User & Installation Manual

MF/HF RADIO（GMDSS）

NHR-1500

NHR-1500 UM.E 20251010-26

GENERAL INFORMATION

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iv. Notice

Please read this manual carefully to ensure proper use before installation and operation of the NHR-1500.

MODIFY RECORD

No.	Modify by	Date	Paragraph	Version	Reason
1	Q/A	2017/07/01		01	First edition
2	Q/A	2018/11/07		02	Add the specifications
3	Q/A	2019/05/27		03	Update the latest feature
4	Q/A	2019/06/11		04	Update the drawings
5	Q/A	2020/01/01	All	05	General modification
6	Q/A	2020/06/10	All	06	General modification
7	Q/A	2020/09/21	All	07	General modification
8	Q/A	2021/01/26	1-3,7, App.1, App.5	08	Update the software and drawings
9	Q/A	2021/04/01	All	09	NBDP operations
10	Q/A	2021/06/11	2.1, 5, App.6, App.7	10	General modification
11	Q/A	2021/07/09	1, 7, App.7	11	Update the drawings with BAM, etc.
12	Q/A	2021/08/02	5	12	NBDP modification, etc.
13	Q/A	2021/10/15	App.2, App.6	13	NBDP menu tree & drawings, etc.
14	Q/A	2021/11/01	1.4, 7.7, App.6	14	Update the drawings
15	Q/A	2022/06/10	1.4, 7, App.5&6	15	Add Alarm Unit and PN, update the drawings
16	Q/A	2022/09/09	1.4, 7, App.6	16	Update the drawings, etc.
17	Q/A	2022/10/19	All	17	General modification
18	Q/A	2023/1/16	7.1 & 7.2	18	Installation requirements
19	Q/A	2023/11/03	1, 4, 7, App.1&6	19	Some modifications
20	Q/A	2024/05/10	All	20	Some modifications
21	Q/A	2024/06/13	1, 2.11.1, 7.9.1，Appendix	21	Add Alarm Unit operations, etc.
22	Q/A	2024/07/19	1, 2.12.2	22	Alert list modification, etc.
23	Q/A	2025/04/02	All	23	Some modifications
24	Q/A	2025/07/04	1.4, 7.2, Appendix 1&7	24	Some modifications
25	Q/A	2025/09/12	2, Appendix 2&6	25	Some modifications
26	Q/A	2025/10/10	2.9.4.2, 2.11.1, 2.12.2, 2.12.3, 4.3.5, 8.3, Appendix 2	26	Some modifications

VERSION COMPARISON TABLE

Manual Version	Program Version	Remarks
20250402_23	**Transceiver:** CTRL: 1.17 20241124 **Control Unit:** APP : 1.25 2025030	
20250704_24	**Transceiver:** CTRL: 1.17 20241124 **Control Unit:** APP : 1.25 2025030	
20250912_25	**Transceiver:** CTRL: 1.18 20250814 **Control Unit:** APP : 1.27 20250901	
20251010_26	**Transceiver:** CTRL: 1.18 20250814 **Control Unit:** APP : 1.27 20250901	

TABLE OF CONTENTS

1. OVERVIEW

1.1 Outline

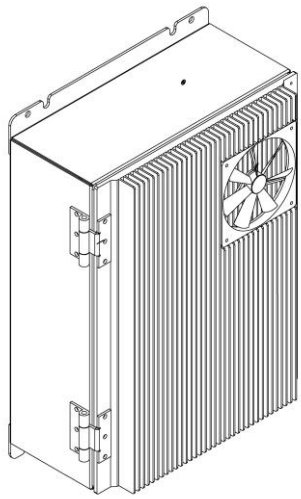
NHR-1500 MF/HF RADIO (GMDSS) is a high-performance MF/HF device, capable of voice communication and DSC (digital selective calling) facilities as well. Conforming to Class A standard set for MF/HF DSC by ITU and IMO regulation, NHR-1500 can be part of onboard GMDSS package for vessels of A2/A3/A4 sea area. NHR-1500 conforms to the regulations of ITU-R M.476-5, ITU-R M.492-6, ITU-R M.493-15, ITU-R M.541-10, IMO MSC.302 (87) [2010], IEC 61097-9, IEC 61097-3, IEC 60945, IEC 62923-1, IEC 62923-2 etc.
NHR-1500 is the new generation of NSR MF/HF product, easy to install and maintain.

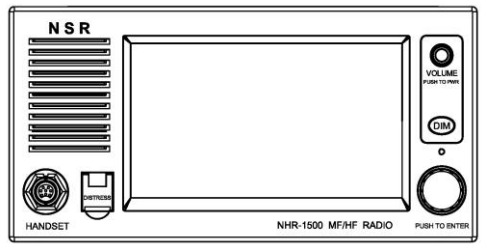
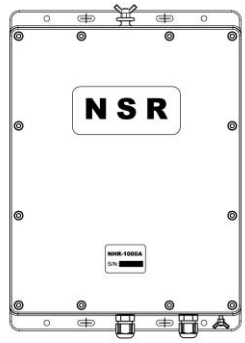
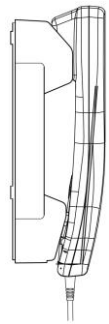
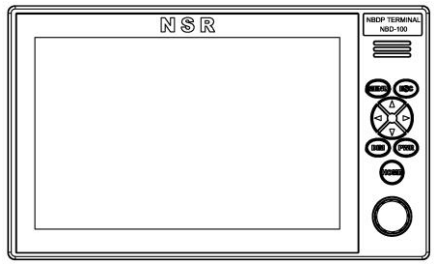
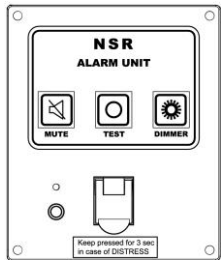
1.2 Product Features

The main features of NHR-1500 include:

- Large 7-inch color LCD.
- Knob & touch screen operation.
- Android system on NBDP terminal.
- LAN network interface.
- Data interface to BAM System/INS.
- Digital signal processing with software radio technology.
- Intelligent scanning for Voice, DSC and NBDP (option).
- Marine communication handset.
- Alarm unit (option) for distress alert displaying and triggering.

1.3 System Description

No.	Unit Description	
1	**Transceiver Unit (NHR-1500T)** Transceiver Unit is used for transmitting and receiving radio signals.	

No.	Unit Description	
2	**Control Unit (NHR-1000C)** Control Unit is mainly used for system setting and SSB/DSC operation.	
3	**Antenna Coupler (NHR-1000A)** The Antenna Coupler tunes the antenna to the transmitter.	
4	**Handset (NHS-200)** The handset controls voice communications. Press the PTT (push-to-talk) button to talk, and release it to listen for the response.	
5	**NBDP Terminal (NBD-100) (option)** NBDP Terminal is designed for ARQ/FEC communications.	
6	**Alarm Unit (option)** The Alarm Unit can either display distress alerts or trigger a distress alert.	

1.4 System Configuration

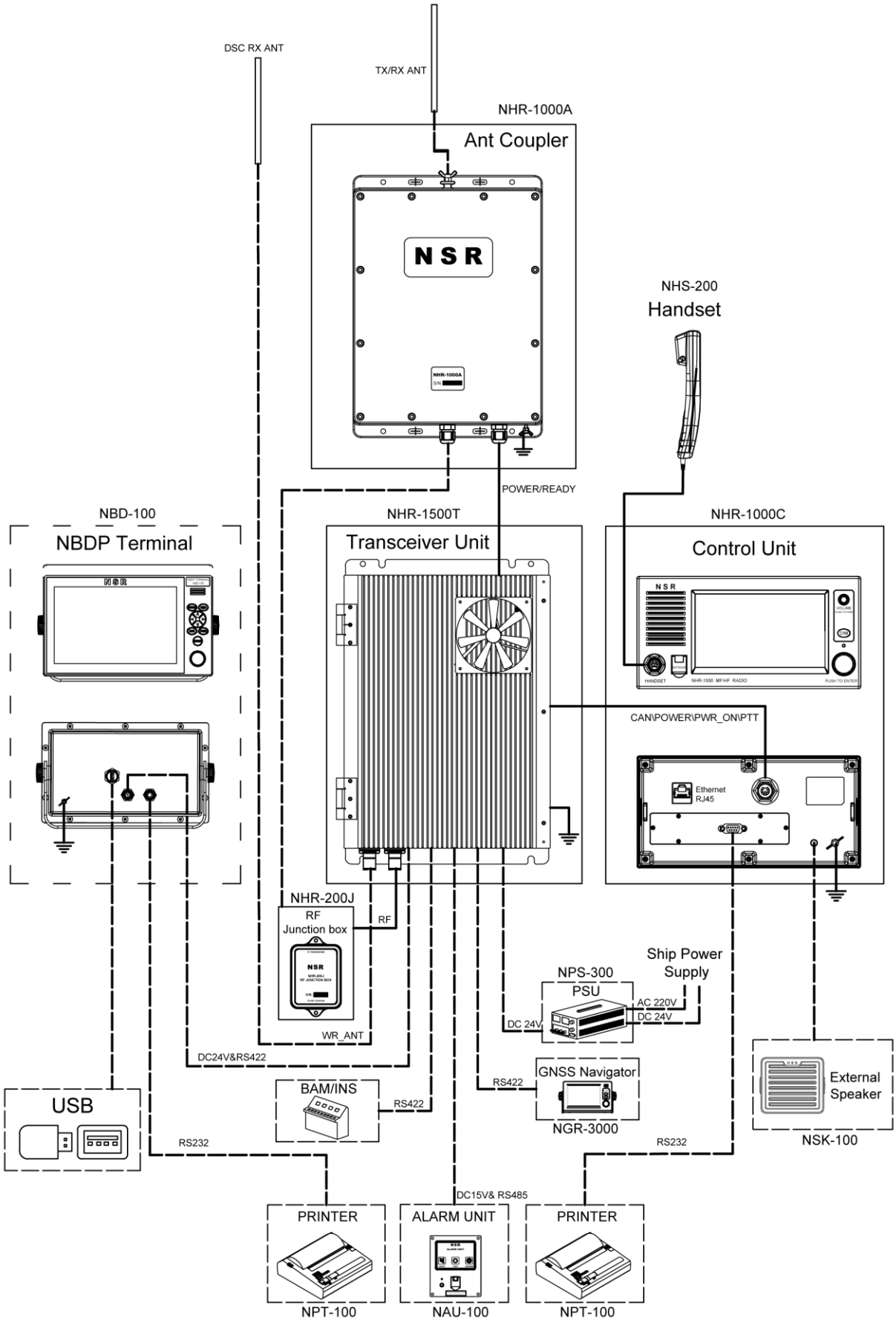
NHR-1500 consists of a Control Unit, a Transceiver Unit, an Antenna Coupler and a Handset. The options include NBDP Terminal, Printer, Antenna, PSU, etc.

STANDARD

Name	Type	Q'ty	Part No.	Remarks
Transceiver Unit	**NHR-1500T**	**1**	N992610	
Control Unit	**NHR-1000C**	**1**		
Antenna Coupler	**NHR-1000A**	**1**		
Handset	**NHS-200**	**1**		
Accessories:				
Insulation Tape		1		
Waterproof Tape		1		
Grounding Copper Strap 0.8m (for Antenna Coupler)		1		
Grounding Copper Braided Line 1.5m (for Transceiver Unit)		1		
Grounding Copper Braided Line 1m (for Control Unit)		1		
Power cable 20m (for Antenna Coupler)		1		
Connection Cable 10m （Control Unit & Transceiver Unit）		1		
Bolt (for Antenna Coupler & Transceiver Unit)		8		
Self-tapping Screws (for Control Unit and Handset)		6		
RF Junction Box (between Antenna Coupler & Transceiver Unit)	NHR-200J	1		
User Manual		1		

OPTIONAL

Name	Type	Q'ty	Part No.	Remarks
AC/DC Power Supply Unit	NPS-300	1	N993430	
Whip Antenna 8 m, TX/RX, including mounting kit	NHA100	1	N588011	
Whip Antenna 1.2 m, DSC Watch RX	NXA100	1	N585010	
Preamplifier for Whip antenna, DSC watch RX	NXA100A	1	N585011	
NBDP Terminal & Keyboard	NBD-100	1	N502613	
Alarm Unit	NAU-100	1	N502615	
Printer	NPT-100	1	N995502	
External Speaker	NSK-100	1	N502614	
Flush Mount Brackets for Control Unit	NFB700B	1	N561071	
Flush Mount Brackets for NBDP Terminal	NFB100	1	N561010	
Feeder line (5m)		1	N565112	
Ceramic Insulator with installation accessories		2	N160013	



NHR-1500 SYSTEM CONFIGURATION

2. BASIC OPERATION

2.1 Control Unit Description

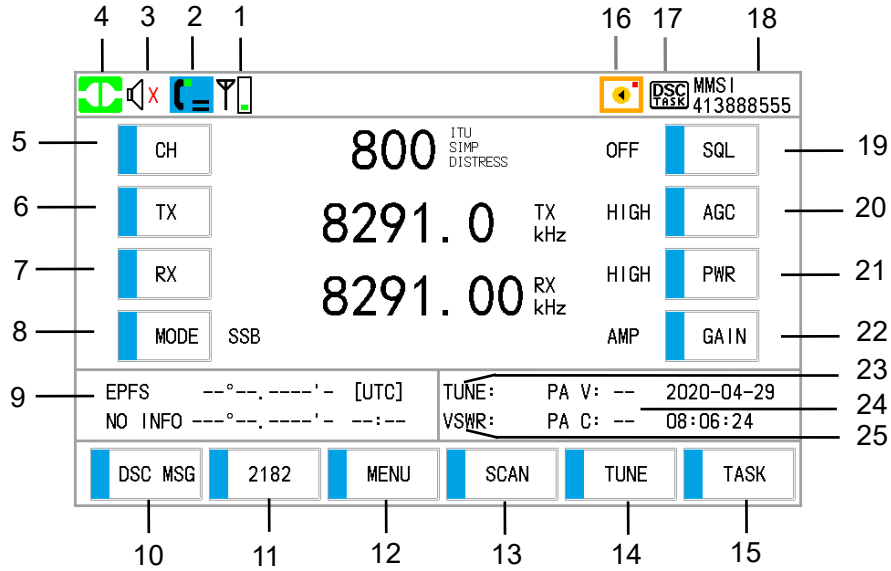
The Control Unit (NHR-1000C) can be operated by key & knob on panel or touch-screen operation.
When operating with knob, rotate to select an item on screen and press the knob to confirm the selection.

No.	Panel Button	Function
1	**VOLUME PUSH TO PWR**	● Adjust the volume of the main speaker and handset (Clockwise: volume up, Anti-clockwise: volume down). Press to mute the audio of the main speaker. ● Press to turn the power on or off.
2	**DIM**	Brightness key for LCD brightness control.
3	**PUSH TO ENTER**	● Press to switch the volume adjustment between the main speaker and handset in the main screen. ● Rotate to select menu items or change the page in multi-page screens (e.g., list data); push to confirm a selection. ***Note: Menu items can also be selected by clicking directly.***
4	**DISTRESS**	Press and hold down the button for 3 seconds to transmit a distress alert. ***Note: The DISTRESS button is covered to prevent false alarms.***
5		Handset socket.
6		Main speaker.
7		LCD.

2.2 Power On/Off

● **Power On:** Press the **PUSH TO PWR** knob to turn on the power.	● **Power Off:** Press and hold down the **PUSH TO PWR** knob until the screen goes blank, approx. three seconds.

2.3 SSB Screen

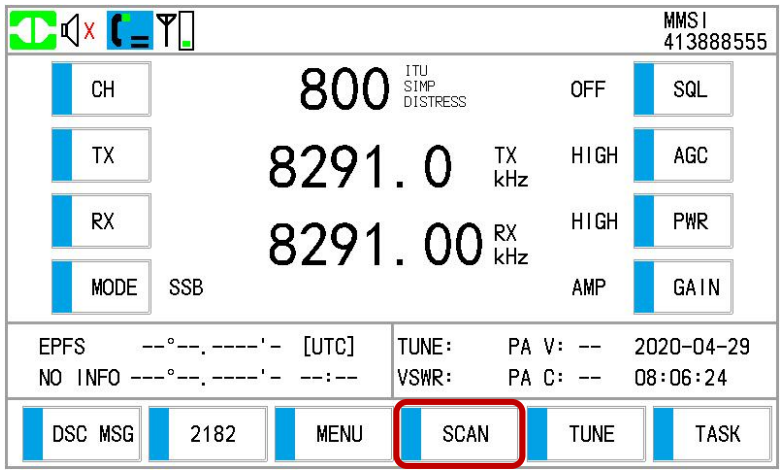


No.	Indication	Meaning
1	RX Signal Level	The signal level of receiving.
2	Handset Volume	The volume of the handset.
3	Speaker Volume	The volume of the speaker.
4	Connection Icon	Connection status of the control unit and transceiver unit. Green: OK.
5	CH	Channel setting.
6	TX	TX frequency setting.
7	RX	RX frequency setting.
8	MODE	Type of emission setting.
9	EPFS EPFS (OFFLINE) EPFS (OVER 4H) MANUAL NO INFO	[EPFS]: The position and time data from EPFS; [EPFS (OFFLINE)]: No position data from EPFS for 15 minutes; [EPFS (OVER 4H)]: No position data from EPFS for 4 hours; [MANUAL]: Set the position and time manually; [NO INFO]: No position and time data.
10	DSC MSG	Compose DSC message.
11	2182	Switch to the SSB (radiotelephone) screen and set the frequency to 2182.0 kHz.
12	MENU	Open the Main Menu.
13	SCAN	Open the Watch Scan screen. Start/stop the scanning of DSC frequencies set on the Watch Scan screen.
14	TUNE	Manual tuning.
15	TASK	Back to the DSC task menu.
16	Alert Icon	Click to visit the alert list quickly. The icon is not displayed while there is no alert.
17	Task Icon (DSC TASK/RT)	THE DSC TASK icon appears when transmitting or receiving DSC calls. Click it to enter the DSC menu quickly. For the RT icon, please refer to Section 3.3.1.
18	MMSI	Own ship's ID (9 digits).
19	SQL	Squelch (OFF/ON) setting.
20	AGC	Automatic Gain Control (LOW/MID/HIGH) setting.
21	PWR	Power (LOW/MID/HIGH) setting.
22	GAIN	RF gain (sensitivity) (ATT/AMP) setting.
23	TUNE	Tuning result.
24	PA Status	Power amplifier status.
25	VSWR	Voltage standing wave ratio.

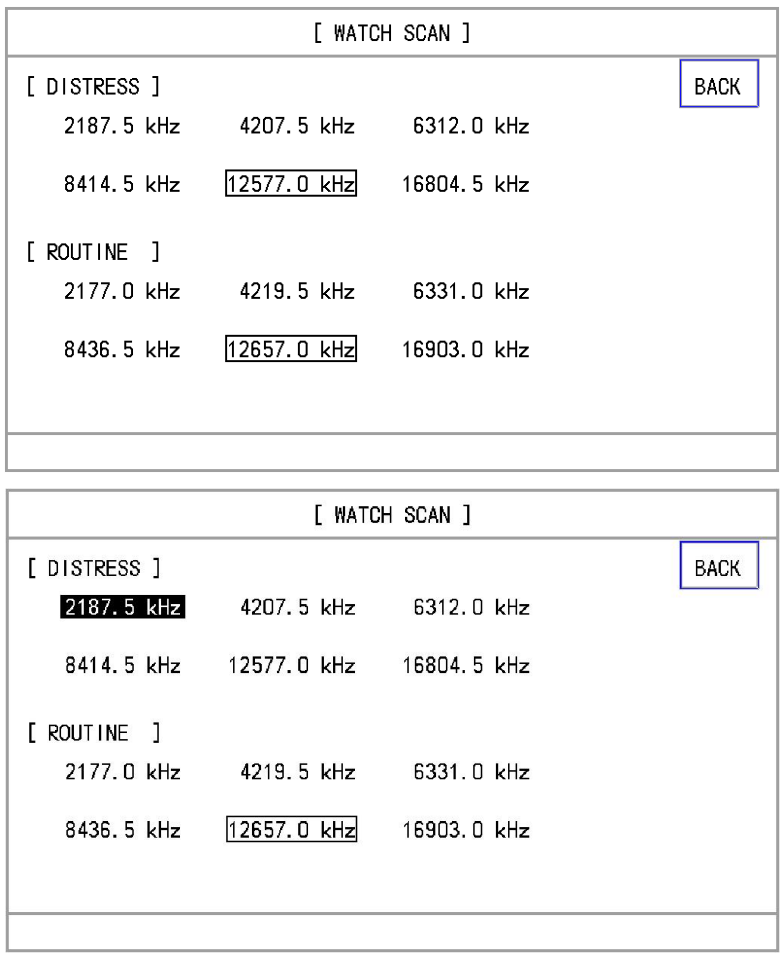
2.4 DSC Watch Scan Screen

DSC Watch Scan screen includes distress and routine frequencies.

Note: The SSB and NBDP communications are not affected during scanning.



① Click **[SCAN]** to open the DSC **WATCH SCAN** Screen, and start the scanning. When receiving the signal on the appropriate frequency, the scanning stops at that frequency (for example, 2187.5 kHz).



② Click **[BACK]** to stop scanning the frequencies in **[WATCH SCAN]**, and go back to the SSB screen.

Note: The scanning for the distress alert can't be stopped manually.

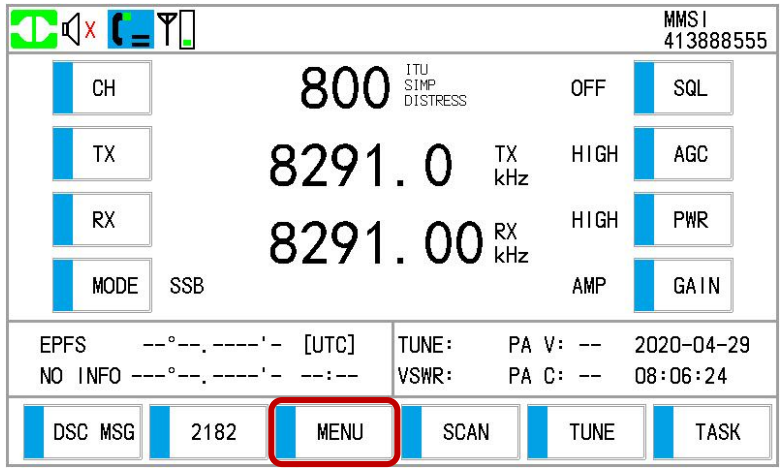
③ Click **[SCAN]** to restart the scanning.

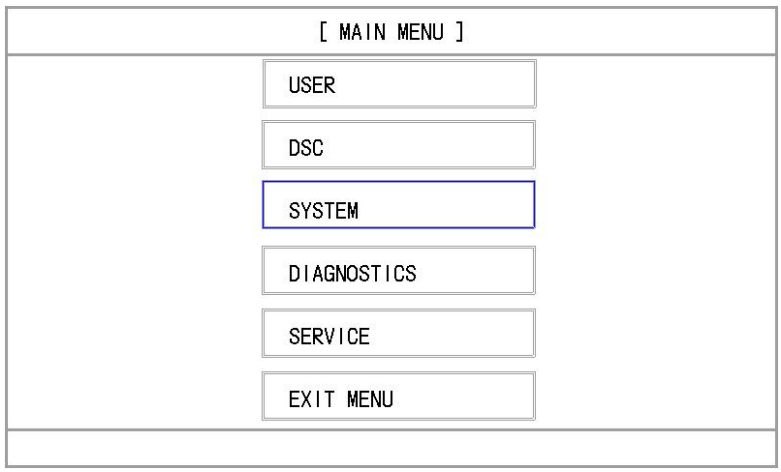
2.5 Brightness Adjustment

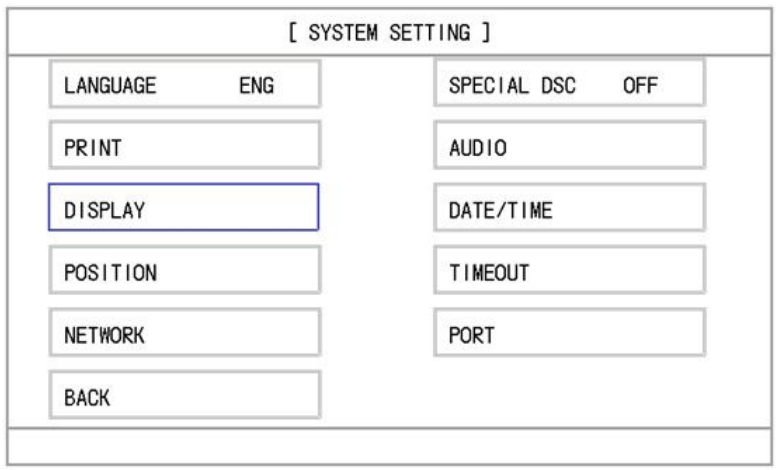
There are two ways to adjust the brightness of the screen.

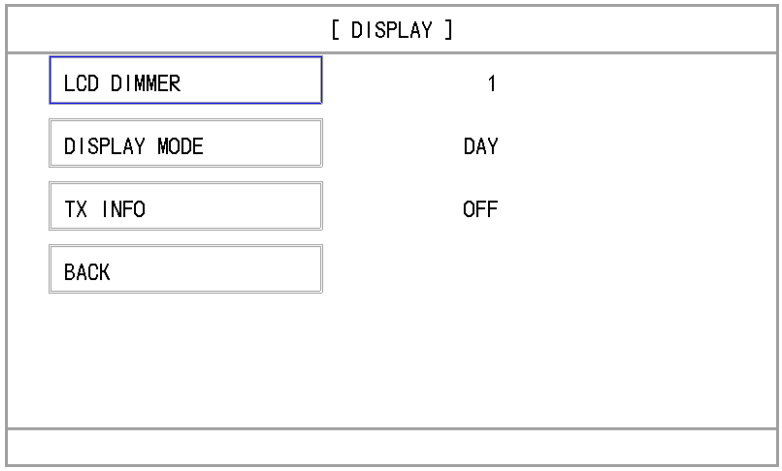
① Press the **DIM** button on the panel to adjust the brightness in ten steps, or

② Click **[MENU]** and adjust the brightness in the **[MAIN MENU]**: **[SYSTEM]-[DISPLAY]-[LCD DIMMER]**. Click **[LCD DIMMER]**, or press the **PUSH TO ENTER** knob by 1 ~ 10 steps.









***Note**: When the power is turned off, the last status of brightness is stored. Therefore, when the power is turned on, the screen will display with the last brightness before powered off.*

2.6 Main Speaker On/Off

There are three ways to turn on/off the main speaker (except in DSC communication, alarming and key buzzing).

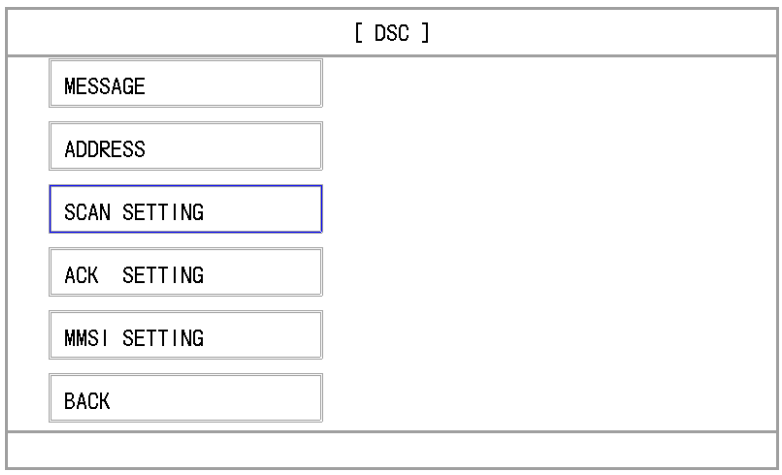
① Rotate the **VOLUME** knob anti-clockwise to mute the main speaker;

② At any screen, shortly press the **VOLUME** knob to mute the main speaker, and press again to resume;

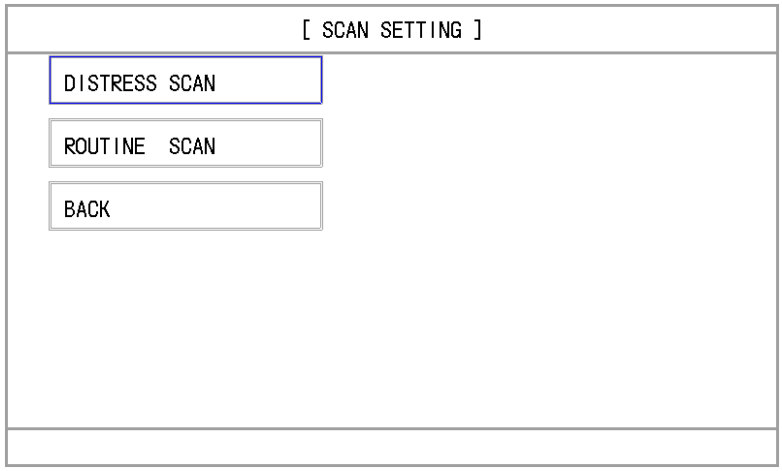
③ While **[AUDIO]** - **[OFF HOOK SPK]** in **[SYSTEM SETTING]** is set as **ON**, the main speaker keeps on, no matter whether the handset is on/off the hook. While **[OFF HOOK SPK]** is set as **OFF**, the main speaker will be muted if the handset is off the hook. Refer to Section 2.9.3.3.

2.7 Scan Setting

The DSC Distress and Routine frequencies can be scanned. These frequencies are set on **[SCAN SETTINGS]** in the **[MAIN MENU]**-**[DSC]** menu.

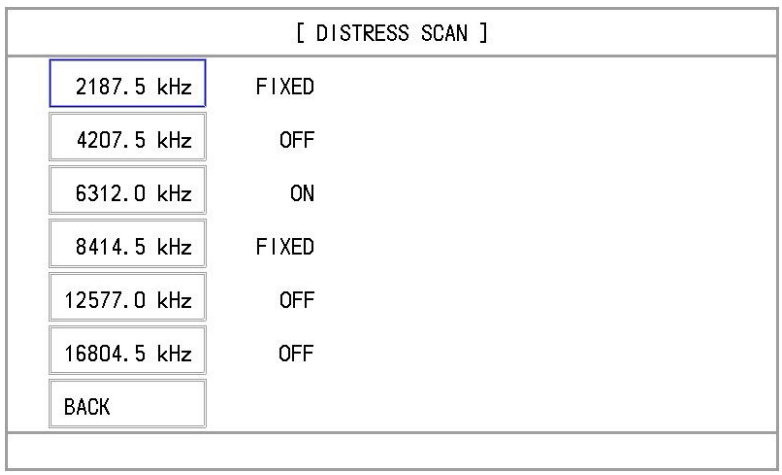


Click **[SCAN SETTINGS]**, the following screen appears:



2.7.1 Distress Scan

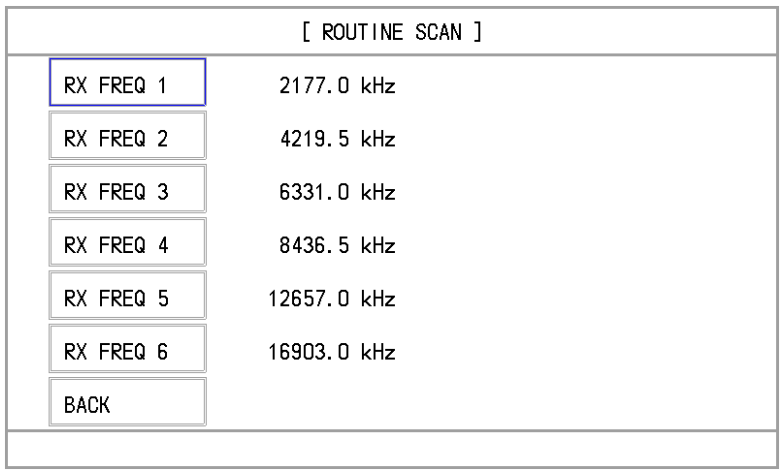
Click **[DISTRESS SCAN]** to open the **[DISTRESS SCAN]** window and select the frequencies to be scanned.

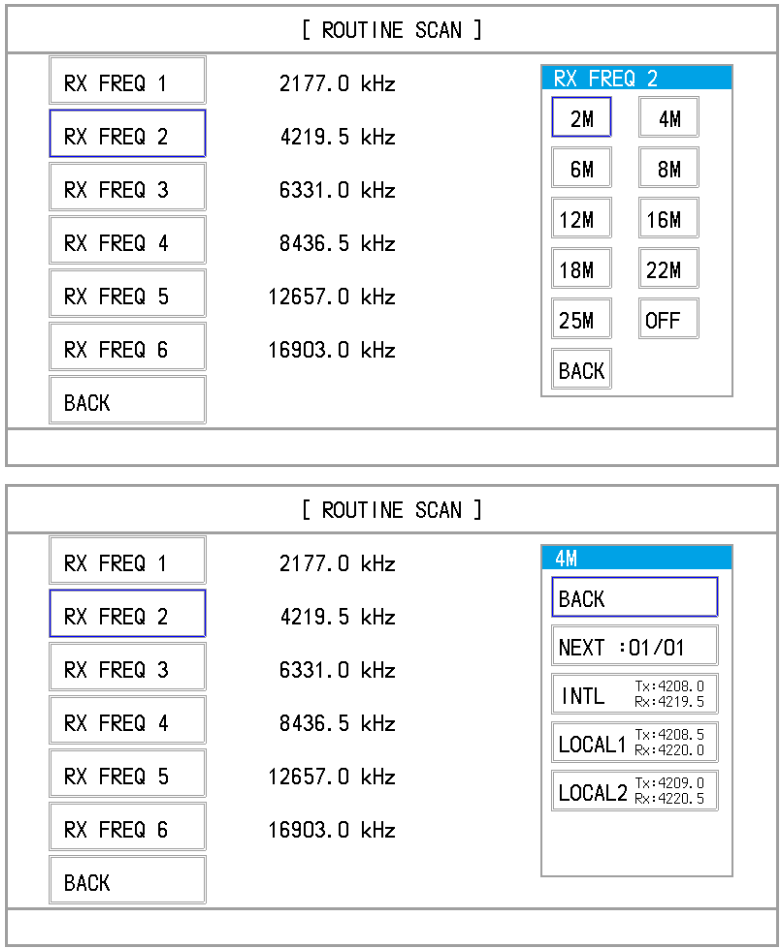


***Note**: 2 MHz and 8 MHz cannot be deselected. The maximum other three frequencies can be set OFF.*

2.7.2 Routine Scan

Click **[ROUTINE SCAN]** to open the **[ROUTINE SCAN]** window and click to select the frequency desired to scan.

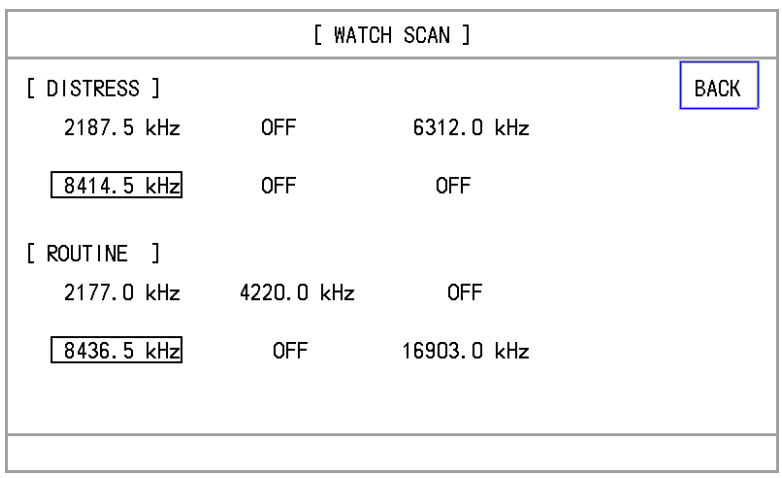




[NEXT]: Next pages
[INTL]: International channels
[LOCAL1/LOCAL2]: Local channels
[USER]: User channels

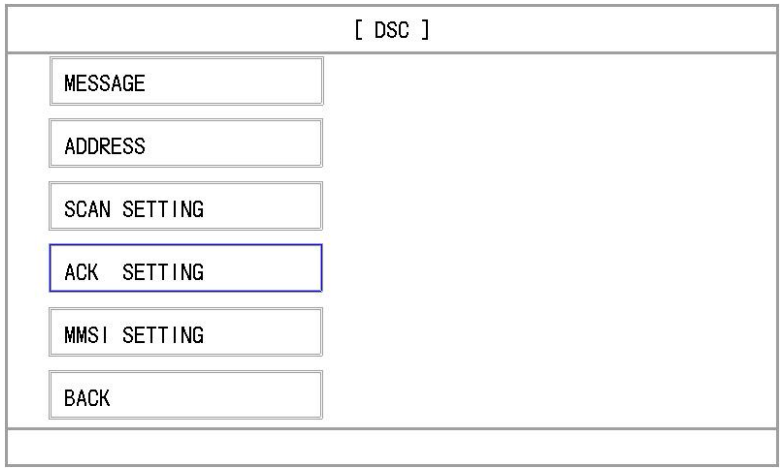
***Note*: Should set one routine frequency at least. Refer to APPENDIX 3 – DSC Frequency Table.**

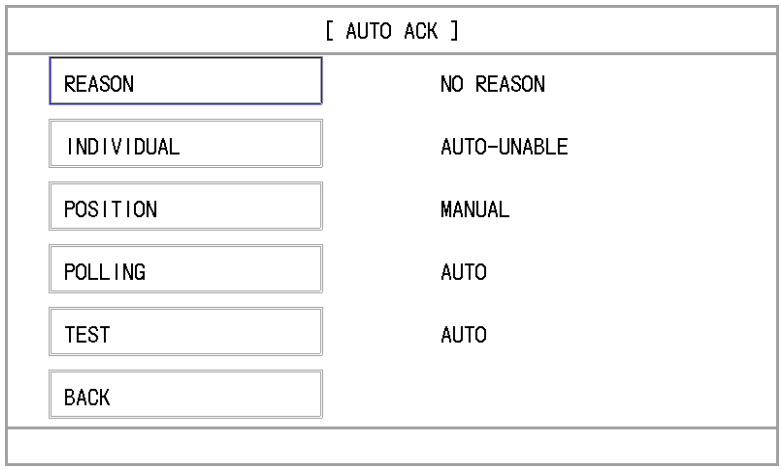
For example: After setting, the **[WATCH SCAN]** screen is as follows.



2.8 Auto Acknowledgement Setting

Individual, position, polling and test calls can be acknowledged automatically. This is to set on **[ACK SETTING]** in the **[MAIN MENU]-[DSC]** menu.





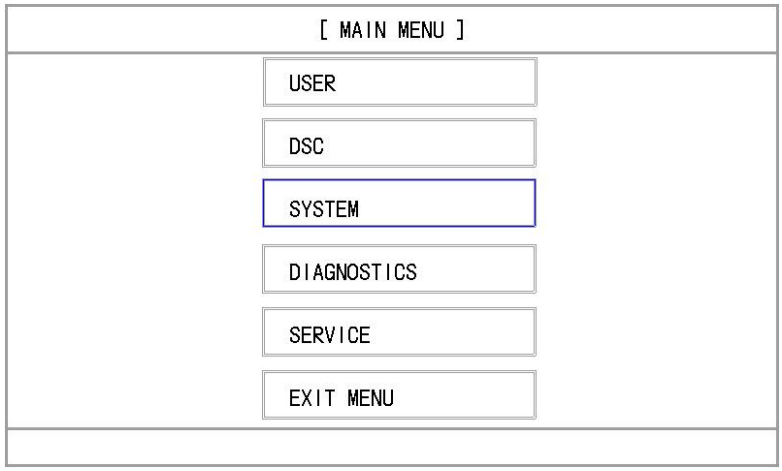
***Note**: When own ship's communication is at high priority, set to manual acknowledgement.*
The auto acknowledgement is not sent in the following cases:

- There are DSC communications (for individual call).
- Channel is in use.

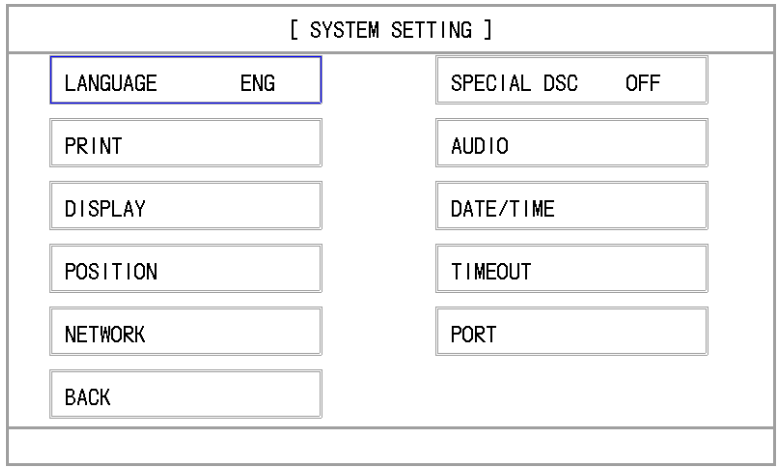
***Note**: The auto acknowledgement for the individual call is sent only when the proposed channel or communication mode is available. "REASON" area gives the reason for AUTO-UNABLE correspondingly.*

2.9 System Setting

Click **[SYSTEM]** or rotate the **PUSH TO ENTER** knob to select **[SYSTEM]** on the **[MAIN MENU]** screen then push the knob.



The following **[SYSTEM SETTING]** screen appears:



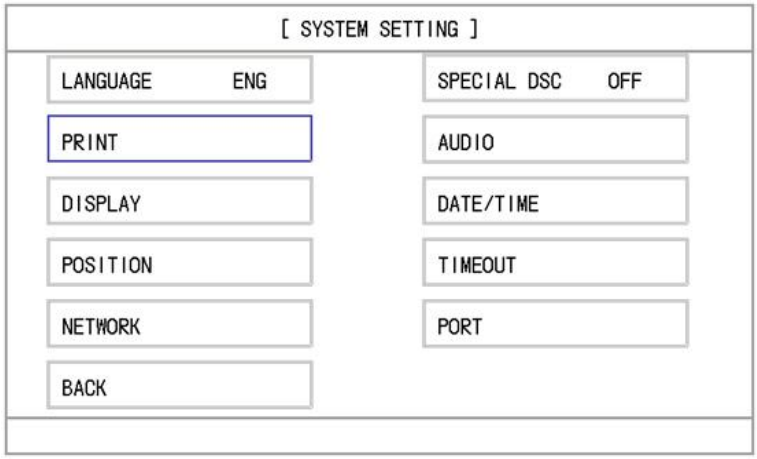
2.9.1 Language Setting

The default menu language is English.
Click **[LANGUAGE]**, or rotate the **PUSH TO ENTER** knob to select **[LANGUAGE]** then press the knob, to change the menu language.
The following knob operations are the same as above.

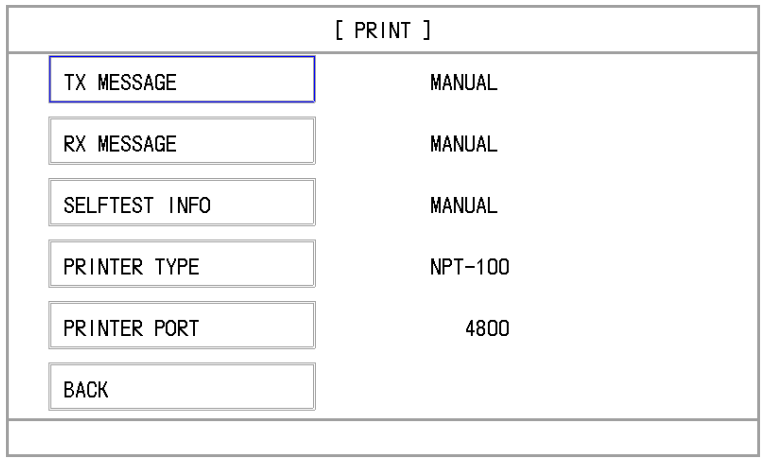
2.9.2 Print Setting

The **[PRINT]** menu enables/disables automatic printing of all transmitted and received calls and the results of the self-test.

① Click **[PRINT]** in **[SYSTEM SETTING]**.



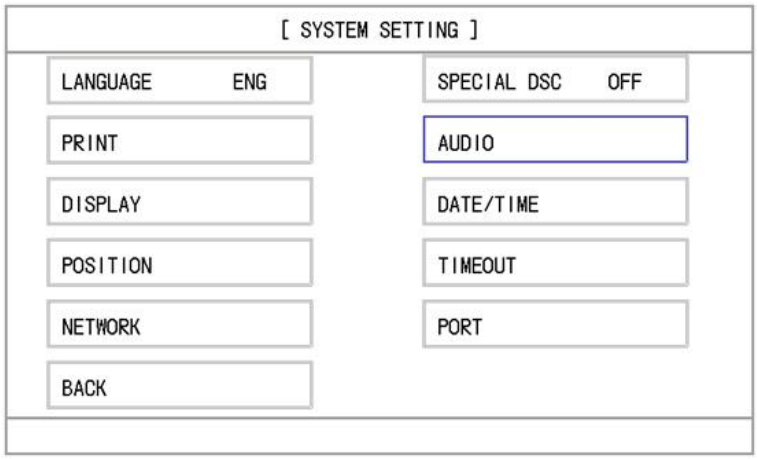
② Click **[TX MESSAGE]** to select **MANUAL** or **AUTO**.



③ Set [**RX MESSAGE**] and [**SELFTEST INFO**] similarly.
④ You can also set the printer type and port baud rate here.

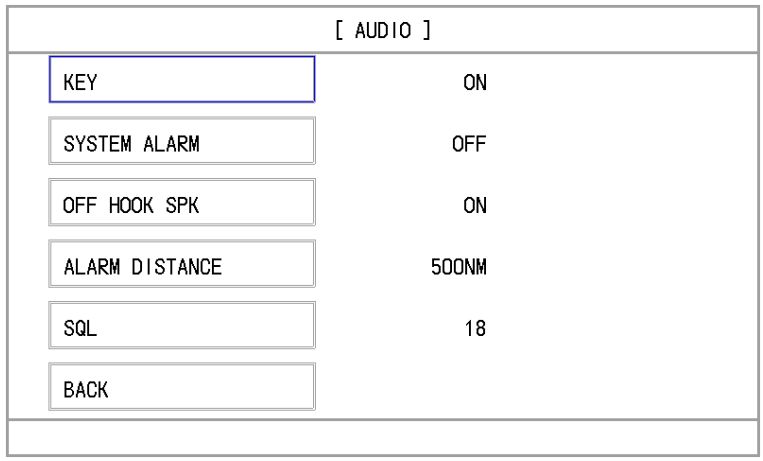
2.9.3 Audio Setting

Click **[AUDIO]** in **[SYSTEM SETTING]** to set the key buzzer and alarm buzzer, etc.



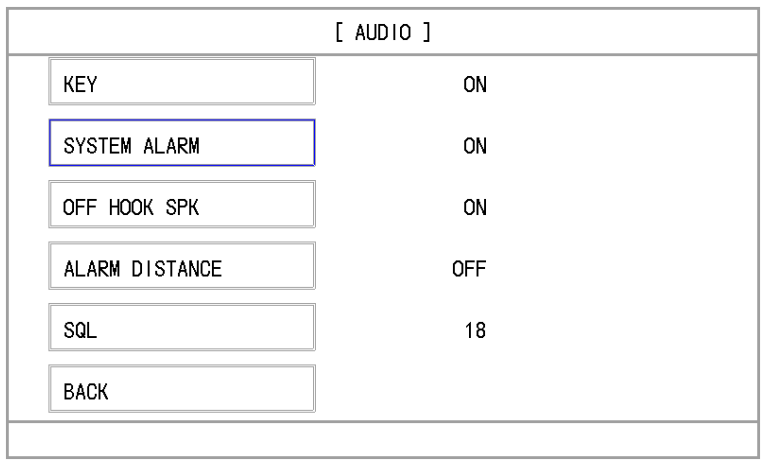
2.9.3.1 KEY BUZZER

Click **[KEY]** to switch the buzzer on or off.



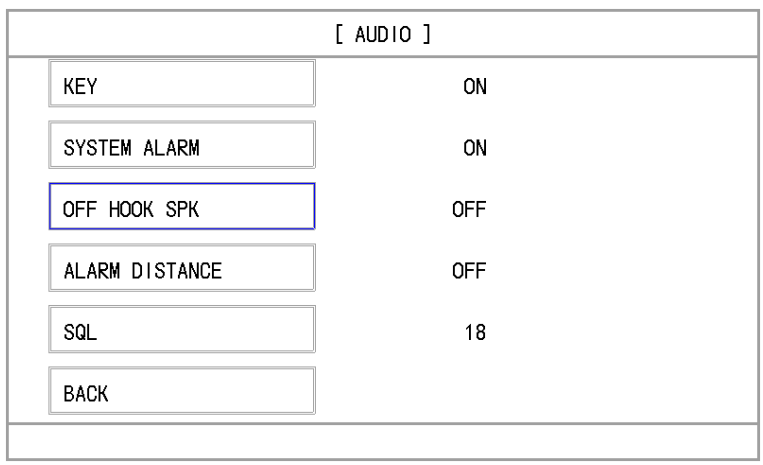
2.9.3.2 SYSTEM ALARM BUZZER

Click **[SYSTEM ALARM]** to switch the system alarm buzzer on or off.
By setting the **[SYSTEM ALARM]**, alarm that sounds against system faults and message receiving may be enabled or disabled.



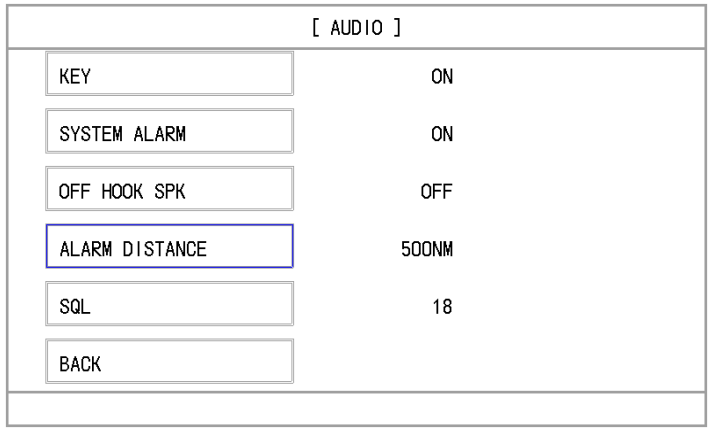
2.9.3.3 OFF HOOK SPK

Click **[OFF HOOK SPK]** to switch the main speaker on or off when the handset is off-hook.



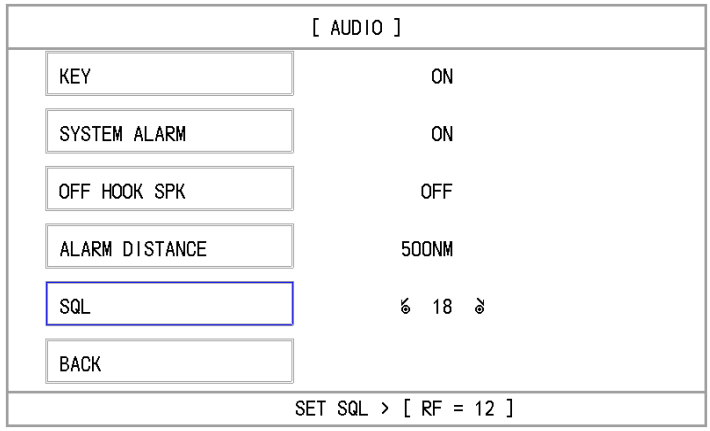
2.9.3.4 ALARM DISTANCE

Click **[ALARM DISTANCE]** to set the alarm distance:
OFF: The audio alarm sounds when any distress call is received.
500nm: The audio alarm sounds when a distress call from a ship within 500nm is received.



