN        255 (ff)
5. RX VR           255 (ff)
6. TVG(MID)        10 ▼
7. TVG(FAR)        20 ▼

0. RETURN          >>
```

In the "TVG" menu, turn the [MULTI] knob to move to "5. RX VR". Press the [MULTI] knob to open the value input key menu.

The initial setting is set to 255.

The setting range is between 0 and 255, and can be set in steps of 1. It is set to the initial value.

5.2.4.1.6 Settings for Time Varied Gain (Medium Distance)

This is a menu for setting the slope of the ABS ATT curve + the diffusion loss over medium distances.

Operating Procedure **Press the keys "7 → 4 → 1 → 6" to go to TVG (MID) settings**

```
■ MENU
■ FISH IMAGE
■ TECHNOLOG SET
■ TVG
1. MIN VR          128 (80)
2. GOS             0 (0)
3. ABFG            8 (8)
4. MAX GAIN        255 (ff)
5. RX VR           255 (ff)
6. TVG(MID)        10 ▼
7. TVG(FAR)        20 ▼

0. RETURN          >>
```

```
5. RX VR       1.0
6. TVG(MID)    2.10
7. TVG(FAR)    3.20
               4.30
0. RETURN      5.40
```

In the [TVG] menu, turn the [MULTI] knob to move to [6. TVG(MID)]. Press the [MULTI] knob to display the pulldown menu.

The initial setting differs in the fish image settings.

This value is normally set to 2.10.

You can select the setting value from 1.0, 2.10, 3.20, 4.30, and 5.40.

Change this according to the types of fish and your method of fishing.

5.2.4.1.7 Settings for Time Varied Gain (Long Distance)

This is a menu for setting the slope of the ABS ATT curve + the diffusion loss over long distances.

Operating Procedure **Press the keys "7 → 4 → 1 → 7" to go to TVG (FAR) settings**

In the [TVG] menu, turn the [MULTI] knob to move to [7. TVG(FAR)]. Press the [MULTI] knob to display the pulldown menu.

The initial setting differs in the fish image settings.

This value is normally set to 3.20.

You can select the setting value from 1.0, 2.10, 3.20, 4.30, and 5.40.

Change this according to the types of fish and your method of fishing.

5.2.4.2 AGC

This is a menu item for setting the constants and various methods to control the AGC.

Normally, use the standard setting values the way they are.

Operating Procedure **Press the keys "7 → 4 → 2" to go to AGC settings**

Move to the "TECHNOLOG SET" menu and turn the [MULTI] knob to move to "2. AGC". Press the [MULTI] knob to open the submenu.

Do the settings for submenus 1 through 7.

5.2.4.2.1 Settings for the Automatic Gain Control Mode

This is a menu item for setting the constants and various methods to control the AGC.

Operating Procedure Press the keys "7 → 4 → 2 → 1" to go to AGC MODE settings

In the [AGC] menu, turn the [MULTI] knob to move to [1. AGC MODE]. Press the [MULTI] knob to display the pulldown menu.

The initial setting differs in the fish image settings.

This value is normally set to "RCG".

You can select the settings value from 1. OFF, 2. RCG, 3. AGC, and 4. RCG+AGC.

Change this according to the types of fish and your method of fishing.

5.2.4.2.2 RCG LEVEL

This is a menu item for doing settings for the RCG LEVEL.

Operating Procedure Press the keys "7 → 4 → 2 → 2" to go to RCG LEVEL settings

In the "AGC" menu, turn the [MULTI] knob to move to [2. RCG LEVEL]. Press the [MULTI] knob to display the menu for entering values.

The initial setting is set to 128.

The setting range of the value is between 0 and 255, and can be changed in steps of 1.

Change this according to the types of fish and your method of fishing.

5.2.4.2.3 SCAN AGC LEVEL

This is a menu item for doing settings for SCAN AGC LEVEL (circumferential direction of AGC).

Operating Procedure **Press the keys "7 → 4 → 2 → 3" to go to SCAN AGC LEVEL settings**

```
■ MENU
■ FISH IMAGE
■ TECHNOLOG SET
■ AGC
1. AGC MODE          RCG ▼
2. RCG LEVEL      128 (80)
>3. SCAN AGC LEVEL  64 (40)
4. SLOW AGC ON/OFF    OFF ▼
5. FAST AGC ON/OFF     ON ▼
6. SLOW AGC LEVEL  64 (40)
7. FAST AGC LEVEL  64 (40)

0. RETURN            >>
```

In the "AGC" menu, turn the [MULTI] knob to move to [3. SCAN AGC LEVEL]. Press the [MULTI] knob to display the menu for entering values.

The initial setting is set to 64. This differs from the fish image settings.

The setting range of the value is between 0 and 255, and can be changed in steps of 1.

Change this according to the types of fish and your method of fishing.

5.2.4.2.4 SLOW AGC ON/OFF

This is a menu item for doing ON/OFF settings for SLOW AGC.

This is for AGC that effectively suppresses the excessive signals that are input continuously by the direction distance.

Operating Procedure **Press the keys "7 → 4 → 2 → 4" to go to SLOW AGC ON/OFF settings**

```
■ MENU
■ FISH IMAGE
■ TECHNOLOG SET
■ AGC
1. AGC MODE          RCG ▼
2. RCG LEVEL      128 (80)
3. SCAN AGC LEVEL  64 (40)
>4. SLOW AGC ON/OFF    OFF ▼
5. FAST AGC ON/OFF     ON ▼
6. SLOW AGC LEVEL  64 (40)
7. FAST AGC LEVEL  64 (40)

0. RETURN            >>

>4. SLOW AGC ON/OFF    OFF ▼
5. FAST AGC ON/O  1.OFF
6. SLOW AGC LEVE  2.ON
```

In the [AGC] menu, turn the [MULTI] knob to move to [4. SLOW AGC ON/OFF]. Press the [MULTI] knob to display the pulldown menu.

The initial setting differs in the fish image settings.

This value is normally set to "OFF".

Change this according to the types of fish and your method of fishing.

5.2.4.2.5 FAST AGC ON/OFF

This is a menu item for doing ON/OFF settings for FAST AGC.

This is for AGC that promptly and effectively suppresses the excessive signals that are input from various directions.

Operating Procedure **Press the keys "7 → 4 → 2 → 5" to go to FAST AGC ON/OFF settings**

In the [AGC] menu, turn the [MULTI] knob to move to [5. FAST AGC ON/OFF]. Press the [MULTI] knob to display the pulldown menu.

The initial setting differs in the fish image settings.

This value is normally set to "ON".

Change this according to the types of fish and your method of fishing.

5.2.4.2.6 SLOW AGC LEVEL

This is a menu item for doing level settings for SLOW AGC.

Operating Procedure **Press the keys "7 → 4 → 2 → 6" to go to SLOW AGC LEVEL settings**
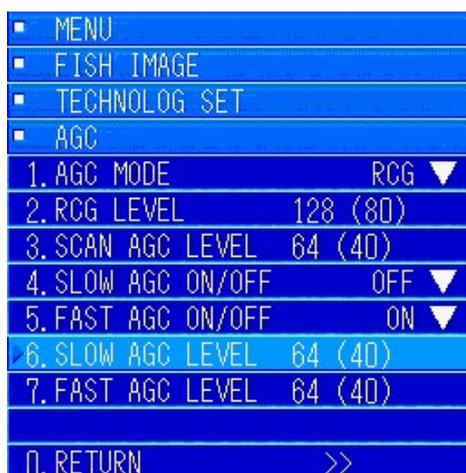
In the "AGC" menu, turn the [MULTI] knob to move to [6. SLOW AGC LEVEL]. Press the [MULTI] knob to display the menu for entering values.

The initial setting is set to 64. This differs from the fish image settings.

The setting range of the value is between 0 and 255, and can be changed in steps of 1.

Change this according to the types of fish and your method of fishing.

5.2.4.2.7 FAST AGC LEVEL

This is a menu item for doing level settings for FAST AGC.

Operating Procedure **Press the keys "7 → 4 → 2 → 7" to go to FAST AGC LEVEL settings**

```
■ MENU
■ FISH IMAGE
■ TECHNOLOG SET
■ AGC
1. AGC MODE           RCG ▼
2. RCG LEVEL      128 (80)
3. SCAN AGC LEVEL  64 (40)
4. SLOW AGC ON/OFF     OFF ▼
5. FAST AGC ON/OFF      ON ▼
6. SLOW AGC LEVEL  64 (40)
▶7. FAST AGC LEVEL  64 (40)

0. RETURN              >>
```

In the "AGC" menu, turn the [MULTI] knob to move to [7. FAST AGC LEVEL]. Press the [MULTI] knob to display the menu for entering values.

The initial setting is set to 64. This differs from the fish image settings.

The setting range of the value is between 0 and 255, and can be changed in steps of 1.

Change this according to the types of fish and your method of fishing.

5.2.4.3 Signal Reception Settings

This is a menu item for doing reception settings for the gain, clutter, STC and TVG.

Operating Procedure **Press the keys "7 → 4 → 3" to go to RX settings**

```
■ MENU
■ FISH IMAGE
■ TECHNOLOG SET
■ RX
▶1. RX CLUTTER     0
2. RX WIDTH        0
3. STC RANGE     160
4. TVG RANGE     320




0. RETURN              >>
```

Move to the "TECHNOLOG SET" menu and turn the [MULTI] knob to move to "3. RX". Press the [MULTI] knob to open the submenu.

Do the settings for submenus 1 through 5.

5.2.4.3.1 Settings for Signal Reception Clutter

This is a menu item that sets the clutter within the receiver.

Operating Procedure **Press the keys "7 → 4 → 3 → 2" to go to RX CLUTTER settings**

In the "RECEIVE" menu, turn the [MULTI] knob to move to [2. RX CLUTTER]. Press the [MULTI] knob to display the menu for entering values.

The initial setting is set to 0.

The setting range of the value is between 0 and 255, and can be changed in steps of 1.

5.2.4.3.2 RX WIDTH

This is a menu item that sets the beam control within the receiver.

Operating Procedure **Press the keys "7 → 4 → 3 → 3" to go to RX WIDTH settings**

In the "RECEIVE" menu, turn the [MULTI] knob to move to [3. RX WIDTH]. Press the [MULTI] knob to display the menu for entering values.

The initial setting is set to 0.

The setting range of the value is between 0 and 255, and can be changed in steps of 1.

It is always set to the initial value.

5.2.4.3.3 STC RANGE

This is a menu item that sets the distance of the STC and TVG (MID) changeover points.

Operating Procedure **Press the keys "7 → 4 → 3 → 4" to go to STC RANGE settings**

```
■ MENU
■ FISH IMAGE
■ TECHNOLOG SET
■ RX
  1. RX CLUTTER       0
  2. RX WIDTH         0
 ⟩3. STC RANGE      160
  4. TVG RANGE      320



  0. RETURN          ⟩⟩
```

In the "RECEIVE" menu, turn the [MULTI] knob to move to [4. STC RANGE]. Press the [MULTI] knob to display the menu for entering values.

The initial setting is set to 160. This differs from the fish image settings.

The setting range of the value is between 0 and 1000 m and can be changed in steps of 1 m.

5.2.4.3.4 Range of the Time Varied Gain

This is a menu item that sets the distance of the TVG (MID) and (FAR) changeover points.

Operating Procedure **Press the keys "7 → 4 → 3 → 4" to go to TVG RANGE settings**

```
■ MENU
■ FISH IMAGE
■ TECHNOLOG SET
■ RX
  1. RX CLUTTER       0
  2. RX WIDTH         0
  3. STC RANGE      160
 ⟩4. TVG RANGE      320



  0. RETURN          ⟩⟩
```

In the "RECEIVE" menu, turn the [MULTI] knob to move to [4. TVG RANGE]. Press the [MULTI] knob to display the menu for entering values.

The initial setting is set to 320. This differs from the fish image settings.

The setting range of the value is between 0 and 1000 m and can be changed in steps of 1 m.

You can confirm the settings for STC and TVG at "INITIAL → MAINTENANCE → TVG CURVE".

5.2.4.4　Settings for Signal Transmission and Reception Calibration

This is a menu item for doing settings for stabilize and the basic features of the ultrasonic sound waves.

Operating Procedure **Press the keys "7 → 4 → 4" to go to TX/RX CALIB settings**

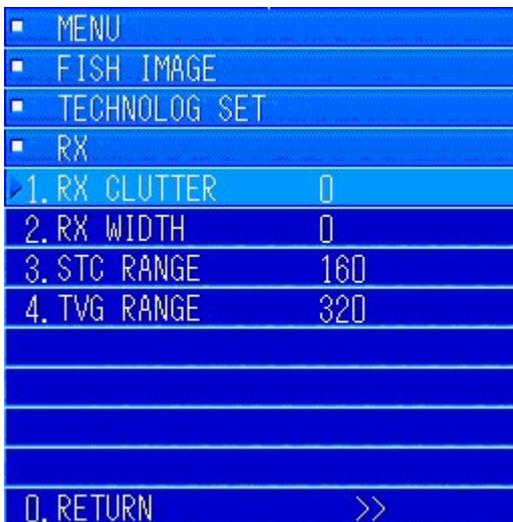| MENU	
■ FISH IMAGE	
■ TECHNOLOG SET	
1. TVG	>>
2. AGC	>>
3. RX	>>
▶4. TX/RX CALIB	>>
5. ADC	7
0. RETURN	>>

Move to the "TECHNOLOG SET" menu and turn the [MULTI] knob to move to "4. TX/RX CALIB". Press the [MULTI] knob to open the submenu.

Do the settings for submenus 1 through 7.

5.2.4.4.1　Settings for Stabilize

This is a menu item for doing ON/OFF settings for stabilize.

Operating Procedure **Press the keys "7 → 4 → 4 → 1" to go to the STABILIZE settings**

MENU	
■ FISH IMAGE	
■ TECHNOLOG SET	
■ TX/RX CALIB	
▶1. STABILIZE	ON ▼
2. ABS ATT	8
3. GAIN MODE SW	HIGH ▼
4. GAIN RANGE SW	0
5. FILTER SHIFT	OFF ▼
6. FREQ SHIFT	OFF ▼
7. FILTER BAND	0
0. RETURN	>>

In the [TX/RX CALIB] menu, turn the [MULTI] knob to move to [1. STABILIZE]. Press the [MULTI] knob to display the pulldown menu.

The initial setting is set to "ON".

It is normally always set to "ON".

5.2.4.4.2 ABS ATT

This is a menu item that sets the ABS ATT of the frequency to be used.

Operating Procedure **Press the keys "7 → 4 → 4 → 2" to go to ABS ATT settings**

MENU
■ MENU
■ FISH IMAGE
■ TECHNOLOG SET
■ TX/RX CALIB
1.STABILIZE   ON ▼
▶2.ABS ATT   8
3.GAIN MODE SW   HIGH ▼
4.GAIN RANGE SW   0
5.FILTER SHIFT   OFF ▼
6.FREQ SHIFT   OFF ▼
7.FILTER BAND   0
0.RETURN   >>

In the "TX/RX CALIB" menu, turn the [MULTI] knob to move to [2. ABS ATT]. Press the [MULTI] knob to display the menu for entering values.
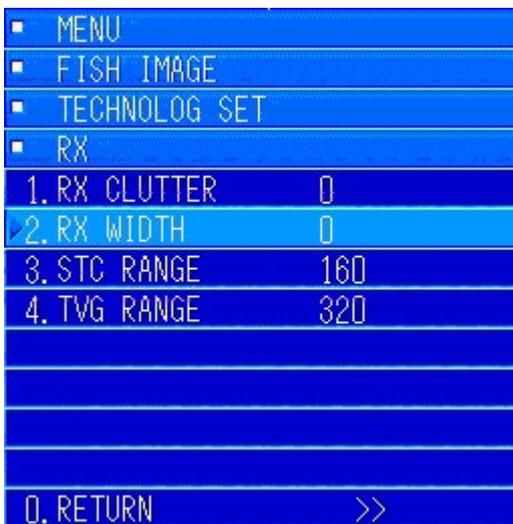
The initial setting is set to 8.

The setting range of the value is between 0 and 15, and can be changed in steps of 1.

This equipment is set to 8.

5.2.4.4.3 Settings for Gain Mode SW

This is a menu item that sets the sensitivity changeover of the receiver.

Operating Procedure **Press the keys "7 → 4 → 4 → 3" to go to GAIN MODE SW settings**

MENU
■ MENU
■ FISH IMAGE
■ TECHNOLOG SET
■ TX/RX CALIB
1.STABILIZE   ON ▼
2.ABS ATT   8
▶3.GAIN MODE SW   HIGH ▼
4.GAIN RANGE SW   0
5.FILTER SHIFT   OFF ▼
6.FREQ SHIFT   OFF ▼
7.FILTER BAND   0
0.RETURN   >>

In the [TX/RX CALIB] menu, turn the [MULTI] knob to move to [1. STABILIZE]. Press the [MULTI] knob to display the pulldown menu.

The initial setting is set to "ON".

It is normally always set to "ON".

5.2.4.4.4 Settings for Gain Range SW

This is a menu item that sets the gain range switch of the receiver.

Operating Procedure **Press the keys "7 → 4 → 4 → 4" to go to GAIN RANGE SW settings**

In the "TX/RX CALIB" menu, turn the [MULTI] knob to move to [4. GAIN RANGE SW]. Press the [MULTI] knob to display the menu for entering values.

The initial setting is set to 0.

The setting range of the value is between 0 and 50, and can be changed in steps of 1.

It is normally always set to 0.

5.2.4.4.5 Settings for Filter Shift

Filter shift is an item that is set for scalability.

Operating Procedure **Press the keys "7 → 4 → 4 → 5" to go to FILTER SHIFT settings**

The initial setting is set to "OFF".

5.2.4.4.6 Settings for Frequency Shift

Frequency shift is an item that is set for scalability.

Operating Procedure **Press the keys "7 → 4 → 4 → 6" to go to FREQ SHIFT settings**

The initial setting is set to "OFF".

5.2.4.4.7 Settings for the Filter Band

Filter band is an item that is set for scalability.

Operating Procedure **Press the keys "7 → 4 → 4 → 7" to go to FILTER BAND settings**

The initial setting is set to 0.

5.2.4.5 ADC Curve Settings

This is a menu item that sets the curve at which to convert to color when displaying the received signals on the screen.

Operating Procedure **Press the keys "7 → 4 → 5" to go to ADC settings**

Move to the "TECHNOLOG SET" menu and turn the [MULTI] knob to move to "5. ADC". Press the [MULTI] knob to open the menu for entering values, and then do the settings for 0 through 7.

The initial setting is 3.

Lowering this number makes the gain appear low, while increasing the value makes the gain appear high.

5.2.5 Settings for the Image SW Function

Turning the [IMAGE] knob registers a setting between A and E.

Settings A through E change the internal settings values, as seen in the following table.

Refer to the following table when using this equipment.

Echoes SW	Assumed use (Assumed speed)	STC LEVEL (Assumed range of use)	Pulse Length (Long/short)	Clutter (Strong/ medium/ weak)	Interference (Strong/ medium/ weak)	AGC MODE	TVG Mid/Far
A50	Standard/ normal search	7.0 (700 to 300)	20 (Long)	3 (Medium)	2 (Weak)	RCG	20/30
B50	Sardines, mackerel, etc. Strong echoes indicate schools	9.0 (1000 to 500)	20 (Long)	4 (Strong)	2 (Weak)	RCG	30/30
C50	Squids, sauries, etc. Wide, weak echoes	3.0 (400 to 200)	20 (Long)	2 (Medium)	2 (Weak)	RCG	20/30
D50	You want to move away from the sea floor Echoes from bottom fish	7.0 (600 to 300)	3 (Short)	3 (Medium)	2 (Weak)	RCG	20/30
E50	Bonito, tuna, etc. Echoes from fast moving objects	7.0 (600 to 300)	20 (Long)	3 (Medium)	4 (Medium)	RCG	20/30

A50: Standard setting value for finding fish.

B50: Setting for searching long distances for large schools of fish.

C50: Setting to enhance objects repeatedly captured from amongst weak echoes.

D50: Setting to raise resolution for directional distance.

E50: Setting for searching medium distances for school of fish at low ship speeds.

Function of the Image SW

 Turning the [IMAGE] knob clockwise scrolls through the following figures in the order of "A → B → C → D → E → A". Likewise, turning it counterclockwise scrolls in the order of "A → E → D → C → B → A".

A

B
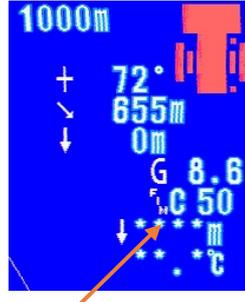
C

D

E

Before pressing

After pressed

Turning the [IMAGE] knob while the value is displayed in red changes the value.

Increasing this value increases noise and decreasing it decreases noise.

5

6   Operation Settings

Contents

6.1 Operation Modes

This section explains the operation mode settings, such as setting transmission to "On" or "Off", recording screenshots, alarms, reading saved setting values, automatic tilt angle, adjustments to the speed of the cursor (which is used for operations), the amount of change to the tilt angle, and other settings and adjustments.

6.1.1 AUTO TX

Set the function for transmitting automatically according to whether the hoisting device is extending or retracting.

Operating Procedure **Press the keys "8 → 1 → 1" to go to AUTO TX settings**

Press the [MENU] key to open the menu.

Turn the [MULTI] knob to move to "OPERATION". Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "MODE SET".

Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "1. AUTO TX". Press the [MULTI] knob to display the pulldown menu.

The initial setting is set to "On".

Generally, this setting is not changed.

A service representative uses it for testing or if the hoisting device is damaged.

Precaution: If this setting is turned "Off", transmissions are not done unless the next "TX" menu is set to "On".

When the pulldown menu appears, turn the [MULTI] knob to move to the item you want to set.
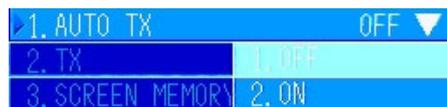
Press the [MULTI] knob to select and set.

Press the [MENU] key to close the menu.

6.1.2 TX

⎯ Precautions ⎯

Always confirm that the hoisting device is extended before turning this setting "On". Do not turn it "On" if the hoisting device is stored. Doing so could damage both the transmitter and the transducer.

If the "AUTO TX" menu is "On", the menu is masked (cannot be set).

You can set this to "On" or "Off" while "AUTO TX" is set to "Off".

If "AUTO TX" is set to "On", transmission is automatic, regardless of this setting.

Operating Procedure **Press the keys "8 → 1 → 2" to go to TX settings**

Press the [MENU] key to open the menu.

Turn the [MULTI] knob to move to "OPERATION".

Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "MODE SET".

Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to the "2. TX" menu.

Press the [MULTI] knob to display the pulldown menu.

Turn the [MULTI] knob and select "On" or "Off".

6.1.3 Screen Memory Card

You can save or read the entire screen to and from the memory card. You need a **compact flash card** to save data. (Precaution: Check with your retailer or service representative before purchase.)

6.1.3.1 Saving Screen Images

First, for the screen you want to save, press the [MEMORY/4] key on the controls.

[MEMORY] appears in the lower left part of the screen.

Operating Procedure **Press the keys "8 → 1 → 3 → 1" to go to WRITE FILE settings**

MENU
OPERATION
MODE SET
1. AUTO TX   ON ▼
2. TX   ON ▼
3. SCREEN MEMORY   >>
4. ALARM   >>
5. SETTING CARD   >>
6. AUTOMATIC RISE   16 ▼
7. OPERATION SET   >>
8. TILT SET   >>

0. RETURN   >>

Press the [MENU] key to open the menu.

Turn the [MULTI] knob to move to "OPERATION". Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "MODE SET". Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to the "3. SCREEN MEMORY" menu. Press the [MULTI] knob to open the "3. SCREEN MEMORY" submenu.

MENU
OPERATION
MODE SET
SCREEN MEMORY
1. WRITE FILE   CANCEL ▼
2. READ FILE   >>
3. DELETE FILE   >>
4. REPLAY SCREEN   OFF ▼

0. RETURN   >>

Turn the [MULTI] knob to select "1. WRITE FILE". Select "2. WRITE FILE" from the pulldown menu, and then press the [MULTI] knob to start saving.

1. WRITE FILE   CANCEL ▼
2. READ FILE   1. CANCEL
3. DELETE FILE   2. CARD WRITE

EL]   CARD WRITE ...
MEMORY ANGLE MANUAL

EL]   CARD WRITE OK
MEMORY ANGLE MANUAL

When you start to write the screen "WRITE..." appears in the lower right part of the screen, as shown in the diagram on the left, so you know that writing has started.

When the screen is finished being written, the message "WRITE OK" appears.

EL]   WRITE NG
MEMORY ANGLE MANUAL

If no compact flash card has been inserted, or if writing the screen does not end normally, the message "WRITE NG" appears as shown in the diagram on the right.

EL]   CARD
MEMORY ANGLE MANUAL

Confirm that a card has been inserted, as indicated by "CARD" in the diagram on the left.

Precaution: Writing may not be possible, depending on the card. If this happens, contact your retailer or service representative.

6.1.3.2 READ FILE

You can display the screen data that you saved to the memory card.

Operating Procedure **Press the keys "8 → 1 → 3 → 2" to go to READ FILE settings**

Press the [MENU] key to open the menu.

Turn the [MULTI] knob to move to "OPERATION".

Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "MODE SET".
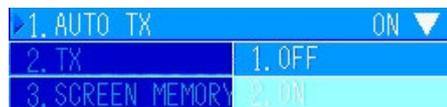
Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to the "3. SCREEN MEMORY" menu. Press the [MULTI] knob to open the "3. SCREEN MEMORY" submenu.

Turn the [MULTI] knob and select "2. READ FILE".
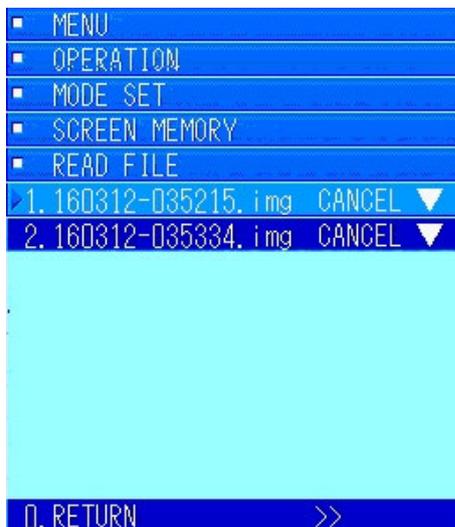
While the recorded screen data is being written, the name of the file that is being written is displayed as shown in the diagram on the left.

In the example in the diagram on the left, two files have been saved.

The file names list the last two digits of the year, the month, date, hour, minutes, and seconds, in that order. We know that the file in the diagram on the right was the screen data saved on March 12, 2016, at 3:40:04.

When you find a file with the date that you want to read, turn the [MULTI] knob to move to that file.

Pressing the [MULTI] knob displays the pulldown menus "1.STOP" and "2. REPLAY DISPLAY", so turn the [MULTI] knob to move to "2. REPLAY DISPLAY". Press the [MULTI] knob to select it.

If the reading is completed successfully, "READ OK" appears on the screen as shown in the diagram on the left.

Precaution: To display the screen data that was read, you need to press the menu number keys "8 → 1 → 3 → 4" and set "REPLAY" to "On". Refer to the "REPLAY" section.

6.1.3.3 Deleting Files

You can delete the screen data that you saved to the memory card.

Operating Procedure **Press the keys "8 → 1 → 3 → 3" to go to DELETE FILE settings**

Press the [MENU] key to open the menu.

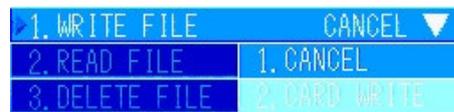Turn the [MULTI] knob to move to "OPERATION". Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "MODE SET". Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to the "3. SCREEN MEMORY" menu. Press the [MULTI] knob to open the "3. SCREEN MEMORY" submenu.

Turn the [MULTI] knob to select "3. DELETE FILE". In the example in the diagram on the left, you can see that there are two types of data stored in the card.

Turn the [MULTI] knob to move to the data you want to delete. Press the [MULTI] knob to open the pulldown menu as shown in the diagram on the left. If the selected file is correct, turn the [MULTI] knob to select "2. DELETE". Press the [MULTI] knob to delete the data.

If "DELETE" is completed successfully, the message "DELETE OK" appears as shown in the diagram on the left.

6.1.3.4 Replaying Screens

Screens are not displayed as is, even if you replay them from the screen memory or the from the screen memory on the card.

To display them, you need to set the replay display settings to "On".

Operating Procedure **Press the keys "8 → 1 → 3 → 4" to go to REPLAY settings**

Press the [MENU] key to open the menu.

Turn the [MULTI] knob to move to "OPERATION".

Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "MODE SET".

Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to the "3. SCREEN MEMORY" menu. Press the [MULTI] knob to open the "3. SCREEN MEMORY" submenu.

Turn the [MULTI] knob to select "4. REPLAY SCREEN".

Press the [MULTI] knob. Turn the [MULTI] knob to "REPLAY SCREEN" from the pulldown menu. Select "2. REPLAY" by pressing the [MULTI] knob.

The selection is set, and items 1 to 3 on the "SCREEN MEMORY" menu are masked and cannot be selected.

To replay other image data in the memory, first set "4. REPLAY SCREEN" to "Off".

During "REPLAY SCREEN" the "REPLAY" message is displayed as shown in the diagram on the left.

6

6.1.4 Alarms

In this section we explain how to turn alarms "On" and "Off", as well as how to set "ANGLE", "DISTANCE", "AREA SIZE", "LEVEL", and "LOST COUNT".

Operating Procedure **Press the keys "8 → 1 → 4" to go to ALARM settings**

Press the [MENU] key to open the menu.

Turn the [MULTI] knob to move to "OPERATION".

Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "MODE SET".

Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "4. ALARM".

Press the [MULTI] knob to open the submenu for "4. ALARM".

6.1.4.1.1 Alarm Operations

You can turn the alarm operations on or off. The initial value is set to "Off".

Operating Procedure **Press the keys "8 → 1 → 4 → 1" to go to ALARM settings**

To turn the alarm function "On", turn the [MULTI] knob to move to "1. ALARM". Press the [MULTI] knob to display the pulldown menu, as shown in the diagram below.
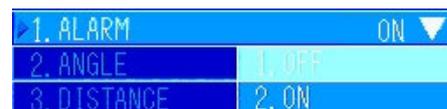
Turn the [MULTI] knob to move to "2. ON" and press the [MULTI] knob to set it.

When it is set, the "Alarm Range" is displayed as the example shows in the diagram on the left.
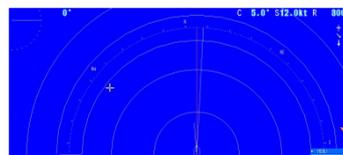
Alarm range (fan-shaped white frame)

6.1.4.2 Angle Settings

This menu is for changing the detection angle of the alarm range. You can select from three settings: 30°, 90°, and 180°. The initial value is set to "90°".

Operating Procedure **Press the keys "8 → 1 → 4 → 2" to go to ANGLE settings**

Use the [MULTI] knob to open the submenu for "ALARM" to do "ALARM" operations.

Turn the [MULTI] knob to move to "2. ANGLE". Press the [MULTI] knob to open the pulldown menu. Turn the [MULTI] key to select the angle you want to use from "1. 30°", "2. 90°", or "3. 180°". Then press the [MULTI] key to set it. The various angles are as shown in the diagrams below.
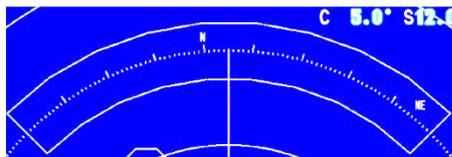
"2. 90°" is the standard initial value that is set.

"1.30°"
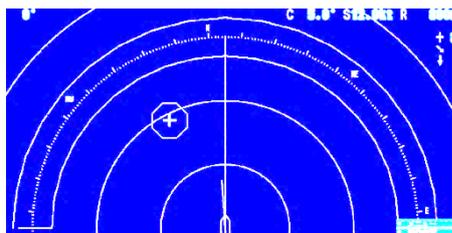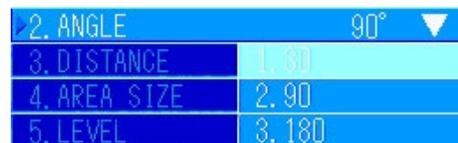
"3.180°"
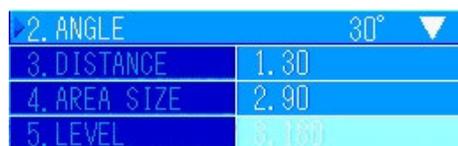
Precaution: When you select the settings to change them, the alarm is cleared and the scanning operations start in a new range.

6.1.4.3 Distance Settings

This section explains how to set the detection distance for the alarm range.

You can set the distance from 50 m to 5000 m in 1 m increments.

Operating Procedure **Press the keys "8 → 1 → 4 → 3" to go to DISTANCE settings**

Use the [MULTI] knob to open the submenu for "ALARM" to do "ALARM" operations.

Turn the [MULTI] knob to move to "3. DISTANCE". Press the [MULTI] knob to open the menu for inputting values.

The initial value is set to "300 m".

The diagram on the left shows a screen in which the initial value is set to "300 m".

Center of alarm range is 300 m

The diagram on the left shows an example of a screen in which the distance is set to "200 m".
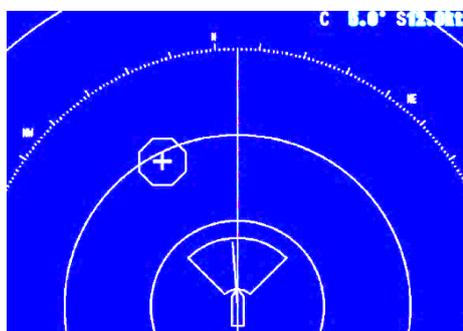
The diagram on the left shows an example of a screen in which the distance is set to "50 m".

6.1.4.4 Area Size Settings

You can set the detection area for the distance direction of the alarm range.

You can select a detection area from three types: "Small", "Medium", and "Large".

Operating Procedure **Press the keys "8 → 1 → 4 → 4" to go to AREA SIZE settings**

Use the [MULTI] knob to open the submenu for "ALARM" to do "ALARM" operations.

Turn the [MULTI] knob to move to "4. AREA SIZE".

Press the [MULTI] knob to open the pulldown menu.

The initial value is set to "Medium".

The area size is set to 10%, 20%, or 30% for each of the distances set in "3. DISTANCE".

To change it, turn the [MULTI] knob to move to a selected item. Press the [MULTI] knob to set it.
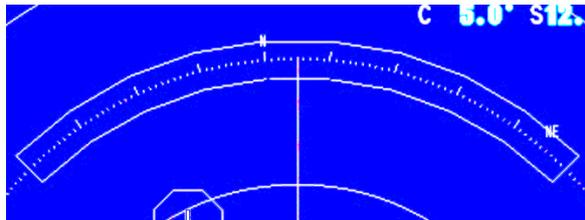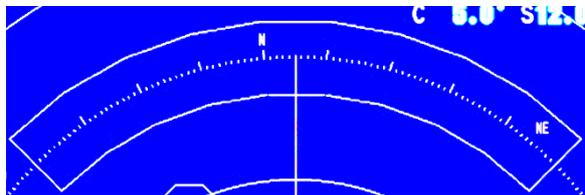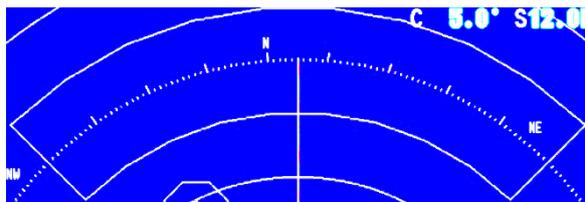
When you turn the [MULTI] knob to move to the various setting values, the screen will change, but the changes are not reflected until they are set. (The settings revert when you close the menu.)

6.1.4.5 Level Settings

This section explains how to set the minimum level that is detected as an alarm. The initial value is set to "15".

If you set the alarm level too low, static noise may cause the alarm to operate.

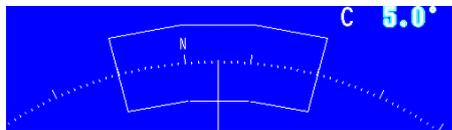**Operating Procedure** **Press the keys "8 → 1 → 4 → 5" to go to LEVEL settings**

Use the [MULTI] knob to open the submenu for "ALARM" to do "ALARM" operations.

Turn the [MULTI] knob to move to "5. LEVEL". Press the [MULTI] knob to open the menu for inputting values.

The numerical range is between 0 and 31, and can be set in steps of 1.

Change the settings according to the conditions of the sea and the type of fish school.

6.1.4.6 Amount Settings

This section explains how to set the amount that must be within the alarm range that is detected as an alarm.

The range of settings for the amount is "Very small", "Small", "Medium", and "Large". The percentages of the alarm area for each of these are set as "Very small = 1%", "Small = 5%", "Medium = 10%", and "Large = 20%". The initial value is "Small".

Operating Procedure **Press the keys "8 → 1 → 4 → 6" to go to AMOUNT settings**

Use the [MULTI] knob to open the submenu for "ALARM" to do "ALARM" operations.

Turn the [MULTI] knob to move to "6. AMOUNT". Press the [MULTI] knob to open the pulldown menu.

Change the settings according to the conditions of the sea and the type of fish school.

6.1.4.7 Lost Count Settings

The sonar is equipped with a function that automatically cancels alarms depending on the number of times that the amount falls below the detection level after an alarm occurs. This function operates according to the "LOST COUNT" settings.

This function stops if set to "CONTINUOUS", so that once an alarm occurs the alarm continues, unless it is cancelled with the [CLR] key. The initial setting is set to "Low".

This also changes depending on the range used for this function.

Setting values can be selected from "Low", "Mid", "High", and "Continuous".

Operating Procedure **Press the keys "8 → 1 → 4 → 7" to go to LOST COUNT settings**

Use the [MULTI] knob to open the submenu for "ALARM" to do "ALARM" operations.

Turn the [MULTI] knob to move to "7. LOST COUNT".

Press the [MULTI] knob to open the pulldown menu.

Change the settings according to the conditions of the sea and the type of fish school.
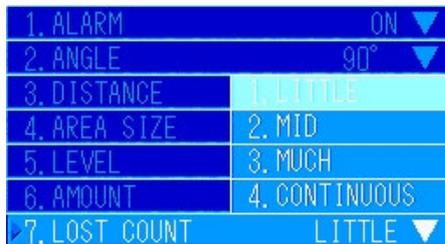
Judgment value for lost count according to range

Long range: Low = 1, Mid = 3, High = 5

Medium range: Low = 2, Mid = 6, High = 10

Short range: Low = 3, Mid = 9, High = 15

6.1.5 Setting Card

You can record items that are set in the menus and the fish image settings to a **compact flash card**. These settings can be read and the memories can be managed (deleted).

(Precaution: Check with your retailer or service representative before purchase.)

Operating Procedure **Press the keys "8 → 1 → 5" to go to SETTING CARD settings**

Press the [MENU] key to open the menu.

Turn the [MULTI] knob to select "8. MODE SET".

Press the [MULTI] key to open the submenu.

Turn the [MULTI] key to select "5. SETTING CARD".

Press the [MULTI] knob to open the submenu.

6.1.5.1 Reading Setting Values

You can use this function to read and then use the set values that have been stored on the card.

You can easily change settings by accessing and using setting values that have been stored in advance. If you need to change the settings, such as when changing the types of fish or the fishing method.

Operating Procedure **Press the keys "8 → 1 → 5 → 1" to go to READ settings**
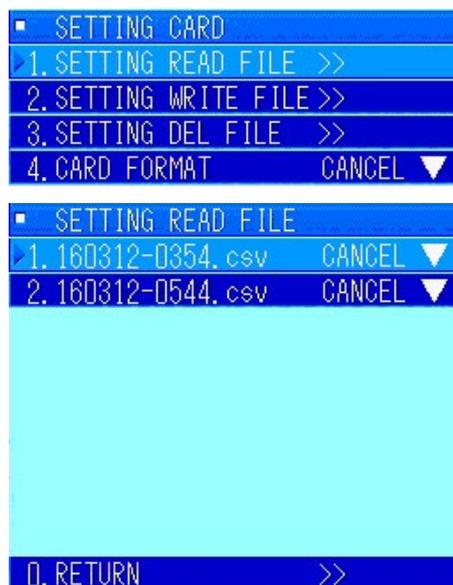
Open the submenu for "5. SETTING CARD".

Turn the [MULTI] knob to select "1. SETTING READ FILE". Press the [MULTI] knob to open a list of setting value files stored on the card.

In the example diagram on the left, you can see that two types of files have been stored. When you find the file you need, turn the [MULTI] knob to select it. Press the [MULTI] knob to open the pulldown menu and then turn the [MULTI] knob to select "2. READ". Press the [MULTI] knob to set it.

Press the [MENU] key, close the menu, and press the [MENU] key again to confirm that it has changed to the value that you want.

6.1.5.2 Reading Setting Values

You can record values, that have been set to match a type of fish and a fishing method that were done while you were fishing, to the card.

You can also record the current setting values to a card and recover them by reading them from the card if you happen to accidently change the current settings and you cannot change them back.

Operating Procedure **Press the keys "8 → 1 → 5 → 2" to go to WRITE settings**

Open the submenu for "5. SETTING CARD", the same as in the previous section.

Turn the [MULTI] knob to select "2. SETTING WRITE FILE".

Pressing the [MULTI] knob displays the "1. SETTING WRITE FILE" menu.

Press the [MULTI] knob again to open the pulldown menu. Turn the [MULTI] knob to select "2. WRITE". Press the [MULTI] knob to set it and start writing.

The pulldown menu closes when writing is complete.

To confirm what was written, open the setting value read menu in the previous section, and confirm whether or not it has been written to the card.

In the example diagram on the left, you can confirm that a new file has been added at the very bottom.

The file names list the last two digits of the year, the month, date, hour, minutes, and seconds in that order, the same as the screen memory files.

6.1.5.3 Deleting Setting Values

You can delete unneeded setting value data from the card.

If you delete data, be very careful and check before you delete it.

Operating Procedure Press the keys "8 → 1 → 5 → 3" to go to DELETE settings

Open the submenu for "5. SETTING CARD", the same as in the previous section.

Turn the [MULTI] knob to select "3. SETTING DEL FILE". Press the [MULTI] knob to open the submenu.

The diagram on the left is an example of an open submenu.

Confirm the data in here that is no longer needed, and then turn the [MULTI] knob to selected it.

As an example this time, delete the file named "1.000000-0136.csv".

Turn the [MULTI] knob to select 1. Press the [MULTI] knob to open the pulldown menu.

Select "2. DELETE" with the [MULTI] knob. Press the [MULTI] knob to set it.

When deletion is complete, the menu closes and the "Delete" selection screen opens.

As shown in the example diagram on the left, you can see that the file has been deleted.

Press the [MENU] key to close all the menus and finish.

6.1.5.4 Formatting Cards

You can use the card format function to easily delete data if you are deleting all the data from an existing card or if you are starting to use a new compact flash card.

Precaution: All the data in the card is lost when the card is formatted.

Operating Procedure Press the keys "8 → 1 → 5 → 4" to go to CARD FORMAT settings
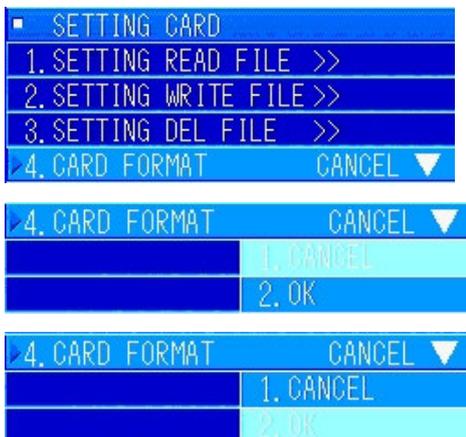
Open the submenu for "5. SETTING CARD", the same as in the previous section.

Turn the [MULTI] knob to select "4. CARD FORMAT". Press the [MULTI] knob to open the submenu.

The "4. FORMAT" submenu opens. Turn the [MULTI] knob to select "2. OK.

If there are no problems with the card to format, press the [MULTI] knob to start formatting.

6.1.6 Automatic Storage Function

This sonar is equipped with an automatic storage function. When the ship reaches a set speed, the transducer is stored automatically. On this menu, you can enable automatic storage and set the ship's speed at which automatic storage is done. The initial value is set to "16 knots". The ship's speed sensor is required to use the automatic storage function.

Operating Procedure **Press the keys "8→1→6" to go to AUTOMATIC RISE settings**

Press the [MENU] key to display the menus. Turn the [MULTI] knob to select "8. MODE SET". Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to select "6. AUTOMATIC RISE". Press the [MULTI] knob to display the pulldown menu.

The diagram on the left shows the pulldown menu for "6. AUTOMATIC RISE". You can set it to "1. OFF" or to a value from "2. 10 to 8.16".

If you set it to "1. OFF" automatic storage does not operate.

If you set it to "OFF", you need to confirm the speed of the ship before extending or storing it.

6.1.6.1 Automatic Storage Operation

This section explains the operations when the automatic storage speed is set to the initial value of 16 knots.
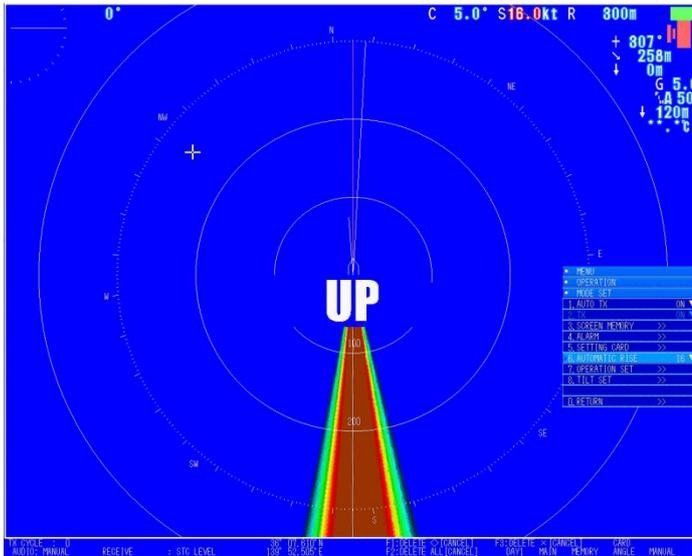
1. If the ship's speed exceeds 16 knots, the ship's speed display turns red.

2. "UP" appears in the middle of the screen. At the same time, the hoisting device buzzer starts sounding and storage operations start after two seconds. As soon as the buzzer sounds, move away from the hoisting device.

3. After a few seconds storage is complete and the hoisting device's buzzer turns off, and a storage complete message appears on screen.

4. It is not possible to do extension operations until the ship's speed is below the set speed. Also, the ship's speed continuous to be displayed in red.

Storage starts 2 seconds after "UP" is displayed

Storage complete

Displayed in red
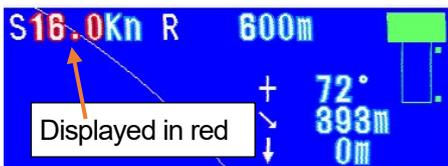
The storage complete display appears on the screen.

When the ship's speed falls below the set value, the ship's speed display changes to its normal color. Extension is now possible.

6.1.7 Operation Settings

You can set the pointer (cursor mark) distance of motion and the speed of the dial operations.

Operating Procedure **Press the keys "8 → 1 → 7" to go to OPERATION SET settings**

Press the [MENU] key to open the menu.

Turn the [MULTI] knob to select "8. OPERATION"

Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to select "1. MODE SET".

Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to select "7. OPERATION SET".

Press the [MULTI] knob to open the submenu.

The diagram on the left is the submenu of "OPERATION SET".

6.1.7.1 Pointer (Cursor Mark) Distance of Motion

Set the speed of the motion of the pointer (cursor mark). The initial value is set to "2. MID". It is normally set to the initial value.

Operating Procedure **Press the keys "8 → 1 → 7 → 1" to go to CURSOR SPEED settings**

Turn the [MULTI] knob to select "1. CURSOR SPEED".

Press the [MULTI] knob to open the pulldown menu.

1.   You can select from three speeds: "1. Low Speed", "2. Intermediate Speed", and "3. High Speed". To change it, turn the [MULTI] knob to select one and press the [MULTI] knob to set it. Close the menu to complete the settings.

6.1.7.2 Knob Operations

This section explains how to set the operating speeds of the various types of knobs. The knobs, MULTI, VOL, FISH IMAGE, GAIN, and AUDIO DIRECTION, are all changed with the same shared setting. The initial value is set to "1. LOW". It is normally set to the initial value.

Operating Procedure **Press the keys "8 → 1 → 7 → 2" to go to DIAL SPEED settings**

Turn the [MULTI] knob to select "2. DIAL SPEED". Press the [MULTI] knob to display the pulldown menu.

You can select from three speeds: "1. LOW", "2. MID", and "3. HIGH".
To change it, turn the [MULTI] knob to select one and press the [MULTI] knob to set it. Close the menu to complete the settings.

6.1.8 Setting the Tilt

This section explains how to set the tilt step (step angle when doing automatic tilting) and the short distance tilt adjustment. The initial values are set to 1 for the tilt step and to 0 for the near distance tilt adjustment.

Operating Procedure **Press the keys "8 → 1 → 8" to go to TILT SET settings**

Press the [MENU] key to open the menu.
Turn the [MULTI] knob to select "8. OPERATION".
Press the [MULTI] knob to open the submenu, turn the [MULTI] knob to select "1. MODE SET".
Press the [MULTI] knob to open the submenu, turn the [MULTI] knob to select "8. TILT SET".
Press the [MULTI] knob to open the submenu.

The diagram on the left is the submenu for "TILT SET".

6.1.8.1 Tilt Step Settings

This section explains the tilt step, which is the tilt steps (changes in angle) that are applied for every transmission when automatic stepping is set.

Operating Procedure **Press the keys "8 → 1 → 8 → 1" to go to TILT STEP settings**

Turn the [MULTI] knob to select "1. TILT STEP". Press the [MULTI] knob to open the pulldown menu.

In the pulldown menu, "1. 1", "2. 2", or "3. 5" is set.
For this product, we recommend "3. 5" according to the vertical beam width, when using automatic tilt.

6.1.8.2 Long Distance Tilt Adjustments

This section explains how to set the tilt angle to adjust when a school of fish that was detected at a distance approaches your own ship.

At a distance, the vertical beam is wide, if, for example, the tilt angle is set to 0° when a nearby fish school is detected 800 m ahead at a depth of 50 m, the person operating the sonar needs to lower the tilt angle because as the fish school approaches 500 m the fish school gradually shifts out of the vertical beam.

This setting automatically raises or lowers the tilt angle.

If you want this to be done automatically, set this adjustment value.

Operating Procedure **Press the keys "8 → 1 → 8 → 2" to go to LONG DISTANCE TILT ADJ settings**

Turn the [MULTI] knob to select "2. LONG DISTANCE TILT ADJ". Press the [MULTI] knob to open the pulldown menu.

In the pulldown menu, you can set "-2 to 2".
Set "5. 2" to automatically lower the tilt angle.
Conversely, set "5. -2" to lower the tilt angle to 3° for surface schools of fish that are far away.

6.2 Display Mode Settings

This section explains settings such as the off center, split settings, RM mode, and whether to hide or show information.

Operating Procedure **Press the keys "8 → 2" to go to DISPLAY MODE settings**

Press the [MENU] key to open the menu.

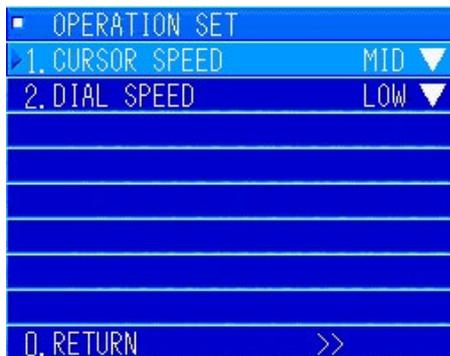Turn the [MULTI] knob to select "8. OPERATION".

Press the [MULTI] knob to open the submenu, turn the [MULTI] knob to select "2. DISPLAY MODE".

Press the [MULTI] knob to open the submenu.

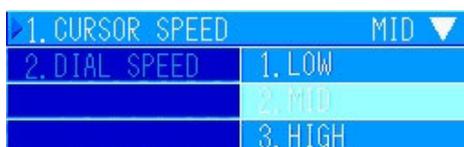Turn the [MULTI] knob to select an item from "1 to 4".

Press the [MULTI] knob to open the submenu and do the settings.

6.2.1 Information Display Settings

This section explains the settings to always display the information screen on the right side or to display the sonar image in full screen.

Operating Procedure **Press the keys "8 → 2 → 1" to go to INFORMATION settings**

Turn the [MULTI] key to select "1. INFORMATION". Press the [MULTI] knob to select "ON" from the pulldown menu.

The sonar screen becomes smaller and an area for displaying information appears on the right side, as shown in the diagram on the left.

Screen in which the sonar image is shown

Area for displaying information

In the information display area, you can split the area to show 3 of the following 5 items, from 2 to 6.

If the information is displayed, "1. SHIP INFO" is fixed in the top position. The user cannot change it.
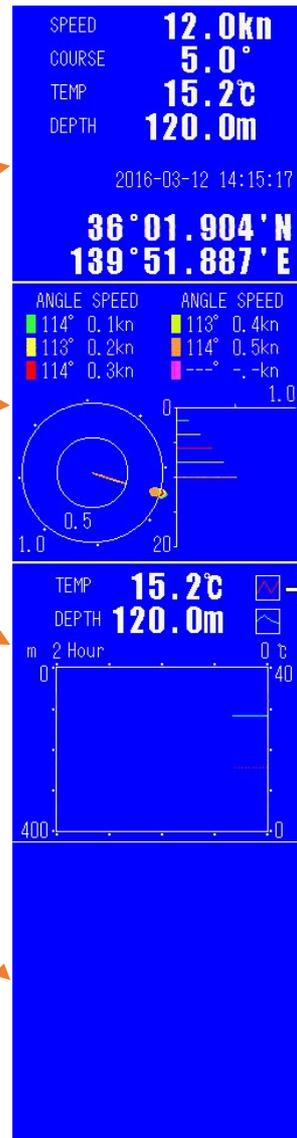
6.2.2 RM

You can set your own ship's heading direction (head-up) or north at the top (north-up) of the sonar image screen.

Operating Procedure **Press the keys "8 → 2 → 2" to go to RM settings**

