KODEN

OPERATION MANUAL

Digital Sonar

Broadband **KDS-6000BB**

DIGITAL **KDS-5500BB**

KDS-6000BB.OM.E 0093160002-14

Koden Electronics Co.,Ltd.
5278 Uenohara, Uenohara-shi
Yamanashi-Ken
409-0112 Japan

Declaration of Conformity

We, Koden Electronics Co., Ltd.; 5278 Uenohara Uenohara-Shi,Yamanashi-Ken; 409-0112, Japan

declare as manufacturer under our sole responsibility that the

Koden Digital Broadband Sonar KDS-6000BB

intended for use as a Marine Fish Finder aboard vessels to which this declaration relates conforms to the following standards or other normative documents refering to EU directives and UK regulations

EU	UK
Electromagnetic Compatibility Directive 2014/30/EU	**SI 2016 No. 1091 Electromagnetic Compatibility Regulations 2016**
EMC IEC 60945 Ed.4.0 2002 (Clauses 9,10 & 12)	**EMC** IEC 60945 Ed.4.0 2002 (Clauses 9,10 & 12)

For assessment, see

- Koden Test Side; Test Report 74-2731U-F001 for EMC, Test Report 74-2731U-F002 for Safety by Koden Electronics Co.,Ltd.

RoHS conformity

EU	UK
RoHS Directive 2011/65/EU as amended by the Commission delegated directive (EU) 2015/863	**SI 2012 No. 3032 RoHS Regulations 2012 as amended**

Type names: KDS-6000BB

Consisting of:
Processor Unit: DPU-610ST
Operation Unit: DOU-620 or DOU-620R
Hull Unit: DHU-6301 ; Transducer Unit: DHU-6302 or DHU-6302 80kHz
Power Cable: CW-259-2M

- Software: Processor Unit: DPU-610ST – KM-F53 Ver. xx.xx (x used as wildcard)
- Frequency: DHU-6302 selectable range 130kHz to 210kHz ; 0.1kHz step
  DHU-6302 80kHz selectable range 80kHz to 90kHz ; 0.1 kHz step

Authorized representative: Koden Elektronik GmbH
Am Gewerbepark 15, D-64823 Gross-Umstadt, Germany

Point of contact: Koden Electronics Co.,Ltd.
5278 Uenohara, Uenohara-shi, Yamanashi-Ken, Japan
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Date: 17 October, 2022

This certificate expires if new regulations come in force or latest at 31 December 2027

Jun Harayama
Manager / Quality Assurance Department

Document No. 82-2731U-X019

Koden Electronics Co., Ltd.
5278 Uenohara, Uenohara-shi,
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Declaration of Conformity

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RoHS conformity

EU	UK
RoHS Directive 2011/65/EU as amended by the Commission delegated directive (EU) 2015/863	**SI 2012 No. 3032 RoHS Regulations 2012 as amended**

Type names: KDS-5500BB

Consisting of:
- Processor Unit: DPU-551
- Operation Unit: DOU-620 or DOU-620R
- Hull Unit: DHU-6301 or DHU-631
- Transducer Unit: DHU-6302-80kHz, DHU-6302-80kHz(AS), DHU-6302-140kHz, DHU-6302-140kHz(AS), DHU-6302-180kHz or DHU-6302-180kHz(AS)
- Power Cable: CW-259-2M

- Software: Processor Unit: DPU-551 – KM-F53 Ver. xx.xx (x used as wildcard)
- Frequency: DHU-6302-80kHz and DHU-6302-80kHz(AS) selectable range 80kHz to 90kHz ; 0.1 kHz step
  DHU-6302-140kHz and DHU-6302-140kHz(AS) selectable range 130kHz to 150kHz ; 0.1 kHz step
  DHU-6302-180kHz and DHU-6302-180kHz(AS) selectable range 170kHz to 190kHz ; 0.1 kHz step

NOTE: (AS) – The transducer is equipped with an electrical stabilization

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Date: 9 March 2023

This certificate expires if new regulations come in force or latest at 31 December 2027

Jun Harayama
Manager, Quality Assurance Department

Document No. 82-2731U-X040

KDS-6000BB/5500BB Operation Manual

Doc No: 0093160002

Document Revision History

No.	Doc. No.- Rev. No.	Revised Date (Y/M/D)	Revised Content
0	0093160002-00	2014/09/30	First edition
1	0093160002-01	2014/12/05	System Configuration, Configuration of Equipment
2	0093160002-02	2015/05/11	Revision (From software KM-F35 Ver01.06 to Ver01.**)
3	0093160002-03	2015/11/10	Configuration of Equipment
4	0093160002-04	2016/02/22	Revision (From software KM-F35 Ver01.09 to Ver01.**) Configuration of Equipment, Chapter 4
5	0093160002-05	2016/05/20	Revision (From software KM-F35 Ver01.10 to Ver01.**)
6	0093160002-06	2017/05/16	Chapter 2
7	0093160002-07	2017/11/08	Revision (From software KM-F35* Ver01.12 to Ver01.**) Revision (From software KM-F53* Ver01.12 to Ver01.**)
8	0093160002-08	2018/03/06	Revision (From software KM-F35* Ver01.13 to Ver01.**) Revision (From software KM-F53* Ver01.13 to Ver01.**)
9	0093160002-09	2019/04/12	Revision (From software KM-F35* Ver01.14 to Ver01.**) Revision (From software KM-F53* Ver01.14 to Ver01.**)
10	0093160002-10	2020/04/01	DHU-631 Addition (Option), Chapter 2, Declaration
11	0093160002-11	2020/12/16	Revision (From software KM-F35* Ver01.17 to Ver01.**) Revision (From software KM-F53* Ver01.17 to Ver01.**) Chapter 1, Chapter 2, Chapter 3, Cover
12	0093160002-12	2021/08/25	Revision (From software KM-F35* Ver01.19 to Ver01.**) Revision (From software KM-F53* Ver01.19 to Ver01.**)
13	0093160002-13	2023/01/05	Revision (From software KM-F35* Ver01.19 to Ver01.**) Revision (From software KM-F53* Ver01.19 to Ver01.**) Declaration, Cover
14	0093160002-14	2023/03/13	KDS-5500BB Addition, Cover

*Software (KM-F**) is displayed on start up.

Document No. Revised Version Norm

When part of the document needs to be revised, the document has advanced revision number.

The document No. is indicated at the lower right side on the cover and at the left or right side of the footer region of each page.

Important Notice

- For copy and transcription of this Operation Manual (hereinafter referred to as this manual), permission from Koden is needed. Koden prohibits the un-authorized copy and transcription of this manual.
- If this manual is lost or damaged, consult a dealer of Koden or Koden.
- The specification of the products and the contents in this manual are subject to change without notice.
- The contents displayed on the menu of product may be different from the expression of this manual. The fonts and shapes of the keys and menus in the illustration may differ from the actual ones, and some parts may be omitted.
- Koden is not liable for damages and troubles arisen from misunderstanding of the contents in this manual.
- Koden is not liable for any damages caused by earthquake, lightning, wind and flood damage and fire for which Koden is not responsible, and actions by third parties, other accidents, customer's unintended error/abuse and the use under other abnormal conditions.
- Koden is not liable for damages of accompaniment (change/loss of memorized content, loss of business profit, stop of business) arisen from use or failure of our products.
- If the stored data are changed or lost, irrespective of causes of troubles and damages, Koden is not liable for them.
- Koden is not liable for any damages arisen from malfunction caused by combination of software and connected equipment in which Koden is not engaged.

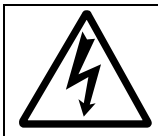
For Your Safe Operation

Symbol used in this Operation Manual

The following pictograms are used in this manual. The meaning of each symbols shall be well understood and the maintenance and inspection shall be carried out.

Symbol	Meaning
 Warning	**Mark for warning** This mark denotes that there is a risk of death or serious injury when dealt with incorrectly.
	**Mark for danger of high voltage** This mark denotes that there is a risk of death or serious injury due to electric shock when dealt with incorrectly.
 Caution	**Mark for caution** This mark denotes that there is a risk of slight injury or damages of devices when dealt with incorrectly.
	**Mark for prohibition** This mark denotes prohibition of specified conducts. Description of the prohibition is displayed near the mark.

Caution items on equipment

	**Be careful of high voltage inside** High voltage, which may risk your life, is used. This high voltage may remain in the circuit even after the power is switched off. To prevent contact with the high voltage circuits accidentally, a protective cover or the label with this mark is provided on the high voltage circuit. When the inside is to be checked, ensure to switch off the power and to discharge the residual voltage for safety. An engineer authorized by Koden shall carry out the inspection and maintenance works.
 Warning	**Power off in the boat** An accidental power-on during works may result in worker's electrification. To prevent such accident in advance, ensure that power in the boat and on the equipment are switched off. Furthermore, it is safer to hang a caution tag saying "Under work" near the power switch of equipment.
 Warning	**Be careful of dust** Inhaled dust may cause respiratory affection. At the time of cleaning the inside of equipment, be careful not to inhale dust. Wearing a safety mask is recommended.

 **Caution**	**Caution on location of installment** The equipment shall not be installed at locations which are excessively damp and suffers from water drops. Otherwise, dew condensation may occur inside the display screen, and corrosion may occur inside the unit box.
 **Caution**	**Measures against static electricity** Static electricity may be generated from the carpet on the floor in the cabin or clothes made of synthetic fiber, and it may destroy the electronic components on circuit boards. The circuit boards shall be handled with appropriate measures against static electricity.
 **Caution**	**Caution at installation of Transducer unit** Transducer unit shall be installed at locations where there is no effect by bubble and noise. Bubble and noise may seriously degrade the performance of this equipment.

Cautions on handling

 **Warning**	No disassembly or modification of this equipment is allowed. It may lead to failure, firing, smoking or electric shock. In case of failure, please contact Koden's dealers or Koden.
 **Warning**	In case of smoking or firing, switch off the power in the boat and of this equipment. It may lead to firing, electric shock or damages.
	**Be careful of residual high voltage** High voltage may remain in capacitors for several minutes after switching off the power. Before inspection of the inside, please wait at least 5 minutes after switching off or discharge the residual electricity in an appropriate manner. Then, start the work.
 **Caution**	The information displayed on this equipment is not intended to use for your navigation. For your navigation, be sure to see the specified materials.
 **Caution**	Please use the specified fuses. If un-specified fuses are used, they may cause firing, smoking or damages.
 **Caution**	Be sure to submerge the Transducer unit in water before transmission. If not, it may be damaged.

Contents

Introduction

KDS-6000BB is digital broadband sonar with broadband Transducer units.

KDS-5500BB is a fixed frequency digital sonar.

This unit equipped with the latest digital process can accurately display circumstances in the water under all conditions.

KDS-6000BB/5500BB is the Black Box type without the display unit, for which customer can select the display monitor of preference. The external monitor and connecting cable are user supply.

The signal to an external monitor is analog VGA.

Koden has 17 inches LCD monitor as option.

The main features of this unit are as follows.

KDS-6000BB:

- This unit is a digital broadband sonar with broadband Transducer units.
- With a simple operation on a menu, frequencies can be optionally set within a wide range.
- Digital reception processing achieves both high resolution in shallow water and noise removal capability in deep water. In addition, the auto mode function enables optimal image display.

KDS-5500BB:

- Choose 80kHz, 140kHz or 180kHz frequency at the time of purchase.
- A high frequency increases the resolution and realizes detailed image expression.
- Lower frequencies increase sensitivity at long distances and enable detection at deep depths.
- Digital signal processing achieves high sensitivity at long distances at any frequency.

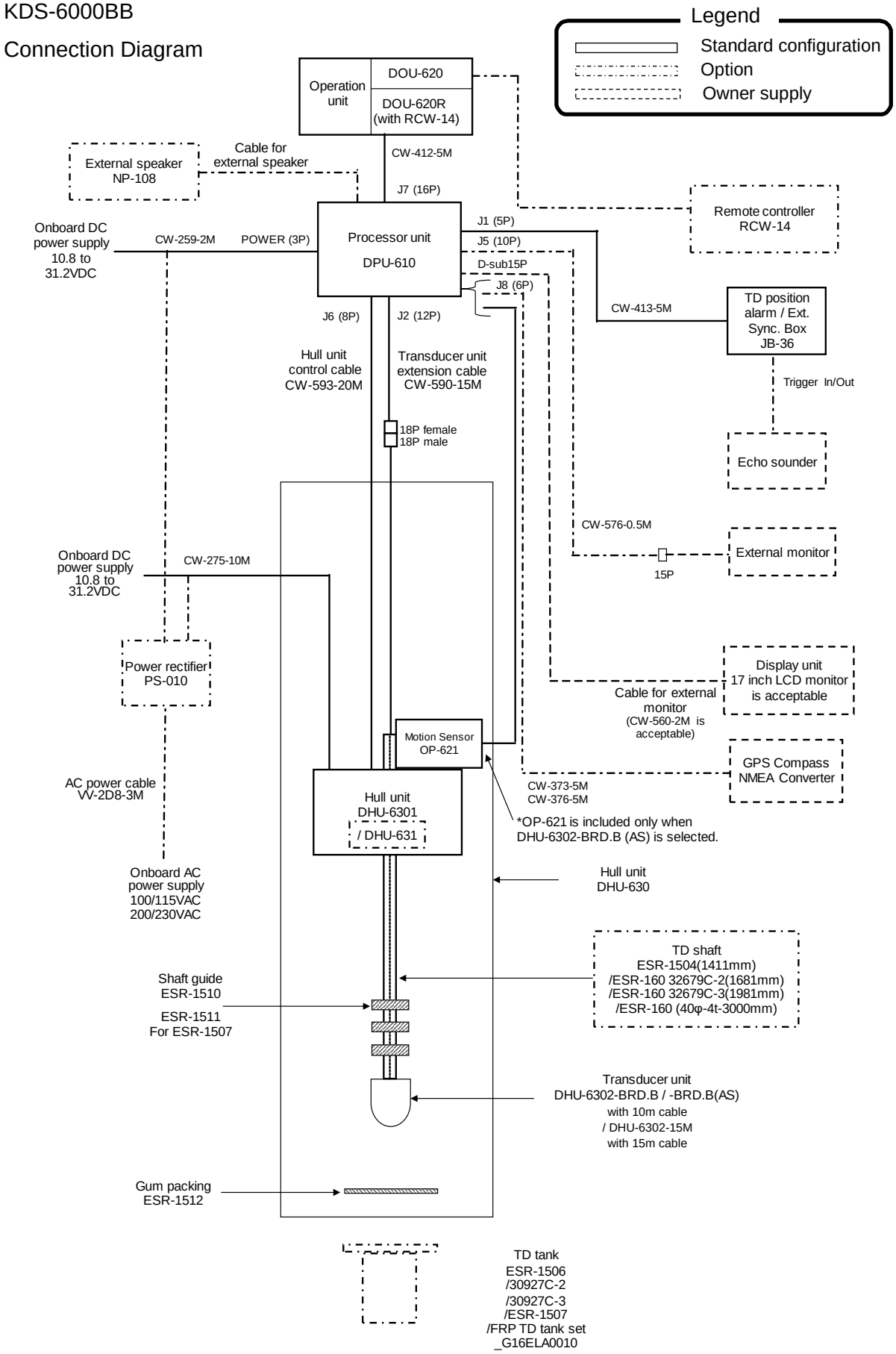
KDS-6000BB/5500BB:

- The operation units can be easily installed from the front side by flush mounting.
- VGA analog output to an external monitor unit is provided as standard. The use of external monitor enables to observe the sonar images from the place distant from the main unit (External monitor is owner supply).
- The data for image, waypoint and setting data can be backed up to the USB memory, to be recalled.
- As the operation unit is separated, operation away from the processor unit is possible.
- Sona-Tone™ (Sonar sound) function provides fish school status by sound.

System Configuration

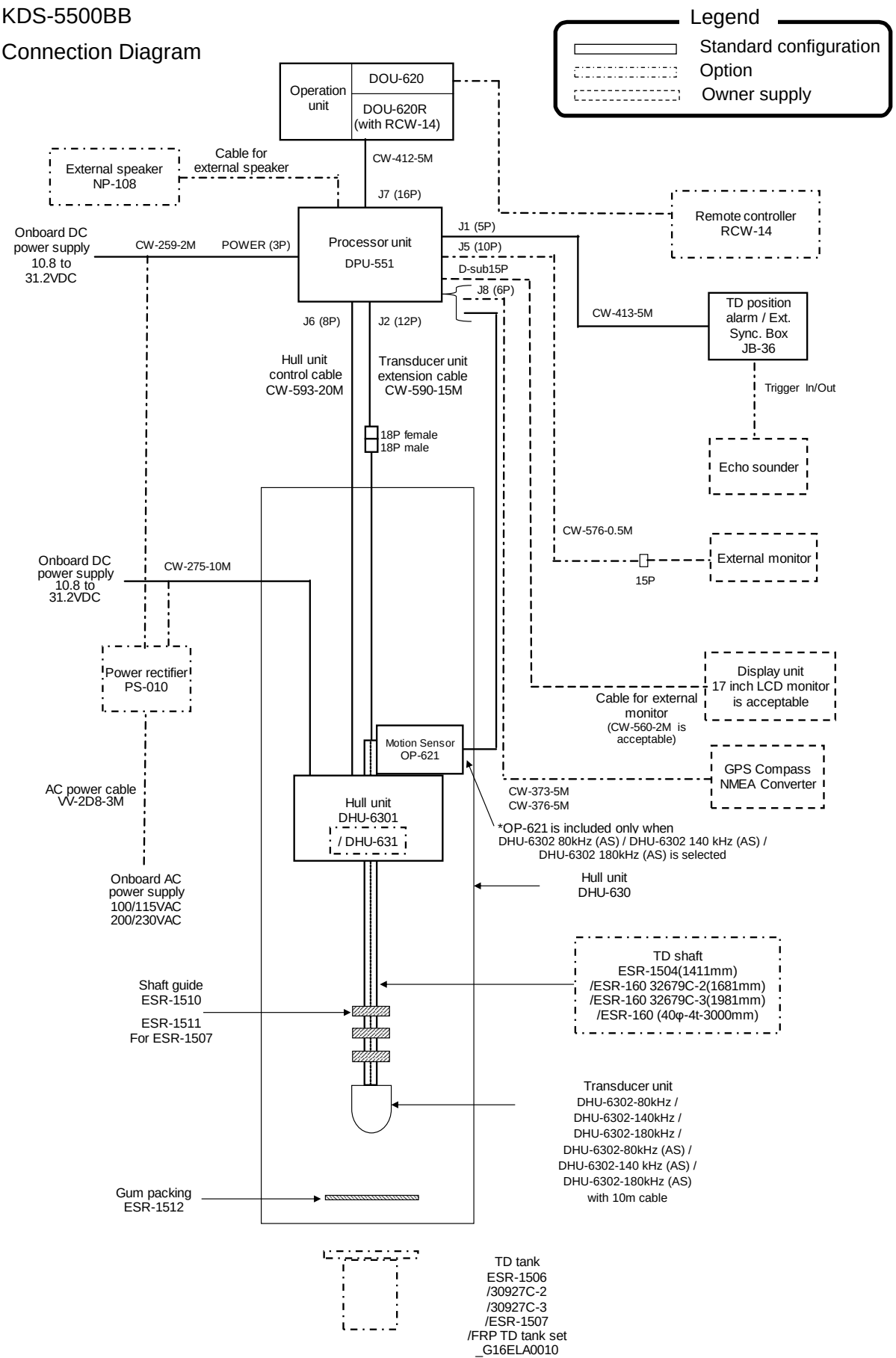
KDS-6000BB

Connection Diagram



KDS-5500BB

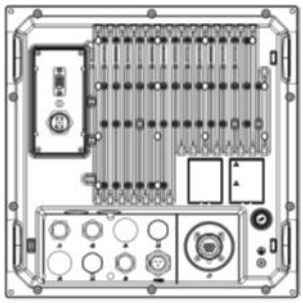
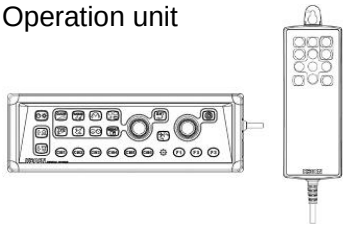
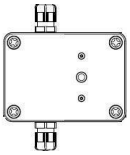
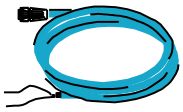
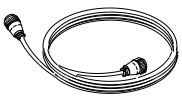
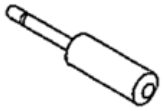
Connection Diagram



Configuration of Equipment

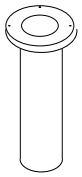
Standard Equipment Configuration List

a. DPU-610/DPU-551 (Processor unit), DOU-620/620R (Operation unit)

No	Name of item	Type	Remark	Weight/ Length	Qty
1	Processor unit 	DPU-610 (KDS-6000BB) DPU-551 (KDS-5500BB)	No display unit VGA output (Sona-Tone™ model)	5.1kg	1
2-1	Operation unit 	DOU-620	With mounting bracket and 5m cable	1.1kg	1
2-2	Operation unit 	DOU-620R	With mounting bracket, 5m cable and Remote controller (RCW-14 with 5m cable)	DOU-620 1.1kg/ RCW-14 0.31kg	
3	TD position alarm / Ext. Sync. Box 	JB-36	With 5m cable (CW-413-5M/With 5 pin connector and one end plain)	5m	1
4	DC power cable 	CW-259-2M	With 3 pin connector and one end plain	2m	1
5	Transducer unit extension cable 	CW-590-15M	With a 18 pin connector and a 12 pin water resistant connector	15m	1
6	Audio system plug 	MP-105LC-RoHS			1

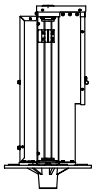
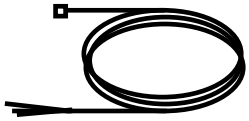
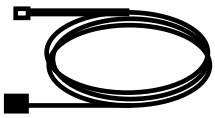
No	Name of item	Type	Remark	Weight/Length	Qty
7	Fuse 	F-7161-10A/N30C-125V Cylinder (ø 6.4x30)	Normal fusion type for main power		3
8	Operation manual	KDS-6000BB.OM.E	English		1
9	Quick Reference	KDS-6000BB.QR.E	English		1
10	Installation manual	KDS-6000BB.IM.E	English		1

b. TD tank / TD shaft

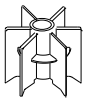
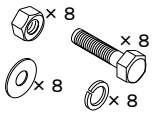
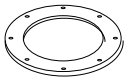
No	Name of item	Type	Remark	Weight/Length	Qty
1	TD tank 	ESR-1506 (PVC) 1230mm 30927C-2 (PVC) 1500mm 30927C-3 (PVC) 1800mm ESR-1507 (FRP) 1500mm	Select according to equipment. *Refer to Option list.	9.0kg 11.0kg 13.0kg 12.0kg	1
2	TD shaft 	ESR-1504 ESR-160_32679C-2 ESR-160_32679C-3 ESR-160_40φ-4t-3000mm	Select according to equipment. *Refer to Option list.	1411mm 1681mm 1981mm 3000mm	1

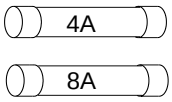
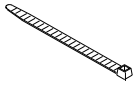
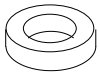
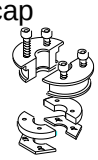
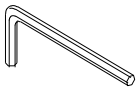
Caution: TD tank and TD shaft are options.

c. DHU-6301 (Hull unit)
Package 1-1

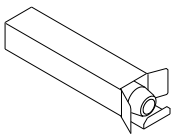
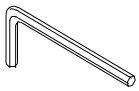
No	Name of item	Type	Remark	Weight/Length	Qty
1	Hull unit 	DHU-6301		17.0kg	1
2	DC power cable 	CW-275-10M	Cable is built into the Hull unit	10m	1
3	Hull unit control cable 	CW-593-20M	Cable is built into the Hull unit	20m	1

d. DHU-6302 (Transducer unit)
Package 2-1

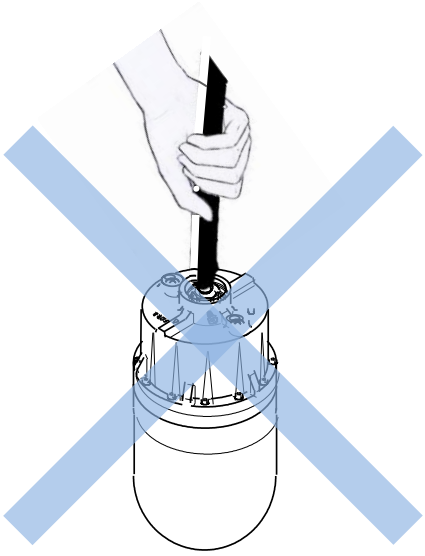
No	Name of item	Type	Remark	Weight/Length	Qty
1	Shaft guide 	ESR-1510			3
2	Bolt set 	SUS-M16-65-Assy (M16x65L, 2W16U, SW16U, N16U)			EACH 8
3	Gum packing for flange 	ESR-1512	Gum		1

No	Name of item	Type	Remark	Weight/Length	Qty
4	Crank handle 	OB-63			1
	Grease 			100g	1
	Fuse 	F-7161-4A F-7161-8A	At input of 12 V At input of 24 V		EACH 3
	ANP base 	ANP-1			2
	Binding Band 	AB-100-1000			2
5	Damper 	34924D			1
	Fixing collar 	32681D			2
	Shaft cap  1 SET	34378D			1
	Cap bolt 	CB4X10U			4
	HEX rod wrench 	1.5mm ×1 2.5mm ×1 3.0mm ×1			EACH 1

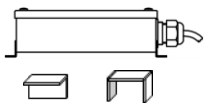
Package 2-2

No	Name of item	Type	Remark	Weight/Length	Qty
1	Transducer unit KDS-6000BB 	DHU-6302-BRD.B Output frequency 130 to 210 kHz	With 10m cable (With 18 pin water resistant connector)	9.0kg	1
		DHU-6302-BRD.B (AS) Output frequency 130 to 210 kHz			
		DHU-6302-15M	With 15m cable (With 18 pin water resistant connector)		
	Transducer unit KDS-5500BB 	DHU-6302-80kHz Output frequency 80 to 90 kHz	With 10m cable (With 18 pin water resistant connector)	9.6kg	
		DHU-6302-80kHz (AS) Output frequency 80 to 90 kHz			
		DHU-6302-140kHz Output frequency 130 to 150 kHz			
		DHU-6302-140kHz (AS) Output frequency 130 to 150 kHz			
		DHU-6302-180kHz Output frequency 170 to 190 kHz			
		DHU-6302-180kHz (AS) Output frequency 170 to 190 kHz			
2	Bath cork 	Bath cork (White) 50g		50g	1
	HEX rod wrench 	3.0mm ×1 5.0mm ×1			EACH 1

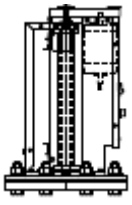
Caution: Don't carry the Transducer unit by holding its cable. Such manner may cause breakage of the equipment.



Package 2-3

No	Name of item	Type	Remark	Qty
1	Motion sensor set 	OP-621	OP-620: Motion sensor, with 6 pin connector and 20m cable. Clamp 1 (37943D) Clamp 2 (37944D) Screws (M4x8, M4x10 EACH 4) * OP-621 is included only when AS type is selected.	1

Option List

No	Name of item	Type		Remark
1	Remote controller	RCW-14		With 5m cable, (Assembled the connection cable into the Operation unit)
2	TD tank (For *xxxx mm of TD shaft) *TD shaft length	ESR-1506		PVC, 1230mm (For 1411mm of TD shaft)
		30927C-2		PVC, 1500mm (For 1681mm of TD shaft)
		30927C-3		PVC, 1800mm (For 1981mm of TD shaft)
		ESR-1507		FRP, 1500mm
		FRP TD tank set (Including Shaft guide)		ESR-1507(1), ESR-1510(2), ESR-1511(2)
3	Shaft guide	ESR-1510		ESR-1506 / 1507
		ESR-1511		ESR-1507 (For FRP TD tank)
4	Power rectifier	PS-010		With 2 pieces of 5A fuse
5	AC power cable	VV-2D8-3M		Both ends plain
6	Connecting cable	CW-372-5M	5m	With 5 pin water resistant connector and one end plain
		CW-373-5M	5m	6 pin water resistant connectors at both ends
		CW-376-5M	5m	With 6 pin water resistant connector and one end plain
	Cable for external monitor	CW-576-0.5M	0.5m	With 10 pin water resistant connector and D-Sub connector
		CW-560-2M	2m	D-Sub 15 pin connectors at both ends
7	Junction box	JB-35		1 input, 3 outputs with CW-376-5M
8	TD shaft	ESR-1504		1411mm
		32679C-2		ESR-160_1681mm
		32679C-3		ESR-160_1981mm
		40φ-4t-3000mm		ESR-160_3000mm
9	Monitor	17inch LCD Monitor		With power cable and signal cable
10	External speaker	NP-108		With 5m cable
11	Hull unit short stroke 	DHU-631		16.8kg (Include cable)

Basic knowledge for making use of sonar

We suppose that you, the user of sonar, already know how to use sonar. In this section we will theorize your experience to improve your fishing.

1. Propagation of ultrasonic wave

(1) Propagation speed of ultrasonic wave

The propagation speed of ultrasonic waves in the sea water is said to be about 1,500m per second.

However it differs very much depending on the seasons and sea areas during a year.

The cause of the difference depends on the following 3 factors:

- Sea water temperature (°C)
- Salt concentration (%)
- Water pressure (water depth) (m)

Consequently, when thinking of the propagation speed at the surface layer zone, the speed differs according to the sea area and also, even in the same sea area, it becomes different on account of vertical propagation.

As a result of surveys conducted at various sea areas in the world, it has been made clear that the difference between maximum and minimum speeds is as much as 100 (m/sec). In a sea area having a fixed salt concentration, the propagation speed of ultrasonic wave increases on an average by the following:

- About 3m/sec every time sea water temperature rises 1°C
- About 1.7m/sec every time water depth increases 100M (about 10 atmospheric pressure)

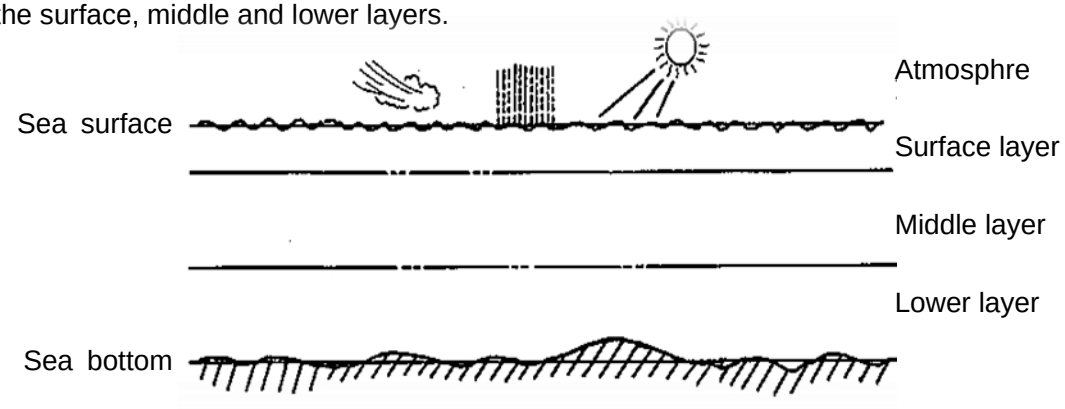
(2) Absorption and attenuation of ultrasonic wave

When an ultrasonic wave is emitted into the sea water, the energy attenuates progressively as the distance becomes farther. It indicates that the higher the frequency becomes, the greater the absorption and attenuation of ultrasonic wave become. The main causes are;

- Attenuation of ultrasonic wave caused by the decrease of the acoustic energy density due to the reflection, refraction and dispersion in water.
- Attenuation of ultrasonic wave caused by the conversation from the acoustic energy to other energy due to absorption by the viscosity of medium.

(3) Influence by marine conditions

The sea water temperature changes according to the three layers which are roughly classified into the surface, middle and lower layers.



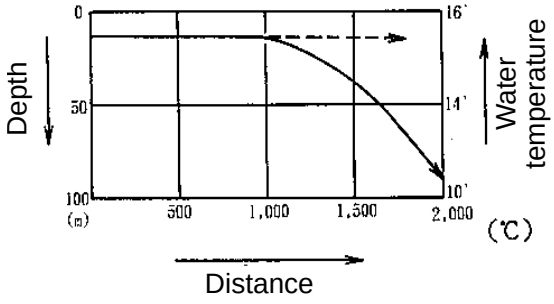
Surface layer:
This layer is greatly affected by the natural phenomena (e.g., sun, wind, rain, etc.) since it is adjacent to the atmosphere. Besides, the propagation route of ultrasonic wave refracts on the boundary where the temperature variations in addition to the difference in temperature between daytime and night are the greatest depending on the temperature distribution.
Also, not only the temperature changes but much noise is produced. Noise at the sea surface having an effect on the sonar is seriously influenced by the wind and sometimes, the sea surface becomes rough. This phenomenon causes the irregular reflection of ultrasonic wave in the vicinity of the sea surface.

Middle layer:
This layer is not subjected to the same direct factors as the above surface layer and often presents a fixed temperature because the respective factors negate with each other, and as the water depth increases, the water temperature falls almost linearly. Thus, in this layer, the ultrasonic wave propagates relatively in a stable condition.

(4) Refraction of ultrasonic wave
A phenomenon so called “Refraction of ultrasonic wave” is greatly affected by the propagation speed.

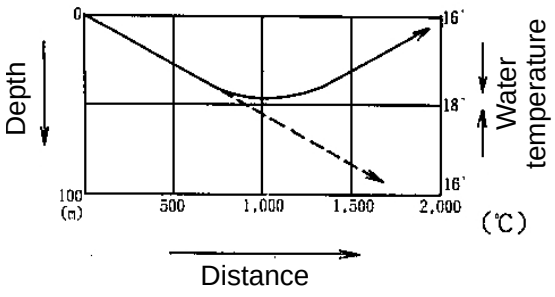
In case the temperature in the surface layer is high:

The propagation route bends down, therefore, it becomes very hard to detect the fish school in the surface layer in the distance.



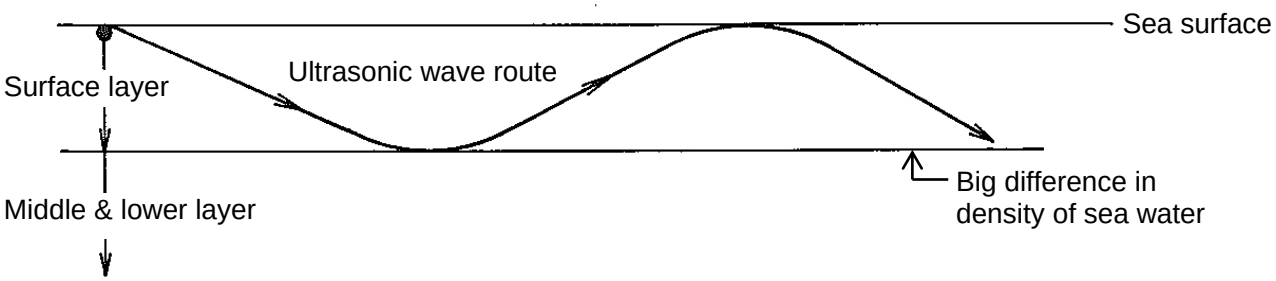
In case the temperature in the surface layer is low:

The propagation route bends up, therefore, it becomes easier to detect the fish school in the surface layer in the distance.