2.9.3.5 SQL

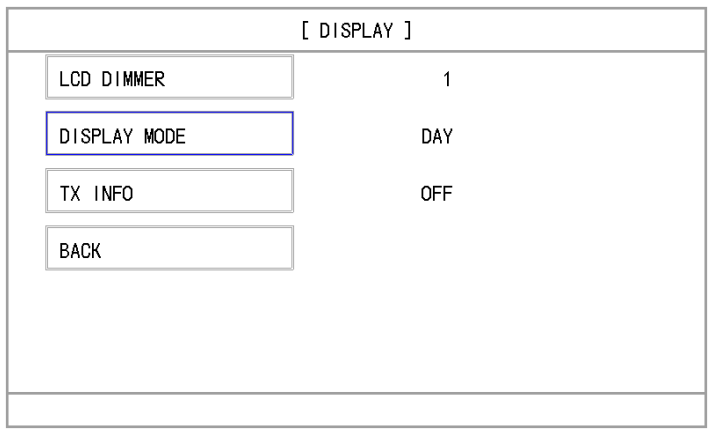
Click **[SQL]**, rotate the **PUSH TO ENTER** knob clockwise or anti-clockwise to select the threshold value between 10~50, then press the knob to confirm the selection.



2.9.4 Display Setting

2.9.4.1 DISPLAY MODE

Set the display mode (DAY or NIGHT) in the **[SYSTEM SETTING]-[DISPLAY]-[DISPLAY MODE]** by clicking or pressing the **PUSH TO ENTER** knob.

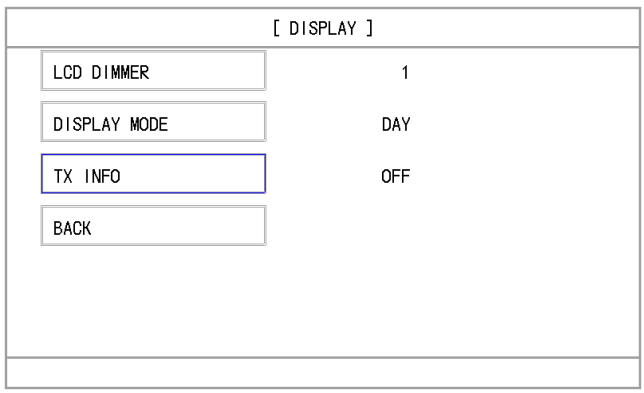


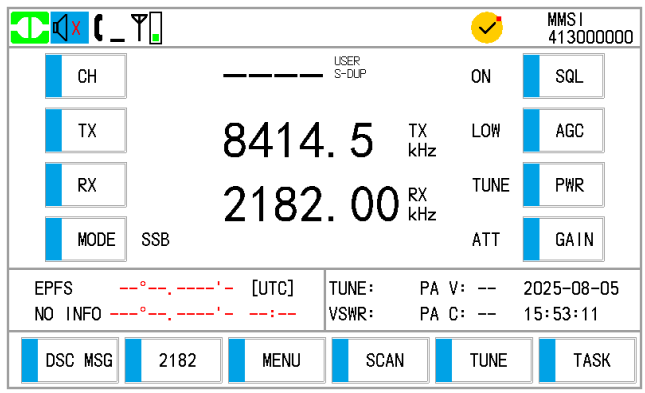
2.9.4.2 TX INFO

This item is used to set whether to display TX information.

For example:

- TX INFO: OFF (default)



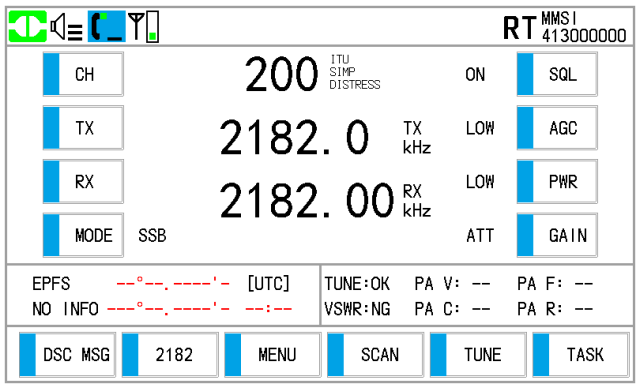


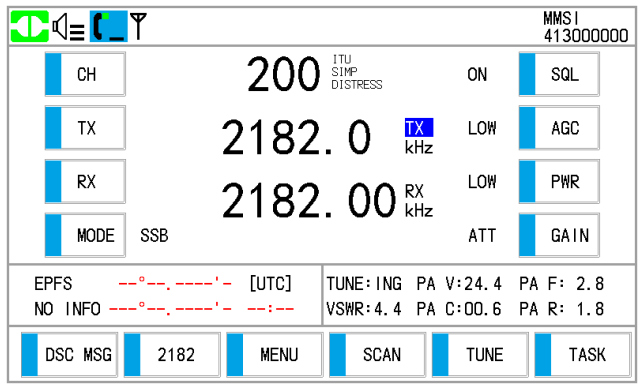
PA V: Voltage.

PA C: Current.

- TX INFO: ON

In turning/transmitting:





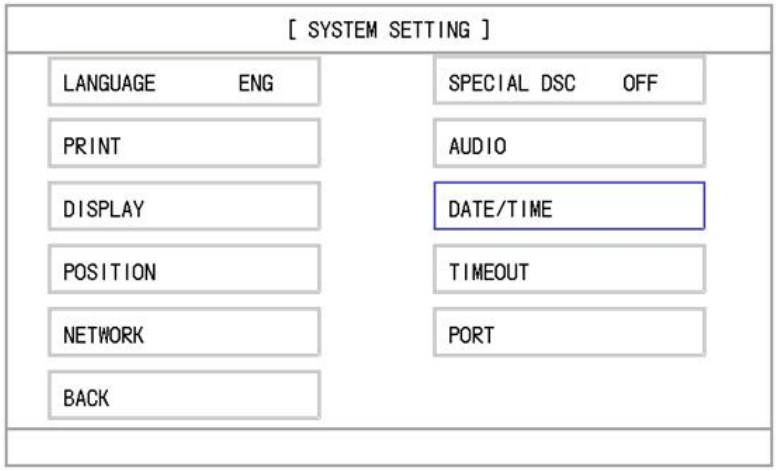
PA F: Forward voltage.

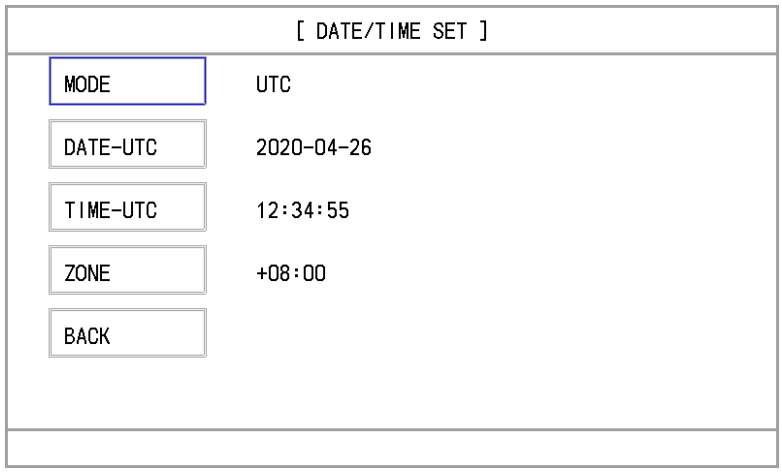
PA R: Reverse voltage.

2.9.5 Date/Time Setting

This is to set the date and time for the system.

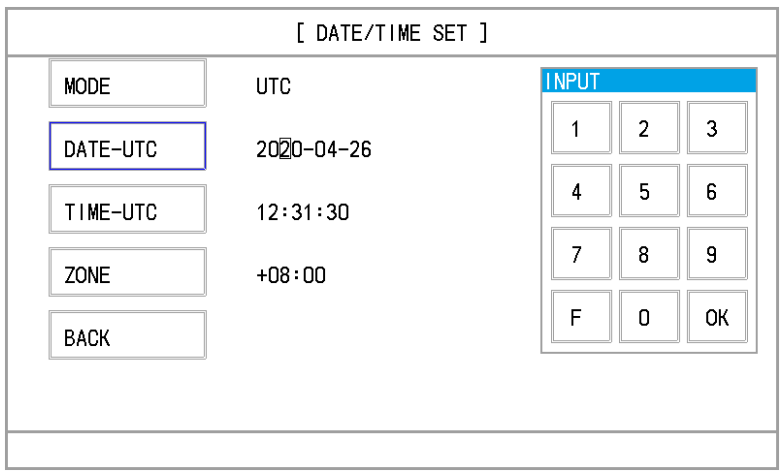
Click **[DATE/TIME]** in **[SYSTEM SETTING]** to open the **[DATE/TIME SET]** screen. There are four items that can be set: MODE, DATE-UTC, TIME-UTC and ZONE.

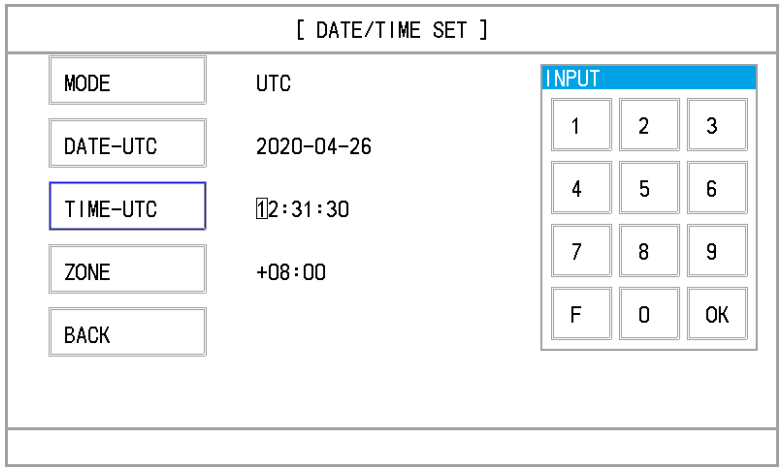


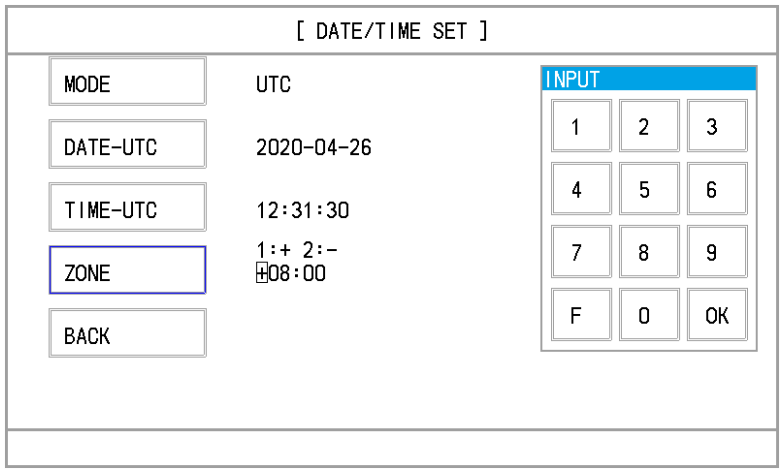


- Date or time cannot be adjusted when they are input from the GNSS navigator.
- If the date or time is not input from the GNSS navigator, click to enter the date and time with the numeric keys in the pop-up window.

***Note**: When manually entering the date and time, use UTC (Universal Time Coordinated). Do not use local time (LMT). If LMT is selected, it will be shown on the bottom right of the SSB screen.*





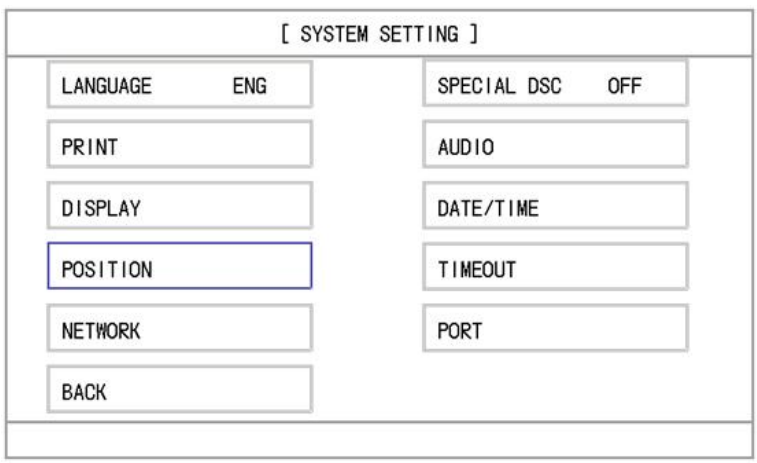


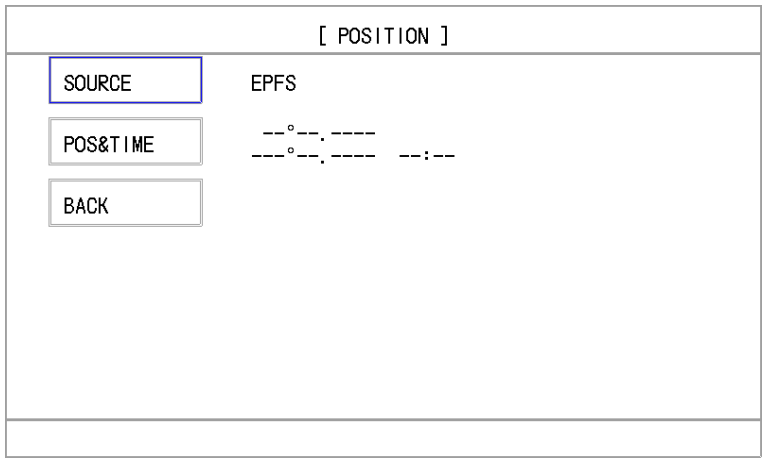
2.9.6 Position Setting

This is to set a position used for DSC operations only when GPS input is not available.

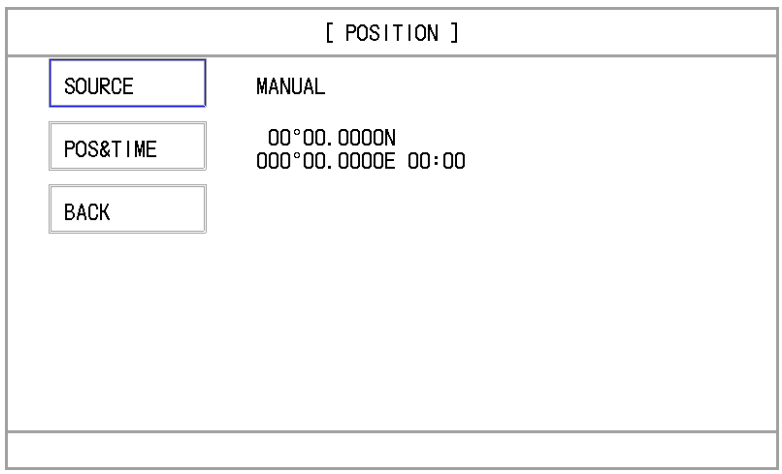
Do the following to set your position:

① Click [**POSITION**] in **[SYSTEM SETTING]**.

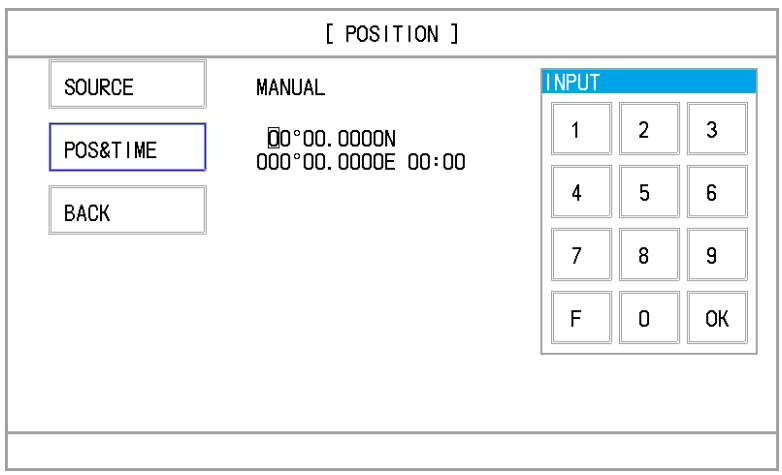


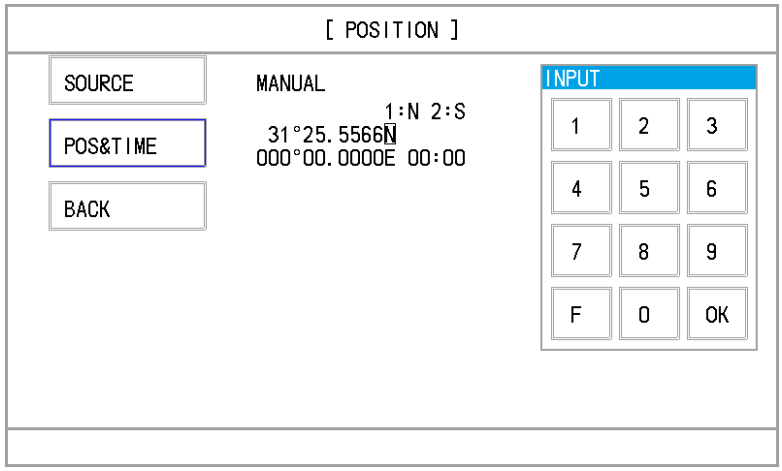


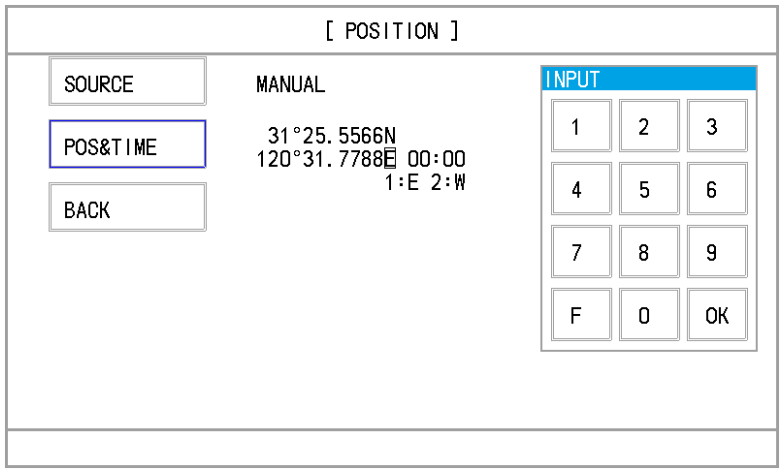
② Click **[SOURCE]** to select [**EPFS**] or [**MANUAL**].
[EPFS]: The position data from EPFS. The system will display "EPFS LOST POSITION" if no data.
When **[EPFS]** is selected, position data will be input and updated from the GNSS navigator connected.
[MANUAL]: Set the position data manually.
For **[MANUAL]**, go to the next step.



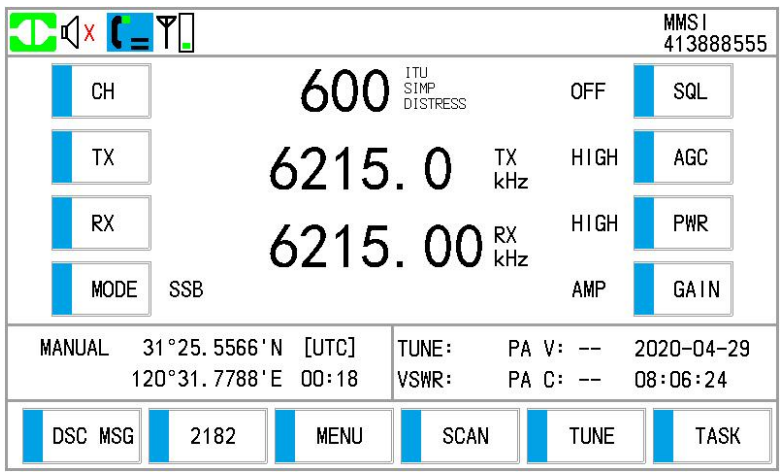
③ For manual input, click **[POS&TIME]**, use the numeric keys to enter the latitude/longitude of your position, and UTC time. To change the coordinate, click 1 for North or East, 2 for South or West.
After entering each data, click **OK**.







You can see the result of setting on the SSB screen by clicking **[BACK]**.

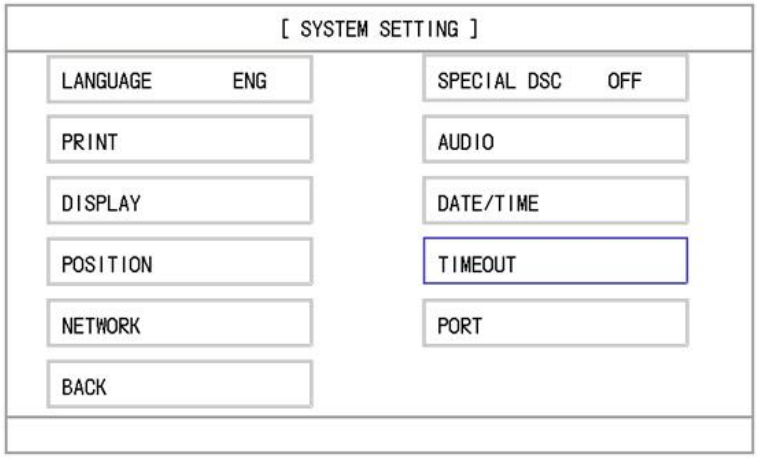


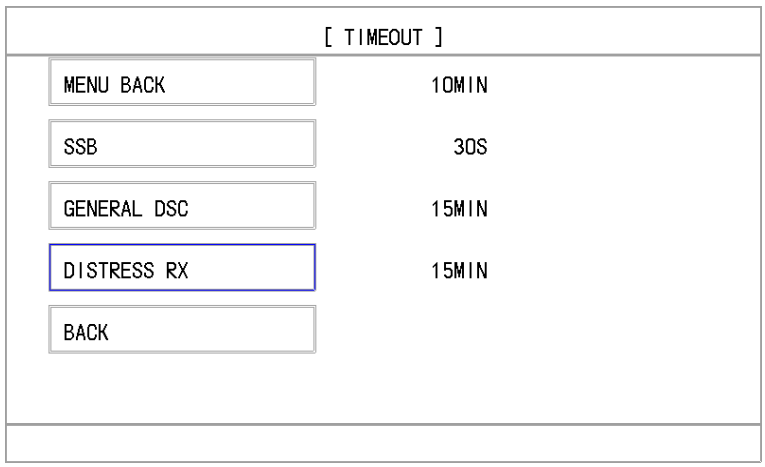
***Note**: When the setting of POSITION input type is [MANUAL], and the message "WARNING: Position data is not updated! " is shown, the Position data was older than 4H. Please update it.*

2.9.7 Timeout Setting

This is to set the timeout parameters for some operation jobs.

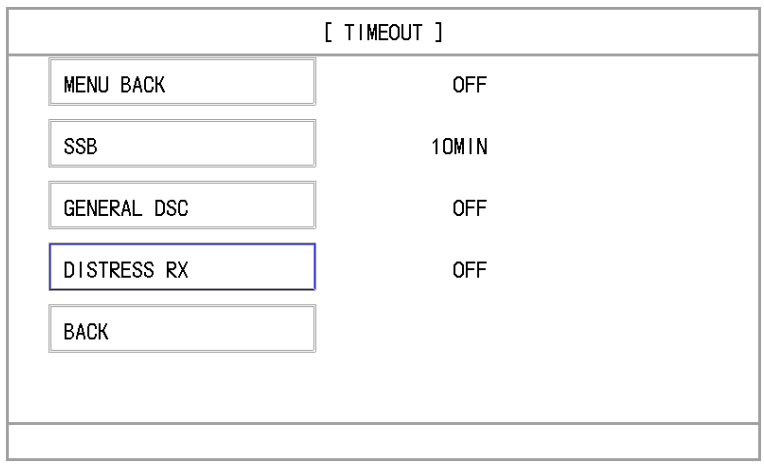
Click **[TIMEOUT]** in **[SYSTEM SETTING]**.





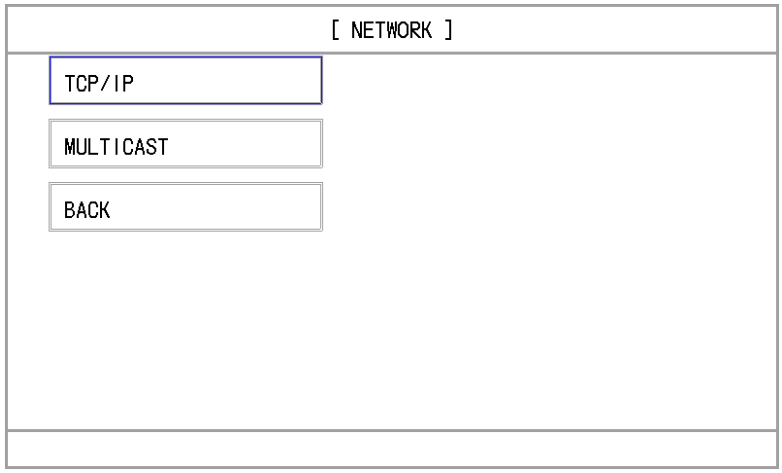
[MENU BACK]: Back to the upper menu screen automatically.
[SSB]: Close the inactive communications for SSB.
[GENERAL DSC]: Close the inactive communications except the distress call.
[DISTRESS RX]: Close the inactive communications for the receiving distress call.

Click or rotate the **PUSH TO ENTER** knob then push the knob to select the item and its time interval desired.
[OFF] leaves the menu screen and/or the inactive communications open until you close them manually.



2.9.8 Network Setting

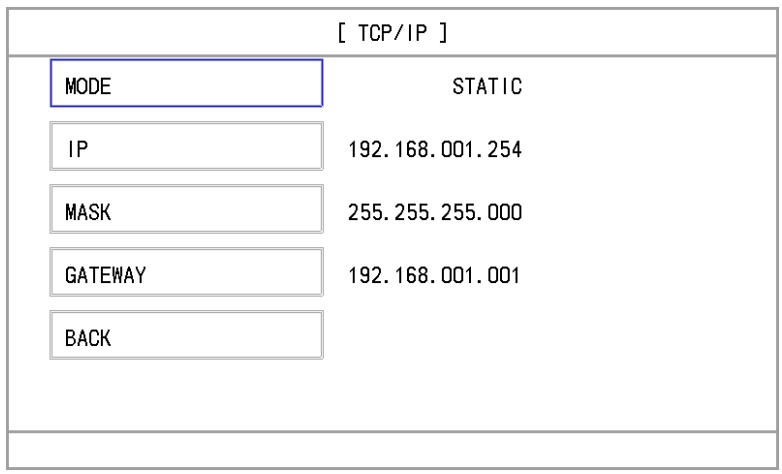
Click **[NETWORK]** in **[SYSTEM SETTING]**, the following screen appears:



***Note**: If you want to configure the network, you need to enter the password first in the [SERVICE] menu.*

① Set IP, Sub Mask and Gateway:

Click **[NETWORK]**-**[TCP/IP]**, the following screen appears:



[MODE]: Default Static IP.

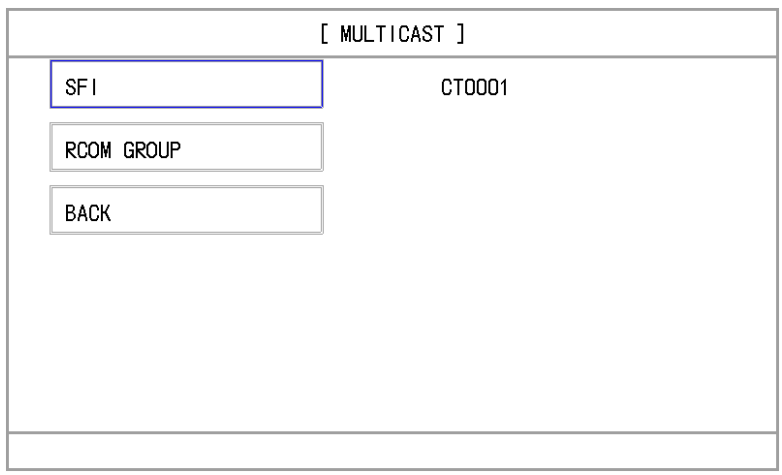
[IP]: Edit Device IP: 192.168.0.1-192.168.255.255, 172.16.0.1-172.16.31.255.

[MASK]: Edit Sub net mask.

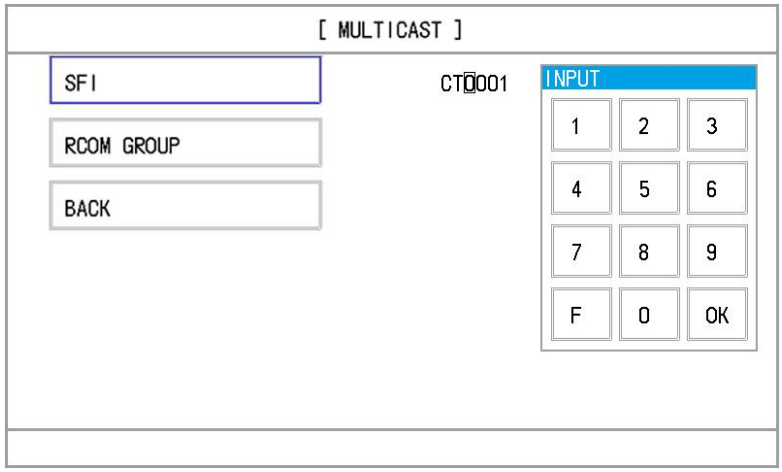
[GATEWAY]: Edit Gateway.

② Set Multicast function:

Click **[NETWORK]**-**[MULTICAST]**, the following screen appears:

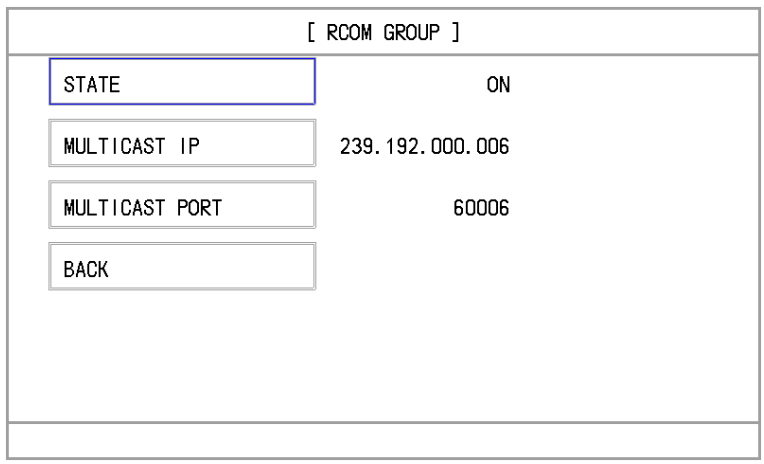


[SFI]: Edit SFI: CT0001-CT9999.



[RCOM GROUP]: View/Edit Multicast RCOM Group information. For example:

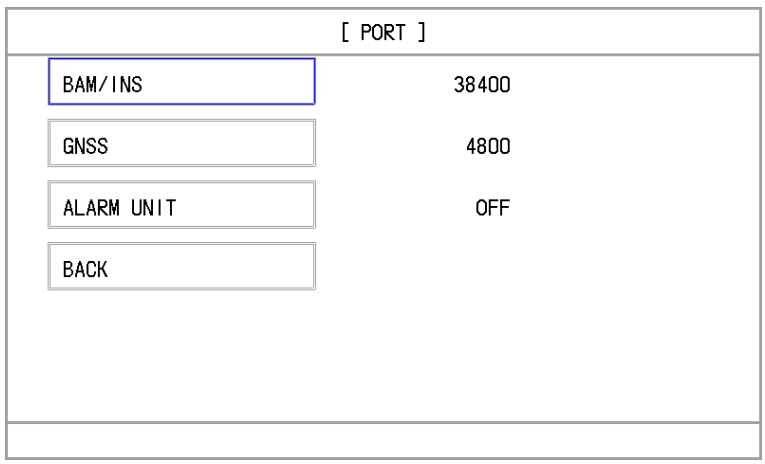
Click **[NETWORK]**-**[MULTICAST]**-**[RCOM GROUP]**, the following screen appears:



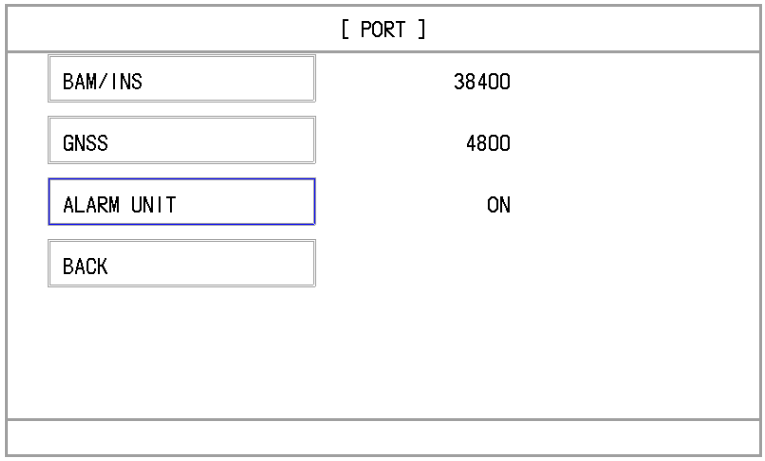
[STATE]: ON: Enable output sentence via RCOM GROUP.
[MULTICAST IP]: RCOM GROUP Default IP.
[MULTICAST PORT]: RCOM GROUP Default Port.

2.9.9 Port Setting

Click **[PORT]** in **[SYSTEM SETTING]**, the following screen appears:

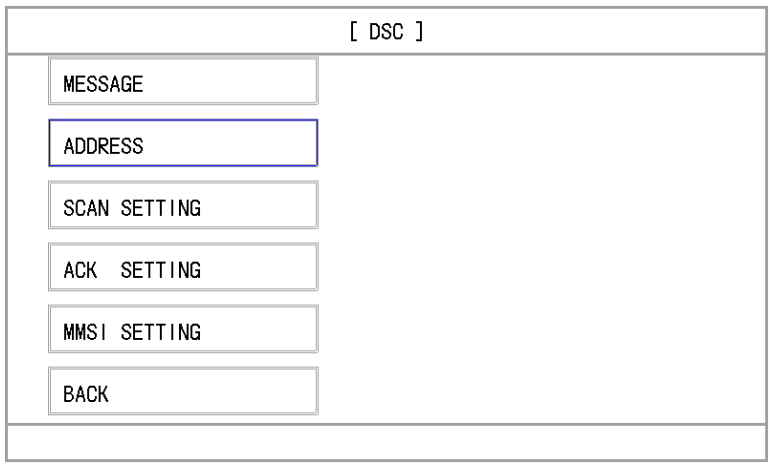


Click **[BAM/INS]** or **[GNSS]** to change the port speed. Click **[ALARM UNIT]** to set the port **ON** or **OFF**.

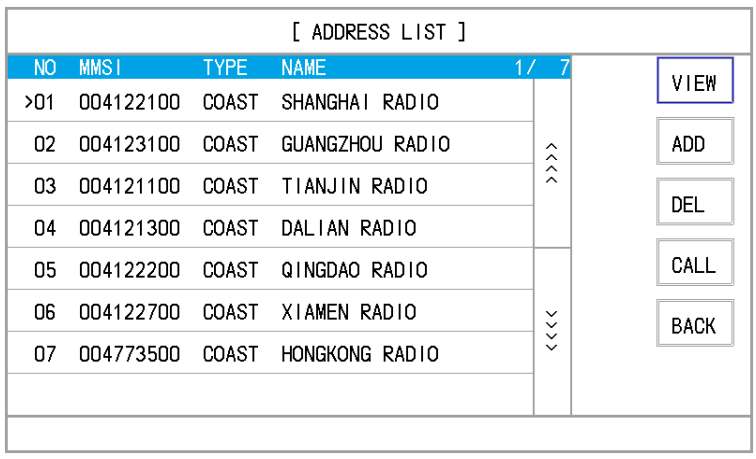


2.10 Address List

This is to build up a list of regularly used stations.



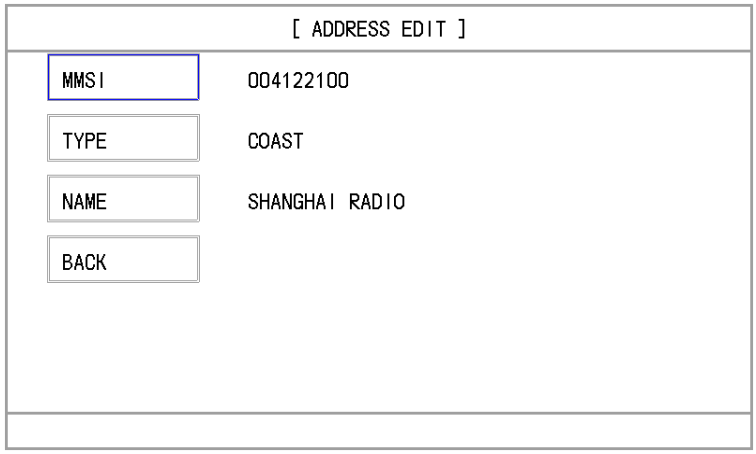
Click **[ADDRESS]** in the **[MAIN MENU]**-**[DSC]** menu, you can do the following operations.



2.10.1 View an Address

① Click or move the cursor by rotating the **PUSH TO ENTER** knob to select the address in list.

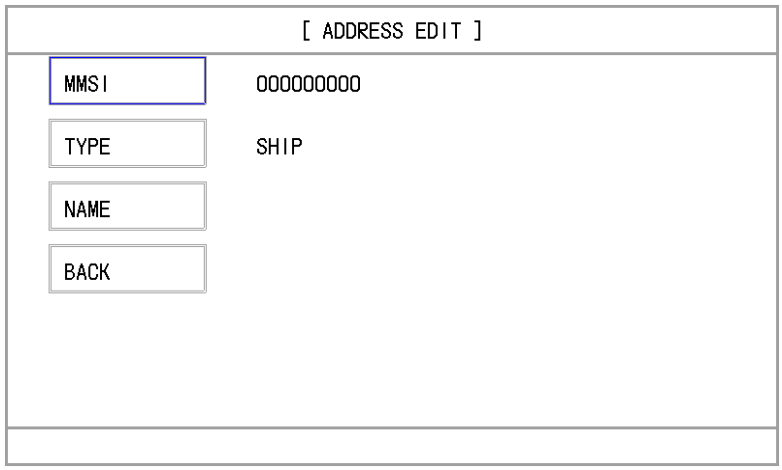
② Click **[VIEW]** to see the details of the address.



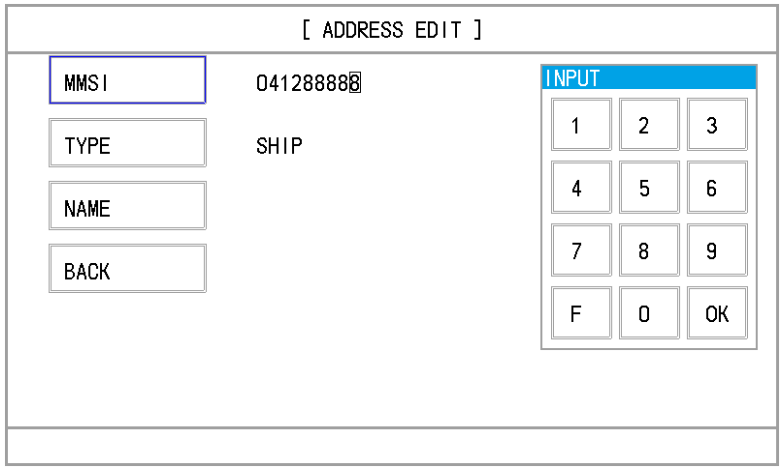
The address can be edited in this menu.

2.10.2 Add an Address

① Click **[ADD]** to add an address. For example, add a group MMSI.

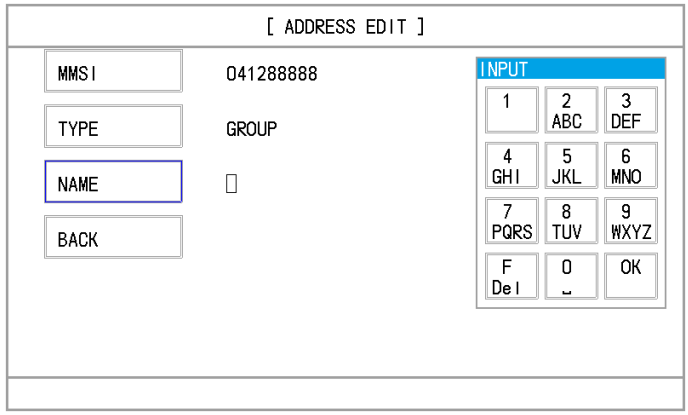


② Click **[MMSI]**, enter the MMSI with the numeric keys in **[INPUT]**.

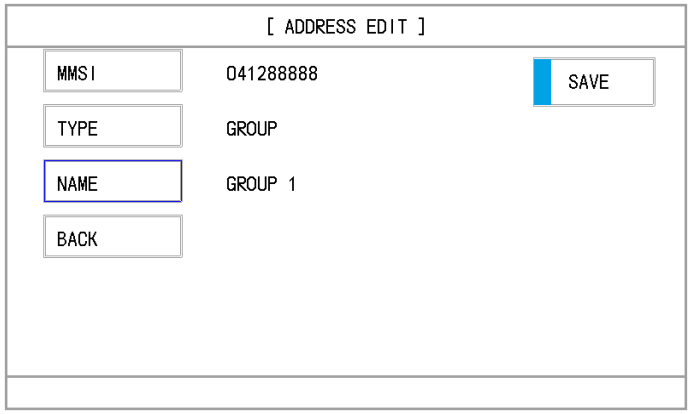


③ Click **OK** to confirm. The **[TYPE]** is automatically changed to **GROUP** if you enter the group MMSI.

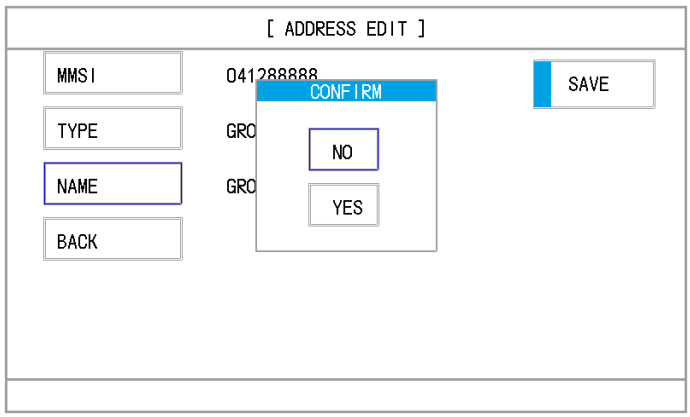
④ Click **[NAME]** to add a group name by using keys in [INPUT] and rotating the **PUSH TO ENTER** knob.

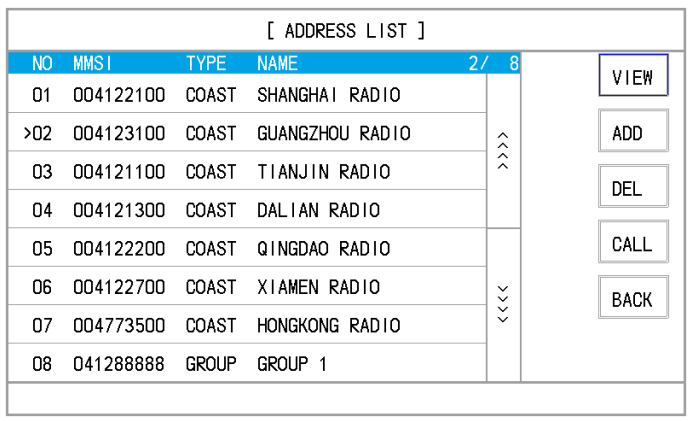


⑤ Click **OK** to confirm the editing.



⑥ Click **[SAVE]** and select **YES**. The address is added to the list.





2.10.3 Delete an Address

① Click or move the cursor by rotating the **PUSH TO ENTER** knob to select an address in list.

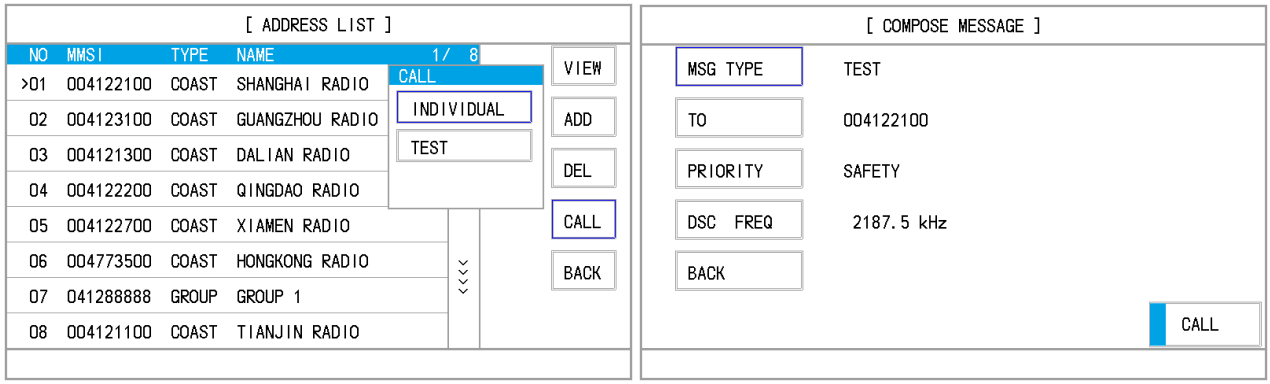
② Click **[DEL]**, delete the selected address directly.

2.10.4 Call to an Address

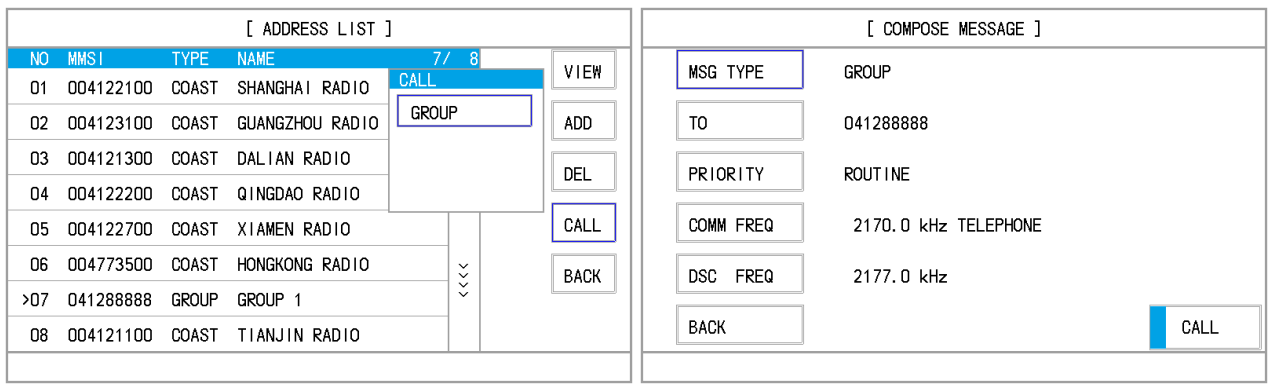
① Click or move the cursor by rotating the **PUSH TO ENTER** knob to select an address in list.

② Click **[CALL]**, you can send a DSC call to the selected address. For example:

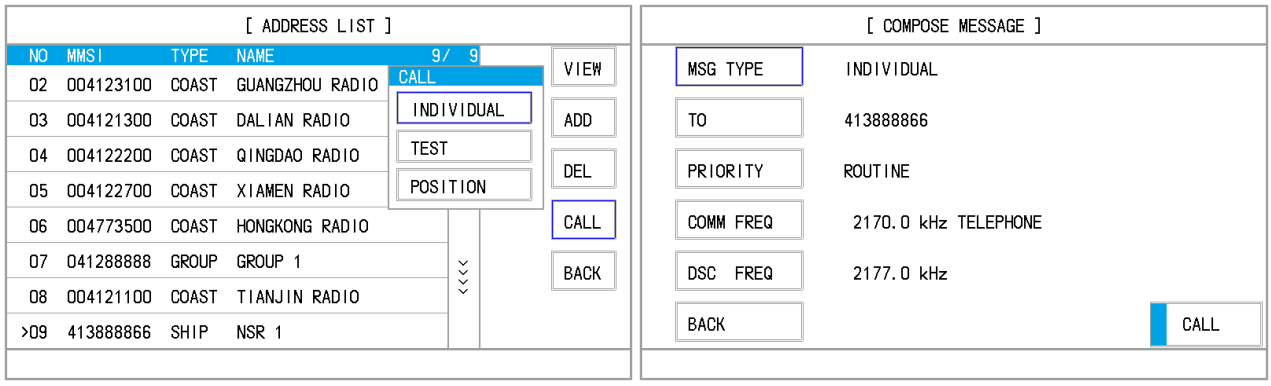
- **To a coast station:** You can send **INDIVIDUAL** or **TEST** call.



- **To a group:** You can send **GROUP** call.



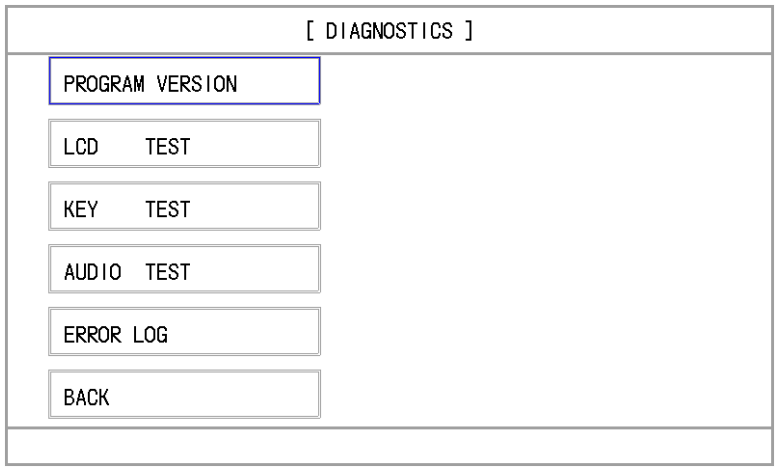
- **To a ship:** You can send **INDIVIDUAL**, **TEST** or **POSITION** call.



After editing, click **[CALL]** to send the DSC call.

2.11 Diagnostics

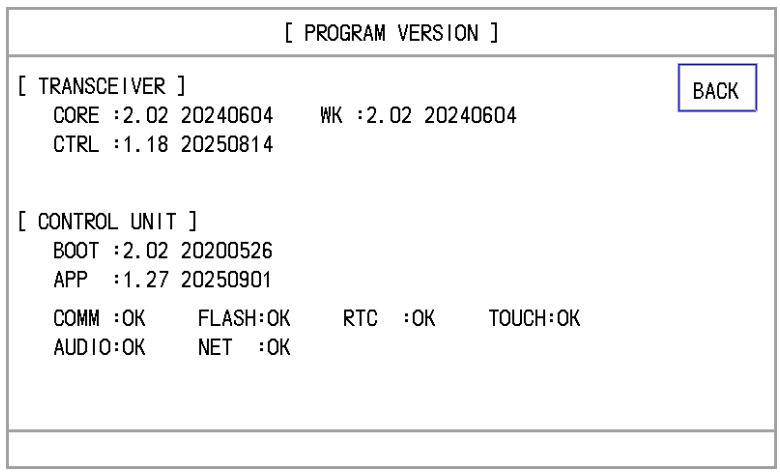
Click **[DIAGNOSTICS]** or rotate the **PUSH TO ENTER** knob to select **[DIAGNOSTICS]** on the **[MAIN MENU]** screen then push the knob. The following **[DIAGNOSTICS]** screen appears：



2.11.1 Program Version

It is to check the current program version at the **[DIAGNOSTICS]** menu.

