



# **COLOR LCD SEARCHLIGHT SONAR**

# **S-1900**

## **OPERATION MANUAL**

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# CHAPTER 1

## INTRODUCTION

Thank you for purchasing the S-1900 searchlight sonar.

We are confident you will enjoy using your unit for many years to come.

This manual provides complete information on safely operating the S-1900.

Please carefully read and follow the safety information so that the S-1900 will perform to the utmost of its ability.

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## SYMBOLS

- The following symbols are used in this manual.
- Please read this manual carefully and take note of these symbols.



: indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



: indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



: indicates a potentially hazardous situation which, if not avoided, may result in minor injury.

**NOTE !**

: Indicates the contents for the user's reference.



: Pages for the user's reference.

## NOTICE

- This manual should be kept on hand to provide your quick reference whenever you need it.
- Any use other than that mentioned in this manual is not guaranteed.
- The contents of this manual and equipment specifications are subject to change without notice.
- No part of this manual may be copied or reproduced without written permission.

## **TURNING the POWER ON/OFF**

### **POWER ON**

Press the POWER  key on the monitor or the keyboard.

“Please wait!” appears on the screen. The soundome is automatically lowered if “**HOIST AUTO DOWN – ON**” previously set.

In case “**HOIST AUTO DOWN – OFF**” is previously set, it is lowered only after pressing the Hoist key (  ).

### **POWER OFF**

Press and hold the  key when turning the power off.

The power is turned off after “Please wait!” appears on the screen.

The soundome is automatically raised.

Note that slight touch of the  key will not turn the power off.

## **KEY OPERATION**

A beep sounds when operating key correctly.

Three short beeps sound when operating wrongly or not accepting the operation.

## **TFT LCD**

The high quality TFT (Thin Film Transistor) LCD displays 99.99% of its picture elements. The remaining 0.01% may drop out or light, however this is an inherent property of the LCD; it is not a sign of malfunction.

## **PREVENTIVE MEASURE for INTERFERENCE in the AREA of**

### **SHIP CONGESTION**

When the fishing ground is crowded with many fishing boats, the sonar is subject to interference from ultrasonic equipment (echo sounder or sonar) on other boards as well as those on own ship. As preventive measure for interference the change of the used frequency or the reduction of the transmitting sound pressure level should be taken from the broadband sonar, the dual frequency sonar and the single frequency sonar accordingly.

# FOR YOUR SAFETY

---

## USE ENVIRONMENT



Keep the unit away from the flammable gas.  
Otherwise it causes a fire.



Follow the below proposed conditions for the installation.  
Otherwise it causes a fire or an electrical shock.

Away as much as possible from areas where the unit is likely to be exposed to direct water spray and free as much as possible from shocks and engine vibration.

Away as much as possible from areas of high temperatures or areas where the unit is likely to be exposed to direct sunlight.

## MOUNTING CONDITIONS



Do not install the S-1900 on unstable or uneven surfaces.  
Installing the unit tentatively may result in dropping, toppling over or injury.

Follow the below conditions for wirings.  
Otherwise it causes heat, a fire or injury.  
Run the cables not to touch the rotary obstacles or disturb the operation.  
Do not use the cables bent, twisted or stretched by force.  
Do not put heavy objects on the cables.



Always turn off the power before connecting or disconnecting the unit.  
Pulling the cables may damage the cables themselves and result in fire or electrical shock.

## **POWER SUPPLY**



Use the proper voltage. Otherwise it will result in fire or electrical shock.



Turn on/off the power by ON/OFF keys on the control panel.  
Turning on/off the power by the switchboard may damage the unit.

Turn off the power when starting the ship engine.  
Otherwise it may damage the unit.

## **HANDLING**



Do not operate the unit while steering.  
Otherwise it will cause wrecks.

Do not open the case cover.  
There is a risk of electrical shock if you touch the high voltage conductors.  
Only qualified personnel should work inside the unit.

Care for sufficient reinforcement and being watertight should be taken when installing the hoist.  
Otherwise it will cause wrecks.



Use the proper fuse when changed.  
Otherwise it could result in serious trouble or fire.

Use the specified power supply cables.  
Otherwise it could result in serious trouble or fire.

The Hoist Gears and Flange Unit need a regular lubrication with grease.

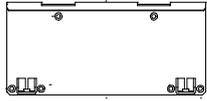
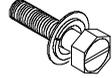
Confirm the voltage between the Flang and the minus terminal of the ship's battery does not exceed 0.65 volts after the installation completed.

Use the larger diameter cable if the voltage exceeds 0.65 volts.  
Otherwise the damage to the Soundome due to the electrolytic corrosion may results.

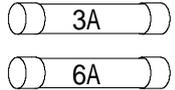
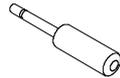
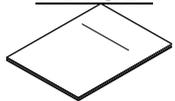
# COMPONENTS

## SUPPLIED COMPONENTS

### M12 DISPLAY UNIT (S-1900 M12)

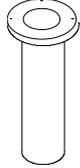
CODE				
DESCRIPTION	<u>MAIN UNIT</u>  BOLT G-3(KGB) 2 PCS	<u>M. BRACKET</u> 	<u>M. BASE</u> 	<u>HEX. BOLT</u>  FOR M.BRACKET
P. No.		36738C	34556C	M6x20-Assy
Q'TY	1	1	1	2

CODE	* * H K 0 1 0				
		* * H K 0 0 1			
DESCRIPTION	<u>P.S.CABLE</u>  2m	<u>HEX.BOLT</u>  FOR REPLACEMENT	<u>TAPPING SCREW</u> 		
P. No.	31524D	M8x16-Assy	M5x30		
Q'TY	1	2	6		

CODE	* * H K 1 2 1				
DESCRIPTION	<u>FUSE</u>  3A 6A	<u>AUDIO PLUG</u> 	<u>COVER</u> 	<u>OPERATION MANUAL</u> 	
P. No.	-	MP-105LC-R	-	S1900-EM	-
Q'TY	3 pcs each	1	1	1	1

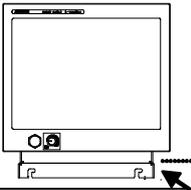
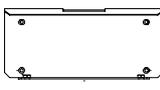
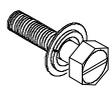
NOTE : The code Number is shown on the package. \* \* indicates the lot management No.

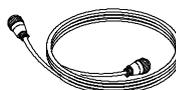
### TRUNK PIPE (option) /JOINT PIPE

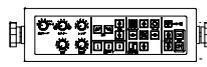
CODE	S-1900 H180/H140/H80			
DESCRIPTION	<u>PVC TRUNK PIPE</u> 	<u>JOINT PIPE</u> 		
P. No.	30927C-2	32679C		
Q'TY	1	1		

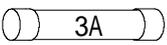
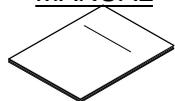
# COMPONENTS

## M15 DISPLAY UNIT (S-1900 M15)

CODE	* * H J 1 1 1			
DESCRIPTION	<u>MAIN UNIT</u>  BOLT KG-B2 4 PCS	<u>M. BASE</u> 	<u>HEX. BOLT</u>  FOR M.BRACKET	<u>TAPPING SCREW</u> 
P. No	M.bracket 36787C included	36788C	M6x20-Assy	M5x30
Q'TY	1	1	2	4

CODE	* * H J 0 1 0			
DESCRIPTION	<u>P.S. CABLE</u>  2m	<u>C. CABLE 1</u>  2.5m		
P. No	31524D	35503D		
Q'TY	1	1		

CODE	* * H J 1 1 0			
DESCRIPTION	<u>KEY BOARD</u>  BOLT KG-B2 2 PCS	<u>M. BRACKET</u> 	<u>TAPPING SCREW</u> 	
P. No	-	36638C	M4x12	
Q'TY	1	1	4	

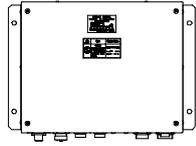
CODE	* * H J 1 2 1			
DESCRIPTION	<u>FUSE</u>  3A	<u>AUDIO PLUG</u> 	<u>COVER</u> 	<u>OPERATION MANUAL</u> 
P. No	-	MP-105LC-R	-	S1900-EM
Q'TY	3	1	1	1

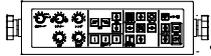
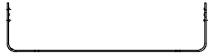
NOTE : The code Number is shown on the package. \* \* indicates the lot management No.

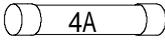
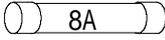
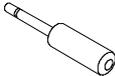
## TRUNK PIPE (option) /JOINT PIPE

**CF** PAGE 7

MBB CONTROL UNIT • KEYBOARD (S-1900MBB)

CODE	* * H N 0 1 0			
DESCRIPTION	<u>CONTROL UNIT</u> 	<u>P.S. CABLE</u>  2m	<u>TAPPING SCREW</u> 	<u>C. CABLE 1</u>  5m
P. No	-	31524D	M6x20	36213D
Q'TY	1	1	4	1

CODE	* * H N 1 1 0		
DESCRIPTION	<u>KEYBOARD</u>  BOLT KG-B2 2 PCS	<u>M. BRACKET</u> 	<u>TAPPING SCREW</u> 
P. No	-	36638C	M4x12
Q'TY	1	1	4

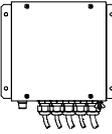
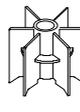
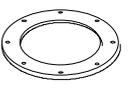
CODE	* * H N 1 2 1		
DESCRIPTION	<u>FUSE</u>  4A  8A	<u>AUDIO PLUG</u> 	<u>OPERATION MANUAL</u> 
P. No	-	MP-105LC-R	S1900-EM
Q'TY	3 pcs per each	1	1

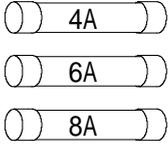
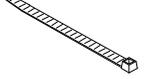
NOTE : The code Number is shown on the package. \* \* indicates the lot management No.

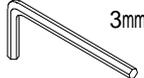
TRUNK PIPE (option) /JOINT PIPE

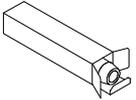
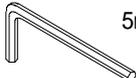
# COMPONENTS

## HULL UNIT (S-1900H)

CODE				**HH110	**HH120
DESCRIPTION	<u>HULL UNIT</u> 	<u>JUNCTION BOX</u> 	<u>PIPE GUIDES</u> 	<u>M. BOLT</u> 	<u>GUM PACKING for FLANGE</u> 
P. No	-	-	33481C	SUS-M16x65-Assy	30926D
Q'TY	1	1	3	1	1

CODE	**HH010					
DESCRIPTION	<u>CRANK HANDLE</u> 	<u>GREASE</u> 	<u>TAPPING SCREW</u> For <u>JUNCTION BOX</u> 	<u>FUSE</u> 	<u>ANP BASE</u> 	<u>CABLE TIE</u> 
P. No	OB-63	-	M5x20	-	ANP-1	AB-100-1000
Q'TY	1	1	4	1	2	2

CODE	**HH140				
DESCRIPTION	<u>DAMPER</u> 	<u>FIXING COLLAR</u> 	<u>PIPE CAP</u> 	<u>CAP BOLT</u> 	<u>HEX. ROD WRENCH</u> 1.5mm 2.5mm 3mm 
P. No	34924D	32681D-Assy	34378D	SUS-M4x10	-
Q'TY	1	2	1	4	各 1

CODE	**HH170				
DESCRIPTION	<u>SOUNDOME</u> 	<u>ADHESIVE</u> 	<u>HEX. ROD WRENCH</u> 3mm 5mm 		
P. No	-	-	-		
Q'TY	1	1	1 each		

NOTE : The code Number is shown on the package. \*\* indicates the lot management No.

# CHAPTER 2

## INSTALLATION

This Chapter explains the installation of S-1900.

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	Wiring between S-1900 M15 and S-1900 H-----	39
	Wiring between S-1900 MBB and S-1900 H-----	40
	Wiring Junction Box -----	41

# INSTALLATION

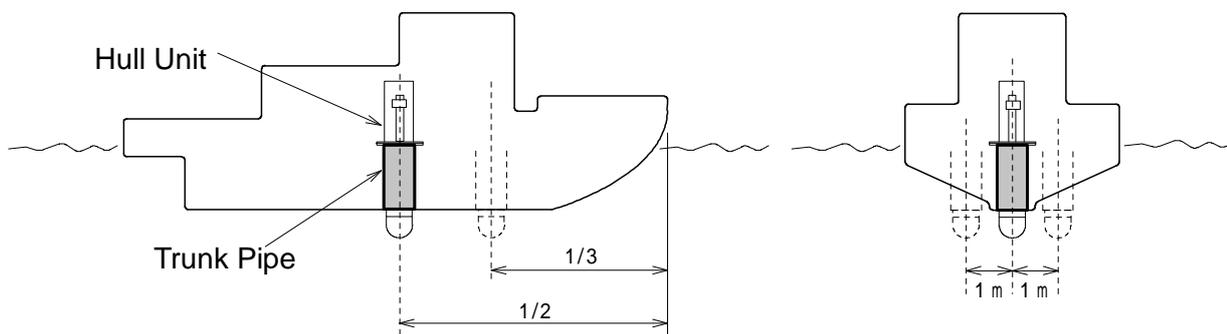
Fully discussion and agreement are required with the ship owner and dockyard in deciding the location for the hull unit. Give careful considerations to the installations.

## INSTALLATION POSITION of HULL UNIT

Select an area where noise, interference and bubbles are minimal.

The point at  $1/3$  to  $1/2$  of the ship's length from the bow or near the keel is the best.

If the hull unit cannot be installed on the keel, the center of the retraction trunk pipe should be within 1 meter of the keel.



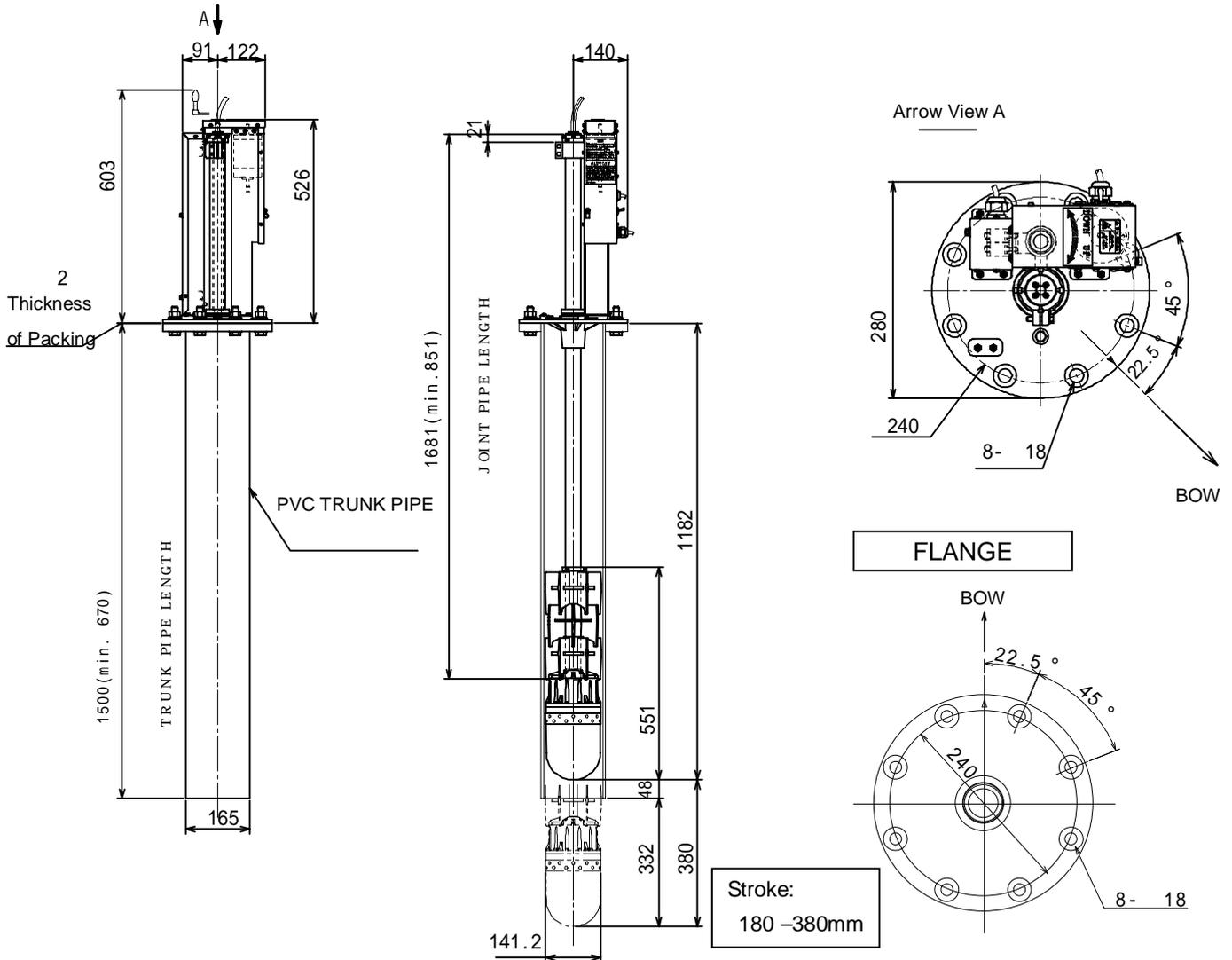
Be sure there are no obstacles to interfere the ultrasonic beam when the Soundome is lowered.

Provide sufficient clearance around the Trunk Pipe for maintenance and inspection work.

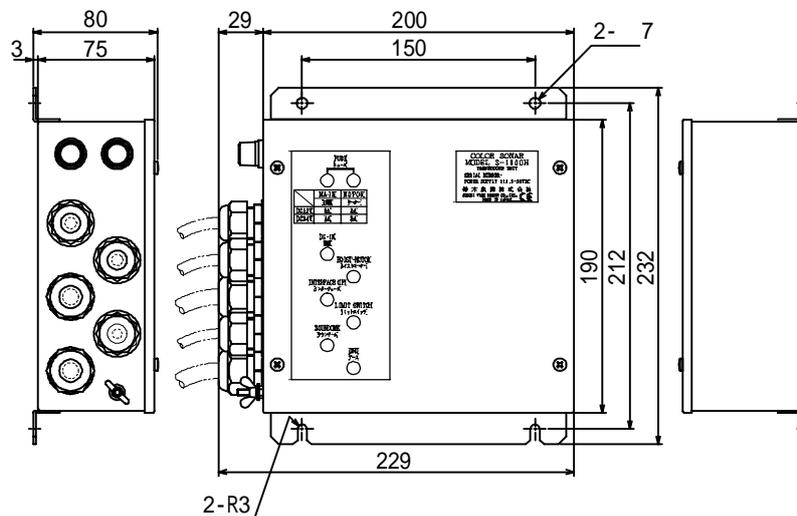
The Bow mark ( ) on the Flange should be installed facing the bow. However, if this hinders maintenance or inspection, and there is no solution, direct the mark to the opposite ( $180^\circ$ ) direction, toward the stern.

# DIMENSIONS (S-1900H)

STANDARD: JUNCTION BOX SEPARATELY

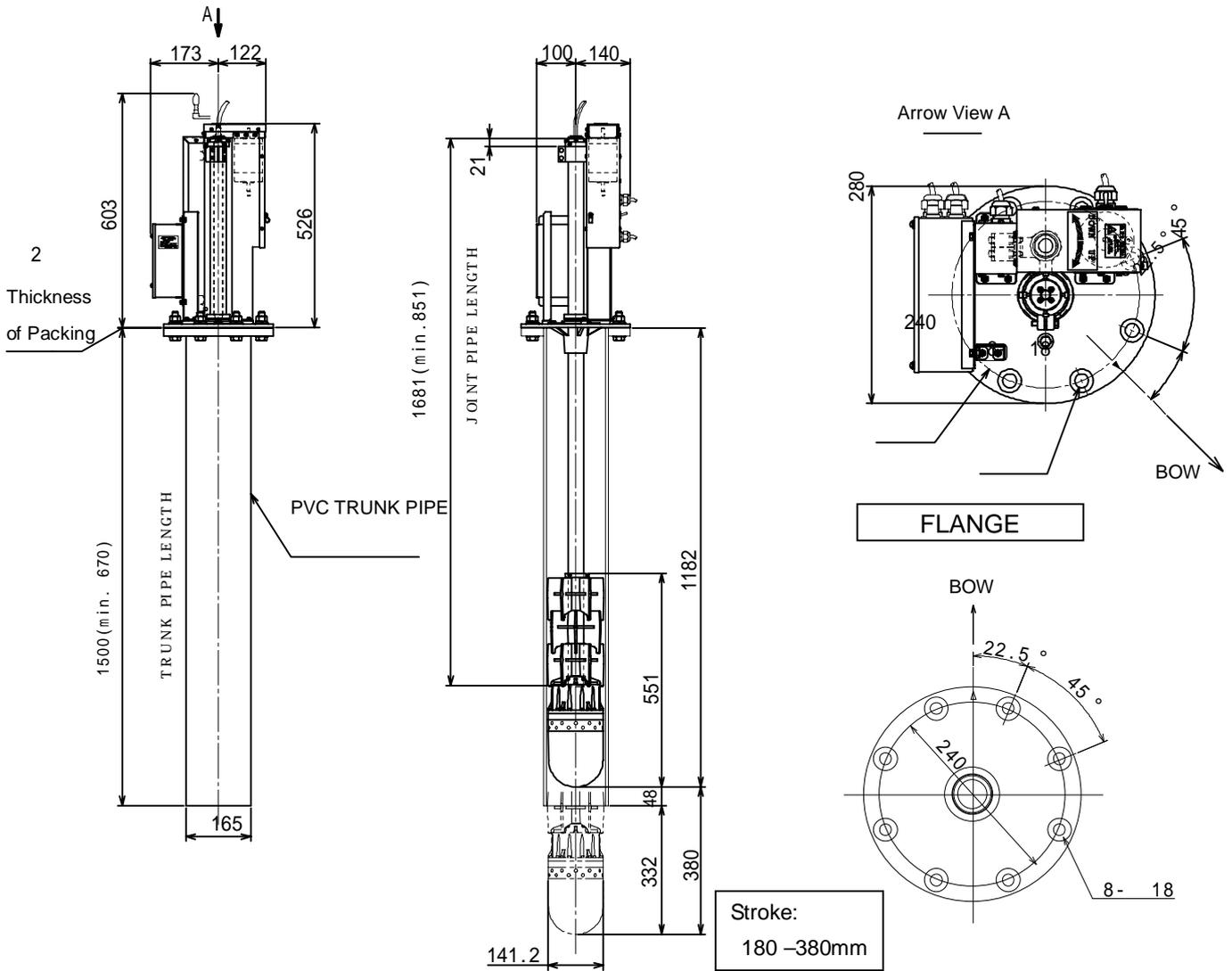


## JUNCTION BOX



# DIMENSIONS (S-1900H)

OPTION: JUNCTIONBOX MOUNTED ON THE HOIST

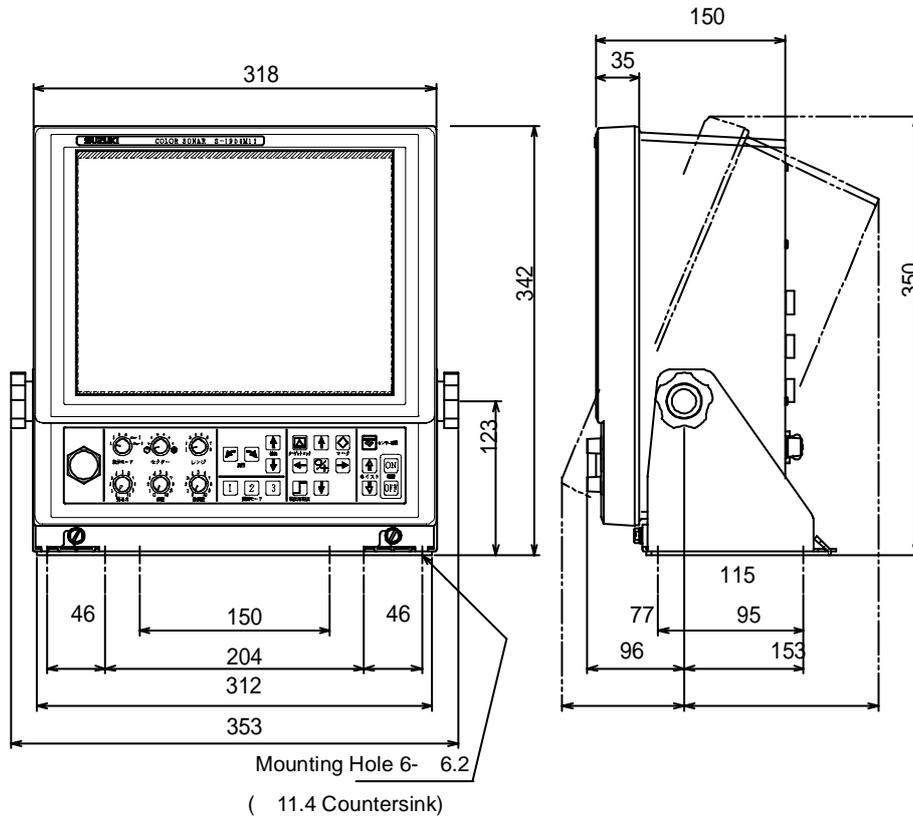


OPTION: OP-700 S-1900 JUNCTION BOX MOUNTING KIT **CF** PAGE 105

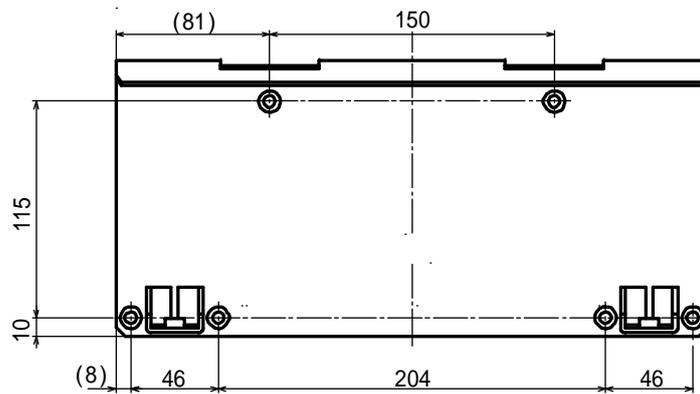
S-1900 H800 DIMENSIONS: Refer to the page 113.

# DIMENSIONS (M12)

M12

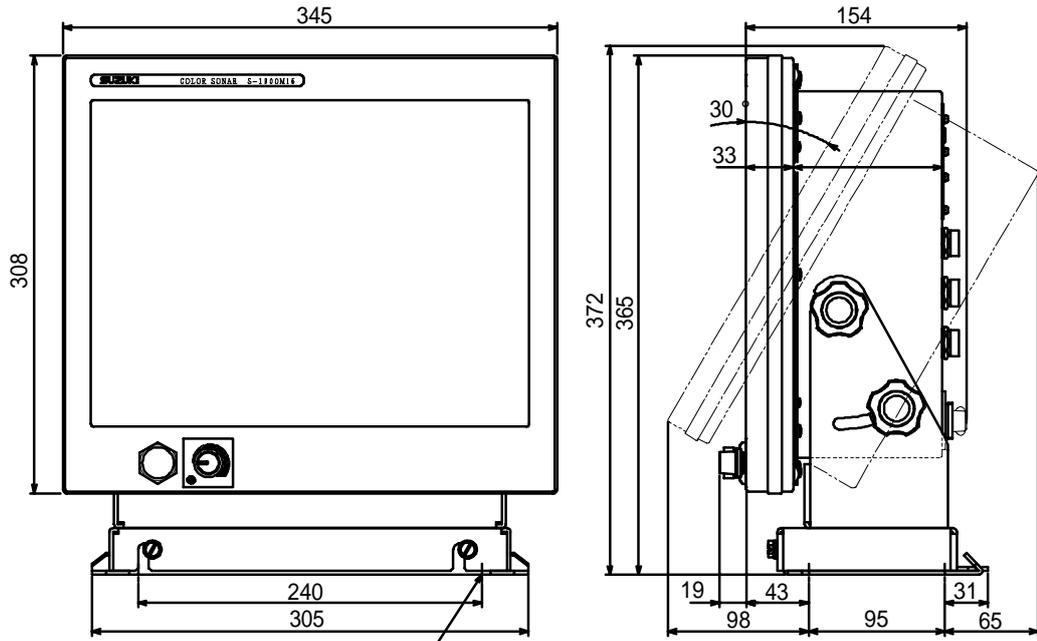


M. BASE



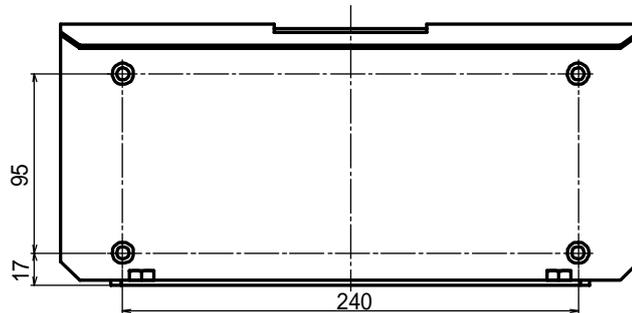
**DIMENSIONS (M15)**

M15

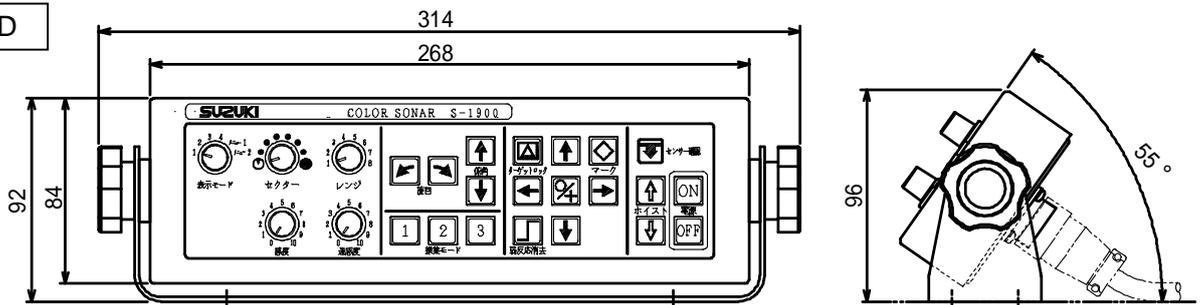


4- 11.4 Countersink  
(M5 Flat Tapping Screw)

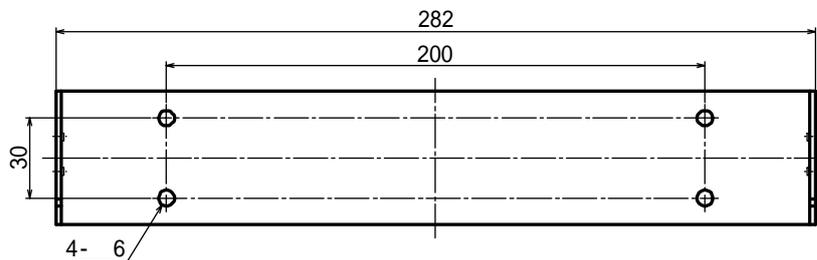
M. BASE



KEYBOARD

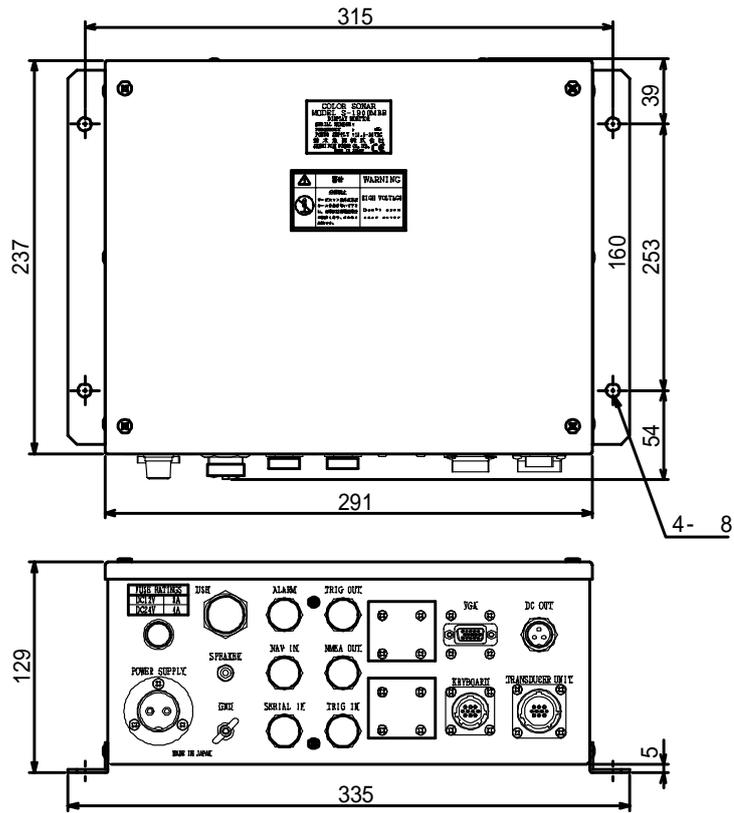


M. BRACKET

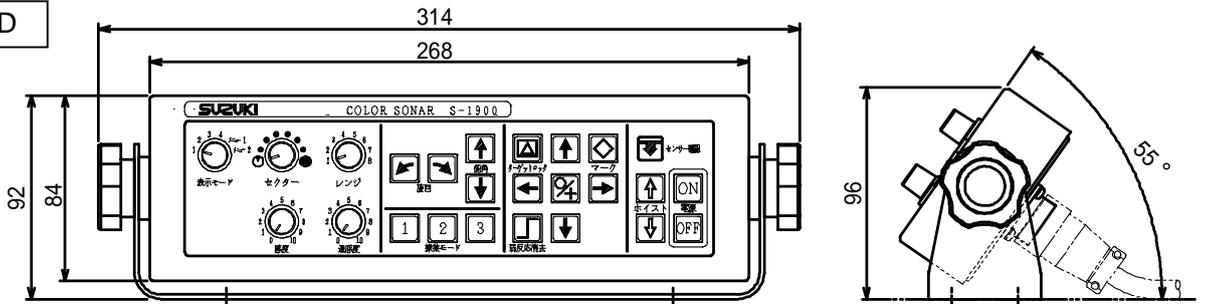


# DIMENSIONS (MBB)

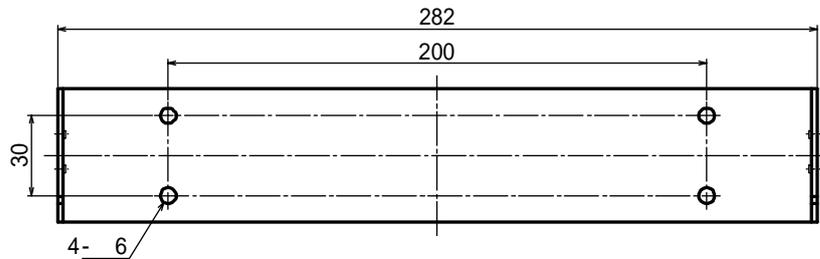
MBB



KEYBOARD



M. BRACKET



## TRUNK PIPE

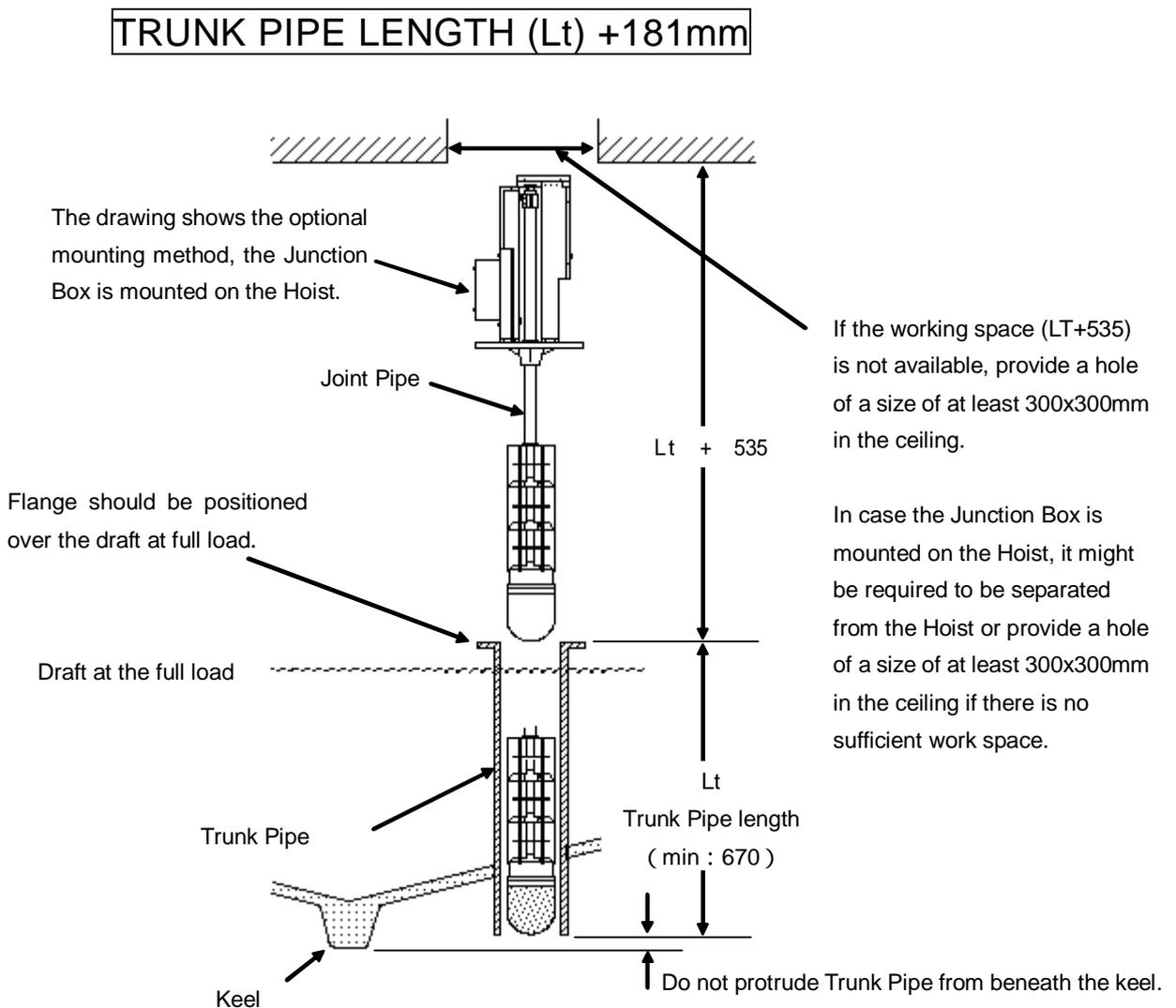
### 1. MAINTENANCE SPACE

When installing the Trunk Pipe, pay full attention to the safety (strength, water-tightness, etc.). At the same time, secure a space for maintenance and inspections.