(As the temperature distribution always changes depending on the natural phenomena such as seasons, sea areas and current etc., some fish schools may not be detected according to the areas no matter how high you may turn up the Gain control. Keep this in mind when you use your sonar.)

(5) Reflection of ultrasonic wave
This is a phenomenon caused by the difference of the water temperature between surface and the middle or lower layers.
For instance, there is a big difference in destiny of sea water between the surface zone and middle zone whose boundary exists about 100m deep.
In this case the ultrasonic wave emitted in the underwater direction propagates in the water within 100m at the surface layer as shown in the next figure.



Therefore, even a small fish school may be detected from a long distance unexpectedly, on the other hand even a big fish school cannot be detected from a distance.

(6) Shadow zone
In the shallow sea area, reflected ultrasonic waves from the surface reflect on the boundary with a big difference in density or on the sea bottom and it appears on the surface. The area out of the propagation route becomes “SHADOW ZONE” and the echoes become weak. This zone differs according to the marine conditions and sea areas, therefore, be careful when you use your sonar in long-distance detection.

2. Difference of detectability according to transmitting frequencies
The intensity of sonar ultrasonic echoes returned back from a fish school is attenuated by the following causes as well as the curvature of ultrasonic waves due to a change of water temperature (See 1. “Propagation of ultrasonic wave”), and the fish school detection becomes difficult.

(1) Attenuation of ultrasonic waves due to the turbidity of sea water
If the sea water is not clear due to the mixing of very fine sand and mud, the ultrasonic echoes are weakened, and the detection distance become shorter as the transmitting frequency becomes higher.

(2) Deviation of ultrasonic beams due to the rolling and pitching of a ship
The transmitting direction of ultrasonic waves changes due to the rolling and pitching of the ship. As the transmitting frequency becomes higher, the ultrasonic beam width becomes narrower, and as a result, the missing of echoes increases due to the rolling and pitching of the ship. (In order to reduce this failure, KDS-6000BB/5500BB provides a built-in stabilizer function.)
(When installed with DHU-6302-BRD.B (AS) / DHU-6302-80kHz (AS) /-140kHz (AS)/-180kHz (AS) you can use the stabilizer function by connecting to the Motion sensor.)

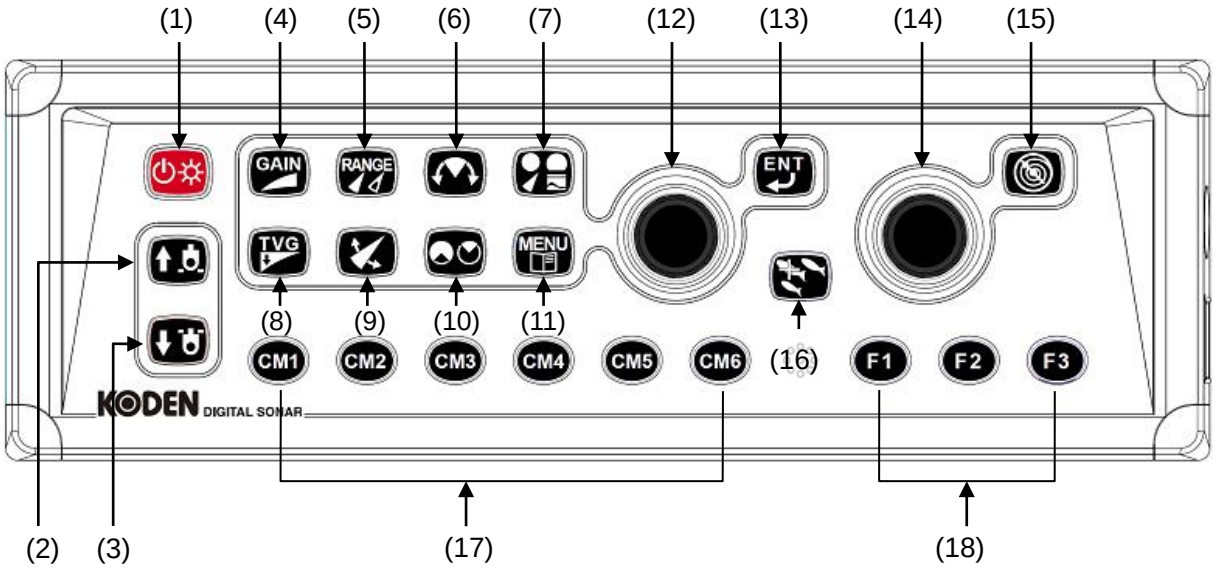
(3) Reduction of gain due to traveling noise
Noises produced by the engine rotation, propeller rotation, and the friction between the ship’s hull and sea water are mixed into echoes to reduce the detecting gain of echoes.
As the transmitting frequency becomes lower, the effect of traveling noises increases.

(4) Attenuation of ultrasonic waves by the bubbles produced in tracks
The vicinities near the tracks of your own ship and other ships are filled with bubbles produced by the rolling from the sea level into the sea, and the propagation of ultrasonic waves is interrupted by these bubbles. As the transmitting frequency becomes lower, the attenuation of ultrasonic waves due to bubbles increases.

Chapter 1 Preparation

1.1 To use keys

Operation unit of KDS-6000BB/5000BB



No.	Key Name	Description
1	[Power/Panel brightness] 	Press: Power on. Adjust brilliance of Operation unit (panel brightness). Long press: Power off.
2	[Hoist] 	Press: Upload the Transducer unit to the upper limit position and stop it automatically.
3	[Lower] 	Press: Download the Transducer unit to the lower limit position and stop it automatically.
4	[Gain] 	Press: Adjust gain
5	[Range] 	Press: Change the range setting Long press: Indicate the range setting menu
6	[Bearing center] 	Press: Change the angle of sector
7	[Presentation mode] 	Press: Select / Confirm of the presentation modes [Sonar] [Sonar (Off-center)] [Bottom-scan] [Echo sounder] [Sonar & One line] [Sonar x 2]

8	[TVG] 	Press: Change of TVG setting
9	[Tilt] 	Press: Change of the tilt angle
10	[Sector] 	Press: Change of the scan sector
11	[Menu] 	Press: Open/Close/Switch the menu
12	[Knob/left] 	Turn: Change the setting item of operation keys • GAIN • RANGE • Bearing center • TVG • Tilt • Sector • Menu • Presentation mode Press: Enter the setting of change
13	[Enter] 	Press: Move from the setting item box to the setting value box. End input of setting value digits for Menu.
14	[Knob/right] 	Turn: Change the marker position (Ring/Bearing/Cross cursor). Press: Change the type of marker
15	[VRM] 	Press: Switch between the marker and the cursor. Close the menu
16	[Target lock] 	Press: Reverse the bearing direction / Search the current position / Search the position specified by the cross cursor.
17	[CM1 to CM6] 	Press: Setting operation mode / Recall CM setting Long press: Start copy of CM
18	[F1 to F3] 	Press: Select the item to register/ Recall directly the item registered Long press: Select and save the item to register

There are two types of pressing of keys, which are Press and Long-press.

1. Press: Press the key and release immediately.
2. Long press: Keep pressed until the screen display responds.

Normal operation is done with [Press].

When the relevant key is long-pressed, the menu box of the function defined for the key is displayed. Release the key immediately, once the menu box is displayed.

Operation of the knobs (left/right)  are in two ways, [Turn] and [Press].

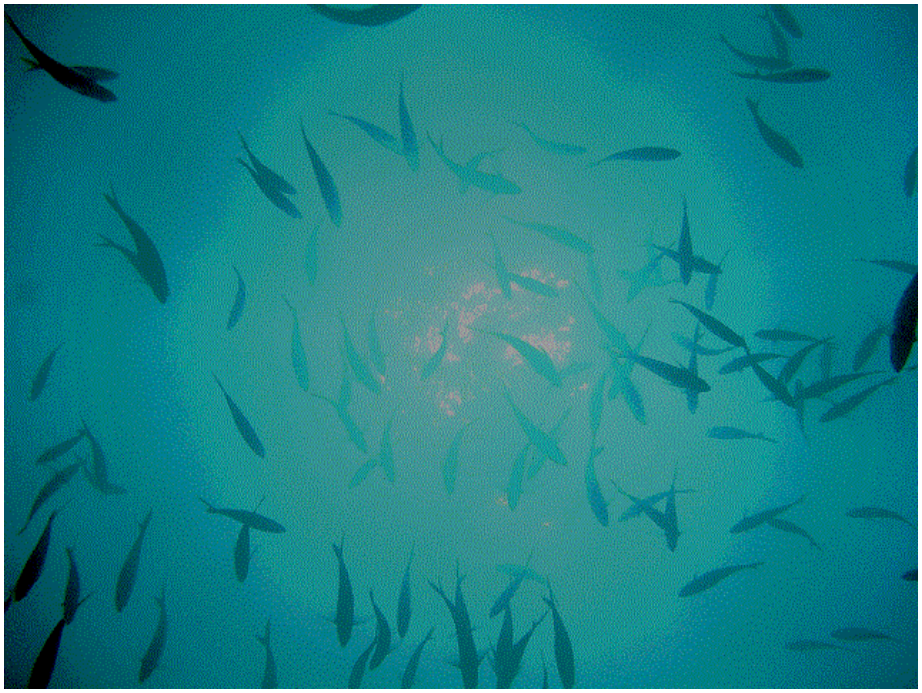
1. Turn: Turn the knob clockwise or anticlockwise
2. Press: Press the top of the knobs.

1.2 Power On/Off

1.2.1 Power On

Press  to power on.

The start-up screen is displayed. On start-up, the internal memory (ROM and RAM) is automatically checked. If no failures are found below message is displayed.



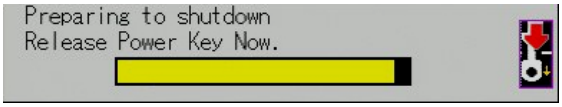
Caution: If an error occurs during the memory check, the unit may have a failure, In this case please contact your Koden dealer or Koden directly.

Caution: Please wait for the startup to complete, takes about 30 seconds to fully start.

1.2.2 Power Off

Keep pressing  (the power key) for 3 seconds to power off. After countdown for power shut down, when the message of [Preparing to shutdown] and the indication below is displayed, release  key immediately.

The indication below is displayed after the countdown of 3, 2, 1, and then a few moments, power is switched off automatically



1.2.3 Power Voltage Alarm

When nonstandard power voltage (out of 10.8 to 31.2V) is detected, the icon  **31.8V** starts blinking.

1.3 Selection of language to be displayed

When the power is switched on for the first time after installation, the following [Language] screen is displayed.

1. Turn  to select a language using.

> **Caution: There are the other languages than English and Japanese for selection.**

2. Press  .

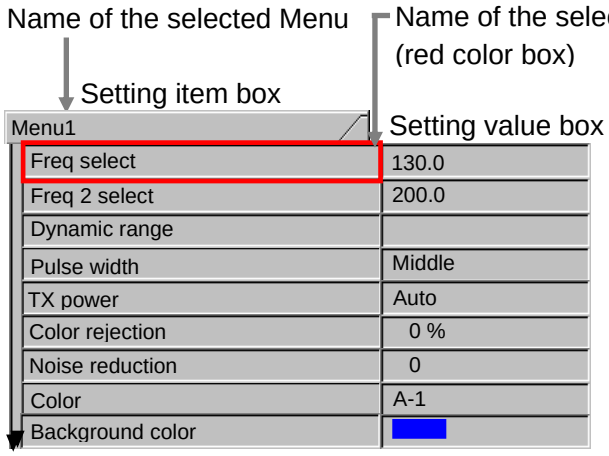
1.4 To use Menu

KDS-6000BB/5500BB has three sets of menu; [Menu1], [Menu2] and [Menu3].

1.4.1 Open/Close the Menu

To display the menu, press MENU .

Each time MENU is pressed, [Menu1] / [Menu2] / [Menu3] are switched over.



To close the menu, press MENU .

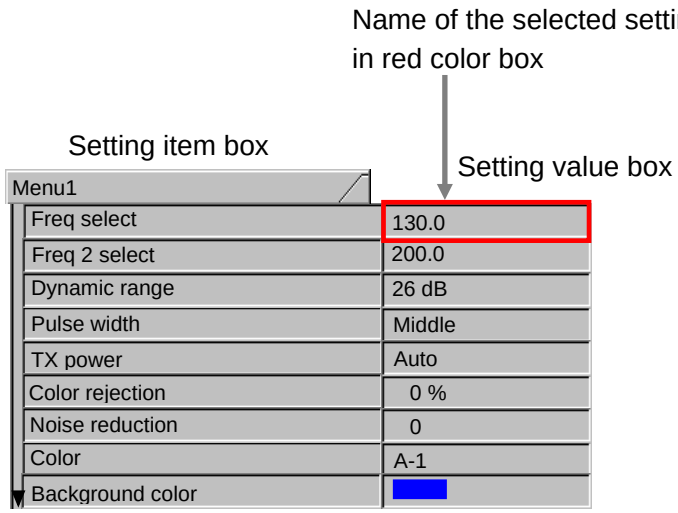
Each time MENU is pressed, [Menu1] => [Menu2] => [Menu3] => [Off] are switched over, and the Menu on the screen disappears.

Or press , the Menu on the screen disappears directly.

1.4.2 Operation of the Menu

1. Turn [knob/left] to select a menu item while Menu is displayed.

2. Press (knob/left) or ENT, to move setting value box.



3. Turn (knob/left) to change the setting.

4. Press (knob/left) or ENT to confirm the setting value.

5. Press to close the menu.

- **When the above process 4 is not done, the setting value is changed.**
- **The menu can also be closed with pressing MENU a few times.**

When MENU is long-pressed, the Maintain menu is displayed.

As for the details of Maintain menu, see the Installation manual.

1.5 Adjustment of brilliance

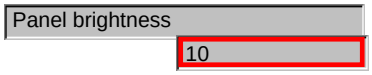
1.5.1 Adjustment of LCD brilliance

Caution: For KDS-6000BB/5500BB the screen brilliance cannot be adjusted by pressing  . Please adjust brilliance by the LCD monitor.
Please refer to the operation manual of the LCD monitor.

1.5.2 Adjustment of panel brilliance

The brilliance of operation panel can be adjusted by pressing  .

1. When  is pressed, the [Panel brightness] box is displayed.



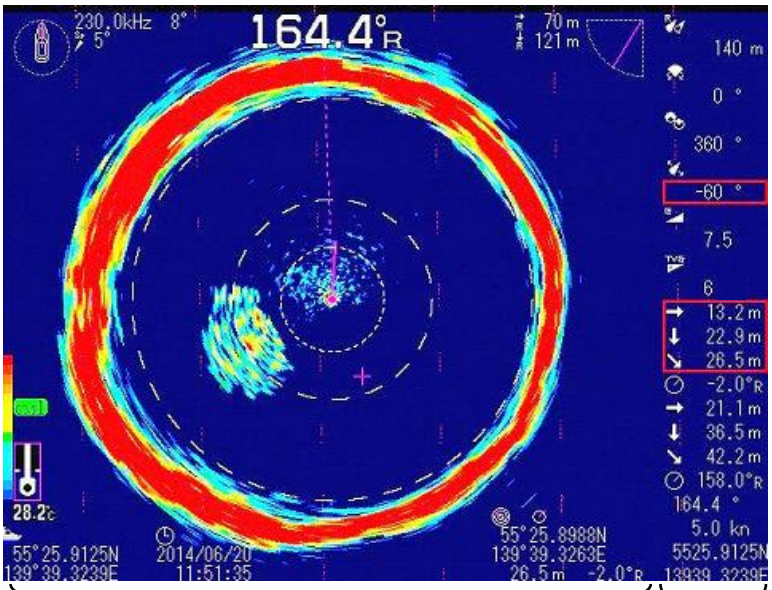
2. If  (knob/left) is turned to right, the brightness increases.
   If turned to left, the brightness decreases.

3. Press  to close the menu.

1.6 Screen display

The screen data presentation system is as follows.

The KDS-6000BB/5500BB offers a variety of display modes in split screen by combination of Mode dials and Menu.

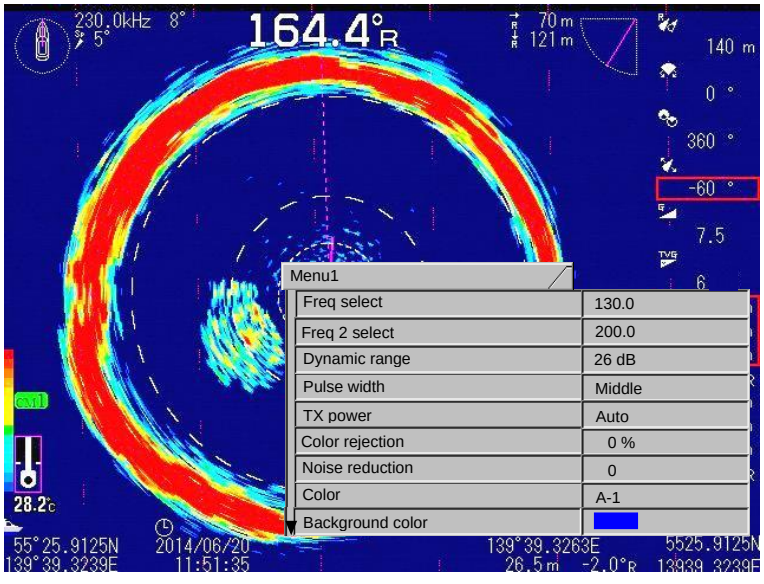


Split screen left

Split screen right

[Sonar] [Sonar (Off-center)] [Information-Data display]
[Bottom-scan] [Echo sounder]
[Sonar & One line] [Sonar x 2]

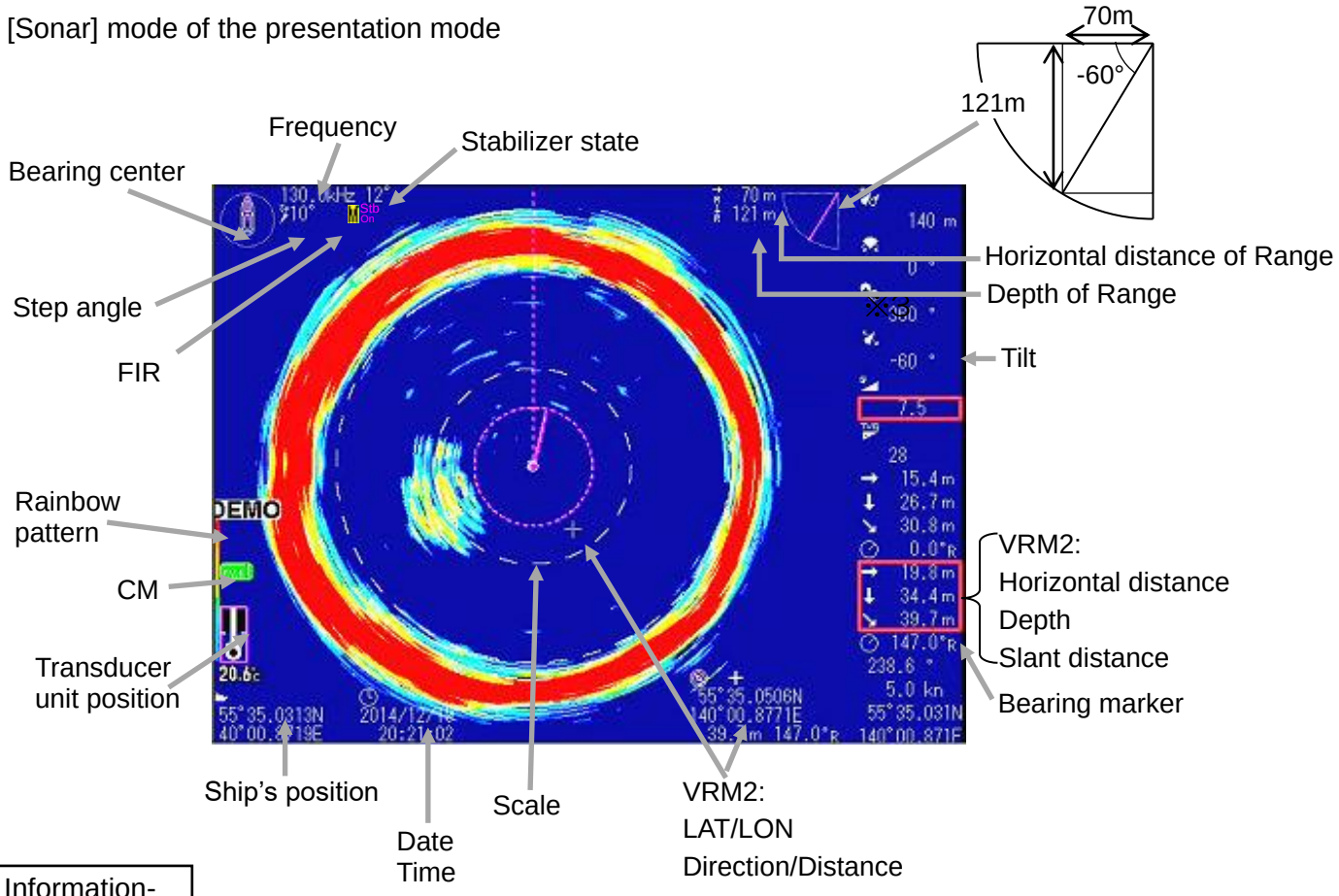
Select display mode of the presentation modes.



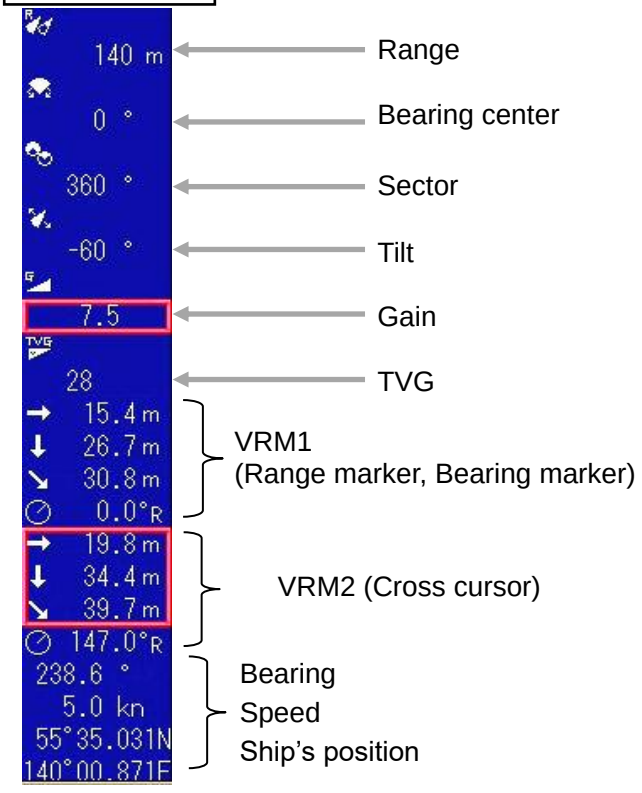
[Menu1] [Menu2] [Menu3]

1.6.1 Sonar mode display

[Sonar] mode of the presentation mode



Information-Data display



Caution: To present this info will require the KDS-6000BB/5500BB to be connected to an external navigator.

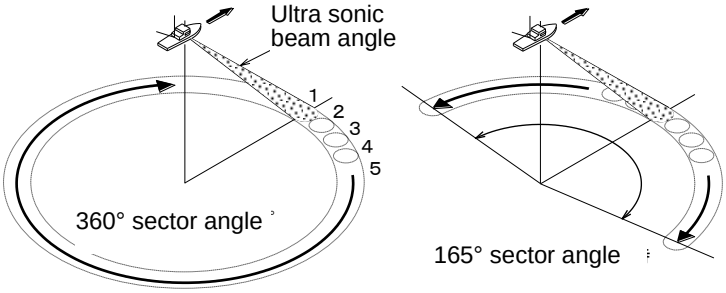
Caution: The Stabilizer status is displayed only when DHU-6302-BRD.B (AS) or DHU-6302-80kHz (AS) / -140kHz (AS) / -180kHz (AS) is installed.

1.6.2 Sonar mode Operation

The Transducer unit sends out a beam of ultrasonic sound which sweeps in the specified sector and bearing.

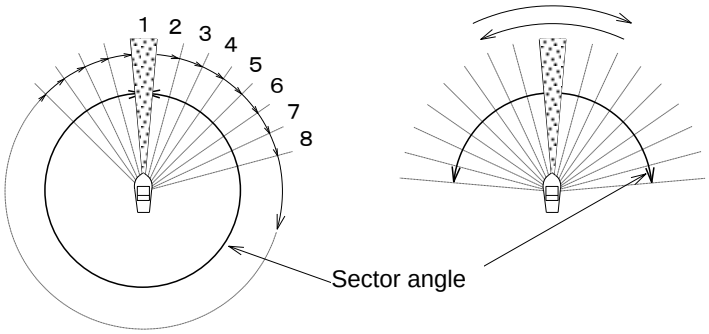
The echoes of reflected sound waves are picked up by the Transducer unit and displayed like a radar in their respective range and direction on the Display unit screen.

By adjusting the tilt and bearing the sonar beam may be trained from the surface to the bottom.

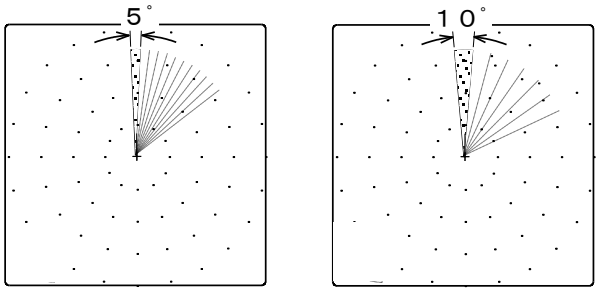


• Send out a beam of ultrasonic sound which sweeps in the specified sector and bearing.

• Changing the sector angle makes it possible to detect in various ranges.
(Refer to page 3-2)



• The echoes received from the sound beam (1=>2=>3~) are displayed on the screen in that order.



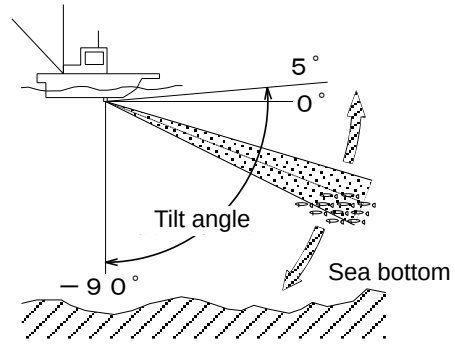
• The sector is covered by the Sonar beam in the selected step angle.

• The reflected echo is displayed in order in the angle specified.

• The step angle can be selected in Menu2 [Step (sonar, Off-center)].
(Refer to page 2-26)

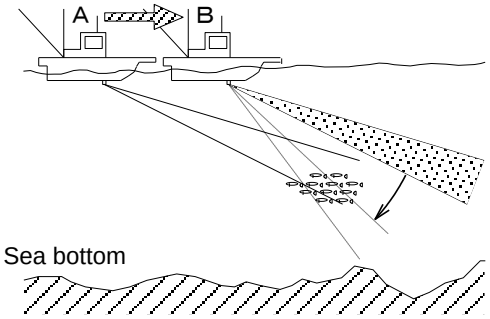
• A narrow step gives a more detailed image on the screen, however more sweep time is requested than a wide step.

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.

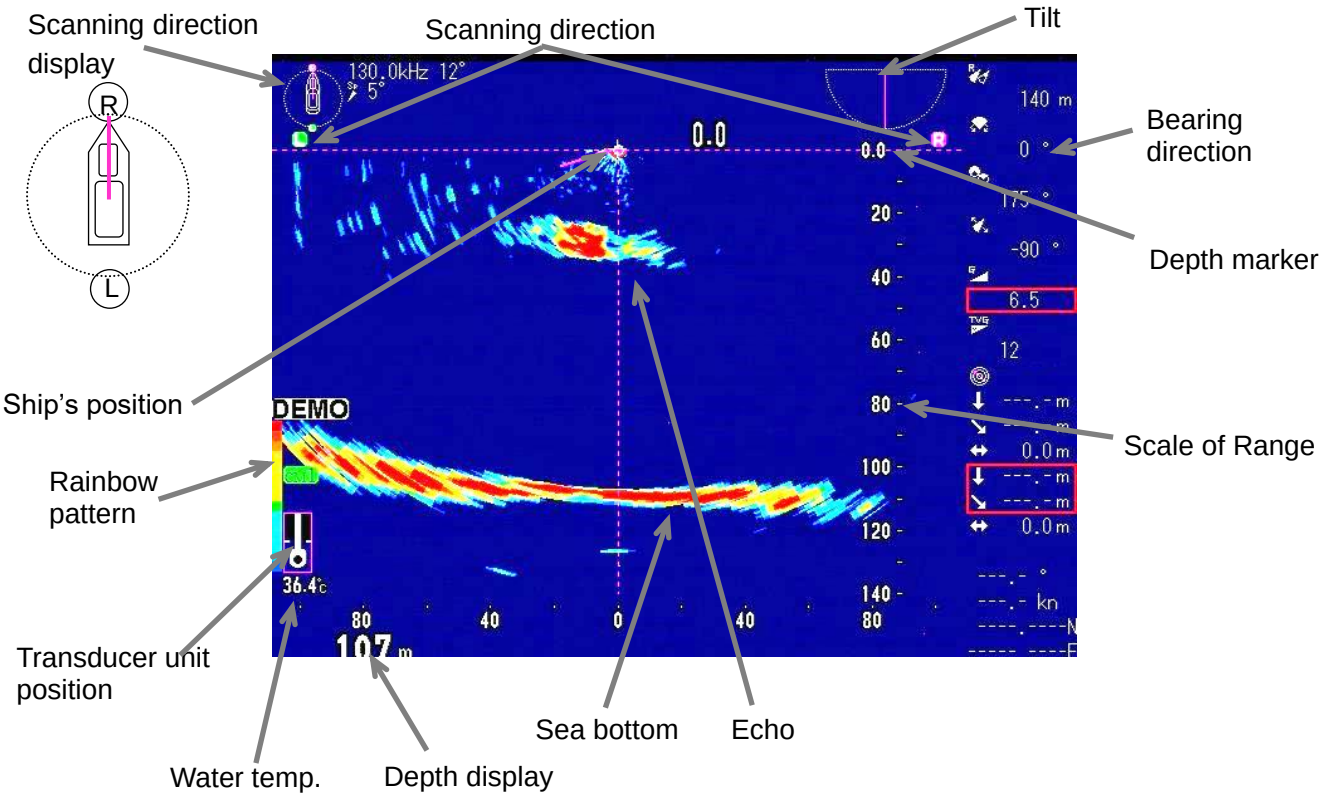
• In order to display the fish school at point B, adjust the tilt angle so that the sonar beam strikes the target.

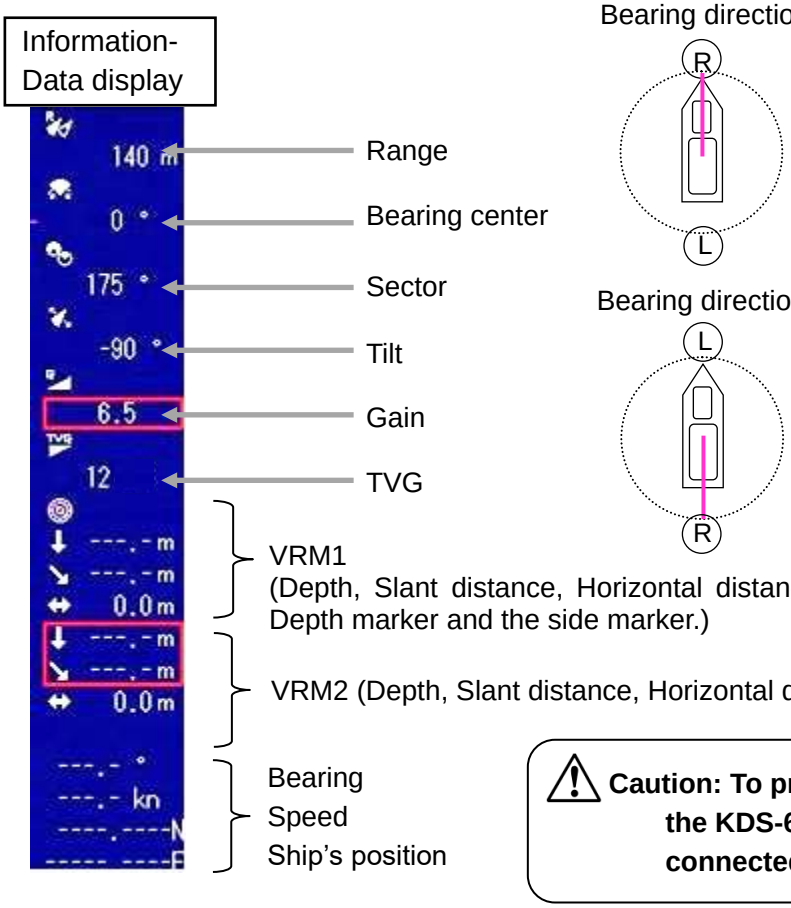
• The tilt angle of the sonar sound beam can only be changed when the sound beam is in [Sonar] mode, [Bottom-scan] mode and [Echo sounder] mode.

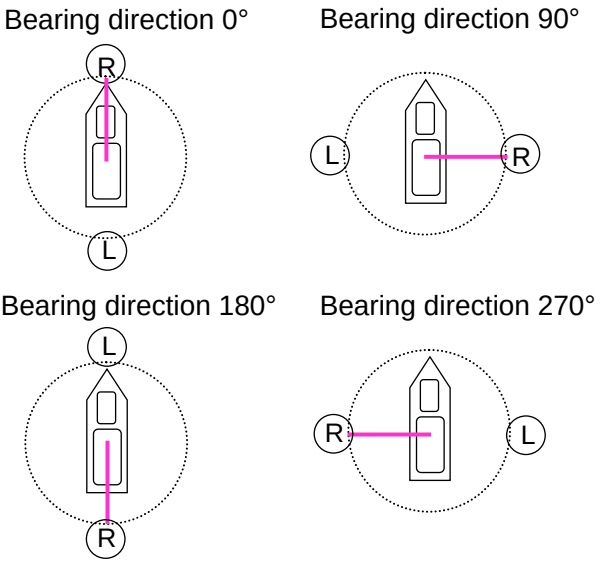
(Refer to page 3-10)

1.6.3 Bottom-scan mode display

[Bottom-scan] mode of the presentation mode
Indicate the Scanning direction as L (Left) in green and R (right) in pink.





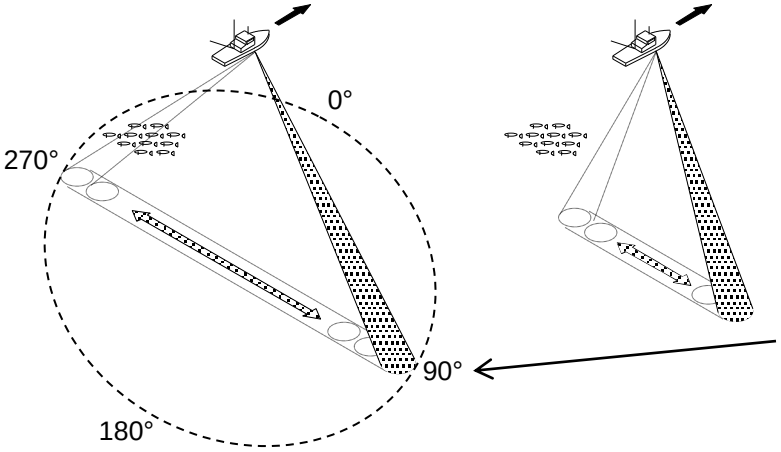


VRM1 (Depth, Slant distance, Horizontal distance from the intersection of the Depth marker and the side marker.)