Click **[PROGRAM VERSION]**, the following screen appears (for example)：



Note：

If FLASH, RTC, AUDIO or NET is faulty, "OK" will be "—".

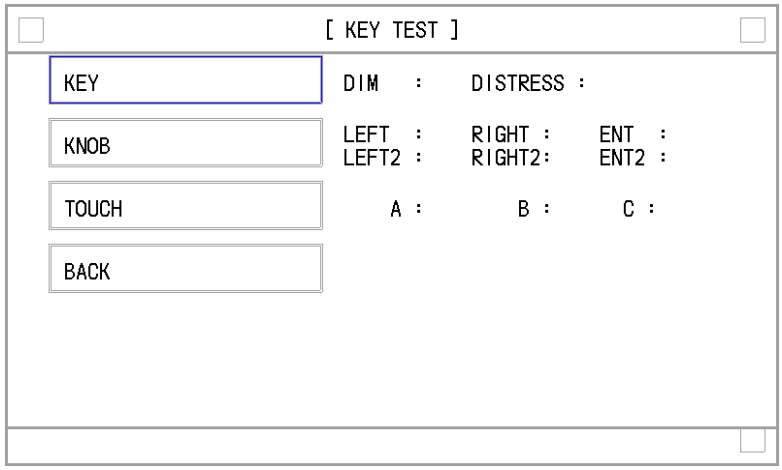
For example, if the audio chip is faulty (excluding the audio *PA and volume circuit), it will show "AUDIO:--".*

2.11.2 LCD Test

After clicking **[LCD TEST]**, press the **DIM** button to test the Display Brightness. Press the **PUSH TO ENTER** knob to return to the upper menu.

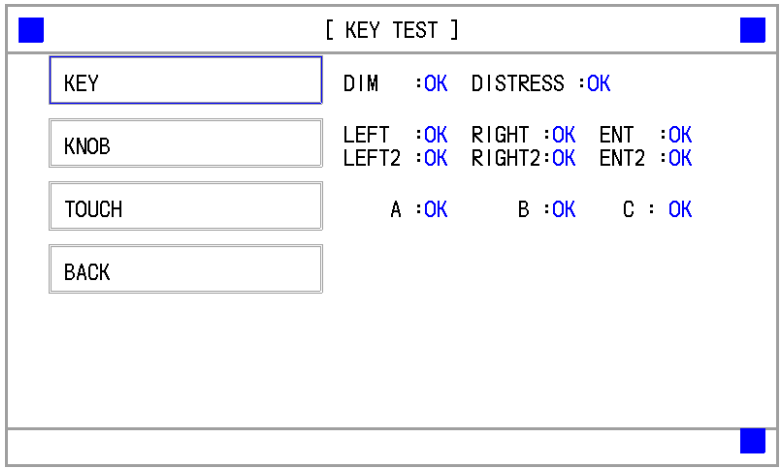
2.11.3 Key Test

KEY TEST is designed to test whether the key, knob and touch-screen are working or not.
Click **[KEY TEST]** to enter the following screen:



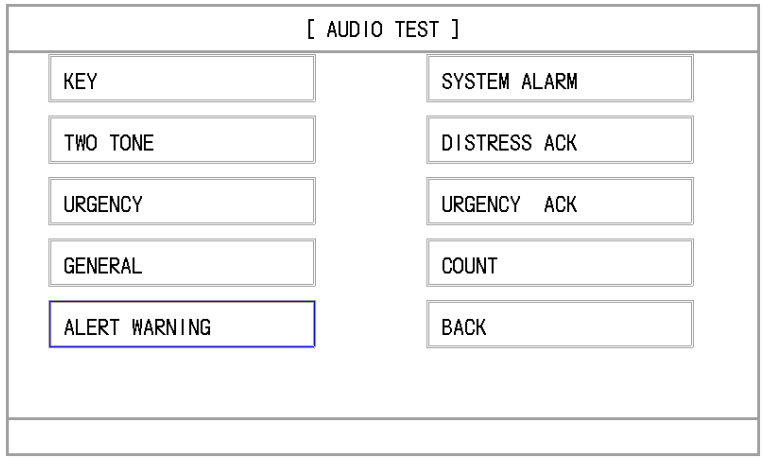
KEY test:
DIM: Press the **DIM** button.
DISTRESS: Press the **DISTRESS** button.
KNOB test:
LEFT/RIGHT/ENT: Turn the **PUSH TO ENTER** knob to left and right, then press it.
LEFT2/RIGHT2/ENT2: Turn the **PUSH TO PWR** knob to left and right, then press it.
TOUCH test: Touch the corner of the screen. The box corresponding to the item will be filled with blue color.

If everything is good, **OK** icon will appear.
Click **[BACK]** to return to the upper menu.



2.11.4 Audio Test

It is to check the audio at the [**DIAGNOSTICS]** menu.
Click **[AUDIO TEST]**, the following screen appears：



Click the items to test the corresponding audio.

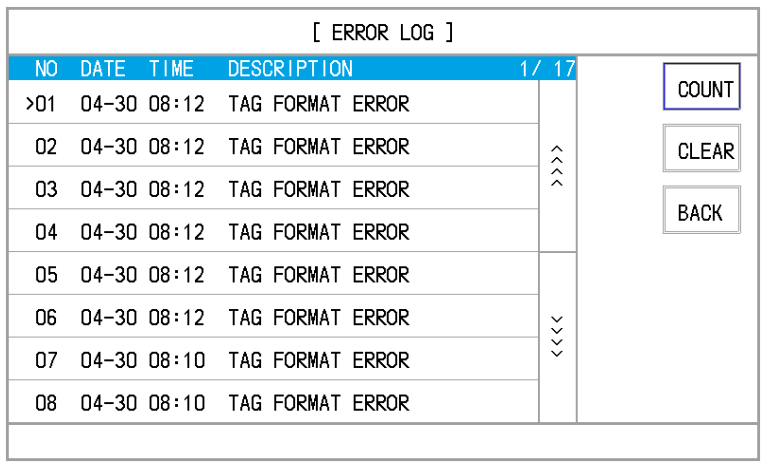
***Note*: The ALARM buzzer should be set to ON while doing the test.**

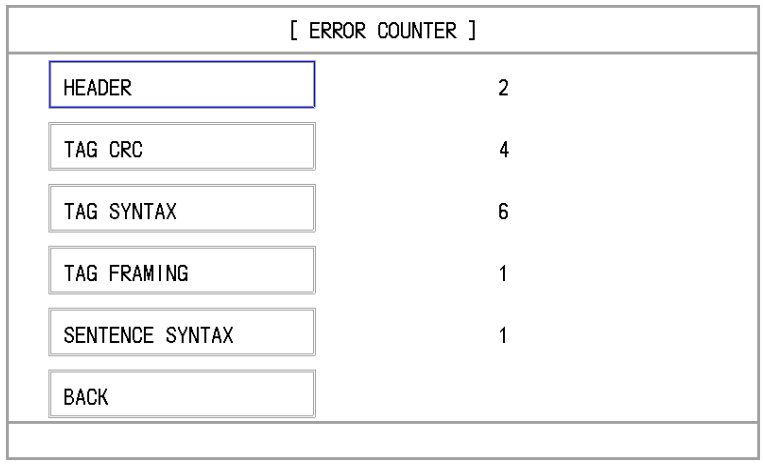
2.11.5 Error Log

① Click [**ERROR LOG**] on the [**DIAGNOSTICS**] screen.

② With [**ERROR LOG**] selected, the screen shown below appears.

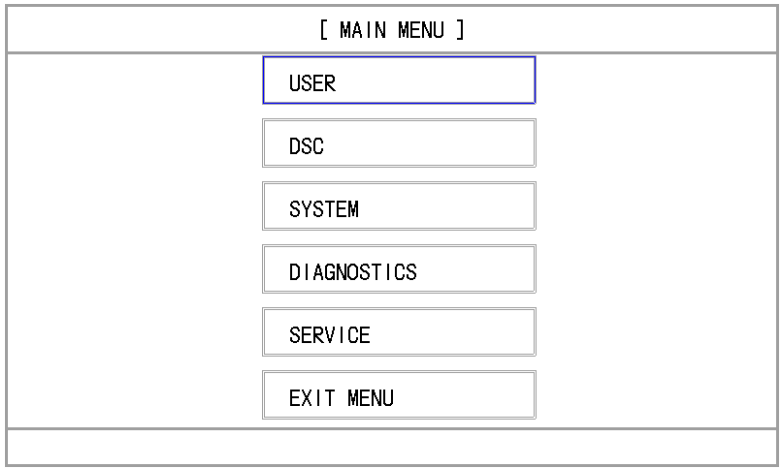
- Display Error info when receiving the Tag Block message via IEC61162-450.
- [**COUNT**]: Click to view the Error counter.
- [**CLEAR**]: Click to reset list.

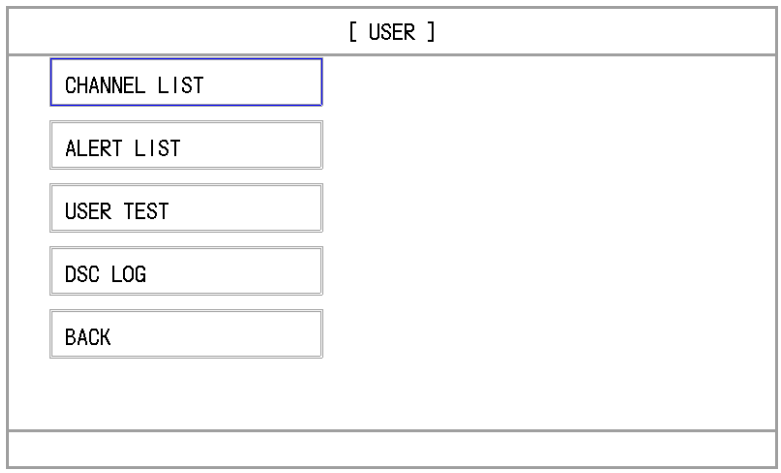




2.12 User Manager

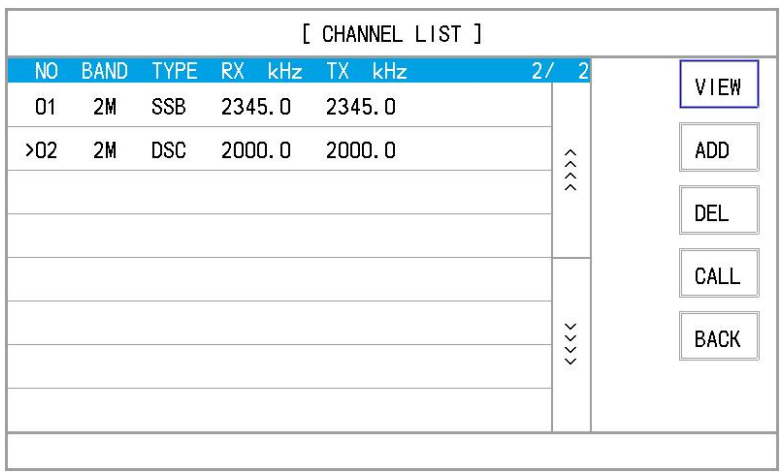
Click **[USER]** on the **[MAIN MENU]** screen. The **[USER]** menu appears.





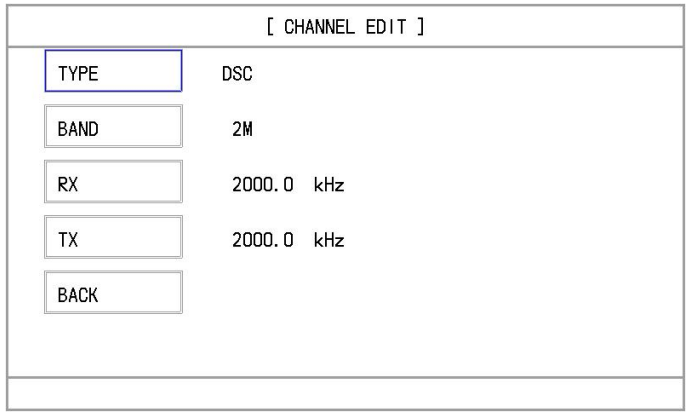
2.12.1 Channel List

Click **[CHANNEL LIST]**, the following screen appears:

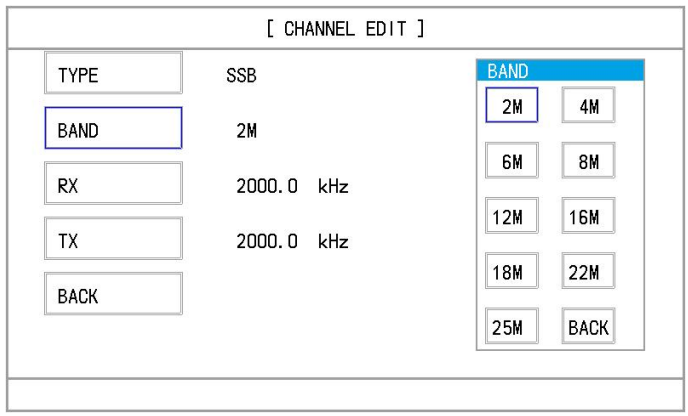


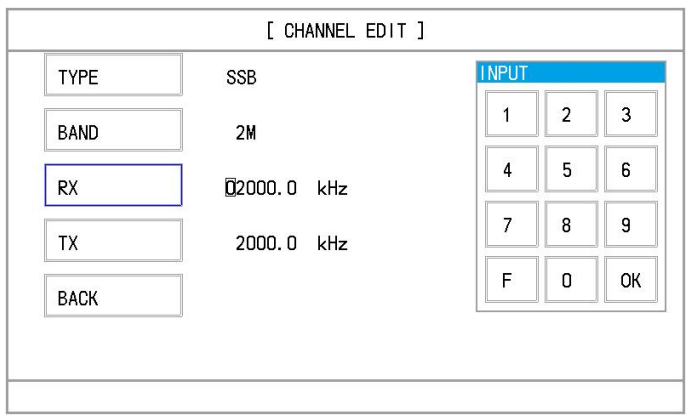
① View/Edit a channel

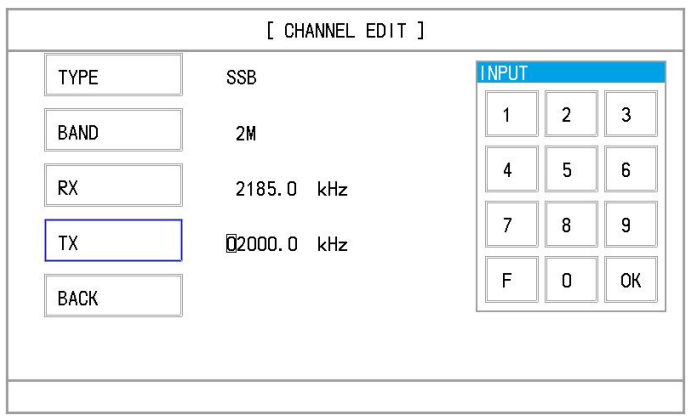
Move the cursor to the wanted channel, click **[VIEW]**, and the **[CHANNEL EDIT]** screen appears:

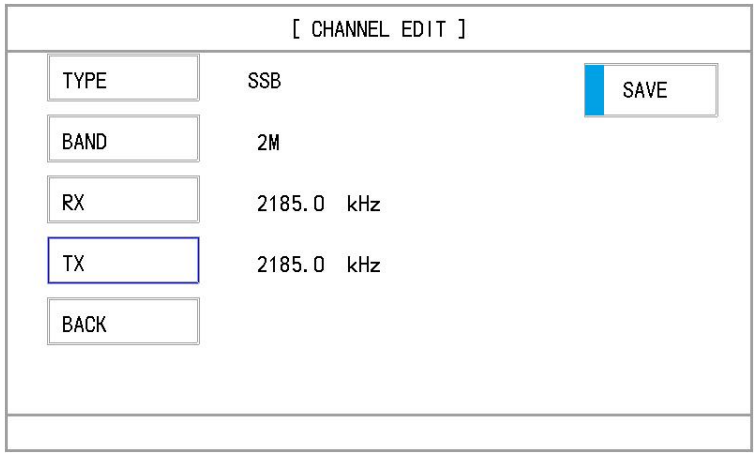


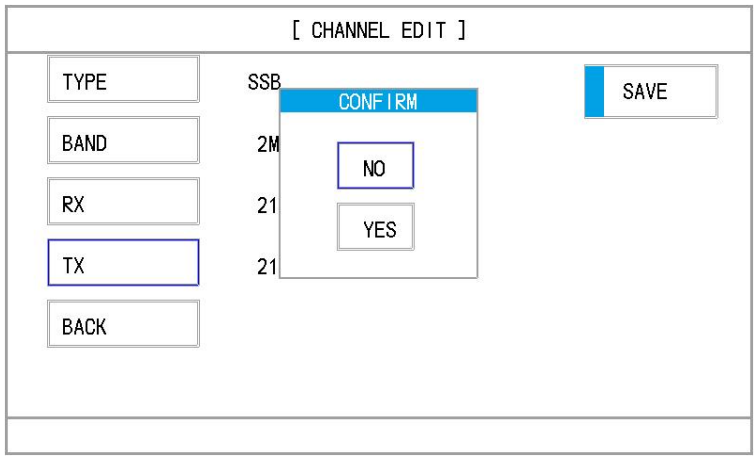
You can click the **TYPE**, **BAND**, **RX** frequency or **TX** frequency to edit.











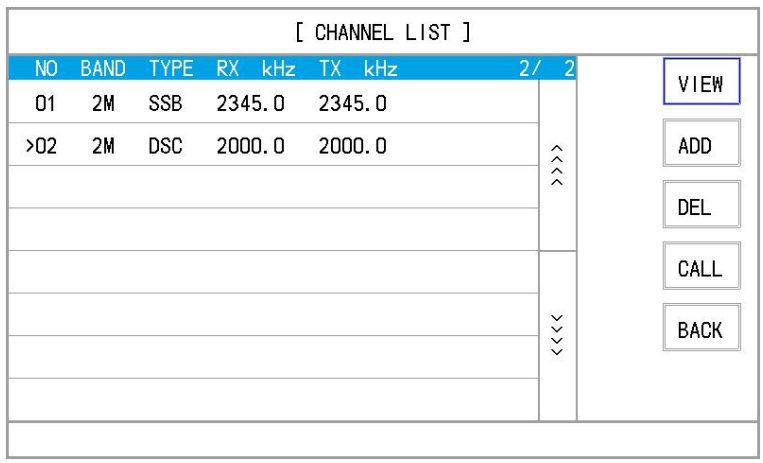
Click **OK** to confirm the input. Click **SAVE** and choose "**YES**" to save the edition, "**NO**" to discard the edition.

② Add a channel

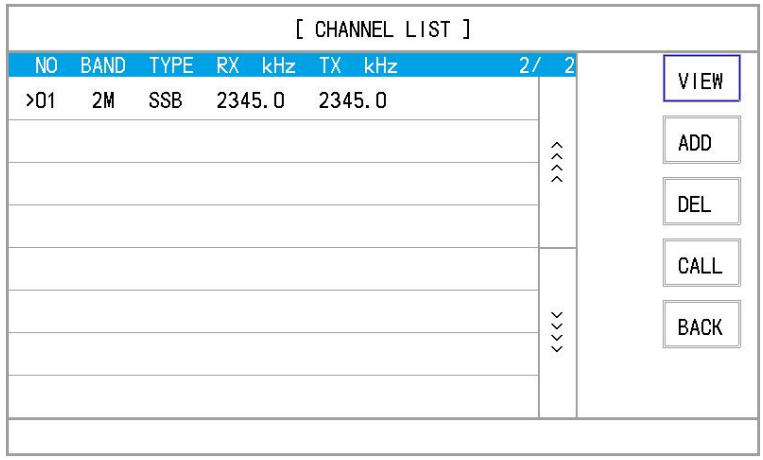
Click **[ADD]**, open the **[CHANNEL EDIT]** screen. The operation is the same as above.

③ Delete a channel

Move the cursor to the wanted channel.

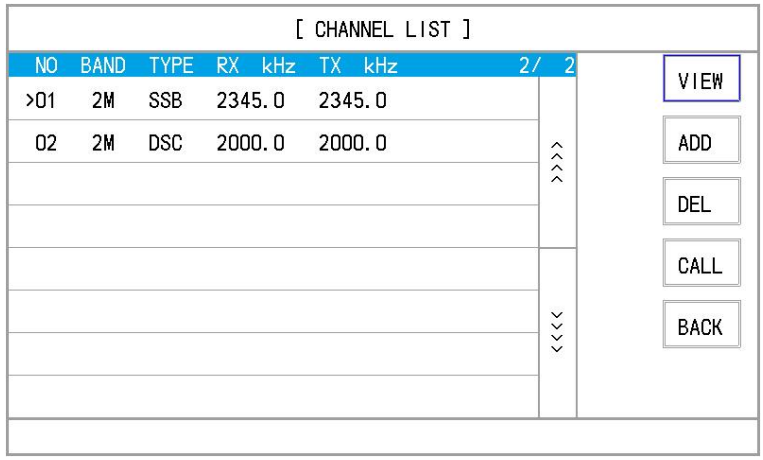


Click **[DELETE]**, delete the channel directly.

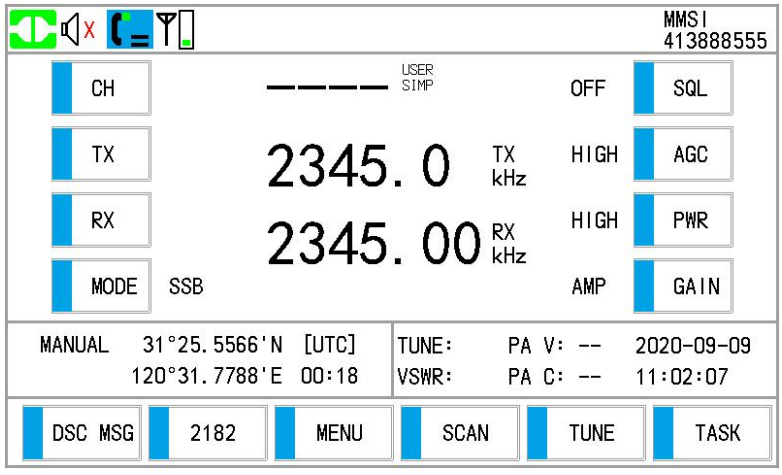


④ Call

Move the cursor to the wanted channel.

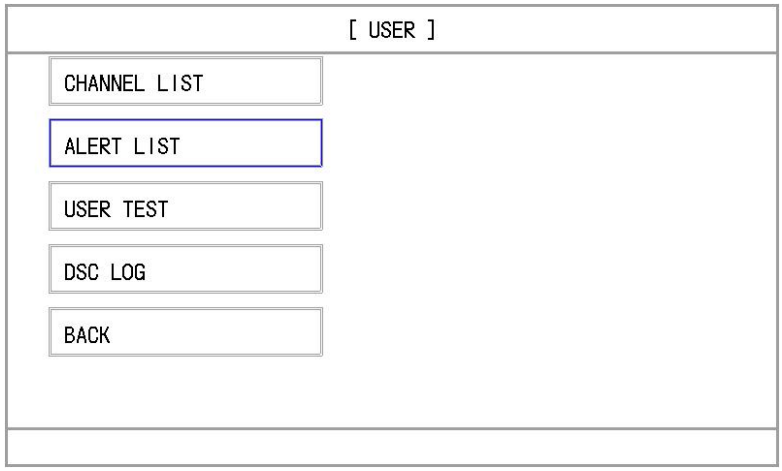


Click **[CALL]**, open the SSB screen to start SSB communication.

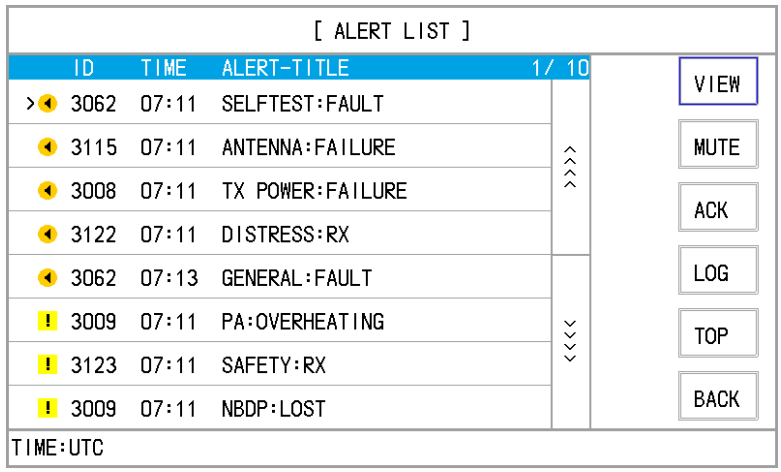


2.12.2 Alert List

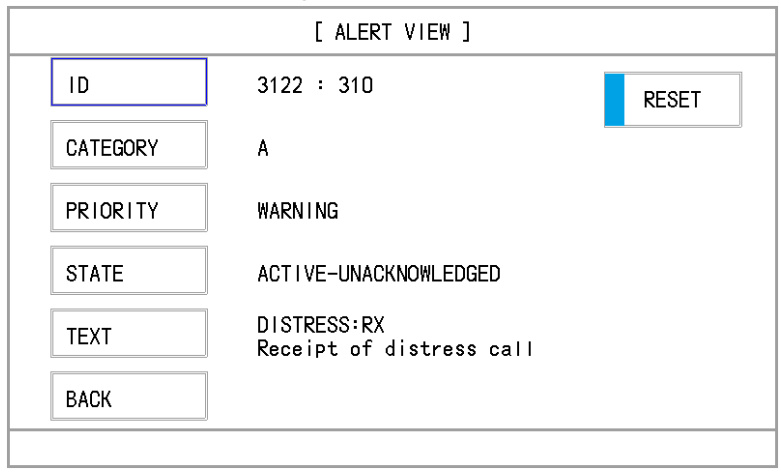
Click **[USER]** on the **[MAIN MENU]** screen. The **[USER MANAGER]** menu appears.



Select **[ALERT LIST]** to show the following menu.



[VIEW]: Check the details of the alert selected.
[MUTE]: Mute the alert.
[ACK]: Acknowledge the alert.
[LOG]: Check the alert history.
For example, click **[VIEW]** to show the following menu.



<u>Note</u>: [RESET] is only used for DISTRESS RX alert reset.

Alert mark description:

MARK	PRIORITY	STATE
	EMERGENCY ALARM	ACTIVE
	ALARM	ACTIVE-UNACKNOWLEDGED
		ACTIVE-SILENCED
		ACTIVE-ACKNOWLEDGED
		ACTIVE-RESPONSIBILITY TRANSFERRED
		RECTIFIED-UNACKNOWLEDGED
	WARNING	ACTIVE-UNACKNOWLEDGED
		ACTIVE-SILENCED
		ACTIVE-ACKNOWLEDGED
		ACTIVE-RESPONSIBILITY TRANSFERRED
		RECTIFIED-UNACKNOWLEDGED
	CAUTION	ACTIVE

Alert description:

Alert identifier	Alert instance	Alert category	Alert priority	Alert Title	Additional Description
3122	310	A	WARNING	DISTRESS: RX	Receipt of distress call
3008	314	B	WARNING	TX POWER: FAILURE	Transceiver fail
3115	313	B	WARNING	ANTENNA: FAILURE	VSWR high
3062	316	B	WARNING	GENERAL: FAULT	HW error
3062	317	B	WARNING	SELFTEST: FAULT	Built in self test failure
3123	311	B	CAUTION	SAFETY: RX	Receipt of other call
3016	312	B	CAUTION	POSITION: LOST	No position data received
3016	332	B	CAUTION	POSITION: LOST 4H	Position older than 4h
3019	318	B	CAUTION	MMSI: WRONG	Check MMSI setting
3009	319	B	CAUTION	CONTROL: LOST	Check control unit
3009	320	B	CAUTION	TRANSCEIVER: LOST	Check transceiver
3009	321	B	CAUTION	CORE: LOST	Check transceiver
3009	322	B	CAUTION	NBDP: LOST	Check NBDP
3009	323	B	CAUTION	PA: OVERHEATING	Reduced Transmission power
3023	324	B	CAUTION	AC POWER FAIL	Check AC power supply

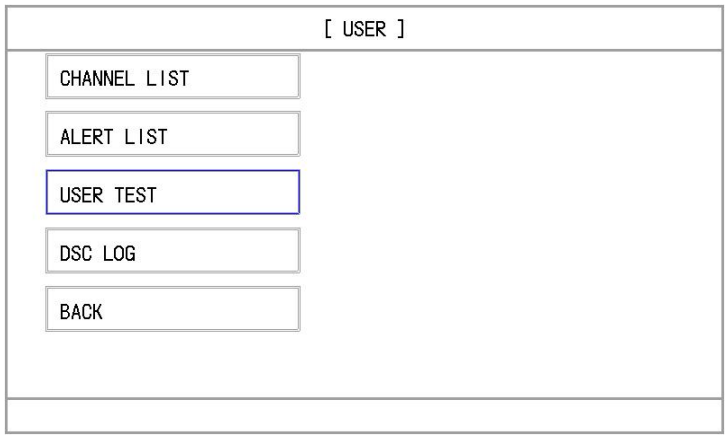
Alert Configuration Table:

Alert identifier	Alert instance	Alert category	Alert priority	Escalation Properties	Permission Acknowledge	Permission Transfer of Responsibility
3122	310	A	WARNING	WARNING	NO	NO
3115	313	B	WARNING	WARNING	YES	YES
3008	314	B	WARNING	WARNING	YES	YES
3062	316	B	WARNING	WARNING	YES	YES
3062	317	B	WARNING	WARNING	YES	YES

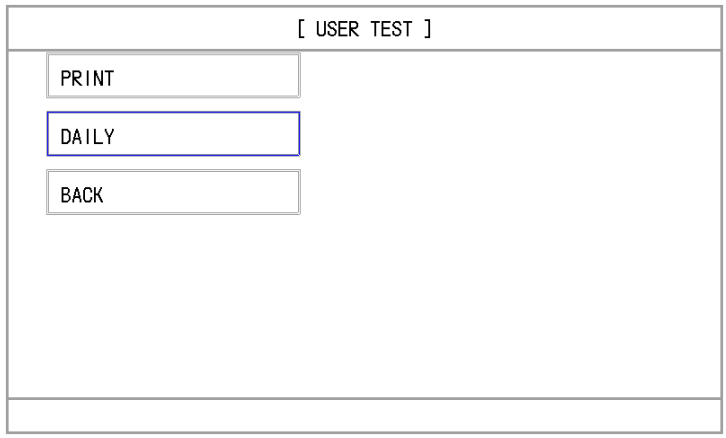
Note:
The principles of responsibility transfer: Reduction of the high-priority of alerts, recognizes that a system may have knowledge about the context of some alert(s) of another system. Such a system may want to tell other equipment to cease its priority request for operator attention, and raise an alert with a lower priority instead. In that case, it may apply the "responsibility transfer" option to inform the alerting system that the alert is replaced by a more suitable alert to the operator, warranting a request to change the associated alert state to "active – responsibility transferred", which essentially embodies an auto-acknowledge.

Alert	Alert Description	Reason
ANTENNA: FAILURE	VSWR high_In Tuning	VSWR exceeds limit in turning.
	VSWR high_LastTime_TuneError	VSWR is high and also exceeded limit in previous turning.
	VSWR high_LastTime_TuneOK	VSWR is high but was OK in previous turning.
GENERAL: FAULT	HW error: FLASH	Flash chip failure.
	HW error: RTC	RTC circuit failure.
	HW error: AUDIO	Audio chip failure (excluding the audio PA and volume circuit).
	HW error: NET	Network chip failure.

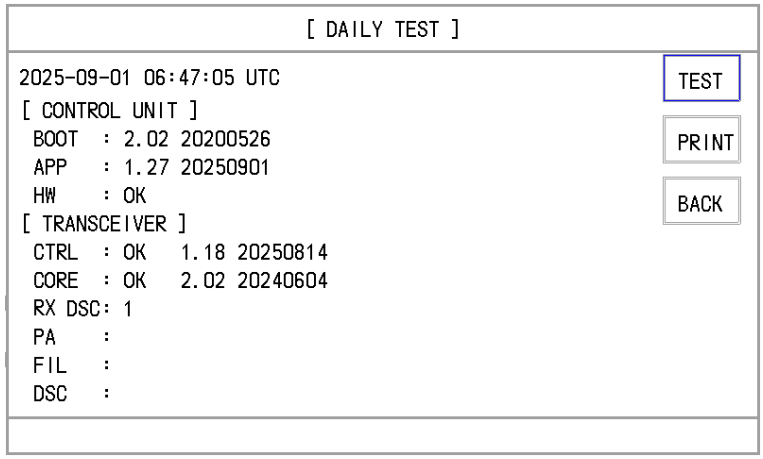
2.12.3 Daily Test



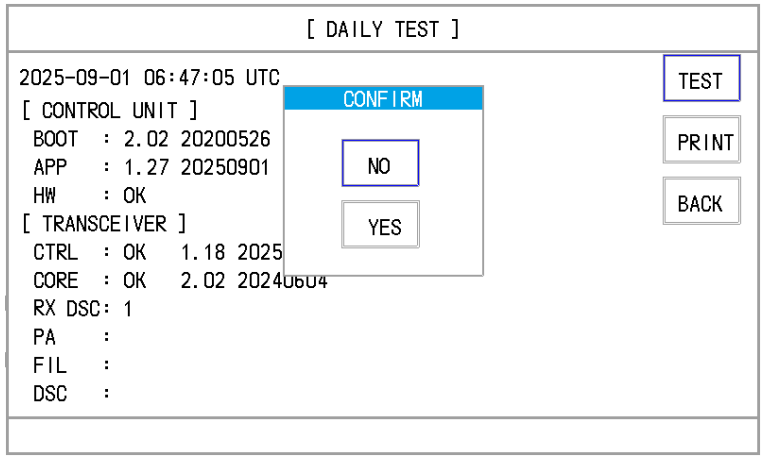
To do the DAILY TEST, click **[USER TEST]** on the **[USER]** screen.



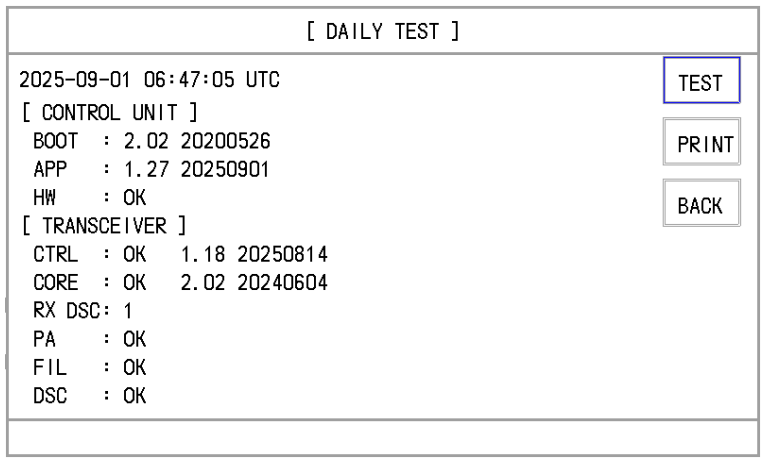
Click **[DAILY]** to open the **[DAILY TEST]** screen.



Click **[TEST]** and confirm "YES" to start the test of PA, FIL and DSC.



The test result is shown below:



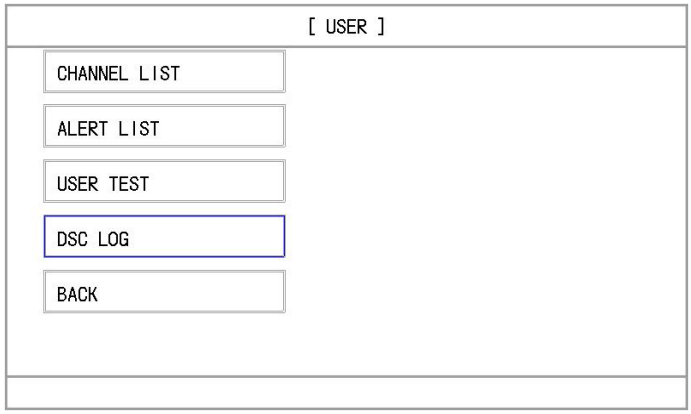
***Note*:**

HW: *If FLASH, RTC, AUDIO or NET is faulty, "FAIL" will be displayed.*
For example, if the audio chip is faulty (excluding the audio *PA and volume circuit), it will show "AUDIO FAIL".*

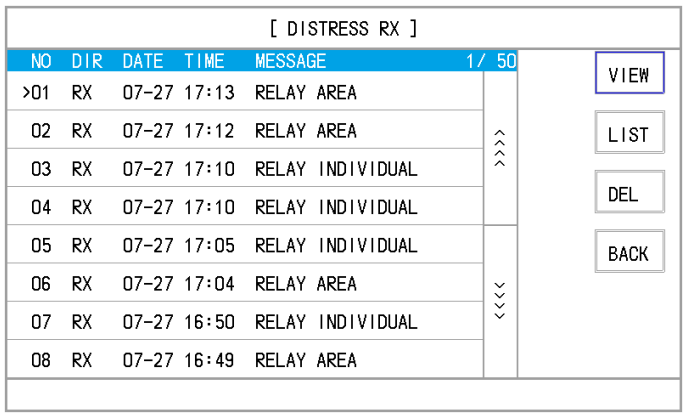
RX DSC: *Number of DSC received after startup, including all types of DSC received. If the number is 0, it will not be displayed.*

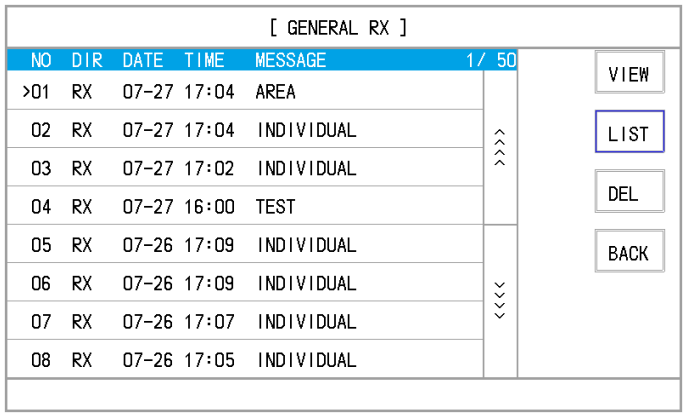
2.12.4 DSC Log

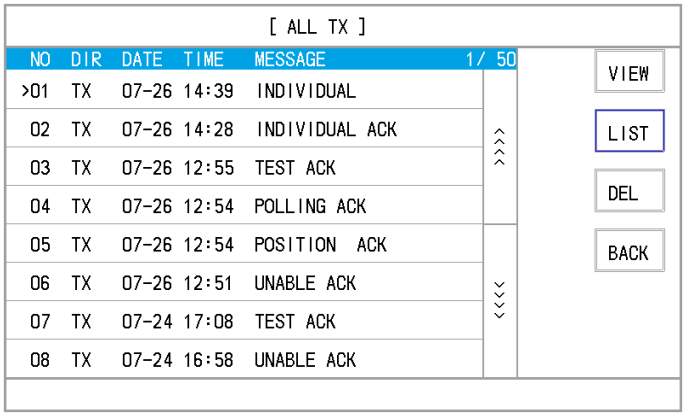
DSC log can also be checked at the **[USER]** menu.



Click [**DSC LOG**], and repeat click [**LIST**] to check the following screens:







3. SSB OPERATION

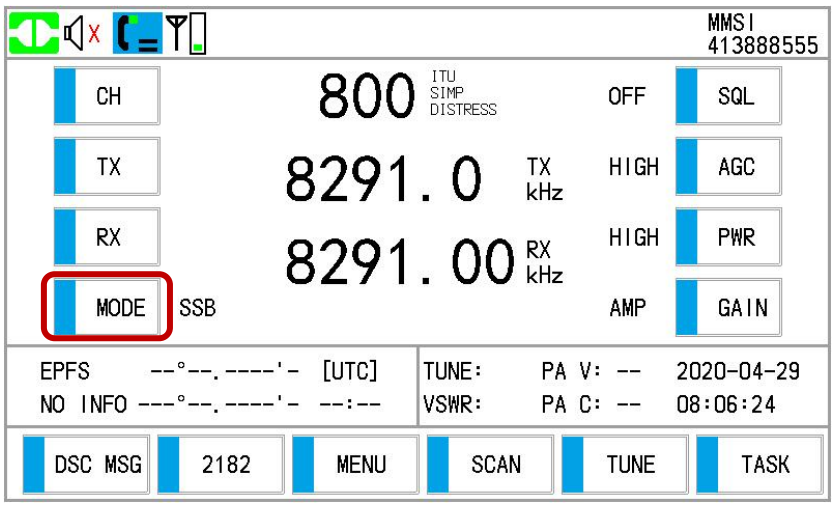
You can make a voice call at the SSB screen or from **[MAIN MENU]-[USER]-[CHANNEL LIST]-[CALL]**.

3.1 Type of Emission Selection

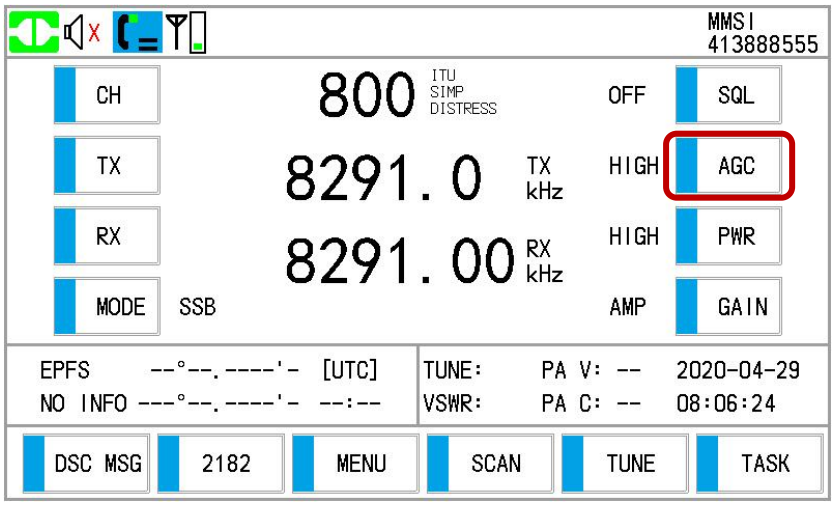
The type of emission can be selected among SSB (J3E), CW (A1A), etc., the default is [SSB].

At the SSB screen, proceed as follows:

① Click **[MODE]** to select the type of emission.



② Click **[AGC]** to select **[LOW]**, **[MID]** or **[HIGH]**.



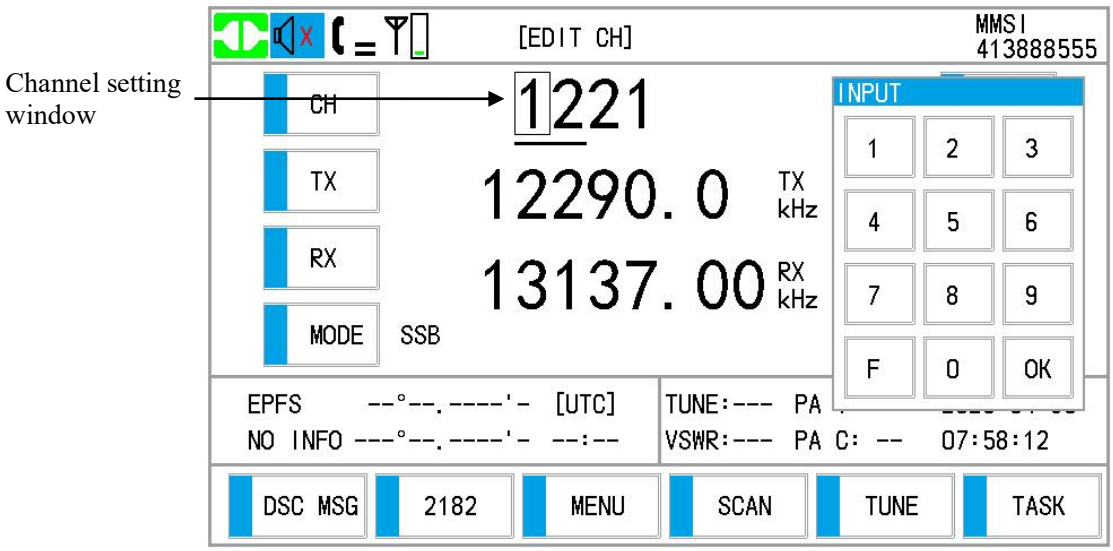
3.2 Channel & Frequency Selection

Select the channel or transmitting/receiving frequency to use for the SSB.

***Note*: To set the SSB radiotelephone to 2182 kHz/J3E, click [2182].**

3.2.1 Channel

① Click **[CH]**.

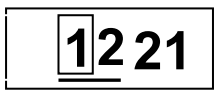


The channel can be entered by entering the number on the right. See below for details:

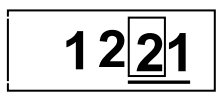
- Click the number to enter the channel, then click **OK**. Or

- Select band and band channel with the following knobs:

- Use the **PUSH TO ENTER** knob to place the cursor in the band or band channel position, whichever you want to change.

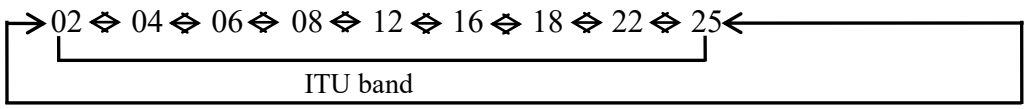


Cursor position for selection of band



Cursor position for selection of band channel

- Rotate the **PUSH TO PWR** knob to set band or band channel desired.



Setting Range
ITU Band (SSB, TLX): 2/4/6/8/12/16/18/22/25
ITU Band (CW): 2/4/6/8/12/16/18/22/25
ITU Channel (SSB): 00 - XX

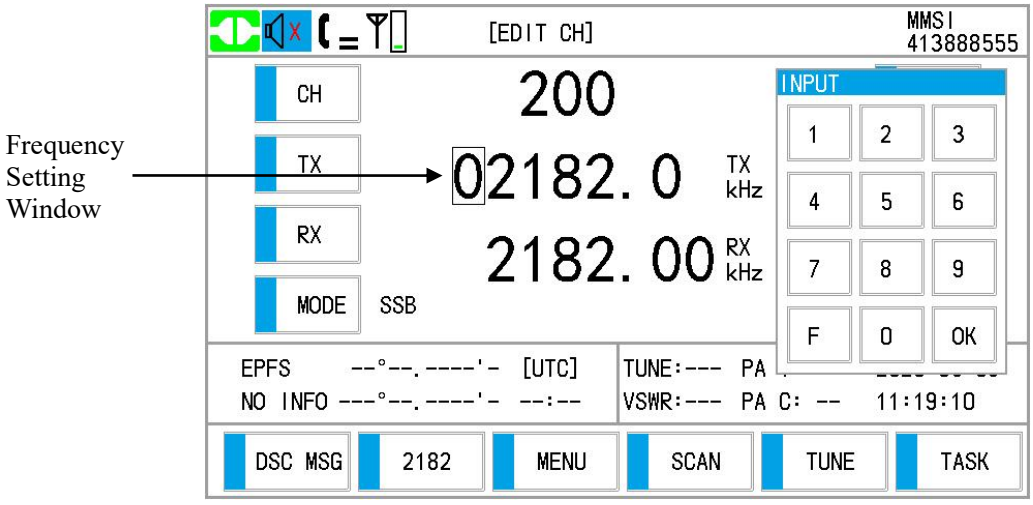
- Click **OK** or press the **PUSH TO ENTER** knob to close the setting window.

② Click [CH], rotate the **PUSH TO PWR** knob to adjust the previous channel or the next channel.

Note: When the power is turned off, the last setting of channel is stored. Therefore, when the power is turned on, the screen will display with the last channel before powered off.

3.2.2 Frequency

① Click **[TX]** or **[RX]**.



② Enter frequency by one of the methods below.

- Enter frequency with the numeric keys:
  Use the numeric keys to enter the frequency, then click **OK**. For example, to enter 2126 kHz, key in 0, 2, 1, 2, 6, 0. (Note: Keying in 2-1-2-6-0 sets 21260.0 kHz.)
- Select frequency with the **PUSH TO ENTER** knob:
  1) Rotate the **PUSH TO ENTER** knob to change the range which the frequency setting window covers.
  2) Click the desired number key to set the desired frequency.
  3) Click **OK** or press the **PUSH TO ENTER** knob to close the setting window.

***Note 1*: When TX and RX frequencies are different, enter TX first and then enter RX.**

***Note 2*: Click [RX], RX frequency can be adjusted in 100/10Hz step by rotating the *PUSH TO PWR* knob.**

3.3 Transmit

3.3.1 Transmitting Procedure

The maximum transmitting power can only be achieved when the antenna impedance and transmitter impedance match each other. Since the antenna impedance changes with frequency, antenna impedance matching with the transmitter impedance is done through the antenna coupler. The antenna coupler will automatically tune the transmitter to a wide range of different antenna lengths. The available range is;

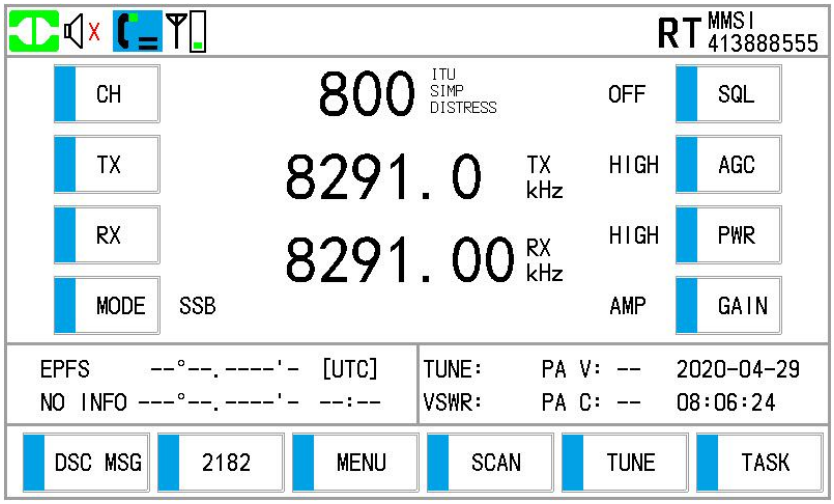
- Wire antenna 10 to 18 meters long (horizontal part)
- Whip antenna 8 meters long (Horizontal feeder is 2 meters or longer.)
- Whip antenna 10 meters long

To initiate the tuning, do the following:

① Click the **PTT** button on the handset. Tuning is automatically performed at the first transmission after the frequency is changed. For manual tuning, click **[TUNE]** on the SSB screen. If tuning fails, the message "**ERR**" appears and the output power is automatically set to **[LOW]**.

