CE

KODEN

OPERATION MANUAL

COLOR Sonar

ESR-180
ESR-180BB

This product is specifically desingned to be installed on boats and other means of maritime transport. If your country forms part to the EU, please contact your dealer for advice before attempting to install elsewhere.

KODEN

Declaration of Conformity

(As required by Article 7 (1) of Directive 89/336/EEC)

Declares under his sole responsibility that the produced Color Sonar manufactured by

Koden Electronics Co., Ltd.
5278 Uenohara, Uenohara-Machi
Kitatsuru-Gun, Yamanashi-Ken
409-0112, Japan

Telephone +81 554 20 5865   Telefax +81 554 20 5880

Identified by the type number $ESR-180$ to which this declaration refers conforms to the requirements of Directive 89/336/EEC amended by 92/31/EEC and 93/68/EEC and is in conformity with the EMC, Health and Safety standards of

EN60945

Signed ....

Saburo Suzuki,

Dated ....20. 07. 2004.........

Koden Elektronik GmbH.
Am Gewerbepark 15
D-64823, Gross–Umstadt /
Hessen Germany.
Telephone +49 6078 2056
Telefax   +49 6078 73824

N.B. As this product is for Maritime use compliance with Directive 72/23/EEC is not required.

AMENDMENT HISTORY

ESR-180 OPERATION MANUAL
Doc No: 0093132862

No.	Document No & Rev No.	Date	Amendments
0	93132862-00	04/07/20	First issue
1	93132862-01	05/03/01	Page 85 DISPLAY CABINET (Sonar Mode)
2	0093132862-02	06/01/26	Cover
3	0093132862-03	07/10/12	Cover
4	0093132862-04	10/08/11	Page 11,Page 13_TRUNK/JOINT PIPE LENGTH
5	0093132862-05	11/02/07	Page 11_TRUNK/JOINT PIPE LENGTH detail Addition
6	0093132862-06	11/11/28	Page 7,Page 12_ESR-180BB_OPERATION UNIT Addition
7	0093132862-07	13/05/14	Chapter 2, Chapter 3, Cover
8			
9			
10			

Amendment policy

When any change is applied in the document, the document number of the cover sheet is modified. The document number is shown in the footer area, right bottom of cover sheet.

CONTENTS

Chapter 1

NOTES TO USERS

Thank you for selecting the ESR-180/180BB.

Before operating this unit, please read this manual thoroughly
to ensure correct and safe operation in accordance with the
warning instructions and operation procedures.

SYMBOLS

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

⚠ WARNING	: indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ DANGER	: indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	: indicates a potentially hazardous situation which, if not avoided, may result in minor injury.
NOTE !	: indicates the contents for the user's reference.
[CF]	: pages for your reference.

INSTRUCTIONS FOR THIS OPERATION MANUAL

◎ This manual should be kept on hand to provide your quick reference whenever you need it. When you give this unit to someone else, make sure to give this manual, too.

◎ Any use other than that mentioned in this manual is not guaranteed.

◎ The contents in this manual are subject to change without notice or obligation.

TURNING ON THE POWER

◎ When the power ON key is pressed, the power is turned on.

As soon as the power is turned on, the soundome starts to go down.

TURNING OFF THE POWER

◎ When the power OFF key is pressed and held, the power is turned off.

As soon as the power is turned off, the soundome starts to go up.

KEY OPERATION

◎ One short beep will show that you pressed the correct key.

Three short beeps will advise you that a wrong key is pressed.

FOR YOUR SAFETY

INSTALLATION SITE REQUIREMENTS

⚠ WARNING

◎ Do not let flammable gas get in the unit, as this will lead to fires.

⚠ CAUTION

◎ For long term trouble-free service, the proposed site for installation should be:
  • 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 vibrations.
  • Away as much as possible from areas of high temperatures or areas where the unit is likely to be exposed to direct sunlight.

◎ To avoid magnetic interference to the display,   please keep the unit separated from magnetic equipments such as loud speakers.
  • Also equipments effected by magnetism, compass and tapes etc, should be kept separately from the Display Cabinet.

MOUNTING CONDITIONS

⚠ WARNING
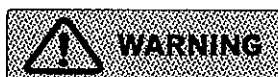
◎ Do not install this unit   on unstable or unlevel surfaces..
   Failure to observe this condition may result in the unit falling or toppling over, resulting in injury.

◎ Bring wiring to the following attention to avoid getting hurt or causing fire or damage.
  • 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 thing on the cables.

⚠ CAUTION

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

POWER SUPPLY
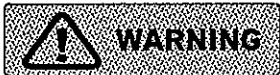
⚠ **WARNING** ◎ Please use with the indicated voltage.
Otherwise, it will lead to fires or electric shock.

⚠ **CAUTION**

◎ Make sure to turn off the power by the power "ON/OFF" key on
the control panel. Turning on/off the power by the switchboard
may cause a serious problem or wrong operation
◎ When starting the vessel engine, make sure the power of this unit is.
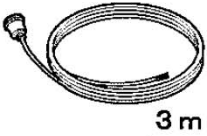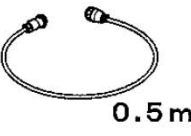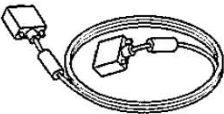turned off, otherwise it may cause a serious problem or wrong operation.

HANDLING
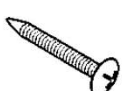
⚠ **DANGER** ◎ Do not open the case cover.   There is a risk of electric shock if you
touch the high voltage conductors.
Electrical installations should be carried out by the qualified staff
◎ When installing the transducer through an opening in the hull bottom,
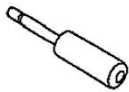pay attention to intensity and waterproofing. If not, it may cause wrecks.
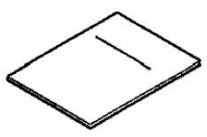
⚠ **WARNING**

◎ Please use specified fuse.
If not, it could result in serious trouble or fire.
◎ Please use the specified power supply cables.
If not, it could result in fire.
◎ The Hoist Gears and Flange Unit require regular lubrication with grease.
◎ Make sure the voltage between the Flange and the Battery's negative
terminal not to exceed 0.65V.
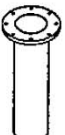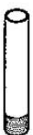Otherwise due to the electric corrosion the Soundome may be damaged.

SUPPLIED COMPONENTS

LCD DISPLAY · OPERATION UNIT (ESR-1801)

CODE	* * H V 0 1 0				
PART	DISPLAY UNIT	POWER SUPPLY CABLE	P-CONNECT CABLE	M-CONNECT CABLE	TRUSS T. SCREW
		3 m	0.5 m		
P. No.	ESR-1801	CW-257-3M	CW-258-0.5M	CW-396-1.5M	M 6 X 2 0
QTY	1	1	1	1	4

CODE	* * H V 1 2 1				
PART	FUSE	AUDIO PLUG	HEX ROD WRENCH	DISPLAY CABINET COVER	OPERATION MANUAL
	2 A		6 mm		
P. No.	F-7161-2A	P—1 1 0	—	—	ESR-180.0M.E
QTY	2	1	1	1	1

NOTE: the code No. is shown on the packages.   However, two ** indicates the lot management No.

TRUNK PIPE ╱ JOINT PIPE

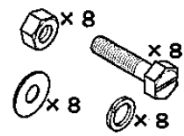| CODE	ESR-1506╱1507 (Option)	ESR-1504	
PART	TRUNK PIPE	JOINT PIPE	
P. No.	ESR-1506╱1507	ESR-1504	
QTY	1	1	
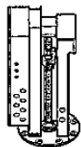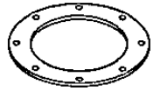
OPERATION UNIT (ESR-180BB)
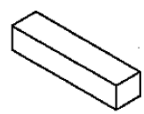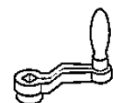
CODE		* * H L 0 1 0		* * H L 1 2 1		
PART	OPERATION UNIT	POWER SUPPLY CABLE	TRUSS T. SCREW	FUSE	AUDIO PLUG	OPERATION MANUAL
		3 m		2 A		
P. No.	ESR-180BB	CW-257-3M	M6 x 20	—	MP-105LC-R	ESR-180.OM.E
QTY	1	1	4	3	1	1

NOTE: the code No. is shown on the packages.   However, two ** indicates the lot management No.

SUPPLIED COMPONENT

HULL UNIT (ESR-1602-80kHz or 180kHz)

CODE				**HF110	**HF120
PART	HULL UNIT	SOUNDOME	PIPE GUIDE	BOLT SET	GUM PACKING for FLANGE
P. No.	ESR-1602	ESR-1603	ESR-1510	SUS-M16x55-Ass	ESR-1512
QTY	1	1	3	1	1

CODE	**HF170 (FOR SOUNDOME)			**HF010	
PART	BATH CORK	HEX ROD WRENCH		CRANK HANDLE	GREASE
P. No.	(50g)	—		OB-63	(100g)
QTY	1	EACH 1		1	1

CODE	**HF010				
	**HF001		**HF002		
PART	FUSE		ANP BASE	BAND	
P. No.	F-7161		ANP-1	AB-100-1000	
QTY	EACH 3		2	2	

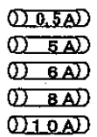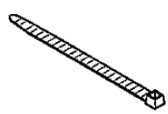| CODE	**HF140				
PART	DAMPER	FIXING COLLAR	PIPE CAP	CAP BOLT	HEX ROD WRENCH
P. No.	34924D	32681D-Assy	32682D-Assy	SUS-M4x10	—
QTY	1	2	1	4	EACH 1

NOTE: the code No. is shown on the packages. However, two ** indicates the lot management No.

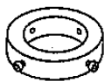Chapter 2

Chapter 2

INSTALLATION

This chapter explains the installation for sonar monitor and hull unit.

INSTALLATION

INSTALLATION

Satisfy the following conditions and also instructions of operation manual in deciding the trunk pipe mounting site.

Fully discuss about the strength with the shipyard and the installer before determining on the position and the method of installation and necessary materials.

INSTALLATION POSITION

◎ Select a position the least influenced from air bubbles, interference or noise.

・ It is most advisable to select a position along the keel and within 1/3 to 1/2 of the overall length. If this is not possible, install the unit so that the center of the tank comes within 1m from the keel.
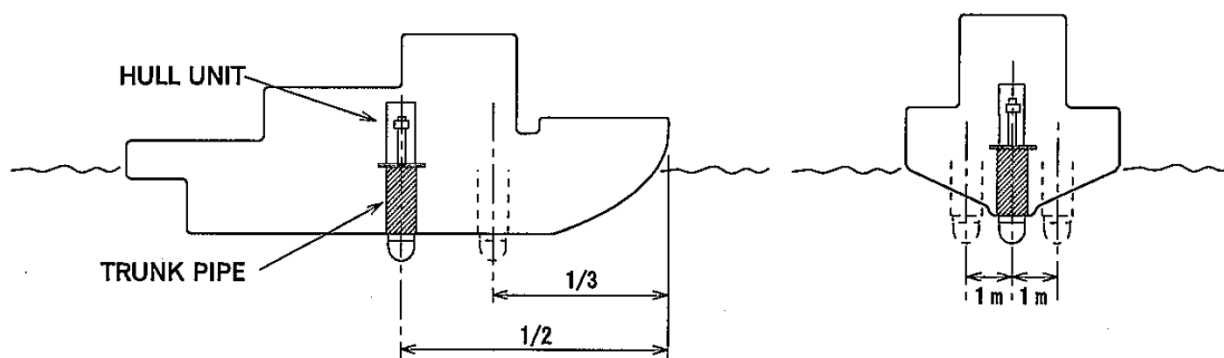
◎ Be sure there are no obstacles to interfere the ultrasonic beam when the soundome is lowered.

◎ Provide sufficient clearance around the trunk pipe to make maintenance and inspection work.

◎ The Bow mark (△) on the Hull unit flange should be installed facing the bow of the vessel. However, if this hinders maintenance and inspection and when there is no solution, direct the mark to the opposite (180 degrees) direction toward the stern.

DIMENSIONS

HULL CONTROL UNIT

φ280

BOW SIDE

139 167

185

21

603

2

1411 (min. 851)
JOINT PIPE LENGTH

1230 (min. 670)
TRUNK PIPE LENGTH

φ165

551

50

150

φ141.2

HULL UNIT FLANGE

BOW SIDE

22.5°

45°

φ240

8-φ18
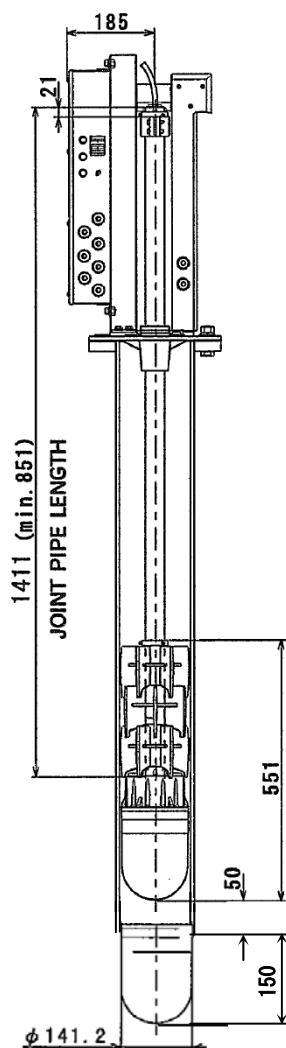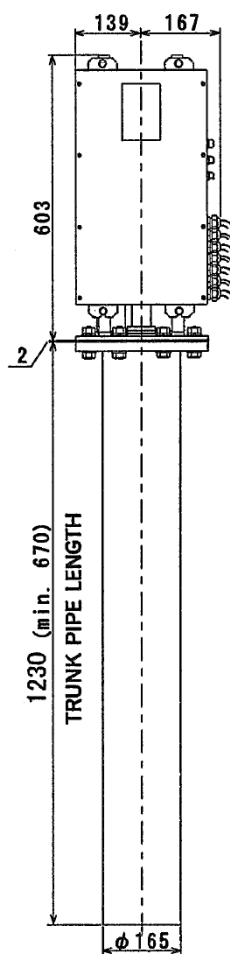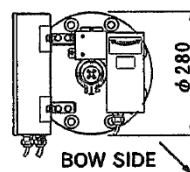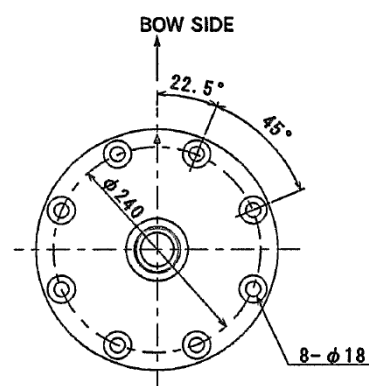
PIPE \ TYPE	STANDARD	OPTION
JOINT PIPE LENGTH	1411 (mm)	1681 (mm)
TRUNK PIPE LENGTH	1230 (mm)	1500 (mm)

DIMENSIONS

ESR-180

| DISPLAY UNIT · OPERATION UNIT M15 |

Front view dimensions: 340 (width), 308, 117
324, 340
4 − φ 8

Side view dimensions: 65.2, 430.7, 447.6, 150, 40.8, 217.5

ESR-180BB

| OPERATION UNIT |

Front view dimensions: 296, 117, 324, 340, 4 − φ 8

Side view dimensions: 150, 150, 40.8, 217.5
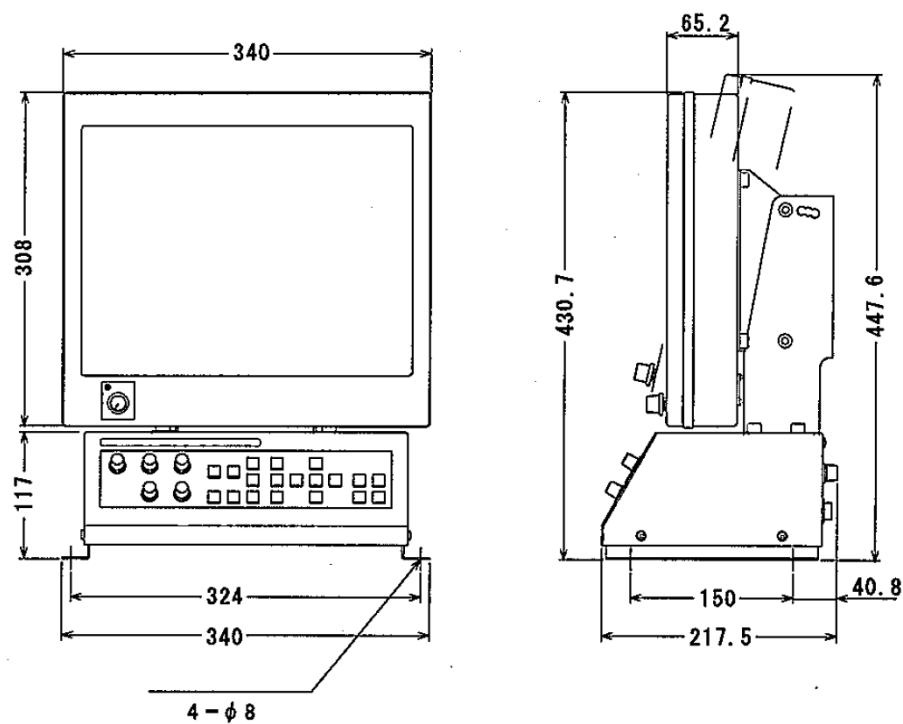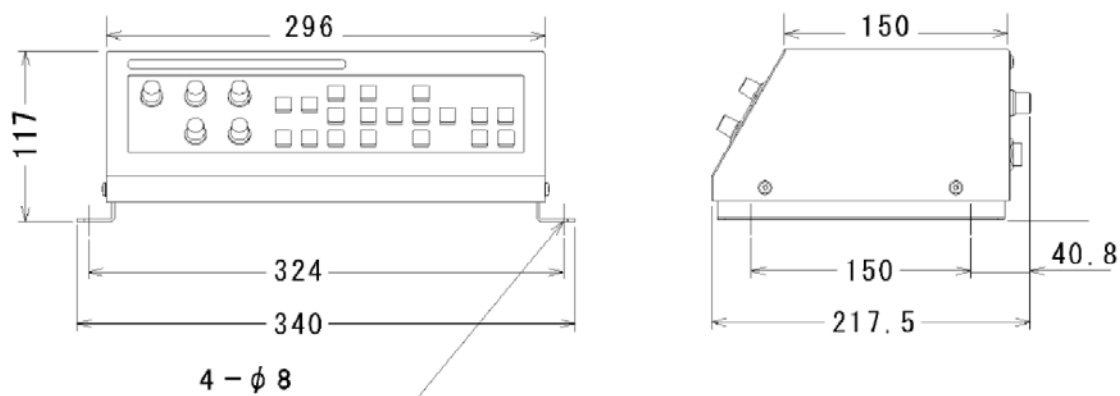
TRUNK PIPE INSTALLATION

1 MAINTENANCE SPACE

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

◎ Since the hoist-lower unit is not of waterproof structure, keep it away from water drops and splashes.

◎ The ESR-180/180BB 180kHz and 80kHz are shipped from the factory with a standard, 1,411mm Joint Pipe and without Trunk Pipe (options are available).

◎ **The Joint Pipe should be at least 181 mm longer than the Trunk Pipe.**

If a work space of (Lt+610) is not available, provide a hole of a size of at least 330×330mm in the ceiling.

JOINT PIPE

Lt+610

Install the unit so that the flange comes above the draft at full load.

Draft at the full load

TRUNK PIPE

Lt
Trunk pipe length
(min:670)

KEEL

It should not project beyond the keel end.
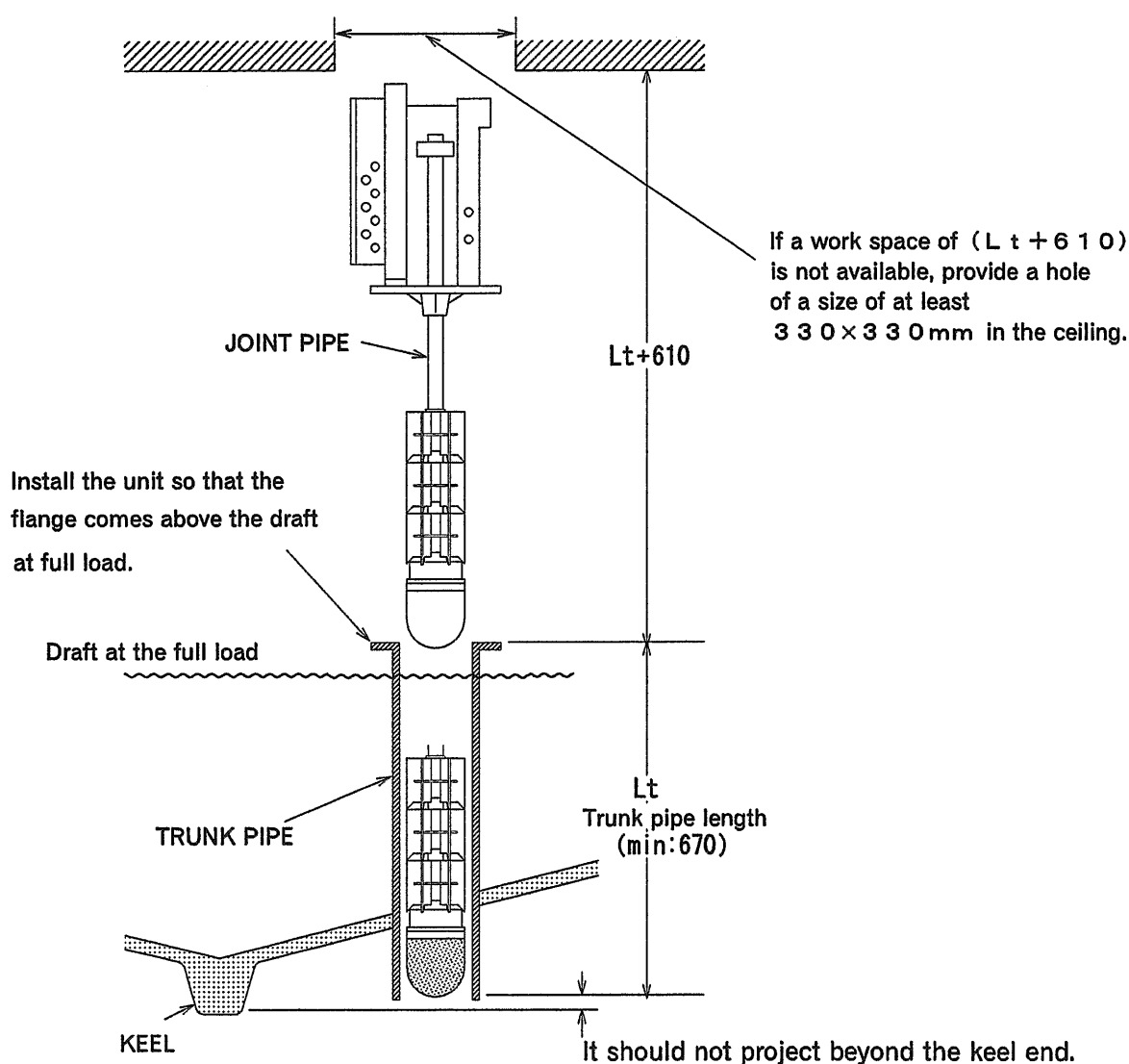
2 INSTALLATION CONDITIONS

◎ The Trunk Pipe should be installed satisfying the following conditions.

FLANGE HOLE ANGLE
22.5°   22.5°

TRUNK PIPE   TRUNK PIPE

SPACE UNDER FLANGE

FRP →   ← FRP

HOLDER

F R P

KEEL   KEEL

MAX 1 m

It should not project beond the keel end.

CURRENT PLATE   CURRENT PLATE

⚠ DANGER
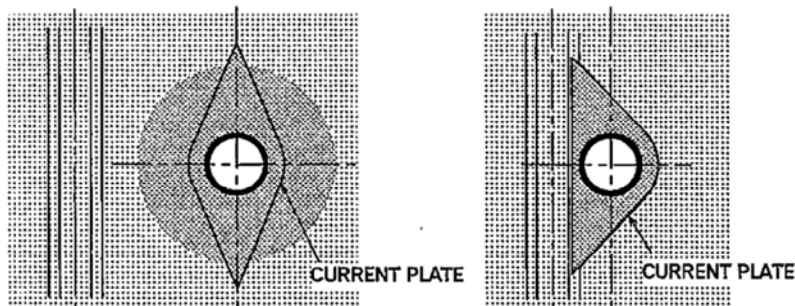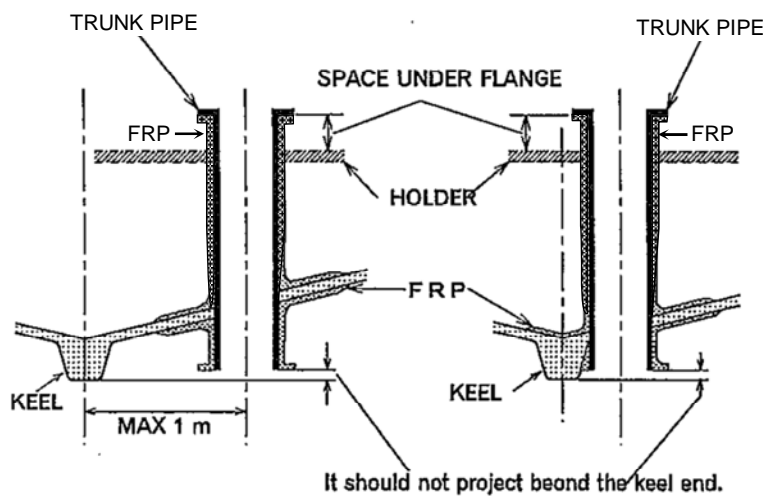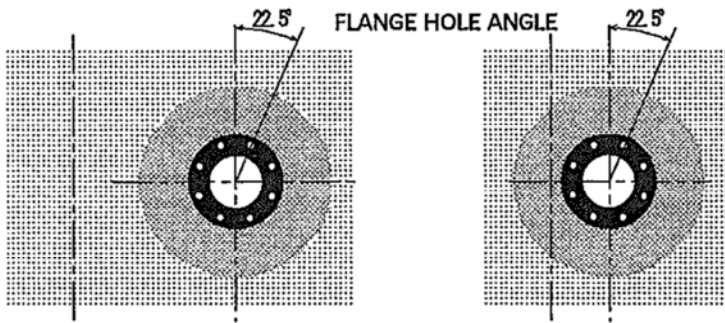
- The position for installation should be within 1/3 to 1/2 of the overall length from the bow.

- It also should come on the keel or within 1m for the keel.

- There should be no obstacles right below the flange of the Tank which may interrupt bolt clamping of the flange.

- **The bottom of Flange should be reinforced by FRP.**

- The top end of the pipe should not project below the keel end.

- The flange surface of the trunk pipe should stay level during standard cruise.

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

- Make the surrounding of the pipe projecting out from the bottom in a streamline shape and provide a current plate to suppress water resistance and generation of air bubbles to the minimum.

- When necessary, install a holder to stop shaking. When doing this, make sure the holder does not interfere bolt clamping of the flange.
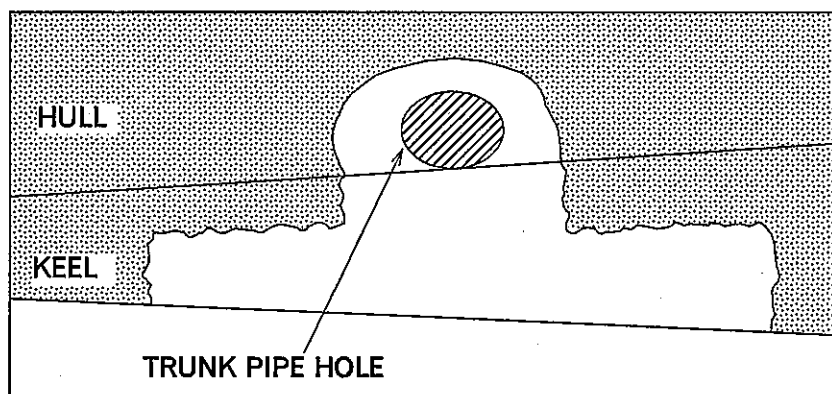
◎ Fully discuss about the strength and water tightness with the ship owner, persons in charge in the shipyard and the installer before determining on the position and the method of installation and necessary materials.