- Since the Hoist unit is not a waterproof structure, keep it away from water drops and splashes.

- S-1900 is shipped from the factory with standard, 1,681mm Joist Pipe and without Trunk Pipe.

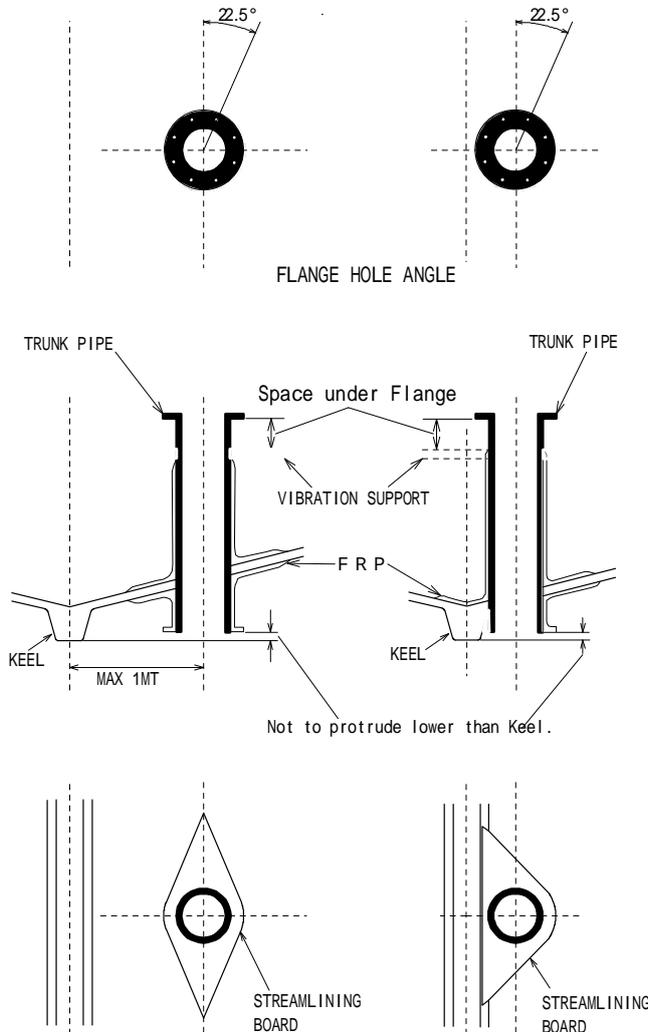
When mounting the Joint Pipe to the Soundome, be sure not to damage the Joint Pipe thread or twist the Soundome cable



## 2. TRUNK PIPE INSTALLATION CONDITIONS

Satisfy the following installation conditions.

- Installation point should be 1/3 to 1/2 of the ship's overall length back from the bow.
- If it cannot be installed on the keel, the center of the trunk pipe should be within 1 meter of the keel.



-There should be no obstacles right below the flange to avoid hindering bolt clamping.

-Do not protrude the Trunk Pipe from beneath the keel.

-Flange should be positioned in parallel with the ship's draft and over the draft at full load.

-Apply FRP sufficiently to all the necessary sections to prevent water leakage.

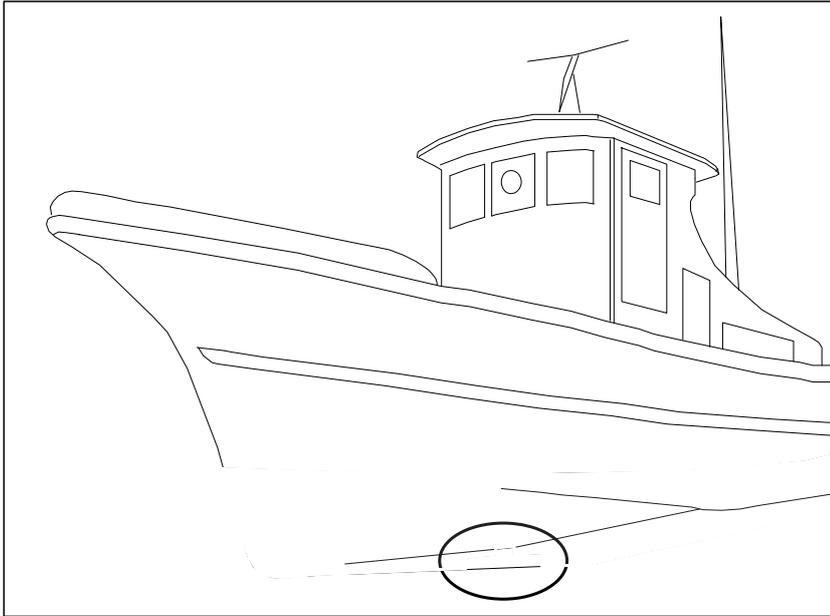
-Make the surrounding of Trunk Pipe in a streamline shape and provide a fairing plate to suppress water resistance and generation of air bubbles to the minimum.

-Attach a fin if necessary. Make sure the fin does not hinder bolt clamping for Flange.

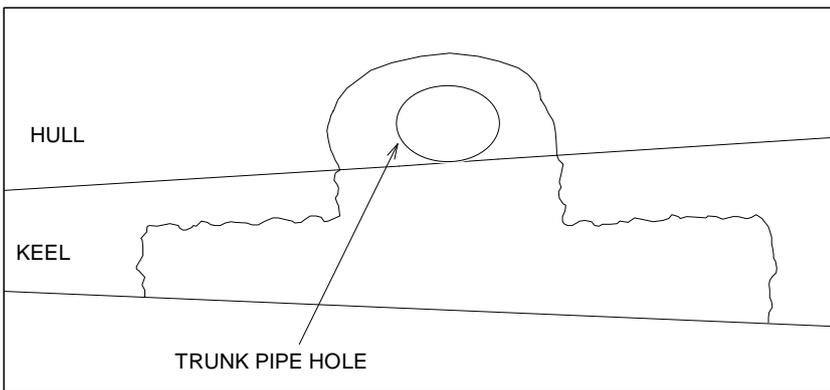


Fully discuss about the strength and water tightness with the ship owner, the engineer in the shipyard, and the installer before determining on the position, the method of installation, and necessary materials. Otherwise it causes maritime accidents.

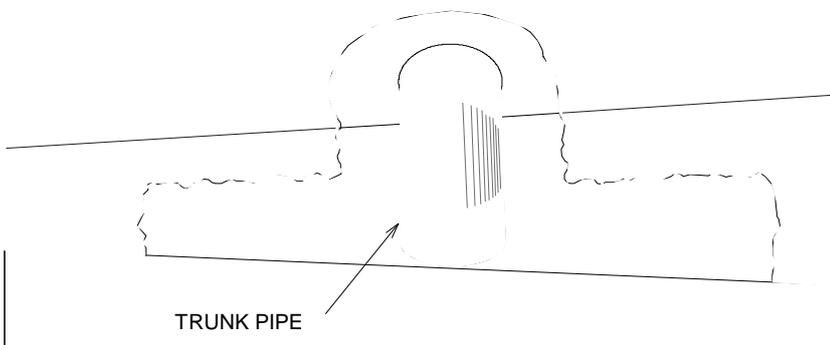
3. TRUNK PIPE INSTALLATION EXAMPLES



- Select a location of Trunk pipe.  
**CF** page 12

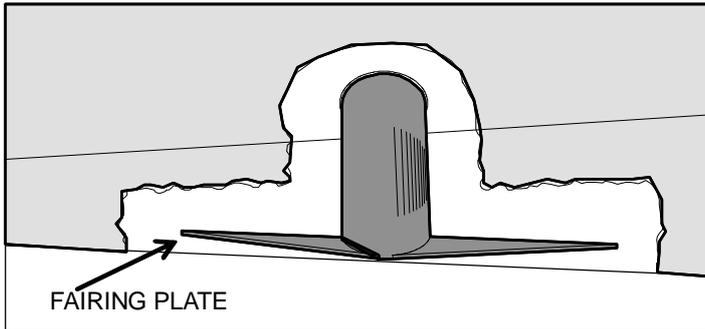


-Make a hole of Trunk Pipe diameter in the bottom of ship.

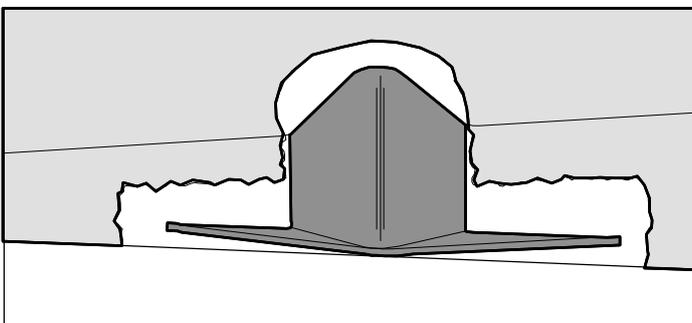
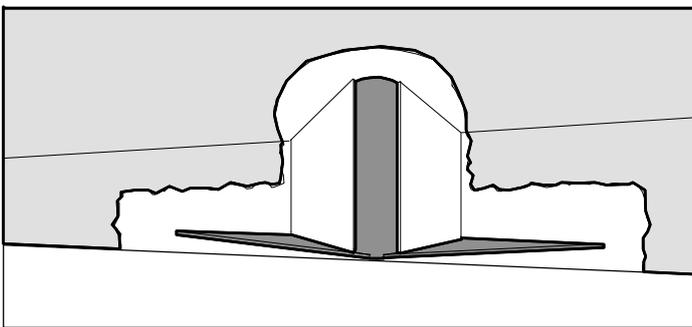


-Install the Trunk Pipe.  
Flange should be positioned in parallel with the ship's draft in sailing.

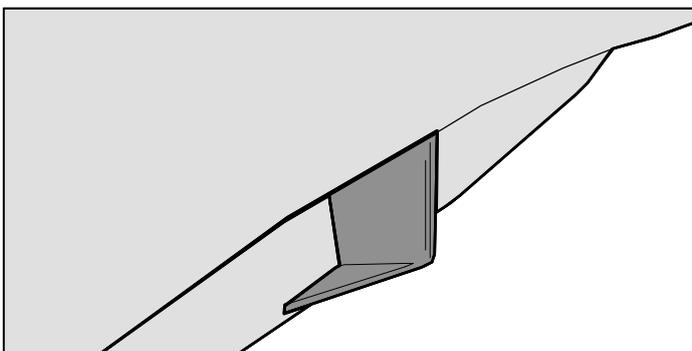
< To be continued >



-Make the surrounding of the Trunk Pipe projecting out from the bottom in a stream line shape and provide a fairing plate to suppress water resistance and generation of air bubbles to the minimum.



-Apply FRP sufficiently to all the necessary parts to prevent leakage of water.



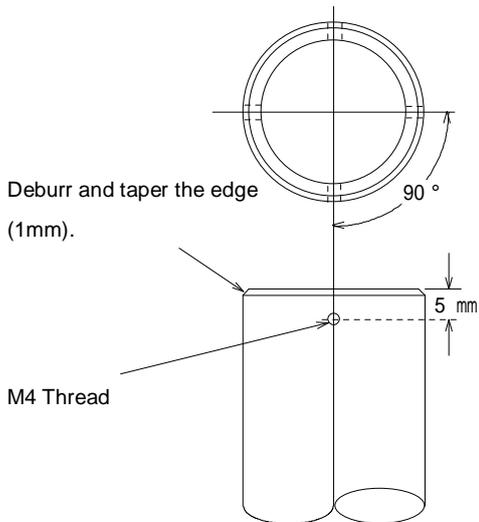
## ASSEMBLING and MOUNTING of HOIST

### 1. JOINT PIPE

Calculate necessary length of Joint Pipe (Standard length of 1681mm) from the length of Trunk Pipe  $L_t$  and cut off the unnecessary portion.

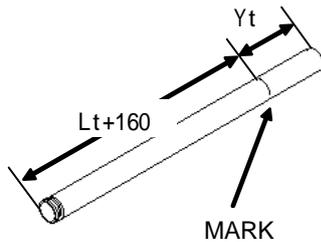
$$\text{JOINT PIPE LENGTH} = \text{TRUNK PIPE LENGTH } (L_t) + 181\text{mm}$$

### 2. JOINT PIPE ADJUSTMENT

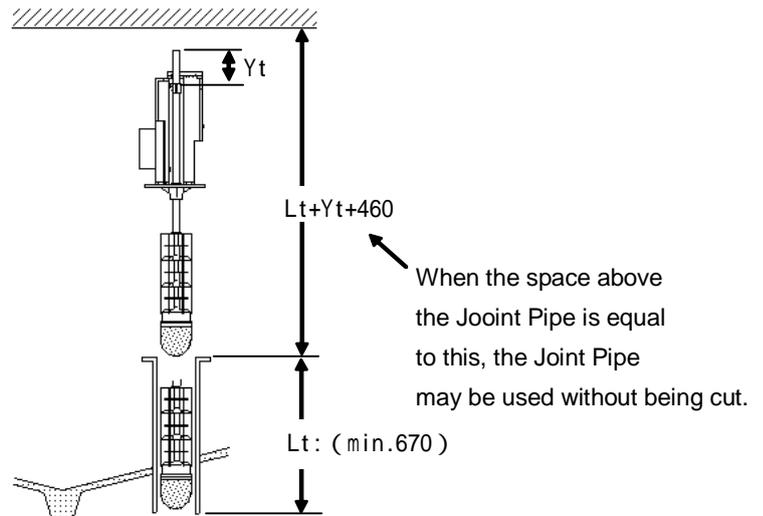


- 1) Cut the Joint Pie to the required length, Trunk Pipe length ( $L_t$ ) + 181mm.
- 2) Deburr the cut piece and taper the edge (1mm).
- 3) Bore 4 hoers in the Joine Pipe as follows,
  - every 90 degrees
  - 5mm from the cut end of the pipe
  - hole size of 3.4
  - set a tapping screw (M4) on the hole each

In case of sufficient space above the Joint Pipe it can be used without cutting.



Mark to the point of  $L_t+160$ .  
The upper end of Joint Arm should be united with the Mark and tighten them.



### 3. ASSEMBLING of HOIST

#### 1) Screw Joint Pipe into the Soundome.

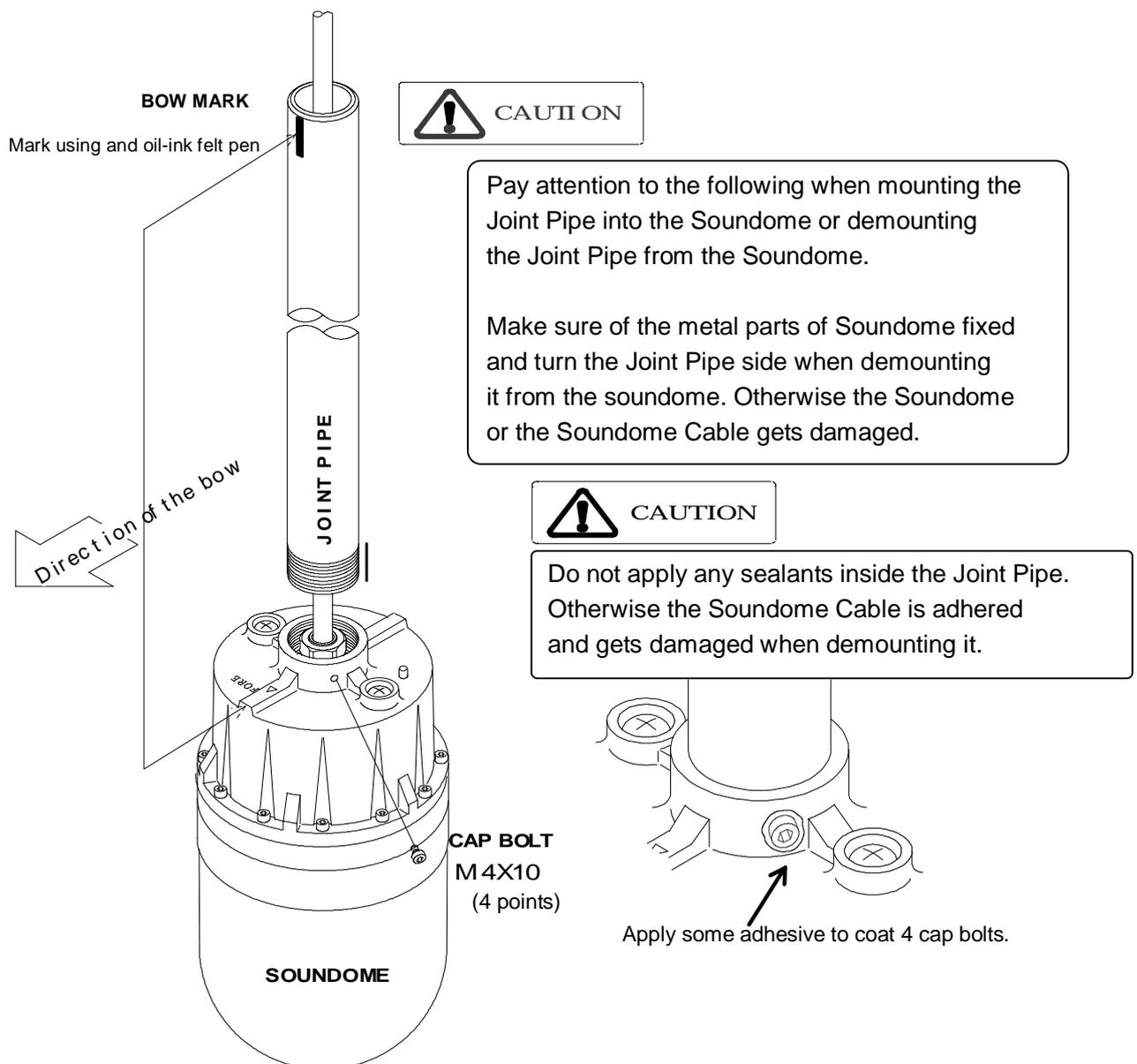
Make sure not to damage the Joint Pipe or twist the Soundome Cable.

Totally wipe dirt and grease from the threaded parts of the Soundome and Joint Pipe.

Apply adhesive, Cemedine Bathcork (supplied) to the threaded parts of the Joint Pipe.

Coat the attached cap bolts with adhesive to prevent an electric corrosion after clamping the Joint pipe securely with cap bolts.

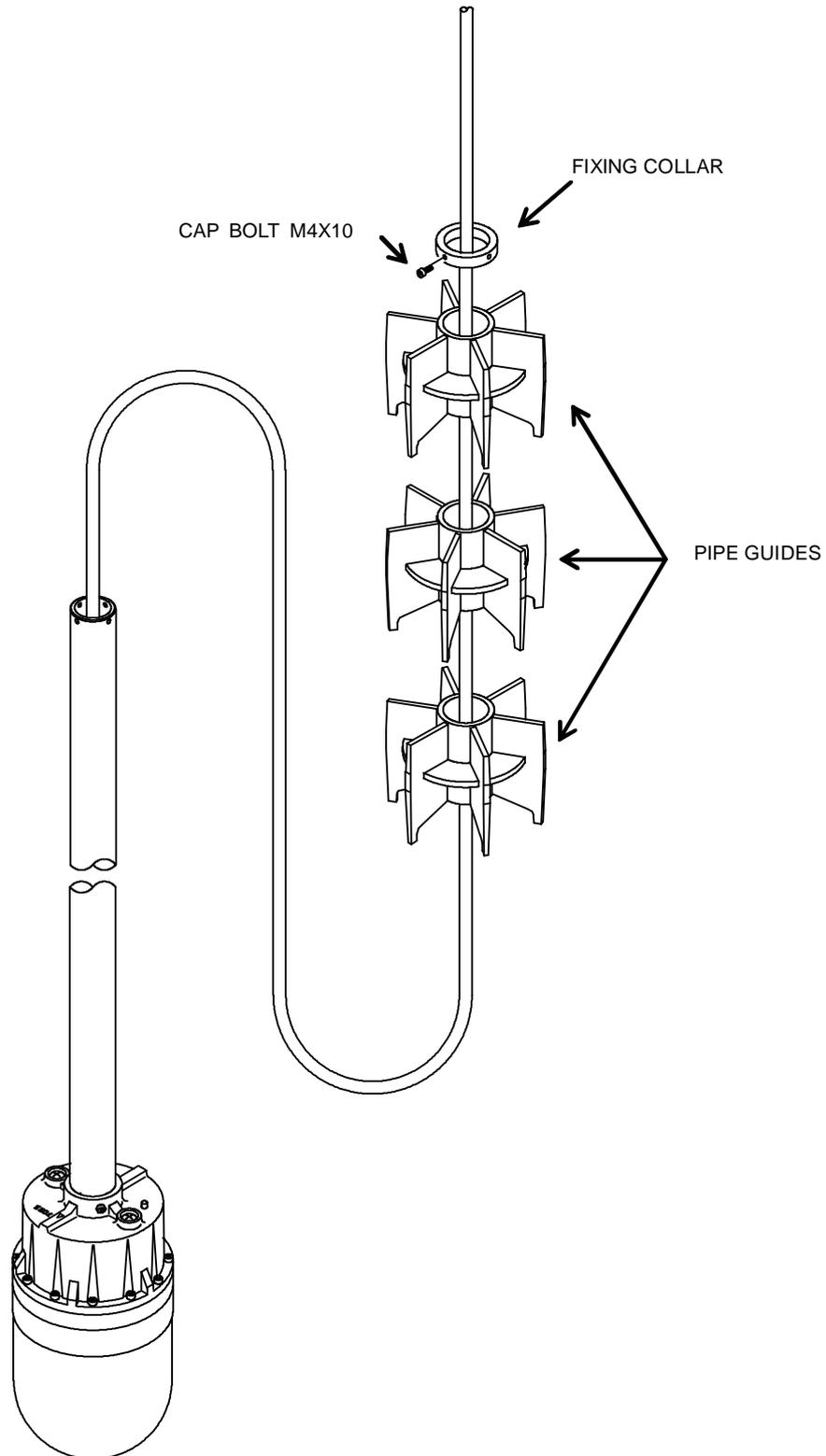
Put a Bow Mark with a felt pen at the top end of the Joint Pipe as shown in the drawing.



< To be continued >

## 2) Mount Pipe Guides

Insert Pipe Guides (3 pcs) as shown in the drawing.  
Insert Fixing Collar and fix it with the Cap Bolts (2 pcs).



< To be continued >

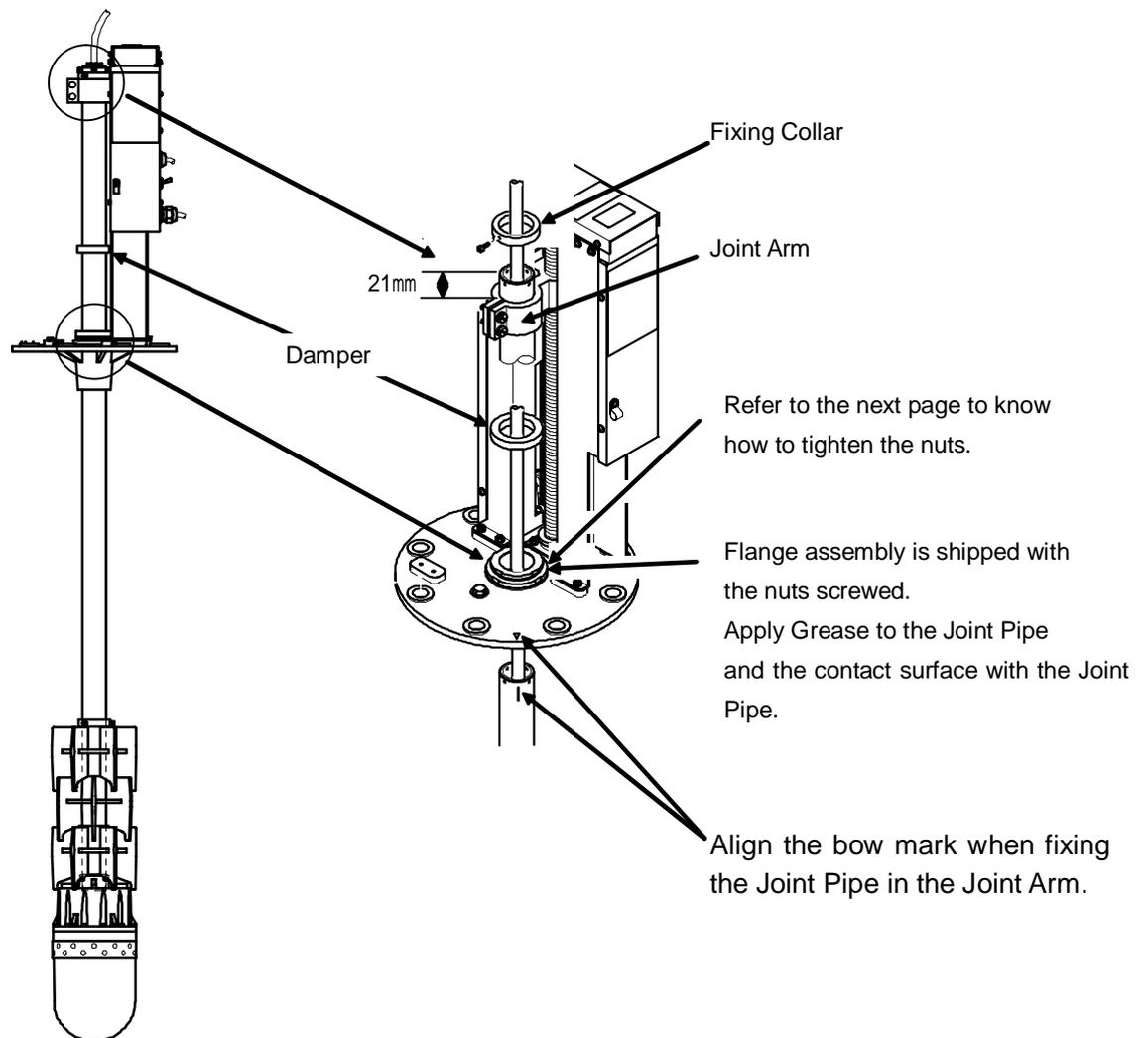
### 3) Mount Soundome on the Hoist

-Apply Grease inside the nuts and the Flange.

-Unscrew the nuts. Pass the Joint Pie through the Flange assembly.  
Pass the Damper through and align the bow mark on the Soundome with the mark on the Flange assembly. Fix the Joint Arm to the Joint Pipe.

-Take care the position of the Soundome bottom is 48mm up from the Trunk Pipe bottom.

-Pass the Fixing Collar into the Joint Pipe and fasten it with the cap bolts (2 pcs).



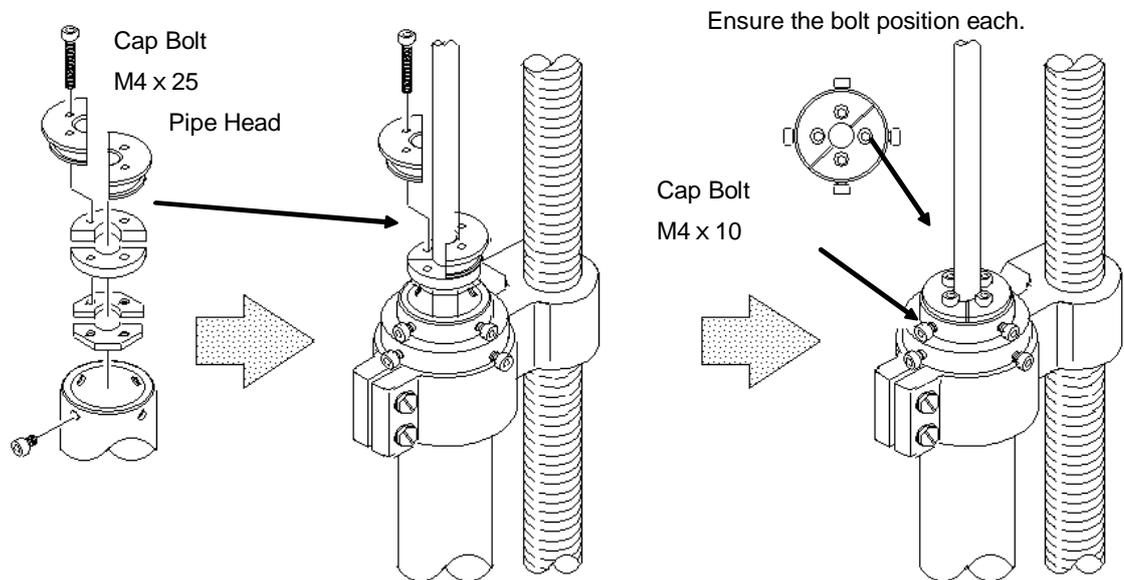
< To be continued >

## 4) Mount Pipe Head at the end of Joint Pipe

Insert the Pipe Head into the Joint Pipe.

Screw it with the cap bolts, M4x25 (4 pcs).

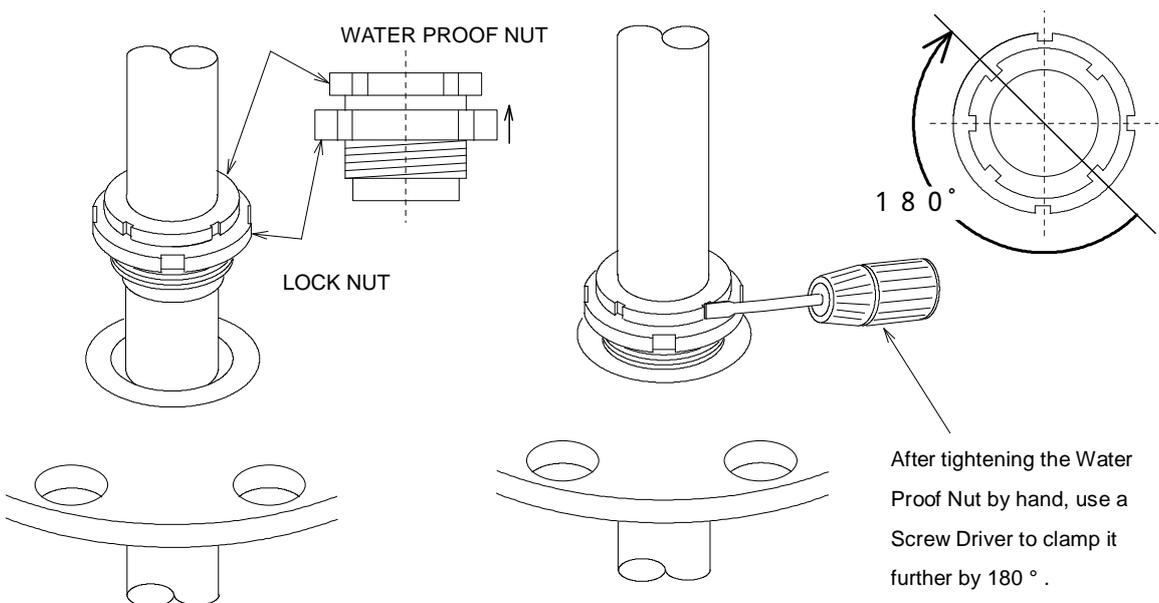
Screw the cap bolts, M4x10 (4 pcs) to prevent slip-out of the Pipe Head.



## 5) How to tighten the nuts

Lift up the Lock Nut as shown in the drawing. Place the Waterproof Nut on the Flange opening and tighten it firmly by hand and then make a 180-degree turn with a screwdriver. Take care not to over a 180-degree. This Lock Nut is to protect loosening the Waterproof Nut.