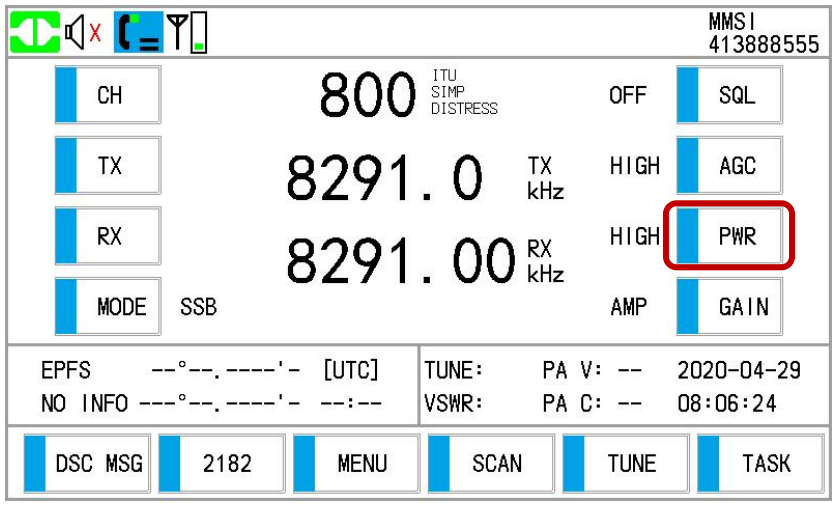
② Hold the handset close to your mouth, press the **PTT** button and speak clearly.

***Note*: "RT" appears to indicate a RT task when the PTT button is pressed. It will disappear after hanging up.**



3.3.2 Transmitting Power Setting

When using the transceiver in a harbor, near the shore or close to the communication partner (other ship), please reduce the transmitting power to minimize possible interference to other stations.
Click **[PWR]** to select **[HIGH]**, **[MID]**, or **[LOW]**.



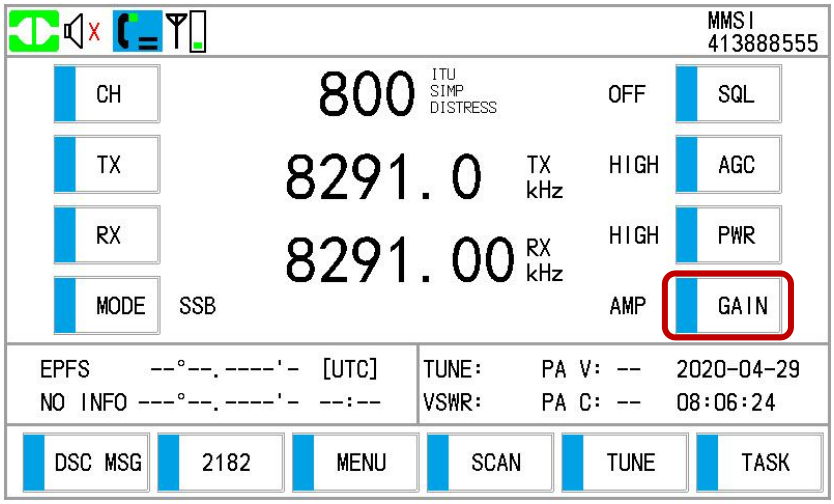
***Note*: The temperature of the PA (power amplifier) is monitored. When its temperature rises above a certain temperature, the output power is automatically reduced.**

3.4 Receive

Check whether the type of emission and receiving frequency are set properly or not. If necessary, set them again by referring to Section 3.1 and 3.2.

3.4.1 RF Gain Adjustment

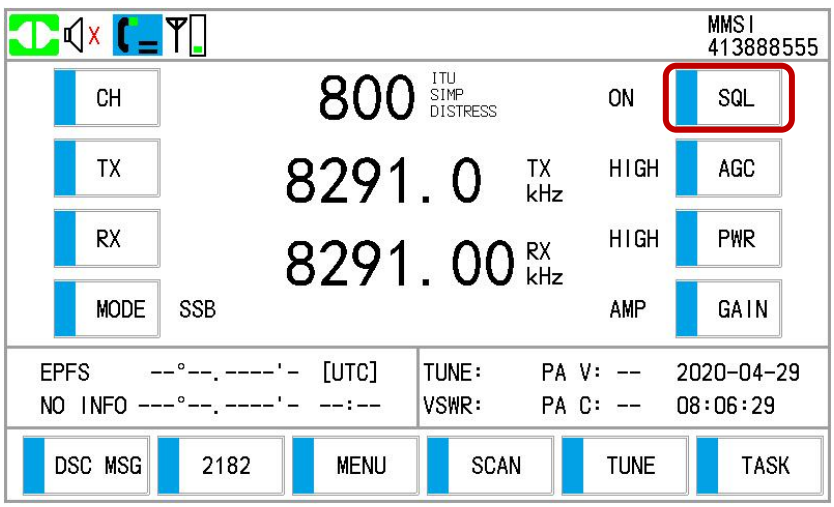
If the audio on the received channel is unclear or interfered with other signals, adjust RF gain to improve clarity. Click **[GAIN]** and select **[ATT]**, **[AMP]** to adjust gain.



3.4.2 Squelch

- **Squelch on/off**

The squelch mutes the noise output in the absence of an incoming signal. Click **[SQL]** to alternately turn squelch on and off on the SSB screen. When radio noise is too jarring during standby condition, it can be muted by activating the squelch, and **ON** is displayed on the SSB screen.



- **Squelch threshold**

Please refer to Section 2.9.3.5.

***Note**: While using the handset for communication, press the **PTT** button to talk and release it to listen.*

4. DSC OPERATION

4.1 DSC Description

DSC (Digital Selective Calling) is an important mean for emergency calls at sea. It's a part of GMDSS (Global Maritime Distress and Safety System) set by IMO (International Marine Organization).
DSC should be primarily used for distress, urgency and safety call and response to such calls, in addition, it can be used for general service between ship to ship and ship to shore station.
For DSC distress, urgency and safety callings in the MF and HF bands, the frequencies are 2187.5, 4207.5, 6312.0, 8414.5, 12577.0, and 16804.5 kHz.

DSC Category (Priority)
Distress
Urgency
Safety
Routine

DSC Type (Format)
Distress Alert (ACK / Relay)
Group Call
Area Call
Individual Call (ACK)

4.1.1 DSC Message

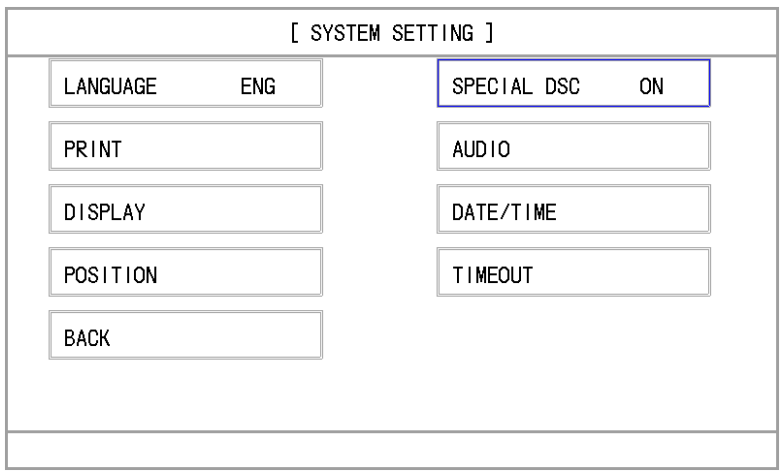
Normally, the contents of a DSC call include Calling category, Station ID (MMSI), Priority, Communication mode, Communication frequency, Position, DSC frequency, and End code.

- **Calling category**

DSC calls are roughly divided in two groups: distress messages and general (urgency, safety and routine) messages. Below are the types of DSC messages.

Call category	Call
DISTRESS	DISTRESS ALERT, DISTRESS RELAY AREA, DISTRESS RELAY INDIVIDUAL, DISTRESS ACK, DISTRESS RELAY ACK
GENERAL	MEDICAL MSG*, NEUTRAL MSG*, INDIVIDUAL MSG, TEST MSG, GROUP MSG, AREA MSG, POSITION MSG, POLLING MSG

*SPECIAL MSG: To send these messages, set **[SYSTEM SETTING]** - **[SPECIAL DSC]** to **[ON]**.



- **Station ID (MMSI)**

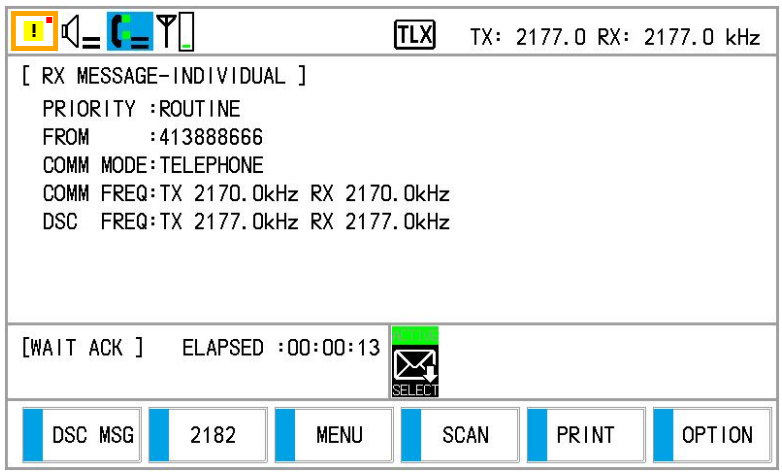
Ship station ID: MIDxxxxxx
Coast station ID: 00MIDxxxx
Group ID: 0MIDxxxxx
Above, MID (Maritime Identification Digits): Country code, x…x: Digital number.

- **Priority**

Distress: In grave and imminent danger and request immediate assistance.
Urgency: A very urgent call concerning safety of ship, aircraft or other vehicle or safety of person.
Safety: A call containing an important navigational or meteorological warning.
Routine: General calling.

- **Communication mode**

TELEPHONE(TP): Telephone (J3E) by SSB radiotelephone
ARQ*: Telex (J2B) mode ARQ via NBDP Terminal Unit
FEC*: Telex (J2B) mode FEC via NBDP Terminal Unit
*: NBDP terminal unit is required.



- **Communication frequency**

COMM FREQ: Subsequent working frequency used to call by SSB radiotelephone or NBDP. The sending station may have the receiving station (ship or coast station) assign the frequency to use.

- **Position**

POSITION: Position can be automatically or manually set. The own ship's position (LAT/LON) is sent with four decimal places automatically in case of the distress alert.

- **DSC frequency**

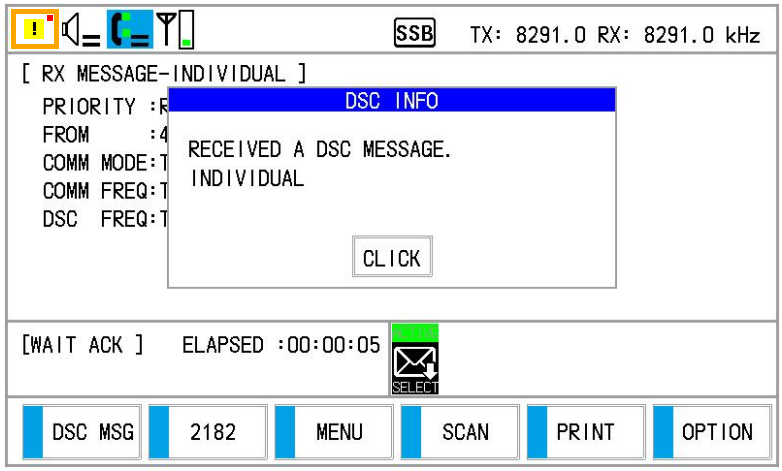
DSC FREQ: DSC frequency which to be used. If the call priority is DISTRESS, URGENCY or SAFETY, select a DSC distress frequency.

- **End code**

The end of a DSC call is indicated with "EOS" (acknowledgement, acknowledgement required, no acknowledgement required).

4.1.2 Audio Alarms

When you receive a distress alert or general call addressed to own ship, the audio and visual alarms are released. The audio alarm can be silenced with any key on the SSB screen or **CLICK** on **[DSC INFO]**.



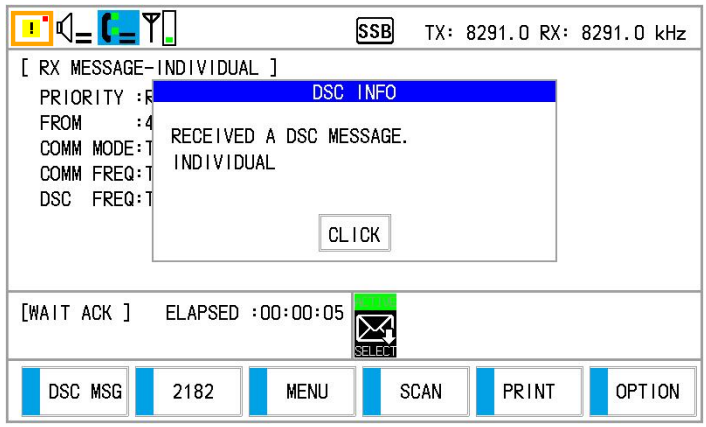
Alarm	Frequency (interval)
Distress Count Down	2000Hz 500ms, Silence 500ms
Two Tone (Distress)	2200Hz 250ms, 1300Hz 250ms
Distress Ack	2200Hz 500ms, 1300Hz 500ms
Urgency	2200Hz 250ms, Silence 250ms
Urgency Ack	2200Hz 500ms, Silence 500ms
General (Routine, Routine Ack)	750Hz 50ms, 650 Hz 50ms
Warning	2000Hz 250ms, 1500 Hz 250ms
System Alarm	2000Hz 250ms, Silence 250ms

4.1.3 DSC Call Screens

4.1.3.1 RX calls

Distress alert:

Individual call:



The marks "*", "-" appear on the DSC receiving screen in the following conditions:

- "*" indicates a corrupt character in received data.
- "-" indicates missing digits after the decimal point when receiving position data with no information for expansion (expansion: digits after the decimal point).

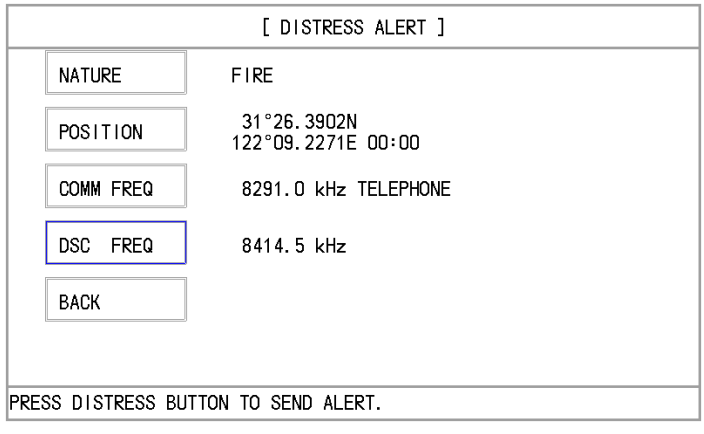
Examples:

1) When receiving position data without expansion, the indication is "LAT: 12°34'N".
2) When receiving position data with expansion, the indication is "LAT: 12°34.5678'N".
3) When receiving position data with no information for expansion, the indication is "LAT: 12°34.----'N".

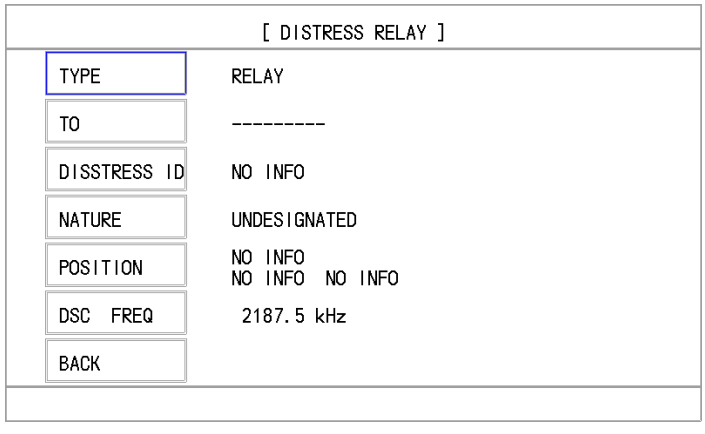
The contents of other types of RX calls are similar to those of the individual call.

4.1.3.2 TX calls

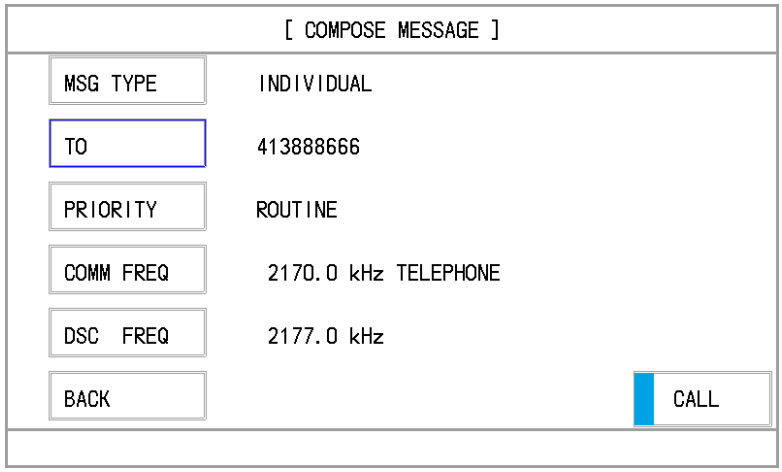
Distress alert:



Distress relay call:



Individual call:

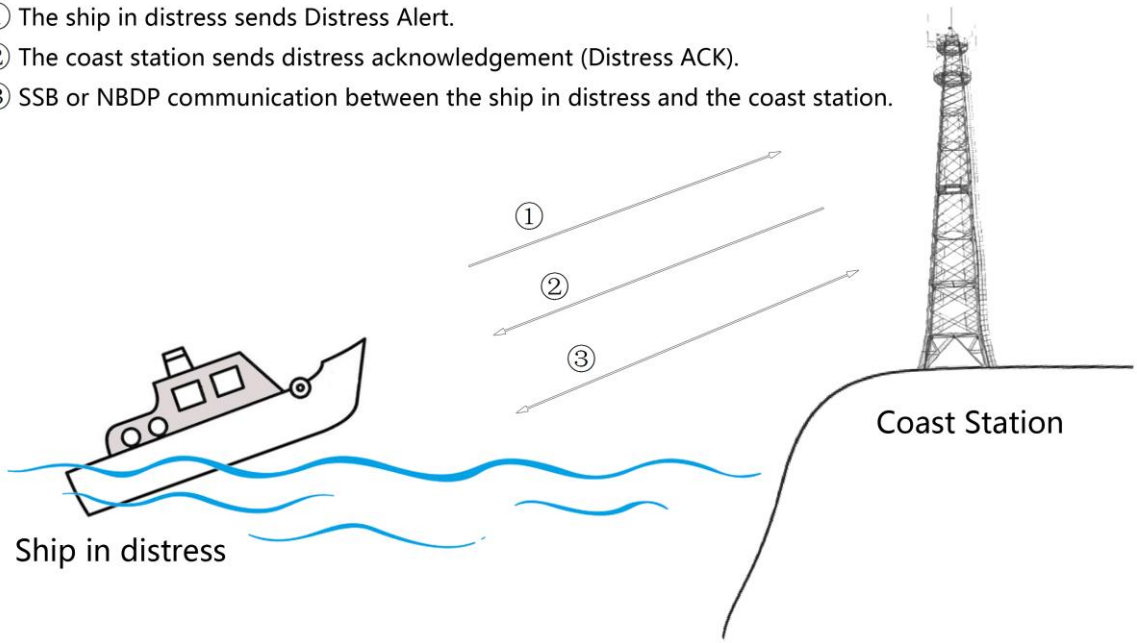


The contents of other types of TX calls are similar to the above.

4.2 DSC Distress Operation

Distress operation overview:

① The ship in distress sends Distress Alert.
② The coast station sends distress acknowledgement (Distress ACK).
③ SSB or NBDP communication between the ship in distress and the coast station.



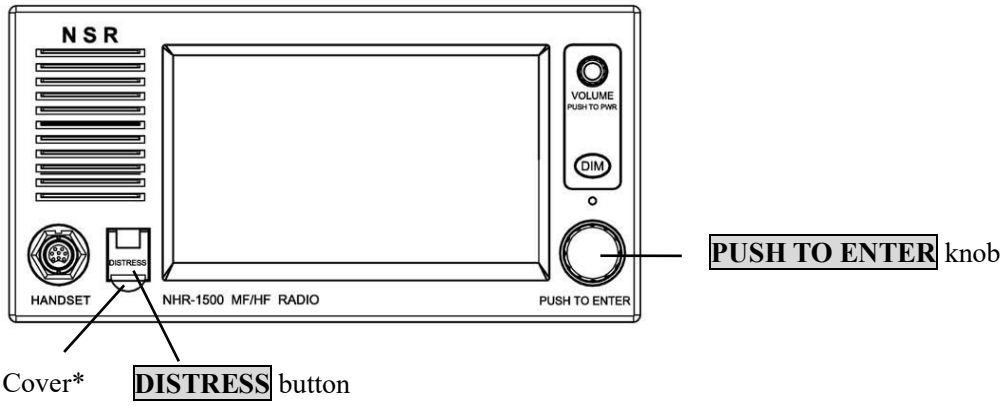
When own ship is in distress:

① Press the **DISTRESS** button to send a distress call.
② Wait for the distress alert acknowledgement.
③ Communicate with the coast station.

4.2.1 Send a Distress Call

4.2.1.1 By DISTRESS button with distress information not edited

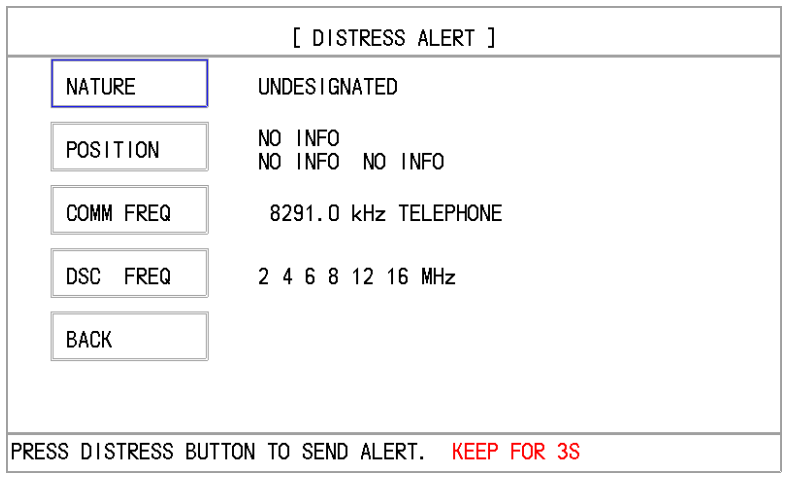
(1) Open the cover of **DISTRESS** button, then press and keep the **DISTRESS** button for 3 seconds.



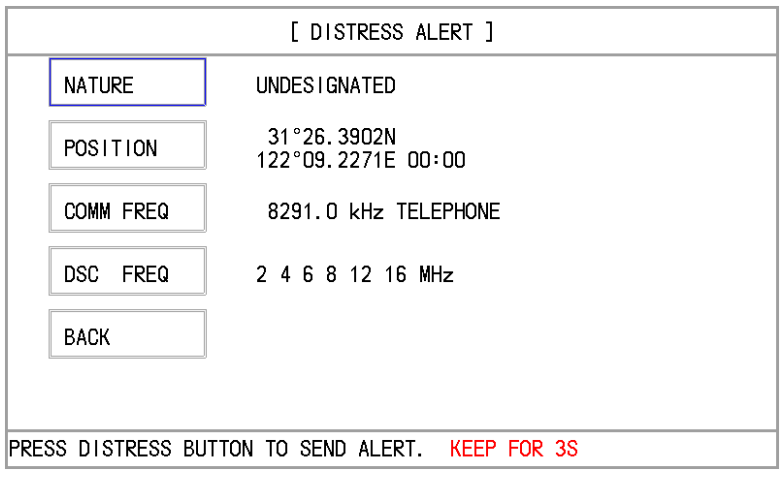
*: The **DISTRESS** button is covered to prevent false alarms.

The audio alarm sounds while pressing the button, and the button flashes. The countdown message appears on the screen while pressing the **DISTRESS** button (3S → 2S → 1S). For example:

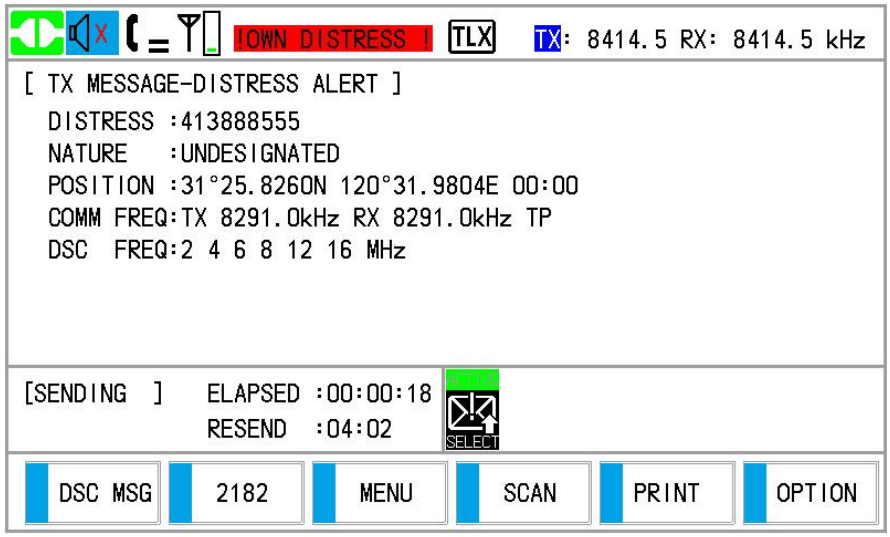
No position information:



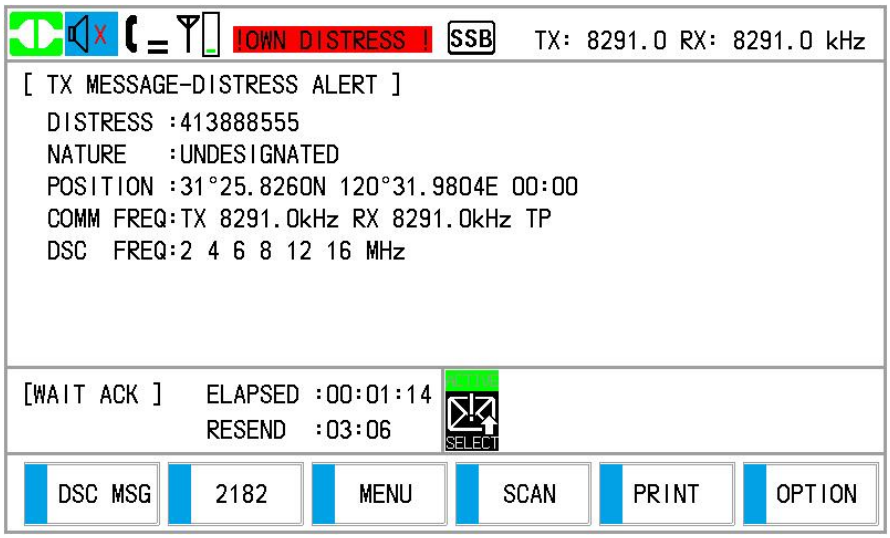
With position information:



Press the **DISTRESS** button after the countdown shows 1S, the distress call is sent. The audio alarm sounds for two seconds and the message "!OWN DISTRESS!" appears. The screen shows the contents of the distress alert call. The **DISTRESS** button flashes and only the icon for DISTRESS transmission ( ) is displayed in the tab area.



(2) After the distress call has been sent, the screen changes as follows. Wait to receive the distress acknowledgement call from a coast station. The elapsed time since transmission is displayed. At this time, the icons for other DSC received messages except the distress acknowledgement call are not displayed. You can only confirm them in the DSC log.



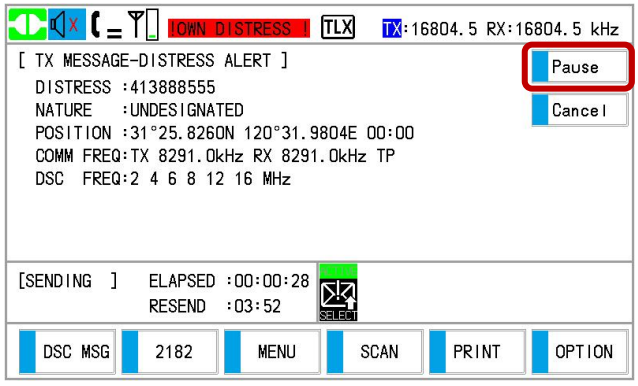
***Note**: The equipment automatically re-transmits the distress alert after 3 min 30 seconds to 4 min 30 seconds if doesn't receive the distress acknowledgement call. Then awaits the distress acknowledgement call. This is repeated until the distress call is acknowledged.*

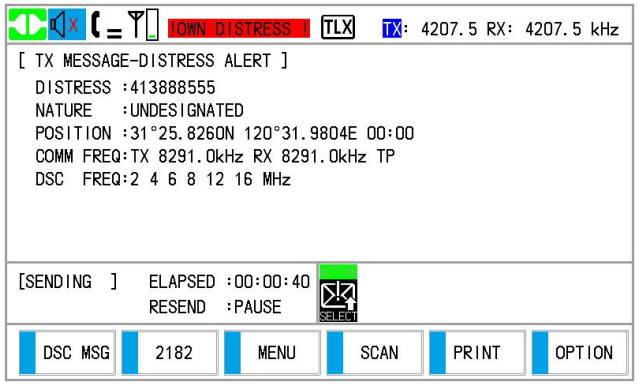
(3) Click **[OPTION]**, you can temporarily stop the countdown during next retransmission by selecting **[PAUSE]** in the user options area. **[Pause]** is displayed instead of the countdown indication at **[RESEND]** indication.
To restart, click **[OPTION]** again, **[Pause]** indication changes to **[Start]**, select **[Start]**. The countdown restarts.
You can also cancel the sending/resending by clicking **[Cancel]**.

For example:

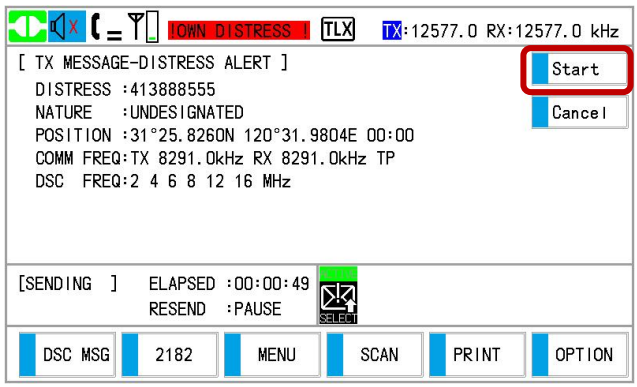
During sending

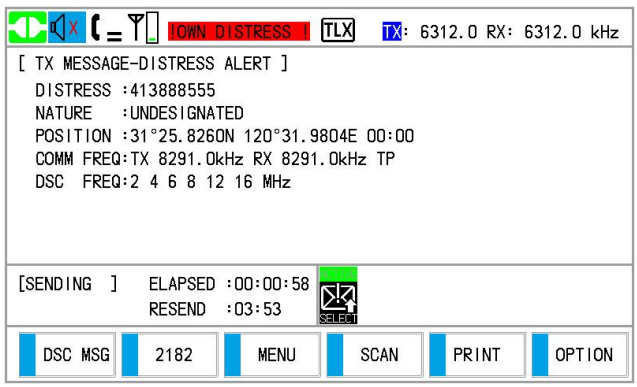
① **[OPTION]- [Pause]:**





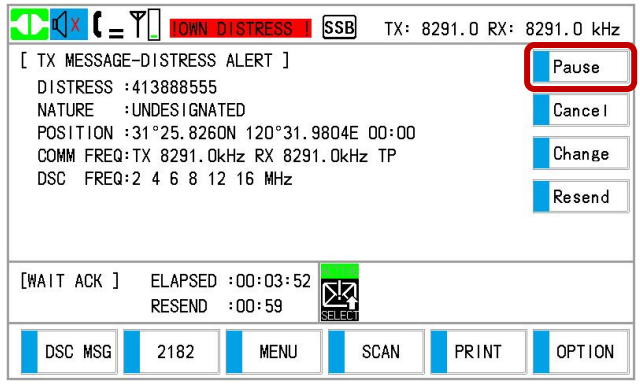
② **[OPTION]- [Start]:**

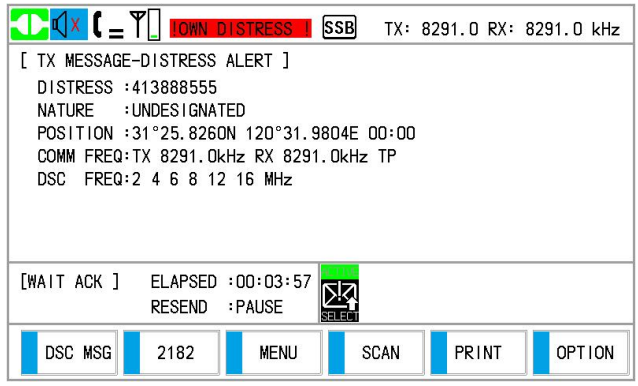




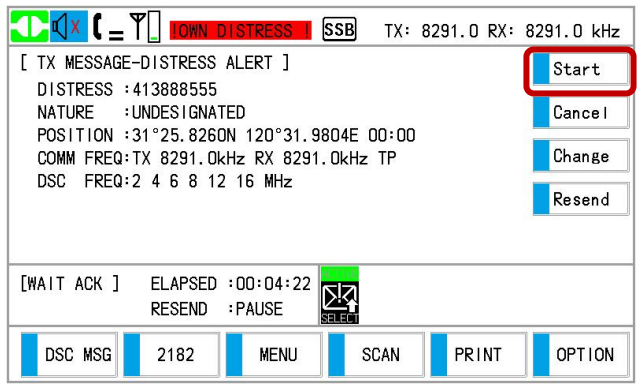
During waiting acknowledgement

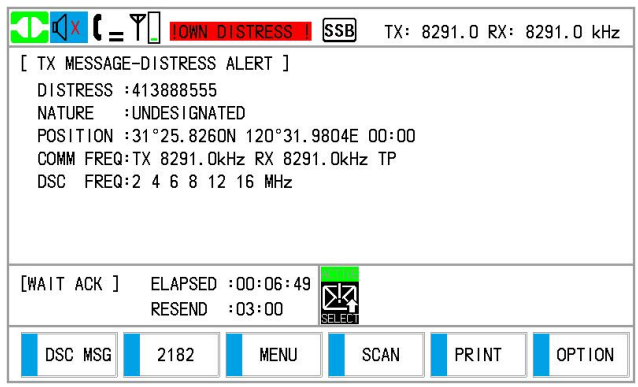
① **[OPTION]- [Pause]:**



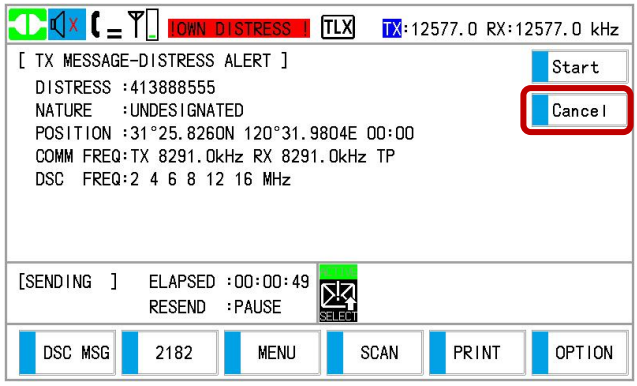


② **[OPTION]- [Start]:**

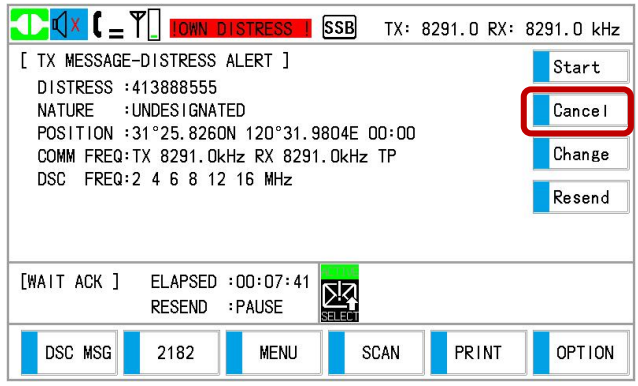




③ **[OPTION]- [Cancel]**:



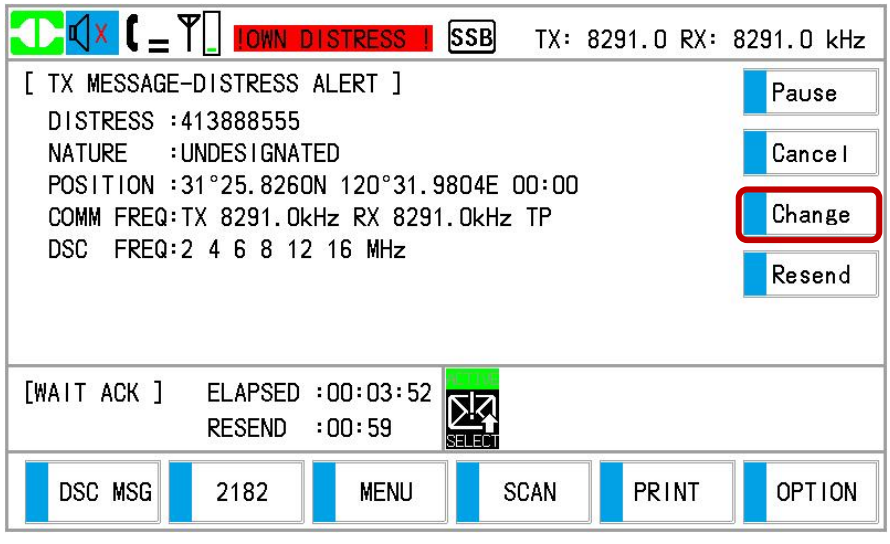
③ **[OPTION]- [Cancel]**:

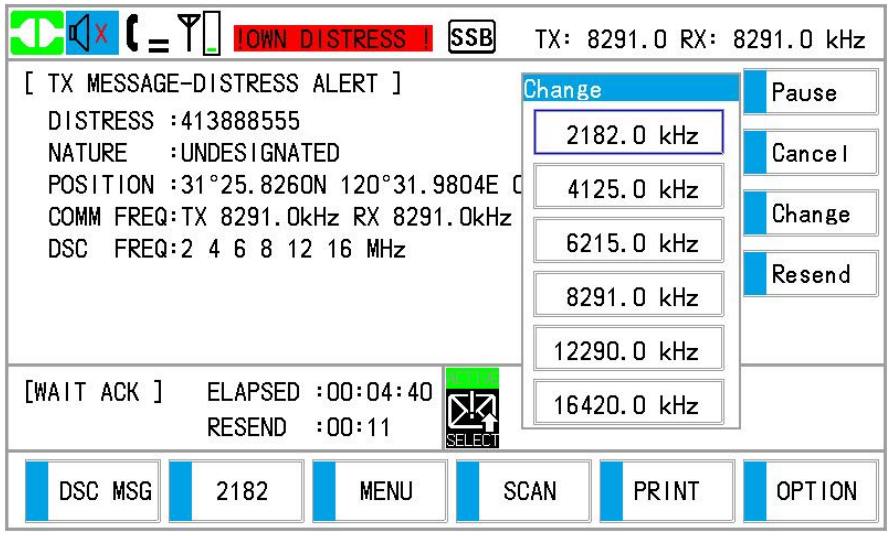


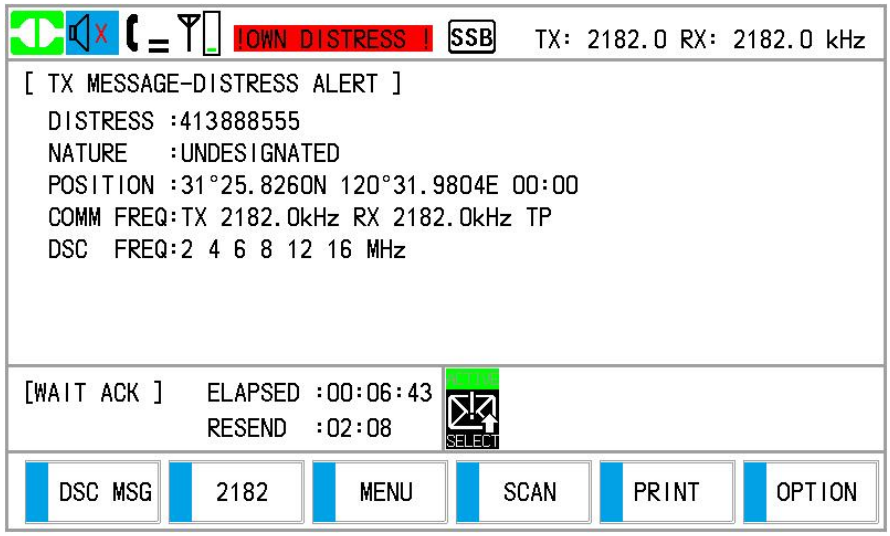
Please see the details in Section 4.2.4 - Cancel a Distress Call.

(4) During waiting acknowledgement, you can also change the follow-up communication frequency.

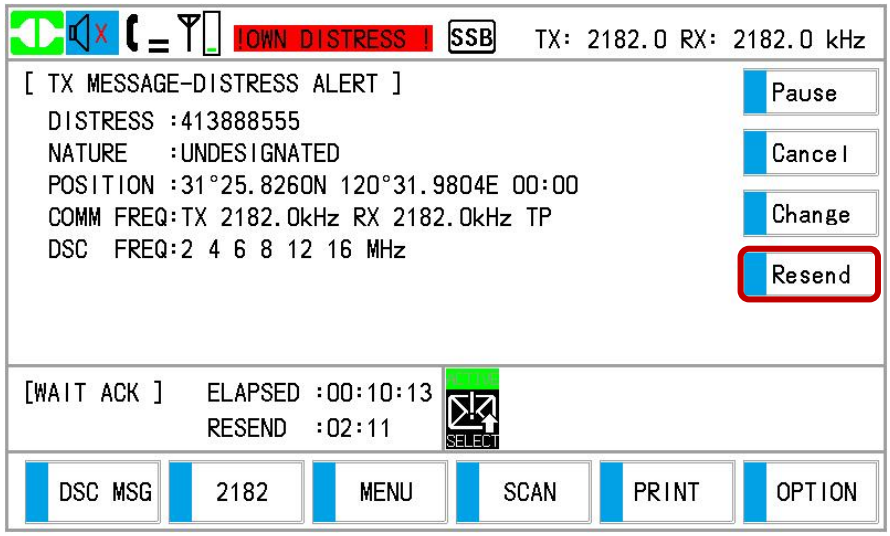
For example: Click **[OPTION]-[Change]-[2182.0 kHz]**to change the SSB TX/RX frequency to 2182.0 kHz.

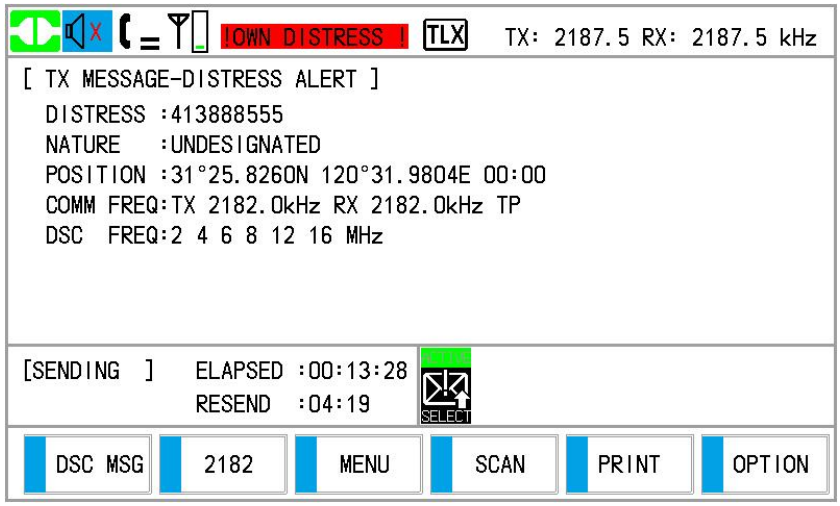






(5) You can also click **[Resend]** to resend the distress call on 2/4/6/8/12/16 MHz.





Also, you can re-send the distress alert manually by pressing the **DISTRESS** button for 3 seconds.

(6) When the distress acknowledgement call is received, the audio alarm sounds, the LED of **DISTRESS** button flashes and the icon for DISTRESS ACK received ( ) appears. The screen changes as follows.

① Click **CLICK** to silence the audio alarm. Then, the **DISTRESS** button stops flashing, and the pop-up message disappears.

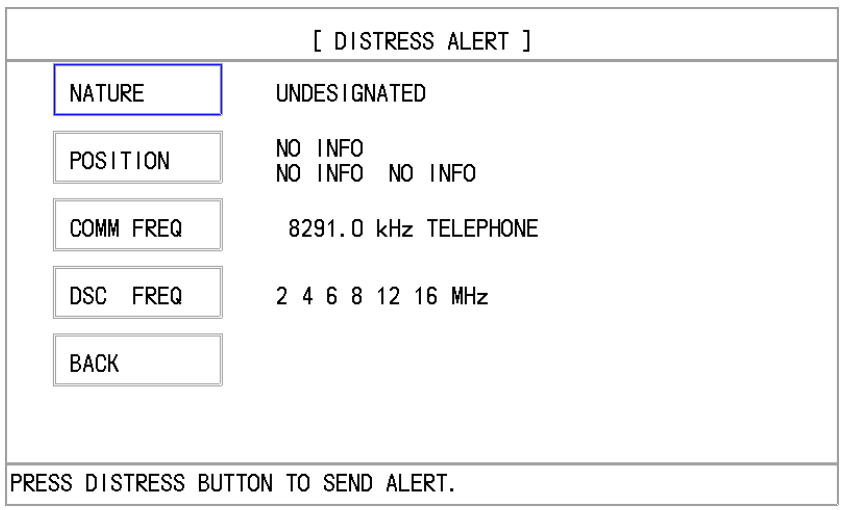
② Communicate with the coast station via radiotelephone, following the instructions below. If the distress alert was sent using the MULTI mode, the radiotelephone automatically sets the working frequency on which the distress acknowledgement call is first received.

- Say “MAYDAY” three times.
- Say “This is ...” name of own ship and call sign three times.
- Give nature of distress and assistance needed.
- Give description of own ship (type, color, number of persons onboard, etc.).

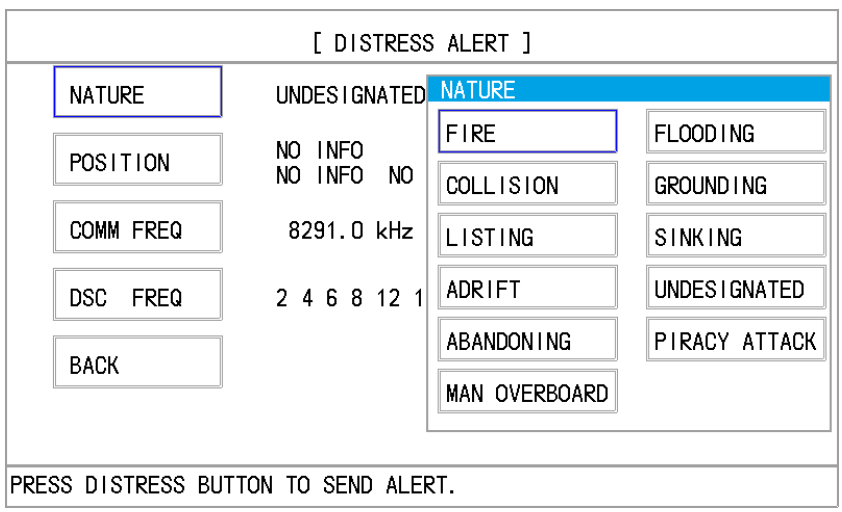
4.2.1.2 Send a distress call by DSC MSG with distress information edited

If you have a time to prepare the distress message, send the distress call as follows:

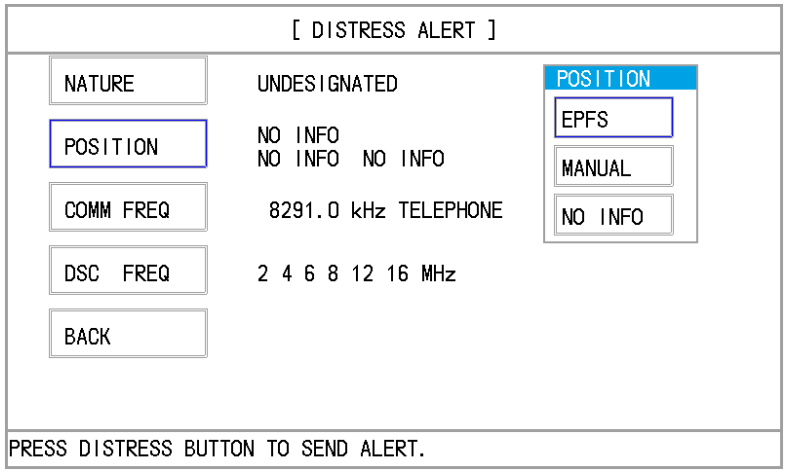
① Click **[DSC MSG]**, or click [**MENU**] and choose **[DSC]** – **[MESSAGE]**, then click **[DISTRESS ALERT]** in **[MESSAGE]**.



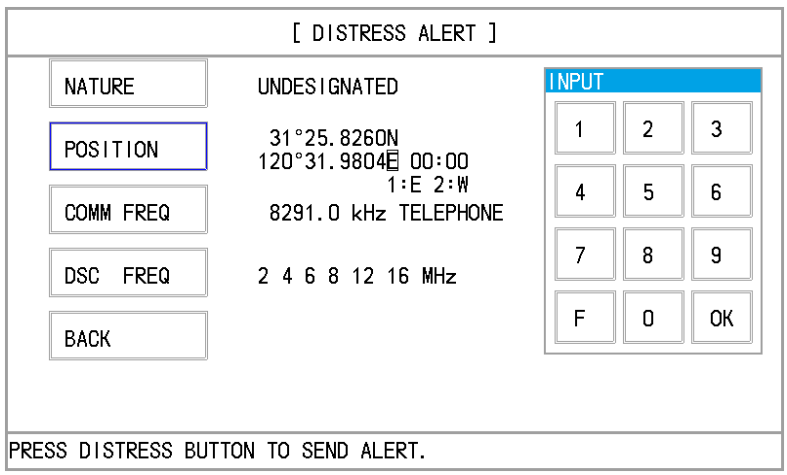
② Click [**NATURE**] to select nature of distress, among the following 11 selections.



③ Click **[POSITION]**, select **[EPFS]**, **[MANUAL]** or **[NO INFO]** in pop-up window.
[EPFS]: The position information from EPFS is automatically shown.
[MANUAL]: Input your position manually.
[NO INFO]: No information.
For **[MANUAL]**, go to step ④. For others, go to step ⑤.

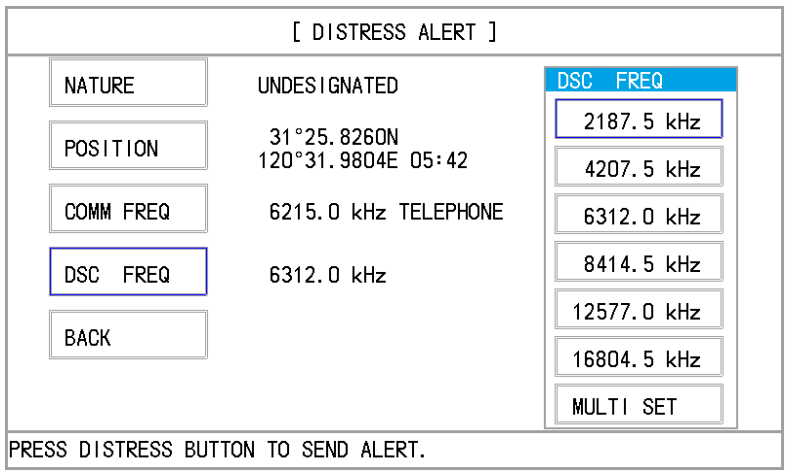


④ Use the numeric keys to enter latitude/longitude of your position, and UTC time. To change coordinate, click **1** for North or East, **2** for South or West.
After enter each data, click **OK**.



