

**JLN-205MK2**

**DOPPLER LOG**

**INSTRUCTION  
MANUAL**



*Japan Radio Co., Ltd.*



## Foreword

Thank you for purchasing the Japan Radio Co., Ltd. JLN-205MK2 Doppler Log. The JLN-205MK2 conforms to the IMO (International Maritime Organization) performance standards, provides accurate displays of ship's speed over a wide range from dead slow to maximum.

- Before attempting to operate this equipment, read this instruction manual thoroughly to ensure correct and safe operation in accordance with the warning instructions and operation procedures.
- You are strongly recommended to store this instruction manual carefully for future reference. In the event that you have an operational problem or malfunction, this manual will provide useful instructions.

## Before Commencing the Operation

### Symbols Used In This Manual

In this manual, and on the equipment, we use several warning signs to call your attention to important items that, if not handled correctly, could present danger to yourself or property. These warning note classifications are as described below. Please be fully aware of the importance of these items before using this manual.



# WARNING

Indicates warning items that, if ignored, may result in serious personal injury or even death.



# CAUTION

Indicates cautionary items that, if ignored, may result in personal injury or physical damage.

### Examples of Related Symbol Marks Used in this Manual and on the Unit



Each  mark is intended to alert the user to the presence of precautions including danger and warning items. The picture in each  mark (“Electric shock” in the example on the left.) alerts you to operations that should be carefully performed.



Each  mark is intended to alert the user to the presence of prohibited activity. The picture/word in/beside each mark (“Disassembling Prohibited” in the example on the left.) alerts you to operations that are prohibited.



Each  mark is intended to alert the user to the presence of necessary instructions. The picture in each  mark (“Disconnect the power plug” in the example on the left.) alerts you to operations that must be performed.

### WARNING LABEL

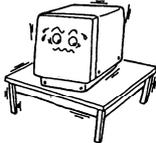
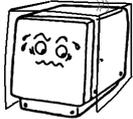
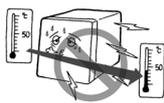
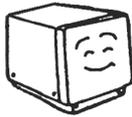
You can see the warning label on the top of the unit.  
Do not attempt to remove the warning label from the unit or impair or modify it.

## Precautions Upon the Operation

# ⚠️ WARNING

	Do not remove the cover of this unit. Otherwise, you may touch a high-voltage part and suffer from an electric shock.	
	Turn off the power on/off switch, and turn off the power supply breaker when you for maintenance check this unit for maintenance. Otherwise, a fire, an electric shock, or a failure may occur.	
	Do not disassemble or modify this unit. Otherwise, a fire, an electric shock, or a failure may occur.	
	Do not place drinks on this equipment. Spillage entering the equipment can cause electric shock to the user, or short-circuit, fire or damage to the equipment. Do not place or insert metallic objects on or into the equipment, this can cause electric shock to the user, or short-circuit, fire or damage to the equipment.	
	Do not use this unit at a voltage other than the supply voltage stated on the unit. Otherwise, a fire, an electric shock, or a failure may occur.	
	Do not insert or remove the power cord or operate switches with a wet hand. Otherwise, you may suffer from an electric shock.	
	Do not damage or modify the power cord. Placing a heavy object onto, heating, stretching or bending the cord may cause a fire or an electric shock.	
	Do not any maintenance on the transducer while the ship is in the water. Doing so may cause injury or water leakage to the ship.	
	Do not check or repair in this unit. Please call our field representative or your nearest JRC office for inspection and repair services. Otherwise It may cause a fire or an electric shock.	
	In the event that you spill or drop any liquids or metals etc., turn off the unit, turn off the power supply breaker, and contact your sales agent outlet or one of JRC branch offices, sales centers or liaison offices. Otherwise continuing operation may cause a fire, an electric shock or a malfunction.	
	In the event that smoking or burning odors are detected, immediately terminate operation of the unit and contact your sales agent outlet or one of JRC branch offices, sales centers or liaison offices. Never attempt to check or repair the interior of the unit. Otherwise continuing operation may cause a fire or an electric shock.	

# ⚠ CAUTION

	<p>Without qualified service personnel, do not attempt to install this unit. Contact our service center or agent for any electrical work or installation of this unit. Otherwise it may cause a malfunction.</p>	
	<p>Do not install this unit at the place exposed to direct sunlight for a long time or hit by hot wind or where the temperature rises above 55°C. Otherwise it may cause a fire or a breakdown.</p>	
	<p>Do not place the unit on a wobbly stand or any unsteady foundation. Otherwise it may cause the unit to fall, resulting in an injury or a damage.</p>	
	<p>Do not put this unit in the cabinet, and do not cover with the nonporous thing such as cardboard. Heat shuts oneself up, and it may cause a fire or a breakdown.</p>	
	<p>When this unit is suddenly moved from a warm place to a cool place or the sudden converse move, dew condensation water may form on the inside windows, and the liquid crystal part can become visually difficult. In this case, leave the unit for a while until becoming dry condition. Then operate the unit.</p>	
	<p>When installing this set, be sure to connect the grounding wire or the grounding plate to the grounding terminal of the unit. Otherwise you may suffer from an electric shock.</p>	
	<p>Do not turn on the power switch of the unit while the ship is on the shore. Otherwise, the transducer may malfunction.</p>	
	<p>Reasonable care must be exercised for the routing of the transducer cable, power cable, signal cable and grounding cable. Otherwise, the unit may adversely effect other equipment or vice versa.</p>	
	<p>Do not use an organic solvent such as thinner or benzine when you clean the surface of the unit. For cleaning the surface, remove the dust and wipe with clean dry cloth. Otherwise, the painting on the surface may be damaged</p>	

## Appearance of the Main Display



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# Chapter 1 Equipment Overview

## 1.1 Function

The JRC Model JLN-205MK2 Doppler Log is an equipment for measuring accurately the true speed and run of a ship, utilizing the Doppler shift of ultrasonic signals, which are radiated from a transducer into sea water downward obliquely to the bow and stern sides, then scattered and reflected in the sea water. The transducer is mounted on the hull bottom.

This equipment measures a relative speed to seawater from the hull bottom within 3m. Therefore, ship's speed corresponding to the output of a main engine can be obtained without containing the speed such as the currents. The ship's speed error margin caused by the change in the water line doesn't occur because the transmission and the reception of the pulse are done, and it excludes the signal in the vicinity of the bottom of a ship. Moreover, because the dual beam method to launch the ultrasonic wave signal in two directions (fore and aft) is adopted, the ship's speed error margin because of the change in the trim is greatly reduced.

This equipment offers measured information to other equipment such as radar and ECDIS.

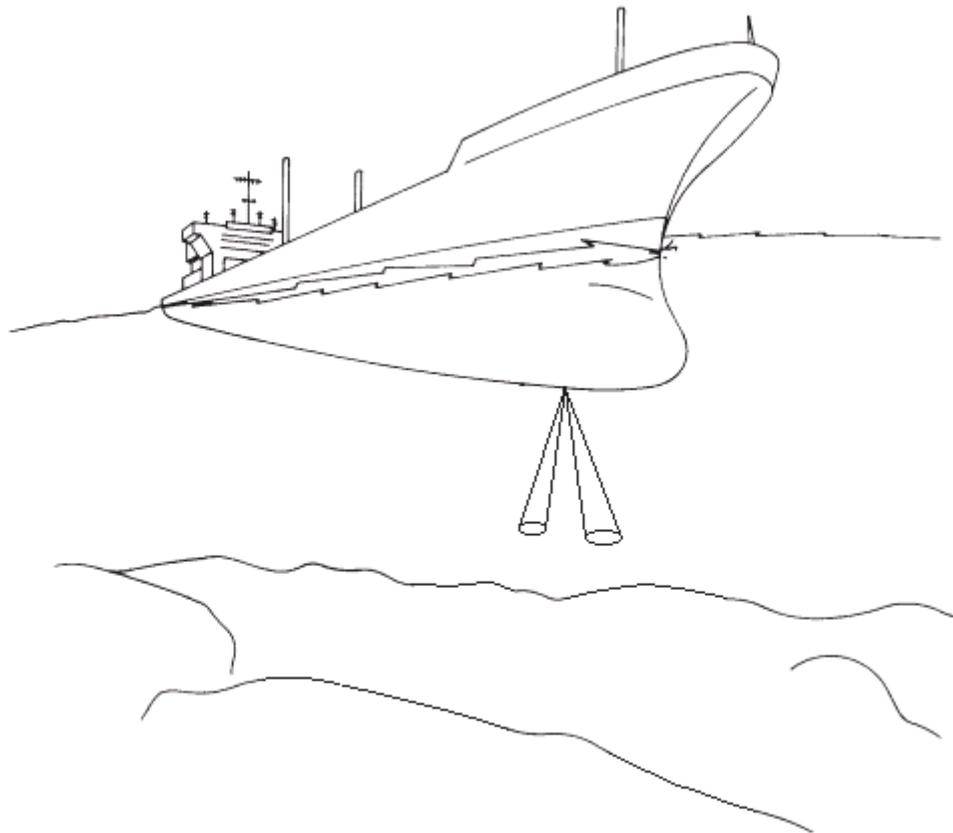


Fig. 1.1 Doppler Log

## 1.2 Features

JLN-205MK2 Doppler Log has the following features:

1) Ship's Speed Through the Water

Using a high-accuracy pulse Doppler system and high-frequency ultrasonic signals, signals reflected from approximately 2 to 3m underwater below the hull bottom are tracked to detect their Doppler frequency shifts, ensuring highly accurate measurement of own ship's speed through the water without being effected by following waves.

2) Free of Errors Due to Hull Motions

An ultrasonic beam pair is transmitted aslant underwater in the fore and aft directions. The error margin because of the hull motion like the rolling and the pitching can be greatly removed by measuring the difference of both Doppler shift reception signals. This equipment ensures high accuracy of speed measurement even in roughest sea conditions.

3) Reliable Compact Transducer

The transducer unit is of molded rubber and has a compact and lightweight construction, ensuring ease of installation. Moreover, the unit has been designed to minimize the effects of aeration, ensuring stable, accurate operation. There is also no troublesomeness of putting the detector into and out of water when the ship leaves and enters the port.

4) Confirms to the following standards

IMO A.824(19), as amended by MSC.96(72), IMO A.694(17), IEC 61023:2007, IEC 60945:2002, IEC 61162-1:2010, IEC 62288:2008

## 1.3 Configuration

The standard equipment and options are shown in the tables below.

### 1.3.1. Standard Configuration

Description	Model No.	QTY	MASS	IP	Remarks
MAIN DISPLAY UNIT	NWZ-4610	1	0.8kg	IP55	
DATA POWER CABLE	CFQ-5766A	1	-	-	2m
FUSE	MF60NR 250V 1	2	-	-	For Display unit 1A
FRONT PANEL	MTV305018A	1	-	-	
BASE KITS	MPBX47065	1	-	-	Base, Knob Bolt, Gear Washer, Knob Washer
MODEL IDENTIFICATION PLATE	MPNN47524A	1	-	-	For Rear
PRODUCT NAME PLATE	MPNN47529A	1	-	-	For Front
Flush Mounting Drawing	-	1	-	-	For Flush Mount
QUICK REFERENCE	7ZPNA4352	1	-	-	English / Japanese
SIGNAL DISTRIBUTOR	NQA-4288A	1	6kg	IPX2	
SIGNAL PROCESSOR	NJC-25	1	10kg	IPX5	
TRANSDUCER	NKF-547	1	17kg	IPX8	Flush mount type With cable 30m
SPARE PARTS	7ZXBS0020	1	--	--	
INSTRUCTION MANUAL	7ZPNA4286B	1	--	--	

### 1.3.2. Option

Description	Model No.	QTY	MASS	Remarks
SUB DISPLAY	NWZ-4610	2Max	0.8kg	
DATA POWER CABLE	CFQ-5766D	1	-	10m
DATA POWER CABLE	CFQ-5766F	1	-	20m
T-SHAPED CONNECTOR	AA-040404-MM M-TL	1	-	For RS-485
DATA CABLE	CFQ-5769	1	-	For RS-485 3m
ANALOG DISPLAY	NWW-24	2Max	6.5kg	Flush mount type
	NWW-25		7kg	Wall mount type
	NWW-26		2.5kg	Panel mount type
REMOTE DISPLAY	NWW-5	1Max	1.5kg	Fore/Aft. Speed &. Direction
	NWW-16		2.5kg	Fore/Aft. Speed &. Direction Distance
DISTANCE COUNTER	NWW-7	1Max	0.8kg	Distance, 9999.99NM Max.
DIMMER UNIT	NCM-227	--	0.5kg	for Main/Sub/Remote Display
	NCM-329	--	0.5kg	for Analog Display
JUNCTION BOX	CQD-10	--	1.5kg	NWZ-4610---NQA-4288A for extension
TRANSDUCER	NKF-531E	1	48kg	Gate Valve type With cable 25m

## 1.4 Configuration

- **Main display unit NWZ-4610**

NWZ-4610 Desktop type

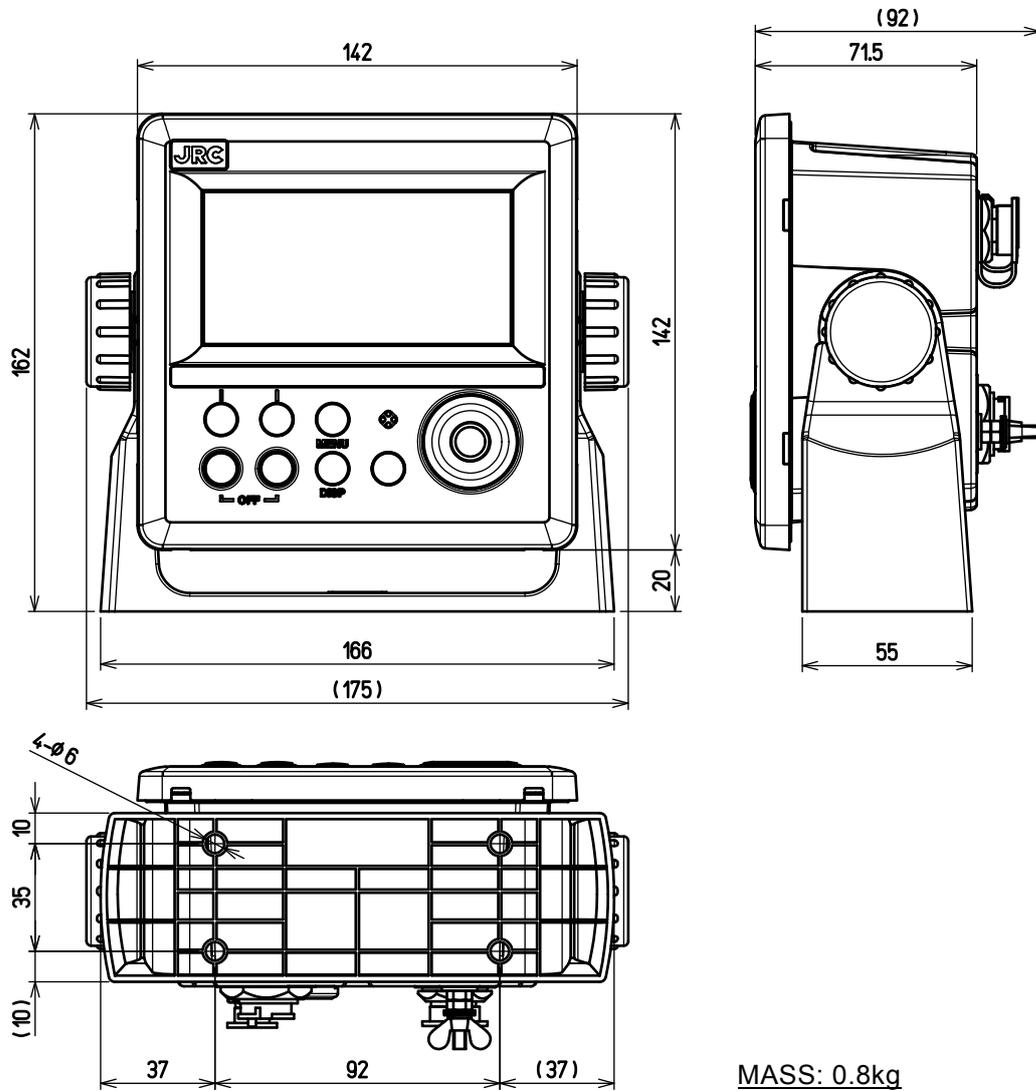


Fig.1.2 Outline of the desktop type main display unit (Unit: mm)

- **Signal Distributor NQA-4288A**

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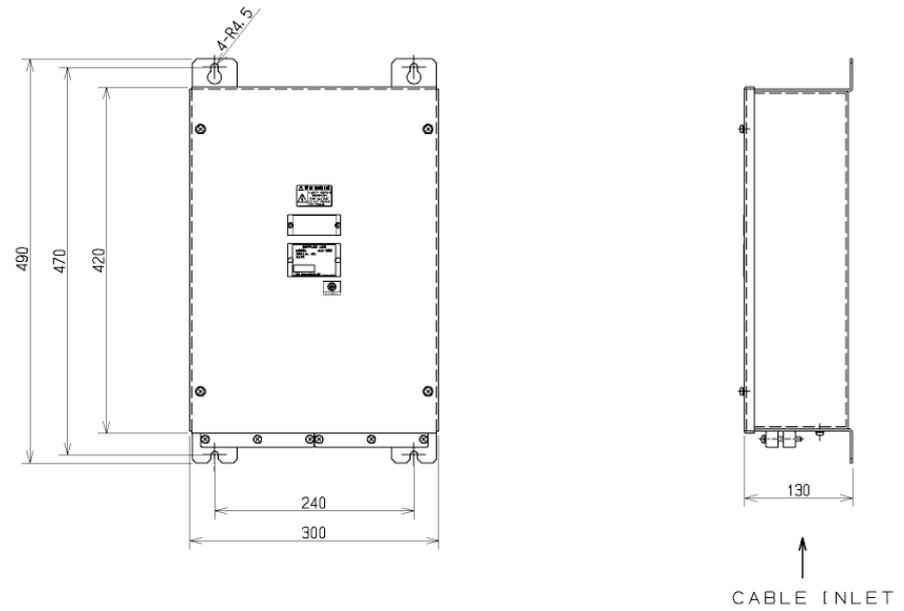


Fig.1.3 NQA-4288A OUTLINE (Unit :mm)

MASS: 6kg

- **Signal Processor NJC-25**

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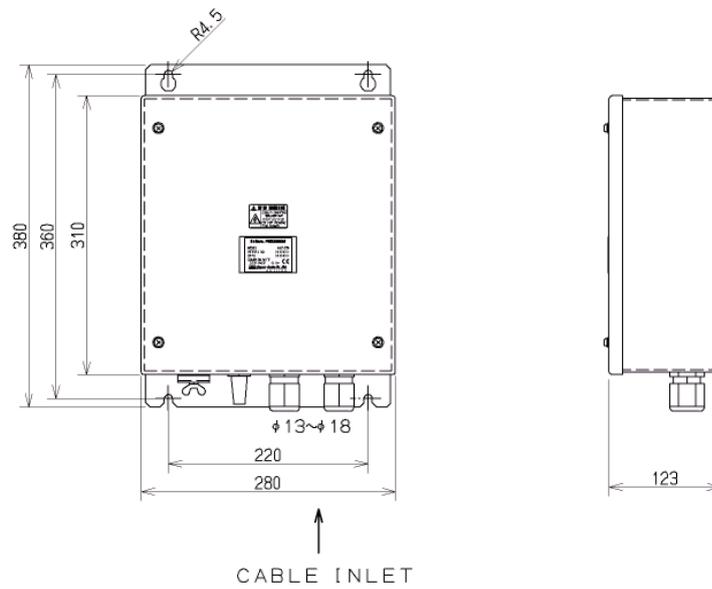


Fig.1.4 NJC-25 OUTLINE (Unit :mm)

MASS: 10kg

● **Transducer NKF-547**

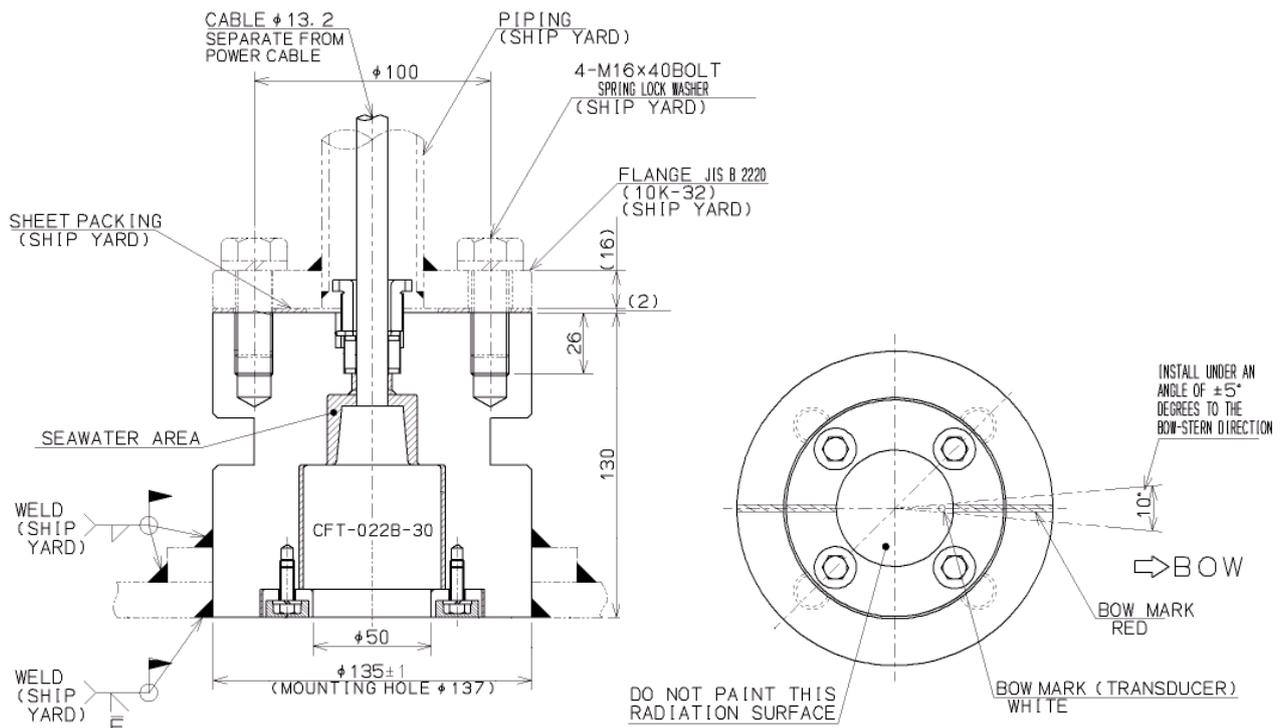


Fig.1.5 NKF-547 OUTLINE (Unit :mm)