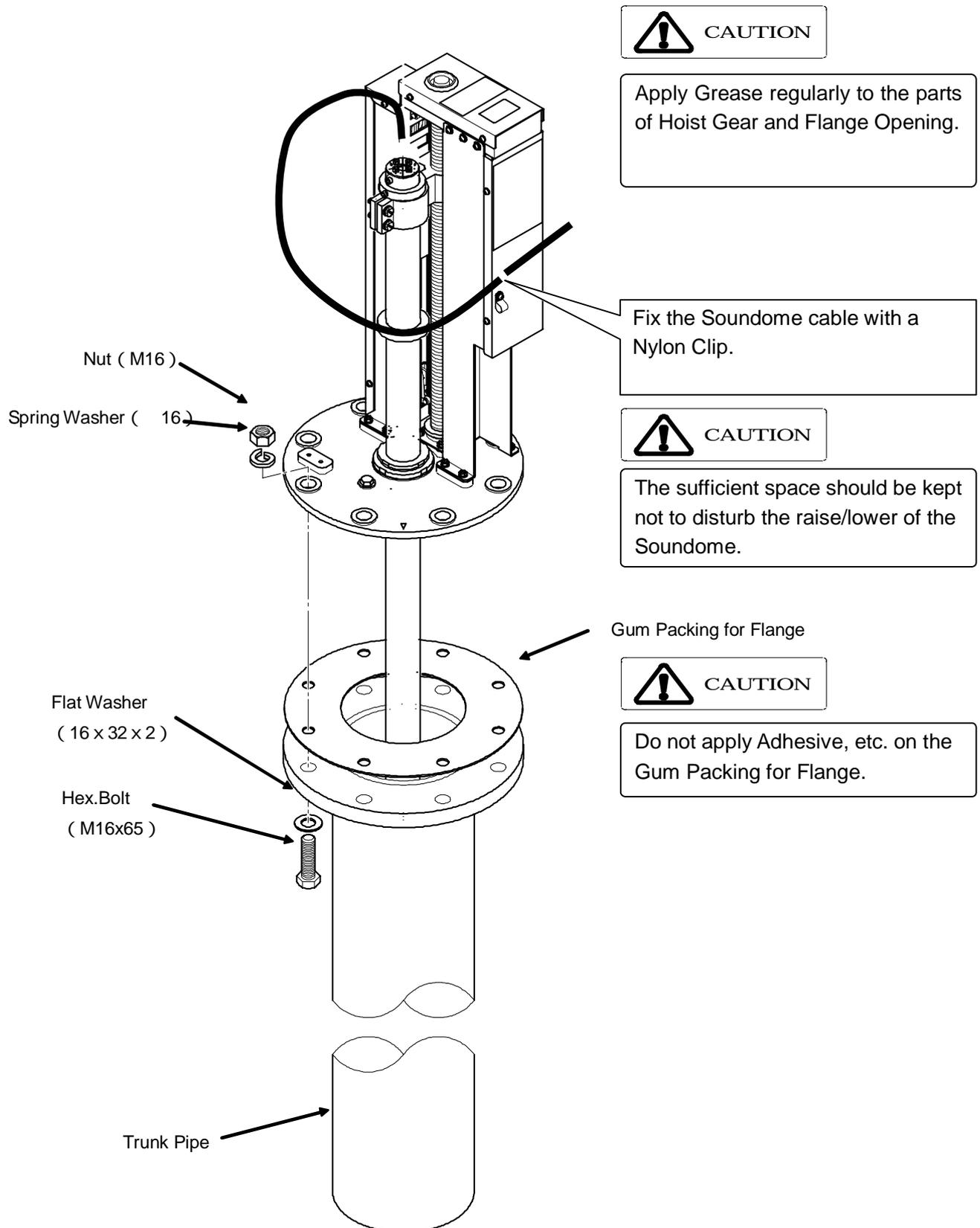
Screw the Lock Nut tightly with a screwdriver and a hammer.



< To be continued >

### 6) Assemble Hoist with Trunk Pipe

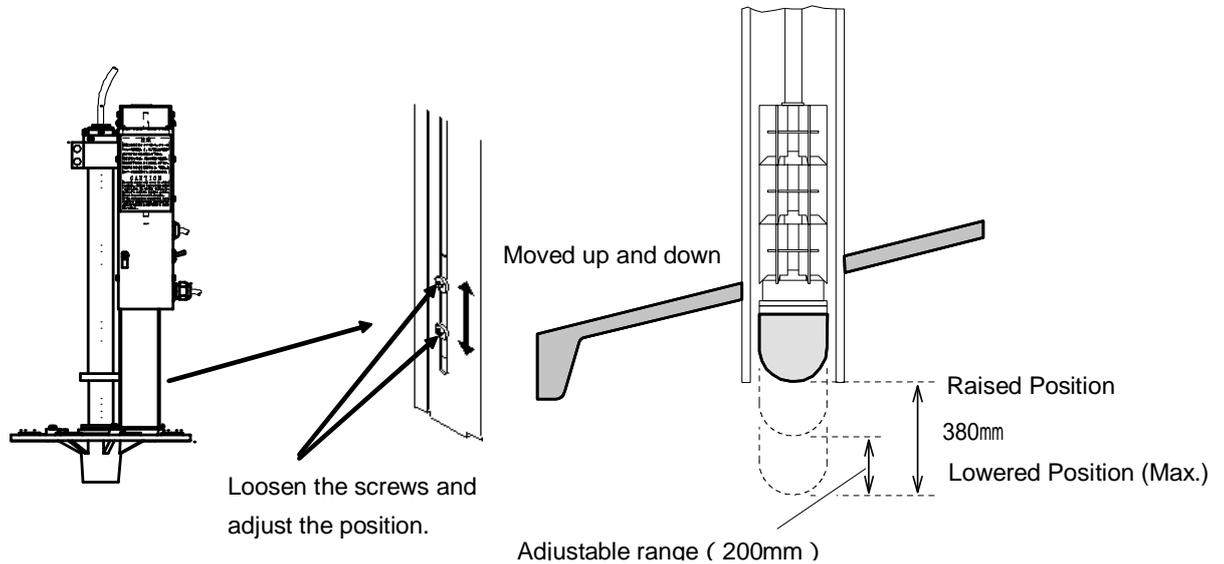
Insert Gum Packing between Hoist Unit and Trunk Pipe.  
 Use 8 Hex.Bolts (M16x65) to fit Hoist Unit in Trunk Pipe.  
 Check the performance of rising/lowering of the Soundome several times while tentatively clamping with Hex.Bolts and fasten them after the performance is confirmed.



#### 4. HOW TO ADJUST HOIST STROKE

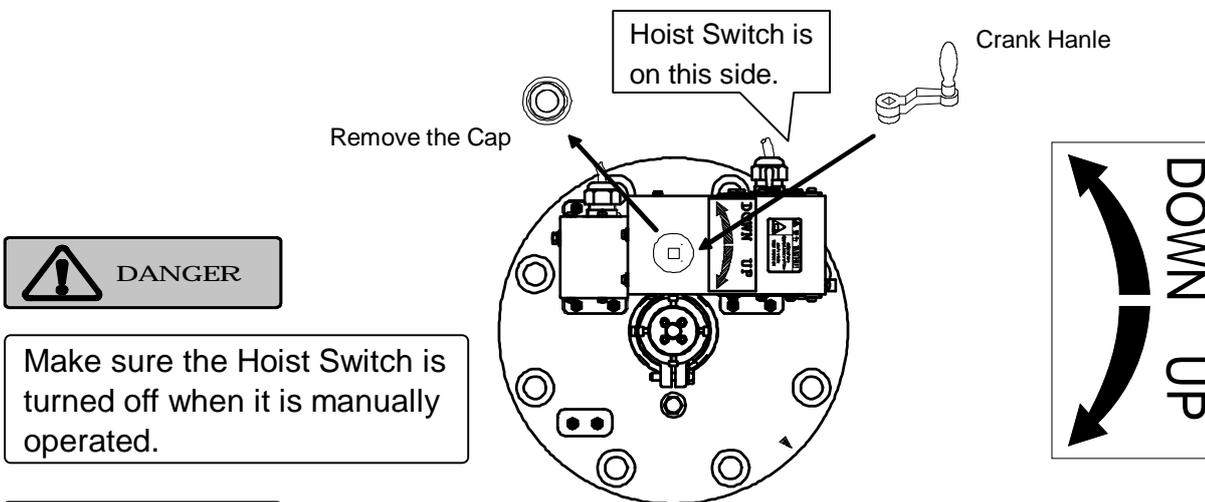
The stroke of raising/lowering of the Soundome can be adjusted from the minimum, 180mm to the maximum, 380mm by adjusting the switch shown in the drawing.

Find the proper lowering position of the Soundome with this Switch.



#### 5. MANUAL RAISE/LOWER OF SOUNDOME

In case the Hoist cannot raise the soundome, it is possible to raise the Soundome with the Crank Handle manually after removing the Cap.



**DANGER**

Make sure the Hoist Switch is turned off when it is manually operated.

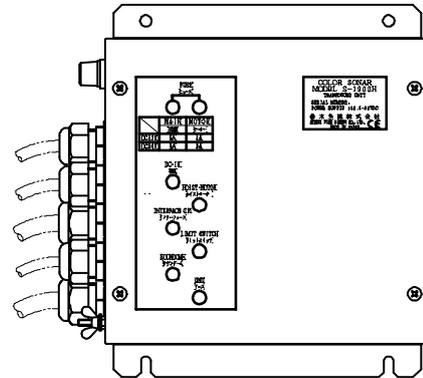
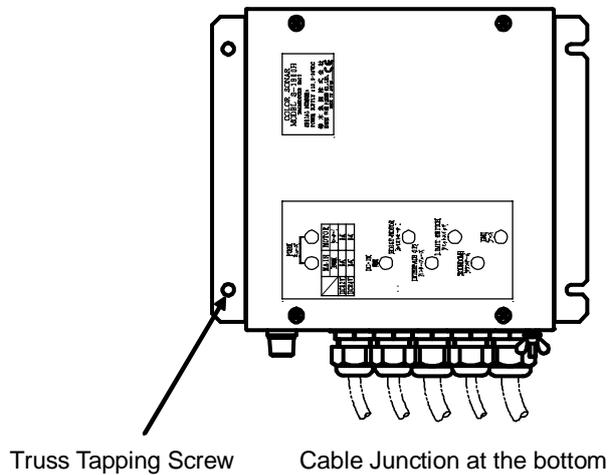
**WARNING**

Confirm the voltage between the Flang and the minus terminal of the ship's battery does not exceed 0.65 volts after the installation completed.

Use the larger diameter cable if the voltage exceeds 0.65 volts.  
Otherwise the damage to the Soundome due to the electrolytic corrosion may results.

## MOUNTING of JUNCTION BOX

The mounting location should be well ventilated and dry.  
 Avoid locations subject to watersplash or rain. Allow enough service clearance.  
 The Cable Junction side should be at the bottom side or the left side.



Cable Junction at the left

### Components

- Hull Control Unit --- 1
- Truss Tapping Screw --- 4  
( M5x20 )

Use the S-1900 Junction Box Mounting Kit to joint the Junction Box to the Hoist if desired.

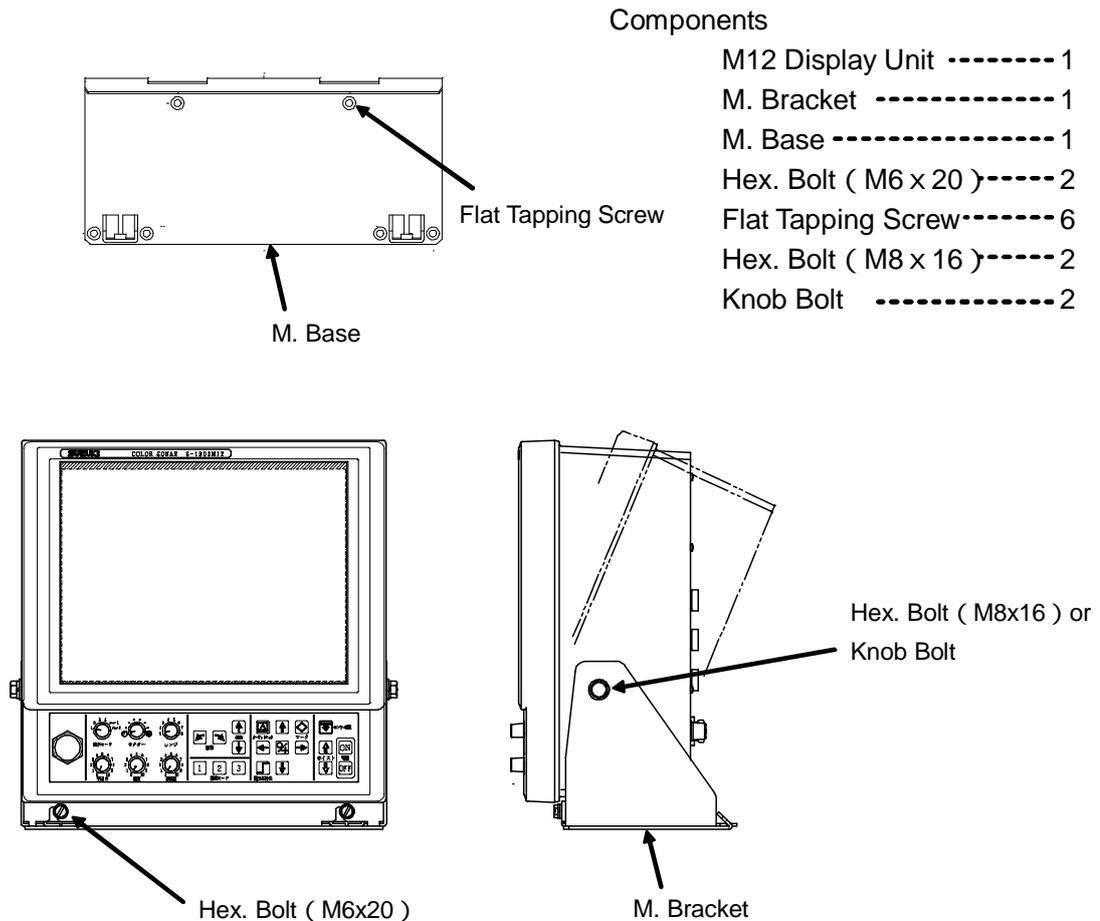
### Option

OP-700 S-1900 Junction Box Mounting Kit

**CF** page 105

## MOUNTING M12 DISPLAY UNIT

- 1) Fasten the M. Base with 6 Flat Tapping Screws on the mounting place.
- 2) Fit the M12 to the M. Bracket with the Hex. Bolts or the Knob Bolts adjusting the comfortable viewing angle of the monitor.
- 3) Hook the back of M12 on the M. Base from the upward position diagonally and match the front notch of the M. Bracket with 2 Hex. Bolts. Set the M. Bracket into the left side and screw them.

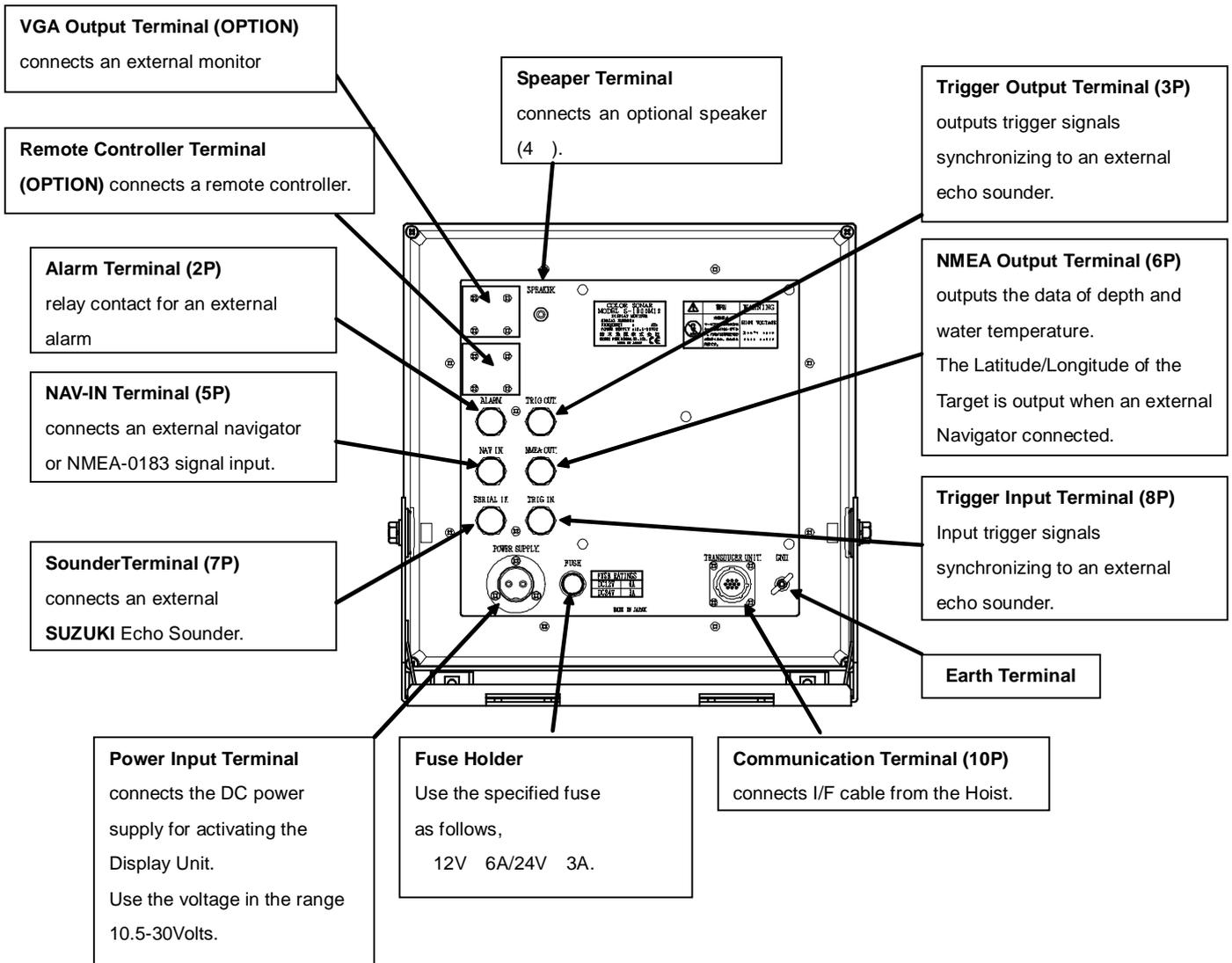


The unit should be installed and fixed on a flat surface.  
Otherwise it may cause the trouble.



Vibration or shock in the mounting area should be minimal.  
Locate the unit away from areas subject to water splash or rain.  
Otherwise it may causes corrosive trouble.  
Locate the unit away from areas subject to heat sources and direct sunlight.

# M12 DISPLAY UNIT (REAR SIDE)



The following optional terminals are available.

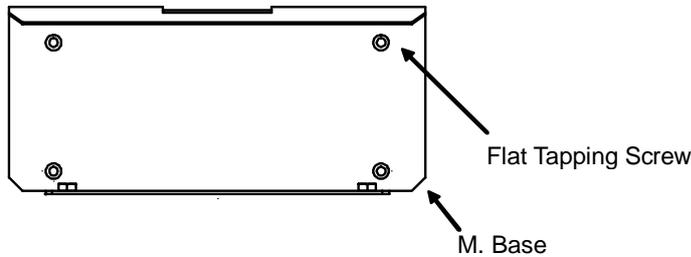
• OPTION

OPTION No.	Description	
OP-287	Connecting Cable for Remote Controller	Connects this terminal when Remote Controller used.
OP-360	VGA Connecting Cable	Connects this terminal when External Monitor used.

## MOUNTING of M15 DISPLAY UNIT/ KEYBOARD

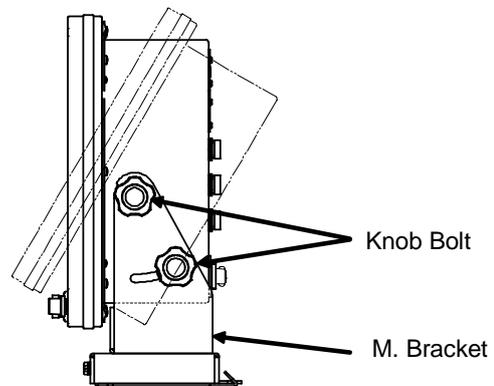
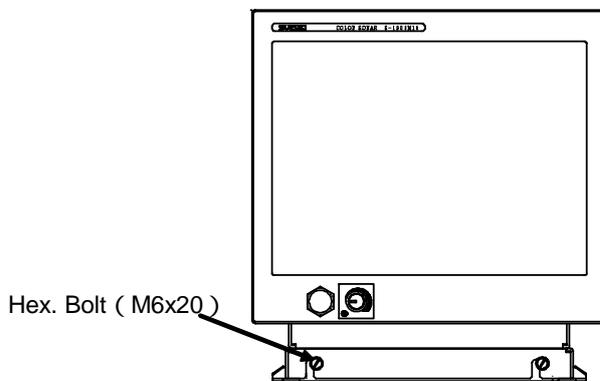
### DISPLAY UNIT

- 1) Fasten the M. Base to the mounting location with 4 Flat Tapping Screws.
  - 2) Fit the Display Unit to the M. Base with the Knob Bolts adjusting the comfortable viewing angle of the monitor. Fasten the both knob bolts.
  - 3) Hook the back of M15 on the M.Base from the upward position diagonally and match the front notch of the M. Base with 2 Hex. Bolts.
- Set the M. Base into the left side and screw them.

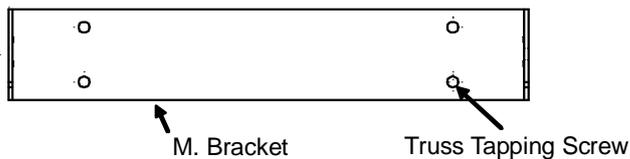


#### Components

M15 Display Unit	-----	1
M. Bracket	-----	1
M. BASE	-----	1
Hex. Bolt ( M6 x 20 )	-----	2
Flat Tapping Screw	-----	4
Knob Bolt	-----	4

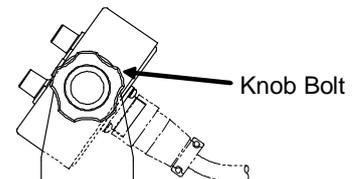
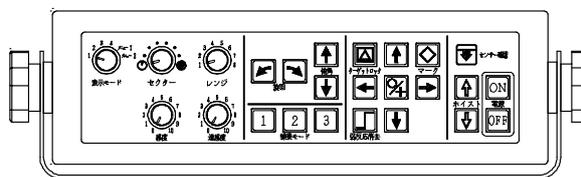


### KEYBOARD CF Refer to MBB Keyboard page 34



#### Components

Keyboard	-----	1
M. Bracket	-----	1
Truss Tapping Screw	-----	4
Knob Bolt	-----	2

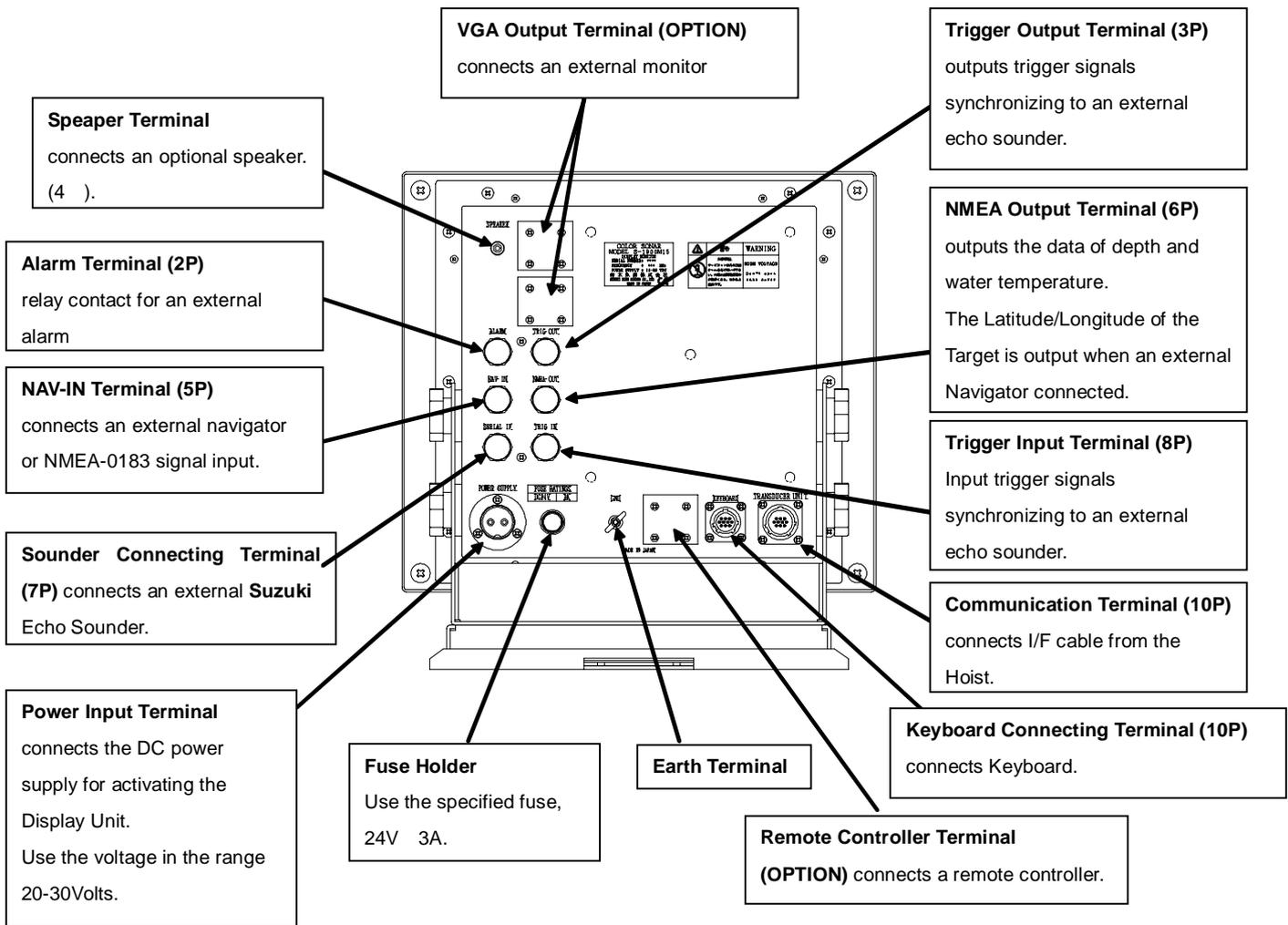


The unit should be installed and fixed on a flat surface.  
Otherwise it may cause the trouble.



Vibration or shock in the mounting area should be minimal.  
Locate the unit away from areas subject to water splash or rain.  
Otherwise it may causes corrosive trouble.  
Locate the unit away from areas subject to heat sources and direct sunlight.

# M15 DISPLAY UNIT (REAR SIDE)



The following optional terminals are available.

• OPTION

OPTION No.	Description	
OP-287	Connecting Cable for Remote Controller	Connects this terminal when Remote Controller used.
OP-360	VGA Connecting Cable	Connects this terminal when External Monitor used.

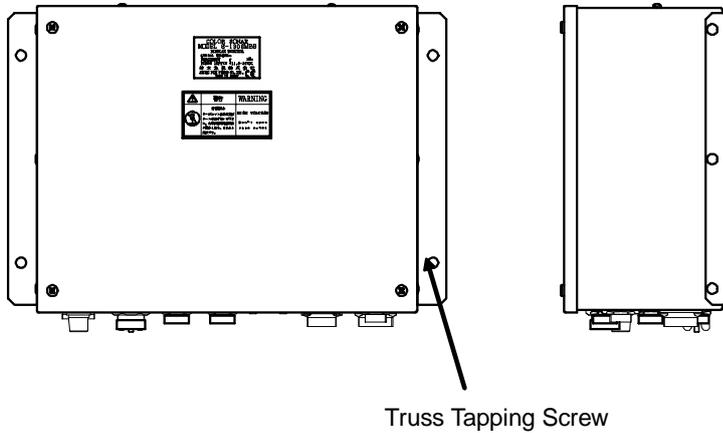
## MOUNTING of MBB CONTROL UNIT/ KEYBOARD

### CONTROL UNIT

- 1) Fasten the Control Unit to the mounting location with 4 Truss Tapping Screws.

#### Components

- MBB Control Unit ----- 1  
 Truss Tapping Screw ----- 4

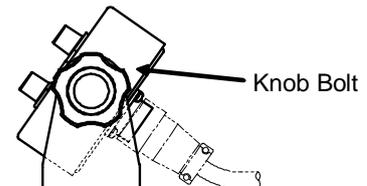
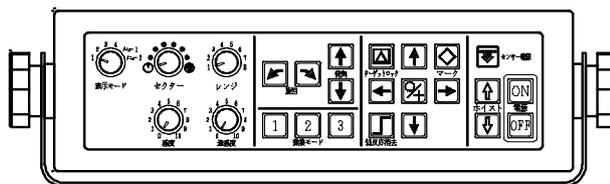
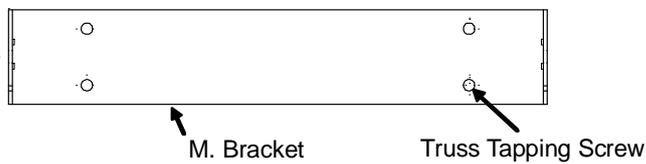


### KEYBOARD

- 1) Fasten the M. Bracket to the mounting location with 4 Truss Tapping Screws.
- 2) Fit the Keyboard to the M. Bracket with the Knob Bolts adjusting the comfortable viewing angle of the monitor. Fasten the both knob bolts.

#### Components

- Keyboard ----- 1  
 M. Bracket ----- 1  
 Truss Tapping Screw ----- 4  
 Knob Bolt ----- 2

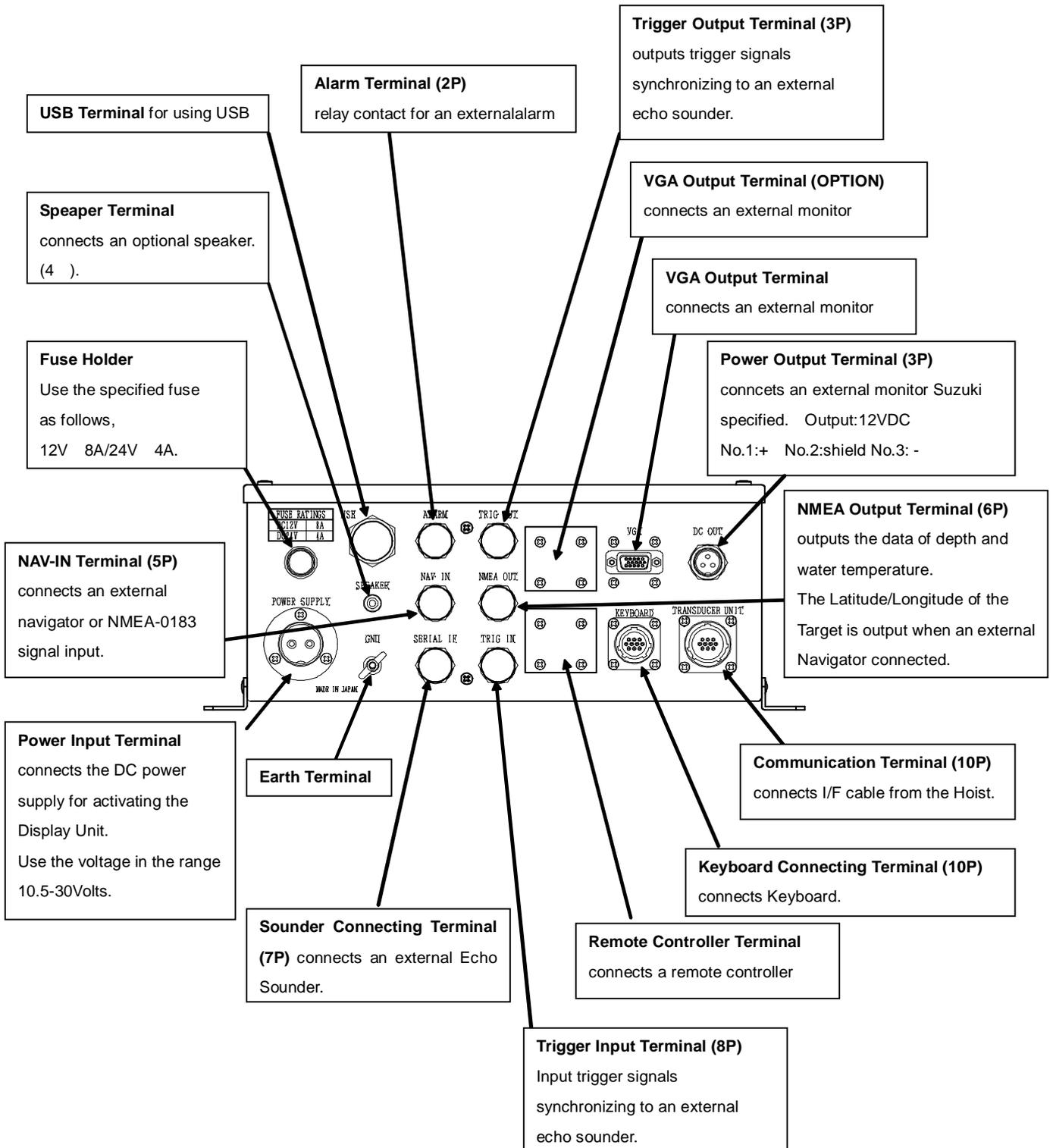


The unit should be installed and fixed on a flat surface.  
 Otherwise it may cause the trouble.



Vibration or shock in the mounting area should be minimal.  
 Locate the unit away from areas subject to water splash or rain.  
 Otherwise it may causes corrosive trouble.  
 Locate the unit away from areas subject to heat sources and direct sunlight.

# MBB CONTROL UNIT (REAR SIDE)

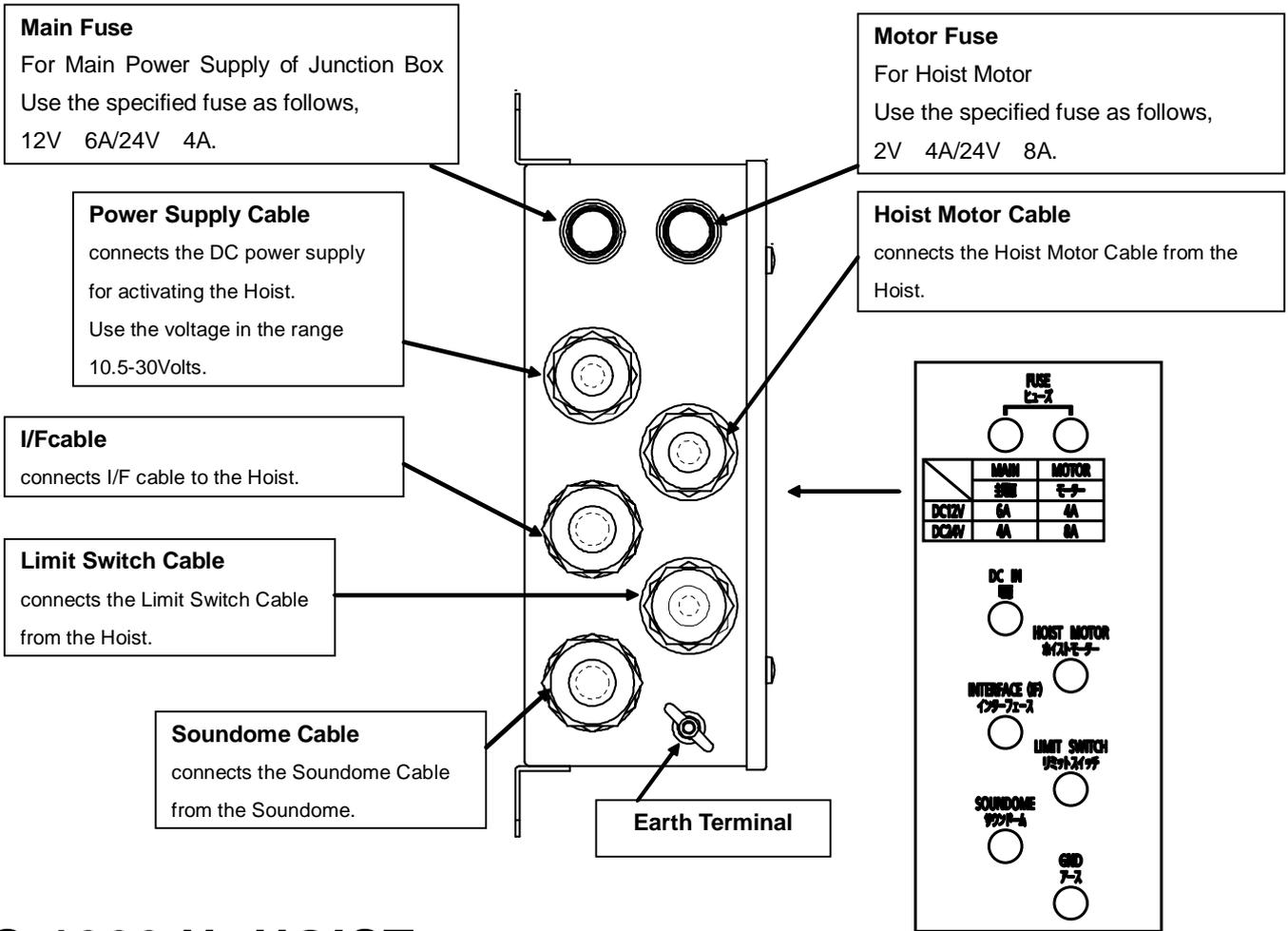


The following optional terminals are available.