Caution: To present this info will require the KDS-6000BB/5500BB to be connected to an external navigator.

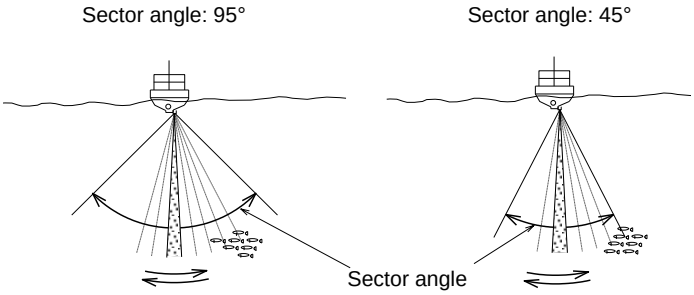
1.6.4 Bottom-scan mode operation

The sonar beam sweeps from side to side underneath the vessel.
The screen will clearly display echoes from the middle depth and sea-bottom contour.



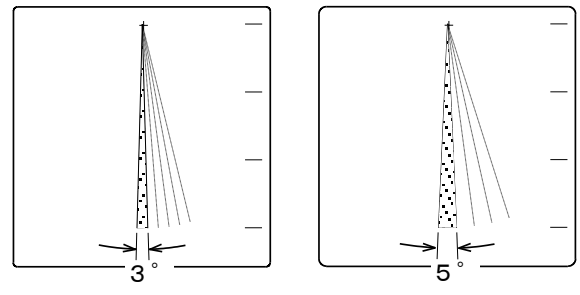
• The ultra sonic sound beams out as the beam sweeps from side to side.

• Sector angle can be changed at every 5 degree. The scan direction can be changed from front to back and from side to side.



• Choose the size of the area to be scanned by changing sector angle.
(Refer to page 3-2)

• The specified sector angle is centered on the bearing line.
(Refer to page 3-9)



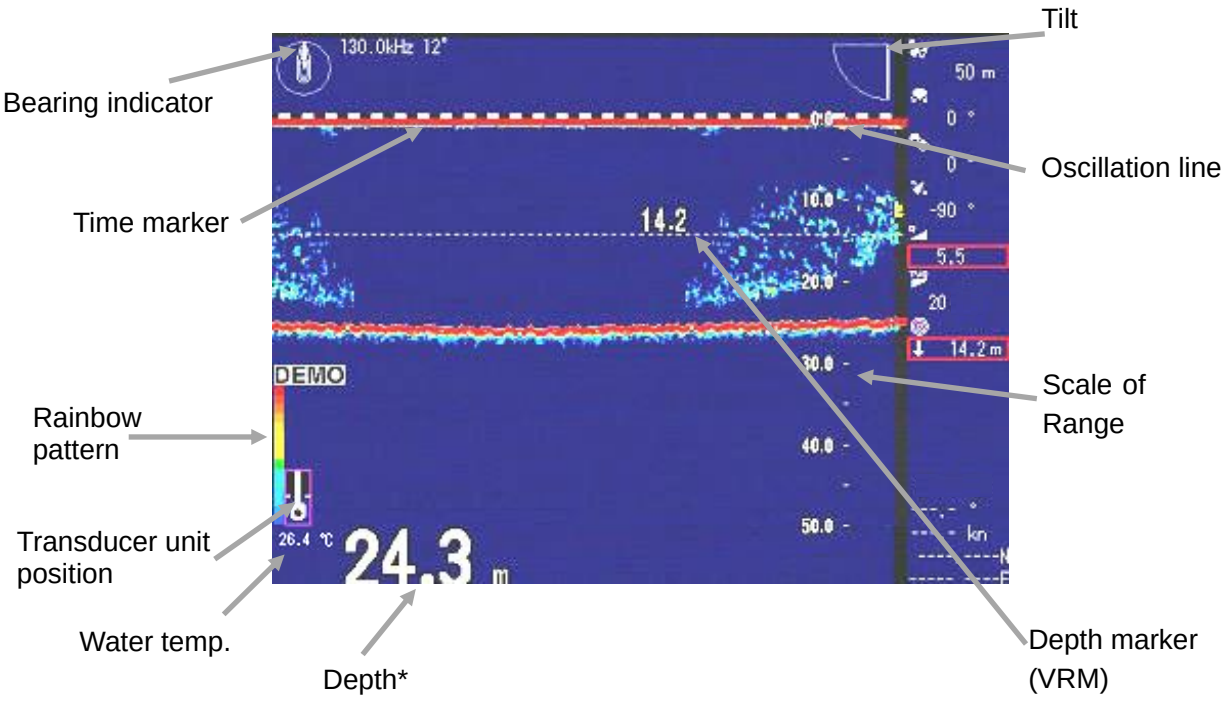
• The sector is covered by the sonar beam in steps of the specified angle.

• The reflected echo is displayed in order in the angle specified.

• The step angle may be selected in the Menu2 [STEP (Bottom-scan)].
(Refer to page 2-26/2-27)

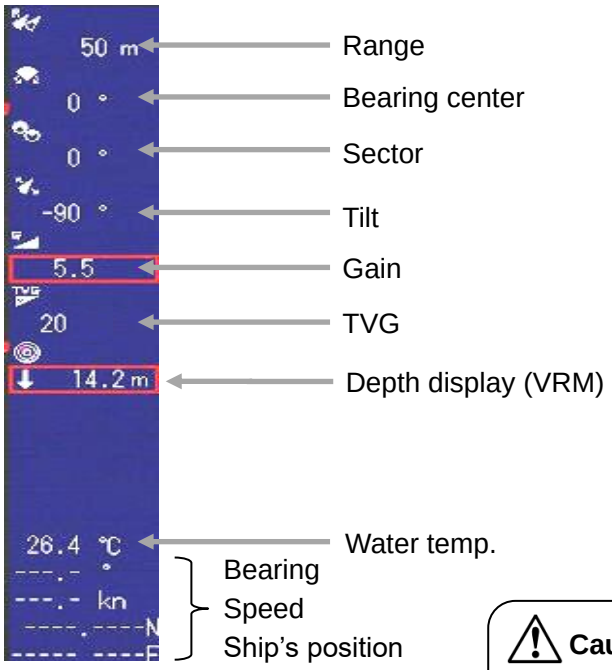
1.6.5 Echo sounder mode display

[Echo sounder] mode of the presentation mode



*The depth display can be appeared when the tilt angle is set to -90° only.

Information-Data display

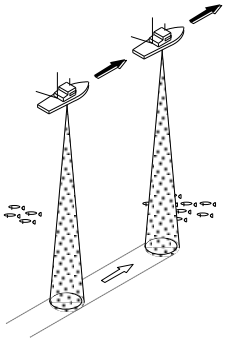


Caution: To present this info will require the KDS-6000BB/5500BB to be connected to an external navigator.

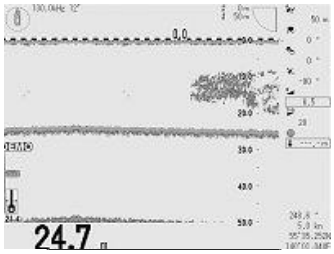
1.6.6 Echo sounder mode operation

The sonar beam sweeps underneath the vessel and the KDS-6000BB/5500BB can be used as echo sounder mode by selecting of [Echo sounder] mode of the presentation mode.

The screen will clearly display echo sounder images from the middle depth and the sea-bottom contour.



Echo sounder mode

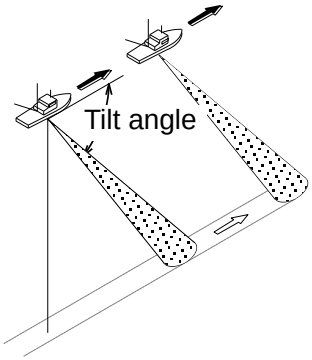


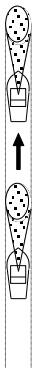
• When operating in the [Echo sounder mode], the Transducer unit tilt 90° and stops rotating and the sounder image is displayed on the screen.

• The beam width is relative to the frequency.

detects underneath the vessel.

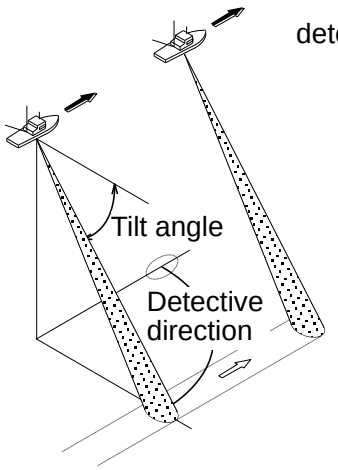
detects fore by changing tilt angle.



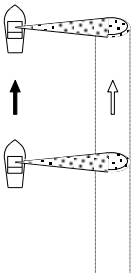


• The sounder image other than that of underneath the vessel can be displayed by changing tilt angle and detective direction.

(Refer to page 3-9/3-10)

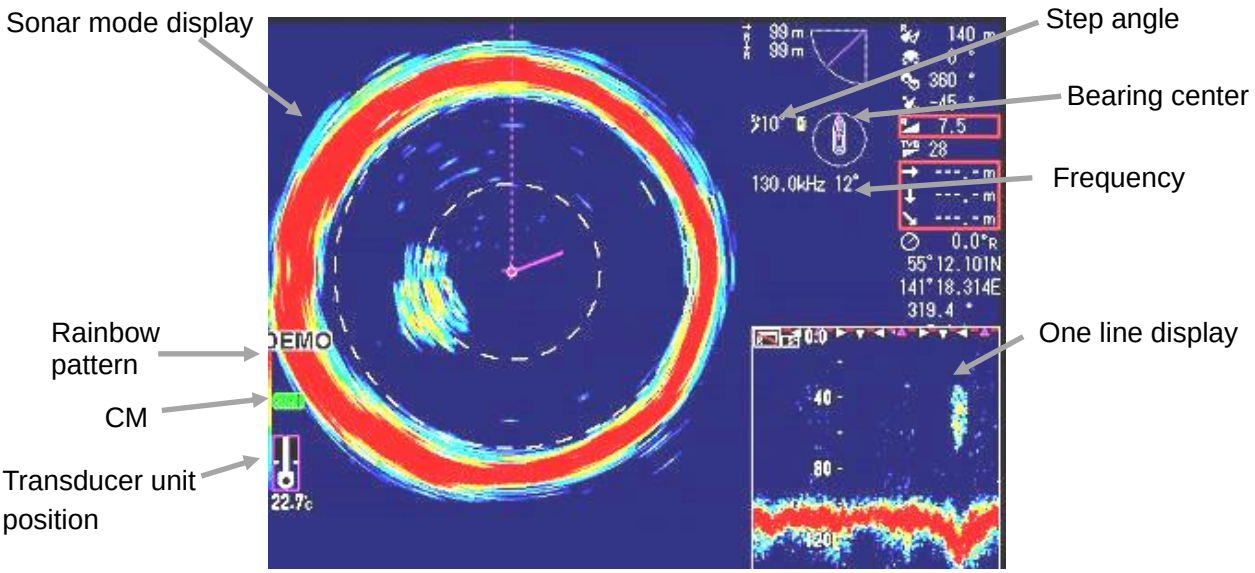


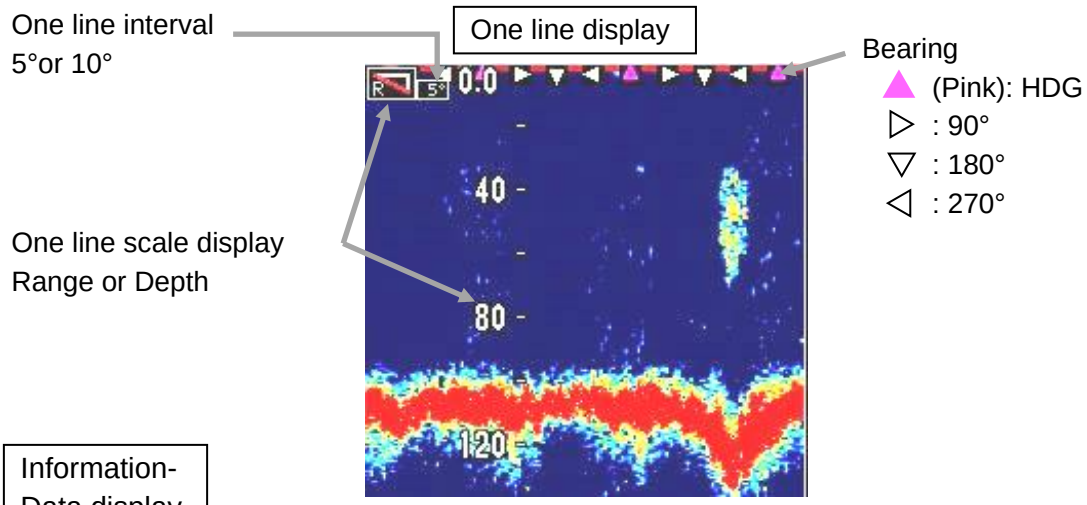
detects fore by changing tilt angle and bearing.



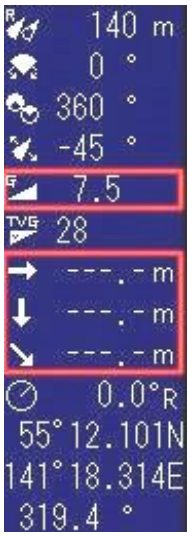
1.6.7 Sonar & One line mode display

[Sonar & One line] mode of the presentation mode





Information-Data display



Range
Bearing center
Sector
Tilt
Gain
TVG

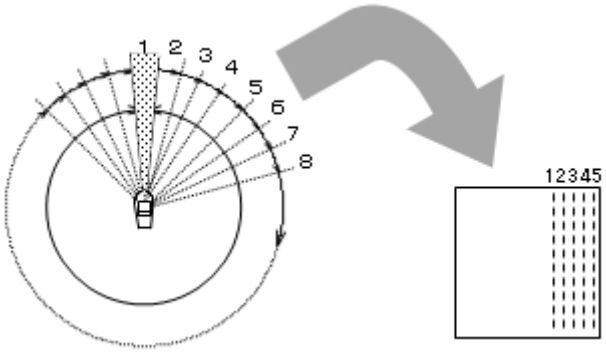
VRM1 or VRM2 (Selectable)

Bearing
Speed
Ship's position

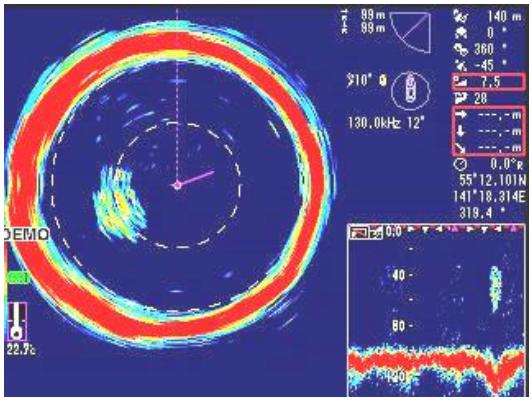
Caution: To present this info will require the KDS-6000BB/5500BB to be connected to an external navigator.

1.6.8 Sonar & One line mode operation

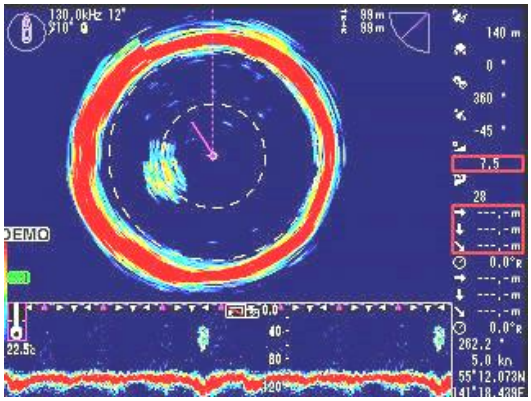
The vertical sonar image can be shown in the Sub-screen beside the main circular image. The vertical sonar image like an echo sounder image is called “One line”. The image setting can be changed by [Menu2] > [One line display] / [One line scale] / [One line shift] / [One line interval].
(Refer to "2.3.26 One line display”, “2.3.27 One line scale”, “2.3.28 One line shift” and “2.3.29 One line interval”)



• [One line display]: Small, [One line interval]: 5°
> 3 laps (1080 degree) image can be shown in the Sub-screen



• [One line display]: Medium, [One line interval]: 5°
> 7.5 laps (2700 degree) image can be shown in the Sub-screen.



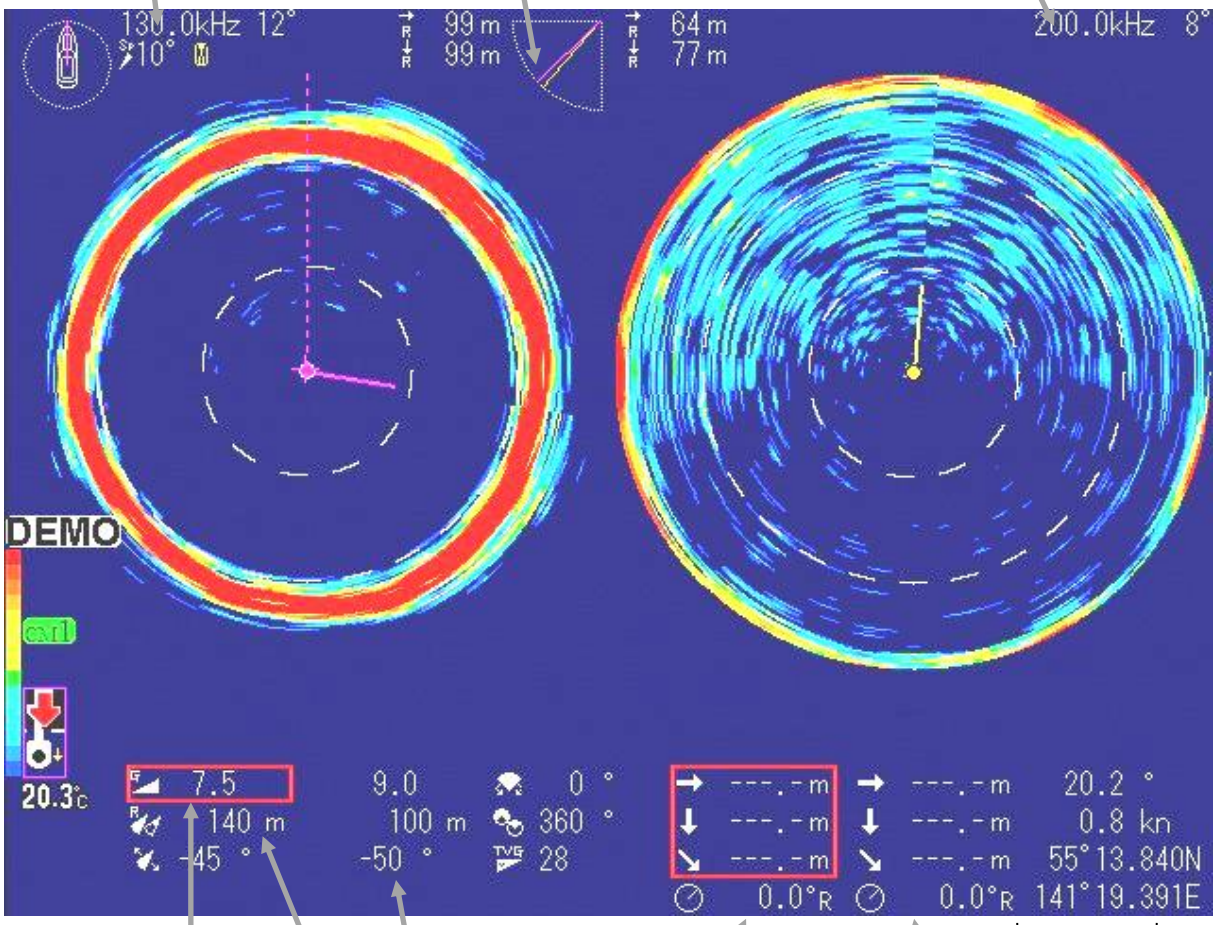
1.6.9 Sonar x 2 mode display

[Sonar x 2] mode of the presentation mode

Left Sonar Freq.
([Menu1] =>
[Freq select] menu)

Tilt angle
(Pink line: Left Sonar)
(Yellow line: Right Sonar)

Right Sonar Freq.
([Menu1] =>
[Freq 2 select] menu)



Gain Range Tilt

Left: Left Sonar
Right: Right Sonar

Bearing
Speed
Ship's position

VRM1
(Depth, Slant distance,
Horizontal distance from
the intersection of the Depth
marker and the side marker)

VRM2
(Depth, Slant distance,
Horizontal distance from
the cross cursor)

1.6.10 Sonar x 2 mode operation

Two sonar images can be displayed side by side. Each image can be set to the frequency, range, tilt angle and gain individually.

The frequency of the left / right side image can be changed by [Menu1] => [Freq select] / [Freq 2 select]
[Range] / [Tilt] / [Gain] setting can be switched by pressing [Range] / [Tilt] / [Gain] keys.
[VRM1], [VRM2], [Wake] and [Compass] indicator can be shown in the left sonar image only.

Chapter 2 Function setting

2.1 Menu configuration

2.1.1 Initial setting

The factory default setting is shown in square.

Functions	Factory setting (in the item □)	Setting Menu
Menu1		Change at Menu1 Refer to page 2-4
Freq select	[80]*1•• 90 •• [130]*2• [140]*3•• [180]*4• • 210	
Freq 2 select	80•• [90]*1 •• 130• [140]*3•• [180]*4• • [200]*2• 210	
Dynamic range	12, 14, 16, 18, [20], 22, 24, 26, 28, 30, 32	
Pulse width	Short, [Middle], 1• • •100	
TX power	[Auto], 20, 30, 40, 50, 60, 70, 80, 90, 100	
Color rejection	[0], 5, 10, 15, 20, 25• • • • • •70, 75, 80	
Noise reduction	[0], 1, 2, 3, 4, 5, 6, 7, 8, 9, 10	
Color	[A-1], A-2, B-1, B-2, C-1, C-2, Z-1, Z-2	
Background color	[Blue], Seven other colors	
Image correct	Off, [1], 2, 3	
Gain (TD)	-50• • • •[0]• • • •+50	
FIR	Auto, 1, 2, 3, 4, 5, 6, 7, Low speed, [Medium speed], High speed	
Interference rejection	[Off], On	
Range (Sonar, Off-center)	[20, 50, 80, 100, 140, 200, 300, 500] => 3000	
Range (Bottom-scan)	[20, 50, 80, 100, 140, 200, 300, 500] => 3000	
Range (Echo sounder	[20, 50, 80, 100, 140, 200, 300, 500] => 3000	
Remote key set	[Refer to page 3-18]	
Color palette	Color ([Z-1], Z-2)	
Sub-screen selection	[Wake disp (H up)], Wake disp (N up), Wake disp (S up), Bottom-scan	
Sub-screen display	[Off], Small, Medium, Large	
Wake range (Sub-screen)	0.1 • • • [1.0] • • • 10.0	
Language	[English], Japanese, Korean, Traditional Chinese, Spanish, Thai, Myanmar, Portuguese, Greek etc	
Menu2		Change at Menu2 Refer to page 2-25
Step (Sonar, Off-center)	5°, [10°], 15°, 20°	
Step (Bottom-scan)	3°, [5°]	
Off-center position	[Fore], Back, Right, Left	
Target lock	[Reverse] ,Mode1, Mode2, Marker Mode1, Marker Mode2	
A scope	[Off], On	
White line	[Off], 1, 2, 3, 4, 5	
Scale	Off, [1], 2, 3, 4, 5, 6	
Internal buzzer volume	0, 1, 2, 3, 4, 5 => 96, 97, 98, 99, [100]	
NMEA monitor	[Off], On	
Compass display	[Off], On	
Wake display	[Off], On	
Wake memory interval	[1],2,3,4,5,10,20,30 (second)	
Sonic speed	-7.0 • • • [0.0] • • • 2.0% (0.1%step)	

Functions	Factory setting (in the item □)	Setting Menu
Power freq adjust	[250.0] => 300.0kHz (0.1step)	
Depth unit	[m], ft, fm, I.fm	
Range & Speed unit	[NM, kn], km, km/h	
Temperature unit	[°C], °F	
Temperature adjustment	-9.9 • • • •[0.0] • • • •9.9	
Train correct	-180.00 => [0.00] => +180.00 (1.25°step)	
Ext synchronized	[Off], ↑, ↓	
Bearing display	[Off], Small, Large	
True / Relative bearing	[Relative], True	
Step (Bearing center)	1 • • [5] • • • • •30	
Audio level	1 • [3] • • • • • • 32	
Audio tune	1 • • [5] • • 10	
One line display	[Small], Medium, Large	
One line scale	[Range], Depth	
One line shift	[0-100%], 0-50%, 0-75%, 25-100%, 50-100%	
One line interval	[5°], 10°	
Save operation	[Auto], Manual	
Menu3		Change at Menu3 Refer to page 2-53
Baud rate	[4800]*5, 9600, 19200, 38400	
DBT output	[Off], On	
DPT output	[Off], On	
GGA output	[Off], On	
GLL output	[Off], On	
MTW output	[Off], On	
RMC output	[Off], On	
TLL output	Off, [On]	
VTG output	[Off], On	
ZDA output	[Off], On	
Simulation	[Off], On	
Menu time-out period	[Off], 5, 6 • • 10 • • • •58, 59, 60 (1sec/step)	
Hull unit auto up	Off, 1 • • 5 • • [15] • 17 (1sec/step) kn Off, 1 • • [15] • • 29 • 30 (1sec/step) km/h	
Hull unit operation at the start	[No], Yes	
Transducer unit baud rate	4800, 9600, [19200]	
Slow down the Bearing speed	[0], 10, 20 • • 100, 200, 300, 400, 500	
Menu (transparent)	0 • • 10 • • [15] • • 25	
Message (transparent)	0 • • [10] • • 20	
Sub-screen (transparent)	[0] • • 10 • • 20	
Information display	[Off], Lat/long, Date, Lat/long/Date	
Localtime offset	-11.0 • • -5.0 • • [0.0] • • 5.0 • • 10.0 • • 14.0	
Dynamic range standard	[Top], Under	
The origin detection	Off, [On]	
Stabilizer*6	Off, [On]	

*1: For DHU-6302-80kHz / -80kHz (AS)
*2: For DHU-6302-BRD.B / -BRD.B (AS)
*3: For DHU-6302-140kHz / -140kHz (AS)
*4: For DHU-6302-180kHz / -180kHz (AS)

*5: For DHU-6302-BRD.B (AS)/-80kHz (AS) / -140kHz (AS) / -180kHz (AS), 9600 is the initial value
*6: Displayed only for DHU-6302-BRD.B (AS) / -80kHz (AS) / -140kHz (AS) / -180kHz (AS)

CM keys, F1/F2/F3 key

Functions	Factory setting (in the item □)	Setting Menu
CM keys	Refer to “2.5.1 Initial setting of [CM] keys”	Change at CM menu Refer to page 2-67
F1 key Event (TLL)	TLL was sent・No data・Check TLL output	Change at each F key by long-press Refer to page 2-72
F2 key Frequency	[80.0]*7 to 90.0 [130.0]*8 to 150.0 [170.0]*9 to 190.0 [130.0]*10 to 210.0	
F3 key Dynamic range	12 • 14 • 16 • 18 • [20] • 22 • 24 • 26 • 28 • 30 • 32	

*7: For DHU-6302-80kHz / -80kHz (AS)
*8: For DHU-6302-140kHz / -140kHz (AS)
*9: For DHU-6302-180kHz / -180kHz (AS)
*10: For DHU-6302-BRD.B / -BRD.B (AS)

2.2 Menu1

To display the menu, press 

and select [Menu1].

The selected menu item will be displayed in red color box.
There are 22 setting items in [Menu1] box.

Menu1

Freq select	130.0
Freq 2 select	200.0
Dynamic range	26 dB
Pulse width	Middle
TX power	Auto
Color rejection	0 %
Noise reduction	0
Color	A-1
Background color	

Menu1

Image correction	1
Gain (TD)	Auto
FIR	Off
Interference rejection	
Range (Sonar, Off-center)	
Range (Bottom-scan)	
Range (Echo sounder)	
Remote key set	
Color palette	

Menu1

Range (Sonar, Off-center)	
Range (Bottom-scan)	
Range (Echo sounder)	
Remote key set	
Color palette	
Sub-screen selection	Wake disp (H up)
Sub-screen display	Off
Wake range (Sub-screen)	1. 0
Language	English

Basic Operation of the Menu

1. Turn  (knob/left) to select the setting item.

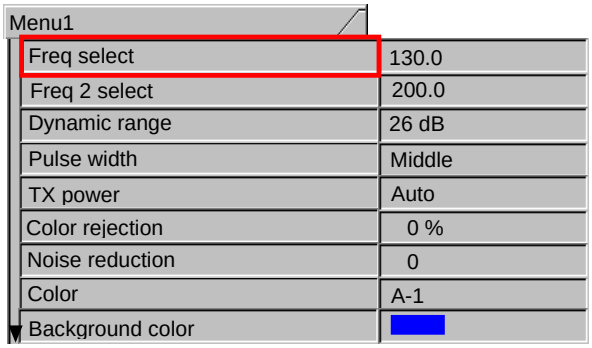
2. Press  (knob/left) or 

to confirm of the setting item.

2.2.1 Frequency, Frequency 2

On KDS-6000BB/5500BB, the frequencies can be set.
[Freq select]: In Sonar x2 mode, the frequency of Left side Sonar image can be set.
[Freq 2 select]: In Sonar x2 mode, the frequency of Right side Sonar image can be set.

1. Press MENU to display [Menu1].
2. Turn (knob/left) to select [Freq select]. (or [Freq 2 select])



Frequency setting value

KDS-6000BB:
For DHU-6302-BRD.B / -BRD.B (AS): 130kHz to 210kHz

KDS-5500BB:
For DHU-6302-80kHz / -80kHz (AS): 80kHz to 90kHz
For DHU-6302-140kHz / -140kHz (AS): 130kHz to 150kHz
For DHU-6302-180kHz / -180kHz (AS): 170kHz to 190kHz

3. Press (knob/left) or ENT to move setting value box.
   The setting value will be displayed in red color box.
4. Turn (knob/left) to select frequency. (or [Freq 2 select])

5. Press to close the menu.

2.2.2 Range (Sonar, Off-center) (Bottom-scan) (Echo sounder)

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.

1. Press MENU to display [Menu1] and select [(Sonar, Off-center), (Bottom-scan) or (Echo sounder)].
   Or Keep pressing RANGE .

2. [Range setting box] will be displayed.

Range1	20 m
Range2	50 m
Range3	80 m
Range4	100 m
Range5	140 m
Range6	200 m
Range7	200 m
Range8	500 m

[Range setting value: 10 to 1000m]

3. Turn  (knob/left) to select [Range number].

4. Press  (knob/left) or  to move setting value box.

The setting value will be displayed in red color box.

Range1	20 m

5. Turn  (knob/left) to select [Range setting value].

Set as the same way [Range 2 to Range 8] as above setting.

6. Press  or  to close the menu.

The range initial setting of [Sonar, Off-center], [Bottom-scan], [Echo sounder] are different.
Set the depth unit by setting box of [Menu2].

The range setting of all presentation modes (Sonar, Sonar (Off-center), Bottom-scan and Echo sounder) is same, but the range setting value should be set separately for each.

2.2.3 Gain (TD)

The insufficient gain due to ultrasonic signal attenuation can be corrected. Accuracy of bottom detection is adjusted. Such false recognition can be corrected that a deeper position is recognized as sea bottom than actual, or large fish school is recognized as sea bottom.
It is not necessary to do this gain correction, as the factory default setting is optimized.

1. Press  to display [Menu1].

2. Turn  (knob/left) to select [Gain (TD)].

Menu1	
Dynamic range	26 dB
Pulse width	Middle
TX power	Auto
Color rejection	0 %
Noise reduction	0
Color	A-1
Background color	
Image correct	1
Gain (TD)	0

3. Press (knob/left) or ENT to move setting value box.

The setting value will be displayed in red color box.

Gain (TD)	0

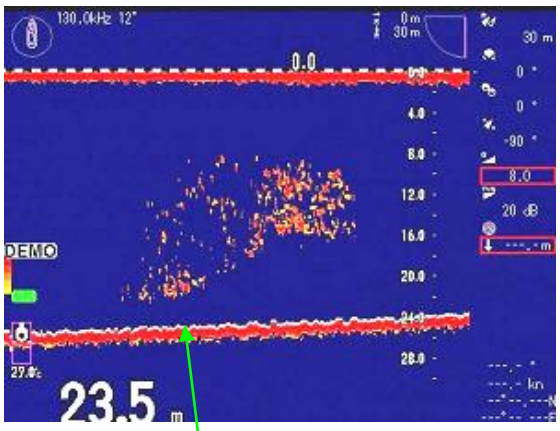
4. Turn (knob/left) to select [Gain (TD) setting value].

Gain (TD) adjustment

When the bottom cannot be detected or when the bottom is of mud pool or seaweed, [Gain (TD)] shall be turned up. When jump to fish schools, etc. frequently occurs, [Gain (TD)] shall be turned down.

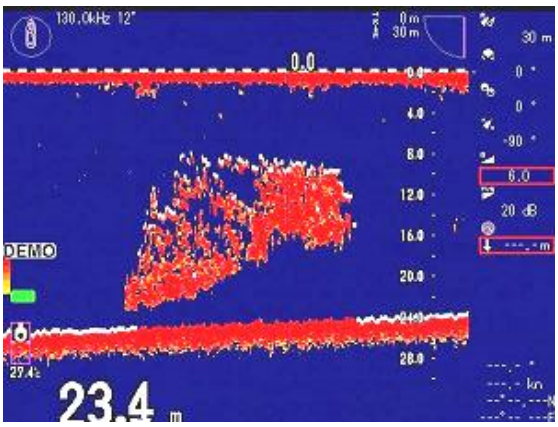
Adjustment shall be made under conditions where the white line is displayed. To display the white line, select [White line] in [Menu2].

The Gain (TD) setting shall be adjusted so that the white line on the seabed does not jump to the school of fish and indicates the position of the seabed.



Optimum
The white line is displayed on the sea bottom.

Adjust so that the white line indicates the position of the seabed.



Over-Gain
The white line moves to fish school.

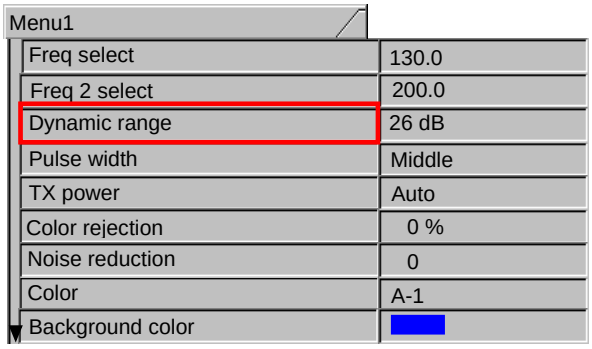
5. Press to close the menu.

2.2.4 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.

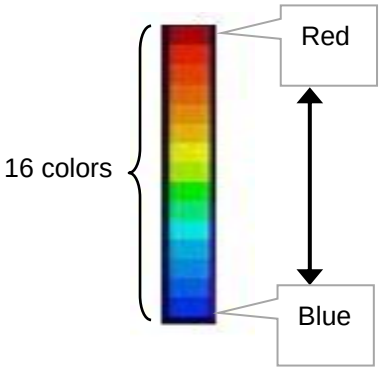
1. Press MENU to display [Menu1].