MASS: 17kg

● **Transducer NKF-531E (Option)**

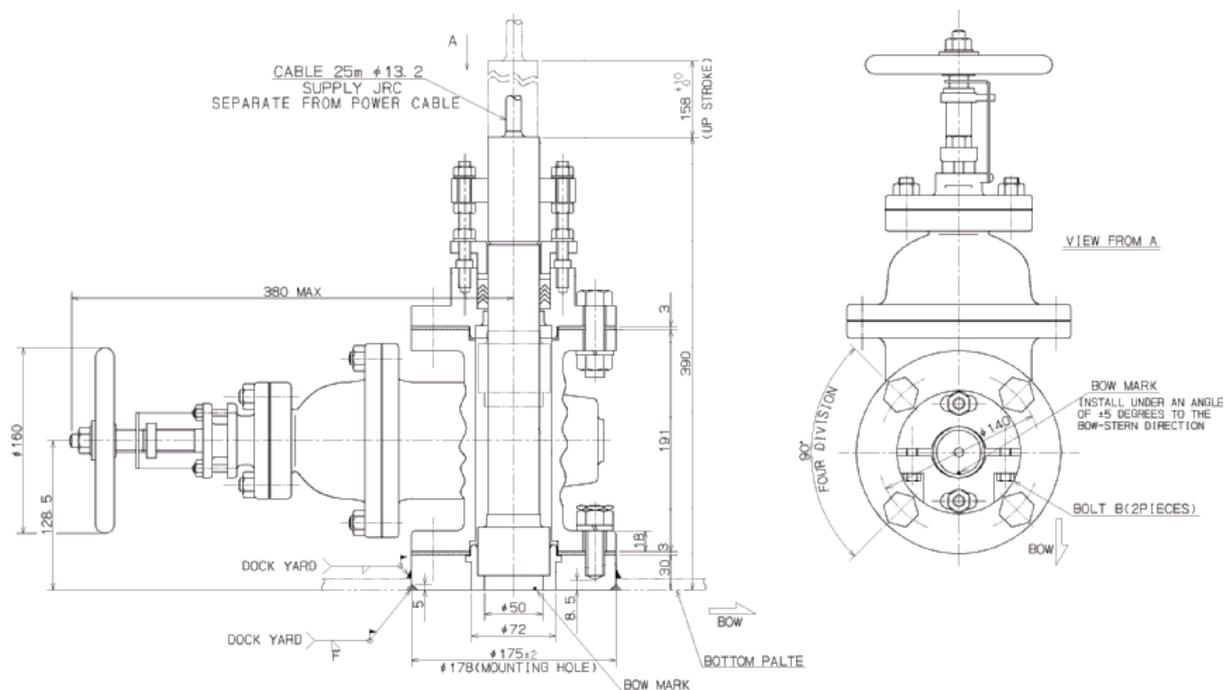
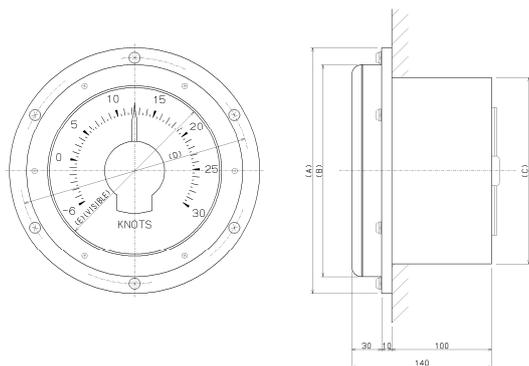


Fig.1.6 NKF-531E OUTLINE (Unit :mm)

MASS: 48kg

● **Analog Display (Option)**



NWW-24L MASS: 6.5kg

NWW-25L MASS: 7kg

NWW-26L MASS: 2.5kg

Area	Size	NWW-24 (Finish mount)		NWW-25 (Wall mount)		NWW-26 (Panel mount)	
		Green	Orange	Green	Orange	Green	Orange
4~20kt	L	NWW-24L20G	NWW-24L20O	NWW-25L20G	NWW-25L20O	NWW-26L20G	NWW-26L20O
	M	---	---	---	---	NWW-26M20G	NWW-26M20O
	S	NWW-24S20G	NWW-24S20O	NWW-25S20G	NWW-25S20O	NWW-26S20G	NWW-26S20O
5~25kt	L	NWW-24L25G	NWW-24L25O	NWW-25L25G	NWW-25L25O	NWW-26L25G	NWW-26L25O
	M	---	---	---	---	NWW-26M25G	NWW-26M25O
	S	NWW-24S25G	NWW-24S25O	NWW-25S25G	NWW-25S25O	NWW-26S25G	NWW-26S25O
6~30kt	L	NWW-24L30G	NWW-24L30O	NWW-25L30G	NWW-25L30O	NWW-26L30G	NWW-26L30O
	M	---	---	---	---	NWW-26M30G	NWW-26M30O
	S	NWW-24S30G	NWW-24S30O	NWW-25S30G	NWW-25S30O	NWW-26S30G	NWW-26S30O

Fig.1.7 Analog Display OUTLINE (Unit :mm)

● **Remote Display NWW-5 (Option)**

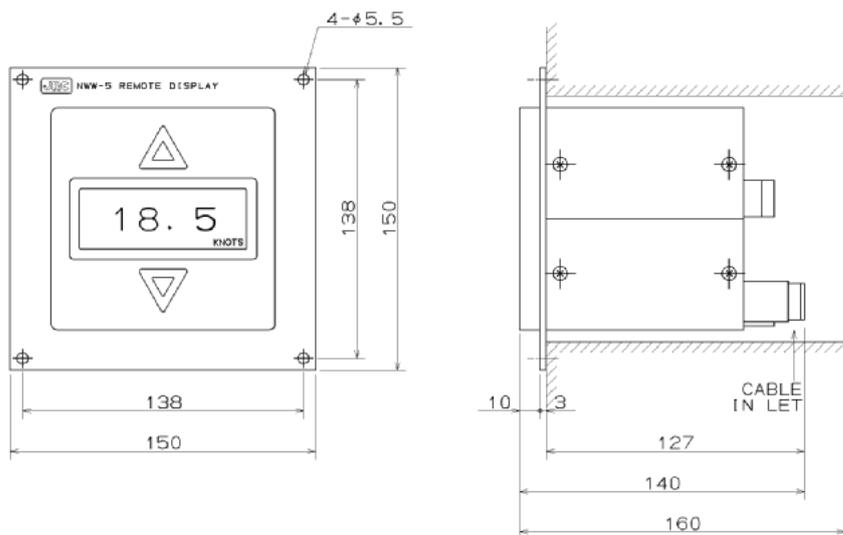


Fig1.8 NWW-5 OUTLINE (Unit :mm)

MASS: 1.5kg

- **Remote Display NWW-16 (Option)**

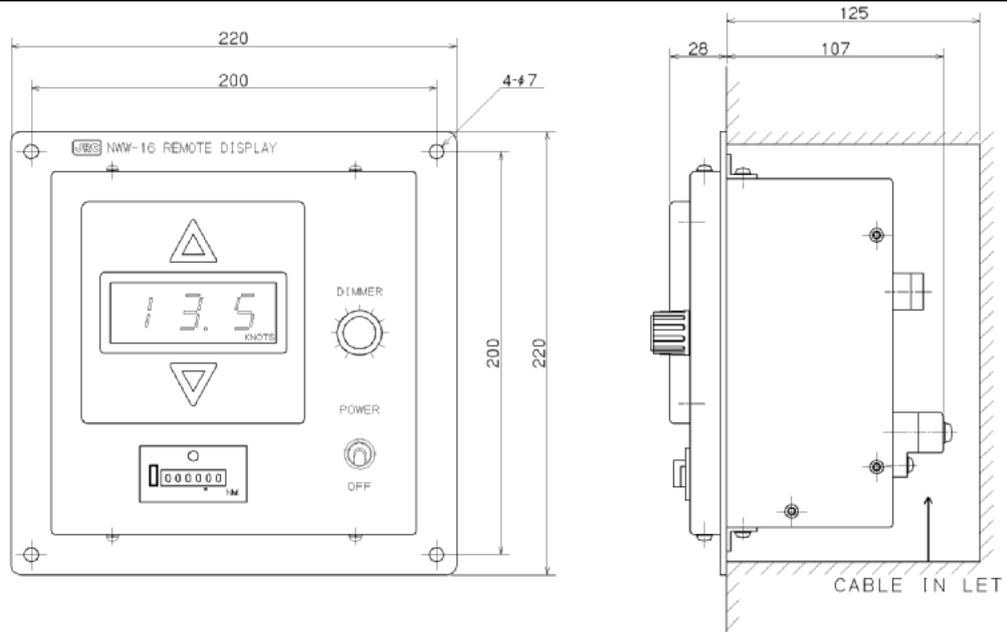


Fig.1.9 NWW-16 OUTLINE (Unit :mm)

MASS: 2.5kg

- **Distance Counter NWW-7 (Option)**

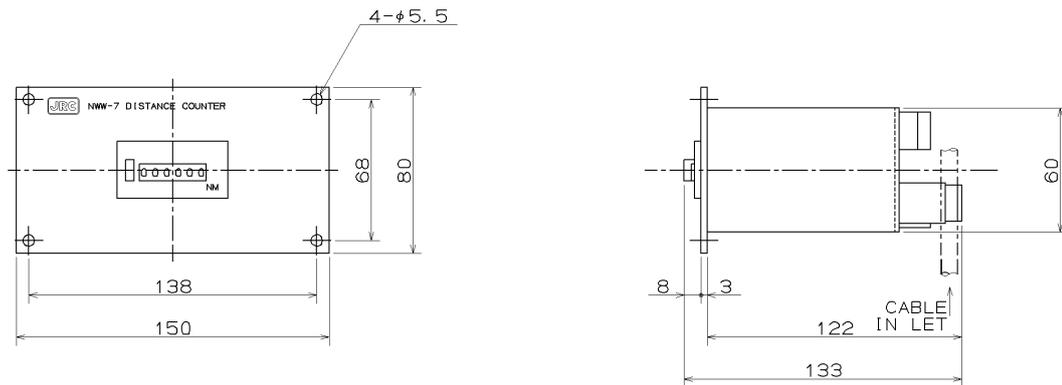


Fig.1.10 NWW-7 OUTLINE (Unit :mm)

MASS: 0.8kg

- **Dimmer Unit NCM-227 / 329 (Option)**

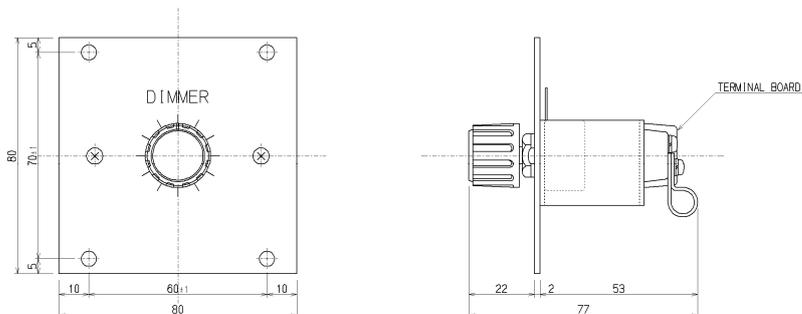


Fig.1.11 NCM-227 / 329 OUTLINE (Unit :mm)

MASS: 0.5kg

● **Junction Box CQD-10 (Option)**

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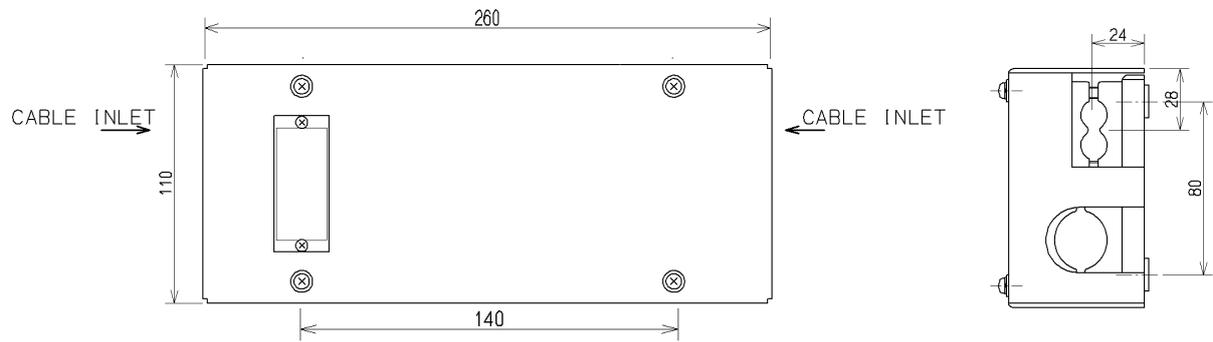


Fig.1.12 CQD-10 OUTLINE (Unit :mm)

MASS: 1.5kg

# 1.5. System Diagram

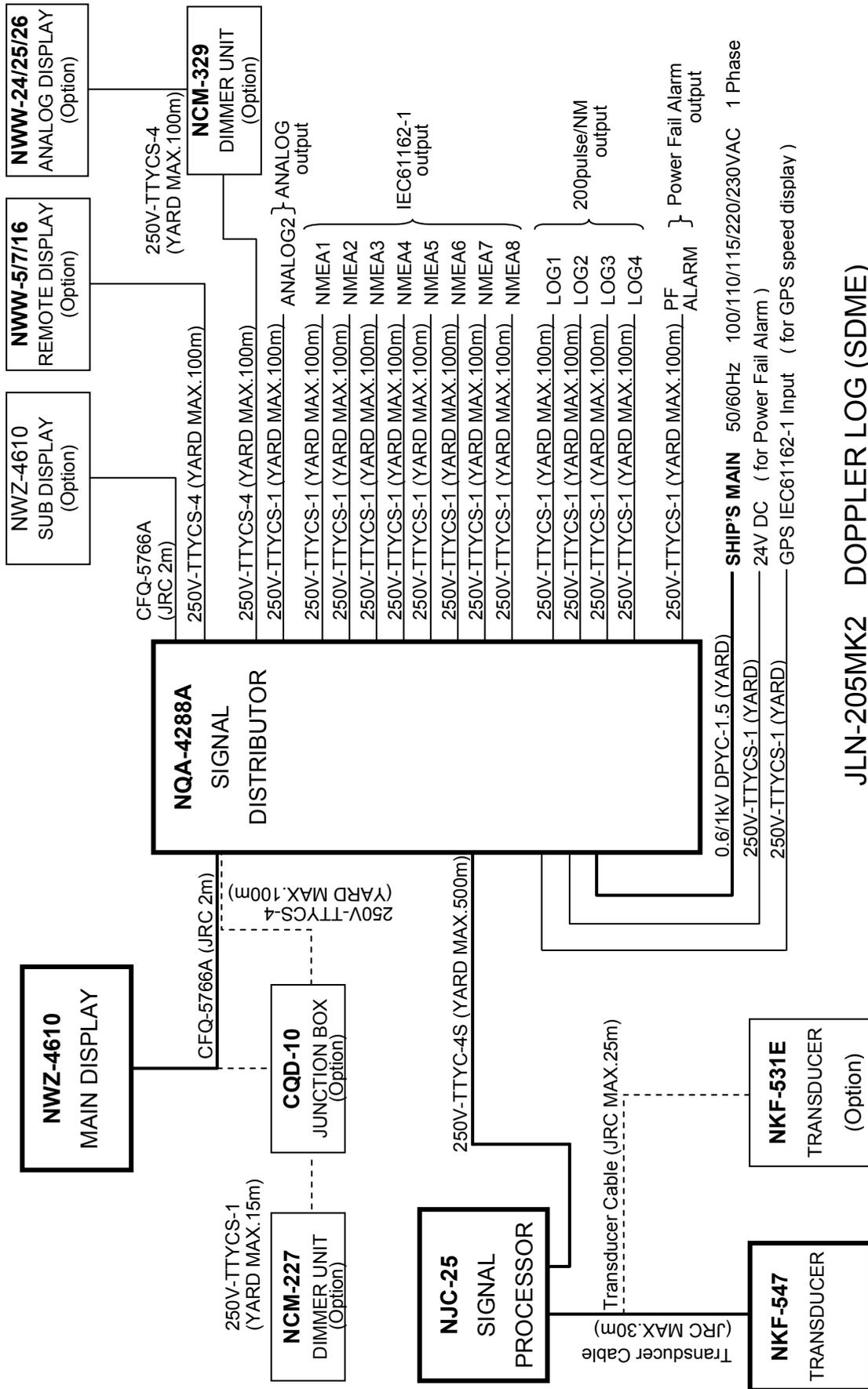
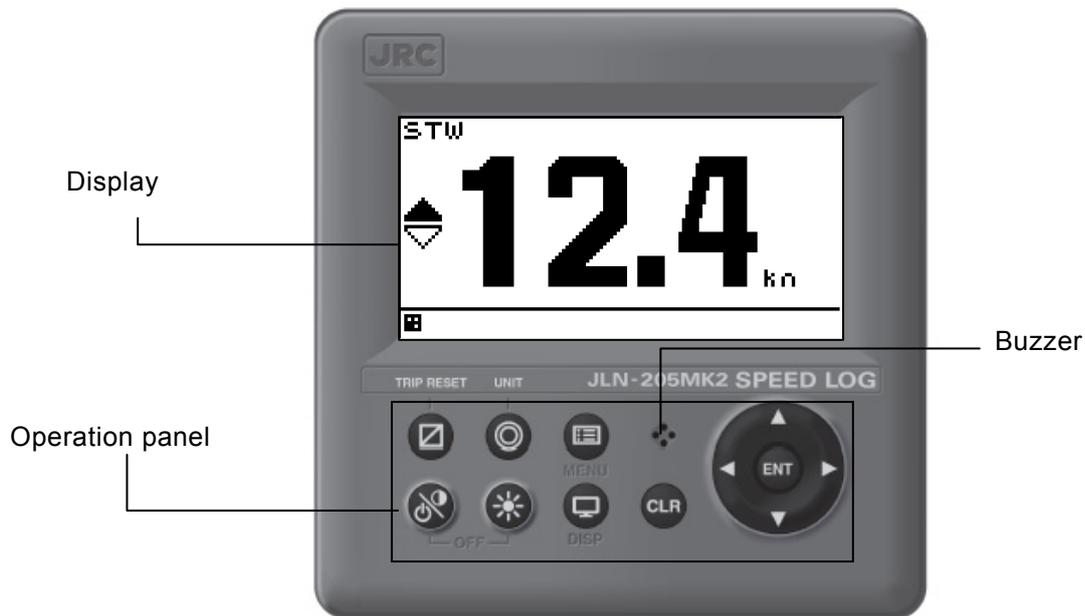


Figure 1.13 JLN-205MK2 DOPPLER LOG (SDME) OVERALL SYSTEM BLOCK

# Chapter 2 Names and Functions of the Components

- Main /Sub display unit

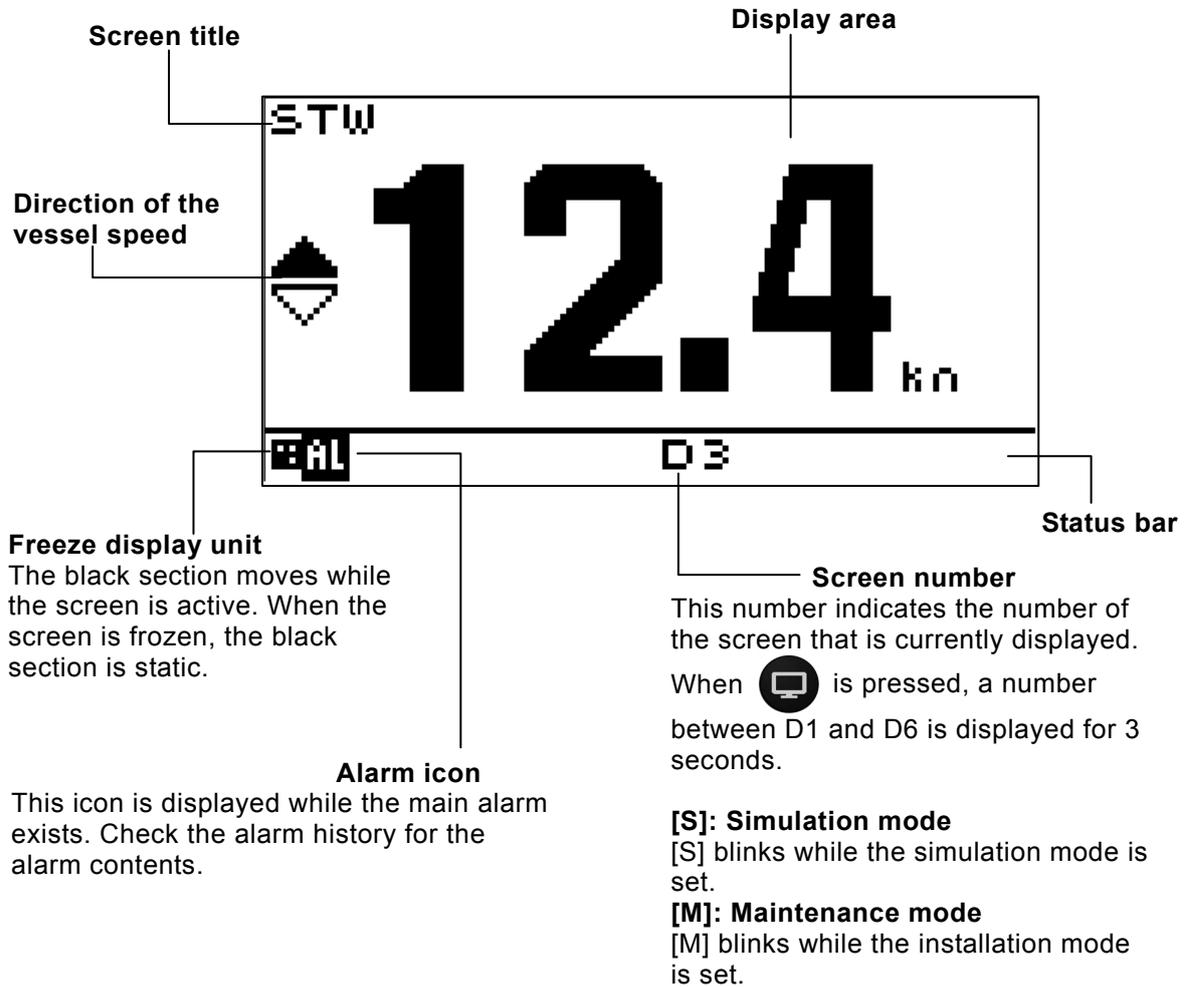


Refer to “4.9.15. Setting the display unit to a sub-display unit” for the sub display.

Figure 2.1 Operation panel of the main display unit

No.	Keys	Key Name	Functions
1		Power/ Contrast	Use this key to turn on the power. Adjust the contrast. To turn off the power, press this key together with the  key.
2		Dimmer	Use this key to adjust the brightness of the back light.
3		Menu	Use this key to display the main menu.
4		Display	Use this key to switch the display screen.
5		Clear	Use this key to cancel the operation. Use this key also to stop the alarm.
6		Cursor	Use this key to move the cursor.
7		Enter	Uses this key to determine the operation.
8		Trip reset	Press this key for 1 second to reset TRIP.
9		Unit	Use this key to change the unit.