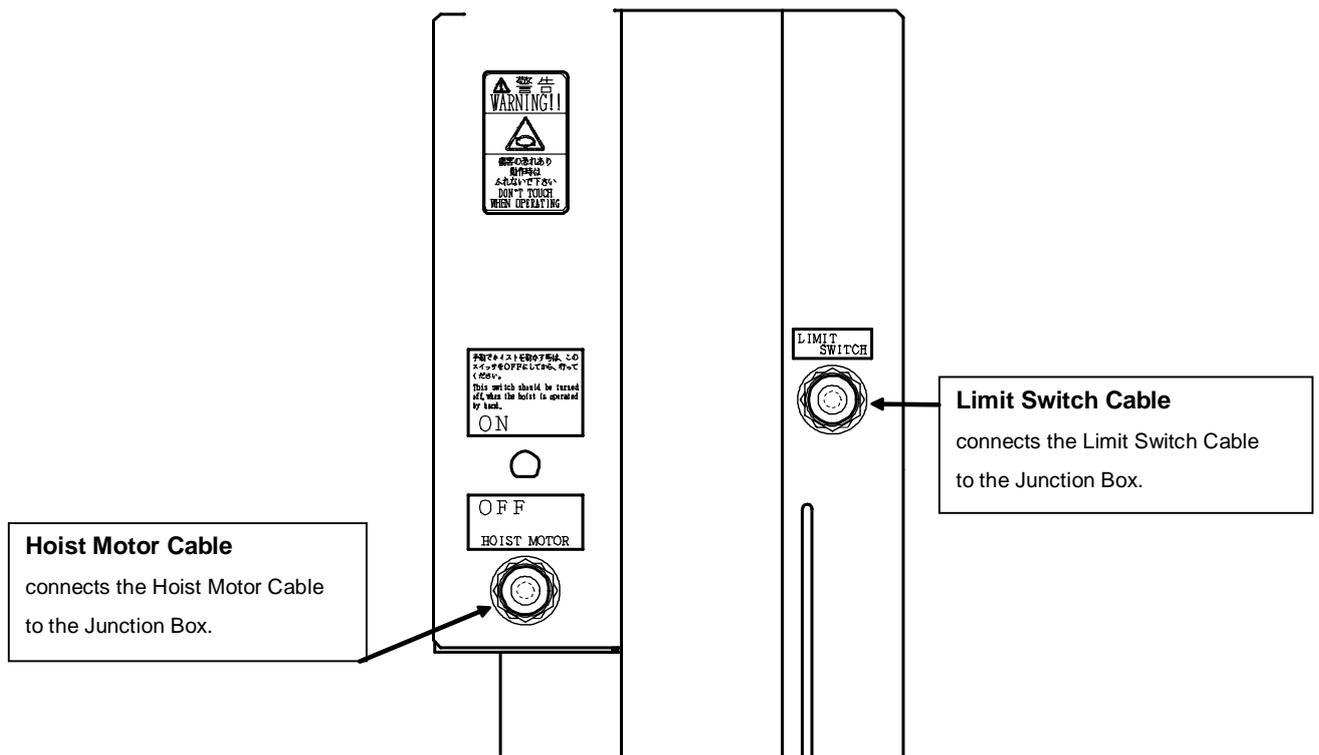
• OPTION

OPTION No.	Description	
OP-287	Connecting Cable for Remote Controller	Connects this terminal when Remote Controller used.
OP-360	VGA Connecting Cable	Connects this terminal when External Monitor used.

## WIRING BETWEEN S-1900H AND JUNCTION BOX



## S-1900 H- HOIST



## WIRING WARNINGS

Connect the cables to the Hoist, the Junction Box, the Display Units or the Keyboard referring to the following instructions.



WARNING

- The DC Power Supply connected to the main unit each is as follows,

S-1900 M12	Display Unit	: 10.5 – 30 volts
S-1900 M15	Display Unit	: 20 – 30 volts
S-1900 MBB	Control Unit	: 10.5 – 30 volts
S-1900 H	Junction Box	: 10.5 – 30 volts

Connection of an incorrect power supply may cause fire, electrical shock or damage to the units.

- Use the specified power supply cable.

Otherwise fire or generation of heat may result.

- Confirm the voltage between the Flang and the minus terminal of the ship's battery does not exceed 0.65 volts after the installation completed.

Use the larger diameter cable if the voltage exceeds 0.65 volts.

Otherwise the damage to the Soundome due to the electrolytic corrosion may results.

-Turn off the power and hold the plug when connecting or disconnecting the cable.

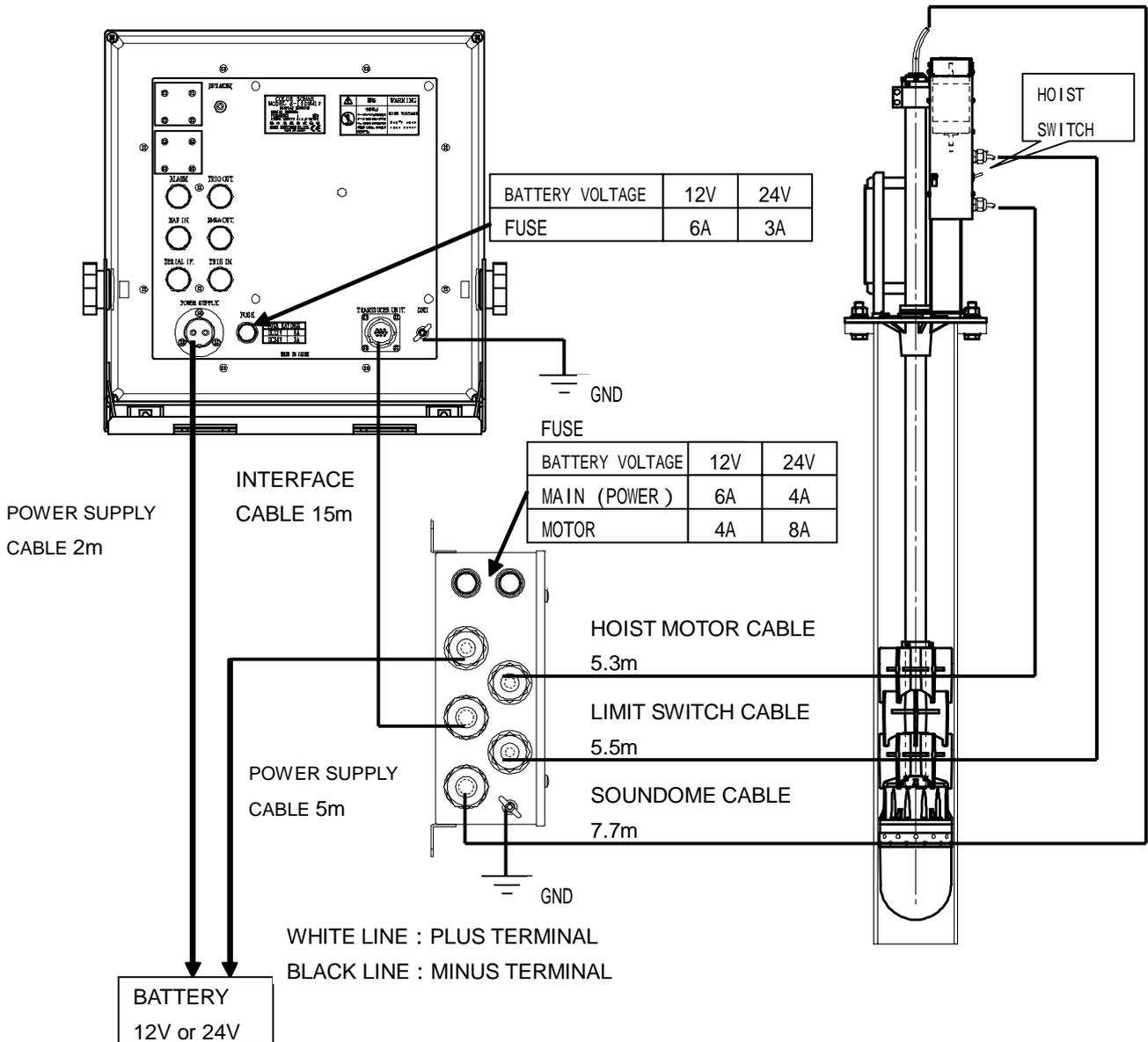
Otherwise the cable gets damaged and causes electrical shock or fire.

- Do not bent or twist the cables and not to put the heavy obstacles on the cable.

Wiring positions should not disturb the sailing operation or interfere with walking.

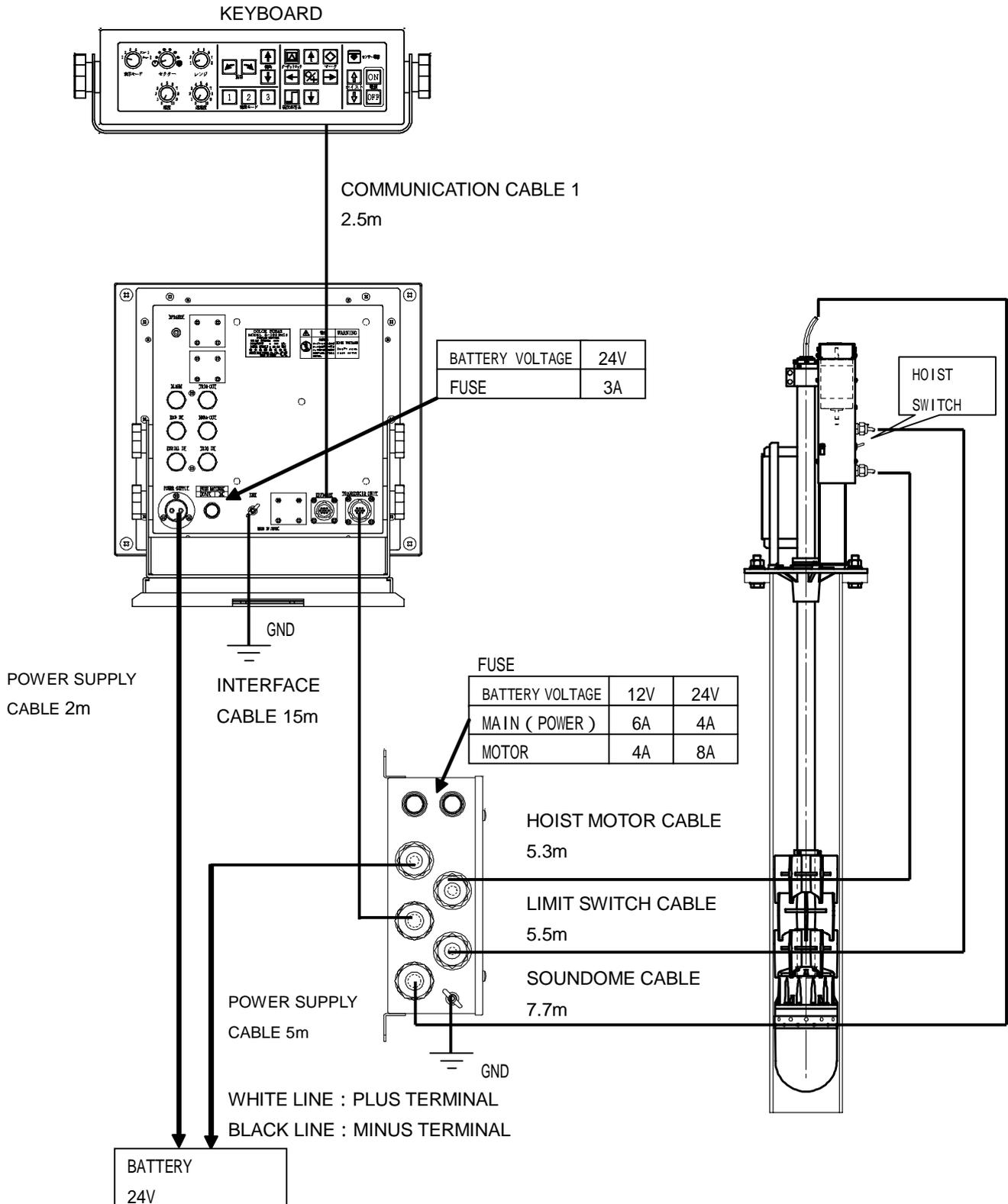
It may cause fire, generation of heat or injury.

**WIRING between S-1900M12 and S-1900H**



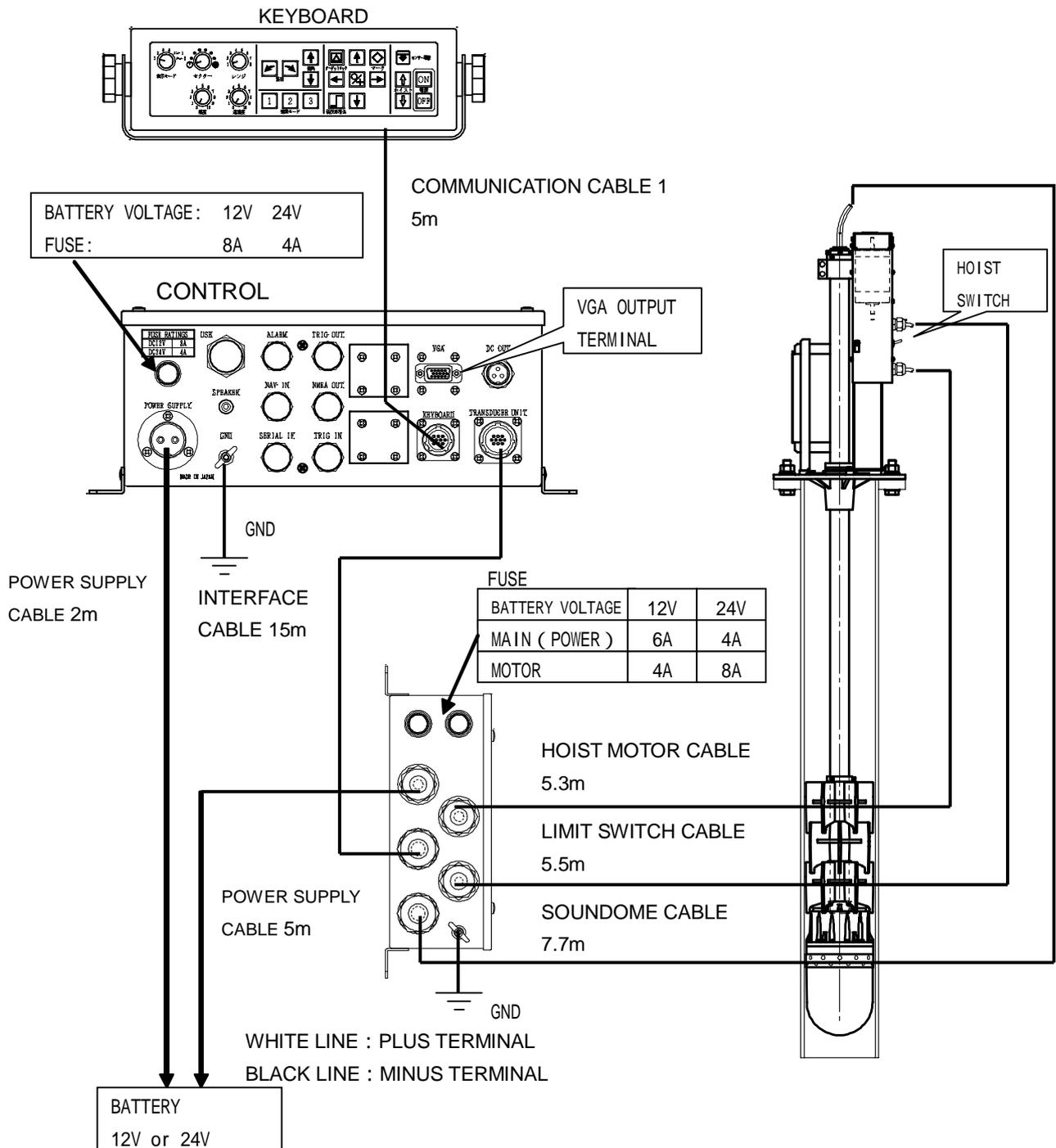
The length of each cable includes a part (up to 60 cm) for drawing inside the main unit.

# WIRING between S-1900M15 and S-1900H



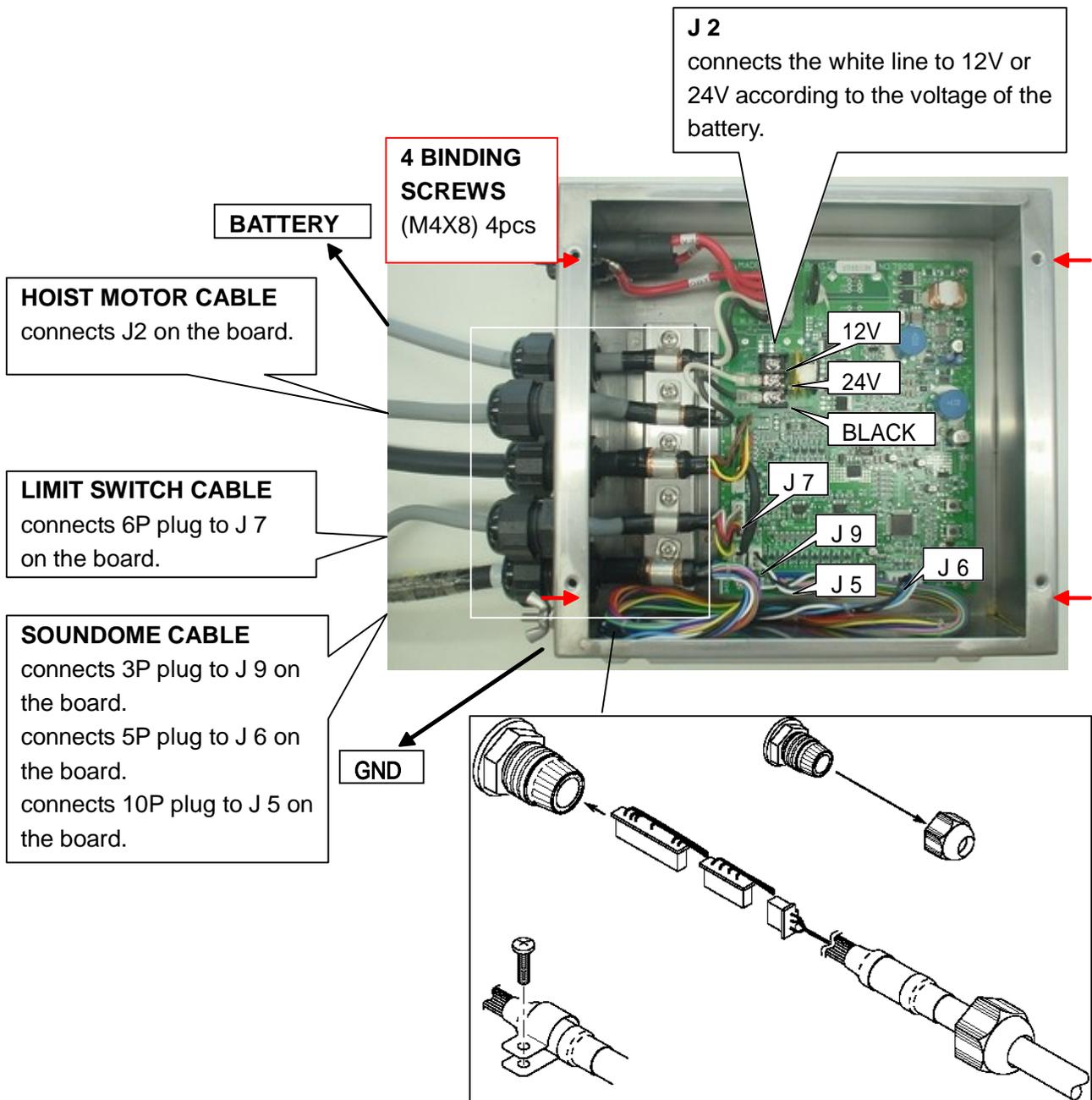
The length of each cable includes a part (up to 60 cm) for drawing inside the main unit.

**WIRING between S-1900MBB and S-1900H**



The length of each cable includes a part (up to 60 cm) for drawing inside the main unit.

# WIRING JUNCTION BOX



# CHAPTER 3

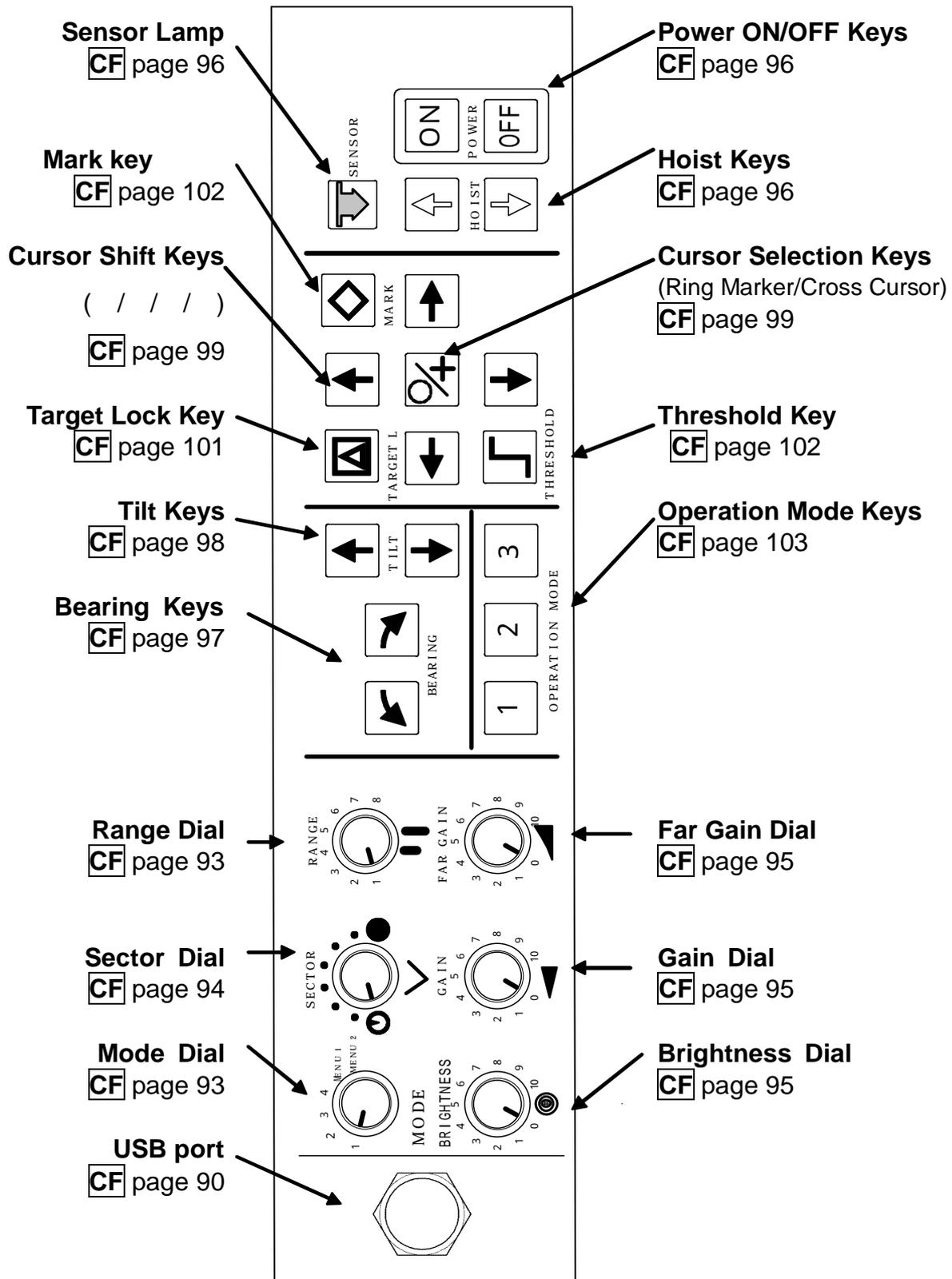
## BASIC OPERATION

This Chapter explains the basic operation of S-1900.

<b>Basic Operation</b>	Operation Panel-----	43
	Display Description-----	44
	Sample Display of Sonar Mode -----	45
	Sonar Mode -----	46
	Sample Display of Bottom-Scan Mode -----	48
	Bottom-Scan Mode-----	49
	Sample Display of Sounder Mode-----	50
	Sounder Mode -----	51

# BASIC OPERATION

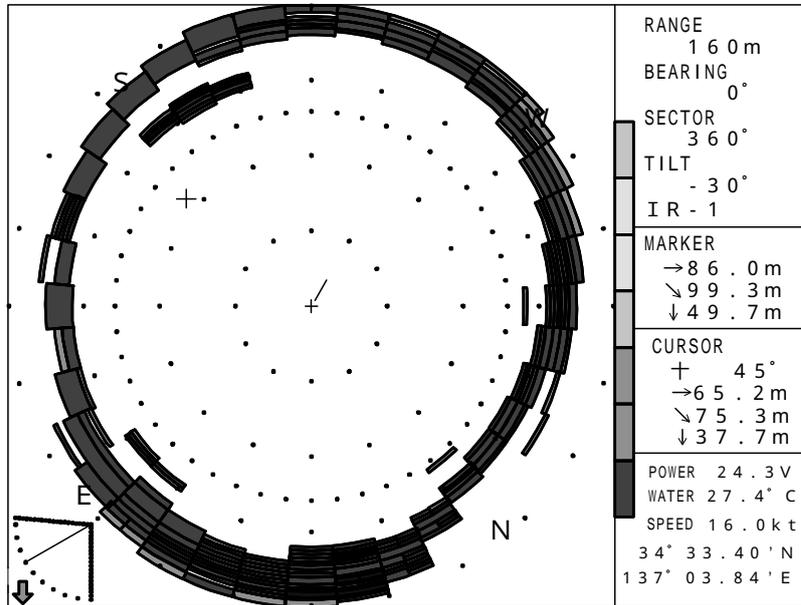
## OPERATION PANEL



Note that the drawing shows the Panel for S-1900 M12.

# DISPLAY DESCRIPTION

The drawing below shows the typical sonar mode display. Various combination displays are available by selecting the Sub-Display menu and the change of the Mode Dials.



## SCREEN LEFT

- SONAR MODE
- OFF-CENTER MODE
- BOTTOM-SCAN MODE
- SOUNDER MODE

Use the MODE DIAL to select the display mode.

## MENU 1

Select the desired 8 ranges.

## MENU 2

Select the desired user settings.

## SUB-DISPLAYS

Select the desired sub-display with MENU 2

In case "SUB-DISPLAY – NO SUB DISPLAY" selected the display mode in the left side can be displayed on the whole screen. **CF** page 66

## SCREEN RIGHT

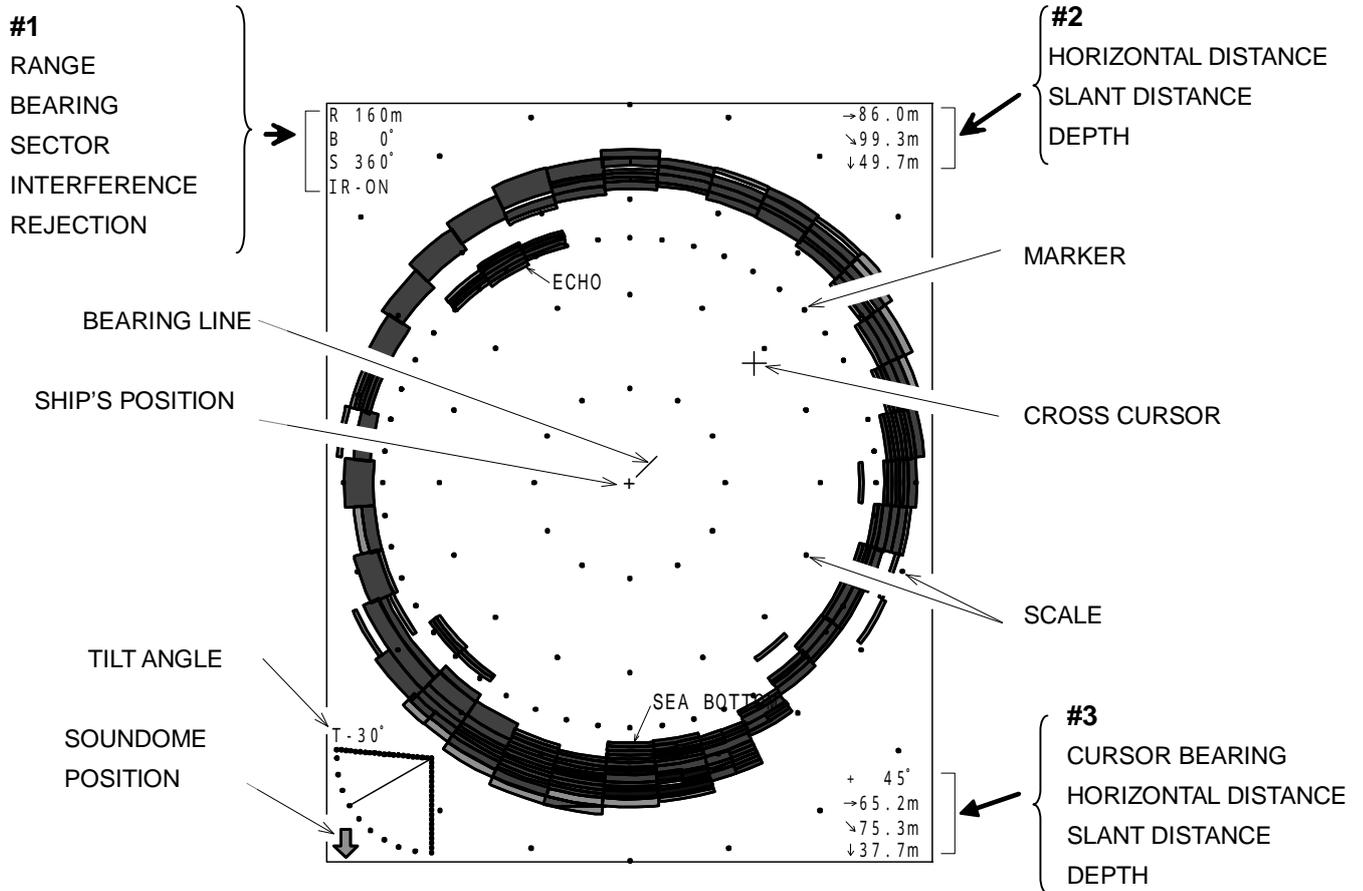
- MENU 1 & SELF CHECK
- MENU 2 & SELF CHECK
- INFORMATION
- SUB-DISPLAYS

Use the MODE DIAL to select MENU 1 & 2.

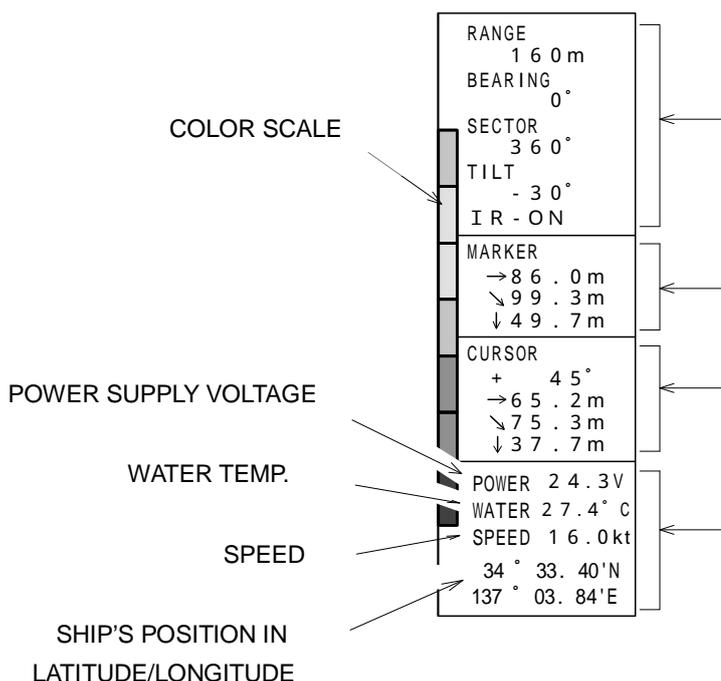
INFORMATION/SUB-DISPLAYS can be set via MENU 2.

# SAMPLE DISPLAY of SONAR MODE

Select **MODE DIAL 1** to display SONAR MODE or **MODE DIAL 2** to display OFF-CENTER MODE.



## INFORMATION DISPLAY



## When the Sub menus other than INFORMATION selected,

They are displayed in the upper left of the Sonar Display (#1). Tilt angle is displayed in the lower left.

"IR-ON" is not displayed when INTERFERENCE REJECTION OFF selected. They are displayed in the upper right of Sonar Display (#2).

They are displayed in the lower right of Sonar Display (#3).

They are display in the lower right corner of Sub-Display.

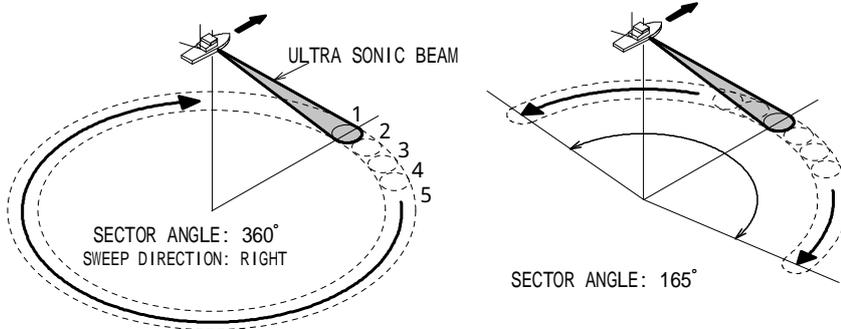
An External Navigator is required to display the ship's position and the speed.

# SONAR MODE

Rotating the transducer in the soundome protruded from the ship's bottom, the ultra sound beams are sent out and detects the targets in accordance with the selected speed and the range (distance).

The reflected sound appears on the PPI depending on the transducer's sweep.

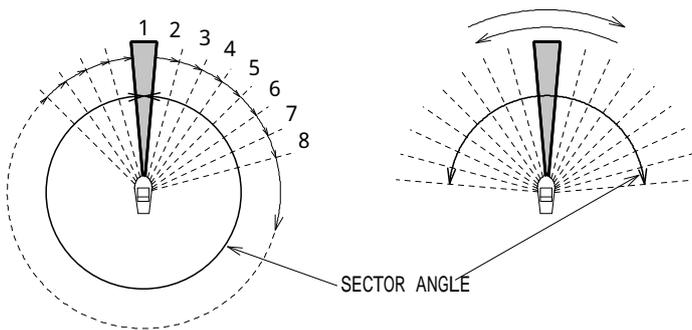
Adjusting the Tilt and Bearing the sonar beam can be trained from the surface to the bottom.