```
■  DISPLAY MODE
1. INFORMATION          OFF  ▼
▷2. RM                   Hup  ▼
3. SPLIT DISPLAY         >>
4. OFF CENTER         CURSOR  ▼




0. RETURN               >>
```
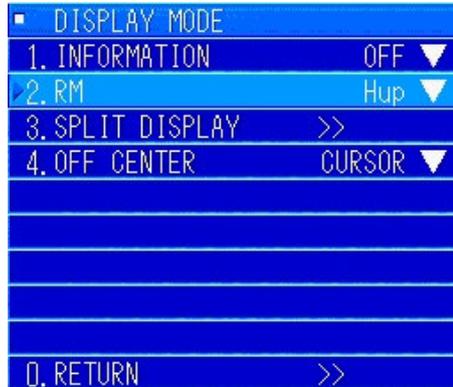
Turn the [MULTI] key to select "2. RM". Press the [MULTI] knob to select "1. Hup" or "2. Nup" from the pulldown menu.

"1. Hup" is the own ship heading
"2. Nup" is the north direction.
Turn the [MULTI] knob to move to select "1" or "2". Press the [MULTI] knob to set it.

Hup screen is the initial value
The initial value is set to "1. Hup".

Screen when changed to Nup

```
▷2. RM                   Hup  ▼
3. SPLIT DISPLAY    1. Hup
4. OFF CENTER       2. Nup
```

C 5.0°

N

Front is own ship

```
■  DISPLAY MODE
1. INFORMATION          OFF  ▼
▷2. RM                   Nup  ▼
```

C 5.0°

N

Front is north

6
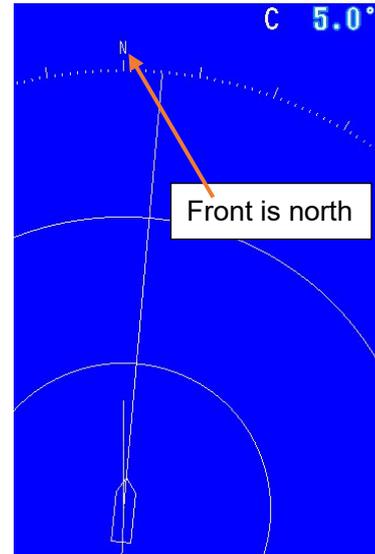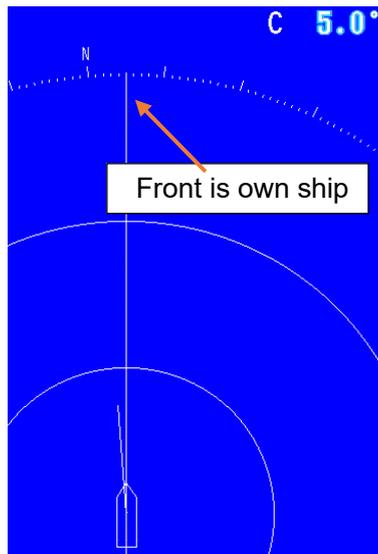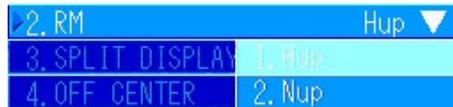
6.2.3 Split Display

You can set the system to show the audio image or the fish finder image on the sonar image screen.

Operating Procedure **Press the keys "8 → 2 → 3" to go to SPLIT DISPLAY settings**
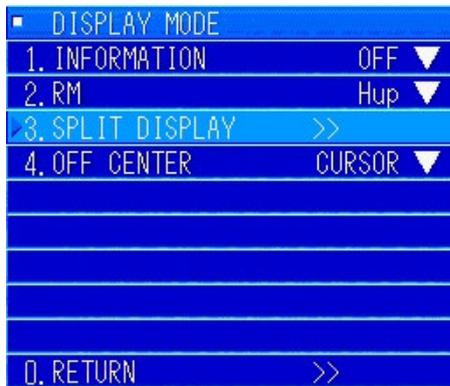
Turn the [MULTI] key to select "3. SPLIT DISPLAY". Press the [MULTI] knob to display the submenu, select either "1. AUDIO" or "2. F/F", and then set it.

The "2. F/F" menu is masked unless you have connected the fish finder in the "INITIAL SENSOR CONNECTION" settings.

6.2.3.1 Audio

You can also display the image of the direction of the sound you are hearing. To display it, you need to press the [DISPLAY MODE] key.

Operation Procedure **Press the keys "8 → 2 → 3 → 1" to go to AUDIO settings**

Turn the [MULTI] key to select "1. AUDIO". Press the [MULTI] key to display the pulldown menu.
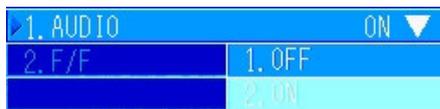
Turn the [MULTI] key to select "2. ON". Press the [MULTI] key to set "2. ON".
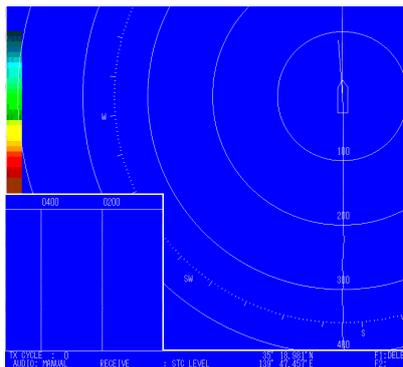
After doing the above settings, press the [DISPLAY MODE] key to display the split display as shown in the diagram on the left, and the sound detection image is displayed.

6.2.3.2 Fish finder

If the fish finder is connected, you can also display the fish finder image on the screen by setting the split display setting to "2. ON".

Operating Procedure **Press the keys "8 → 2 → 3 → 2" to go to FISH FINDER settings**

Turn the [MULTI] key to select "2. F/F".

Press the [MULTI] key to display the pulldown menu.

Turn the [MULTI] key to select "2. OK".

Press the [MULTI] key to set "2. OK".

After doing the above settings, press the [DISPLAY MODE] key to display the split display as shown in the diagram on the left, and the sound detection image is displayed.

Precaution: The fish finder cannot be displayed if it is not connected. If you want to connect it, contact your retailer or service representative to confirm if you can connect it.

After connecting it, set the fish finder you connected to "CONNECT" in "SENSOR CONNECTION" in the "INITIAL" menu.

6

6.2.4 Off Center Function

You can move your own ship's position from the center of the screen to a position that is up to 3/4 of the maximum setting range.

There are three types of off center settings. You can set these operations by long pressing the [OFF CENT] key while this menu is open.

Operating Procedure Press the keys "8 → 2 → 4" to go to OFF CENTER settings
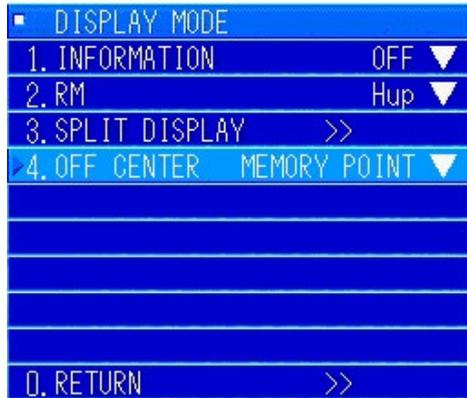
Open the "DISPLAY MODE" menu. Turn the [MULTI] key to select "4. OFF CENTER".

Press the [MULTI] key to display the pulldown menu.

Two types of menu are displayed, "1. CURSOR" and "2. MEMORY POINT".

Turn the [MULTI] key to select the off center you want to use. Press the [MULTI] key to set it.

For information about off center operations, refer to section "4.1.7 Off Center" in section 4.

6.3 Deleting Marks

This menu is for deleting track lines and the various marks from the sonar screen.

Precaution) To delete marks, except the track lines, one at a time, align the cursor with the mark and press the same type of mark again.

It is useful to register a function key, F1 to F3, to delete marks that you often use.

Operating Procedure **Press the keys "8 → 3" to go to DELETE MARK settings**

■ MENU	
■ OPERATION	
1. MODE SET	>>
2. DISPLAY MODE	>>
3. DELETE MARK	>>
4. INFORMATION	>>
5. SPLIT DISPLY SET	>>
6. SCREEN SETTING	>>
7. FISH SET	>>
0. RETURN	>>

Press the [MENU] key to display the menus.

Turn the [MULTI] knob to select "8. OPERATION".

Press the [MULTI] knob to open the submenu.

In the submenu, turn the [MULTI] knob to select "3. DELETE MARK".

Press the [MULTI] knob to open the submenu.

■ MENU	
■ OPERATION	
■ DELETE MARK	
1. DELETE TRACK	CANCEL ▼
2. DELETE ◇	CANCEL ▼
3. DELETE ✕	CANCEL ▼
4. DELETE BUOY	CANCEL ▼
5. DELETE FQ	CANCEL ▼
6. DELETE ALL	CANCEL ▼
0. RETURN	>>

Select the item you want to delete from the submenu and then delete it.

For details, refer to the following section.

6.3.1 Deleting Track Lines

This item is set when you delete track lines.

Operating Procedure **Press the keys "8 → 3 → 1" to go to DELETE TRACK settings**
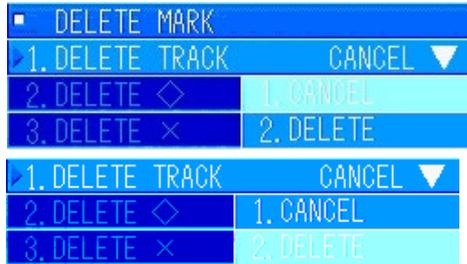
Follow the operations for deleting marks. Open the "DELETE MARK" menu. Turn the [MULTI] knob to select "1. DELETE TRACK".

Press the [MULTI] knob to open the pulldown menu. Turn the [MULTI] knob to select "2. DELETE". Press the [MULTI] knob to set it. All the track lines on the screen are deleted and a new track line starts being written.

The track line created up until deletion was set is deleted.
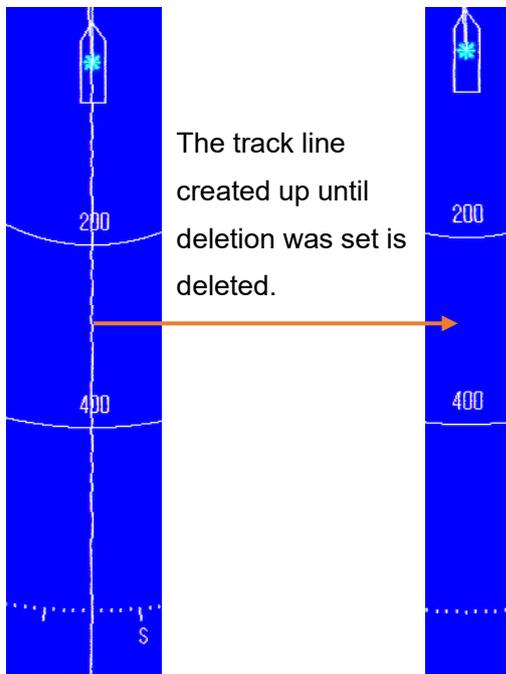
6.3.2 Deleting ◇ Marks

The fish school marks are used, by placing multiple marks, to measure the speed and direction in which the fish school is moving.

After following one fish school, you need to delete the first fish school once to measure the speed and direction of the next school of fish. With this menu, you can delete all the ◇ marks. If you often use the fish school mark, we recommend registering this function to one of the F1 to F3 keys.

Operating Procedure **Press the keys "8 → 3 → 2" to go to DELETE ◇ settings**

Follow the operations for deleting marks. Open the "DELETE MARK" menu. Turn the [MULTI] knob to select "2. DELETE ◇". Press the [MULTI] knob to display the pulldown menu.

When the pulldown menu appears, turn the [MULTI] knob.

Select "2. DELETE". Press the [MULTI] knob to set it.

Fish school marks (◇ mark) and fish information are deleted.
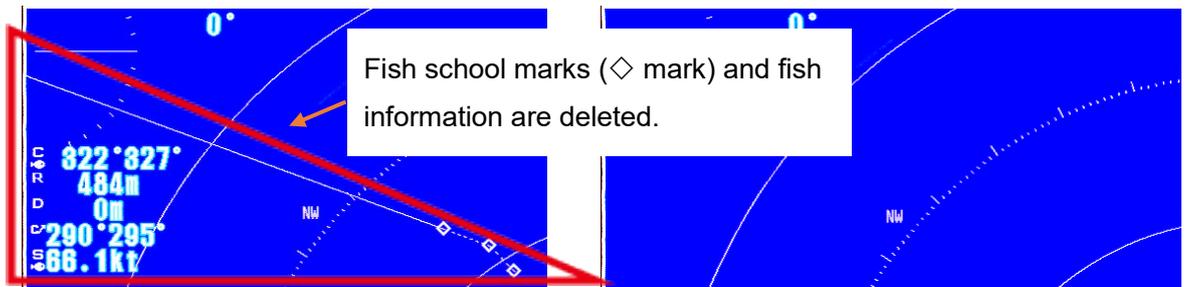
6.3.3 Deleting × Marks

X marks are what event marks are called for short. You can place a maximum of 10 marks. The first 5 marks show the distance and direction from your own ship.

With this menu, you can delete the X marks.

Operating Procedure **Press the keys "8 → 3 → 3" to go to DELETE X MARKS settings**

Follow the operations for deleting marks.

Open the "DELETE MARK" menu. Turn the [MULTI] knob to select "3. DELETE X".

Press the [MULTI] knob to display the pulldown menu.

When the pulldown menu appears, turn the [MULTI] knob.

Select "2. DELETE". Press the [MULTI] knob to set it.
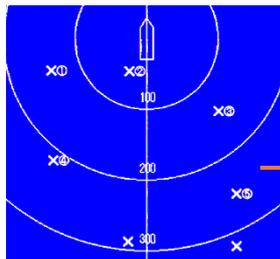
All of the × marks are deleted.
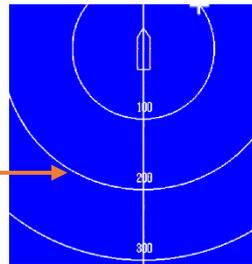
6.3.4 Deleting Buoy Marks

This menu is for deleting all the buoy marks.

Operating Procedure **Press the keys "8 → 3 → 4" to go to DELETE BUOY settings**
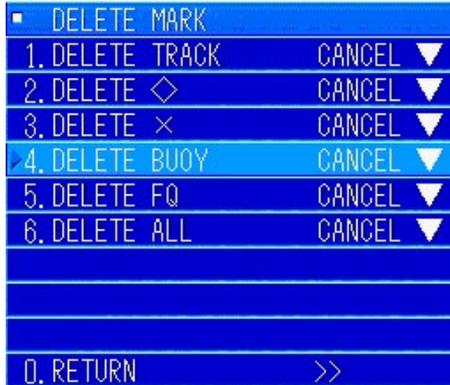
Follow the operations for deleting marks. Open the "DELETE MARK" menu. Turn the [MULTI] knob to select "4. DELETE BUOY". Press the [MULTI] knob to display the pulldown menu.

When the pulldown menu appears, turn the [MULTI] knob.
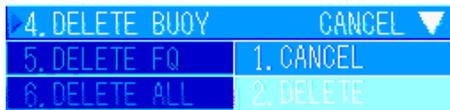
Select "2. DELETE". Press the [MULTI] knob to set it.
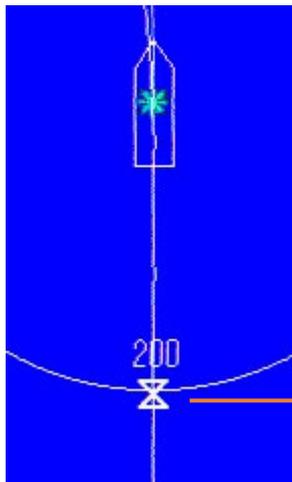
All of the buoy marks are deleted.
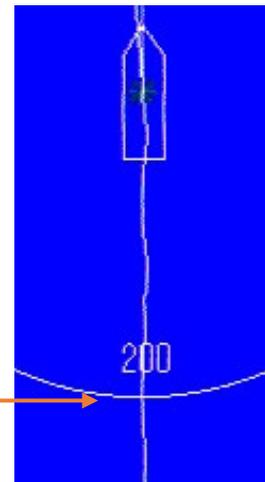
6.3.5 Deleting Fish School Quantity Marks

This menu is for deleting fish school quantity marks.

Operating Procedure **Press the keys "8 → 3 → 5" to go to DELETE FISH SCHOOL MARKS settings**
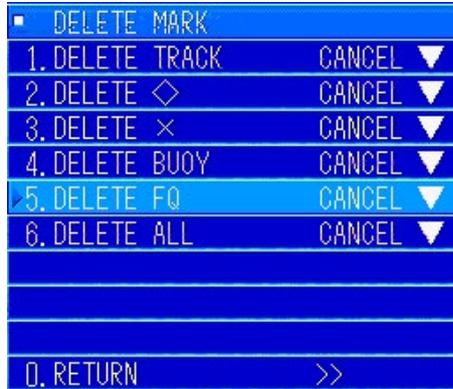
Follow the operations for deleting marks.

Open the "DELETE MARK" menu.

Turn the [MULTI] knob to select "5. DELETE FQ".

Press the [MULTI] knob to display the pulldown menu.
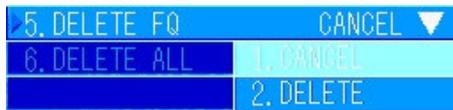
When the pulldown menu appears, turn the [MULTI] knob.
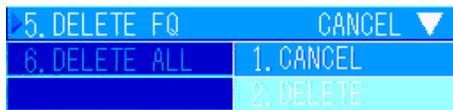
Select "2. DELETE". Press the [MULTI] knob to set it.
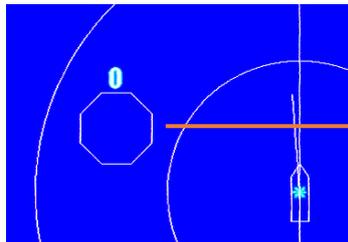
All of the fish school quantity marks are deleted.
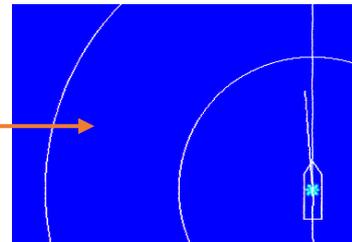
6.3.6 Deleting All Marks

All the marks are deleted, except for track lines. Use this when you want to delete everything at the same time.

Operating Procedure **Press the keys "8 → 3 → 6" to go to DELETE ALL settings**

DELETE MARK	
1. DELETE TRACK	CANCEL ▼
2. DELETE ◇	CANCEL ▼
3. DELETE ×	CANCEL ▼
4. DELETE BUOY	CANCEL ▼
5. DELETE FQ	CANCEL ▼
6. DELETE ALL	CANCEL ▼

6. DELETE ALL	CANCEL ▼
	1. CANCEL
	2. DELETE

6. DELETE ALL	CANCEL ▼
	1. CANCEL
	2. DELETE

Follow the operations for deleting marks.

Open the "DELETE MARK" menu.

Turn the [MULTI] knob to select "6. DELETE ALL".

Press the [MULTI] knob to display the pulldown menu.

When the pulldown menu appears, turn the [MULTI] knob.

Select "2. DELETE". Press the [MULTI] knob to set it.

All the marks are deleted
Track lines cannot be deleted

Track line

6

6-35   6 Operation Settings
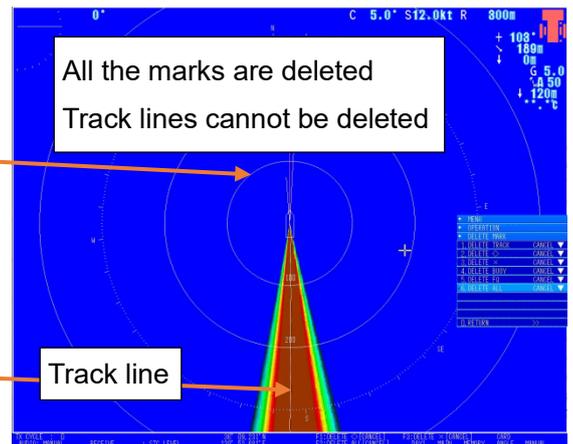
6.4 Information Display Settings

This menu is for setting the display settings: ship information, fish school information, water temperature graph, current, and net depth. Also, in regard to the event mark information display, whether to show or hide the display, display position, and priority position.

Operating Procedure Press the keys "8 → 4" to go to INFORMATION settings

MENU	
OPERATION	
1. MODE SET	>>
2. DISPLAY MODE	>>
3. DELETE MARK	>>
4. INFORMATION	>>
5. SPLIT DISPLY SET	>>
6. SCREEN SETTING	>>
7. FISH SET	>>
0. RETURN	>>

Press the [MENU] key to display the menus.
Turn the [MULTI] knob to select "8. OPERATION".
Press the [MULTI] knob to open the submenu.
In the submenu, turn the [MULTI] knob to select "4. INFORMATION".

MENU	
OPERATION	
INFORMATION	
1. STATUS	>>
2. POSITION	>>
3. PRIORITY	>>
4. SETTING	>>
0. RETURN	>>
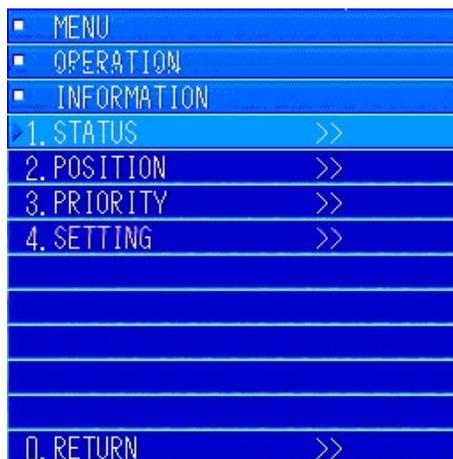
Press the [MULTI] knob to open the submenu. Set 1 through 4.

The following images are examples of the information that is displayed.

Own ship's information
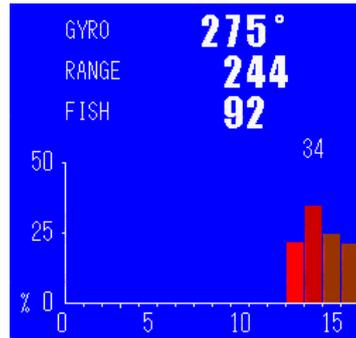
Fish School Information
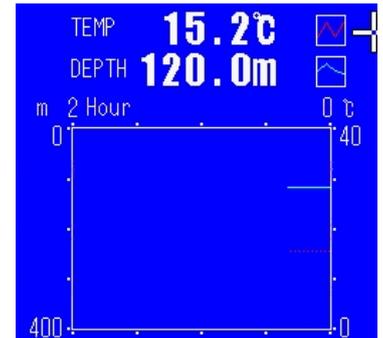
Water Temperature Graph
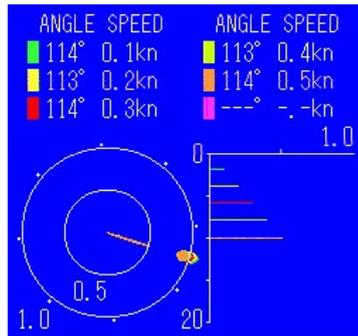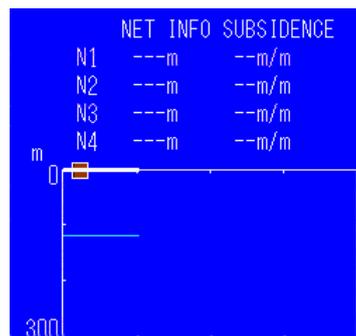
Current

Net Depth

Event Marks

6.4.1 Information Display Format

This menu is for setting whether to hide, show, or automatically show: own ship's information, fish school information, water temperature graphs, currents, net depth, and event marks. If the information displays are hidden, you can press the [Delete/Information] key on the controls to display them.

Operating Procedure **Press the keys "8 → 4 → 1" to go to STATUS settings**
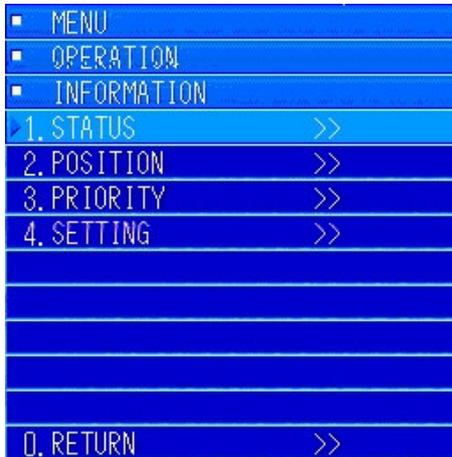
Follow the menu operations for information display to display the "INFORMATION" submenu.
Turn the [MULTI] knob to select "1. STATUS".
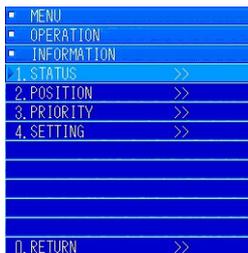
Press the [MULTI] knob to open the submenu.
The initial setting value is to hide them all.

6.4.1.1 Own Ship's Information

This section explains how to set your own ship's information to be hidden, displayed, or automatically displayed.

Operation Procedure **Press the keys "8 → 4 → 1 → 1" to go to SHIP INFO settings**

Follow the menu operations for status display to display the "STATUS" submenu.

Turn the [MULTI] knob to select "1. SHIP INFO". Press the [MULTI] knob to display the pulldown menu.

If you want to display the position of your own ship, set "2. ON".

To show the signal to be displayed when it is input, select "3. AUTO".

If the "8. OPERATION", "2. DISPLAY MODE", or "1. INFORMATION" menu settings are set to display, "SHIP INFO" is always displayed in the top position, regardless of this setting.

6.4.1.2 Fish School Information

This section explains how to set the fish school information to be hidden, displayed, or automatically displayed.

Operation Procedure **Press the keys "8 → 4 → 1 → 2" to go to FISH HISTOGRAM settings**

Follow the menu operations for status display to display the "STATUS" submenu.

Turn the [MULTI] knob to select "2. FISH HISTOGRAM".

Press the [MULTI] knob to display the pulldown menu.

If you want to display the fish school information, set "2. ON". Or, select "3. AUTO" if you want to display it when you set a fish school mark.

6 Operation Settings

6.4.1.3 Water Temperature Graph

This section explains how to set the water temperature graph to be hidden, displayed, or automatically displayed.

You can display a water temperature graph with these settings.

Precaution) You need to connect the sensors to display the water temperature and water depth.

Operating Procedure **Press the keys "8 → 4 → 1 → 3" to go to TEMP/DEPTH settings**

Follow the menu operations for status display to display the "STATUS" submenu.

Turn the [MULTI] knob to select "3. TEMP/DEPTH". Press the [MULTI] knob to display the pulldown menu.

If you want to display the water temperature graph, set "2. ON". Or, select "3. AUTO" if you want to display it when a signal is received.

6.4.1.4 Current

This section explains how to set data about the currents to be hidden, displayed, or automatically displayed.

Precaution) You need to connect the sensors to display the currents.

Operating Procedure **Press the keys "8 → 4 → 1 → 4" to go to CURRENT INFO settings**

Follow the menu operations for status display to display the "STATUS" submenu.

Turn the [MULTI] knob to select "4. CURRENT INFO". Press the [MULTI] knob to display the pulldown menu.

If you want to display the current, set "2. ON". Or, select "3. AUTO" if you want to display it when a signal is received.

6.4.1.5 Net Depth

This section explains how to set net depth to be hidden, displayed, or automatically displayed.

Precaution) You need to connect the sensors to display the net depth.

Operating Procedure **Press the keys "8 → 4 → 1 → 5" to go to NET INFO settings**

Follow the menu operations for status display to display the "STATUS" submenu.

Turn the [MULTI] knob to select "5. NET INFO". Press the [MULTI] knob to display the pulldown menu.

If you want to display the net depth, set "2. ON". Or, select "3. AUTO" if you want to display it when a signal is received.

6.4.1.6 Event Marks

This section explains how to set event marks to be hidden, displayed, or automatically displayed.

Operating Procedure **Press the keys "8 → 4 → 1 → 6" to go to EVENT MARK settings**

Follow the menu operations for status display to display the "STATUS" submenu.

Turn the [MULTI] knob to select "6. EVENT MARK". Press the [MULTI] knob to display the pulldown menu.

If you want to display event marks, set "2. ON". Or, select "3. AUTO" if you want to display them when a signal is received.

6.4.2 Position of Display

This menu item is for setting the display position for: own ship's information, fish school information, water temperature graphs, currents, net depth, and event marks.

Operating Procedure Press the keys "8 → 4 → 2" to go to POSITION settings

Follow the menu operations for information display to display the "INFORMATION" submenu.
Turn the [MULTI] knob to select "2. POSITION".
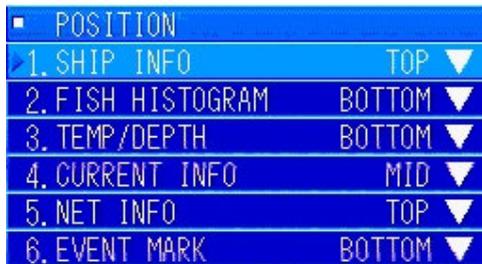
Press the [MULTI] knob to open the submenu. You can set the positions of items 1 through 6.

If the "INFORMATION" settings are set to "ON", "1. SHIP INFO" is masked and shown in the top position.

Information Display Hidden   Information Display Hidden
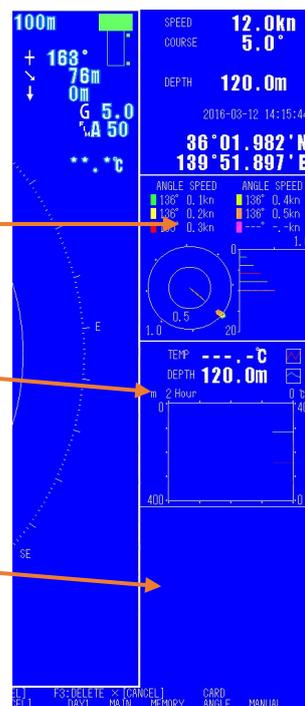
The diagrams on the left indicate the positions when hidden/displayed.

6.4.2.1 Own Ship's Information

This is the menu item for setting the position to display own ship's information.

Operation Procedure **Press the keys "8 → 4 → 2 → 1" to go to SHIP INFO settings**

Follow the menu operations for position display to display the "POSITION" submenu.

Turn the [MULTI] knob to select "1. SHIP INFO". Press the [MULTI] knob to display the pulldown menu.

Turn the [MULTI] knob to select the position to display the own ship's information. Press the [MULTI] knob to set it.

6.4.2.2 Fish School Information

This is the menu item for setting the position to display fish school information.

Operation Procedure **Press the keys "8 → 4 → 2 → 2" to go to FISH HISTOGRAM settings**

Follow the menu operations for position display to display the "POSITION" submenu.

Turn the [MULTI] knob to select "2. FISH HISTOGRAM".

Press the [MULTI] knob to display the pulldown menu.

Turn the [MULTI] knob to select the position to display the fish school information. Press the [MULTI] knob to set it.

6.4.2.3 Water Temperature Graph

This is the menu item for setting the position to display water temperature graph.

Operating Procedure **Press the keys "8 → 4 → 2 → 3" to go to TEMP/DEPTH settings**

Follow the menu operations for position display to display the "POSITION" submenu.

Turn the [MULTI] knob to select "3. TEMP/DEPTH". Press the [MULTI] knob to display the pulldown menu.

Turn the [MULTI] knob to select the position to display the water temperature graph. Press the [MULTI] knob to set it.

6.4.2.4 Current

This is the menu item for setting the position to display currents.

Operating Procedure **Press the keys "8 → 4 → 2 → 4" to go to CURRENT INFO settings**

Follow the menu operations for position display to display the "POSITION" submenu.

Turn the [MULTI] knob to select "4. CURRENT INFO".

Press the [MULTI] knob to display the pulldown menu.

Turn the [MULTI] knob to select the position to display the current information. Press the [MULTI] knob to set it.

6.4.2.5 Net Depth

This is the menu item for setting the position to display net depth.

Operating Procedure **Press the keys "8 → 4 → 2 → 5" to go to NET INFO settings**

Follow the menu operations for position display to display the "POSITION" submenu.

Turn the [MULTI] knob to select "5. NET INFO".

Press the [MULTI] knob to display the pulldown menu.

Turn the [MULTI] knob to select the position to display the net depth information.

Press the [MULTI] knob to set it.

6.4.2.6 Event Marks

This is the menu item for setting the position to display event marks.

Operating Procedure **Press the keys "8 → 4 → 2 → 6" to go to EVENT MARK settings**

Follow the menu operations for position display to display the "POSITION" submenu.

Turn the [MULTI] knob to select "6. EVENT MARK". Press the [MULTI] knob to display the pulldown menu.

Turn the [MULTI] knob to select the position to display the even mark information. Press the [MULTI] knob to set it.

6.4.3 Priority of Displays

This menu item is for setting the display priority for: own ship's information, fish school information, water temperature graphs, currents, net depth, and event marks. If the display positions are the same, they are displayed in order of highest priority to lowest (1 to 3).

Operating Procedure **Press the keys "8 → 4 → 3" to go to PRIORITY settings**

Follow the menu operations for information display to display the "INFORMATION" submenu.

Turn the [MULTI] knob to select "3. PRIORITY".

Press the [MULTI] knob to open the submenu. You can set the priority from 1 to 6.

If the "INFORMATION" settings are set to "ON", "1. SHIP INFO" is masked and shown in the top position, regardless of the settings.

6.4.3.1 Own Ship's Information

This is the menu item for setting the priority at which to display own ship's information.

Operation Procedure **Press the keys "8 → 4 → 3 → 1" to go to SHIP INFO settings**

Follow the menu operations for priority display to display the "PRIORITY" submenu.

Turn the [MULTI] knob to select "1. SHIP INFO".

Press the [MULTI] knob to display the pulldown menu.

Turn the [MULTI] knob to select the priority at which to display the own ship's information.

Press the [MULTI] knob to set it.

The initial setting is set to "1".

6.4.3.2 Fish School Information

This is the menu item for setting the priority at which to display fish school information.

Operation Procedure **Press the keys "8 → 4 → 3 → 2" to go to FISH HISTOGRAM settings**

Follow the menu operations for priority display to display the "PRIORITY" submenu.

Turn the [MULTI] knob to select "2. FISH HISTOGRAM". Press the [MULTI] knob to display the pulldown menu.

Turn the [MULTI] knob to select the priority at which to display the fish school information. Press the [MULTI] knob to set it.

The initial setting is set to "3".

6.4.3.3 Water Temperature Graph

This is the menu item for setting the priority at which to display water temperature graph.

Operating Procedure **Press the keys "8 → 4 → 3 → 3" to go to TEMP/DEPTH settings**

Follow the menu operations for priority display to display the "PRIORITY" submenu.

Turn the [MULTI] knob to select "3. TEMP/DEPTH". Press the [MULTI] knob to display the pulldown menu.

Turn the [MULTI] knob to select the priority at which to display the water temperature graph. Press the [MULTI] knob to set it.

The initial setting is set to "2".

6.4.3.4 Current

This is the menu item for setting the priority at which to display current information.

Operating Procedure **Press the keys "8 → 4 → 3 → 4" to go to CURRENT INFO settings**

Follow the menu operations for priority display to display the "PRIORITY" submenu.

Turn the [MULTI] knob to select "4. CURRENT INFO". Press the [MULTI] knob to display the pulldown menu.