3 EXAMPLES OF INSTALLATION OF THE TRUNK PIPE
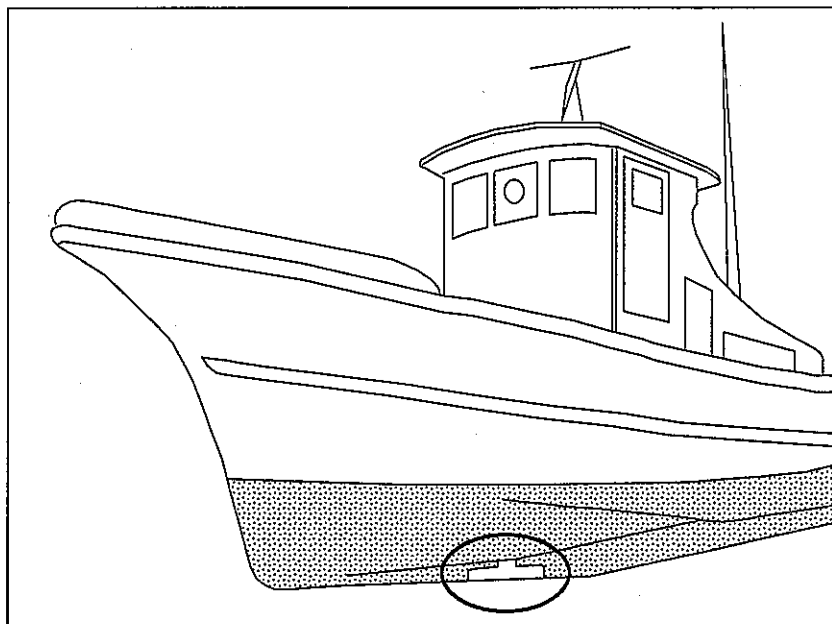
• The position
  to install the trunk pipe.
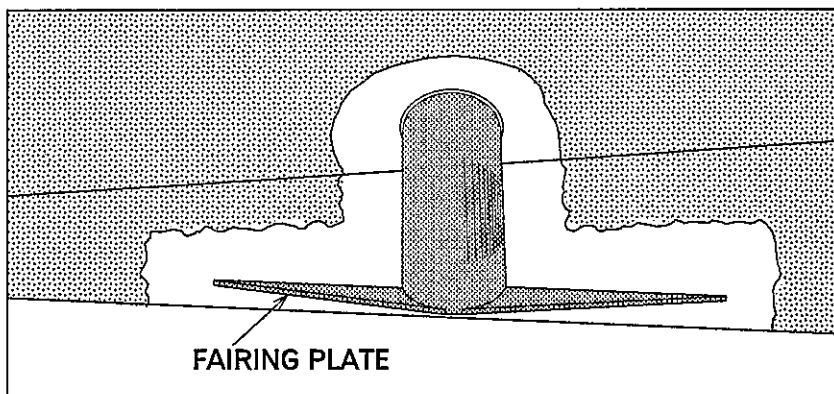 [cf] page 10

HULL

KEEL

TRUNK PIPE HOLE

• Open a hole of the same
  diameter as of the trunk
  pipe along the keel in
  the bottom.
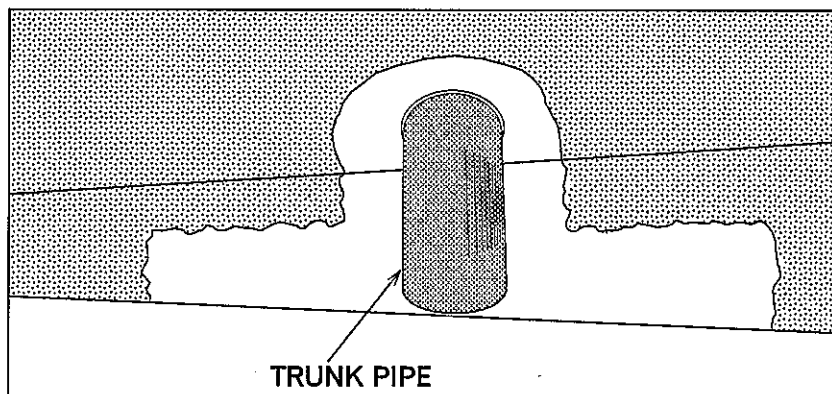
TRUNK PIPE

• Install the trunk pipe
  into the hole.
  The flange surface of the
  trunk pipe should stay
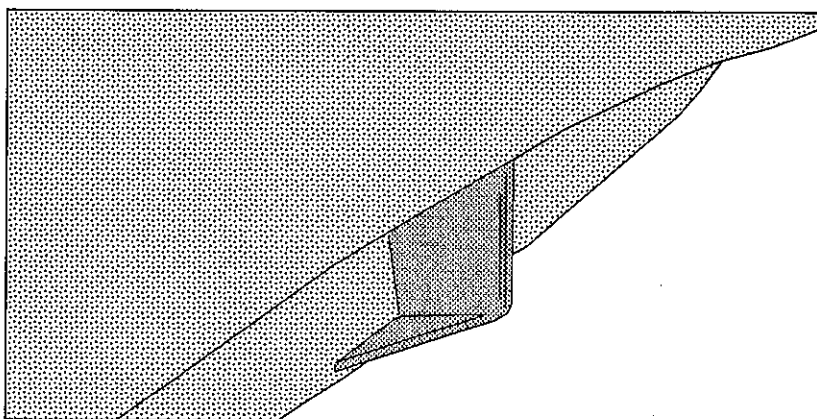 level during standard
  cruise.

INSTALLATION

FAIRING PLATE

- Make the surrounding of the trunk pipe projecting out from the bottom in a streamline shape and provide a fairing plate to suppress water resistance and generation of air bubbles to the minimum.
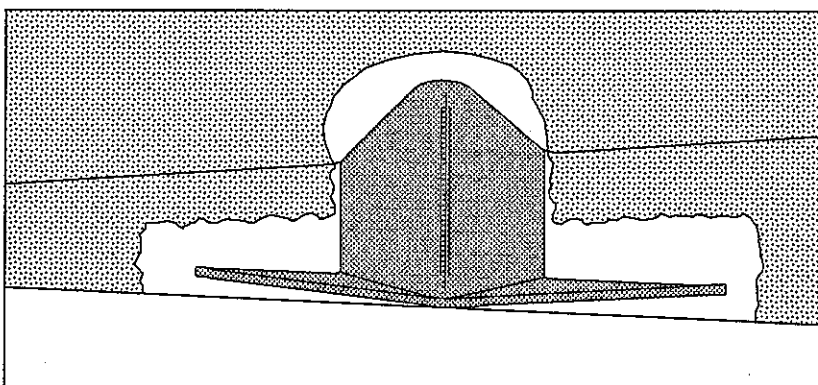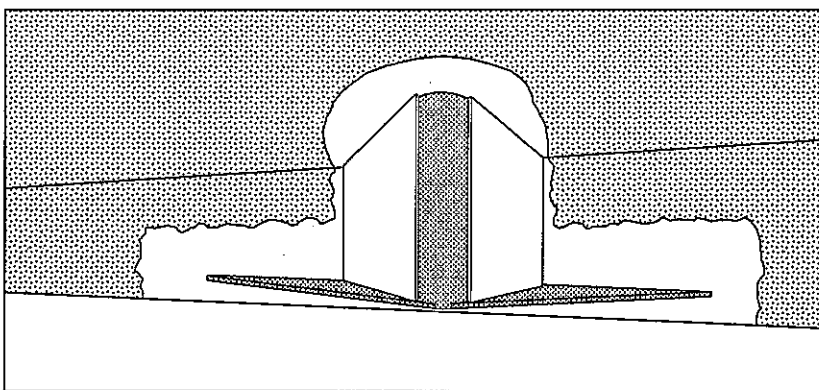
- Apply FRP sufficiently to all the necessary sections to prevent leakage of water.
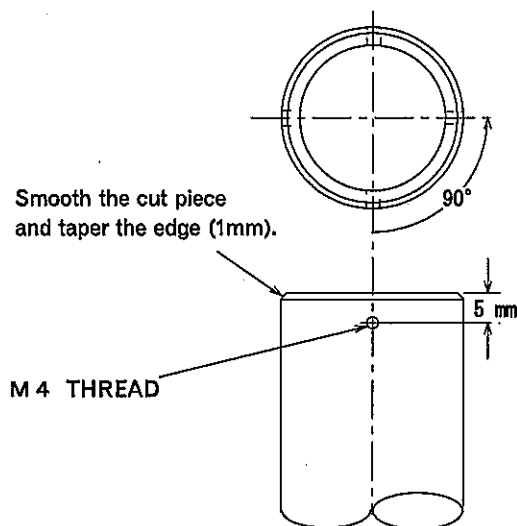
HULL UNIT ASSEMBLY

1 JOINT PIPE LENGTH

STANDARD JOINT PIPE LENGTH = TRUNK PIPE LENGTH + 181mm

If you need a longer joint pipe, consult us when placing your order.

2 JOINT PIPE ADJUSTMENT

Smooth the cut piece
and taper the edge (1mm).

90°

5 mm

M 4 THREAD

◎ If the Joint Pipe length is standard, that is,
Trunk Pipe + 181mm, adjustment is unnecessary.

① Cut the Joint Pipe to the required length.

② Smooth the cut piece and taper the edge as
shown.

③ 5 mm from the end of the pipe and at an
angle of 90° drill four ϕ 3.4 holes and
tap with a M4 thread.

◎ When using a short Trunk Pipe the Joint Pipe may be cut in the method explained above.

Lt+160

Yt
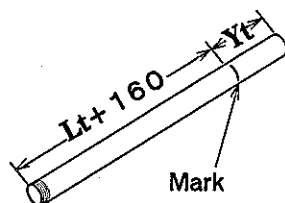
Mark

A mark is attached to the place
of L t + 1 6 0.
This mark is united and bound
tight at the upper end of Joint arm.

Yt

Lt+Yt+460

When the space above
the Joint Pipe is equal
to this, the Joint Pipe may
be used without being cut.

Lt (min:670)
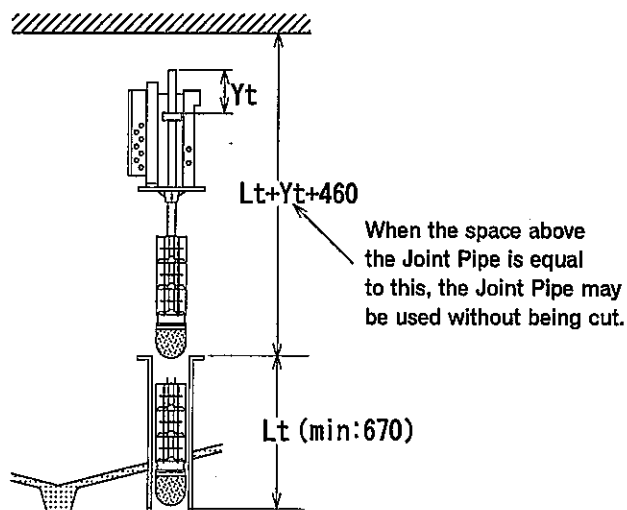
3 MOUNTING THE JOINT PIPE TO THE SOUNDOME

① Mounting the Joint Pipe to the Soundome

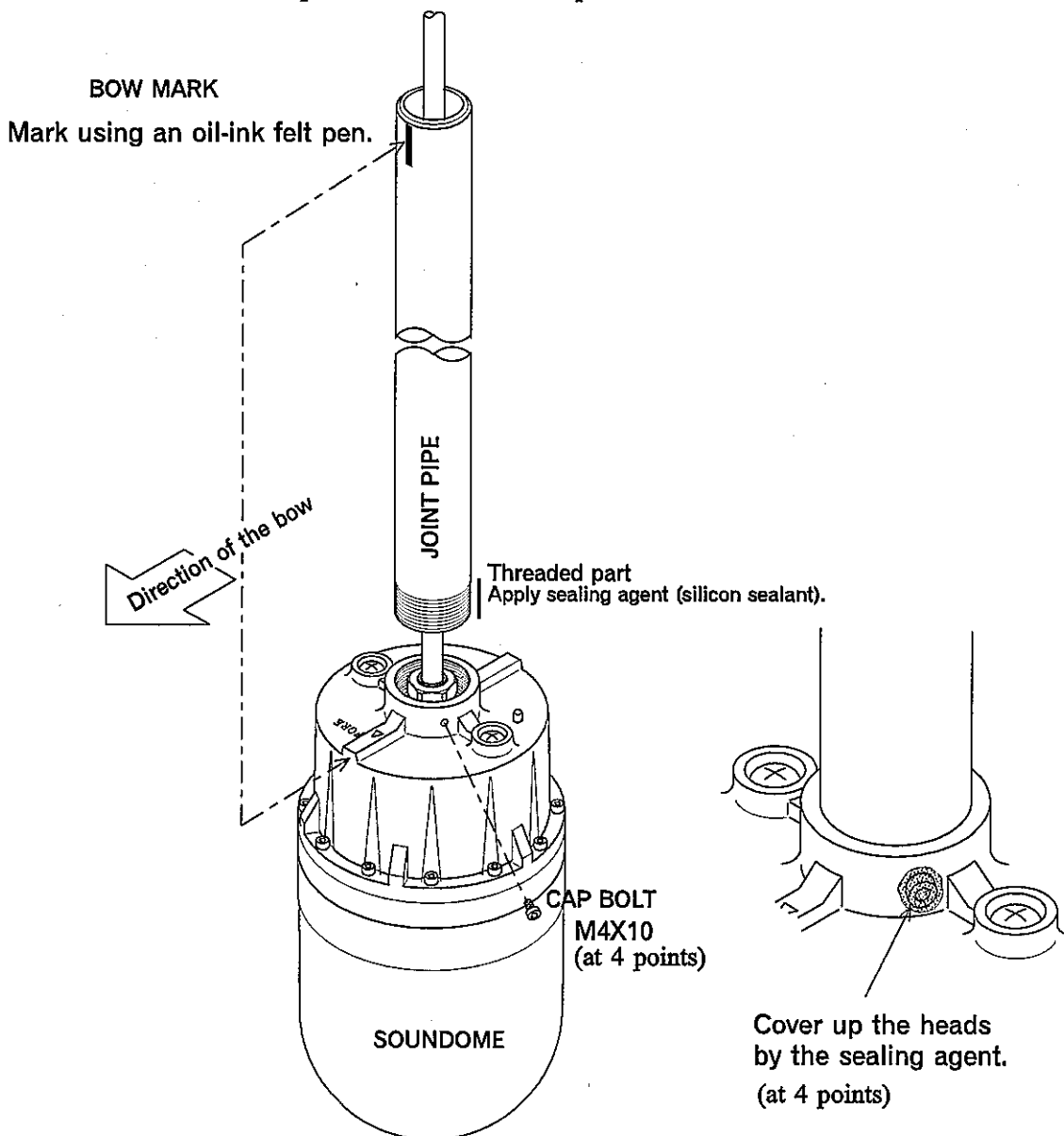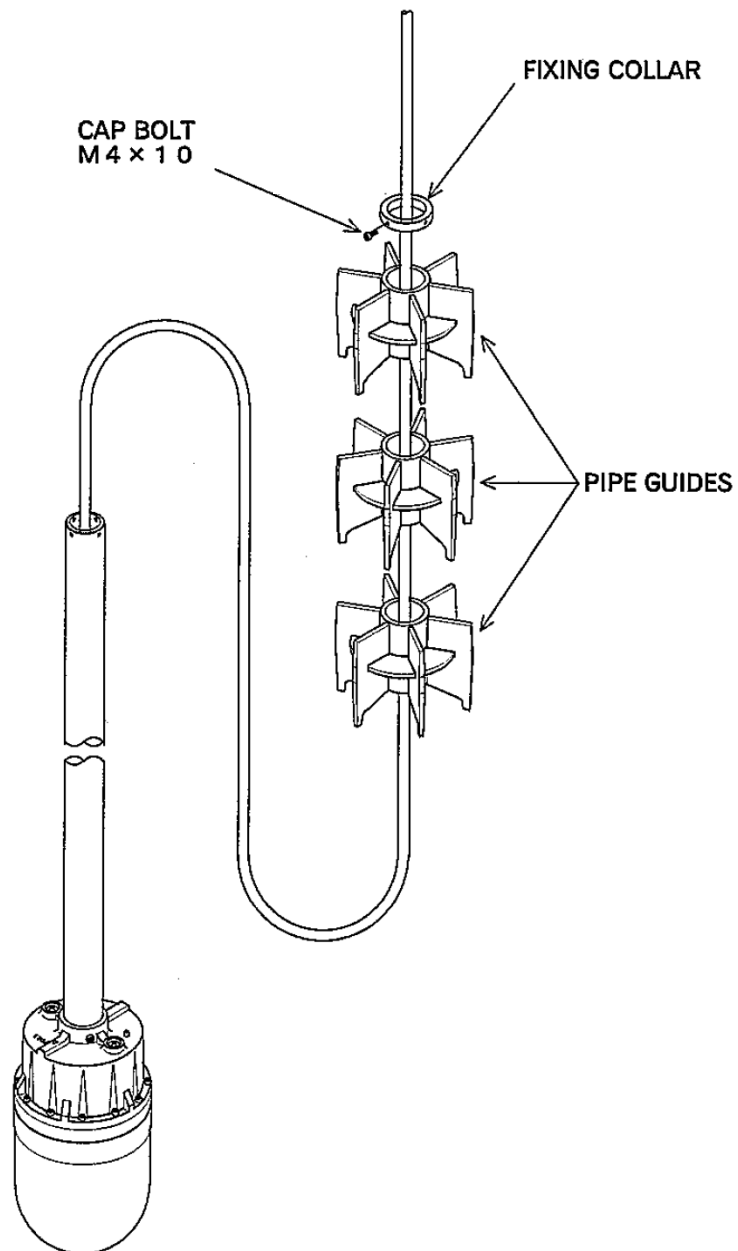When attaching the Joint Pipe to the Soundome, be sure not to damage the Joint Pipe thread or twist the Soundome cable.

- Totally wipe dirts and grease of from the threaded parts of the Soundome and the Joint Pipe and apply sealing agent.

- Clamp the Joint Pipe into the Soundome as tight as possible and lock the clamp using M4x10 Cap bolts (4 units.) and cover up the Cap bolts by the sealing agent.

- Apply the bow mark at the top end of the Joint Pipe.

BOW MARK
Mark using an oil-ink felt pen.

Direction of the bow

JOINT PIPE

Threaded part
Apply sealing agent (silicon sealant).

CAP BOLT
M4X10
(at 4 points)

SOUNDOME

Cover up the heads
by the sealing agent.
(at 4 points)

② Attaching the Pipe Guides

• Thread the three Pipe Guides onto the Joint Pipe in the direction shown below.

• Thread the fixing collar and tighten the attached cap bolts (2 pcs).

• Thread the Fixing collar and tighten it using the attached cap bolts (2 pcs) so that the guides can not move.

FIXING COLLAR
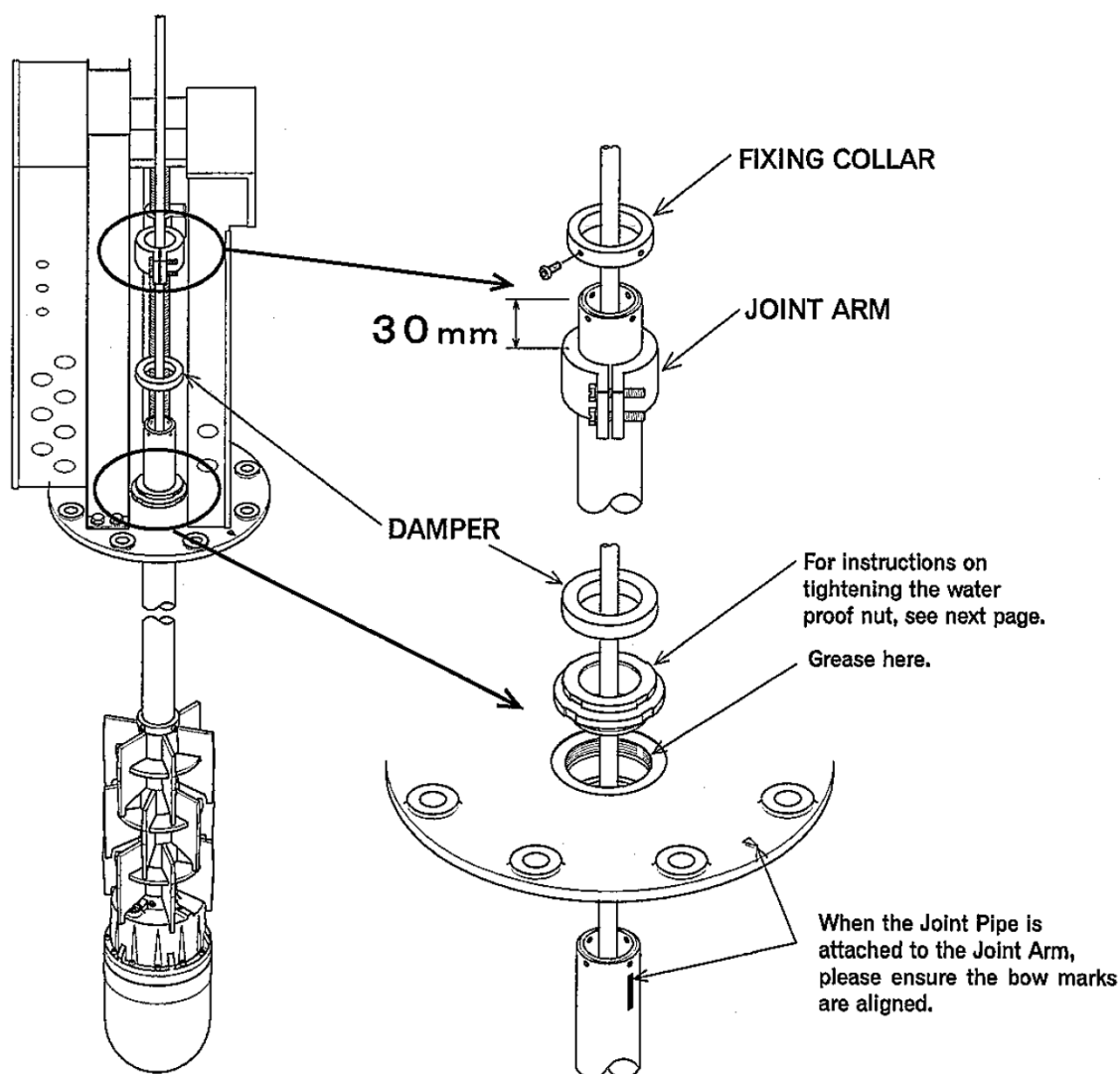
CAP BOLT
M4 × 10

PIPE GUIDES

<To be continued>

INSTALLATION

③ Attaching the Soundome to the Hoist

- Apply grease to the bearing of the Flange.
- Loosen the water proof nut and thread the Joint pipe through the Flange bearing and thread the dumper. Mount them to the Joint arm matching the bow direction.
- Ensure that the Joint pipe end projects 30mm from the Joint arm surface.
  In case of the length of the Trunk Pipe other than 1230mm long, ensure the lowest part of the Soundome is at least 50mm above the lowest part of the Trunk pipe.
- To prevent slip-out of the Joint pipe, fasten the attached Fixing collar using cap bolts (2 pcs).

FIXING COLLAR

30 mm

JOINT ARM

DAMPER

For instructions on tightening the water proof nut, see next page.

Grease here.

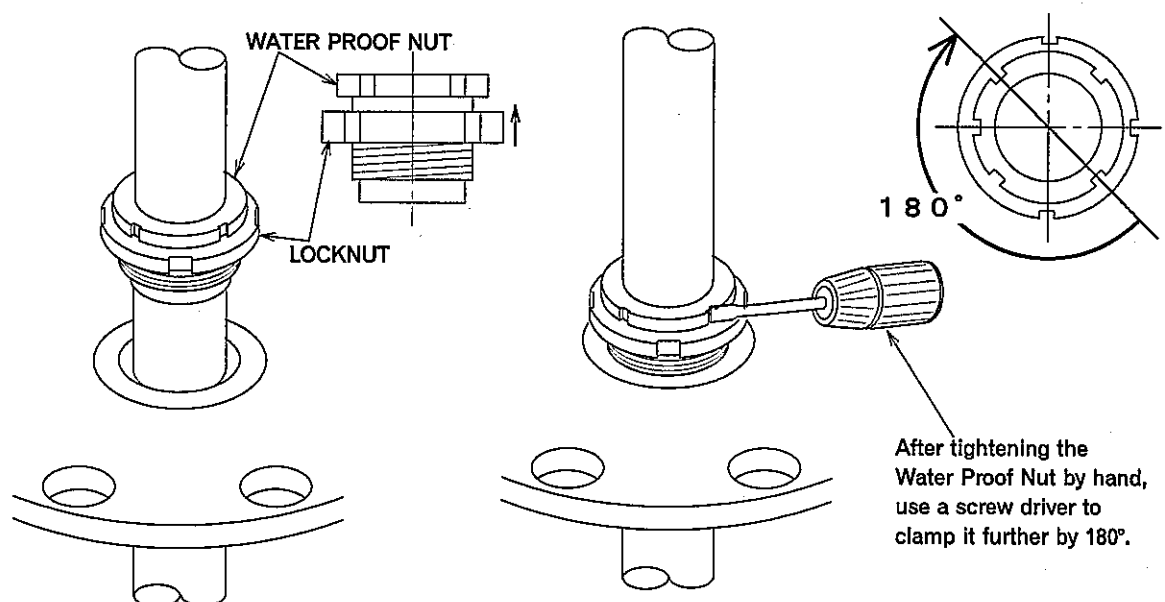When the Joint Pipe is attached to the Joint Arm, please ensure the bow marks are aligned.

④ Attaching the Pipe Head to the end of the Joint Pipe

- Insert the Pipe Head into the end of the Joint Pipe as per the diagram below and tighten the attached cap bolts.
- To prevent slip-out of the pipe cap tighten the cap bolts, 4 pcs included as the accessories, (M4x10).

CAP BOLT
M 4 × 2 5

PIPE HEAD

Ensure the bolt position each.

CAP BOLT
M 4 × 6
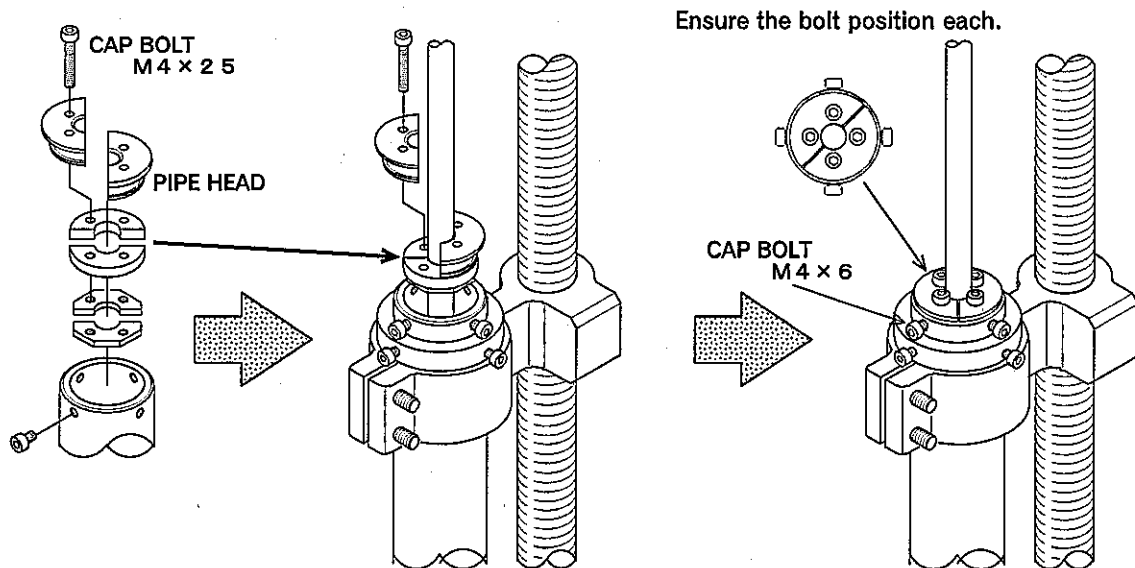
⑤ How to tighten Water Proof Nut and Locknut

- Lift up the Locknut as shown in the diagram below.
  Tighten the Water Proof Nut firmly by hand into the Flange opening.
  Turn the nut 180° with screwdriver and the hammer. Not to over tighten this nut.