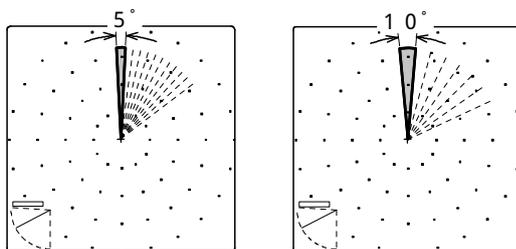
The transducer emits the ultra sound beams rotating the Soundome.

Changing the sector angle makes it possible to detect in various ranges.

**CF** page 94



The reflected echoes are displayed accordingly after emitting the ultra sound beam from 1 to 8 shown in the drawing left.



The transducer rotates with the selected step angle.

The reflected echoes are displayed as the image every step accordingly.

The step angle can be selected in **MENU 2 – “STEP (SONAR)”**. **CF** page 72

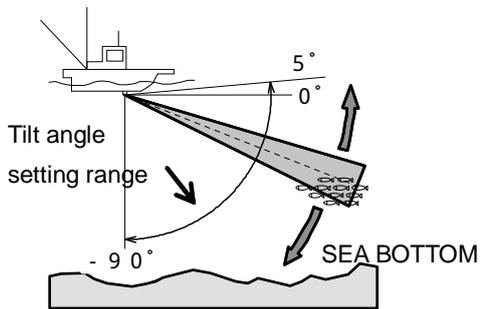
A narrow step gives a more detailed image on the screen, however more sweep time is requested than a wide step

<to be continued>

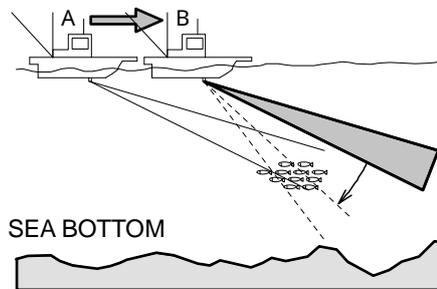
The Tilt angle can be set in increments of 1 ° from 0 ° to 5 ° to 0 ° to -90 ° .

All directions from extremely shallow waters to deep areas can be searched.

Adjust the tilt angle considering the conditions such as ship's speed and water depth.



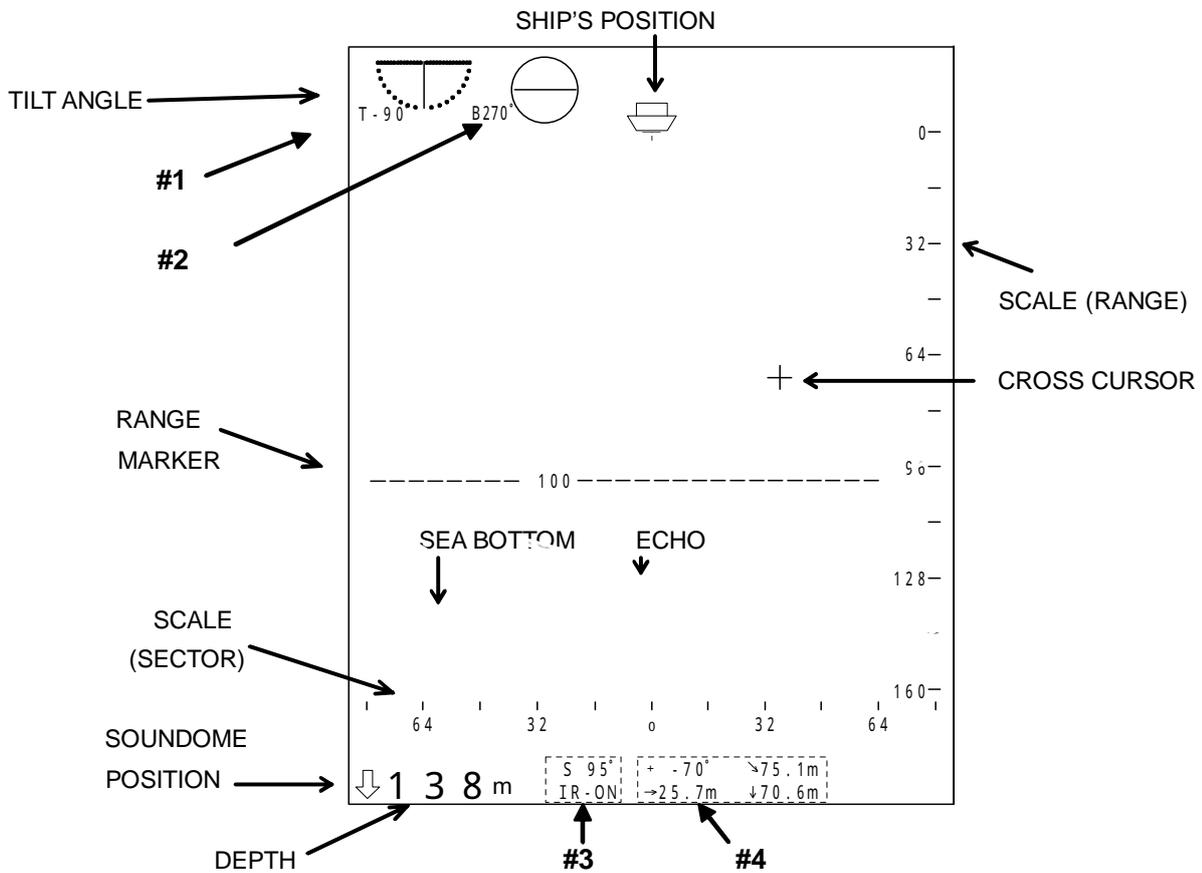
The below drawing illustrates the fish school is displayed on the screen when the ship reaches the point A, but it is not displayed at the point B even if the same tilt angles are set. Select an appropriate tilt angle in order to display the fish school at the point B.



The setting of the tilt angle is available in the Sonar Mode, Bottom-Scan Mode or Sounder Mode. **CF** page 98

# SAMPLE DISPLAY of BOTTOM-SCAN MODE

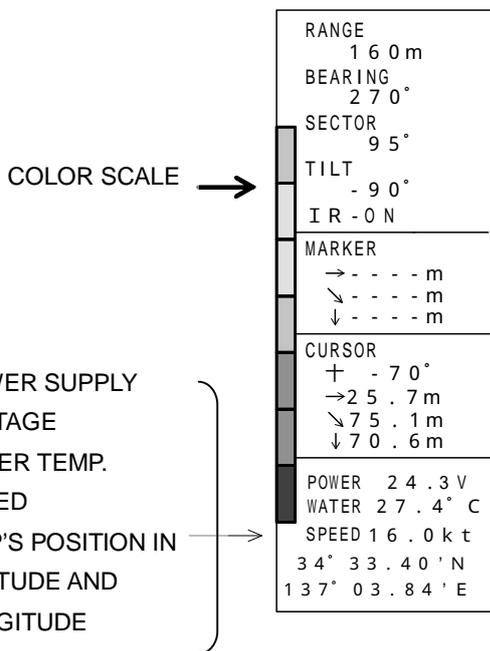
Select **MODE DIAL 3** to display the BOTTOM-SCAN MODE.



The above values of #1, #2, #3 and #4 are not displayed when the Sub-Display menu, INFORMATION is active.

## INFORMATION DISPLAY

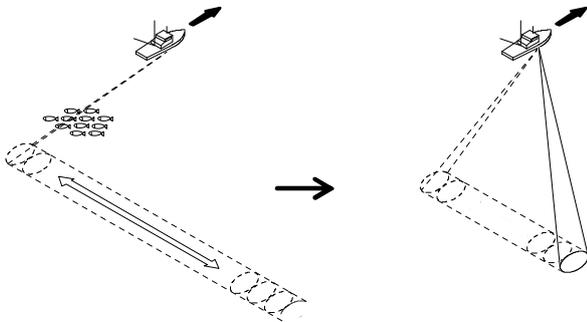
When the Sub menus other than **INFORMATION** selected,



- ← They are displayed in the Bottom Scan Mode Display (#1, #2 and #3). "IR-ON" is not displayed when INTERFERENCE REJECTION OFF selected.
- ← They are displayed as the data of the range marker in the Bottom-Scan Mode.
- ← They are displayed in the Bottom-Scan Mode (#4).
- ← They are displayed in the lower right corner of Sub-Display when an external navigator connected.

## BOTTOM-SCAN MODE

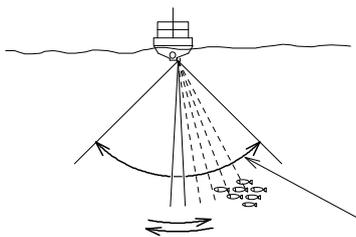
Shaking the transducer in the soundome protruded from the ship's bottom right and left alternately, it sends out the ultra sound beams and displays the images of the middle layer and the sea-bottom contour.



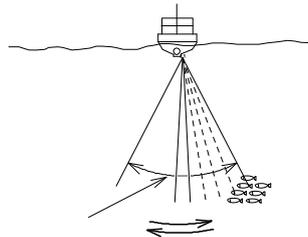
The transducer emits the ultra sound beams sweeping the transducer right and left.

The reflected echoes are displayed accordingly after emitting the ultra sound beam.

SECTOR ANGLE: 95 °



SECTOR ANGLE: 45 °

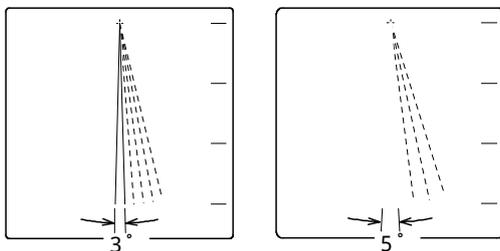


Changing the sector angle makes it possible to detect both the narrow and the wide ranges.

**CF** page 94

Changing the tilt angle makes it possible to detect the area of the selected sector angle centering the tilt angle.

**CF** page 98



The transducer moves with the selected step angle.

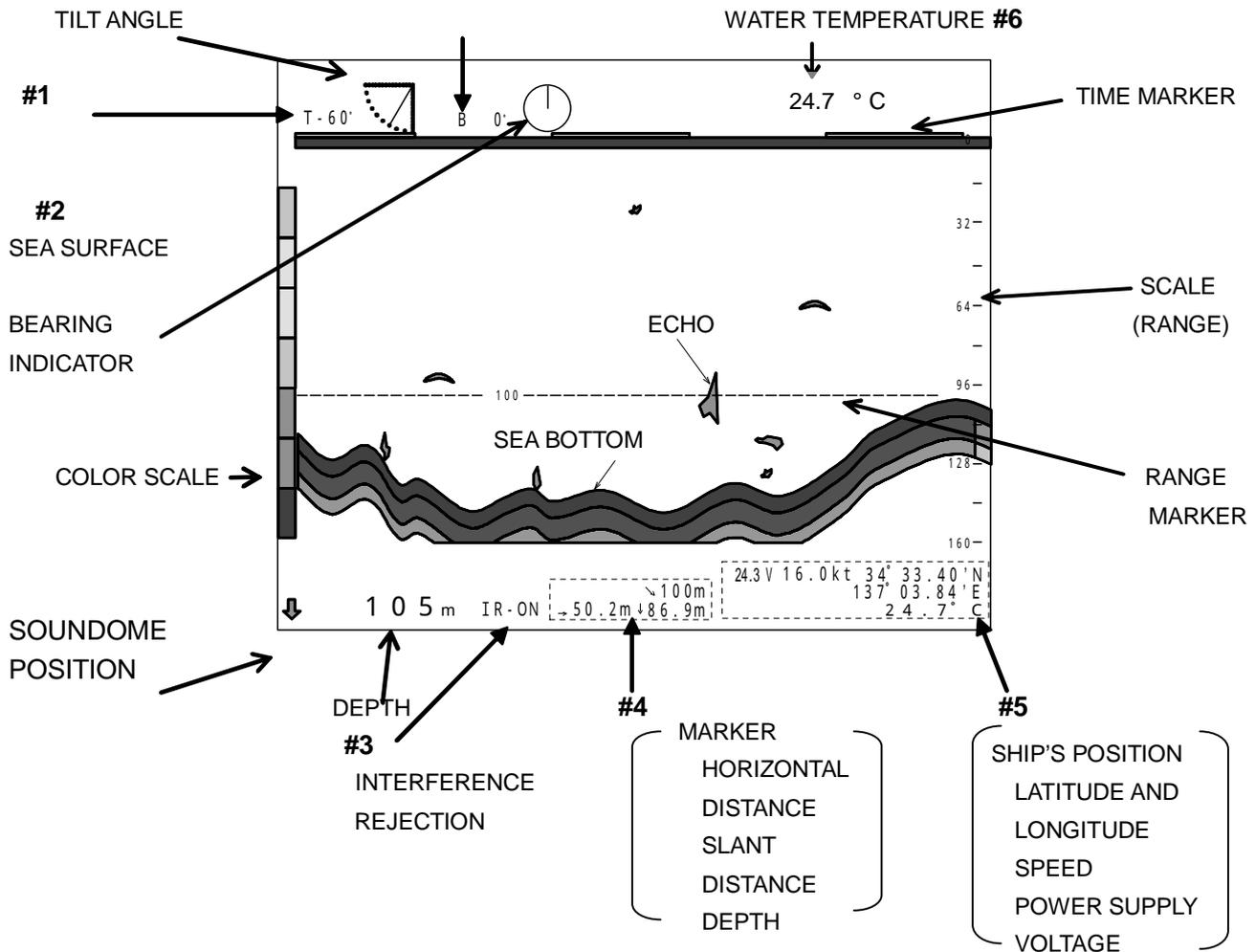
The reflected echoes are displayed as the image every step accordingly.

The step angle can be selected in **MENU 2 – “STEP (BOTTOM-SCAN)”**.

**CF** page 72

# SAMPLE DISPLAY of SOUNDER MODE

Select MODE DIAL 4 to display the SOUNDER MODE.



The above values of #1, #2, #3, #4, #5 and #6 are not displayed when the Sub-Display, INFORMATION display is active. The depth display is available only when the tilt angle -90 ° set.

## INFORMATION DISPLAY

RANGE	160 m
BEARING	0°
SECTOR	---
TILT	-60°
IR-ON	
MARKER	→ 100 m ↘ 50.2 m ↓ 86.9 m
CURSOR	+ ---° → --- m ↘ --- m ↓ --- m
POWER	24.3 V
WATER	27.4 °C
SPEED	16.0 kt
	34° 33.40' N
	137° 03.84' E

When the Sub menus other than INFORMATION selected,

They are displayed in the Sounder Mode Display (#1, #2 and #3).

"IR-ON" is not displayed when INTERFERENCE REJECTION OFF selected.

They are displayed as the data of the range marker in the Sounder Mode Display (#4).

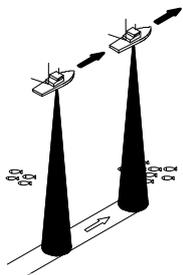
They are not displayed in the Sounder Mode Display.

They are displayed in the lower right corner of Sub-Display (#5). The latitude/longitude and the speed of the ship are displayed only when an external navigator connected.

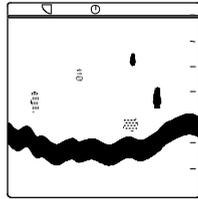
POWER SUPPLY VOLTAGE  
WATER TEMP.  
SPEED  
SHIP'S POSITION IN LATITUDE AND LONGITUDE

# SOUNDER MODE

The transducer in the soundome protruded from the ship's bottom sends out the ultra sound beams and displays the images of the middle layer and the sea-bottom contour, which are just beneath the ship.



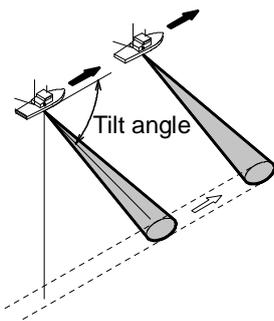
Sounder Mode



Detects beneath the ship.

The transducer emits the ultra sound beams toward the bottom just beneath the ship and the images are displayed like the Echo Sounder. The beam width is different depending on the frequency.

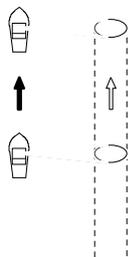
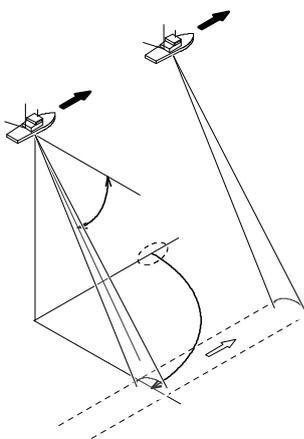
Detects fore by changing the tilt angle



The images other than beneath the ship can be displayed by changing the tilt angle and the bearing.

**CF** page 97/98/99

Detects starboard by changing the tilt angle and the bearing.



# CHAPTER 4

## FUNCTION SETTINGS

This Chapter explains the function settings of S-1900.

Select the appropriate setting for performing to the utmost of its ability before use.

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# FACTORY SETTINGS

## FACTORY SETTINGS

The factory settings are shown in the below box. Select the desired settings before use.

FUNCTION SETTINGS	FACTORY SETTINGS (shown in )	CF
<b>FUNCTION SET</b> GAIN UP TVG CURVE DYNAMIC RANGE PULSE WIDTH TX POWER RX GAIN RED. RX BANDWIDTH FULL-SCREEN GAIN SET	<input type="checkbox"/> OFF · +10dB · +20dB · +30dB · +40dB · +50dB OFF · 10LOG · 20LOG · <input type="checkbox"/> 30LOG · 40LOG 1 dB · 2 dB · <input type="checkbox"/> 3 dB <input type="checkbox"/> X1 · X1.5 · x2 A · B · C · <input type="checkbox"/> D <input type="checkbox"/> OFF · ON S. WIDE · WIDE · <input type="checkbox"/> STANDARD NARROW · S. NARROW OFF · <input type="checkbox"/> ON	MENU 2 PAGE 59-64
<b>REJECTION</b> INTERFERENCE REJ	<input type="checkbox"/> OFF · ON	PAGE 65
<b>DISP ITEM SEL</b> SUB-DISPLAY STEP (SONAR) STEP (BOTTOM-SCAN) OFF-CENTER POS. SCALE DOTS COMPASS DISP. HEADING DISP. TRACK DISP. TRACK SUB RANGE TRACK MEM. INTERVAL PRESS RATE FILTER SUB BOTTOM-SCAN CURSOR DIRECTION CURSOR POSITION	NO SUB-DISP. · <input type="checkbox"/> INFO · HISTORICAL · +PRESS +A-SCOPE · BOTTOM · TRACK · EXTSOUNDER 5 ° · <input type="checkbox"/> 10 ° · 15 ° 3 ° · <input type="checkbox"/> 5 ° <input type="checkbox"/> FORE · BACK · LEFT · RIGHT OFF · <input type="checkbox"/> ON <input type="checkbox"/> OFF · ON <input type="checkbox"/> OFF · ON <input type="checkbox"/> OFF · ON <input type="checkbox"/> 50m (10-500 depth unit) <input type="checkbox"/> 5 SEC · 10 SEC · 30 SEC · 60 SEC 1/2 · <input type="checkbox"/> 1/4 · 1/8 · 1/16 OFF · <input type="checkbox"/> 1 · 2 <input type="checkbox"/> AUTO · MANUAL <input type="checkbox"/> R-DIRECTION · T-DIRECTION <input type="checkbox"/> DISTANCE · LAT/LONG	PAGE 66-76
<b>OTHERS</b> AUDIO LEVEL TARGET LOCK TRIGGER SIGNAL DEPTH UNIT TEMP. UNIT TEMP. ADJUST SPEED UNIT AUTO RETRACT TRAIN CORRECT PANEL BRIGHTNESS POWER S. FREQUENCY HOIST AUTO DOWN OPE.MODE MEMORY	<input type="checkbox"/> 0 (0-31) <input type="checkbox"/> MODE0 · MODE1 · MODE2 · MODE3 <input type="checkbox"/> INTERNAL · EXTERNAL <input type="checkbox"/> m · ft · fm · br <input type="checkbox"/> ° C · ° F <input type="checkbox"/> +0.0 ° C (-9.9 ° ~ +9.9 ° ) <input type="checkbox"/> kt · km/h <input type="checkbox"/> OFF · 1kt (1~27km/h or 1kt ~15kt) <input type="checkbox"/> 0 ° (0 ° - 355 ° ) <input type="checkbox"/> 15 (0 - 15) <input type="checkbox"/> 120k · 125k · 130k <input type="checkbox"/> OFF · ON <input type="checkbox"/> OFF · ON	PAGE 77-84

<p><b>COLOR PALETTE</b>          COLOR SELECT          DISPLAY COLORS</p>	<p><span style="border: 1px solid black; padding: 2px;">A-1</span> · A-2 · B-1 · B-2 · C-1 · C-2  <span style="border: 1px solid black; padding: 2px;">8</span> · 16</p>	<p>MENU 2          PAGE 85-86</p>
<p><b>FREQUENCY SETTING</b>          TX FREQUENCY          RX FREQUENCY</p>	<p>BASIC FREQUENCY ( ± 10kHz / 0.1kHz UNIT)          BASIC FREQUENCY ( ± 10kHz / 0.1kHz UNIT)          Note 1)</p>	<p>PAGE 88</p>

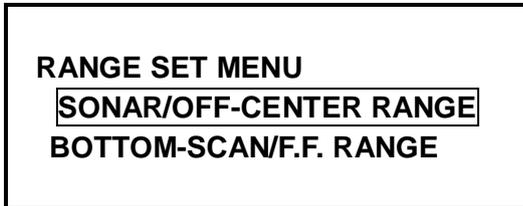
Note 1) The Basic Frequency indicates the frequency the customer purchases.

# MENU

## MENU 1 (RANGE SETTING MENU)

Select the display range in 8 settings according to the depth desired.

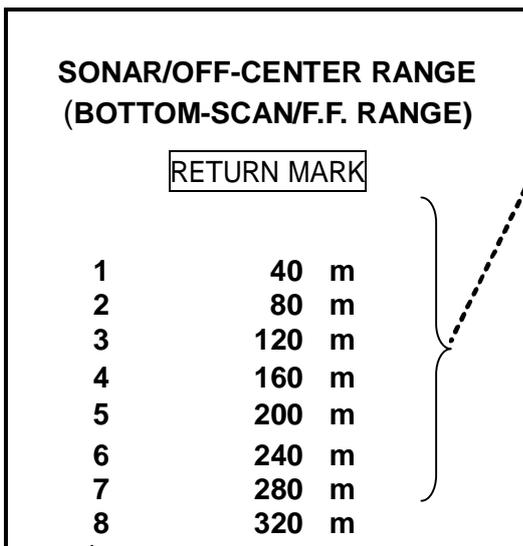
The following menu appears after selecting "MENU 1" with the MODE DIAL.



Use the Cursor Shift key  or  to highlight the item to change.

Press the Cursor Selection key  / + to display the following range setting menu.

The range can be set freely as desired every 10 units of depth measurement until 2000 units in case of the units, meters, braccia, and fathoms and every 20 feet until 6000 feet in case of the unit, feet.



Use the Cursor Shift key ( or ) to select the range number desired.

Press the Cursor Shift key ( or ) to set the range.

### Cursor Shift keys

: set the value smaller

: set the value larger

These numbers correspond to the Range Dial numbers.

The initial range setting values of both ranges are different each.

Displayed unit of depth measurement can be set via MENU 2 - "OTHERS". **CF** page 80

The way of the range setting is the same for both ranges, but the values of range setting are not corresponded each other. The settings for both ranges are required.

In the range settings for SONAR/OFF-CENTER MODE, the range is changed in accordance with the value of SONAR MODE when the Cursor Shift key ( or ) pressed. However, 1.5 times of range of SONAR MODE is displayed when OFF-CENTER MODE selected.

## MENU 2 (FUNCTION SETTING MENU)

Customize the functions to suit individual needs before using the S-1900.  
The basic settings are as follows.

<b>FUNCTION SET</b>	GAIN UP TVG CURVE DYNAMIC RANGE PULSE WIDTH TX POWER RX GAIN RED. RX BANDWIDTH FULL-SCREEN GAIN SET
<b>REJECTION</b>	INTERFERENCE REJECTION
<b>DISP ITEM SEL</b> (DISPLAY ITEM SELECTION)	SUB-DISPLAY STEP (SONAR) STEP (BOTTOM-SCAN) OFF-CENTER POSITION SCALE DOTS COMPASS DISPLAY HEADING DISPLAY TRACK DISPLAY TRACK SUB RANGE TRACK MEMORY INTERVAL PRESS RATE FILTER SUB BOTTOM-SCAN CURSOR DIRECTION CURSOR POSITION
<b>OTHERS</b>	AUDIO LEVEL TARGET LOCK TRIGGER SIGNAL DEPTH UNIT TEMPERATURE UNIT TEMPERATURE ADJUST SPEED UNIT AUTO RETRACT TRAIN CORRECT PANEL BRIGHTNESS POWER SUPPLY FREQUENCY HOIST AUTO DOWN OPERATION MODE MEMORY

# MENU

---

**COLOR PALETTE**

COLOR SELECT  
DISPLAY COLORS

**REMOTE CONTROL**

**FREQUENCY SETTINGS**

TX FREQUENCY  
RX FREQUENCY

**SELF CHECK**

**MAINTENANCE**

UPDATE  
BACK UP  
RECOVERY  
VERSION

For further details see next pages.

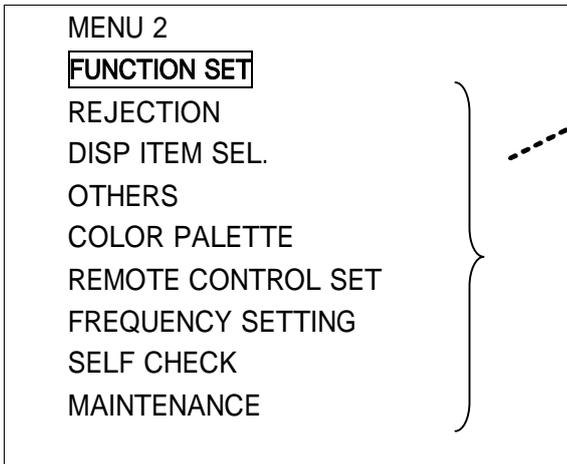
# FUNCTION SETTINGS

Turn the MODE DIAL to “**MENU 2**” to display the below menu.

The item currently selected is highlighted.

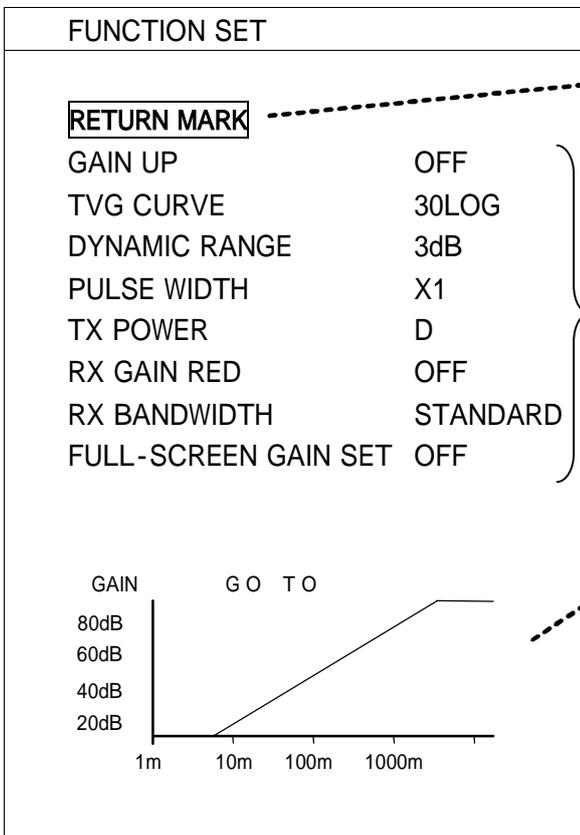
Use the Cursor Shift key (◀ or ▶) to select the desired item.

Press the Cursor Selection key (↵) to open the menu for change.



Use the Cursor Shift key (◀ or ▶) to select the desired item.  
Press the Cursor Selection key (↵) to open the menu for change.

## FUNCTION SET MENU



Press the Cursor Selection key (↵) to return to MENU 2.

Use the Cursor Shift key (◀ or ▶) to select the desired item to change.

Use the Cursor Shift key (◀ or ▶) to change the settings.

**TVG (Time-Varying-Gain) Curve** reflects various changes such as TVG Curve, Gain Adjustment, Gain/Far Gain dials.

### 1. GAIN UP

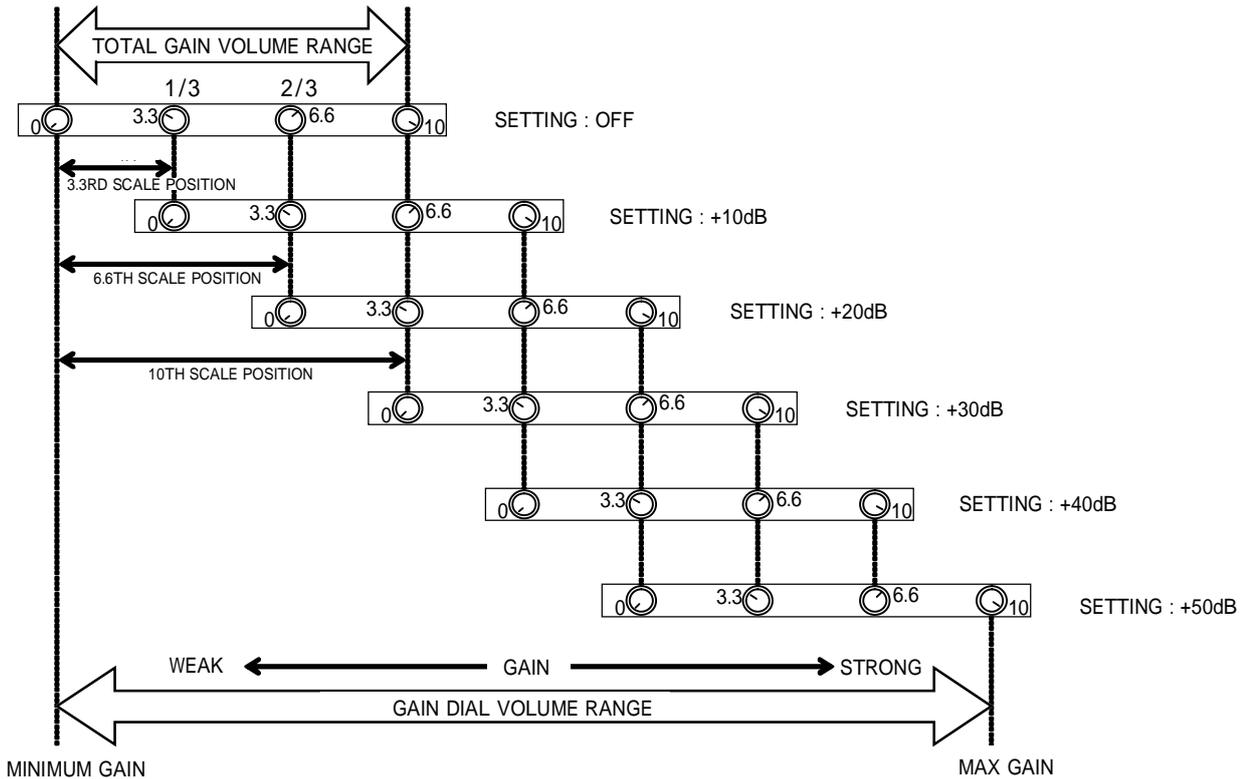
This function makes it possible to display a clearer picture of the full range and control the sensitivity at various depths.

Use the Cursor Shift key (  or  ) to select "GAIN UP".

Use the Cursor Shift key (  or  ) to change the setting.

**GAIN UP** OFF ----- Use the Cursor Shift key (  or  ) to change.

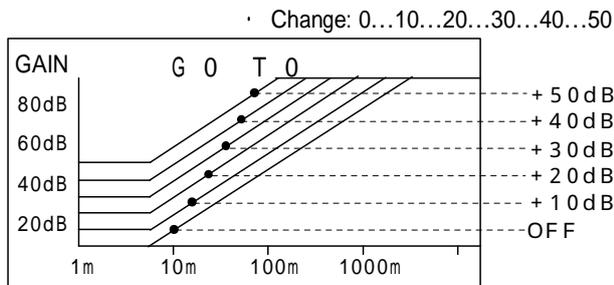
[OFF, +10dB, +20dB, +30dB, +40dB, +50dB]



The "sensitivity" or possibly "volume" is increased 3.3 times when the gain setting is changed to "+10dB" from "OFF".

The reflected image at level "3.3" in the gain setting "OFF" is the one at level "0" in the Gain setting "+10dB".

TVG Curve changes in accordance with the change of the values of GAIN UP.



The setting values shown in the above drawing are as follows,  
 Gain Dial: 0  
 Far Gain Dial: 0  
 TVG Curve: 30LOG

## 2. TVG CURVE

TVG (Time Variable Gain) offsets the effects of propagation loss of sound as it passes through the water. To counter this loss, the TVG curve is adjusted by correctly set.

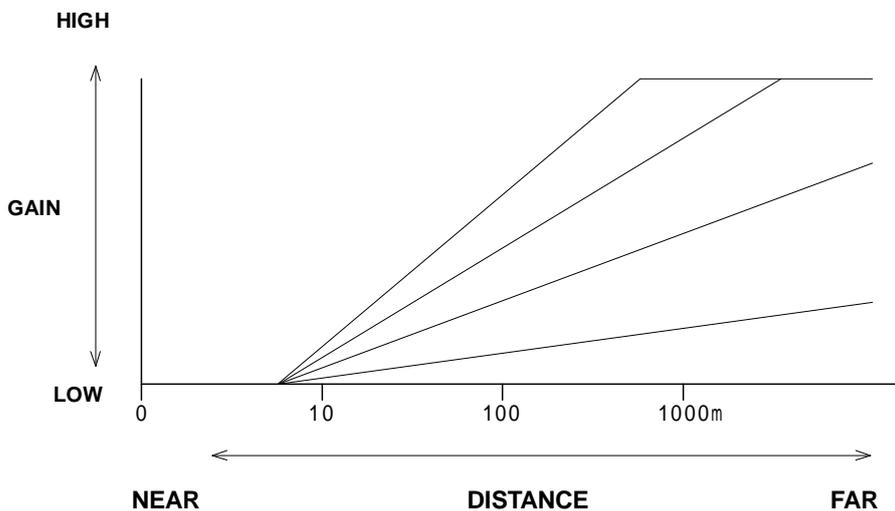
Use the Cursor Shift key (□ or □) to select “**TVG CURVE**”.

Use the Cursor Shift key (□ or □) to change the setting.

**TVG CURVE      30LOG** ----- Use the Cursor Shift key (□ or □) to change.  
**[OFF, 10LOG, 20LOG, 30LOG, 40LOG]**

### TVG CURVE

- OFF: No TVG curve
- 10LOG: in the below drawing
- 20LOG: in the below drawing
- 30LOG: in the below drawing
- 40LOG: in the below drawing



### NOTE!

Caution should be taken to select the TVG curve of which TVG setting is related to the Gain Dial functions.

### 3. DYNAMIC RANGE

This is the way to display the reactions with emphasis or with density discrimination.