```
▶4.CURRENT INFO        1 ▼
 5.NET INFO
 6.EVENT MARK          2.2
                       3.3
```

Turn the [MULTI] knob to select the priority at which to display the current information.

Press the [MULTI] knob to set it.

The initial setting is set to "1".

6.4.3.5 Net Depth

This is the menu item for setting the priority at which to display net depth.

Operating Procedure **Press the keys "8 → 4 → 3 → 5" to go to NET INFO settings**

```
■ PRIORITY
 1.SHIP INFO           2 ▼
 2.FISH HISTOGRAM      1 ▼
 3.TEMP/DEPTH          3 ▼
 4.CURRENT INFO        1 ▼
▶5.NET INFO            2 ▼
 6.EVENT MARK          1 ▼
```

```
▶5.NET INFO            1 ▼
 6.EVENT MARK
                       2.2
                       3.3
```

Follow the menu operations for priority display to display the "PRIORITY" submenu.

Turn the [MULTI] knob to select "5. NET INFO".

Press the [MULTI] knob to display the pulldown menu.

Turn the [MULTI] knob to select the priority at which to display the net depth. Press the [MULTI] knob to set it.

The initial setting is set to "1".

6.4.3.6 Event Marks

This is the menu item for setting the priority at which to display net depth.

Operating Procedure **Press the keys "8 → 4 → 3 → 6" to go to EVENT MARK settings**

```
■ PRIORITY
 1.SHIP INFO           2 ▼
 2.FISH HISTOGRAM      1 ▼
 3.TEMP/DEPTH          3 ▼
 4.CURRENT INFO        1 ▼
 5.NET INFO            2 ▼
▶6.EVENT MARK          1 ▼
```

```
▶6.EVENT MARK          2 ▼

                       2.2
                       3.3
```

Follow the menu operations for priority display to display the "PRIORITY" submenu.

Turn the [MULTI] knob to select "6. EVENT MARK".

Press the [MULTI] knob to display the pulldown menu.

Turn the [MULTI] knob to select the priority at which to display event marks.

Press the [MULTI] knob to set it.

The initial setting is set to "2".

6.4.4 Display Settings

This menu item is for setting the display for: fish school information, water temperature graphs, currents, and net depth. Depending on the display items, you can graph numerical values or display a combination of graphs and numerical values.

Operating Procedure **Press the keys "8 → 4 → 4" to go to SETTING settings**

Follow the menu operations for information display to display the "INFORMATION" submenu.

Turn the [MULTI] knob to select "4. SETTING".

Press the [MULTI] knob to open the submenu. You can change the display settings from 1 to 4.

6.4.4.1 Display Settings for the Fish School Information

This is the menu item for setting the display of fish school information.

Operating Procedure **Press the keys "8 → 4 → 4 → 1" to go to FISH HISTOGRAM settings**

Follow the menu operations for setting display to display the "SETTING" submenu.

Turn the [MULTI] knob to select "1. FISH HISTOGRAM".

Press the [MULTI] knob to display the submenu.

Do the settings for submenus 1 and 2.

6.4.4.1.1 Detection Area

This is the menu item for setting the area of the detection area.

`Operating Procedure` **Press the keys "8 → 4 → 4 → 1 → 1" to go to DETECT AREA settings**
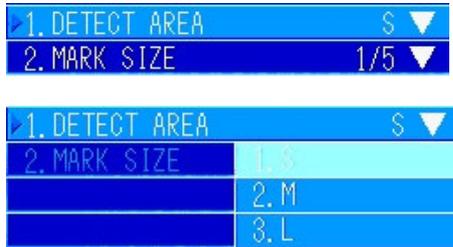
Turn the [MULTI] knob to select "1. DETECT AREA".

Press the [MULTI] knob to display the pulldown menu.

Adjust the detection area according to the type of fish and the fishing method.

"1. Small (10%)", "2. Medium (20%)", "3. Large (40%)"

The initial setting is set to "1. S".

It is normally set to the initial setting value.

6.4.4.1.2 Mark Size

This is the menu item for setting the size of the marks displayed on the screen.

`Operating Procedure` **Press the keys "8 → 4 → 4 → 1 → 2" to go to MARK SIZE settings**
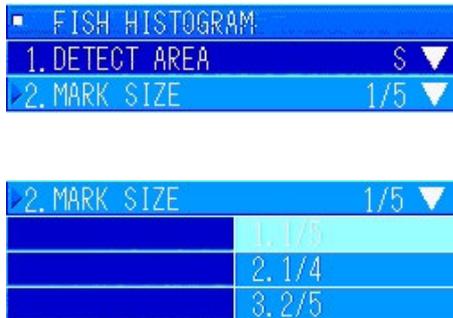
Turn the [MULTI] knob to select "2. MARK SIZE".

Press the [MULTI] knob to display the pulldown menu.

Adjust the mark size according to the type of fish and the fishing method.

The various setting ranges "1. 1/5", "2. 1/4", "3. 2/5" are displayed.

The initial setting is set to "1. 1/5".

Calculation of the inside of the red frame

School of fish mark

Maximum value in histogram

Ratio scale

Level scale

Range is 1/5, 1/4, or 2/5
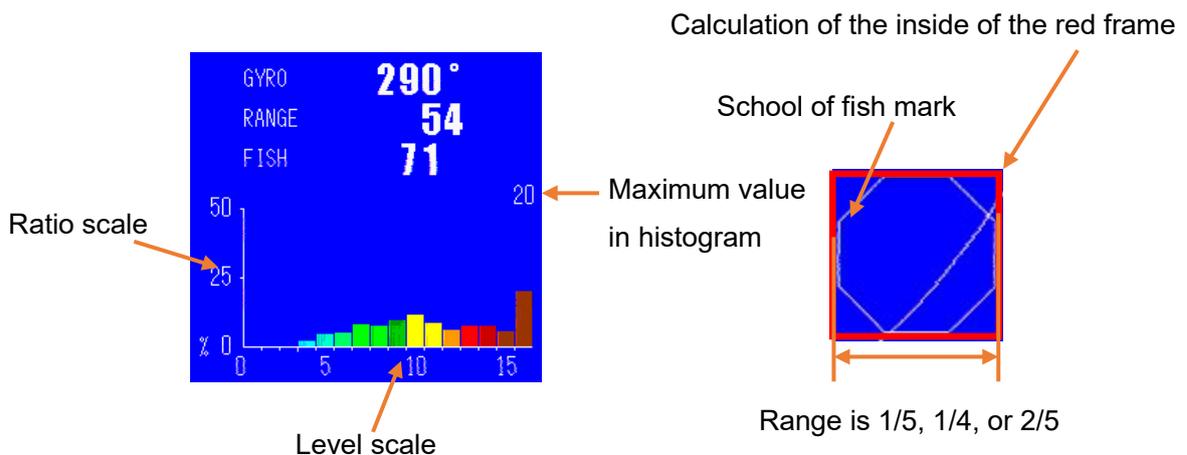
6.4.4.2 Display Settings for the Water Temperature Graph

This is the menu item for setting the various setting values for the water temperature graph.

Operating Procedure **Press the keys "8 → 4 → 4 → 2" to go to TEMP/DEPTH settings**

Follow the menu operations for setting display to display the "SETTING" submenu.

Turn the [MULTI] knob to select "2. TEMP/DEPTH".

Press the [MULTI] knob to display the submenu.

Do the settings for submenus 1 through 6.

Current water depth

Current water temperature

Display time

End time

Lower limit for the water depth

Upper limit for water depth

Start time

Upper limit of water temperature

Lower limit of water temperature

Example: Combination of water temperature and depth on screen

6.4.4.3 Displays

This is the menu item for setting the method to display water temperature graphs.

Operating Procedure **Press the keys "8 → 4 → 4 → 2 → 1" to go to TEMP/DEPTH settings**

Turn the [MULTI] knob to select "1. TEMP/DEPTH".

Press the [MULTI] knob to display the pulldown menu.
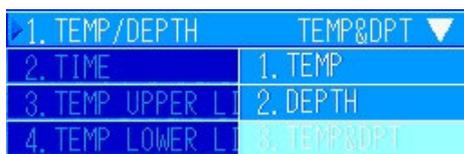
You can change the display according to the sensor that is attached.

Turn the [MULTI] knob to select the connected sensor.

Press the [MULTI] knob to set it.
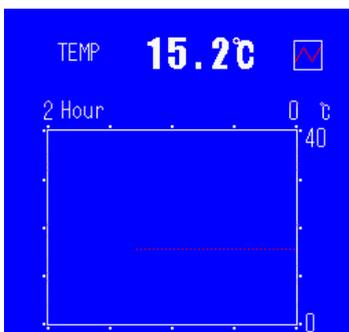
| Display examples: Water temperature display | Water depth display | Water temperature + water depth display |
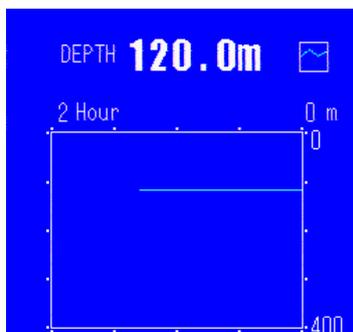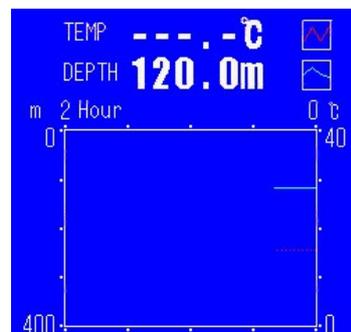
If only the water temperature sensor is connected, select and set "1. TEMP".

If only the water depth sensor is connected, select and set "2. DEPTH".

If both the water temperature and water depth sensors are connected, select and set "3. TEMP + DEPTH".

Alternatively, select one of the sensors, even if both of the sensors are connected but one display is not needed. The initial value is set to "3. TEMP + DEPTH".

6.4.4.3.1　Display time

This is the menu item for setting the time to display water temperature graph.

Operating Procedure **Press the keys "8 → 4 → 4 → 2 → 2" to go to TIME settings**

Turn the [MULTI] knob to select "2. DISPLAY".

Press the [MULTI] knob to display the pulldown menu.

Turn the [MULTI] knob to select from "1. 1H" or "2. 2H".

After selecting, press the [MULTI] knob to set it.

The initial setting is set to "2. 2H".

6.4.4.3.2　Upper limit of water temperature

This is the menu item for setting the water temperature upper limit value for the water temperature graph.

Operating Procedure **Press the keys "8 → 4 → 4 → 2 → 3" to go to TEMP UPPER LIM settings**

Turn the [MULTI] knob to select "3. TEMP UPPER LIM". Press the [MULTI] knob to display the menu for inputting values.

The temperatures that can be set range from 40° C to -10° C.

Turn the [MULTI] knob to set an appropriate value and press the [MULTI] knob to set it.

6.4.4.3.3　Lower limit of water temperature

This is the menu item for setting the water temperature lower limit value for the water temperature graph.

Operating Procedure **Press the keys "8 → 4 → 4 → 2 → 4" to go to TEMP LOWER LIM settings**

Turn the [MULTI] knob to select "4. TEMP LOWER LIM". Press the [MULTI] knob to display the menu for inputting values.

`4. TEMP LOWER LIM  0          -10`

The temperatures that can be set range from -10°C to 40°C.

`4. TEMP LOWER LIM  0           40`

Turn the [MULTI] knob to set an appropriate value and press the [MULTI] knob to set it.

6.4.4.3.4 Upper limit for water depth

This is the menu item for setting the upper limit for water depth value for the water temperature graph.

Operating Procedure **Press the keys "8 → 4 → 4 → 2 → 5" to go to DEPTH UPPER LIM settings**

```
■  TEMP/DEPTH
1. TEMP/DEPTH     TEMP&DPT ▼
2. TIME                2H ▼
3. TEMP UPPER LIM  40
4. TEMP LOWER LIM  0
5. DEPTH UPPER LIM 400
6. DEPTH LOWER LIM 0
```

Turn the [MULTI] knob to select "5. DEPTH UPPER LIM". Press the [MULTI] knob to display the menu for inputting values.

`5. DEPTH UPPER LIM 400          0`

You can set the depth from 0 m to 2000 m.

`5. DEPTH UPPER LIM 400       2000`

Turn the [MULTI] knob to set an appropriate value and press the [MULTI] knob to set it.

6.4.4.3.5 Lower limit for the water depth

This is the menu item for setting the lower limit for the water depth value for the water temperature graph.

Operating Procedure **Press the keys "8 → 4 → 4 → 2 → 6" to go to DEPTH LOWER LIM settings**