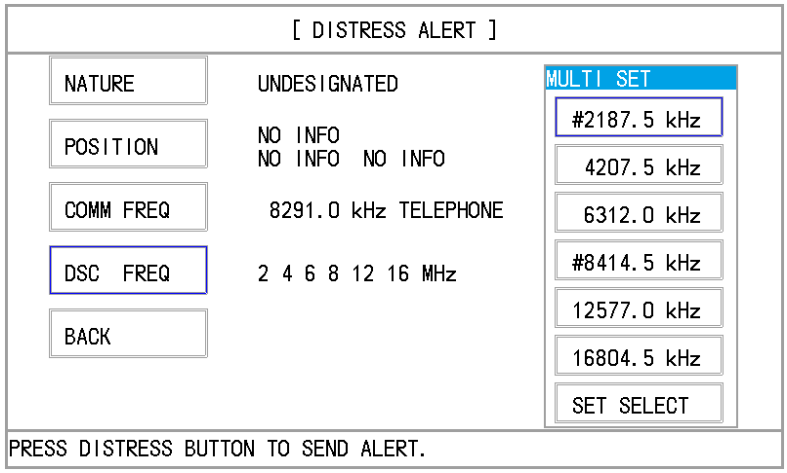
⑤ If you want to select the desired DSC frequency, click **[DSC FREQ]** or rotate the **PUSH TO ENTER** knob to select **[DSC FREQ]** then push the knob, select the single DSC frequency or the multi frequencies.

- **Single frequency**: You can transmit on the distress frequency of your selection. Select one frequency among 2 MHz, 4 MHz, 6 MHz, 8 MHz, 12 MHz and 16 MHz. Then **[COMM FREQ]** changes to the same pair frequency as the DSC frequency automatically.

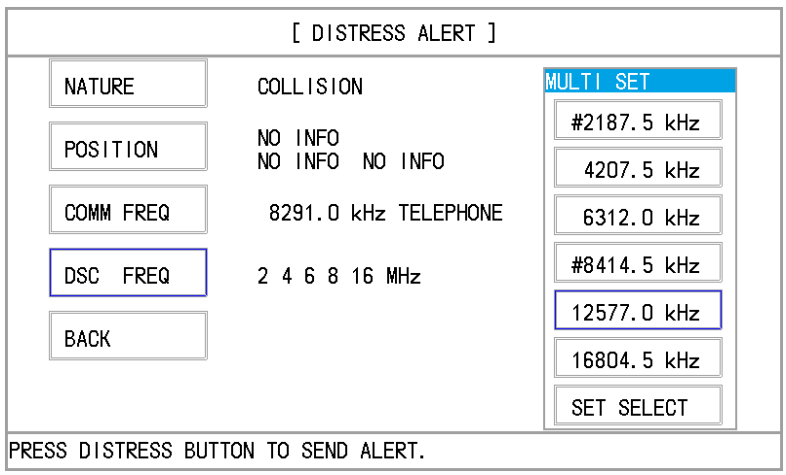


- **Multi frequencies**: Transmit the distress alert on three to six frequencies (in numerical order), which you can

select among 2 MHz, 4 MHz, 6 MHz, 8 MHz, 12 MHz and 16 MHz. 2 MHz and 8 MHz are automatically selected and cannot be excluded.

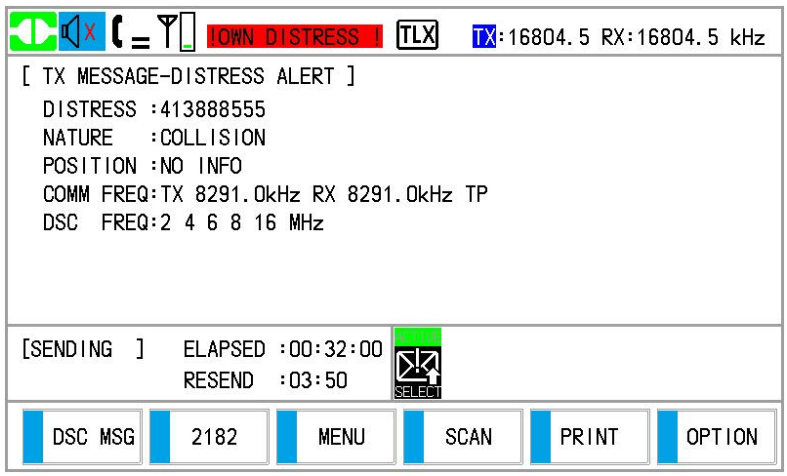


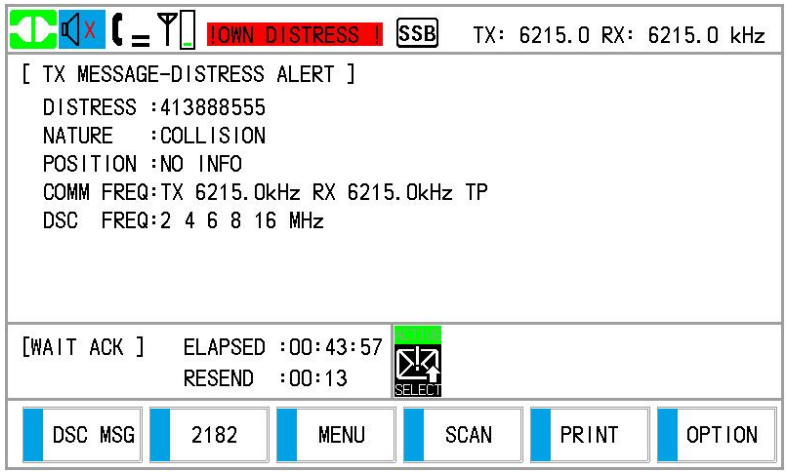
Click the frequency to select or deselect and click **SET SELECT** to confirm. Each clicking displays (selected) or removes (deselected) the frequency in **[DSC FREQ]** area.



If you keep all six DSC frequencies, transmit the distress alert in this sequence:
1st: 2 MHz, 2nd: 8 MHz, 3rd: 16 MHz, 4th: 4 MHz, 5th: 12 MHz and 6th: 6 MHz.
[COMM FREQ] is 8MHz while multi set.

⑥ Press and keep the **DISTRESS** button for 3 seconds to send the distress alert and wait for the acknowledgement. This operation is the same as Section 4.2.1.1.



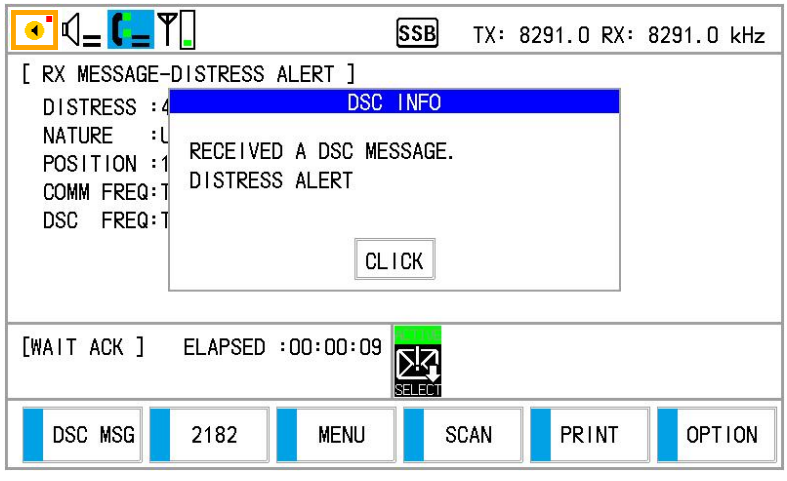


⑦ When the distress acknowledgement call is received, use the telephone or telex to communicate with the coast station. For NBDP, follow the procedure in "NBDP operation manual". For SSB, please refer to Section 4.2.1.1 (6). If you selected multi frequencies at step ⑤, you can communicate via telephone, on the communication frequency which the distress acknowledge is first received.

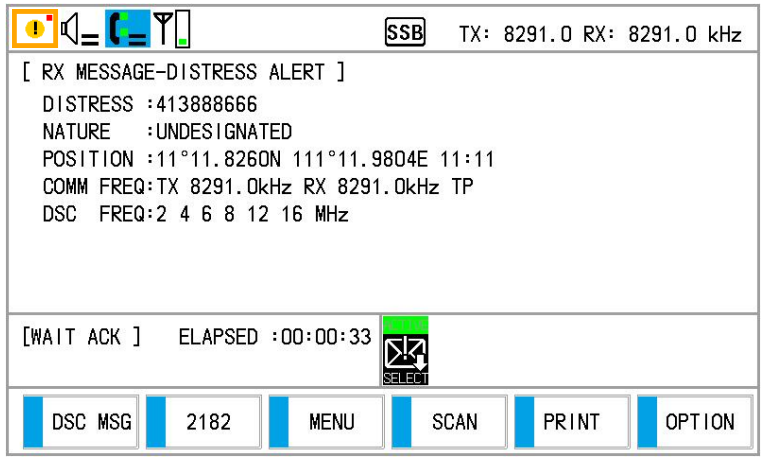
If it is necessary to change the frequency, refer to Section 4.2.1.1 (4).

4.2.2 Receive a Distress Call

When you receive a distress call from a ship in distress, the audio alarm sounds, and the LED of the **DISTRESS** button flashes. The icon for DISTRESS receiving ( ) appears in the tab area. The DSC frequency that received the distress call is listed one by one.



Click **CLICK** to silence the audio alarm. Wait for the distress acknowledgement from a coast station.



If you do not receive the distress acknowledgement from a coast station in about 3 minutes after receiving a distress call, please follow the flow charts in this section to determine your action.

***Note**: An asterisk (*) appearing in a distress alert message indicates an error at the asterisk's location.*

4.2.2.1 Action for receiving distress call on MF band

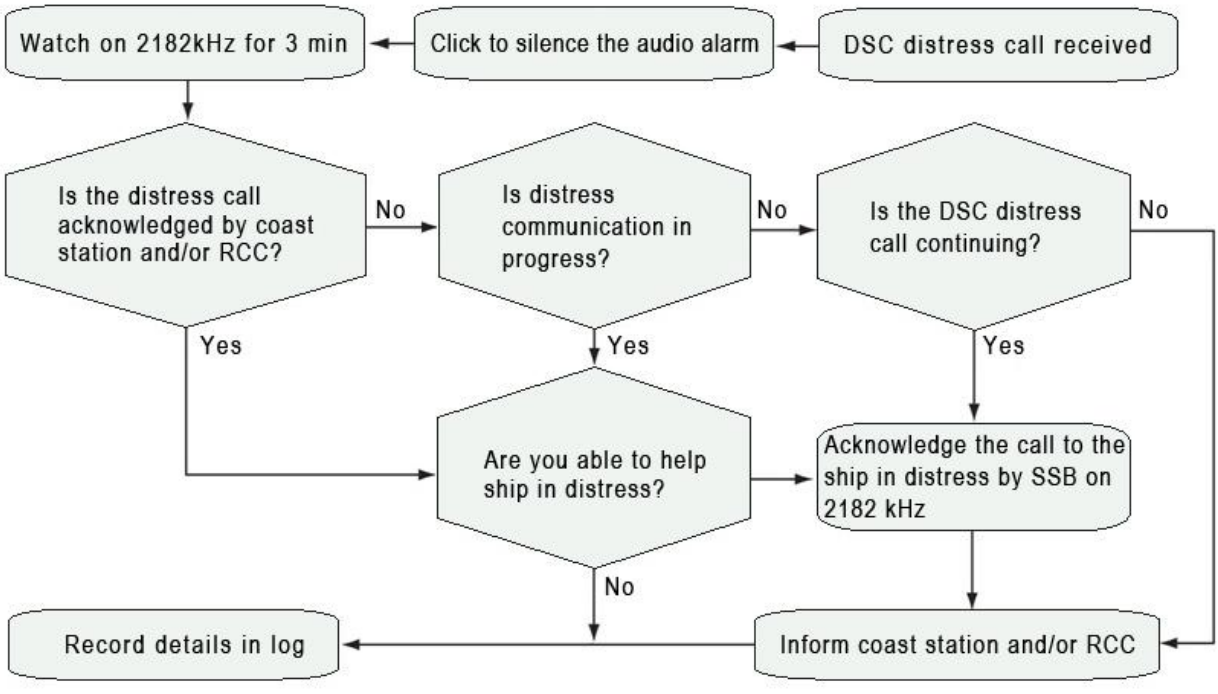
After receiving a distress call on MF band, do the following steps:

(1) Continue watching on 2182 kHz. Wait for the coast station to acknowledge the distress call. Watch until "SEELONCE FINI" is announced.

(2) If multiple DSC distress calls are received from the same ship in distress and it is near own ship, communicate with RCC or coast station and send distress acknowledgement (see step (4)) to the ship in distress under the direction of RCC or coast station.

(3) Watch on the distress frequency.

Flow chart of action for ship receiving DSC distress call on MF band:



***Note**: You must wait at least 3 minutes before you can acknowledge the distress call so that the coast station has time to send a distress acknowledgement.*

(4) Send the DSC distress acknowledgement to the ship in distress (on MF band):
You can transmit the distress acknowledgement to the ship in distress only when you do not receive it from a coast station and you are able to aid the ship in distress. First, contact the ship in distress over SSB radiotelephone.

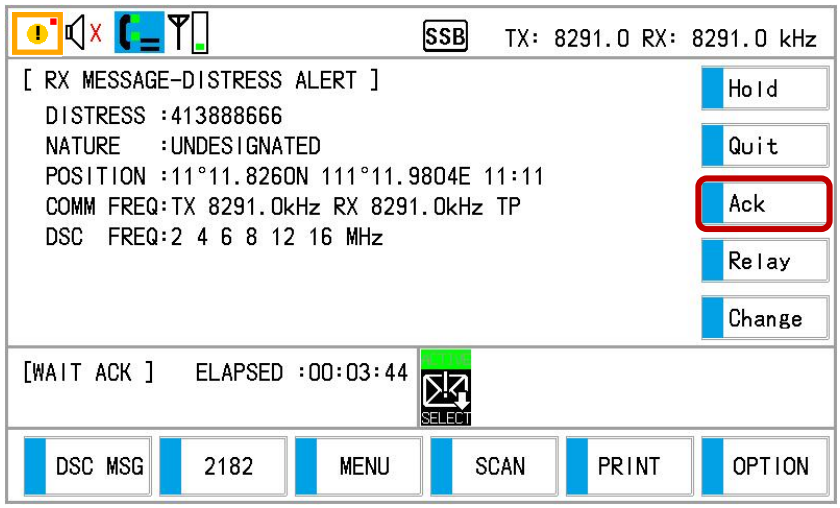
Send acknowledgement on MF band as follows:

① When you received a distress call, click **CLICK** to silence the audio alarm and stop the flashing of the LED.

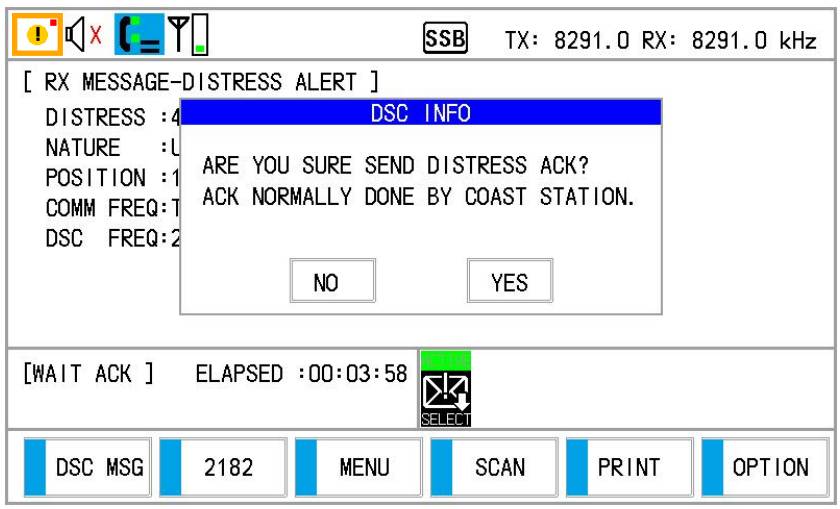
② Wait 3 minutes after receiving a distress call.

③ If you do not receive the distress acknowledgement from a coast station and you have received the distress call more than twice, contact the ship in distress over SSB radiotelephone.

④ Click **[OPTION]**, select [**Ack**].



⑤ The following message appears on the screen.



⑥ Click **YES** to transmit the distress acknowledgement to the ship in distress.

***Note*: You can not edit the message for the distress acknowledgement.**

4.2.2.2 Action for receiving distress call on HF band

After receiving a distress call on HF band, do the following steps:

(1) Watch on the distress frequency.

(2) Wait 3 minutes after receiving a distress call.

(3) Relay the distress call in the following cases:

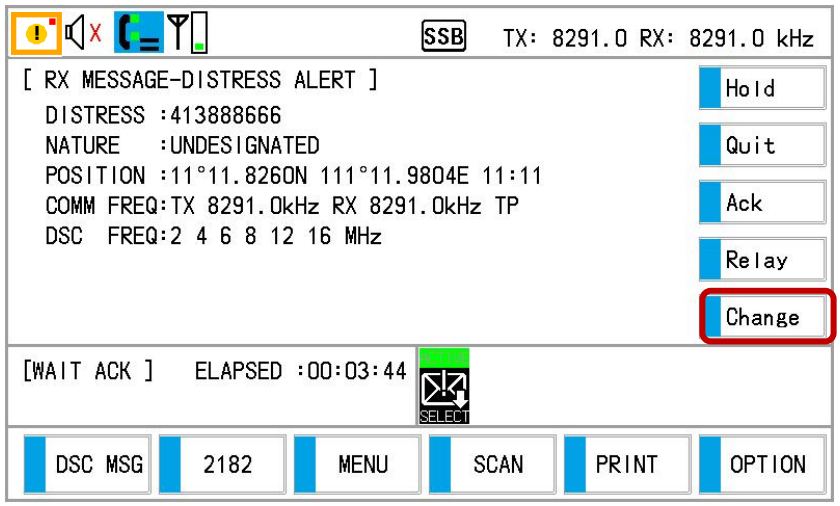
- You have not received a distress acknowledgement from a coast station within 3 minutes after receiving a distress call.
- You have not received a distress relay from other ship.
- You cannot receive distress communications from other ship over radiotelephone.

(4) The ship relaying the distress call should establish communications with the station controlling the distress as directed and provide such assistance as required and in an appropriate manner.
For relay operation, see step (7).

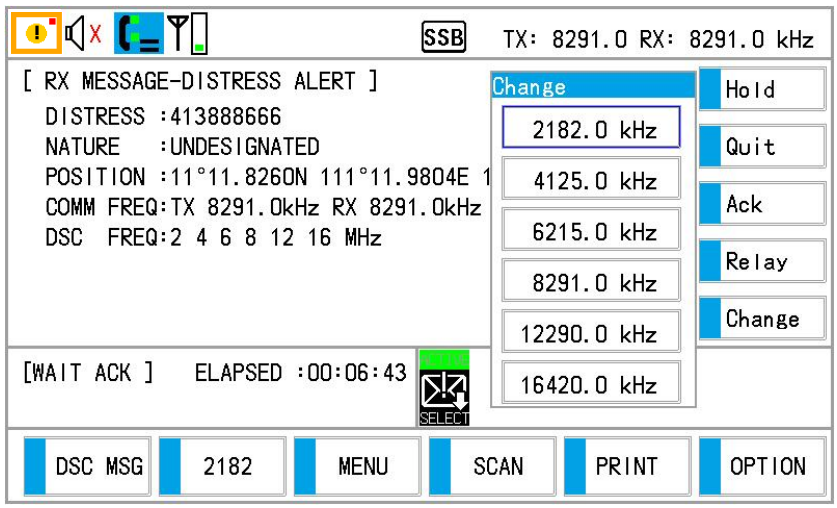
(5) If it is clear the ship or person in distress is not near own ship and/or other vessels are in a better position to provide assistance, then you should avoid redundant communications that may interfere with search and rescue activities.
Details should be recorded in the log.

(6) When the received distress frequency is different from the current communication frequency, do the following:

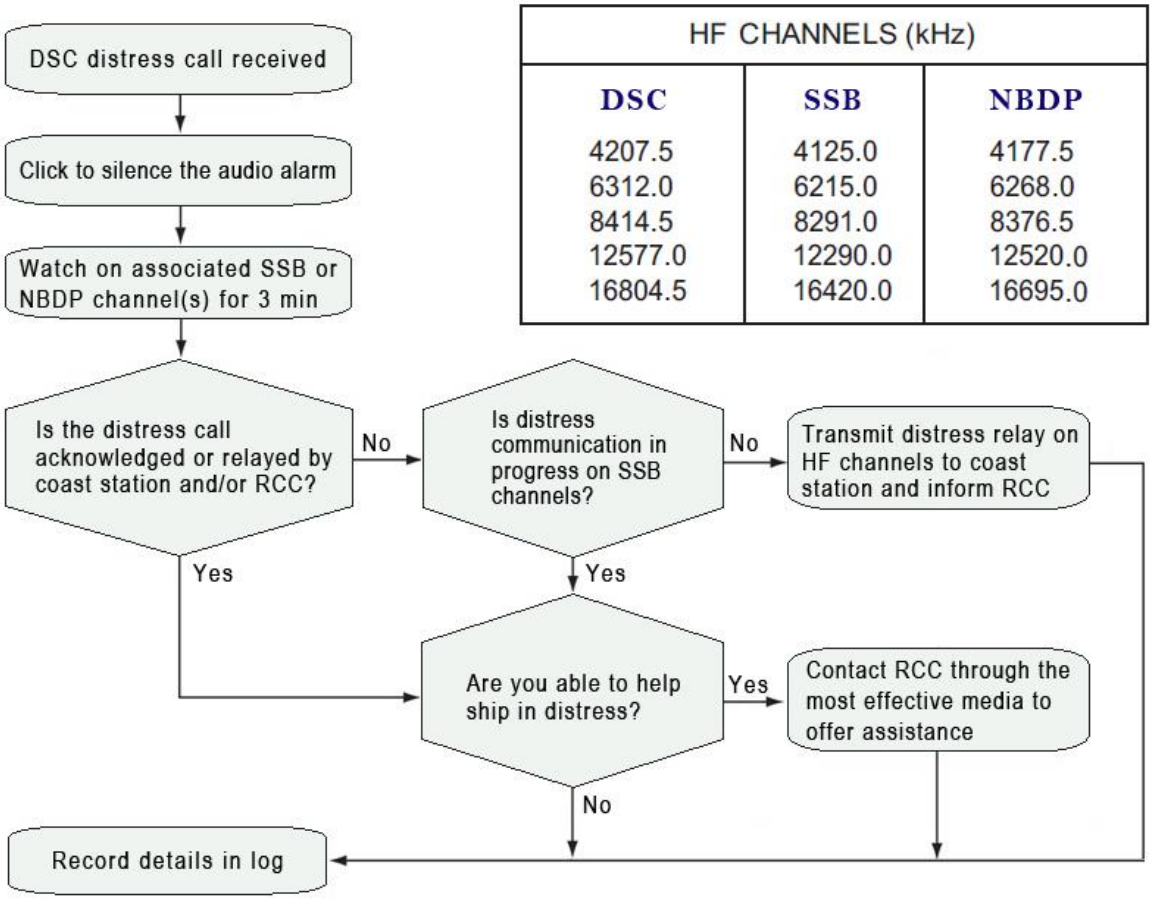
- Click **[OPTION]**, select **[Change]**.



- Click to select the frequency same as the received distress one.



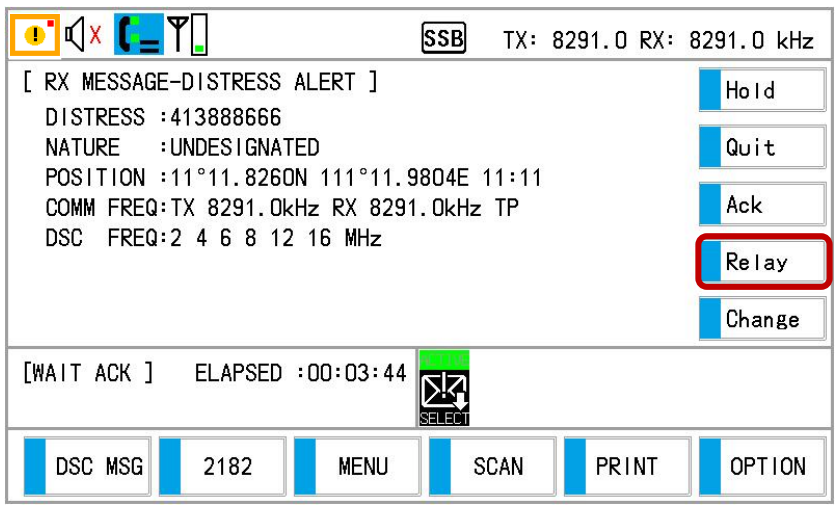
Flow chart of action for ship receiving distress call on HF band:

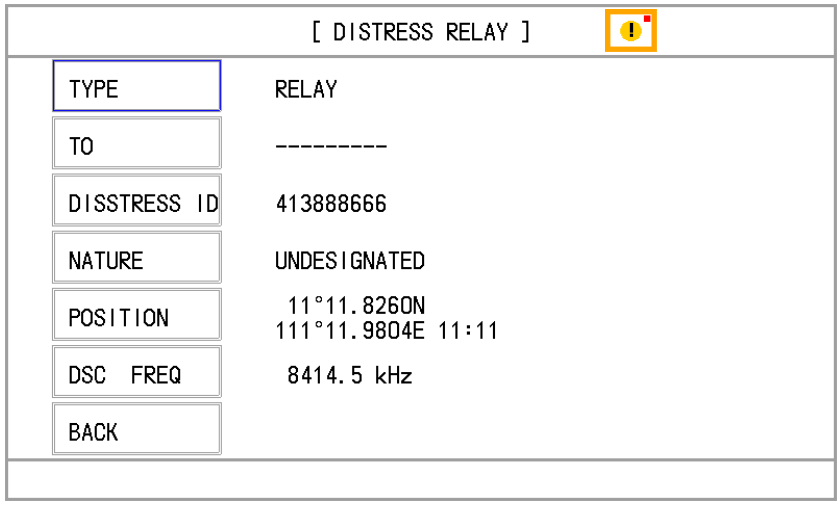


HF CHANNELS (kHz)		
DSC	**SSB**	**NBDP**
4207.5	4125.0	4177.5
6312.0	6215.0	6268.0
8414.5	8291.0	8376.5
12577.0	12290.0	12520.0
16804.5	16420.0	16695.0

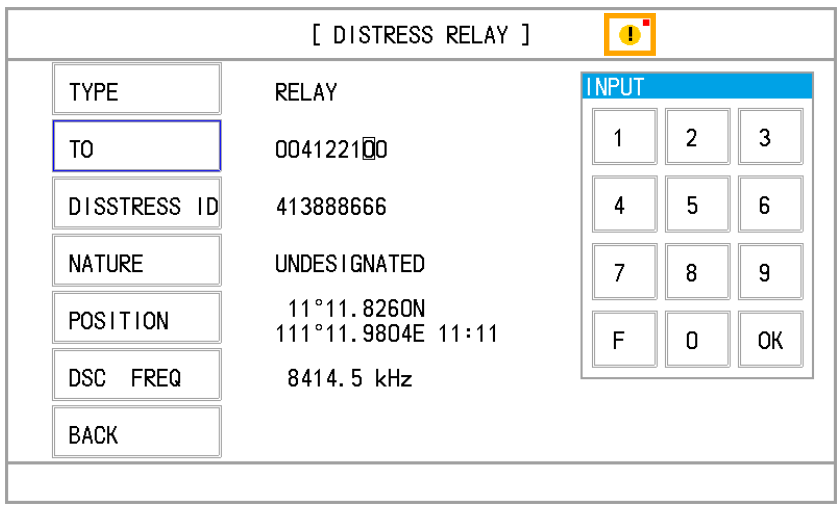
(7) Send the distress relay to the coast station (on HF band):

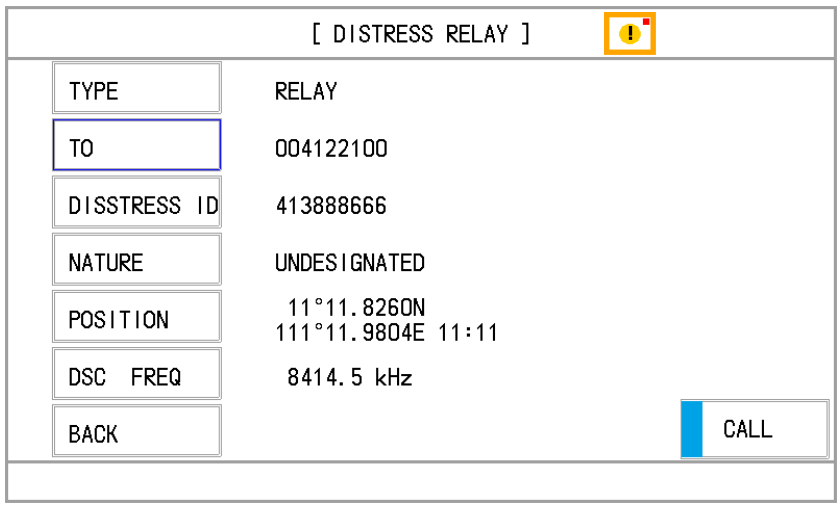
① Click **[OPTION]**, select **[Relay]** to open the composing screen for the distress relay individual.



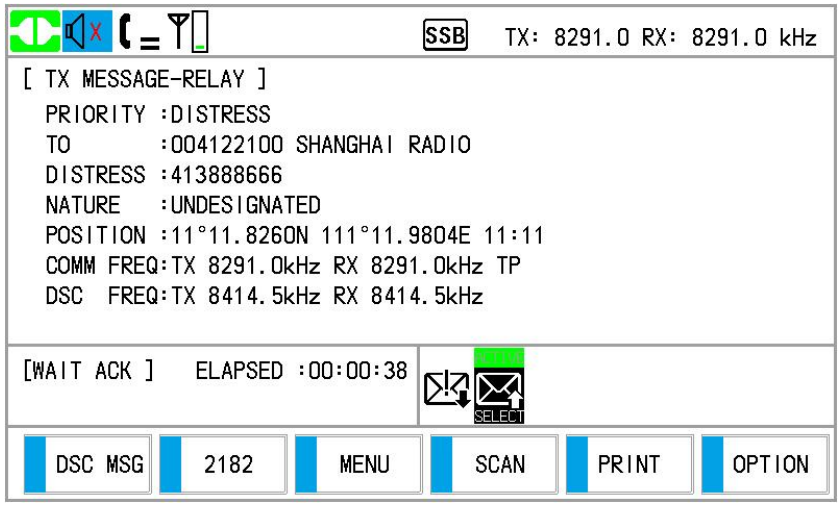


② Click [TO], enter the MMSI of the coast station, where to send the distress relay, with the numeric keys then click OK to confirm.





③ Click **[CALL]**, A caution "START TUNE" appears; click to confirm it. When normal tuning is complete, the screen changes to the **[TX MESSAGE-RELAY]** for transmitting. After transmitting, the **[WAIT ACK]** screen appears.



When the distress relay individual acknowledgement from the coast station is received, the audio alarm sounds and a pop-up message appears. Click **CLICK** to silence the alarm and erase the pop-up message. Communicate with the coast station by telephone, over the frequency specified. If you do not receive the distress acknowledgement from a coast station, click **[OPTION]**, select **[RESEND]** to transmit the distress relay again, or select **[Quit]** to finish the distress relay. You can also transmit the distress relay (refer to 4.2.3) again over a different frequency.

4.2.3 Relay a Distress Call

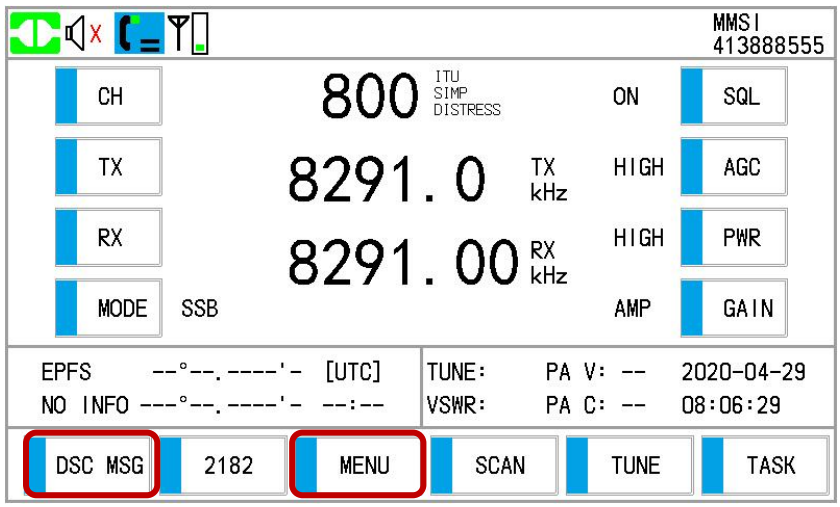
4.2.3.1 Send distress relay to coast station

You can send the distress relay to a coast station on behalf of a ship in distress in the following cases:

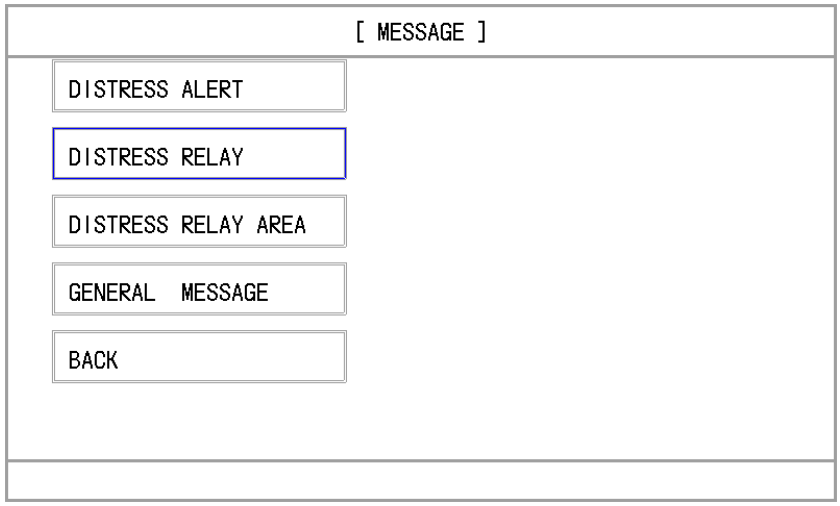
- You are near the ship in distress and the ship in distress cannot transmit the distress alert.
- When the master or person responsible for own ship considers that further assistance is necessary.

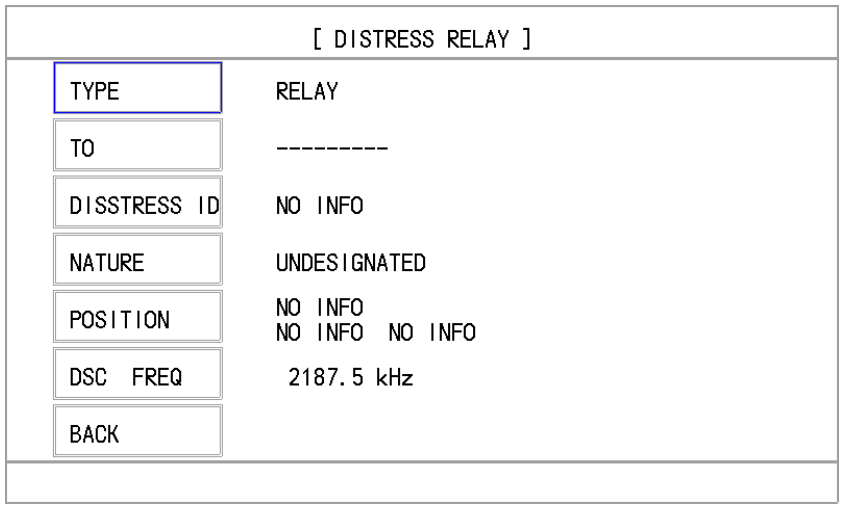
Note: Do not use the DISTRESS button to relay distress.

① Click **[DSC MSG]** or **[MENU]-[DSC]-[MESSAGE]**.

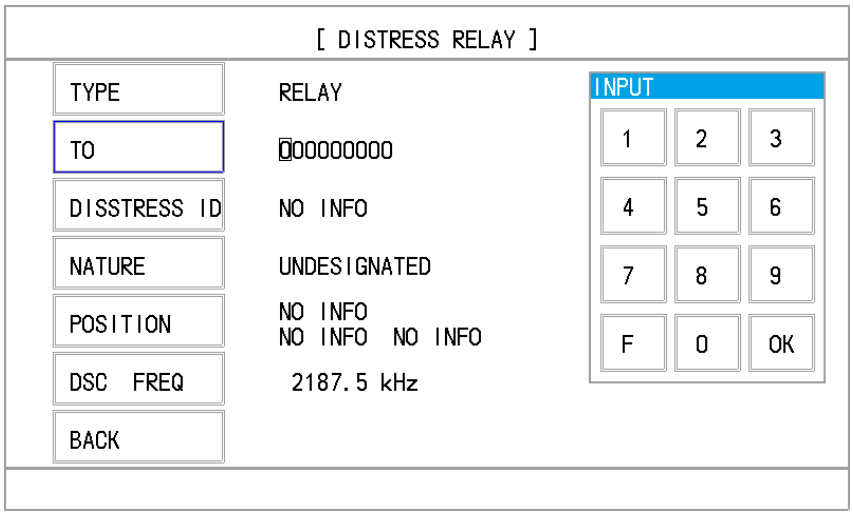


② Click [**DISTRESS RELAY**] in the [**MESSAGE**] menu to open the composing screen for the distress relay individual.

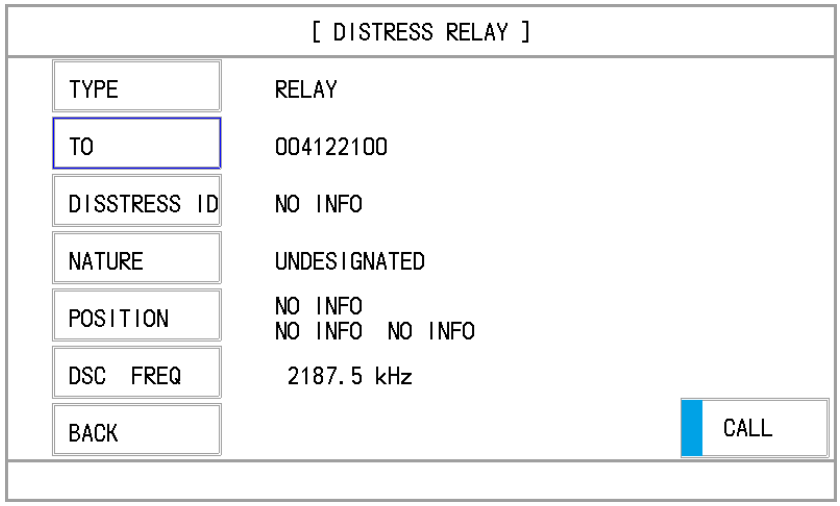




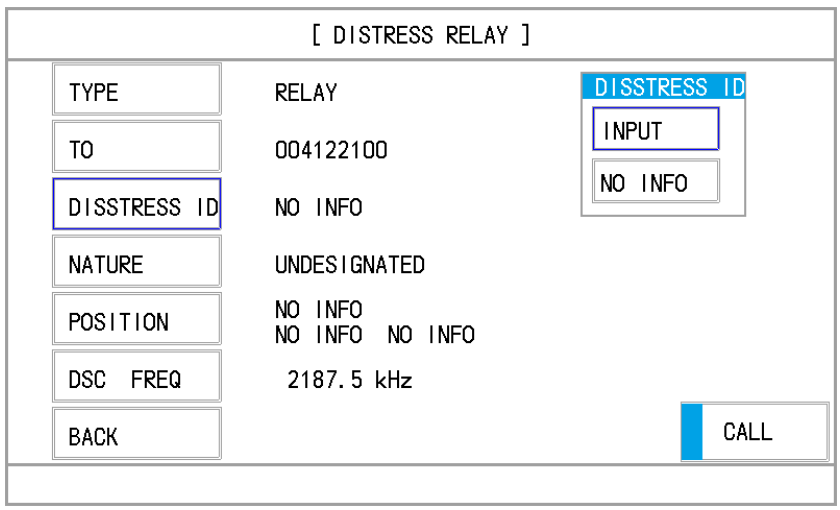
③ With [**TO**] selected, click to enter the MMSI where to send the distress relay by numeric keys in **[INPUT]**. Click **OK** to confirm.



You can also rotate the **PUSH TO ENTER** knob to a digit to input or modify.

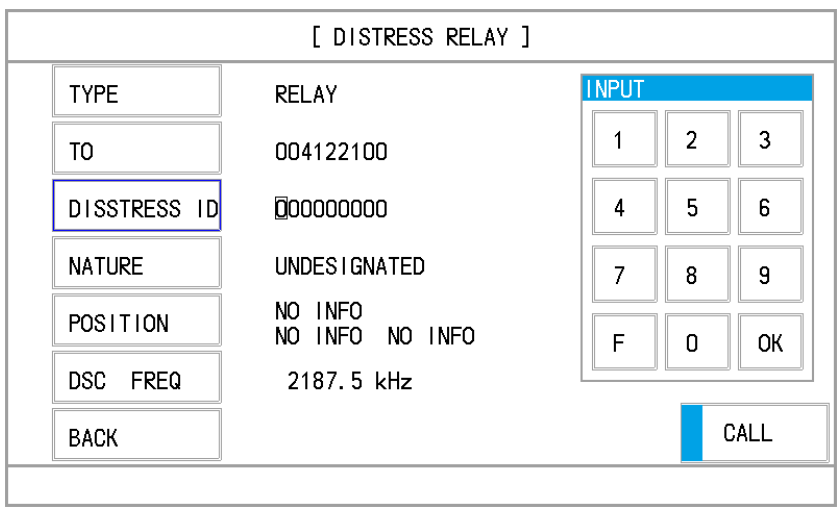


④ With **[DISTRESS ID]** selected, click to choose **[INPUT]** or **[NO INFO]**.

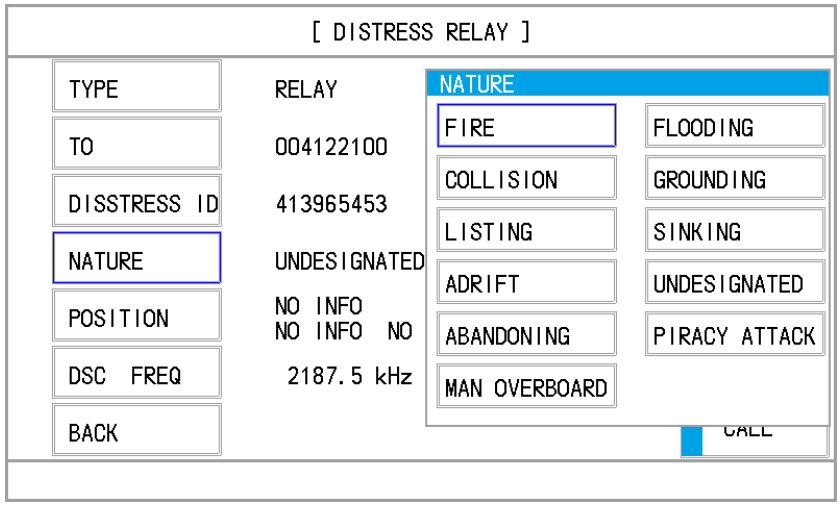


⑤ For [**INPUT**], go to step ⑥. For [**NO INFO**], go to step ⑦.

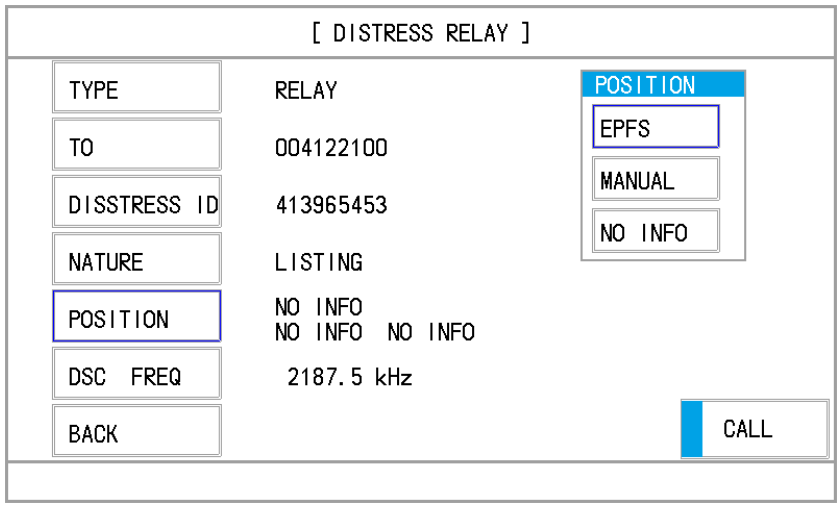
⑥ Enter the ID (MMSI) of the ship in distress with the numeric keys, then click **OK**.



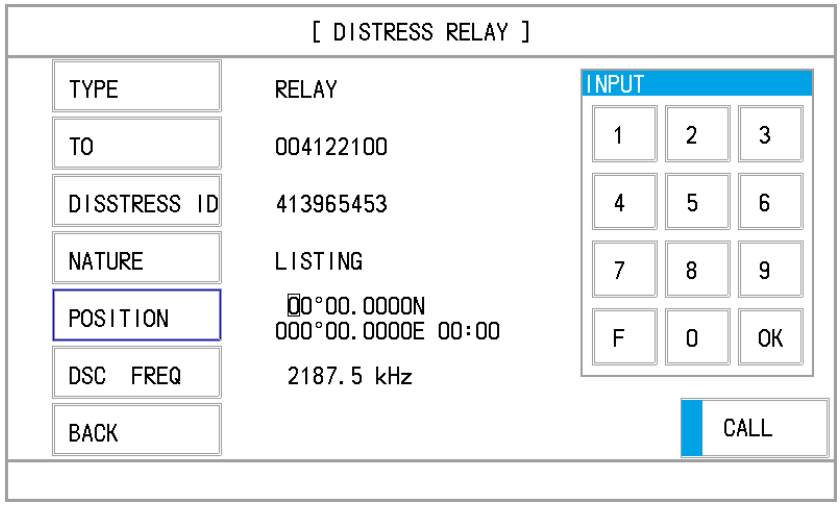
⑦ With [**NATURE**] selected, click to select the nature of distress.



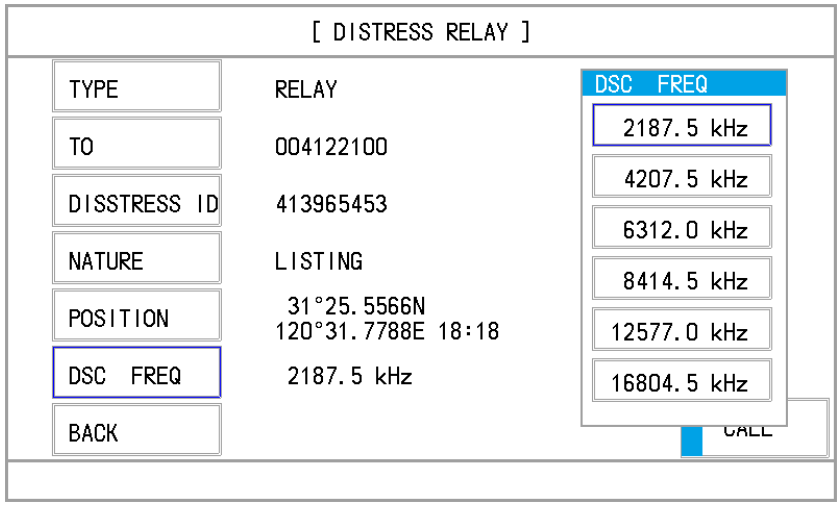
⑧ With [**POSITION**] selected, click to select **[EPFS]**, **[MANUAL]** or **[NO INFO]**.
For **[MANUAL]**, go to step ⑨. For others, go to step ⑩.

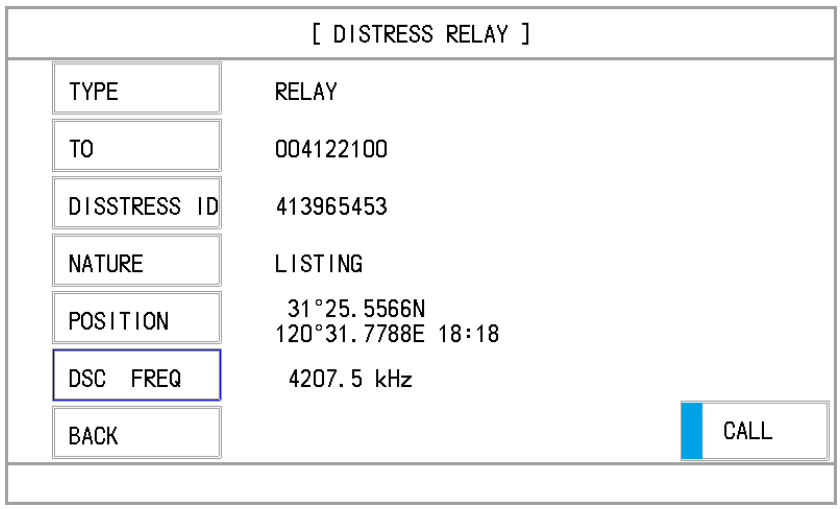


⑨ Use the numeric keys to enter the latitude and longitude of the ship in distress. Switch coordinates: Click **1** to switch to North (East for longitude), **2** to switch to South (West for longitude). Also, enter the UTC time, then click **OK** to confirm.

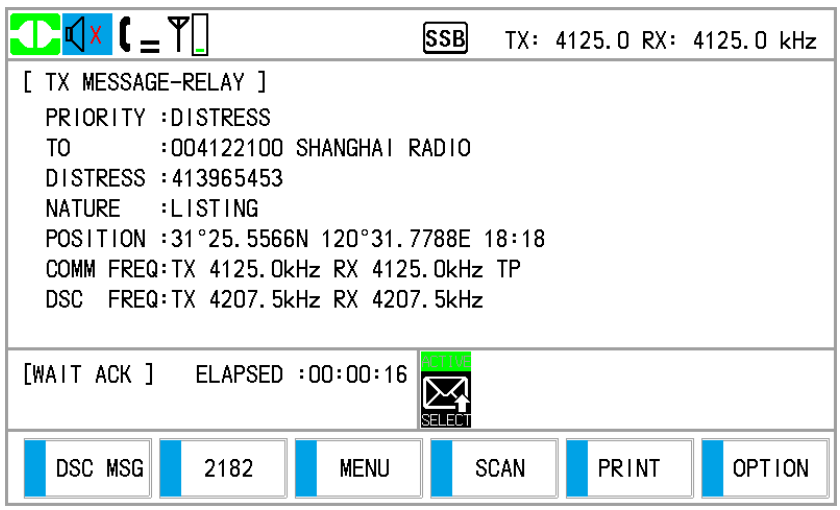


⑩ With [**DSC FREQ**] selected, click to select the frequency.