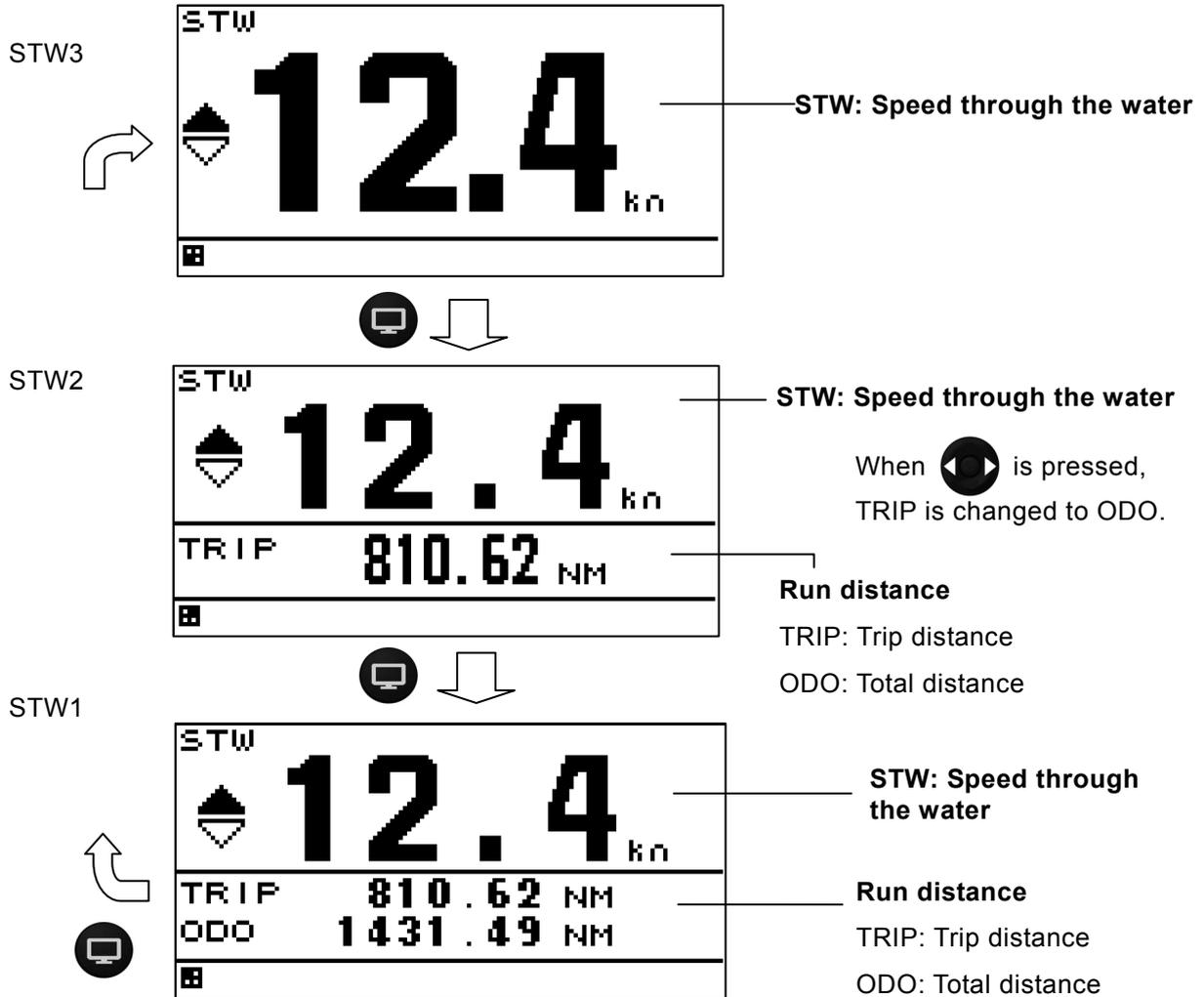
- How to check the display



# Chapter 3 Display Screen

## 3.1 Display Screen

Whenever  is pressed, the screen is changed. Six screens are available. When the power is turned on, the last screen that was displayed at power off is displayed. The following three screens are set at the factory.





# Chapter 4 Operation

## **WARNING**



Do not place drinks on this equipment. Spillage entering the equipment can cause electric shock to the user, or short-circuit, fire or damage to the equipment.  
Do not place or insert metallic objects on or into the equipment, this can cause electric shock to the user, or short-circuit, fire or damage to the equipment.



Do not use this unit at a voltage other than the supply voltage stated on the unit. Otherwise, a fire, an electric shock, or a failure may occur.



Do not insert or remove the power cord or operate switches with a wet hand. Otherwise, you may suffer from an electric shock.



Do not damage or modify the power cord. Placing a heavy object onto, heating, stretching or bending the cord may cause a fire or an electric shock.

## **CAUTION**



When this unit is suddenly moved from a warm place to a cool place or the sudden converse move, dew condensation water may form on the inside windows, and the liquid crystal part can become visually difficult. In this case, leave the unit for a while until becoming dry condition. Then operate the unit.



Do not turn on the power switch of the unit while the ship is on the shore. Otherwise, the transducer may malfunction.

## 4.1 Menu

### Normal menu

Main menu	Sub menu	Range	remarks
1. DISPLAY	1. LCD		4.5
	1. CONTRAST	1-13	4.5.1
	2. DIMMER MAXIMUM	4-13	4.5.2
	3. DIMMER TYPICAL	3-12	4.5.2
	4. DIMMER MINIMUM	2-11	4.5.2
	2. CLICK SOUND	ON / OFF	4.5.3
	3. DISPLAY SELECTION		4.5.4
	1. DISPLAY1	OFF/SEG.1/2/3/4/SPE./GRA.	4.5.4.1
	SEGMENTATION1		4.5.4.2
	1. DISPLAY		4.5.4.3
	DOPPLER	STW / TRIP / ODO	4.5.4.3
	OFF		4.5.4.3
	2. DISPLAY MODE	NORMAL / SPECIAL1 / SPECIAL2 / AUTO RANGE	4.5.4.3
	3. AUTO SCREEN	ON / OFF	4.5.4.3
	4. SOUND	SOUND1 / SOUND2 / OFF	4.5.4.3
	5. TIME	1-10sec	4.5.4.3
	SEGMENTATION2		4.5.4.2
	1. DISPLAY1/2	Same as DISPLAY 1/1	4.5.4.3
	2. DISPLAY2/2	Same as DISPLAY 1/1	4.5.4.3
	3. AUTO SCREEN	ON / OFF	4.5.4.3
	4. SOUND	SOUND1 / SOUND2 / OFF	4.5.4.3
	5. TIME	1-10sec	4.5.4.3
	SEGMENTATION3		4.5.4.2
	1. DISPLAY1/3	Same as DISPLAY 1/1	4.5.4.3
	2. DISPLAY2/3	Same as DISPLAY 1/1	4.5.4.3
	3. DISPLAY3/3	Same as DISPLAY 1/1	4.5.4.3
	4. AUTO SCREEN	ON / OFF	4.5.4.3
	5. SOUND	SOUND1 / SOUND2 / OFF	4.5.4.3
	6. TIME	1-10sec	4.5.4.3
	SEGMENTATION4		4.5.4.2
	1. DISPLAY1/4	Same as DISPLAY 1/1	4.5.4.3
	2. DISPLAY2/4	Same as DISPLAY 1/1	4.5.4.3
	3. DISPLAY3/4	Same as DISPLAY 1/1	4.5.4.3
	4. DISPLAY4/4	Same as DISPLAY 1/1	4.5.4.3
	5. AUTO SCREEN	ON / OFF	4.5.4.3
	6. SOUND	SOUND1 / SOUND2 / OFF	4.5.4.3
	7. TIME	1-10sec	4.5.4.3
	SPECIAL		4.5.4.2
	1. DISPLAY	STW1 / STW2 / STW3	4.5.4.3
	2. AUTO SCREEN	ON / OFF	4.5.4.3
	3. SOUND	SOUND1 / SOUND2 / OFF	4.5.4.3
	4. TIME	1-10sec	4.5.4.3
	GRAPHIC		4.5.4.2
	1. DISPLAY	STW	4.5.4.3
	2. AUTO SCREEN	ON / OFF	4.5.4.3
	3. SOUND	SOUND1 / SOUND2 / OFF	4.5.4.3
	4. TIME	1-10sec	4.5.4.3
	2. DISPLAY2	Same as DISPLAY1	4.5.4.1
	3. DISPLAY3	Same as DISPLAY1	4.5.4.1
	4. DISPLAY4	Same as DISPLAY1	4.5.4.1
	5. DISPLAY5	Same as DISPLAY1	4.5.4.1
	6. DISPLAY6	Same as DISPLAY1	4.5.4.1
	4. BACK LIGHT	WHITE / ORANGE	4.5.5
2. SYSTEM	1. UNIT		4.6.1
	1. SPEED	kn / m/s	4.6.1

	2. SMOOTHING		4.6.2
	1. STW	10-240sec	4.6.2
	3. SPEED	STW / SOG(GPS)	4.6.3
3. LANG.	1. LANG.	English /(Japanese)	4.7
4. ALARM	1. SYSTEM	ON / OFF	4.8 / 4.8.1
	1. SOUND	ON / OFF	4.8.5
	2. LCD	ON / OFF	4.8.5
	2. SPEED	OVER / UNDER/IN RANGE / OUT RANG / OFF	4.8.2
	OVER		4.8.2
	1. OVER	0-99kn	4.8.2
	2. SOUND	ON / OFF	4.8.5
	3. LCD COLOR	ON / OFF	4.8.5
	UNDER		4.8.2
	1. UNDER	0-99kn	4.8.2
	2. SOUND	ON / OFF	4.8.5
	3. LCD COLOR	ON / OFF	4.8.5
	IN RANGE		4.8.2
	1. MAXIMUM	0-99kn	4.8.2
	2. MINIMUM	0-99kn	4.8.2
	3. SOUND	ON / OFF	4.8.5
	4. LCD COLOR	ON / OFF	4.8.5
	OUT RANGE		4.8.2
	1. MAXIMUM	0-99kn	4.8.2
	2. MINIMUM	0-99kn	4.8.2
	3. SOUND	ON / OFF	4.8.5
	4. LCD COLOR	ON / OFF	4.8.5
	3. TRIP	OVER / OFF	4.8.3
	OVER		4.8.3
	1. OVER	0-99999.9NM	4.8.3
	2. SOUND	ON / OFF	4.8.5
	3. LCD COLOR	ON / OFF	4.8.5
	4. SPEED LOST	ON / OFF	4.8.4
	1. SOUND	ON / OFF	4.8.5
	2. LCD COLOR	ON / OFF	4.8.5
5. SENSOR	1. SPEED CORR	-50 - +99.9%	4.9.16 / 4.9.16.1
	2. NMEA1	1.5 / 2.3	4.9.16.2
	3. NMEA2	1.5 / 2.3	4.9.16.2
	4. PULSE1	0-99 ×100P/NM	4.9.16.3
	5. PULSE2	0-99 ×100P/NM	4.9.16.3
	6. PULSE3	0-99 ×100P/NM	4.9.16.3
	7. SCALE	10-40	4.9.16.4

Maintenance menu Please don't change the part of  .

Main menu	Sub menu	Range	Remarks
6. INTERFACE	1. DATA I/O		4.9.5
	1. DATA IN/OUT1		4.9.5
	<b>NMEA</b>		4.9.5 <b>Don't change</b>
	1. DATA IN/OUT	<b>SEND</b> / RECEIVE	4.9.5 <b>Don't change</b>
	1. VERSION	1.5 / 2.1 / 2.3 / 4.0	4.9.5 SEND only
	SENTENCE	Sentence list ACK VBW VLW <b>OFF</b>	4.9.5 <b>Don't change</b>
	2. BIT RATE	4800 / <b>9600</b> / 19200 / 38400	4.9.5 <b>Don't change</b>
	IEC		4.9.5
	1. DATA IN/OUT	SEND/RECEIVE	4.9.5
	SENTENCE	Sentence list ACK VBW VLW	4.9.5 SEND only
	2. BIT RATE	4800 / 9600 / 19200 / 38400	4.9.5
	2. DATA IN/OUT2		4.9.5
	NMEA		4.9.5
	1. DATA IN/OUT	<b>SEND</b> /RECEIVE	4.9.5 <b>Don't change</b>

	1. VERSION	1.5 / 2.1 / 2.3 / 4.0	4.9.5 SEND only
	SENTENCE	Sentence list ACK VBW VLW	4.9.5 SEND only
	2. BIT RATE	4800 / 9600 / 19200 / 38400	4.9.5
	IEC		4.9.5
	1. DATA IN/OUT	<b>SEND/RECEIVE</b>	4.9.5 <b>Don't change</b>
	SENTENCE	Sentence list ACK VBW VLW	4.9.5 SEND only
	2. BIT RATE	4800 / 9600 / 19200 / 38400	4.9.5
	3. DATA IN/OUT3		4.9.5
	<b>NMEA</b>		4.9.5 <b>Don't change</b>
	1. DATA IN/OUT	<b>SEND/RECEIVE</b>	4.9.5 <b>Don't change</b>
	1. VERSION	1.5 / 2.1 / 2.3 / 4.0	4.9.5 SEND only
	SENTENCE	Sentence list ACK VBW VLW	4.9.5 SEND only
	2. BIT RATE	4800 / <b>9600</b> / 19200 / 38400	4.9.5 <b>Don't change</b>
	IEC		4.9.5
	1. DATA IN/OUT	SEND/RECEIVE	4.9.5
	SENTENCE	Sentence list ACK VBW VLW	4.9.5 SEND only
	2. BIT RATE	4800 / 9600 / 19200 / 38400	4.9.5
	4. RS-485		4.9.4.4
	NMEA		4.9.4.4
	1. VERSION	1.5 / 2.1 / 2.3 / 4.0	4.9.4.4 SEND only
	SENTENCE	Sentence list ACK VBW VLW	4.9.4.4 SEND only
	2. BIT RATE	38400 / 57600 / 76800 / 115200	4.9.4.4
	IEC		4.9.4.4
	1. SENTENCE	Sentence list ACK VBW VLW	4.9.4.4 SEND only
	2. BIT RATE	38400 / 57600 / 76800 / 115200	4.9.4.4
	5. CONTACT INPUT	DIMMER/ACK	4.9.6
	2. DIAGNOSIS	---	---
	ERROR LOG OUT	---	---
7. MAINTENANCE	1. INPUT DATA		4.9.8
	2. DIAGNOSIS		4.9.9
	1. DISPLAY DIAG		4.9.9
	2. MONITOR TEST		4.9.9
	3. BUZZER TEST		4.9.9
	3. ERROR LOG		4.9.10
	1. ALARM		4.9.10
	2. ERROR LOG		4.9.10
	4. SOFT VERSION		4.9.11
	1. DISPLAY VER		4.9.11
	1. APP VER		4.9.11
	2. SERIAL NUMBER		4.9.11
	3. BARCODE		4.9.11
	5. TX	ON / OFF	4.9.12
8. MASTER RESET	1. ODO RESET		4.9.13
	2. DISPLAY RESET		4.9.13
	1. DISPLAY		4.9.13
	3. RECEIVER RESET		4.9.13
9. DEMO MODE	1. DEMO TYPE	-5 / 0 / 18 / 36 / 40 / OFF	4.9.14
10. SOFT UPDATE	1. DISPLAY		---
11. MAIN/SUB		MAIN / SUBSTITUTE	4.9.15
12. DISPLAY TYPE		LOG / MID / OFF	4.9.2 Factory setting: OFF
13. RS-485ID		1-10	4.9.4.1
14. DIMMER GROUP		1-10	4.9.4.3
15. DIMMER		KEY / EXT DIMMER	4.9.3

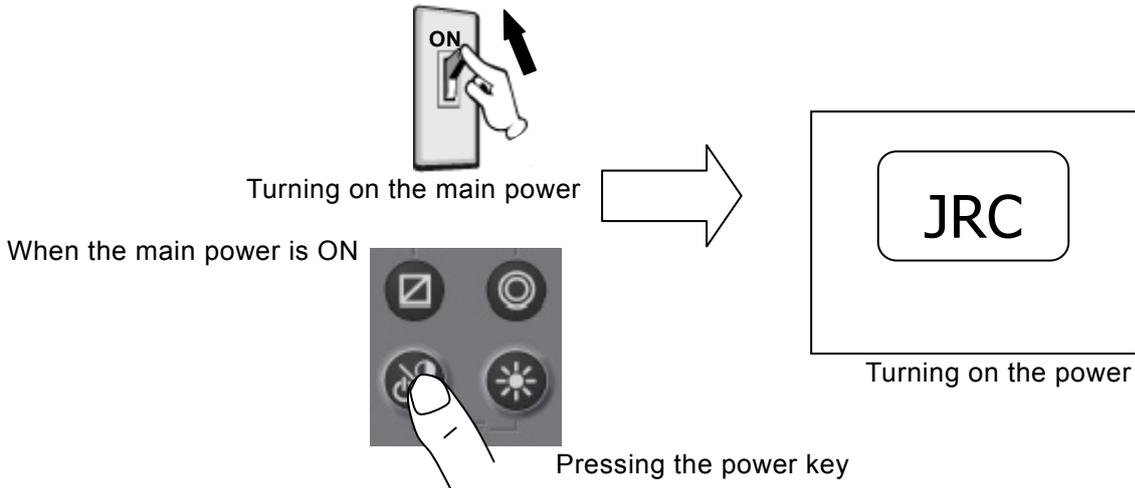
## 4.2 Basic Operation

### 4.2.1. Turning on the power

When the main power of the power distribution board is turned on, the power of the display unit is turned on automatically.

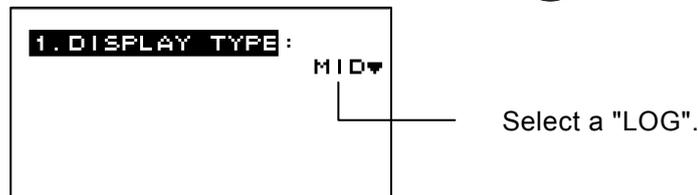
When the power is turned on by the key operation on the display unit, the power can be turned off by pressing .

When the main power is OFF



When the power is ON for first time.

The following screen is displayed. Select a model "LOG" with  and press .



When the other model is selected wrong.

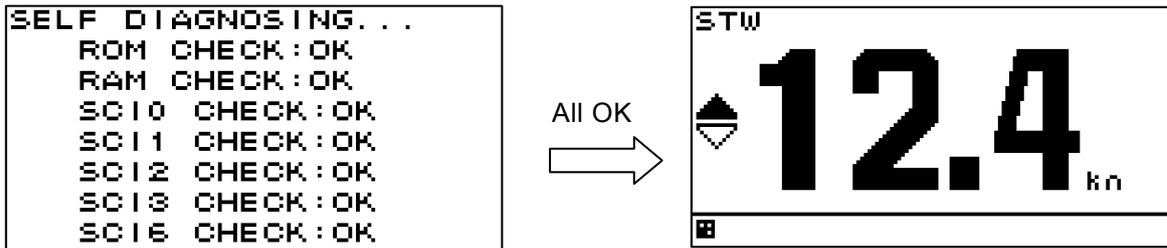
To select a "LOG", refer to "4.9.2 setting a model".

#### Caution

If the power cannot be turned on, check the main switch of the power distribution board and the cable connection of the equipments.

#### 4.2.2. Starting (Normal)

If all the self-check results are 'OK', the screen is automatically changed to the normal screen.



When the power is turned on by using the main power switch, the transducer protection function is activated for safety and a message is displayed on the screen as shown below. Turn off the power as indicated in 4.2.5 "Turning off the power" and turn on the power again by using the power ON key.

Please turn on the power again.

**Caution**

The transducer protection function protects the transducer from the failure that occurs when it is operated in the open air. Turn on the power after checking that the transducer is placed under water.

When 'Please turn on the power again' is displayed again even if the power supply is turned on again, it operates it as follows.

1. Press the both  and  for 8 seconds.
2. 2) Display in clause 4.9.13. "Performing master reset" is executed.

#### 4.2.3. Starting (Abnormal)

When the self-diagnosis result indicates any abnormality (NG), the following message is displayed.

ALARM  
ROM [21]  
OK

**Caution**

When any abnormality (NG) is found, contact JRC or one of our agents.

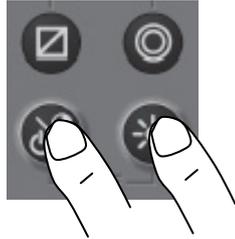
#### 4.2.4. Starting (Abnormal)

When the program is corrupted, the following screen is displayed. Turn off the power and contact JRC or one of our agents.

R0004  
Recovery  
mode.

#### 4.2.5. Turning off the power

To turn off the power, press  while pressing .



#### Supplement

The power may be turned on due to the release timing of your finger.

In this case, first release the  and then release the .

#### 4.2.6. Adjusting the back light (lighting) by using the key

The brightness of the back light of the display and the operation panel can be adjusted over 4 levels (bright, medium, dark, and off). Whenever  is pressed, the level changes in the order of bright – medium – dark – off –dark – medium – bright.



#### Supplement

- The brightness levels other than “off” can be set. See “0 4.5.2. Adjusting back light”.
- An external dimmer unit can also be used for adjusting brightness. See “0 4.9.3. Selecting a dimmer unit”.

#### 4.2.7. Adjusting contrast

Contrast can be adjusted over 13 levels.

Whenever  is pressed, the contrast is reduced (or increased) from the current setting and after the contrast reaches the lowest (or highest) level, the contrast increases (or reduce) gradually.



#### 4.2.8. Turning off the alarm buzzer

Buzzer sound can be turned off by pressing .

The buzzer sound is emitted when an alarm occurs.

## 4.2.9. Switching display

The display screen is switched whenever  is pressed.

Refer to “4.5.4.1 STEP1 Selecting a display screen” for details.

## 4.2.10. Alarm display

When an alarm occurs, the event is notified with a popup menu and buzzer sound.

When  is pressed, the popup menu is cleared and the buzzer sound stops. However, display of  remains on the status bar unless the alarm is cancelled.

When the alarm to which STW cannot be measured or SOG(GPS) signal is abnormal, the invalid ship's speed value keeps blinking until the alarm is cancelled.

To check the alarm again after clearing the popup menu, display the alarm history by referencing 0 “4.9.10. Displaying an alarm”.

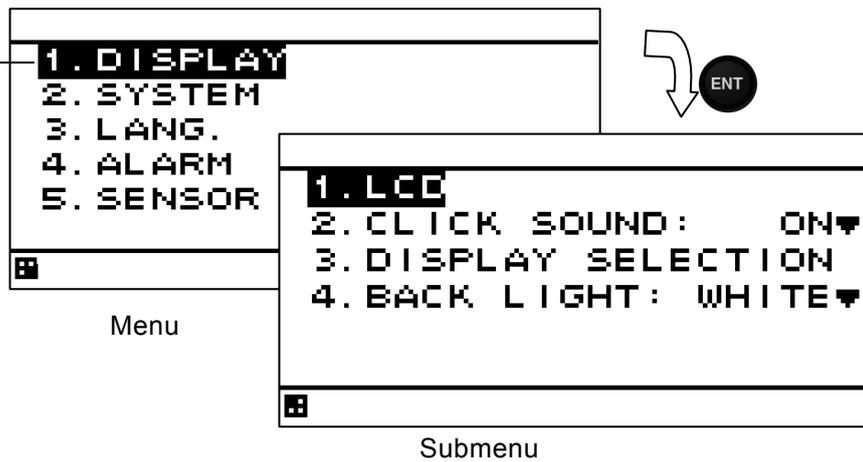
## 4.2.11. Selecting items from the menus

This section shows the procedure for selecting items from the menus and determining the selection.

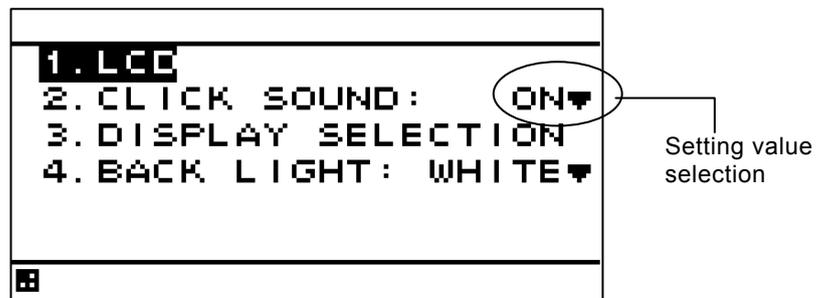
### Procedure

1. Move the cursor to a required item by using  and press . The item is selected and a submenu is opened to enable selection of details.