```
■  TEMP/DEPTH
1. TEMP/DEPTH     TEMP&DPT ▼
2. TIME                2H ▼
3. TEMP UPPER LIM  40
4. TEMP LOWER LIM  0
5. DEPTH UPPER LIM 400
6. DEPTH LOWER LIM 0
```

Turn the [MULTI] knob to select "6. DEPTH LOWER LIM". Press the [MULTI] knob to display the menu for inputting values.

`6. DEPTH LOWER LIM 0           0`

You can set the depth from 0 m to 2000 m.

`6. DEPTH LOWER LIM 0        2000`

Turn the [MULTI] knob to set an appropriate value and press the [MULTI] knob to set it.

6.4.4.4 Display Settings for Current

This menu item is for setting the screen configuration for the current information settings and the current graph.

Operating Procedure **Press the keys "8 → 4 → 4 → 3" to go to CURRENT settings**
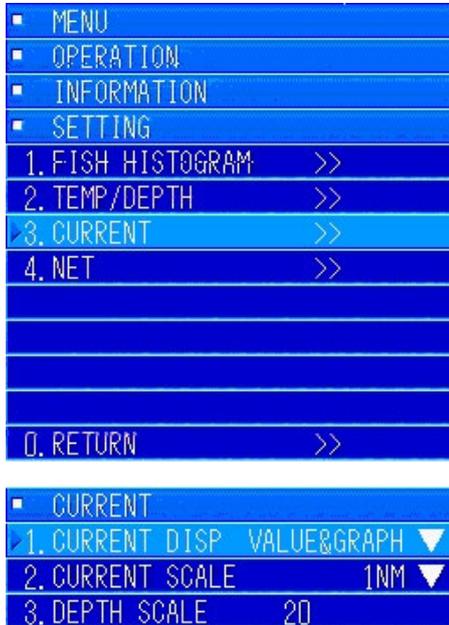
Follow the menu operations for setting display to display the "SETTING" submenu.
Turn the [MULTI] knob to select "3. CURRENT". Press the [MULTI] knob to display the submenu.

Do the settings for submenus 1 through 3.

6.4.4.4.1 Displays

This menu item is for setting the screen configuration for the current information settings.

Operating Procedure **Press the keys "8 → 4 → 4 → 3 → 1" to go to CURRENT DISP**
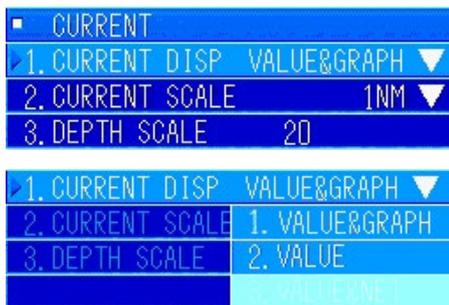
Turn the [MULTI] knob to select "1. CURRENT DISP". Press the [MULTI] knob to display the pulldown menu.

You can change the display to one of three formats.
To display "3. VALUE + NET", net depth must be connected in "SENSOR CONNECTION".

Turn the [MULTI] knob to select the item you want to display from the pulldown menu. Press the [MULTI] knob to set it. Check the example shown below.
The initial setting value is "1. VALUE + GRAPH".
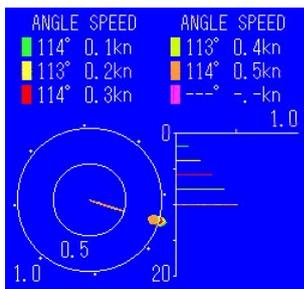
Display example:
Numerical Value + Graph
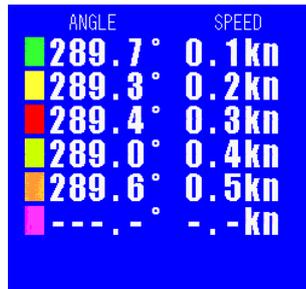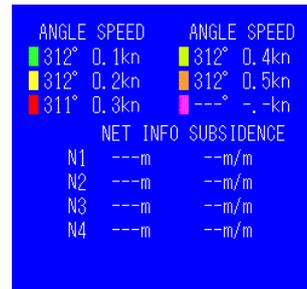
Numerical Value

Numerical Value + Net Depth
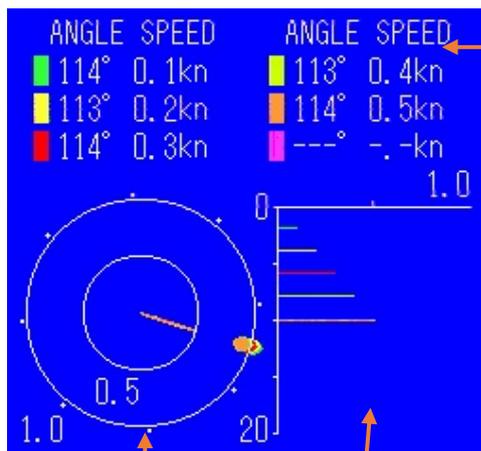
Numerical Value Display Current Direction and Current Speed Display
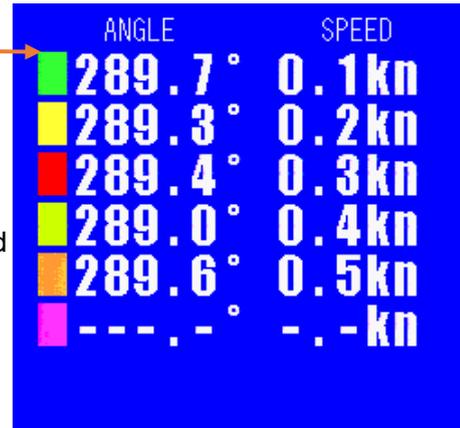
Current Direction + Current Speed Display Graph

Current Speed and Current Speed Depth Display

Current + Current Speed Numerical Value Display
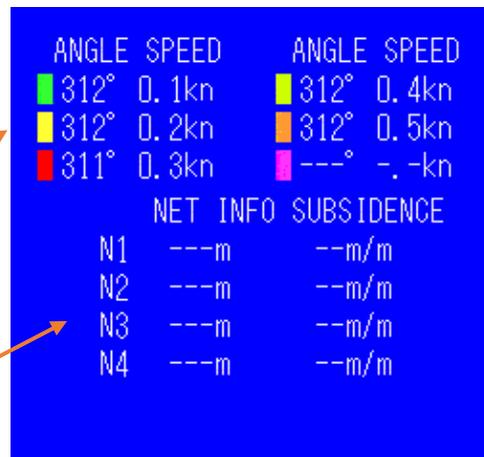
Net Depth Numerical Value Display

6.4.4.4.2　Current Range

This is the menu item for setting the values on the current speed graph axis of the "Numerical Value + Graph" display.

Operating Procedure **Press the keys "8 → 4 → 4 → 3 → 2" to go to CURRENT SCALE settings**

Turn the [MULTI] knob to select "2. CURRENT SCALE". Press the [MULTI] knob to display the pulldown menu.

Turn the [MULTI] knob to select a numerical value according to the fishing method and sea conditions. The initial setting is set to "2. 2NM". Select an item and press the [MULTI] knob to set it.
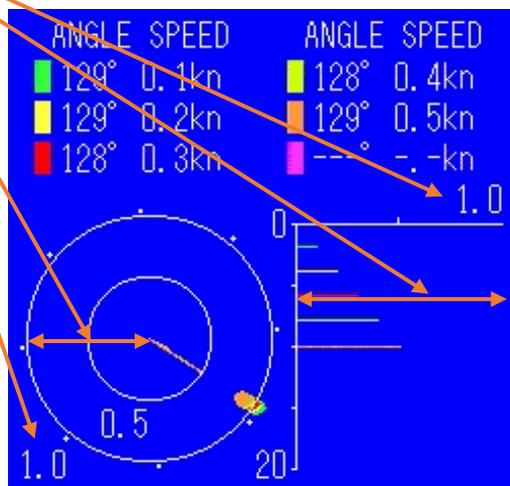
6.4.4.4.3 Depth Range

This is the menu item for setting the values on the current measurement depth graph axis of the "Numerical Value + Graph" display.

Operating Procedure Press the keys "8 → 4 → 4 → 3 → 3" to go to DEPTH SCALE settings

Turn the [MULTI] knob to select "3. DEPTH SCALE". Press the [MULTI] knob to display the menu for inputting values.

Turn the [MULTI] knob to set the depth that is set by the current meter. Press the [MULTI] knob to set it.
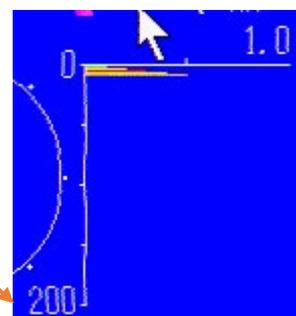
6.4.4.5 Display Settings for Net Depth

This is the menu item for setting the configuration to display the net depth display.

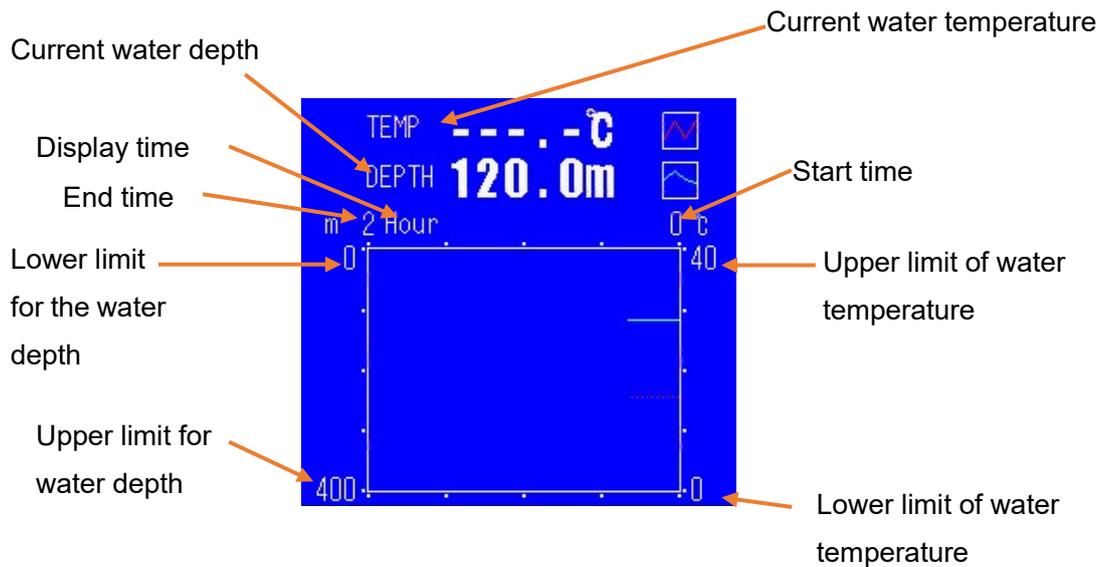**Operating Procedure** **Press the keys "8 → 4 → 4 → 4" to go to NET settings**

Follow the menu operations for setting display to display the "SETTING" submenu.

Turn the [MULTI] knob to select "4. NET". Press the [MULTI] knob to display the submenu.

Do the settings for the "1. NET DISP" submenu.

6.4.4.5.1   NET DISP

This is the menu item for setting the configuration to display the net depth display.

Operating Procedure **Press the keys "8 → 4 → 4 → 1" to go to NET DISP settings**
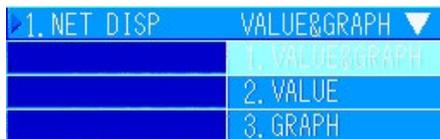
Turn the [MULTI] knob to select one of the three types of display configurations for the net depth display. Check the example displays below.

When you have decided which display you want to display, turn the [MULTI] knob to select it. Press the [MULTI] knob to set it. Press the [MENU] key to complete the settings.
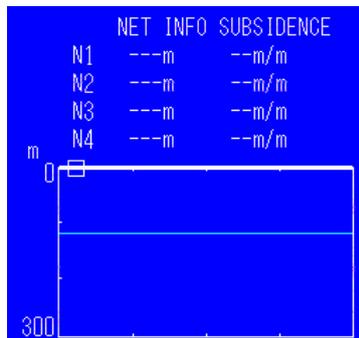
Display example:

Numerical Value + Graph
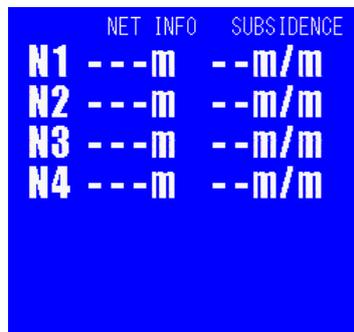
Numerical Values
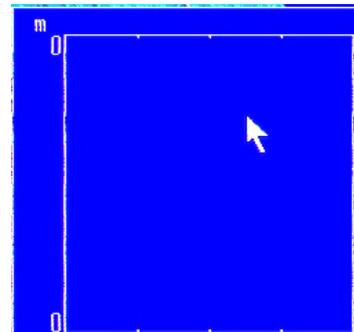
Graph

6.5 Split Display Settings

This is the menu item for setting the audio and fish finder split screen mode and the size and positions of the screens.

Operating Procedure **Press the keys "8 → 5" to go to SPLIT DISPLY SET settings**

Press the [MENU] key to display the menus.

Turn the [MULTI] knob to select "8. OPERATION" and press the [MULTI] knob to open the submenu.

In the submenu, turn the [MULTI] knob to select "5. SPLIT DISPLY SET".

Press the [MULTI] knob to open the submenu. Set 1 through 3.

6.5.1 Split Mode Settings

This is the menu item for setting the split size and the split display positions.

Operating Procedure **Press the keys "8 → 5 → 1" to go to SPLIT MODE SET settings**

Follow the menu operations for split display to display the "SPLIT DISPLAY" submenu.

Turn the [MULTI] knob to select "1. SPLIT MODE SET".

Press the [MULTI] knob to open the submenu.

Do the settings for "1. SPLIT SIZE" and "2. SPLIT POSITION" in the submenu.

6.5.1.1 Split Size

This is the menu item for setting the split size.

Operating Procedure Press the keys "8 → 5 → 1 → 1" to go to PARTITION SIZE settings

Turn the [MULTI] knob to select "1. PARTITION SIZE". Press the [MULTI] knob to display the pulldown menu.

Check the following display examples and select an appropriate size.

Turn the [MULTI] knob to select an appropriate size. Press the [MULTI] knob to set it. The initial setting value is "SMALL".
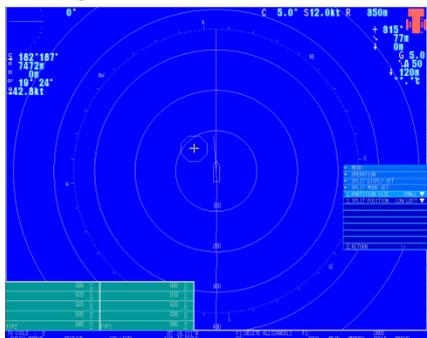
Display example: Split size "SMALL"

Split size "LARGE"

6.5.1.2 Position of Split Display

This is the menu item for setting the position to display the split screens.

Operating Procedure Press the keys "8 → 5 → 1 → 2" to go to SPLIT POSITION settings

Turn the [MULTI] knob to select "2. SPLIT POSITION". Press the [MULTI] knob to display the pulldown menu.

Determine the position to split the display according to the fishing method and the example displays in the following section.

Turn the [MULTI] knob to select the item you chose. Press the [MULTI] knob to set it. The initial setting value is "2. LOW LEFT".

Display example:
Position of Split Display "LOW LEFT"

Position of Split Display "LOW RIGHT"

6.5.2 Audio Display Settings

This is the menu item for setting audio steps, scroll direction, image scrolling, and whether to have a distance scale on the audio split screen.

Operating Procedure Press the keys "8 → 5 → 2" to go to AUDIO settings

Follow the menu operations for split display to display the "SPLIT DISPLAY" submenu.

Turn the [MULTI] knob to select "2. AUDIO". Press the [MULTI] knob to display the submenu.

When the submenu is displayed, do the settings for items 1 through 4.

6.5.2.1 Distance Scale

This is the menu item for setting whether to show or hide the distance scale.

Operating Procedure Press the keys "8 → 5 → 2 → 1" to go to LENGTH SCALE settings

Turn the [MULTI] knob to select "1. LENGTH SCALE". Press the [MULTI] knob to display the pulldown menu.

Refer to the following display example to decide whether to hide or show the scale lines.

Turn the [MULTI] knob to select the item your chose. Press the [MULTI] knob to set it. The initial setting value is set to "2. ON".
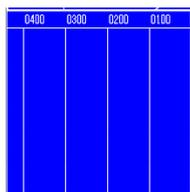
Display example:
Scale lines shown

Scale lines hidden

6.5.2.2 Scrolling

This is the menu item for setting the start and stop for scrolling in the audio split screen.

Operating Procedure **Press the keys "8 → 5 → 2 → 2" to go to SCROLL settings**
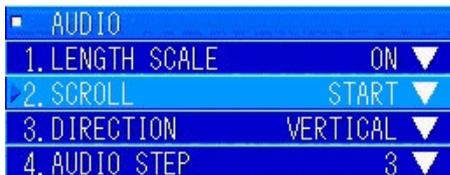
Turn the [MULTI] knob to select "2. SCROLL". Press the [MULTI] knob to display the pulldown menu.
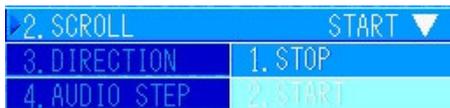
To scroll the screens, turn the [MULTI] knob to select "2. START". Press the [MULTI] knob to set it.
The initial setting is set to "STOP".

6.5.2.3 Scrolling Direction

This is the menu item for setting the direction for scrolling in the audio split screen.

Operating Procedure **Press the keys "8 → 5 → 2 → 3" to go to DIRECTION settings**

Turn the [MULTI] knob to select "3. DIRECTION".
Press the [MULTI] knob to display the pulldown menu.

Refer to the example displays in the following section to determine the scrolling direction.
Turn the [MULTI] knob to select the item your chose. Press the [MULTI] knob to set it. The initial setting value is set to "2. VERTICAL".
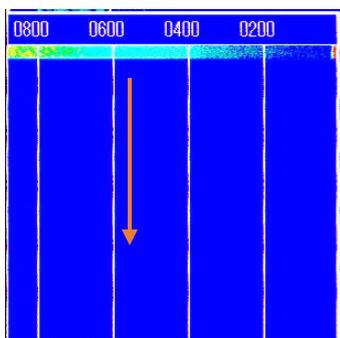
Display example:

Scroll direction vertical
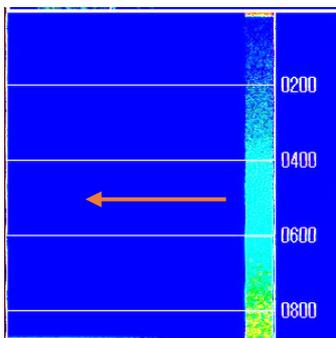
Scroll direction horizontal

6.5.2.4 Audio Step Settings

This is the menu item for setting the steps when the direction knob is turned.

Operating Procedure **Press the keys "8 → 5 → 2 → 4" to go to AUDIO STEP settings**

Turn the [MULTI] knob to select "4. AUDIO STEP". Press the [MULTI] knob to display the pulldown menu.

Select and set an appropriate value from 1 through 6 from the pulldown menu. Turn the [MULTI] knob to select the value. Press the [MULTI] knob to set it. The initial setting value is set to "3. 3°".
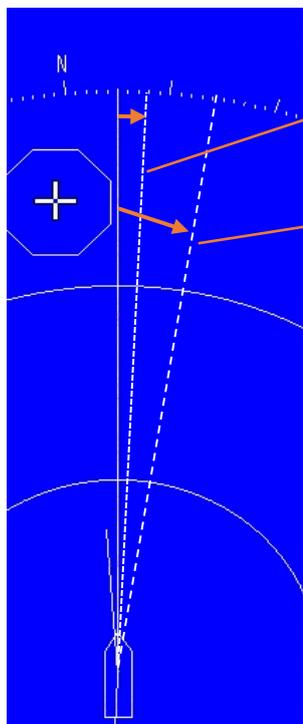
Audio Step Settings
When 1 click is set to move

Audio Step Settings
When 1 click is set to move

6.5.3 Display Settings for Fish Finder

This is the menu item for setting the amount to scroll, the direction to scroll, and the method to split the fish finder screen.

Operating Procedure **Press the keys "8 → 5 → 3" to go to FISH FINDER settings**

Follow the menu operations for split display to display the "SPLIT DISPLAY" submenu.
Turn the [MULTI] knob to select "3. FISH FINDER".
Press the [MULTI] knob to display the submenu.

When the submenu is displayed, do the settings for items 1 through 3.

6.5.3.1 Split Screen

This is the menu item for setting the method to display the fish finder split screens.

Operating Procedure **Press the keys "8 → 5 → 3 → 1" to go to SPLIT POSITION settings**
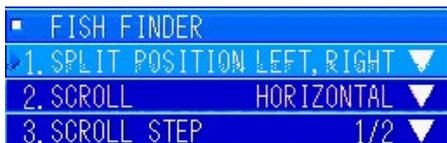
Turn the [MULTI] knob to select "1. SPLIT POSITION".
Press the [MULTI] knob to display the pulldown menu.
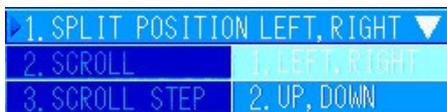
Refer to the following display examples to set the method to split the screens. Turn the [MULTI] knob to select the item you chose. Press the [MULTI] knob to set it. The initial setting value is "1. LEFT,RIGHT".
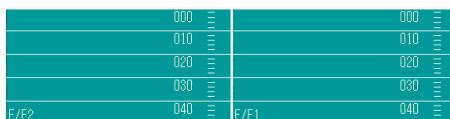
Example display:
Screen split left/right
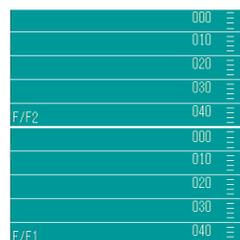
Split screen up/down

6.5.3.2 Scrolling Direction

This is the menu item for setting the direction for scrolling in the fish finder split screen.

Operating Procedure **Press the keys "8 → 5 → 3 → 2" to go to SCROLL settings**

Turn the [MULTI] knob to select "2. DIRECTION". Press the [MULTI] knob to display the pulldown menu.
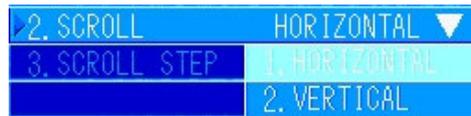
Refer to the following display examples to set the scrolling direction. Turn the [MULTI] knob to select the item you chose. Press the [MULTI] knob to set it. The initial setting value is "1. LEFT,RIGHT ".

Display example:
Scroll direction horizontal
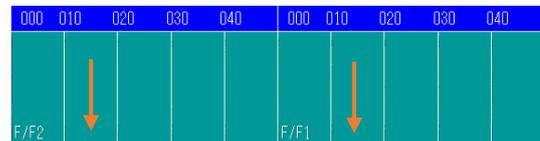
Scroll direction vertical

6.5.3.3 Scrolling Steps

This is the menu item for setting the steps for scrolling in the fish finder split screen.

Operating Procedure **Press the keys "8 → 5 → 3 → 3" to go to SCROLL STEP settings**

Turn the [MULTI] knob to select "3. SCROLL STEP". Press the [MULTI] knob to display the pulldown menu.
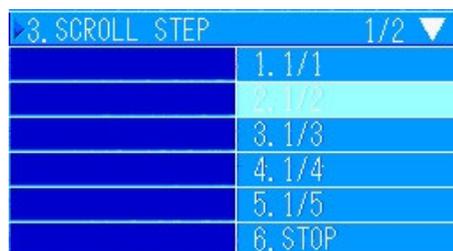
Select 1 through 5 from the pulldown menu according to the type of fish and fishing method. Turn the [MULTI] knob to select the item you chose. Press the [MULTI] knob to set it. The initial setting value is "2. 1/2".

6.6 Screen Settings

These are the menu items for setting the numbers that are displayed on the screen, showing/hiding marks on the screen, etc.

Operating Procedure **Press the keys "8 → 6" to go to SCREEN SETTING settings**

Press the [MENU] key to display the menus.

Turn the [MULTI] knob to select "8. OPERATION" and press the [MULTI] knob to open the submenu.

In the submenu, turn the [MULTI] knob to select "6. SCREEN SETTING".

Press the [MULTI] knob to open the submenu. Set 1 through 3.

6.6.1 Settings for the Display of Numbers

These are the menu items for setting the numbers that are displayed on the screen, showing/hiding marks on the screen, etc.

Operating Procedure **Press the keys "8 → 6 → 1" to go to CHARACTER settings**

Follow the menu operations for screen settings to display the "SCREEN SETTING" submenu.

Turn the [MULTI] knob to select "1. CHARACTER".

Turn the [MULTI] knob to set and open the submenu.

Do the settings for each of the items, 1 through 9, in the submenu.

6.6.1.1 Settings for the Display of the Position of Own Ship

This is the menu item for setting whether to show or hide the display of the position of your own ship that is shown at the bottom of the screen.

Operation Procedure **Press the keys "8 → 6 → 1 → 1" to go to SHIP INFO settings**

Turn the [MULTI] knob to select "1. SHIP INFO".

Press the [MULTI] knob to display the pulldown menu.

Choose one item out of "1. OFF", "2. ON", or "3. AUTO" from the pulldown menu.

Turn the [MULTI] knob to select the item you chose.

Press the [MULTI] knob to set.

The initial setting value is set to "2. ON". "3. AUTO" displays the latitude and longitude if it is received. Display example: Ship info

6.6.1.2 Settings for the Display of Speed and Course

This is the menu item for setting whether to show or hide the display of your speed and course that is shown at the top right of the screen.

Operation Procedure **Press the keys "8 → 6 → 1 → 2" to go to SPEED COURSE settings**

Turn the [MULTI] knob to select "2. SPEED COURSE". Press the [MULTI] knob to display the pulldown menu. Choose one item out of "1. OFF", "2. ON", or "3. AUTO" from the pulldown menu. Turn the [MULTI] knob to select the item you chose. Press the [MULTI] knob to set.

The initial setting value is set to "2. ON". "3. AUTO" displays your speed and course if it is received.

Display example: Course: Speed, hide/show

6.6.1.3 Settings for the Display of Compass Points

This is the menu item for setting whether to show or hide the display of the compass points in the form of a range ring.

Operation Procedure Press the keys "8 → 6 → 1 → 3" to go to COMPASS POINT settings

Turn the [MULTI] knob to select "3. COMPASS POINT". Press the [MULTI] knob to display the pulldown menu.

Choose one item out of "1. OFF" or "2. ON" from the pulldown menu. Turn the [MULTI] knob to select the item you chose. Press the [MULTI] knob to set.

The initial setting value is set to "2. ON".
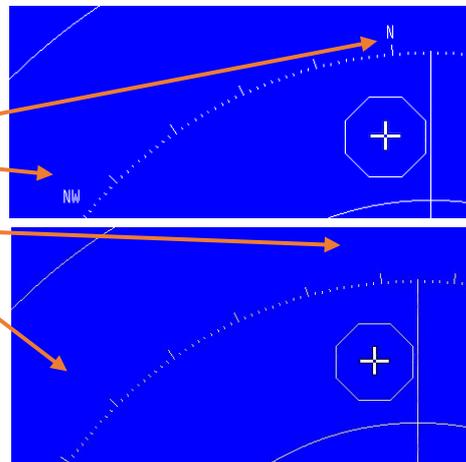
6.6.1.4 Settings for the Display of Direction

This is the menu item for automatically setting whether the display of the direction is the course or a direction heading.

Operation Procedure **Press the keys "8 → 6 → 1 → 4" to go to DIRECTION settings**

Turn the [MULTI] knob to select "4. DIRECTION". Press the [MULTI] knob to display the pulldown menu.

Choose one item out of "1. AUTO", "2. HEADING", or "3. COURSE" from the pulldown menu. Turn the [MULTI] knob to select the item you chose. Press the [MULTI] knob to set.

The initial setting value is set to "3. COURSE".

Auto displays [COURSE] if the speed is relative to land. If the speed relative to water, Auto displays [HEADING].

6.6.1.5 Settings for the Display of Fish Speed and Fish Course

This is the menu item for setting the direction of the fish school mark and whether it is true or relative to your own ship.

Operation Procedure **Press the keys "8 → 6 → 1 → 5" to go to FISH SPEED & COURSE settings**

Turn the [MULTI] knob to select "5. FISH SPEED & COURSE". Press the [MULTI] knob to display the pulldown menu.

Choose one item out of "1. RELA", "2. TRUE", or "3. R&T" from the pulldown menu. Turn the [MULTI] knob to select the item you chose. Press the [MULTI] knob to set.

The initial setting value is set to "3. R&T".

1. Relative   2. True direction   3. Relative and
true direction

6.6.1.6 Settings for the Display of Water Temperature

This is the menu item for setting whether to show or hide the display for the temperature of the water, positioned at the upper right of the screen.

Operating Procedure **Press the keys "8 → 6 → 1 → 6" to go to TEMP settings**

Turn the [MULTI] knob to select "6. TEMP". Press the [MULTI] knob to display the pulldown menu.

Choose one item out of "1. OFF", "2. ON", or "3. AUTO" from the pulldown menu. Turn the [MULTI] knob to select the item you chose. Press the [MULTI] knob to set.

The initial setting value is set to "3. AUTO".

If you set this setting to "3. AUTO", the temperature of the water is displayed when a signal is input.
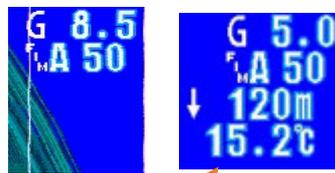
Position of the water temperature display

6.6.1.7 Depth Settings

This is the menu item for setting whether to show or hide the display for the depth of the water, positioned at the upper right of the screen.

Operating Procedure **Press the keys "8 → 6 → 1 → 7" to go to DEPTH settings**

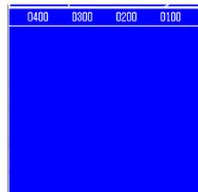Turn the [MULTI] knob to select "7. DEPTH". Press the [MULTI] knob to display the pulldown menu.

Choose one item out of "1. OFF", "2. ON", or "3. AUTO" from the pulldown menu. Turn the [MULTI] knob to select the item you chose. Press the [MULTI] knob to set.

The initial setting value is set to "3. AUTO". If you set this setting to "3. AUTO", the depth of the water is displayed when a signal is input.

6.6.1.8 Settings for the Display of the Cursor Position

This is the menu item for setting whether to show or hide the display for the cursor position, positioned at the upper right of the screen.

Operation Procedure **Press the keys "8 → 6 → 1 → 8" to go to CURSOR POSITION settings**

Turn the [MULTI] knob to select "8. CURSOR POSITION". Press the [MULTI] knob to display the pulldown menu.
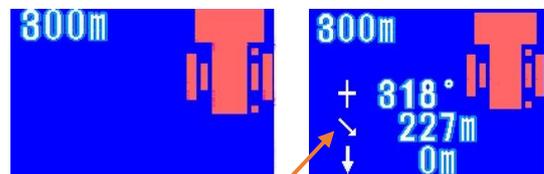
Position of the cursor position display

Choose one item out of "1. OFF" or "2. ON" from the pulldown menu. Turn the [MULTI] knob to select the item you chose. Press the [MULTI] knob to set.

The initial setting value is set to "2. ON".

6.6.1.9 Settings for the Display of the Cursor Direction

This is the menu item for setting the display standard for the cursor position, positioned at the upper right of the screen.

Operation Procedure **Press the keys "8 → 6 → 1 → 9" to go to CURSOR POSITION settings**

Turn the [MULTI] knob to select "9. CURSOR DIRECTION". Press the [MULTI] knob to display the pulldown menu.

Choose one item out of "1. HEADING", "2. H ±", or "3. NORTH" from the pulldown menu. Turn the [MULTI] knob to select the item you chose. Press the [MULTI] knob to set. The initial setting value is set to "1. HEADING".
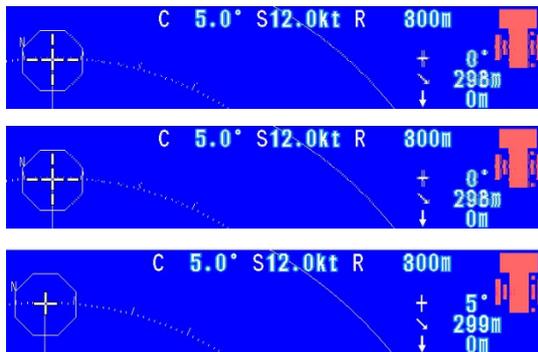
1. HEADING DIRECTION

2. HEADING ±

3. NORTH

6.6.2 Selecting What Marks to Display

This is the menu item for setting whether to show or hide each mark on the screen.

Operating Procedure **Press the keys "8 → 6 → 2" to go to MARK settings**

Follow the menu operations for screen settings to display the "SCREEN SETTING" submenu.

Turn the [MULTI] knob to select "2. MARK".

Turn the [MULTI] knob to set and open the submenu.

Do the settings for each of the items, 1 through 7, in the submenu.
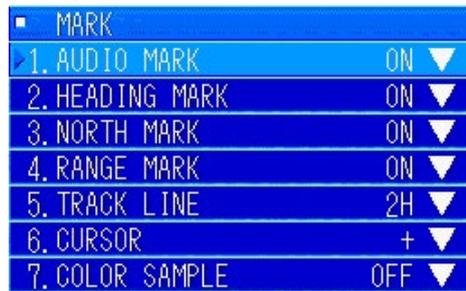
6.6.2.1 Settings for the Audio Mark

This is the menu item for setting whether to show or hide the audio mark.

Operation Procedure **Press the keys "8 → 6 → 2 → 1" to go to AUDIO MARK settings**
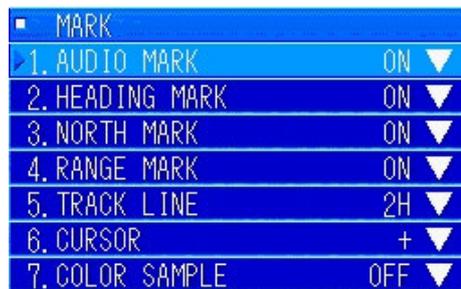
Turn the [MULTI] knob to select "1. AUDIO MARK".
Press the [MULTI] knob to display the pulldown menu.

Select "1. OFF" or "2. ON" from the pulldown menu.
Turn the [MULTI] knob to select the item you chose.
Press the [MULTI] knob to set.
The initial setting value is set to "2. ON".
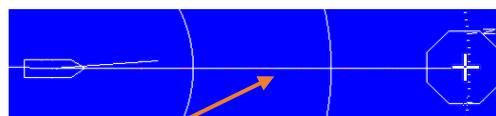
Display example: The white line is the audio mark (in a direction of 0°)
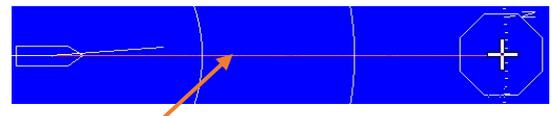
The audio mark is hidden (in a direction of 0°)

6.6.2.2 Settings for the Heading Mark

This is the menu item for setting whether to show or hide the heading mark.

Operation Procedure **Press the keys "8 → 6 → 2 → 2" to go to HEADING MARK settings**

Turn the [MULTI] knob to select "2. HEADING MARK".

Press the [MULTI] knob to display the pulldown menu.

Select "1. OFF" or "2. ON" from the pulldown menu.

Turn the [MULTI] knob to select the item you chose.

Press the [MULTI] knob to set.

The initial setting value is set to "2. ON".
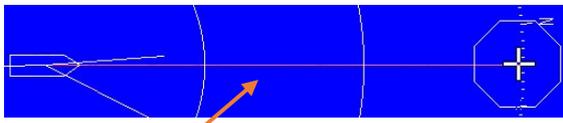
Display example: The red line is the heading mark (in a direction of 0°)

The heading mark is hidden (in a direction of 0°)

6.6.2.3 Settings for the North Mark

This is the menu item for setting whether to show or hide the north mark.

Operation Procedure **Press the keys "8 → 6 → 2 → 3" to go to NORTH MARK settings**

Turn the [MULTI] knob to select "3. NORTH MARK".

Press the [MULTI] knob to display the pulldown menu.

Select "1. OFF" or "2. ON" from the pulldown menu.

Turn the [MULTI] knob to select the item you chose.

Press the [MULTI] knob to set.

The initial setting value is set to "2. ON".

North mark

Shown   Hidden
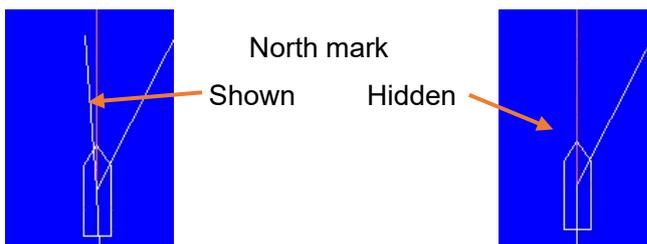
6.6.2.4 Settings for the Range Marks

This is the menu item for setting whether to show or hide the range marks.

Operation Procedure **Press the keys "8 → 6 → 2 → 4" to go to RANGE MARK settings**

Turn the [MULTI] knob to select "4. RANGE MARK". Press the [MULTI] knob to display the pulldown menu.

Select "1. OFF" or "2. ON" from the pulldown menu. Turn the [MULTI] knob to select the item you chose. Press the [MULTI] knob to set.

The initial setting value is set to "2. ON".

Range mark
Shown   Hidden

6.6.2.5 Settings for the Track Line

This is the menu item for setting whether to show or hide the track line.

Operating Procedure **Press the keys "8 → 6 → 2 → 5" to go to TRACK LINE settings**

Turn the [MULTI] knob to select "5. TRACK LINE". Press the [MULTI] knob to display the pulldown menu.

Select "1. OFF", "2. 1H", or "3. 2H" from the pulldown menu. Turn the [MULTI] knob to select the item you chose . Press the [MULTI] knob to set.

The initial setting value is set to "2. 2H".

Track line

1H or 2H   Hidden
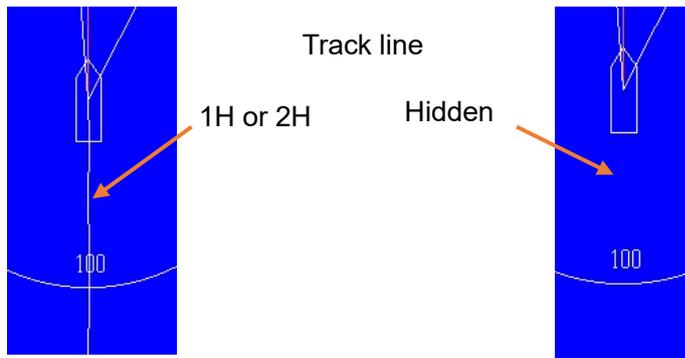
6.6.2.6 Cursor Settings

This is the menu item for setting the display mark for the cursor.
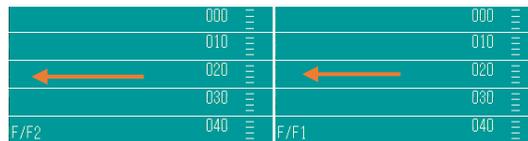
Operation Procedure **Press the keys "8 → 6 → 2 → 6" to go to CURSOR settings**

Turn the [MULTI] knob to select "6. CURSOR". Press the [MULTI] knob to display the pulldown menu.

Select "1. +", "2. +& FRAME", or "3. VRM, EBL" from the pulldown menu. Turn the [MULTI] knob to select the item you chose . Press the [MULTI] knob to set.

The initial setting value is set to "2. +& FRAME".
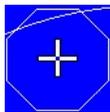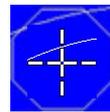
1.+   2. +& FRAME   3.VRM, EBL   + mark during cursor movement
                                                        The mark becomes large.

6.6.2.7 Color Sample Settings

This is the menu item for setting whether to show or hide the color sample.

Operation Procedure **Press the keys "8 → 6 → 2 → 7" to go to COLOR SAMPLE settings**

Turn the [MULTI] knob to select "7. COLOR SAMPLE".
Press the [MULTI] knob to display the pulldown menu.

Select "1. OFF" or "2. ON" from the pulldown menu.
Turn the [MULTI] knob to select the item you chose.
Press the [MULTI] knob to set.

The initial setting value is set to "1. OFF".
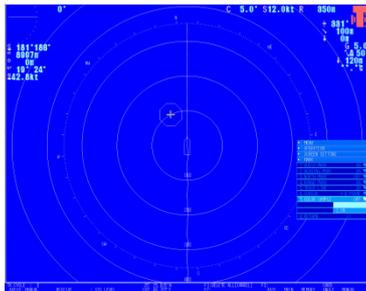
Display example:
Hidden color display
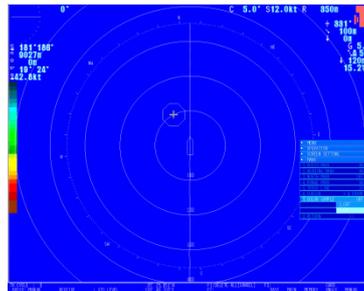
Shown
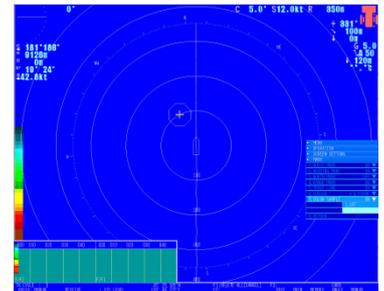
When shown, the color sample also appears on the fish finder screen of the split screen.

6.6.3 Color Selection Settings

This is the menu item for setting the text, sonar, and fish finder colors that appear on the screen.

Operating Procedure **Press the keys "8 → 6 → 3" to go to COLOR SELECT settings**

Follow the menu operations for screen settings to display the "SCREEN SETTING" submenu.
Turn the [MULTI] knob to select "3. COLOR SELECT".

Turn the [MULTI] knob to set and open the submenu.
Do the settings for each of the items, 1 through 4, in the submenu.

6.6.3.1 Color Pattern Settings

This is the menu item for setting the display color of sonar images.

Operation Procedure **Press the keys "8 → 6 → 3 → 1" to go to COLOR PATTERN settings**
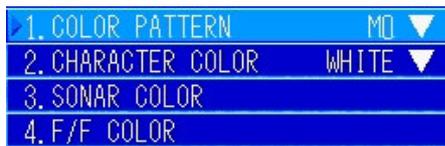
Turn the [MULTI] knob to select "1. COLOR PATTERN". Press the [MULTI] knob to display the pulldown menu.
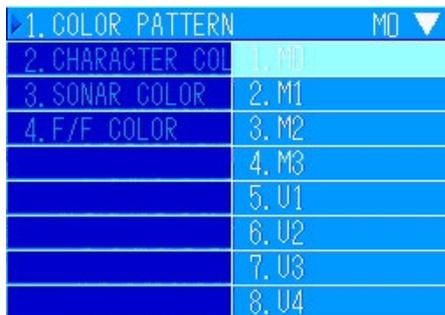
Select "1. M0" through "8. U4" from the pulldown menu. Turn the [MULTI] knob to select the item you chose. Press the [MULTI] knob to set.
The initial setting value is set to "1. M0".
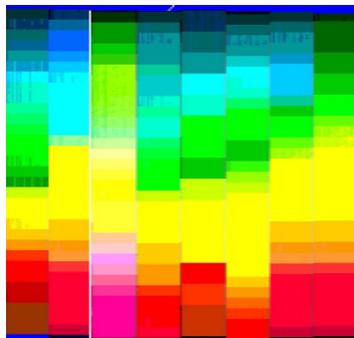
The diagram on the left shows the sample color patterns, from left to right.
M0, M1, M2, M3, U1, U2, U3, U4
You can change the settings of the three items for each color pattern for the color of the sonar display.

6.6.3.2 Text Color Settings

This is the menu item for setting the text color that appears on the screen.

Operation Procedure **Press the keys "8 → 6 → 3 → 2" to go to CHARACTER COLOR settings**

Turn the [MULTI] knob to select "2. CHARACTER COLOR". Press the [MULTI] knob to display the pulldown menu.

Select "1. WHITE" through "4. BLACK" from the pulldown menu. Turn the [MULTI] knob to select the item you chose. Press the [MULTI] knob to set.

The initial setting value is set to "1. WHITE".

Display example: 1. White   2. Green   3. Yellow   4. Black

6.6.3.3 Setting the Colors of the Sonar Display

This is the menu item for setting each color level, MO through U4, for the color of the sonar display.

Operating Procedure **Press the keys "8 → 6 → 3 → 3" to go to SONAR COLOR settings**

Turn the [MULTI] knob to select "3. SONAR COLOR SETTINGS". Press the [MULTI] knob to display the pulldown menu.

HUE CHROMA VALUE

01	240	255	180
02	180	255	040
03	180	255	060

LEVEL 01

SET CNCL

HUE CHROMA VALUE

01	240	255	180
02	180	255	040
03	180	255	060

LEVEL 01

SET CNCL

HUE CHROMA VALUE

| 30 | 020 | 219 | 112 |
| 31 | 022 | 216 | 104 |
32	024	213	096

LEVEL 32

SET CNCL

In order from the left, adjust the color, saturation, and brightness of the color pattern settings to create the colors. At first, the border moves to the "COLOR" of "LEVEL 1" in the diagram to the left. Next, each time you press the [MULTI] knob, the border moves to [SATURATION], to [BRIGHTNESS], and then to [LEVEL]. If you are changing to the next level, turn the [MULTI] knob to change the level. Press the [MULTI] knob to move to the [COLOR] of the level that you set.

The diagram to the right is an example in which you have moved to the 32nd color setting. The white border moves at the same time.

The initial display color settings are described in section 12.2 Setting the Colors of the Sonar Display, in this instruction manual.

MENU 「8」 → 「6」 → 「3」 → 「3」 SONAR−COLOR												
	M0			M1			M2			M3		
LEVEL	SHADE	VIVID	Bright	SHADE	VIVID	Bright	SHADE	VIVID	Bright	SHADE	VIVID	Bright
1	240	255	184	180	255	24	180	255	24	135	255	16
2	180	255	40	180	255	44	180	255	44	135	255	32
3	180	255	60	180	255	84	180	255	84	134	255	68
4	180	255	80	180	255	92	180	255	92	133	255	76
29	0	255	120	16	255	252	347	233	184	347	233	184
30	20	219	112	10	255	252	349	231	168	349	231	168
31	22	216	104	6	255	252	349	228	152	349	228	152
32	24	213	96	0	255	252	352	225	136	352	225	136
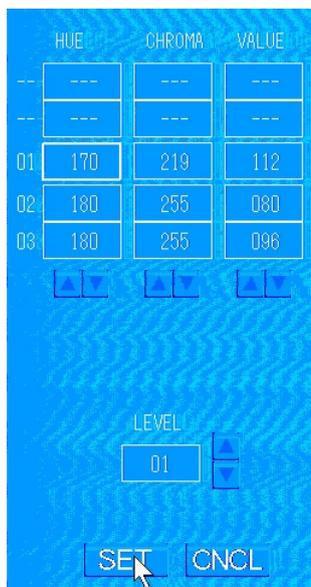
After doing the color settings, align the cursor with "SET" and press the [ENT] key to complete the settings.

You can align the cursor with "CNCL" and press the [ENT] key to cancel if you want to cancel the values of the settings.

6.6.3.4 Setting the Colors of the Fish Finder Display

This is the menu item for setting each color level, MO through U4, for the colors of the fish finder display.

Operating Procedure **Press the keys "8 → 6 → 3 → 4" to go to F/F COLOR settings**

Turn the [MULTI] knob to select "4. F/F COLOR". Press the [MULTI] knob to display the "COLOR PATTERN" menu.
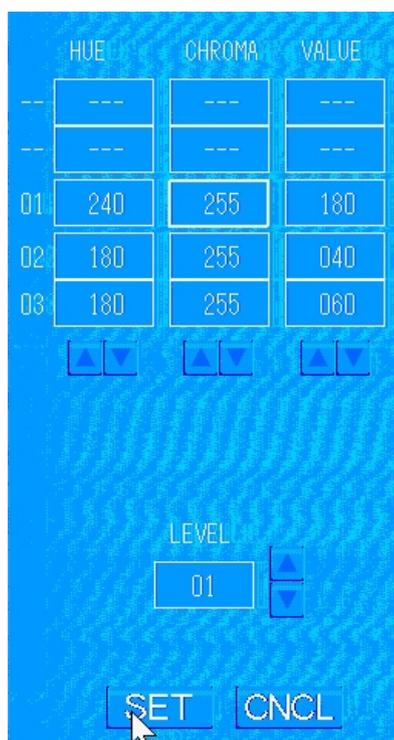
Although you can set 32 colors for the sonar display, you can only set 16 colors for the fish finder display.

The operations are the same as those for the colors of the sonar display.

The initial display color settings are described in section 12.3 Setting the Colors of the Fish Finder Display, in this instruction manual.

6.7 Fish Finder Settings

This is the menu item for doing the various settings for a fish finder to which sensors are connected.

Operating Procedure **Press the keys "8 → 7" to go to SCREEN SETTING settings**

Press the [MENU] key to display the menus.

Turn the [MULTI] knob to select "8. OPERATION" and press the [MULTI] knob to open the submenu. In the submenu, turn the [MULTI] knob to select "7. FISH SET".

Press the [MULTI] knob to open the submenu. Set 1 through 6. Likewise, set the next 1 through 6, as well.

6.7.1 Trigger Selection

This menu item sets whether to alternate or scroll images from fish finder 1 and fish finder 2 at the same time at the trigger that was input for the fish finders.

Operating Procedure **Press the keys "8 → 7 → 1" to go to TRIGGER settings**

Turn the [MULTI] knob to select "1. TRIGGER". Press the [MULTI] knob to display the pulldown menu.

Choose one item out of "1. SYNCHRO 1/2" or "2. ALTERNATE 1/2" from the pulldown menu. Turn the [MULTI] knob to select the item you chose. Press the [MULTI] knob to set it.

The initial setting value is set to "1. SYNCHRO 1/2". For details on this setting, check with your retailer or a service representative.

6.7.2 Fish Finder Range Settings

This is the menu item for setting the range of the fish finder to display on the split screen.

Operating Procedure **Press the keys "8 → 7 → 2" to go to F/F RANGE settings**

Turn the [MULTI] knob to select "2. RANGE". Press the [MULTI] knob to display the pulldown menu.

Choose one item out of "1. RANGE 1" through "4. RANGE 4" from the pulldown menu. Turn the [MULTI] knob to select the item you chose. Press the [MULTI] knob to set.

The initial setting value is set to "1. RANGE 1".

The following table is a table of the initial settings for the fish finder range settings. Refer to the list of other menus for details.

MENU 「9」 → 「1」 → 「1」 → 「3」 → 「1」SONAR RANGE SET				
RANGE №.	RANGE 1	RANGE 2	RANGE 3	RANGE 4
1	100	100	100	100
2	150	150	200	150
3	200	200	300	200
4	250	250	400	250

6.7.3 Setting the Gain for Fish Finder 1

This is the settings menu for adjusting the gain for fish finder 1.

Operating Procedure **Press the keys "8 → 7 → 3" to go to GAIN 1 settings**

Turn the [MULTI] knob to select "3. GAIN 1". Press the [MULTI] knob to display the menu for inputting values. Turn the [MULTI] knob to adjust the image to be close to the image of the fish finder that is connected.

You can set the gain from 0.0 to 10.0 in steps of 0.1.

Once you choose the gain, press the [MULTI] knob to set it.

While you change the values, they are reflected in the fish finder image. The initial setting is set to 5.0.

6.7.4 Setting the Gain for Fish Finder 2

This is the settings menu for adjusting the gain for fish finder 2.

Operating Procedure Press the keys "8 → 7 → 4" to go to GAIN 2 settings

Turn the [MULTI] knob to select "4. GAIN 2". Press the [MULTI] knob to display the menu for inputting values. Turn the [MULTI] knob to adjust the image to be close to the image of the fish finder that is connected.

You can set the gain from 0.0 to 10.0 in steps of 0.1.

Once you choose the gain, press the [MULTI] knob to set it.

While you change the values, they are reflected in the fish finder image. The initial setting is set to 5.0.

6.7.5 Setting Clutter for Fish Finder 1

This is the settings menu for adjusting the clutter for fish finder 1.

Operating Procedure Press the keys "8 → 7 → 5" to go to F/F CLUTTER 1 settings

Turn the [MULTI] knob to select "5. CLUTTER". Press the [MULTI] knob to display the menu for inputting values. Turn the [MULTI] knob to adjust the image to be close to the image of the fish finder that is connected.

You can set the clutter for fish finder 1 from 0.0 to 10.0 in steps of 0.1. Adjust the clutter. After adjusting for the optimal image, press the [MULTI] knob to set it. The initial setting value is set to 0.0.

6.7.6 Doing Settings in Next

Move to the settings menus for SHIFT, ADC, STC 1 and 2, INTERFERENCE, and STC CURVE.

Operating Procedure Press the keys "8 → 7 → 6" to go to NEXT settings

Turn the [MULTI] knob to select "6. NEXT". Press the [MULTI] knob to move to the menus in "NEXT".

6.7.6.1 Settings for Fish Finder Shift

This is the settings menu for adjusting the fish finder shift.

Operating Procedure **Press the keys "8 → 7 → 6 → 1" to go to SHIFT settings**

Turn the [MULTI] knob to select "6. NEXT". Press the [MULTI] knob to move to the menus in "NEXT".

Turn the [MULTI] knob to select "1. SHIFT". Turn the [MULTI] knob to display the menu for inputting values. Set the values according to the fish finder that is connected.

The setting range for fish finder shift is between 0 m and 900 m, and can be set in steps of 1 m. The initial setting is set to 0.

6.7.6.2 Setting the Fish Finder ADC

This is the settings menu for adjusting the fish finder shift.

Operating Procedure **Press the keys "8 → 7 → 6 → 2" to go to ADC settings**

Turn the [MULTI] knob to select "6. NEXT". Press the [MULTI] knob to move to the menus in "NEXT".

Turn the [MULTI] knob to select "2. ADC". Turn the [MULTI] knob to display the menu for inputting values. Set the values according to the fish finder that is connected. The setting range for fish finder ADC is between 1 and 8, and can be set in steps of 1. The initial setting is set to 1.

6.7.6.3 Setting the STC for Fish Finder 1

This is the settings menu for adjusting the STC for fish finder 1.

Operating Procedure **Press the keys "8 → 7 → 6 → 3" to go to STC1 settings**

Turn the [MULTI] knob to select "6. NEXT". Press the [MULTI] knob to move to the menus in "NEXT".

Turn the [MULTI] knob to select "3. STC1". Turn the [MULTI] knob to display the menu for inputting values. Set the values according to the fish finder that is connected. The setting range for the STC of fish finder 1 is from 0.0 to 10.0, and can be set in steps of 0.1. You can remove the noise near the sending line. The initial setting value is set at 0.0.

6.7.6.4 Setting the STC for Fish Finder 2

This is the settings menu for adjusting the STC for fish finder 2.

Operating Procedure **Press the keys "8 → 7 → 6 → 4" to go to STC2 settings**

`4. STC2          0.0`

Turn the [MULTI] knob to select "6. NEXT".

Press the [MULTI] knob to move to the menus in "NEXT".

Turn the [MULTI] knob to select "4. STC2". Turn the [MULTI] knob to display the menu for inputting values. Set the values according to the fish finder that is connected. The setting range for the STC of fish finder 2 is from 0.0 to 10.0, and can be set in steps of 0.1. You can remove the noise near the sending line. The initial setting value is set at 0.0.

6.7.6.5 Interference Settings

This is the menu item for setting the interference from other ships and your own ship's ultrasound equipment.

Operating Procedure **Press the keys "8 → 7 → 6 → 5" to go to INTERFERENCE settings**

`5. INTERFERENCE      OFF ▼`

Turn the [MULTI] knob to select "6. NEXT".

Press the [MULTI] knob to move to the menus in "NEXT". Turn the [MULTI] knob to select "5. INTERFERENCE". Press the [MULTI] knob to display the pulldown menu.
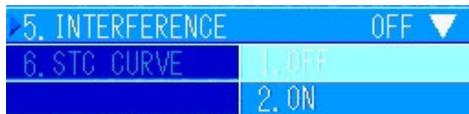
```
▶5. INTERFERENCE      OFF ▼
6. STC CURVE      1. OFF
                  2. ON
```

Choose one item out of "1. OFF" or "2. ON" from the pulldown menu.

Turn the [MULTI] knob to select the item you chose. Press the [MULTI] knob to set.

The initial setting value is set to "1. OFF".

6.7.6.6 Setting the STC Curve

This is the menu item for setting the propagation of ultrasonic waves and ABS ATT.

Operating Procedure **Press the keys "8 → 7 → 6 → 6" to go to STC CURVE settings**

`6. STC CURVE      20 ▼`

Turn the [MULTI] knob to select "6. NEXT". Press the [MULTI] knob to move to the menus in "NEXT".

Turn the [MULTI] knob to select "6. STC CURVE". Press the [MULTI] knob to display the pulldown menu.