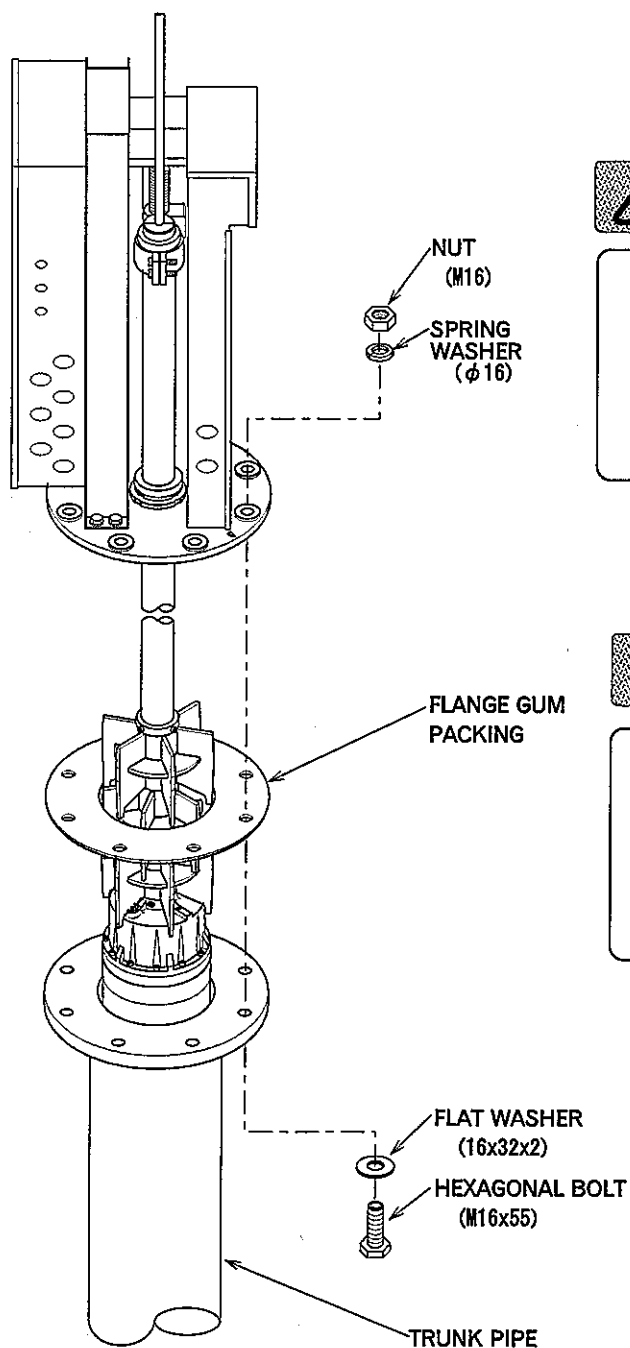- The Locknut is used to prevent slip-out of the Water Proof Nut.

WATER PROOF NUT

LOCKNUT

1 8 0°

After tightening the
Water Proof Nut by hand,
use a screw driver to
clamp it further by 180°.

INSTALLATION

⑥ Hull Unit and Trunk Pipe attachment.

• Use the 8 attached hexagonal bolts (M16 x 55) to fit the Hull unit to the Trunk pipe.
  When clamping bolts for fitting the Hull unit to the Trunk pipe, make tentative clamp
  and try to move the soundome up and down for several times to confirm the alignment
  when making the final clamping evenly.

NUT
(M16)

SPRING
WASHER
(φ16)

FLANGE GUM
PACKING

FLAT WASHER
(16x32x2)

HEXAGONAL BOLT
(M16x55)

TRUNK PIPE

⚠ **CAUTION**

Please apply grease regularly
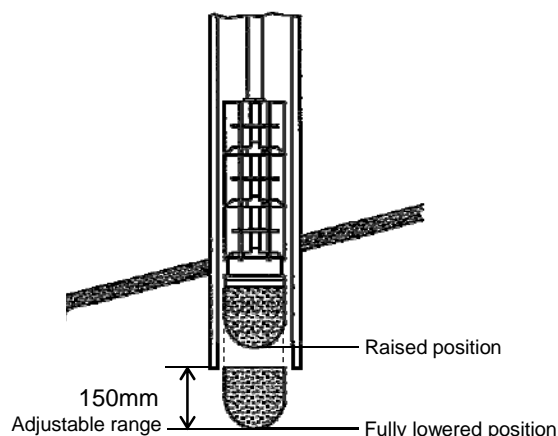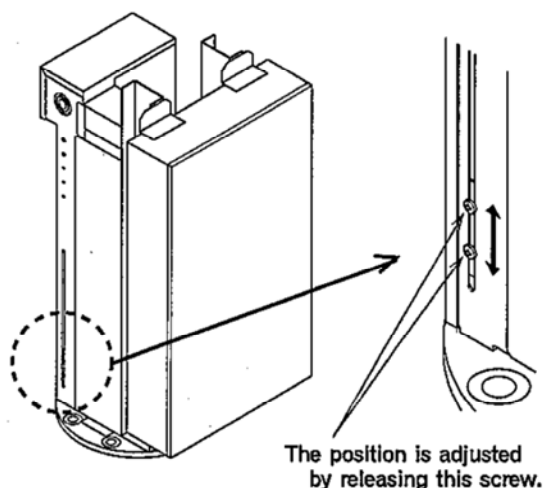to the Flange opening and Hoist
gears.

⚠ **CAUTION**

Do not apply adhesive, etc. on the
Gum packing of the Flange but use
it direct as it is.

4 ADJUSTMENT OF THE HOIST STROKE

◎ The stroke from the trunk pipe of the soundome can be adjusted within the range of 200 to 400 mm. Adjustment of the stroke can be made by adjusting the lower limit switch of the hoist-lower unit.
If the limit switch is raised, please use the ANP base and plastic bands provided ensuring the limit switch wiring does not touch the Hoist gears.

The position is adjusted by releasing this screw.

150mm Adjustable range

Raised position

Fully lowered position

5 MANUAL OPERATION OF THE HOIST

◎ In the case the Hoist is unable to raise the Soundome, it can operate the Hoist manually as shown in the below drawings.

CRANK HANDLE

RAISE
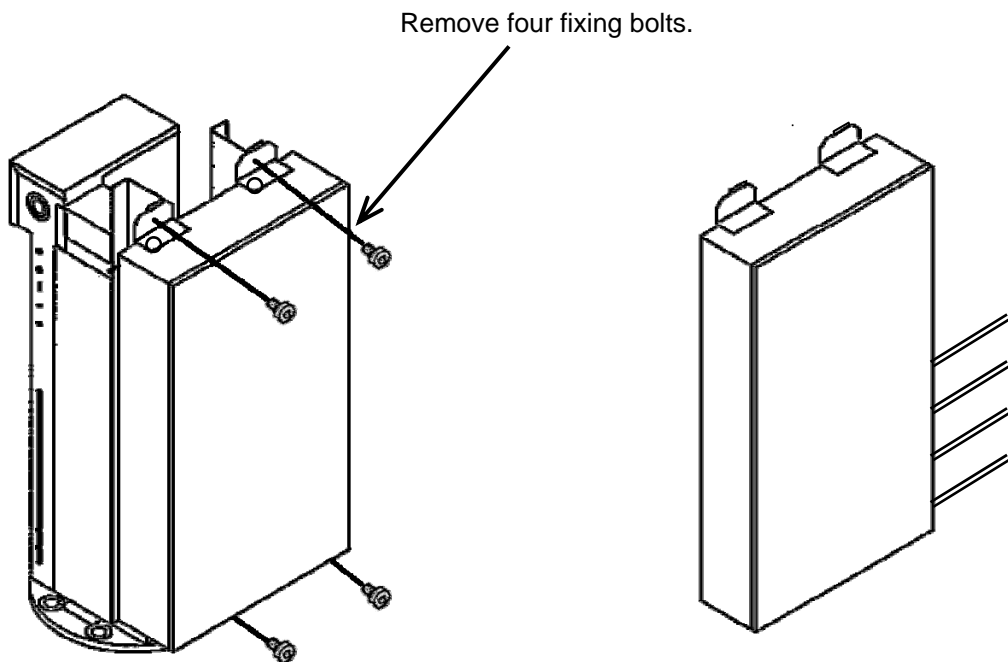
LOWER

Remove the cap.

⚠ WARNING
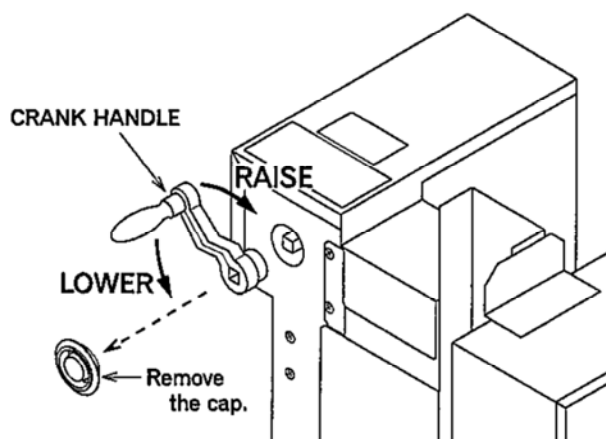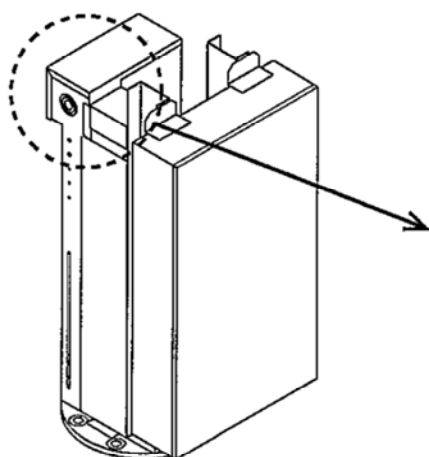
Confirm the voltage between the Flange and battery minus terminal does not exceed 0.65 volts after the assembly.
The damage to the soundome due to the corrosion may result, if the voltage exceeds.

6 CONTROL UNIT INSTALLATION

◎ The Control unit can be installed separately from the Hoist unit after detaching it.

Remove four fixing bolts.

Please check that the cable junction face should be at the bottom side or the right side.

◎ The Control unit may be installed in a location away salt spray, heat sources and shocks. Allow enough service clearance.

◎ When the Control unit is detached from the Hoist unit, the load of the Flange will be reduced because of reduction of the Hoist unit weight.

DISPLAY UNIT · OPERATION UNIT INSTALLATION

◎ The assembly of Display unit and Operation unit is shipped from our factory.

① Using the attached tapping screws (4 pcs), secure 4 installation holes of the Operation unit as shown in the below drawing.

② Loosen the cap bolt A and release the bolt B shown in the drawing below. After selecting a comfortable viewing angle of the display unit, insert the bolt B and tighten the bolts, both A and B.

DISPLAY UNIT

TAPPING SCREW

B

ANGLE ADJUSTER

OPERATION UNIT

A

C
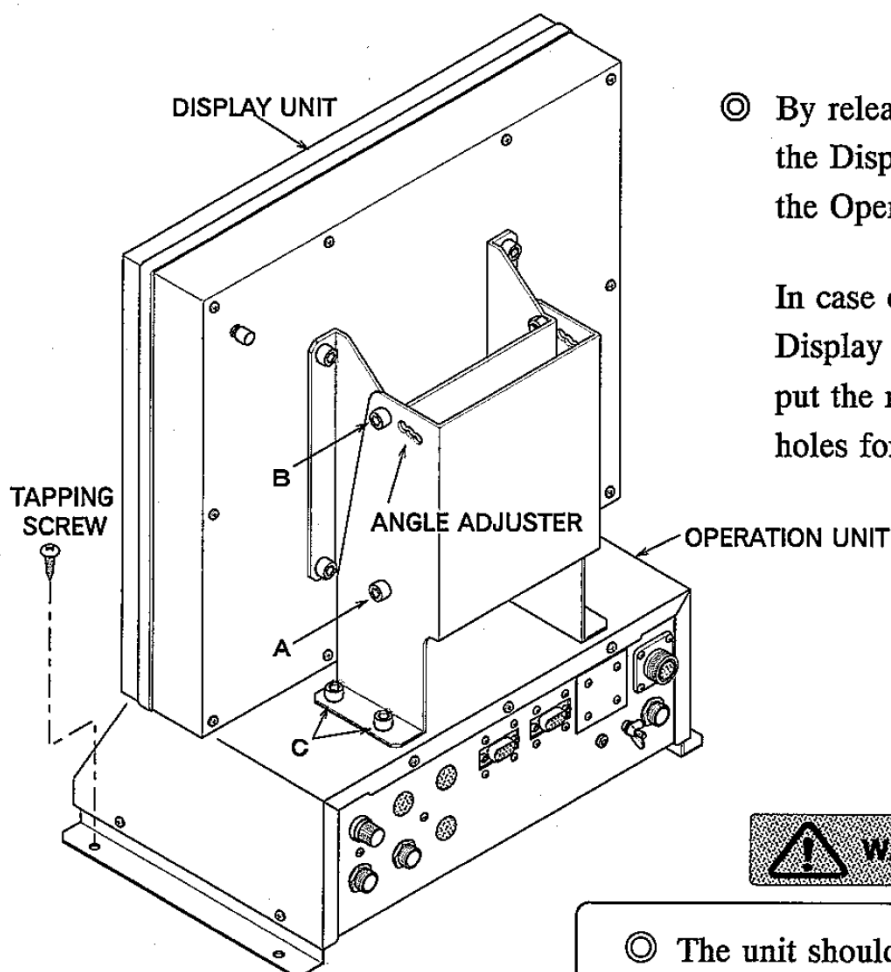
◎ By releasing the bolts C (4 pcs) the Display unit is parted from the Operation unit.

In case of the separate use of the Display unit and Operation unit, put the released bolts back to the holes for waterproof sake.

⚠ **WARNING**

◎ The unit should be installed on a flat surface. Do not use the unit while tentatively installed, otherwise it may cause trouble.
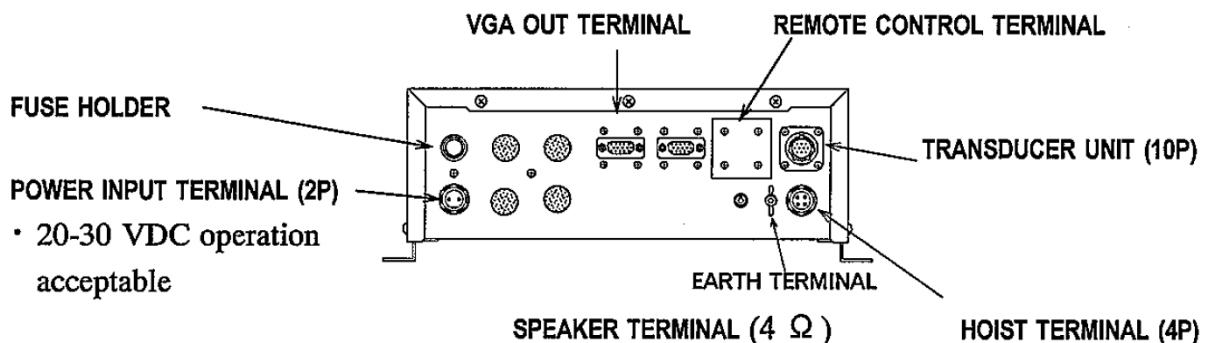
⚠ **CAUTION**

◎ Make sure the unit is not close to any inverters, converters, or transformers that interfere with the sonar performance.

◎ Install the unit in a location away from salt spray, heat sources and direct sunlight.

CONNECTIONS - REAR PANEL

RESET SWITCH
- Adjust the horizontal/ vertical synchronization of the display image.

IN/OUT TERMINALS (OPTION)
- Refer to the list in the page 39.

FUSE HOLDER
- Use the specified fuse 2A.

POWER INPUT TERMINAL (2P)
- 20-30 VDC operation acceptable

POWER OUTPUT TERMINAL
for DISPLAY UNIT (3P)

- Connects to power input terminal on Display unit.

VGA OUT TERMINAL
- Connects to VGA input terminal and the other for connecting an external monitor.

VGA IN TERMINAL
- Connects to VGA output terminal on the . Operation unit.

NO USABLE TERMINAL
- Not connect anything.

EARTH TERMINAL

POWER INPUT TERMINAL
for Operation unit (3P)
- Connects to the power input terminal on the Operation unit.

TRANSDUCER UNIT (10P)
- Connects the signal cable.

HOIST TERMINAL (4P)
- Connects hoist cable.

SPEAKER TERMINAL (4 Ω)
- Connects to the optional speaker.

REMOTE CONTROL TERMINAL
- Connects to an optional remote controller.

DISPLAY UNIT

OPERATION UNIT

EARTH TERMINAL

CONNECTIONS - REAR PANEL for ESR-180 BB control box

VGA OUT TERMINAL   REMOTE CONTROL TERMINAL

FUSE HOLDER

POWER INPUT TERMINAL (2P)
- 20-30 VDC operation acceptable

TRANSDUCER UNIT (10P)

EARTH TERMINAL

SPEAKER TERMINAL (4 Ω)

HOIST TERMINAL (4P)

The details of the optional connections with the ESR-180/180BB are shown on page 84 and 85.

INSTALLATION

CONNECTIONS - HULL CONTROL UNIT

FUSE 1 · 2 · 3

Please use fuses in accordance with the chart below.

FUSE 1	For Control Unit
FUSE 2	For Hoist Motor
FUSE 3	For Limit Switch Circuit

When changing the fuses, please ensure the correct fuses shown in the fuse list are used.

EARTH TERMINAL

FOR TRIGGER SIGNAL OUTPUT CABLE

HOIST CABLE

LIMIT SWITCH CABLE
* Connects to the limit switch cable from the Hull Unit.

FUSE SEAL

This shows the correct amperage.

VOLTAGE	12 V	24 V
FUSE 1	10 AMP	6 AMP
FUSE 2	5 AMP	8 AMP
FUSE 3	0.5 AMP	

POWER SUPPLY CABLE
* Supplies power to the Hull Unit. Operating voltage range from 10.5 to 30V.

SIGNAL CABLE
* Connects to the signal terminal (10P) on the rear panel of the display cabinet.

HOIST MOTOR CABLE
* Connects to the Hoist Motor from the Hull Unit.

FOR SOUNDOME CABLE
* Routes the soundome cable through this seal connector.
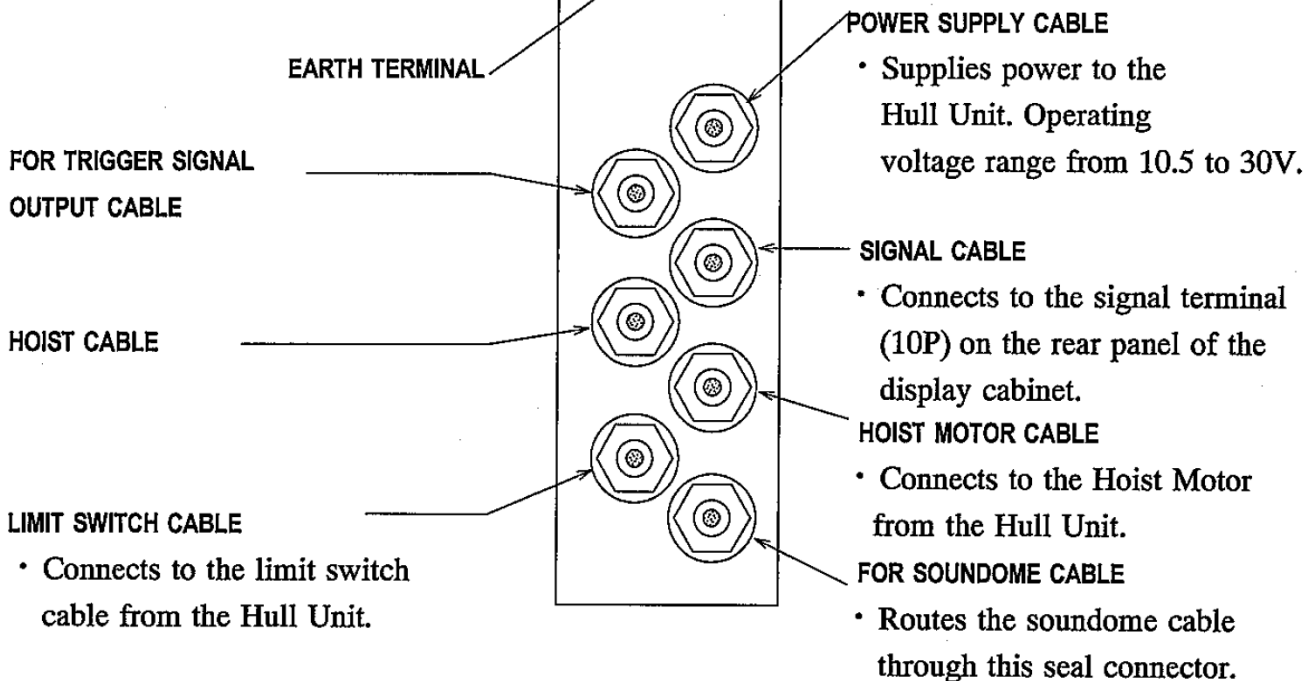
CONNECTIONS - HOIST SYSTEM

LIMIT SWITCH CABLE.
* Connects to the main board of the Hull unit.

HOIST MOTOR

LIMIT SWITCH

HOIST MOTOR CABLE
* Connects to the main board of the Hull unit.
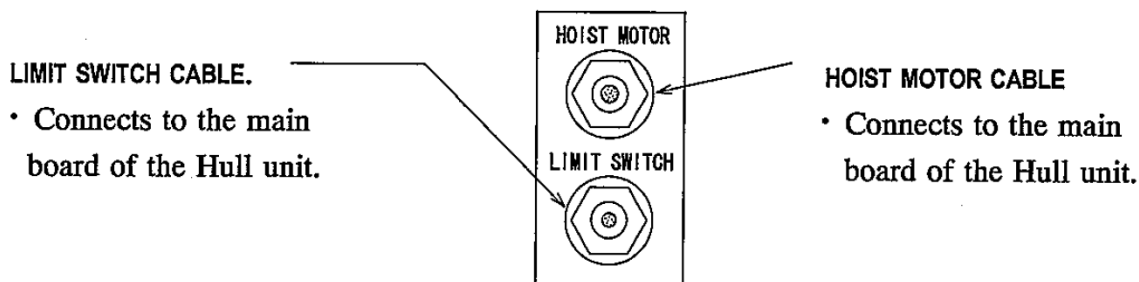
CONNECTIONS

◎ Prior to the connections between the display cabinet and the hull unit,
read the following warning carefully to ensure its correct operation.

⚠ WARNING
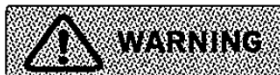
◎ All ESR-180 operate a universal power supply of the following voltages.

ESR-180 /BB DISPLAY CABINET   : 20.0 ~ 30 V
ESR-180 HULL UNIT   : 10.5 ~ 30 V

Incorrect voltage may cause units damage.
Note that the power supply connection for ESR-180/180BB should be accomplished
via Operation unit.

◎ Please use the specified power supply cables.
If not, it may cause fire or any damage.
◎ Please check if the power from the flange to the battery (negative terminal)
should stay within 0.65V.   In case the higher voltage, connect with the thick
cable and stay within 0.65V.   Otherwise it may cause soundome damage.
◎ When connecting the cables, do not bent it to an acute angle, twist it, or impart
excessive force because this sometimes causes cracks or damage.

INTERNAL CONNECTIONS

GND

GND

CONTROL UNIT

BATTERY

WHITE LINE : + TERMINAL
BLACK LINE : −TERMINAL

GND

POWER SUPPLY CABLE

SIGNAL CABLE

HOIST CABLE

HOIST UNIT

HOIST MOTOR

LIMIT SWITCH

SOUNDOME CABLE

Refer to the following page
for the connection of the Control Unit.
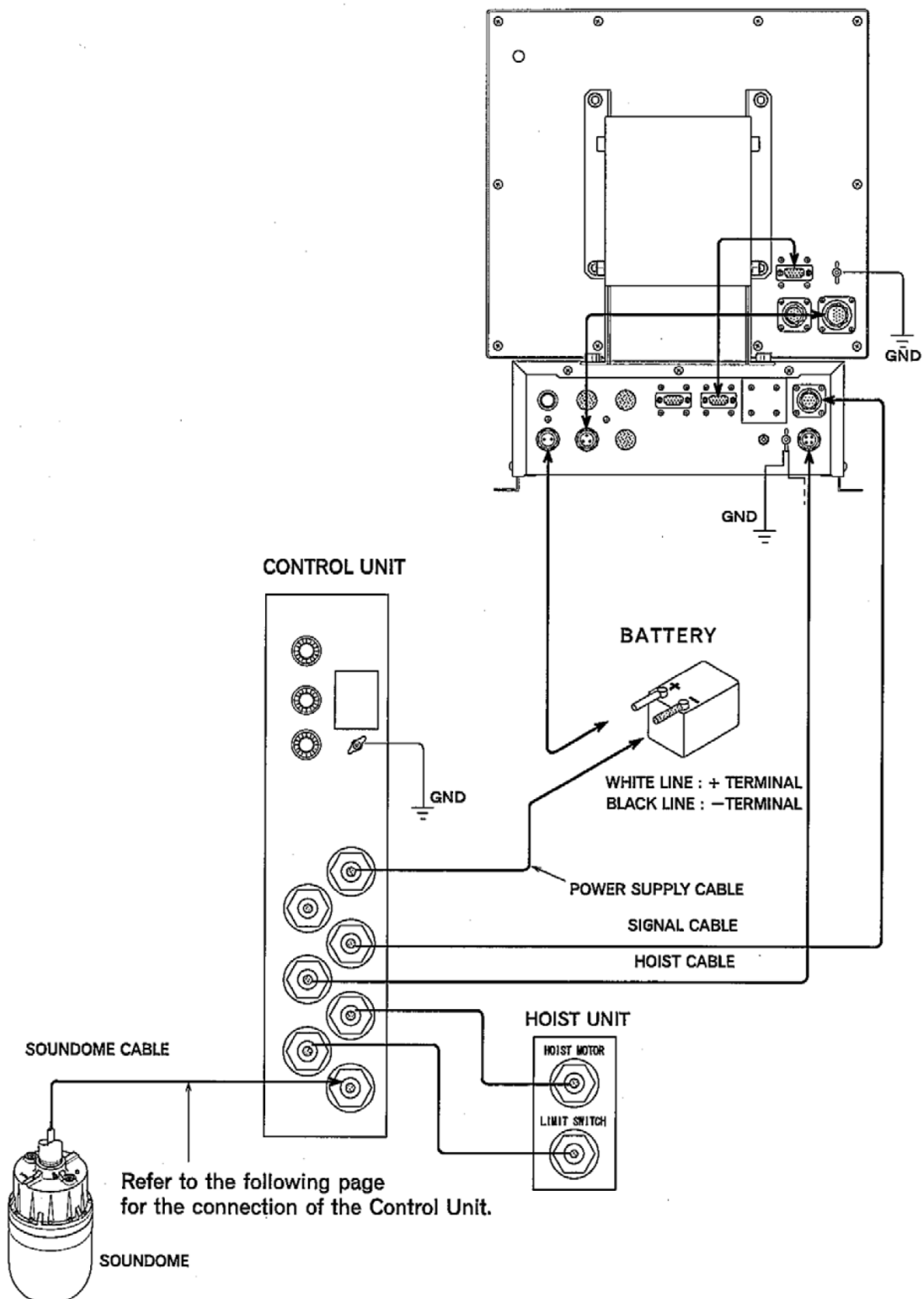
SOUNDOME

CONNECTIONS - SOUNDOME CABLE

◎ Remove the cover of the Control unitl and connects
in accordance with the following notes and drawings.