The selected item is displayed in reverse video.



2. Move the cursor to a required item by using  and press . The cursor moves to the setting value selection.
3. Select a setting value with  and press  or . The setting value is confirmed.



4. To return to the previous item, press  or .

### Supplement

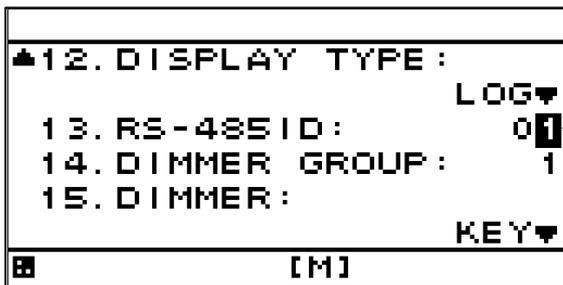
Turn off power after 10 seconds after setting, if you turn off power.

## 4.2.12. Entering a numeric value

This section describes the procedure for entering a numeric value.

### Procedure

1. Move the cursor to the field in which a value is to be entered by using .
2. Set a numeric value to be entered by using  and press  or .
3. Move the cursor to the right most field and press  or . The setting value is confirmed.



Select a field by using 

Select a numeric value by using 

### Supplement

When there are the input plural digits, input the numeric value from the highest digits. To prevent the value from exceeding the input range, the input of the low-order digits is restricted by the value of the high-order digit.

Example) The input range is from 1 to 10:

If 1 is input to a high-ranking digit, the subordinate position digit compulsorily becomes 0 because the range of the input is up to 10.

Turn off power after 10 seconds after setting, if you turn off power.

## 4.3 Changing a unit of the vessel speed

The unit of the vessel speed can be switched between kn and m/s.

### Procedure

1. Press .

Whenever the key is pressed, the setting switches between kn and m/s.

### Supplement

The unit can also be set on a menu.

## 4.4 Resetting a TRIP

A trip value can be reset.

A total travel distance cannot be reset.

### Procedure

1. Press  for 1 second.

The TRIP screen is reset to 0.00NM.

## 4.5 Setting Display

When "Display" is selected on the main menu, a display menu is displayed.

On the display menu, LCD (contrast and back light), click sound, screen selection, and back light color can be set.



Each submenu is outlined below.

- 1) LCD: Adjusts the contrast and sets the back light level.
- 2) CLICK SOUND: Turns on/off the click sound.
- 3) DISPLAY SELECTION: Selects a screen.
- 4) BACK LIGHT: Selects a back light color (white/orange).

### 4.5.1. Adjusting contrast

- Adjust the LCD contrast.
- The darkest contrast is 1 and the lightest contrast is 13.
- The default setting is 7.

#### Procedure

1. Display a main menu by pressing .
2. Select "DISPLAY", "LCD", and "CONTRAST" in this order by using .
3. Enter a contrast value by using  and press .

### 4.5.2. Adjusting back light

- Brightness of the back light can be changed by using . Four levels of brightness are available, bright, medium, dark, and off.  
This section shows how to set a value of each brightness level.

#### Procedure

1. Display a main menu by pressing .
2. Select "DISPLAY", "LCD", and "DIMMER MAXIMUM/TYPICAL/MINIMUM" by using .
3. Select a brightness level by using  and press .

#### Supplement

Enter the highest value in "MAXIMUM" and the lowest value in "MINIMUM".

### 4.5.3. Setting a click sound

- Turn on/off a key-operation click sound.  
 ON: Enables a click sound. When the key is pressed, a click sound is emitted. Rings “pi pi pi” when the operation is invalid.  
 OFF: Disables a click sound.

#### Procedure

1. Display a main menu by pressing .
2. Select “DISPLAY” and “CLICK SOUND” in that order by using .
3. Select “ON” or “OFF” by using  and press .

### 4.5.4. Setting a display screen

Up to six display screens can be registered in this display unit.

The display screen can be switched either manually by using  or automatically (auto screen function).

The auto screen function enables the setting of a switching interval. Switching can also be notified by emitting a buzzer sound.

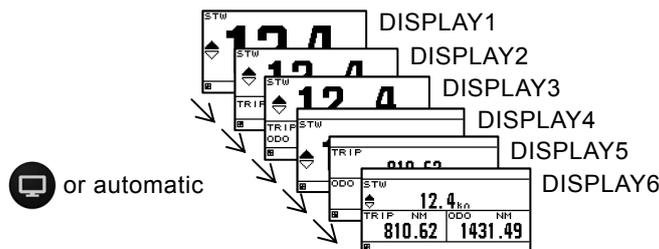
Only the integer section or the decimal section of a indication character can be expanded and displayed. (Display mode) The setting of the auto screen function and the display mode are performed by "STEP3." The screen structures of each display screen include customized screens that can be set freely, special screens that do not allow any setting, and graphic screens. The contents to be displayed on the display screen can be selected.

The screen selection procedure is as follows.

- STEP1 Select a display screen.
- STEP2 Select a screen structure.
- STEP3 Select the display contents.

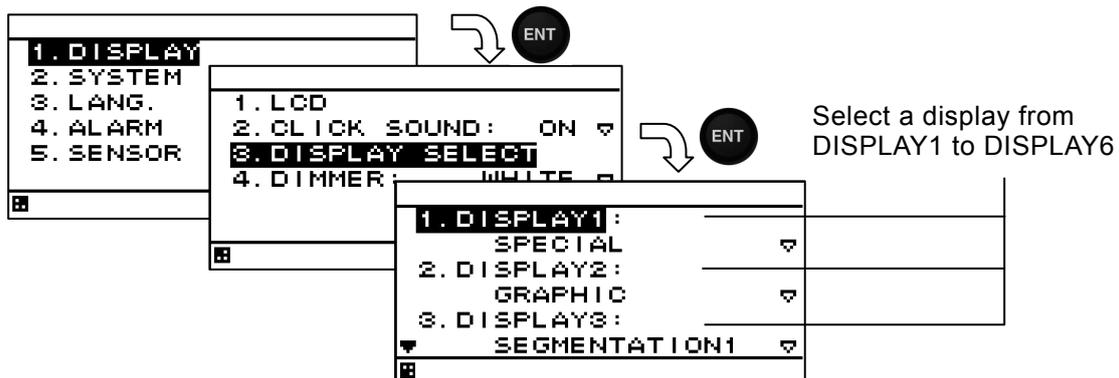
#### 4.5.4.1. STEP1 Selecting a display screen

Up to six display screens can be registered in this display unit.



#### Procedure

1. Display a main menu by pressing  (normal mode).
2. Select “DISPLAY” and “DISPLAY SELECTION” in that order by using  and press .
3. Select a display screen from “DISPLAY1” to “DISPLAY6” by using  and press .



#### 4.5.4.2. SETP2 Selecting a screen structure

The screen structures of each display screen include customized screens that can be set freely, special screens that do not allow any setting, and graphic screens.

Select a screen structure.

When display structure selection is set to "OFF", the display screen cannot be registered.

Customized screen

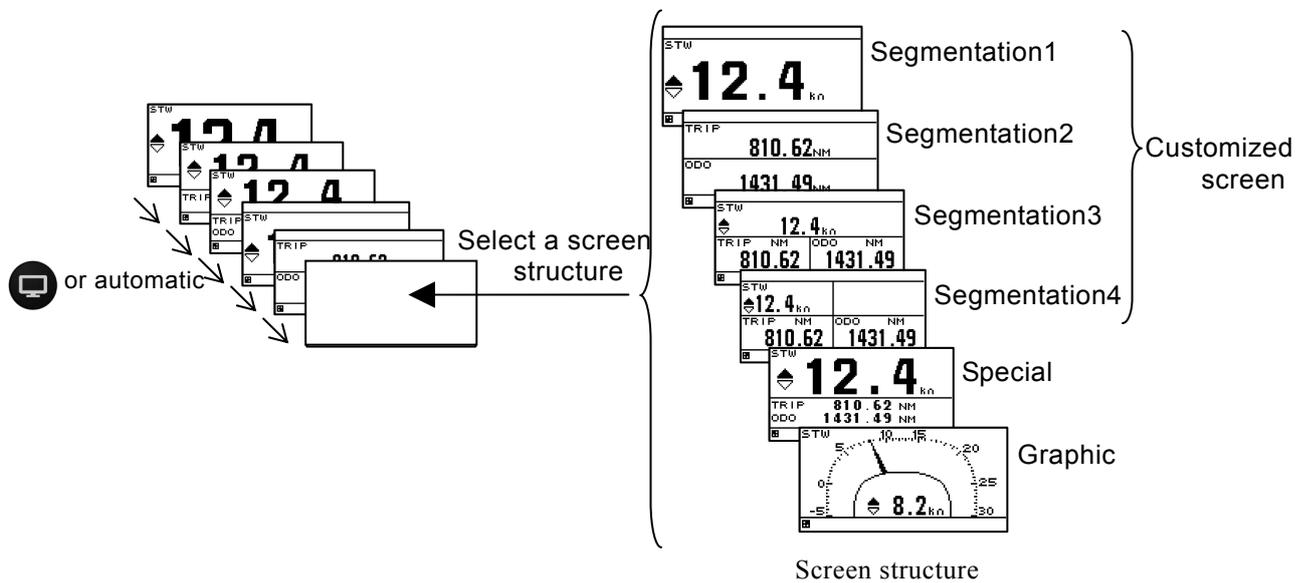
One screen can be segmented into screens 1 to 4. Up to four contents can be displayed concurrently.

Special screen and graphic screen

Users cannot change the screen structure. Special contents for the model are displayed on the screen.

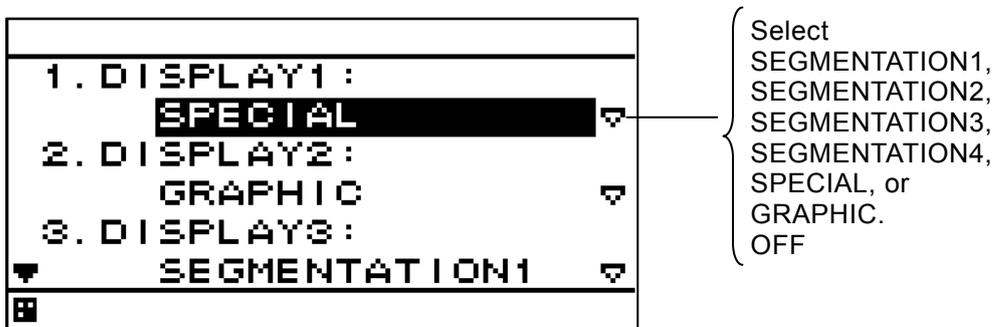
The following screen structures can be selected.

- 1) SEGMENTATION1: Full screen
- 2) SEGMENTATION2: The screen is segmented into two sections.
- 3) SEGMENTATION3: The screen is segmented into three sections.
- 4) SEGMENTATION4: The screen is segmented into four sections.
- 5) SPECIAL: Special Doppler log screen
- 6) GRAPHIC: Graphic screen



#### Procedure

1. Select a display screen by referencing "STEP1".
2. Select a screen structure from "SEGMENTATION1", "SEGMENTATION2", "SEGMENTATION3", "SEGMENTATION4", "SPECIAL", "GRAPHIC" and "OFF" by using and press .



### 4.5.4.3. SETP3 Selecting display contents

Select as many display contents as the number of screens that are created by segmentation. For instance, for a 2-segmentation screen, select the display content for one half of the screen and then select the display content for the other half of the screen (see the diagram below).

First select Doppler on the customized screen, and, next, select the display contents.

Table 4-1 shows the display contents of each screen structure.

Only the integer section or a decimal section of some item that is selected on a 1-segmentation customized screen or a special screen can be expanded.

If display content selection is set to "OFF", no information is displayed in the area.

Set the auto screen function and display mode in STEP3. The following functions can be set.

1-1) AUTO SCREEN: ON – Enables the auto screen function.

OFF – Disables the auto screen function.

1-2) SOUND: SOUND 1 – Emits a buzzer sound "pi pi" when the screen is switched.

SOUND 2 – Emits a buzzer sound "pi" when the screen is switched.

OFF – Does not emit a buzzer sound even if the screen is switched.

1-3) TIME: Sets a screen switching time. A time of up to 10 seconds can be set.

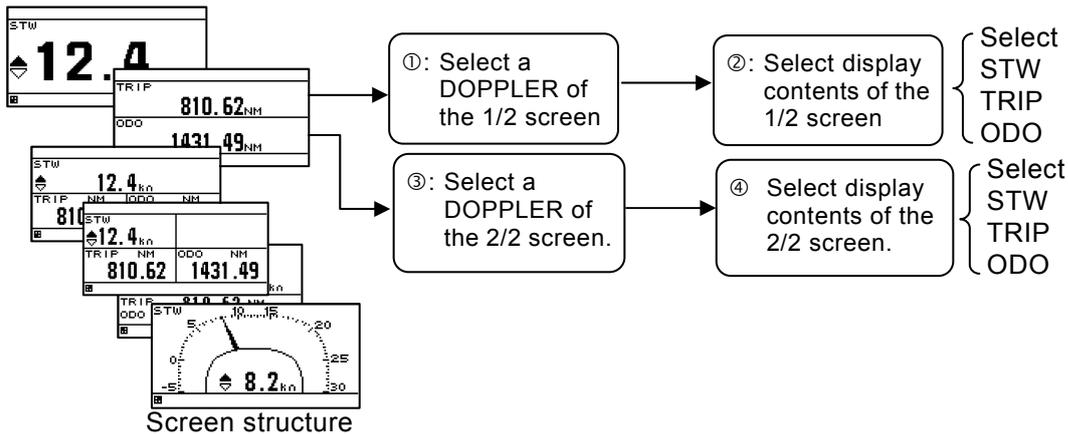
2-1) DISPLAY MODE: normal It displays in the character of the same size.

special 1 Only integer part is expanded and displayed.

special 2 Only a decimal part is expanded and displayed.

auto range Integer part or a decimal part is expanded and it displays the optimal.

Example) Procedure for selecting display contents for a 2-segmentation screen



#### Procedure

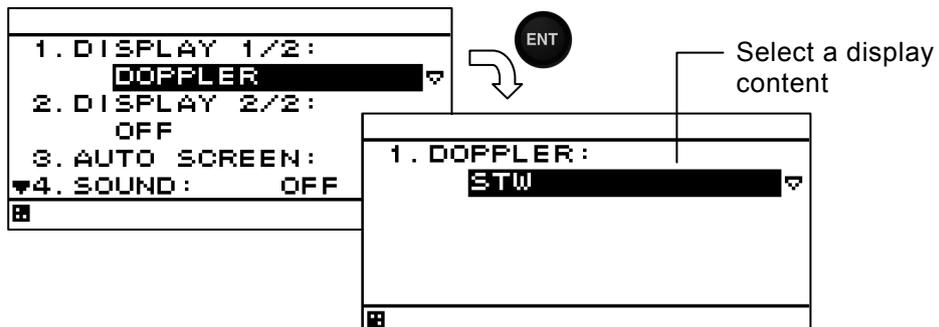
1. Select a screen structure by referencing "STEP1" and "STEP2".

Customized screen

2. Select a screen section to be displayed by using and press .

Select the screen section from the following:

- 1- segmentation screen: "DISPLAY"
- 2- segmentation screen: "DISPLAY 1/2" "DISPLAY 2/2"
- 3- segmentation screen: "DISPLAY 1/3" "DISPLAY 2/3" "DISPLAY 3/3"
- 4- segmentation screen: "DISPLAY 1/4" "DISPLAY 2/4" "DISPLAY 3/4" "DISPLAY 4/4"



3. Select the "DOPPLER" of the display by using  and press .
4. Select display contents by using  and press .
5. Go to procedure 6 when setting an auto screen.

#### Special screen and graphic screen

2. Select "1. DISPLAY" by using  and press .
3. Select display contents by using  and press .
4. Go to procedure 6 when setting an auto screen.

Table 4-1 Display structure and display contents

Display structure	Display	Display contents
Segmentation 1, 2, 3, 4	DOPPLER / OFF	STW, TRIP, ODO(Odometer)
Special screen	---	Speed through the water 1 / 2 / 3
Graphic screen	---	Vessel speed
OFF	---	---

#### Setting an auto screen

On an auto screen, set a screen switching time and whether a buzzer sound is emitted at screen switching.



6. Select "ON" or "OFF" under "AUTO SCREEN" by using  and press .
7. Select "SOUND1" or "SOUND2" or "OFF" under "SOUND" by using  and press .
8. Select "TIME" by using .
9. Enter a switching time by using  and press .

#### Starting an auto screen

1. Set an auto screen to "ON" beforehand to make an auto screen available.
2. Press  for 1 second or more longer.

#### Stopping an auto screen

1. Press , then an auto screen stops. Even if keys except  and  are pushed, it stops.

### Setting a display mode

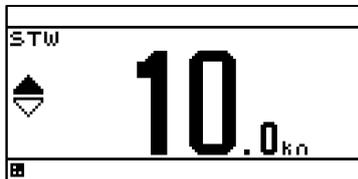
The display mode can be set only with segmentaion1 screen.  
 The contents of a display with an effective auto range are STW, trip, and total distance (ODO).  
 An auto range changes a display in the following range.

#### Auto range

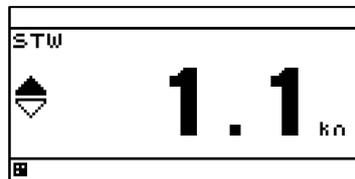
The contents of a display	Integer part expanded display (special 1)	Usual display	Decimal part expanded display (special 2)
STW	10.0kn or more	1.0 - 9.9kn	0.9kn or less
Total distance/ Trip	10.00NM or more	1.00 - 9.99NM	0.99NM or less

1. The contents of a display are set up with the above-mentioned operating procedure.
2. Select the "DISPLAY MODE" by using  and press .
3. Select the "NORMAL", "SPECIAL1", "SPECIAL2" or "AUTO RANGE" by using  and press .

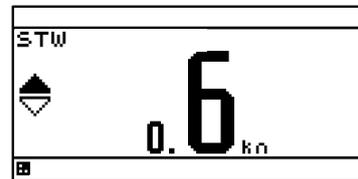
#### Example) STW display



Integer part expanded display



Normal display



Decimal part expanded display

### 4.5.5. Selecting a back light color

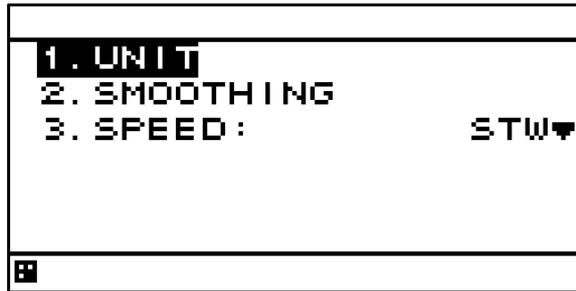
Select white or orange as the back light color of the screen that is normally used.

#### Procedure

1. Display a main menu by pressing .
2. Select "DISPLAY" and "BACK LIGHT" in this order by using .
3. Select "WHITE" or "ORANGE" by using  and press .

## 4.6 System Setting

Select "System" on the main menu. A system setting screen is displayed.  
The system setting can be changed in maintenance mode only.



Each submenu is outlined below.

- 1) UNIT: Sets a vessel speed unit.
- 2) SMOOTHING: Smooth the vessel speed through the water.
- 3) SPEED: Changes the display of the vessel speed.

### 4.6.1. Selecting a unit

The unit of a vessel speed can be set to kn or m/s.  
The speed can be converted by  $1[\text{m/s}] \approx (1852\text{m} \div 3600\text{sec}) \times 1 [\text{kn}]$ .

#### Procedure

1. Display a maintenance menu by referencing 0 "4.9.1. Changing to a maintenance mode".
2. Select "SYSTEM", "UNIT", and "SPEED" in this order by using .
3. Select "kn" or "m/s" by using  and press .

### 4.6.2. Setting a time constant

A speed through the water can be smoothed. The setting range is from 10 seconds to 240 seconds.  
The vessel speed can be stabilized by setting a long smoothing time. However, the following time increases.

#### Procedure

1. Display a maintenance menu by referencing 0 "4.9.1. Changing to a maintenance mode".
2. Select "SYSTEM", "SMOOTHING", and "STW" in this order by using .
3. Enter a smoothing time by using  and press .

### 4.6.3. Select a vessel speed to be displayed

It is possible to select a vessel speed through the water or a ground speed by GPS for the vessel speed display mode in special screen and graphic screen.

#### Procedure

1. Display a maintenance menu by referencing 0 "4.9.1. Changing to a maintenance mode".
2. Select "SYSTEM" and "SPEED" in this order by using .
3. Select "STW" or "SOG (GPS)" by using  and press .

## 4.7 Language Setting

A display language can be selected from 2 languages (English/Japanese (Katakana)).  
Language setting can be changed in maintenance mode only.

### Procedure

1. Display a maintenance menu by referencing 0 “4.9.1. Changing to a maintenance mode”.
2. Select “LANG.” and “LANG” by using .
3. Select a language by using  and press .

## 4.8 Setting Alarm

When “ALARM” is selected on the main menu, an alarm setting screen is displayed.  
When the alarm that is set occurs, the occurrence of the alarm is notified through the popup menu and the alarm icon  on the status bar. The back light color of the screen can be changed.

When  is pressed, the popup menu, buzzer sound, and back light color change are stopped; however, the alarm icon is kept lit until the alarm is cancelled.  
See 0 “5.2 Alarm” for the contents of the message that is displayed on the popup menu.  
Alarm setting can be changed in maintenance mode only.



The alarms that can be set are outlined below.

- 1) SYSTEM: An alarm occurs when computation of the vessel speed is disabled or a system failure occurs.
- 2) SPEED: An alarm occurs when the vessel speed reaches the set range.
- 3) TRIP: An alarm occurs when the trip distance exceeds the set value.
- 4) SPEED LOST: An alarm occurs when the receiver signal cannot be received.  
When OFF is set, each alarm setting is cancelled.

The buzzer sound and back light color of the screen at the occurrence of an alarm can be set.

- 1) SOUND ON: When an alarm occurs, the buzzer sound is emitted.  
OFF: Even if an alarm occurs, the buzzer sound is not emitted.
- 2) LCD COLOR ON: When an alarm occurs, the back light color of the screen is changed.  
OFF: Even if an alarm occurs, the back light color of the screen is not changed.

When the back light color is set to white, the color is changed to orange and when the back light color is set to orange, the color is changed to white.

### Caution

If the alarm occurrence condition is already satisfied when the power is turned on, no alarm is issued.

### 4.8.1. Setting a system alarm

When computation of the vessel speed is disabled or a system failure occurs, an alarm is issued.

#### Procedure

1. Display a maintenance menu by referencing 0 "4.9.1. Changing to a maintenance mode".
2. Select "ALARM" and "SYSTEM" in this order by using .
3. Select "ON" or "OFF" by using  and press .
4. Set a buzzer sound and back light color by referencing "4.8.4. Setting a buzzer sound and back light color".

### 4.8.2. Setting a vessel speed alarm

When the vessel speed reaches the set range, the alarm is issued. The asterisk is also the same. The range can be selected from OVER, UNDER, IN RANGE, and OUTRANGE.