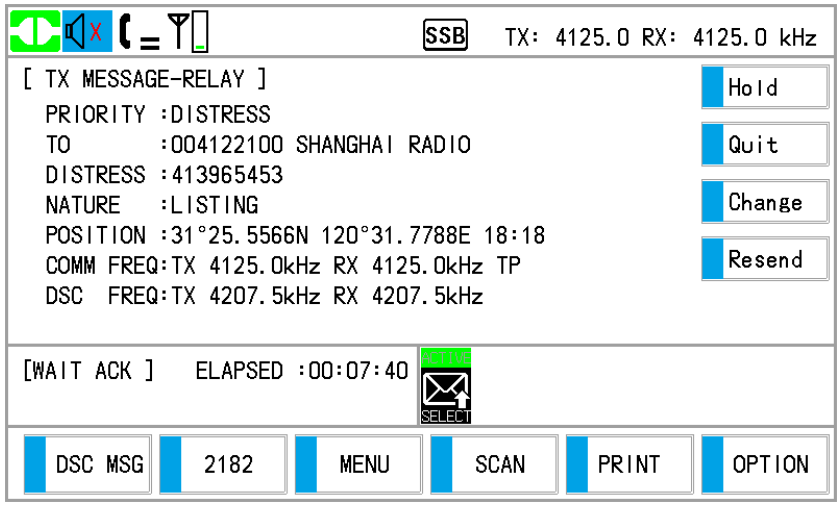


⑪ Click [**CALL**], A caution "START TUNE" appears; click to confirm it. When normal tuning is complete, the distress relay is transmitted to the coast station. After transmitting, the **[WAIT ACK]** screen appears. The elapsed time since transmitting is displayed.



When the distress relay individual acknowledgement from the coast station is received, the audio alarm sounds and a pop-up message appears. Click **CLICK** to silence the alarm and erase the pop-up message. Communicate with the coast station by telephone, over the frequency specified. If you do not receive the distress acknowledgement

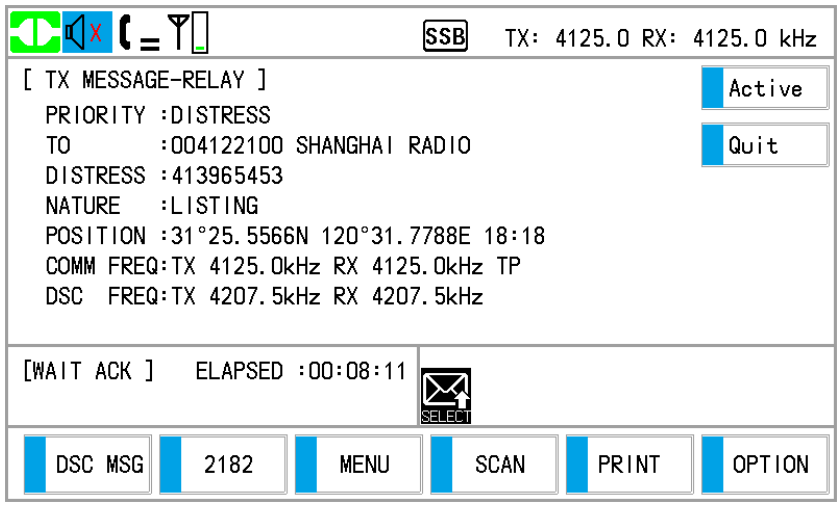
from a coast station, click **[OPTION]** to select further operation.



[Hold]: You can hold the distress relay (

changes to 

) and activate it again by clicking **[OPTION]**.



***Note*: If you click [2182] to the SSB screen, the operation is held automatically, and click [TASK] to return to the DSC screen.**

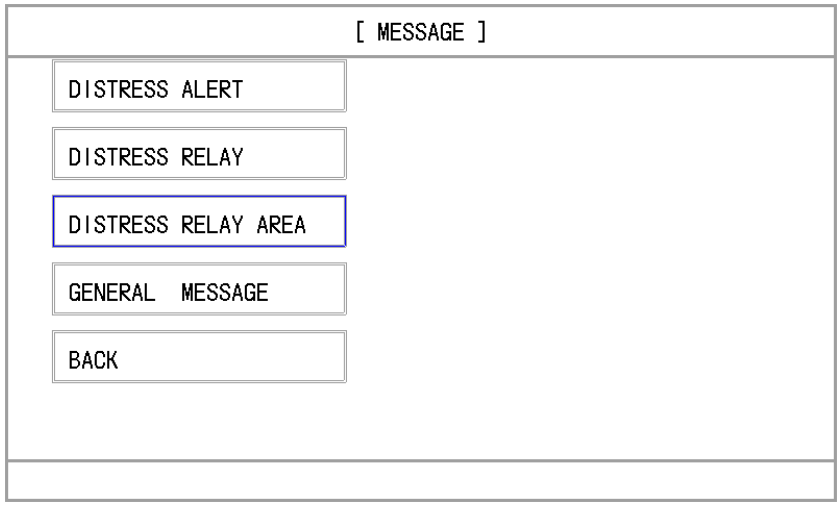
[Quit]: You can finish the distress relay. Click **YES** to return to the SSB screen.
[Change]: You can change the communication frequency.
[Resend]: You can resend the distress relay.

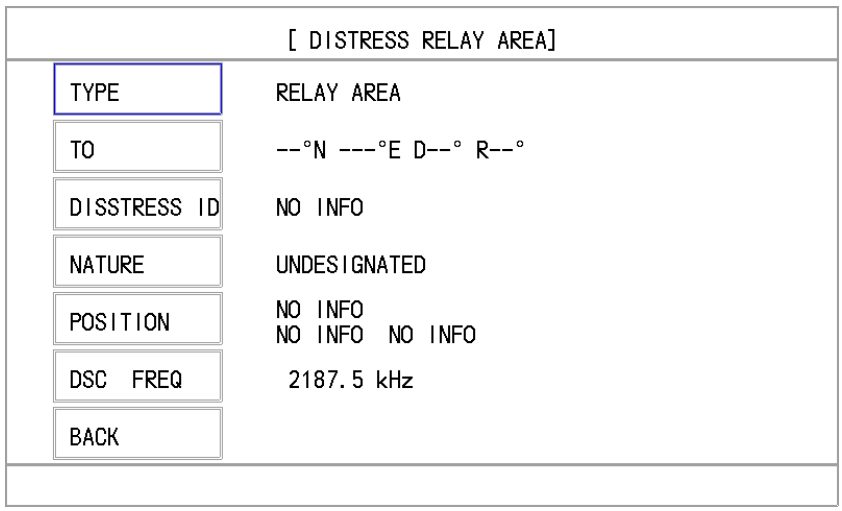
The above option functions are the same as in other DSC calls.

4.2.3.2 Send a distress relay to ships in your area

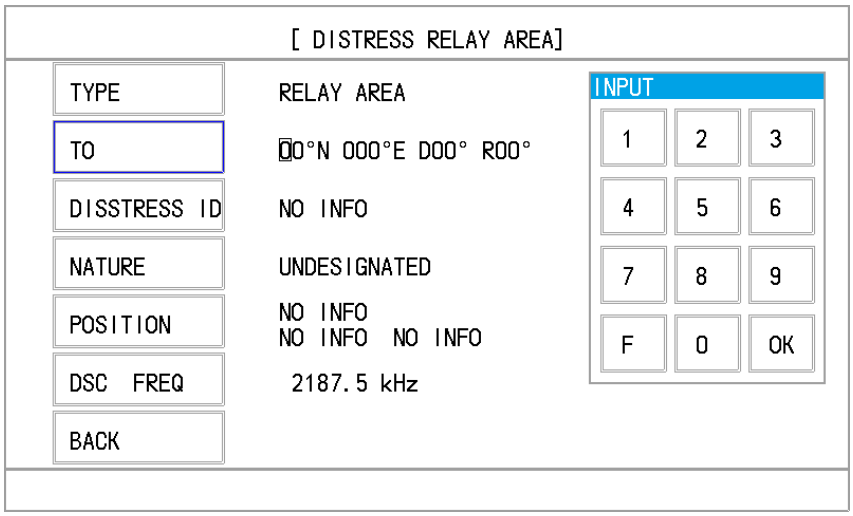
If a coast station directs you to send a distress relay to ships in your area, follow the procedure as follows. You can not transmit a distress relay in the area unless directed by a coast station.

① Click [**DISTRESS RELAY AREA**] in the [**MESSAGE**] menu to open the screen for composing the distress relay area.

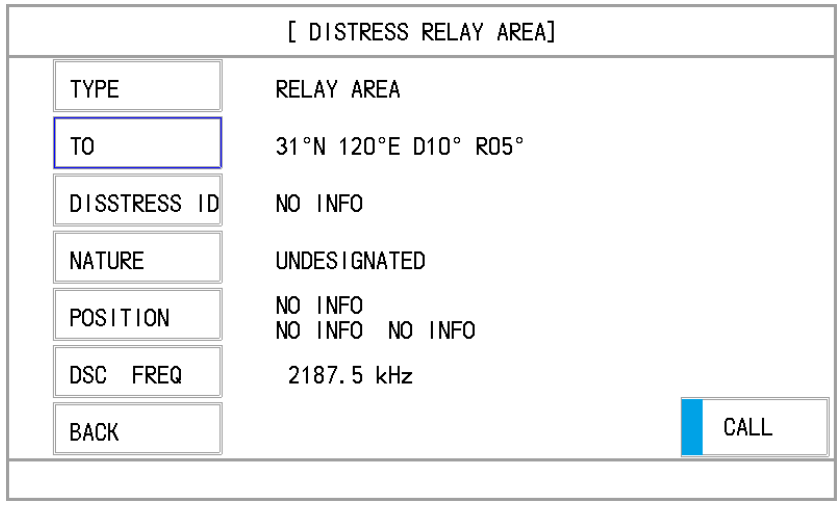


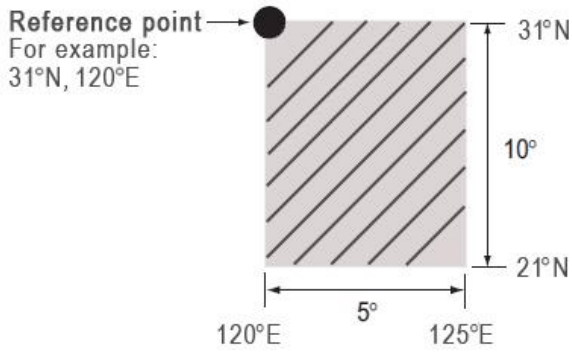


② With [**TO**] selected, enter the area that where to send the distress relay area with the numeric keys in **[INPUT]**. Click **OK** to confirm.



The area call is for sending a call to all ships within the area you designated.
For example, the call will be sent to all ships within an area from 21°N -31°N, 120°E -125°E.





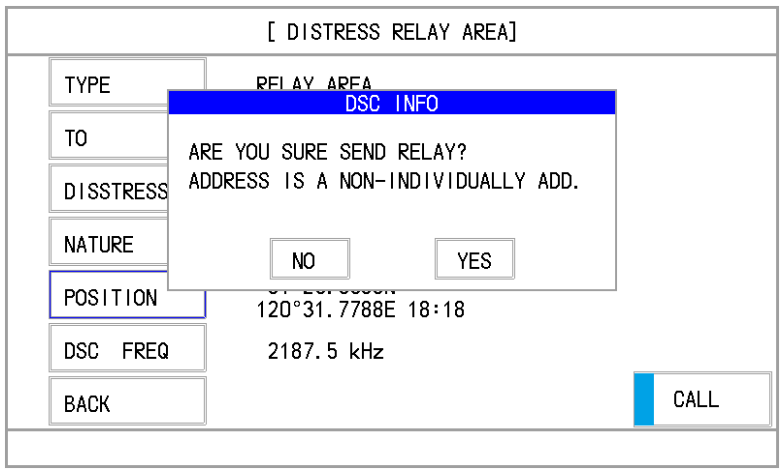
③ With **[DISTRESS ID]** selected, enter the ID (MMSI) of the ship in distress. Refer to Section 4.2.3.1 ④~⑥.

④ With [**NATURE**] selected, click to select nature of distress. Refer to Section 4.2.3.1 ⑦.

⑤ With [**POSITION**] selected, enter latitude and longitude of the ship in distress. Refer to Section 4.2.3.1 ⑧~⑨.

⑥ With **[DSC FREQ]** selected, choose the frequency to call. Refer to Section 4.2.3.1 ⑩.

⑦ Click **[CALL]**, the following message appears on the screen.

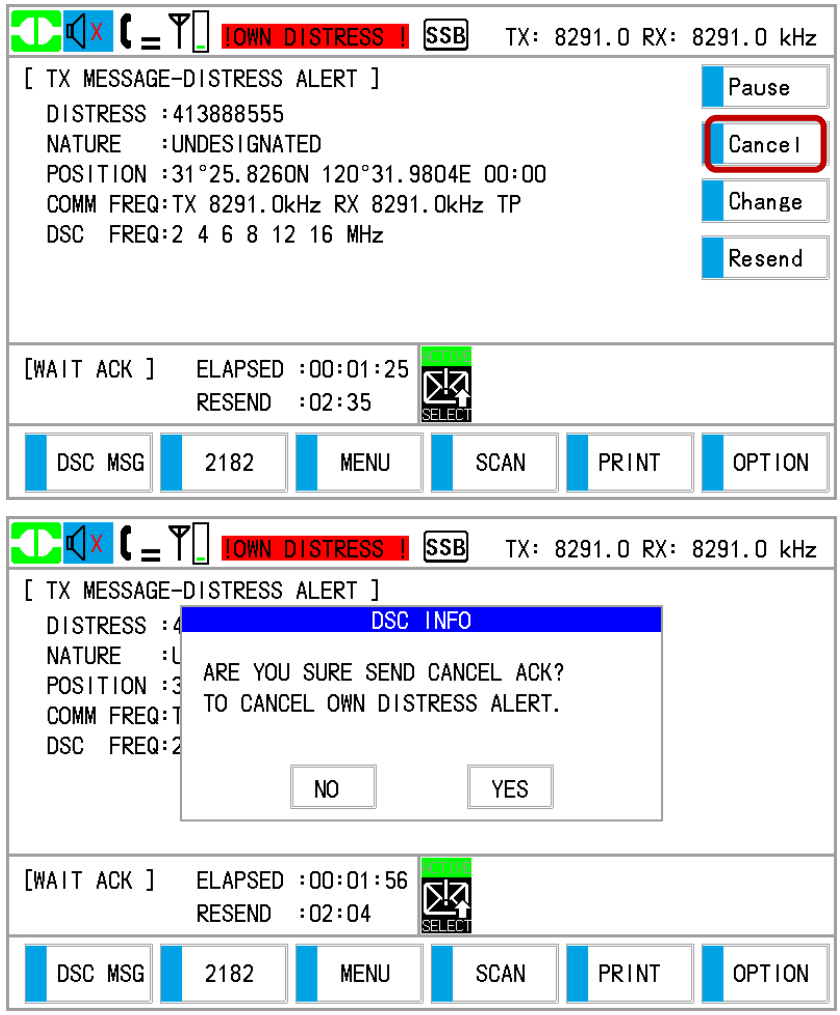


⑧ Click **YES**, the distress relay is transmitted to the ships within the area specified after tuning is completed well.

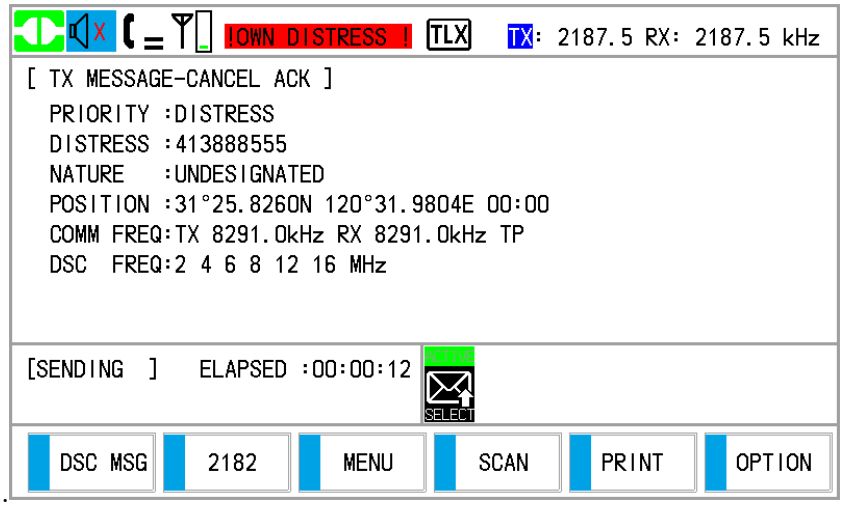
4.2.4 Cancel a Distress Call

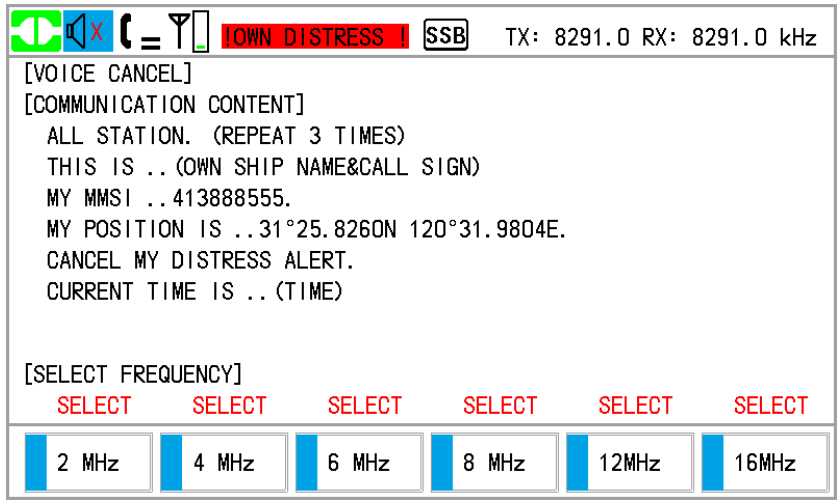
You can cancel the distress call while it is being sent or while waiting for its acknowledgement as follows.

① Click **[OPTION]**, then select **[Cancel]**.

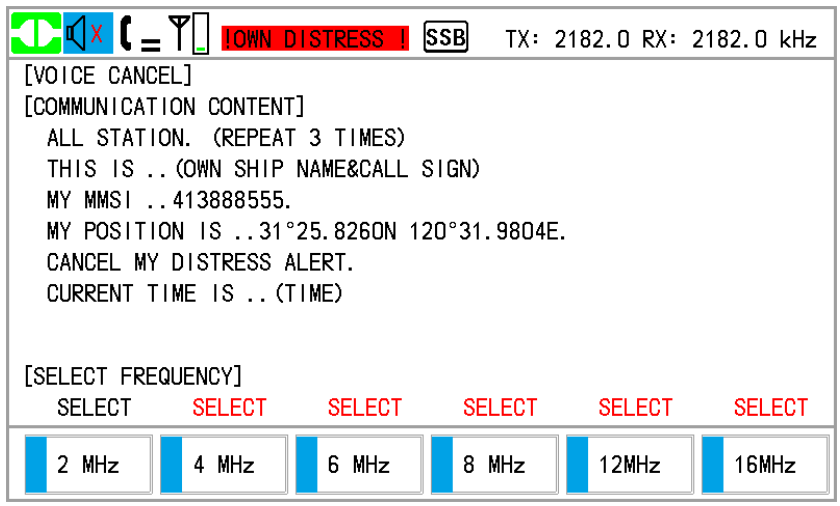


② Click **YES** to cancel, the sending screen appears, then wait till the following SELECT FREQUENCY screen appears:



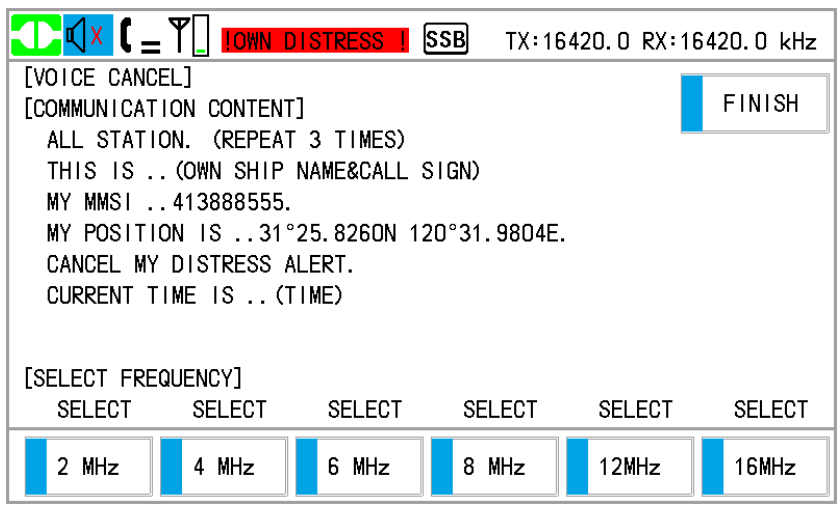


③ Select a frequency (for example, 2 MHz). The following screen appears, the color of "SELECT" changes from red to black. The communication frequency changes correspondingly.

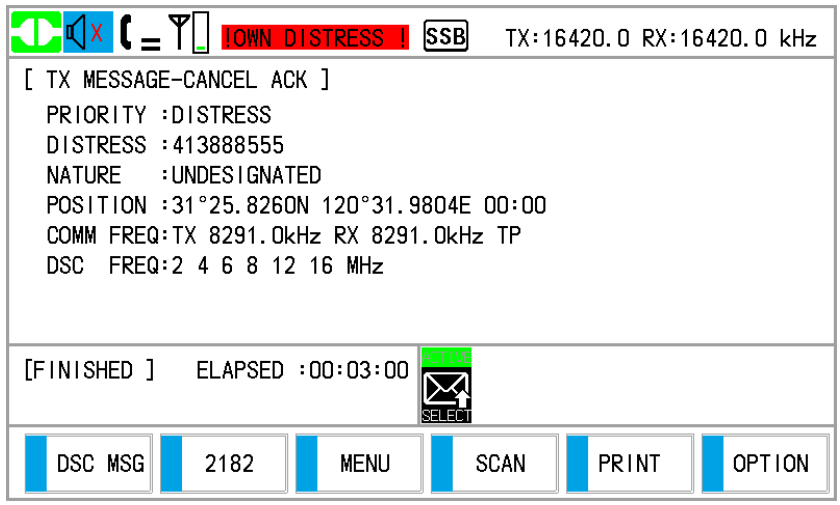


④ Pick up the handset, make a voice announcement with all ships via radiotelephone referring to the message on screen.

⑤ Repeat steps ③~④ to cancel for all frequencies. When cancellation on all frequencies is completed, **[FINISH]** appears:



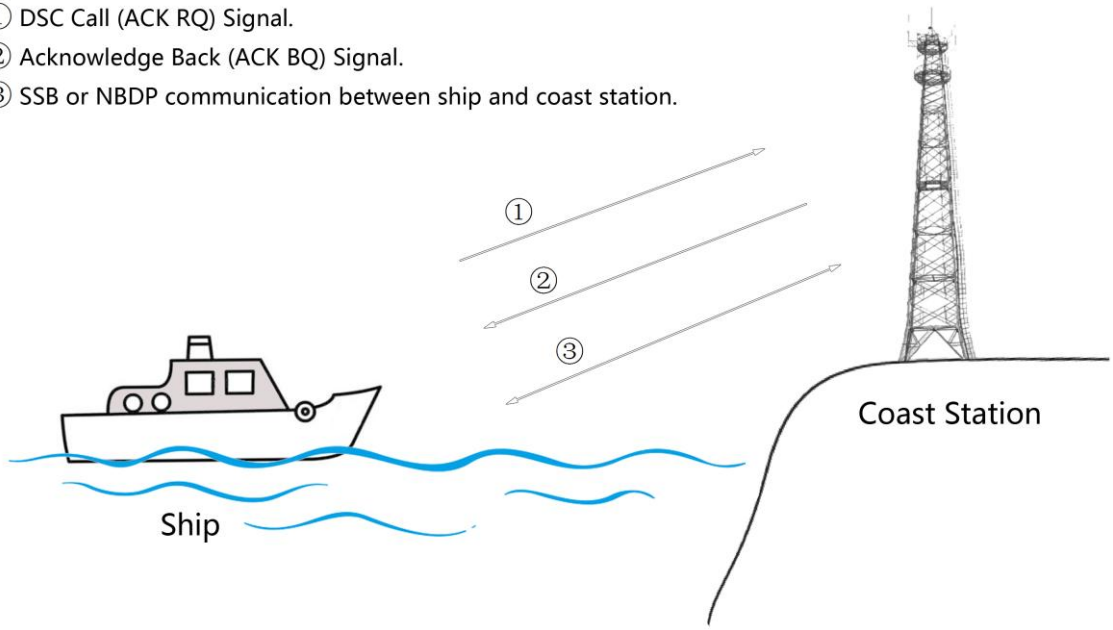
⑥ Click **[FINISH]** to finish the operation.



4.3 DSC General Calls

General procedure for non-distress DSC calls:

① DSC Call (ACK RQ) Signal.
② Acknowledge Back (ACK BQ) Signal.
③ SSB or NBDP communication between ship and coast station.



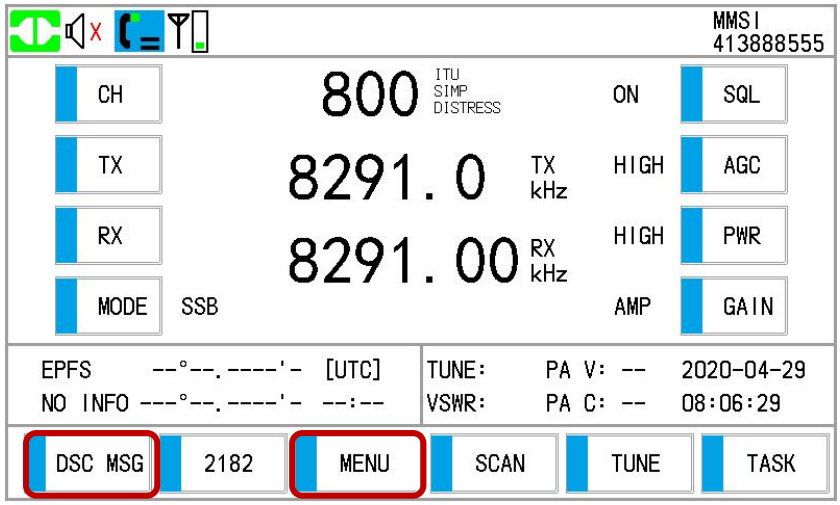
The procedures for sending and receiving non-distress DSC messages are similar among different message types. The following is an example of the procedures for an individual call.

① Send the individual call.
② Wait for the individual message acknowledgement.
③ Start the communication.

4.3.1 Individual Call

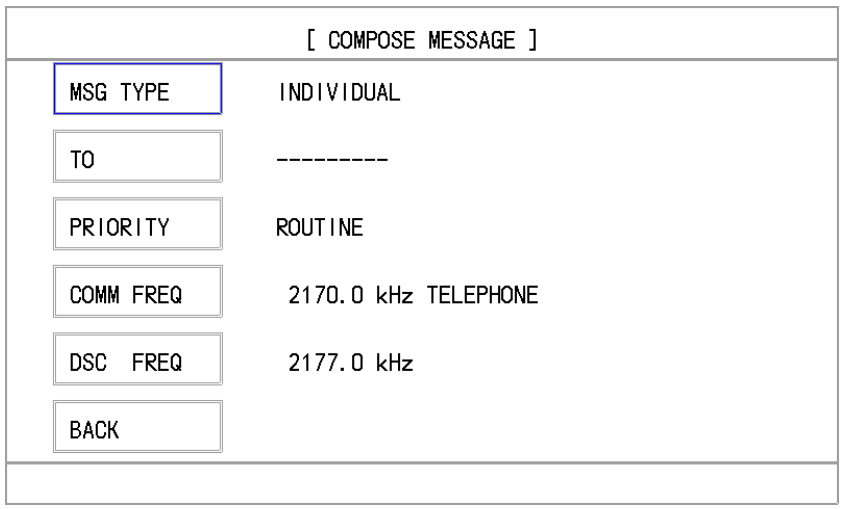
The individual call is for calling a specific station. After sending an individual call, called ACK RQ transmission, wait to receive the acknowledge back (ACK BQ) signal from the receiving station.

4.3.1.1 Send an individual call

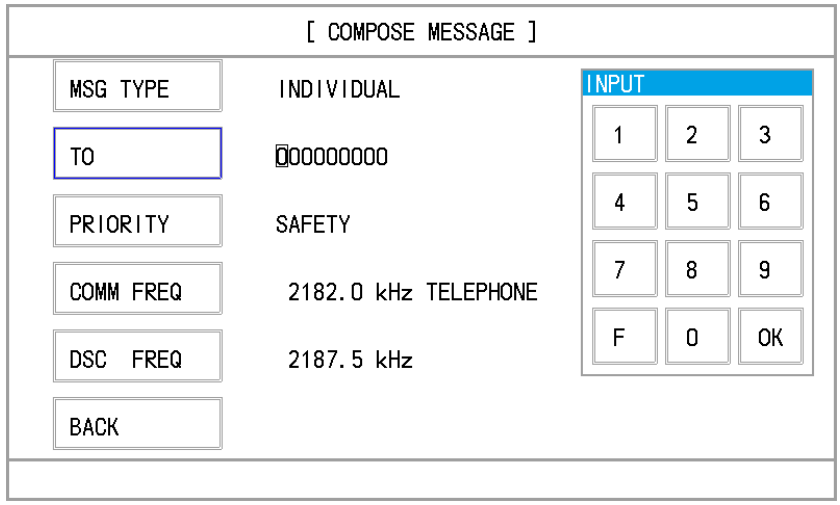


(1) Click **[DSC MSG]**, or click [**MENU]** and choose **[DSC]** – **[MESSAGE]**, then click **[GENERAL MESSAGE]** in **[MESSAGE]**.

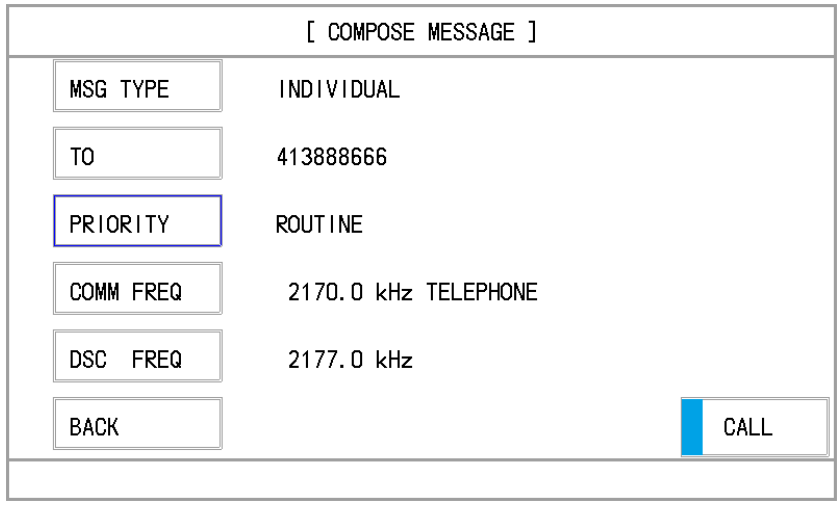
(2) Click [**MSG TYPE**] or rotate the **PUSH TO ENTER** knob to select [**MSG TYPE**] then push the knob, select **[INDIVIDUAL]** among INDIVIDUAL, GROUP, AREA, POSITION and TEST.



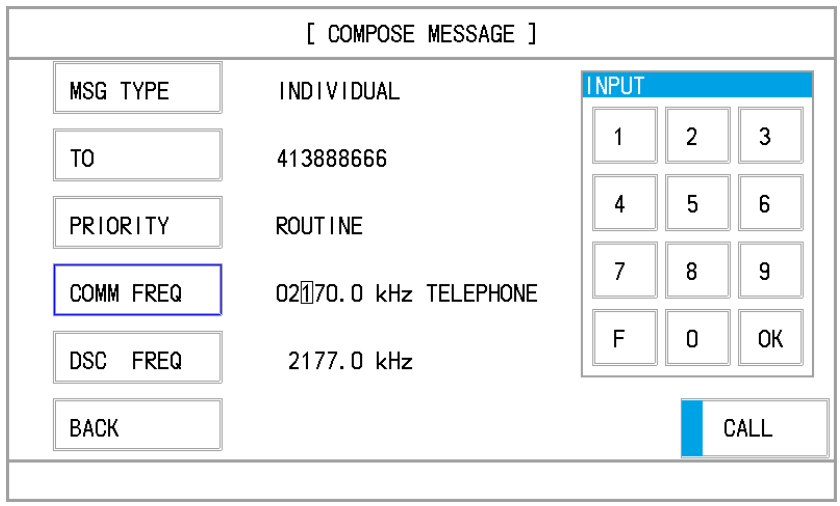
(3) With **[TO]** selected, enter the MMSI where to send the call with the numeric keys in **[INPUT]**. Click **OK** to confirm.



(4) Click [**PRIORITY**] or rotate the **PUSH TO ENTER** knob to select [**PRIORITY**] then push the knob, select **[ROUTINE]**, **[SAFETY]** or **[URGENCY]**.

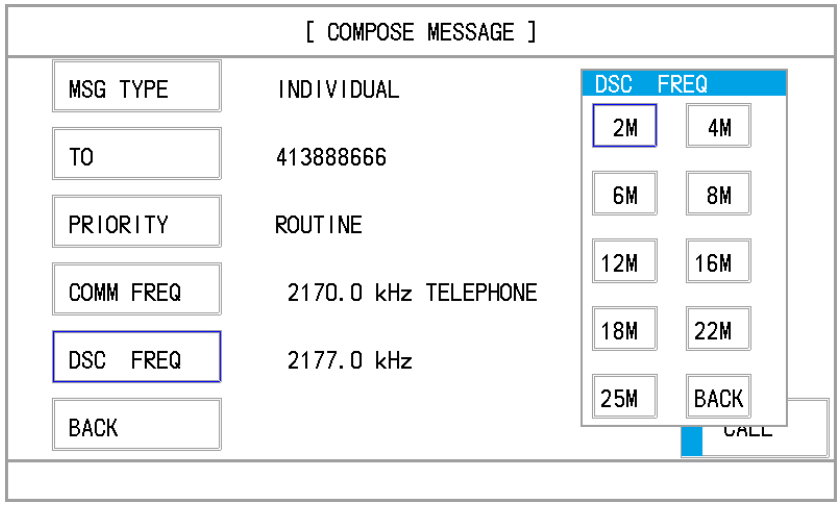


(5) The **[COMM FREQ]** is automatically set to the same pair frequency as the DSC frequency. If you change the communication frequency, set **[DSC FREQ]** before setting **[COMM FREQ]**.

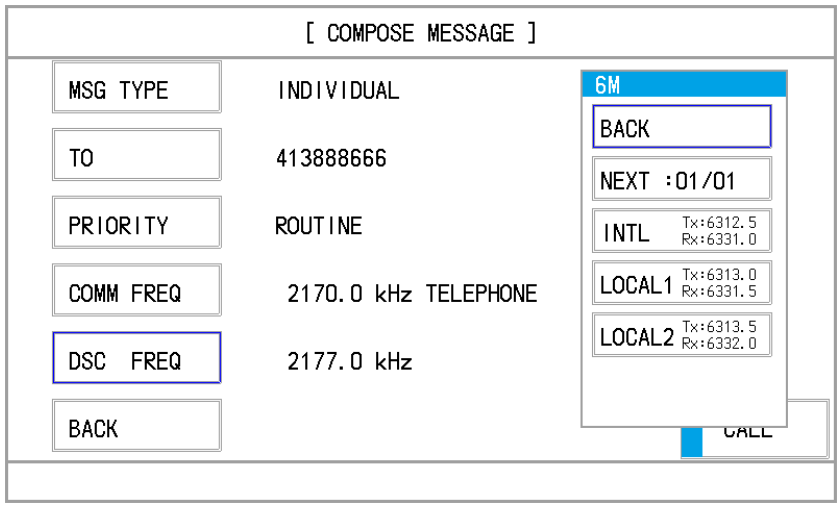


(6) Click **[DSC FREQ]** or rotate the **PUSH TO ENTER** knob to select **[DSC FREQ]** then push the knob to set DSC frequency.

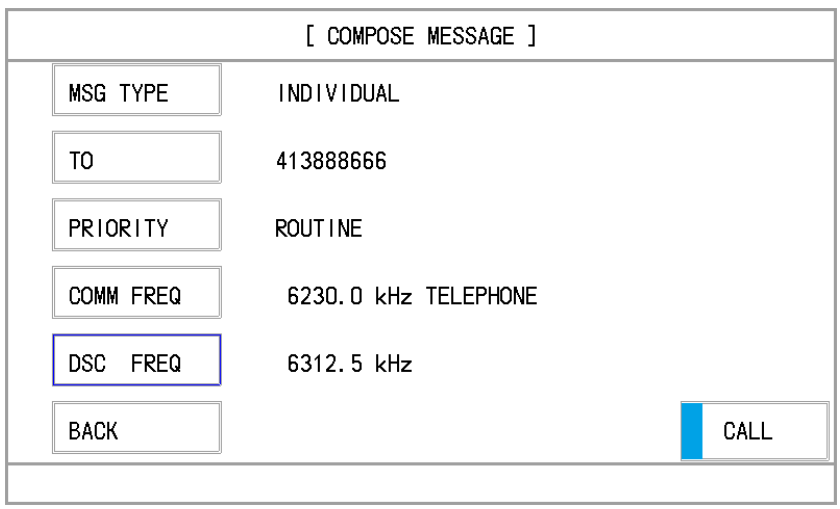
- **Routine priority**



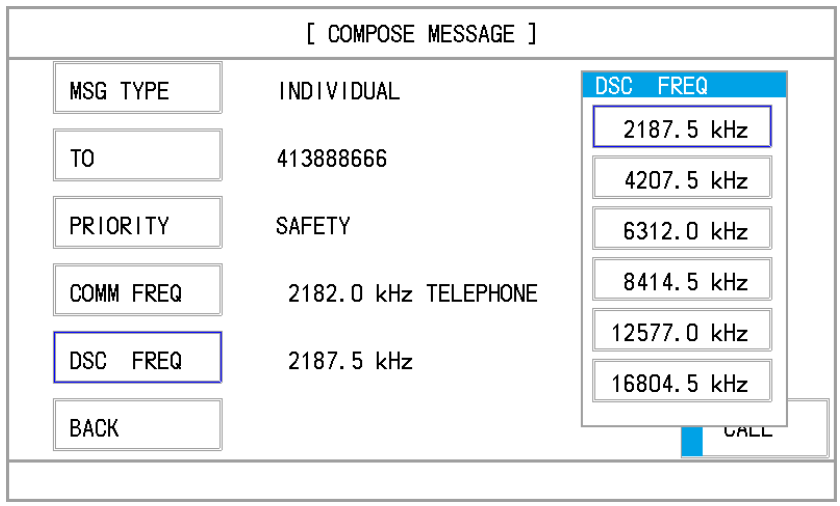
① Click to select the DSC band, for example **6M**. The menu shown below appears depending on the band selected.



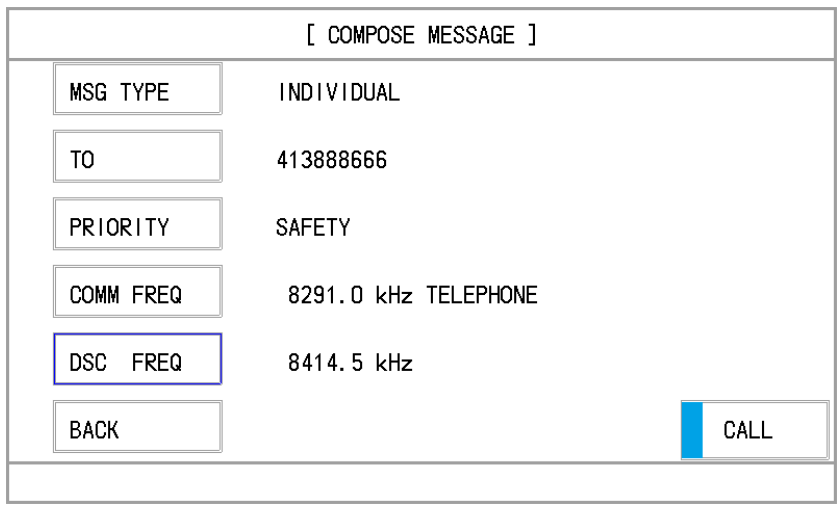
② Click to select DSC frequency. The screen shows the DSC frequency at **[DSC FREQ]**. And the **[COMM FREQ]** is automatically set to the same pair frequency as the DSC frequency. If you change the communication frequency, go to step (7). If not, go to step (8).



- **Urgency or safety priority**

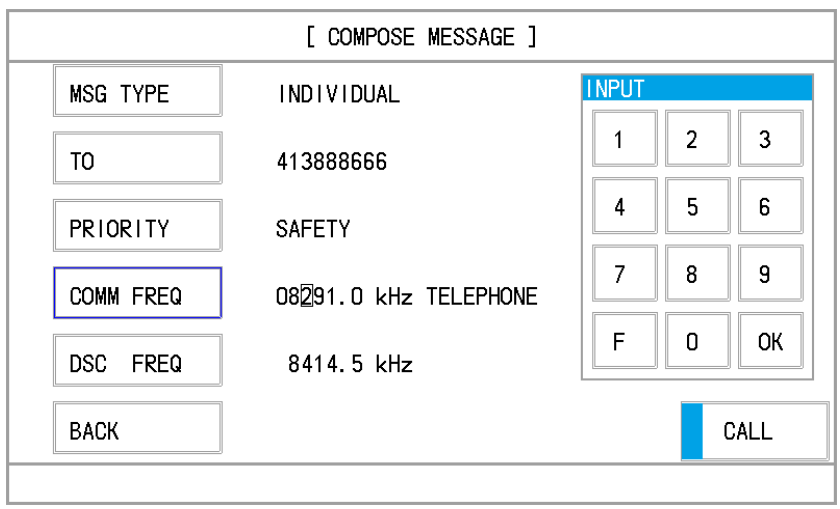


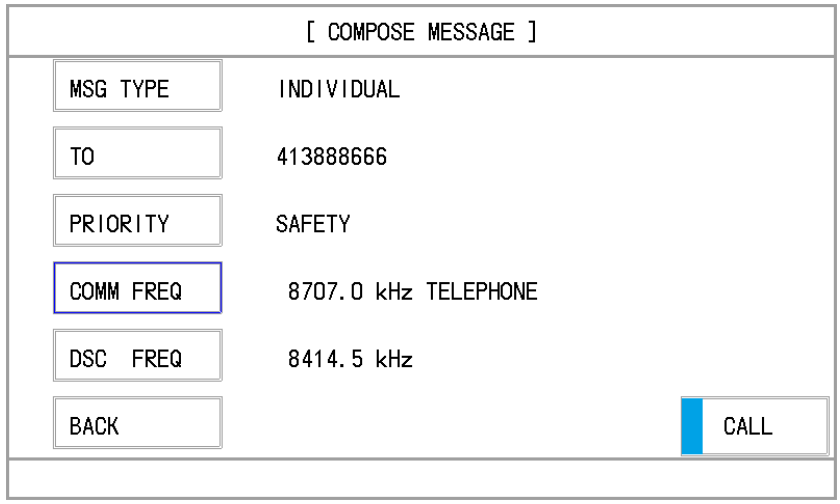
Click to select the frequency, for example, 8414.5 kHz. The **[COMM FREQ]** is automatically set to the same pair frequency as the DSC frequency. If you change the communication frequency, go to step (7). If not, go to step (8).



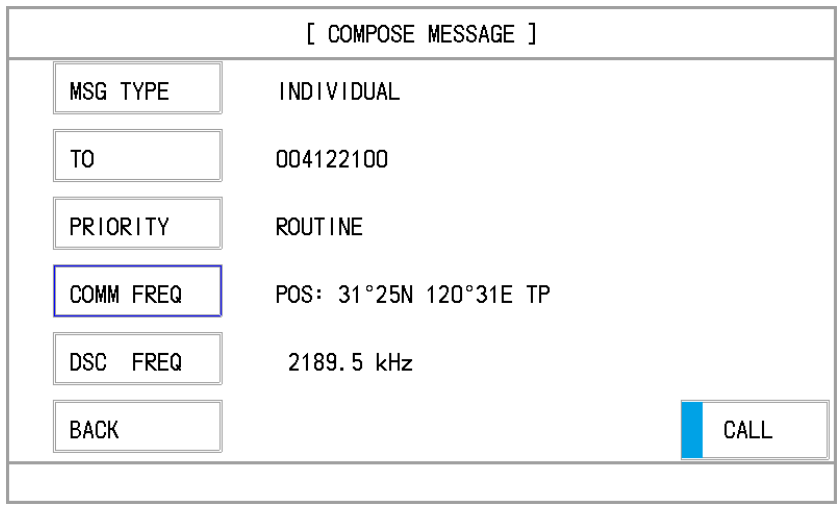
(7) Click **[COMM FREQ]** or rotate the **PUSH TO ENTER** knob to select **[COMM FREQ]** then push the knob.

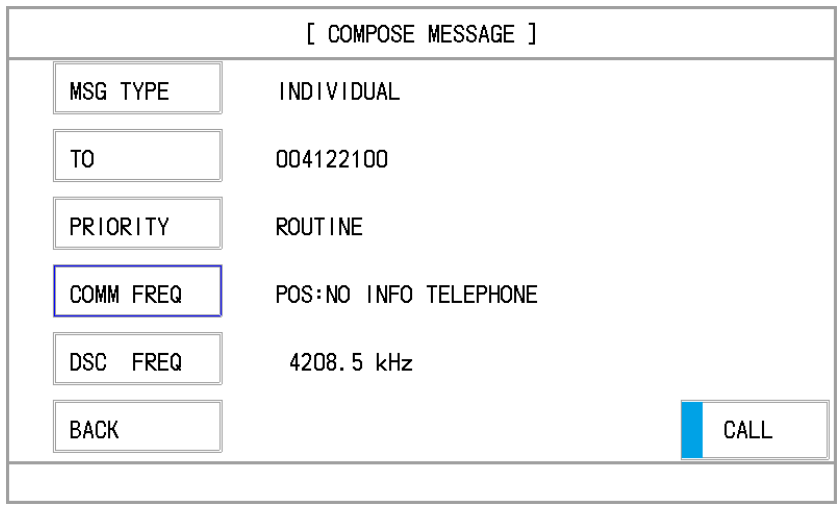
Use the numeric keys to enter the communication frequency and click **OK** to confirm. For example:



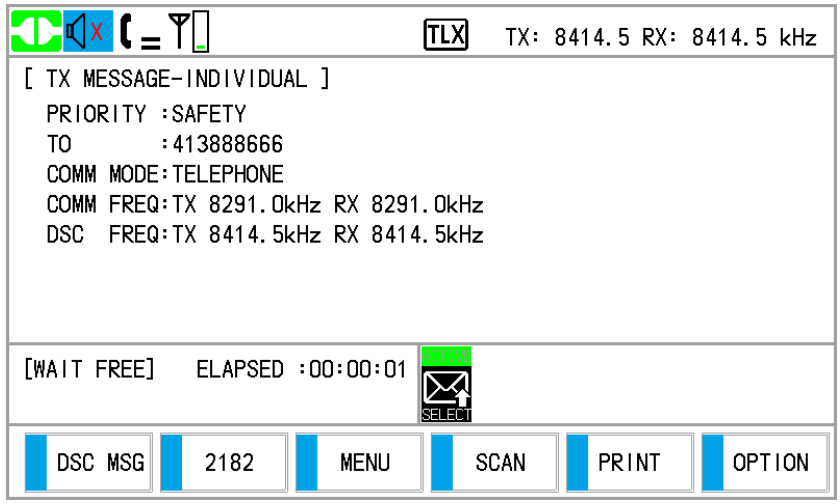


***Note**: When you send an individual call to a coast station, [COMM FREQ] is automatically set to "POSITION" or "NO INFO". "NO INFO" lets the receiving station set the communication frequency. For example:*

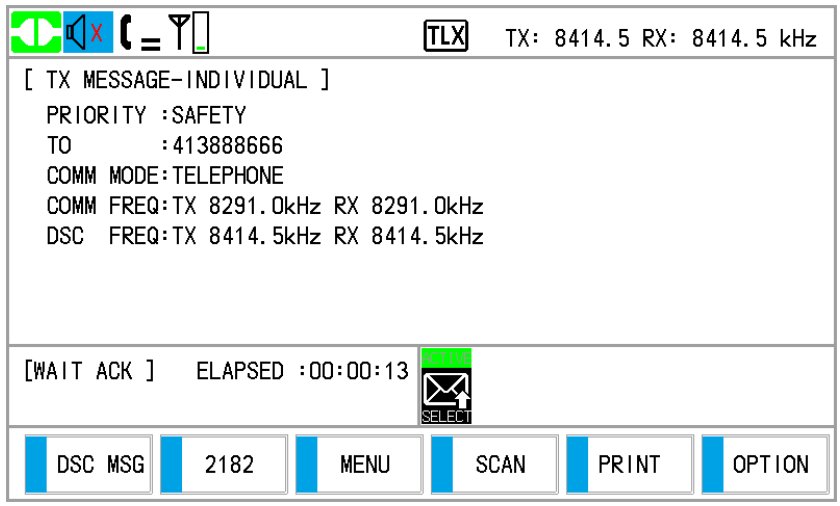




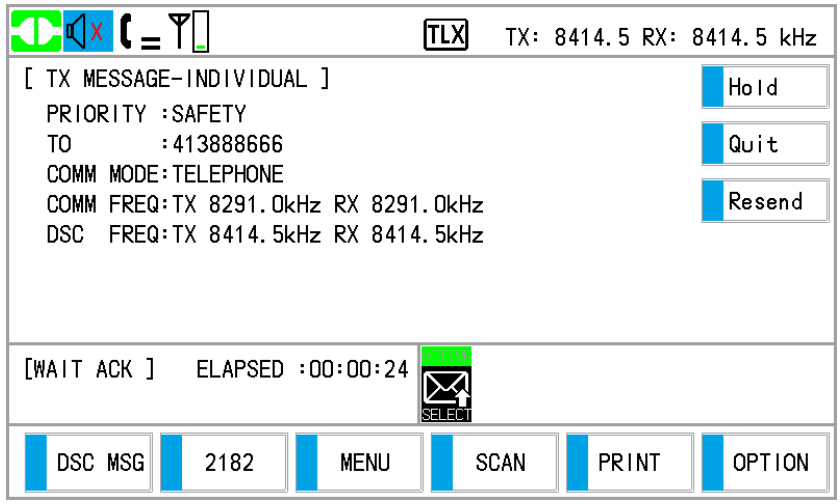
(8) Click **[CALL]** to send the individual call. A caution "START TUNE" appears; click to confirm it. When normal tuning is complete, the call will be sent out. The screen changes as follows.



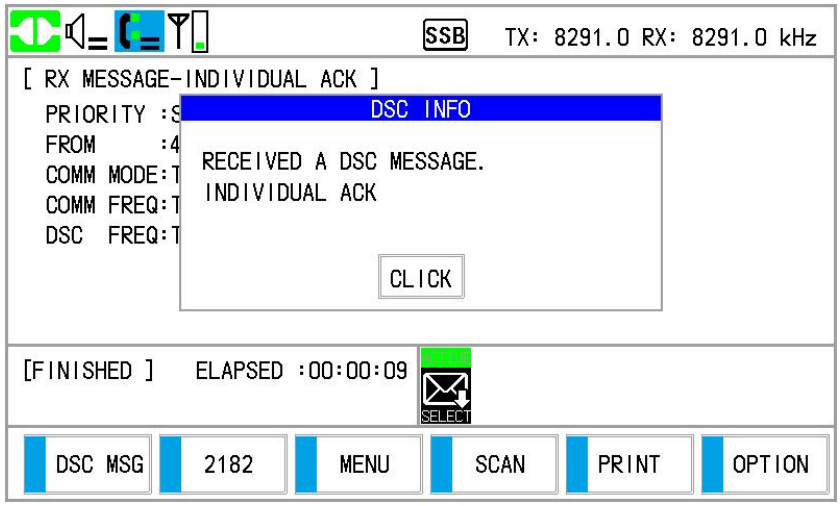
The timer starts counting up the time since the call is sent. After the call is sent, the equipment waits for acknowledgement of the call, showing the [WAIT ACK] screen as follows.