CONTROL UNIT
CONNECTING PARTS   CABLE GLAND

CAP

CONNECTS
SOUNDOME CABLE

CONTROL UNIT

CONNECTOR

CONTROL UNIT

MOTOR
CONTROL   J 8
BOARD   5 P PLUG
10P PLUG
J 2
MAIN BOARD

J 2
3P PLUG

T/R BOARD

SOUNDOME CABLE
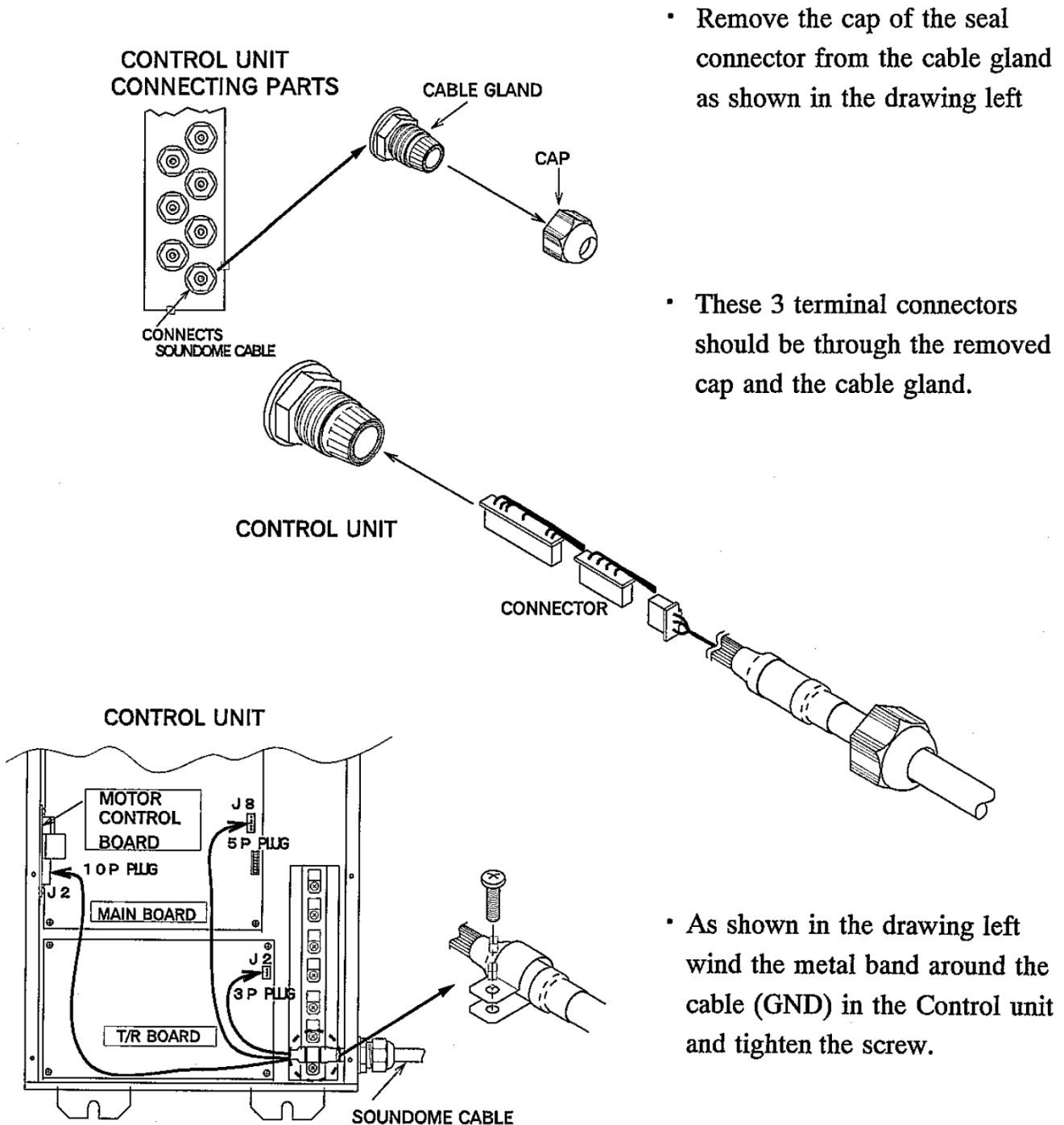
- Remove the cap of the seal
connector from the cable gland
as shown in the drawing left

- These 3 terminal connectors
should be through the removed
cap and the cable gland.

- As shown in the drawing left
wind the metal band around the
cable (GND) in the Control unit
and tighten the screw.

- Connect the 3P plug to J2 on the T/R board, 5P plug to J8 on the Main board and
10P plug to J2 on the Motor Control board.

- Put the cover back to the unit after the connections are completed.

Chapter 3

FUNDAMENTALS

This chapter explains the fundamentals of ESR-180/180BB systems.

FUNDAMENTALS

OPERATION PANEL

SENSOR LAMP: [CF] PAGE 75
- When the Sensor Light is on, it indicates that the soundome is in the down position.

CURSOR SHIFT KEYS (↑ ↓ ← →)
: [CF] PAGE 78
- Moves cursor or selects to display Marker or Cursor.

TARGET LOCK KEY: [CF] PAGE 80
- Turns on or off the target lock mode.

TILT KEY: [CF] PAGE 77
- Adjusts tilt angel.

BEARING KEY: [CF] PAGE 76
- Moves cursor center right or left.

RANGE DIAL: [CF] PAGE 72
- Selets a desired range scale

SECTOR DIAL: [CF] PAGE 73
- Adjusts the sector angel.

MODE DIAL: [CF] PAGE 72
- Changes Display Mode.

POWER ON/OFF KEY: [CF] PAGE 75
- Turns on/off the power.

HOIST KEYS: [CF] PAGE 75
- Uploads/downloads the soundome.

CURSOR SELECTION KEY
: [CF] PAGE 78
- Selects Ring Marker or Cross Marker.

MARK KEY: [CF] PAGE 81

THRESHOLD KEY: [CF] PAGE 81
- Reduces the unnecessary weak echoes accordingly.

OPERATION MODE: [CF] PAGE 82
- Calls up the user-defined setting or changes the settings.

FAR GAIN DIAL: [CF] PAGE 74
- Adjusts the receiver sensitivity for the long ranges.

GAIN DIAL: [CF] PAGE 74
- Adjusts the receiver sensitivity.

BRIGHTNESS DIAL: [CF] PAGE 74
- Adjusts the screen brightness.

⚠ CAUTION

◎ Make sure to turn on/off the power by turning the POWER ON/OFF KEY Turning on/off the power by the switchboard may cause a serious problem or wrong operation.

SCREEN DISPLAY

◎ The screen data presentation system is as follows.

• The ESR-180/180BB offers a variety of display modes in split screen by combination of Mode dials and Menu.
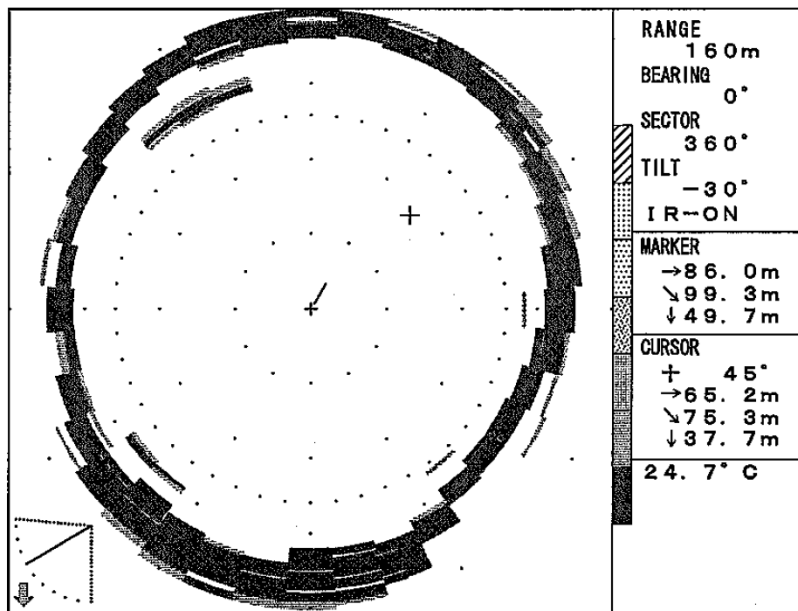
SPLIT SCREEN LEFT	SPLIT SCREEN RIGHT
• Sonar Mode	• MENU 1 & Self check function
• Sonar Off-center Mode	• MENU 2 & Self check function
• Bottom-Scan Mode	• INFORMATION - Data display
• Sounder Mode	• SUB-DISPLAY - various displays in split screen
Use Mode Dial to select displayed Mode.	Use Mode Dial to select MENU 1 or 2 . Information - Data display and Sub-display can be applied in MENU 2.

• Range Dial provides 8 kinds of optimized user-defined ranges set in MENU 1.

• Fundamental appropriate menu settings can be applied in MENU 2

• Displays of HISTRICAL, +PRESS, +A-SCOPE, WAKE and EXT.F.F.(external fish finder) as well as INFORMATION - Data display can be applied and set in MENU 2.

SONAR MODE DISPLAY

◎ To select Mode Dial 1 or 2 to display the following sample.
Off-center display is activated when Mode 2 is selected.

RANGE ※1
BEARING }
SECTOR }
INTER- }
FERENCE RED.

```
R  160m                              →86. 0m
B    0°                              ↘99. 3m
S  360°                              ↓49. 7m
IR-ON
```

※2 { To the Marker
Horizontal distance
Slant distance
Depth

ECHO

MARKER

BEARING LINE

CROSS CURSOR

SHIP'S POSITION

SCALE

TILT ANGLE

SEA BOTTOM

※3 { Bearing from the ship
to the cursor
Horizontal distance to
the cursor
Slant distance to the cursor
Depth to the cursor

```
T-30°
```

SOUNDOME
POSITION

```
+   45°
→65. 2m
↘75. 3m
↓37. 7m
```

In SONAR MODE + INFORMATION displays on the split screen the above mentioned ※ 1 to ※ 3 and tilt angle are not displayed.
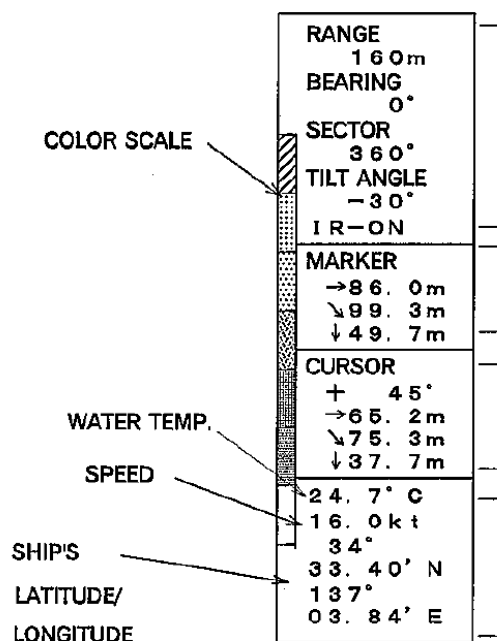
INFORMATION - Data display

COLOR SCALE

```
RANGE
     160m
BEARING
       0°
SECTOR
     360°
TILT ANGLE
     -30°
IR-ON
MARKER
→86.  0m
↘99.  3m
↓49.  7m
CURSOR
+     45°
→65.  2m
↘75.  3m
↓37.  7m
24. 7° C
16.  0kt
     34°
33.  40' N
137°
03.  84' E
```

WATER TEMP.

SPEED

SHIP'S

LATITUDE/
LONGITUDE

· The info will be displayed as the below-mentioned, selecting the item other than SUB-DISPLAY, INFORMATION .

※ 1 on Sonar mode screen, top left.
indicates the info left except Tilt angle.
Tilt angle is displayed down left.
"IR" will not be displayed when INTERFERENCE RED. function "OFF" is selected.

※ 2 on Sonar mode screen, top right.

※ 3 on Sonar mode screen, down right

displayed on Sub-Display down.
* To present this info will require the ESR-180/180BB is connected to an external navigator.

SONAR MODE OPERATIONS

## (1) SEARCH LIGHT MODE

◎ The Soundome transducer sends out a beam of ultra sonic sound which sweeps in the specified sector and bearing.

• The echoes of reflected sound waves are picked up by the transducer and displayed like a radar in their respective range and direction on the Display Unit screen.

• By adjusting the Tilt and Bearing the Sonar beam may be trained from the surface to the bottom.

360° SECTOR ANGLE

ULTRA SONIC BEAM ANGLE

165° SECTOR ANGLE

Direction of Sweep
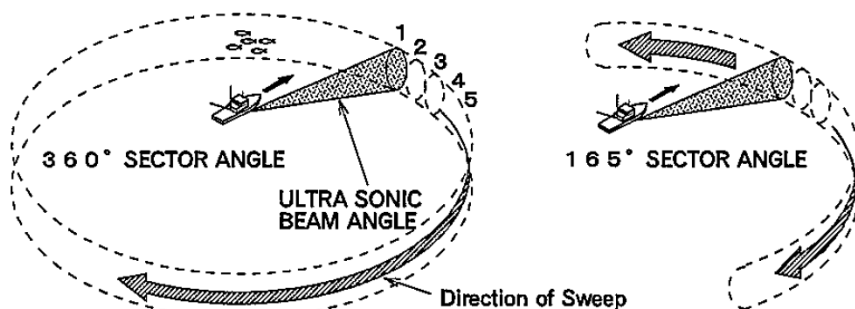
• Changing the sector angle makes it possible to detect in various ranges.

[CF] page 73
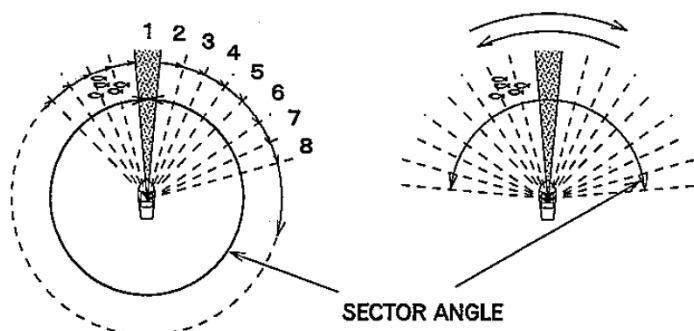
SECTOR ANGLE

• The echoes received from the sound beam (1 → 2 → 3 ~) are displayed on the screen in that order.
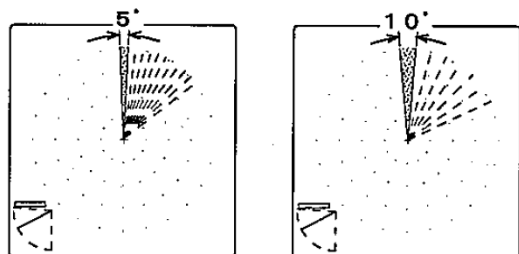
180/80 kHz

• The sector is covered by the Sonar beam in the selected step angle.
• The reflected echo is displayed in order in the angle specified.
• The step angle can be selected in Menu 2 - STEP (SONAR).
  [CF] page 58
• A narrow step gives a more detailed image on the screen, however more sweep time is requested than a wide step.

◎ The Tilt angle can be changed from 5° above horizontal to — 90° vertical in a 1° step.
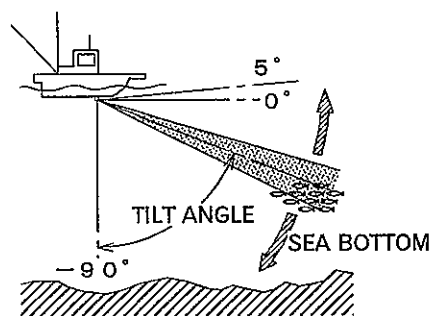
· With this range all directions from extremely shallow waters to deep areas may be searched.
· When adjusting the tilt angle please consider the conditions such as boat speed and water depth.
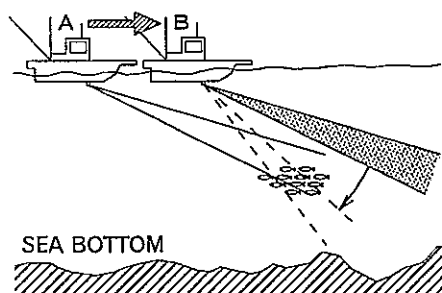
· If the vessel should proceed with the Sonar beam at the same angle at point A. the fish school echo will be displayed but when the vessel reaches point B. The beam will pass above the fish school and no echo will be displayed.
· In order to display the fish school at point B. adjust the Tilt angle so that the Sonar beam strikes the target.

The Tilt angle of the sonar sound beam can only be changed when the sound beam is in Sonar Mode, Bottom Scan Mode and Sounder Mode.

- 36 -

BOTTOM SCAN MODE DISPLAY

◎ To select Mode dial 3 to display the following sample.

TILT ANGLE

T-90°

※1

SHIP'S POSITION

SCANNING DIRECTION

B270°
0—

※2

32—

SCALE (RANGE)

64—

VRM

CROSS CURSOR

96—

120

SCALE (SECTOR)

SEA BOTTOM — ECHO

128—

TRANSDUCER
POSITION

160—

64   32   o   32   64

※4

138 m

DEPTH DISPLAY

※3
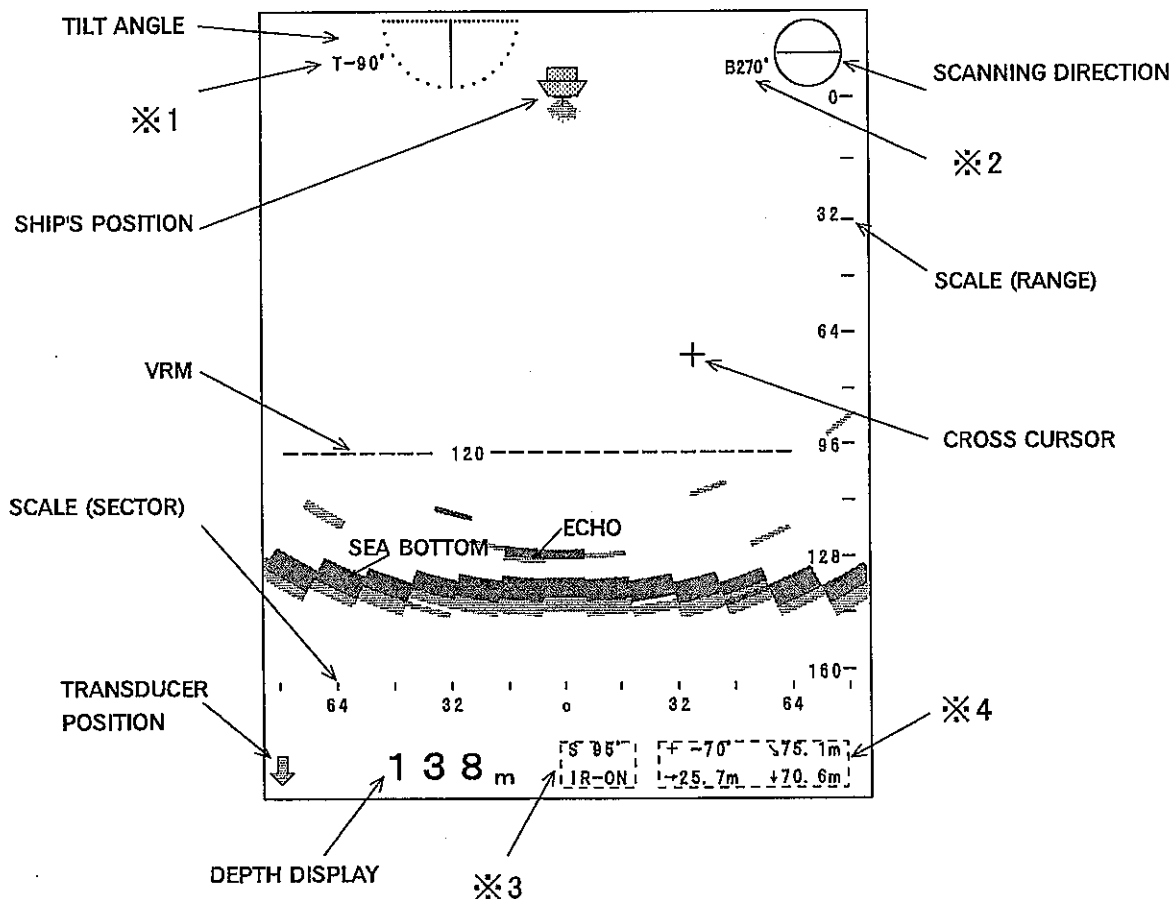
In BOTTOM SCAN MODE + INFORMATION displays on the split screen the above mentioned ※ 1 to ※ 4 are not displayed.
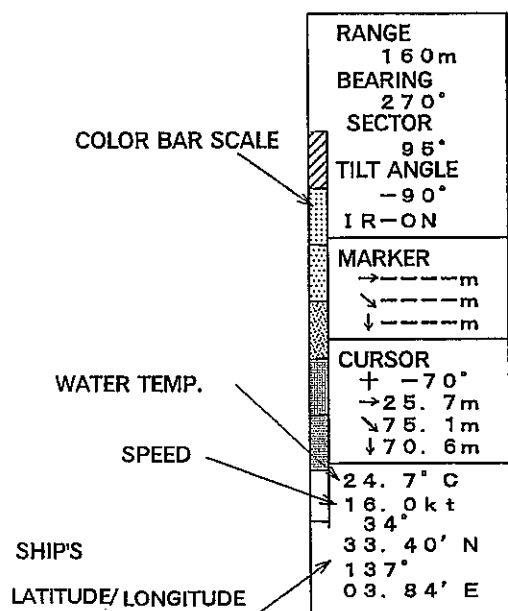
INFORMATION - Data display

RANGE
    160m
BEARING
    270°
SECTOR
    95°
TILT ANGLE
    -90°
IR-ON

COLOR BAR SCALE

MARKER
→————m
↘————m
↓————m

WATER TEMP.

CURSOR
+ -70°
→25. 7m
↘75. 1m
↓70. 6m

SPEED

24. 7° C
16. 0 k t
    34°
33. 40' N
137°
03. 84' E

SHIP'S

LATITUDE/ LONGITUDE

• The info will be displayed as the below-mentioned, selecting the item other than SUB-DISPLAY, INFORMATION.

  ※ 1, ※ 2 and ※ 3 on Sonar mode screen indicate the info left.

  "IR" will not be displayed when INTERFERENCE RED. function "OFF" is selected.

  VRM on Bottom Scan mode screen.

  ※ 4 on Sonar mode screen.

  displayed on Sub-Display down.

  * To present this will require the the ESR-180/180BB is connected an external navigator.

BOTTOM SCAN MODE OPERATIONS

◎ The Sonar beam sweeps from side to side underneath the vessel.
The screen will clearly display echoes from the middle depth and the sea-bottom contour.
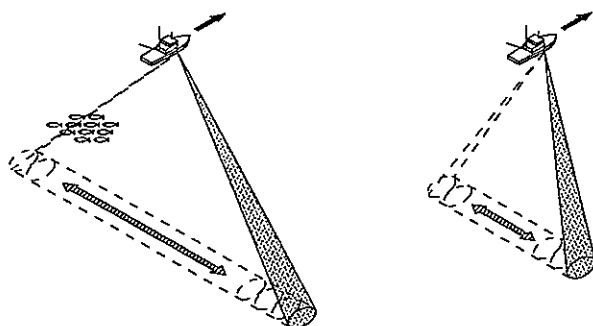
• The ultra sonic sound beams out as the beam sweeps from side to side.

180/80kHz

SECTOR ANGLE : 95°   SECTOR ANGLE : 45°
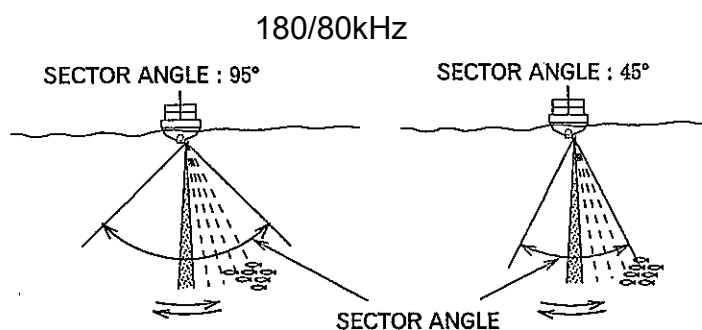
SECTOR ANGLE

• Choose the size of the area to be scanned by changing Sector angle.
  (CF) page 73
• The specified Sector angle is centered on the bearing line.
  (CF) page 77

180/80kHz
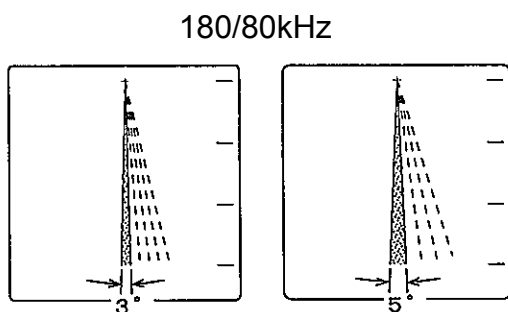
• The sector is covered by the Sonar beam in steps of the specified angle.
• The reflected echo is displayed in order in the angle specified.
• The step angle may be selected in the Menu 2 - STEP (BOTTOM SCAN).
  (CF) page 59

SOUNDER MODE DISPLAY

◎ To select Mode dial 4 to display the following sample.

TILT ANGLE

TIME MARKER

※1

※2

BEARING INDICATOR

SEA SURFACE

ECHO

SCALE
(RANGE)

COLOR BAR SCALE

SEA BOTTOM

DEPTH MARKER

TRANSDUCER
POSITION

1 0 5 m   IR-ON

DEPTH DISPLAY

※3
INTER-
FERENCE RED.