- OVER: An alarm is issued when the vessel speed reaches or exceeds the set speed.  
UNDER: An alarm is issued when the vessel speed is equal to or slower than the set speed.  
IN RANGE: An alarm is issued when the vessel speed is between the lower limit value and the upper limit value.  
OUT RANGE: An alarm is issued when the vessel speed is equal to or slower than the lower limit value or equal to or higher than the upper limit value.  
For IN RANGE and OUT RANGE, set the upper limit value and lower limit value.

#### Procedure

1. Display a maintenance menu by referencing 0 "4.9.1. Changing to a maintenance mode".
2. Select "ALARM" and "SPEED" in this order by using .
3. Select "OVER", "UNDER", "IN RANGE", or "OUT RANGE" by using .
4. Select "OVER", "UNDER" or "MAXIMUM", "MINIMUM" by using .
5. Enter a vessel speed by using  and press .
6. Set an buzzer sound and back light color by referencing "4.8.4. Setting a buzzer sound and back light color".

### 4.8.3. Setting a TRIP alarm

An alarm is issued when the TRIP distance exceeds the set TRIP distance.

#### Procedure

1. Display a maintenance menu by referencing 0 "4.9.1. Changing to a maintenance mode".
2. Select "ALARM" and "TRIP" in this order by using .
3. Select "OVER" by using .
4. After selecting "OVER", enter a TRIP distance by using  and press .
5. Set an buzzer sound and back light color by referencing "4.8.4. Setting a buzzer sound and back light color".

#### 4.8.4. Setting a speed lost alarm

When the signal level of the receiver decreases, an alarm is issued.

##### Procedure

1. Display a maintenance menu by referencing 0 “4.9.1. Changing to a maintenance mode”.
2. Select “ALARM” and “SPEED LOST” in this order by using .
3. Select “ON” or “OFF” by using  and press .
4. Set an buzzer sound and back light color by referencing “4.8.4. Setting a buzzer sound and back light color”.

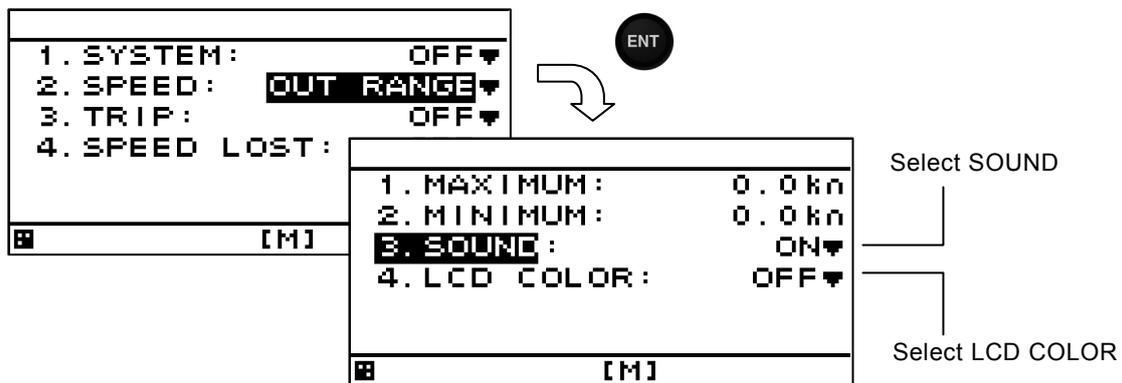
#### 4.8.5. Setting a buzzer sound and back light color

A buzzer sound and the color of the back light color at the occurrence of an alarm can be set. When the back light color is set to white, the color is changed to orange and when the back light color is set to orange, the color is changed to white.

- 1) SOUND ON: When an alarm occurs, the buzzer sound is emitted.  
OFF: Even if an alarm occurs, the buzzer sound is not emitted.
- 2) LCD COLOR ON: When an alarm occurs, the back light color is changed.  
OFF: Even if an alarm occurs, the back light color is not changed.

##### Procedure

1. Display an alarm setting screen by referencing 4.8 “Setting Alarm”.



2. Select “SOUND” by using .
3. Select “ON” or “OFF” by using  and press .
4. Select “LCD COLOR” by using .
5. Select “ON” or “OFF” by using  and press .

## 4.9 Setting Installation

After completing the installation that is described in Chapter 6, check the operation and set the details. In the installation setting, implement the following operations according to the system specification of the vessel.

- 1) Changing to a maintenance mode
- 2) Setting a model
- 3) Selecting a dimmer unit
- 4) Setting dimmer control linkage and data sharing
  - Setting RS-485ID
  - Setting a dimmer group
  - Setting data sharing
- 5) Setting a sub display unit
- 6) Setting a display screen
- 7) Setting details

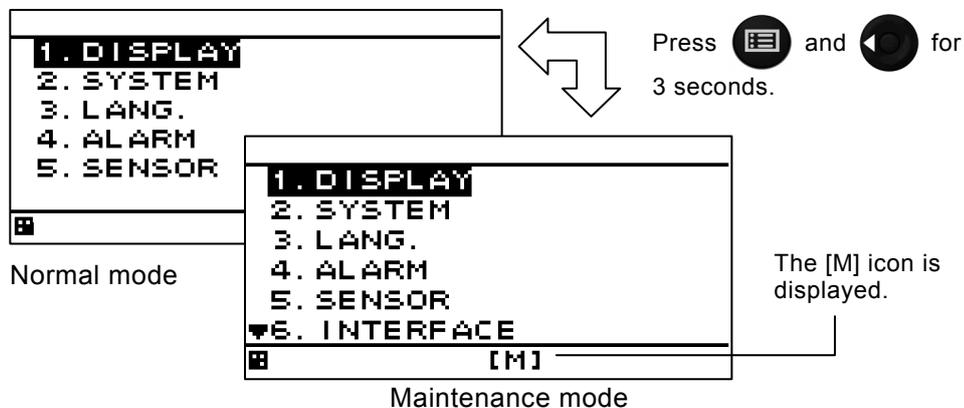
### 4.9.1. Changing to a maintenance mode

Before starting installation, the mode must be changed to a maintenance mode to prevent an operation error.

Change the mode to a maintenance mode by the following operation.

#### Procedure

1. Display a main menu by pressing  (normal mode).
2. Press  and  for 3 seconds.
3. The menu is changed to a maintenance menu (maintenance mode).  
When the mode is changed to a maintenance mode, the [M] icon is displayed at the bottom of the screen.



#### • Returning to a normal mode

When  and  are pressed for 3 seconds or no operation is performed for 3 minutes, the mode is reset to a normal mode.

When the power is turned on, the system starts in normal mode.

## 4.9.2. Setting a model

Set this display unit as a Doppler log display unit.

When the model is set, the setting contents are initialized.

When the model is set to a Doppler log display unit, the following contents are set automatically.

Serial port     Data IN/OUT 1/2: Output (Don't change.)  
                  Data IN/OUT 3: Input (Don't change.)

### Procedure

1. Display a maintenance menu by referencing 0 "4.9.1. Changing to a maintenance mode".
2. Select "DISPLAY TYPE" by using  and press .
3. Select "LOG" by using  and press .
4. When the following popup menu is displayed, press "YES".  
When "NO" is selected, the model setting is cancelled.



### Caution

Don't turn off the power supply until the "INITIALIZING" disappears.

## 4.9.3. Selecting a dimmer unit

Specify whether an external dimmer unit (NCM-227) or a dimmer key is used for controlling the dimmer unit of this display unit.

When an external dimmer unit is used, the contact point input must be set to "DIMMER". For the setting method, see 0 "4.9.6. Setting a contact point input port".

When sharing a dimmer unit, set the same dimmer unit for the display units that share the dimmer unit. Unless the same dimmer unit is set, linking cannot be performed.

To calibrate the external dimmer unit, refer to "6.6 Calibration of External dimmer unit".

### Procedure

1. Display a maintenance menu by referencing 0 "4.9.1. Changing to a maintenance mode".
2. Select "DIMMER" by using .
3. Select a dimmer unit by using  and press .

#### 4.9.4. Dimmer linked control with RS-485

By connecting display units with RS-485 network, dimmer control can be linked.

To connect display units with RS-485 network, the display units must be identified by setting RS-485ID in each display unit.

Up to 10 display units can be connected.

The same baud rate must be set for all the display units. Normally, the baud rate is set to 115,200bps.

It is possible to select key control or control by an external dimmer unit for dimmer control. Display units that are linked can be selected by classifying display units under dimmer control into groups.

However, the same control method such as key control or control using an external dimmer unit must be applied among the display units that are linked. Up to 10 groups are allowed.

Data can be shared by outputting a NMEA sentence to the RS-485 network.

By sharing data, the same data can be displayed.

To output data, the data must be received from the external unit.

A typical connection example for implementing dimmer control with RS-485 is shown below. Refer to the setting reference section for the setting method.

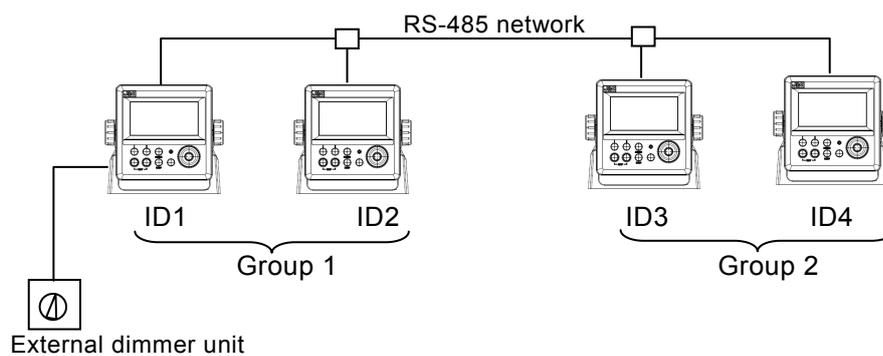
The connection conditions of the connection example are as follows.

	Display unit 1	Display unit 2	Display unit 3	Display unit 4	Setting reference section
RS-485ID	1	2	3	4	0
Dimmer control unit	External dimmer unit	External dimmer unit	Dimmer key	Dimmer key	0
Dimmer group	1	1	2	2	0
Baud rate [bps]	115,200	115,200	115,200	115,200	0

In this example, dimmer control of ID1 and that of ID2 are linked by the external dimmer unit and dimmer control of ID3 and ID4 are not linked.

Dimmer control of ID3 and that of ID4 are linked by key operation and dimmer control of ID1 and that of ID2 are not linked.

#### Connection example



#### 4.9.4.1. Setting RS-485ID

To identify a display unit on the RS-485 network, set an ID for each display unit.

To use RS-485, an ID must be set.

Avoid duplication of ID among the display units. Otherwise, data and dimmer linkage are not possible. Available IDs are from 1 to 10.

##### Procedure

1. Display a maintenance menu by referencing 0 "4.9.1. Changing to a maintenance mode".
2. Select "RS-485ID" by using .
3. Enter an ID number by using  and press .

#### 4.9.4.2. Linking dimmer control

Dimmer control linkage is available for the display units that are connected by the RS-485 network.

The following conditions are necessary for the linkage.

- 1) The display units must be connected by RS-485.
- 2) The same dimmer control is used.
- 3) The display units are in the same dimmer group.

Set the details by referencing the following sections.

- 1) Set RS-485ID by referencing 0, "4.9.4.1. Setting RS-485ID".
- 2) Select the same dimmer unit by referencing 0, "4.9.3. Selecting a dimmer unit".
- 3) Set the display units in the same dimmer group by referencing 0, "4.9.4.3. Setting a dimmer group".

To disable linkage of dimmer control even though the display unit is connected by the RS-485 network, change the dimmer group.

##### Caution

Since dimmer data is transmitted between display units, some time lag may occur at dimmer switching.

#### 4.9.4.3. Setting a dimmer group

Set a group within which dimmer control for this display unit is linked.

Available dimmer group numbers are from 1 to 10.

Set a dimmer group when the display units for which dimmer control is to be linked need to be grouped due to the different equipment environment even though the units are connected by RS-485.

Select the same dimmer unit within the same group. Otherwise, dimmer control cannot be linked within the group.

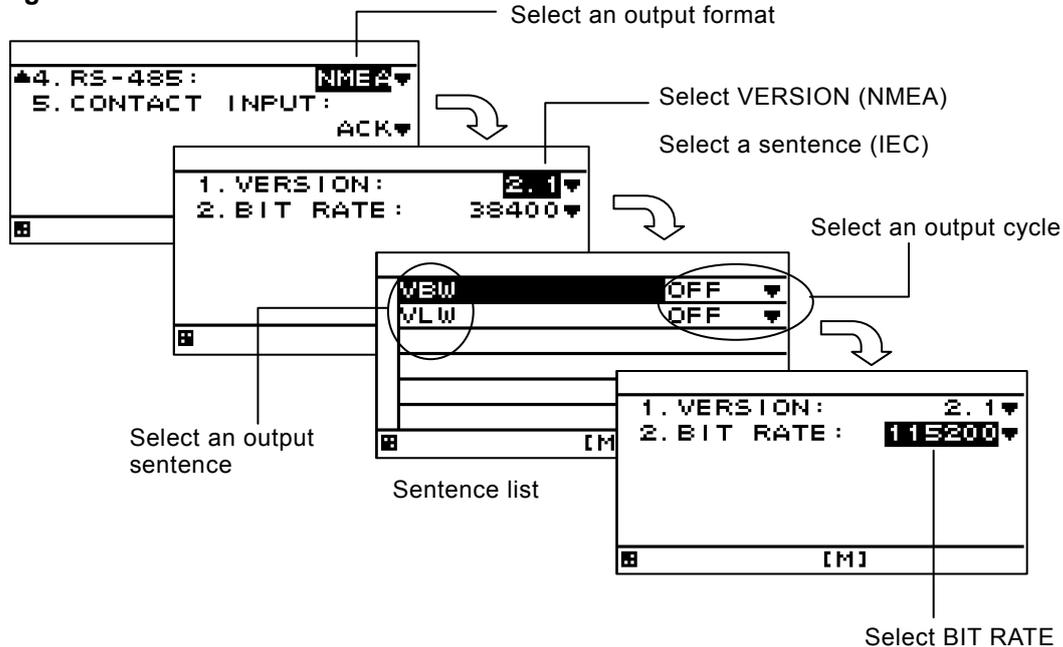
##### Procedure

1. Display a maintenance menu by referencing 0 "4.9.1. Changing to a maintenance mode".
2. Select "DIMMER GROUP" by using .
3. Enter a group number by using  and press .

#### 4.9.4.4. Sharing data

Data can be shared among the display units that are connected through the RS-485 network. Set the data to be transmitted. Although setting for reception is not necessary, the baud rate must be standardized among the display units. For the linkage, set RS-485ID by referencing 0, "4.9.4.1. Setting RS-485ID".

##### Setting transmission



##### Procedure

1. Display a maintenance menu by referencing 0 "4.9.1. Changing to a maintenance mode".
2. Select "INTERFACE", "DATA I/O", and "RS-485" in this order by using .
3. Select the output format to be set by using .
- 1) Selecting NMEA
4. When an output version is selected by using , a sentence list is displayed. Available versions are "1.5", "2.1", "2.3", and "4.0".
5. Select an output sentence by using  and set an output cycle. A cycle can be selected within the range from 1 second to 9 seconds and if OFF is selected, the sentence is not output.
6. Return control to the BIT RATE selection screen and select BIT RATE by using .
- Available bit rates are "38400", "57600", "76800", and "115200". Normally, "115200" is recommended.
- 2) Selecting IEC
- In IEC, VERSION is not selected.
4. When "SENTENCE" is selected by using , a sentence list is displayed.
5. Select an output sentence by using  and set an output cycle. A cycle can be selected within the range from 1 second to 9 seconds and when OFF is selected, the sentence is not output.

6. Return control to the BIT RATE selection screen and select BIT RATE by using . Available bit rates are “38400”, “57600”, “76800”, and “115200”. Normally, “115200” is recommended.

**Caution**

Since data is transmitted between display units, some time lag occurs at the switching of display.

**4.9.5. Setting a serial port**

When a Doppler log is selected at model setting, the port is set automatically as shown below. **Therefore, normally, the setting of a serial port is not required.**

Data IN/OUT1: Output }  
 Data IN/OUT2: Output } Don't change because it uses it for the connection between equipment.  
 Data IN/OUT3: Input }

Only the output of Data IN/OUT2 can be used.

Don't change the  parts.

Port	Port setting			Remarks
	NMEA / IEC	IN / OUT	BIT RATE	
Data I/O 1	NMEA	Output	9600	Used
Data I/O 2	NMEA IEC	Output	4800	Possible to use
			9600	
			19200	
			38400	
Data I/O 3	NMEA	Input	9600	Used

Although an output sentence, a cycle, and a bit rate can be set for each port, some bit rates and the number of sentences may not be set. In this case, select the minimum sentence.

The following serial data of Data I/O2 can be set.

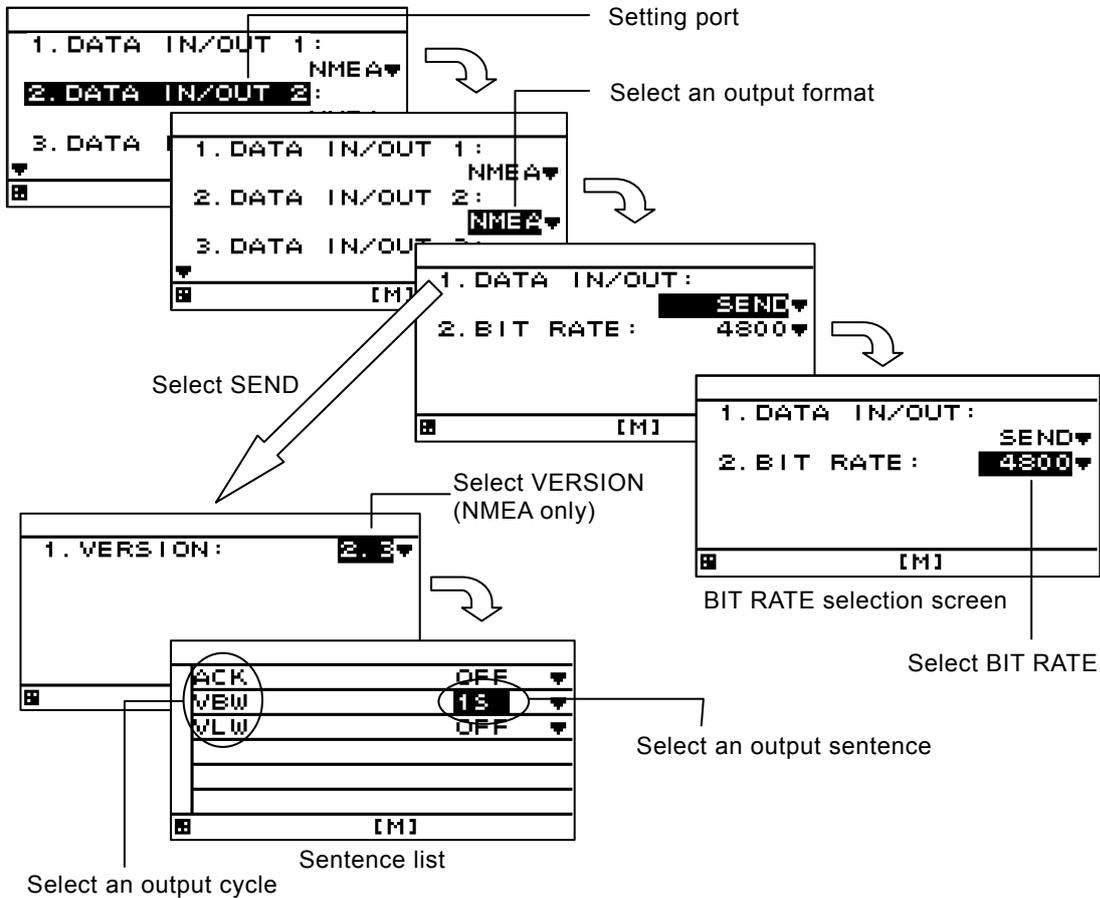
- 1) NMEA: Data is output in NMEA format. Available options are Version 1.5, 2.1, 2.3, and 4.0.
- 2) IEC: Data is output in IEC format.

Data I/O2 is output from pin 10(pink)-pin 11(light green) of the CFQ-5766.

### 4.9.5.1. Setting transmission

The procedure for setting a serial port for transmission is shown below. Only Data IN/OUT2 can be used.

#### Procedure



1. Display a maintenance menu by referencing 0 "4.9.1. Changing to a maintenance mode".
2. Select "INTERFACE" and "DATA I/O" in this order by using .
3. Select the output format to be set by using .
- 1) Selecting NMEA
4. Select "SEND" from "DATA IN/OUT" by using .
5. When an output version is selected by using , a sentence list is displayed. Available versions are "1.5", "2.1", "2.3", and "4.0".
6. Select an output sentence by using  and set an output cycle. A cycle can be selected within the range from 1 second to 9 seconds and if OFF is selected, the sentence is not output.
7. Return control to the BIT RATE selection screen and select BIT RATE by using . Available bit rates are "4800", "9600", "19200", and "38400".

- 2) Selecting IEC  
For IEC, there is no need to select VERSION.
  4. Select "SEND" from "DATA IN/OUT" by using .
  5. Select an output sentence by using  and set an output cycle.  
The cycle can be selected within the range from 1 second to 9 seconds and when OFF is selected, the sentence is not output.
  6. Return control to the BIT RATE selection screen and select BIT RATE by using .
- Available bit rates are "4800", "9600", "19200", and "38400".

### Supplement

In the setting SEND or RECEIVE of data IN/OUT1 or data IN/OUT2, when one port is changed, the other port is also set concurrently. The message that is shown below is displayed to prevent the unintentional setting of the other port. Select "NO", and the port is not changed.

```

SET DATA
IN/OUT 1AND2 OK?
YES   NO

```

## 4.9.6. Setting a contact point input port

A contact point input port can be set to the following input.

- 1) DIMMER: Use this option when connecting an external dimmer unit.

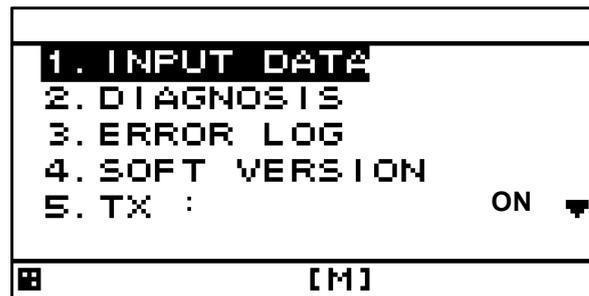
To use an external dimmer unit, the dimmer unit must be set to "EXT DIMMER". See 0, "4.9.3. Selecting a dimmer unit" for the setting method.

### Procedure

1. Display a maintenance menu by referencing 0 "4.9.1. Changing to a maintenance mode".
2. Select "INTERFACE", "DATA I/O" and "CONTACT INPUT" in this order by using .
3. Select an item to be input by using  and press .

## 4.9.7. Checking installation

Installation can be checked.



The following items can be checked.

- 1) Checking the input port
- 2) Self-diagnosis
- 3) Display of alarm history
- 4) Confirmation of software version and serial number
- 5) Stopping transducer transmission

### Supplement

See 0 "4.9.14. Demonstration" for setting a demo mode for confirmation of data output.

## 4.9.8. Checking the input port

Data that is received from the input port can be displayed on a screen.

The input port and display format (ASCII/BINARY) can be selected.

Data of the port that is set to output cannot be displayed.