You can also do the option: [Hold]/[Quit]/[Resend].



(9) When the ACK is received, the audio alarm sounds and the pop-up message appears on the screen as follows. The timer starts counting up the time since the ACK is received.



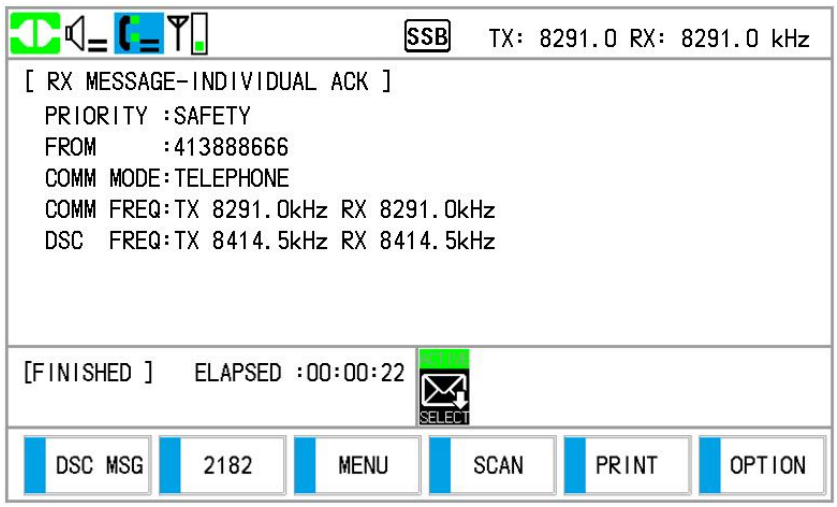
There are three types of ACK messages: [INDIVIDUAL ACK], [INDIVIDUAL ACK] (NEW FREQ) and [UNABLE ACK].

(10) Do one of the following depending on the message type shown at step (9).

- **Individual acknowledgement call received:**

① Click **CLICK** to silence the audio alarm and erase the pop-up message.

② The working frequency is automatically set; you can communicate by radiotelephone (pick up the handset to talk) or NBDP (see the NBDP operation manual).

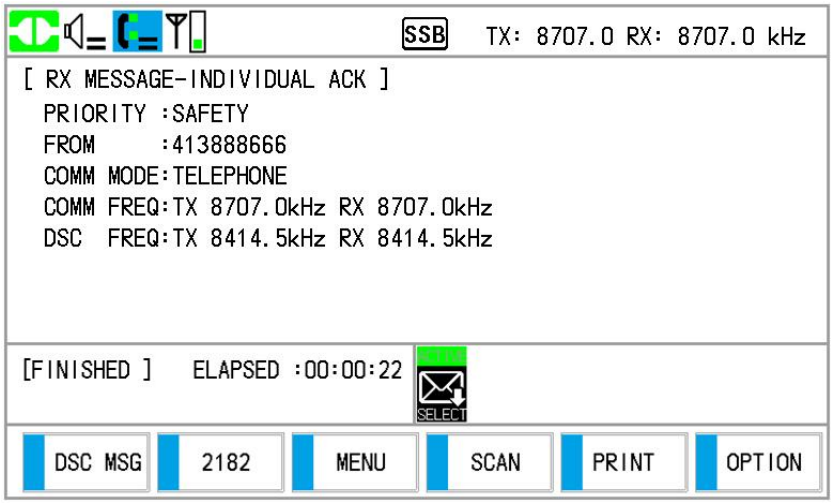


③ After you have completed communications, click **[OPTION]**, select **[Quit]** to the SSB screen.

- **Individual acknowledgement call (new frequency) received:**

This call means that the station you sent the individual call to accepts your call, but requests their frequency.

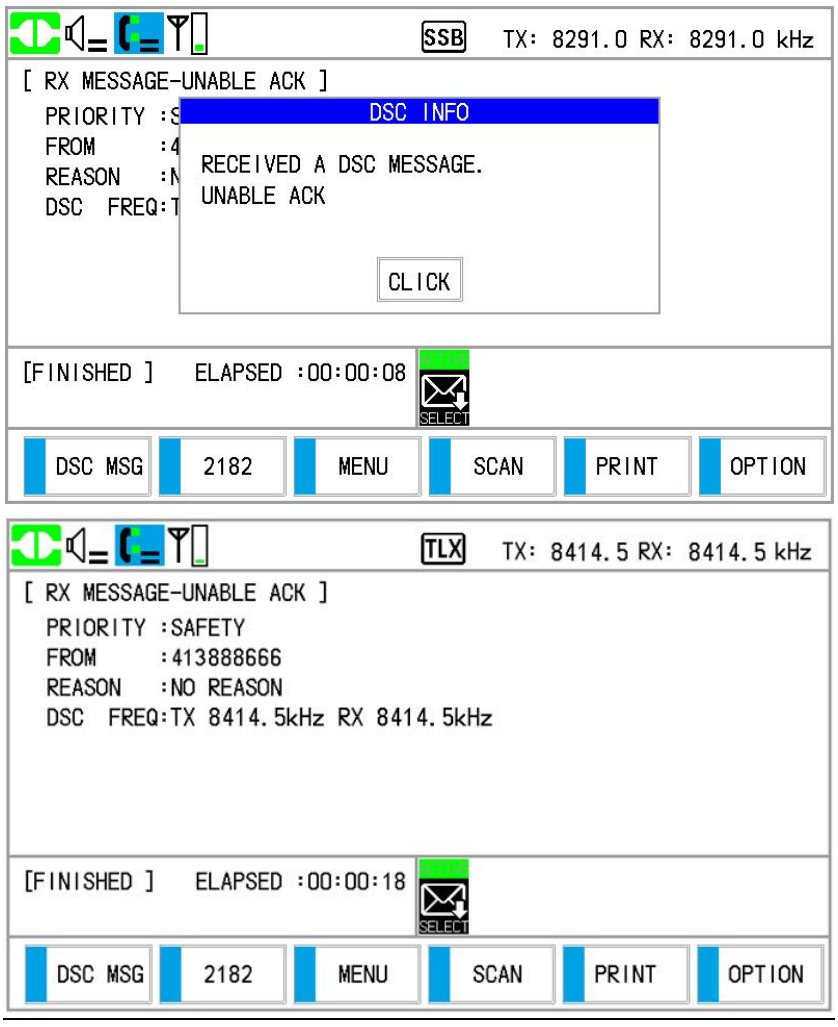
① Click **CLICK** to silence the audio alarm and erase the pop-up message. You can do the communication on the new frequency, whichever the station requests.



② After you have completed communications, click **[OPTION],** select **[Quit]** to the SSB screen.

- **Unable to acknowledge call received:**

① Click **CLICK** to silence the audio alarm and erase the pop-up message. The reason for **[UNABLE ACK]** is displayed on the screen.



Reason for being unable to acknowledge

NO REASON	CONGESTION*
BUSY	QUEUE
STA. BARRED	NO OPERATOR
TEMP. NO ONE	EUT DISABLED
CH UNABLE	MODE UNABLE
NON-ARMED	MED TRANSPORT

*: Coast station use

② Click **[OPTION]**, select **[Quit]** to the SSB screen.

Note: If the coast station sends the message "QUEUE", wait until your turn comes.

If there is no response from the receiving station, do one of the following procedures:
Resend call: Click **[OPTION]**, select **[Resend]**.
Cancel call: Click **[OPTION]**, select **[Quit]**, then select **[Yes]** to cancel the call.

4.3.1.2 Receive an individual call

Unable acknowledgement is sent automatically or manually depending on the acknowledgement method setting. Able acknowledgement is sent only manually.

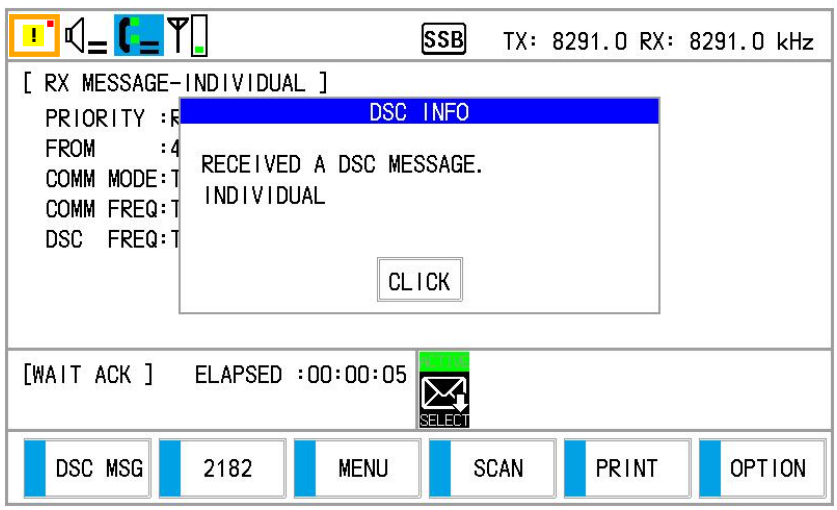
Note: The handset must be on hook and all sessions must be quit to enable automatic acknowledgement.

- **Send unable acknowledgement automatically:**

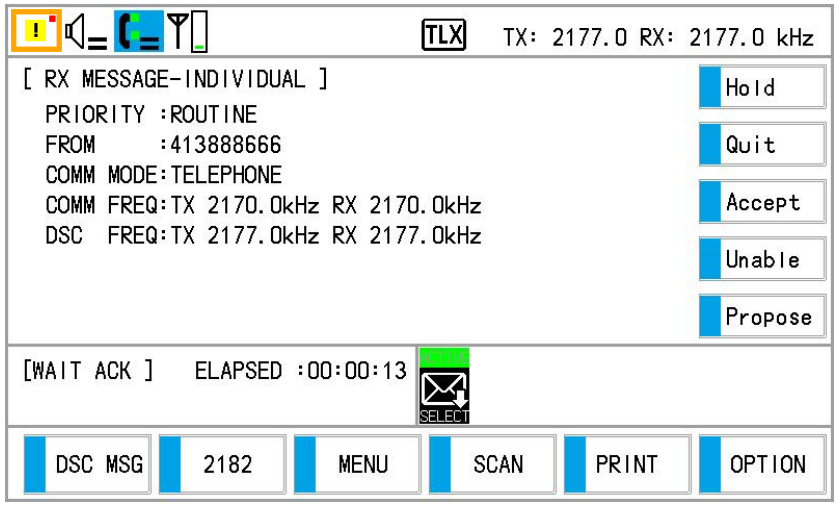
If you cannot use the frequency or mode specified by the sending station, an unable acknowledge [CH UNABLE] is sent automatically. The [ACK SETTING] menu is set to [AUTO-UNABLE]. It takes about seven seconds to transmit the call.

- **Send able/unable acknowledgement manually:**

When an individual call is received with the setting [MANUAL] on the [ACK SETTING] menu, the audio alarm sounds and a pop-up message appears on the screen as follows.

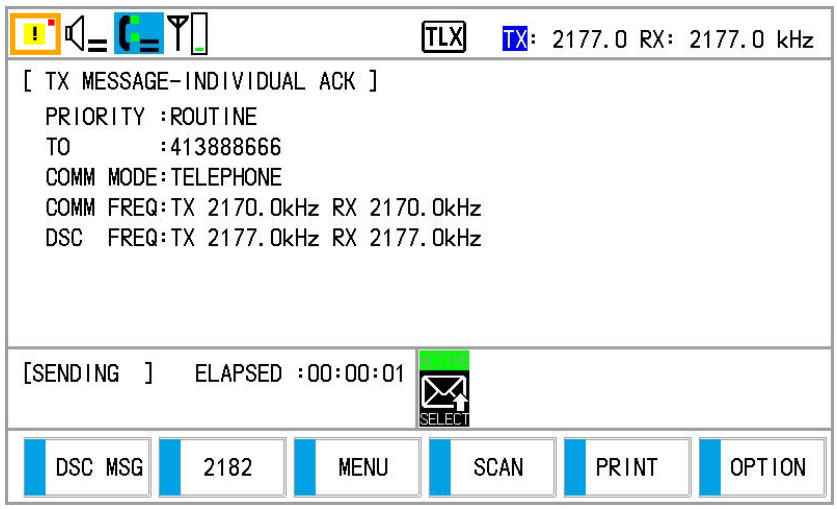


Click **CLICK** to silence the audio alarm and erase the pop-up message.
There are three types of ACK transmission: able acknowledgement, able to change frequency and unable acknowledgement. Click **[OPTION]**, follow the appropriate procedure as follows.



(1) Send able acknowledgement call

① Click **[Accept]**, send the able acknowledgement call.

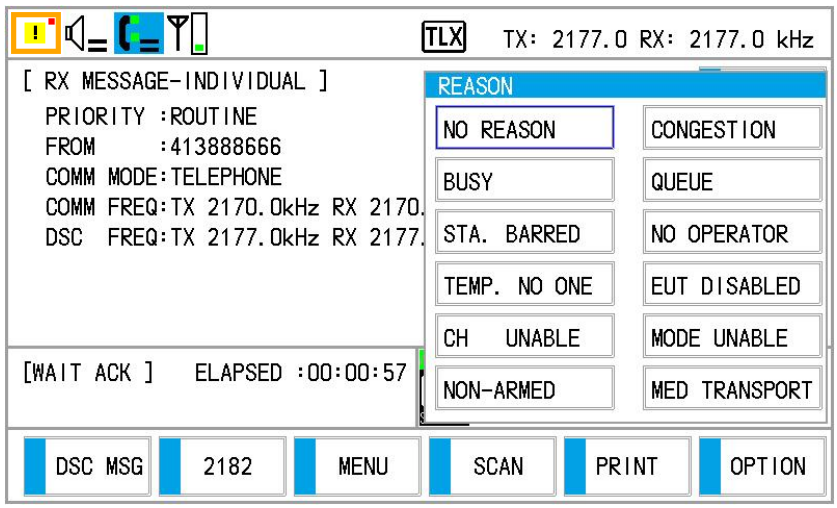


② Communicate by radiotelephone or NBDP.

③ After you have completed communications, click **[OPTION]** to select **[Quit]**.

(2) Send unable acknowledgement call

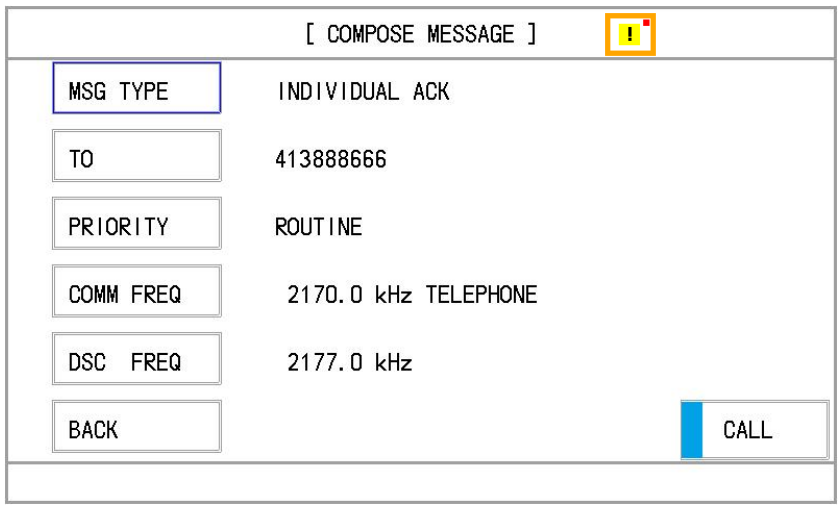
① Click **[Unable]**.



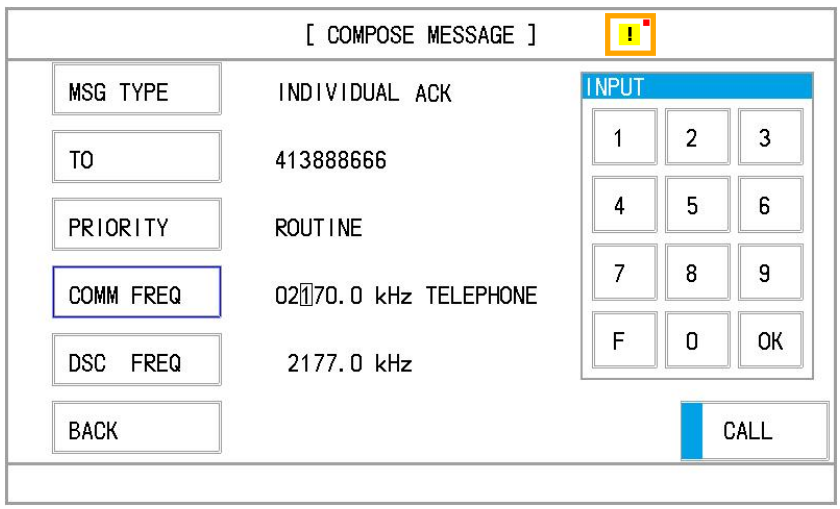
② With **[REASON]** selected, click **[CALL]** to send unable acknowledgement call.

(3) Send able acknowledgement call and change frequency

① Click **[Propose]**, the following screen appears.

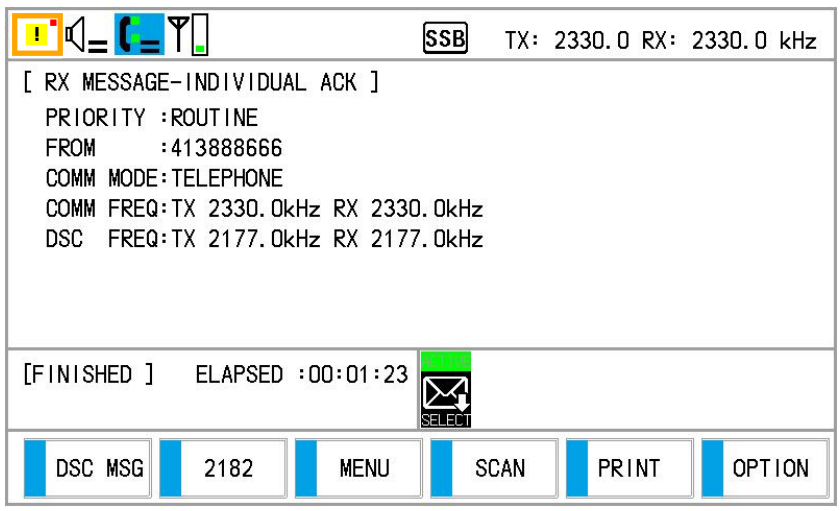


② Click **[COMM FREQ]** or rotate the **PUSH TO ENTER** knob to select **[COMM FREQ]** then push the knob.



③ Set the frequency by the numeric keys and click **OK** to confirm.

④ Click **[CALL]**, send the able to change frequency acknowledge call after tuning is completed well.



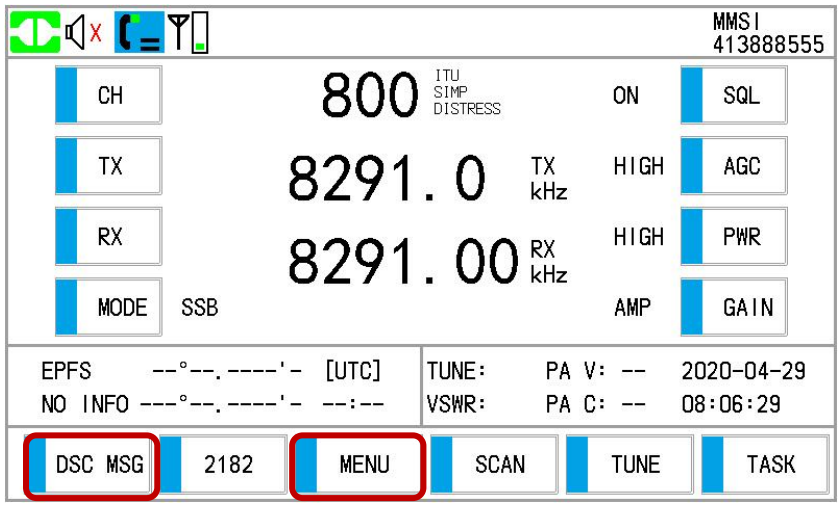
⑤ Communicate by radiotelephone or NBDP.

⑥ After you have completed communications, click **[OPTION]** to select **[Quit]**.

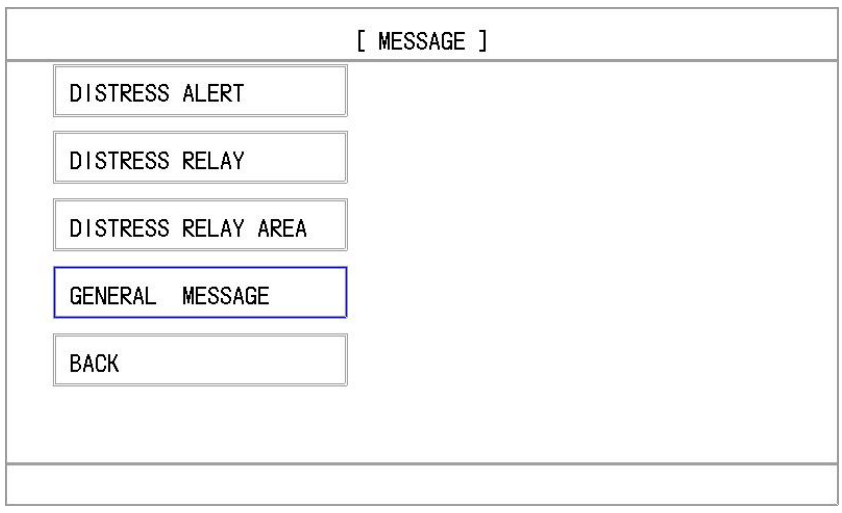
4.3.2 Group Call

Group call is used to call a specific group by specifying its group MMSI.

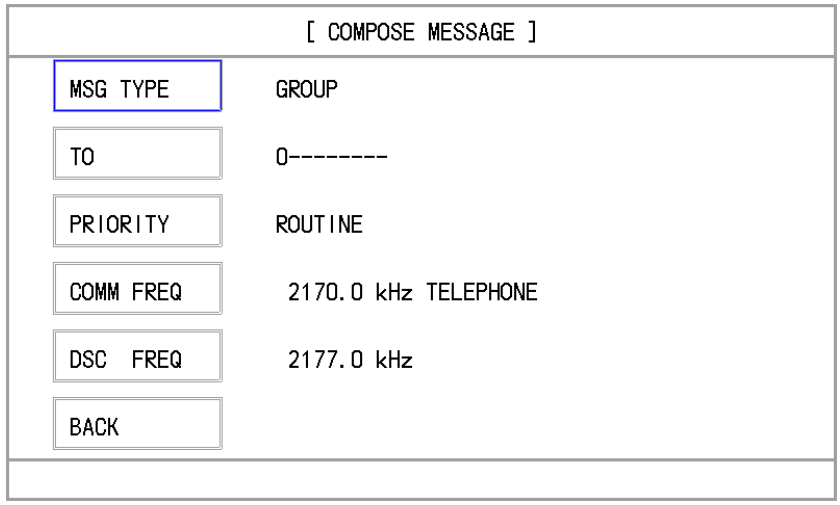
4.3.2.1 Send a group call



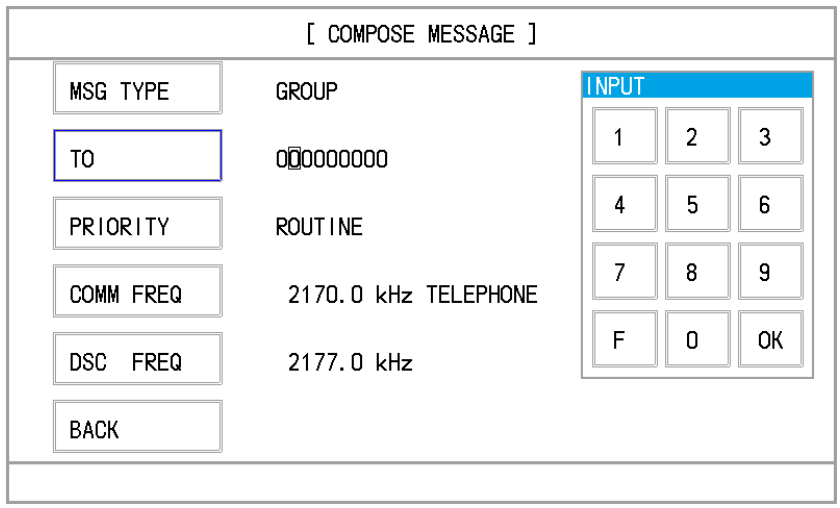
(1) Click **[DSC MSG]**, or click [**MENU]** and choose **[DSC]** – **[MESSAGE]**, then click **[GENERAL MESSAGE]** in **[MESSAGE]**.



(2) Click [**MSG TYPE**] or rotate the **PUSH TO ENTER** knob to select [**MSG TYPE**] then push the knob, select **[GROUP]**.

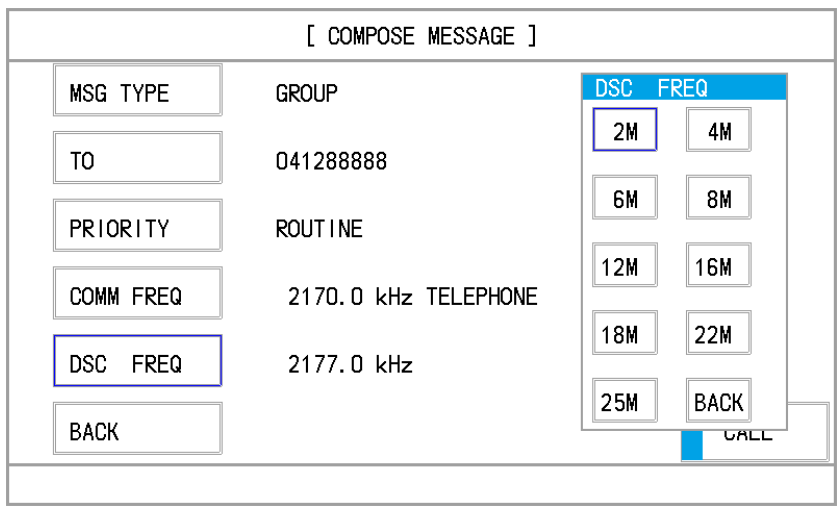


(3) With **[TO]** selected, enter the group MMSI where to send the group call in **[INPUT]**, then click **OK** to confirm.

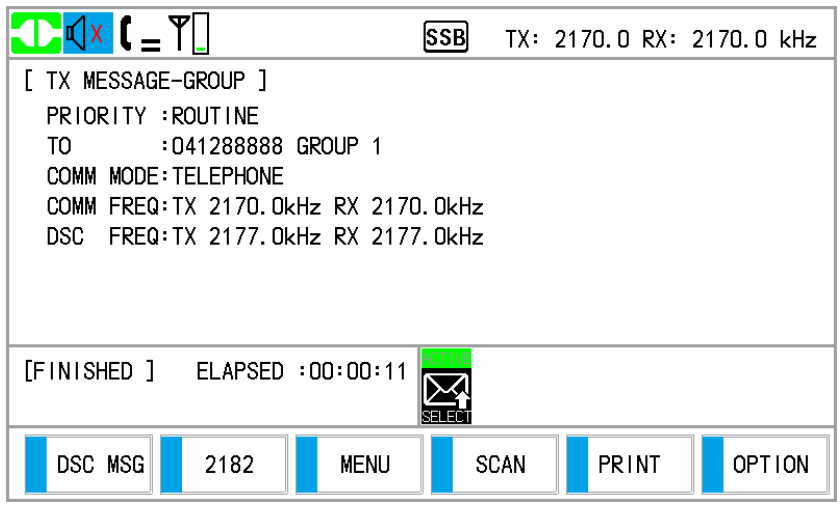


(4) [**PRIORITY**] is automatically selected to **[ROUTINE]**.

(5) Set **[DSC FREQ]** and **[COMM FREQ]** if you need. The procedure is the same as Section 4.3.1.1 (6) - Routine priority.

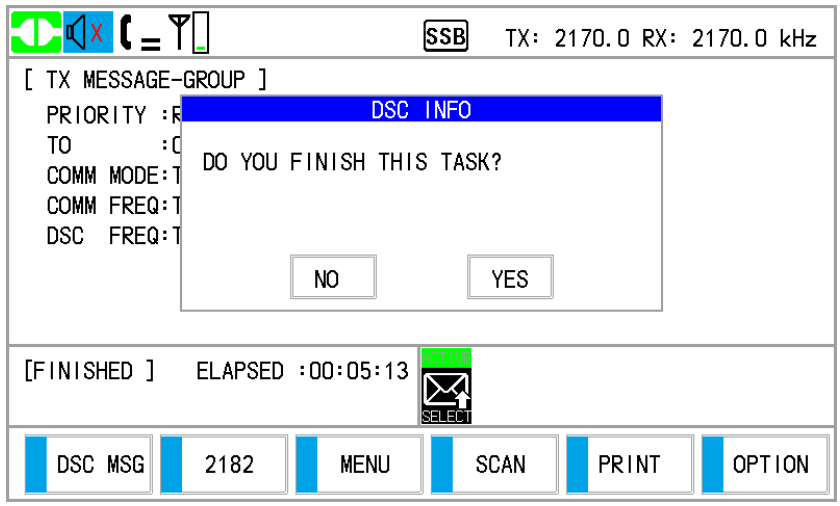


(6) After finishing setting of DSC/communication frequency, click **[CALL]** to send the group call. A caution "START TUNE" appears; click to confirm it. When normal tuning is complete, the call is sent out. The screen changes as follows.

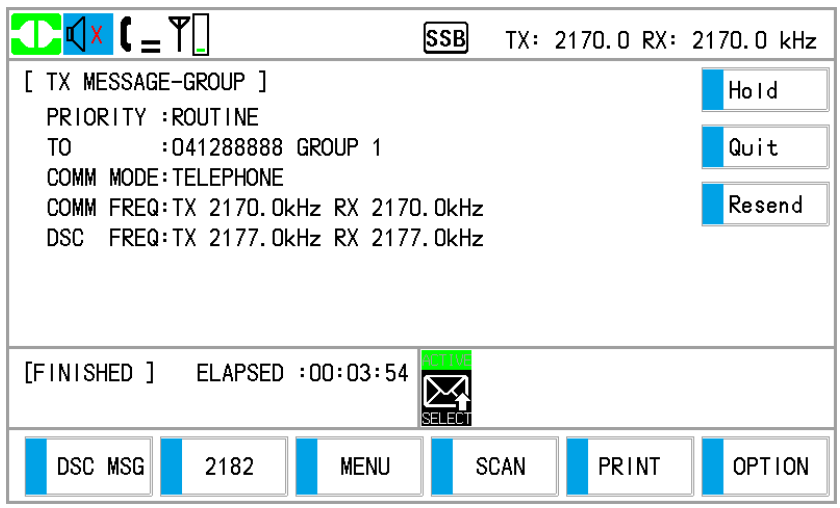


Communicate by radiotelephone or NBDP.

(7) After you have completed communications, click **[OPTION]**, select **[Quit]** and click **YES** to the SSB screen.



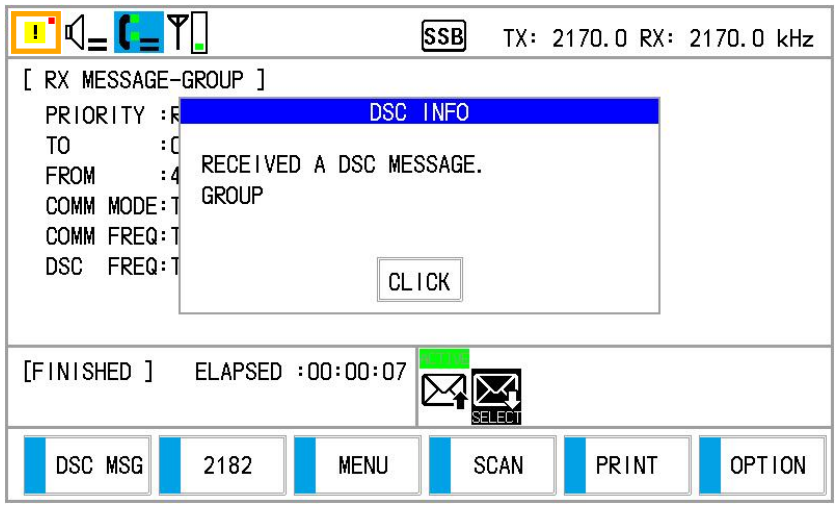
(8) You can also do the option: **[Hold]** or /**[Resend]**.



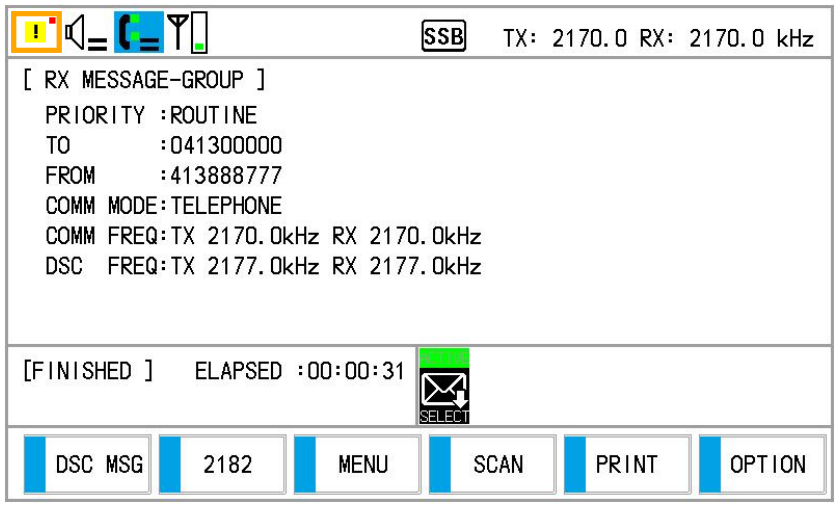
4.3.2.2 Receive a group call

Group MMSI must be registered in order to receive a group call. Refer to Section 2.10.

When a group call is received, the audio alarm sounds. The icon () appears in the tab area, and the pop-up message "RECEIVED A DSC MESSAGE. GROUP" appears.



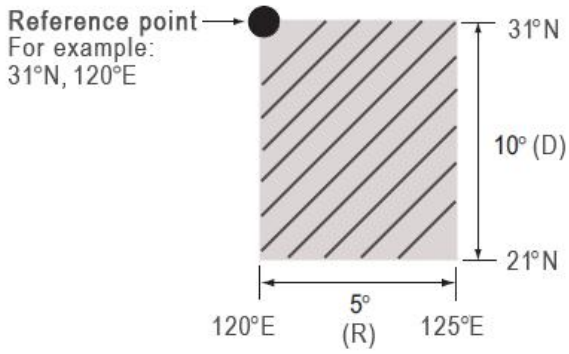
(1) Click **CLICK** to silence the audio alarm and erase the pop-up message.
The frequency is automatically tuned to the received frequency.



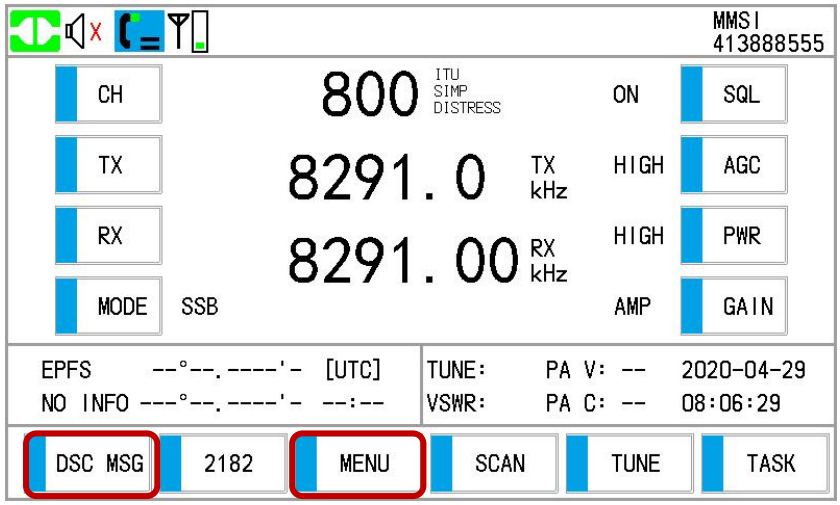
(2) Watch on the working frequency. Communicate by radiotelephone or NBDP.
(3) After you have completed communications, click **[OPTION]** to select **[Quit]**.

4.3.3 Area Call

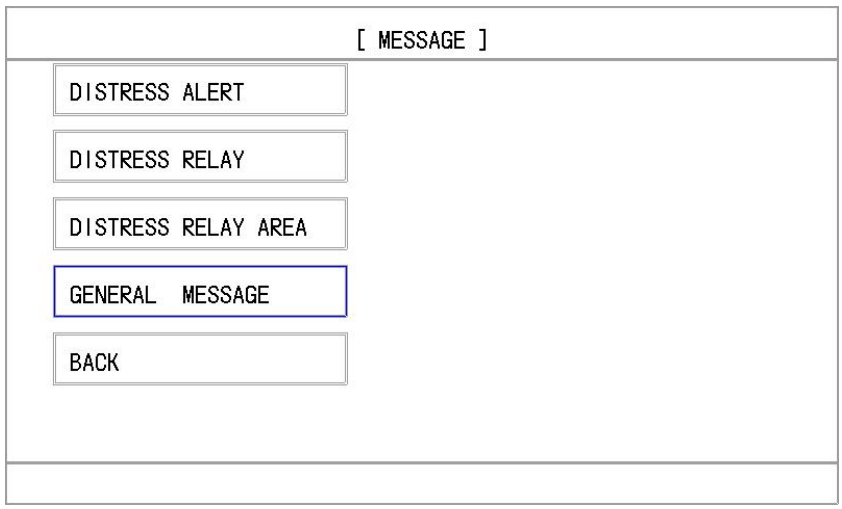
The purpose of a geographical area call is to send a call to all ships within the area you designate. In the figure below, for example, the call is sent to all ships within an area from 21-31°N, 120-125°E.



4.3.3.1 Send an area call



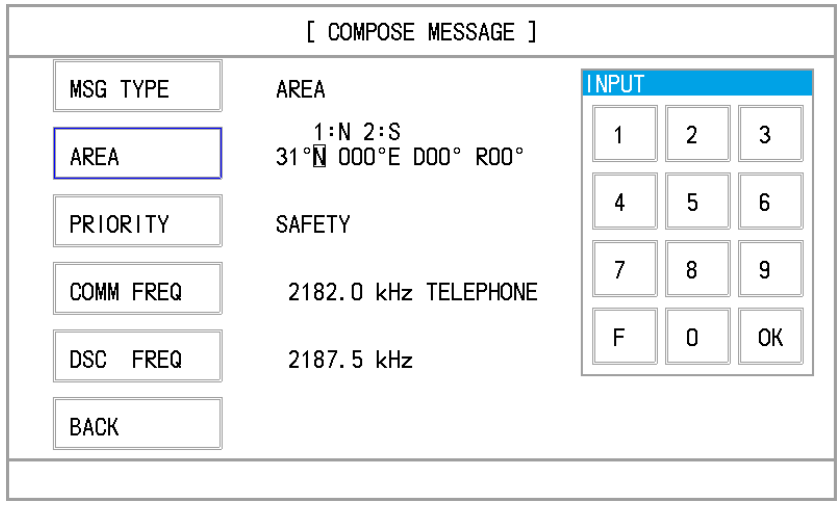
(1) Click **[DSC MSG]**, or click [**MENU**] and choose **[DSC]** – **[MESSAGE]**, then click **[GENERAL MESSAGE]** in **[MESSAGE]**.



(2) Click [**MSG TYPE**] or rotate the **PUSH TO ENTER** knob to select [**MSG TYPE**] then push the knob, select **[AREA]**.

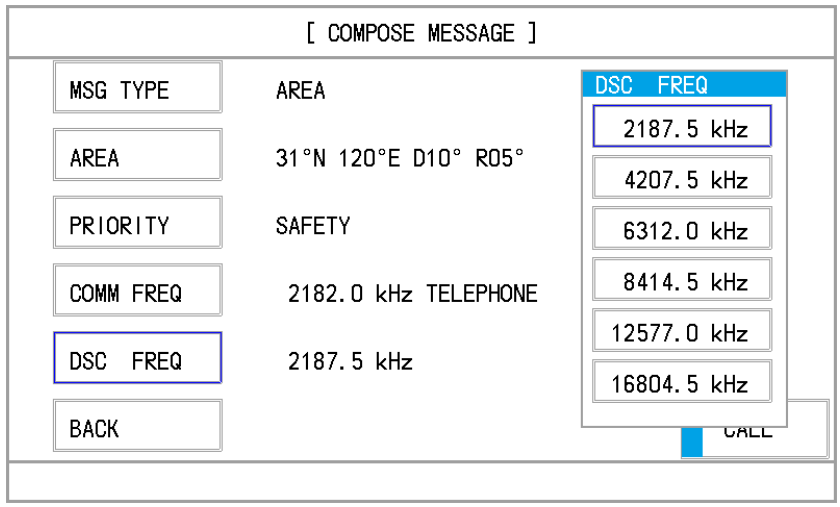
(3) Click **[AREA]**, enter the latitude and longitude of the reference point and the range of area by using the numeric keys. To change the coordinate, select it and click **1** for North or East, **2** for South or West.

After entering data, click **OK** to finish.

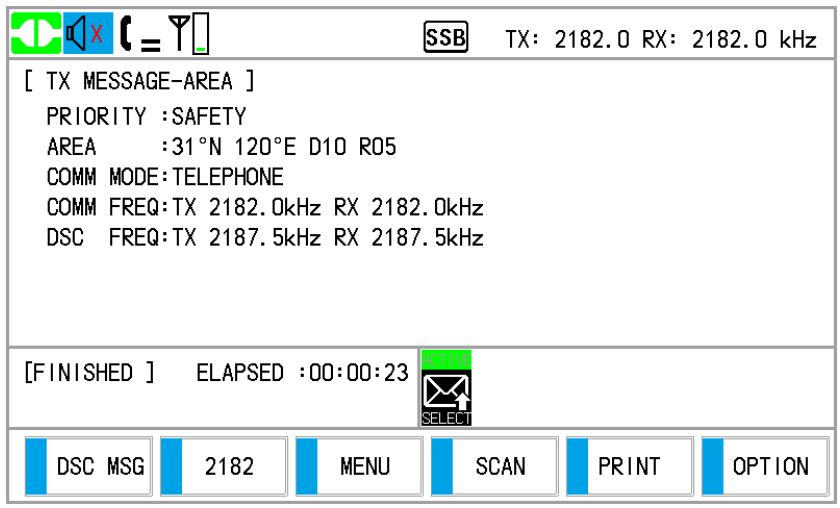


(4) Click [**PRIORITY**] to select [**URGENCY**] or [**SAFETY**].

(5) Set [**DSC FREQ**] and [**COMM FREQ**] if you need. The procedure is the same as Section 4.3.1.1 (6) - Urgency or safety priority.

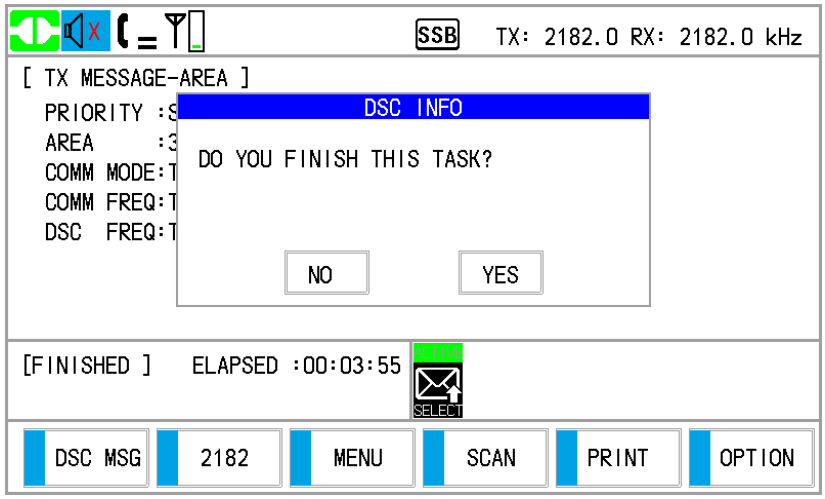


(6) Click **[CALL]** to send the call. A caution "START TUNE" appears; click to confirm it. When normal tuning is complete, the call is sent out. The screen changes as follows.

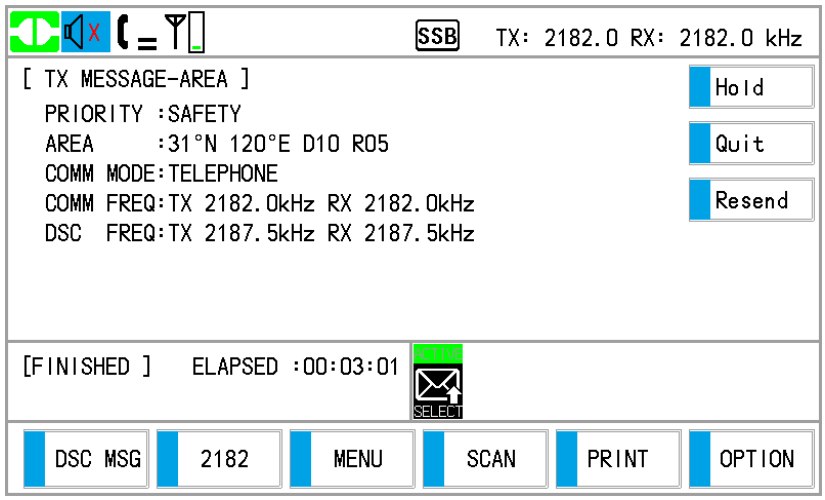


Communicate by radiotelephone or NBDP.

(7) After you have completed communications, click **[OPTION]**, select **[Quit]** and click **YES** to the SSB screen.

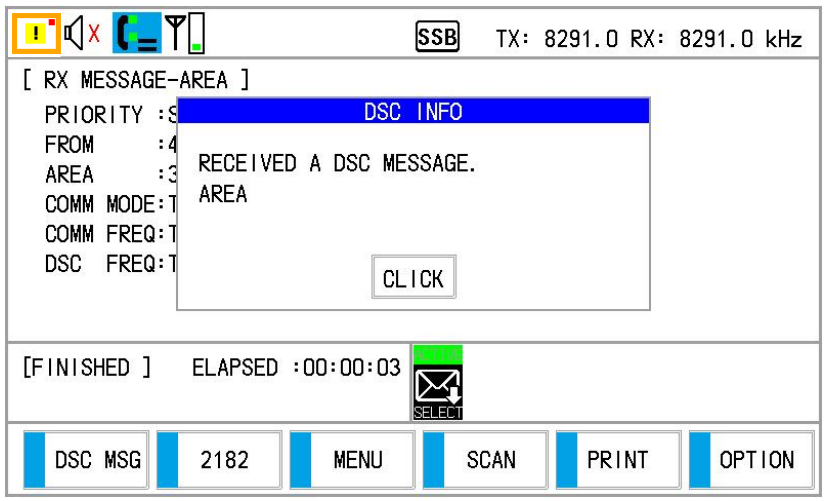


(8) You can also do the option: **[Hold]** or **[Resend]**.

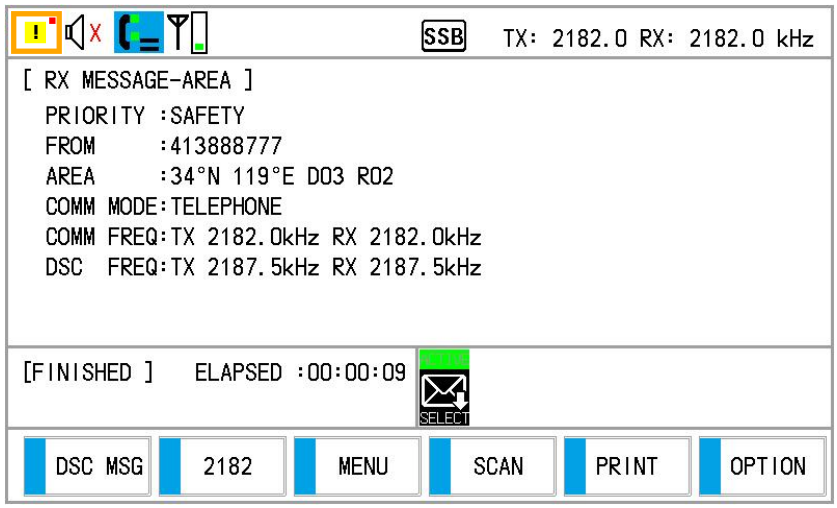


4.3.3.2 Receive an area call

When you receive a geographical area message, the audio alarm sounds. The icon () appears in the tab area, and the pop-up message "RECEIVED A DSC MESSAGE. AREA" appears.



(1) Click **CLICK** to silence the audio alarm and erase the pop-up message. The frequency is automatically tuned to the received frequency.

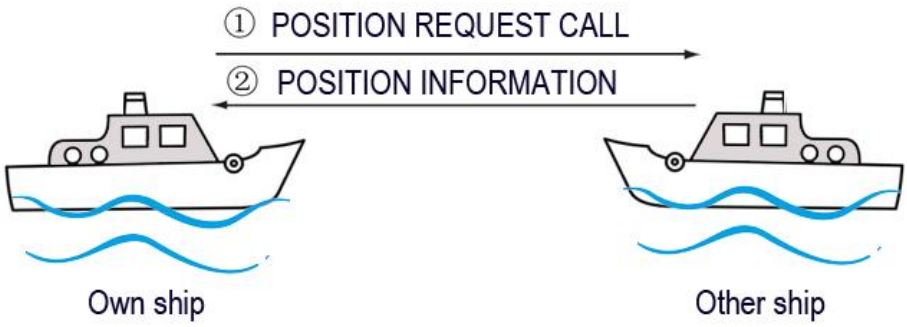


(2) Watch on the working frequency. Communicate by radiotelephone or NBDP.
(3) After you have completed communications, click **[OPTION]** to select **[Quit]**.

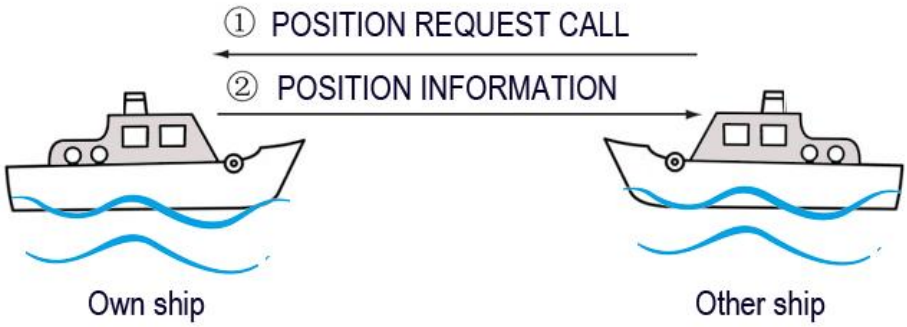
4.3.4 Position Call

There are two types of position calls: own ship requests another ship's position and other station requires own ship's position.