2. Turn (knob/left) to select [Dynamic range].



3. Press (knob/left) or ENT to move setting value box.

4. Turn (knob/left) to select the setting value from [12dB] to [32dB].



[Dynamic range standard] is set to [High]: When the value is small, the target is easy to recognize because the weaker signal will become undistinguished.

[Dynamic range standard] is set to [Lower]: When the value is small, the weaker signal is emphasized.

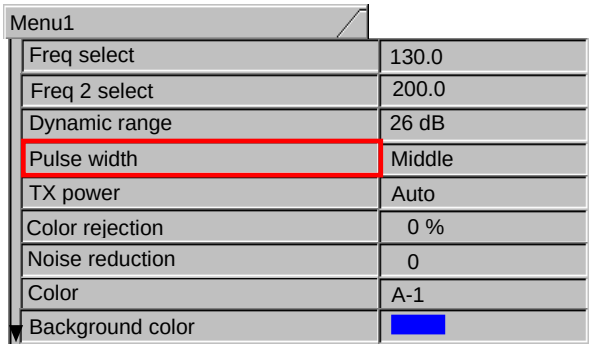
5. Press to close the menu.

2.2.5 Pulse width

The transmitted pulse width can be set.

1. Press MENU to display [Menu1].

2. Turn (knob/left) to select [Pulse width].



3. Press (knob/left) or ENT to move setting value box.

4. Turn (knob/left) to select the setting value from [Short], [Middle] or [1] to [100].

Short: automatically changes the transmit pulse width according to the range (defaults) listed below.
Middle: automatically the normal transmit pulse width x 1.5

A longer pulse width provides high sensitivity as increasing the detective ranges.

Range (m)	Pulse width (ms)
0 to 59	0.52
60 to 79	0.74
80 to 99	0.95
100 to 119	1.05
120 to 159	1.47

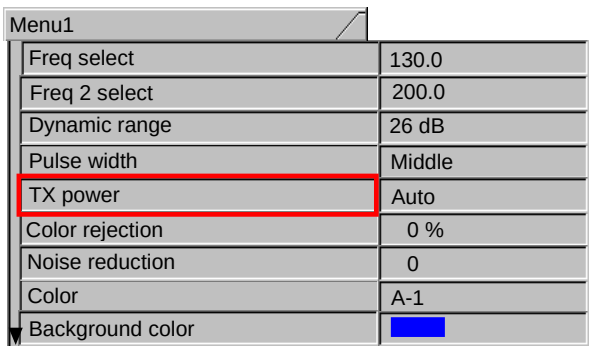
Range (m)	Pulse width (ms)
160 to 199	1.89
200 to 239	2.31
240 to 399	3.99
400 and more	4.20

5. Press to close the menu.

2.2.6 TX power

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

1. Press MENU to display [Menu1].
2. Turn (knob/left) to select [TX power].



3. Press (knob/left) or ENT to move setting value box.

4. Turn (knob/left) to select the setting value from [100] to [20] or [Auto].

In crowded fishing areas, this function may be used to reduce power and avoid interference to other fishing boat's sonars and echo sounders.
[100] indicates the maximum power and then gradually reduced by moving from [90] => [80] => [70] =>=> => [20] that is the minimum power.

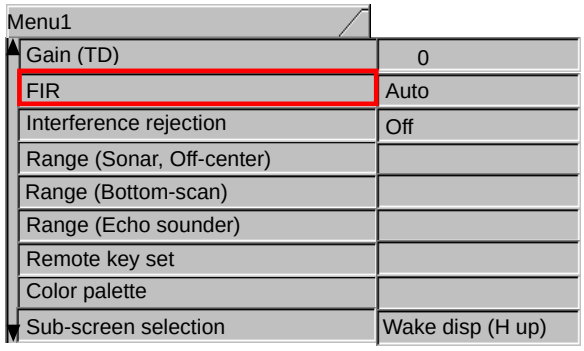
5. Press to close the menu.

2.2.7 FIR (Bandwidth)

Change the frequency bandwidth. To avoid the noise, interference, etc., set the frequency bandwidth to narrow.

1. Press MENU to display [Menu1].

2. Turn (knob/left) to select [FIR].

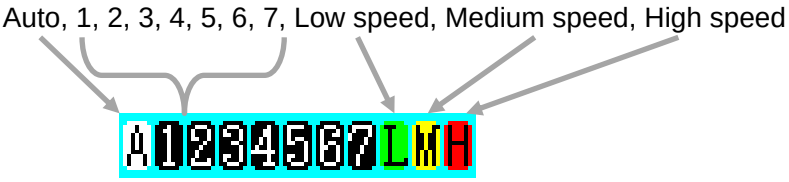


3. Press (knob/left) or ENT to move setting value box.

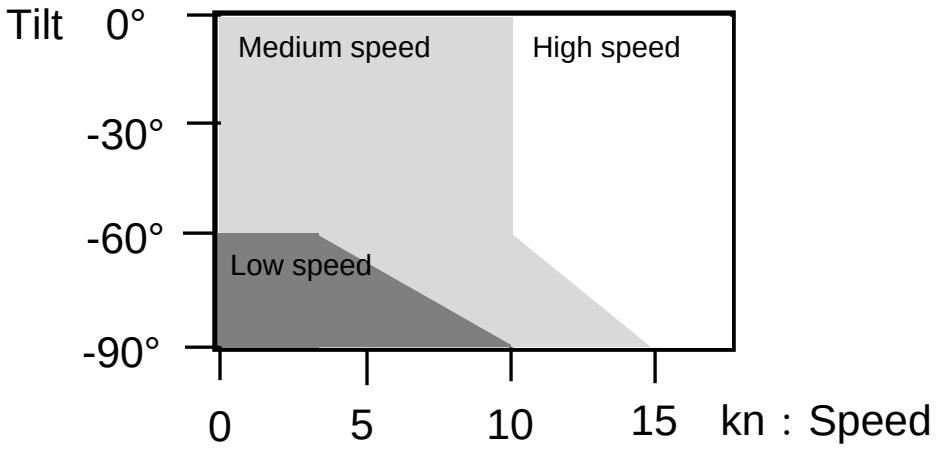
4. Turn (knob/left) to select the setting value from [Auto] or from [1] to [7] or [High speed], [Medium speed] and [Low speed].
.

5. Press to close the menu.

FIR display



Setting:
Set the value of [FIR] by “Tilt angle” and “Speed”. Refer to the figure as below.



Setting value	Description
[High speed]	Ship’s speed: 10 knots or more. Tilt angle: -30° or upwards. S/N ratio is reduced compared with [Medium speed].
[Medium speed]	Ship’s speed: From 5 to 10 knots. Tilt angle: -30° or upwords. S/N ratio is reduced compared with [Low speed].
[Low speed]	Ship’s speed: 5 knots or less. Tilt angle: -60° or downwards. Sensitivity of the Bow-side and Stern-side are reduced when tilt angle is set to upwards or the ship’s speed is 5 knots or more.
[1 to 7]	[7] is the widest bandwidth and then gradually reduced by moving from [6] =>[5]=>[4]=>[3]=>[2]=>[1] that is the narrowest bandwidth.
[Auto]	[FIR] is set automatically according to the ship’s speed and the tilt angle.

[High speed] is the widest bandwith and then gradually reduced by moving from [Medium speed]=>[Low speed]=>[6]=>[5]=>[4]=>[3]=>[2]=>[1] that is the narrowest bandwidth.

Caution: If the frequency bandwidth is wide, the resolution becomes high. It is easy to find the small targets, but there is too much noise to make distinctions with signs of fish. If it is narrow, resolution becomes low, and the noise becomes reduced.

Caution: Depending on the setting of the frequency bandwidth, the sensitivity of the bow-side or the stern-side may decrease under the influence of the "Doppler effect". Please set a bandwidth widely when the ship's speed is fast or the tilt angel is upwards.

2.2.8 Interference rejection

The interference can be reduced, but the scanning speed is about two times slower.

1. Press MENU to display [Menu1].

2. Turn (knob/left) to select [Interference rejection].

Menu1	
Gain (TD)	0
FIR	Auto
Interference rejection	Off
Range (Sonar, Off-center)	
Range (Bottom-scan)	
Range (Echo sounder)	
Remote key set	
Color palette	
Sub-screen selection	Wake disp (H up)

3. Press (knob/left) or ENT to move setting value box.

Interference rejection	Off

4. Turn (knob/left) to select the setting value from [Off] or [On].

[Off]: No rejection
[On]: Rejection

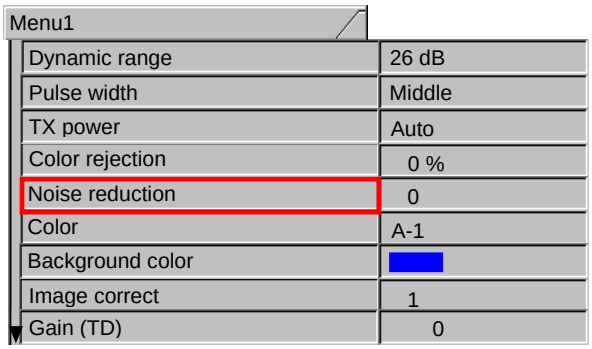
5. Press to close the menu.

2.2.9 Noise reduction

When the response from dust and plankton is to be diminished regardless of water depth and echo, [Noise reduction] is effective.
For [Noise reduction] function, by narrowing the dynamic range and reducing tone graduation of colors, the color of weak response level becomes less visible.

1. Press MENU to display [Menu1].

2. Turn (knob/left) to select [Noise reduction].



3. Press (knob/left) or ENT to move setting value box.

4. Turn (knob/left) to select the setting value from [0] to [10].

[0] is the minimum effect and the gradually increased by moving from [0]=>[1]=>[2]=>that is the maximum effect.

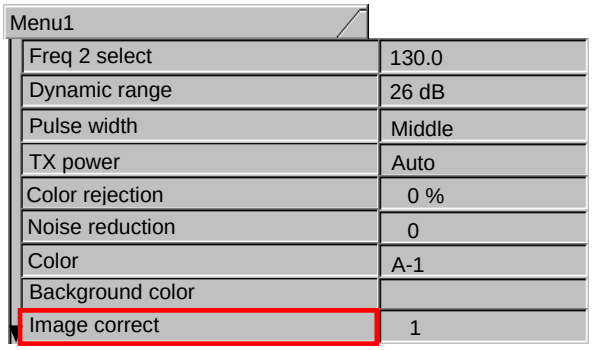
5. Press to close the menu.

2.2.10 Image correction

The image of the sonar mode can be corrected smoothly.

1. Press MENU to display [Menu1].

2. Turn (knob/left) to select [Image correct].



3. Press (knob/left) or ENT to move setting value box.

4. Turn (knob/left) to select the setting value from [Off], [1], [2] or [3].

[Off]: No effect
[1]: Medium effect
[2]: Strong effect
[3]: Weak effect which is effected between [Off] to [1]

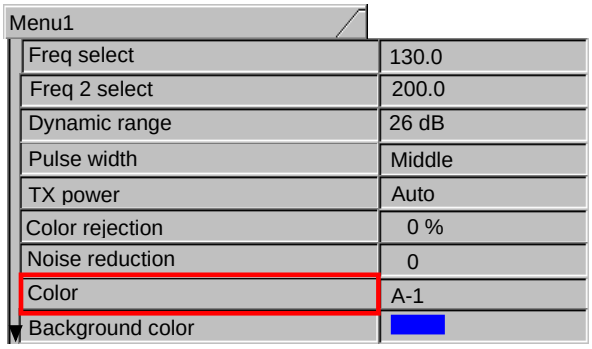
5. Press to close the menu.

2.2.11 Color selection

Color table can be selected from [A-1, A-2], [B-1, B-2], [C-1, C-2] or [Z-1, Z- 2].

1. Press MENU to display [Menu1].

2. Turn (knob/left) to select [Color].



3. Press (knob/left) or ENT to move setting value box.

4. Turn (knob/left) to select the setting value from [A-1, A-2], [B-1, B-2], [C-1, C-2] or [Z-1, Z-2].

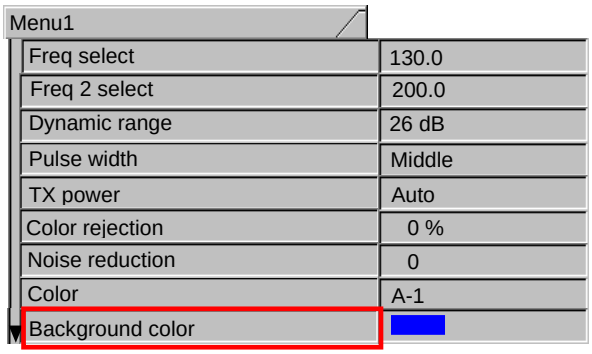
The color palette of [Z-1] and [Z-2] can be set by “Color palette” menu. Refer to “2.2.13 Color palette” (page 2-15).

5. Press to close the menu.

2.2.12 Background color

Background color can be selected from 8 colors.

1. Press MENU to display [Menu1].
2. Turn (knob/left) to select [Background color].



3. Press (knob/left) or ENT to move setting value box.

4. Turn (knob/left) to select the background color from the setting box.

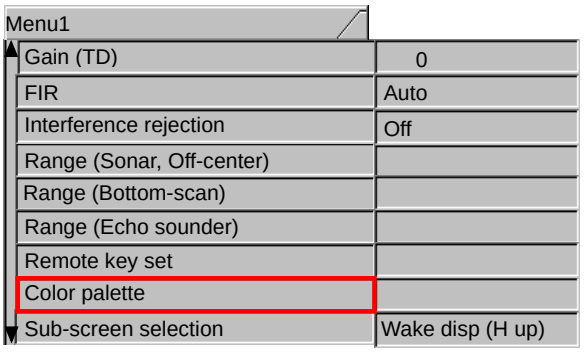
   Refer to “2.2.13 Color palette” (page 2-15).

5. Press to close the menu.

2.2.13 Color palette

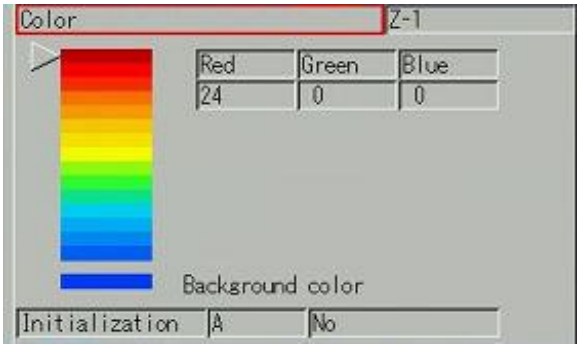
[Z-1] and [Z-2] of Color table menu ([Z-1], [Z-2]) and [Background color] can be edited.

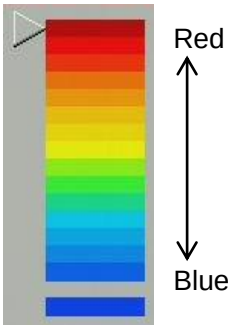
1. Press MENU to display [Menu1].
2. Turn (knob/left) to select [Color palette].



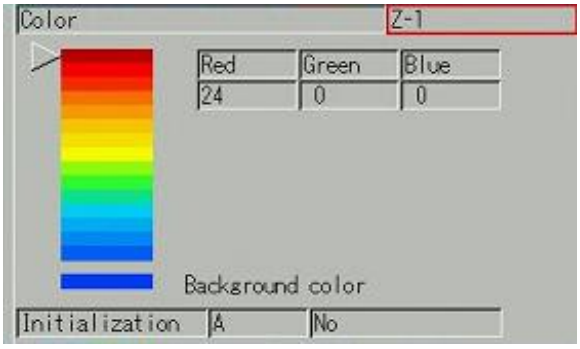
3. Press  (knob/left) or  to display Color palette menu.

If there is no need to change the color palette of “Z-1” and “Z-2”, go on to the below 7.





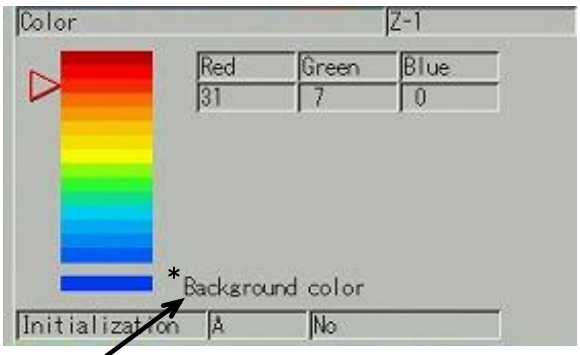
4. Press  (knob/left) or  to move setting value box.



5. Turn  (knob/left) to select the setting value from [Z-1] or [Z-2].

When [Z-1] is selected, 15 colors and one background color can be edited.
When [Z-2] is selected, 7 colors and one background color can be edited.

6. Press  (knob/left) or  to move [Color].

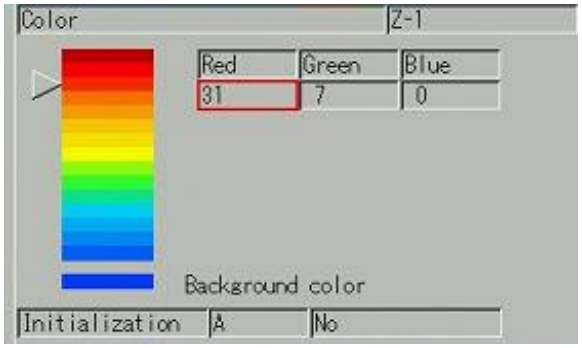


*For indicate the background color.

7. Turn (knob/left) and move to select appropriate color.

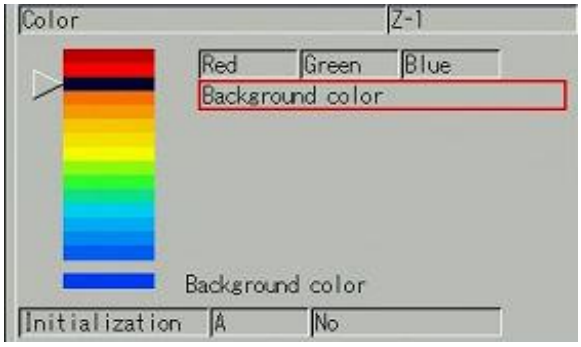
If you want to set the same color as the background color, select “Background color”.

8. Press (knob/left) or ENT to move the setting value box of the “Red value”.



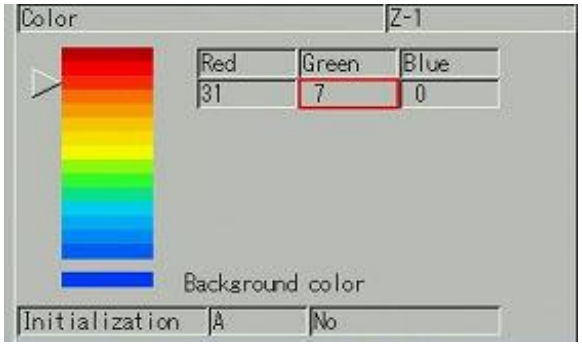
9. Turn (knob/left) to select the setting value from [Background color] or [0] to [31].

When “Background color” is selected, the color is set to the same color as the background color. The “Background color” selection is effective for rejection of the echo because echo’s color and the background color are same.

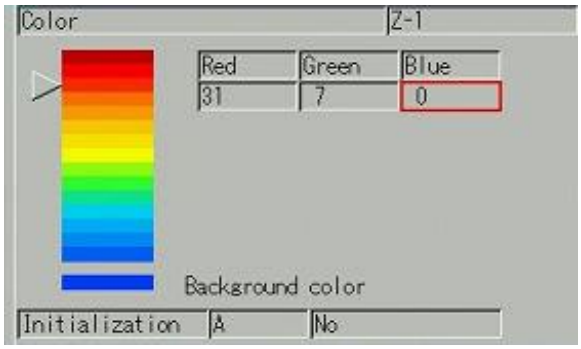


10. Press (knob/left) or ENT to move the setting value box of the “Green value”.

When the “Background color” has been already set by the “Red value”, return to .



11. Select the setting value of the green color value and the blue color value from [0] to [31] like a red color value.



12. Press (knob/left) or ENT to move .

13. Press to close the menu.

> **Caution: To display the color by the color palette settings, select [Menu1] => [Color] => [Z-1] or [Z-2].**

> **Caution: To display the background color by the color palette settings, select [Menu1] => [Background color].**

2.2.14 Initialization of Color palette

Initialize the color palette of [Z-1] and [Z-2].
There are 3 types of the default value as [A], [B] and [Z].
[A] is set from the default value of [A-1] and [A-2] to the current [Z-1] and [Z-2].
[B] is set from the default value of [B-1] and [B-2] to the current [Z-1] and [Z-2].
[C] is set from the default value of [Z-1] and [Z-2] to the current [Z-1] and [Z-2].

1. Press MENU to display [Menu1].

2. Turn (knob/left) to select [Color palette].

3. Press (knob/left) or ENT to move [Color] box and to display Color palette menu.

4. Turn (knob/left) to select [Initialization].

5. Press (knob/left) or ENT to move setting value box.

6. Turn (knob/left) to select the setting value from [A], [B] or [Z].

7. Press (knob/left) or ENT to move setting value box.

8. Turn (knob/left) to select the setting value from [No] or [Yes].

[No]: No initialization.
[Yes]: Initialization.

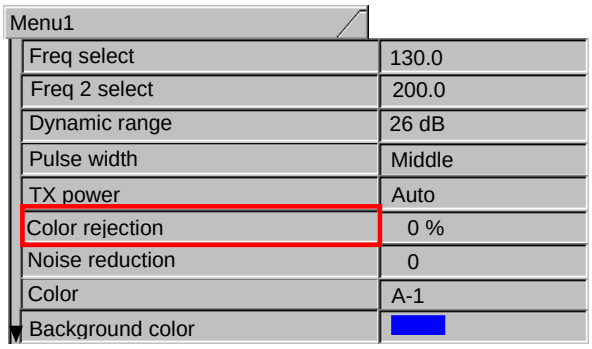
9. Press (knob/left) or ENT .

10. Press to close the menu.

2.2.15 Color rejection

When the response from dust and plankton displayed in light bluish color is to be erased, it is effective to use [Color rejection] function.
The color of aimed fish images and appearance of expanding response are displayed as it is and unnecessary response from dust and plankton is erased.

1. Press MENU to display [Menu1].
2. Turn (knob/left) to select [Color rejection].



3. Press (knob/left) or ENT to move setting value box.

4. Turn (knob/left) to select the setting value from [0%] to [80%].

5. Press to close the menu.

2.2.16 Sub-screen selection

Select the Sub-screen to be displayed and display the multi information into the window.

1. Press MENU to display [Menu1].

2. Turn (knob/left) to select [Sub-screen selection].

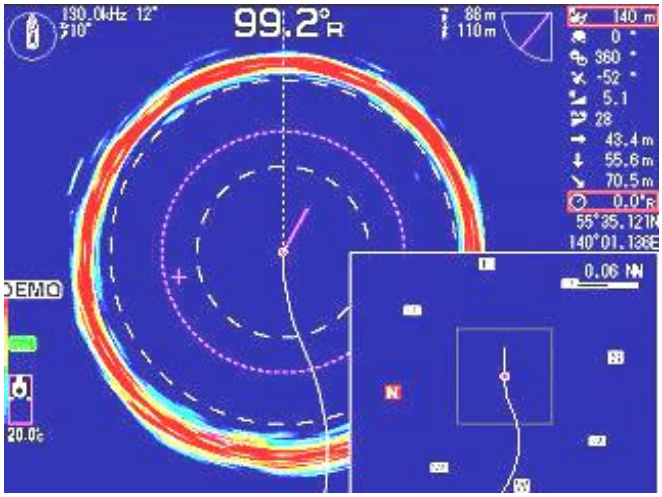
Menu1	
Range (Sonar, Off-center)	
Range (Bottom-scan)	
Range (Echo sounder)	
Remote key set	
Color palette	
Sub-screen selection	Wake disp (H up)
Sub-screen display	Off
Wake range (Sub-screen)	1. 0
Language	English

3. Press (knob/left) or ENT to move setting value box.

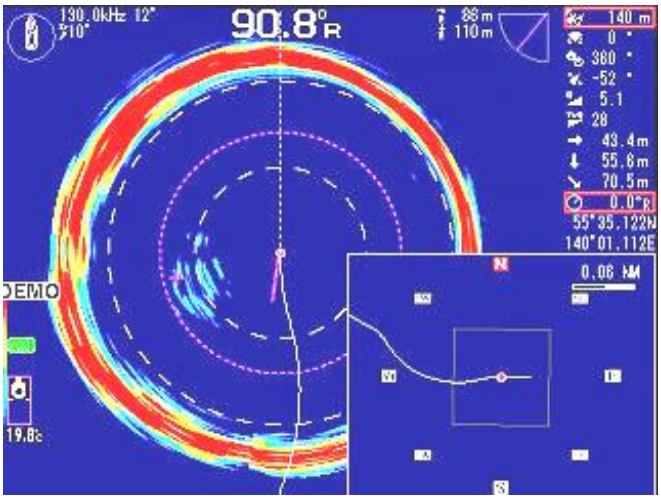
Sub-screen selection	Wake disp (H up)

4. Turn (knob/left) to select the setting value from [Wake disp (H up)], [Wake disp (N up)], [Wake disp (S up)] or [Bottom-scan].

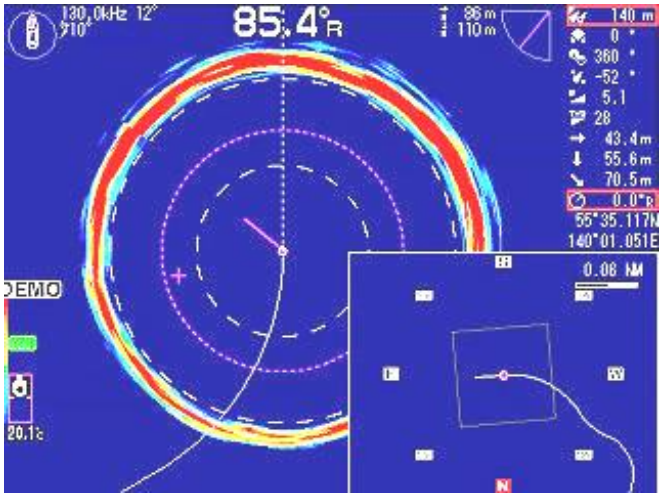
[Wake disp (H up)]



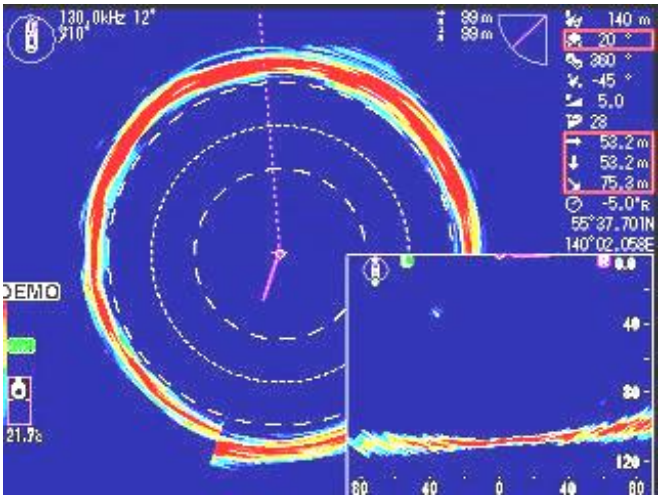
[Wake disp (N up)]



[Wake disp (S up)]



[Bottom-scan]



You can choose the combination of “Sonar / Bottom-scan”, “Sonar (offset) / Bottom scan”, “Bottom-scan / Bottom-scan” and “Echo sounder / Bottom-scan”
In this mode, the sonar scan alternately between a Sonar mode and a Bottom-scan mode.
The Bottom-scan settings for the Sub-screen come from the normal Bottom-scan settings. To change the settings, press key and select “Bottom-scan” to move to the normal Bottom-scan mode.

5. Press to close the menu.

2.2.17 Sub-screen display

Sub-screen display can be selected from [Off], [Small], [Middle] and [Large].
When [Bottom-scan] is selected, the Sub-screen size is same at [small] and [Middle].

1. Press 

to display [Menu1].

2. Turn  (knob/left) to select [Sub-screen display].

Menu1	
Range (Sonar, Off-center)	
Range (Bottom-scan)	
Range (Echo sounder)	
Remote key set	
Color palette	
Sub-screen selection	Wake disp (H up)
Sub-screen display	Off
Wake range (Sub-screen)	1. 0
Language	English

3. Press  (knob/left) or 

to move setting value box.

Sub-screen display	Off

4. Turn  (knob/left) to select the setting value from [Off], [Small], [Middle] or [Large].

5. Press  to close the menu.

2.2.18 Wake range (Sub-screen)

Set the range in the Sub-screen. The range unit can be set by [Menu2] => [Range & Speed unit]. Refer to “2.3.20 Range & Speed unit” (page 2-42).

1. Press 

to display [Menu1].

2. Turn  (knob/left) to select [Wake range (Sub-screen)].

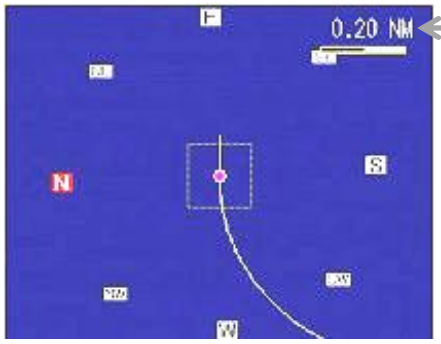
Menu1	
Range (Sonar, Off-center)	
Range (Bottom-scan)	
Range (Echo sounder)	
Remote key set	
Color palette	
Sub-screen selection	Wake disp (H up)
Sub-screen display	Off
Wake range (Sub-screen)	1. 0
Language	English

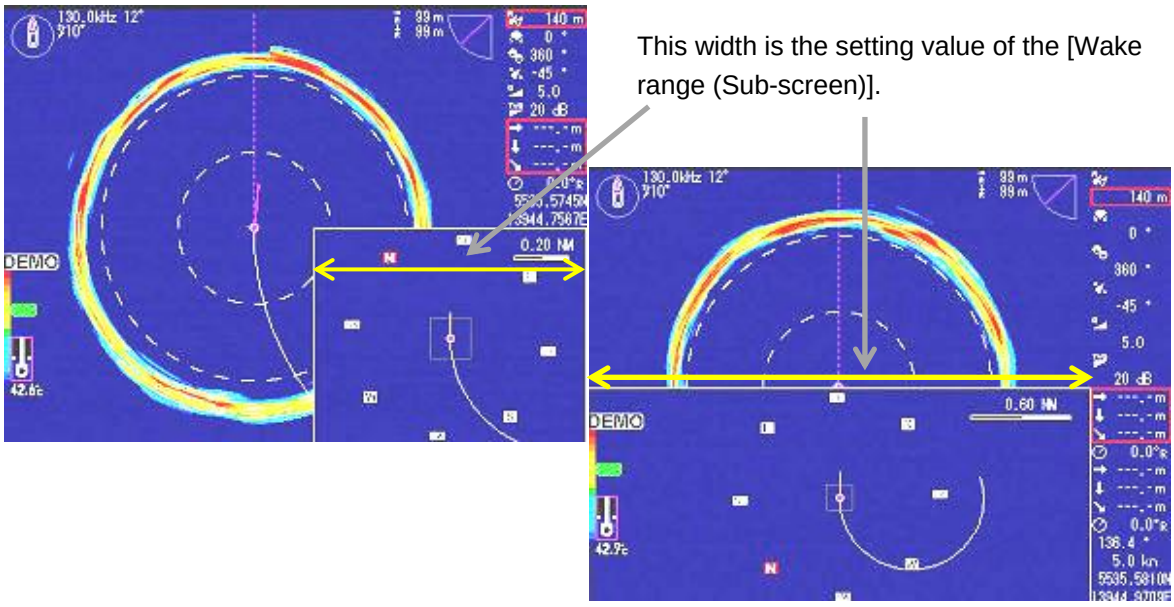
3. Press (knob/left) or ENT to move setting value box.

Wake range (Sub-screen)	1. 0

4. Turn (knob/left) to select the setting value from [0.1] to [10.0].

Wakes are shown within the range. Scale bar is indicated at the top right of the screen.





5. Press to close the menu.

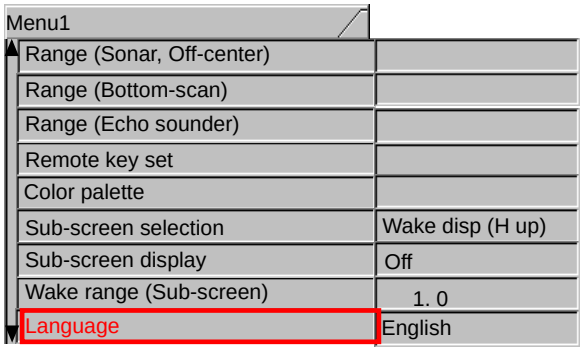
2.2.19 Language

Displayed language can be changed.

1. Press 

to display [Menu1].

2. Turn  (knob/left) to select [Language].



3. Press  (knob/left) or 

to move setting box.

4. Turn  to select a language to be used.

5. Press  to close the menu.

2.3 Menu2

To display the menu, press 

and select [Menu2].

The selected menu item will be displayed in red color box.
There are 30 setting items in [Menu2] box.

Menu2

Step (Sonar, Off-center)	10°
Step (Bottom-scan)	5°
Off-center position	Fore
Target lock	Reverse
A scope	Off
White line	Off
Scale	1
Internal buzzer volume	100
NMEA monitor	Off

Menu2

Compass display	Off
Wake display	Off
Wake memory interval	1 Second
Sonic speed	0.0%
Power freq adjust	250.0
Depth unit	m
Range & Speed unit	NM kn
Temperature unit	℃
Temperature adjustment	0.0

Menu2

Train correct	0.00
Ext synchronized	Off
Bearing display	Off
True / Relative bearing	Relative
Step (Bearing center)	5
Audio level	2
Audio tune	5
One line display	Small
One line scale	Range

Menu2

True / Relative bearing	Relative
Step (Bearing center)	5
Audio level	2
Audio tune	5
One line display	Small
One line scale	Range
One line display	0-100%
One line interval	5°
Save operation	Auto

Basic Operation of the Menu

1. Turn (knob/left) to select the setting item.

2. Press (knob/left) or ENT to confirm of the setting item.

2.3.1 Step (Sonar, Off-center)

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

1. Press MENU to display [Menu2].

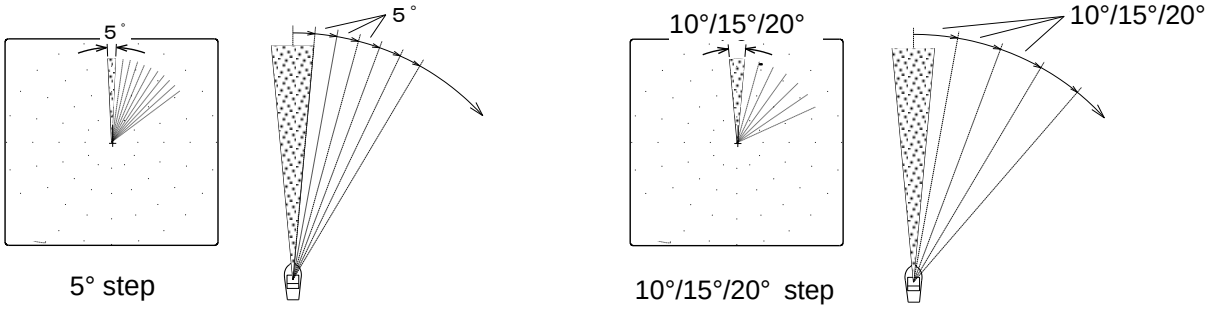
2. Turn (knob/left) to select [Step (Sonar, Off-center)].