※4 {
MARKER
horizontal distance
slant distance
depth

※5

SHIP'S POSITION
LAT/LON
SPEED
WATER TEMP.
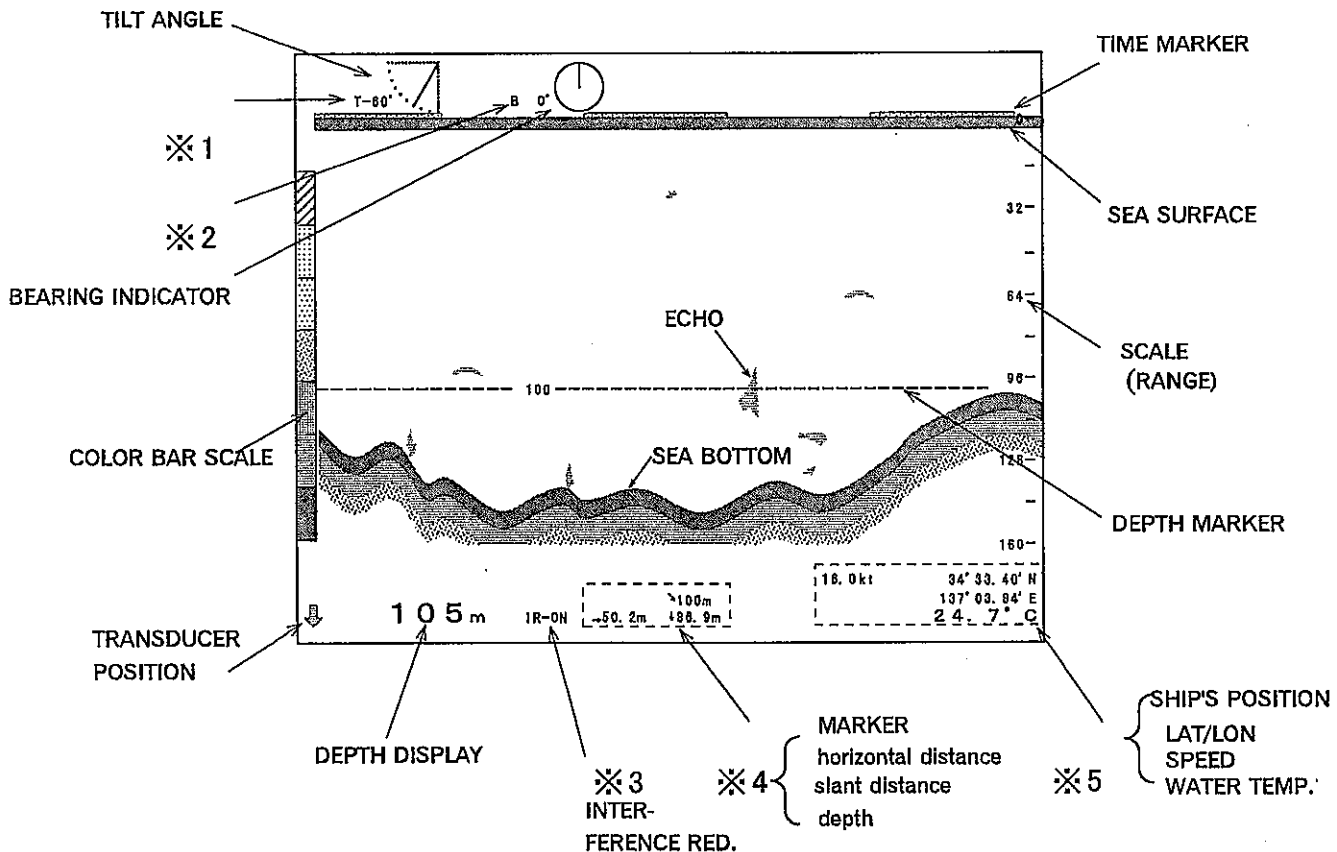
In SOUNDER MODE + INFORMATION in the split screen
the above mentioned ※ 1 to ※ 5 are not displayed.

INFORMATION SCREEN
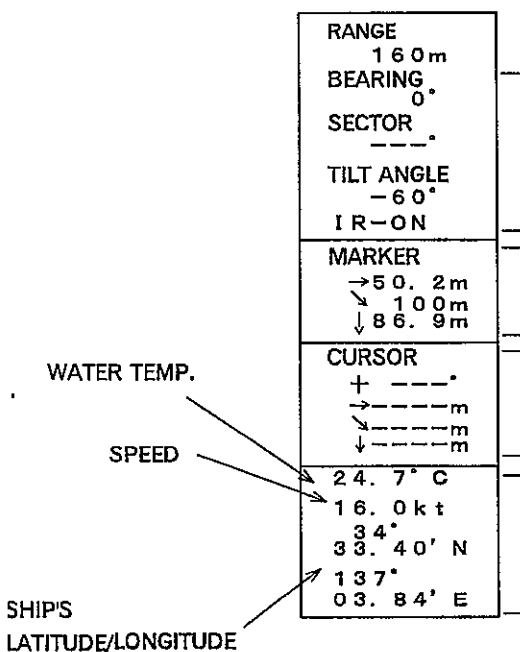
| RANGE |
| 1 6 0 m |
| BEARING 0° |
| SECTOR --- ° |
| TILT ANGLE -6 0° |
| I R−O N |
| MARKER |
| →5 0. 2 m |
| ↘ 1 0 0 m |
| ↓8 6. 9 m |
| CURSOR |
| + ---° |
| →----m |
| ↘----m |
| ↓----m |
| 2 4. 7° C |
| 1 6. 0 k t |
| 3 4° |
| 3 3. 4 0' N |
| 1 3 7° |
| 0 3. 8 4' E |

WATER TEMP.

SPEED

SHIP'S
LATITUDE/LONGITUDE

• The info will be displayed as the below-mentioned,
selecting the item other than SUB-DISPLAY,
INFORMATION .

※1, ※2 and ※3 on Sounder mode screen indicate
the info left. "IR" will not be displayed when
INTERFERENCE RED. function "OFF" is selected.

VRM on Sounder mode screen and ※4 on Sounder
mode screen indicates its Data.

not displayed on Sounder mode screen

displayed on Sounder mode screen or on ※5
on Sub-Display screen

* To present this will require the ESR-180/180BB is
connected an external navigator.

- 39 -

SOUNDER MODE OPERATION

◎ The Sonar beam sweeps underneath the vessel and the ESR-180/180BB can be used as echo sounder mode by selecting Mode dial 4.
The screen will clearly display echo sounder images from the middle depth and the sea-bottom contour.
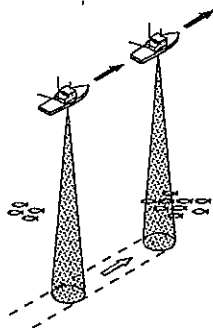
SOUNDER MODE

detects underneath the vessel.
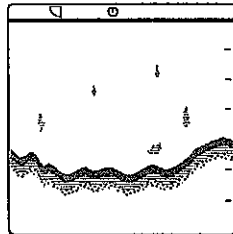
- When operating in the SOUNDER MODE, the transducer tilt 90° and stops rotating and the sounder image is displayed on the screen.
- The beam width is relative to the frequency.

detects fore by changing Tilt angel.
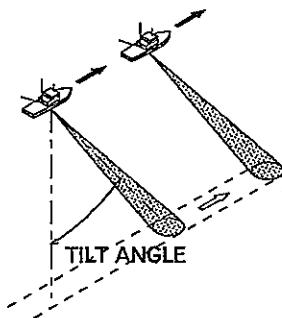
TILT ANGLE

- The sounder image other than that of underneath the vessel can be displayed by changing Tilt angle and detetive direction.

detects fore by changing Tilt angel and Bearing .

DETECTIVE
DIRECTION

TILT ANGLE
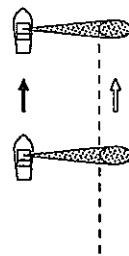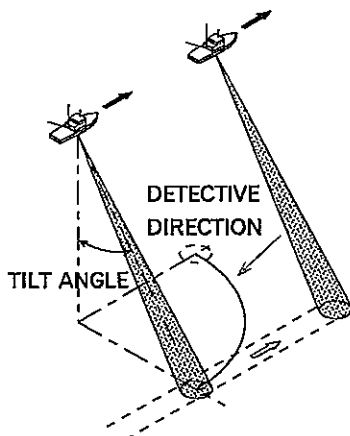
FUNCTION SETTINGS

This chapter provides you the main functions of the ESR-180/180BB Sonar and
describes the primary controls.   It also suggests settings to use for initial start up.

INITIAL SETTINGS

FACTORY SETTINGS (180/80kHz)

◎ The ESR-180/180BB is shipped from the factory with the functions under the settings listed below. Before using it, please enter the functions to the desired setup.

FUNCTIONS	FACTORY SETTINGS (in the item □)	SETTING MENU
FUNCTION SET		
GAIN UP	〔OFF〕 · +10dB · +20dB · +30dB · +40dB	
TVG CURVE	OFF · 10LOG · 20LOG · 〔30LOG〕 · 40LOG	Change at Menu 2
DYNAMIC RANGE	1 d B · 2 d B · 〔3 d B〕	
PULSE WIDTH	〔× 1〕 · × 1 . 5 · × 2	
TX POWER	A · B · C · 〔D〕	〔CF〕 (pages 46)
REDUCTION		
INTERFERENCE RED.	〔O F F〕 · O N	
DISP ITEM SEL.		
SUB-DISPLAY	〔INFORMATION〕 · HISTORICAL · +PRESS · + A-SCOPE · WAKE · EXT.F.F.	
STEP (SONAR)	5° · 〔1 0°〕	
STEP (BOTTOM-SCAN)	3° · 〔5°〕	
OFF-CENTER POS.	〔FORE〕 · BACK · RIGHT · LEFT	
SCALE DOTS	O F F · 〔O N〕	
COMPASS DISP.	〔O F F〕 · O N	
WAKE DISP.	〔O F F〕 · O N	
WAKE SUB RANGE	〔5 0 m〕 (10~500m)	
WAKE MEM. INTERVAL	〔5 SEC.〕 · 1 0 SEC. · 3 0 SEC. · 6 0 SEC.	
PRESS RATE	1／2 · 〔1／4〕 · 1／8 · 1／1 6	
OTHERS		
AUDIO LEVEL	〔0〕 (0～3 9)	
TARGET LOCK	〔MODE0〕 · MODE1 · MODE2 · MODE3	
TRIGGER SIGNAL	〔INTERNAL〕 · EXTERNAL	
DEPTH UNIT	〔m〕 · br · fm · ft	
TEMP. UNIT	〔°C〕 · °F	
TEMP. ADJUST	〔+0.0°C〕 (−9.9°~+9.9°)	
SPEED UNIT	〔k t〕 · k m／h	
HOIST AUTO UP	〔O F F〕 · 1 0 k t	
TRAIN CORRECT	〔0°〕 (0°~3 5 5°)	
PANEL BRIGHTNESS	〔BRIGHT〕 · DARK	
COLOR	〔A-1〕 · A-2 · B-1 · B-2 · C-1 · C-2	
REMOTE CONTROL SET	SELECT OPTIMIZED FUNCTIONS	
RANGE SET MENU		Change at Menu 1
SONAR/OFF-CENTER RANGE	SELECTABLE 8 RANGES	〔CF〕 (pages 44)
BOTTOM-SCAN/ F.F. RANGE		
OPERATION MODE 1, 2, 3	NO SETTINGS	
USER'S SETTINGS	NO SETTINGS	

RETURN TO FACTORY SETTINGS

◎ First press the Power OFF key, then press $\boxed{\text{ON}}$ key while pressing both $\boxed{\nearrow}\boxed{\searrow}$ at the same time.
Keep pressing the $\boxed{\nearrow}\boxed{\searrow}$ keys until the beep sound stops.

• Activating this operation will erase all settings excluding "Train Correct" at Menu 2, and restore the basic settings from the factory.

USER SETTINGS

◎ Separate to the Factory Setting function, Settings may be entered by the user and memorized. This function is called "User Settings". By entering "User Settings" the ESR-180/180BB to suit individual needs can be done. This not only simplifies operation of the ESR-180/180BB, but adds considerably to its reliability.

• All user implemented data in the ESR-180/180BB can be erased by making a reset of the unit and thus return to "User setting". Please ensure the "User settings" are memorized on the first operation.

1. MEMORIZE USER SETTINGS

• First ensure the functions are at the desired settings.
• After disconnecting the power supply once by pressing the power supply $\boxed{\text{OFF}}$ key,

then turn the power supply back on, while pressing both $\boxed{1}$ and $\boxed{\text{ON}}$ keys at the same time. Keep pressing the $\boxed{1}$ and $\boxed{\text{ON}}$ keys until the beep sound stops.

• After completing this operation all functions and their units will be memorized as set by the user.

2. RETURN TO USER SETTINGS

• In case, for some reason, the ESR-180/180BB become inoperable, the unit can be reset by disconnecting

the power supply and then turn the power supply back on, while pressing the $\boxed{3}$ and $\boxed{\text{ON}}$ keys at the same time. Keep pressing the $\boxed{3}$ key until the beep sound stops.

• This operation can return to User Settings.

3. CHANGING USER SETTINGS

• To change the functions in User Settings first activate "Return to Factory Settings" and then memorize "User Settings" again as described in the previous item 1

NOTE ! ～～～～～～～～～～～～～～～～～～～～～～～～～～～～～～～～～～～～～
Releasing the keys before the beep sounds stops may not complete the job.
Performing "Return to Factory Settings" will return all settings to Factory Settings and erase all User Settings.

MENU

MENU 1 (RANGE SET MENU)

◎ One of eight ranges can be quickly selected using this function and each of
these ranges can be set by the user to meet his own requirements using RANGE dial.

• The following will be displayed by selecting MENU 1 of MODE dial.
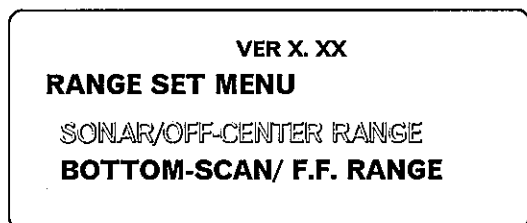
```
                VER X. XX
    RANGE SET MENU

    SONAR/OFF-CENTER RANGE
    BOTTOM-SCAN/ F.F. RANGE
```

• Use the cursor shift key ⬆ or ⬅ to highlight the item you wish to change.
By pressing the cursor shift key ⬇ or ➡ the following is displayed.

• Refer to the next page for 8 available ranges.

```
    SONAR/OFF-CENTER RANGE
    ( BOTTOM-SCAN/ F.F. RANGE )

    1        4 0 m
    2        8 0 m
    3      1 2 0 m
    4      1 6 0 m
    5      2 0 0 m
    6      2 4 0 m
    7      2 8 0 m
    8      3 2 0 m
```
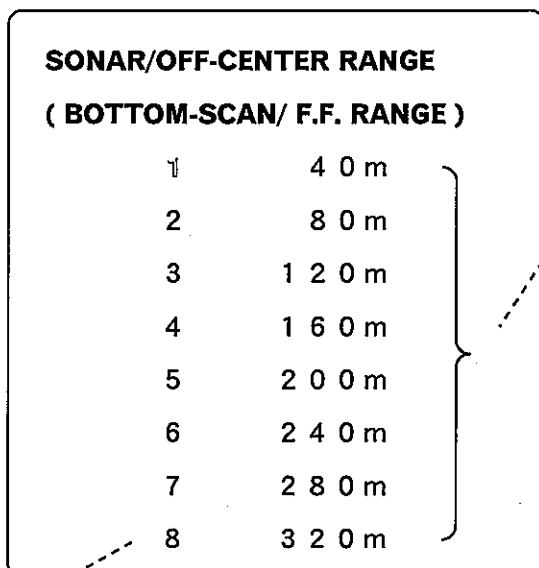
• Use the cursor shift key ⬆ or ⬇ to highlight the number you wish to change.

• Each press of ⬅ or ➡ key change the range related to the basic ranges listed in the next page.

cursor key

⬅ : makes the range value smaller.

➡ : makes the range value larger.

• indicates RANGE DIAL numbers .

The initial set values of SONAR/OFF-CENTER RANGE differ from those of BOTTOM-SCAN/ F.F. RANGE. Depth units can be selected from MENU 2 → OTHERS → DEPTH UNIT. Each range value of both SONAR/OFF-CENTER RANGE and BOTTOM-SCAN/ F.F. RANGE should be entered.

The range values can be selected from the list shown in the next page by pressing the ⬅➡ keys, however the values of OFF-CENTER can be displayed automatically when OFF-CENTER MODE is activated.

<To be continued>

H180/H80 (180kHz/80kHz)
BASIC RANGE (BASIC DEPTH)

initial values

RANGE	m			br·fm			ft		
	NORMAL	OFF-CENTER	BOTTOM-SCAN	NORMAL	OFF-CENTER	BOTTOM-SCAN	NORMAL	OFF-CENTER	BOTTOM-SCAN
1	–	–	10	–	–	6	–	–	40
2	–	–	15	–	–	9	–	–	60
3	20	30	20	12	18	12	80	120	80
4	40	60	40	20	30	20	100	150	100
5	60	90	60	30	45	30	120	180	120
6	80	120	80	40	60	40	160	240	160
7	100	150	100	50	75	50	200	300	200
8	120	180	120	60	90	60	240	360	240
9	140	210	140	80	120	80	280	420	280
10	160	240	160	100	150	100	320	480	320
11	180	270	180	120	180	120	360	540	360
12	200	300	200	160	240	160	400	600	400
13	240	360	240	200	300	200	500	750	500
14	280	420	280	240	360	240	600	900	600
15	320	480	320	280	420	280	700	1050	700
16	360	540	360	320	480	320	800	1200	800
17	400	600	400	360	540	360	900	1350	900
18	500	750	500	400	600	400	1000	1500	1000
19	600	900	600	500	750	500	1200	1800	1200
20	700	1050	700	600	900	600	1600	2400	1600
21	800	1200	800	700	1050	700	2000	3000	2000
22	900	1350	900	800	1200	800	2400	3600	2400
23	1000	1500	1000	900	1350	900	3200	4800	3200
24	1200	1800	1200	1000	1500	1000	4000	6000	4000
25	1600	2400	1600	1200	1800	1200	5000	7500	5000
26	2000	3000	2000	1600	2400	1600	6000	9000	6000

MENU 2 (FUNCTION SET MENU)

◎ Basic functions may be briefly described in the following.

• Before first using the ESR-180/180BB, customizing the functions to suit individual needs.

• Turn the mode selection dial to "MENU 2" to display the menu below.

MAIN MENU

```
├── FUNCTION SET ──────┬── GAIN UP
│                      ├── TVG CURVE
│                      ├── DYNAMIC RANGE
│                      ├── PULSE WIDTH
│                      └── TX POWER
│
│
├── REDUCTION ─────────┬── INTERF RED (INTERFERENCE REDUCTION)
│                      └── NOISE REDUCTION
├── DISP ITEM SEL
│   (DISPLAY      ─────┬── SUB-DISPLAY
│     ITEM SELECTION)  ├── STEP (SONAR)
│                      ├── STEP(BOTTOM-SCAN)
│                      ├── OFF-CENTER POS. (OFF-CENTER POSITION)
│                      ├── SCALE DOTS
│                      ├── COMPASS DISP. (COMPASS DISPLAY)
│                      ├── WAKE DISP. (WAKE DISPLAY)
│                      ├── WAKE SUB RANGE
│                      ├── WAKE MEM. INTERVAL ( WAKE MEMORY INTERVAL)
│                      └── PRESS RATE (COMPRESSED RATE)
│
├── OTHERS ────────────┬── AUDIO LEVEL
│                      ├── TARGET LOCK
│                      ├── TRIGGER SIGNAL
│                      ├── DEPTH UNIT
│                      ├── TEMP. UNIT
│                      ├── TEMP. ADJUST
│                      ├── SPEED UNIT
│                      ├── HOIST AUTO UP
│                      ├── TRAIN CORRECT
│                      ├── PANEL BRIGHTNESS
│                      └── COLOR
│
└── REMOTE CONTROL SET ──── OPTION
                            Remote control key settings
```

✻ For more detailed explanation, refer to the following pages.

FUNCTION SETTINGS

MAIN MENU

◎ Turn the mode selection dial to "MENU 2" to display the menu below.

- Use the cursor shift key ⬆ or ⬇ to highlight the item you wish to change.
  By pressing the cursor shift key ⬅ or ➡ the following is displayed.

```
                    VER 0.00E  ----|----- • Version No. of EPROM
   MAIN MENU
      FUNCTION SET                       • Use the cursor shift key ⬆ or ⬇
      REDUCTION                             to highlight the item you wish to change.
      DISP ITEM SEL.
      OTHERS                                The setup display is accessed by pressing
      REMOTE CONTROL SET                    the cursor shift key ⬅ or ➡.


            SELF CHECK
             DATA-TX  OK
             DATA-RX  OK    --|----- • SELF CHECK function
             DATA     OK                 The test result NG in red is displayed
             HOIST    OK                 in case of some troubles.
             TILT     OK
             TRAIN    OK
             ROM-VER OK
             OTHERS  OK
```
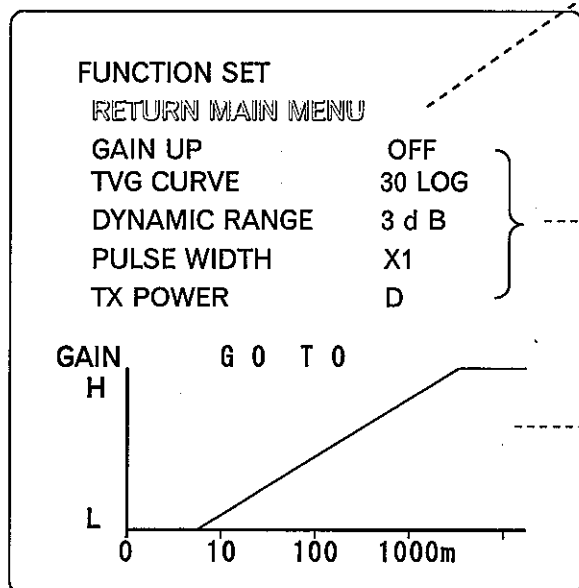
SETTING FUNCTIONS

- Use the cursor shift key ⬅ or ➡
  to return to MAIN MENU.

```
   FUNCTION SET
      RETURN MAIN MENU
      GAIN UP            OFF
      TVG CURVE          30 LOG
      DYNAMIC RANGE      3 d B
      PULSE WIDTH        X1
      TX POWER           D

   GAIN      G 0  T 0
    H




    L
       0    10    100   1000m
```

- Use the cursor shift key ⬆ or ⬇
  to highlight the item you wish to change.

- Press ⬅ or ➡ key to select the desired setting.

- Graph for Gain Characteristics
  displays the changed gains such as
  TVG curve, Gain Up, Gain dial and
  Far Gain dial etc.

1. GAIN UP

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

- Highlight the "GAIN UP" function by means of [↑][↓] keys and select the desired values by [←][→] keys.

GAIN UP   OFF ---------------- • Each press of [←] or [→] key changes the settings "OFF → + 10dB → + 20dB → + 30dB → + 40dB".
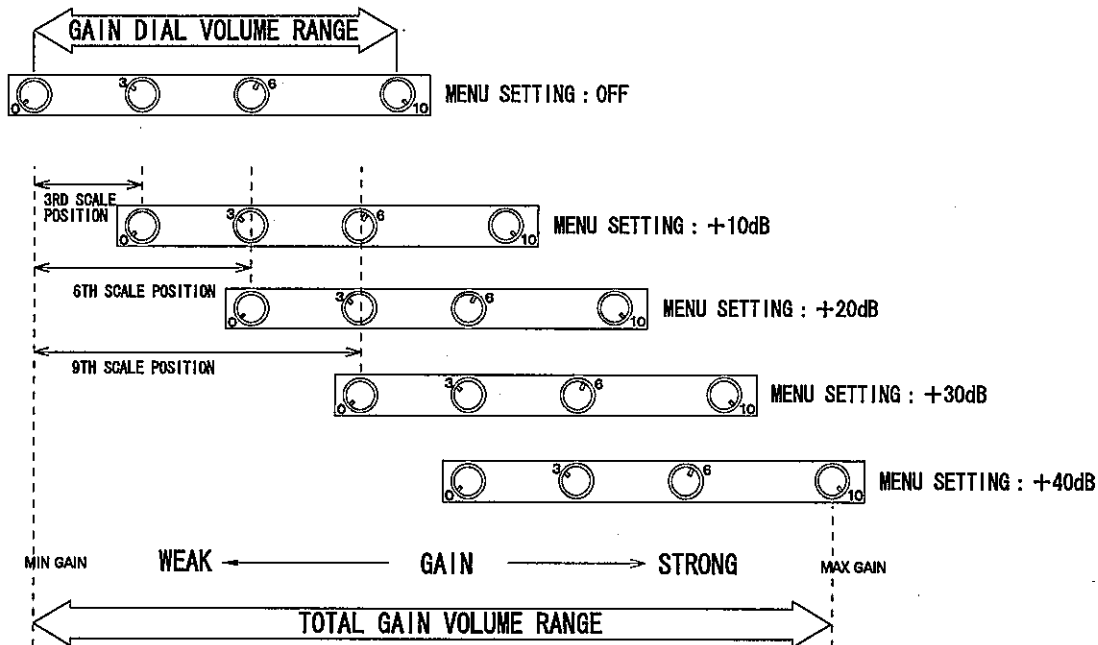
- When the menu gain adjust setting is changed from OFF to + 10dB, the gain dial volume increases 3 points on the scale.

- When the menu gain adjust setting is OFF and the front panel dial is on 3, it has the same result as when the menu gain adjust setting is on + 10dB and the gain dial is on 0.
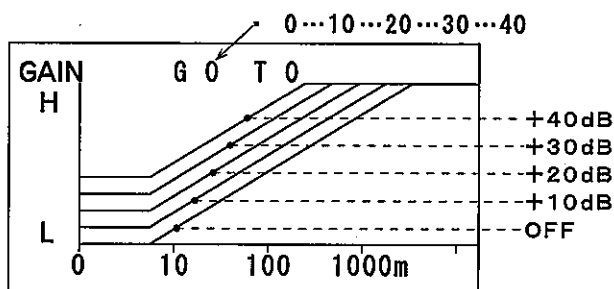
- Selected GAIN UP, Gain Characteristics Diagram shifted accordingly shows left under the following conditions.

Gain dial   : 0
Far Gain dial   : 0
TVG Curve   : 30LOG

2. TVG CURVE

◎ TVG offsets the effects of propagation loss of sound as it passes through the water. Propagation loss of sound is the sum of spreading and attenuation losses. The TVG curve is adjusted to counter the loss.

• Highlight the "TVG CURVE" function by means of [↑][↓] keys and select the desired values by [←][→] keys.

TVG CURVE   30LOG -------- • Each press of [←] or [→] key changes the settings "OFF → 10LOG → 20LOG → 30LOG → 40LOG"

OFF   : TVG is inactive in 180/80kHz frequencies.
10LOG   : Curve ① in the below drawing.
20LOG   : Curve ② in the below drawing.
30LOG   : Curve ③ in the below drawing.
40LOG   : Curve ④ in the below drawing.
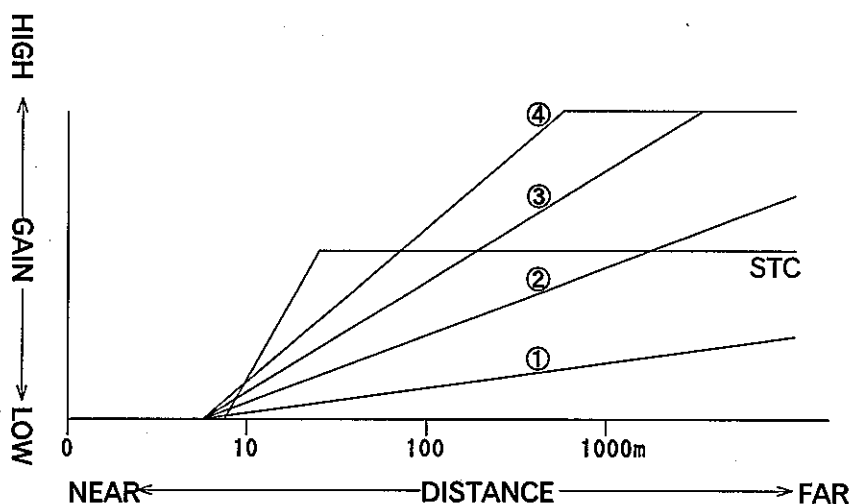
• In accordance with the distance the gain increases automatically even if the gain volume is unchanged as seen in the above drawing.

NOTE !

◎ Please note that the TVG settings and gain control by Gain dials have its affect mutually.

3. DYNAMIC RANGE

◎ By shifting the dynamic range, the display to reflect the received echo more precisely or the display to discriminate their density is selected.

- Highlight the "DYNAMIC RANGE" function by means of ⬆ ⬇ keys and select the desired values by ⬅ ➡ keys.

DYNAMIC RANGE   3dB ---- • Each press of ⬅ or ➡ key changes the settings "OFF → + 1dB → + 2dB → + 3dB.........".

COLOR SCALE
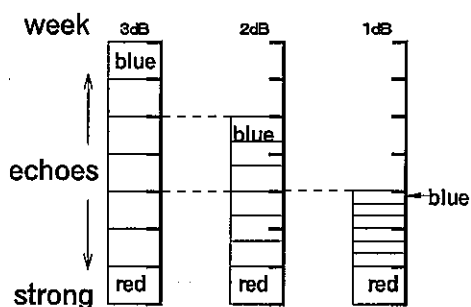
The diagram shows the comparative signal threshold levels for the dynamic ranges.