```
▶6. STC CURVE      20 ▼
                  1. 20
                  2. 30
                  3. 40
```
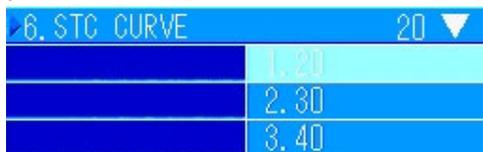
Choose one item out of "1. 20", "2. 30", or "3. 40" from the pulldown menu. Turn the [MULTI] knob to select the item you chose. Press the [MULTI] knob to set it.

The initial setting value is set to "1. 20". If you are searching for small fish schools, set the value to "2. 30".

7 Other Items

Contents

7

7.1 Other

In other menus, you can check and do the settings for INITIAL, SYSTEM SELECT, MAINTENANCE, CHECK, LANGUAGE SET, GYRO, DATE/TIME SET, and VERSION INFO.

7.2 Initial Settings

On the INITIAL menu, you can do RANGE SETTING, SENSOR SET, CONNECTION, FISH SET, ADJUST, and UNIT SET.

Operating Procedure **Press the keys "9 → 1" to go to INITIAL settings**

Press the [MENU] key to open the menu.
Turn the [MULTI] knob to move to "9. OTHER". Press the [MULTI] knob to open the submenu.
Turn the [MULTI] knob to move to "1. INITIAL".

Press the [MULTI] knob to select "INITIAL".
The password input screen (diagram on the left) is displayed to change the details of the initial settings.
Enter "0" for the password. However, have your retailer or service representative either do or check changes to initial settings.
There may be no connection with connected sensors, or the equipment may not function.

Press the [0] key on the keyboard. Pressing the [ENT] key displays the initial settings screen.

7.2.1 Range Settings

In RANGE SETTING, you can select the SONAR RANGE and F/F RANGE to use and change the distance of the SONAR RANGE and F/F RANGE.

Operating Procedure **Press the keys "9 → 1 → 1" to go to RANGE settings**

Open the "1. INITIAL" menu. Turn the [MULTI] knob to move to "1. RANGE", and then press the [MULTI] knob to open the submenu.

Set submenus "1. SONAR RANGE", "2. F/F RANGE", and "3. RANGE SETTING".

7.2.1.1 Sonar Range Settings

From the menu, select the range to be used from the four types that are registered.

Operating Procedure **Press the keys "9 → 1 → 1 → 1" to go to SONAR RANGE settings**
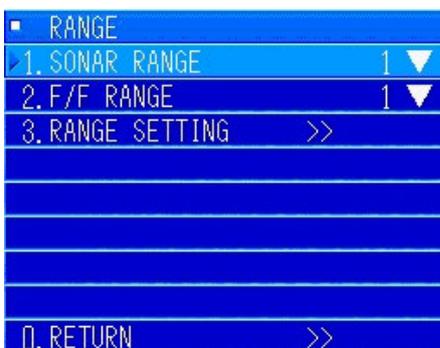
In the [RANGE] menu, turn the [MULTI] knob to select "1. SONAR RANGE". Press the [MULTI] knob to display the pulldown menu.
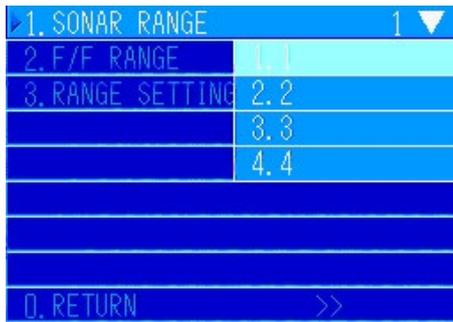
Match 1 through 4 of the pulldown menu to the fish type and fishing method to be used. Turn the [MULTI] knob to select. Press the [MULTI] knob to accept.

Refer to the list of menus in Chapter 12 "Other" for the settings table for SONAR RANGE.

7.2.1.2   Fish Finder Range Settings

From the menu, select the range to be used from the four types that are registered.

Operating Procedure Press the keys "9 → 1 → 1 → 2" to go to F/F RANGE settings
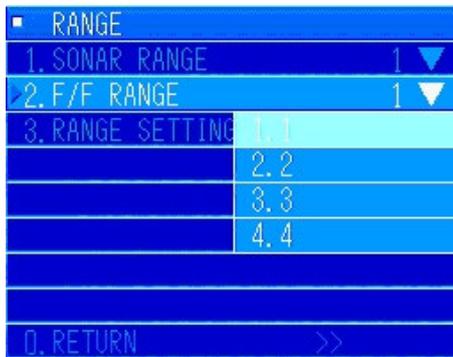
In the [RANGE SETTING] menu, turn the [MULTI] knob to select "2. F/F RANGE". Press the [MULTI] knob to display the pulldown menu.

Match and assign1 through 4 of the pulldown menu to the fish finder that is connected. Turn the [MULTI] knob to select. Press the [MULTI] knob to accept.

Refer to the list of menus in Chapter 12 "Other" for the settings table for F/F RANGE.

7.2.1.3   Range Settings

You can change the range that is registered from the RANGE SETTING menu when the range to be used is not found in the four types that are registered.

Operating Procedure Press the keys "9 → 1 → 1 → 3" to go to RANGE SETTING settings
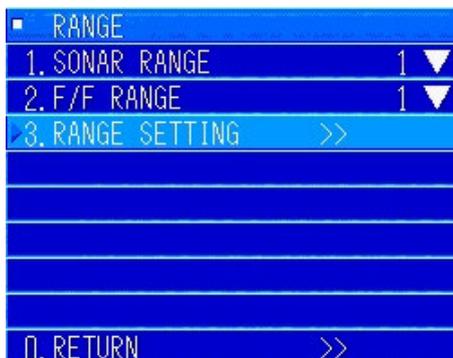
In the [RANGE SETTING] menu, turn the [MULTI] knob to select "3. RANGE SETTING". Press the [MULTI] knob to display the pulldown menu.

Select either "1. SONAR" or "2. FISH" from the pulldown menu, and change the registered range.

7.2.1.4 Sonar Range Settings

Change the range that is registered from the RANGE SETTING menu.

Operating Procedure **Press the keys "9 → 1 → 1 → 3 → 1" to go to SONAR settings**
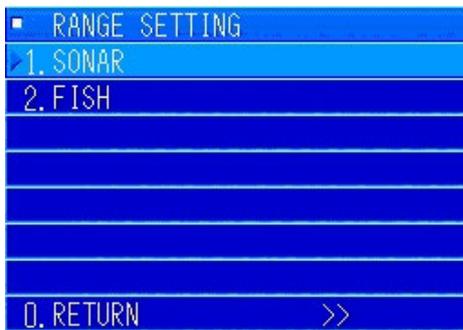
In the [3. RANGE SETTING] menu, turn the [MULTI] knob to select "1. SONAR". Press the [MULTI] knob to accept.

The menu for changing the sonar range is displayed.

The following SONAR screen is displayed.

Number of range, 1 through 16

Range pattern selection
(Select the range that you want to change from the four types)
Currently, pattern 1 is selected.

Range selection
Currently, "01" is selected.

Cancel button

Set button
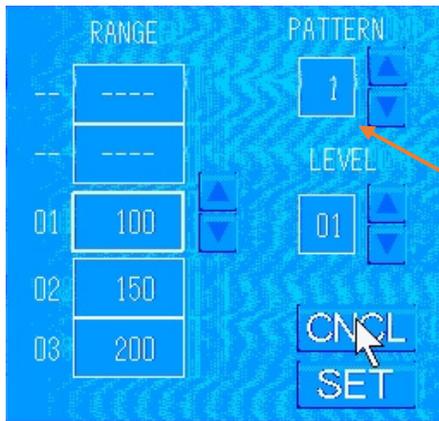
Press the [MULTI] knob to move the white frame to the location that you want to set.

White frame
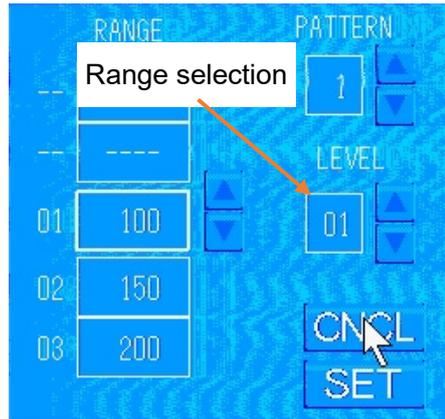
How to change a registered sonar range

Range selection

1) Turn the [MULTI] knob to move to Pattern (1 through 4 of the registered ranges). Turn the [MULTI] knob to select a pattern from 1 through 4. Example: Select "1".

2) Select the range (1 through 16) that you want to change.

Turn the [MULTI] knob to move to the frame for Level.

Turn the [MULTI] knob to select the range you want from 1 through 16. Example: "10"

Change the range value
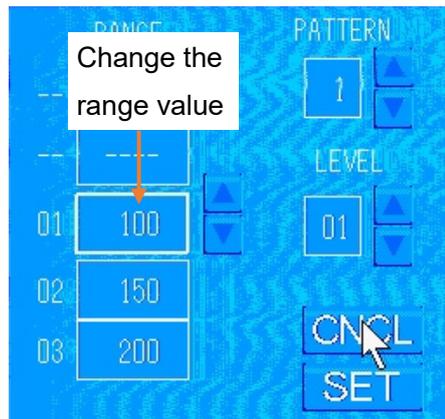
3) Turn the [MULTI] knob to move to Range. Because level "10" is already selected, move to range "10". Turn the [MULTI] knob to adjust the value for the range that you want to set. Example: "550"

4) Repeat steps 2) to 3) to change other ranges.

5) When you have completed the changes, move the cursor to the "SET" position. Press the [ENT] key to accept.

Close the "SONAR" menu.

6) If you complete mid-way without making changes, move the cursor to "CNCL". Press the [ENT] key to finish.

Move cursor and press [ENT] key to finish
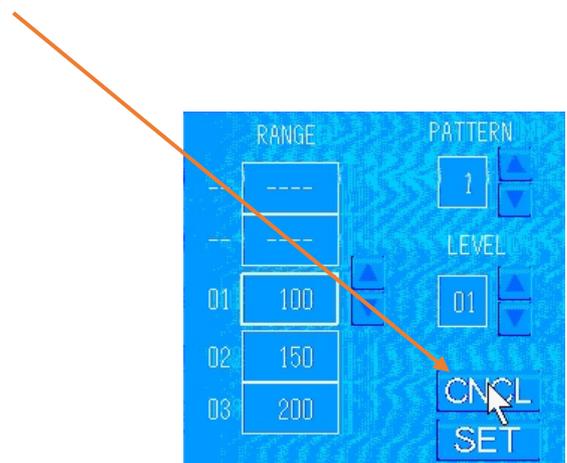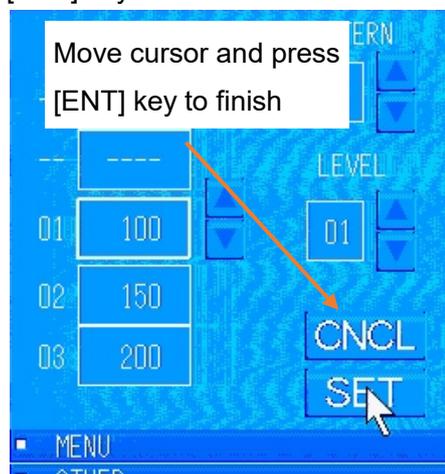
7.2.1.5 Fish Settings

Change the range that is registered from the RANGE SETTING menu.

Operating Procedure **Press the keys "9 → 1 → 1 → 3 → 2" to go to FISH settings**

```
■  RANGE SETTING
 1. SONAR
▷2. FISH



 0. RETURN          ≫
```
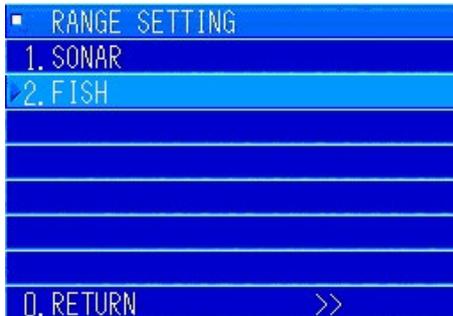
In the [3. RANGE SETTING] menu, turn the [MULTI] knob to select "2. FISH". Press the [MULTI] knob to accept.

The menu for changing the sonar range is displayed.

The menus and operations to change the range are the same as those for SONAR.

7.2.2 Sensor Set Settings

This is a menu for setting how to use sensors that are connected and sensors to be connected.

Operating Procedure **Press the keys "9 → 1 → 2" to go to SENSOR settings**

```
■  MENU
■  OTHER
■  INITIAL
 1. RANGE          ≫
▷2. SENSOR         ≫
 3. CONNECTION     ≫
 4. FISH FAINDER   ≫
 5. FISH IMAGE     ON ▼
 6. ADJUST         ≫
 7. UNIT SET       ≫


 0. RETURN         ≫
```

Open the "1. INITIAL" menu. Turn the [MULTI] knob to move to "2. SENSOR", and then press the [MULTI] knob to open the submenu.

Select from the following submenus and do the settings.

"1. INPUT"

"2. SENSOR SET"

"3. NET RECORDER"

"4. LINE MONITOR" (confirmation only)

```
■  MENU
■  OTHER
■  INITIAL
■  SENSOR
▷1. INPUT          ≫
 2. SENSOR SET     ≫
 3. NET RECORDER   ≫
 4. LINE MONITOR




 0. RETURN         ≫
```

7.2.2.1 Input Settings

This is a menu for setting how to use sensors that are connected and sensors to be connected.

Operating Procedure **Press the keys "9 → 1 → 2 → 1" to go to INPUT settings**

```
■ MENU
■ OTHER
■ INITIAL
■ SENSOR
■ INPUT
>1. COMPASS        NAV1 ▼
 2. DEPTH/TEMP      NAV3 ▼
 3. CURRENT         NAV2 ▼
 4. GPS             NAV1 ▼
 5. LOG              OFF ▼

 0. RETURN            >>
```

In the [SENSOR SETTINGS] menu, turn the [MULTI] knob to select "1. INPUT". Press the [MULTI] knob to display the submenu.

Select from the following submenus and do the settings.

"1. COMPASS"

"2. DEPTH/TEMP"

"3. CURRENT"

"4. GPS"

"5. LOG"

7.2.2.2 Compass Settings

Operating Procedure **Press the keys "9 → 1 → 2 → 1 → 1" to go to COMPASS settings**

```
■ INPUT
>1. COMPASS        NAV1 ▼
 2. DEPTH/TEMP    1. OFF
 3. CURRENT       2. NAV1
 5. GPS           3. NAV2
 6. LOG           4. NAV3
                  5. NAV4

 0. RETURN          >>
```

In the [INPUT] menu, turn the [MULTI] knob to select "1. COMPASS". Press the [MULTI] knob to display the pulldown menu.

Select from "1. OFF" to "5. NAV4".

Confirm and set the input terminal that is connected to the terminal board.

Normally, turn the [MULTI] knob to select "2. NAV1". Press the [MULTI] knob to accept.

7.2.2.3 Depth/Temp Settings

Operating Procedure **Press the keys "9 → 1 → 2 → 1 → 2" to go to DEPTH/TEMP settings**

```
■ INPUT
 1. COMPASS        NAV1 ▼
>2. DEPTH/TEMP     NAV3 ▼
 3. CURRENT       1. OFF
 5. GPS           2. NAV1
 6. LOG           3. NAV2
                  4. NAV3
                  5. NAV4
 0. RETURN          >>
```

In the [INPUT] menu, turn the [MULTI] knob to select "2. DEPTH/TEMP ". Press the [MULTI] knob to display the pulldown menu.

Select from "1. OFF" to "5. NAV4".

Confirm and set the input terminal that is connected to the terminal board.

Normally, turn the [MULTI] knob to select "4. NAV3". Press the [MULTI] knob to accept.

7.2.2.4   Current settings

In the [INPUT] menu, turn the [MULTI] knob to select "3. CURRENT". Press the [MULTI] knob to display the pulldown menu.

Select from "1. OFF" to "5. NAV4".

Confirm and set the input terminal that is connected to the terminal board.

Normally, turn the [MULTI] knob to select "3. NAV2". Press the [MULTI] knob to accept.

7.2.2.5   GPS

In the [INPUT] menu, turn the [MULTI] knob to select "4. GPS". Press the [MULTI] knob to display the pulldown menu.

Select from "1. OFF" to "5. NAV4".

Confirm and set the input terminal that is connected to the terminal board.

Normally, turn the [MULTI] knob to select "2. NAV1". Press the [MULTI] knob to accept.

Because a one-second pulse is good for a direction mark, assume that a normal sonar adds the GPS-equivalent output and outputs to the line of the compass.

7.2.2.6   Log Settings

In the [INPUT] menu, turn the [MULTI] knob to select "5. LOG". Press the [MULTI] knob to display the pulldown menu.

Select from "1. OFF" to "5. NAV4".

Confirm and set the input terminal that is connected to the terminal board.

Normally, turn the [MULTI] knob to select "1. OFF". Press the [MULTI] knob to accept.

Precaution) If the sonar is normally connected to a current meter, it is unnecessary to connect a log.

7.2.2.7 Sensor Set Settings

This is a menu for selecting sensors connected to such displays as course, speed, and direction mark.

Operating Procedure Press the keys "9 → 1 → 2 → 2" to go to SENSOR SET settings

▪ MENU	
▪ OTHER	
▪ INITIAL	
▪ SENSOR	
▪ SENSOR SET	
▷1. COURSE	COMPASS ▼
2. SPEED	GPS ▼
3. DIRECTION MARK	COMPASS ▼
4. LAT/LON	COMPASS ▼
5. TRACK LINE	GPS ▼
0. RETURN	>>

In the [SENSOR SETTINGS] menu, turn the [MULTI] knob to select "2. SENSOR SET". Press the [MULTI] knob to display the submenu.

Select from the following submenus and do the settings.

"1. COURSE"

"2. SPEED"

"3. DIRECTION MARK"

"4. LAT/LON"

"5. TRACK LINE"

7.2.2.8 Course Settings

Operating Procedure Press the keys "9 → 1 → 2 → 2 → 1" to go to COURSE settings

▪ SENSOR SET	
▷1. COURSE	COMPASS ▼
2. SPEED	1. COMPASS
3. DIRECTION MAR	2. CURRENT
4. LAT/LON	3. GPS
5. TRACK LINE	4. LOG
0. RETURN	>>

In the [SENSOR SET] menu, turn the [MULTI] knob to select "1. COURSE". Press the [MULTI] knob to display the pulldown menu.

Select from "1. COMPASS" to "4. LOG".

Example: From the previous input sensor connection

Turn the [MULTI] knob to select "1. COMPASS". Press the [MULTI] knob to accept.

7.2.2.9 Speed Settings

Operating Procedure Press the keys "9 → 1 → 2 → 2 → 2" to go to SPEED settings

▪ SENSOR SET	
1. COURSE	COMPASS ▼
▷2. SPEED	GPS ▼
3. DIRECTION MAR	1. CURRNT
4. LAT/LON	2. GPS
5. TRACK LINE	3. LOG
	4. GYRO I/F
0. RETURN	>>
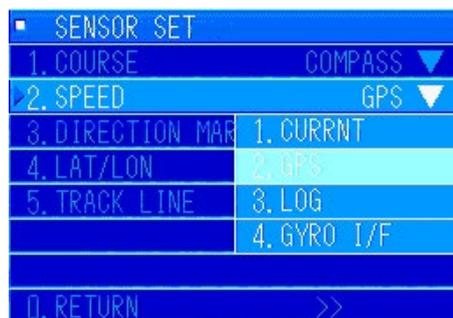
In the [SENSOR SET] menu, turn the [MULTI] knob to select "2. SPEED". Press the [MULTI] knob to display the pulldown menu.

Select from "1. CURRNT" to "4. GYRO I/F".

Example: From the previous input sensor connection

Turn the [MULTI] knob to select "1. CURRNT". Press the [MULTI] knob to accept.

7.2.2.10 Direction Mark Settings

Operating Procedure Press the keys "9 → 1 → 2 → 2 → 3" to go to DIRECTION MARK settings

In the [SENSOR SET] menu, turn the [MULTI] knob to select "3. DIRECTION MARK". Press the [MULTI] knob to display the pulldown menu.
Select from "1. COMPASS" to "2. GYRO I/F".
Example: From the previous input sensor connection Turn the [MULTI] knob to select "1. COMPASS". Press the [MULTI] knob to accept.

7.2.2.11 Lat/Lon Settings

Operating Procedure Press the keys "9 → 1 → 2 → 2 → 4" to go to LAT/LON settings

In the [SENSOR SET] menu, turn the [MULTI] knob to select "4. LAT/LON". Press the [MULTI] knob to display the pulldown menu.
Select from "1. COMPASS" to "2. GPS".
Example: From the previous input sensor connection Turn the [MULTI] knob to select "1. COMPASS". Press the [MULTI] knob to accept.

7.2.2.12 Wake Settings

Operating Procedure Press the keys "9 → 1 → 2 → 2 → 5" to go to TRACK LINE settings

In the [SENSOR SET] menu, turn the [MULTI] knob to select "5. TRACK LINE". Press the [MULTI] knob to display the pulldown menu.
Select from "1. CURRNT" to "4. GYRO I/F".
Example: From the previous input sensor connection Turn the [MULTI] knob to select "1. CURRNT". Press the [MULTI] knob to accept.
Precaution) Selecting "1. CURRNT" in "TRACK LINE" draws form the track line relative to water and the direction mark.

7.2.2.13 Net Recorder Settings

Operating Procedure **Press the keys "9 → 1 → 2 → 3" to go to NET RECORDER settings**

Precaution) The menu is masked if the connection for "2. SENSOR CONNECTION" "NET RECORDER" is not set to "CONNECTED".

In the [SENSOR SETTINGS] menu, turn the [MULTI] knob to select "3. NET RECORDER". Press the [MULTI] knob to display the submenu.

Select from the following submenus and do the settings.

"1. DISTANCE 1" "2. DISTANCE 2"

"3. DISTANCE 3" "4. DISTANCE 4"

"5. TRIG POLARITY"   "6. TRIG MODE"

7.2.2.14 Distance Settings

Operating Procedure **Press the keys "9 → 1 → 2 → 3 → 1 through 4" to go to DISTANCE settings**

These are the settings for "DISTANCE 1" through "DISTANCE 4".

In the [NET RECORDER] menu, turn the [MULTI] knob to select "1. DISTANCE 1". Press the [MULTI] knob to display the menu for inputting values.

When gathering nets, turn the [MULTI] knob from cast net to distance 1 to set the distance. Press the [MULTI] knob to accept.

Continue to set each of the distances from the cast net position to distance 2, 3, and 4 using the same method as for distance 1.

7.2.2.15 Trig Polarity Settings

Operating Procedure **Press the keys "9 → 1 → 2 → 3 → 5" to go to TRIG POLARITY settings**

In the [NET RECORDER] menu, turn the [MULTI] knob to select "5. TRIG POLARITY". Press the [MULTI] knob to display the pulldown menu.

From "1. POS" and "2. NEG", match the connected sensors and select with the [MULTI] knob. Press the [MULTI] knob to assign it.

7.2.2.16 Trig Mode Settings

Operating Procedure **Press the keys "9 → 1 → 2 → 3 → 6" to go to TRIG MODE settings**
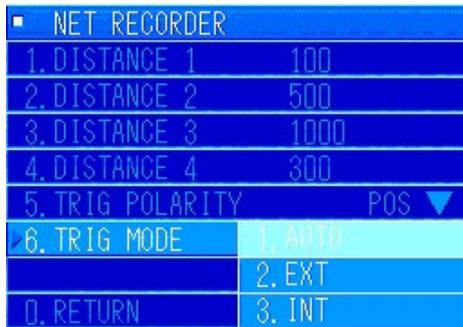
In the [NET RECORDER] menu, turn the [MULTI] knob to select "6. TRIG MODE". Press the [MULTI] knob to display the pulldown menu.

From "1. AUTO", "2. EXT" and "3. INT", match the connected sensors and select with the [MULTI] knob. Press the [MULTI] knob to assign it.

7.2.2.17 Line Monitor Settings

Use this to check signals from the outer sensors and to confirm communication with the transmitter/receiver unit and controls.

Operating Procedure **Press the keys "9 → 1 → 2 → 4" to go to LINE MONITOR settings**

In the [SENSOR] menu, turn the [MULTI] knob to select "4. LINE MONITOR". Press the [MULTI] knob to display the specialized screen for the "LINE MONTOR".

LINE MONITOR

```
2A 36 36 0D 0A 24 48 45 48 44 54 2C 30 30 35 2E 30 2C 54 2A 32 41 0D 0A 24 48 45 52 4F 54 2C 36    *66,.$HEHDT,005.0,T*2A..$HEROT,6
30 2E 30 30 2C 41 2A 32 44 0D 0A 24 56 44 56 43 44 2C 31 36 33 2E 32 2C 66 2C 30 34 39 2E 37 2C     0.00,A*2D..$VDVCD,163.2,f,049.7,
```

```
*66,.$HEHDT,005.0,T*2A..$HEROT,6
0.00,A*2D..$VDVCD,163.2,f,049.7,
```

```
NAV1          NAV1          STOP
NAV1          NAV2          NAV1
NAV2          NAV3          NAV2
NAV3          NAV4          NAV3
NAV4          KEY1          NAV4
KEY1          KEY2          KEY1
KEY2          HST           KEY2
HST           XCV           HST
XCV           EXT           XCV
EXT           PROC1         EXT
PROC1         PROC2         PROC1
PROC2         STOP          PROC2
STOP          CLEAR
CLEAR         EXIT          CLEAR
EXIT                        EXIT
```
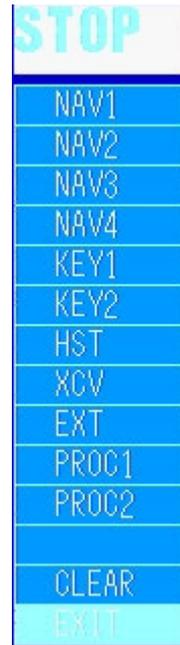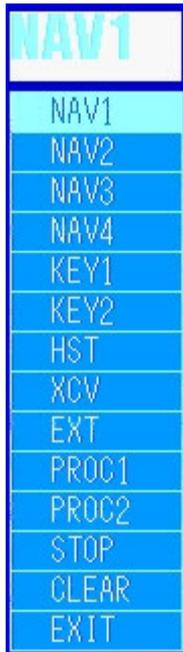
1) Turn the [MULTI] knob to select the signal that you want to confirm. Press the [MULTI] knob to accept.

Selecting NAV1 displays the data from the upper tier of the area from which the signal was received. This is displayed in ASCII code on the right side. Additionally, if NMEA is not received normally from the outer signal of NAV1 to NAV4, it repeatedly searches for the baud rate in the order of 1200 bps (for JRC) → 4800 (NMEA) → 9800 (JRC, Gyro I/F).

2) If you want to stop signals to confirm, move the [MULTI] knob to the "STOP" position. Pressing the [MULTI] knob to assign it stops the signals.

3) To clear the receive and transmit screens, move the [MULTI] knob to "CLEAR". You can clear the screen by pressing the [MULTI] knob.

4) To stop LINE MONITOR, select "EXIT" with the [MULTI] knob. Pressing the [MULTI] knob closes the specialized screen for LINE MONITOR.

7.2.3 Connection Settings

```
■ MENU
■ OTHER
■ INITIAL
■ CONNECTION
>1. PROCESSOR            >>
 2. SENSOR CONNECTION  >>




 0. RETURN              >>
```
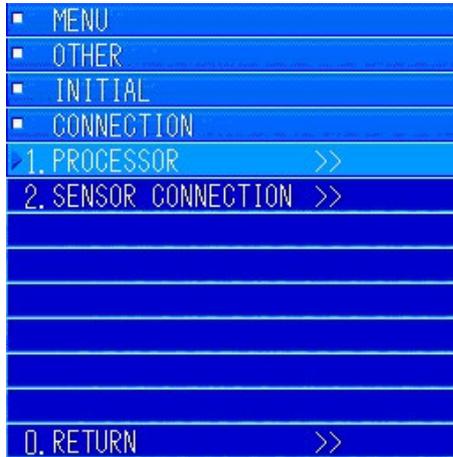
Open the "1. INITIAL" menu. Turn the [MULTI] knob to move to "3. CONNECTION", and then press the [MULTI] knob to open the submenu.
Do the settings displayed by the submenu.
"1. PROCESSOR"
"2. SENSOR CONNECTION"

7.2.3.1 Settings for Connections between Equipment