### Procedure

1. Display a maintenance menu by referencing 0 "4.9.1. Changing to a maintenance mode".
2. Select "MAINTENANCE" and "INPUT DATA" in this order by using and press . A screen is displayed as shown below.
3. To change the display form press . The format changes between ASCII and BINARY.
4. Select the port whose data is to be displayed by using and press . The received data is displayed on the screen. The scroll of the screen stops when is pressed again. Blinking of mark stops while stopping the scroll. To return to the operation description screen, press .



When no data is displayed, check the connection and the setting of the serial port.

## 4.9.9. Self-diagnosis

Self-diagnosis of the display unit can be performed and the result can be displayed.

The following items can be diagnosed.

- 1) ROM, RAM, and serial port of the display unit
- 2) Screen LCD
- 3) Buzzer sound

### Procedure

1. Display a maintenance menu by referencing 0 "4.9.1. Changing to a maintenance mode".
2. Select "MAINTENANCE" and "DIAGNOIS" in this order by using .
3. Select a diagnosis item by using  and press . The diagnosis is executed and the result is displayed.

1. DISPLAY DIAG : When it is normal in each item, OK is displayed.
2. MONITOR TEST : The white and black of screen are alternately painted out.
3. BUZZER TEST : Discontinuous sounds of the buzzer ring.

To return to the menu screen, press .

## 4.9.10. Displaying an alarm

The current alarm and past alarms can be displayed. Up to 40 past alarms can be stored and when the number of alarms exceeds 40, alarms are deleted from the oldest one.

### Procedure

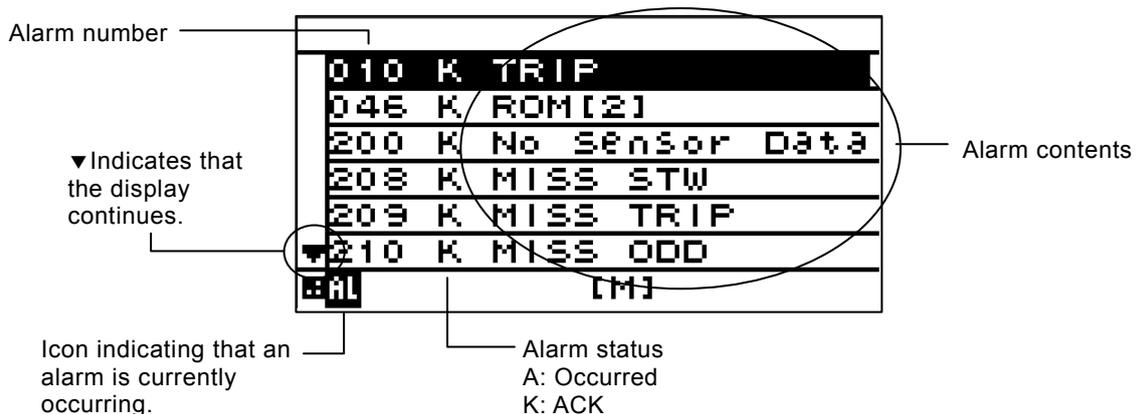
1. Display a maintenance menu by referencing 0 "4.9.1. Changing to a maintenance mode".
2. Select "MAINTENANCE" and "ERROR LOG" in this order by using .

- Displaying the current alarm

3. Select "ALARM" by using  and press .

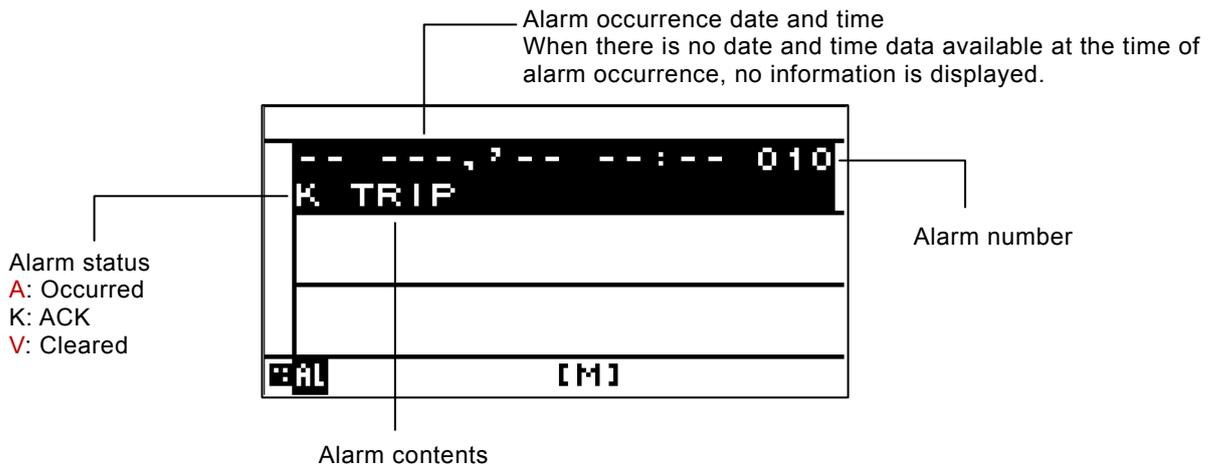
The current alarm is displayed.

When no alarm has occurred, no information is displayed.



- Displaying past alarm history

4. Press “ERROR LOG” by using  and press .

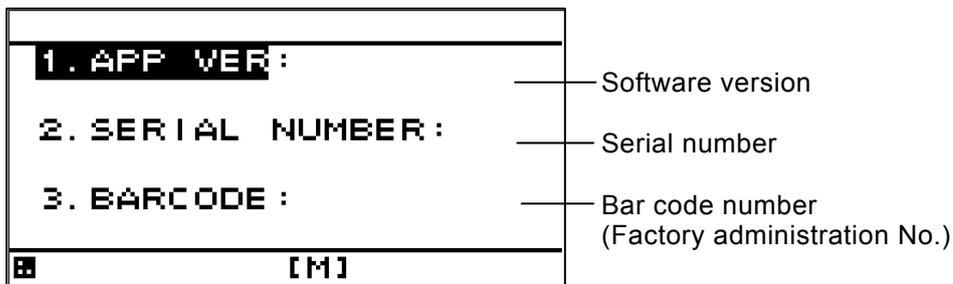


#### 4.9.11. Displaying the software version

The software version, serial number and bar code number of the display unit can be displayed.

##### Procedure

1. Display a maintenance menu by referencing 0 “4.9.1. Changing to a maintenance mode”.
2. Select “MAINTENANCE”, “SOFT VERSION”, and “DISPLAY VER” in this order by using .



#### 4.9.12. Stopping transmission

Transmission of the signal processor can be stopped (OFF).

The transducer is turned on when the power is turned on again. Normally, the transducer is used in the ON state.

##### Procedure

1. Display a maintenance menu by referencing 0 “4.9.1. Changing to a maintenance mode”.
2. Select “MAINTENANCE” and “TX” in this order by using .
3. Select “OFF” by using  and press .

### 4.9.13. Performing master reset

When master reset is performed, the setting values are reset to the default values. It is recommended to keep the records of the setting values before performing master reset.

However, the following items are not reset.

Model, RS-485ID, dimmer control unit setting, dimmer group

The following items can be reset.

- 1) Odo : Total distance (Odo) and Trip distance (TRIP) can be reset at same time.  
After the self-diagnosis ends after power supply ON and it changes into the normal screen, the following operation procedure is done.  
After power is On, it is effective only for 1 minute.
- 2) Display : To initialize the setting of the screen and brightness, etc., the initialization only of the display unit is executed. After it executes, it restart.
- 3) Receiver : To initialize the concerning setting of the measurement and output data, etc., the initialization only of the receiver is executed.

#### Procedure

1. Display a maintenance menu by referencing 0 “4.9.1. Changing to a maintenance mode”.
2. Select “MASTER RESET” by using  and press .
3. Select a reset item by using  and press .
4. When the following message is displayed, press “YES”.



### 4.9.14. Demonstration

Through a demonstration, display and external output are enabled in the same way as the actual equipment operation.

To perform demonstration, the signal processor must be connected.

The available speeds are -5, 0, 18, 36, and 40 kn.

#### Procedure

1. Display a maintenance menu by referencing 0 “4.9.1. Changing to a maintenance mode”.
2. Select “DEMO MODE” and “DEMO TYPE” in this order by using .
3. Select a vessel speed by using  and press .

#### Supplement

During execution of demonstration, [S] is displayed in blinking mode at the bottom of the screen.

To end demonstration, set “DEMO MODE” to “OFF” or turn off the power.

#### Caution

The subtraction of the distance demonstrates when -5kn is selected.

The distance value in usual use adds only forward speed.

Turn on after 3 seconds or more pass when you turn on the power supply again.

#### 4.9.15. Setting the display unit to a sub-display unit

The display unit can be used as a sub-display unit of Doppler log in addition to the main display. When the display unit is set as a sub-display unit, the setting to a data distributor/signal processor and demonstration are not possible.

##### Procedure

1. Display a maintenance menu by referencing 0 "4.9.1. Changing to a maintenance mode".
2. Select "MAIN/SUB" by using .
3. Select "SUBSTITUTE" by using  and press .
4. When the following message is displayed, press "OK".

ARE YOU SURE?

 CANCEL

5. The display unit restarts.

#### 4.9.16. Setting details

When "SENSOR" is selected on the main menu, a detail setting screen is displayed. When there is no change including connection, normally, this operation is not necessary. Detail setting can be changed in maintenance mode only.

```
1. SPEED CORR: + 0.0%
2. NMEA1 :      1.50
3. NMEA2 :      1.50
4. PULSE1 :    0X100P/NM
5. PULSE2 :    0X100P/NM
6. PULSE3 :    0X100P/NM
```

Each submenu is outline below.

- 1) SPEED CORR: Corrects the vessel speed.
- 2) NMEA1: Sets the output versions of NMEA1-NMEA4 in the signal distributor TB515A.
- 3) NMEA2: Sets the output versions of NMEA5-NMEA8 in the signal distributor TB515A.
- 4) PULSE1: Sets the distance pulse output rates of LOG1 and LOG2 in the signal distributor TB519B.
- 5) PULSE2: Sets the distance pulse output rates of LOG3 and LOG4 in the signal distributor TB519B.
- 6) PULSE3: Sets the distance pulse output rate of LOG RELAY in the signal distributor TB519A.
- 7) SCALE: Adjusts the display scale of the analog display (optional).

##### 4.9.16.1. Setting vessel speed correction

This section describes how to correct a vessel speed. The speed can be set within the range from -50.0% to +99.9%. When + value is set, the displayed value increases.

##### Procedure

1. Display a maintenance menu by referencing 0 "4.9.1. Changing to a maintenance mode".
2. Select "SENSOR" and "SPEED CORR" in this order by using .
3. Enter a correction value by using  and press .

#### 4.9.16.2. Setting a serial port of the signal distributor

The NMEA version of a serial port can be set.

When NMEA1 is set, channels from NMEA 1 to NMEA 4 in the signal distributor TB515A are set concurrently.

When NMEA2 is set, channels from NMEA 5 to NMEA 8 in the signal distributor TB515A are set concurrently.

The available versions are 1.5 and 2.3.

The setting complies with IEC61162-1.

##### Procedure

1. Display a maintenance menu by referencing 0 "4.9.1. Changing to a maintenance mode".
2. Select "SENSOR and "NMEA1" or "NMEA2" in this order by using .
3. Select "1.5" or "2.3" by using  and press .

#### 4.9.16.3. Setting a contact point port of the signal distributor

The output rate of the distance pulse can be set.

When PULSE1 is set, LOG1 and LOG2 in the signal distributor TB519B are set concurrently.

When PULSE2 is set, LOG3 and LOG4 in the signal distributor TB519B are set concurrently.

When PULSE3 is set, LOG RELAY in the signal distributor TB519A is set.

The output rates can be set within the range from 0 to 99x100pulse/NM.

When 0 is set, the output is stopped.

##### Procedure

1. Display a maintenance menu by referencing 0 "4.9.1. Changing to a maintenance mode".
2. Select "SENSOR" and "PULSE1", "PULSE2", or "PULSE3" in this order by using .
3. Enter an output rate by using  and press .

#### 4.9.16.4. Setting a scale of the analog display unit (Option unit)

The maximum value of the optional analog display can be set.

The value can be set within the range from 10 kn to 40 kn.

##### Procedure

1. Display a maintenance menu by referencing 0 "4.9.1. Changing to a maintenance mode".
2. Select "SENSOR" and "SCALE" in this order by using .
3. Enter a scale by using  and press .



# Chapter 5 Maintenance and Inspection



## WARNING



Do not check or repair in this unit. Please call our field representative or your nearest JRC office for inspection and repair services. Otherwise it may cause a fire or an electric shock.



Do not remove the cover of this unit. Otherwise, you may touch a high-voltage part and suffer from an electric shock.



Turn off the power on/off switch, and turn off the power supply breaker when you check this unit for maintenance. Otherwise, a fire, an electric shock, or a failure may occur.



Do not disassemble or modify this unit. Otherwise, a fire, an electric shock, or a failure may occur.



Do not check the transducer for any maintenance while the ship is on the water. Otherwise it may cause injury or water leakage of the ship.



In the event that you spill or drop any liquids or metals etc., turn off the unit, turn off the power supply breaker, and contact your sales agent outlet or one of JRC branch offices, sales centers or liaison offices. Continuing operation may cause a fire, an electric shock or a malfunction.



In the event that smoking or burning odors are detected, immediately terminate operation of the unit and contact your sales agent outlet or one of JRC branch offices, sales centers or liaison offices. Never attempt to check or repair the unit. Continuing operation may cause a fire or an electric shock.



## CAUTION



Do not use an organic solvent such as thinner or benzene when you clean the surface of the unit. For cleaning the surface, remove the dust and wipe with clean dry cloth. Otherwise, the painting on the surface may be damaged.

## 5.1 General Maintenance and Inspection



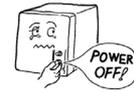
# WARNING



Do not remove the cover of this unit. Otherwise, you may touch a high-voltage part and suffer from an electric shock.



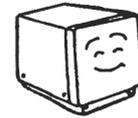
Turn off the power on/off switch, and turn off the power supply breaker when you check this unit for maintenance. If an electric shock. Otherwise, a fire, an electric shock, or a failure may occur.



# CAUTION



Do not use an organic solvent such as thinner or benzine when you clean the surface of the unit. For cleaning the surface, remove the dust and wipe with clean dry cloth. Otherwise, the painting on the surface may be damaged.



The life of the device depends on how daily maintenance and inspection are performed carefully. To keep the device in the best condition at all times, it is recommendable to perform periodical inspections constantly. Any failure in the device can be prevented before it occurs through such inspections. Please perform the inspections shown in the table below periodically.

- Remove stains from the panel face, knob, panel keys, top cover by wiping them lightly with dry cloth.
- Check knob, panel keys, loosening of the connector and starting the omission, and it tightens correctly.
- Check loosening and rattling of the screw bolt that is the fixation of the case, and it tightens surely.

## 5.2 Alarm

This equipment is constantly monitoring the occurrence of vessel speed and trip alarms, disability of calculation of the vessel speed due to deterioration of the received signal level, and any system failure. When detecting any abnormality, the equipment displays an alarm message on the LCD screen.

When the buzzer sound is set to "ON", the buzzer sound is also emitted. The alarm icon is not cleared until the alarm is cancelled.

The following table lists alarm items and possible causes.

No.	Warning message	Alarm occurrence condition	Possible cause
63	STW Lost	The vessel speed cannot be computed.	Degradation of the received signal level and increase of noise. Bubbles were generated on the surface of the transducer.
3	STW	The vessel speed is within the alarm range that is set.	-
4	SOG(GPS)		
7	SOG(LOG)		
10	TRIP	The trip value is within the alarm range that is set.	-
--	Sensor Data Invalid	The data is invalid.	Degradation of the received signal level and increase of noise. Bubbles were generated on the surface of the transducer.
200	No Sensor Data	Data cannot be obtained from the distributor.	Display unit communication error
54	NG:URT Data Lost	URT Data is lost.	Display unit communication error
55	NG:Disp RxT Data	The display data cannot be obtained in the display unit.	Communication error in the display unit, distributor, or processor
56	NG:Proc RxT Data	A measurement condition is not set in the processor.	Processor communication error (reception)
57	NG:Tmnl TxD TB	There is no display data to the display unit on the terminal in the distributor.	Distributor communication error (transmission)
58	NG:Tmnl TxD Pin	There is no display data to the display unit in the distributor.	Distributor communication error (transmission) or fault in the distributor or processor
59	NG:Tmnl RxD Pin	Signals from the display unit are not delivered to the distributor.	Display unit communication error (transmission) or distributor communication error (reception)
60	NG:Tmnl TxP Pin	There is no signal to the processor in the distributor.	Distributor communication error (transmission)
61	NG:Tmnl TxP TB	There is no signal to the processor in the terminal of the distributor.	Distributor communication error (transmission)
62	NG:Tmnl RxP Pin	Signals from the processor are not delivered to the distributor.	Distributor communication error (reception)

Press  to erase the displayed warning messages.

When two or more alarms have been generated, the warning message of the next alarm is displayed.

## 5.3 Troubleshooting



# WARNING



In the event that smoking or burning odors are detected, immediately terminate operation of the unit and contact your sales agent outlet or one of JRC branch offices, sales centers or liaison offices. Never attempt to check or repair the unit. Continuing operation may cause a fire or an electric shock.



When the following symptom exists, it is thought abnormality or the breakdown. Use is stopped at once.

- The power supply doesn't enter.
- Nothing is displayed on the screen.
- Smoke has risen from the units.
- It smells strange.
- It is abnormally hot.

# Chapter 6 Installation



## WARNING



Do not use this equipment at the voltage other than its rated voltage provided for by the specification. Otherwise it may result in a fire, an electric shock or a failure.



Do not any maintenance on the transducer while the ship is in the water. Doing so may cause injury or water leakage to the ship.



Separate from the magnet compass more than the compass safe distance that has been marked to the name plate of the per-equipment when you install this equipment. Installation near a magnetic compass may interfere with the magnetic compass, resulting in an accident.



## CAUTION



Consult with JRC or our agents to install. Installation by unauthorized personnel may result in a malfunction.



During installation, be sure to connect the earth plate and earth cable to the earth terminal. Otherwise it may cause an electric shock in case of failure or electric leak.



Do not use or leave the equipment at the place exposed to direct sunlight or hit by hot wind for a long time or where the temperature becomes 55°C or higher. Otherwise it may cause a fire or a failure.



Do not put the equipment on the unstable place such as wobbly or tilted area. Otherwise it may cause the equipment to drop or fall, resulting in a fire or a failure.



Do not put the equipment in the cabinet or cover it with the nonporous thing such as cardboard. Otherwise it may cause the equipment to be filled with heat, resulting in a fire or a failure.



When this unit is suddenly moved from a warm place to a cool place or the sudden converse move, dew condensation water may form on the inside windows, and the liquid crystal part can become visually difficult. In this case, leave the unit for a while until becoming dry condition. Then operate the unit.



# CAUTION



Reasonable care must be exercised for the routing of the transducer cable, power cable, signal cable and grounding cable. Otherwise, the unit may adversely effect other equipment or vice versa.



Use te indicated screws when installing the display unit to a stable woodnsurface.

Otherwise it may cause the display to fall down, resulting in an injury or a property damage.

Avoid the installation of those units in the following places.

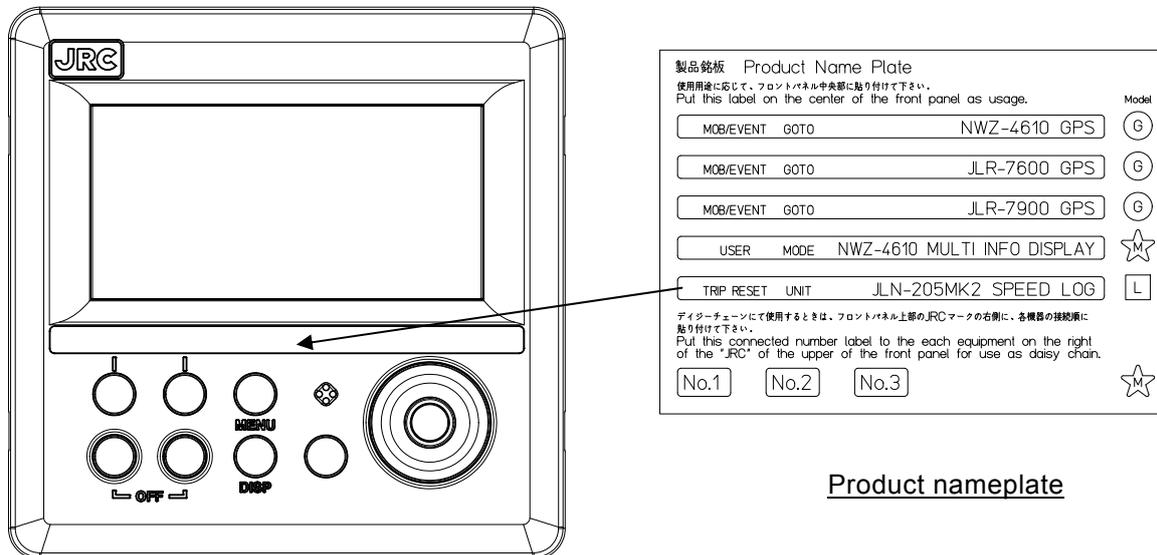
Otherwise, a failure will occur or the life of the set will be shortened.

- A place exposed to direct sunlight.  
The temperature in the unit might rise, and it damages it.
- A place exposed to water splash.  
The units are not a complete waterproof construction.  
The IP grade of Section 1.3 "Components" is confirmed. Do not set it up in severe place more than grade.  
It is likely to be flooded internally, and to damage it.
- A place with poor ventilation  
When the units are set up in the place where ventilation in the cabinet and the box, etc. is bad, the power supply part and the transmission part might overheat, and be damaged abnormally.

## 6.1 Attaching a Nameplate

### 1) Product nameplate

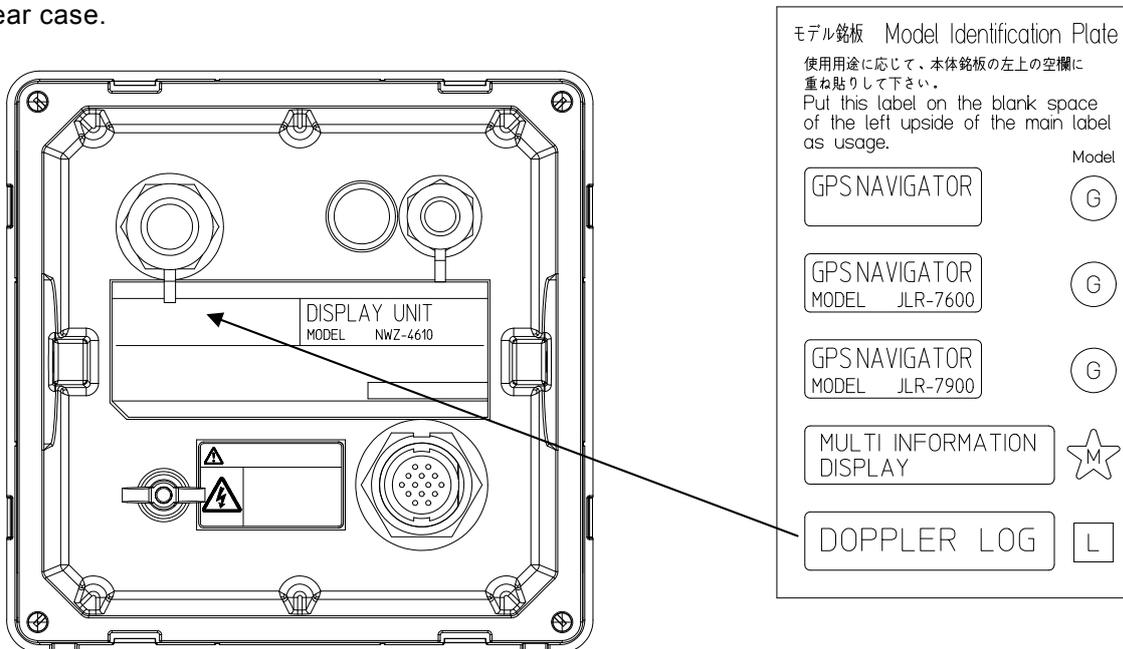
Peel off the seal of “JLN-205MK2” from the product nameplate that is attached and attach it at the center of the front panel.