4. PULSE WIDTH (180/80kHz)

◎ The transmitted pulse width can be set.

- Highlight the "PULSE WIDTH" function by means of ⬆ ⬇ keys and select the desired values by ⬅ ➡ keys.

PULSE WIDTH   × 1 ---- • Each press of ⬅ or ➡ key changes the settings "× 1 ...× 1 . 5 ...× 2 ......".

× 1   : automatically changes the transmit pulse width according to the range (normal) listed below.

× 1 . 5 : automatically the normal transmit pulse width x 1.5

× 2   : automatically the normal transmit pulse width x 2

      A longer pulse width provides greater detective range.

RANGE (m)	PULSE WIDTH(msec)	RANGE (m)	PULTH WIDTH (msec)
0 ~ 5 9	0 . 2 5	1 6 0 ~ 1 9 9	1 . 2 5
6 0 ~ 7 9	0 . 4 0	2 0 0 ~ 2 3 9	2 . 0 0
8 0 ~ 9 9	0 . 7 5	2 4 0 ~ 3 9 9	2 . 5 0
1 0 0 ~ 1 1 9	0 . 9 0	4 0 0 ~	3 . 7 5
1 2 0 ~ 1 5 9	1 . 0 0		

NOTE !

◎ In actual practice, the short pulse width gives better resolution, and less noise in shallow water or surface scanning. The longer pulse width is selected, the lower resolution is given.

5. TX POWER

◎ The output power of the ultrasonic sound wave may be selected.

· In crowded fishing areas, this function may be used to reduce power and avoid interference to other Fishing boat's Sonars and Echo Sounders.

· Highlight the "TX POWER" function by means of [↑][↓] keys and select the desired level of the transmitting power by [←][→] keys.

· "D" indicates the maximum power and then gradually reduced by moving from "D "→" C" →"B"→"A" that is the minimum power.
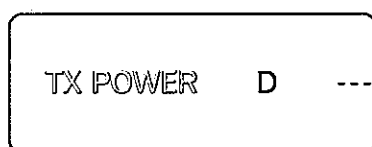
TX POWER   D   ---|---------- · Each press of [←][→] keys changes the setting "D - C - B - A" .

REDUCTION
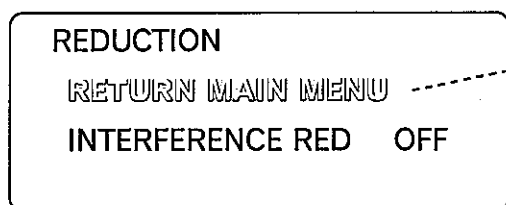
```
REDUCTION

RETURN MAIN MENU  -------
INTERFERENCE RED    OFF
```

- Use the cursor selection key ← or →
  to return to MAIN MENU.
- Use the cursor selection key ↑ or ↓
  to highlight the item you wish to change.
- Press ← or → key to select
  the desired setting.

1. INTERFERENCE REDUCTION

◎ This function may be used to eliminate noise from other boats..

- Highlight the "INTERFERENCE RED" by means of ↑ ↓ keys and select
  the function "ON" or "OFF" by ← → keys.
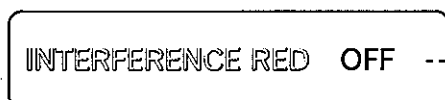
```
INTERFERENCE RED    OFF  ------
```
- Each press of ← or → key changes the settings
  "ON → OFF".

(ON : Interference reduction is functioning.
(OFF : Interference reduction is not functioning.

DISPLAY ITEM SELECTION

```
DISP ITEM SEL.
  RETURN MAIN MENU      ---------------------
  SUB-DISPLAY            INFORMATION
  STEP (SONAR)           1 0°
  STEP (BOTTOM-SCAN)      5°
  OFF-CENTER POS.        FORE
  SCALE DOTS             O N
  COMPASS DISP.          O F F
  WAKE DISP.             O F F
  WAKE SUB RANGE         50m
  WAKE MEM. INTERVAL     5 SEC.
  PRESS RATE             1 / 4
```

- Use the cursor selection key ◄ or ► to return to MAIN MENU.

- Use the cursor selection key ▲ or ▼ to highlight the item you wish to change.

- Press ◄ or ► key to select the desired setting.

※ Other values are shown in 150kHz frequency.

1. SUB-DISPLAY

◎ This function may be used to select the mode displayed on the right split screen.

- Highlight the "SUB-DISPLAY" by means of ▲ ▼ keys and select the desired setting by ◄ ► keys.

```
SUB-DISPLAY    INFORMATION
```

- Each press of ◄ or ► key changes the settings, "INFORMATION → HISTORICAL → +PRESS → + A -SCOPE → WAKE → EXT.F.F."

① INFORMATION

◎ This can be activated by selecting the MODE dial 1 ~ 4.

```
RANGE
    1 6 0m
BEARING
    0°
SECTOR
    3 6 0°
TILT ANGLE
   - 3 0°
I R - O N
MARKER
 → 8 6.  0m
 \ 9 9.  3m
 ↓ 4 9.  7m
CURSOR
 +     4 5°
 → 6 5.  2m
 \ 7 5.  3m
 ↓ 3 7.  7m
2 4.  7° C
1 6.  0 k t
    3 4°
3 3.  4 0' N
1 3 7°
0 3.  8 4' E
```

- displays the selected range.
- displays the bearing angle set by the Bearing keys
- displays the sector angle set by the Sector dial.
- displays the tilt angle set by the Tilt keys
- displays only when the INTERFERENCE RED - ON is selected.
- displays horizontal distance, slant distance and depth to the makder. not displayed in BOTTOM SCAN MODE.
- displays horizontal distance, slant distance and depth to the cursor. not displayed in SOUNDER MODE.

- displays the water temperature.
- displays the ship's speed and latitude/longitude.
  * To present this info will require the ESR-180/180BB is connected to an external navigator.

② HISTORICAL DISPLAY

◎ This vertical writing display appears on the right split screen by HISTORICAL in SUB-DISPLAY under SONAR MODE and BOTTOM SCAN MODE. However, on selecting SOUNDER MODE the vertical sounding picture is full up on the screen.

PORT SIDE MARK · STARBOARD SIDE MARK

SWEEPING PORT SIDE : YELLOW

STERN : BLUE

BOW : WHITE

SWEEPING STARBOARD : RED

32-
64-
86-

BEARING MARK

COUNTERCLOCKWISE : YELLOW

CLOCKWISE : BLUE

18. 6kt   34° 36. 974N
137° 01. 698E
24. 7° C

COLOR SCALE

OWN SHIP'S POSITION IS DISPLAYED CONNECTING S-1800 TO AN EXTERNAL NAVIGATOR.

WEAK

weakest color (background color)

WATER TEMPERATURE

SIGNAL STRENGTH

second strongest color

STRONG

strongest color

NOTE: The displayed color varies in related to the signal (echo) strength.

BEARING MARK

PORT SIDE MARK · STARBOARD SIDE MARK

When the Sonar beam passes the ship's bow, a white mark is displayed.

SWEEPING CLOCKWISE : BLUE

When the Sonar beam s weeps on the starboard side, red is displayed.

SWEEPING COUNTERCLOCKWISE : YELLOW

When the Sonar beam sweeps on the port side, yellow is displayed.

When the Sonar beam passes the ship's stern, blue is displayed.

The mark color is displayed as shown in the color scale being related to the Sonar beam bearing direction.

The mark color is displayed as shown in the color scale being related to the Sonar beam direction (position).

③ + PRESS (COMPRESSED VERTICAL WRITING DISPLAY)

◎ The vertical writing display and its compressed writing display appears
on the right split screen by + PRESS in SUB-DISPLAY under SONAR MODE
and BOTTOM SCAN MODE.

However, on selecting SOUNDER MODE the normal vertical sounding picture
and its compressed picture appear in the right and left split screen..

SONAR MODE BOTTOM SCAN MODE

PRESS DISPLAY (COMPRESSED IMAGE)　HISTORICAL DISPLAY

32–
64–
96–

18. 6kt　34° 36. 974N
137° 01. 698E
24. 7° C

SOUNDER MODE

T-90°　B　0°

PRESS DISPLAY (COMPRESSED IMAGE)　NORMAL DISPLAY

32–
64–
96–
128–
160–

100

16. 0kt　34° 33. 40′ N
137° 03. 84′ E
24. 7° C

1 0 6 m　IR-ON　→0. 0m　↘100m ↓100m
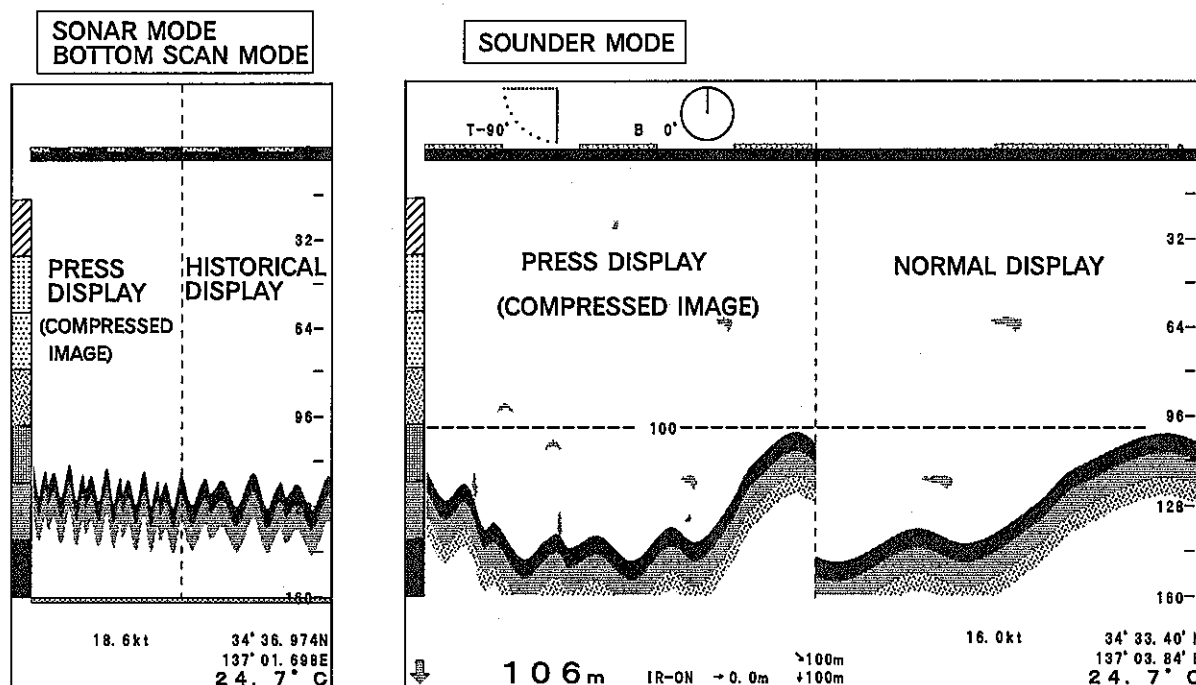
④ + A-SCOPE

◎ A-SCOPE appears at the right side of the vertical writing display on the right
split screen.
· The drawing below shows an example in SONAR MODE and BOTTOM
SCAN MODE. A-Scope function is also avaialble in SOUNDER MODE.

A-SCOPE

32–
84–
96–

18. 8kt　34° 36. 974N
137° 01. 698E
24. 7° C
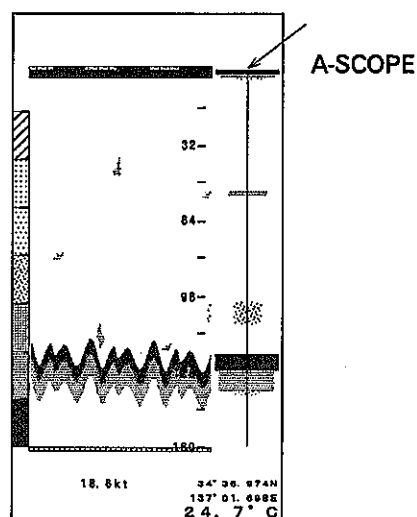
⑤ WAKE

◎ By connecting the ESR-180/180BB to an external navigator own ship's position can be shown on the screen.
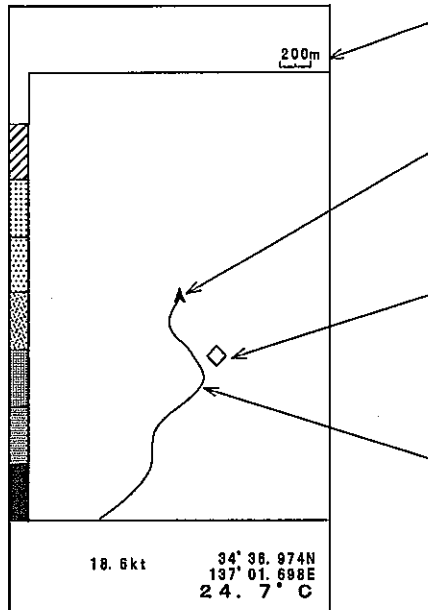
• **SCREEN WIDTH**

displays the screen width selected by "WAKE SUB RANGE".

• **OWN SHIP**

displays own ship's position in latitude/longitude and speed at the bottom of the split screen..

• **MARK**

displays marks placed by the cross cursor in SONAR MODE screen.

• **WAKE (TRACK)**

The wake (track) is initially saved into memory every 2 seconds. The previous wake saving periods can be selected via the procedure of "WAKE MEM. INTERVAL".

※ No color scale apears on Sounder Mode screen.

⑥ EXT.F.F. (EXTERNAL FISH FINDER)

◎ This function is only available for the case that the ESR-180/180BB is connected to an echo sounder with TRT system.
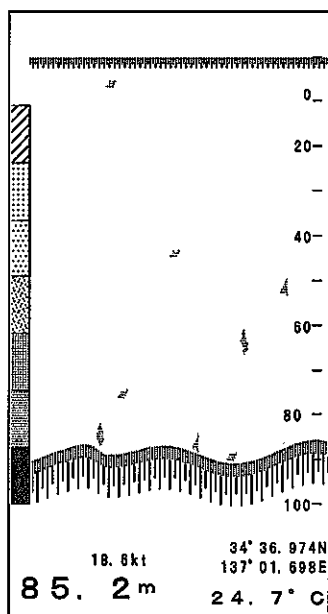
2. STEP (SONAR)

◎ The step angle (scanning angle) in the Sonar mode may be selected.

· Highlight the "STEP (SONAR)" function by means of [↑][↓] keys and select the desired step angle by [←][→] keys.
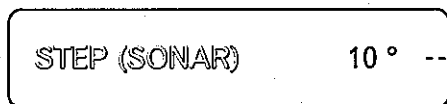
STEP (SONAR)   10 ° --------- · Each press of [←] or [→] key changes the angles
                                       " 5° →10° " in 180/80kHz frequency.

※ 180/80kHz frequencies
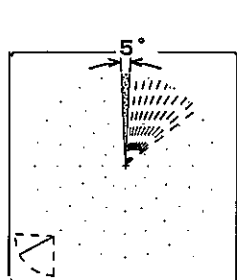
5° STEP
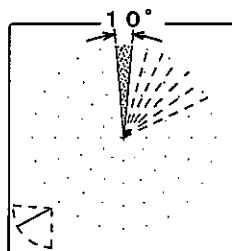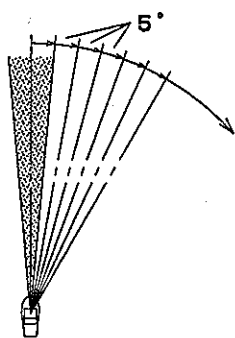
1 0° STEP
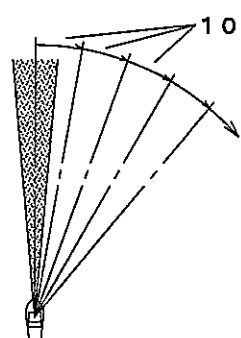
NOTE !

◎ narrower step : The image density is increased but the rotational speed is reduced.

   wider step : The image density is reduced but the rotational speed is increased.

3. STEP (BOTTOM-SCAN)

◎ The step angle (scanning angle) in the Bottom Scan mode may be selected.

· Highlight the "STEP (BOTTOM-SCAN)" function by means of $\boxed{\uparrow}$ $\boxed{\downarrow}$ keys and select the desired step angle by $\boxed{\leftarrow}$ $\boxed{\rightarrow}$ keys.

STEP (SONAR)   5 ° --------- · Each press of $\boxed{\leftarrow}$ $\boxed{\rightarrow}$ keys changes the angles "3° →5° " in 180/80kHz frequency.

※ 180/80kHz frequencies

3° STEP   5° STEP

- 59 -
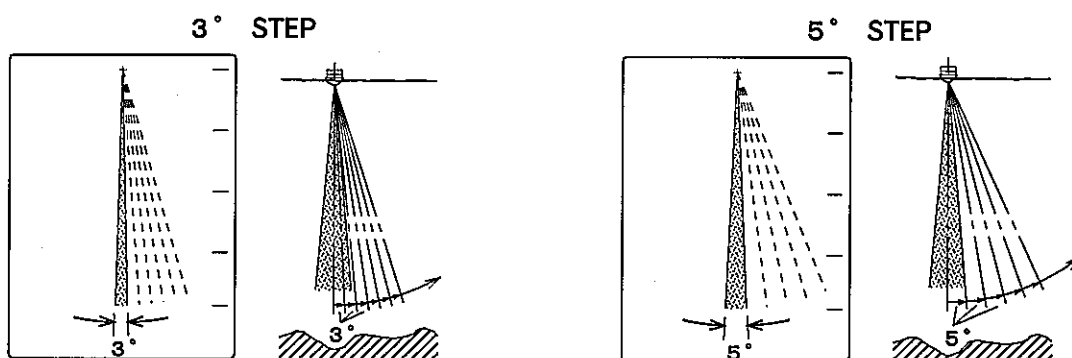
4. OFF-CENTER POSITION

◎ The ship's position on the screen may be selected in the OFF-CENTER mode (MODE dial 2).

• Highlight the "OFF-CENTER POS." function by means of ⬆⬇ keys and select the desired center postion by ⬅➡ keys.

OFF-CENTER POS.　　FORE ------ • Each press of ⬅ or ➡ key changes the setting "FORE - BACK - RIGHT - LEFT"

| FORE | BACK | RIGHT | LEFT |
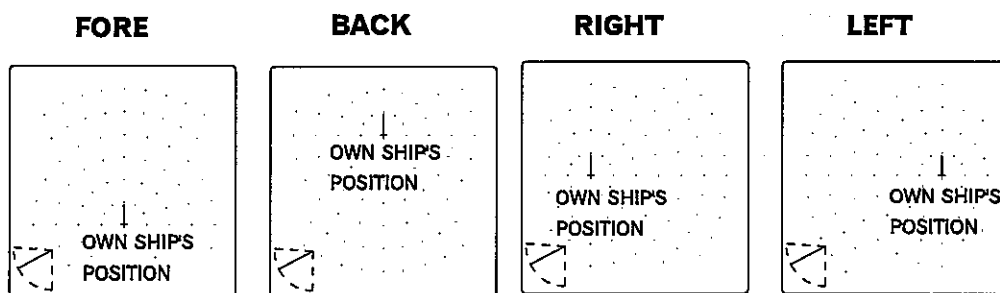
5. SCALE DISPLAY

◎ The scale dots display under SONAR mode can be turned on/off.

• Highlight the "SCALE DOTS" function by means of ⬆⬇ keys and select ON or OFF by ⬅➡ keys.

SCALE DOTS　　ON --------- • Each press of ⬅ or ➡ key changes the setting, "OFF - ON".
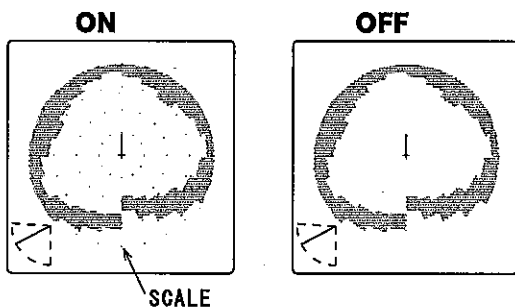
(ON : displays scale (dots).
  OFF : displays no scale.

• When the scale dots display OFF is selected, no scale appears on the screen in SONAR/OFF-CENTER modes. However the scale appears on the screen in BOTTOM SCAN/SOUNDER modes.

6. COMPASS DISPLAY

◎ The points of the compass can be shown on the screen in the Sonar mode
by connecting the ESR-180/180BB to an external navigator.

• Highlight the "COMPASS DISP." function by means of [↑] [↓] keys and
select the compass display function ON or OFF by [←] [→] keys.

COMPASS DISP.   OFF ------ • Each press of [←] or [→] key changes the
Compass display, "ON - OFF".

DIRECTIONS
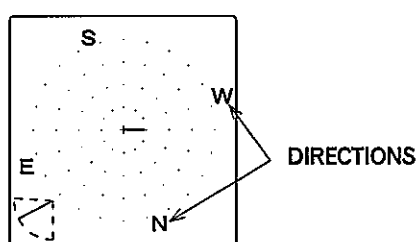
┌ ON   : displays the points of the compass.
│
└ OFF   : displays no points of the compass.

7. WAKE DISPLAY

◎ The track line can be shown on the screen in the Sonar mode
by connecting the ESR-180/180BB to an external navigator.

• Highlight the "WAKE DISP." function by means of [↑] [↓] keys and select
the wake display function ON or OFF by [←] [→] keys.
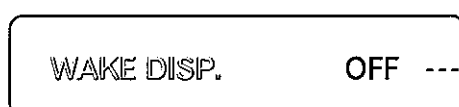
WAKE DISP.   OFF --------- • Each press of [←] [→] keys changes the wake
display "ON - OFF".
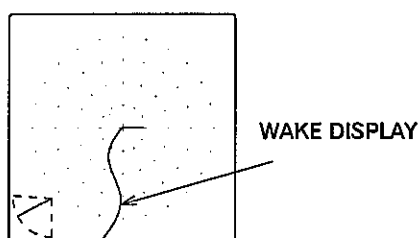
WAKE DISPLAY

┌ ON   : displays the wake (trackline).
│
└ OFF   : displays no wake (trackline).

8. WAKE SUB RANGE

◎ The screen width scaling for a navigational display can be selected. [CF] page 76

- Highlight the "WAKE SUB RANGE" function by means of ▲ ▼ keys and select the screen width by ◄ ► keys.

WAKE SUB RANGE   50m --

- Each press of ◄ or ► key changes the values. "10 - 20 - 30 ....500".

► : increases the values.

◄ : decreases the values.

9. WAKE MEMORY INTERVAL

◎ The track is saved into memory and its interval can be seleced.

- Highlight the "WAKE MEM. INTERVAL" function by means of ▲ ▼ keys and select the interval by ◄ ► keys.

WAKE MEM. INTERVAL   5 SEC.

- Each press of ◄ or ► keys changes the values. "5 SEC. - 10 SEC. - 30 SEC. - 60 SEC".

10. PRESS RATE (COMPRESSED RATE)

◎ The rate of the compressed picture can be selected. [CF] page 56

- Highlight the "PRESS RATE" function by means of ▲ ▼ keys and select the setting by ◄ ► keys.

PRESS RATE   1 / 4 ----

- Each press of ◄ or ► key changes the values. "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.

OTHERS

```
OTHERS
RETURN MAIN MENU     ------------------------
AUDIO LEVEL          0
TARGET LOCK          MODE 1
TRIGGER SIGNAL       INTERNAL
DEPTH UNIT           m
TEMP. UNIT           °C
SPEED UNIT           K t
HOIST AUTO UP        OFF

TRAIN CORRECT        0 °
PANEL BRIGHTNESS     BRIGHT
COLOR SELECTION      A-1
```

- Use the cursor shift key ⬅ or ➡ to return to MAIN MENU.

- Use the cursor shift key ⬆ or ⬇ to highlight the item you wish to change.

- Press ⬅ or ➡ key to select the desired setting.
  The values of TRAIN CORRCET can not be changed here.
  CF page 68

1. AUDIO LEVEL

◎ The sound level of an external speaker can be adjusted.

- Highlight the "AUDIO LEVEL" function by means of ⬆ ⬇ keys and select the desired level by ⬅ ➡ keys.

```
AUDIO LEVEL              0
```
------- • Each press of ⬅ or ➡ key changes the level from 0 to 39.

⬅ key : decreases the volume

➡ key : increases the volume

NOTE !

~~~~~~

◎ Please note that "AUDIO LEVEL" function is not available when 45° step is set in Sonar Mode.

◎ The connection of the optional external speaker (4 Ω) is requried. **CF** page 39/41

~~~~~~

2. TARGET LOCK

◎   This function changes the rotary direction or tracks the target automatically.

· To select the desired Target Lock function when [△] key is pressed during the Searchlight operation in the Sonar mode.

· Highlight the "TARGET LOCK" function by means of [↑][↓] keys and select the desired TARGET LOCK function by [←][→] keys.

TARGET LOCK   MODE0

· Each press of [←] or [→] key changes the setting "MODE0 - MODE1 - MODE2 - MODE3"
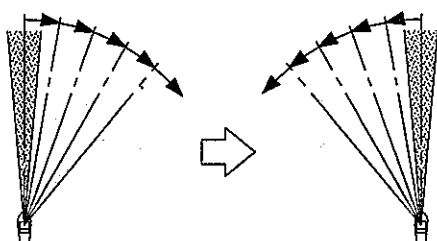
① MODE 0

· When MODE 0 is selected as a target lock mode, the sector rotary direction is reversed by pressing [△] key.

· Not tracking the echo automatically.

② MODE 1
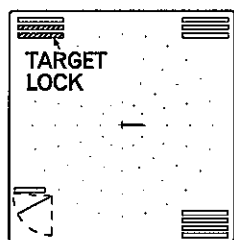
· When MODE 1 is selected as a target lock mode, by pressing [△] key the Sonar beam will track the echo automatically left and right and "TARGET LOCK" will be displayed at the top left of the screen. If the beam should have lost the echo and not picked it up again after a 60° sweep, the Target Lock function will be released.

③ MODE 2

·   When MODE 2 is selected as a target lock mode, the Sonar beam will track the echo automatically up and down (one time of up and down track after three times of left and right track) in addition to the Mode 1 functions.

<To be continued>

④ MODE 3
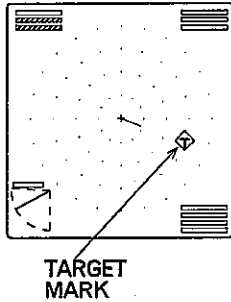
TARGET
MARK

- When the ESR-180/180BB is connected to a navigator, the Target Mark is displayed and tracked automatically by pressing the Target Lock key △ .

The Target Mark follows after the ship automatically and moves on the screen. This Target Mark also displayed on the Sub-Display in the split screen.

NOTE !

- ECHO CONFIRMATION: Under Target Lock the Sonar beam will track the strongest echo from 1/4 of the scale (in Off Center mode 1/6 of the scale) or when the strongest echo of the Historical Display is 3 pixels or more.
- During Target Lock operation Tilt, Bearing and Sector keys will not be operated, and if the Menu or Range keys are pressed or the Display mode is changed Target Lock will be released.
- When Target Lock ceases Bearing and Sector angles will return to their original positions, Tilt angle will remain in Target Lock position.
- Target Lock function is not available in the Bottom Scan Mode.

3. TRIGGER SIGNAL

◎ To select where the trigger signal is taken from either INTERNAL or EXTERNAL.

- Highlight the "TRIGGER SIGNAL" function by means of ↑ ↓ keys and select the desired trigger signal by ← → keys.
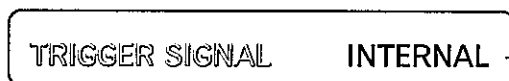
TRIGGER SIGNAL   INTERNAL ----- • Each press of ← or → key changes the setting

"INTERNAL - EXTERNAL "

INTERNAL : selects the signal of the ESR-180/180BB.
EXTERNAL : selects the signal from an external unit.