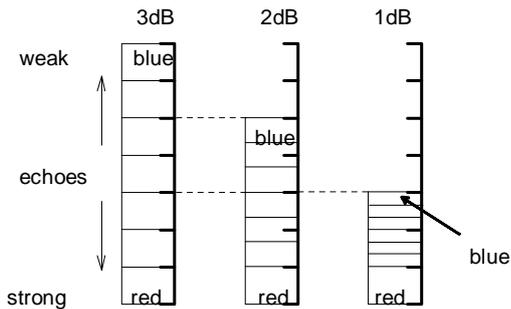
Use the Cursor Shift key (  or  ) to select “**DYNAMIC RANGE**”.

Use the Cursor Shift key (  or  ) to change the setting.

**DYNAMIC RANGE**      **3dB** ----- Use the Cursor Shift key (  or  ) to change.

[1dB, 2dB, 3dB]

#### COLOR SCALE



The selected level is reflected to the Color Scale as shown in the left.

The weaker reflections are eliminated and the stronger reflections are displayed when selecting rather 2dB than 3dB or 1dB than 2dB.

### 4. PULSE WIDTH

This is the way to select the transmitted pulse width.

Use the Cursor Shift key (  or  ) to select “**PULSE WIDTH**”.

Use the Cursor Shift key (  or  ) to change the setting.

**PULSE WIDTH**      **x1** ----- Use the Cursor Shift key (  or  ) to change.

[x1, x1.5, x2]

- x1 : standard (shown in the below box)
- x 1.5 : 1.5 times of standard
- x 2 : 2 times of standard for longer range detection

RANGE (m)	PULSE WIDTH (ms)
0 - 59	0.25
60 - 79	0.40
80 - 99	0.75
100 - 119	0.90
120 - 159	1.00

RANGE (m)	PULSE WIDTH (ms)
160 - 199	1.25
200 - 239	2.00
240 - 399	2.50
400 - up	3.75

## 5. TX POWER

The output power of the ultra sound wave from the transmitter can be set.

Use the Cursor Shift key ( or ) to select "TX POWER".

Use the Cursor Shift key ( or ) to change the setting.

<b>TX POWER</b>	<b>D</b>	----
-----------------	----------	------

 Use the Cursor Shift key ( or ) to change.

[A, B, C, D]

D is the maximum level and A is the minimum level.

## 6. RX GAIN REDUCTION

Reduction of RX gain to weaken too strong reaction in the shallow water can be set .

Use the Cursor Shift key ( or ) to select "RX GAIN REDUCTION".

Use the Cursor Shift key ( or ) to change the setting.

<b>RX GAIN RD.</b>	<b>OFF</b>	-----
--------------------	------------	-------

 Use the Cursor Shift key ( or ) to change.

[ON, OFF]

- ON:** reduces the RX gain.
- OFF:** no change.

## 7. RX BANDWIDTH

RX bandwidth can be set.

Use the Cursor Shift key ( or ) to select “**RX BANDWIDTH**”.

Use the Cursor Shift key ( or ) to change the setting.

**RX BANDWIDTH STANDARD** ----- Use the Cursor Shift key ( or ) to change.

[S. WIDE, WIDE, STANDARD, NARROW, S. NARROW]

## NOTE!

-----  
Selecting wider bandwidth makes the resolution higher, but more noise.

Selecting narrower bandwidth makes the resolution lower, but less noise.  
-----

## 8. FULL-SCREEN GAIN SET

Select full gain function ON or OFF when changing the gain dial.

Use the Cursor Shift key ( or ) to select “**FULL-SCREEN GAIN SET**”.

Use the Cursor Shift key ( or ) to change the setting.

**FULL-SCREEN GAIN SET ON** ----- Use the Cursor Shift key ( or ) to change.

[ON, OFF]

- **ON:** the gain is changed on the full screen at the same time when changing the gain dial.
- **OFF:** the gain is changed from the point of changing the gain dial.

## REJECTION

[MODE DIAL – MENU 2 – REJECTION]

REJECTION
<b>RETURN MARK</b>
INTERFERENCE REJ.    OFF

/ + to return to MENU 2.

Use the Cursor Shift key ( or ) to select the desired item to change.

Use the Cursor Shift key ( or ) to change the settings.

### 1. INTERFERENCE REJECTION

This function can be used to eliminate noise from other ships.

Use the Cursor Shift key ( or ) to select “**INTERFERENCE REJ.**”.

Use the Cursor Shift key ( or ) to change the setting.

**INTERFERENCE REJ    OFF** ----- Use the Cursor Shift key ( or ) to change.

[ON, OFF]

**ON:** activates this function.

**OFF:** inactivates this function.

## DISPLAY ITEM SELECTION

DISP ITEM SEL	
<b>RETURN MARK</b>	
SUB-DISPLAY	}
STEP (SONAR)	
STEP (BOTTOM-SCAN)	
OFF-CENTER POS.	
SCALE DOTS	
COMPASS DISP.	
HEADING DISP.	
TRACK DISP.	
TRACK SUB RANGE	
TRACK MEM. INTERVAL	
PRESS RATE	
FILTER	
SUB BOTTOM-SCAN	
CURSOR DIRECTION	
CURSOR POSITION	

Press the Cursor Selection key  
 /  to return to MENU 2.

Use the Cursor Shift key ( or )  
to select the desired item to change.

Use the Cursor Shift key ( or )  
to change the settings.

### 1. SUB-DISPLAY

Sub menu displayed on the right half of the screen can be selected.

Use the Cursor Shift key ( or ) to select "SUB-DISPLAY".

Use the Cursor Shift key ( or ) to change the setting.

**SUB-DISPLAY**      **INFO** ----- Use the Cursor Shift key ( or ) to change.

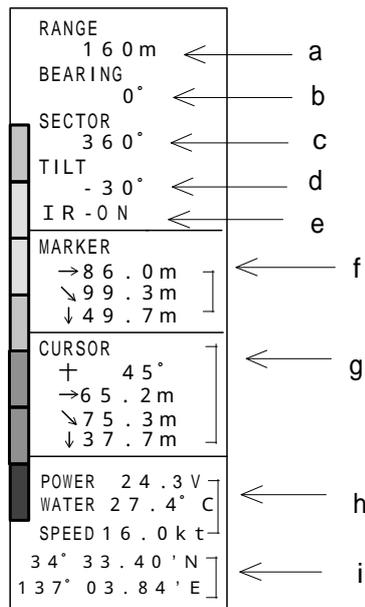
[NO SUB-DISP., INFO, HISTORICAL, +PRESS, + A-SCOPE, BOTTOM, TRACK,  
EXTSOUNDER]

#### **NO SUB-DISP. (NO SUB-DISPLAY)**

The SUB-DISPLAY is not displayed. SONAR MODE, OFF-CENTER MODE,  
BOTTOM-SCAN MODE or SOUNDER MODE is displayed on the whole screen.

**INFO (INFORMATION)**

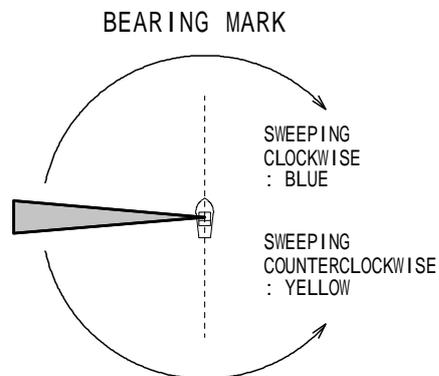
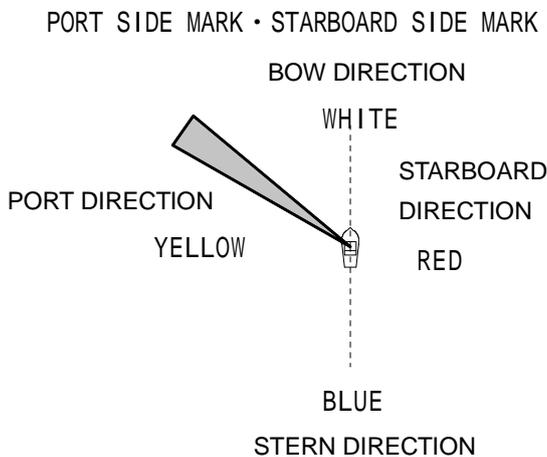
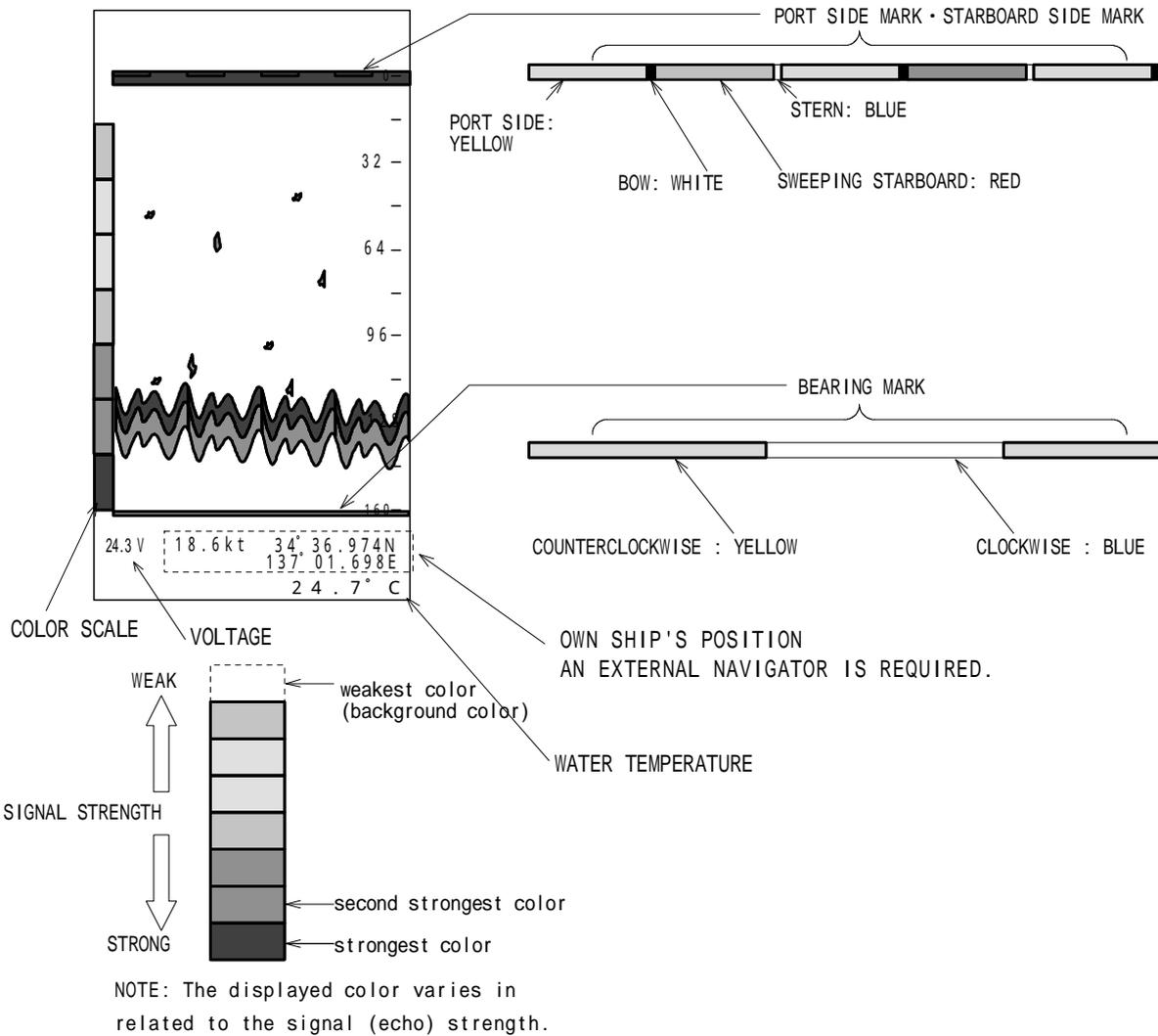
This sub menu "INFO" can be displayed when one of the Mode dials, No.1-4 selected.



- a) Displays the selected range by using the Range Dial desired.
- b) Displays the selected bearing angle by using the Bearing Key.
- c) Displays the selected sector angle by using the Sector Dial.
- d) Displays the selected tilt angle by using the Tilt Key.
- e) It appears only when Interference Rejection-ON selected.
- f) Displays the horizontal distance, slant distance and depth to the marker.  
No data appears when Bottom-Scan mode set.
- g) Displays the horizontal distance, slant distance and depth to the cursor.  
No data appears when Sounder mode set.
- h) Displays the power supply voltage and the temperature.
- i) Displays the ship's speed and own ship's position in latitude/longitude.  
Note that an External Navigator is required to display these values.

**HISTORICAL DISPLAY**

The vertical images can be displayed as sub menu when SONAR MODE or BOTTOM-SCAN MODE set. Note that the normal echo sounder images are displayed on the whole screen when SOUNDER MODE is selected.



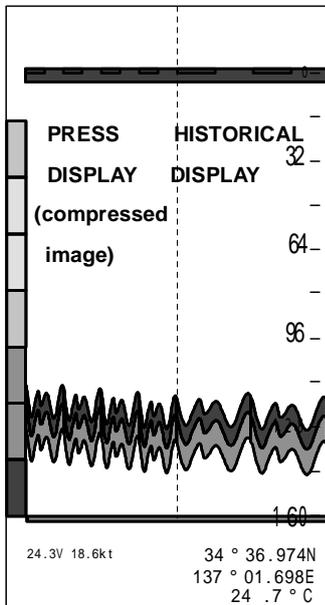
The color shows the position/direction currently the beam passes.

**+PRESS (COMPRESSED IMAGE AND HISTORICAL DISPLAY)**

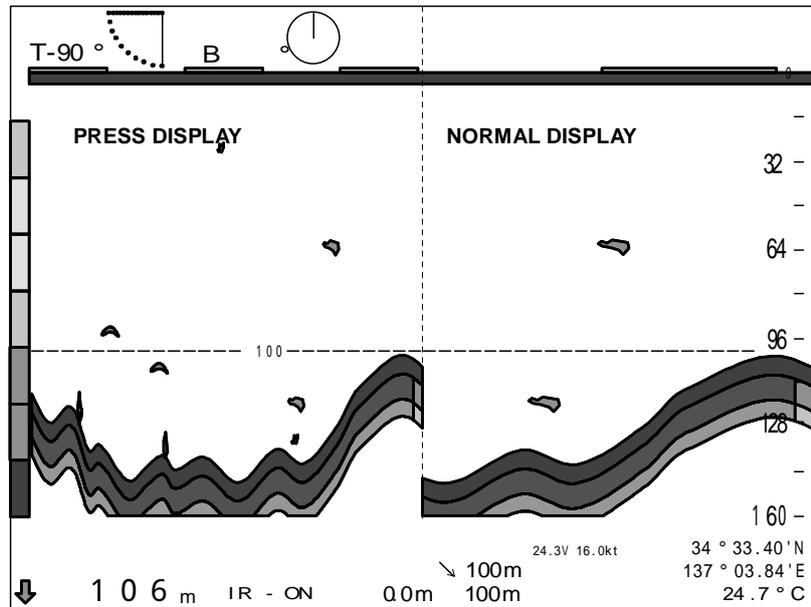
The vertical images and their compressed image can be displayed when SONAR MODE or BOTTOM-SCAN MODE set. The normal echo sounder images and compressed image are displayed on the screen when SOUNDER MODE is selected.

**SONAR MODE**

**BOTTOM-SCAN MODE**



**SOUNDER MODE**

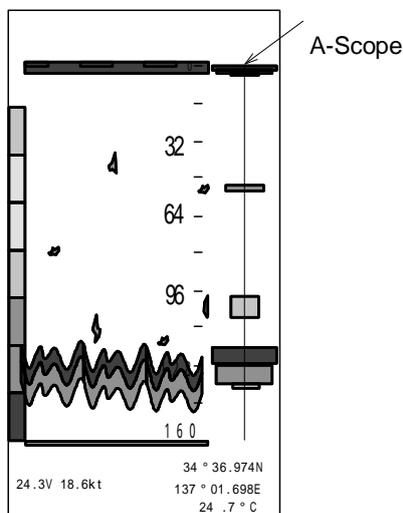


Compressed images are displayed at the selected rate [MENU-DISP ITEMSEL-PRESS RATE].

**+A-SCOPE (HISTORICAL DISPLAY+A-SCOPE)**

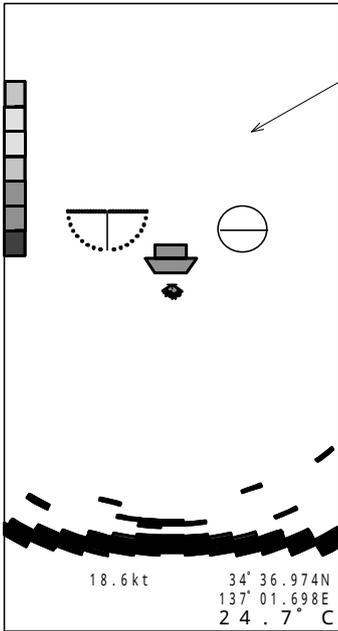
A-Scope is displayed on the right side of the historical display.

The illustration below shows when SONAR MODE/BOTTOM SCAN MODE selected. It is also displayed on the right side of the screen when SOUNDER MODE selected.



**BOTTOM-SCAN**

The images of BOTTOM-SCAN MODE can be displayed in the sub-display.  
 Note that this function is not available in Sounder Mode. **CF** page 76



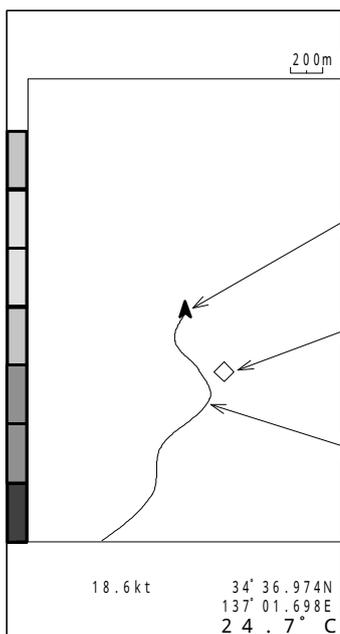
-The setting values such as Range, Bearing, Sector, Tilt for the Bottom-Scan mode can be set while the Bottom-Scan mode is active.  
 The setting values will not be changed even if it backs to the Sonar Mode.

-The Sonar Mode display changes into the Bottom-Scan when it passes the center while clockwise rotating when “**SUB BOTTOM-SCAN / AUTO**” selected. After it updated, it will back to the Sonar Mode.

-The Sonar Mode display alternates with the Bottom-Scan display each time the Hoist  key pressed when “**SUB BOTTOM-SCAN / MANUAL**” selected. The scanning direction is determined by the position when the Sonar Mode changes into the Bottom Scan.

**TRACK**

Own ship's position can be displayed when an external navigator connected.



**SCREEN WIDTH**

Displays the screen width selected via “**TRACK SUB RANGE**” selected.

**OWN SHIP**

Displays Own Ship's position in latitude/longitude and the speed at the bottom of the screen.

**MARK**

Displays the mark placed by a Cross Cursor in the Sonar Mode.

**TRACK**

Displays the track line.  
 The past line is memorized every interval set via “**TRACK MEM.INTERVAL**”.

**EXT.SOUNDER (EXTERNAL SOUNDER)**

This function is only available when some Suzuki units connected.

## 2. STEP (SONAR)

The Step angle for SONAR MODE can be selected.

Use the Cursor Shift key (  or  ) to select “STEP (SONAR)”.

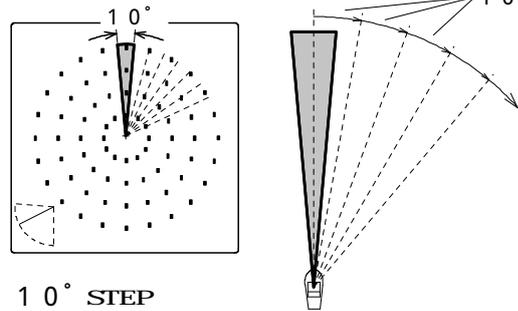
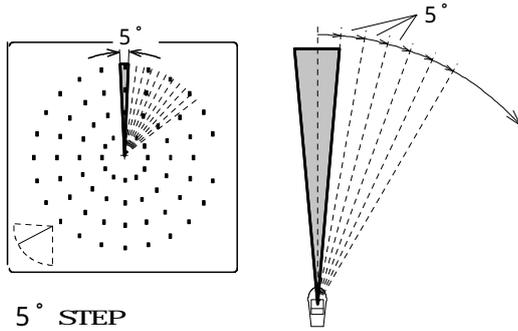
Use the Cursor Shift key (  or  ) to change the setting.

**STEP (SONAR)** 10 ° ----- Use the Cursor Shift key (  or  ) to change.

[ 5 ° , 10 ° , 15 ° ]

( or 15 ° )

( or 15 ° )



## 3. STEP (BOTTOM-SCAN)

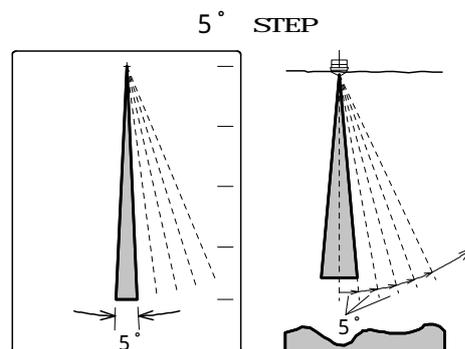
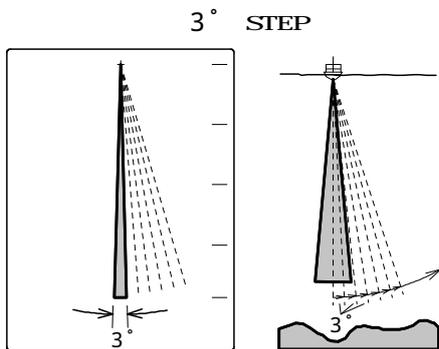
The Step angle for SONAR MODE can be selected.

Use the Cursor Shift key (  or  ) to select “STEP (BOTTOM-SCAN)”.

Use the Cursor Shift key (  or  ) to change the setting.

**STEP (BOTTOM-SCAN)** 5 ° -----Use the Cursor Shift key (  or  ) to change.

[ 3 ° or 5 ° ]



### NOTE!

The superior detection images can be obtained when the narrower step angle selected, but the longer detection time is required.

### 4. OFF-CENTER POS. (OFF-CENTER POSITION)

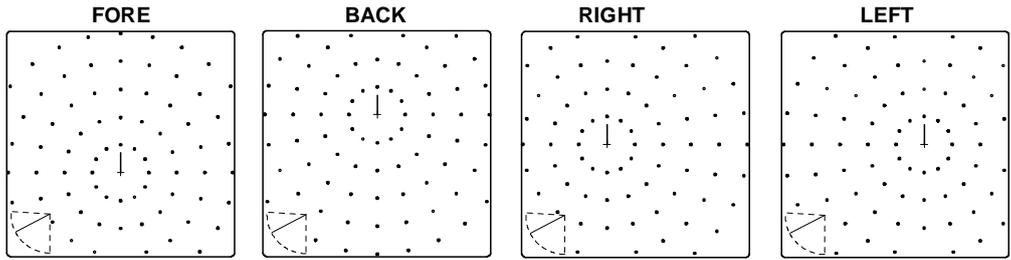
The displayed position of own ship on the screen can be selected when OFF-CENTER MODE is active.

Use the Cursor Shift key ( or ) to select “OFF-CENTER POS.”.

Use the Cursor Shift key ( or ) to change the setting.

**OFF-CENTER POS. FORE** ----- Use the Cursor Shift key ( or ) to change.

[FORE, BACK, RIGHT, LEFT]



shows Own Ship's Position

### 5. SCALE DOTS

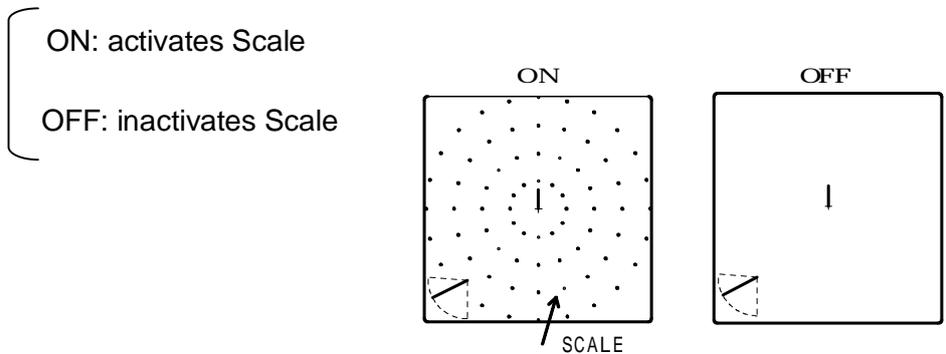
The display of scale dots on the screen can be selected ON/OFF.

Use the Cursor Shift key ( or ) to select “SCALE DOTS”.

Use the Cursor Shift key ( or ) to change the setting.

**SCALE DOTS ON** ----- Use the Cursor Shift key ( or ) to select.

[ON, OFF]



When “OFF” set, Scale does not appear on SONAR MODE/OFF-CENTER MODE screens. However, it appears on BOTTOM-SCAN MODE/SOUNDER MODE screens even if “OFF” set.

## 6. COMPASS DISPLAY

Compass can be displayed in the SONAR MODE when an External Navigator connected.

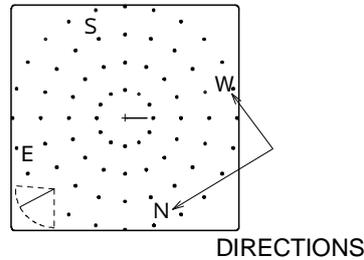
Use the Cursor Shift key (  or  ) to select “**COMPASS DISP.**”.

Use the Cursor Shift key (  or  ) to change the setting.

**COMPASS DISP. OFF** ----- Use the Cursor Shift key (  or  ) to change.

[ON, OFF]

- ON: activates Compass display
- OFF: inactivates Compass display



## 7. HEADING DISPLAY

Heading line can be displayed in the SONAR MODE.

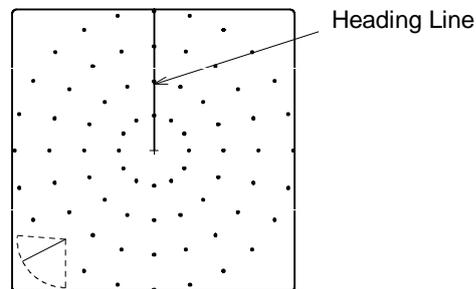
Use the Cursor Shift key (  or  ) to select “**HEADING DISP.**”.

Use the Cursor Shift key (  or  ) to change the setting.

**HEADING DISP. OFF** ----- Use the Cursor Shift key (  or  ) to select.

[ON, OFF]

- ON: activates Heading line display
- OFF: inactivates Heading line display



## 8. TRACK DISPLAY

Track line can be displayed in the SONAR MODE when an external navigator connected.

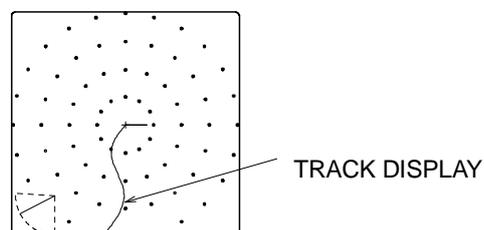
Use the Cursor Shift key (  or  ) to select “**TRACK DISP.**”.

Use the Cursor Shift key (  or  ) to change the setting.

**TRACK DISP. OFF** ----- Use the Cursor Shift key (  or  ) to change.

[ON, OFF]

- ON: activates Track line display
- OFF: inactivates Track line display



## 9. TACK SUB RANGE

The screen width for Track display in sub menu can be selected. **CF** page 70

Use the Cursor Shift key ( or ) to select "TRACK SUB RANGE".

Use the Cursor Shift key ( or ) to change the setting.

**TRACK SUB RANGE 50m ----** Use the Cursor Shift key ( or ) to change.

[10 – 500 depth unit]

Cursor Shift keys

: sets the value smaller.

: sets the value larger.

## 10. TRACK MEM. INTERVAL (TRACK MEMORY INTERVAL)

The tracking interval can be selected.

Use the Cursor Shift key ( or ) to select "TRACK MEM. INTERVAL".

Use the Cursor Shift key ( or ) to change the setting.

**TACK MEM. INTERVAL 5SEC -----** Use the Cursor Shift key ( or ) to change.

[5 SEC, 10 SEC, 30 SEC, 60 SEC]

The short interval can provide for the display of smooth wake line, but it is the record of short term. In case of the long interval it displays the record of long term, but the zigzag line appears on the screen.

Interval	Memorized Time
5 seconds	: 8 minutes 20 seconds
10 seconds	: 16 minutes 40 seconds
30 seconds	: 50 minutes
60 seconds	: 100 minutes

## 11. PRESS RATE (COMPRESSED RATE)

The compressed rate for images on the screen can be selected. **CF** page 69

Use the Cursor Shift key ( or ) to select "PRESS RATE".

Use the Cursor Shift key ( or ) to change the setting.

**PRESS RATE 1/4 -----** Use the Cursor Shift key ( or ) to change.

[1/2, 1/4, 1/8, 1/16]

Compress rate 1/2 shows one line for 2 sound beams and 1/4 for 4 sound beams. The information for the long time can be displayed when the higher rate selected, but the compressed image is tighter.

## 12. FILTER

The image on the sonar can be enhanced by this function.

Use the Cursor Shift key (  or  ) to select "**FILTER**".

Use the Cursor Shift key (  or  ) to change the setting.

**FILTER**      **1**      **--**----- Use the Cursor Shift key (  or  ) to change.

[OFF, 1, 2]

- OFF: inactivates filter function.
- 1: enhances the image on the sonar.
- 2: enhances further the image on the sonar.

## 13. SUB BOTTOM-SCAN

Select the SUB BOTTOM-SCAN MODE. **CF** page 70

Use the Cursor Shift key (  or  ) to select "**SUB BOTTOM-SCAN**".

Use the Cursor Shift key (  or  ) to change the setting.

**SUB BOTTOM SCAN**      **AUTO**      **--**----- Use the Cursor Shift key (  or  ) to change.

[AUTO, MANUAL]

- AUTO: Sonar Mode changes into BOTTOM-SCAN MODE automatically .
- MANUAL: Sonar Mode changes into BOTTOM-SCAN MODE display manually.

## 14. CURSOR DIRECTION

Select the display way of the CUSOR DIRECTION when an External Navigator connected.

Use the Cursor Shift key (  or  ) to select "**CURSOR DIRECTION**".

Use the Cursor Shift key (  or  ) to change the setting.

**CURSOR DIRECTION**      **R-DIRECTION**      **--**--- Use the Cursor Shift key (  or  ) to change.

[R-DIRECTION, A-DIRECTION]

- R-DIRECTION (RELATIVE DIRECTION): corresponds to the ship's heading direction
- T-DIRECTION (TRUE DIRECTION): corresponds to the compass direction

## 15. CURSOR POSITION

Select the display way of CUSOR POSITION when an External Navigator connected.

Use the Cursor Shift key (  or  ) to select "**CURSOR POSITION**".

Use the Cursor Shift key (  or  ) to change the setting.

**CURSOR POSITION**      **DISTANCE**      **--**--- Use the Cursor Shift key (  or  ) to change.

[DISTANCE, LAT/LONG]

- DISTANCE: displays the distance of the cursor position
- LAT/LONG: displays the cursor position in latitude/longtude.

# OTHERS

## [MODE DIAL – MENU 2 – OTHERS]

OTHERS	
<b>RETURN MARK</b>	
AUDIO LEVEL	0
TARGET LOCK	MODE0
TRIGGER SIGNAL	INTERNAL
DEPTH UNIT	m
TEMP. UNIT	° C
TEMP. ADJUST	+0.0 ° C
SPEED UNIT	kt
AUTO RETRACT	OFF
TRAIN CORRECT	0 °
PANEL BRIGHTNESS	15
POWER S.FREQUENCY	120k
HOIST AUTO DOWN	OFF
OPE. MODE MEMORY	OFF

Press the Cursor Selection key  / + to return to MENU 2.

Use the Cursor Shift key  or  to select the desired item to change.

Use the Cursor Shift key  or  to change the settings.

Note that the value of Train Correct cannot be set here. **CF** page 82

### 1. AUDIO LEVEL

The audio volume can be selected when connecting an external speaker.

Use the Cursor Shift key  or  to select “**AUDIO LEVEL**”.

Use the Cursor Shift key  or  to change the setting.

**AUDIO LEVEL**      **0** ----- Use the Cursor Shift key  or  to change.

[0 – 31]

- Cursor Shift keys
- : sets the value smaller.
  - : sets the value larger.

### NOTE!

A speaker device (4 ) is required. **CF** page 31, 33, and 35.

## 2. TARGET LOCK

The desired target lock function can be selected, which is activated by pressing the Target Lock key () while SONAR MODE or BOTTOM-SCAN MODE (only in case of MODE0) operated. It can change the rotary direction, track the target or the position specified with a cursor automatically.

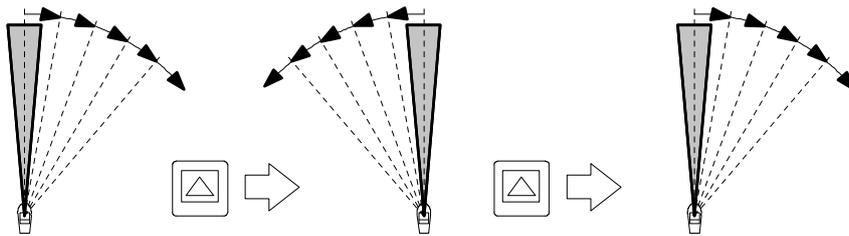
Use the Cursor Shift key ( or ) to select "TARGET LOCK".

Use the Cursor Shift key ( or ) to change the setting.

**TARGET LOCK    MODE0** ----- Use the Cursor Shift key ( or ) to change.  
**[MODE0, MODE1, MODE2, MODE3]**

### MODE 0 (REVERSE)

Each press of the Target Lock key reverses the sector rotary direction. Note that the automatic tracking is not available in this MODE 0.



### MODE 1 (RIGHT - LEFT)

Press the Target Lock key to track the reaction automatically.

"TARGET LOCK" sign appears on the upper left corner of the screen or on the display position of **BEARING** and **SECTOR** in the INFORMATION display. MODE 1 reverses the soundome train direction only right and left and track the target automatically.



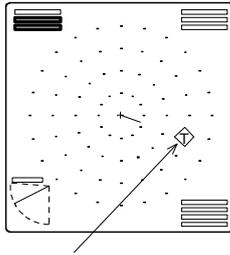
If it should have lost the target after a 60° reverse sweep, this function is released.

### MODE 2 (UP-DOWN, RIGHT-LEFT)

One time of up and down detection is added after 3 times of MODE1 detection. Other actions are the same with MODE 1.

**MODE 3**

Target mark appears on the screen and tracks the target automatically after placing the Cross cursor on the target and press the Target Lock key.



TARGET MARK

Target mark moves along with the own ship on the screen.

Target mark also appears on the sub menu if TRACK is selected.

**NOTE!**

Tilt and Bearing keys are inoperative while Target lock function is active.  
 Target lock function is released when Range, Sector and Display mode changed.  
 Bearing and Sector angles will back to the original values when Target Lock function is released. The value of Tilt angle of activating Target lock remains.  
 Target lock function is inoperative while SOUNDER MODE is active.  
 It is only operative in case of [Bottom-Scan mode - MODE0] selected.  
 It is inoperative other than MODE0.