```
■ MENU
■ OTHER
■ INITIAL
■ CONNECTION
>1. PROCESSOR            >>
 2. SENSOR CONNECTION  >>




 0. RETURN              >>
```
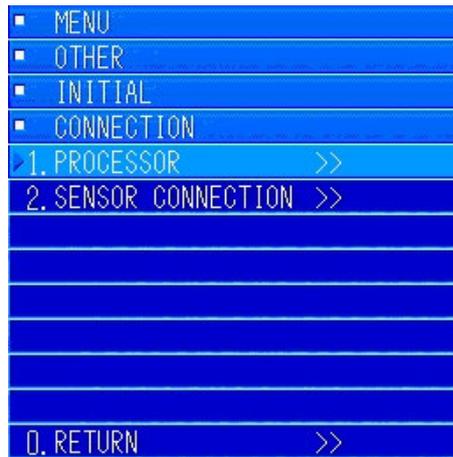
PROCESSOR is an item that is set for scalability.

7.2.3.2 Settings for Sensor Connections

Operating Procedure **Press the keys "9 → 1 → 3 → 2" to go to SENSOR CONNECTION settings**
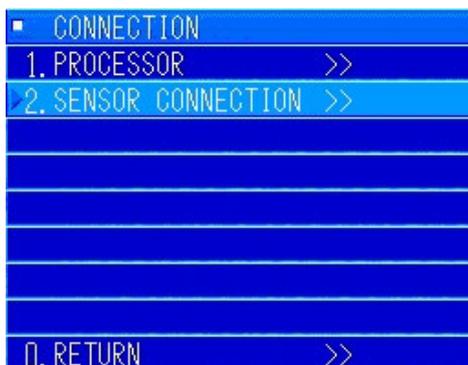
In the [CONNECTION] menu, turn the [MULTI] knob to select "2. SENSOR CONNECTION". Press the [MULTI] knob to display the submenu.

The following submenu is displayed.

Do the settings for all submenus.

7.2.3.3 Fish Finder 1 Settings

Operating Procedure **Press the keys "9 → 1 → 3 → 2 → 1 through 2" to go to FISH FINDER 1 and 2 settings**
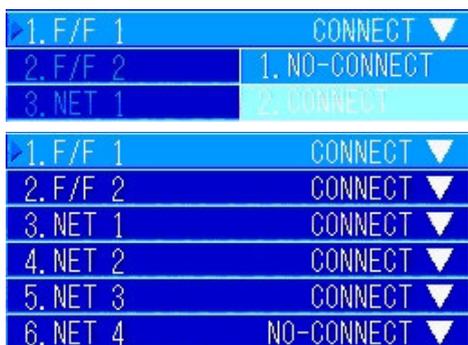
In the [SENSOR CONNECTION] menu, turn the [MULTI] knob to select "1. F/F 1". Press the [MULTI] knob to display the pulldown menu.

From "1. NO-CONNECT" and "2. CONNECT", match the connected sensors and select with the [MULTI] knob. Press the [MULTI] knob to assign it.

Set "2. F/F 2" the same way.

7.2.3.4 Net Settings

Operating Procedure **Press the keys "9 → 1 → 3 → 2 → 3 through 6" to go to NET 1 through 4 settings**
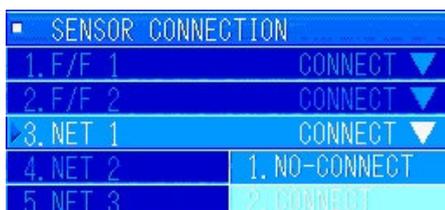
In the [SENSOR CONNECTION] menu, turn the [MULTI] knob to select "3. NET 1". Press the [MULTI] knob to display the pulldown menu.

From "1. NO-CONNECT" and "2. CONNECT", match the connected sensors and select with the [MULTI] knob. Press the [MULTI] knob to assign it. Set "4. NET 2" through "6. NET 4" the same way.

7.2.4　Fish Finder Settings

Open the "1. INITIAL" menu. Turn the [MULTI] knob to move to "4. FISH FINDER", and then press the [MULTI] knob to open the submenu.
Do the settings displayed by the submenu.

Do the settings for all submenus in the diagram on the left.
The menu is masked if SENSOR CONNECTION is not connected.

7.2.4.1　Amplifier Settings

Set the signal form for the received signal output of the connected fish finder.
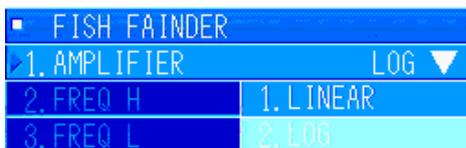
Open the "4. FISH FINDER" menu. Turn the [MULTI] knob to select "1. AMPLIFIER", and then press the [MULTI] knob to set. A pulldown menu is displayed, so match the output of the connected fish finder. Turn the [MULTI] knob to select either "1. LINEAR" or "2. LOG", and then press the [MULTI] knob to assign it.

7.2.4.2 Freq H Settings

Set the frequency of the connected fish finder. Make sure to use this menu to set the received signal output for log amplifier-type fish finders.

Operating Procedure **Press the keys "9 → 1 → 4 → 2 through 3" to go to FREQ H and L settings**

Open the "4. FISH FINDER" menu. Turn the [MULTI] knob to select "2. FREQ H", and then press the [MULTI] knob to set. A menu for inputting values is displayed, so turn the [MULTI] knob to set the frequency.

The frequency range that can be set is 20 kHz through 400 kHz/1 kHz step.

Once the frequency is set, press the [MULTI] knob to assign it.

Set FREQ L the same way as you set FREQ H.

7.2.4.3 Trig Mode Settings

Operating Procedure **Press the keys "9 → 1 → 4 → 4" to go to TRIG MODE settings**

Open the [4. FISH FINDER] menu. Turn the [MULTI] knob to select "4. TRIG MODE". Press the [MULTI] knob to accept.

A pulldown menu is displayed, so match the signal of the connected fish finder. Turn the [MULTI] knob to select from "1. H/L SYNCHRO" or "2. H/L SEPARATE", and then press the [MULTI] knob to assign it.

7.2.4.4 Trig Polarity Settings

Operating Procedure **Press the keys "9 → 1 → 4 → 5" to go to TRIG POLARITY settings**

Open the [4. FISH FINDER] menu. Turn the [MULTI] knob to select "5. TRIG POLARITY". Press the [MULTI] knob to accept.

A pulldown menu is displayed, so match the signal of the connected fish finder. Turn the [MULTI] knob to select from "1. POS" or "2. NEG", and then press the [MULTI] knob to assign it.

7.2.5 Fish Image Settings

Set the items for the fish image settings to allow or deny operations.

Operating Procedure **Press the keys "9 → 1 → 5" to go to FISH IMAGE settings**

Open the "1. INITIAL" menu. Turn the [MULTI] knob to move to "5. FISH IMAGE", and then press the [MULTI] knob to open the pulldown menu.

Turn the [MULTI] knob to select "1. ON" or "2. OFF" from the pulldown menu. Press the [MULTI] knob to assign it.

Set "1. ON" for the initial setting.

It is normally set to the initial setting.

Setting this setting to "2. OFF" masks all items in "5. FISH IMAGE", making it inoperable.

7.2.6   Adjust Settings

Operating Procedure **Press the keys "9 → 1 → 6" to go to ADJUST settings**

MENU	
■ OTHER	
■ INITIAL	
1. RANGE	>>
2. SENSOR	>>
3. CONNECTION	>>
4. FISH FAINDER	>>
5. FISH IMAGE	ON ▼
6. ADJUST	>>
7. UNIT SET	>>
0. RETURN	>>

Open the "1. INITIAL" menu. Turn the [MULTI] knob to move to "6. ADJUST", and then press the [MULTI] knob to open the pulldown menu.

MENU	
■ OTHER	
■ INITIAL	
■ ADJUST	
1. MARK TILTING	ON ▼
2. DRAFT	0
3. FURNISHED ANGLE	0
4. TILT TO BOW	0.0
5. TILT TO PORT	0.0
6. DISP ANGLE	0
7. STUN BLANCK	ON ▼
8. A/D OFFSET	0
0. RETURN	>>

Set items 1 through 8 from the pulldown menu.

7.2.6.1   Mark Tilting Settings

Operating Procedure **Press the keys "9 → 1 → 6 → 1" to go to MARK TILTING settings**

■ ADJUST	
1. MARK TILTING	ON ▼
2. DRAFT	1. OFF
3. FURNISHED ANG	2. ON

1. MARK TILTING	ON ▼
2. DRAFT	1. OFF
3. FURNISHED ANG	2. ON

In the [6. ADJUST] menu, turn the [MULTI] knob to select "1. MARK TILTING". Press the [MULTI] knob to display the pulldown menu.

If you do not turn the [MULTI] knob from "1. OFF" to "2. ON" to adjust, select "1. OFF". Press the [MULTI] knob to assign it.

MARK TILTING is a mechanism to make automatic adjustments due to being unable to see images at marked depths when an EVENT MARK comes close to own ship if you marked the EVENT MARK at a far distance with the tilt angle lowered. Precaution) Operates when the tilt angle increases beyond 30°.

7.2.6.2 Draft Settings

Operating Procedure **Press the keys "9 → 1 → 6 → 2" to go to DRAFT settings**

In the [6. ADJUST] menu, turn the [MULTI] knob to select "2. DRAFT". Press the [MULTI] knob to display the menu for inputting values.

For this example, turn the [MULTI] knob to input a draft value of 5 m for this ship. Press the [MULTI] knob to assign it.

7.2.6.3 Furnished Angle Adjustment Settings

This is a menu for inputting angles that deviate from the heading mark of the transducer, in regard to the heading of this ship, when this ship is furnished with a hoisting device.

Precaution) When furnishing angle deviations, do not adjust the image.

Operating Procedure **Press the keys "9 → 1 → 6 → 3" to go to FURNISHED ANGLE ADJUSTMENT settings**
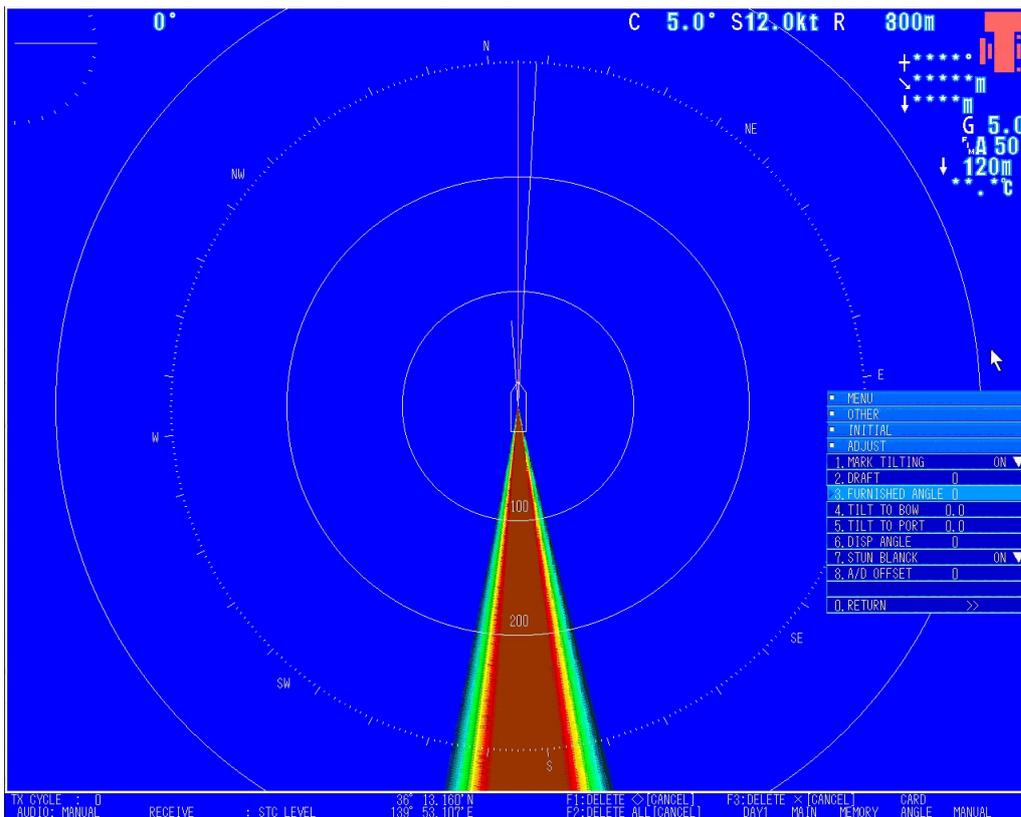
In the [6. ADJUST] menu, turn the [MULTI] knob to select "3. FURNISED ANGLE". Press the [MULTI] knob to display the menu for inputting values.
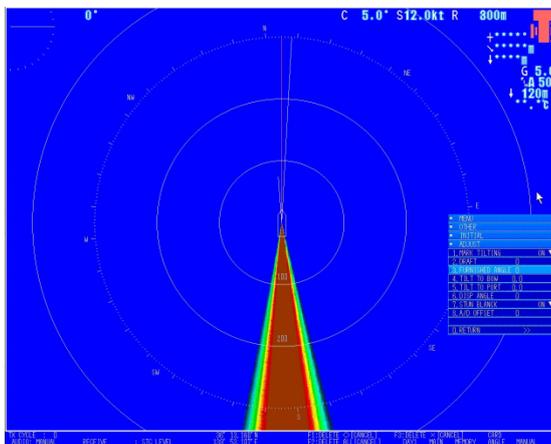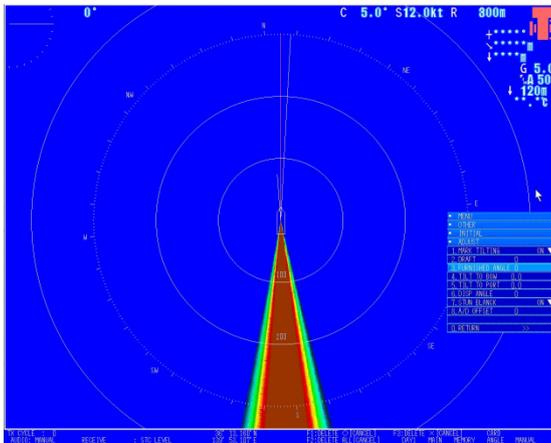
For the values to be input, you can set the heading as 0° and set the angle clockwise from 0° to 359° in steps of 1°. If the hoisting device is furnished in a direction that deviates 5° from the heading, set this setting to 355°.

As an operation turn the [MULTI] knob counterclockwise and set to 355. Press the [MULTI] knob to assign it.

7

7.2.6.4 Tilt to Bow Settings

Operating Procedure Press the keys "9 → 1 → 6 → 4" to go to TILT TO BOW settings
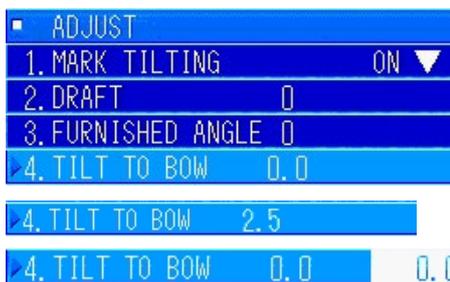
In the [6. ADJUST] menu, turn the [MULTI] knob to select "4. TILT TO BOW ". Press the [MULTI] knob to display the menu for inputting values.

Input the angle at which the bow deviates horizontally while a hoisting device is anchored.

Example: If the bow is submerged 2.5°, turn the [MULTI] knob to set -2.5. Press the [MULTI] knob to assign it. The setting range is between -12.7° and 12.7°, and is set in steps of 0.1.

7.2.6.5 Tilt to Port Settings

Operating Procedure Press the keys "9 → 1 → 6 → 5" to go to TILT TO PORT settings

In the [6. ADJUST] menu, turn the [MULTI] knob to select "5. TILT TO PORT". Press the [MULTI] knob to show the display for inputting values.

Input the angle at which the port and starboard sides deviate horizontally while a hoisting device is anchored.

Example: If the starboard side is submerged 2.1°, turn the [MULTI] knob to set -2.1. Press the [MULTI] knob to assign it.

The setting range is between -12.7° and 12.7°, and is set in steps of 0.1.

7.2.6.6 Display Angle Settings

Operating Procedure Press the keys "9 → 1 → 6 → 6" to go to DISP ANGLE settings

In the [6. ADJUST] menu, turn the [MULTI] knob to select "6. DISP ANGLE". Press the [MULTI] knob to display the menu for inputting values.

Be sure to do this after executing "3. FURNISHED ANGLE".

Example of settings values and confirmation method: If a hoisting device is installed at central keel, and propellers are attached to the center of the stern, propeller noise is displayed, such as that in the diagram to the left, when the ship moves. If there is any deviation, input values into DISP ANGLE to adjust. The setting range is between 0 and 359, and can be set in steps of 1. As for how to do the settings, turn the [MULTI] knob to open the menu for inputting values. Turn the [MULTI] knob while looking at the image and find the optimum position. Press the [MULTI] knob to assign it.
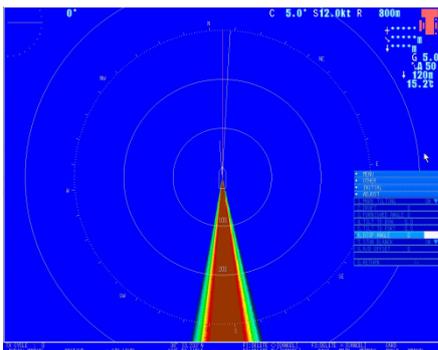
7.2.6.7 Stern Blank Settings

Operating Procedure Press the keys "9 → 1 → 6 → 7" to go to STERN BLANK settings

When such strong signals as propeller noise are input, it impacts surrounding images. The specialized function "STERN BLANK" is included for this reason.

In the [6. ADJUST] menu, turn the [MULTI] knob to select "7. STERN BLANK". Press the [MULTI] knob to display the pulldown menu.

Turn the [MULTI] knob to select "ON". Press the [MULTI] knob to assign it. The initial value is set to "ON".

Precaution) Because the position of the STERN BLANK adjusts the direction using the corrected values for "3. FURNISHED ANGLE", be sure to set the corrected "3. FURNISHED ANGLE" if there are changes to the furnished position of the transducer.

7.2.6.8 A/D Offset Settings

A/D OFFSET is used when the connection cable is long and the level has decreased or when noise was generated between the transmitter/receiver unit and processor.

Operating Procedure Press the keys "9 → 1 → 6 → 8" to go to A/D OFFSET settings

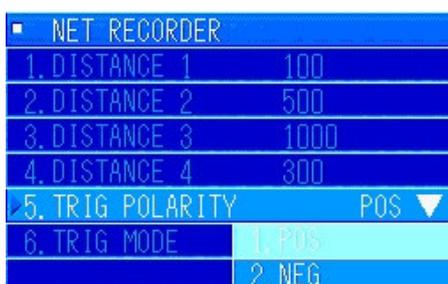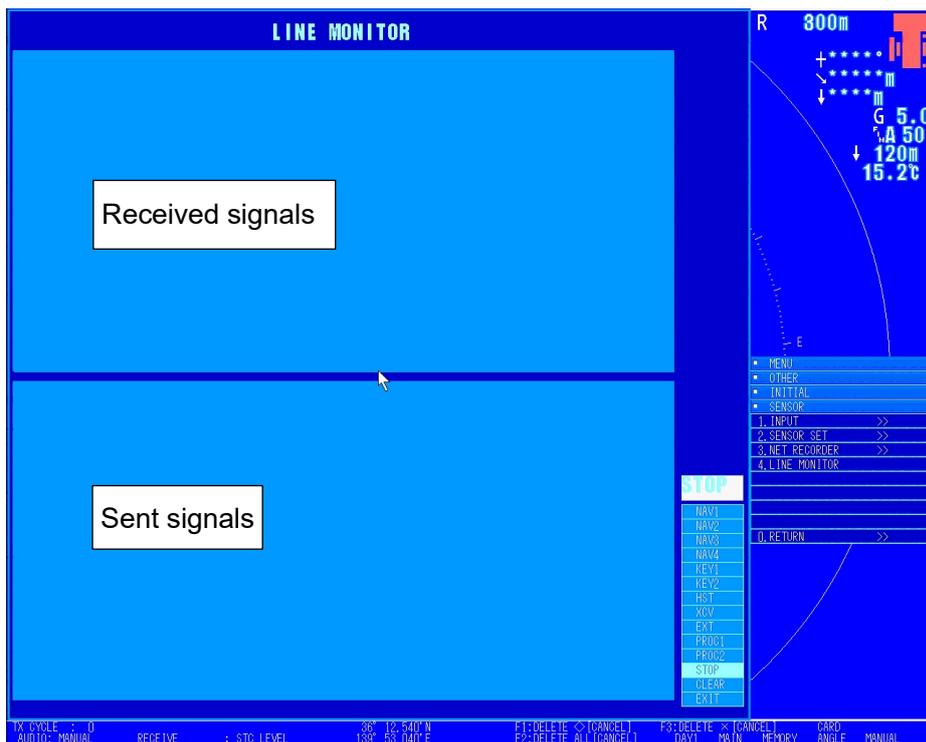In the [6. ADJUST] menu, turn the [MULTI] knob to select "8. A/D OFFSET". Press the [MULTI] knob to display the menu for inputting values.

The setting range is set between -54 and 55.

Increasing the value makes the gain seem high.

Turn the [MULTI] knob while looking at the screen to select the optimum value. Press the [MULTI] knob to assign it. The initial value is set to 0.

7.2.7 Unit Set Settings

This is a menu for setting the units for range, water temperature, etc.

Operating Procedure **Press the keys "9 → 1 → 7" to go to UNIT SET settings**

Open the "1. INITIAL" menu. Turn the [MULTI] knob to move to "7. UNIT SET", and then press the [MULTI] knob to open the submenu.

The following submenu is displayed.
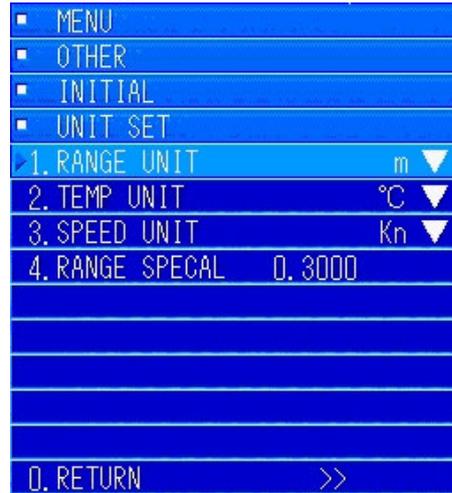
7.2.7.1 RANGE UNIT

Operating Procedure **Press the keys "9 → 1 → 7 → 1" to go to RANGE UNIT settings**

In the [7. UNIT SET] menu, turn the [MULTI] knob to select "1. RANGE UNIT". Press the [MULTI] knob to display the pulldown menu.

Turn the [MULTI] knob to select the unit you want to use.
Press the [MULTI] knob to assign it.
If "4. RANGE SPECIAL" is set, move to the "4. RANGE SPECIAL " menu and set arbitrary units (fathom, etc.).

7.2.7.2 Temp Unit Settings

Operating Procedure **Press the keys "9 → 1 → 7 → 2" to go to TEMP UNIT settings**

In the [7. UNIT SET] menu, turn the [MULTI] knob to select "2. TEMP UNIT". Press the [MULTI] knob to display the pulldown menu.

Turn the [MULTI] knob to select the unit you want to use. Press the [MULTI] knob to set.

7.2.7.3 Speed Unit Settings

Operating Procedure **Press the keys "9 → 1 → 7 → 3" to go to SPEED UNIT settings**

In the [7. UNIT SET] menu, turn the [MULTI] knob to select "3. SPEED UNIT". Press the [MULTI] knob to display the pulldown menu.

Turn the [MULTI] knob to select the unit you want to use. Press the [MULTI] knob to set.

7.2.7.4 Range Special Settings

Operating Procedure **Press the keys "9 → 1 → 7 → 4" to go to RANGE SPECAL settings**

In the [7. UNIT SET] menu, turn the [MULTI] knob to select "4. RANGE SPECAL". Press the [MULTI] knob to display the menu for inputting values.

The setting range is between 0.3000 and 1.9999, and can be set in steps of 0.0001.

Turn the [MULTI] knob to set the value to be set. Press the [MULTI] knob to set it.

7.3 System Select Settings

MENU
■ OTHER
1. INITIAL >>
2. SYSTEM SELECT 280 ▼
3. REGISTRATION CANCEL>>
4. MAINTENANCE >>
5. CHECK >>
6. LANGUAGE SET OTHER ▼
7. GYRO SET 0.0
8. DATE/TIME >>
9. VERSION >>
0. RETURN >>
2. SYSTEM SELECT 280 ▼
3. REGISTRATION 1.280

Press the [MENU] key to open the menu.

Turn the [MULTI] knob to move to "9. OTHER". Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "2. SYSTEM SELECT".

Press the [MULTI] knob to display the pulldown menu.

Turn the [MULTI] knob to select "1. 280". Press the [MULTI] knob to set it.

The initial setting is "1. 280". Do not change it.

7.4 Cancelling Registrations

This is the menu for cancelling the various settings that were registered when registering operations in chapter 4.

Operating Procedure **Press the keys "9 → 3" to go to REGISTRATION CANCEL settings**

MENU	
OTHER	
1. INITIAL	>>
2. SYSTEM SELECT	280 ▼
3. REGISTRATION CANCEL>>	
4. MAINTENANCE	>>
5. CHECK	>>
6. LANGUAGE SET	OTHER ▼
7. GYRO SET	0.0
8. DATE/TIME	>>
9. VERSION	>>
0. RETURN	>>

Press the [MENU] key to open the menu.

Turn the [MULTI] knob to move to "9. OTHER". Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "3. REGISTRATION CANCEL". Open the submenu.

Open the following submenus "1 to 3".

MENU	
OTHER	
REGISTRATION CANCEL	
1. USER MENU	>>
2. USER KEY	>>
3. MULTI KEY	>>
0. RETURN	>>

7

7.4.1   User Menus

Operating Procedure **Press the keys "9 → 3 → 1" to go to USER MENU settings**

Open the "3. REGISTRATION CANCEL" menu. Turn the [MULTI] knob to move to "1. USER MENU". Press the [MULTI] knob to open the pulldown menu.

In the example in the diagram on the left, three user menus have been registered. This section explains how to cancel the registration for "3. SIG PROCESS".

Turn the [MULTI] knob to select "3. SIG PROCESS". Press the [MULTI] knob to set it.

As shown in the diagram on the left, the registration for "3" is cancelled.

Press the [MENU] key to close the menu.

To confirm, press the [MENU] key to confirm the menu screen, where 1 and 2 are still registered. However, you can see that the registration for 3 has been cancelled.

The registrations for 1 and 2 are done the same way.

7.4.2   User Defined Keys

Open the "3. REGISTRATION CANCEL" menu. Turn the [MULTI] knob to move to "2. USER KEY". Press the [MULTI] knob to open the pulldown menu.

In the example in the diagram on the left, two user menus have been registered. This section explains how to cancel the registration for "1. DELETE ALL".

Turn the [MULTI] knob to select "1. DELETE ALL". Press the [MULTI] knob to set it.
Press the [MENU] key to close the menu.

The registration of "F1" as a user defined key is cancelled.

7.4.3   Multi Knob Key

Open the "3. REGISTRATION CANCEL" menu. Turn the [MULTI] knob to move to "3. MULTI KEY". Press the [MULTI] knob to open the pulldown menu.

In the example in the diagram on the left, two multi knobs have been registered. This section explains how to cancel the registration for "1. CLUTTER".
Turn the [MULTI] knob to select "1. CLUTTER". Press the [MULTI] knob to set it.
Press the [MENU] key to close the menu.

Only "STC LEVEL" appears, even when the [MULTI] knob is turned while "MENU" is closed.

7.5 Maintenance

If an abnormality occurs with the sonar, execute this maintenance and explain the results to your retailer or service representative. If you retailer or sales representative has preset instructions, follow those instructions.

Operating Procedure **Press the keys "9 → 4" to go to MAINTENANCE settings**
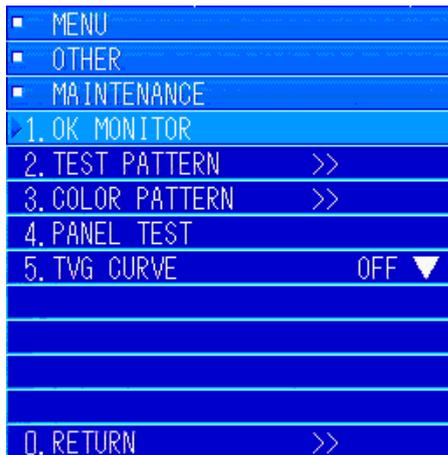
Press the [MENU] key to open the menu.

Turn the [MULTI] knob to move to "9. OTHER". Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "4. MAINTENANCE".

The submenu in the diagram on the left is displayed.

7.5.1 OK Monitor

This is for checking the operations of the transmitter/receiver unit.

Operating Procedure **Press the keys "9 → 4 → 1" to go to OK MONITOR settings**

Turn the [MULTI] knob to select "1. OK MONITOR". Press the [MULTI] knob to set it.

To exit the OK Monitor, press the [CLR] key.

Transmitting and receiving stops while the OK Monitor is displayed. Examples of the display are shown in the next section.
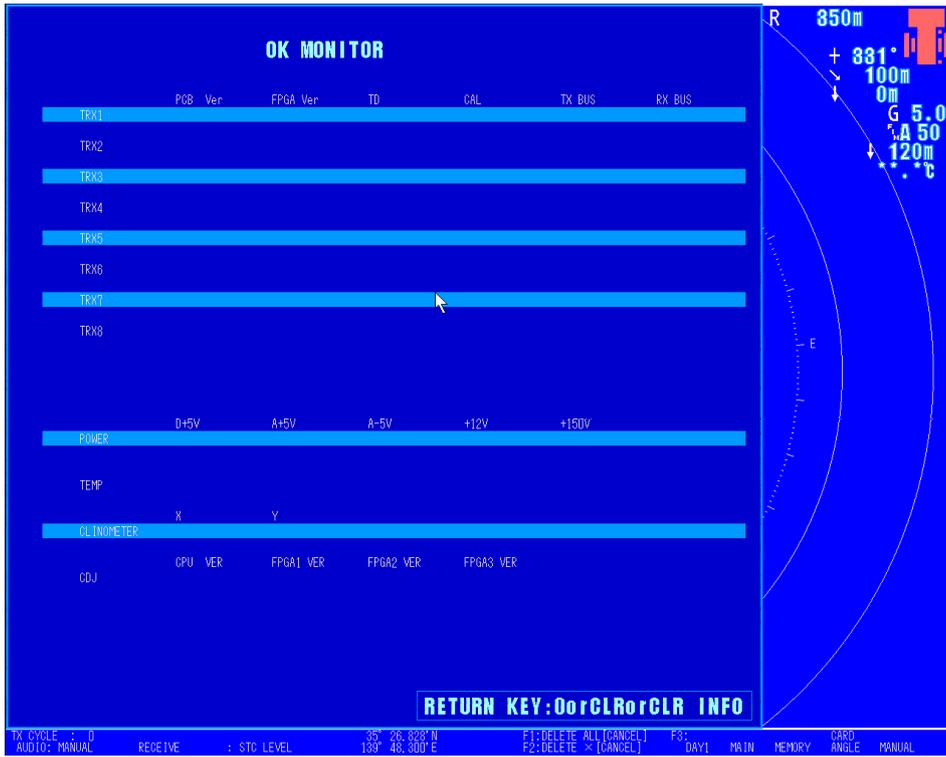
OK MONITOR

	PCB Ver	FPGA Ver	TD	CAL	TX BUS	RX BUS
TRX1	0	Ver0.00	NG	NG	NG	NG
TRX2	0	Ver0.00	NG	NG	NG	NG
TRX3	0	Ver0.00	NG	NG	NG	NG
TRX4	0	Ver0.00	NG	OK	OK	OK
TRX5	0	Ver0.00	NG	OK	OK	OK
TRX6	0	Ver0.00	NG	NG	NG	NG
TRX7	0	Ver0.00	NG	NG	NG	NG
TRX8	0	Ver0.00	NG	NG	NG	NG

	D+5V	A+5V	A-5V	+12V	+150V
POWER	OK	OK	OK	OK	NG

TEMP	28.1	

	X	Y
CLINOMETER	00.0	00.0

	CPU VER	FPGA1 VER	FPGA2 VER	FPGA3 VER
CDJ	Ver9.00	Ver1.04	Ver1.04	Ver1.02

RETURN KEY:0orCLRorCLR INFO

7-33   7 Other Items

7.5.2 Test Pattern

This test pattern is for confirming the operation of the processor unit.

Operating Procedure **Press the keys "9 → 4 → 2" to go to TEST PATTERN settings**

Press the [MENU] key to open the menu.

Turn the [MULTI] knob to move to "9. OTHER". Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "4. MAINTENANCE".

Turn the [MULTI] knob to select "2. TEST PATTERN". Press the [MULTI] knob to open the submenu.

The setting method for doing regular tests is shown below.

"1. CLOCK" is set to internal. This is the initially set value.
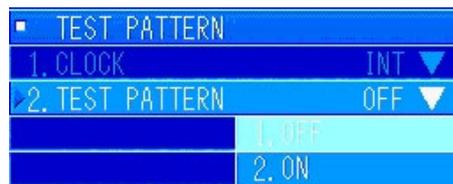
Turn the [MULTI] knob to select "2. TEST PATTERN". Press the [MULTI] knob to display the submenu. Turn the [MULTI] knob to select "2. ON" and press the [MULTI] knob to set it.
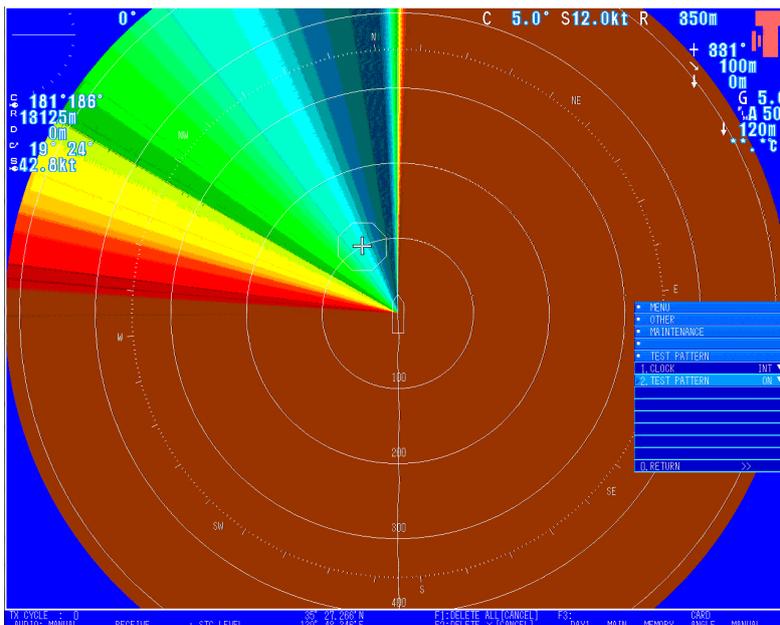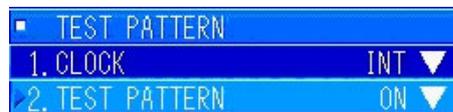
If the test pattern shown in the diagram on the left appears, you can see that the processor unit is operating normally.

7.5.3 Color Pattern

You can check for malfunctions on the monitor (display unit) and of the image output of the processor unit.

Operating Procedure **Press the keys "9 → 4 → 3 to go to COLOR PATTERN settings**
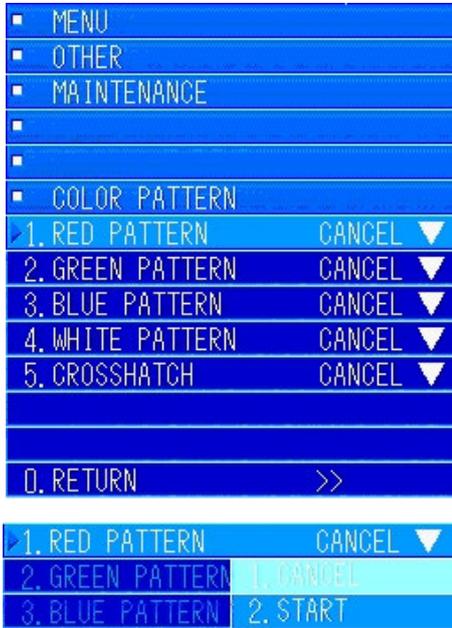
Press the [MENU] key to open the menu.

Turn the [MULTI] knob to move to "9. OTHER". Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "4. MAINTENANCE".

Turn the [MULTI] knob to select "3. COLOR PATTERN". Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to select a color pattern from 1 through 5. You can confirm the display of each color.

As an example, you can display the entire screen as red. Use the [MULTI] knob to select "1. RED PATTERN". Press the [MULTI] knob to select it. A submenu opens. Turn the [MULTI] knob to select "2. START". Press the [MULTI] knob to execute it.

The entire screen is red, as shown below.
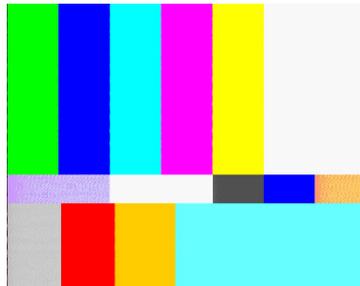
Press the [CLR] key to cancel it and return to the "COLOR PATTERN" menu.

7.5.4 Panel Test

You can check the on/off operation of the keys on the control panel.

Operating Procedure **Press the keys "9 → 4 → 4" to go to PANEL TEST settings**

Press the [MENU] key to open the menu.

Turn the [MULTI] knob to move to "9. OTHER". Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "4. MAINTENANCE".

Turn the [MULTI] knob to select "4. PANEL TEST". Press the [MULTI] knob to open the "PANEL TEST".

Turn the [MULTI] knob to select "PANEL-1".
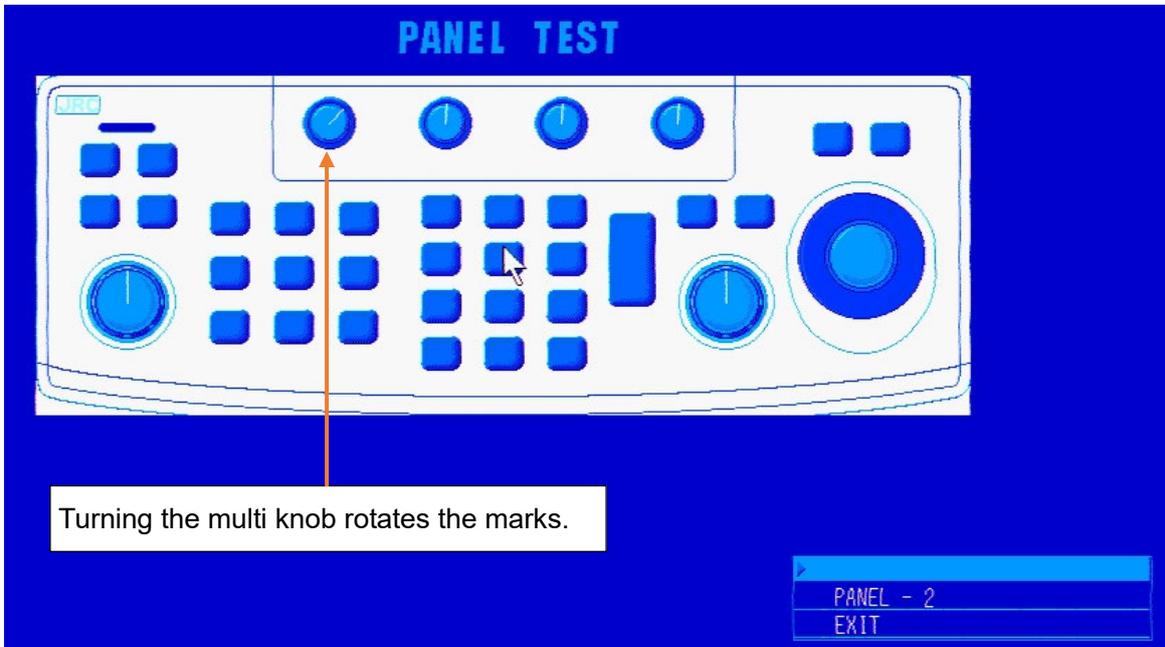
Turning the multi knob rotates the marks.
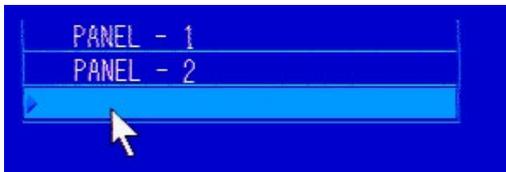
To exit, move the cursor to "EXIT" and press the [ENT] key to return to the menu.

7.5.5 TVG Curve

This menu is for confirming the STC+TVG curves of the receiver unit while the transmitter/receiver unit is transmitting and receiving.

Operating Procedure **Press the keys "9 → 4 → 5" to go to TVG CURVE settings**

Press the [MENU] key to open the menu.

Turn the [MULTI] knob to move to "9. OTHER". Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "4. MAINTENANCE". Turn the [MULTI] knob to move to "5. TVG CURVE". Press the [MULTI] knob to set it.

The pulldown menu shown in the diagram on the left is displayed. Turn the [MULTI] knob to select "2. ON".

Press the [MULTI] knob to set it and display the TVG curve on top of the sonar image.

Refer to the following diagram
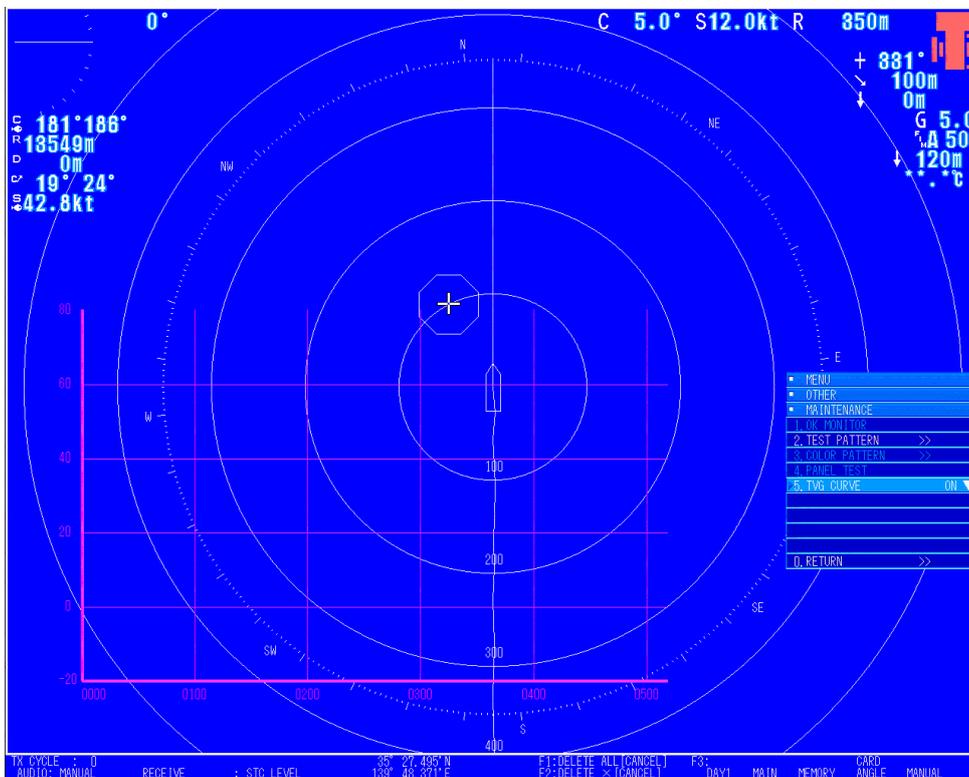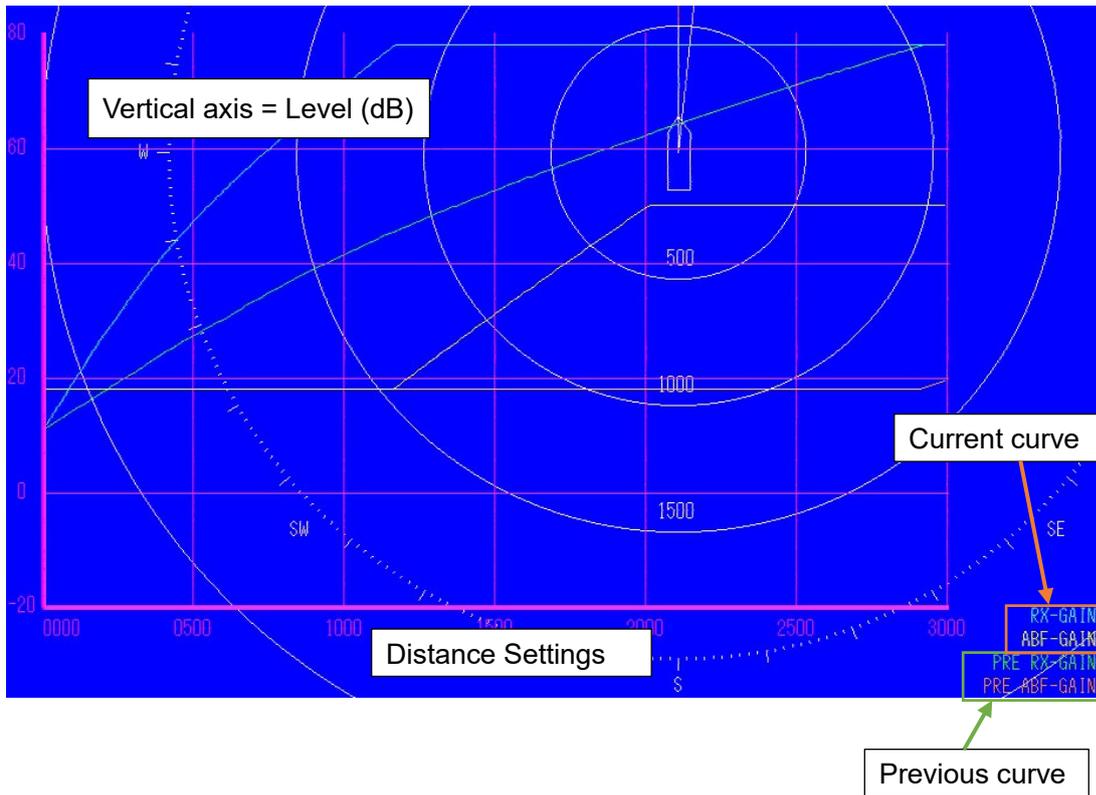
The TVG curve is used to adjust the optimum curve, from far distances to close distances.

To close this menu, open the menu for TVG curve and set "HIDE".

7.6 Checks

```
■  MENU
■  OTHER
1. INITIAL              >>
2. SYSTEM SELECT     280 ▼
3. REGISTRATION CANCEL>>
4. MAINTENANCE         >>
5. CHECK               >>
6. LANGUAGE SET    OTHER ▼
7. GYRO SET        0.0
8. DATE/TIME           >>
9. VERSION             >>

0. RETURN              >>
```

Precautions

The CHECK item is an item that is set for scalability.

Do not operate this item.

7.6.1 Check Mode

```
■  MENU
■  OTHER
■  CHECK
1. CHECK MODE        OFF ▼
2. TEST RING No.    8
3. REAERVATION         >>










0. RETURN              >>
```

```
1. CHECK MODE        OFF ▼
2. TEST RING No.    1. OFF
3. REAERVATION      2. SCAN STOP
                    3. TD TEST
```

7

7.6.2 Test Ring Number

```
■ CHECK
▶1.CHECK MODE      TD TEST ▼
 2.TEST RING No.    8
 3.REAERVATION      >>
```

```
▶2.TEST RING No.    8
```
```
▶2.TEST RING No.    8          1
```
```
▶2.TEST RING No.    8              1
```
```
▶2.TEST RING No.    1             16
```

7.6.3 Reservation Settings

```
■ CHECK
 1.CHECK MODE      TD TEST ▼
 2.TEST RING No.    8
▶3.REAERVATION      >>
```

```
■ REAERVATION
▶1.SETTING 1       0
 2.SETTING 2       0
 3.SETTING 3       0
 4.SETTING 4       1
 5.SETTING 5       0
 6.SETTING 6       0
 7.SETTING 7       0
 8.SETTING 8       0
 9.NEXT             >>
 0.RETURN           >>
```

```
■ REAERVATION
■ NEXT
▶1.SETTING 9       0
 2.SETTING 10      0
```

7.7 Language Selection

Operating Procedure **Press the keys "9 → 6" to go to LANGUAGE SET settings**

Press the [MENU] key to open the menu.

Turn the [MULTI] knob to move to "9. OTHER". Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "6. LANGUAGE SET".

Pressing the [MULTI] knob displays the pulldown menu. The "1. ENGLISH", "2. SPANISH", 3. , 4. , 5. , 6. , 7. , and "8. NEXT" menus appear. (Diagram ①)

No language is set at the factory.

The menu that is set in the "LANGUAGE SET" menu at startup is set.

To set Thai or Spanish, do the setting from "6. LANGUAGE SET".

Selecting "8. NEXT" in the menu in diagram ① displays the pulldown menu shown in diagram ②.

Selecting "6. BACK" in the menu in diagram ② displays diagram ①.

You can select a language from the menus in diagrams ① and ②.
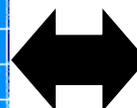
Diagram ①

Diagram ②

Startup Menu after Shipping from Factory

Align the cursor and press the [ENT] key.

You can select Japanese by pressing the [2] key.

7.8 Gyro Settings

To use the gyro I/F integrated into the processor unit, you must set the gyro.

Open this menu to do the settings. There is no problem in confirming the values when the sonar is started, once it is set, if you do not turn off the power to the gyro that is connected.

If slippage occurs, do the settings on this menu.

Operating Procedure **Press the keys "9 → 7" to go to GYRO SET settings**

Press the [MENU] key to open the menu.

Turn the [MULTI] knob to move to "9. OTHER". Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "7. GYRO SET".

Press the [MULTI] knob to open the menu for inputting values. Turn the [MULTI] knob to select the value of the gyro that is connected. Press the [MULTI] knob to set it.

7.9 Time Setting

```
■  MENU
■  OTHER
1. INITIAL              >>
2. SYSTEM SELECT      280 ▼
3. REGISTRATION CANCEL>>
4. MAINTENANCE          >>
5. CHECK                >>
6. LANGUAGE SET      OTHER ▼
7. GYRO SET           0.0
>8. DATE/TIME           >>
9. VERSION             >>

0. RETURN               >>
```

Press the [MENU] key to open the menu.

Turn the [MULTI] knob to move to "9. OTHER". Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "8. DATE/TIME". Press the [MULTI] knob to open the submenu and do time and date settings.

7.9.1   Time Setting

```
■  MENU
■  OTHER
■  DATE/TIME
>1. TIME SET
2. DATE SET      yyyy-mm-dd ▼




0. RETURN               >>
```

Move to "DATE/TIME". Press the [MULTI] knob to open the submenu. Turn the [MULTI] knob to move to "1. TIME SET" and a specialized menu opens.

In the position you want to change, press the [MULTI] knob; press it until the white frame moves. After the frame moves, turn the [MULTI] knob to set a value.

To finish, move the cursor to "SET" and press the [ENT] key to return to the menu.