NOTE !

◎ To synchronize the external equipment, the optional kit is required.
In case of "INTERNAL" selection the receptacle for the trigger signal output is on the control unit panel of the ESR-180/180BB. **CF** page 27

4. DEPTH UNIT

◎ The user may select the displayed depth unit to be one of the following:
meters (m), braccia (br), fathoms (fm) or feet (ft).

• Highlight the "DEPTH UNIT" function by means of ⬆⬇ keys and select the desired depth unit by ⬅➡ keys.

| DEPTH UNIT   m |

-------- • Each press of ⬅ or ➡ keychanges the Depth unit.

" m – br – fm – ft "

⌠ mt   : Displays the unit meters.   br : Displays the unit braccia.   1BR : 1.65m
⌡ fm   : Displays the unit fathoms. 1FM : 1.8288m   ft : Displays the unit feet.   1FT : 0.3048m

5. TEMPERATURE UNIT

◎ Temperature unit can be set to °C or °F.

• Highlight the "TEMP. UNIT" function by means of ⬆⬇ keys and select the desired temperature unit by ⬅➡ keys.

| TEMP. UNIT   °C |

---------- • Each press of ⬅ or ➡ key changes the temperature unit "°C – °F "

⌠ °C : centigrade
⌡ °F : Fahrenheit

6. TEMPERATURE ADJUSTMENT

◎ To adjust the water temperature displayed on the screen.
• Highlight the "TEMP. ADJUST" function by means of ⬆⬇ keys and select the range to display an adjusted temperature by ⬅➡ keys.

| TEMP. ADJUST   0.0 °C |

------------- • Each press of ⬅ or ➡ key changes the range in 0.1 interval from – 9.9 to + 9.9.

⌠ + 9.9 ° : maximized the value of the adjustment
⎮   ⎰
⎮ + 0.0 ° : no adjustment   ⬆ ➡ increases the value
⎮   ⎱
⌡ – 9.9 ° : minimized the value of the adjustment   ⬇ ⬅ decreases the value
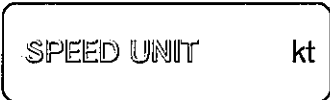
- 66 -

7. SPEED UNIT

◎ It can be shown in knots (kt) or kilometers/hour (km/h).

· Highlight the "SPEED UNIT" function by means of [↑][↓] keys and select the speed unit by [←][→] keys.

SPEED UNIT   kt --------------- · Each press of [→] or [→] key changes the speed unit, " kt - km/h ".

[kt   : meaured in knot.

km/h : meaured in kilometers.

8. HOIST AUTO UP

◎ The soundome can be retracted automatically when the ship speed is over a specified speed by connecting to an external equipment.

· Highlight the "HOIST AUTO UP" function by means of [↑][↓] keys and select the value by [←][→] keys.

HOIST AUTO UP   OFF --------- · Each press of [←] or [→] key changes the item, "OFF or 10 kt (18 km/h).

· Use the Tilt Key [↑] or [↓] to change the speed after selecting the initial value 10 kt (18 km/h). Selectable values : "1 kt ～ 15 kt" or "1 km/h ～ 27 km/h)

[Tilt Key [↑] : increases the value

Tilt Key [↓] : decreases the value

· Soundome position mark shows the down direction ⇓ on the left bottom of the screen while the soundome is lowering.   When Hoist Auto UP function is activated, the mark changes into ⇑. The Hoist Down Light [▽] (Sensor)goes off when the soundome is retracted automatically.

※ We recommend the ship speed below 15kt (27km/h) in 180/80kHz while retracting.
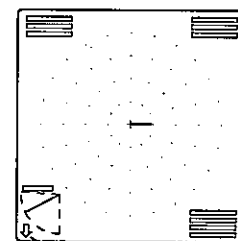
SHOWS THE SOUNDOME POSITION, LOWERING RAISING.

9. TRAIN CORRECT

◎ To adjust the deviation of the bow direction (0°).

· In the Sonar mode use [↖] or [↘] key to set the Bearing toward Bow direction.

· Select MENU 2/OTHERS and highlight the "TRAIN CORRECT" function by meansof [↑][↓] keys.

TRAIN CORRECT   90 °   -------- · Each press of [←] or [→] key changes the degree of Train Correct.

BOW DIRECTION (0°)

The display turned
90° counterclockwise
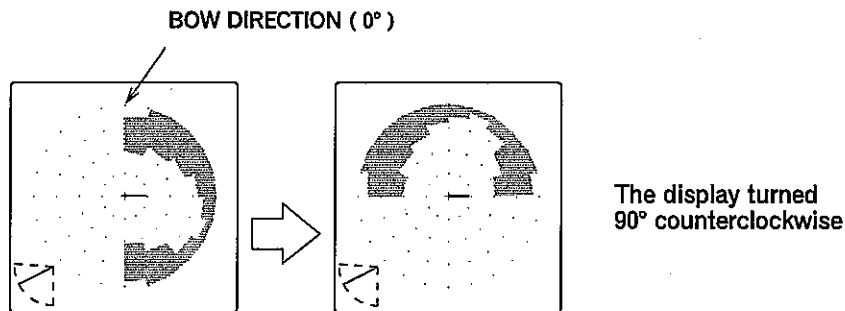
· When releasing this function, set the current Bearing at 0° and follow the above procedure "TRAIN CORRECT" again.

11. PANEL BRIGHTNESS

◎ To adjust the intensity of the sonar display (backlight) .
For nighttime view, Suzuki recommends "DARK".

• Highlight the "PANEL BRIGHTNESS" function by means of [↑][↓] keys and select "BRIGHT" or "DARK" by [←][→] keys.
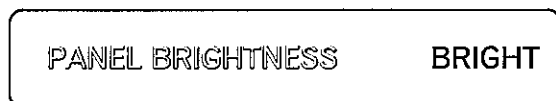
> PANEL BRIGHTNESS   BRIGHT ---- • Each press of [←] or [→] key changes the item "BRIGHT" or "DARK" .

12. COLOR SELECTION

◎ The display background color may be selected from four set options A-1, A-2, B-1, B-2 or the tone range may be specified freely on C-1, C-2 in Color Palette function.

• C-1 and C-2 can be customized to suit individual needs and wishes.

• The initial settings for C-1, C-2 are C-1=A-1, C-2=B-1.

• Highlight the "COLOR" function by means of [↑][↓] keys and select the desired tone by [←][→] keys.
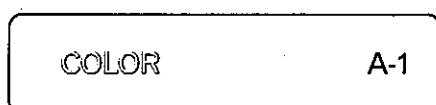
> COLOR   A-1 ------------- • Each press of [←] or [→] key changes the tone, " A-1, A-2, B-1, B-2, C-1, C-2 ".

* GUIDES TO THE COLOR PALETT

> C-1 COLOR PALETTE SET
> SET   RESET

• Use [←][→] keys to select C-1 or C-2.

• Press [⌐] key to display the menu on the left.

• Highlight the "RESET" function by means of [←][→] keys and press [⌐] key to return to the initial setting and the Pallete Setting Menu terminates.

<To be continued>

FUNCTION SETTINGS

- Highlight the "SET" function by means of ⬅➡ keys and press ⎍ key to activate the following menu.

- Press ⎍ key to select the desired color.

- By using ⎍ key to move the arrow to the desired frame, the menu to set the color tone selected in step 3 (red • green • blue) is displayed.

```
C - 1 COLOR PALLET SET

                      R   0
                      G   0
BACKGROUND            B  10
COLOR

                   Press ⎍ key
                   to select the color
                   to be set.
COLOR BAR
```
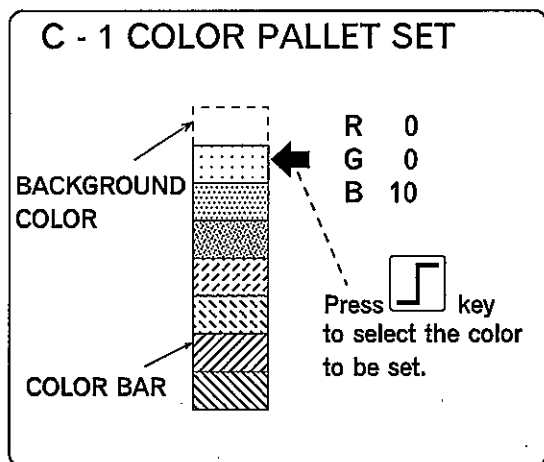
- Highlight a color to be set by means of ⬆⬇ keys and select the level of the color (0 ~ 15) by ⬅➡ keys.

- The number 15 is the strongest color and its tone decreases in accordance with the smaller number

- Press ⎍ key to memorize the desired color selection into "C - 1" or "C - 2" .

COLOR PALLET

- By using Color Palette function by changing the ratio of red, green, blue of the colors on the display sample various tones may be selected.
- By using Color Palette function the strength of each of the three colors (red, green, blue) may be set in 15 steps freely.
- The Color Palette function may be used to set the tones according to the target fish species so as to produce the most visible display.

```
        RED

        WHITE
GREEN         BLUE
```
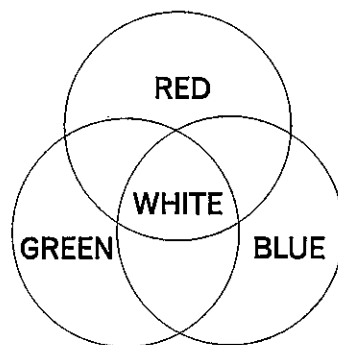
REMOTE CONTROL SET

- Select the "REMOTE CONTROL SET" function at Menu 2.
- Refer to Chapter 6 Option, "REMOTE CONTROL SET" on page 86.

SONAR OPERATION

This chapter provides you the description of operation dials and keys for the ESR-180/180BB Sonar.

OPERATION DIALS

MODE DIAL

◎ Selects the Displayed Mode.

- All operational functions displayed in the right split screen (CF page 73) and own ship's positon on OFF-CENTER screen (CF page 79) are accessed by using "MENU 2".

OFF -CENTER DISPLAY

BOTTOM SCAN DISPLAY

SOUNDER DISPLAY

360° ROTATION DISPLAY

RANGE SETTING MENU

VER XXX
RANGE SET MENU

SELF CHECK

MENU 1
MENU 2

MODE

FUNCTION SETTING MENU

VER XXX
MAIN MENU

SELF CHECK
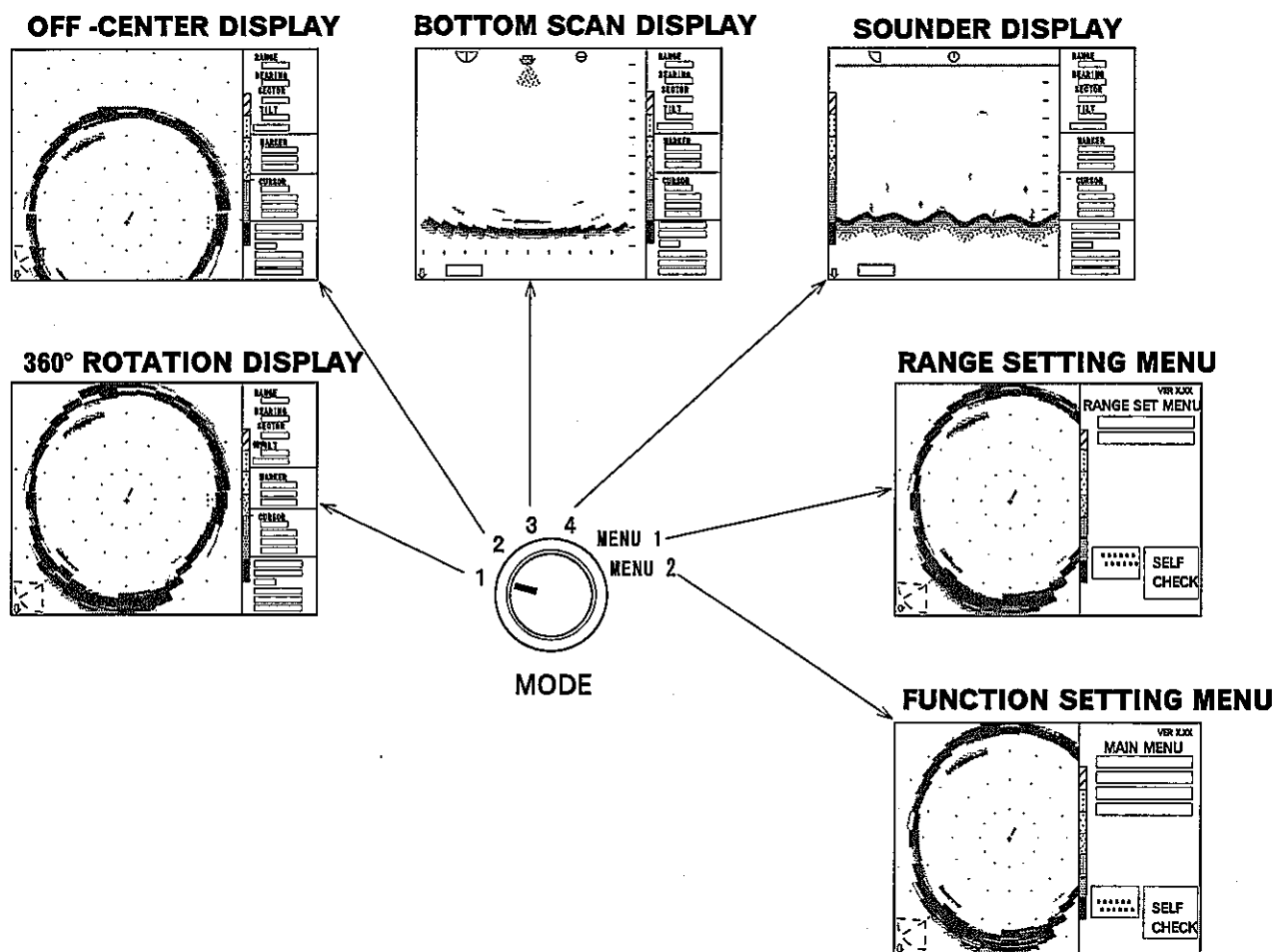
RANGE DIALS

◎ Changes the basic range (basic depth).

- The setting for 8 ranges is accessed by using "MENU 1".   CF page 62
- The setting for the depth units is accessed by using "MENU 2".
  CF page 85
- Scale marker can be turned on or off by using "MENU 2".   CF page 79

displays the selected values and units.

changes this distance.

SCALE MARKER
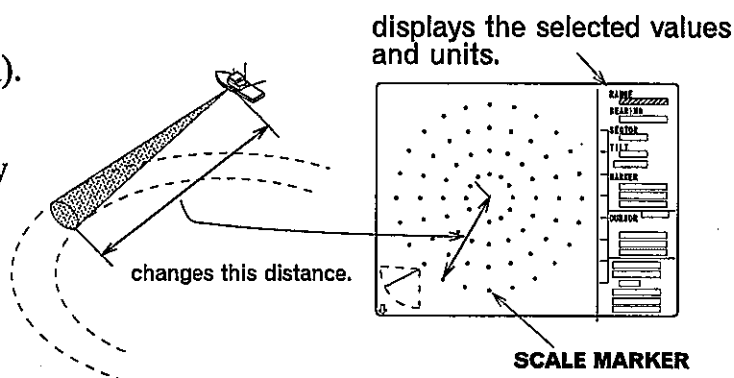
SECTOR DIAL

◎ Changes the scanning historical angle (sector angle) in the Sonar Mode.

◎ Changes the scanning secotr angel (vertical angle) in the Botom Scan Mode.

displays the selected angle.

changes this angel.

BOTTOM SCAN MODE

changes this angle.
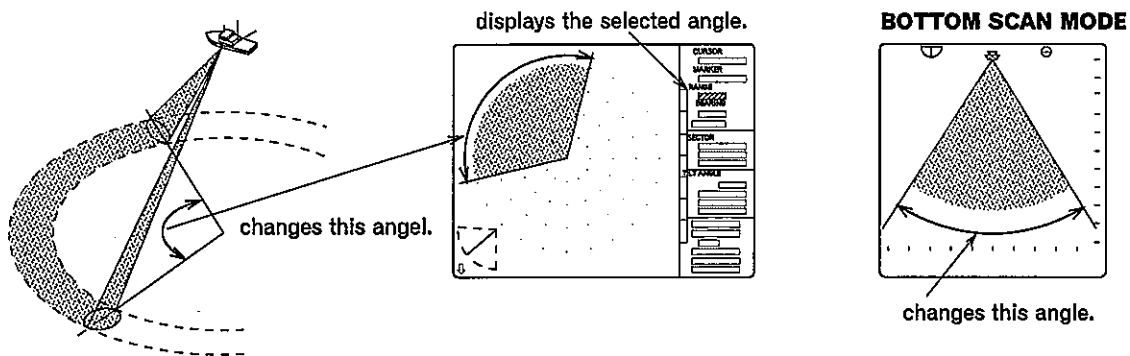
- Clockwise rotation (→●) widens the sector angle and counterclockwise ratation (→①) narrows the sector angle.

- Refer to the following list for the step angle for each frequency.
  The setting for the step is accessed by using "MENU 2". page 77/78

※ **SELECTABLE SECTOR ANGLE FOR 180/80kHz**

SONAR MODE OPERATION

5° STEP	5°	25°	45°	85°	125°	165°	205°	360°
1 0° STEP	10°	30°	50°	90°	130°	170°	210°	360°

BOTTOM SCAN MODE OPERATION

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

ON/OFF BRIGHTNESS DIAL

◎ Clockwise turning: increases the screen brightness and "10" is the brightest.

• The brightness of the control panel can not be adjusted here. It can be adjusted by "MENU 2 ". (CF) page 88

GAIN DIAL
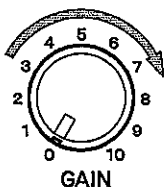
◎ Adjusts the sensitivity of the received signal.

• Gain controls can be adjusted by "GAIN UP" function in "MENU 2". (CF) page 48

FAR GAIN DIAL

◎ **TVG CURVE in MENU 2**
180/80kHz ....OFF ~ 40 LOG

As the echoes returning from the bottom and from fish targets get weaker as the depth increase it is advantageous to have a Time Variable Gain that automatically compensates for the loss in signal strength. (CF) page 49

• Selecting STC function releases the gain adjustment automatically

• Gain controls can be adjusted by Gain Dials and "GAIN UP" function in MENU 2 for all conditions the operator will encounter, ensuring accurate target presentation. (CF) page 48

POWER ON/OFF KEY

◎ To turn on the power, press |ON| key.

   When power is applied, the soundome lowers automatically and the following will occur.
   - The Hoist Down Light-sensor lamp ([↧]) is lighted on.
   - The sensor lamp mark (↧) appears on the left down of the screen.
   - The sign "WAITING" appears on the middle of the screen while lowering
     the soundome and then start to operate.

◎ To turn off the power, press |OFF| key for a while.

   When power is turned off, the soundome raises automatically and the following
   will occur.
   - The Hoist Down Light-sensor lamp [↧] is lighted off when the soundome is
     completely uploaded in the trunk.
   - Not turn off the power of the hoist until the sensor lamp is lighted off.

HOIST KEYS

◎ The hoist keys raise and lower the soundome.

   - Pressing [↑] key during the sonar operation raises the soundome and the mark on
     the screen changes into ↑ . The sensor lamp is lighted off when the soundome
     is completely uploaded in the trunk.
   - Pressing [↓] key lowers the soundome and the mark on the screen changes
     into ↧ . The sensor lamp is lighted on.

   - Slow down the ship's speed before pressing [↓] key in case of lowering the
     soundome again after the uploading it automatically.

SENSOR LAMP

SENSOR

◎ The soundome is lowering while this sensor lamp is lighted on.
   Not turn off the power of the hoist while this lamp is lighted on.

MAX. RAISING POINT

SENSOR LAMP IS ON WHILE
LOWERING/RAISING.

MIN. LOWERING POINT
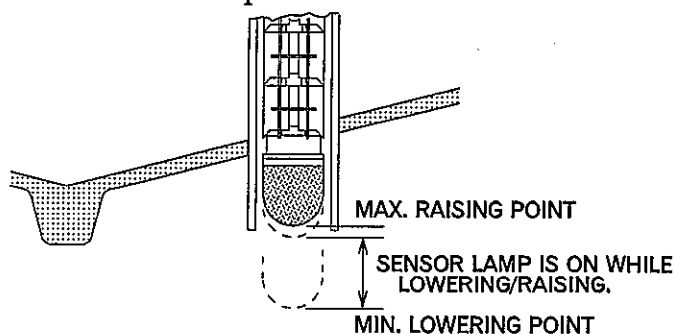
OPERATION KEYS

BEARING KEYS

◎ Use these keys to define the center of current scanning sector in Sonar Mode.

• The bearing angle of the display is shifted with every 5° steps in 180/80kHz frequencies.

rotates the center of the Sector counterclockwise.

rotates the center of Sector clockwise

Changes the center direction.

displays the values of the Sector angle.

This arrow marks the center of the sector.
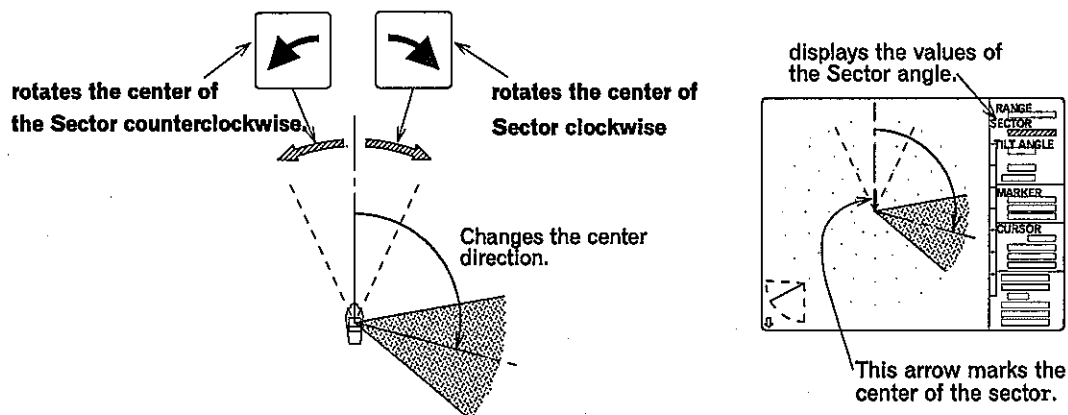
◎ Use these keys to define the center of current scanning sector in Bottom Scan Mode.

• The bearing angle of the display is shifted with every 5° steps in 180/80kHz frequencies.

Counterclockwise rotation

Clockwise rotation

display of the scanning direction

displays the scanning direction of the bow.

displays your own ship direction at every 90° off the record.
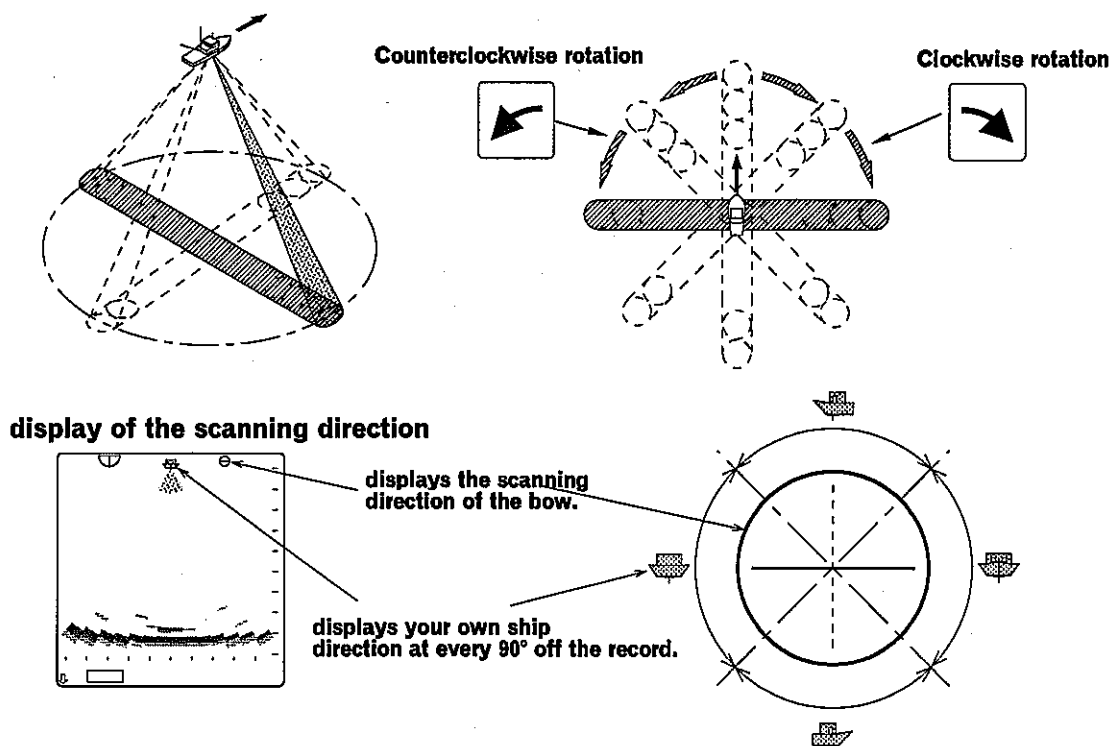
◎ In case of Sounder Mode "TILT KEYS" explained in the next page is collaborated with the bearing keys. The shifted angles are the same as those of Bottom Scan Mode.

TILT KEYS

◎ Use these keys to control the tilt angle in the Sonar Mode.

Changes this angle.

Each press of this key moves the tilt angle upwards.

Tilt angle

Each press of this key moves the tilt angle downwards.

Displays the values of the tilt angle.

Displays the tilt angle in a diagram.
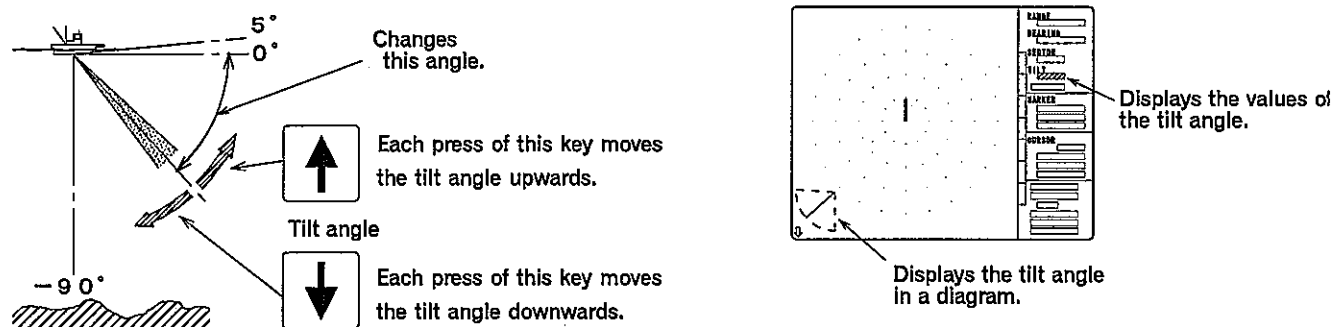
VARIABLE TILT ANGLE : 5° ～ 0° ～ − 90° (every 1°)

◎ Use these keys to control the tilt angle in the Bottom Scan Mode.

This key changes the tilt angle and the center dirction.

Each press of this key moves the tilt angle clockwise.