Menu2	
Step (Sonar, Off-center)	10°
Step (Bottom-scan)	5°
Off-center position	Fore
Target lock	Reverse
A scope	Off
White line	Off
Scale	1
Internal buzzer volume	100
NMEA monitor	Off

3. Press (knob/left) or ENT to move setting value box.

Step (Sonar, Off-center)	5°

4. Turn (knob/left) to select the setting value from [5°], [10°], [15°] or [20°].



5° step

10°/15°/20° step

5. Press to close the menu.

2.3.2 Step (Bottom-scan)

The step angle (scanning angle) in the Bottom-scan mode may be selected.

1. Press MENU to display [Menu2].

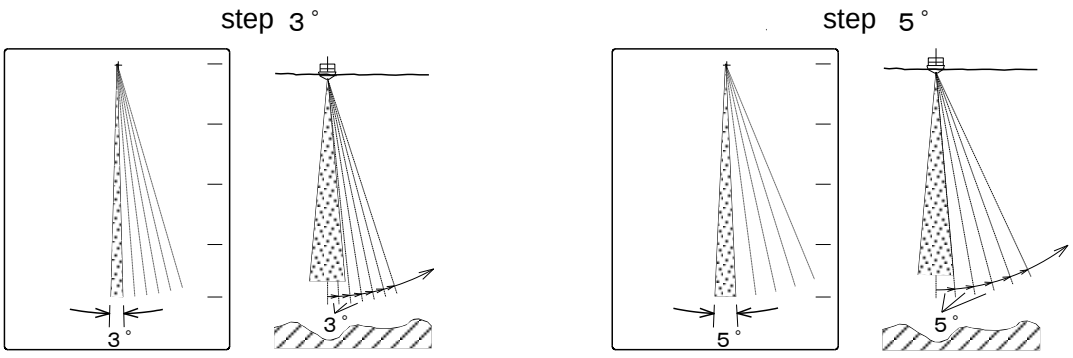
2. Turn (knob/left) to select [Step (Bottom-scan)].

Menu2	
Step (Sonar, Off-center)	10°
Step (Bottom-scan)	5°
Off-center position	Fore
Target lock	Reverse
A scope	Off
White line	Off
Scale	1
Internal buzzer volume	100
NMEA monitor	Off

3. Press (knob/left) or ENT to move setting value box.

Step (Bottom-scan)	5°

4. Turn (knob/left) to select the setting value from [3°] or [5°].



When a narrow step angel is selected, the image resolution becomes high, but the bearing speed becomes slow compared with a wide step angle.

5. Press to close the menu.

2.3.3 Off-center position

The ship's position on the screen may be selected in the Off-center mode.

1. Press MENU to display [Menu2].

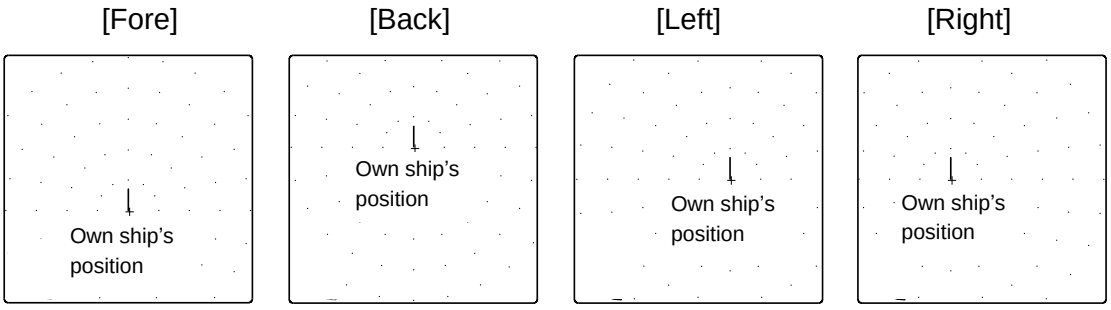
2. Turn (knob/left) to select [Off-center position].

Menu2	
Step (Sonar, Off-center)	10°
Step (Bottom-scan)	5°
Off-center position	Fore
Target lock	Reverse
A scope	Off
White line	Off
Scale	1
Internal buzzer volume	100
NMEA monitor	Off

3. Press (knob/left) or ENT to move setting value box.

Off-center position	Fore

4. Turn (knob/left) to select the setting value from [Fore], [Back], [Left] or [Right].



The ship's position can be selected from [Fore], [Back], [Left] or [Right] in the Off-center mode.

5. Press to close the menu.

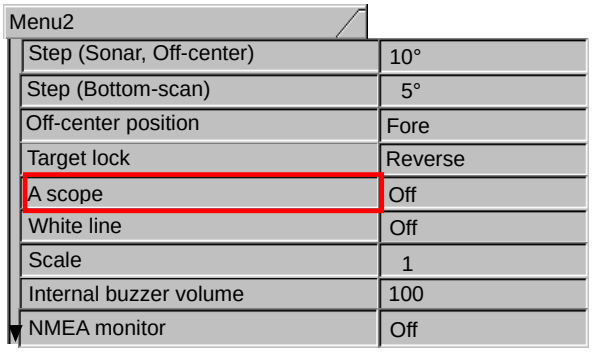
2.3.4 A scope

A scope expresses the echo strength of fish image from one set of the latest transmitted/received signal as width, to provide better view by displaying stronger response wide and weaker response narrow.
A Scope will be displayed on the right side of the echo sounder's images.

1. Press 

to display [Menu2].

2. Turn  (knob/left) to select [A scope].



3. Press  (knob/left) or 

to move setting value box.

4. Turn  (knob/left) to select the setting value from [Off] or [On].

[Off]: displays no A scope.
[On]: displays A scope.

5. Press  to close the menu.

2.3.5 White line

This mode can be enabled in Echo sounder mode.
[White line] is set to any value, the surface of sea bottom is marked with a white line of constant width to make the fish school at the bottom easily identified.

1. Press 

to display [Menu2].

2. Turn  (knob/left) to select [White line].

Menu2	
Step (Sonar, Off-center)	10°
Step (Bottom-scan)	5°
Off-center position	Fore
Target lock	Reverse
A scope	Off
White line	Off
Scale	1
Internal buzzer volume	100
NMEA monitor	Off

3. Press (knob/left) or ENT to move setting value box.

White line	Off

4. Turn (knob/left) to select the setting value from [Off], [1], [2], [3], [4] or [5].

[Off] : displays no White line.
[1] to [5] : displays White line. Select from 5 types. [5] is a thick white line which gradually reduced by moving from [5]=>[4]=>[3]=>[2]=>[1] that is the narrow.

5. Press to close the menu.

2.3.6 Scale

The scale dots display under Sonar mode can be selected [Off] or 6 types.

1. Press MENU to display [Menu2].
2. Turn (knob/left) to select [Scale].

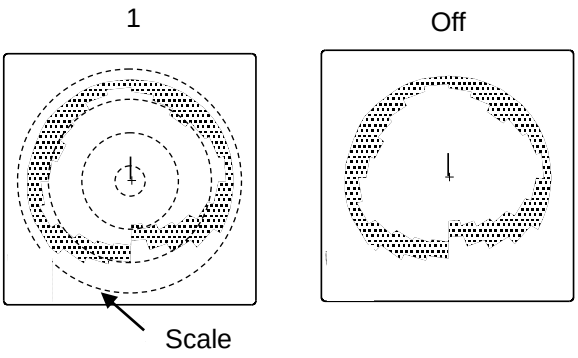
.

Menu2	
Step (Sonar, Off-center)	10°
Step (Bottom-scan)	5°
Off-center position	Fore
Target lock	Reverse
A scope	Off
White line	Off
Scale	1
Internal buzzer volume	100
NMEA monitor	Off

3. Press (knob/left) or ENT to move setting value box.

Scale	1

4. Turn (knob/left) to select the setting value from [Off], [1], [2], [3], [4], [5] or [6].



[Off] : displays no scale.
[1] to [6]: displays scale (dots). Select from 6 types.

When the scale 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/Echo sounder modes.

5. Press to close the menu.

2.3.7 Internal buzzer volume

Control the internal buzzer volume.

1. Press MENU to display [Menu2].

2. Turn (knob/left) to select [Internal buzzer volume].

Menu2	
Step (Sonar, Off-center)	10°
Step (Bottom-scan)	5°
Off-center position	Fore
Target lock	Reverse
A scope	Off
White line	Off
Scale	1
Internal buzzer volume	100
NMEA monitor	Off

3. Press (knob/left) or ENT to move setting value box.

Internal buzzer volume	100

4. Turn (knob/left) to select the setting value from [0] to [100].

The minimum volume is [0]. (silence)
Turn the volume up as the setting value is increased from [0]=>[1]=>[2]=>[100].
The maximum volume is [100].

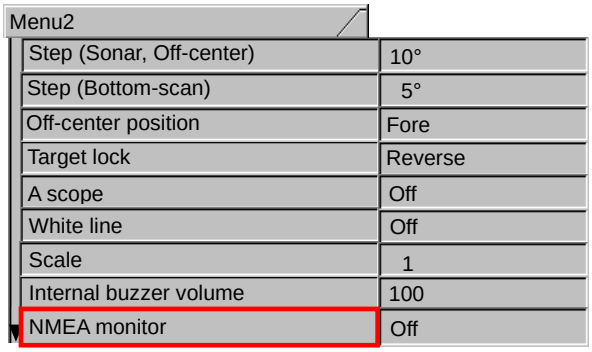
5. Press  to close the menu.

2.3.8 NMEA monitor

This is the function to confirm the data input/output from NMEA1 (J8) and Transducer unit (J2).

1. Press  to display [Menu2].

2. Turn  (knob/left) to select [NMEA monitor].



3. Press  (knob/left) or  to move setting value box.

4. Turn  (knob/left) to select the setting value from [Off] or [On].

[Off]: displays ordinary screen.
[On]: displays the input/output data.

Press  : Switch the NMEA1 (J8) or Transducer unit (J2).

Press  : Stop the data scroll temporality.

“NMEA1 Rx” shows the NMEA1 (J8) input sentence.
“NMEA1 Tx” shows the NMEA1 (J8) output sentence.
“SCANNER Rx” shows the Transducer unit (J2) input sentence.
“SCANNER Tx” shows the Transducer unit (J2) output sentence.

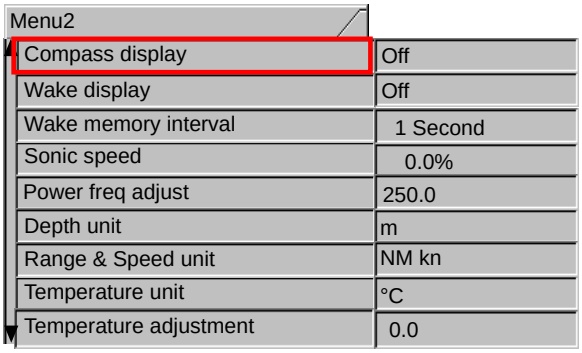
5. Press  to close the menu.

2.3.9 Compass display

The points of the compass can be shown on the screen in the Sonar mode by connecting the KDS-6000BB/5500BB to an external navigator.

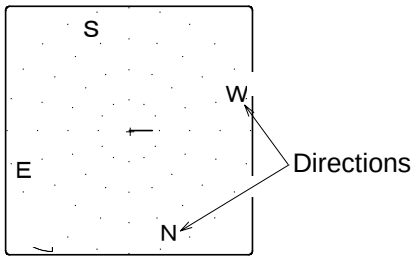
1. Press MENU to display [Menu2].

2. Turn (knob/left) to select [Compass display].



3. Press (knob/left) or ENT to move setting value box.

4. Turn (knob/left) to select the setting value from [Off] or [On].



[Off]: displays no points of the compass.
[On]: displays the points of the compass.

5. Press to close the menu.

2.3.10 Bearing display

The bearing display can be shown on the screen in the Sonar mode.

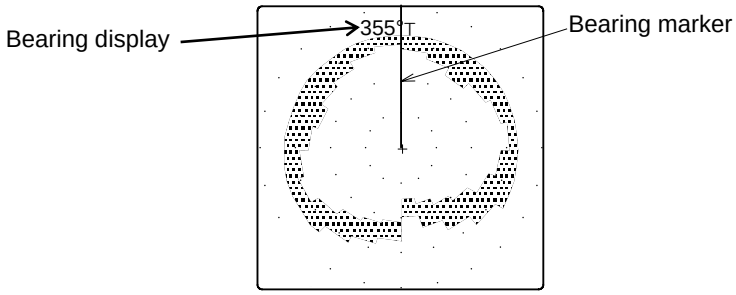
1. Press MENU to display [Menu2].
2. Turn (knob/left) to select [Bearing display].

Menu2	
Depth unit	m
Range & Speed unit	NM kn
Temperature unit	℃
Temperature adjustment	0.0
Train correct	0.00
Ext synchronized	Off
Bearing display	Off
True / Relative bearing	Relative
Step (Bearing center)	1

3. Press (knob/left) or ENT to move setting value box.

Bearing display	Off

4. Turn (knob/left) to select the setting value from [Off], [Small] or [Large].



[Off] : displays no bearing.
[Small] or [Large]: displays the bearing (in small characters or in large characters).

5. Press to close the menu.

2.3.11 Wake display

The track line can be shown on the screen in the Sonar mode.

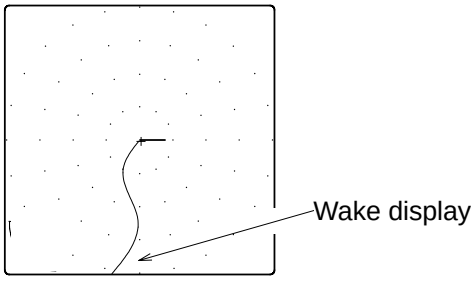
1. Press MENU to display [Menu2].
2. Turn (knob/left) to select [Wake display].

Menu2	
Compass display	Off
Wake display	Off
Wake memory interval	1 Second
Sonic speed	0.0%
Power freq adjust	250.0
Depth unit	m
Range & Speed unit	NM kn
Temperature unit	°C
Temperature adjustment	0.0

3. Press (knob/left) or ENT to move setting box.

Wake display	On

4. Turn (knob/left) to select the setting value from [Off] or [On].



[Off]: displays no wake (trackline).
[On]: displays the wake (trackline).

5. Press to close the menu.

2.3.12 Wake memory interval

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

1. Press MENU to display [Menu2].
2. Turn (knob/left) to select [Wake memory interval].

Menu2	
Compass display	Off
Wake display	Off
Wake memory interval	1 Second
Sonic speed	0.0%
Power freq adjust	250.0
Depth unit	m
Range & Speed unit	NM kn
Temperature unit	°C
Temperature adjustment	0.0

3. Press (knob/left) or ENT to move setting value box.

Wake memory interval	1 Second

4. Turn (knob/left) to select the setting value from [1 sec] to [30 sec].

When Wake memory interval is set to the short time, the smooth trail is displayed, but the trail length is short compared with setting to the long interval.
When Wake memory interval is set to the long time, the trail length is long, but the zigzag trail is displayed compared with setting to the short interval.
The trail position data can be stored up to 1000 points. When the additional position data is stored, the oldest position is deleted and the newest position is stored.

1 second: Recording interval 1sec., Storage time: 16m 40s
5 second: Recording interval 5sec., Storage time: 1h 23m 20s
10 second: Recording interval 10sec., Storage time: 2h 46m 20s
30 second: Recording interval 30sec., Storage time: 8h 20m 00s

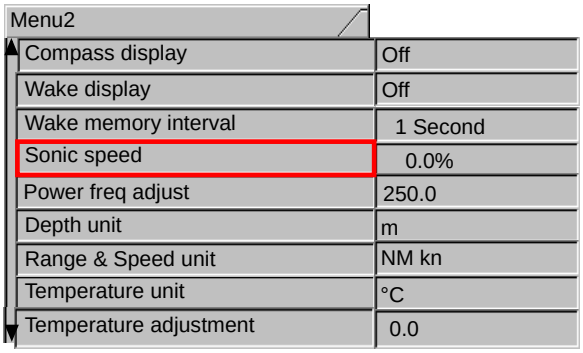
5. Press  to close the menu.

2.3.13 Sonic speed

Ultra sonic speed varies according to the temperature, the salt levels and the depth level.
Ultra sonic speed is decreased when the temperature level or the salt level is decreased.
The depth error can be reduced by correcting the ultrasonic speed.

1. Press  to display [Menu2].

2. Turn  (knob/left) to select [Sonic speed].



3. Press  (knob/left) or  to move setting value box.

4. Turn  (knob/left) to select the setting value from [-7.0%] to [2.0%].

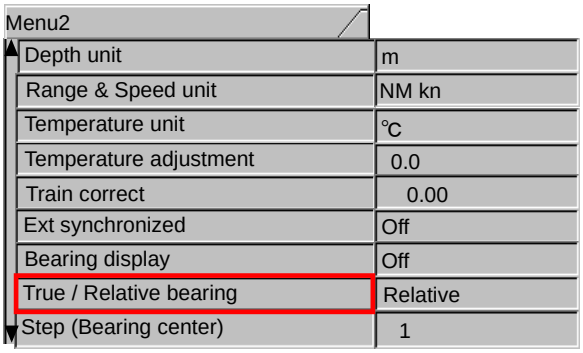
When the sonic speed is set to plus, the depth is increased.
When the sonic speed is set to minus, the depth is decreased.
In fresh water, set to around -4.0%.

5. Press  to close the menu.

2.3.14 True / Relative bearing

Select the cursor display mode when an external navigation equipment is connected.

1. Press MENU to display [Menu2].
2. Turn (knob/left) to select [True / Relative bearing].



3. Press (knob/left) or ENT to move setting value box.

4. Turn (knob/left) to select the setting value from [True] or [Relative].

True (with “T”): The settings available in the true bearing with the true north as 000 degree.
Relative (with “R”): The settings available in the relative bearing with the heading as 000 degree. Left side is indicated as the minus value. Right side is indicated as the plus value.

5. Press to close the menu.

2.3.15 Target lock

To select the desired Target lock function when is pressed during the operation in the Sonar mode.
This function changes the direction of rotation or searches the current position or the position specified by the cross cursor.

1. Press MENU to display [Menu2].
2. Turn (knob/left) to select [Target lock].

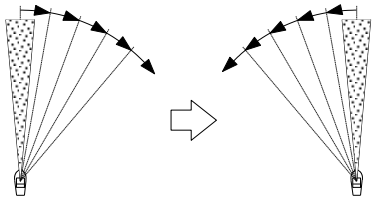
Menu2	
Step (Sonar, Off-center)	10°
Step (Bottom-scan)	5°
Off-center position	Fore
Target lock	Reverse
A scope	Off
White line	Off
Scale	1
Internal buzzer volume	100
NMEA monitor	Off

3. Press (knob/left) or ENT to move setting value box.

Target lock	Reverse

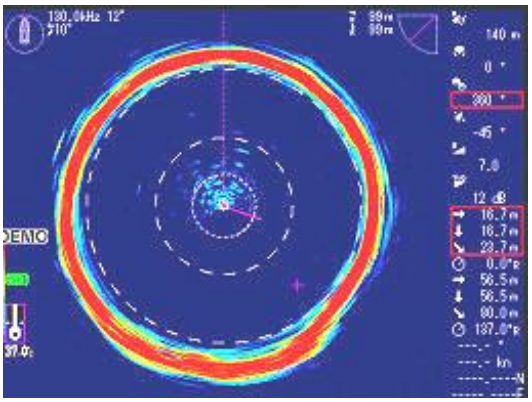
4. Turn (knob/left) to select the setting value from [Reverse], [Mode1], [Mode2], [Marker Mode1] or [Marker Mode2].

Reverse



The sector rotary direction is reversed by pressing .

Mode1



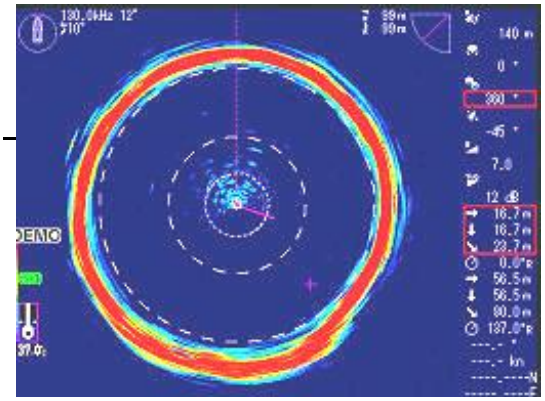
- When Mode1 is selected as a target lock mode, the latest direction when the key is pressed is searched.
- Mode1 searches left and right.

  After searching for a certain fixed time, the Target lock function will be released.

Mode2

- When Mode2 is selected as a target lock mode, the sonar beam will search the echo automatically up and down in addition to the Mode1 functions.

Marker Mode1 / Marker Mode2



- When Marker Mode1 is selected as a target lock mode, first move the cross cursor to the echo location. Then press the key to search for that location.
- Marker Mode1 searches left and right. Marker Mode2 searches left / right and up / down.

  After searching for a certain fixed time, the Target lock function will be released.

When Target lock ceases Bearing and Sector angles will return to their original positions.
Target lock function is not available in the Echo sounder mode.
In Bottom scan mode only reverse is available.

5. Press to close the menu.

2.3.16 Ext synchronized

To select where the trigger signal is taken from either Internal or External.

1. Press MENU to display [Menu2].
2. Turn (knob/left) to select [Ext synchronized].

Menu2	
Depth unit	m
Range & Speed unit	NM kn
Temperature unit	℃
Temperature adjustment	0.0
Train correct	0.00
Ext synchronized	Off
Bearing display	Off
True / Relative bearing	Relative
Step (Bearing center)	1

3. Press (knob/left) or ENT to move setting value box.

Ext synchronized	⌐¬

4. Turn (knob/left) to select the setting value from [Off], [⌐¬] or [¬⌐].

Off : selects when the internal synchronized signal is used for external equipment.
⌐¬ : selects when the rise synchronized signal is used from external equipment.
¬⌐ : selects when the fall synchronized signal is used from external equipment.

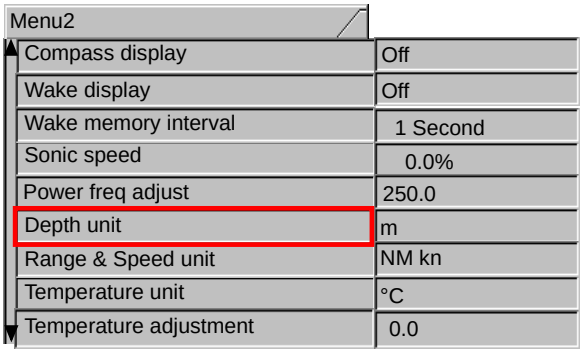
When KDS-6000BB/5500BB is used with external equipment as synchronization movement, the bearing speed may be reduced depending on the range settings.
To avoid this, it is recommended to use with the internal synchronized signal of the KDS-6000BB/5500BB as synchronization movement.
Refer to Installation Manual Chapter 1 Installation “1.6 Wiring Connection of TD position alarm / Ext. Sync. Box (JB-36)”.

5. Press  to close the menu.

2.3.17 Depth unit

The user may select the displayed depth unit to be one of the following.

1. Press  to display [Menu2].
2. Turn  (knob/left) to select [Depth unit].



3. Press  (knob/left) or  to move setting value box.

4. Turn  (knob/left) to select the setting value from [m], [ft], [fm] or [I.fm].

m ：Displays the unit meters.
ft ：Displays the unit feet. (1ft: 0.305m)
fm ：Displays the unit fathoms. (1fm: 1.83m)
I.fm ：Displays the unit Italian fathoms. (1I.fm: 1.6m)

5. Press  to close the menu.

2.3.18 Temperature unit

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

1. Press  to display [Menu2].

2. Turn (knob/left) to select [Temperature unit].

Menu2	
Depth unit	m
Range & Speed unit	NM kn
Temperature unit	°C
Temperature adjustment	0.0
Train correct	0.00
Ext synchronized	Off
Bearing display	Off
True / Relative bearing	Relative
Step (Bearing center)	1

3. Press (knob/left) or ENT to move setting value box.

Temperature unit	°C

4. Turn (knob/left) to select the setting value from [°C] or [°F].

°C: Centigrade
°F: Fahrenheit

5. Press to close the menu.

2.3.19 Temperature adjustment

To adjust the water temperature displayed on the screen.

1. Press MENU to display [Menu2].
2. Turn (knob/left) to select [Temperature adjustment].

Menu2	
Depth unit	m
Range & Speed unit	NM kn
Temperature unit	°C
Temperature adjustment	0.0
Train correct	0.00
Ext synchronized	Off
Bearing display	Off
True / Relative bearing	Relative
Step (Bearing center)	1

3. Press (knob/left) or ENT to move setting value box.

Temperature adjustment	0.0

4. Turn (knob/left) to select the setting value from [-9.9] to [9.9]. (every 0.1 steps)

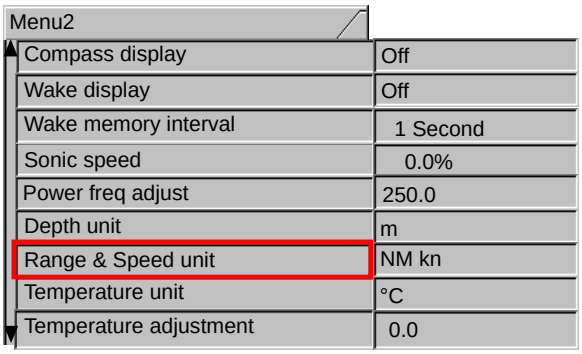
9.9° : maximized the value of the adjustment
| ↑ increases the value
0.0° : no adjustment
| ↓ decreases the value
-9.9° : minimized the value of the adjustment

5. Press to close the menu.

2.3.20 Range & Speed unit

It can be shown in [NM (nautical miles), kn (knots)] or [km, km/h].

1. Press MENU to display [Menu2].
2. Turn (knob/left) to select [Range & Speed unit].



3. Press (knob/left) or ENT to move setting value box.

4. Turn (knob/left) to select the setting value from [NM kn] or [km km/h].

NM : measured in nautical mile. (1NM: 1.852km)
kn : measured in knot. (1knot: 1.852km/h)
km/h : measured in kilometer.

5. Press to close the menu.

2.3.21 Train correct

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

In the Sonar mode use  to adjust the Bearing toward Bow direction.

1. Press  to display [Menu2].
2. Turn  (knob/left) to select [Train correct].

Menu2	
Depth unit	m
Range & Speed unit	NM kn
Temperature unit	°C
Temperature adjustment	0.0
Train correct	0.00
Ext synchronized	Off
Bearing display	Off
True / Relative bearing	Relative
Step (Bearing center)	1

3. Press  (knob/left) or  to move setting value box.

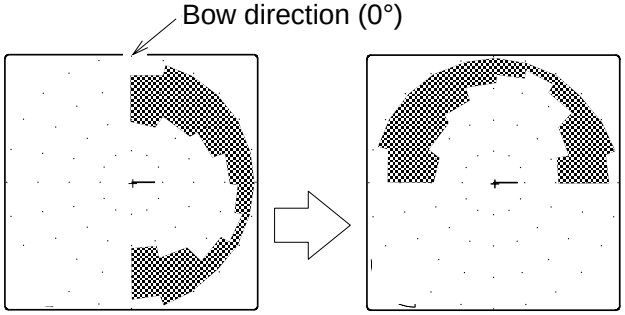
Train correct	0.00

4. Turn  (knob/left) to select the setting value from [-180.00] to [180.00].
5. Press  to close the menu.

Procedure of [Train correct] (90° setting)

1. Turn  (knob/left) to select the value of [90.00].
2. Press  to close the menu.

The screen display will be corrected 90° counterclockwise.



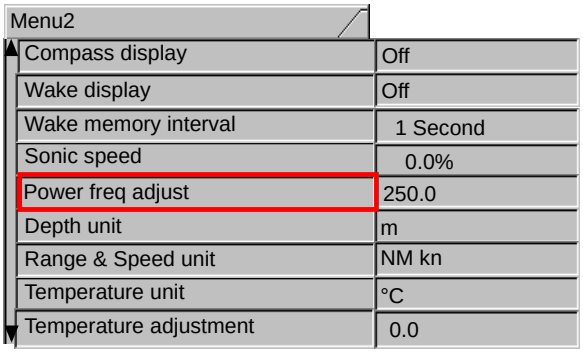
The display is turned by 90° counterclockwise.

2.3.22 Power freq adjust

To adjust of switching frequency of power supply. The image may have noise due to the interference with the frequency of the internal power supply. Erase the noise by changing the transmit frequency or the frequency of the power supply.

1. Press MENU to display [Menu2].

2. Turn (knob/left) to select [Power freq adjust].



3. Press (knob/left) or ENT to move setting value box.

4. Turn (knob/left) to select the setting value from [250.0] to [300.0].
(every 0.1kHz steps)

> **Caution: The setting value should be set to “250.0 kHz” in normal use.**

5. Press to close the menu.

2.3.23 Step (Bearing center)

Set the step angle for changing the angle of sector.

1. Press MENU to display [Menu2].

2. Turn (knob/left) to select [Step (Bearing center)].

Menu2	
Depth unit	m
Range & Speed unit	NM kn
Temperature unit	°C
Temperature adjustment	0.0
Train correct	0.00
Ext synchronized	Off
Bearing display	Off
True / Relative bearing	Relative
Step (Bearing center)	1

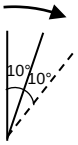
3. Press (knob/left) or ENT to move setting value box.

Step (Bearing center)	5

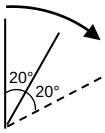
4. Turn (knob/left) to select the setting step from [1] to [30].

The bearing direction is moved each settings step.

[Setting step: 10]



[Setting step: 20]



5. Press to close the menu.

2.3.24 Audio level

Control the Audio level when an audio speaker is connected to the KDS-6000BB/5500BB.

1. Press MENU to display [Menu2].

2. Turn (knob/left) to select [Audio level].

Menu2	
Bearing display	Off
True / Relative bearing	Relative
Step (Bearing center)	5
Audio level	2
Audio tune	5
One line display	Small
One line scale	Range
One line shift	0-100%
One line interval	5°

3. Press (knob/left) or ENT to move setting value box.

4. Turn (knob/left) to select the setting value from [1] to [40].

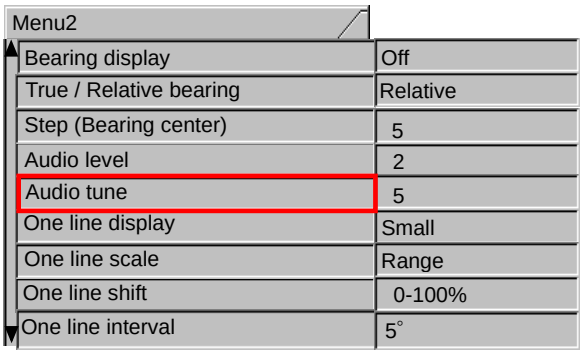
5. Press to close the menu.

2.3.25 Audio tune

Control the Audio tune when an audio speaker is connected to the KDS-6000BB/5500BB.

1. Press MENU to display [Menu2].

2. Turn (knob/left) to select [Audio tune].



3. Press (knob/left) or ENT to move setting value box.

4. Turn (knob/left) to select the setting value from [1] to [10].

5. Press to close the menu.

2.3.26 One line display

One line display can be selected from [Small], [Medium], and [Large].

1. Press MENU to display [Menu2].

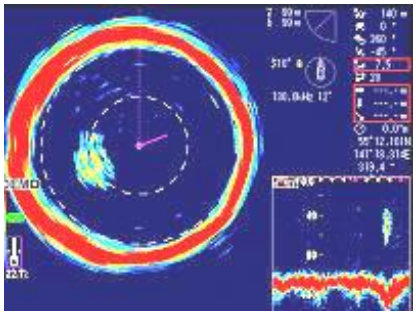
2. Turn (knob/left) to select [One line display].

Menu2	
Bearing display	Off
True / Relative bearing	Relative
Step (Bearing center)	5
Audio level	2
Audio tune	5
One line display	Small
One line scale	Range
One line shift	0-100%
One line interval	5°

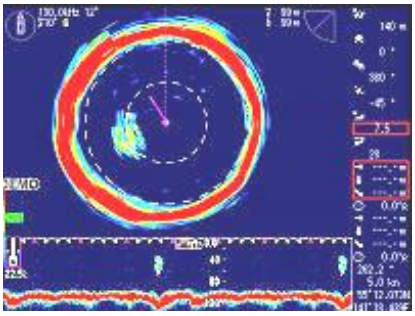
3. Press (knob/left) or ENT to move setting value box.

One line display	Small

4. Turn (knob/left) to select the setting value from [Small], [Medium] or [Large].



[Small]



[Large]

5. Press to close the menu.

2.3.27 One line scale

One line scale can be selected from [Range] and [Depth].
[Depth]: The scale value is calculated by Range and Tilt angle.

1. Press MENU to display [Menu2].

2. Turn (knob/left) to select [One line scale].

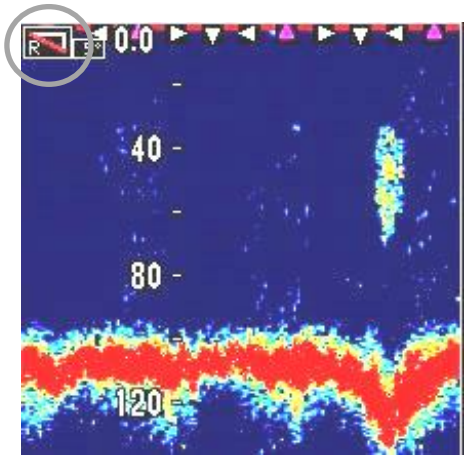
Menu2	
Bearing display	Off
True / Relative bearing	Relative
Step (Bearing center)	5
Audio level	2
Audio tune	5
One line display	Small
One line scale	Range
One line shift	0-100%
One line interval	5°

3. Press (knob/left) or ENT to move setting value box.

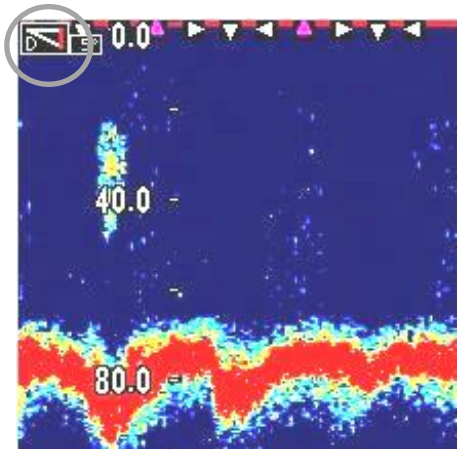
One line scale	Range

4. Turn (knob/left) to select the setting value from [Range] or [Depth].

[Range] scale / value



[Depth] scale / value



5. Press to close the menu.

2.3.28 One line shift

The display range of [One line display] can be selected.

One line shift can be selected from [0-100%], [0-50%], [0-75%], [25-100%] and [50-100%].