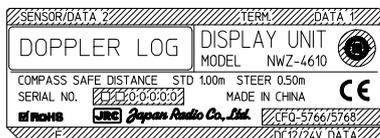
**Product nameplate**

### 2) Model identification plate

Peel off the seal of “DOPPLER LOG” from the model identification plate that is attached and attach it on a blank section at the top left corner of the main unit nameplate at the center of the rear case.



After affixing model identification plate



MED mark of Doppler Log is affixed on the signal distributor.

## 6.2 Installing the Display unit

### Installation location

- Install the main unit in the location that is protected from interference since the signal cable is susceptible to noise and easily generates noise.

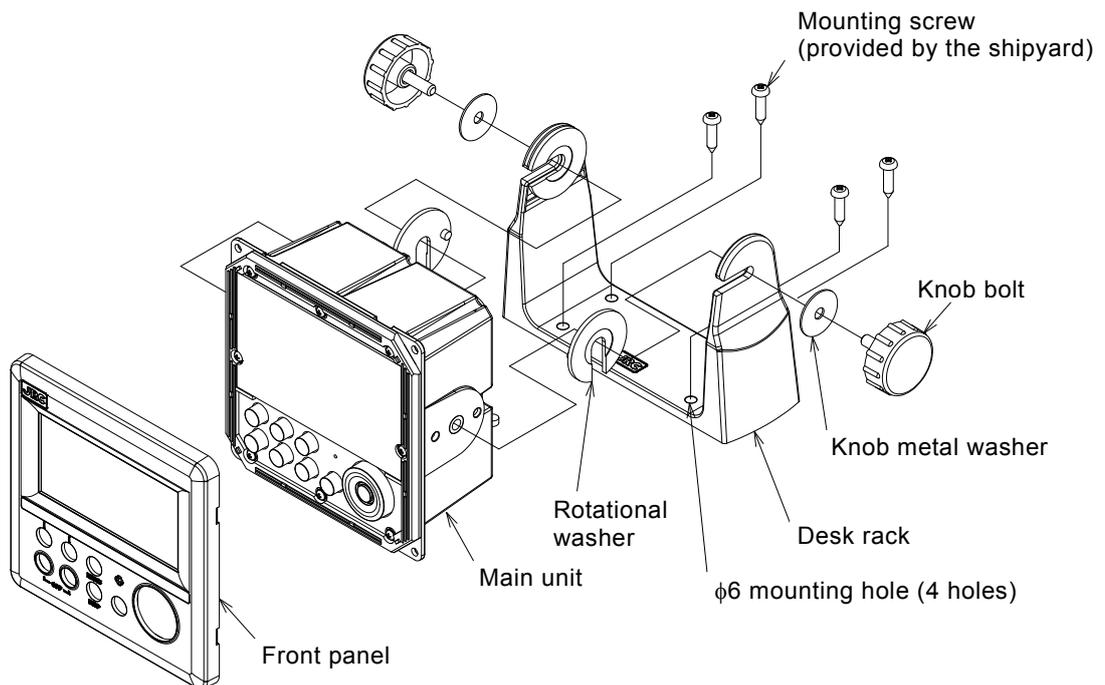
#### Caution

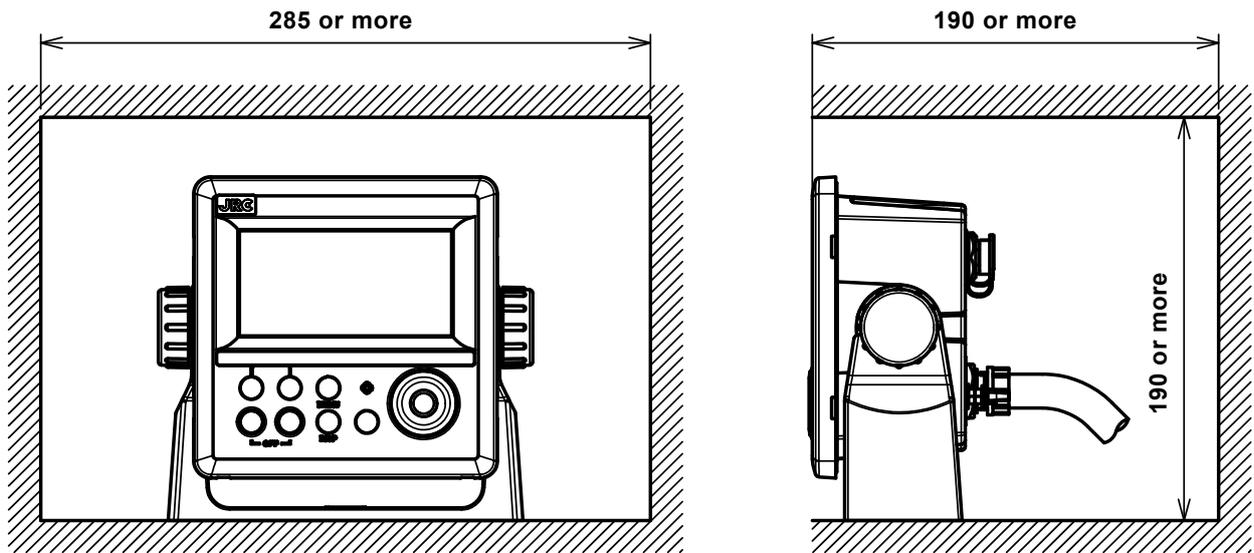
Do not install the display unit on the coaxial cable side of the DSB radio or amateur radio.

### 6.2.1. Mounting the display unit using a rack

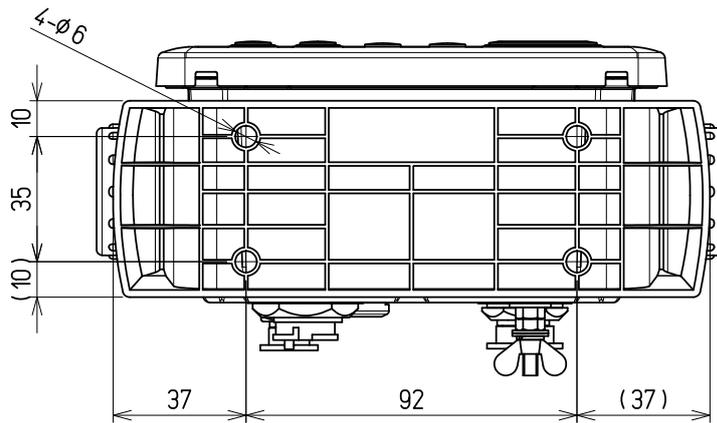
Use the following procedure.

- (1) Fix the desktop rack at the required installation position by using the mounting screws ( $\phi 4$ -6 screw or wood screw,  $L \geq 15$ mm, provided by the shipyard).
- (2) Insert the front panel into the main unit.
- (3) Attach the rotational washer on the side of the main unit.
- (4) Attach the rotational washer on the side of the desktop rack.
- (5) Assemble the main unit on the desktop rack, insert the knob metal washer between the desktop rack and the knob bolt, and fix the main unit by tightening the knob bolts.





Required installation space



Mount (bottom)

(Unit: mm)

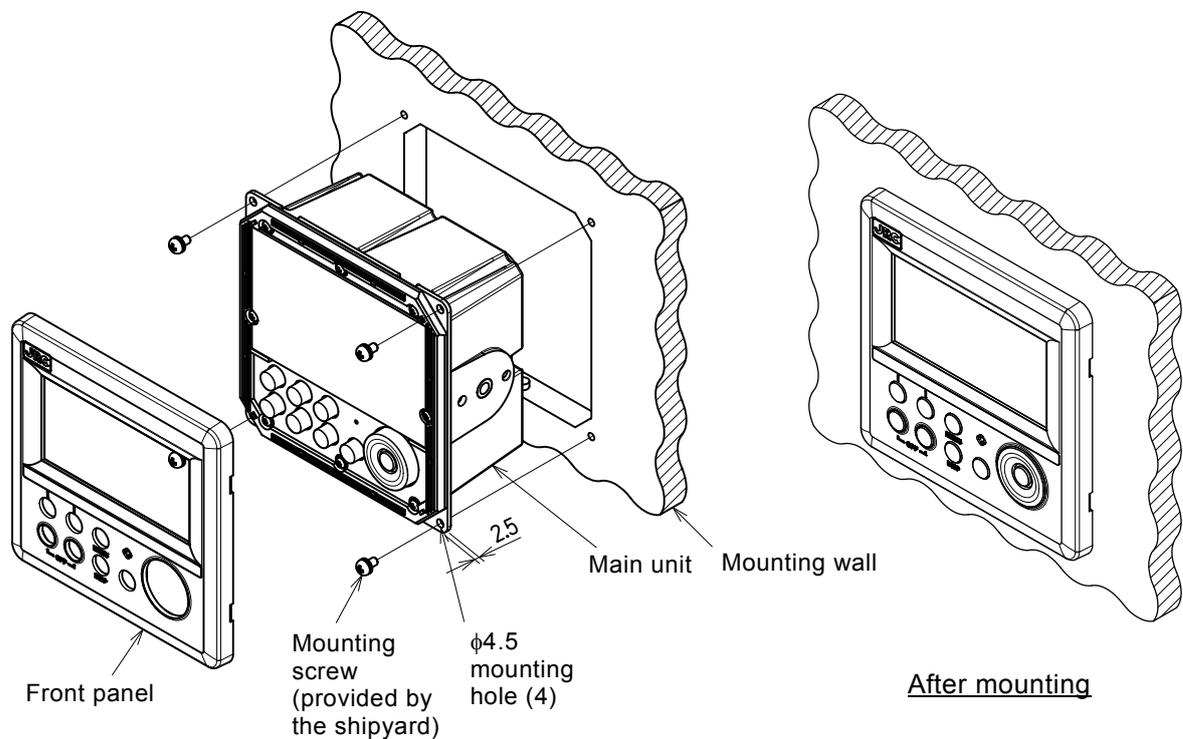
## 6.2.2. Mounting using a flash mount

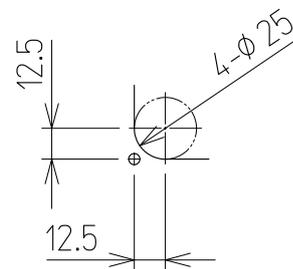
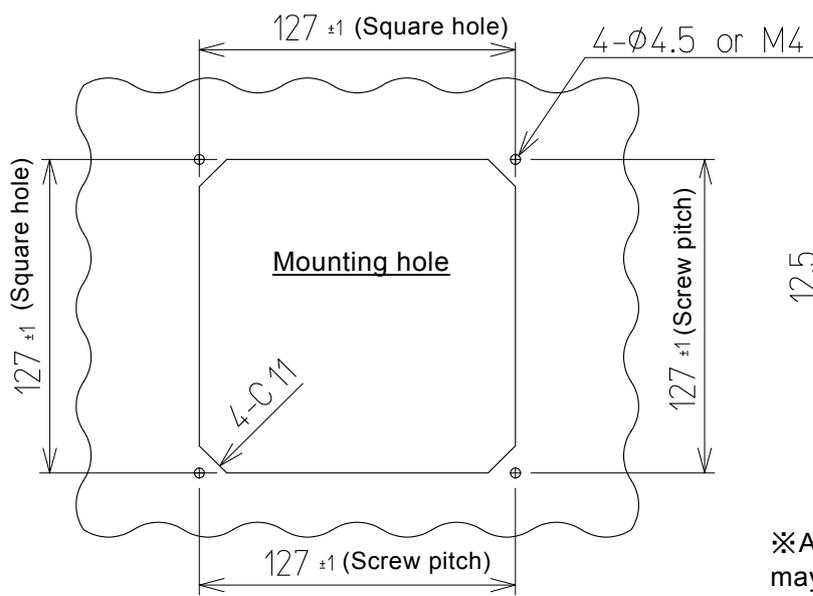
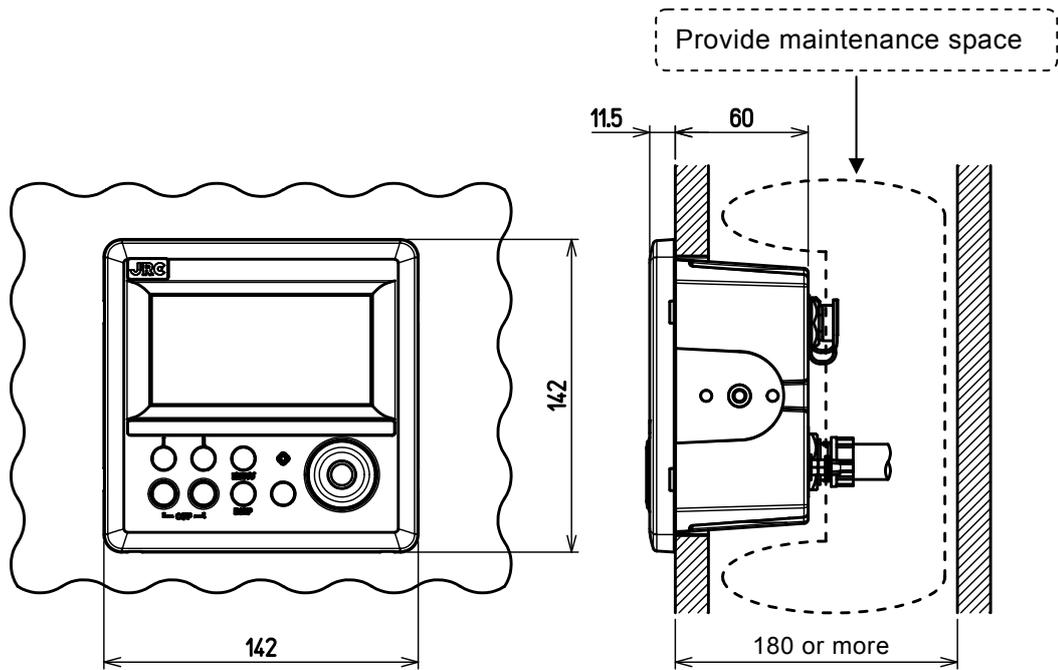
Use the following procedure.

See the diagram below for the mounting space and mounting holes.

Do not tighten a screw too much. Doing so may result in damage of installation holes.

- (1) Insert the main unit in the installation location.
- (2) Fix the main unit using the mounting screws ( $\phi 4$  screw or wood screw,  $L \geq 10\text{mm}$ , provided by the shipyard).  
The sizes of the heads of the screws to be used are restricted as follows including the washers.
  - Diameter: Up to  $\phi 8\text{mm}$
  - Height: Up to  $4.5\text{mm}$
- (3) Insert the front panel into the main unit





※About the corner C11, may want to cut  $\phi 25$

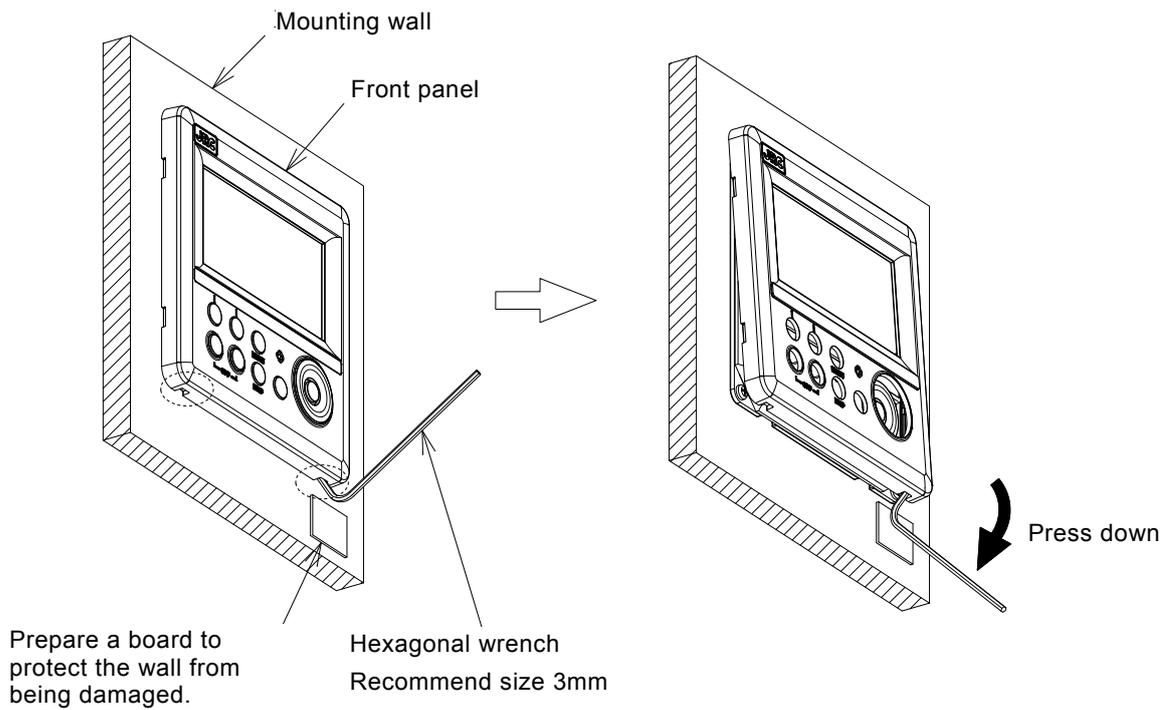
Mounting hole

(Unit: mm)

### 6.2.3. Removing the display unit by flash mounting

Use the following procedure to remove the display unit.

- (1) Insert a hexagonal wrench into the holes (2) at the bottom of the front panel.
- (2) Remove the front panel by pressing down the hexagonal wrench.



## 6.3 Installing the signal Distributor Unit

### Mounting Location

- As the signal cable may receive or generate noise, install the unit in a place that is free of interference.
- It vertically installs it in the wall so that the cable inlet may become it below.

### Mounting Procedure

- It fixes to the wall in four the M8 bolts.
- The earth cable is used and grounded from the cable clamber.

## 6.4 Installing the signal processor Unit

### Mounting Location

- The unit install in the distance that the transducer cable reaches.  
Because the IP grade is IPX5, this unit is usually installed in boatswain's store.
- As the transducer cable may receive or generate noise, install the unit in a place that is free of interference. Usually, it covers the cable with the piping of the exclusive use from the transducer to the signal processor.
- It vertically installs it in the wall so that the cable inlet may become it below.

### Mounting Procedure

- It fixes to the wall in four the M8 bolts.
- The earth terminal is used and grounded the copper plate of 30mm or more in width.

## 6.5 Mounting the Transducer

### Mounting Location

- This equipment measures the speed of the ship by using the ultrasonic wave.

To cause attenuation and diffusion when the bubble influences the ultrasonic wave, this equipment cannot measure an accurate speed of the ship.

#### CAUTION !

It is necessary to choose the place where the bubble is not generated when sailing, and to install the transducer. The transducer is installed in place before 1/10 of the ship's lengths in the large vessel. Moreover, the transducer is installed in place before it when there is bow-thruster.

### Mounting Procedure

- After the welding of tank ends, the transducer is installed. If the transducer is built into the tank, after it is detached from the tank, and the tank is welded.
- The tank is welded so that surface of transducer at the sailing may become within 2° for a horizontal plane.
- The tank is installed within 5° so that the bow mark may become parallel to the keel line.

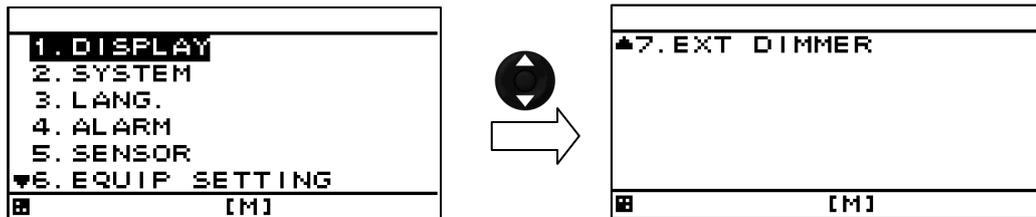
## 6.6 Calibration of External Dimmer Unit

When an external dimmer unit (NCM-227) is connected, calibration can be performed.

Its calibration is carried out only with the display unit, which connected the external dimmer unit (NCM-227).

### Procedure

1. Connect the external dimmer unit.
2. Refer to the instruction manual "4.9.1 Changing to a maintenance mode" And display the maintenance menu.
3. Refer to the instruction manual "4.9.6 Setting a contact input port" And set to the contact input to "DIMMER".
4. Refer to the instruction manual "4.9.3 Selecting a dimmer unit" And set to the dimmer unit to "EXT DIMMER"
5. Press the both  and  for 8 seconds.
6. The detailed menu is displayed.



7. Select "EXT DIMMER" with .
8. Minimize the knob of NCM-227, and then press .
9. Maximize the knob of NCM-227, and then press .



- How to return to the normal mode

Press again the both  and  for 3 seconds, or when operating nothing for 3 minutes, it returns automatically to the normal mode.

When the power turns to ON, It starts in the normal mode.

# Chapter 7 After-Sales Service

## 7.1 When ordering a repair

When a failure has been detected, stop operation and contact the dealer or agent from which you purchased the device or one of our branches, marketing offices, and representative offices.

- **Repair during warranty period**

Should a malfunction occur when the unit has been operated according to descriptions and instructions in the instruction manual, it will be repaired free of charge. However, breakdowns resulting from abuse, negligence, natural disaster, fire or other unforeseeable incident will be charged.

- **Repair after warranty period**

Repairs that restore normal operation made after the warranty period have to be paid in full by the client.

- **Product data that should be provided when you ask for service**

- Name of product, model, date of manufacture and serial number
- Description of malfunction (as detailed as possible)
- Company address or name of organization, address and telephone number

## 7.2 Recommendation of overhaul

The performances of the set may deteriorate due to the aging of parts, and so on through the rate varies depending on the conditions of use. So it is recommendable to contact the dealer from which you purchased the device or one of our marketing offices for overhaul apart from daily service.

Incidentally, such overhaul will be performed with charge.

Please contact the dealer from which you purchased the device or our marketing office that is nearest to you for any question as to the after-sales service.



# Chapter 8 DISPOSAL

## 8.1 Disposal of the Equipment

Observe all local laws and regulations when disposing of those units.

The battery is not used for those units.

## 8.2 About Chinese version RoHS

### 有毒有害物质或元素的名称及含量

(Names & Content of toxic and hazardous substances or elements)

形式名(Type): JLN-205MK2

名称(Name): Doppler Log

部件名称 (Part name)	有毒有害物质或元素 (Toxic and Hazardous Substances and Elements)					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr <sup>6+</sup> )	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
换能器 (Transducer)	×	×	×	×	×	×
显示装置 (Display Unit) 信号分配装置 (Signal Distributer) 信号处理装置 (Signal Processor)	×	×	×	×	×	×
外部设备 (Peripherals) 选择(Options) 电线类(Cables) 手册/Documents)	×	○	×	×	×	×

○:表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T11306-2006 标准规定的限量要求以下。  
(Indicates that this toxic, or hazardous substance contained in all of the homogeneous materials for this part is below the requirement in SJ/T11363-2006.)