```
TIME  00 : 00 : 00
      ▲▼  ▲▼  ▲▼

DATE  04 / 01 / 2016
      ▲▼  ▲▼    ▲▼

GPS  OFF    DIFF  00
     ▲▼          ▲▼

        CNCL  SET
```

```
TIME  00 : 00 : 00
      ▲▼  ▲▼  ▲▼
```

```
TIME  10 : 00 : 00
      ▲▼  ▲▼  ▲▼
```

```
TIME  10 : 00 : 00
      ▲▼  ▲▼  ▲▼
```

```
DATE  04 / 01 / 2016
      ▲▼  ▲▼    ▲▼
```

```
■  MENU
■  OTHER
■  DATE/TIME
>1. TIME SET
```
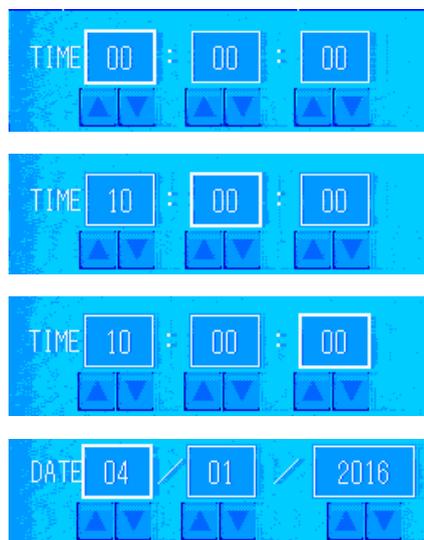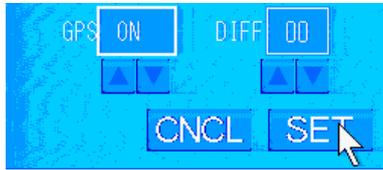
If a GPS is connected and ZDA is being input, press the [MULTI] key to move to the GPS item. Turn the [MULTI] key to set "ON", align the cursor with "SET". Press the [ENT] key to set it.

7.9.2   Date Settings

Operating Procedure Press the keys "9 → 8 → 2" to go to DATE SET settings
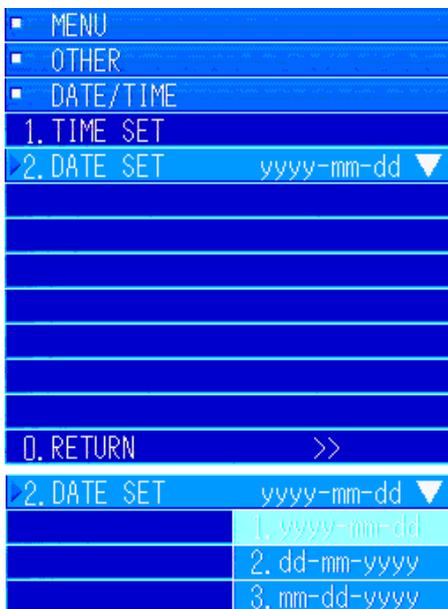
Move to "DATE/TIME". Press the [MULTI] knob to open the submenu. Press the [MULTI] knob to select "2. DATE SET". Press the [MULTI] knob to open the pulldown menu.

Turn the [MULTI] knob to the year, month, and date that you want to display and select them. Press the [MULTI] knob to set them.

7
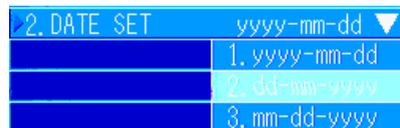
7.10 Version Information

Press the keys "9 → 9" to go to VERSION INFO settings

Press the [MENU] key to open the menu.

Turn the [MULTI] knob to move to "9. OTHER". Press the [MULTI] knob to open the submenu.

Turn the [MULTI] knob to move to "9. VERSION".

8   Maintenance and inspections

Contents

8

8.1   General Maintenance

> # ⚠ Warning
>
> 🚫 **Absolutely do not inspect or repair the internal parts by yourself.**
> **Inspections and repairs done by people other than specialized mechanics may cause fires or electric shocks.**
> **Ask our sales department or a representative, branch office, branch store, or business office near you for inspections and repairs of the internal parts.**
>
> ❗ **Be sure to turn off the main power supply when doing maintenance.**
> **If you do not turn off the power, it may cause electric shocks.**
>
> 🚫 **When cleaning the display screen, do not wipe it hard with a dry cloth or use gasoline or thinners.**
> **Doing so may damage the surface.**

You must do the following maintenance to operate the sonar in good condition. Because doing maintenance often decreases breakdowns, we recommend doing routine maintenance regularly.

The following points are general maintenance common to all equipment.

Clean the equipment.

Clean off as much dust, dirt, seawater, etc., stuck to the housing as possible. When cleaning, use a dry cloth. Especially clean the vents well with a brush so that they maintain good airflow.

If dust gets stuck to the display screen, its transparency will worsen and images will be dark. When cleaning, wipe with a soft cloth (flannel or cotton). Do not wipe it hard with a dry cloth or use gasoline or thinners.

8.2 Handling and Maintenance of the Hoisting Device

8.2.1 Explanation of the Parts of the Hoisting Device

①: Relay box

②: Slot for the manual handle

③: Hoisting motor

④: Hoisting pipe

⑤: Gland clamp

⑥: Brake knob

⑦: Insertion cap for the manual handle

⑧: Connection cable for the transducer

⑨: Power switch
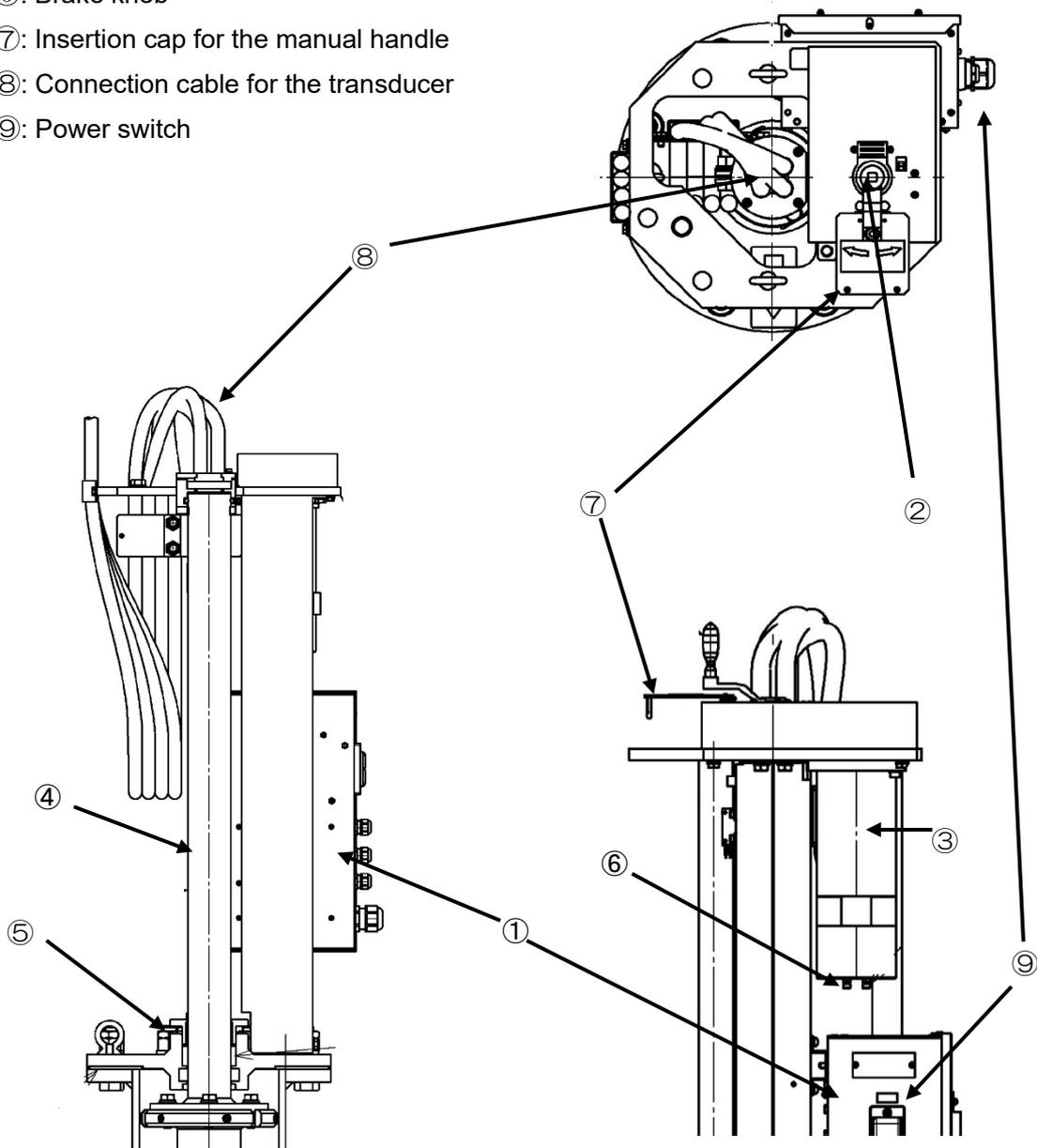
①: Relay box   • Stores electrical parts and the control board

②: Manual handle   • Use only when doing hoisting operations without the power to the hoisting device turned on.

          To use, open the insertion cap for the manual handle.

Precautions

●   The brake inside the motor locks the device when the hoisting motor is stopped.

If you do not release the brake according to the instructions on the precautions plate on the

③   hoisting motor, the manual handle does not rotate.

③: Hoisting motor   • Uses a 100 W, 24 VDC brake with a gear motor. The optimal adjusting current value of the thermal relay for the motor is approximately 6.6 A. Be aware that the thermal relay does not operate as a breaker when the current is unstable.

          Additionally, the thermal relay is set to automatic recovery.

④: Hoisting pipe   • This is the central pipe for the hoisting part. The cable for the transducer is stored inside.

⑤: Gland clamp   • V packing for waterproofing from the seawater is inserted under this gland. Water leaks can occur due to friction, etc., if you use it for long periods of time. If this happens, temporarily loosen the hex socket head cap bolt. Adjust the tightened height by removing spacers for adjusting the height, and then tighten the gland tightening bolt. Be aware that overtightening causes hoisting operations to drag. Remove the same number and type of spacers so that the height stays even.

⑥: Brake knob   • This is the screw for mechanically releasing the brake without energizing the hoisting motor. You must be sure to release the brake part if you are using the manual handle.

See the procedure for manual hoisting.

Procedure for Manual Hoisting

1. For your safety, do this procedure after cutting the power to the hoisting motor.

2. To release the brake, tighten the two bolts on ⑥ Then, after releasing the brake, begin hoisting.

3. After use, completely cover the slot using the insertion cap for the manual hole. Then turn on the power.

4. After using the manual handle, place it in the manual handle bag and keep it in a safe place.

8

⑦ : Insertion cap for the manual handle

- This is a cap that covers the hole in which to insert the manual handle. If the cover is open, the safety equipment activates and the power does not turn on, even if the power switch is on.

⑧: Connection cable for the transducer

- This is a cable that sends and receives signals to and from the transducer. Be careful not to damage it.

⑨: Power switch

- This is the main power supply for the hoisting device. Use it as an emergency stop switch if there are any abnormalities.

8.2.2 Explanation of the Parts of the Relay Box

Power switch

Switch for manual operation
Left side: remote
Right side: local

Thermal relay

Switch to retract the hoisting device
Left side: extend
Right side: retract

Warning buzzer
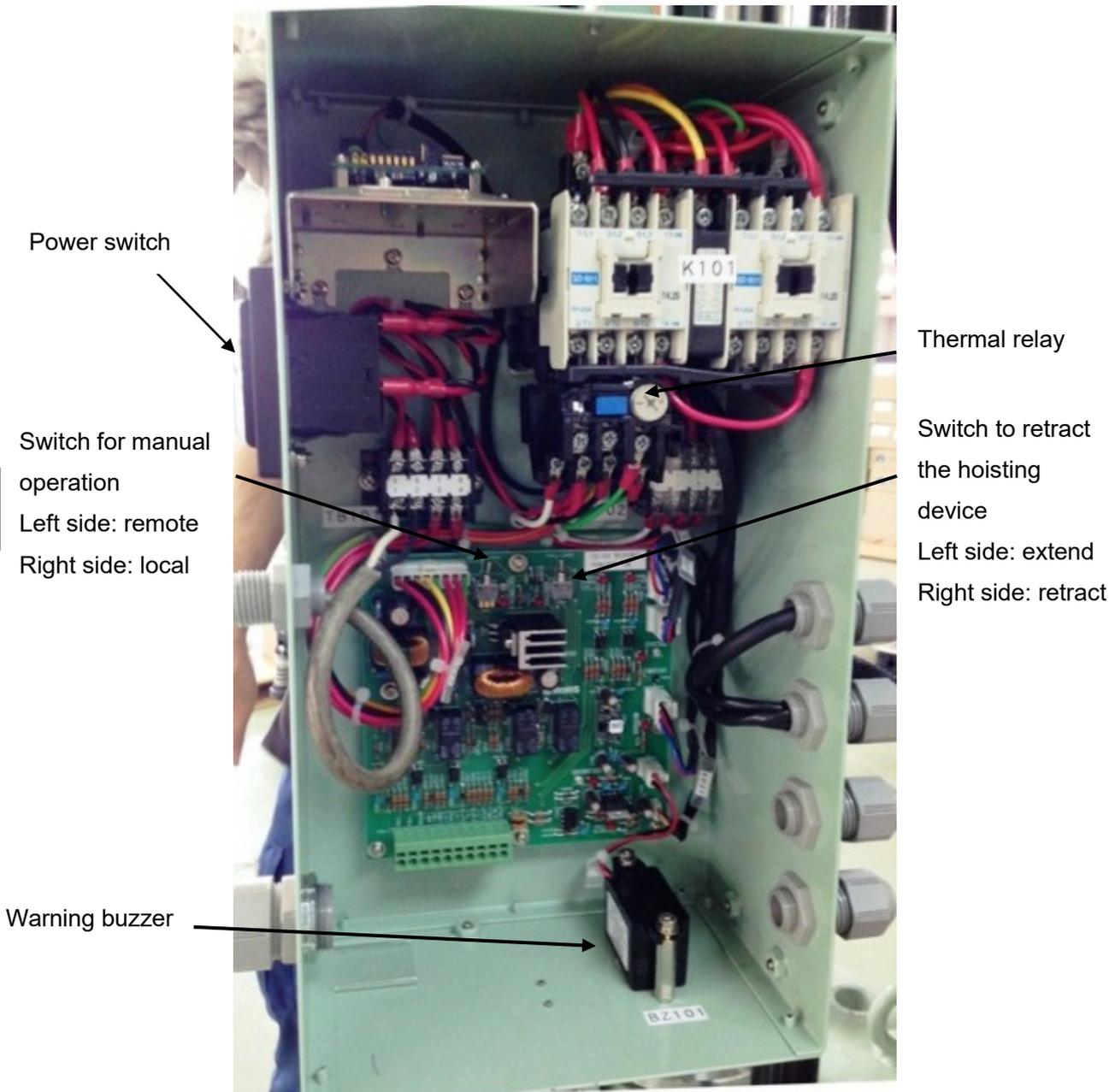
8.2.3 Maintenance and Routines for the Hoisting Device

Gland Clamp

If the hoisting device has been used for a long time and water is leaking from around the gland clamp of the hoisting shaft, do the following procedures for tightening.
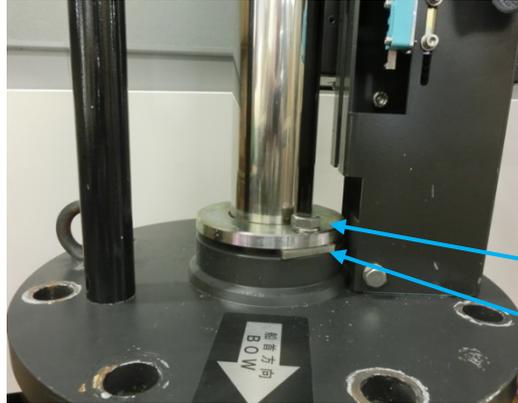
1. Loosen the gland clamp's bolts, remove the shims from two places, and then tighten the V packing.

Note: Remove the shims uniformly.

Tightening bolts (2 places)

Shim (2 places)

Periodically clean the hoisting shaft, otherwise the effectiveness of waterproofing declines if it is dirty.

Greasing

Periodically (about every 6 months) apply grease to the moving parts (hoisting shaft, gears, ball screws, etc.).

(Recommended grease: Mobilux-EP2)

Zinc Plate for Preventing Electrolytic Corrosion

Replace the zinc plate, which is for preventing electrolytic corrosion to the hoisting device, about once a year.

(Aluminum anode plate: AB-1 ALAP)

8

8

9 Malfunctions and after-sales service

Contents

9

9.1 Checklist of Hoisting Device Troubles

1. Put the Remote/Local switch inside the hoisting device's relay box to Local.

Precaution) This indicates that the hoisting device is operating manually (Local mode).

If there are no problems with manual operations, and the operations on the indicator (Remote/Local switch is set to Auto) are abnormal, check the cable (CFQ-5552) and the processor.

2. Hoisting Operations

Condition	Description of Check	Location/Other
A) Does not hoist, even if the SHED or FALL switch is pressed (Electromagnetic switch for hoisting also does not work)	1 Is the power on? Ø1, 24 VSC: Check on the terminal block	Turn on the power
	2 Does the CD relay for hoisting on the control board work? Yes ⟶ Coil side of the electromagnetic switch Does the LED (12 VDC) light?	
	3 Is the polarity of the 24 VDC wiring normal?	Switch the two wires
	4 Is the insertion cap for the manual handle open?	
	Does the thermal relay work?	Refer to item C)
	6 Is the limit switch for the upper limit (or lower limit) malfunctioning? (Does it make a noise if you push it with your hand?)	Adjust the limit switch
B) The electromagnetic switch works, but the device does not hoist.	Is there an open circuit in the wiring (external wiring) for the motor?	
	2 Is the front of the motor too hot to touch (about 50°C)? Cannot touch ⟶ Do a thermal relay check	Refer to item C)

9

Condition	Description of Check	Location/Other
C) The thermal relay activates when it moves a little (or does not move).	1 Do the setting values for the thermal relay meet the standards for the motor? (Rated current on the motor nameplate) Precaution) Do not set values larger than the rated current for the motor. Doing so may burn out the motor.	
	2 Are the drive parts (gear) rusted or extremely bent? Does the motor rotate by itself (without the gear)? Does not rotate ⟶	Replace motor
	3 Does the manual handle move? (While ship is stopped)	Refer to [Procedure for Operating the Manual Handle]
	Movement is sluggish ⟶	Slightly loosen the gland and try moving the manual handle again.
	Does not budge at all ⟶	You can assume that the pipe is bent (accident at sea).
D) It overruns.	1 Is the motor's brake normal? (Has it been released?)	Refer to [Procedure for Operating the Manual Handle]
	2 Is the limit switch for the upper limit (or lower limit) operating correctly? (Is there any swing?)	Adjust the limit switch

9.2 Warning Display Settings

**You can check if there are any abnormalities by going to [OTHER] →
[MAINTENANCE].**

Checking OK MONITOR
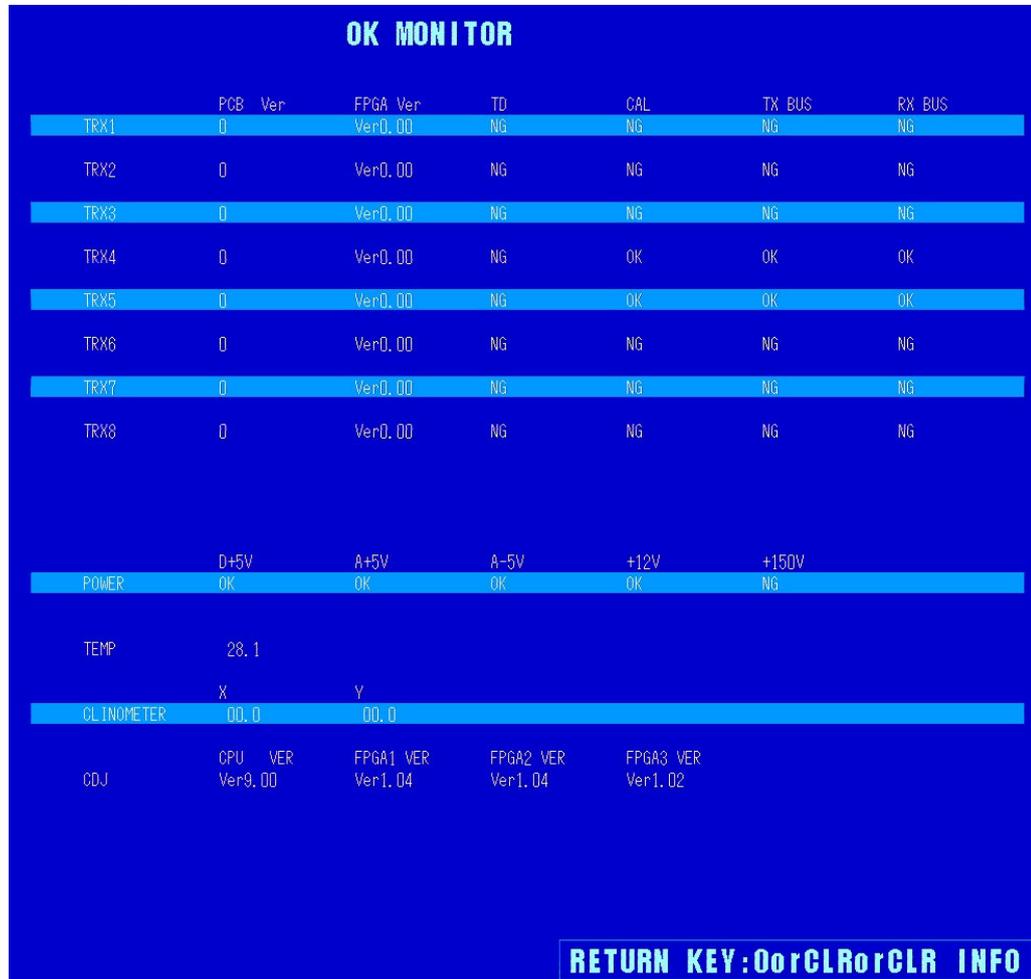
Checking the Test Pattern

9
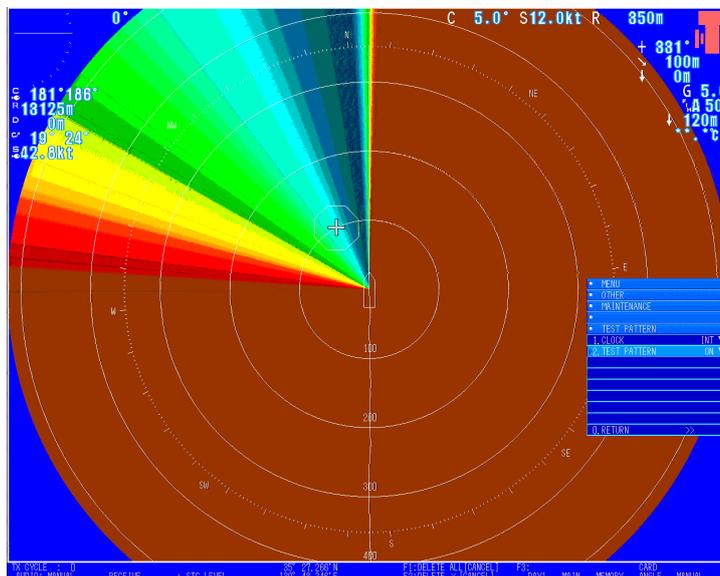
10   Disposal

Contents

10

10.1 Disposing of the Device

When disposing of the device, do the process according to your local regulations.

For details, ask the retailer from which you bought the device, our office nearest you, or your local government.
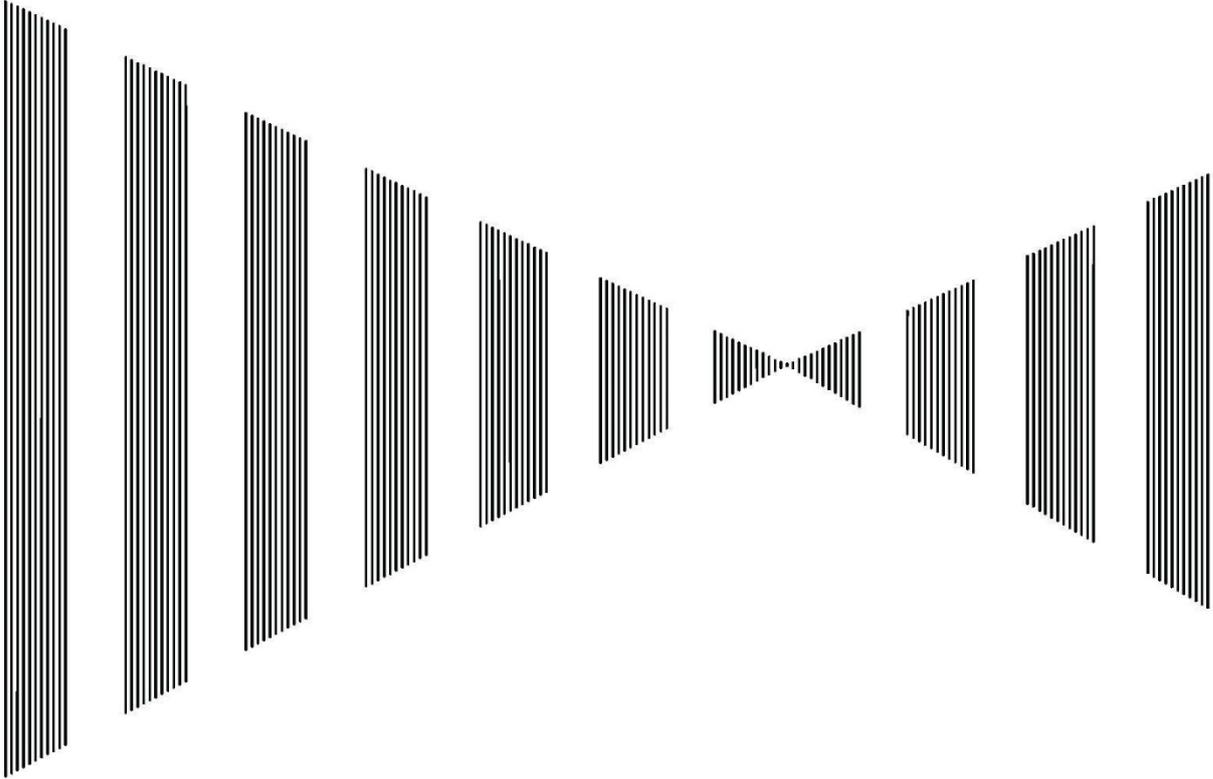
10.2 Disposing of the Battery

When disposing of the lithium battery built into this device, cover the battery's "+" and "-" terminal ends using cellophane tape, and then dispose of it.

Collection methods vary according to the local authorities. Follow their instructions for the way to dispose of the battery.

10

10

11 Specifications

Contents

11
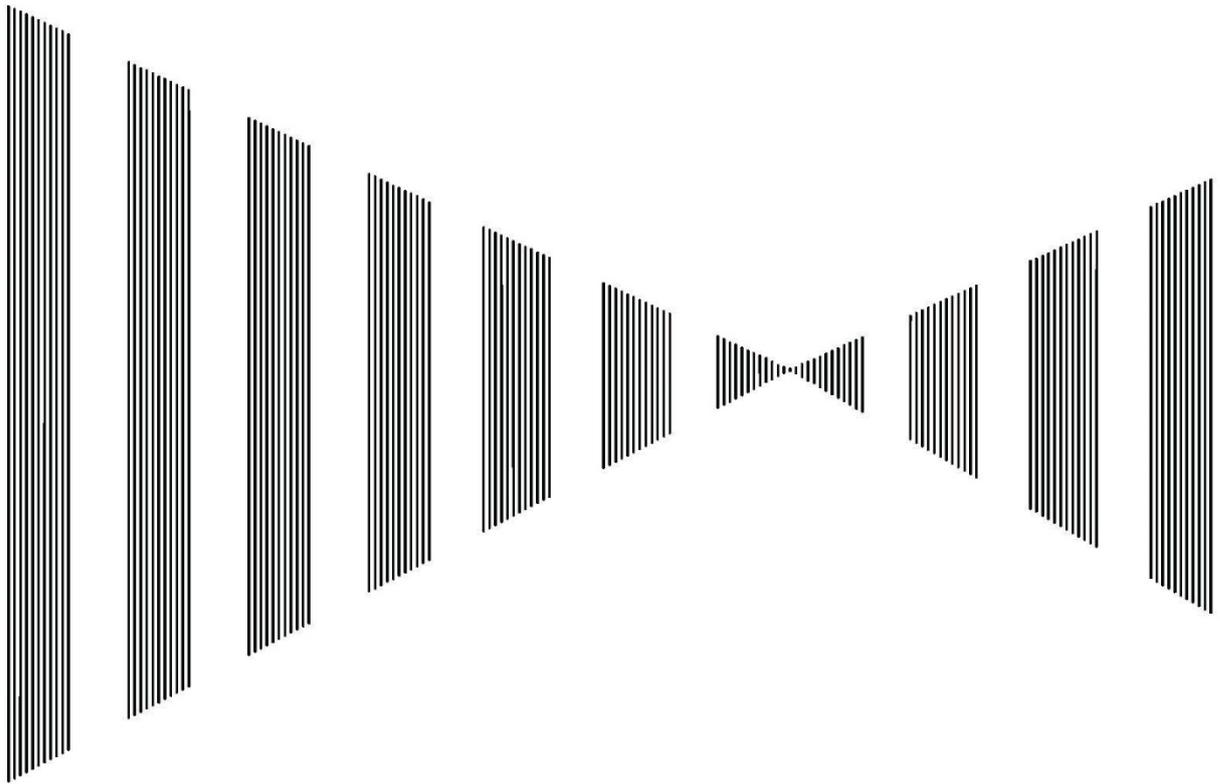
11.1 Specifications

11.1.1 Fundamental Abilities

Major division		Item	Details	Comments
1. Display				
	-1	LCD size	19 inches	
	-2	Pixel count	SXGA (1280×1024)	
	-3	Display color	Sonar imaging 32 colors, user settings possible	
	-4	Display motion	Head up, nose up	*1
	-5	Display mode	Full screen, normal screen Off center = approx. 1.5 × normal range (max. less than 5000 m)	
	-6	Split screen mode	Audio split screen, fish finder split screen	*2
	-7	Information display	Ship information (latitude and longitude, speed relative to ground, speed relative to water, date and time) Water temperature and water depth information (graph) Current display (5 layers, graph, values) Net depth meter (4 points, graph, values) Fish school information (histogram) Event information (5 points, direction, distance)	*3
	-8	Added features	5 types of fish image settings, interference elimination, clutter, signal processing, automatic elevation controls, fish school alarm, and auto follow for fish schools	
2. Range			16 preset ranges Select from 24 types from 100 m to 2000 m 4 types of preset ranges (changeable)	
3. Audio output		800 Hz/2W	Load resistance 4Ω, manual rotation/automatic oscillating sound	
4. Transmission				
	-1	Transmission mode	OMNI (full-perimeter transmission): pulse width modulation (PWM) D previously amplified	

11

Major division	Item		Details	Comments
	-2	Transmission frequency	62 kHz	
	-3	Pulse width of transmission	0.4 ms to 36 ms (range link) (function for manual change available)	
	-4	Adjustment for rocking	±20°	
	-5	Transmission power reduction	11 levels (switch manually)	
5. Reception				
	-1	Transmission mode	Straight amplifier, full digital beam form	
	-2	Adjustment for rocking	±20°	
	-3	Other functions	RCG, AGC, TVG	
6. Tilt range			-5° to +60°	
7. Hoisting device				
	-1	Stroke	600 mm	
	-2	Time for vertical operations	Under 20 seconds	
	-3	Resistance to the speed of the ship	Maximum 18 KN (16 KN during vertical operations) Function for auto retraction triggered by the speed of the ship included	
8. Power source				
	-1	Input voltage range	24 VDC (20.4 DC × 31.2 V)	
	-2	Average power consumption	0.5 kW	
	-3	Maximum power consumption	30 A (when beginning to hoist)	
9. Compass safe distance				
	-1	Processor unit	1.2 m (standard compass), 0.8 m (steering compass)	
	-2	Keyboard	0.4 m (standard compass), 0.2 m (steering compass)	

*1, *2, and *3: Connection to sensors needed for signals is required. (See the specifications for input/output signals.)

11.1.2 Machine Specifications

Name of device	Item	Comments
Display	Exterior: 429 × 382 × 74.5 mm (width, height, depth); weight: 6 kg; mount: embedded type	
Control panel	Exterior: 360 × 132 × 59 mm (width, height, depth); weight: 1.3 kg; mount: installation type	Standard
Processor	Exterior: 396 × 488 × 264.5 mm (width, height, depth); weight: 15 kg; mount: installation type	Standard
Transmitter/receiver unit	Exterior: 436 × 487 × 344 (width, height, depth); weight: 34 kg; mount: wall-mounted type	Standard
Hoisting device	Exterior: according to diagram of exterior view; weight: 110 kg	

11

11.2 Input/Output Signals

NME A0183 signal (Versions: Ver. 1.5 to 3.01)

NAV1 to NAV4 are required for connections. The optional Gyro I/F is required for logs.

Connection equipment:

Compass, water depth/water temperature meter, tidal current meter, GPS, log

The written order indicates the order of priority to be selected.

Direction: 1 second pulse

$__HDT

$__HDG

$__HDM

$__VHW

JRC-specific format (when optional Gyro I/F is connected)

Course: 1 second pulse

$__RMC

$__RMA

$__VTG

Depth: 1 second pulse

$__DPT

$__DBS, $__DBK, $__DBT

Water temperature: 1 second pulse

$__MTW

Speed over ground: 1 second pulse

$__RMC

$__RMA

$__VTG

Speed relative to water: 1 second pulse

$__VHW

JRC-specific format (when optional Gyro I/F is connected)

Tidal current: 1 second pulse (max. 5 layers)

$__CUR

11

Latitude and longitude: 1 second pulse

$__GGA

$__RMC

$__RMA

$__GNS

$__GLL

Month and day: 1 second pulse

$__RMC

$__RMA

$__VTG

Time: 1 second pulse

$__ZDA

$__RMC

$__GNC

$__GLL

Correction for time: 1 second pulse

$__ZDA

Fish Finder (2 channels)

Trigger: unipolar, bipolar, edge sense, + 5 V/15 mA

Fish finder signal: 0 to 5 V $_{0\ to\ P}$

Net depth meters (max. 4 connections possible)

Trigger input: bipolar, edge sense, + 12 V/15 mA

Trigger output: positive polarity, 5 V/5 mA

Depth signal: bipolar, edge sense, + 12 V/15 mA

11

12 Other

Contents

12

12.1　List of Menus

The item which can be registered. : <mark>USER SET</mark> , <mark>FUNCTION KEY</mark> , <mark>MULTI CONTROL</mark> <mark>NOT OPERATION</mark>

MENU LIST　－: Without the setting memory items. X : The established menu　■ : not Fish image SW.

MENU	SUB MENU LIST				MENU ITIM	SETTING RANGE or ITEM SET	FISH IMAGESW STANDARD SET VALUE				
No.	1	2	3	4		RENGE/STEP	A	B	C	D	E
1					USER SET No.1	Shipment from factory isn't set.	X	X	X	X	X
2					USER SET No.2	Shipment from factory isn't set.	X	X	X	X	X
3					USER SET No.3	Shipment from factory isn't set.	X	X	X	X	X
4					USER SET No.4	Shipment from factory isn't set.	X	X	X	X	X
5					USER SET No.5	Shipment from factory isn't set.	X	X	X	X	X
6					USER SET No.6	Shipment from factory isn't set.	X	X	X	X	X
7					FISH IMAGE						
	1				RECEIVE						
		1			CLUTTER	0〜1 0/1　Step	3	4	2	3	3
		2			STC LEVEL	0.0〜10.0/0.1 Step	7.0	9.0	3.0	7.0	7.0
		3			H BEAM	0〜15/1　Step	5	5	5	5	5
		4			V BEAM	0〜15/1　Step	0	1	0	0	0
	2				TX						
		1			TX POWER	0〜10/1　Step	10	10	10	10	10
		2			PLUSE LENGTH	1〜20/1　Step	20	20	20	3	20
		3			TX MODE	OMNI/RDT	OMNI	OMNI	OMNI	OMNI	OMNI
		4			V BEAM	0〜3/1　Step	0	0	0	0	0
		5			SHADING	0〜3/1　Step	0	0	0	0	0
		6			TX PRR	0〜100/1　Step	0	0	0	0	0
	3				SIG PROCESS						
		1			INTEFERENCE	0〜20/1　Step	2	2	2	2	4
		2			SIG PROCESS P	0〜20/1　Step	5	5	5	5	5
		3			SIG PROCESS R	0〜20/1　Step	5	20	5	5	5
		4			SIG PROCESS D	0〜20/1　Step	5	5	5	5	5
		5			SIG PROCESS C	0〜20/1　Step	0	0	0	0	0
	4				TECHNOLOG SET						
		1			TVG						
			1		MIN VR	0〜255/1　Step	128	128	128	128	128
			2		GOS	0〜15/1　Step	1	5	0	1	1
			3		ABFG	0〜15/1　Step	8	9	8	8	8
			4		MAX GAIN	0〜255/1　Step	255	255	255	255	255
			5		RX VR	0〜255/1　Step	255	255	255	255	255
			6		TVG（MID）	0/10/20/30/40	20	30	20	20	20
			7		TVG（FAR）	0/10/20/30/40	30	30	30	30	30

12

The item which can be registered. : USER SET , FUNCTION KEY , MULTI CONTROL, NOT OPERATION

MENU No.	SUB MENU LIST				MENU ITIM	SETTING RANGE or ITEM SET RENGE/STEP	FISH IMAGESW STANDARD SET VALUE				
	1	2	3	4			A	B	C	D	E
7	4				TECHNOLOG SET						
		2			AGC						
			1		AGC MODE	OFF/RCG/AGC/RCG+AGC	RCG	RCG	RCC	RCG	RCG
			2		RCG LEVEL	0~255/1 Step	128	100	128	128	128
			3		SCAN AGC LEVEL	0~255/1 Step	64	64	64	64	64
			4		SLOW AGC ON/OFF	OFF/ON	ON	ON	ON	ON	ON
			5		FAST AGC ON/OFF	OFF/ON	OFF	OFF	OFF	OFF	OFF
			6		SLOW AGC LEVEL	0~255/1 Step	64	45	64	64	64
			7		FAST AGC LEVEL	0~255/1 Step	64	64	64	64	64
		3			RX						
			1		RX CLUTTER	0~255/1 Step	O	O	O	O	O
			2		RX WIDTH	0~255/1 Step	O	O	O	O	O
			3		STC RANGE	0~1000/1 Step	160	160	160	160	160
			4		TVG RANGE	0~1000/1 Step	320	320	320	320	320
		4			TX/RX CALIB						
			1		STABILIZE	OFF/ON	ON	ON	ON	ON	ON
			2		ABS ATT	0~15/1 Step	8	8	8	8	8
			3		GAIN MODE SW	LOW/HIGH	HIGH	HIGH	HIGH	HIGH	HIGH
			4		GAIN RANGE SW	0~50/1 Step	O	O	O	O	O
			5		FILTER SHIFT	OFF/-1/+1	OFF	OFF	OFF	OFF	OFF
			6		FREQ SHIFT	OFF/-2/-1/+1/+2	OFF	OFF	OFF	OFF	OFF
			7		FILTER BAND	0~15/1 Step	O	O	O	O	O
		5			ADC	0~7/1 Step	7	5	3	7	3
8					OPERATION						
	1				MODE SET						
		1			AUTO TX	OFF/ON	ON	ON	ON	ON	ON
		2			TX	OFF/ON	OFF	OFF	OFF	OFF	OFF
		3			SCREEN MEMORY						
			1		WRITE FILE	CANCEL/CARD WRITE	CANCEL	CANSE	CANSE	CANSE	CANSE
			2		READ FILE	CANCEL/PLAYBACK	-	-	-	-	-
			3		DELETE FILE	CANCEL/DELETE	-	-	-	-	-
			4		REPLAY	OFF/REPLAY					

MENU LIST   - : Without the setting memory items. X : The established menu   ■ : not Fish image SW.

12

The item which can be registered. : USER SET , FUNCTION KEY , MULTI CONTROL:NOT OPERATION

MENU LIST   - : Without the setting memory items. X : The established menu   ■ : not Fish image SW.

MENU	SUB MENU LIST				MENU ITIM	SETTING RANGE or ITEM	FISH IMAGESW STANDARD SET VALUE				
No.	1	2	3	4		SET RENGE/STEP	A	B	C	D	E
8	1				MODE SET						
		4			ALARM						
			1		ALARM	OFF/ON	OFF	OFF	OFF	OFF	OFF
			2		ANGLE	30°/90°/180°	90°	90°	90°	90°	90°
			3		DISTANCE	50m~5000m/1m Step	300	300	300	300	300
			4		AREA SIZE	SMALL/MID/LARGE	MID	MID	MID	MID	MID
			5		LEVEL	0~31/1 Step	15	15	15	15	15
			6		AMOUNT	XS/S/M/L	S	S	S	S	S
			7		LOST COUNT	LITTLE/MID/MUCH/CONTINUOUS	LITTLE	LITTLE	LITTLE	LITTLE	LITTLE
		5			SETTING CARD						
			1		SETTING READ FILE						
				1	FILE 1	FILE No/CANCEL/READ	-	-	-	-	-
				2	FILE 2	FILE No/CANCEL/READ	-	-	-	-	-
				3	FILE 3	FILE No/CANCEL/READ	-	-	-	-	-
				4	FILE 4	FILE No/CANCEL/READ	-	-	-	-	-
				5	FILE 5	FILE No/CANCEL/READ	-	-	-	-	-
				6	FILE 6	FILE No/CANCEL/READ	-	-	-	-	-
				7	FILE 7	FILE No/CANCEL/READ	-	-	-	-	-
				8	FILE 8	FILE No/CANCEL/READ	-	-	-	-	-
			2		SETTING WRITE FILE						
				1	SETTING WRITE	CANCEL/WRITE	CANCEL	CANCEL	CANCEL	CANCEL	CANCEL
			3		SETTING DEL FILE						
				1	FILE 1	CANCE/DELETEL	-	-	-	-	-
				2	FILE 2	CANCE/DELETEL	-	-	-	-	-
				3	FILE 3	CANCE/DELETEL	-	-	-	-	-
				4	FILE 4	CANCE/DELETEL	-	-	-	-	-
				5	FILE 5	CANCE/DELETEL	-	-	-	-	-
				6	FILE 6	CANCE/DELETEL	-	-	-	-	-
				7	FILE 7	CANCE/DELETEL	-	-	-	-	-
				8	FILE 8	CANCE/DELETEL	-	-	-	-	-
			4		CARD FORMAT	CANCEL/OK	CANCEL	CANCEL	CANCEL	CANCEL	CANCEL

12

The item which can be registered. : USER SET , FUNCTION KEY , MULTI CONTROL , NOT OPERATION

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MENU	SUB MENU LIST				MENU ITIM	SETTING RANGE or ITEM	FISH IMAGESW STANDARD SET VALUE				
No.	1	2	3	4		SET RENGE/STEP	A	B	C	D	E
8	1				MODE SET						
		6			AUTOMATIC RISE	OFF/10/11/12/13/14/15/16	16	16	16	16	16