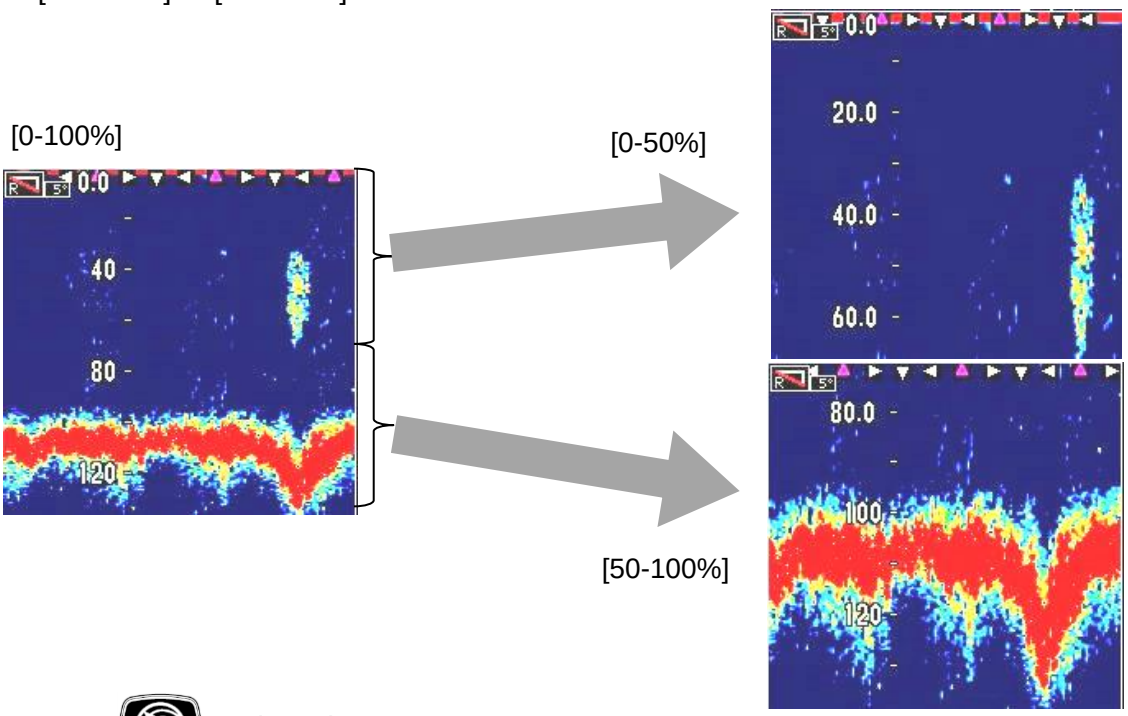
1. Press MENU to display [Menu2].
2. Turn (knob/left) to select [One line shift].

Menu2	
Bearing display	Off
True / Relative bearing	Relative
Step (Bearing center)	5
Audio level	2
Audio tune	5
One line display	Small
One line scale	Range
One line shift	0-100%
One line interval	5°

3. Press (knob/left) or ENT to move setting value box.

One line shift	0-100%

4. Turn (knob/left) to select the setting value from [0-100%], [0-50%], [0-75%], [25-100%] or [50-100%].



5. Press to close the menu.

2.3.29 One line interval

One line interval can be selected from [5°] and [10°].

[5°] : The image of the Sonar mode is displayed every 5° steps in [One line display].
[10°]: The image of the Sonar mode is displayed every 10°steps in [One line display].

1. Press MENU to display [Menu2].

2. Turn (knob/left) to select [One line interval].

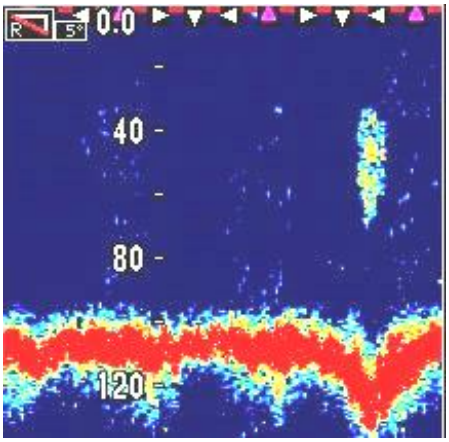
Menu2	
Bearing display	Off
True / Relative bearing	Relative
Step (Bearing center)	5
Audio level	2
Audio tune	5
One line display	Small
One line scale	Range
One line shift	0-100%
One line interval	5°

3. Press (knob/left) or ENT to move setting value box.

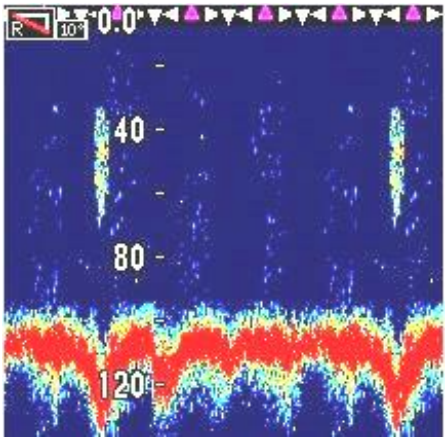
One line interval	5°

4. Turn (knob/left) to select the setting value from [5°] or [10°].

One line interval: [5°]



One line interval: [10°]



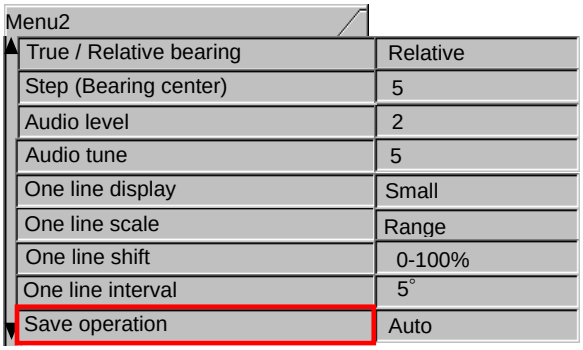
5. Press to close the menu.

2.3.30 Save operation

Backup method of setting (value) can be selected from [Auto] or [Manual].
[Save operation] is useful for adjustment of TVG and other settings.

1. Press MENU to display [Menu2].

2. Turn (knob/left) to select [Save operation].



3. Press (knob/left) or ENT to move setting value box.

4. Turn (knob/left) to select the setting value from [Auto] or [Manual].

[Auto]: Each time the setting is changed, the setting value is saved automatically.
[Manual]: The setting value is saved when any CM key is long pressed. The setting value will return to previous status when any CM key is pressed.

> ⚠ **Caution: When [Save operation] is changed from [Manual] to [Auto], any CM key must be long pressed to confirm this change.**

5. Press to close the menu.

Example: Setting [Manual] of Save operation (TVG, Dynamic range and so on)

1. Turn (knob/left) to select [Manual].
2. Press CM1 .
3. Change the setting of TVG, Dynamic range and so on.
4. Press CM1 to return to previous setting.

5. Long press 

to confirm this setting.

6. Press  to close the menu.

2.4 Menu3

To display the menu, press 

and select [Menu3].

The selected menu item will be displayed in red color box.
There are 23 setting items in [Menu3] box.
(Stabilizer items will be added when DHU-6302-BRD.B (AS) / -80kHz (AS) / -140kHz (AS) / -180kHz (AS) is installed.)

Menu3	
Baud rate	4800
DBT output	Off
DPT output	Off
GGA output	Off
GLL output	Off
MTW output	Off
RMC output	Off
TLL output	On
VTG output	Off

Menu3	
ZDA output	Off
Simulation	Off
Menu time-out period	Off
Hull unit auto up	15
Hull unit operation at the start	No
Transducer unit baud rate	19200
Slow down the Bearing speed	0
Menu (transparent)	15
Message (transparent)	10

Menu3	
Transducer unit baud rate	19200
Slow down the Bearing speed	0
Menu (transparent)	15
Message (transparent)	10
Sub-screen (transparent)	0
Information display	Lat / long
Localtime offset	9.0
Dynamic range standard	Top
The origin detection	On

Basic Operation of the Menu

1. Turn  (knob/left) to select the setting item.

2. Press  (knob/left) or 

to confirm of the setting item.

2.4.1 Baud rate

Select the baud rate of NMEA1 when external equipment is connected.

1. Press MENU to display [Menu3].
2. Turn (knob/left) to select [Baud rate].

Menu3	
Baud rate	4800
DBT output	Off
DPT output	Off
GGA output	Off
GLL output	Off
MTW output	Off
RMC output	Off
TLL output	On
VTG output	Off

3. Press (knob/left) or ENT to move setting value box.

Baud rate	4800

4. Turn (knob/left) to select the setting value from [4800], [9600], [19200] or [38400].
5. Press to close the menu.

2.4.2 Selection of NMEA output

Select to enable the output or to disable the output.
(DBT/DPT/GGA/GLL/MTW/RMC/TLL/VTG/ZDA output)

1. Press MENU to display [Menu3].
2. Turn (knob/left) to select [Optional output].

Menu3	
Baud rate	4800
DBT output	Off
DPT output	Off
GGA output	Off
GLL output	Off
MTW output	Off
RMC output	Off
TLL output	On
VTG output	Off

3. Press (knob/left) or ENT to move setting value box.

DBT output	Off

4. Turn (knob/left) to select the setting value from [On] or [Off].

5. Press to close the menu.

2.4.3 Simulation

The actual movie stored in the internal memory can be played for the operating instructions. (In order to distinguish from the current real image, “DEMO” is indicated during playing the Simulation movie.)

1. Press MENU to display [Menu3].

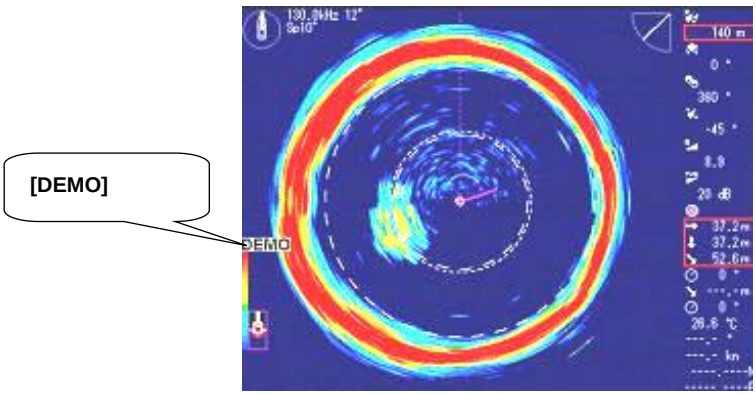
2. Turn (knob/left) to select [Simulation].

Menu3	
ZDA output	Off
Simulation	Off
Menu time-out period	Off
Hull unit auto up	15
Hull unit operation at the start	No
Transducer unit baud rate	19200
Slow down the Bearing speed	0
Menu (transparent)	15
Message (transparent)	10

3. Press (knob/left) or ENT to move setting value box.

Simulation	On

4. Turn (knob/left) to select the setting value from [On] or [Off].



5. Press to close the menu.

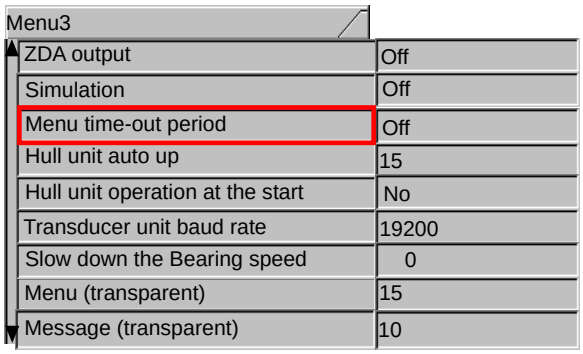
2.4.4 Menu time-out period

You can set the Menu time-out period to close the menu automatically from the last menu operation.

1. Press 

to display [Menu3].

2. Turn  (knob/left) to select [Menu time-out period].



3. Press  (knob/left) or 

to move setting value box.

4. Turn  (knob/left) to select the setting value from [Off] or [5] to [60].

When [Off] is set, the menu is not closed automatically.

5. Press  to close the menu.

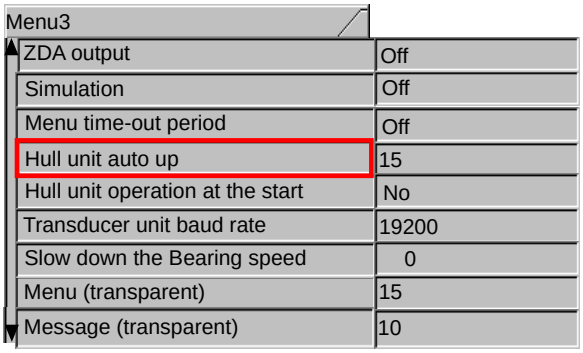
2.4.5 Hull unit auto up

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

1. Press 

to display [Menu3].

2. Turn  (knob/left) to select [Hull unit auto up].



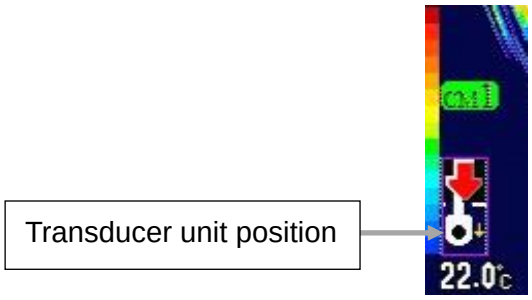
3. Press (knob/left) or ENT to move setting value box.

4. Turn (knob/left) to select the setting value from [Off] or [1] to [17] (Speed unit: kn).

Or select from [Off] or [1] to [30] (Speed unit: km/h).

The setting range is changed when the speed unit is selected to kn or km/h.
The Transducer unit can be retracted automatically when the ship speed is over a specified speed.
This function is for safe operation when forgetting to hoist the Transducer unit at high speed.

The Transducer unit position mark shows on the left bottom of the screen while the Transducer unit is lowering.
The Transducer unit position mark shows on the left bottom of the screen when the Transducer unit is retracted automatically.



Caution: The setting value can be set up to 17kn (30km/h), but the ship speed it should be kept up15kn (27km/h) or less.

Caution: It is recommended to set to 12kn (22km/h) or less when you have forgotten to retract the Transducer unit in the high speed.

5. Press to close the menu.

2.4.6 Hull unit operation at the start

Select the status of Hull unit after power on.

1. Press MENU to display [Menu3].

2. Turn (knob/left) to select [Hull unit operation at the start].

Menu3	
ZDA output	Off
Simulation	Off
Menu time-out period	Off
Hull unit auto up	15
Hull unit operation at the start	No
Transducer unit baud rate	19200
Slow down the Bearing speed	0
Menu (transparent)	15
Message (transparent)	10

3. Press (knob/left) or ENT to move setting value box.

Hull unit operation at the start	No

4. Turn (knob/left) to select the setting value from [Yes] or [No].

[Yes] : Transducer unit automatically will go down after initial screen is displayed.

[No] : Transducer unit will not go down after initial screen is displayed. Press to lower.

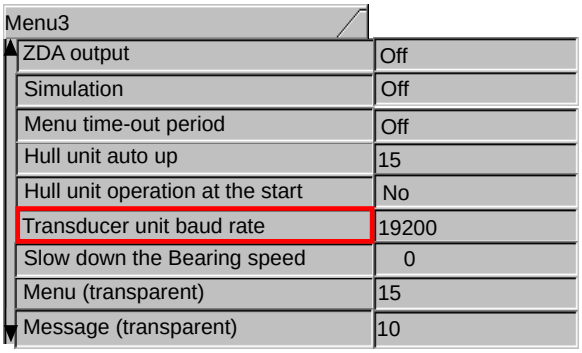
Caution: Transducer unit does not go down soon after power on.
When [Hull unit operation at the start] is set to "Yes", Transducer unit will go down soon after power on.

5. Press to close the menu.

2.4.7 Transducer unit baud rate

Set the baud rate between Processor unit and Transducer unit.

1. Press MENU to display [Menu3].
2. Turn (knob/left) to select [Transducer unit baud rate].



3. Press (knob/left) or ENT to move setting value box.

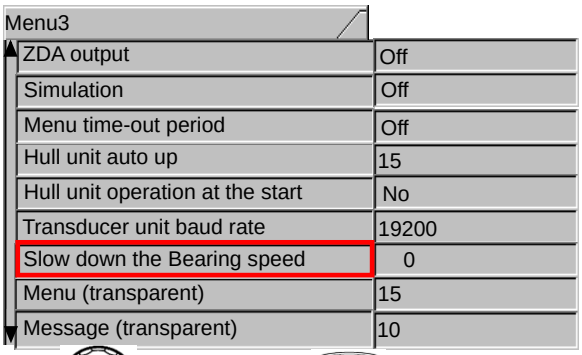
4. Turn (knob/left) to select the setting value from [4800], [9600] or [19200].

5. Press to close the menu.

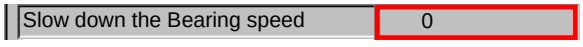
2.4.8 Slow down the Bearing speed

The bearing speed may be unstable depending on the range settings.
In this case, it can be stable by change the bearing speed to be slow. However the image update rate will be slow.

1. Press MENU to display [Menu3].
2. Turn (knob/left) to select [Slow down the Bearing speed].



3. Press (knob/left) or ENT to move setting value box.



4. Turn (knob/left) to select the setting value from [0] to [500].
5. Press to close the menu.

2.4.9 Menu (transparent)

The background image can be easy to see by changing the transparent rate of the menu.

1. Press 

to display [Menu3].

2. Turn  (knob/left) to select [Menu (transparent)].

Menu3	
ZDA output	Off
Simulation	Off
Menu time-out period	Off
Hull unit auto up	15
Hull unit operation at the start	No
Transducer unit baud rate	19200
Slow down the Bearing speed	0
Menu (transparent)	15
Message (transparent)	10

3. Press  (knob/left) or 

to move setting value box.

Menu (transparent)	15

4. Turn  (knob/left) to select the setting value from [0] to [25].

5. Press  to close the menu.

2.4.10 Message (transparent)

The background image can be easy to see by changing the transparent rate of the message box.

1. Press 

to display [Menu3].

2. Turn  (knob/left) to select [Message (transparent)].

Menu3	
ZDA output	Off
Simulation	Off
Menu time-out period	Off
Hull unit auto up	15
Hull unit operation at the start	No
Transducer unit baud rate	19200
Slow down the Bearing speed	0
Menu (transparent)	15
Message (transparent)	10

3. Press (knob/left) or ENT to move setting value box.

Message (transparent)	10

4. Turn (knob/left) to select the setting value from [0] to [20].

5. Press to close the menu.

2.4.11 Sub-screen (transparent)

The background image can be easy to see by changing the transparent rate of the sub-screen.

1. Press MENU to display [Menu3].

2. Turn (knob/left) to select [Sub-screen (transparent)].

Menu3

Hull unit operation at the start	No
Transducer unit baud rate	19200
Slow down the Bearing speed	0
Menu (transparent)	15
Message (transparent)	10
Sub-screen (transparent)	0
Information display	Lat / long
Localtime offset	9.0
Dynamic range standard	Top

3. Press (knob/left) or ENT to move setting value box.

Sub-screen (transparent)	10

4. Turn (knob/left) to select the setting value from [0] to [20].

5. Press to close the menu.

2.4.12 Information display

Select the display of own ship's information from Lat/long or Date.

1. Press MENU to display [Menu3].

2. Turn (knob/left) to select [Information display].

Menu3	
Hull unit operation at the start	No
Transducer unit baud rate	19200
Slow down the Bearing speed	0
Menu (transparent)	15
Message (transparent)	10
Sub-screen (transparent)	0
Information display	Lat / long
Localtime offset	9.0
Dynamic range standard	Top

3. Press (knob/left) or ENT to move setting value box.

Information display	Off

4. Turn (knob/left) to select the setting value from [Off], [Lat/long], [Date], or [Lat/long/Date].

[Lat/long]: displays own position and VRM in numerical values of latitude and longitude.
[Date] : displays date.

5. Press to close the menu.

2.4.13 Localtime offset

Set time difference to the world standard time.

1. Press MENU to display [Menu3].
2. Turn (knob/left) to select [Localtime offset].

Menu3	
Hull unit operation at the start	No
Transducer unit baud rate	19200
Slow down the Bearing speed	0
Menu (transparent)	15
Message (transparent)	10
Sub-screen (transparent)	0
Information display	Lat / long
Localtime offset	9.0
Dynamic range standard	Top

3. Press (knob/left) or ENT to move setting value box.

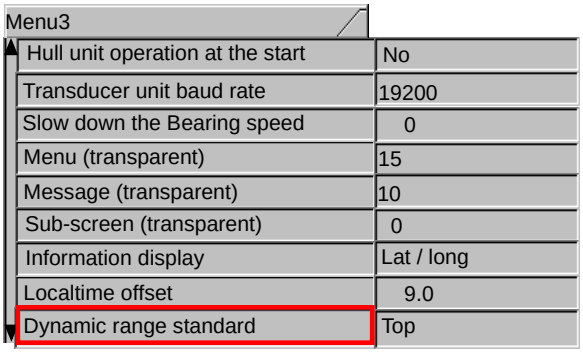
Localtime offset	0.0

4. Turn (knob/left) to select the setting value from [-11.0] to [14.0].
5. Press to close the menu.

2.4.14 Dynamic range standard

Set the base point of the Dynamic range.

1. Press MENU to display [Menu3].
2. Turn (knob/left) to select [Dynamic range standard].



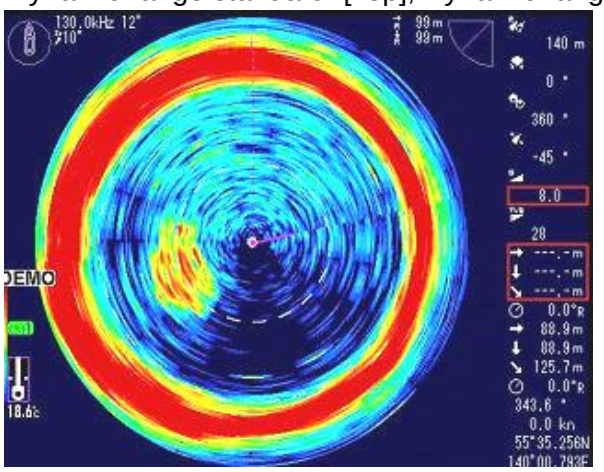
3. Press (knob/left) or ENT to move setting value box.

4. Turn (knob/left) to select the setting value from [Top] or [Under].

[Top]: The echo is displayed based on the strong echo. The echo is changed depending on the [Dynamic range] settings in the “Menu1” (Refer to page 2-8).
When [Dynamic range] is set to 32dB, the echo can be displayed from the strong echo to the weak echo.
When [Dynamic range] is set to 12dB, the weak echo is disappeared and the strong echo (fish, bottom, etc.) can be emphasized.

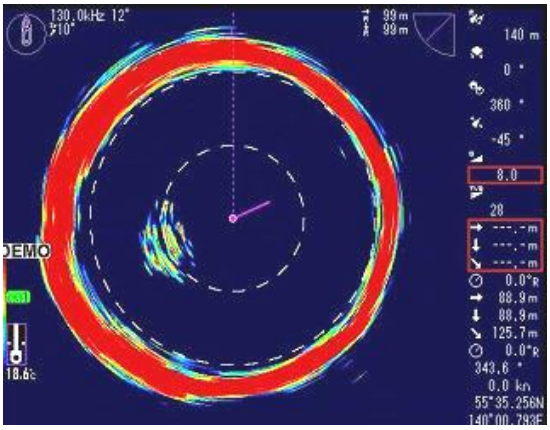
[Sample image]

Dynamic range standard: [Top], Dynamic range: [32dB]



[Sample image]

Dynamic range standard: [Top], Dynamic range: [12dB]



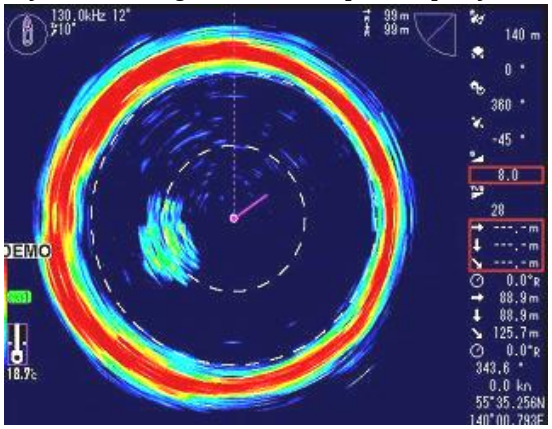
[Under]: the echo is displayed based on the strong echo. The echo is changed depending on the [Dynamic range] settings in the “Menu1” (Refer to page 2-8).

When [Dynamic range] is set to 32dB, the strong echo can be emphasized more strongly.

When [Dynamic range] is set to 12dB, the weak echo can be emphasized.

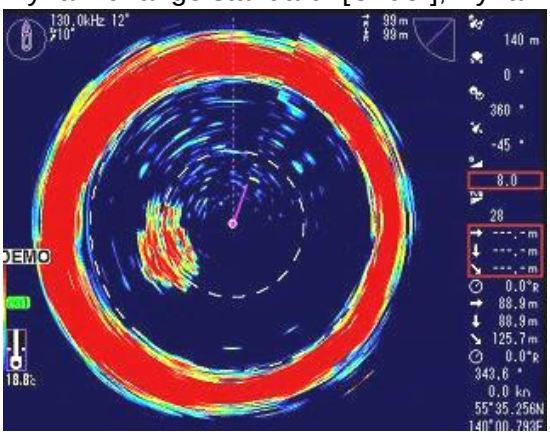
[Sample image]

Dynamic range standard: [Under], Dynamic range: [32dB]



[Sample image]

Dynamic range standard: [Under], Dynamic range: [12dB]



5. Press  to close the menu.

2.4.15 The origin detection

Set the timing for the origin detection.

1. Press  to display [Menu3].
2. Turn  (knob/left) to select [The origin detection].

Menu3	
Transducer unit baud rate	19200
Slow down the Bearing speed	0
Menu (transparent)	15
Message (transparent)	10
Sub-screen (transparent)	0
Information display	Lat / long
Localtime offset	9.0
Dynamic range standard	Top
The origin detection	On

3. Press  (knob/left) or  to move setting value box.

The origin detection	On

4. Turn  (knob/left) to select the setting value from [On] or [Off].

[On]: Set the timing every time after moving the Transducer unit to the lower position.
[Off]: Set the timing only once after moving the Transducer unit to the lower position.

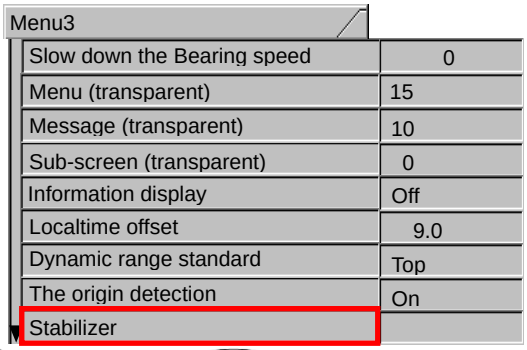
5. Press  to close the menu.

2.4.16 Stabilizer

Select whether to enable or disable the stabilizer function. The stabilizer function reduces the disturbance of sonar display caused by the pitch and roll of the vessel.

⚠ıtion: [Stabilizer] menu is displayed only when DHU-6302-BRD.B (AS) / -80kHz (AS) / -140kHz (AS) / -180kHz (AS) is installed. The connection with the Motion sensor is necessary to use the [Stabilizer] function.

1. Press MENU to display [Menu3].
2. Turn (knob/left) to select [Stabilizer].



3. Press (knob/left) or ENT to display [Stabilizer] menu.

4. Press (knob/left) or ENT to move setting value box.

5. Turn (knob/left) to select the setting value from [On] or [Off].

[On]: Enable the stabilizer function.
[Off]: Disable the stabilizer function.

⚠ Caution: We recommend setting the tilt setting below -20°.
Set the range so that the seabed is displayed outside half of the sonar screen.
Set the [Stabilizer] to [Off] when a rolling/pitching of the ship is gently or when not install the Motion sensor.

6. Press to close the menu.

⚠ Caution: For Rolling and Pitching settings, refer to "Installation Manual 1.5.6 Install Motion sensor".

2.5 [CM] keys

[CM] (Condition Memory) key is used to memorize setting conditions of sonar and recall them with one touch of a key button. For example, it is possible to switch the setting for seine fishing to the setting of squid fishing with one touch of a key button. KDS-6000BB/5500BB is equipped with six [CM] keys, so can be used as if six units of sonars were used at a time.

2.5.1 Initial setting of [CM] keys

6 types of setting modes can be memorized with 6 keys of CM1 to CM6.

Initial setting of [CM] keys

	CM1	**CM2**	**CM3**	**CM4**	**CM5**	**CM6**
Presentation mode	Sonar	Sonar (Off-center)	Bottom-scan	Echo sounder	Sonar	Sonar
Panel brightness	10					
Gain	5.0					
TVG	28					
Range	140				80	200
Tilt	-45	-45	-90	-90	-50	-60
Bearing center	0					
Sector	360°	360°	175°	0°	360°	360°

Menu1	**CM1**	**CM2**	**CM3**	**CM4**	**CM5**	**CM6**
Freq select	130.0[*1]				210.0[*1]	150.0[*1]
	80.0[*2]/140.0[*3]/180.0[*4]					
Freq 2 select	200.0[*1]/90.0[*2]/140.0[*3]/180.0[*4]					
Dynamic range	20					
Pulse width	Middle					
TX power	Auto					
Color rejection	0%					
Noise reduction	0					
Color	A-1					
Background color	Blue					
Image correct	1					
Gain (TD)	0					
FIR	Medium speed					
Interference rejection	Off					
Sub-screen selection	Wake disp (H up)					
Sub-screen display	Off					
Wake range (Sub-screen)	1.0					

Menu2	CM1	CM2	CM3	CM4	CM5	CM6
Step (Sonar, Off-center)	10°				5°	10°
Step (Bottom-scan)	5°				3°	5°
Off-center position	Fore					
Target lock	Reverse					
A scope	Off					
White line	Off					
Scale	1					
Internal buzzer volume	100					
NMEA monitor	Off					
Compass display	Off					
Wake display	Off					
Wake memory display	1 Second					
Sonic speed	0.0%					
Power freq adjust	250.0					
Depth unit	m					
Range & Speed unit	NM kn					
Temperature unit	°C					
Temperature adjustment	0.0					
Train correct	0.00					
Ext synchronized	Off					
Bearing display	Off					
True / Relative bearing	Relative					
Step (Bearing center)	5					
Audio level	3					
Audio tune	5					
One line display	Small					
One line scale	Range					
One line shift	0 to 100%					
One line interval	5°					
Save operation	Auto					

*1 For DHU-6302-BRD.B / -BRD.B (AS)

*2 For DHU-6302-80kHz / -80kHz (AS)

*3 For DHU-6302-140kHz / -140kHz (AS)

*4 For DHU-6302-180kHz / -180kHz (AS)

Menu3	**CM1**	**CM2**	**CM3**	**CM4**	**CM5**	**CM6**
Baud rate	4800[*5]					
DBT output	Off					
DPT output	Off					
GGA output	Off					
GLL output	Off					
MTW output	Off					
RMC output	Off					
TLL output	On					
VTG output	Off					
ZDA output	Off					
Simulation	Off					
Menu time-out period	Off					
Hull unit auto up	15					
Hull unit operation at the start	No					
Transducer unit baud rate	19200					
Slow down the Bearing speed	0					
Menu (transparent)	15					
Message (transparent)	10					
Sub-screen (transparent)	0					
Information display	Off					
Local time offset	9.0					
Dynamic range standard	Top					
The origin detection	On					
Stabilizer[*6]	On	On	On	On	On	On
Remote key set	**CM1**	**CM2**	**CM3**	**CM4**	**CM5**	**CM6**
A1	Hull unit U/D					
A2	Target lock			Marker up	Target lock	
A3	Tilt angle up					
B1	Event (TLL)					
B2	Marker up			Marker down	Marker up	
B3	Tilt angle down					
C1	Marker left			Range up	Marker left	
C2	Marker switching			F1	Marker switching	
C3	Marker right			Bearing left	Marker right	
D1	Bearing left			Range down	F1	
D2	Marker down			F2	Marker down	
D3	Bearing right			Bearing right	F1	

Setting values for each mode can be memorized, recalled and switched with one touch of a [CM] key.

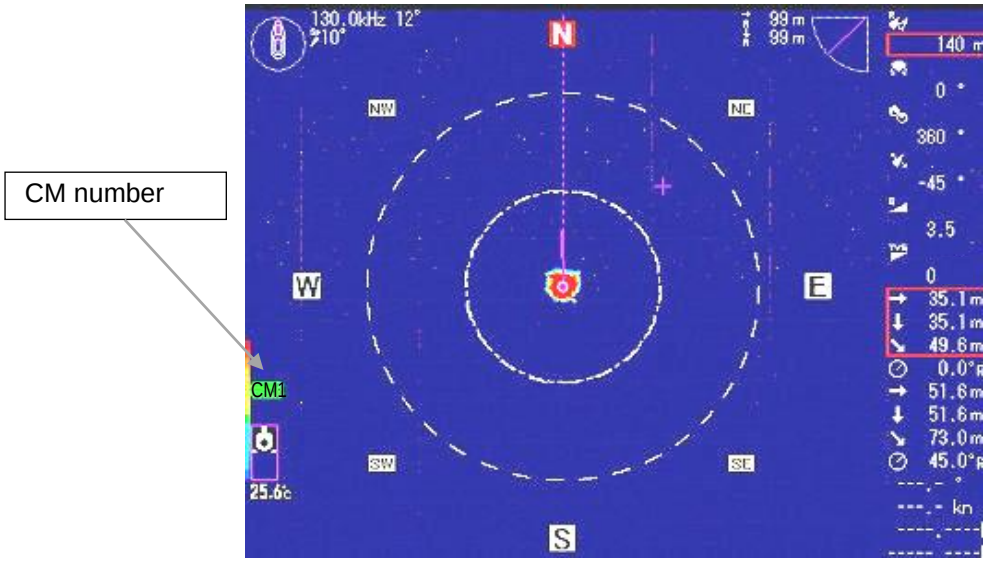
[*5] For DHU-6302-BRD.B (AS) / -80kHz (AS) / 140kHz (AS) / -180kHz (AS), 9600 is the initial setting.

[*6] Displayed only for DHU-6302-BRD.B (AS) / -80kHz (AS) / 140kHz (AS) / -180kHz (AS).

2.5.2 Function of [CM] keys

By pressing each key of CM1 to CM6, and the screen mode, Range, Shift, Gain and Menu setting item turn to the setting mode (Color of light turns green).

⚠ Caution: setting [CM] number displays on screen, down left.



Usually, settings of range, shift and gain value position are changed depending on fishing conditions in shallow or deep water. Once settings are memorized in CM keys, settings can be recalled by one touch of a button.
CM key function enables such switching as required, after saving maximum 6 different settings.

The present screen of the [CM] key lights green.

2.5.3 Store in [CM] keys

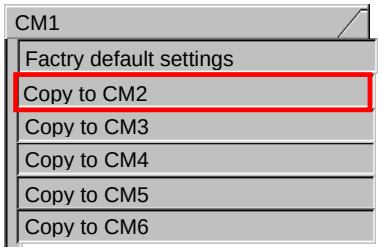
The present settings are stored in the [CM] key currently lit green.
There is no special operation necessary for storage.
Each time screen mode, range, shift, gain or setup of Menu, etc. is operated, the changes are stored in the [CM] keys lit green.

2.5.4 Store a new setting in another [CM] key based on a particular setting in a [CM] key

The setting can be stored easily by copying operation.
The setting in the present [CM] key is copied in the [CM] key to be stored.

When new setting is to be stored in [CM2] key, based on the present setting in [CM1] key

1. Keep pressed CM1 to display the menu of [CM1].
2. Turn (knob/left) to select [Copy to CM2].



3. Press (knob/left) or ENT to move setting box.
4. Turn (knob/left) to select [Cancel] or [Execute].

5. Select [Execute] and press (knob/left) or ENT .
6. The pop-up message of [It has been executed.] is displayed and copy of the setup in [CM1] to [CM2] key is complete.
7. Press CM2 . CM1 is switched over to CM2.
8. CM2 lights green. The setting of CM2 is the same as CM1.