×:表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。  
(Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T 11363-2006.)



# Chapter 9 SPECIFICATIONS

Operation system	: Dual - beam pulse Doppler system
Operation frequency	: 2MHz
Speed measurement range:	-10.0 to +40.0 kn
Run distance display range:	0 to 99999.99NM (However, NWW-7 of the option is 0 to 9999.99NM )
Water depth	: Relative speed to water of depth greater than 3 meters below hull bottom
Speed accuracy	: $\pm 1\%$ or $\pm 0.1\text{kn}$ whichever value is greater
Distance accuracy	: $\pm 1\%$ or $\pm 0.1\text{NM}$ in each hour whichever value is greater
Display	: Digital display Speed unit = kn or m/s : Analog display (Fixed scale of 30kn)
IEC61162-1 input	: GPS (for GPS speed display) (Sentence ; \$--RMC, \$--RMA, \$--VTG)
IEC61162-1 output	: NMEA0183 Ver. 1.5 or 2.3 ----- 8 circuits (Sentence ; \$VDVBW, \$VDVLW)
Other output	: Ship speed ----- 2 circuits DC voltage signal for analog display (-2VDC to +10VDC) : LOG pulse ----- 4 circuits Opto-coupler signal (200 pulses/NM, 30V, 50mA max) : LOG signal ----- 1 circuit Relay closure signal (200 pulses/NM, 30V, 1A max) : Sub display signal ----- 2 circuits : Distance signal ----- 1 circuit : Remote display signal ----- 1 circuit : On-line maintenance ----- 1 circuit : Power fail alarm ----- 1 circuit Relay closure signal (250V, 5A max)
Power supply	: 100/110/115/220/230VAC less than $\pm 10\%$ 1 $\phi$ , 50/60Hz
Power consumption	: 100VA or less
Operating temperature range:	-15 to +55°C
Operating humidity range	: +40°C, 93%



# APPENDIX

## APPENDIX 1 Remarks on Error resulting from deviation of radiation angle from the reference value

Hull movement causes deviation of radiation angle from the reference value.

Generally, the dual beam shown in Fig. 11.1 a) is often adopted in the Doppler Log in order to reduce the error caused by various hull movements. The following discusses this tolerance in comparison with the single beam method.

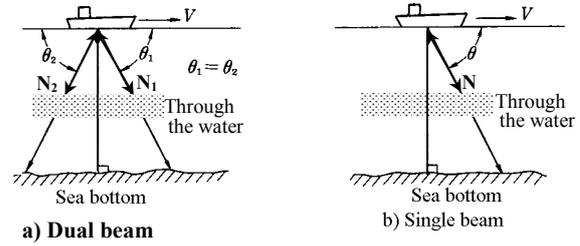


Fig. 11.1 Doppler effect

### 1.1 Error caused by hull movement

The speed error caused by a deviation angle such as rolling and pitching is indicated by Fig.11.4.

An explanation how this is calculated is shown below.

#### (1) Vertical velocity

Only the velocity in the horizontal direction is important for ship. Vertical velocity is also caused by swell and other factors, and appears in the form of an error.

When the horizontal velocity is assumed as U, as shown in Fig. 11.2, the Doppler shift frequency  $f_{d1}$  with respect to beam  $N_1$  is expressed by the following equation 11.1.

$$f_{d1} = \frac{2f_0}{C} (V \cos \theta_1 - U \sin \theta_1) \quad (11.1)$$

Similarly, Doppler shift frequency  $f_{d2}$  with respect to  $N_2$  is expressed by the following equation 11.2.

$$f_{d2} = \frac{2f_0}{C} (-V \cos \theta_2 - U \sin \theta_2) \quad (11.2)$$

Assuming that  $\theta_1 = \theta_2$ , we get (11.3) in the dual beam.

$$f_d = f_{d1} - f_{d2} = \frac{4f_0 V}{C} \cos \theta_1 \quad (11.3)$$

The vertical velocity components cancel each other, without affecting the Doppler shift frequency. Thus, the Doppler shift frequency is double that of the single beam method.

#### (2) Trim and heel

When there is an offset of  $\delta$  with respect to the vertical line as shown in Fig. 11.3, the Doppler shift frequencies occurring to the beams  $N_1$  and  $N_2$  are expressed by the following equations, respectively:

$$f'_{d1} = \frac{2Vf_0}{C} (\cos \theta \cos \delta - \sin \theta \sin \delta)$$

$$f'_{d2} = \frac{2Vf_0}{C} (\cos \theta \cos \delta + \sin \theta \sin \delta)$$

The error due to dual beam is obtained from Eq. 11.4.

$$\varepsilon_\delta = 100 (\cos \delta - 1) \% \quad (11.4)$$

The error in single beam method is expressed by Eq. 11.5.

$$\begin{aligned} \varepsilon'_\delta &= 100 (\cos \delta + \tan \theta \sin \delta - 1) \% \\ \text{or } \varepsilon''_\delta &= 100 (\cos \delta - \tan \theta \sin \delta - 1) \% \end{aligned} \quad (11.5)$$

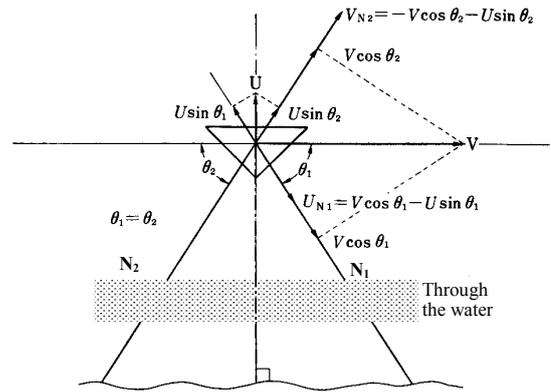


Fig. 11.2 Effect of vertical velocity

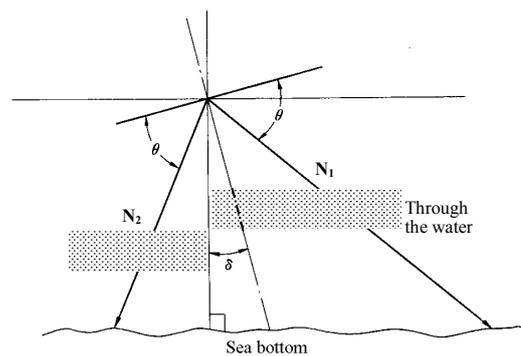


Fig. 11.3 Vertical offset errors

Thus, it can be seen that the error due to dual beam is always negative, independently of the beam radiation angle.

The following calculate an error when an offset of 5° degrees has occurred:

$$\varepsilon_{\delta} = -0.38 \%$$

$$\varepsilon'_{\delta} = -32.1 \text{ or } -32.9 \%$$

The dual beam has a smaller error than the single beam method, and is therefore more advantageous.

(3) Error due to pitching and rolling  
When pitching and rolling have occurred, we get the same result as when  $\delta$  in Eq. 11.4 and Eq. 11.5 is assigned with the following values:

$$\delta \rightarrow \delta(t) = \delta_m \sin \omega t$$

$\delta_m$  = Maximum deflection angle

$\omega$  = Angular frequency of motion

The average Doppler shift frequency in dual beam can be expressed by the following:

$$\overline{f_d} = \frac{f_{d1} - f_{d2}}{T} = \frac{1}{T} \int_{-\frac{T}{2}}^{\frac{T}{2}} \cos \theta \cos \delta(t) dt = \frac{4Vf_0}{C}$$

$$\begin{aligned} \cos \theta \cdot \frac{\omega}{2\pi} \int_{-\frac{\pi}{\omega}}^{\frac{\pi}{\omega}} \cos(\delta_m \sin \omega t) dt \\ = \frac{4Vf_0}{C} J_0(\delta_m) \end{aligned} \quad (11.6)$$

The average error is obtained as follows:

$$\overline{\varepsilon}_{\delta_m} = 100 \{J_0(\delta_m) - 1\} \quad (11.7)$$

The above-mentioned relationship is shown in Fig. 11.4.

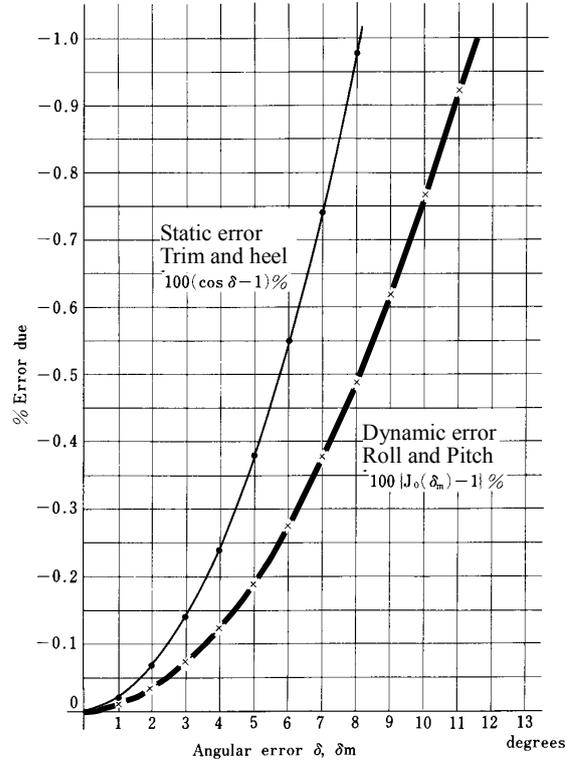
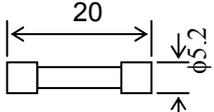
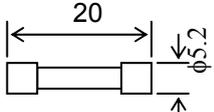
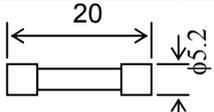
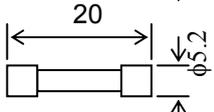


Fig. 11.4 Errors due to dual beam vertical offset

## APPENDIX 2 Spare Parts List

SHIP No.	SPARE PARTS LIST FOR	USE	SET PER VESSEL			
	MODEL JLN-205 MK2 Doppler Log					
ITEM No.	NAME OF PART	OUTLINE (Dimension in m/m)	QUANTITY		REMARKS	
			PER SET	PER VESS	SPARE	DESCRIPTION JRC CORD No.
1	Fuse		1		2	MF51NR0.5 5ZFAA00147
2	Fuse		3		2	250V A TSC2A 5ZFCA00118
3	Fuse		1		2	215 3.15 5ZFAP00101
4	Fuse		1		2	ULT SC 6.3AN1 5ZFCA00034
MFR'S NAME		<i>Japan Radio Co., Ltd.</i>	DRW. No.		7ZXBS0020	

### APPENDIX 3 List of standard terms, units and abbreviations

Term	Abbreviation
Acknowledge	ACK
Acquire, Acquisition	ACQ
Acquisition Zone	AZ
Adjust, Adjustment	ADJ
Aft	AFT
Alarm	ALARM
Altitude	ALT
Amplitude Modulation	AM
Anchor Watch	ANCH
Antenna	ANT
Anti Clutter Rain	RAIN
Anti Clutter Sea	SEA
April	APR
Audible	AUD
August	AUG
Automatic	AUTO
Automatic Frequency Control	AFC
Automatic Gain Control	AGC
Automatic Identification System	AIS
Automatic Radar Plotting Aid	ARPA
Autopilot	AP
Auxiliary System/Function	AUX
Available	AVAIL
Azimuth Indicator	AZI
Background	BKGND
Bearing	BRG
Bearing Waypoint To Waypoint	BWW
Bow Crossing Range	BCR
Bow Crossing Time	BCT
Brilliance	BRILL
Built in Test Equipment	BITE
Calibrate	CAL
Cancel	CNCL
Carried (for example, carried EBL origin)	C
Central Processing Unit	CPU

Term	Abbreviation
Centre	CENT
Change	CHG
Circularly Polarised	CP
Clear	CLR
Closest Point of Approach	CPA
Compact Disk Read Only Memory	CDROM
Consistent Common Reference Point	CCRP
Consistent Common Reference System	CCRS
Contrast	CONT
Coordinated Universal Time	UTC
Correction	CORR
Course	CRS
Course Over the Ground	COG
Course Through the Water	CTW
Course To Steer	CTS
Course Up	C UP
Cross Track Distance	XTD
Cursor	CURS
Dangerous Goods	DG
Date	DATE
Day	DAY
Dead Reckoning, Dead Reckoned Position	DR
December	DEC
Decrease	DECR
Delay	DELAY
Delete	DEL
Departure	DEP
Depth	DPTH
Destination	DEST
Deviation	DEV
Differential GLONASS	DGLONASS
Differential GNSS	DGNSS
Differential GPS	DGPS
Digital Selective Calling	DSC

Term	Abbreviation
Display	DISP
Distance	DIST
Distance Root Mean Square	DRMS
Distance To Go	DTG
Drift	DRIFT
Dropped (for example, dropped EBL origin)	D
East	E
Echo Reference	REF
Electronic Bearing Line	EBL
Electronic Chart Display and Information System	ECDIS
Electronic Chart System	ECS
Electronic Navigational Chart	ENC
Electronic Position Fixing System	EPFS
Electronic Range and Bearing Line	ERBL
Emergency Position Indicating Radio Beacon	EPIRB
Enhance	ENH
Enter	ENT
Equipment	EQUIP
Error	ERR
Estimated Position	EP
Estimated Time of Arrival	ETA
Estimated Time of Departure	ETD
European Geo-Stationary Navigational Overlay System	EGNOS
Event	EVENT
Exclusion Zone	EZ
External	EXT
F - Band (applies to Radar)	F-Band
February	FEB
Foreword	FWD
Fishing Vessel	FISH
Fix	FIX
Forward	FWD
Frequency	FREQ
Frequency Modulation	FM

Term	Abbreviation
Full	FULL
Gain	GAIN
Geographics	GEOG
Geometric Dilution Of Precision	GDOP
Global Maritime Distress and Safety System	GMDSS
Global Navigation Satellite System	GNSS
Global Orbiting Navigation Satellite System	GLONASS
Global Positioning System	GPS
Great Circle	GC
Grid	GRID
Ground	GND
Grounding Avoidance System	GAS
Group Repetition Interval	GRI
Guard Zone	GZ
Gyro	GYRO
Harmful Substances (applies to AIS)	HS
Head Up	H UP
Heading	HDG
Heading Control System	HCS
Heading Line	HL
High Frequency	HF
High Speed Craft	HSC
Horizontal Dilution Of Precision	HDOP
I - Band	I-Band
Identification	ID
In	IN
Increase	INCR
Indication	IND
Information	INFO
Infrared	INF RED
Initialisation	INIT
Input	INP
Input/Output	I/O
Integrated Bridge System	IBS

Term	Abbreviation
Integrated Navigation System	INS
Integrated Radio Communication System	IRCS
Interference Rejection	IR
Inter switch	ISW
Interval	INT
January	JAN
July	JUL
June	JUN
Label	LBL
Latitude	LAT
Latitude/Longitude	L/L
Leeway	LWY
Limit	LIM
Line Of Position	LOP
Log	LOG
Long Pulse	LP
Long Range	LR
Longitude	LON
Loran	LORAN
Lost Target	LOST TGT
Low Frequency	LF
Magnetic	MAG
Man Overboard	MOB
Manoeuvre	MVR
Manual	MAN
Map(s)	MAP
March	MAR
Maritime Mobile Services Identity number	MMSI
Maritime Pollutant (applies to AIS)	MP
Maritime Safety Information	MSI
Marker	MKR
Master	MSTR
Maximum	MAX
May	MAY
Medium Frequency	MF
Medium Pulse	MP

Term	Abbreviation
Menu	MENU
Minimum	MIN
Missing	MISSING
Mute	MUTE
Navigation	NAV
Night	NT
Normal	NORM
North	N
North Up	N UP
Not Less Than	NLT
Not More Than	NMT
Not Under Command	NUC
November	NOV
October	OCT
Off	OFF
Officer On Watch	OOW
Offset	OFFSET
On	ON
Out/Output	OUT
Own Ship	OS
Panel Illumination	PANEL
Parallel Index Line	PI
Past Positions	PAST POSN
Passenger Vessel	PASSV
Performance Monitor	MON
Permanent	PERM
Person Overboard	POB
Personal Identification Number	PIN
Pilot Vessel	PILOT
Port/Portside	PORT
Position	POSN
Positional Dilution Of Precision	PDOP
Power	PWR
Predicted	PRED
Predicted Area of Danger	PAD
Predicted Point of Collision	PPC
Pulse Length	PL
Pulse Modulation	PM

Term	Abbreviation
Pulse Repetition Frequency	PRF
Pulse Repetition Rate	PRR
Pulses Per Revolution	PPR
Racon	RACON
Radar	RADAR
Radar Plotting	RP
Radius	RAD
Rain	RAIN
Range	RNG
Range Rings	RR
Raster Chart Display System	RCDS
Raster Navigational Chart	RNC
Rate Of Turn	ROT
Real-time Kinematic	RTK
Receive	Rx RX
Receiver	RCDR
Receiver Autonomous Integrity Monitoring	RAIM
Reference	REF
Relative	REL
Relative Motion	RM
Revolutions per Minute	RPM
Rhumb Line	RL
Roll On/Roll Off Vessel	RoRo
Root Mean Square	RMS
Route	ROUTE
Safety Contour	SF CNT
Sailing Vessel	SAIL
Satellite	SAT
S-Band	S-BAND
Scan to Scan	SC/SC
Search And Rescue	SAR
Search And Rescue Transponder	SART
Search And Rescue Vessel	SARV
Select	SEL
September	SEP
Sequence	SEQ
Set (i.e., set and drift, or setting a value)	SET

Term	Abbreviation
Ship's Time	TIME
Short Pulse	SP
Signal to Noise Ratio	SNR
Simulation	SIM
Slave	SLAVE
South	S
Speed	SPD
Speed and Distance Measuring Equipment	SDME
Speed Over the Ground	SOG
Speed Through the Water	STW
Stabilized	STAB
Standby	STBY
Starboard/Starboard Side	STBD
Station	STN
Symbol(s)	SYM
Synchronised/Synchronous	SYNC
Target	TGT
Target Tracking	TT
Test	TEST
Time	TIME
Time Difference	TD
Time Dilution Of Precision	TDOP
Time Of Arrival	TOA
Time Of Departure	TOD
Time to CPA	TCPA
Time To Go	TTG
Time to Wheel Over Line	TWOL
Track	TRK
Track Control System	TCS
Tracking	TRKG
Trail(s)	TRAIL
Transmit and Receive	TXRX
Transceiver	TCVR
Transferred Line Of Position	TPL
Transmit	TX
Transmitter	TMTR <sup>1</sup>
Transmitting Heading Device	THD
Transponder	TPR

Term	Abbreviation
Trial	TRIAL
Trigger Pulse	TRIG
True	T
True Motion	TM
Tune	TUNE
Ultrahigh Frequency	UHF
Uninterruptible Power Supply	UPS
Universal Time, Coordinated	UTC
Universal Transverse Mercator	UTM
Unstable	UNSTAB
Variable Range Marker	VRM
Variation	VAR
Vector	VECT
Very High Frequency	VHF
Very Low Frequency	VLF
Vessel Aground	GRND
Vessel at Anchor	ANCH
Vessel Constrained by Draught	VCD
Vessel Engaged in Diving Operations	DIVE
Vessel Engaged in Dredging or Underwater Operations	DRG
Vessel Engaged in Towing Operations	TOW
Vessel Not Under Command	NUC
Vessel Restricted in Manoeuvrability)	RIM
Vessel Traffic Service	VTs
Vessel Underway Using Engine	UWE
Video	VID
Visual Display Unit	VDU
Voyage	VOY
Voyage Data Recorder	VDR
Warning	WARNING
Water	WAT
Waypoint	WPT
Waypoint Closure Velocity	WCV
West	W

Term	Abbreviation
Wheel Over Line	WOL
Wheel Over Point	WOP
Wheel Over Time	WOT
World Geodetic System	WGS
X-Band	X-BAND

## APPENDIX 4 Default value

### Normal menu

Main menu	Sub menu	Default	remarks
1. DISPLAY	1. LCD		
	1. CONTRAST	7	
	2. DIMMER MAXIMUM	11	
	3. DIMMER TYPICAL	7	
	4. DIMMER MINIMUM	3	
	2. CLICK SOUND	ON	
	3. DISPLAY SELECTION		
	1. DISPLAY1	SPECIAL	
	1. DISPLAY	STW3	
	2. AUTO SCREEN	OFF	
	3. SOUND	OFF	
	3. TIME	1sec	
	2. DISPLAY2	SPECIAL	
	1. DISPLAY	STW2	
	2. AUTO SCREEN	OFF	
	3. SOUND	OFF	
	3. TIME	1sec	
	3. DISPLAY3	SPECIAL	
	1. DISPLAY	STW1	
	2. AUTO SCREEN	OFF	
	3. SOUND	OFF	
	3. TIME	1sec	
	4. DISPLAY4	OFF	
	5. DISPLAY5	OFF	
	6. DISPLAY6	OFF	
	4. BACK LIGHT	WHITE	
2. SYSTEM	1. UNIT		
	1. SPEED	kn	
	2. SMOOTHING		
	1. STW	10sec	
	3. SPEED	STW	
3. LANG.	1. LANG.	ENGLISH	
4. ALARM	1. SYSTEM	OFF	
	2. SPEED	OFF	
	3. TRIP	OFF	
	4. SPEED LOST	OFF	
5. SENSOR	1. SPEED CORR	0.0%	
	2. NMEA1	2.3	
	3. NMEA2	2.3	
	1. PULSE1	2×100P/NM	
	2. PULSE2	2×100P/NM	
	3. PULSE3	0×100P/NM	
	7. SCALE	30	

Maintenance menu Please don't change the part of  .

Main menu	Sub menu	Range	remarks
6. INTERFACE	1. DATA I/O		
	1. DATA IN/OUT1		
	<b>NMEA</b>		System use. <b>Don't change.</b>
	1. DATA IN/OUT	<b>SEND</b>	System use. <b>Don't change.</b>
	1. VERSION	1.5	
	SENTENCE	<b>OFF</b>	System use. <b>Don't change.</b>
	2. BIT RATE	<b>9600</b>	System use. <b>Don't change.</b>
	2. DATA IN/OUT2		
	NMEA		
	1. DATA IN/OUT	<b>SEND</b>	System use. <b>Don't change.</b>
	1. VERSION	1.5	
	SENTENCE	OFF	
	2. BIT RATE	4800	
	IEC		
	1. DATA IN/OUT	<b>SEND</b>	System use. <b>Don't change.</b>
	SENTENCE	OFF	
	2. BIT RATE	4800	
	3. DATA IN/OUT3		
	<b>NMEA</b>		System use. <b>Don't change.</b>
	1. DATA IN/OUT	<b>RECEIVE</b>	System use. <b>Don't change.</b>
	2. BIT RATE	<b>9600</b>	System use. <b>Don't change.</b>
	4. RS-485		
	IEC		
	1. SENTENCE	OFF	
	1. BIT RATE	115200	
	5. CONTACT INPUT	DIMMER	
7.MAINTENANCE	5. TX OFF	ON	
9. DEMO MODE	1. DEMO TYPE	OFF	
11. MAIN/SUB		MAIN	
12.DISPLAY TYPE		LOG	Factory setting: OFF
13. RS-485ID		1	
14. DIMMER GROUP		1	
15. DIMMER		KEY	



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