Tilt angle

Each press of this key moves the tilt angle ccounterclockwise.

depth just under your own ship

Displays the angle in a diagram.

just under your own ship (− 9 0˚)
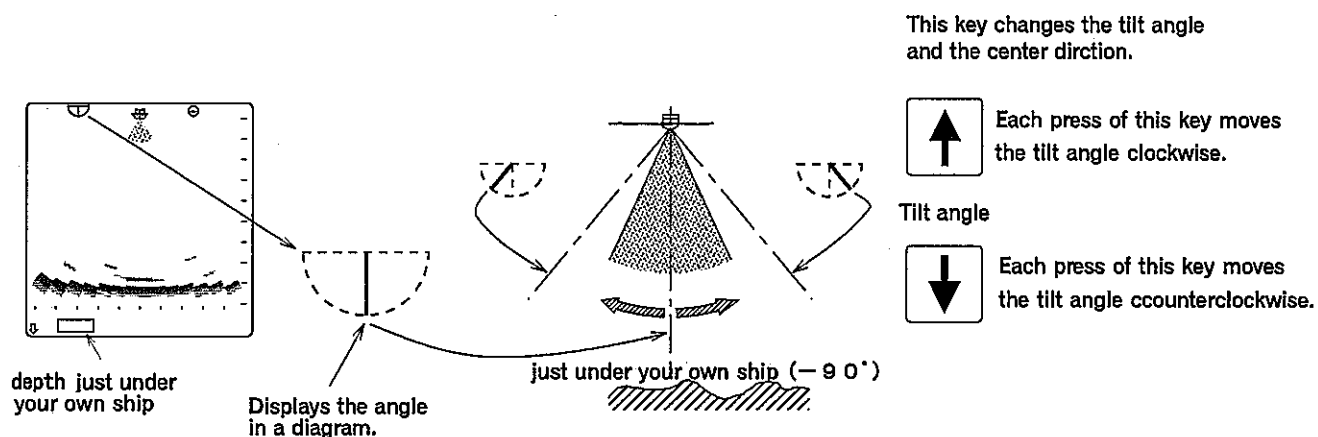
The angle center is just under your own ship.

The center is set in the range shown by an arrow.

The center is set in the range shown by an arrow.
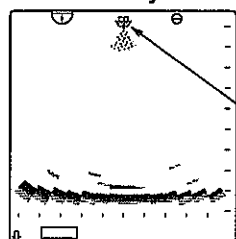
Your own ship position (center)

Your own ship position (right)
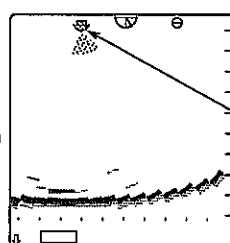
Your own ship position (left)

VARIABLE TILT ANGLE

• 180/80kHz   : 3 ° step ..... − 3 ° ～ − 90 ° (every 3 °)

   : 5 ° step ..... − 5 ° ～ − 90 ° (every 5 °)

<To be continued>

◎ Use the tilt keys and the bearing keys to define the direction of the detection.

displays the tilt angle in a diagram.

displays the bearing angle in a diagram.

displays the value of the bearing angle.

displays the value of the tiltt angle.

defines the direction by the bearing key.

defines this angle by the tilt key.

No depth display other than −90°
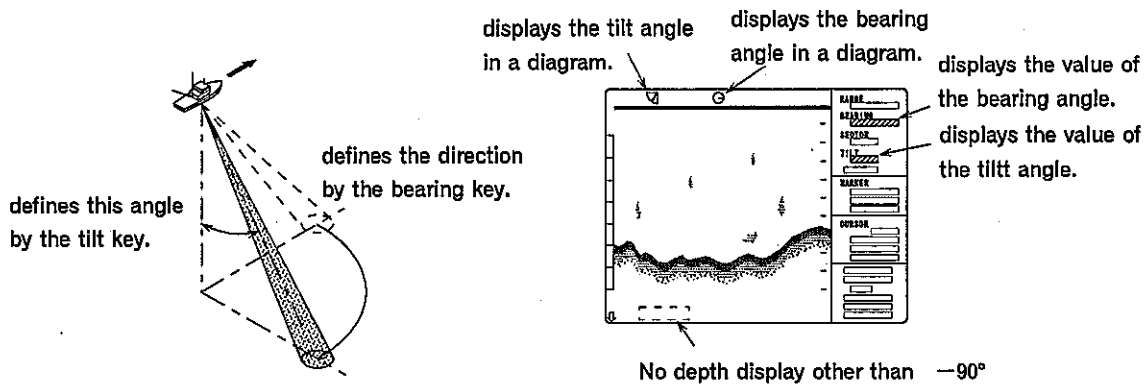
VARIABLE TILT ANGLE : 5° ～ 0° ～ − 90° (every 1°)

• Marker indicates the depth other than just below the ship (− 90°).
Refer to the following "CURSOR KEYS" for Maker.

CURSOR KEYS

◎ Use these keys to know the depth and horizontal/slant distance to a user selected target.

• ⊘₊ key selects the cursor and ↑ ↓ ← → key move cursor in any direction on the screen.

⊘₊ key : activates either Ring Marker or Cross Cursor in Sonar Mode.
: activates either VRM or Cross Cursor in Bottom Scan Mode.
: displays VRM only in Sounder Mode.

↑ key : expands the Ring Marker, shifts the Cross Cursor upward or shifts VRM to the shallow.

↓ key : contracts the Ring Marker, shifts the Cross Cursor downward or shifts VRM to the deeper area.

← key : shifts the Cross Cursor left

→ key : shifts the Cross Cursor right.

◎ After the first installing the ESR-180/180BB the Ring Marker or the Cross Cursor neither appears nor operates on the screen even if turning on the power or after returning to factory settings.

· First the marker appears by pressing either [↑] or [↓] key and then select the Ring Marker or the Cross Cursor by [%+] key.

The Ring Marker is not available in Sounder Mode.
The inactive function is displayed in red and stored even the power is turned off.

◎ When the Ring Marker is selected, (the Cross Cursor is in red or not displayed)

SONAR MODE

→ : HORIZONTAL DISTANCE (a in the below drawing)
＼ : SLANT DISTANCE (b in the below drawing)
↓ : DEPTH (c in the below drawing)

MARKER

This key shorten the distance.

This key lengthens the distance.

MARKER

Changes this range with this key.

TILT ANGLE

MARKER DISTANCE

TILT ANGLE

BOTTOM SCAN MODE

MARKER

MARKER

MARKER UP

MARKER

MARKER DOWN

MARKER DEPTH

SOUNDER MODE

MARKER

→ : HORIZONTAL DISTANCE
＼ : SLANT DISTANCE
↓ : DEPTH

MARKER DEPTH (SLANT DISTANCE)

※ VRM appears and Marker data is not presented right in Bottom Scan Mode.

※ In Sounder Mode it presents the slant distance in the MARKER box.

· Press [↑] and [↓] key at the time to turn the Marker off.

Again pressing [↑] or [↓] key returns Marker to previous position.

◎ When the Cross Cursor is selected, (the Ring Marker is in red or not displayed) however it is not available in Sounder Mode.

- Set the Cross Cursor on a target by using ⬆️⬇️⬅️➡️ key and the depth and horizontal/slant distance to the target are displayed in the CURSOR box.

SONAR MODE

: BEARING
→ : HISTORICAL DISTANCE
\ : SLAND DISTANCE
↓ : DEPTH

CROSS CURSOR

BOTTOM SCAN MODE

: BEARING
→ : HISTORICAL DISTANCE
\ : SLAND DISTANCE
↓ : DEPTH
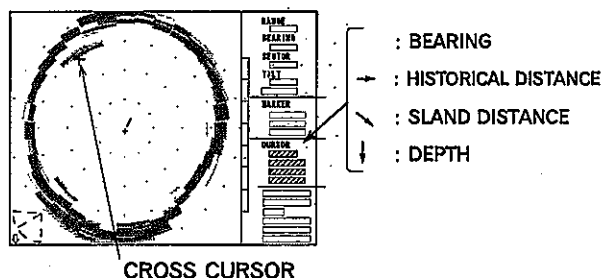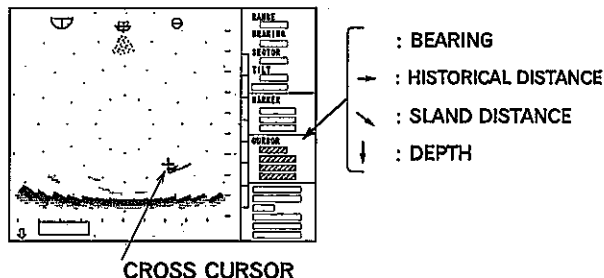
CROSS CURSOR

- The Cross Cursor is used for placing the marks (CF page 81) and also the target marks for Target Lock (CF page 65).

TARGET LOCK KEY

◎ When pressing ⬛ (the Target Lock key) in Sonar Mode, the direction of sweep of the Sonar beam is reversed. (when MENU 2 / TARGET LOCK / MODE 0 is selected.)

◎ When pressing ⬛ (the Target Lock key) in Sonar Mode, the Sonar beam track the echo automatically.
(when MENU 2 / TARGET LOCK / MODE 1 or MODE 2 is selected.)
However 45° step in 150kHz frequency is selected, this function is disabled.

◎ By pressing ⬛ (the Target Lock key) on the target in Sonar Mode the target mark is displayed and tracked automatically.
(when MENU 2 / TARGET LOCK / MODE 3 is selected.)
However 45° step in 150kHz frequency is selected, this function is not disable.

- Make reference to Target Lock function on page 64.

NOTE !

◎ ⬛ Target Lock key is disabled in Bottom Scan Mode and Sounder Mode.

MARK KEY

◎ The mark can be placed on the screen in Sonar Mode.

By placing the Cross Cursor on a marked target and pressing ◇ key is displayed the mark (◇) on the screen.

• The mark moves on the screen being acompanied by the ship's movement.

• Wake Display on (DISP ITEM SEL./WAKE DISP./ON) is selected in the split screen, the mark is also displayed there.

MARK
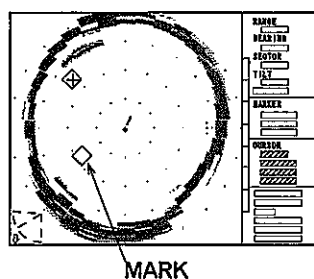
THRESHOLD KEY

◎ The weak echoes disappear by pressing this key accordingly.

• Only strong wanted targets appear on the screen by pressing this key to erase unwanted returns such as plankton or noise.

• Each press of ⌐ key clears the weakest color sample.

COLOR SCALE

Each press of this key changes the color sample as shown right.
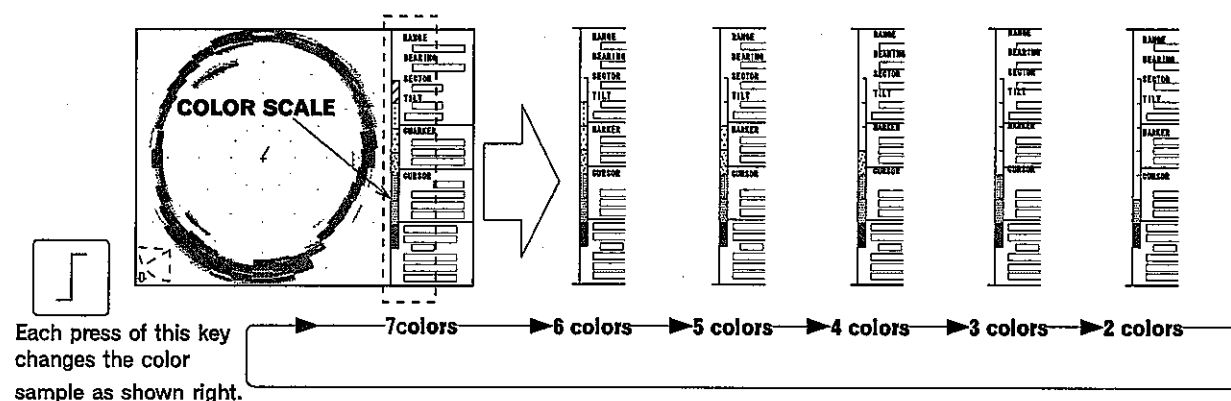
7colors ▶6 colors ▶5 colors ▶4 colors ▶3 colors ▶2 colors

OPERATION MODE KEYS

◎ Use these keys to select one of the 3 kinds of operation mode you have created.

By pressing one of these keys the desired operation mode can be set immediately.

- "OPERATION SET MENU" is accessed by selecting MENU 2 and then pressing [1] ([2] [3]) key.

- Highlight the item to be changed by means of [↑][↓] keys and set the desired values by [←][→] keys.

- To return back to the previous operation mode, use MODE dial.

```
OPERATION MODE 1 (2,3)

  STEP (SONAR)              10°  ⎫
  STEP (BOTTOM-SCAN)         5°  ⎪
  BEARING (SONAR)            0°  ⎪
  BEARING (BOTTOM-SCAN)    270°  ⎬
  TILT (SONAR)               0°  ⎪
  TILT (BOTTOM-SCAN)      − 90°  ⎪
  GAIN UP                   OFF  ⎪
  TVG CURVE               30LOG  ⎭
```

- - - - · Press [←][→] key to set
             the desired values.

- By pressing one of the operation mode [1] ([2] [3]) keys the desired "Operation Mode" appears on the screen instantly.

- The settings of Operation modes would not be changed, even if other settings are selected on the control panel or MENU 2. During the operation by one of the operation modes the settings can be changed and activate the changed settings, however pressing one of the operation keygs [1] ([2] [3]) again returns to the previous operation mode.

NOTE !

◎ It is possible to memorize the present settings in the operation modes without displaying "Operation Mode".

- Hold the [1] ([2] [3]) key for three seconds after the first buzzer.
  By the second buzzer the present settings are memorized in the Operation Mode.

- Note that it may not be memorized when the key is released before the second buzzer.

OPTION

This chapter provides you the explanation related to the optional terminal kits.

OPTIONAL CONNECTIONS

◎ The ESR-180/180BB is designed to interface with various types of external equipment that output or accept data signals in the NMEA sentences or the remote controller.

The connection cables between the main unit and others are not included.

P. No.	NAME	TERMINAL CONNECTIONS
OP-1807	REMOTE CONTROLLER CONNECT CABLE KIT	
OP-1805	N A V − I N TERMINAL (INTERFACE KIT FOR NAVIGATIONAL DEVICE)	No1 : Signal Input + No3 : Shield No4:Signal Output + No2 : Signal Input − No5:Signal Output −
OP-320 (Finishing)	V G A OUTPUT TERMINAL (INTERFACE KIT FOR CONNECTION OF EXTERNAL VGA MONITOR)	No1 : Red Output No6 : Red GND No13 : H − SYNC No2 : Green Output No7 : Green GND No14: V − SYNC No3 : Blue Output No8 : Blue GND No5 : GND No10 : GND Other No : N C
OP-1802	TRIGGER INPUT TERMINAL (INTERFACE KIT FOR EXTERNAL TRIGGER)	No1 : Trigger Input No2 : GND
OP-1806	N M E A OUTPUT TERMINAL (INTERFACE KIT FOR NMEA-OUT)	No1 : NC No3 : Shield No5 :Signal Output − No2 : NC No4:Signal Output + No6 : N C

※ NC.....Nothing to be connected.

• Note: ( ) shows the optional kits for the ESR-180/180BB.

ESR-180/BB control box - INTERFACE CONNECTIONS

◎ Before connecting optional kits, remove all cables on the Operation unit.

① Remove the total 7 screws (2 on the side and 3 on the rear each) that connect the case cover (Point A in the drawing).

Use care when removing the case cover connecting the operation panel from the Operation unit to avoid trouble.

② Remove the cap where the interface kit is connected and attach it as shown in the drawing below.

③ From the inside of the screw for earth rug place a lock washer, earth rug and spring washer in order and firmly secure the earth lug with the nut
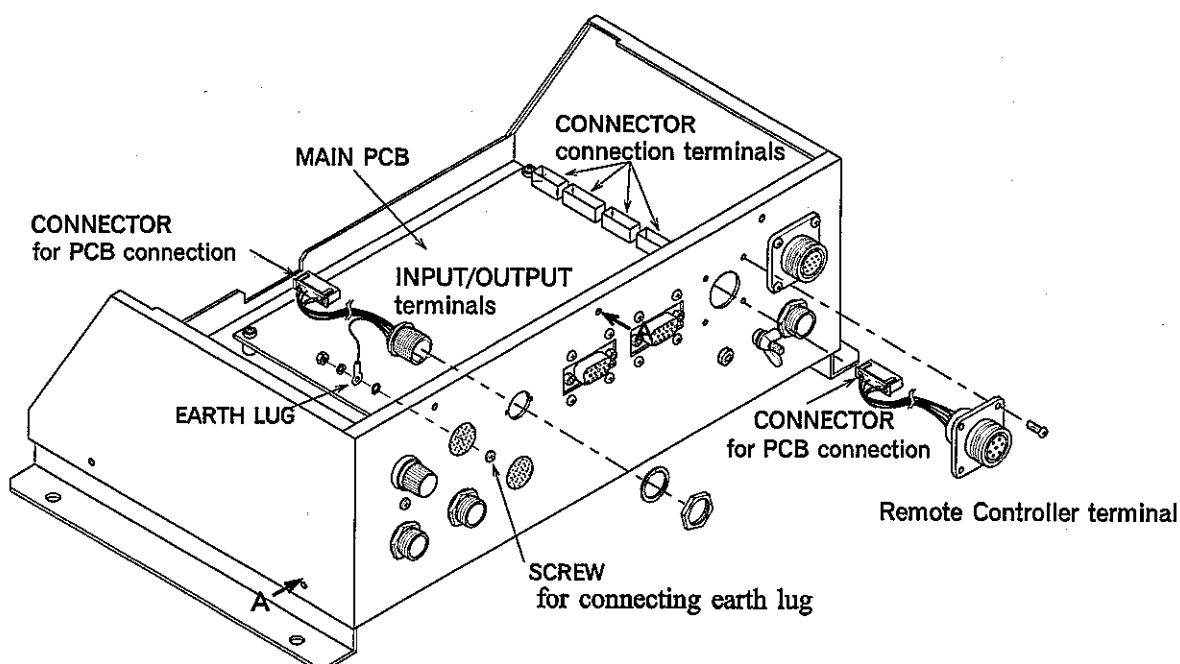
④ Insert the connectors into the specified terminals on the main board.
- NAV-IN terminal → **J4**
- NMEA Output terminal → **J6**
- Remote Controller connection → **J7**
- Trigger Input terminal → **J2**

⑤ Fasten the bolts to fix the case cover.
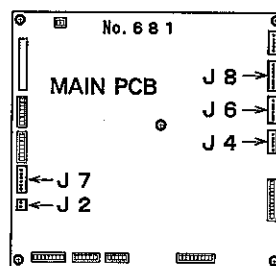
⚠ **DANGER**

◎ Do not open the case cover. There is a risk of electric shock if you touch the high voltage conductors.
Electrical installation should be carried out by the qualified staff.

REMOTE CONTROL SET

◎ Remote controller connection is made to the terminal on the rear of the display
unit.

BEARING KEYS
· Moves cursor-center right or left.

HOIST KEYS
· Uploads/downloads
the soundome.

TILT KEYS
· Adjusts tilt angle.

MARK KEY
· Enters marks.

TARGET LOCK KEY
· Turn on or off the target lock mode.
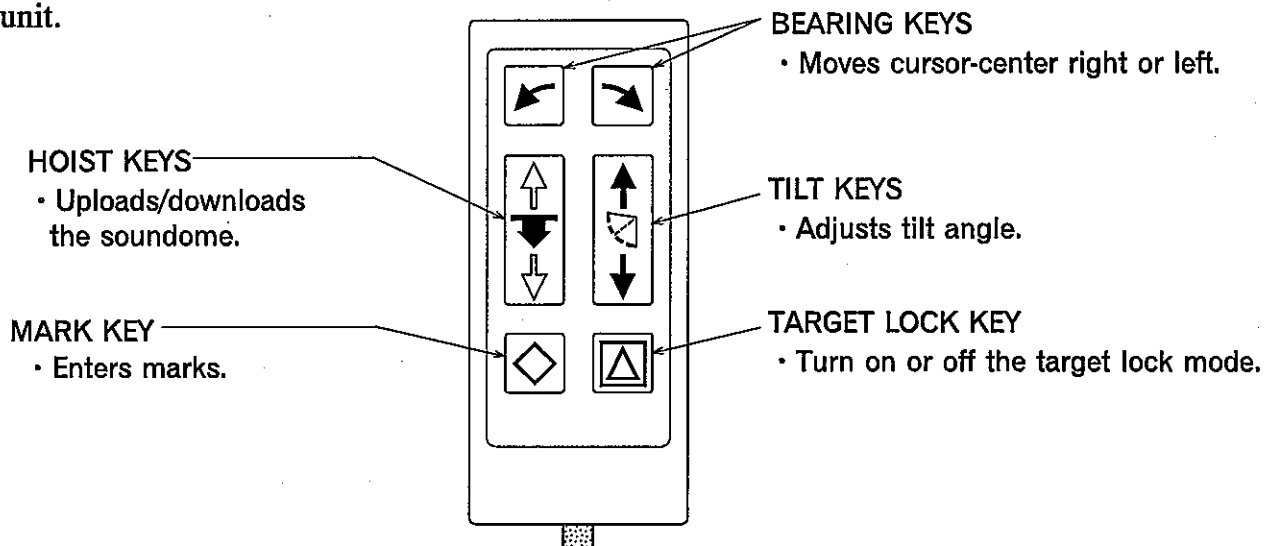
① After connecting the remote controller to the terminal on the rear of the Display
unit or the Operation unit, this function is available by selecting "MAIN MENU
- REMOTE CONTROL SET" at Menu 2 of Mode dial.

② Use the cursor shift key ⬆ or ⬇ to highlight "REMOTE CONTROL SET"
and by pressing the cursor shift key ⬅ or ➡ the following appears on the screen.

```
REMOTE CONTROL SET

1  BEARING LEFT          ┌1┬2┐
2  BEARING RIGHT         ├3┼4┤
3  HOIST UPLOAD          ├5┼6┤
4  TILT UP               ├7┼8┤
5  HOIST DOWNLOAD        └─┴─┘
6  TILT DOWN               │
7  MARK
8  TARGET
```
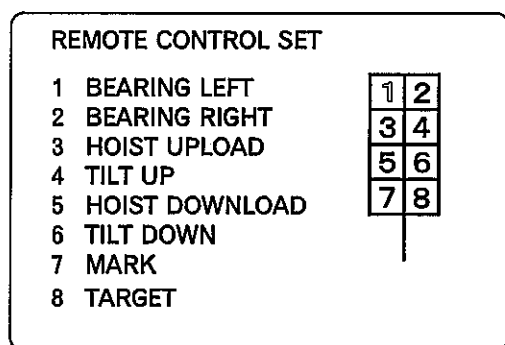
· Use ⬆ or ⬇ key to select the desired item.

Highlighting the item to be changed and pressing the cursor shift key ⬅ or ➡ the key
operation will change as follows.

OPERATION MODE 1 ...OPERATION MODE 2 ... OPERATION MODE 3 ... TARGET...
MARK...THRESHOLD...CURSOR SELECTION...HOIST DOWNLOAD... HOIST UPLOAD
...CURSOR SHIFT LEFT ...CURSOR SHIFT RIGHT...CURSOR SHIFT UP ...CURSOR SHIFT DOWN
...TILT UP...TILT DOWN...BEARING RIGHT...BEARING LEFT...OPERATION MODE 1

The above box shows the initial settings of the remote control keys.

SPECIFICATIONS

◎ DISPLAY CABINET

MODEL NAME	ESR-180/180BB
Display Presentation	15 " LCD (TFT) color
Power Supply	20 ~ 30 VDC 38W
Weight	13 kg
Sonar Type	Searchlight Sonar (180/80kHz frequencies)
Display Range	Selectable 8 positions shown in the following page.
Search Sector Angle (Sonar Mode)	· **180kHz or 80kHz** (5˚ step) 5˚ · 25˚ · 45˚ · 85˚ · 125˚ · 165˚ · 205˚ · 360˚ (10˚ step) 10˚ · 30˚ · 50˚ · 90˚ · 13 0˚ · 17 0˚ · 210˚ · 360˚
(Bottom Scan Mode)	· **180kHz or 80kHz** (3˚ step) 3˚ · 27˚ · 45˚ · 63˚ · 93˚ · 117˚ · 147˚ · 177˚ (5˚ step) 5˚ · 25˚ · 45˚ · 65˚ · 95˚ · 115˚ · 145˚ · 175˚
Bearing Center	selectable in step of 5˚ in 180kHz or 80kHz
Tilt Angle Range	5.˚ ~ 0˚ ~ − 90˚ (1˚ step)
Display Modes	Sonar Mode · Off-center Mode · Bottom Scan Mode · Sounder Mode
Data Display	Range · Range Scale · Tilt Angle · Tilt Angle Diagram · Sector Angle Display · Bearing Angle · Interference Reduction Ring Marker (Historical distance, Slant distance, depth) Cross Cursor (Bearing, Historical distance, Slant distance, Depth) Compass display* · Wake Display* · Ship Speed* · LAT/LON Gain Up · TVG Graph · Color Scale · Temperature · Scan Display (2 types) Own Ship Position · VRM · Depth (on detecting just below the ship)
Other Functions	Operation Modes (3 types) · Off Center, Mark · Mark · Train Correct Target Lock (in Searchlight Mode) · Temperature Adjustment Pulse Width · Color Palette · Gain Control · TVG Control · Dynamic Range Threshold Control · Output Power Reduction · External Trigger Sync. Trigger Signal Output · Hoist Sensor lamp · Hoist Auto Up · Audio Output Gain, Far Gain and Brightness Control Stabilizer (on connecting to the sensor in 150kHz frequency)
Input Data*	NMEA-0183 · Trigger Signal · Remote Controller
Output Data*	LAT/LON for the target · VGA · Trigger Signal

* Optional interface required.

RANGE POSITIONS

180kHz or 80kHz

RANGE	m			br·fm			ft		
	NORMAL	OFF-CENTER	BOTTOM-SCAN	NORMAL	OFF-CENTER	BOTTOM-SCAN	NORMAL	OFF-CENTER	BOTTOM-SCAN
1	–	–	10	–	–	6	–	–	40
2	–	–	15	–	–	9	–	–	60
3	20	30	20	12	18	12	80	120	80
4	40	60	40	20	30	20	100	150	100
5	60	90	60	30	45	30	120	180	120
6	80	120	80	40	60	40	160	240	160
7	100	150	100	50	75	50	200	300	200
8	120	180	120	60	90	60	240	360	240
9	140	210	140	80	120	80	280	420	280
10	160	240	160	100	150	100	320	480	320
11	180	270	180	120	180	120	360	540	360
12	200	300	200	160	240	160	400	600	400
13	240	360	240	200	300	200	500	750	500
14	280	420	280	240	360	240	600	900	600
15	320	480	320	280	420	280	700	1050	700
16	360	540	360	320	480	320	800	1200	800
17	400	600	400	360	540	360	900	1350	900
18	500	750	500	400	600	400	1000	1500	1000
19	600	900	600	500	750	500	1200	1800	1200
20	700	1050	700	600	900	600	1600	2400	1600
21	800	1200	800	700	1050	700	2000	3000	2000
22	900	1350	900	800	1200	800	2400	3600	2400
23	1000	1500	1000	900	1350	900	3200	4800	3200
24	1200	1800	1200	1000	1500	1000	4000	6000	4000
25	1600	2400	1600	1200	1800	1200	5000	7500	5000
26	2000	3000	2000	1600	2400	1600	6000	9000	6000

◎ HULL UNIT · CONTROL UNIT

Model Name	ESR-180/180BB	ESR-180/180BB
Frequency	180kHz	80kHz
Sonar Type	Searchlight Sonar	
Hoist Stroke	200 ~ 400 m m	
Hoist Time	10 seconds (400 m m stroke, 24V power supply) Lowering or Raising automatically	
External Output	Trigger Signal	
Power Supply	10.5 ~ 30 VDC 110W	
Weight	Hull unit: 44kg (trunk pipe exclusive)	

CAUTIONS in HANDLING SOUNDOME

The handling of the soundome should present no problems if the following care is exercised.

a) When taking out the soundome from its packing carton, lift the soundome itself.
   Avoid lifting the cable, which will cause the trouble or damage.

b) When mounting the joint pipe to the soundome or removing it, make sure to fix the metal portion of the soundome and turn the joint pipe.
   Avoid turning the soundome or the cable, which will cause the trouble or damage.

KODEN