		7			OPERATION SET						
			1		CURSOR SPEED	LOW/MID/HIGH	MID	MID	MID	MID	MID
			2		DIAL SPEED	LOW/MID/HIGH	LOW	LOW	LOW	LOW	LOW
		8			TILT SET						
			1		TILT STEP	1/2/5	1	1	1	1	1
			2		LONG DISTANCE TILT ADJ	-2/-1/0/1/2	O	O	O	O	O
	2				DISPLAY MODE						
		1			INFOMATION	OFF/ON	OFF	OFF	OFF	OFF	OFF
		2			RM	Hup/Nup	Hup	Hup	Hup	Hup	Hup
		3			SPLIT DISPLAY						
			1		AUDIO	OFF/ON	OFF	OFF	OFF	OFF	OFF
			2		F/F	OFF/ON	OFF	OFF	OFF	OFF	OFF
		4			OFF CENTER	CURSOR/MEMORY POINT	CURSOR	CURSOR	CURSOR	CURSOR	CURSOR
	3				DELETE MARK						
		1			DELETE TRACK	CANCE/DELETEL	CANCEL	CANCEL	CANCEL	CANCEL	CANCEL
		2			DELETE ◇	CANCE/DELETEL	CANCEL	CANCEL	CANCEL	CANCEL	CANCEL
		3			DELETE X	CANCE/DELETEL	CANCEL	CANCEL	CANCEL	CANCEL	CANCEL
		4			DELETE BUOY	CANCE/DELETEL	CANCEL	CANCEL	CANCEL	CANCEL	CANCEL
		5			DELETE FQ	CANCE/DELETEL	CANCEL	CANCEL	CANCEL	CANCEL	CANCEL
		6			DELETE ALL	CANCE/DELETEL	CANCEL	CANCEL	CANCEL	CANCEL	CANCEL
	4				INFORMATION						
		1			STATUS						
			1		SHIP INFO	OFF/ON/AUTO	OFF	OFF	OFF	OFF	OFF
			2		FISH HISTOGRAM	OFF/ON/AUTO	OFF	OFF	OFF	OFF	OFF
			3		TEMP/DEPTH	OFF/ON/AUTO	OFF	OFF	OFF	OFF	OFF
			4		CURRENT INFO	OFF/ON/AUTO	OFF	OFF	OFF	OFF	OFF
			5		NET INFO	OFF/ON/AUTO	OFF	OFF	OFF	OFF	OFF
			6		EVENT MARK	OFF/ON/AUTO	OFF	OFF	OFF	OFF	OFF

12

The item which can be registered. : USER SET , FUNCTION KEY , MULTI CONTROL, NOT OPERATION

MENU	SUB MENU LIST				MENU ITIM	SETTING RANGE or ITEM	FISH IMAGESW STANDARD SET VALUE				
No.	1	2	3	4		SET RENGE/STEP	A	B	C	D	E
8	4				INFORMATION						
		2			POSITION						
			1		SHIP INFO	TOP/MID/BOTTOM	TOP	TOP	TOP	TOP	TOP
			2		FISH HISTOGRAM	TOP/MID/BOTTOM	MID	MID	MID	MID	MID
			3		TEMP/DEPTH	TOP/MID/BOTTOM	MID	MID	MID	MID	MID
			4		CURRNET INFO	TOP/MID/BOTTOM	TOP	TOP	TOP	TOP	TOP
			5		NET INFO	TOP/MID/BOTTOM	BOTTOM	BOTTOM	BOTTOM	BOTTOM	BOTTOM
			6		EVENT MARK	TOP/MID/BOTTOM	BOTTOM	BOTTOM	BOTTOM	BOTTOM	BOTTOM
		3			PRIORITY						
			1		SHIP INFO	1/2/3	1	1	1	1	1
			2		FISH HISTOGRAM	1/2/3	3	3	3	3	3
			3		TEMP/DEPTH	1/2/3	2	2	2	2	2
			4		CURRNET INFO	1/2/3	1	1	1	1	1
			5		NET INFO	1/2/3	1	1	1	1	1
			6		EVENT MARK	1/2/3	2	2	2	2	2
		4			SETTING						
			1		FISH HISTOGRAM						
				1	DETECT AREA	S/M/L	S	S	S	S	S
				2	MARK SIZE	1/5 / 1/4 / 2/5	1/5	1/5	1/5	1/5	1/5
			2		TEMP/DEPTH						
				1	TEMP/DEPTH	TEMP/DEPTH/TEMP&DPT	TEMP & DPT	TEMP & DPT	TEMP & DPT	TEMP & DPT	TEMP & DPT
				2	TIME	1H/2H	2H	2H	2H	2H	2H
				3	TEMP UPPER LIM	-10~40℃/1℃ Step	40	40	40	40	40
				4	TEMP LOWER LIM	-10~40℃/1℃ Step	0	0	0	0	0
				5	DEPTH UPPER LIM	0~2000m/1m Step	400	400	400	400	400
				6	DEPTH LOWER LIM	0~2000m/1m Step	0	0	0	0	0
			3		CURRENT						
				1	CURRENT DISP	VALUE&GRAPH/VALUE/ VALUE&NET	VALUE & GRAPH	VALUE & GRAP	VALUE & GRAP	VALUE & GRAP	VALUE & GRAP
				2	CURRNT SCALE	1NM/2NM/4NM	2NM	2NM	2NM	2NM	2NM
				3	DEPTH SCALE	20~1000/10m Step	200	200	200	200	200

MENU LIST – : Without the setting memory items. X : The established menu ■ : not Fish image SW.

12

The item which can be registered. : USER SET , FUNCTION KEY , MULTI CONTROL , NOT OPERATION

MENU LIST　　－：Without the setting memory items. X：The established menu　■：not Fish image SW.

MENU	SUB MENU LIST				MENU ITIM	SETTING RANGE or ITEM	FISH IMAGESW STANDARD SET VALUE				
No.	1	2	3	4		SET　RENGE/STEP	A	B	C	D	E
8	4	4	5		NET						
				1	NET DISP	VALUE&GRAPH/VALUE/GRAPH	VALUE& GRAPH	VALUE& GRAPH	VALUE& GRAPH	VALUE& GRAPH	VALUE& GRAPH
		5			SPLIT DISPLY SET						
			1		SPLIT MODE SET						
				1	PARTITION SIZE	LARGE/SMALL	SMALL	SMALL	SMALL	SMALL	SMALL
				2	SPLIT POSITION	LOW RIGHT/LOW LEFT	LOW LEFT	LOW LEFT	LOWE LEFT	LOW LEFT	LOW LEFT
			2		AUDIO						
				1	LENGTH SCALE	OFF/ON	ON	ON	ON	ON	ON
				2	SCROLL	STOP/START	STOP	STOP	STOP	STOP	STOP
				3	DIRECTION	HORIZONTAL/VERTICAL	VERTICAL	VERTICAL	VERTICAL	VERTICAL	VERTICAL
				4	AUDIO STEP	1/2/3/4/5/10	3	3	3	3	3
			3		FISH FINDER						
				1	SPLIT POSITION	LEFT,RIGHT/UP,DOWN	L,R	L,R	L,R	L,R	L,R
				2	SCROLL	HORIZONTAL/VERTICAL	H	H	H	H	H
				3	SCROLL STEP	1/1~1/5/STOP	1/2	1/2	1/2	1/2	1/2
		6			SCREEN SETTING						
			1		CHARACTER						
				1	SHIP INFO	OFF/ON/AUTO	ON	ON	ON	ON	ON
				2	SPEED COURCE	OFF/ON/AUTO	ON	ON	ON	ON	ON
				3	COMPASS POINT	OFF/ON	ON	ON	ON	ON	ON
				4	DIRECTION	AUTO/HEDING/COURSE	COURSE	COURSE	COURSE	COURSE	COURSE
				5	FISH SPEED & COURSE	RELA/TRUE/R&T	R&T	R&T	R&T	R&T	R&T
				6	TEMP	OFF/ON/AUTO	AUTO	AUTO	AUTO	AUTO	AUTO
				7	DEPTH	OFF/ON/AUTO	AUTO	AUTO	AUTO	AUTO	AUTO
				8	CURSOR POSITION	OFF/ON	ON	ON	ON	ON	ON
				9	CURSOR DIRECTION	HEDING/H ± /NORTH	HEADING	HEADING	HEADING	HEADING	HEADING

12

The item which can be registered. : USER SET , FUNCTION KEY , MULTI CONTROL: NOT OPERATION

MENU LIST					- : Without the setting memory items. X : The established menu ■ : not Fish image SW.						
MENU	SUB MENU LIST				MENU ITIM	SETTING RANGE or ITEM SET RENGE/STEP	FISH IMAGESW STANDARD SET VALUE				
No.	1	2	3	4			A	B	C	D	E
8	6				SCREEN SETTING						
		2			MARK						
			1		AUDIO MARK	OFF/ON	ON	ON	ON	ON	ON
			2		HEDING MARK	OFF/ON	ON	ON	ON	ON	ON
			3		NORTH MARK	OFF/ON	ON	ON	ON	ON	ON
			4		RANGE MARK	OFF/ON	ON	ON	ON	ON	ON
			5		TRACK LINE	OFF/1H/2H	2H	2H	2H	2H	2H
			6		CURSOR	+/+ & FRAME/VRM.EBL	+ & FRAME	+ & FRAME	+ & FRAME	+ & FRAME	+ & FRAME
			7		COLOR SAMPLE	OFF/ON	OFF	OFF	OFF	OFF	OFF
		3			COLOR SELECT						
			1		COLOR PATTERN	M0/M1/M2/M3/U1/U2/U3/U4	M0	M0	M0	M0	M0
			2		CHARACTER COLOR	WHITE/GREEN/YELLOW/BLACK	WHITE	WHITE	WHITE	WHITE	WHITE
			3		SONAR COLOR	LEVEL1~32/1 Step，HSV 0~255/1 Step	On the next menu				
			4		F/F COLOR	LEVEL1~16/1 Step，HSV 0~255/1 Step	On the next menu				
		7			FISH SET						
			1		TRIGGER	SYNCHRO 1/2 / ALTERNATE 1/2	SYNCHRO 1/2	SYNCHRO 1/2	SYNCHRO 1/2	SYNCHRO 1/2	SYNCHRO 1/2
			2		RANGE	RANGE1~4/1 Step	RANGE1	RANGE1	RANGE1	RANGE1	RANGE1
			3		GAIN 1	0.0~10.0/0.1 Step	5.0	5.0	5.0	5.0	5.0
			4		GAIN 2	0.0~10.0/0.1 Step	5.0	5.0	5.0	5.0	5.0
			5		CLUTTER	0.0~10.0/0.1 Step	0.0	0.0	0.0	0.0	0.0
			6		NEXT						
				1	SHIFT	0~900m/1m Step	0	0	0	0	0
				2	ADC	1~8/1 Step	1	1	1	1	1
				3	STC1	0.0~10.0/0.1 Step	0.0	0.0	0.0	0.0	0.0
				4	STC2	0.0~10.0/0.1 Step	0.0	0.0	0.0	0.0	0.0
				5	INTERFERENCE	OFF/ON	OFF	OFF	OFF	OFF	OFF
				6	STC CURVE	20/30/40	20	20	20	20	20

The item which can be registered. : USER SET , FUNCTION KEY , MULTI CONTROL NOT OPERATION

MENU LIST					— : Without the setting memory items. X : The established menu ■ : not Fish image SW.						
MENU	SUB MENU LIST				MENU ITIM	SETTING RANGE or ITEM	FISH IMAGESW STANDARD SET VALUE				
No.	1	2	3	4		SET RENGE/STEP	A	B	C	D	E
9					OTHER						
	1				INITIAL						
		1			RANGE						
			1		SONAR RANGE	1/2/3/4	1	1	1	1	1
			2		F/F RANGE	1/2/3/4	1	1	1	1	1
			3		RANGE SETTING						
				1	SONAR	4SET to RENGE 1&16	On the next menu				
				2	FISH	4SETto RENGE1 & 4	On the next menu				
		2			SENSOR						
			1		INPUT						
				1	COMPASS	OFF/NAV1/NAV2/NAV3/NAV4	NAV1	NAV1	NAV1	NAV1	NAV1
				2	DEPTH/TEMP	OFF/NAV1/NAV2/NAV3/NAV4	NAV3	NAV3	NAV3	NAV3	NAV3
				3	CURRNT	OFF/NAV1/NAV2/NAV3/NAV4	NAV2	NAV2	NAV2	NAV2	NAV2
				4	GPS	OFF/NAV1/NAV2/NAV3/NAV4	NAV1	NAV1	NAV1	NAV1	NAV1
				5	LOG	OFF/NAV1/NAV2/NAV3/NAV4	OFF	OFF	OFF	OFF	OFF
			2		SENSOR SET						
				1	COURSE	COMPASS/CURRENT/GPS/LOG	COMPASS	COMPASS	COMPASS	COMPASS	COMPASS
				2	SPEED	CURRNT/GPS/LOG/GYROI/F	CURRNT	CURRNT	CURRNT	CURRNT	CURRNT
				3	DIRECTION MARK	COMPASS/GYROI/F	COMPASS	COMPASS	COMPASS	COMPASS	COMPASS
				4	LAT/LON	COMPASS/GPS	COMPASS	COMPASS	COMPASS	COMPASS	COMPASS
				5	TRACK LINE	CURRNT/GPS/LOG/GYROI/F	CURRNT	CURRNT	CURRNT	CURRNT	CURRNT
			3		NET RECORDER						
				1	DISTANCE 1	0~1000m/10m Step	300m	300m	300m	300m	300m
				2	DISTANCE 2	0~1000m/10m Step	300m	300m	300m	300m	300m
				3	DISTANCE 3	0~1000m/10m Step	300m	300m	300m	300m	300m
				4	DISTANCE 4	0~1000m/10m Step	300m	300m	300m	300m	300m
				5	TRIG POLARITY	POS/NEG	POS	POS	POS	POS	POS
				6	TRIG MODE	AUTO/EXIT/INT	AUTO	AUTO	AUTO	AUTO	AUTO
			4		LINE MONTOR		I shift to a line monitor screen.				

12

The item which can be registered. : USER SET , FUNCTION KEY , MULTI CONTROL: NOT OPERATION

MENU	SUB MENU LIST				MENU ITIM	SETTING RANGE or	FISH IMAGESW STANDARD SET VALUE				
No.	1	2	3	4		IETM SET ENGE/STEP	A	B	C	D	E
9	1				INITIAL						
		3			CONNECTION						
			1		PROCESSOR						
				1	OWN TYPE	MAIN/SUB	MAIN	MAIN	MAIN	MAIN	MAIN
				2	HOIST	NO-CONNECT/CONNECT	CONNECT	CONNECT	CONNECT	CONNECT	CONNECT
				3	PROC LINE	NO-CONNECT/CONNECT	NO-CONNECT	NO-CONNECT	NO-CONNECT	NO-CONNECT	NO-CONNECT
				4	DUAL INDICATION	OFF/MAIN/SUB	OFF	OFF	OFF	OFF	OFF
			2		SENSOR CONNECTION						
				1	F/F 1	NO-CONNECT/CONNECT	NO-CONNECT	NO-CONNECT	NO-CONNECT	NO-CONNECT	NO-CONNECT
				2	F/F 2	NO-CONNECT/CONNECT	NO-CONNECT	NO-CONNECT	NO-CONNECT	NO-CONNECT	NO-CONNECT
				3	NET 1	NO-CONNECT/CONNECT	NO-CONNECT	NO-CONNECT	NO-CONNECT	NO-CONNECT	NO-CONNECT
				4	NET 2	NO-CONNECT/CONNECT	NO-CONNECT	NO-CONNECT	NO-CONNECT	NO-CONNECT	NO-CONNECT
				5	NET 3	NO-CONNECT/CONNECT	NO-CONNECT	NO-CONNECT	NO-CONNECT	NO-CONNECT	NO-CONNECT
				6	NET 4	NO-CONNECT/CONNECT	NO-CONNECT	NO-CONNECT	NO-CONNECT	NO-CONNECT	NO-CONNECT
		4			FISH FAINDER						
				1	AMPLIFIER	LINEAR/LOG	LOG	LOG	LOG	LOG	LOG
				2	FREQ H	20~400 kHz/1 kHz Step	200	200	200	200	200
				3	FREQ L	20~400 kHz/1 kHz Step	50	50	50	50	50
				4	TRIG MODE	H/L SYNCHRO / H/L SEPARATE	H/L SYNC	H/L SYNC	H/L SYNC	H/L SYNC	H/L SYNC
				5	TRIG POLARIY	POS/NEG	POS	POS	POS	POS	POS
		5			FISH IMAGE	ON/OFF	ON	ON	ON	ON	ON
		6			ADJUST						
				1	MARK TILTING	OFF/ON	ON	ON	ON	ON	ON
				2	DRAFT	0~99m/1m Step	0	0	0	0	0
				3	FURNISED ANGLE	0~359° /1° Step	0	0	0	0	0
				4	TILT TO BOW	− 12.7 ~ + 12.7/0.1 Step	0.0	0.0	0.0	0.0	0.0
				5	TILT TO PORT	− 12.7 ~ + 12.7/0.1 Step	0.0	0.0	0.0	0.0	0.0
				6	DISP ANGLE	0~359° /1° Step	0	0	0	0	0
				7	STUN BLANK	OFF/ON	ON	ON	ON	ON	ON
				8	A/D OFFSET	-64~63/1 Step	0	0	0	0	0

MENU LIST   − : Without the setting memory items. X : The established menu ■ : not Fish image SW.

12

The item which can be registered. : USER SET , FUNCTION KEY , MULTI CONTROL , NOT OPERATION

| MENU LIST | | | | | - : Without the setting memory items. X : The established menu ■ : not Fish image SW. | | | | | | |

MENU	SUB MENU LIST				MENU ITIM	SETTING RANGE or ITEM	FISH IMAGESW STANDARD SET VALUE				
No.	1	2	3	4		SET RENGE/STEP	A	B	C	D	E
9	1										
		7			UNIT SET						
			1		RANGE UNIT	m/feet/Fathom/FREE	m	m	m	m	m
			2		TEMP UNIT	℃/F	℃	℃	℃	℃	℃
			3		SPEED UNIT	Kn/kph/ m/s	kn	kn	kn	kn	kn
			4		RANGE SPECAL	0.3000~1.9999/0.0001 Step	0.3	0.3	0.3	0.3	0.3
	2				SYSTEM SELECT	280	280	280	280	280	280
	3				REGISTRATION CANCEL						
		1			USER MENU	1/2/3/4/5/6	未設定	未設定	未設定	未設定	未設定
		2			USER KEY	F1/F2/F3	未設定	未設定	未設定	未設定	未設定
		3			MULTI KEY	1/2/3/4/5/6	未設定	未設定	未設定	未設定	未設定
	4				MAINTENANCE						
		1			OK MONITOR	I shift to the menu by choice.	I shift to another menu.				
		2			TEST PATTERN	I shift to the menu by choice.	I shift to another menu.				
		3			COLOR PATTERN	I shift to the menu by choice.	I shift to another menu.				
		4			PANEL TEST	I shift to the menu by choice.	I shift to the check menu.				
		5			TVG CURVE	OFF/ON	OFF	OFF	OFF	OFF	OFF
	5				CHECK						
		1			CHEK MODE	OFF/SCAN STOP/TD TEST	OFF	OFF	OFF	OFF	OFF
		2			TEST RING No.	1~16/1 Step	8	8	8	8	8
		3			REAERVATION						
			1		SETTING 1	0~7/1 Step	O	O	O	O	O
			2		SETTING 2	0~7/1 Step	O	O	O	O	O
			3		SETTING 3	0~7/1 Step	O	O	O	O	O
			4		SETTING 4	0~7/1 Step	1	1	1	1	1
			5		SETTING 5	0~7/1 Step	O	O	O	O	O
			6		SETTING 6	0~7/1 Step	O	O	O	O	O
			7		SETTING 7	0~7/1 Step	O	O	O	O	O
			8		SETTING 8	0~7/1 Step	O	O	O	O	O
			9		NEXT						
				1	SETTING 9	0~7/1 Step	O	O	O	O	O
				2	SETTING 10	0~7/1 Step	O	O	O	O	O

12

The item which can be registered. : USER SET , FUNCTION KEY , MULTI CONTROL; NOT OPERATION

MENU LIST					- : Without the setting memory items. X : The established menu ■ : not Fish image SW.						
MENU	SUB MENU LIST				MENU ITIM	SETTING RANGE or ITEM	FISH IMAGESW STANDARD SET VALUE				
No.	1	2	3	4		SET RENGE/STEP	A	B	C	D	E
9	6				LANGUAGE SET	ENGLISH/SPANISH JAPANESE/THAI/ ADDITIONAL	ENGLISH	ENGLISH	ENGLISH	ENGLISH	ENGLISH
	7				GYRO SET	0.0~359.9° /0.1° Step	0.0	0.0	0.0	0.0	0.0
	8				DATE/TIME						
		1			TIME SET		I shift to the setting menu.				
		2			DATE SET		I shift to the setting menu.				
	9				VERSION		—	—	—	—	—

12.2   Setting the Colors of the Sonar Display

The item which can be registered. : USER SET , FUNCTION KEY , MULTI CONTROL NOT OPERATION

MENU 「8」 → 「6」 → 「3」 → 「3」 SONAR−COLOR												
	M0			M1			M2			M3		
LEVEL	SHADE	VIVID	Bright	SHADE	VIVID	Bright	SHADE	VIVID	Bright	SHADE	VIVID	Bright
1	240	255	180	180	255	024	240	255	180	180	255	024
2	180	255	040	180	255	040	240	255	180	180	255	024
3	180	255	060	180	255	060	240	255	180	180	255	024
4	180	255	080	180	255	080	240	255	180	180	255	024
5	180	255	088	180	255	088	240	255	180	180	255	024
6	180	255	096	180	255	096	240	255	180	180	255	024
7	180	255	128	180	255	128	240	255	180	180	255	024
8	180	255	160	180	255	160	240	255	180	180	255	024
9	174	255	160	174	255	160	240	255	180	180	255	024
10	168	255	160	168	255	160	240	255	180	180	255	024
11	149	255	200	149	255	200	240	255	180	180	255	024
12	135	255	252	135	255	252	240	255	180	180	255	024
13	129	255	224	129	255	224	240	255	180	180	255	024
14	120	255	192	120	255	192	120	255	192	120	255	192
15	120	255	176	120	255	176	049	255	252	049	255	252
16	120	255	160	120	255	160	049	255	252	049	255	252
17	120	255	144	120	255	144	049	255	252	049	255	252
18	120	255	128	120	255	128	049	255	252	049	255	252
19	082	255	188	082	255	188	049	255	252	049	255	252
20	060	255	252	060	255	252	049	255	252	049	255	252
21	048	255	252	048	255	252	027	255	252	027	255	252
22	038	255	252	038	255	252	000	255	252	000	255	252
23	032	255	252	032	255	252	000	255	252	000	255	252
24	027	255	252	027	255	252	000	255	252	000	255	252
25	011	255	252	011	255	252	000	255	252	000	255	252
26	000	255	252	000	255	252	000	255	252	000	255	252
27	000	255	188	000	255	188	000	255	252	000	255	252
28	000	255	128	000	255	128	000	255	252	000	255	252
29	000	255	120	000	255	120	000	255	252	000	255	252
30	020	219	112	020	219	112	000	215	180	000	215	180
31	022	216	104	022	216	104	000	215	180	000	215	180
32	024	213	096	024	213	096	000	215	180	000	215	180

The item which can be registered. : USER SET , FUNCTION KEY , MULTI CONTROL , NOT OPERATION

MENU「8」→「6」→「3」→「3」SONAR COLOR											
	U1			U2			U3			U4		
LEVEL	SHADE	VIVID	Bright	SHADE	VIVID	Bright	SHADE	VIVID	Bright	SHADE	VIVID	Bright
1	210	255	032	180	255	024	135	255	016	180	255	024
2	208	255	060	180	255	044	135	255	032	180	255	056
3	205	255	116	180	255	084	134	255	068	180	255	056
4	212	255	160	180	255	092	133	255	076	180	255	084
5	215	255	200	180	255	100	131	255	084	180	255	084
6	212	255	228	189	255	136	125	255	100	180	255	100
7	208	255	252	191	255	168	120	255	116	180	255	100
8	202	255	252	191	255	176	120	255	136	180	255	168
9	196	255	252	190	255	184	120	255	152	180	255	168
10	192	255	252	156	255	152	120	255	168	169	255	168
11	188	255	252	120	255	152	120	255	184	169	255	168
12	176	255	236	120	255	168	102	255	200	120	255	200
13	164	255	252	120	255	184	088	255	220	120	255	200
14	123	170	252	102	255	200	083	255	236	120	255	168
15	080	255	252	088	255	220	080	255	252	120	255	168
16	073	255	252	077	255	228	073	255	252	120	255	136
17	067	255	252	068	255	240	067	255	252	120	255	136
18	060	255	252	060	255	252	060	255	252	083	255	220
19	054	255	252	054	255	252	054	255	252	083	255	220
20	048	255	252	048	255	252	048	255	252	076	255	252
21	042	255	252	042	255	252	042	255	252	076	255	252
22	036	255	252	036	255	252	036	255	252	060	255	252
23	031	243	252	031	243	252	031	243	252	060	255	252
24	024	231	252	024	231	252	024	231	252	040	255	252
25	019	223	252	019	223	252	019	223	252	040	255	252
26	002	210	252	002	210	252	002	210	252	000	255	252
27	348	255	252	348	255	252	348	255	252	000	255	252
28	348	246	220	348	246	220	348	246	220	014	255	220
29	347	233	184	347	233	184	347	233	184	014	255	220
30	349	231	168	349	231	168	349	231	168	012	231	128
31	349	228	152	349	228	152	349	228	152	012	231	128
32	352	225	136	352	225	136	352	225	136	012	231	128

12

12.3   Setting the Colors of the Fish Finder Display

The item which can be registered. : `USER SET` , `FUNCTION KEY` , `MULTI CONTROL` `NOT OPERATION`

MENU 「8」→ 「6」→ 「3」→ 「4」F/F COLOR

LEVEL	MO SHADE	MO VIVID	MO Bright	M1 SHADE	M1 VIVID	M1 Bright	M2 SHADE	M2 VIVID	M2 Bright	M3 SHADE	M3 VIVID	M3 Bright
1	170	219	112	240	255	240	360	255	000	240	255	240
2	180	255	080	180	204	080	180	204	080	180	204	080
3	180	255	096	180	255	112	180	255	112	180	255	112
4	180	255	160	198	255	160	180	255	160	126	255	160
5	168	255	160	170	255	192	170	255	192	170	255	192
6	136	255	240	131	255	176	131	255	176	131	255	176
7	120	255	192	127	255	144	127	255	144	127	255	144
8	120	255	160	120	255	096	120	255	112	120	255	096
9	120	255	128	120	255	080	120	255	096	120	255	080
10	060	255	240	075	255	128	075	255	128	075	255	128
11	040	255	240	070	255	192	070	255	192	070	255	192
12	028	255	240	060	255	240	060	255	240	060	255	240
13	000	255	240	028	255	240	028	255	240	028	255	240
14	014	255	208	014	255	208	014	255	208	014	255	208
15	013	230	160	007	230	160	007	230	160	007	230	160
16	024	213	096	024	213	096	360	000	240	24	213	096

| LEVEL	U1 SHADE	U1 VIVID	U1 Bright	U2 SHADE	U2 VIVID	U2 Bright	U3 SHADE	U3 VIVID	U3 Bright	U4 SHADE	U4 VIVID	U4 Bright
1	240	255	096	060	064	064	240	255	064	240	255	096
2	240	255	096	180	153	160	240	255	064	180	255	176
3	195	255	128	180	153	160	240	255	064	180	255	176
4	195	255	128	171	137	208	240	255	064	180	255	240
5	000	000	176	171	137	208	190	255	192	180	255	240
6	000	000	176	120	255	224	285	170	192	180	255	240
7	180	255	160	120	255	224	285	170	192	120	255	224
8	180	255	160	060	255	224	120	255	224	120	255	224
9	060	255	128	060	255	224	120	255	224	060	255	240
10	060	255	128	040	255	240	060	255	224	060	255	240
11	060	255	224	040	255	240	060	255	224	048	255	240
12	060	255	224	012	255	240	060	255	224	048	255	240
13	048	182	224	012	255	240	000	213	192	016	255	240
14	048	182	224	005	255	192	000	213	192	016	255	240
15	009	255	224	005	255	192	000	213	192	006	232	176
16	009	255	224	005	255	192	000	213	192	006	232	176

12.4 Sonar Range and Initial Setting Values for the Fish Finder Range

The item which can be registered. : `USER SET` , `FUNCTION KEY` , `MULTI CONTROL` `NOT OPERATION`

MENU 「9」→「1」→「1」→「3」→「1」SONAR RANGE SET				
RANGE No.	RANGE 1	RANGE 2	RANGE 3	RANGE 4
1	100	100	100	100
2	150	150	200	150
3	200	200	300	200
4	250	250	400	250
5	300	300	500	300
6	350	350	600	350
7	400	400	700	400
8	450	450	800	450
9	500	500	900	500
1 0	550	550	1000	600
1 1	600	600	1100	700
1 2	650	700	1200	800
1 3	700	800	1300	900
1 4	750	900	1400	1200
1 5	800	1000	1500	1500
1 6	1000	1200	1600	2000

MENU 「9」→「1」→「1」→「3」→「2」F/F RANGE SET				
RANGE No.	RANGE 1	RANGE 2	RANGE 3	RENG 4
1	50	100	200	200
2	100	150	300	400
3	150	200	400	600
4	200	250	500	800

12.5   Board Connection Diagram

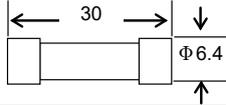JFS-280 Scanning Sonar Connection Diagram
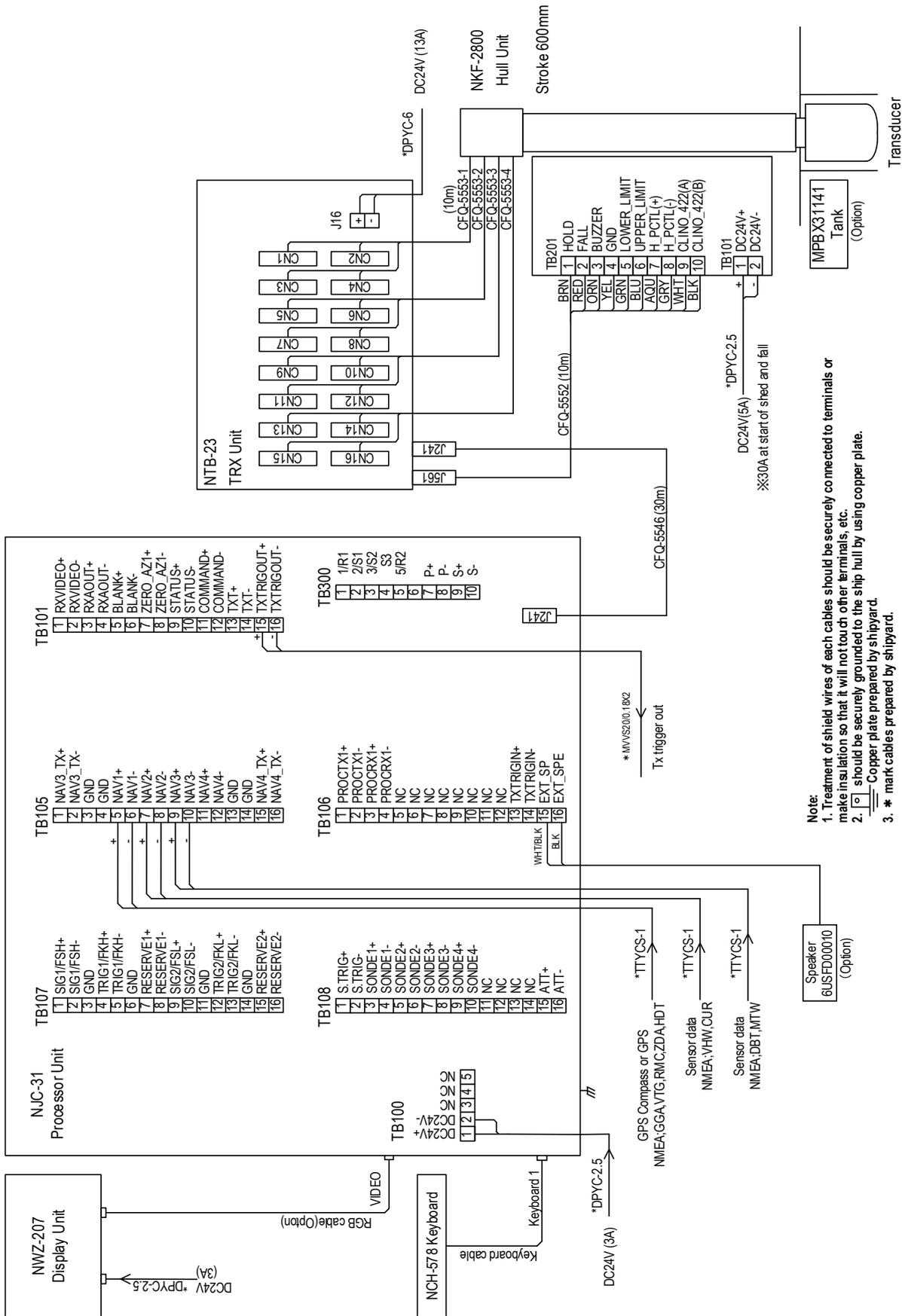
Note:
1. Treatment of shield wires of each cables should be securely connected to terminals or make insulation so that it will not touch other terminals, etc.
2. ⏚ should be securely grounded to the ship hull by using copper plate. Copper plate prepared by shipyard.
3. ✱ mark cables prepared by shipyard.

12.6   Spare Parts

SHIP NO.	SPARE PARTS LIST FOR		U S E		SETS PER VESSEL
	NCM-953 Scanning Sonar スキャニングソナー				

ITEM NO.	NAME OF PART	OUTLINE (Dimension in mm)	QUANTITY			REMARKS	
			WORKING			DESCRIPTION	SUB
			PER SET	PER VESS	SPARE	JRC CODE NO.	MARK OF BOX NO.
1	Fuse ヒューズ	←30→ ↓ Φ6.4 ↑	1		1	MF60NR 250V 5 (5ZFGD00208)	
2							
3							
4							
5							
6							
7							
8							
9							
10							
MFR'S NAME	JAPAN RADIO CO.,LTD.		DRW.NO.		7ZXNA2006		

12

Note: Spare Part (Description or JRC code Number) may be replaced with compatible part.

予備品（型名・コード）は、予告無く互換品に変更することがございます。

Inquiry regarding the order of a part ： Marine Service Department

Telephone：+81-3-5534-7802   Facsimile：+81-3-5534-7801   e-mail：tmsc@jrc.co.jp

For further information,contact:

JRC   *Japan Radio Co., Ltd.*

Since 1915

URL Head office： http://www.jrc.co.jp/eng/
Marine Service Department
1-7-32 Tatsumi, Koto-ku, Tokyo 135-0053, Japan
e-mail ： tmsc@jrc.co.jp
One-call：+81-50-3786-9201

ISO 9001, ISO 14001 Certified

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