Each time screen mode, range, shift, gain or setup of Menu, etc. is operated, the changes are stored in CM2 lights green.

Caution: When [Save operation] is set to [MANUAL], the menu of CM1 to CM6 cannot be used.

2.6 Function keys ([F] keys)

[F] keys can be assigned with the functions used frequently, to be operated with one touch operation.

2.6.1 Setting to function to [F] keys

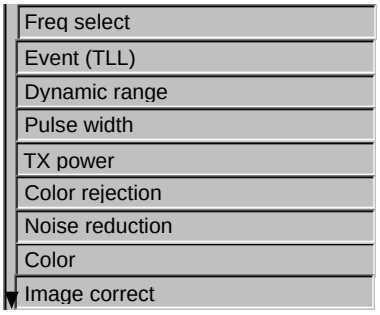
The functions can be assigned to F1 / F2 / F3.

Function
- Freq select
- Event (TLL)
- Dynamic range
- Pulse width
- TX power
- Color rejection
- Noise reduction
- Color
- Image correct
- FIR
- Step (Sonar, Off-center)
- Step (Bottom-scan)
- Off-center position
- Target lock

Function
- A scope
- White line
- Power freq adjust
- Train correct
- Bearing display
- Background color
- Wake erase
- Interference rejection
- Sub-screen selection
- Sub-screen display
- Wake range (Sub-screen)
- Freq 2 select
- Audio level
- Audio tune

2.6.2 Assign intended operation to function keys

1. Keep pressing F1 / F2 / F3 (you desire to change) to display function key setting box.
2. Turn (knob/left) to select [assigned function].



3. Press to close the menu.

2.6.3 Event (TLL)

The latitude and longitude at the VRM cursor position can be sent to external equipment.
The applicable VRM is the selected VRM shown in white color.

> ⚠ **Caution: Requires position data from a GPS sensor to perform the Event (TLL).**

> ⚠ **Caution: When [TLL output] is set to [Off], TLL sentence is not sent.**
> **Refer to "2.4.2 Selection of NMEA output" (page 2-54)**

1. Assign [Event (TLL)] to function key. Refer to "2.6.2 Assign intended operation to function keys" (page 2-72).
   If [Event (TLL)] is already assigned, go on to the next step.

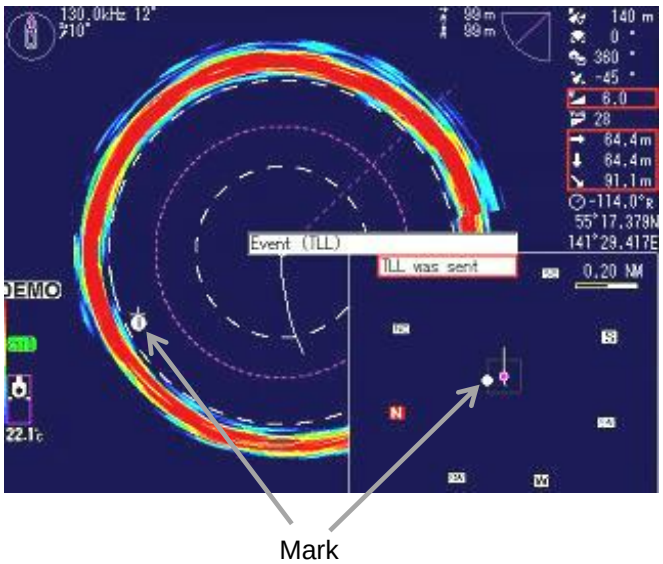
2. Move to the VRM to be sent to the VRM cursor position.

3. Push [F1 / F2 / F3] (assigned [Event TLL] key).

4. "TLL was sent" message is displayed and the latitude and the longitude at the VRM cursor position is sent to external equipment.

Send the latitude and the longitude at the VRM cursor position.

When [Wake display] is set to on and [Event (TLL)] is performed, Marks labeled from (1) to (10) are displayed.



⚠ Caution: Requires position data from GPS sensor to display Marks and Wakes.
When turning power off, all Marks are erased.
When [Wake erase] is done, all wake data and the all marks are erased.

5. Press  to close the menu.

2.7 Remote control set

Select the [Remote control set] function at Menu2.
Refer to Chapter 3 “3.2 Remote control” (page 3-18)

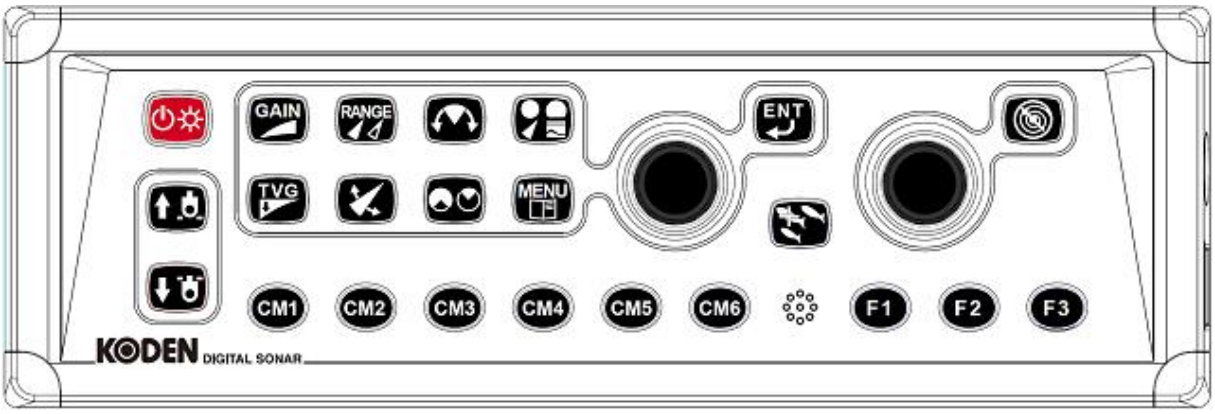
2.8 Maintenance

Refer to Installation Manual Chapter 3 “Maintenance”

Chapter 3 Operation keys

3.1 To use keys

Operation unit of KDS-6000BB/5500BB



3.1.1 Presentation mode key

Select one of the display mode, [Sonar], [Sonar (Off-center)], [Bottom-scan], [Echo sounder] [Sonar & One line] or [Sonar x 2].
Refer to Chapter 1 Preparation “1.6 Screen display” (page 1-9)

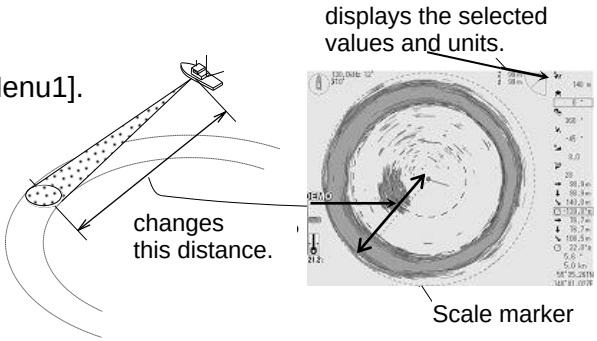
Own ship’s position on Off-center screen are accessed by using [Menu2]. (Refer to page 2-28)

3.1.2 Range key

Change the range setting.

The setting for 8 ranges is accessed by using [Menu1].
(Refer to page 2-5)

The setting for the depth units is accessed by using [Menu2].
(Refer to page 2-40)

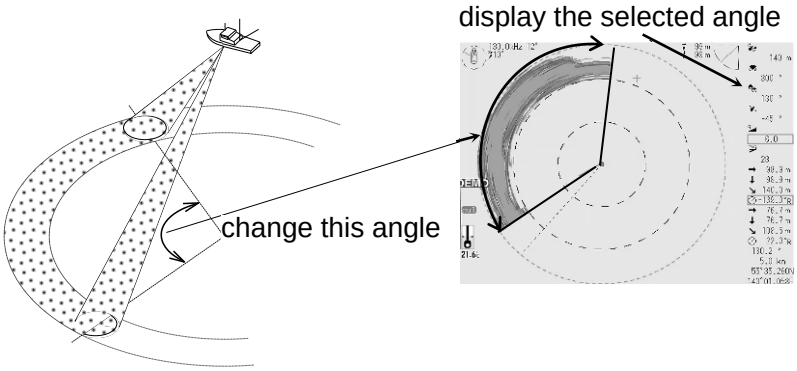


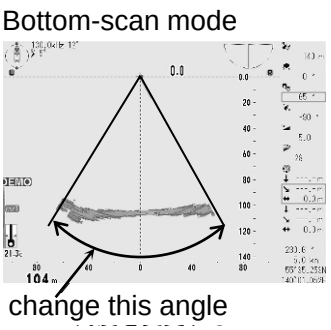
The scale display can be turned on or off by using [Menu2].
(Refer to page 2-30)

3.1.3 Sector key

Change the scanning historical angle (sector angle) in the Sonar mode.

Change the scanning sector angle (vertical angle) in the Bottom-scan mode.





Press  and turn  clockwise to widen the sector angle.

Turn counterclockwise to narrow the sector angle.

The setting for the step is accessed by using [Menu2].
(Refer to page 2-26/2-27)

Sonar mode operation

5° STEP	5°	25°	45°	85°	125°	165°	205°	360°
10° STEP	10°	30°	50°	90°	130°	170°	210°	360°
15° STEP	15°	45°	75°	105°	135°	165°	225°	360°
20° STEP	20°	60°	100°	140°	180°	220°	260°	360°

Bottom-scan operation

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

3.1.4 Gain key

Adjust gain.

The gain setting is changed with every 0.1 steps in 0.0 to 10.0

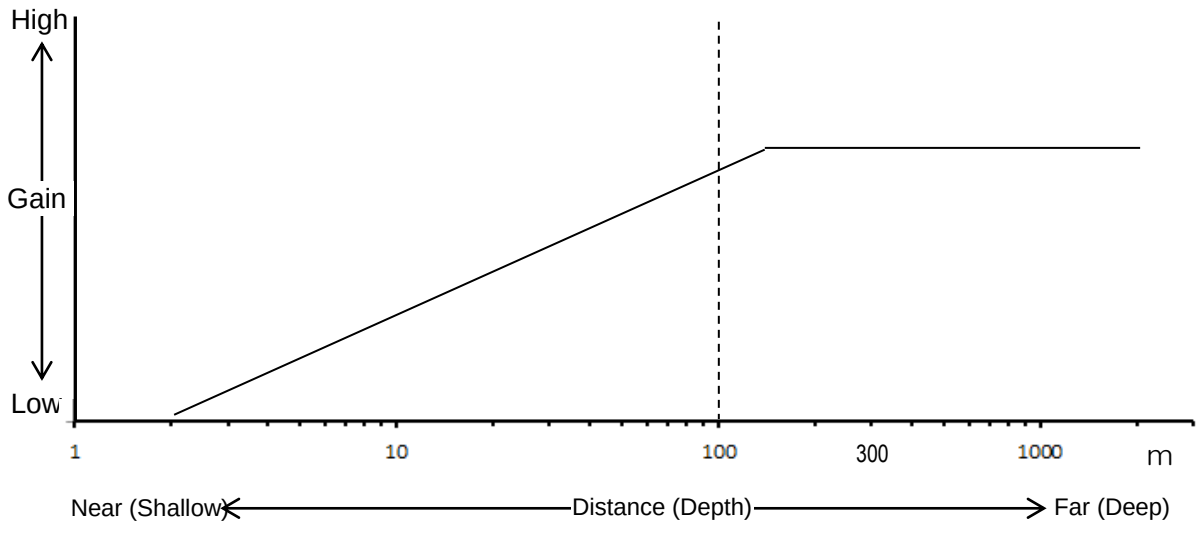
3.1.5 TVG key

Set the TVG curve to correct the attenuation echo.
When the ultrasonic is sent into the sea, the reflection of the ultrasonic (echo) is decreased, as distance is long. To cover the attenuation, the gain is increased automatically in accordance with the distance.

1. Press 

to display [TVG Menu] as below.

TVG	28
TVG adjustment	170
Emphasize	Off
Emphasize depth	100



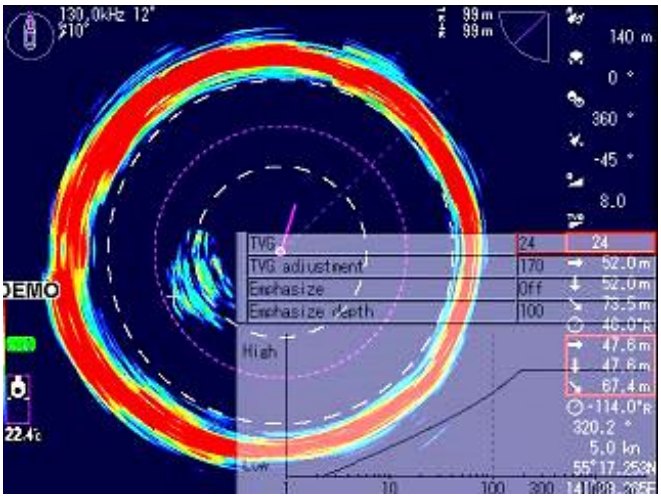
The graph shows TVG curve. The gain is as the vertical axis and the distance is as the horizontal axis. The echo correction depends on the TVG curve.

2. Turn  (knob/left) to change the setting.

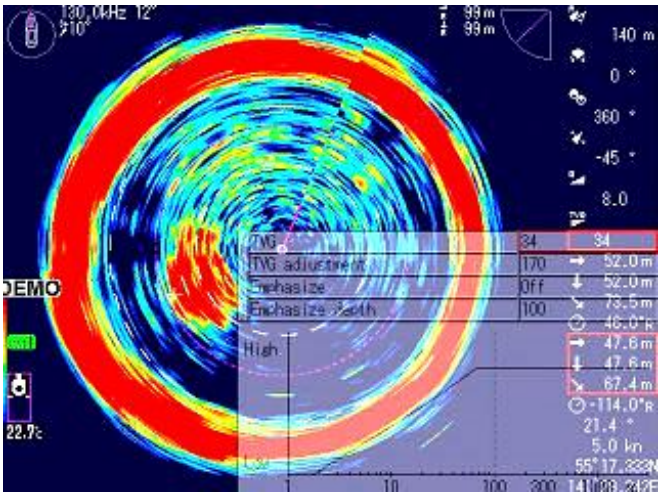
TVG

(Setting value: [0] to [40] or [- -], Initial setting: 28)
[TVG] is set to small, the correction rate is gradual from near to far.
[TVG] is set to large, the correction rate becomes high from the near side.
[TVG] is set to "- -", the correction rate becomes constant value.

When [TVG] is set to small, the TVG curve is gradually increased and the unnecessary reflection echo can be reduced.



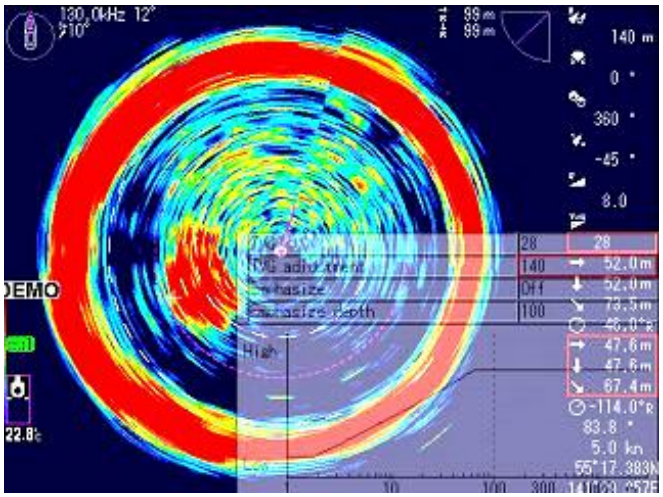
When [TVG] is set to large, the TVG curve is radically increased and some weak echo can be shown.



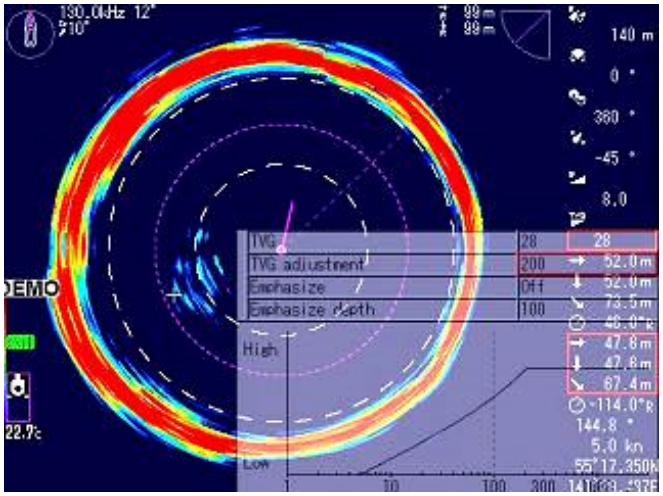
TVG adjustment

(Setting value: [50] to [300], Initial setting: 170)
[TVG adjustment] is the start depth of the TVG correction.
[TVG adjustment] is set to small, the start depth of the TVG correction becomes near.
[TVG adjustment] is set to large, the start depth of the TVG correction becomes far.

When [TVG adjustment] is set to small, the TVG curve is move to the near side and some weak echo can be shown.



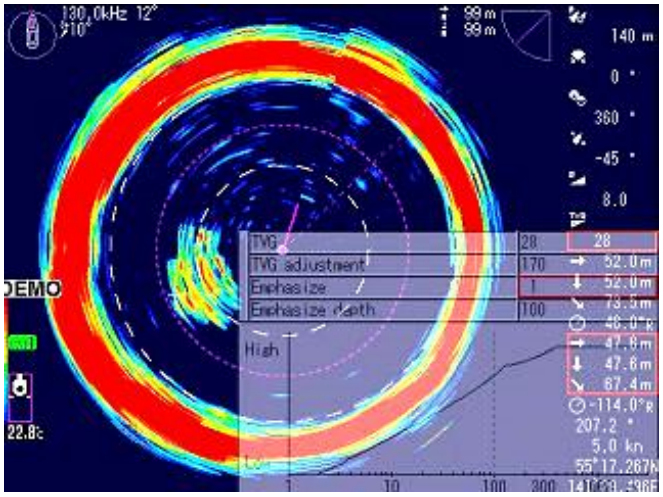
When [TVG adjustment] is set to large, the TVG curve is move to the far side and the all range of the echo can be suppressed.



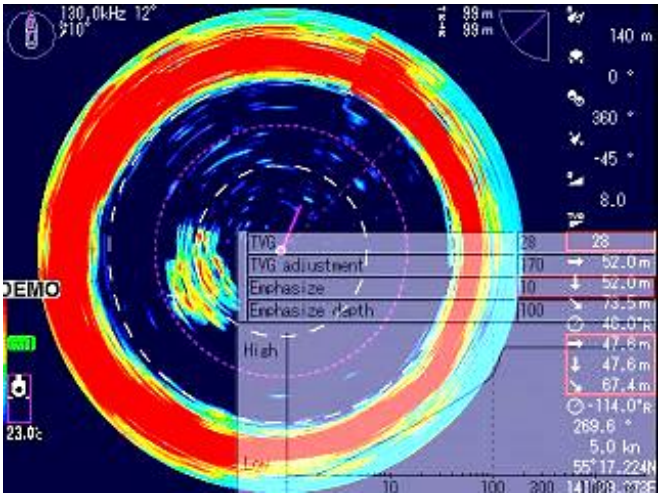
Emphasize

(Setting value: [Off] or [1] to [30], Initial setting: Off)
[Emphasize] is a function to emphasize the attenuation correction from the Emphasize depth. The larger setup becomes, the stronger effect becomes.

When [Emphasize] is set to small, the TVG curve is gradually increased from the Emphasize depth.



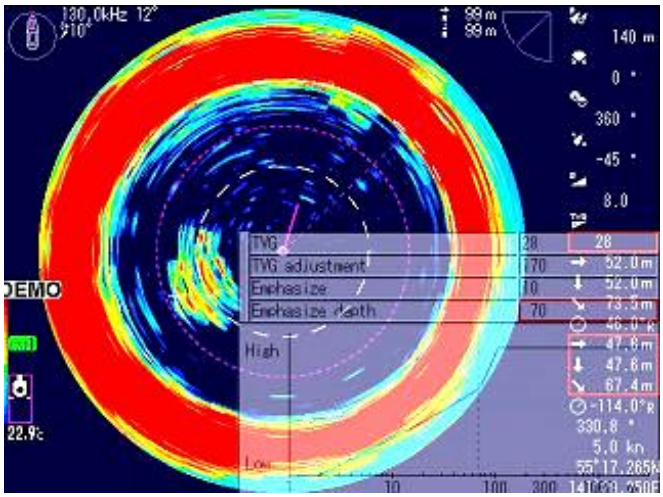
When [Emphasize] is set to large, the TVG curve is radically increased from the Emphasize depth.



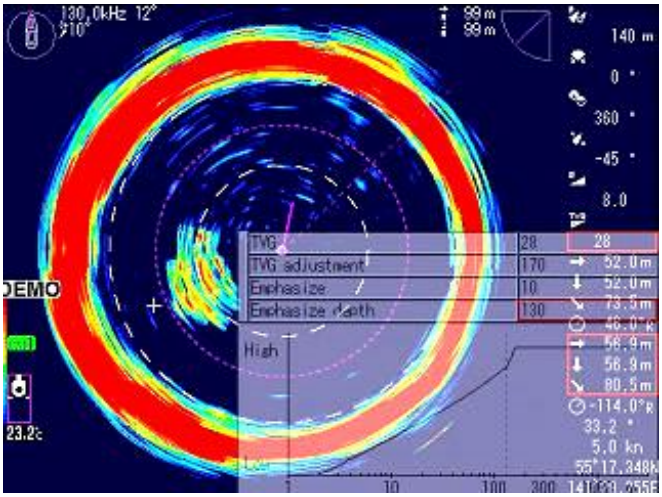
Emphasize depth

(Setting value: [20] to [900], Initial setting: 100)
[Emphasize] is set to [OFF], the effect is disabled.
[Emphasize] is set from [1] to [30], the effect is enabled.
The emphasized effect is strong from the emphasize depth value.

ex.) Emphasize depth: 70
The TVG curve is radically increased from 70 meters line in the graph.



ex.) Emphasize depth: 130
The TVG curve is radically increased from 130 meters line in the graph.



⚠ Caution: The TVG setting and gain setting have its affect mutually.

3.1.6 Power/Panel brightness key

Power On/Off.

Power On

Press  to power on.

On start-up, the internal memory (ROM and RAM) is automatically checked, if the checking completes normally, the start-up screen is displayed.

Power Off

Keep pressing  for 3 seconds to power off.

When the message of [Preparing to shutdown] and countdown for power shut down are displayed, release the power key immediately. The pop-up message of [Preparing to shutdown] is displayed. After a few moments, power is switched off automatically

Refer to Chapter 1 “Preparation 1.2 Power On/Off” (page 1-4).

3.1.7 Hoist/Lower key

• The Transducer unit can hoist down/up during operation.

• When pressing  in operation, the Transducer unit is hoist up and the Transducer unit status indication at the left down side of the screen is changed as  .

• When pressing  to hoist down the Transducer unit again. In this case the indication is changed as  .

•After the Hull unit auto up function is done and the Transducer unit is retracted automatically, press  key to lower down the Transducer unit after ship speed down.

※When the failure is occurred about the hoisting up/down of the Transducer unit, the

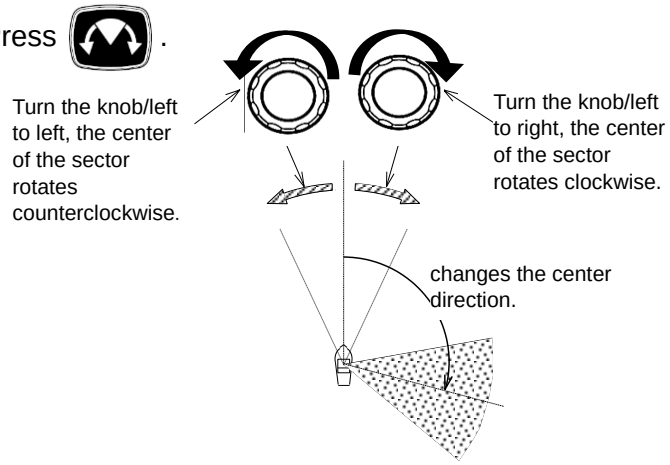
Transducer unit status indication at the left down side of the screen is changed as  and alarm sounds.

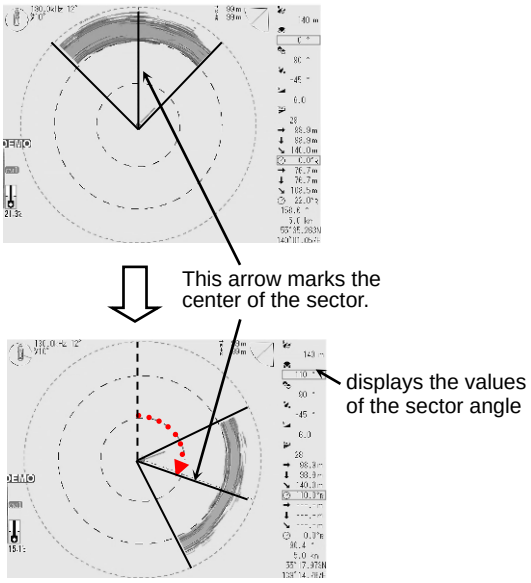
3.1.8 Bearing center key

Use this key to define the center of current scanning sector **in Sonar mode.**

The bearing angle of the display is shifted by 5° steps.

Press .

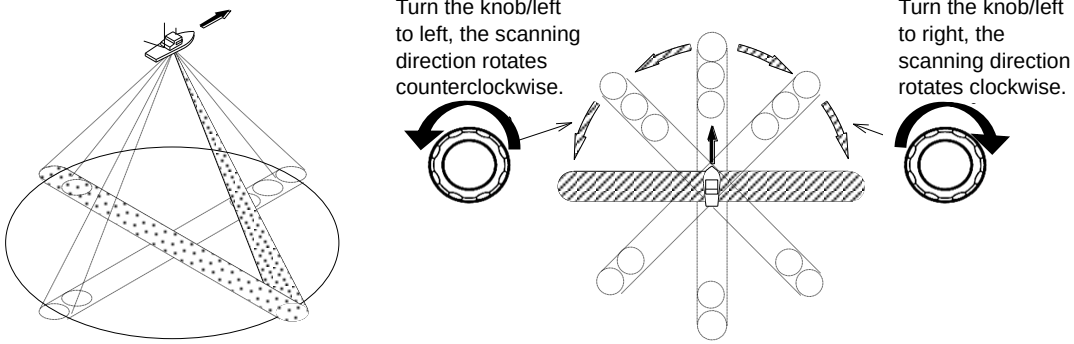




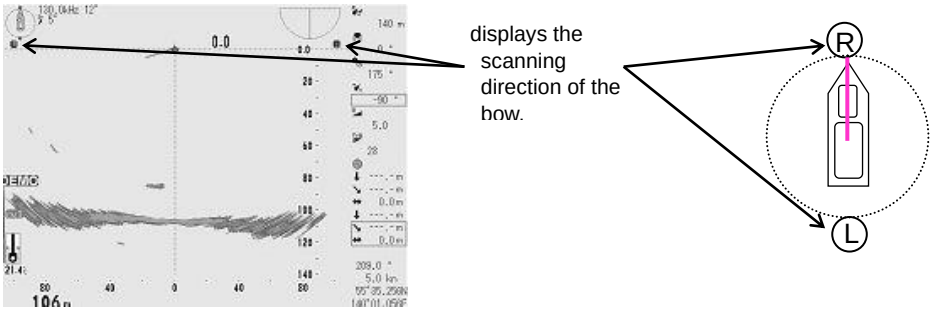
Use this key to define the center of current scanning sector **in Bottom-scan mode.**

The bearing angle of the display is shifted with every 5° steps.

Press .



display of the scanning direction

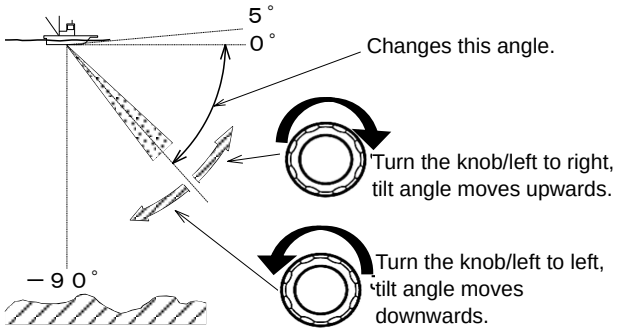


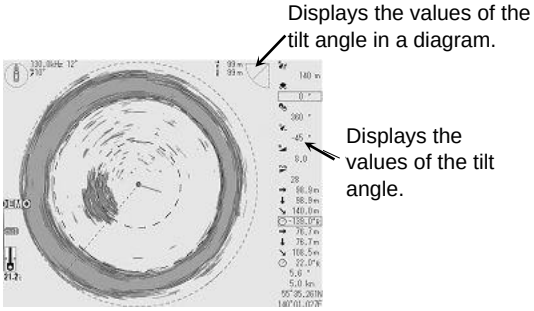
In case of Sonar mode [Tilt key] explained in the next section is collaborated with the bearing key. The shifted angles are the same as those of Bottom scan mode.
(Refer to page 2-27)

3.1.9 Tilt key

Use this key to control the tilt angle **in the Sonar mode.**

Press  .

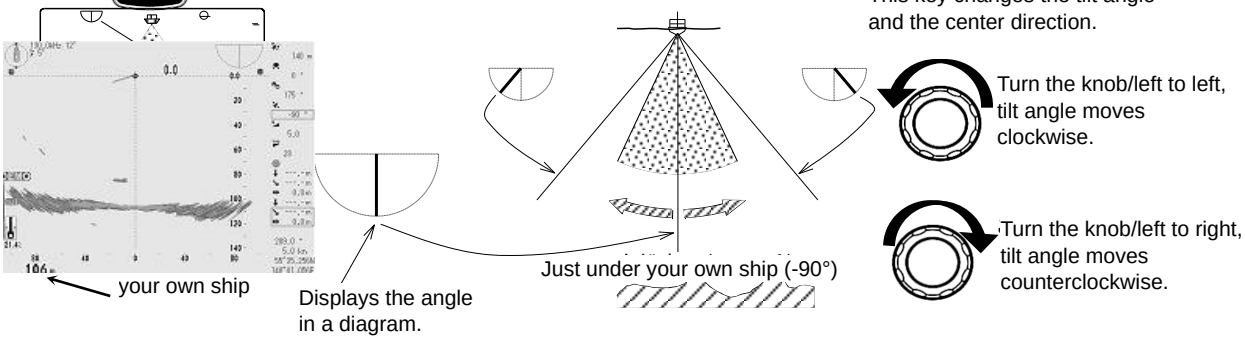


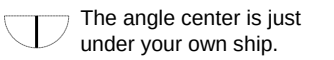


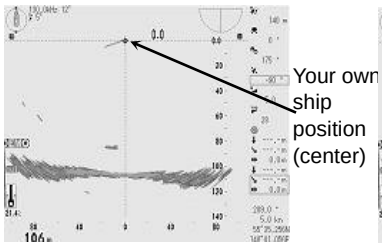
Variable tilt angle: 5° to 0° to -90° (every 1°)

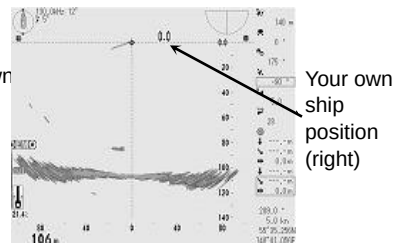
Use this key to control the tilt angle **in the Bottom-scan mode.**

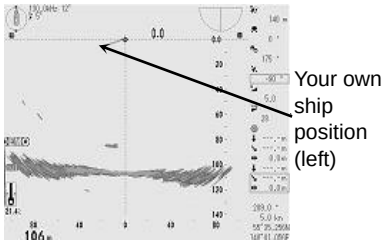
Press  .









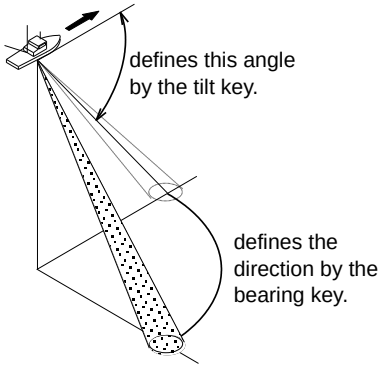


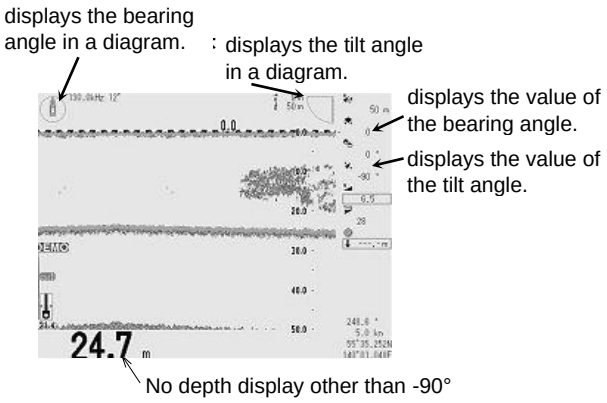
Variable tilt angle: -3° to -177° (every 1°)

Refer to page 2-27 for step.

Use and to define the direction of the detection **in the Echo sounder mode.**

Press and turn (knob/left) to define the angle.





Variable tilt angle: 5° to 0° to -90° (every 1°)

Marker indicates the depth other than just below the ship (-90°).
Refer to the following [VRM key] for the marker.

3.1.10 VRM key

There are two VRMs to measure the distance and the bearing from the target. In case of the echo sounder mode, there is one VRM. In case of the Sonar & One line mode, there is three VRM.
The selected VRM is indicated as white color, and the unselected VRM is indicated as pink color. Measuring value of the distance and the bearing are indicated on [Information-Data display]. VRM1 is indicated on the upper side, VRM2 is indicated on the lower side. Selected VRM is indicated as red box.

Operation of the VRM

Turn (knob/left) to move the direction or distance of the VRM.

Press (knob/left) to switch the direction and the distance of the VRM.

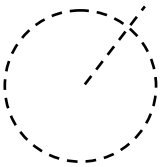
Press to switch two VRMs.

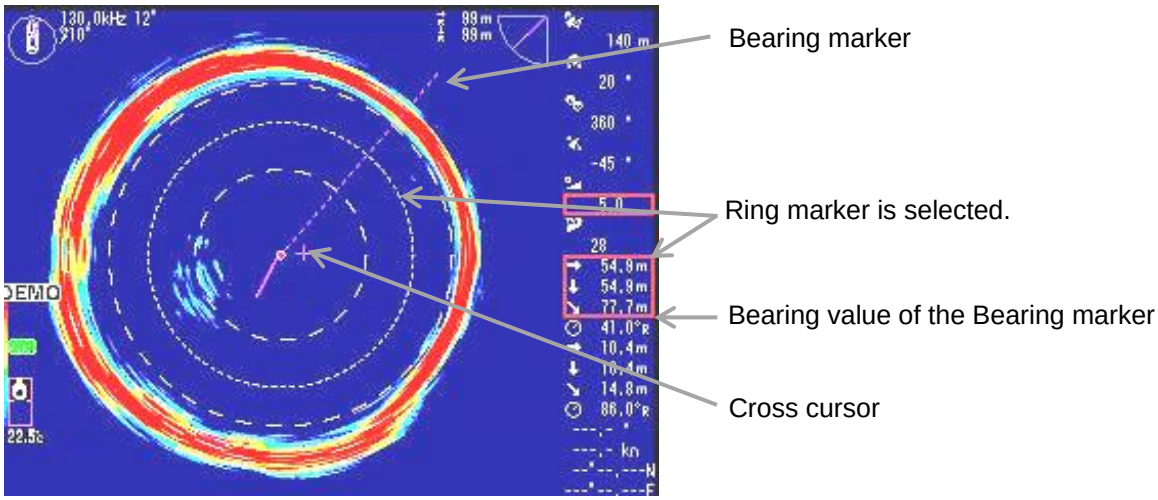
Keep pressed  to clear two VRMs.