**3. TRIGGER SIGNAL**

Select which Trigger signal to use.

Use the Cursor Shift key (  or  ) to select "TRIGGER SIGNAL".

Use the Cursor Shift key (  or  ) to change the setting.

**TRIGGER SIGNAL INTERNAL** -----Use the Cursor Shift key (  or  ) to change.

[INTERNAL, EXTERNAL]

INTERNAL: activates the internal trigger signal of S-1900.

EXTERNAL: activates the signal from an external unit.  
 (when another echo sounder synchronized)

**NOTE!**

The sweeping speed might be slower depending on the depth whe the S-1900 is synchronizing with an external echo sounder.  
 Using the internal trigger signal of S-1900 is recommended for synchronizing with an external echo sounder.  
 The output terminal for trigger signal has prepared in the unit. **CF** page 106



## 7. SPEED UNIT

The unit of the ship's speed displayed on the screen can be selected when an external navigator connected.

Use the Cursor Shift key ( or ) to select "SPEED UNIT".

Use the Cursor Shift key ( or ) to change the setting.

**SPEED UNIT** **kt** -----Use the Cursor Shift key ( or ) to change.

[ kt, km/h ]

kt: displays the speed in knots.

km/h: displays the speed in km/h.

## 8. AUTO RETRACT

The soundome can be raised automatically when the ship's speed exceeds the speed previously set. The preset speed can be set.

Use the Cursor Shift key ( or ) to select "AUTO RETRACT".

Use the Cursor Shift key ( or ) to change the setting.

**AUTO RETRACT** **OFF** -----Use the Cursor Shift key ( or ) to change.

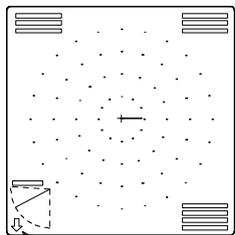
[ OFF, 10kt (18km/h) ] Available setting ranges: 1-15kt (1km/h-27km/h)

Use the Cursor Shift key ( or ) to set the speed after selecting the initial value.

: increases the value.

: decreases the value.

With the speed input the soundome can be raised automatically when the ship's speed exceeds a preset speed.



Soundome status indicator

The down arrow appears at the down left corner of the screen when the soundome is being lowered.

When this function is activated, the arrow changes into the up arrow. When the soundome is retracted completely, the sensor lamp on the control panel is turned off.



: Sensor lamp on the control panel



The ship's speed should not exceed 15 knots (27km/h) while retracting the soundome. The recommended setting speed is less 12kt (22km/h) considering the case that it speeds up without retracting the soundome.

## 9. TRAIN CORRECT

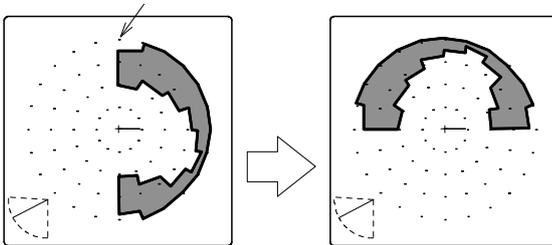
This changes the center direction of the detection range into the bow direction ( 0 °).  
Select the SONAR MODE and set the desired position by using the Bearing keys

(  or  ).

Open “MENU 2” and use the Cursor Shift key (  or  ) to select “**OTHERS-TRAIN CORRECT**”. Press the Cursor Selection (  / + ) so that the confirmation sign appears on the screen. Selecting “**OK**” displays the value for adjustment and the display of the current center direction is changed into the bow direction ( 0 °). Selecting “**CANCEL**” cancel the current operation.

**TRAIN CORRECT**      **90 °** ----- After pressing the Cursor Shift key (  or  ),  
the angle of the center direction set at the menu of SONAR MODE appears.

BOW DIRECTION ( 0 °)



display rotated 90 ° counterclockwise

To release this function, setting the current bearing at 0 ° and the procedure “**TRAIN CORRECT**” above again are required.

## 10. PANEL BRIGHTNESS

The backlight brightness of operation panel can be changed.

Use the Cursor Shift key (  or  ) to select “**PANEL BIRHGTHNESS**”.

Use the Cursor Shift key (  or  ) to change the setting.

**PANEL BRIGHTNESS**      **15** ----- Use the Cursor Shift key (  or  ) to change.

[ 0 - 15 ]

-  : increases the value and sets brighter.
-  : decreases the value and sets darker.

## 11. POWER SUPPLY FREQUENCY

The switching frequency of the power supply is changed.  
The switching currents can cause electrical noise problems.  
The noise produced by the SMPS itself can be suppressed changing the frequency.  
It is usually not required to change the frequency other than noise problem.

Use the Cursor Shift key (  or  ) to select "**POWER FREQUENCY**".

Use the Cursor Shift key (  or  ) to change the setting.

**POWER S. FREQUENCY    120k** ----- Use the Cursor Shift key (  or  ) to change.

[ 120k, 125k, 130k ]



Select "**120K**" for normal use.

## 12. HOIST AUTO DOWN

With the function "**HOIST AUTO DOWN ON**" selected, the soundome is automatically lowered when the power turned on.

Use the Cursor Shift key (  or  ) to select "**HOIST AUTO DOWN**".

Use the Cursor Shift key (  or  ) to change the setting.

**HOIST AUTO DOWN    OFF** ----- Use the Cursor Shift key (  or  ) to change.

[ OFF, ON ]

OFF: This function is inactive. The soundome is not automatically lowered.

ON: This function is active. The soundome is automatically lowered.

### NOTE !

It takes time (some seconds) to lower the soundome even if the POWER ON key on the monitor or the key board pressed.  
If "**HOIST AUTO DOWN ON**" selected, the Hoist starts to lower the soundome just before the unit starts working.

### 13. OPERATION MODE MEMORY

The memory of Operation Mode is restricted. **CF** page 103

It can avoid memorizing the operation accidentally by selecting OFF.

Use the Cursor Shift key ( or ) to select "**OPE. MODE MEMORY**".

Use the Cursor Shift key ( or ) to change the setting.

**OPE. MODE MEMORY    OFF** ----- Use the Cursor Shift key ( or ) to change.

**[OFF, ON]**

OFF: The new settings for Operation Mode are not overwritten.

ON: The new settings for Operation Mode are overwritten.

## COLOR PALETTE

[MODE DIAL – MENU 2 – COLOR PALETTE]

COLOR PALETTE	
B.G.	COLOR
1	
2	
3	
4	
5	
6	
7	

**RETURN MARK**

COLOR SELECT

A-1

DISPLAY COLORS

8

INITIAL SETTINGS

EDIT

Press the Cursor Selection key

 to return to MENU 2.

Use the Cursor Shift key ( or )

to select the desired item to change.

Use the Cursor Shift key ( or )

to change the settings.

### 1. COLOR SELECTION

The color of echoes and background (A-1, A-2, B-1 or B-2) can be set as desired. C-1 / C-2 can set the colors freely with Color palette function.

Use the Cursor Shift key ( or ) to select “**COLOR SELECT**”.

Use the Cursor Shift key ( or ) to change the setting.

**COLOR SELECT**

**A-1**

----- Use the Cursor Shift key ( or ) to change.

[ A-1, A-2, B-1, B-2, C-1, C-2 ]

### 2. DISPLAY COLORS

The display colors, can be select.

C-1 / C-2 can set the colors freely with Color palette function.

Use the Cursor Shift key ( or ) to select “**DISPLAY COLORS**”.

Use the Cursor Shift key ( or ) to change the setting.

**DISPLAY COLORS**

**8**

----- Use the Cursor Shift key ( or ) to change.

[ 8, 16 ]

## HOW TO SET COLOR PALLETTE

Color palette can provide 2 color patterns (C-1 & C-2) freely.

The initial color pattern of C-1 is the same with A-1 and C-2 are is the same with A-2.

Use the Cursor Shift key (□ or □) to select “C-1” or “C-2”, which activates the “**INITIAL SETTINGS**” and “**EIDT**” functions.

Use the Cursor Shift key (□ or □) to select “**INITIAL SETTINGS**” and press the Cursor Selection key  to back to the “**INITIAL SETTINGS**”.

Use the Cursor Shift key (□ or □) to select “**EDIT**” and press the Cursor Selection key  . Color palette appears on the screen.

COLOR PALETTE	
B.G.	COLOR
1	
2	
3	
4	
5	
6	
7	

B.G.:background

**RETURN MARK**

COLOR SELECT

A-1

DISPLAY COLORS

8 COLORS

INITIAL SETTINGS

EDIT

	<b>B.G.</b>
R	4
G	4
B	10

Use the Cursor Shift key (□ or □) to select the color to set, which activates the RGB ratio function.

Press the Cursor Selection key  to close this menu.

Use the Cursor Shift key (□ or □) to select R, G or B for the ratio change.

Use the Cursor Shift key (□ or □) to change the ratio value (0 to 15).

15 is the strongest in RGB and its tone decreases in accordance with the smaller number.

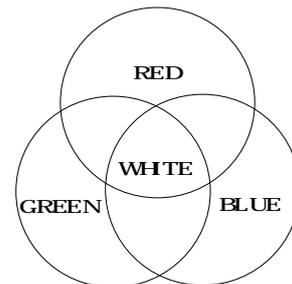
Move the Frame to the top after the RGB setting. Press the Cursor Selection key  to close this menu and the desired settings are memorized in C-1 or C-2.

## COLOR PALLETTE!

Various desired colors can be created from changing RGB ratio.

Color palette function provides the creation of desired colors.

Utilize this Color palette function to set the most visible display for the reaction of fish schools.



## **REMOTE CONTROL SET (OPTION)**

Previously set the key each on the remote controller before use.

### **[MODE DIAL – MENU 2 – REMOTE CONTROL SET]**

See **CF** page 110 for the settings in details.

## FREQUENCY SETTING

FREQUENCY SETTING	
<b>RETURN MARK</b>	
TX FREQUENCY	180.0kHz
RX FREQUENCY	180.0kHz

Refer to NOTE !

Press the Cursor Selection key  /  + to return to MENU 2.

Use the Cursor Shift key  or  to select the desired item to change.

Use the Cursor Shift key  or  to change the settings.

### 1. TX FREQUENCY

Adjust the transmitting frequency of the S-1900 and the receiving frequency changes in conjunction with the transmitting frequency.

It can be changed from the basic frequency to  $\pm 10\text{kHz}$  every 0.1kHz unit.

Use the Cursor Shift key  or  to select "TX FREQUENCY".

Use the Cursor Shift key  or  to change the setting.

**TX FREQUENCY 180.0kHz** ----- Use the Cursor Shift key  or  to change.

[ **BASIC FREQUENCY to  $\pm 10\text{kHz}$**  ] Refer to NOTE !

- : decreases every 0.1kHz of the values of the frequencies for TX FREQUENCY and RX FREQUENCY.
- : increases every 0.1kHz of the values of the frequencies for TX FREQUENCY and RX FREQUENCY.

### 2. RX FREQUENCY

Adjust the receiving frequency of the S-1900, but the transmitting frequency does not change in conjunction with the receiving frequency.

It can be changed from the basic frequency to  $\pm 10\text{kHz}$  every 0.1kHz unit.

Use the Cursor Shift key  or  to select "RX FREQUENCY".

Use the Cursor Shift key  or  to change the setting.

**RX FREQUENCY 180.0kHz** ----- Use the Cursor Shift key  or  to change.

[ **BASIC FREQUENCY to  $\pm 10\text{kHz}$**  ] Refer to NOTE !

- : decreases every 0.1kHz of the values of the frequencies for RX FREQUENCY.
- : increases every 0.1kHz of the values of the frequencies for RX FREQUENCY.

#### NOTE !

The basic frequencies of TX FREQUENCY and RX FREQUENCY is specified by the unit the customer purchases.

## **SELF CHECK**

The following messages appear on the display.

This function checks the battery voltage, the internal voltage, the hoist up and down or the conditions of the stepping motor in the soundome.



Use the Cursor Shift key (◀ or ▶) to select “**RETURN MARK**” and press the Cursor Selection key (◀ / ▶) to close this menu.

Select “**SAVE REPORT**” to store the report of Self Check in the USB memory.

### **NO PROBLEM:**

appears when the system has no problem.

### **MB (Main Board): ABNORMAL POWER SUPPLY VOLTAGE:**

appears when the abnormal voltage detection of the battery is suspected.

### **HB (Hull Board): NO RESPONSE:**

appears when the disconnection of the wiring between Hull Unit and the communication line is suspected.

### **HOIST: BLOWN FUSE:**

appears when the blown fuse in the hoist is suspected.

### **HOIST: UP (DOWN) LIMIT NOT DETECTED:**

appears when the abnormal upper (down) limit switch is suspected.

### **TRAIN MOTOR: DISCONNECTION**

appears when the abnormal train motor is suspected.

### **TILT MOTOR: DISCONNECTION**

appears when the abnormal tilt motor is suspected.

### **TRAIN MOTOR: ABNORMAL DETECTION OF ORIGIN**

appears when the abnormal train motor or the abnormal detection of training position inside the soundome is suspected.

### **TRAIN MOTOR: STEP OUT**

appears when the abnormal train motor or the abnormal detection of training position inside the soundome is suspected.

### **NOTE!**

Both **TRAIN MOTOR: ABNORMAL DETECTION OF ORIGIN** and **TRAIN MOTOR: STEP OUT** appear when the Hall IC board in the soundome is abnormal.

**TRAIN MOTOR: DISCONNECTION**, **TRAIN MOTOR: ABNORMAL DETECTION OF ORIGIN** and **TRAIN MOTOR: STEP OUT** appear all when the soundome is total breakdown.

## MAINTENANCE

### [MODE DIAL – MENU 2 – MAINTENANCE]

MAINTENANCE	
<b>RETURN MARK</b>	
LANGUAGE	ENGLISH (en)
TIME	2013-06-05 17:36:22
ELAPSED TIME	24H
UPDATE	
BACKUP	
RECOVERY	
VERSION	
S-1900	

Press the Cursor Selection key ( / +) to return to MENU 2.

Use the Cursor Shift key ( or ) to select the desired item to change. Each menu appears after the Cursor Selection key ( / +) pressed.

### LANGUAGE

Use the Cursor Shift key ( or ) to select “LANGUAGE”.  
 Use the Cursor Shift key ( or ) to select the desired language.  
 It is required to turn the power off once to determine the language.  
 Hold the **OFF** key for a while and then turn the **ON** key.

### ELAPSED TIME

It indicates the total time that elapses while the S-1900 operating and can be reset.  
 Use the Cursor Shift key ( or ) to select “ELAPSED TIME”.  
 The following menu appears on the bottom of the screen after pressing the Cursor Selection key ( / +).

<b>ELAPSED TIME RESET</b>	
? Do you reset elapsed time?	
<b>OK</b>	<b>CANCEL</b>

**CANCEL:** Use the Cursor Shift key ( or ) to select “CANCEL” and press the Cursor Selection key ( / +) to finish this menu.

**OK:** Use the Cursor Shift key ( or ) to select “OK” and press the Cursor Selection key ( / +) to reset the elapsed time. 0H appears on the screen.

### 1. UPDATE

This is the way to update the version of the program.  
 Use the Cursor Shift key ( or ) to select “UPDATE”.  
 The following menu appears on the bottom of the screen after pressing the Cursor Selection key ( / +). Use the Cursor Shift key ( or ) to select.

<b>UPDATE</b>	
! Insert the USB stick contains updated files	
<b>NEXT</b>	<b>CANCEL</b>

Use the Cursor Shift key ( or ) to select “CANCEL” and press the Cursor Selection key ( / +) to close this menu.

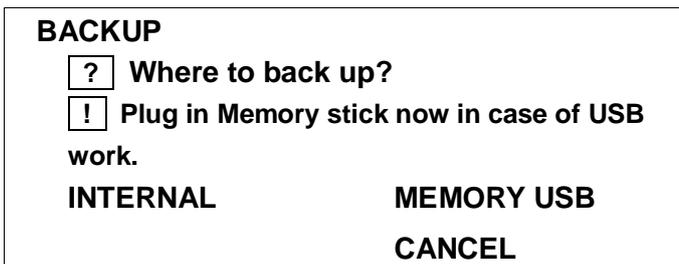
<To be continued>

**[ HOW TO UPDATE VERSION ]**

Insert the USB stick contains the upgraded files.  
 Use the Cursor Shift key (◀ or ▶) to select “NEXT”.  
 Pressing the Cursor Selection key (◻ / +) updates the program.  
 After rebooting the unit, it is operated with the updated version.

**2. BACKUP**

This is the way to back up the settings.  
 Use the Cursor Shift key (◀ or ▶) to select “BACKUP”.  
 The following menu appears on the bottom of the screen after pressing the Cursor Selection key (◻ / +). Use the Cursor Shift key (◀ or ▶) to select.



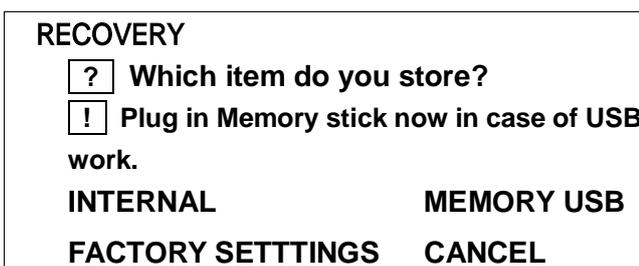
Use the Cursor Shift key (◀ or ▶) to select “CANCEL” and press the Cursor Selection key (◻ / +) to close this menu.

**[ HOW TO BACK UP THE SETTINGS ]**

Use the Cursor Shift key (◀ or ▶) to select where to back up (**INTERNAL** or **MEMORY USB**) and press the Cursor Selection key (◻ / +) to backup the settings.

**3. RECOVERY**

This is the way to recover the settings.  
 Use the Cursor Shift key (◀ or ▶) to select “RECOVERY”.  
 The following menu appears on the screen after pressing the Cursor Selection key (◻ / +). Use the Cursor Shift key (◀ or ▶) to select.



Use the Cursor Shift key (◀ or ▶) to select “CANCEL” and press the Cursor Selection key (◻ / +) to close this menu.

**[ HOW TO RECOVER THE SETTINGS ]**

Use the Cursor Shift key (◀ or ▶) to select what to recover (**INTERNAL**, **MEMORY USB** or **FACTORY SETTTINGS**) and press the Cursor Selection key (◻ / +) to recover the settings. Selecting the factory settings will back to the factory settings.

**4. VERSION**

Use the Cursor Shift key (◀ or ▶) to select “VERSION” to know the version of the program in this unit.

# CHAPTER 5

## DESCRIPTIONS of DIALS and KEYS

This Chapter explains how to use the dials and keys.

<b>Dials</b>	Mode Dial -----	93
	Range Dial -----	93
	Sector Dial -----	94
	Brightness Dial -----	95
	Gin Dial -----	95
	Far Gain Dial -----	95
<b>Keys</b>	Power Supply Key ON/OFF -----	96
	Hoist Key -----	96
	Sensor Lamp -----	96
	Bearing Key -----	97
	Tilt Key -----	98
	Cursor key -----	99
	Target Lock Key -----	101
	Mark Key -----	102
	Threshold Key -----	102
Operation Mode Key -----	103	

## MODE DIAL

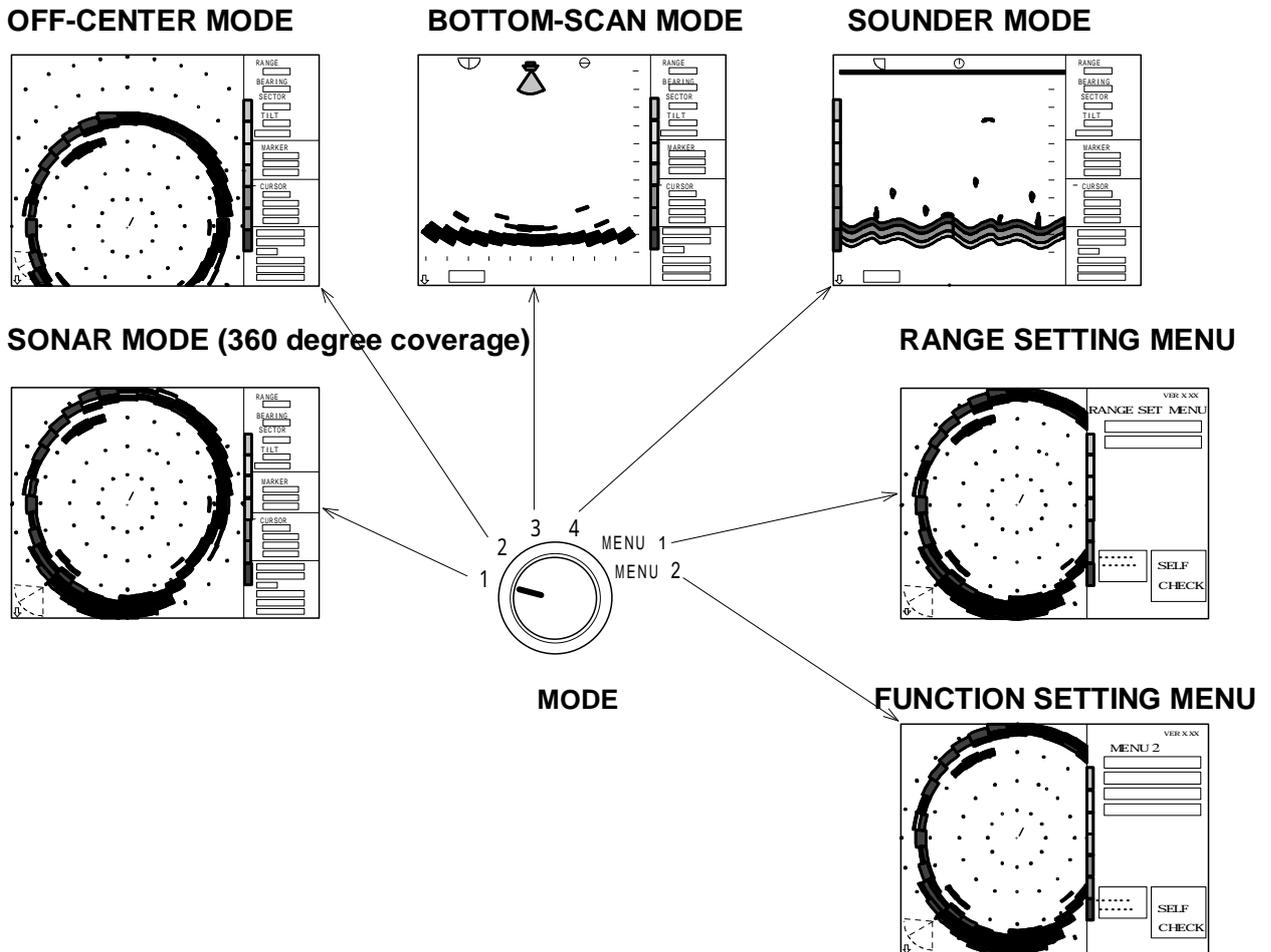
The display mode is selected.

The Sub-Display menu displayed in the right split screen can be set via "MENU 2".

**CF** page 66

The own ship's position in the Off-Center Mode can be set via "MENU 2".

**CF** page 73



## RANGE DIAL

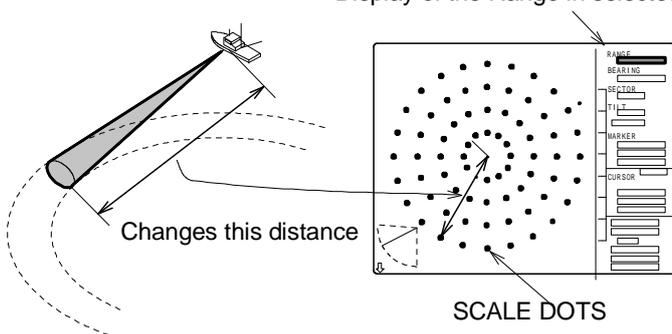
The basic ranges can be changed.

8 ranges can be set via "MENU 1". **CF** page 56

The unit of range measurement can be selected via "MENU 2". **CF** page 80

The display (ON/OFF) of Scale dots can be selected via "MENU 2". **CF** page 73

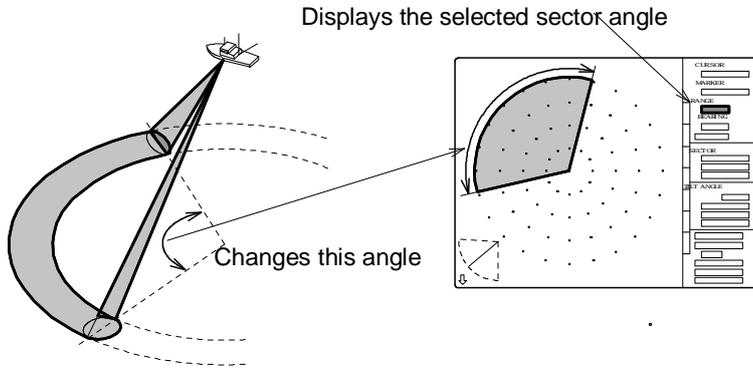
Display of the Range in selected unit



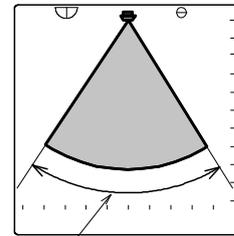
## SECTOR DIAL

The horizontal training angle can be changed when SONAR MODE selected.  
 The vertical training angle can be changed when BOTTOM-SCAN MODE selected.

[SONAR MODE]



[BOTTOM-SCAN MODE]



Clockwise rotation (●) increases the sector width and counterclockwise rotation (⊙) decreases it. The desired step can be selected via "MENU 2". **CF** page 72

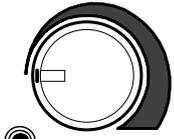
### SONAR MODE

5 ° STEP	5 °	25 °	45 °	85 °	125 °	165 °	205 °	360 °
10 ° STEP	10 °	30 °	50 °	90 °	130 °	170 °	210 °	360 °
15 ° STEP	15 °	45 °	75 °	105 °	135 °	165 °	225 °	360 °

### BOTTOM-SCAN MODE

3 ° STEP	3 °	27 °	45 °	63 °	93 °	117 °	147 °	177 °
5 ° STEP	5 °	25 °	45 °	65 °	95 °	115 °	145 °	175 °

## BRIGHTNESS DIAL

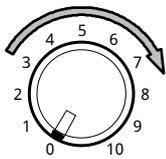


(S-1900 M15)

Screen brilliance can be increased by rotating this dial clockwise and decreases by rotating it counterclockwise.

This dial cannot adjust the brightness of control panel and it's brightness can be only set via "MENU 2 – PANEL BRIGHTNESS".  
**CF** page 82

## GAIN DIAL

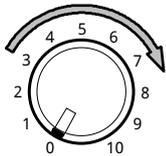


GAIN

Rotating this dial clockwise can adjust or increase the sensitivity of the sonar display.

The gain value can be set via "MENU 2 – GAIN UP". **CF** page 60

## FAR GAIN DIAL



FAR GAIN

Rotating this dial clockwise increases sensitivity of the sonar for the last half of the displayed range and adjusts the TVG curve.

**CF** page 61

# KEYS

---

## POWER ON/OFF KEYS

### **ON** key

Press this key to turn on the power. The soundome is automatically lowered. The sensor lamp on the control panel lights while the soundome is being lowered. The sign “**Please wait**” appears on the bottom of the screen. The sonar operation starts after the sign disappears.

### **OFF** key

Press this key to turn off the power. The soundome is automatically raised. The sign “**Please wait**” appears on the bottom of the screen. The power is turned off after the sign disappears.

The sensor lamp (  ) is off after the soundome is retracted into the Trunk Pipe.

**Do not turn off the power on the hull unit until the sensor lamp is off.**

## HOIST KEYS

 : HOIST UP KEY /  : HOIST DOWN KEY

The hoist keys raises and lowers the soundome while operating the S-1900.

Pressing the hoist up key raises the soundome and the mark on the lower left screen changes into the up arrow (  ). The sensor lamp is off after the retraction of the soundome is completed.

Pressing the hoist down key lowers the soundome, the mark changes into the down arrow (  ) and the sensor lamp lights.

Down the ship's speed and press the hoist down key in case the soundome is retracted by the function “AUTO RETRACT”.

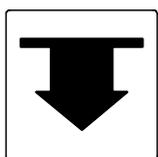
### **NOTE!**

[ X ] in red appears on the left corner of the screen in case of the malfunction of raising/lowering of the Soundome.

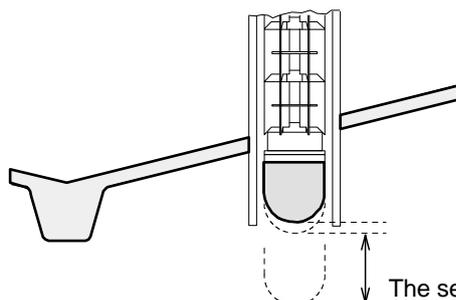
## SENSOR LAMP

The sensor lamp lights while the soundome is being lowered.

**Do not turn off the power on the hull unit until the sensor lamp is off.**



SENSOR LAMP



The sensor lamp lights while the soundome is in this range.

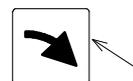
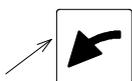
# BEARING KEY

## [SONAR MODE]

The center direction of the detection range can be shifted as follows.

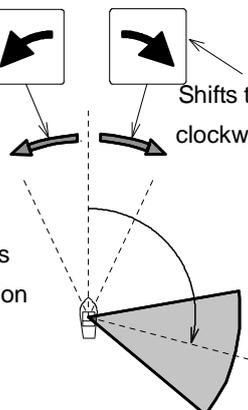
### 5 ° step shift

Shifts the center counterclockwise

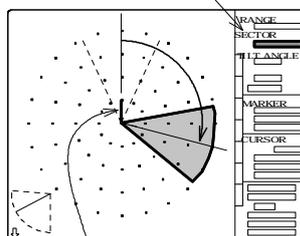


Shifts the center clockwise

This key changes the center direction



Displays values of Sector angle

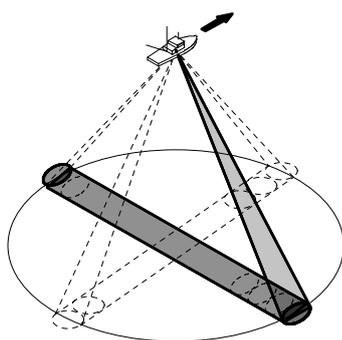


This arrow mark shows the center direction.

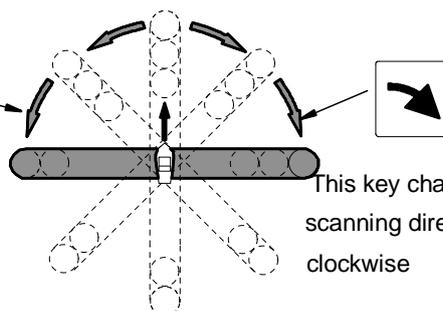
## [BOTTOM-SCAN MODE]

The direction of the detection range can be shifted.

### 5 ° step shift

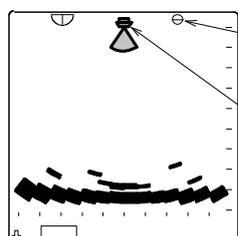


This key changes scanning direction counterclockwise



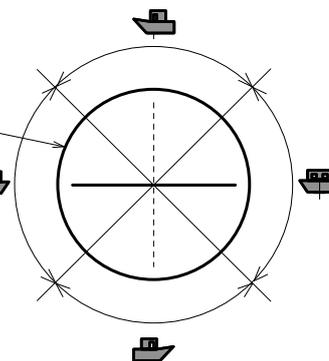
This key changes scanning direction clockwise

Display of scanning direction



Displays the scanning direction of the bow.

Displays the direction of the bow every 90 °.



## [SOUNDER MODE]

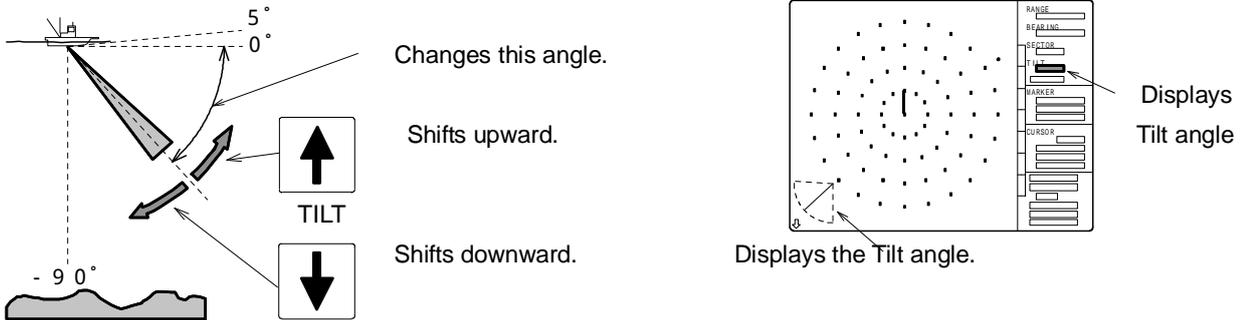
The direction of the detection range can be shifted together with "TILT KEY". The shifted angle is the same with BOTTOM-SCAN MODE.

**CF** page 99

# TILT KEY

[SONAR MODE]

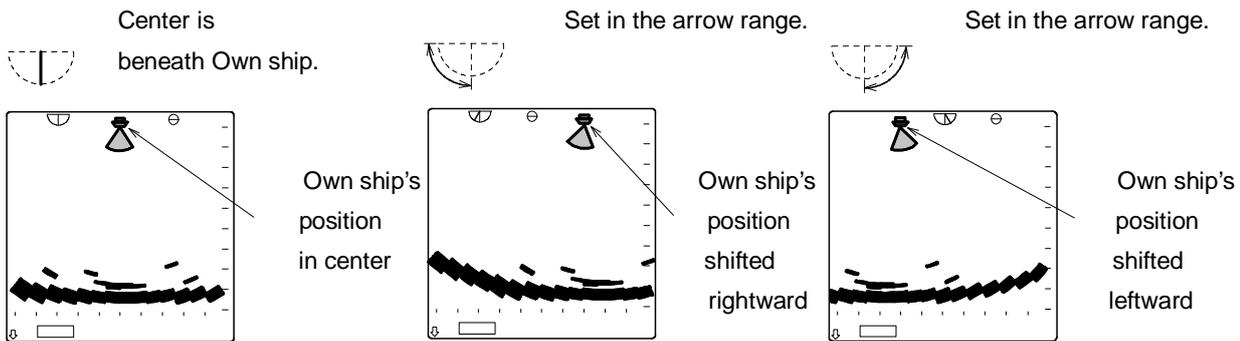
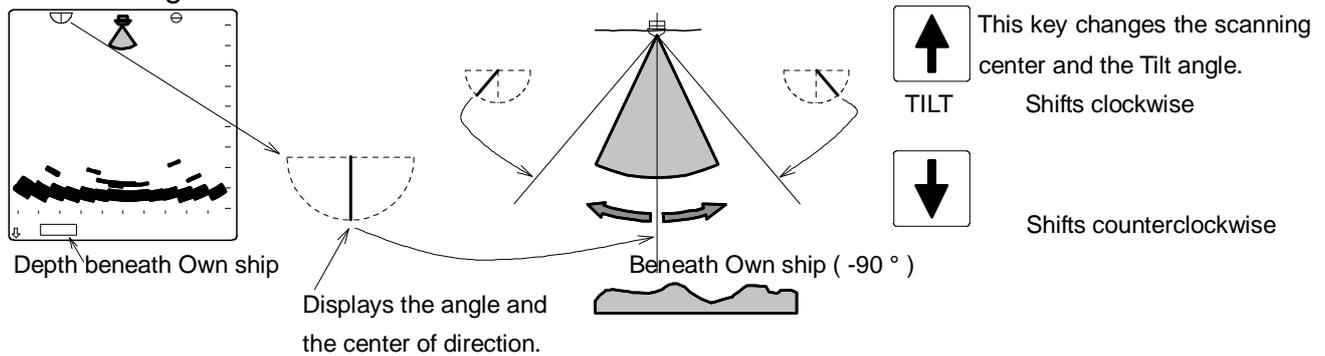
The tilt angle can be changed.