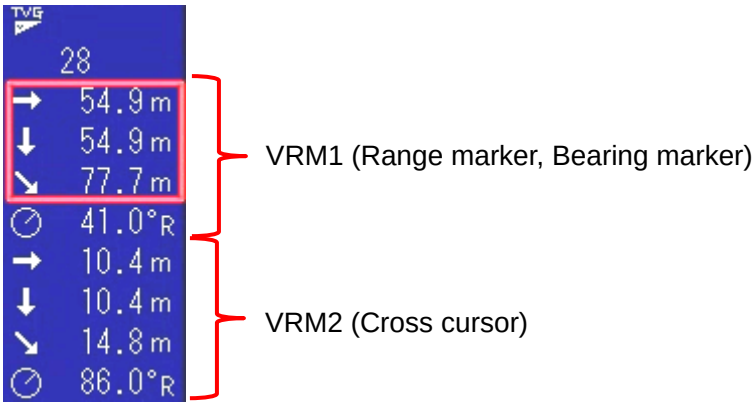
Sonar and Sonar (Off-center) mode operation

There are two VRMs.
VRM1 is the combination of Ring marker and the Bearing marker.
VRM2 is the cross cursor marker.
After the power on, the Ring marker is selected.

VRM1 VRM2







When the Ring marker is selected,

1. Turn  (knob/right) to change the distance of the Ring marker.

2. Press  (knob/ right) to select the bearing marker.

3. Turn  (knob/ right) to move the Bearing marker.

4. The direction and the distance of the target can be measured by the following method.

Turn or press  (knob/ right) repeatedly and set the intersection of the Ring marker and Bearing marker on the target.

The intersection position of the Ring marker and Bearing marker are displayed on the VRM of the [Information-Data display].
Horizontal distance, Depth, Slant distance and Direction are displayed in order.

5. Press  to select the cross cursor.

6. Check [Direction/Distance] from the target by the Cross cursor.

Turn of press  (knob/ right) repeatedly and set the Cross cursor on the target.

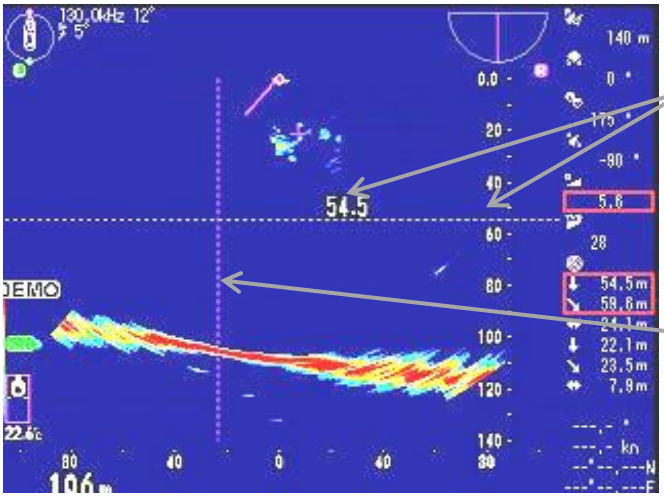
The center position of the cross cursor is displayed on the [Information-Data display] of the VRM2.
Horizontal distance, Depth, Slant distance and Direction are displayed in order from top to bottom.
(When the distance of the Cross cursor is 0, the position of the Cross cursor is not changed even if the bearing of the Cross cursor is changed.)

Keep pressed  to clear the VRM.

Press  or turn  (knob/ right) to indicate the VRM.

Bottom-scan mode operation

There are two VRMs. VRM1 is the combination of the Depth marker and the Vertical marker. VRM2 is the Cross cursor marker. (After the power on, the Depth marker is selected.)



When “Depth marker” is selected,

1. Turn (knob/right) to measure the depth of the Depth marker.
2. Press (knob/ right) to select the Vertical marker.
3. Turn (knob/ right) to move the vertical marker.
4. [Direction/Distance] of the target can be measured by the following method.

   Turn of press (knob/ right) repeatedly and set the intersection of the Depth marker and the vertical marker on the target.

   The intersection position of the depth marker and the vertical marker are displayed on the [Information-Data display] of VRM1.
   Depth, Slant distance and Horizontal distance are displayed in order from top to bottom on the [Information-Data display].

5. Press  to select the cross cursor.

6. Check [Direction/Distance] from the target by the Cross cursor.

Turn of press  (knob/ right) repeatedly and set the Cross cursor on the target.

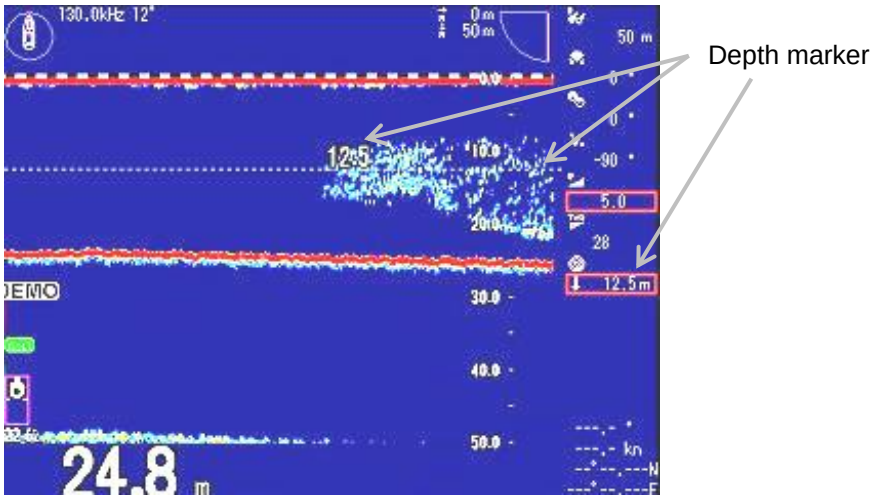
The center position of the Cross cursor is displayed on the [Information-Data display] of VRM2.
Depth, Slant distance and Horizontal distance are displayed in order from top to bottom.
(When the distance of the Cross cursor is 0, the position of the Cross cursor is not changed even if the bearing of the Cross cursor is changed.)

Keep pressed  to clear the VRM.

Press  or turn  (knob/ right) to indicate VRM.

Echo sounder mode operation

There is a Depth marker.



When Depth marker is selected,

1. Turn  (knob/right) to measure the depth by the Depth marker position.
2. Turn  (knob/ right) to measure the target by moving the VRM on the target.

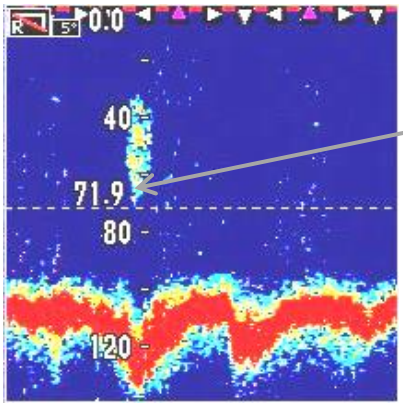
Keep pressed  to clear the VRM.

Press  or turn  (knob/ right) to indicate the VRM.

Sonar & One line mode operation

There are three VRMs.
VRM1 and VRM2 is the same as the Sonar mode.
VRM3 is Depth marker.

It will depend on the [One line scale] settings.
[Depth]: The scale value is calculated by Range and Tilt angle.



Depth marker

When the Ring marker is selected,

1. Press  to select the cross cursor.
2. Press  to select the Depth marker.
3. Turn  (knob/right) to measure the depth by the Depth marker position.
4. Turn  (knob/ right) to measure the target by moving the VRM on the target.

Keep pressed  to clear the VRM.

Press  or turn  (knob/ right) to indicate the VRM.

3.1.11 Target lock key

When Menu2/Target lock/[Reverse] is selected.

When pressing  in Sonar mode or Bottom-scan mode, the direction of sweep of the Sonar beam is reversed.

When Menu2/Target lock/[Mode1] or [Mode2] is selected.

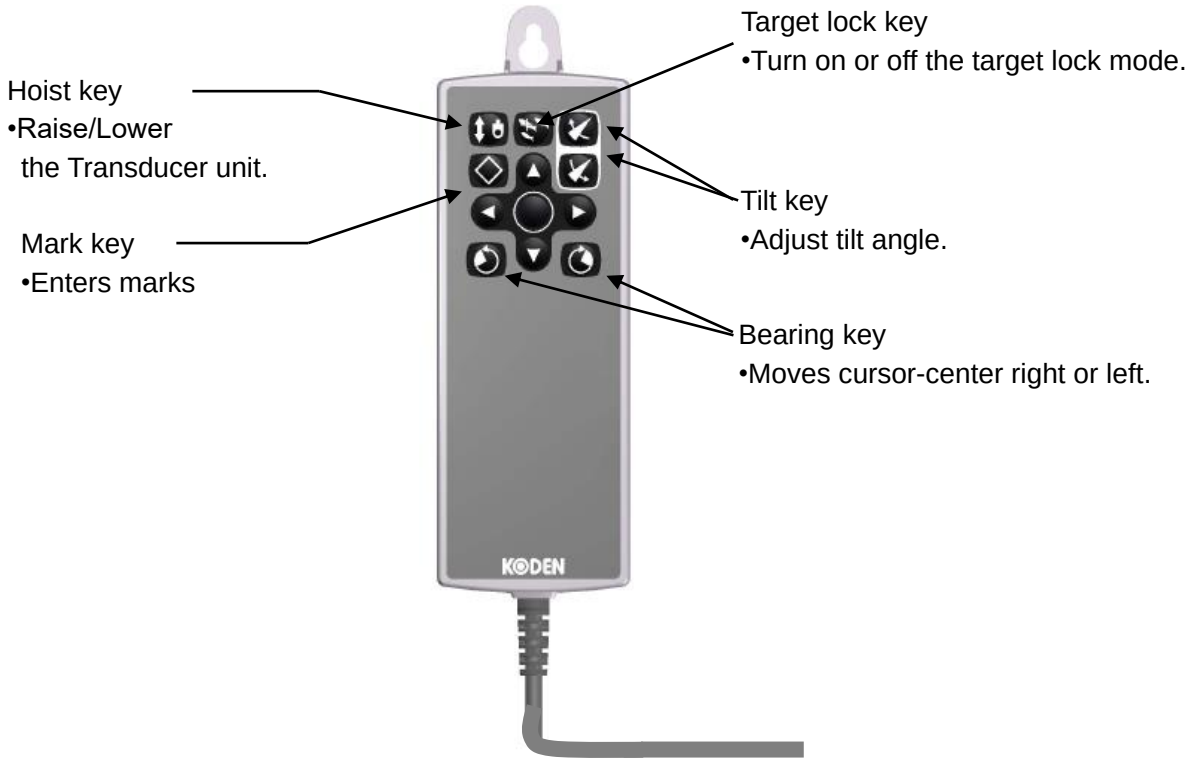
When you press  in Sonar mode, the sonar beam searches for the current position.

When Menu2/Target lock/[Marker Mode1] or [Marker mode2] is selected by connected to an external navigator.

Press  on a target in Sonar mode to search for the cross cursor position.

Refer to Chapter 2 “2.3.15Target lock” (page 2-37)

3.2 Remote controller (RCW-14) (Optional)



3.2.1 Remote key set

Remote control key assignment can be changed as prefer setting.

1. Press MENU to display [Menu1].

   Or keep pressing TVG to display [Remote control setting menu]. (This operation can omit item2 and 3 in the below.)

2. Turn (knob/left) to select [Remote key set].

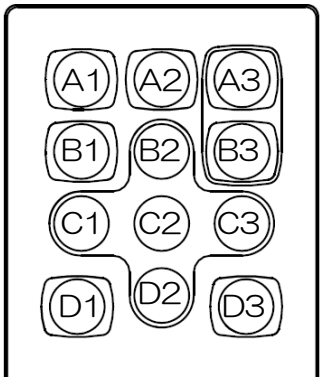
Menu1	
Range (Sonar, Off-center)	
Range (Bottom-scan)	
Range (Echo sounder)	
Remote key set	
Color palette	
Sub-screen selection	Wake disp (H up)
Sub-screen display	Off
Wake range (Sub-screen)	1. 0
Language	English

3. Press (knob/left) or ENT to move Remote key setting box.

A1	Hull unit U/D
A2	Target lock
A3	Tilt angle up
B1	Event (TLL)
B2	Marker up
B3	Tilt angle down
C1	Marker left
C2	Marker switching
C3	Marker right

4. Turn (knob/left) to select the setting number from [A1] to [D3]

The remote control key position and assignment.



5. Press (knob/left) or ENT to move setting function box.

A1	Hull unit U/D

6. Turn (knob/left) to select the setting function.

Setting function

- No entry
- Hull unit U/D
- Target lock
- Range up
- Range down
- Tilt angle up
- Tilt angle down
- Gain up
- Gain down
- Bearing right
- Bearing left
- Sector
- TVG
- Marker up
- Marker down
- Marker right
- Marker left
- Marker switching
- Event (TLL)
- F1
- F2
- F3
- CM1
- CM2
- CM3
- CM4
- CM5
- CM6
- Presentation mode
- Audio level up
- Audio level down
- Audio tune up
- Audio tune down

7. Press (knob/left) or ENT to confirm setting function.

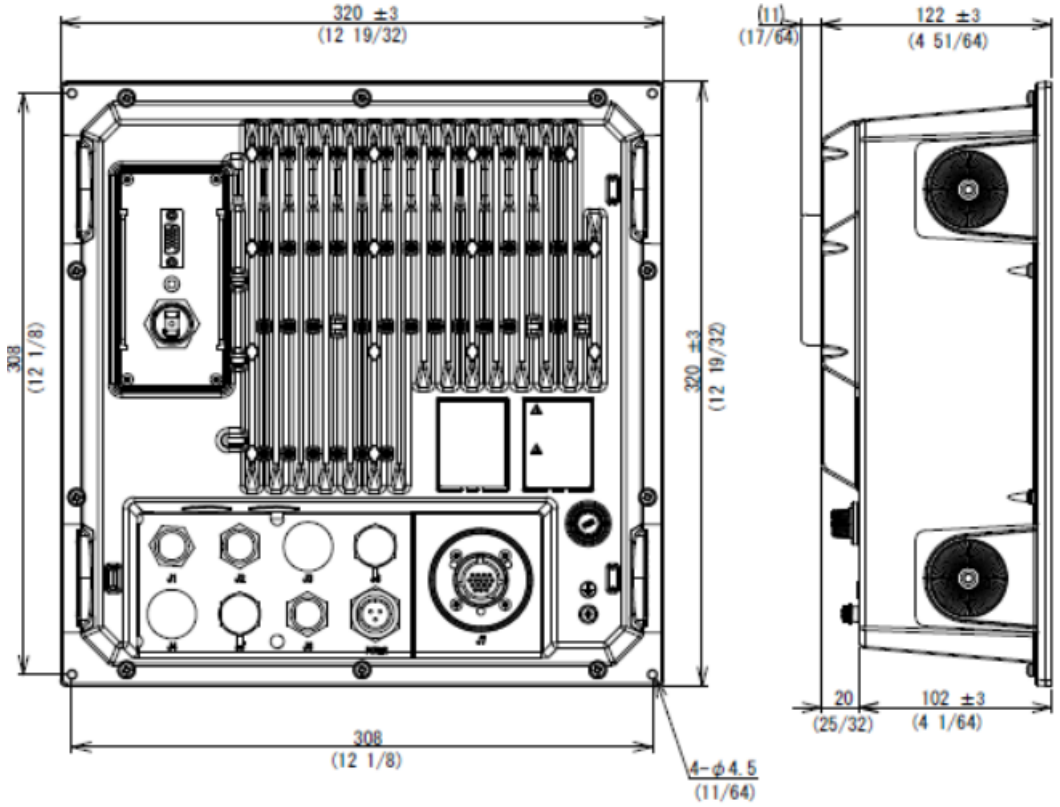
8. Press  to close the menu.

- Set as the same way as other Remote key setting.
- The sheet of remote control key shows the initial setting of the remote control keys.
- The range operation of Remote control key;
  [Range up]: Move to shallow range.
  [Rang down]: move to deep range.

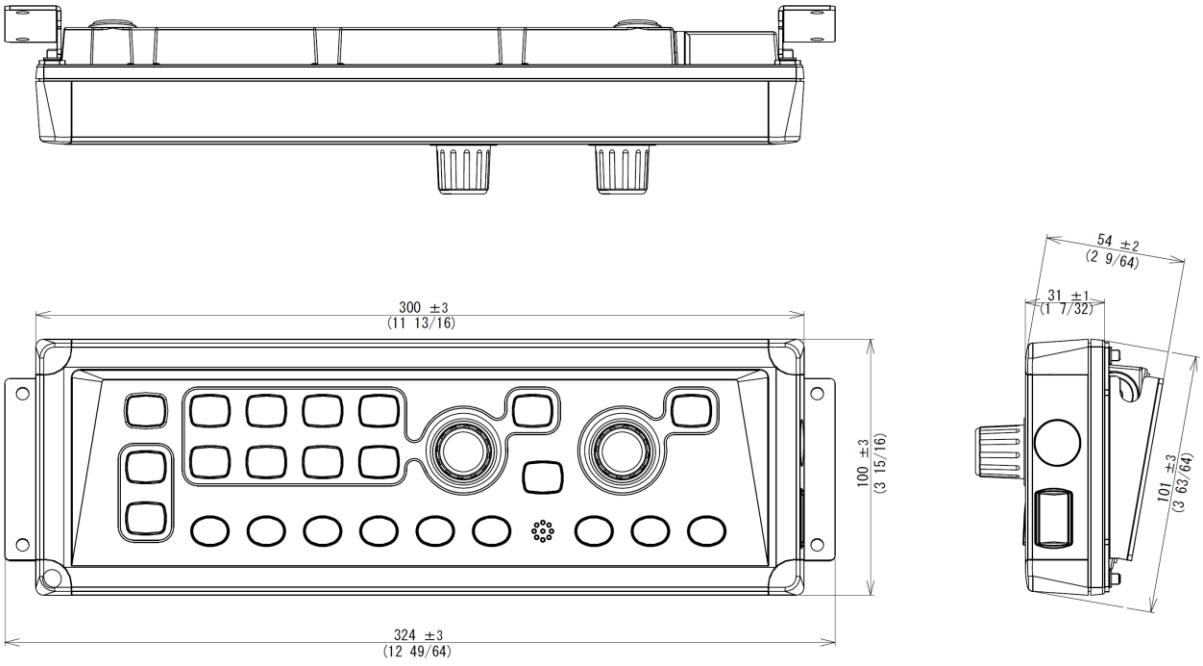
Chapter 4 Appendix

4.1 External view and dimensions

Processor unit (DPU-610/DPU-551)

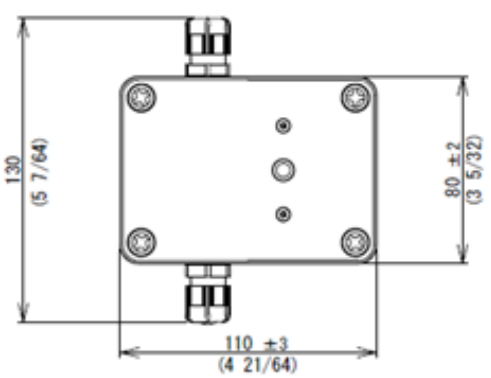


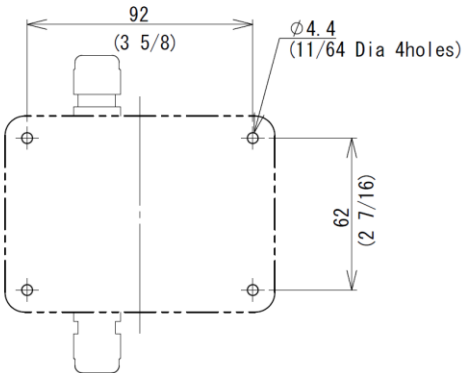
Operation unit (DOU-620)



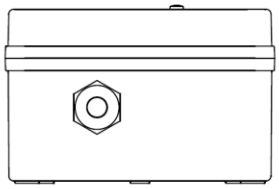
Unit: mm (inch)

TD position alarm / Ext. Sync. Box (JB-36)

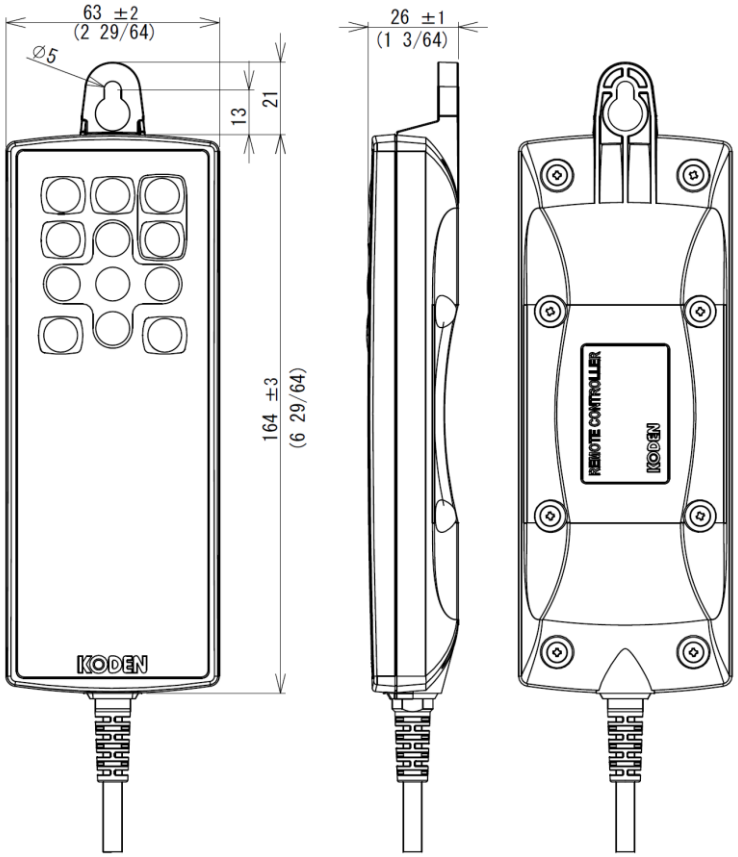




Installation dimensions

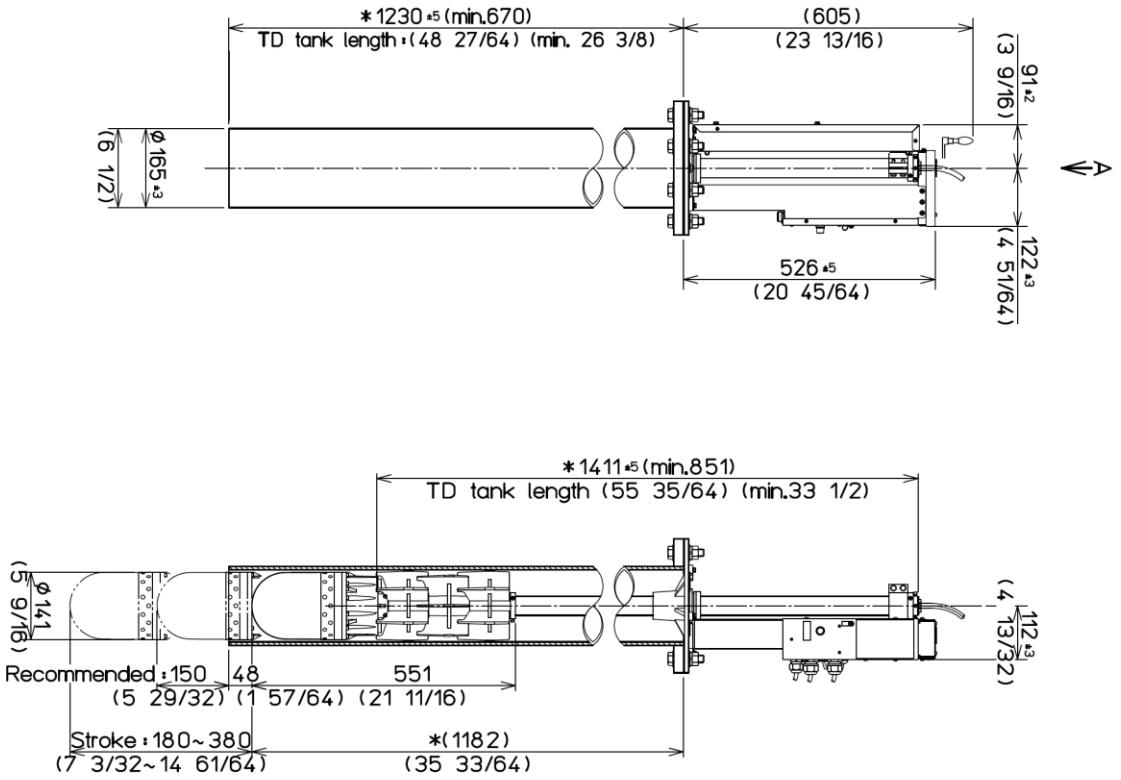


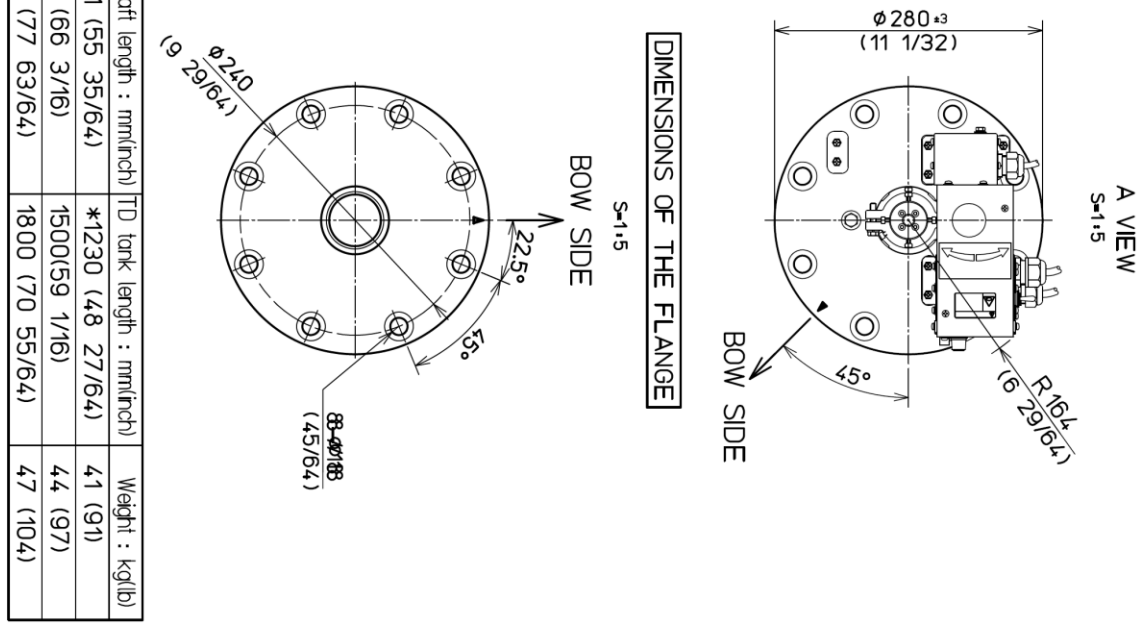
Remote controller (RCW-14) (Optional)



Unit: mm (inch)

Hull unit (DHU-630)



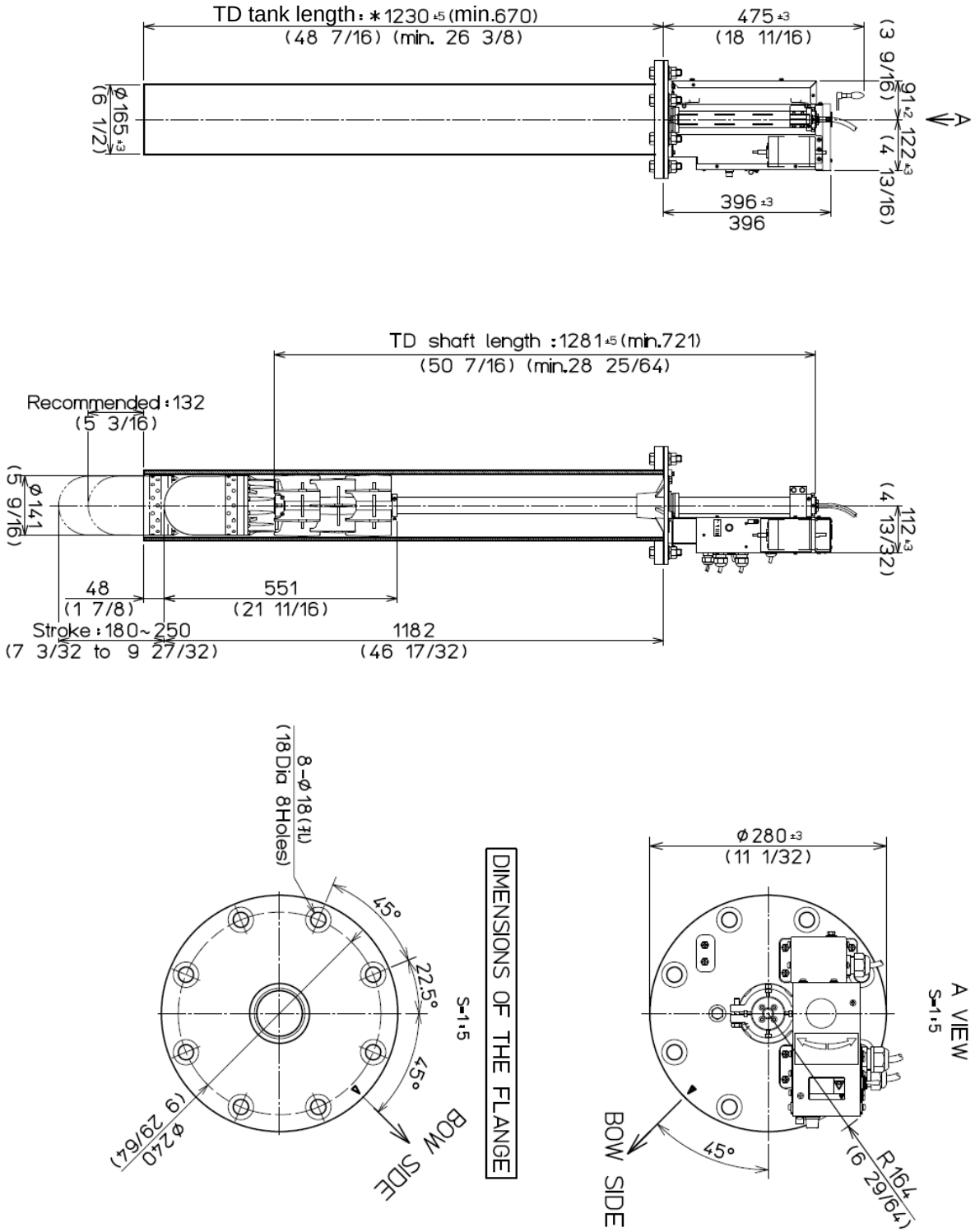


TD shaft length : mm(inch)	TD tank length : mm(inch)	Weight : kg(lb)
*1411 (55 35/64)	*1230 (48 27/64)	41 (91)
1681 (66 3/16)	1500(59 1/16)	44 (97)
1981 (77 63/64)	1800 (70 55/64)	47 (104)

*The seal dimensions show the case of going TD shaft 1,411mm in length specifications

Unit: mm (inch)

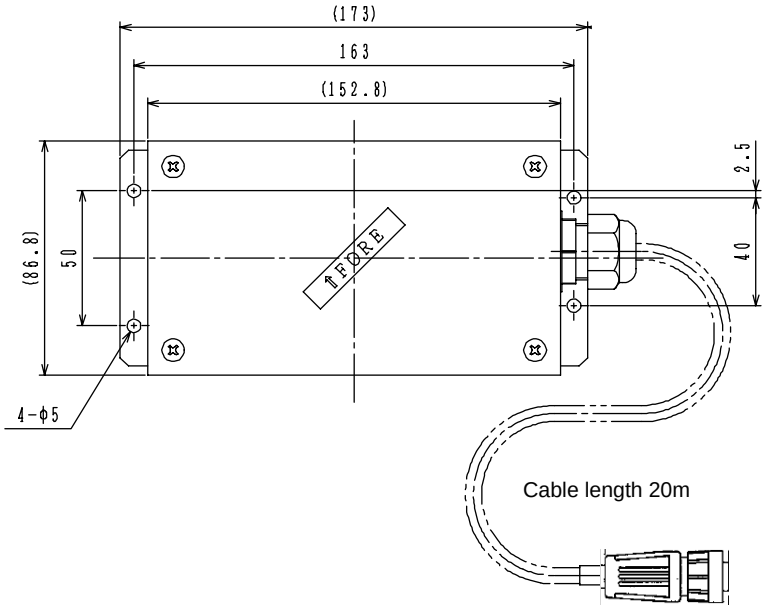
Hull unit Short stroke (DHU-631) (Optional)

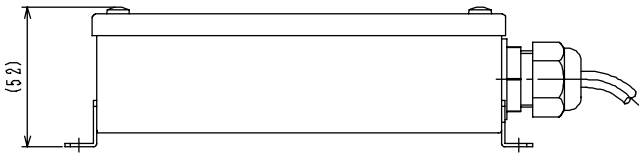


Unit: mm

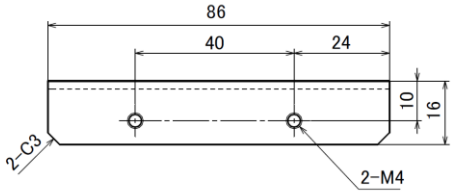
Mosion sensor set (OP-621)

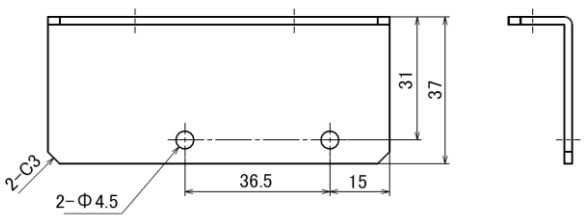
Motion sensor (OP-620)



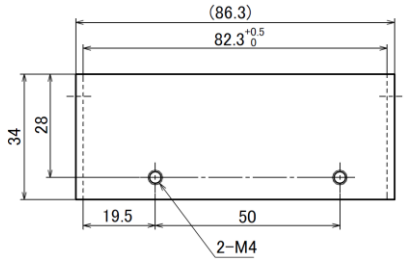


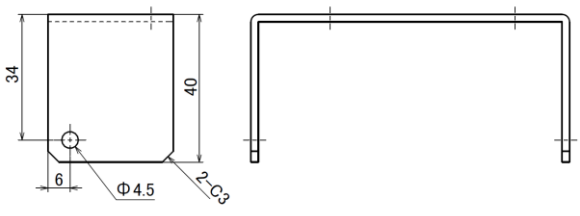
Clamp1 (37943D)





Clamp 2 (37944D)





Unit: mm

4.2 Disposal

Dispose of this equipment in accordance with local regulations.

Chapter 5 Index

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