Variable Tilt angle: in increments of 1 ° from -5 ° ( 0 ° ) to -90 °

[BOTTOM-SCAN MODE]

The scanning center can be shifted.



Variable Tilt angle (Refer to the page 72 for the setting of step.)

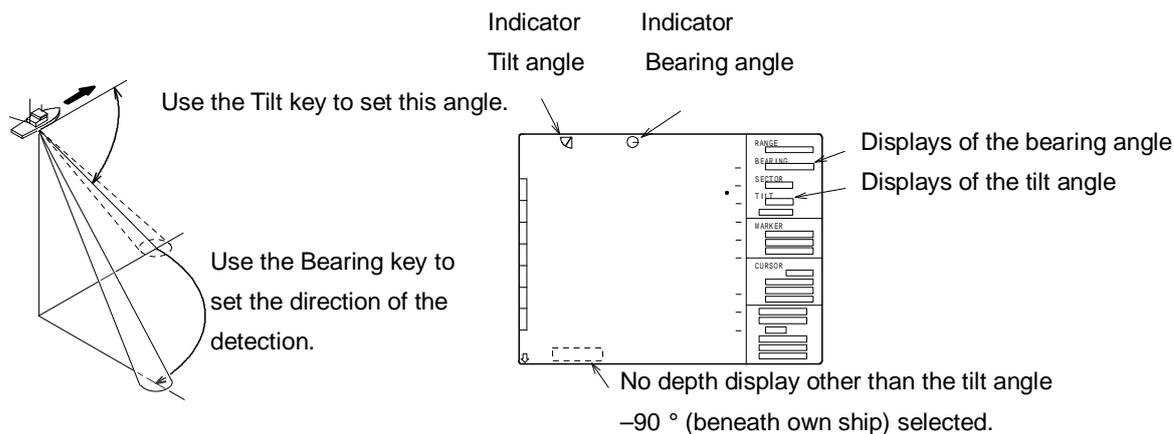
3 ° step: in increments of 3 ° from -3 ° to -90 °

5 ° step: in increments of 5 ° from -5 ° to -90 °

<to be continued>

**[SOUNDER MODE]**

The direction of emitting the sound wave and the bearing of the detection can be shifted together with "BEARING KEY".



Variable Tilt angle: in increments of 1 ° from -5 ° ( 0 ° ) to -90 °

Use the Depth marker to measure the depth other than the tilt angle -90 ° .

**CURSOR KEY**

Use 2 types (one type in case of SOUNDER MODE) of Cursor to display the range from own ship to the cursor location.

Use the Cursor selection key to select the cursor.

Use the Cursor shift keys to move the cursor.

- /+ key [SONAR MODE] Ring marker and Cross cursor ON/OFF available  
[BOTTOM-SCAN MODE] Depth scale and Cross cursor ON/OFF available  
[SOUNDER MODE] Depth scale ON/OFF available
- key Ring marker enlarged, Cross cursor shifted upward,  
Depth scale shifted to the shallower range
- key Ring marker reduced, Cross cursor shifted downward,  
Depth scale shifted to the deeper range
- key Cross cursor shifted leftward
- key Cross cursor shifted rightward

<to be continued>

# KEYS

[when the power turned on]

No cursors appear on the screen when the power turned on. Press the Cursor selection key ( $\square / +$ ) to activate the function.

Press the Cursor shift keys ( $\square$  or  $\square$ ) to display the Marker.

Press the Cursor selection key again to activate this function.

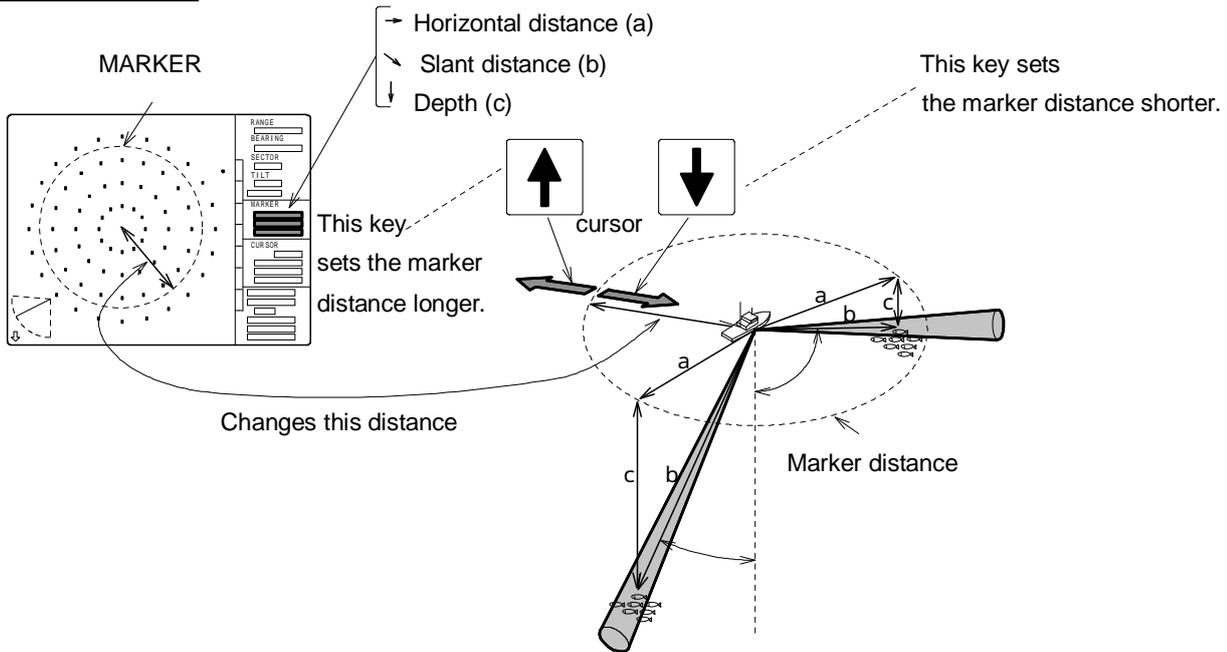
(In case of SOUNDER MODE, this function is off.)

Inactive functions are displayed in yellow.

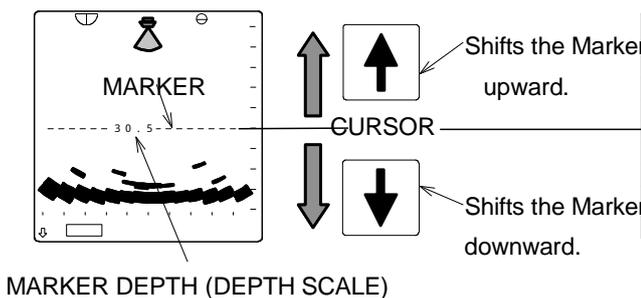
The Marker and the Cursor disappear after pressing the Cursor selection key again.

[when the Marker selected] (Cross cursor displayed in yellow or no display)

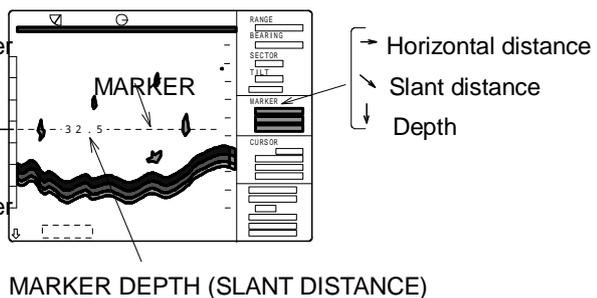
## SONAR MODE



## BOTTOM SCAN MODE



## SOUNDER MODE

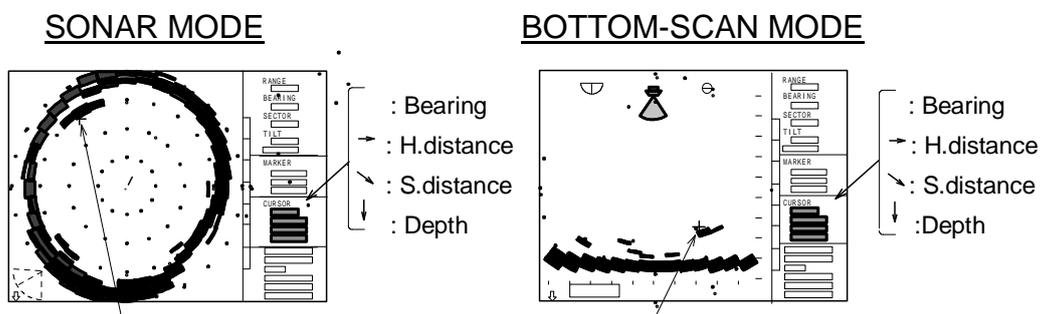


\*Marker data displays in the submenu.

<To be continued>

[when the Cross cursor selected] (Marker displayed in yellow or no display)  
In case of SOUNDER MODE this function is inactive.

Use the Cursor shift keys to place the cursor where desired.  
The data of the "Cross Cursor" is displayed in the submenu.



This Cross cursor is also used for placing the event mark (**CF** page 102) and target mark (**CF** page 79).

## **TARGET LOCK KEY (△)**

The following Target lock key actions are available in the SONAR MODE and in the BOTTOM-SCAN MODE – MODE 0 only and it is different action depending on the selected menu via "MENU 2 – TARGET LOCK.

- Setting MODE 0: the train direction is reversed.
- Setting MODE 1 & 2: it tracks the target automatically.
- Setting MODE 3 (an external navigator should be connected):  
Place the Cross cursor on the target and press the Target lock key.  
A target mark is inscribed at the Cross cursor location and tracks the target automatically. Refer to the page 78 "TARGET LOCK" for details.

### **NOTE!**

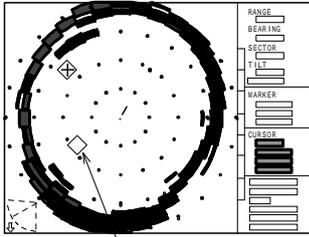
-----  
This Target lock key is not available other than the above Modes.  
-----

## MARK KEY (◇)

The Mark key functions to mark desired locations on the screen, and 5 marks can be inscribed at the Cross cursor locations desired.

Move the Cross cursor to the desired locations and press the Mark key.

The Mark (◇) appears at the Cross cursor location and moves with ship's movement.



MARK

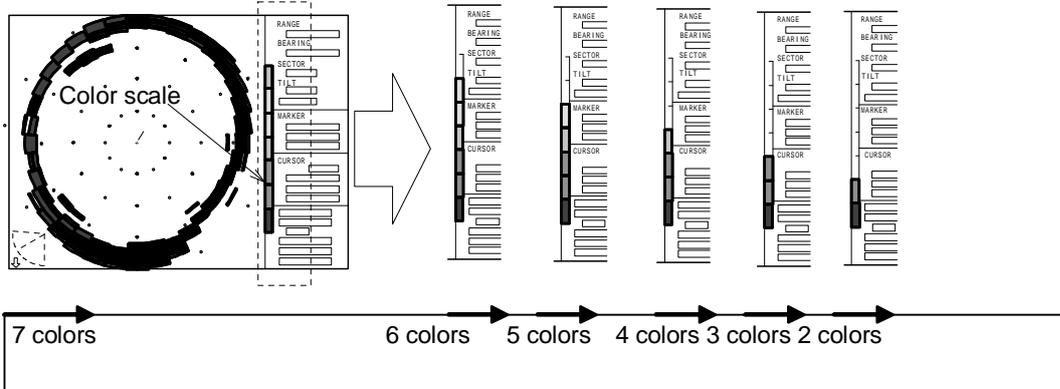
This mark also appears on the screen when the sub-display, WAKE display is active.

## THRESHOLD KEY (⌏)

This key can eliminate the appearance of unwanted weak colors.

It can eliminate small fish and unidentified objects and display the clearer images.

Each time this key is pressed, one of the weakest display colors is eliminated.



## OPERATION MODE KEY

3 different types of customized operation settings can be registered previously.  
Press one of the Operation mode keys to operate the units with the desired settings soon after pressing it.

Open MENU 2 display and press one of the Operation mode keys.  
The following "OPERATION MODE" menu appears on the screen.  
Use the Cursor Shift key (□ or □) to highlight the item to change.  
Use the Cursor Shift key (□ or □) to change the setting values.

OPERATION MODE 1 (2, or 3)	
DISPLAY MODE	SET VALUE
RANGE	SET VALUE
STEP	SET VALUE
SECTOR	SET VALUE
BEARING	SET VALUE
TILT	SET VALUE
GAIN UP	SET VALUE
TVG CURVE	SET VALUE

Each time the Cursor shift key (□ or □) Pressed, the value changes

Use the Mode dial to back to the desired mode after the settings completed.  
Press one of the desired keys (1, 2 or 3) to activate the memorized operation menu.

Even if the settings are changed via MENU 2 or Control panel, the settings in the Operation mode (1, 2 or 3) remain.

In case the settings are changed via MENU 2 or Control panel while the Operation mode is used, the action will follow the changed settings, but it back to the Operation mode by pressing one of the operation mode keys again.

### **NOTE!**

This is the way to register the operation mode being used without opening the "OPERATION MODE" menu.

Hold one of the operation mode keys (1, 2 or 3) for 3 seconds after the first buzzer. The desired settings is registered in the selected operation mode key after the buzzer sounds again.

Do not release the key until the second buzzer sounds.  
Otherwise the new settings cannot be registered.

Selecting [MODE DIAL - MENU2 – OTHERS – OPE.MODE MEMORY OFF]  
can protect overwriting the new settings of the operation.

**CF** page 84

# CHAPTER 6

## OPTION

This chapter provides you the explanation related to the optional input/output terminals and the remote controller.

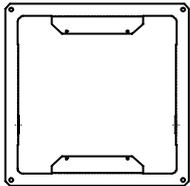
<b>Option</b>	Option List -----	105
	Input/Output Terminals -----	106
	Input/Output Terminals (M12)-----	107
	Input/Output Terminals (M15)-----	108
	Input/Output Terminals (MBB) -----	109
	Remote Controller -----	110

## OPTION LIST

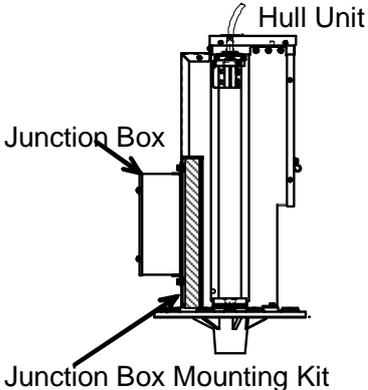
### For M12/M15/MBB

P. No.	Description	
OP-287	Remote Controller Connect Cable Assy	Terminal for Remote Controller
CRC-201	Remote Controller	with 4m cable
OP-360	VGA Connect Cable Assy	Terminal for VGA Output ( to connect an external monitor )
OP-190	Trigger Output Cable 36981D ( one side of the cable is chopped )	To connect Trigger Output to the Sounders of other companies (5m )
OP-191	Trigger Output Cable 36982D ( with FM14-8Pplug )	To connect Trigger Output to the Suzuki Sounders (5m)
TS2GJFV33	USB Flash Drive ( 2GB )	For the backup of the settings or the storage of the report of Self Check

### For M12

P. No.	Description	
OP-131	Panel Mount Fittings for 12.1-inch LCD	For mounting the panel  

### For S-1900 H

P. No.	Description	
OP-700	S-1900 Junction Box Mounting Kit	For mounting Junction Box on the Hull Unit  

# INPUT/OUTPUT TERMINALS

The following optional terminals are required to connect a remote controller and an External monitor.

This is to indicate the settings for the interface setups.

Note that the connection cables between the S-1900 and the external units to be connected are not supplied as standard.

P. No.	NAMES of TERMINALS	TERMINAL CONNECTIONS	
OP-287	REMOTE CONTROLLER		
OP-360	VGA OUTPUT ( TERMINAL for EXTERNAL MONITOR )	No1: RED OUTPUT No2: GREEN OUTPUT No3: BLUE OUTPUT No5: GND No6: RED GND	No7: GREEN GND No8: BLUE GND No10: GND No13: H-SYNC No14: V-SYNC OTHER Nos: N C
STANDARD SUPPLY	ALARM ( TERMINAL for EXTERNAL BUZZER)	No1: ALARM No2: ALARM	not used currently normally open contact
STANDARD SUPPLY	TRIG - OUT ( TERMINAL for TRIGGER OUTPUT )	No1: TRIGGER OUTPUT + No2: SHIELD	No3: TRIGER OUTPUT-
STANDARD SUPPLY	NAV - IN ( TERMINAL for NAVIGATOR )	No1: SIGNAL INPUT + No2: SIGNAL INPUT - No3: SHIELD	No4: SIGNAL OUTPUT + No5: SIGNAL OUTPUT -
STANDARD SUPPLY	NMEA - OUT ( TERMINAL for NAVIGATOR or Something else)	No1: SIGNAL INPUT + No2: SIGNAL INPUT - No3: SHIELD	No4: SIGNAL OUTPUT + No5: SIGNAL OUTPUT - No6: NC
STANDARD SUPPLY	SERIAL - IF ( TERMINAL for EXTERNAL SOUNDER )	No1: SIGNAL INPUT + No2: SIGNAL INPUT - No3: SHIELD No4: SIGNAL OUTPUT +	No5: SIGNAL OUTPUT - No6: NC No7: NC
STANDARD SUPPLY	TRIG - IN ( TERMINAL for TRIGGER INPUT)	No1: TRIGGER INPUT No2: NC No3: NC No4: NC	No5: GND No6: NC No7: NC No8: SHIELD

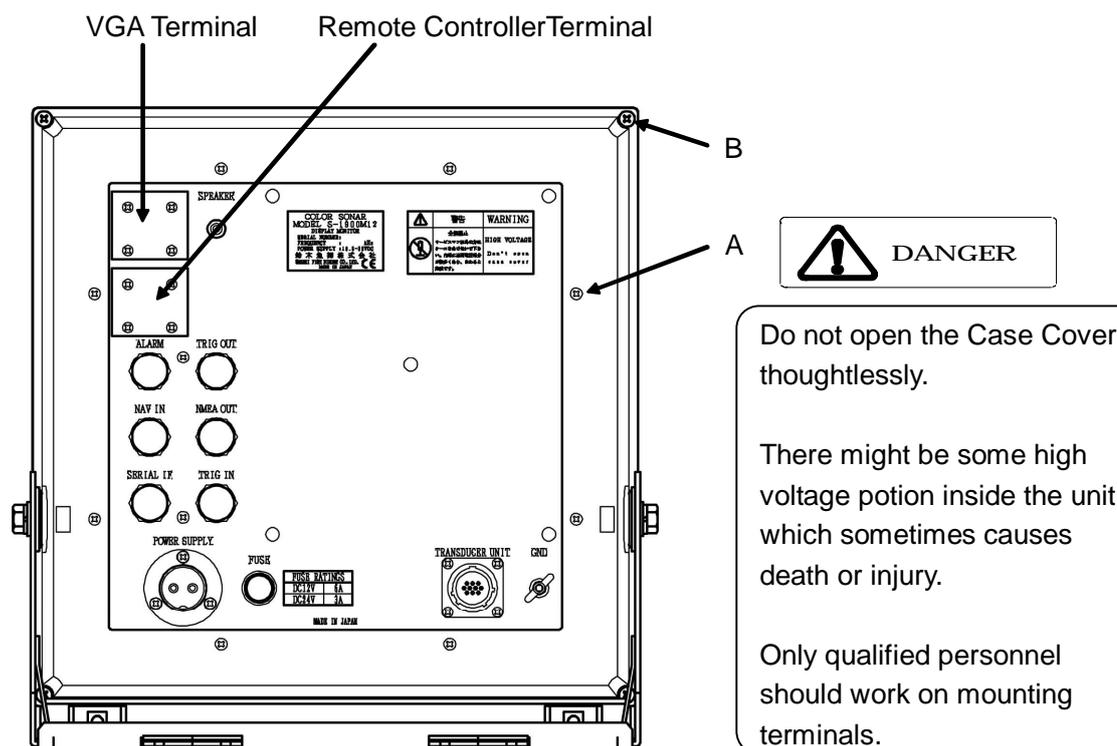
Note that nothing should be connected to the above NC.

A navigator can be connected to NMEA-OUT terminal (No.1 and No.2), but the data of NAV-IN terminal will prior to NMEA-OUT terminal (No.1 and No.2).

## INPUT/OUTPUT TERMINALS (M12)

Remove all cables connected to the rear side of the monitor M12 before mounting any terminals.

- 1) Remove 8 Binding Screws holding the Case Cover and the Rear Panel (Drawing A position).
- 2) Remove 4 Tapping Screws holding the Case Cover and the Front Case (Drawing B position) and remove the Case Cover backward.



- 3) Remove the Blind Lid to mount the terminal. Mount it referring to the above drawing.
- 4) Insert the connector of the terminal into the specified terminal of the Main Board or the External Connecting Board. **CF** page 109

-VGA OUTPUT Terminal      J3 or J4 on the Main Board

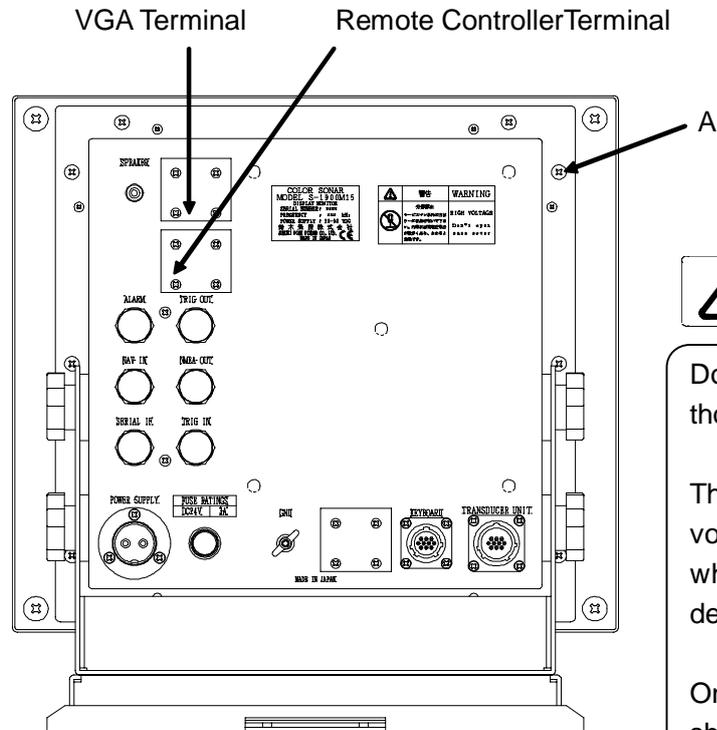
-REMOTE CONTROLLER TERMINAL      J3

- 5) Put the Case Cover back to its original place after finishing the mounting work.

# INPUT/OUTPUT TERMINALS (M15)

Remove all cables connected to the rear side of the monitor M15 before mounting any terminals.

- 1) Remove 10 Binding Screws holding the Case Cover and the Rear Panel (Drawing A position).



Do not open the Case Cover thoughtlessly.

There might be some high voltage portion inside the unit which sometimes causes death or injury.

Only qualified personnel should work on mounting terminals.

- 2) Remove the Blind Lid to mount the terminal. Mount it referring to the above drawing.
- 3) Insert the connector of the terminal into the specified terminal of the Main Board or the External Connecting Board. **CF** page 109

-VGA OUTPUT Terminal      J3 or J4 on the Main Board

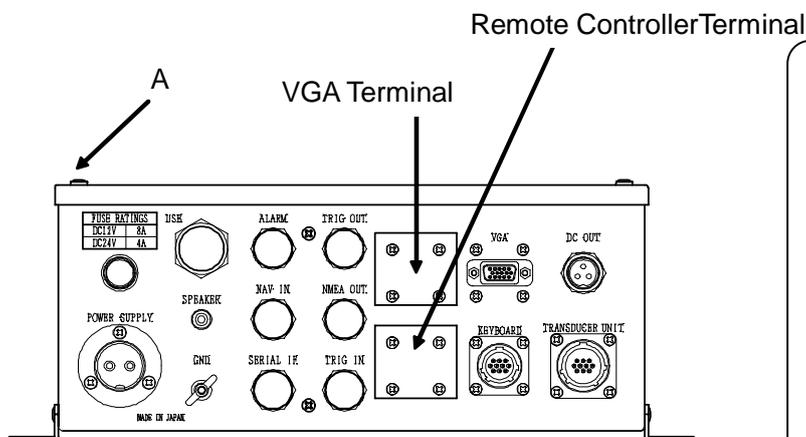
-REMOTE CONTROLLER TERMINAL      J3 on the External Connecting board

- 4) Put the Rear Case back to its original place after finishing the mounting work.

# INPUT/OUTPUT TERMINALS (MBB)

Remove all cables connected to the unit, the MBB before mounting any terminals.

1) Remove 4 Binding Screws holding the Lid of the MBB and remove the Lid (Drawing A position).



Do not open the Case Cover thoughtlessly.

There might be some high voltage portion inside the unit which sometimes causes death or injury.

Only qualified personnel should work on mounting terminals.

2) Remove the Blind Lid or the Cap to mount the terminal.

Mount it referring to the above drawing.

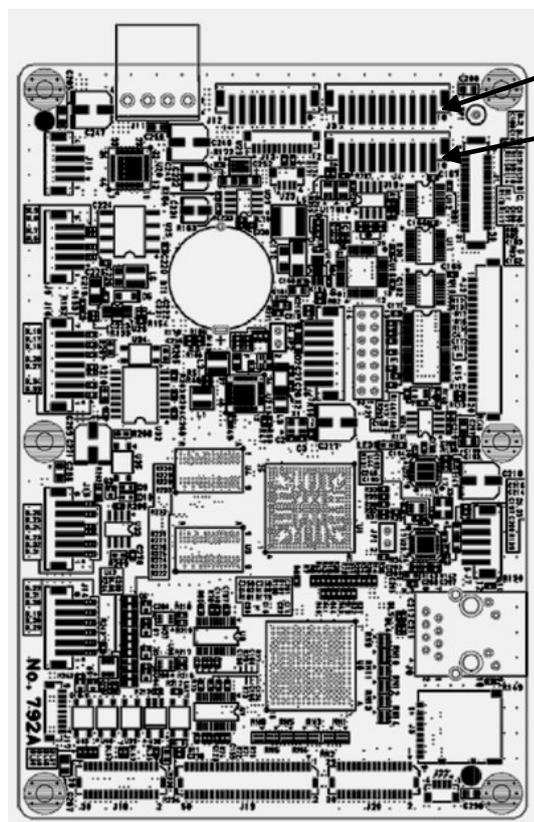
3) Insert the connector of the terminal into the specified terminal of the Main Board or the External Connecting Board.

-VGA OUTPUT Terminal            J3 or J4 on the Main Board No.792

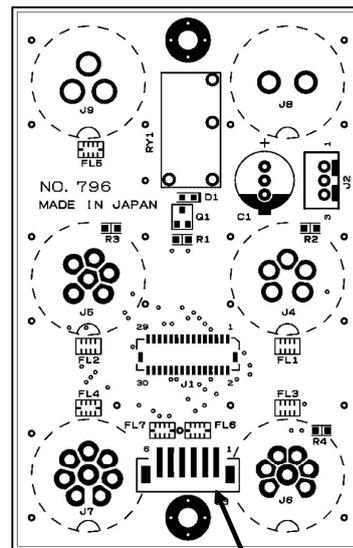
-REMOTE CONTROLLER TERMINAL    J3 on the External Connecting board No.796

4) Put the Lid of the MBB back to its original place after finishing the mounting work.

Main Board No.792



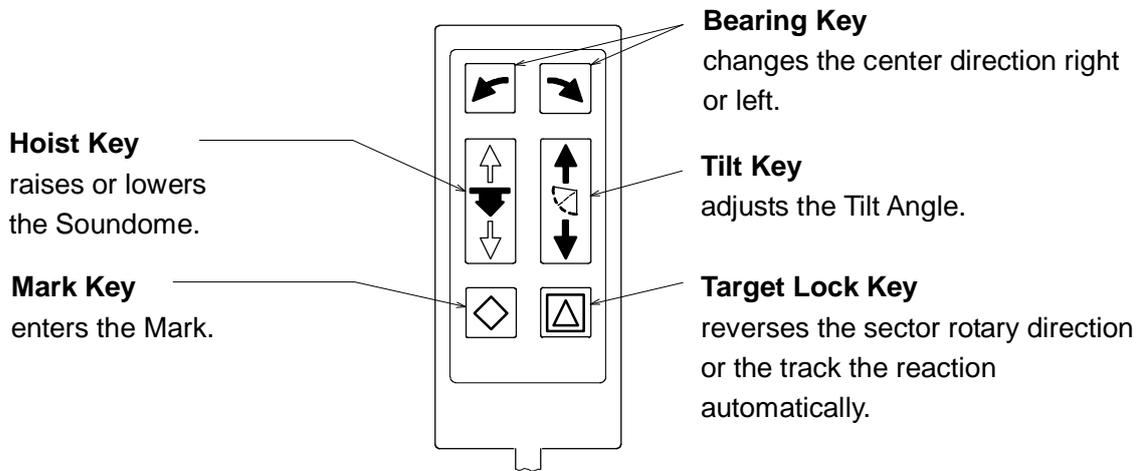
External Connecting Board No.796



J3

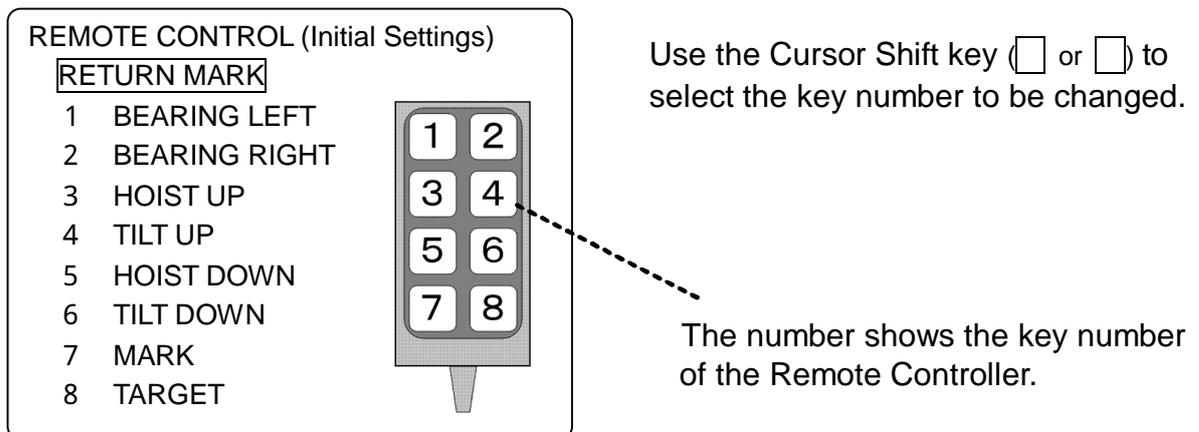
# REMOTE CONTROLLER

Connect the terminal of the Remote Controller to the specified port.



## [MODE DIAL – MENU 2 – REMOTE CONTROL]

- 1) Select the Mode Dial (MENU 2)
- 2) Use the Cursor Shift key (◀ or ▶) to select “**REMOTE CONTROL**” and press the Cursor Selection key (◻ / +) so that the following menu appears on the screen.



Each time the Cursor Shift key (◻ or ▶) pressed, the item appears in the following orders.

[ OPE. MODE 1, OPE. MODE 2, OPE.MODE3, TARGET, MARK, THRESHOLD, CURSOR SEL., CURSOR UP, CURSOR DOWN, CURSOR RIGHT, CURSOR LEFT, RANGE SHALLOW, RANGE DEEP, HOIST UP, HOIST DOWN, TILT UP, TILT DOWN, BEARING RIGHT, BEARING LEFT, OPE.MODE 1.....]

All ranges of the range setting menu can be controlled by the remote control keys until the Range Dial operated.

# ADDITIONS

# DISPOSAL



The S-1900 contains the lithium battery of high-density energy. Careless disposal of the lithium battery causes electric shorts, impact, heat, electrical shock, explosion, injury, fire and so on.

## **DISPOSAL OF S-1900**

Dispose of the S-1900 in accordance with local regulations.

## **DISPOSAL OF LITHIUM BATTERY**

Place a piece of adhesive tape across the plus and minus terminals before disposing of the lithium battery. Dispose of the lithium battery in accordance with local regulations.

# SPECIFICATIONS

## DISPLAY UNIT

Model Name	S-1900 M12	S-1900 M15	S-1900 MBB
Display	12.1-inch TFT color LCD	15-inch TFT color LCD	w/out Display Unit
Weight	9kg (bracket included)	12kg (keyboard included)	1kg (keyboard)+4.5kg (control unit)
Power Supply	10.5 - 30 Vdc	20 - 30 Vdc	20 - 30 Vdc
Sonar Type	Searchlight Sonar		
Ranges	8 ranges freely set (Meters, Feet, Fathoms, Braccia can be selected)		
Sector Angle (Sonar Mode)	(5° STEP) 5° 25° 45° 85° 125° 165° 205° 360° (10°STEP) 10° 30° 50° 90° 130° 170° 210° 360° (15°STEP) 15° 45° 75° 105° 135° 165° 225° 360°		
Sector Angle (Bottom Scan Mode)	(3° STEP) 3° 27° 45° 63° 93° 117° 147° 177° (5° STEP) 5° 25° 45° 65° 95° 115° 145° 175°		
Sector Center	Sector center can be set every 5° step.		
Tilt Angle	+5° (0°) to -90° (1° step)		
Display Mode	Sonar mode + Data display, Off-center mode + Data display Off-center on the whole screen (new !), Bottom scan mode+Data display, Sounder Mode + Data display		
Sub-Display	Historical display, +Press display, + A-scope display, Track, EXT, Sounder display		
Data Display	Range, Sector angle, Range scale, Power supply voltage, Water temperature, Color scale, Interference rejection, Gain, Far Gain, TVG graph, Latitude/Longitude and speed (option)		
(Sonar/Off-Center)	Sector center angle, Tilt angle, Tilt angle indicator, Ring marker, Cross Cursor Compass (option), Navigation (option)		
(Bottom Scan)	Own ship position, Scan image (2 types), VRM, Depth		
Additions	Operation mode (3 modes), Off-center (4 changes), Train correct, Power rejection Gain adjust, Temperature adjust, Pulse width control, TVG change, Target lock Color change (4 types + 2 types of color palette settings), Dynamic range Interference rejection, Threshold, Filter (OFF/1/2), Gain control, Far gain control Brightness control, External trigger synchronization, Trigger signal output Hoist sensor lamp, Audio (optional speaker required), Stabilizer (up to 25°controllable) Soundome automatic retract (Navigator connect required), Full-screen gain control (new!)		
External Input	Trigger input, Navigator input, External sounder input, Remote controller input		
External Output	External buzzer, Trigger output, NMEA output, XGA output, Audio output USB terminal (memory for setting values)		

## HULL UNIT

Model Name	S-1900 H80	S-1900 H140	S-1900 H180
Frequency	80kHz	140kHz	180kHz
Weight	Hoist: 32kg (trunk pipe excluded) / Junction box: 5kg		
Power Supply	10.5 – 30 VDC		