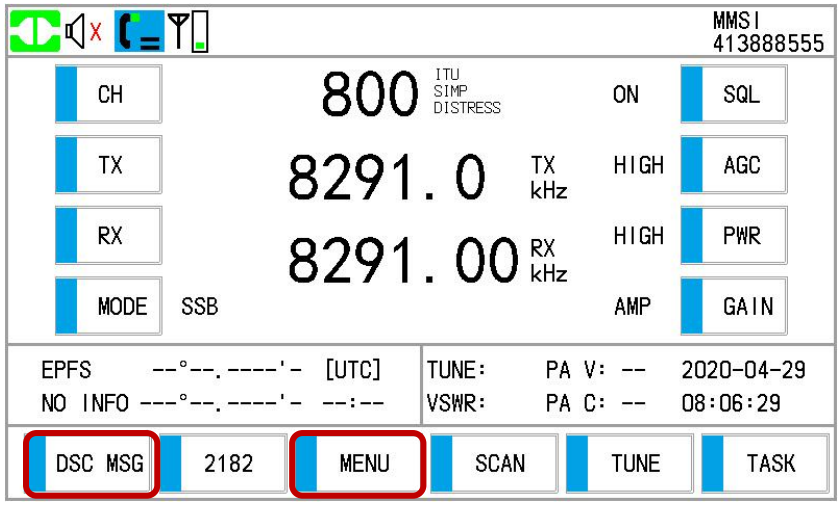
- **Request the position of other station:**



- **Send own ship's position to other station:**



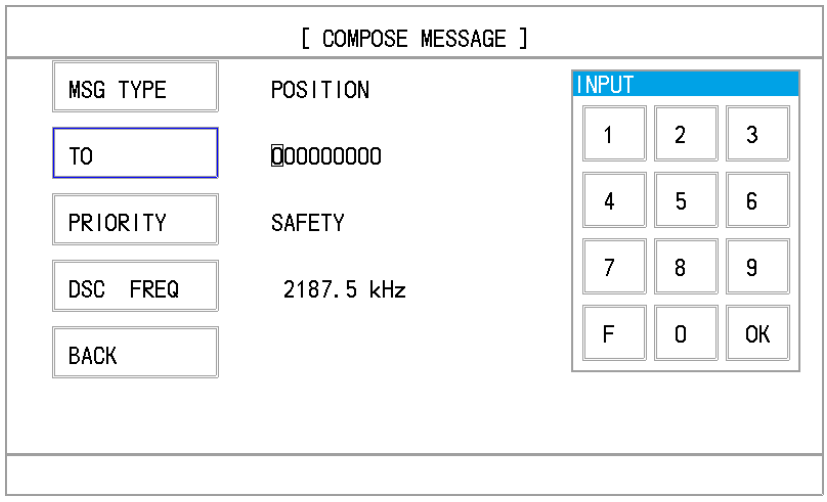
4.3.4.1 Request other ship's position



(1) Click **[DSC MSG]**, or click [**MENU]** and choose **[DSC]** – **[MESSAGE]**, then click **[GENERAL MESSAGE]** in **[MESSAGE]**.

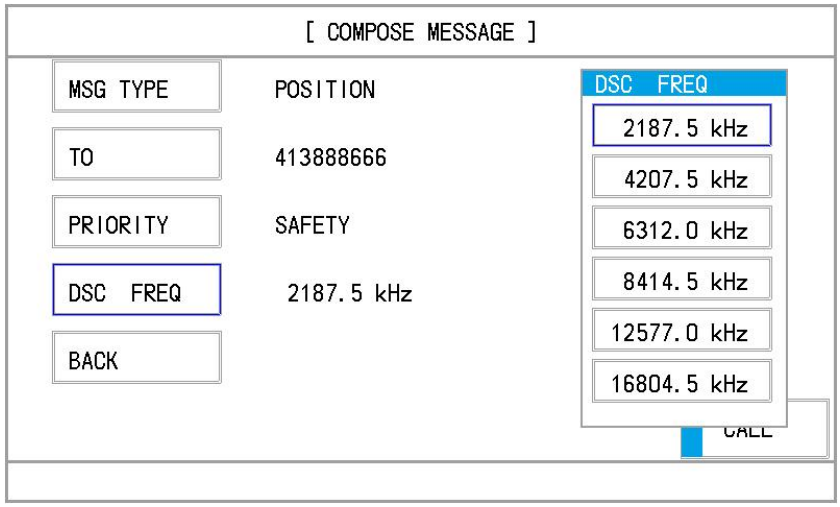
(2) Click [**MSG TYPE**] or rotate the **PUSH TO ENTER** knob to select [**MSG TYPE**] then push the knob, select **[POSITION]**.

(3) Click **[TO]**, enter the MMSI where to send the position call in **[INPUT]**, then click **OK** to confirm.

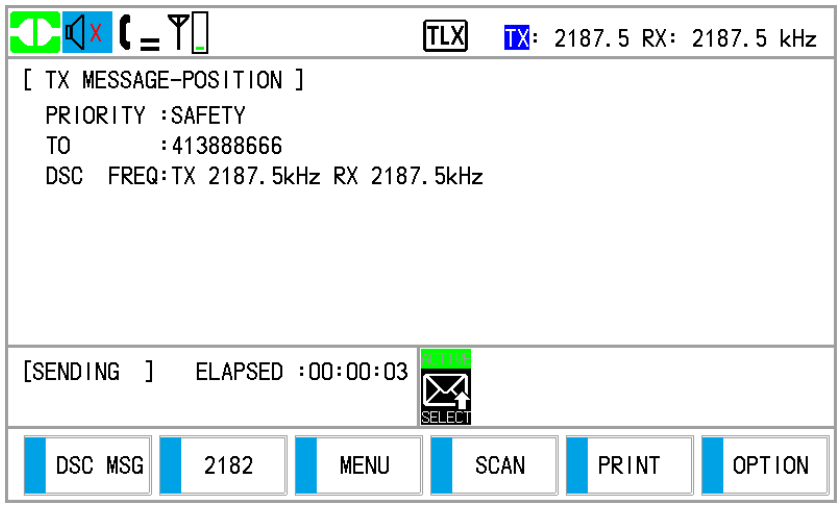


(4) [**PRIORITY**] is automatically selected to **[SAFETY]**.

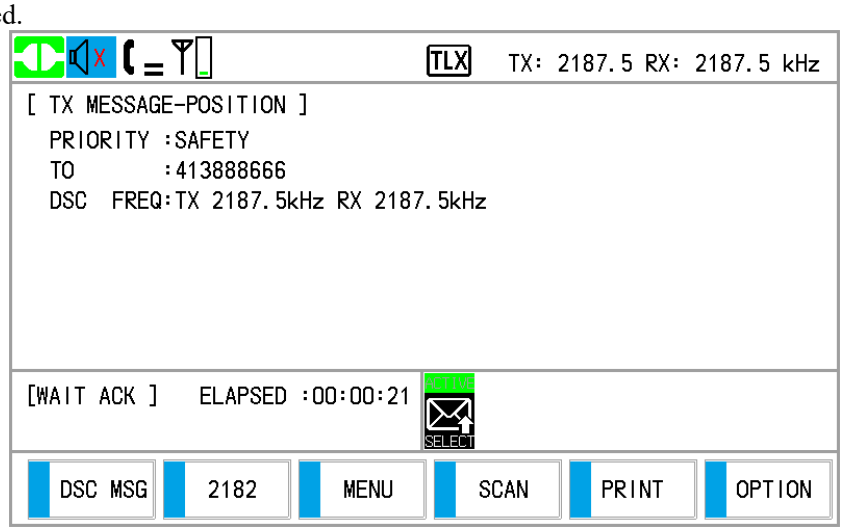
(5) Click **[DSC FREQ]** to set the DSC frequency.



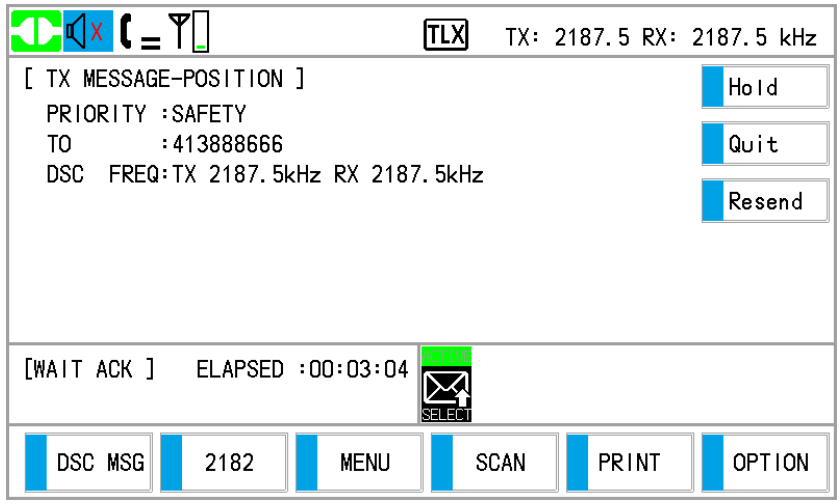
(6) Click [**CALL**] to send the position call. A caution "START TUNE" appears; click to confirm it. When normal tuning is complete, the call will be sent out. The screen changes as follows.



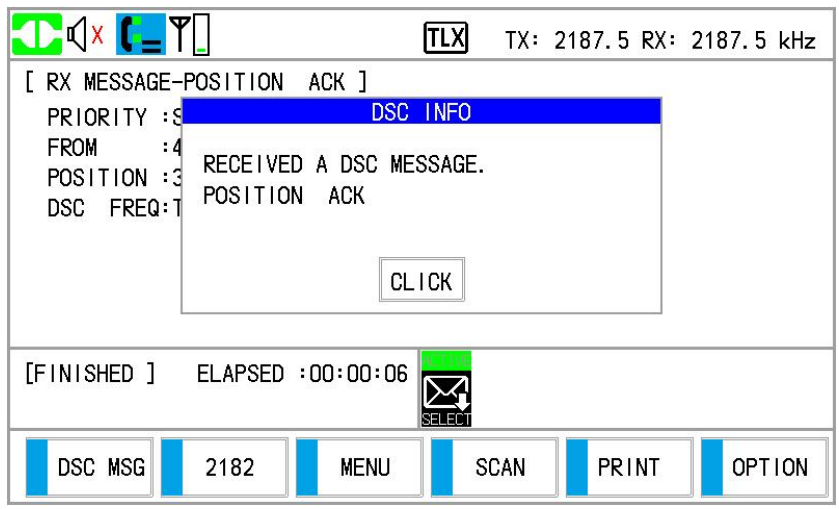
(7) After the call has been sent, the **[WAIT ACK]** screen appears as follows. The elapsed time since sending the call is displayed.



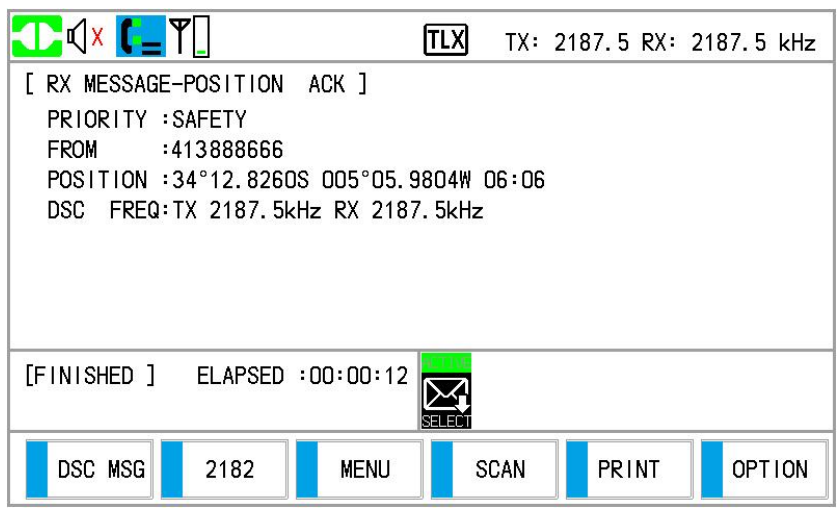
You can also do the option during waiting acknowledgement: **[Hold], [Quit]** or **[Resend]**.



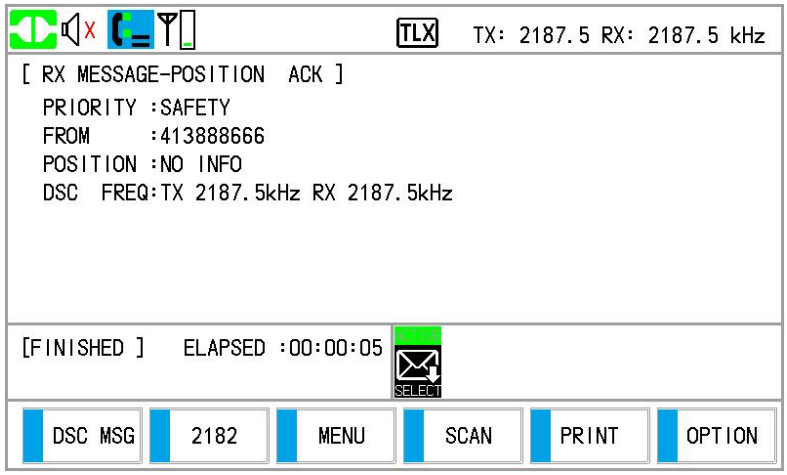
(8) When you receive an acknowledgement message, the audio alarm sounds and a pop-up message appears.



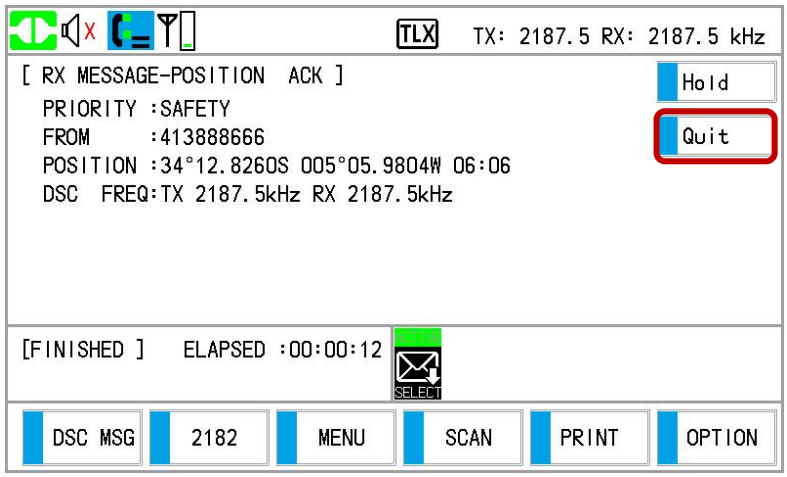
(9) Click **CLICK** to silence the audio alarm and erase the pop-up message.



If you receive and unable acknowledge message (no position information), the screen is as follows:



(10) Click **[OPTION]**, select **[Quit]** to go back to the SSB screen.



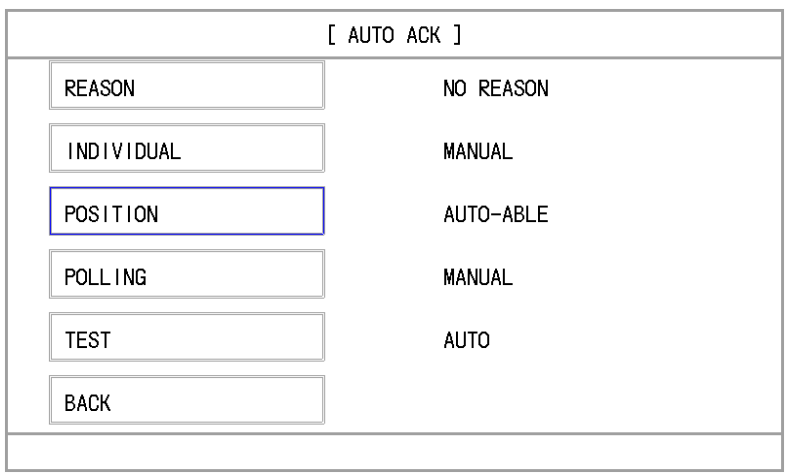
4.3.4.2 Receive a position request call

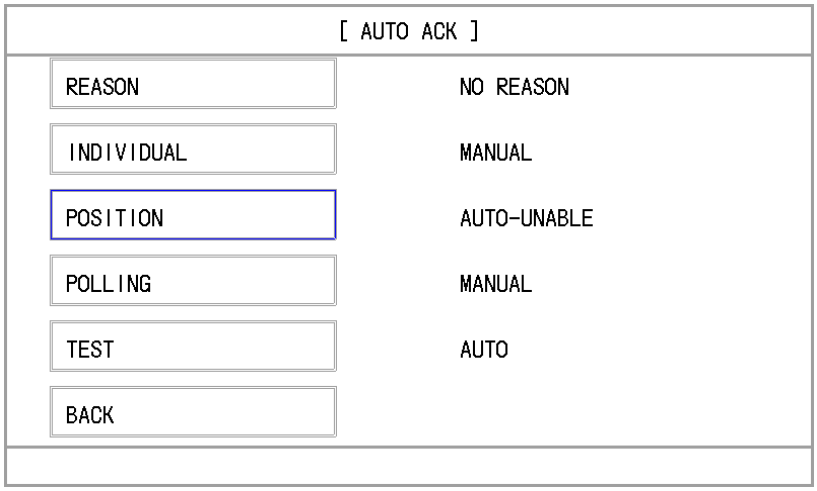
You can enable automatic acknowledgement of position request with [**POSITION**] on the [**ACK SETTING**] menu.

- **Automatic reply**

When another ship requests your position and the setting of [**POSITION**] on the [**ACK SETTING**] menu is [**AUTO**], the equipment automatically transmits a reply.

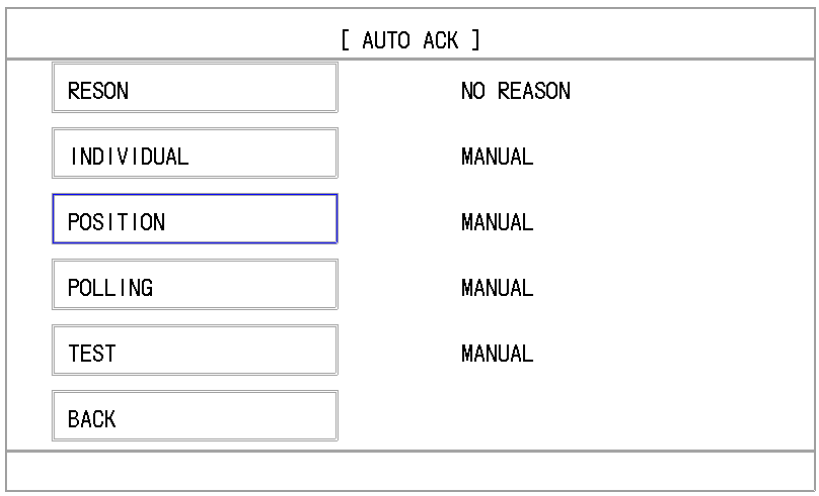
There are two types of automatic replies: one with position information (the setting is **[AUTO-ABLE]**) and the other with no position information (the setting is **[AUTO-UNABLE]**).



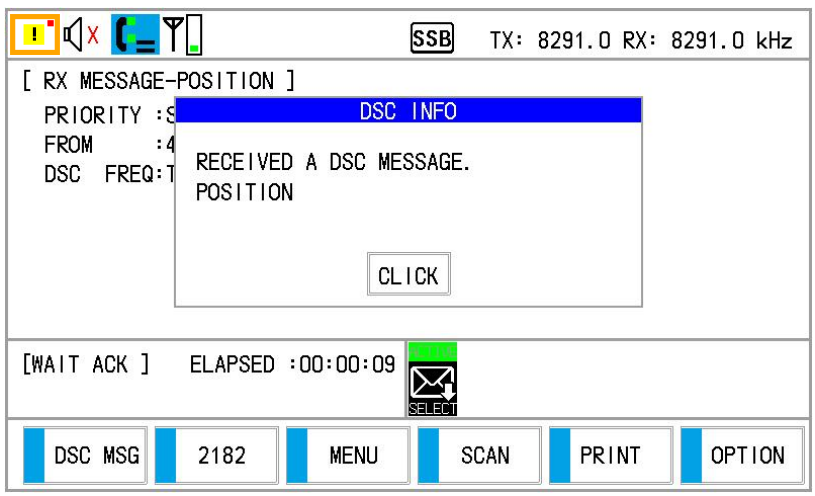


- **Manual reply**

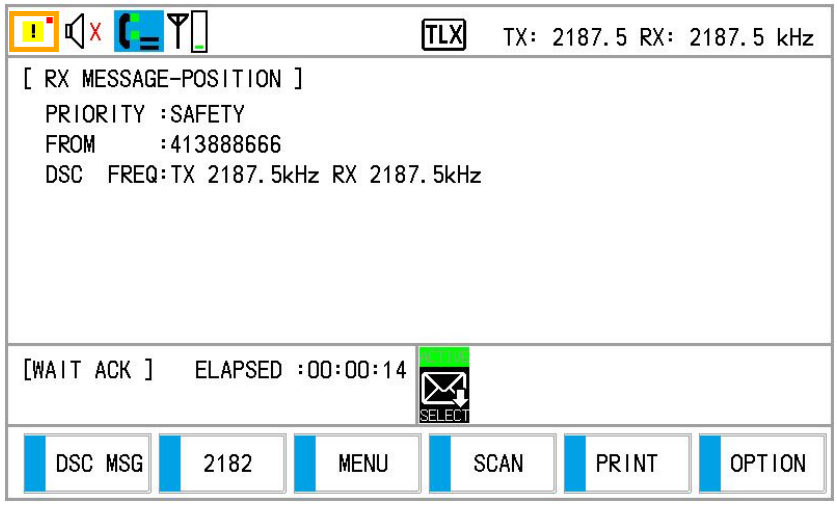
When a position request message is received and the setting of [**POSITION**] on the [**ACK SETTING**] menu is **[MANUAL]**, send the reply manually.



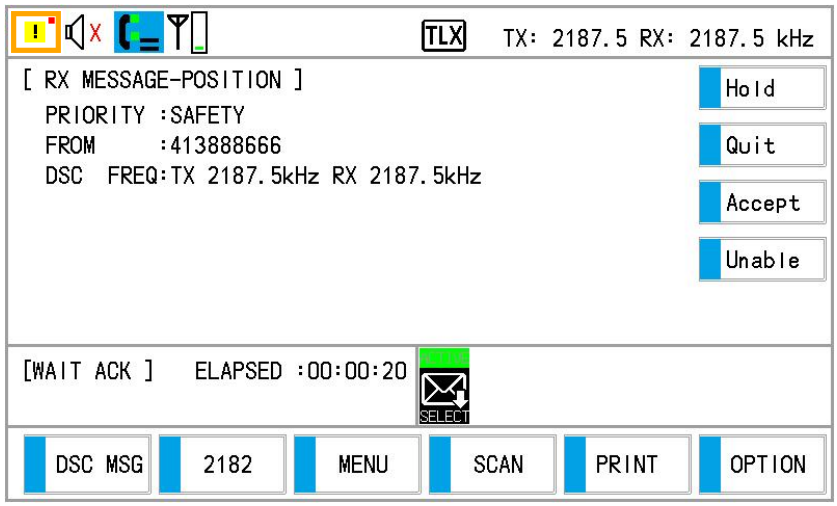
When you receive a position request call, the audio alarm sounds. The icon ( ) appears in the tab area, and the pop-up message "RECEIVED A DSC MESSAGE. POSITION" appears.



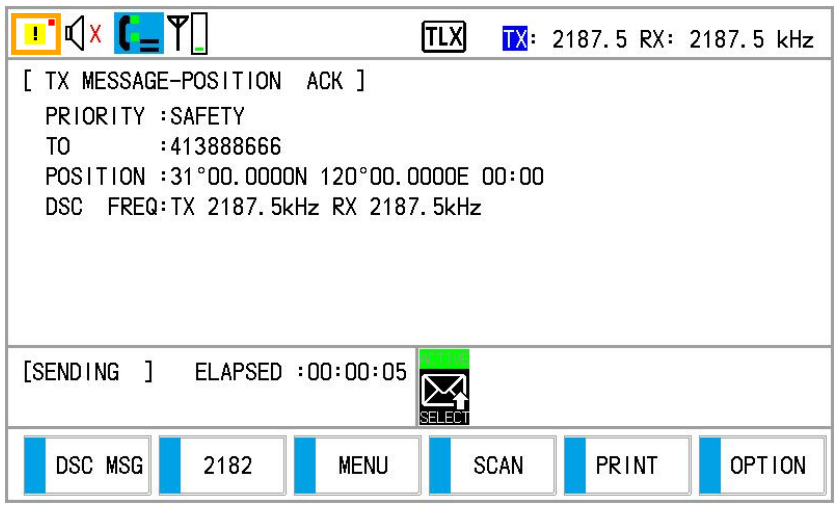
(1) To silence the audio alarm, click **CLICK**.



(2) Click **[OPTION]**, do the operation as follows.

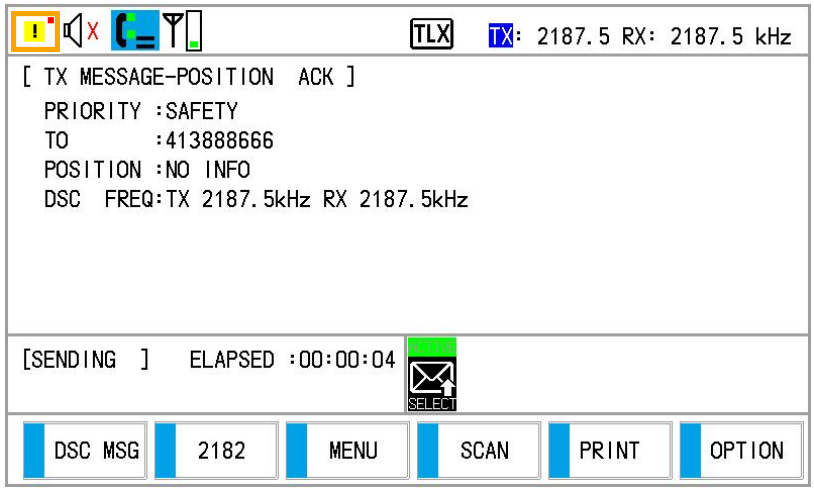


- Send the ACK with position information:
  Click **[Accept]**, send the position information of own ship.



- To send the ACK with no position information:

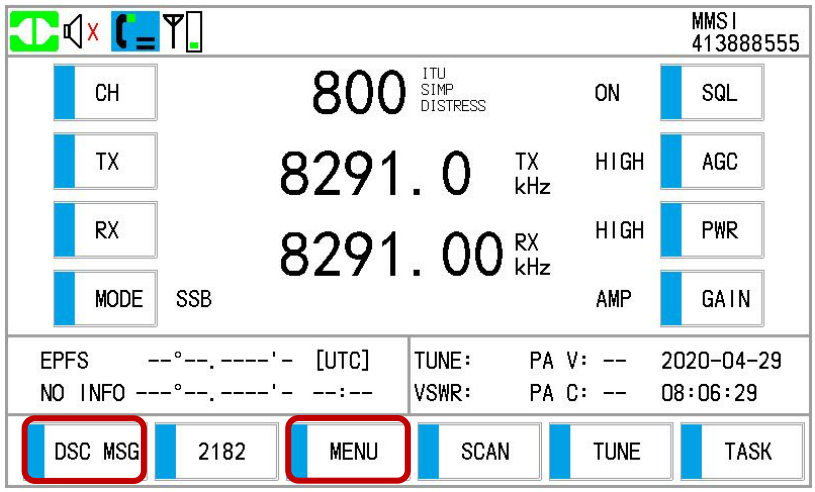
Click **[Unable]**. The screen changes as follows.



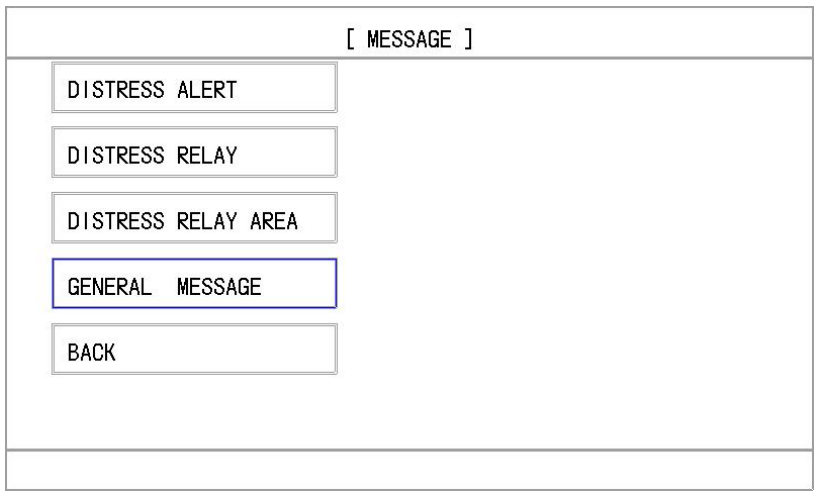
(3) After the ACK is finished, click **[OPTION]** to select **[Quit]**.

4.3.5 Test Call

4.3.5.1 Send a test call

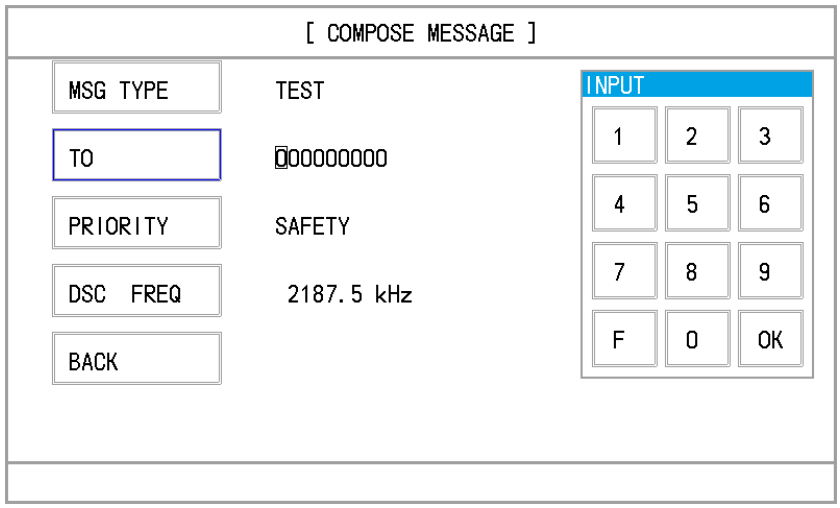


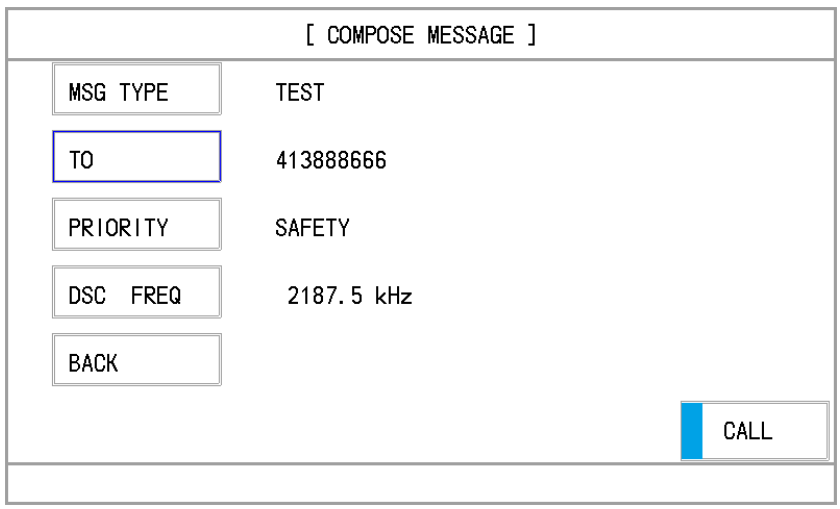
(1) Click **[DSC MSG]**, or click **[MENU]** and choose **[DSC]** – **[MESSAGE]**, then click **[GENERAL MESSAGE]** in **[MESSAGE]**.



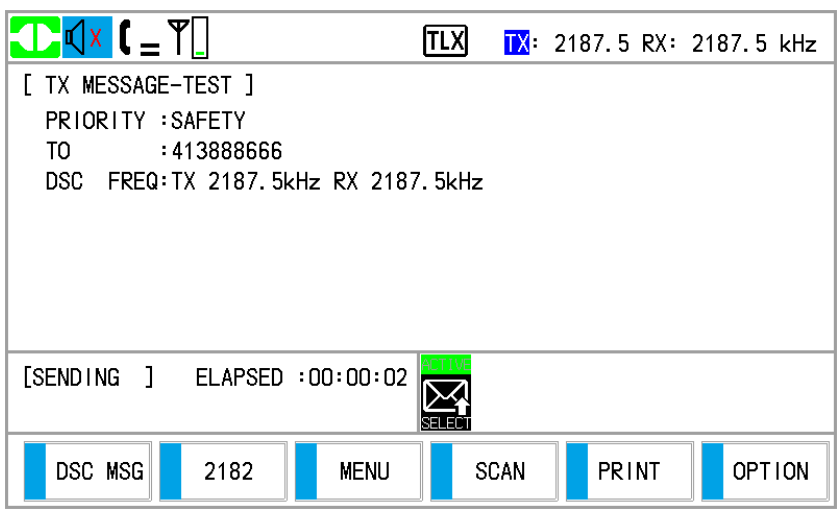
(2) Click [**MSG TYPE**] or rotate the **PUSH TO ENTER** knob to select [**MSG TYPE**] then push the knob, select **[TEST]**.

(3) Click **[TO]**, enter the MMSI where to send the test call in **[INPUT]**, then click **OK** to confirm.

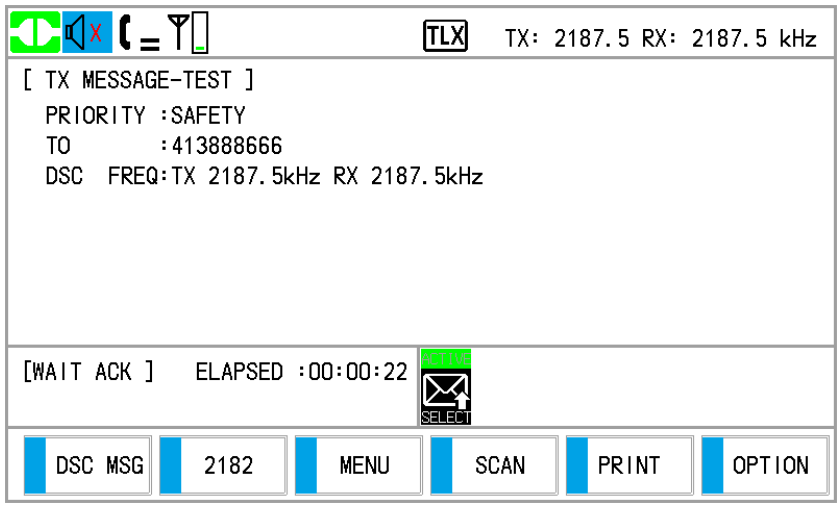




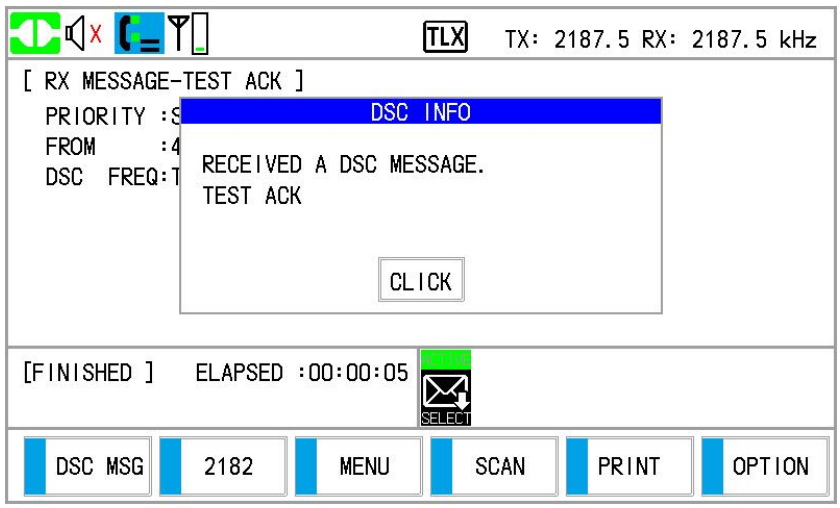
(4) Click [**CALL**] to send the test call. A caution "START TUNE" appears; click to confirm it. When normal tuning is complete, the call will be sent out. The screen changes as follows.



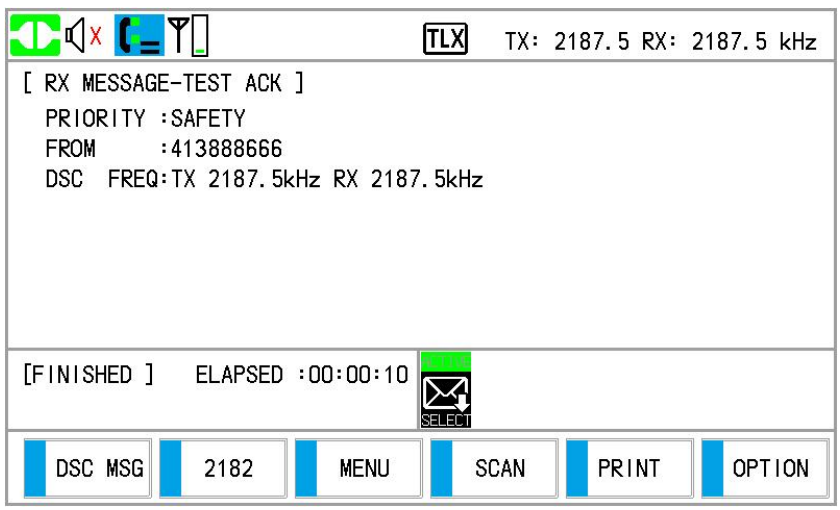
(5) After the call has been sent, the **[WAIT ACK]** screen appears as follows. The elapsed time since sending the call is displayed.



(6) When you receive an acknowledgement message, the audio alarm sounds and a pop-up message appears.



(7) Click **CLICK** to silence the audio alarm and erase the pop-up message.



(8) Click **[OPTION]**, select **[Quit]** to go back to the SSB screen.

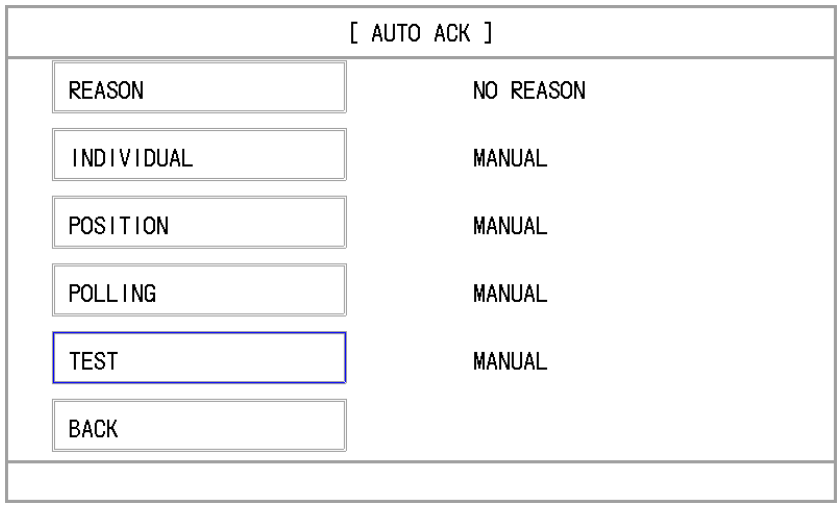
4.3.5.2 Receive a test call

- **Automatic acknowledge**

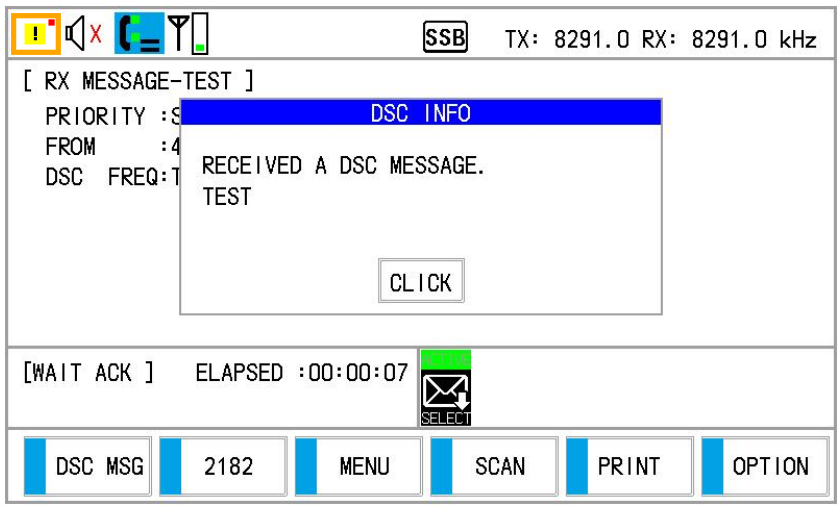
When a test call is received with **[AUTO]** setting on **[TEST]** of the **[ACK SETTING]** menu, an acknowledgement is sent automatically.

- **Manual reply**

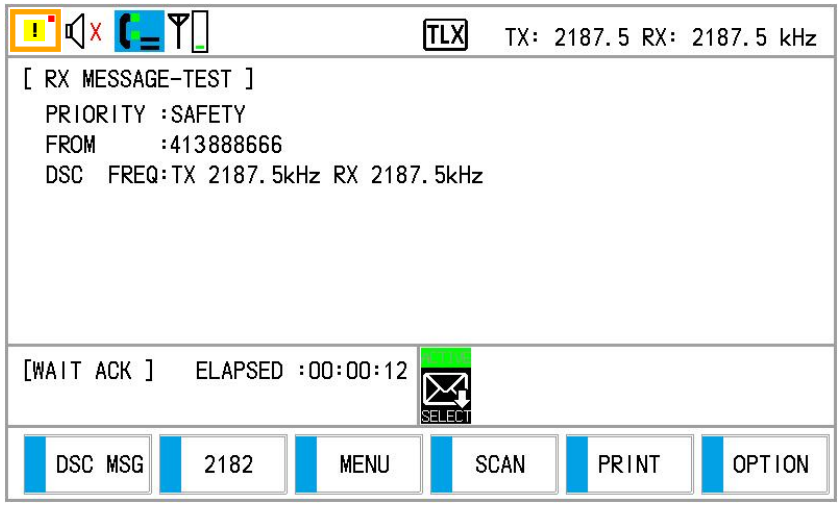
When a test call is received and the setting of **[TEST]** on the [**ACK SETTING**] menu is **[MANUAL]**, send the acknowledgement manually.



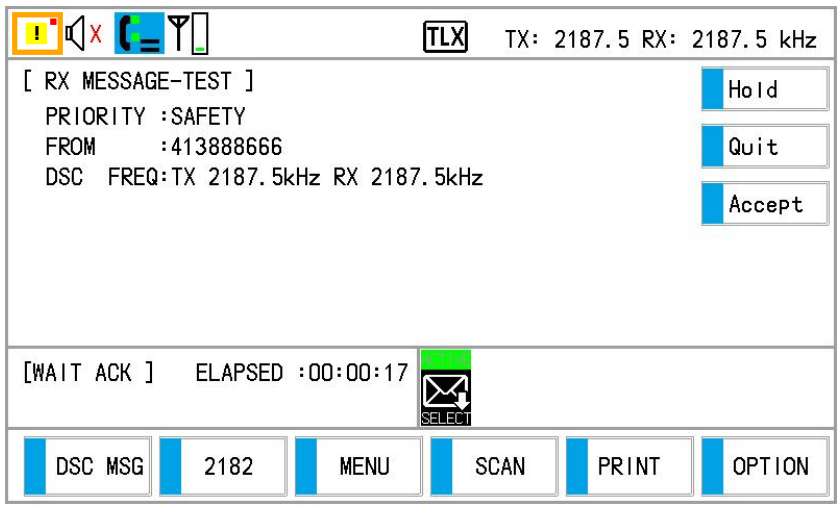
When you receive a test call, the audio alarm sounds. The icon ( ) appears in the tab area, and the pop-up message "RECEIVED A DSC MESSAGE. TEST" appears.



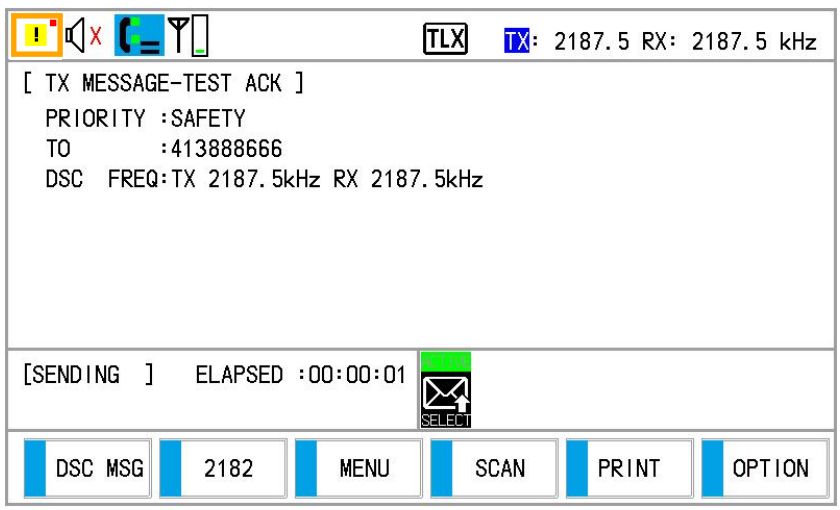
(1) To silence the audio alarm, click **CLICK**.



(2) Click **[OPTION]**, choose one of the operations: **[Hold]**, **[Quit]** or **[Accept]**.



If you click **[Accept]**, the test acknowledgement will be sent.



After the acknowledgement is finished, click **[OPTION]** to select **[Quit]**.

***Note**: Due to location, time, weather, and other factors, HF radio propagation is significantly affected by the ionosphere. This may cause unstable results in DSC test calls - sometimes calls succeed while other times fail, and the same occurs on different channels.*

4.3.6 Polling Call

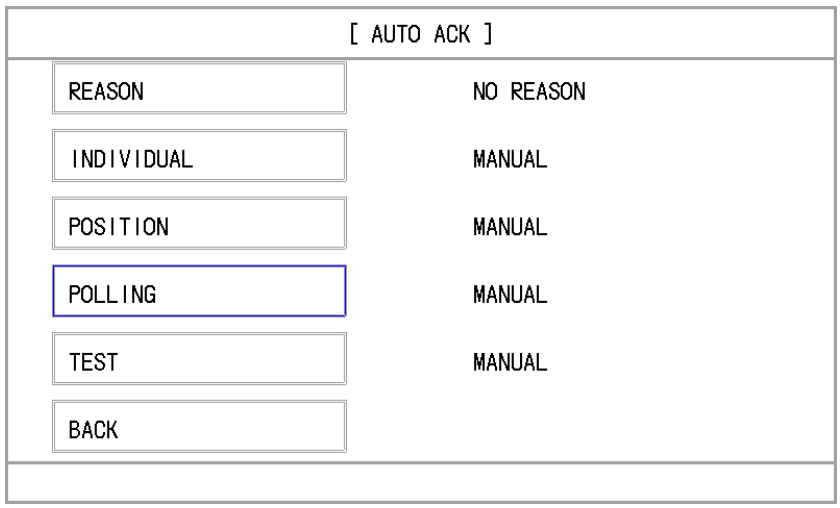
Polling means that another ship wants to confirm if it is within communication range of own ship.

4.3.6.1 Automatic reply

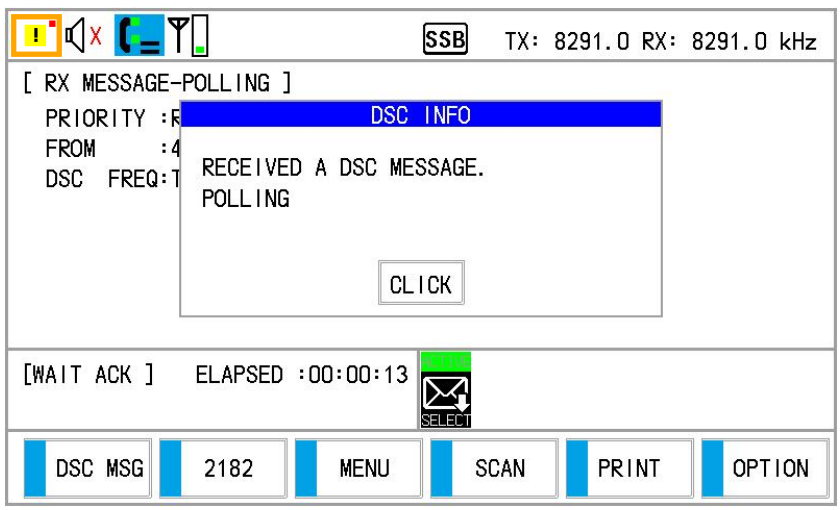
When a polling request message is received with **[AUTO]** setting on **[POLLING]** of the **[ACK SETTING]** menu, an acknowledgement is sent automatically.

4.3.6.2 Manual reply

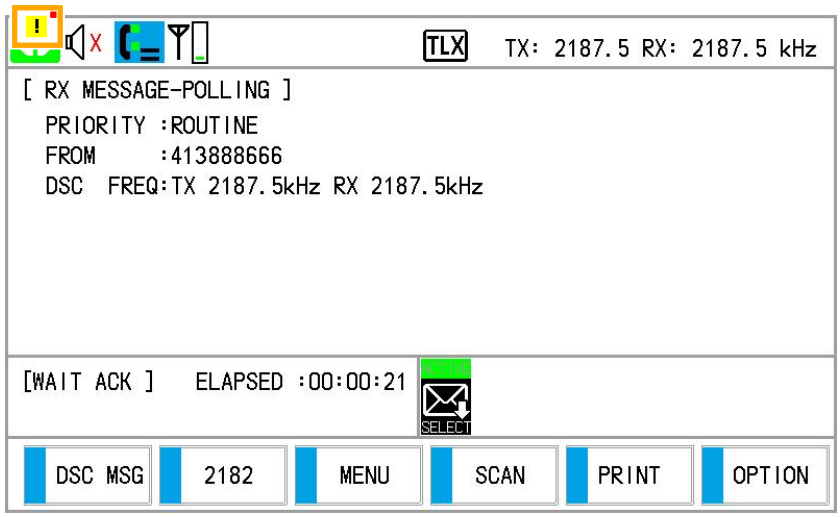
When a polling call is received and the setting of **[POLLING]** on the [**ACK SETTING**] menu is **[MANUAL]**, send the acknowledgement manually.



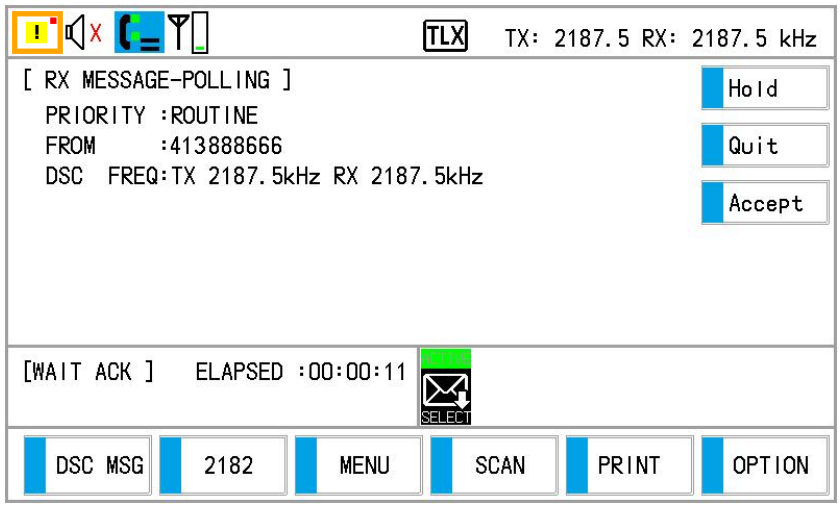
When you receive a polling request message, the audio alarm sounds. The icon ( ) appears in the tab area, and the pop-up message "RECEIVED A DSC MESSAGE POLLING" appears.



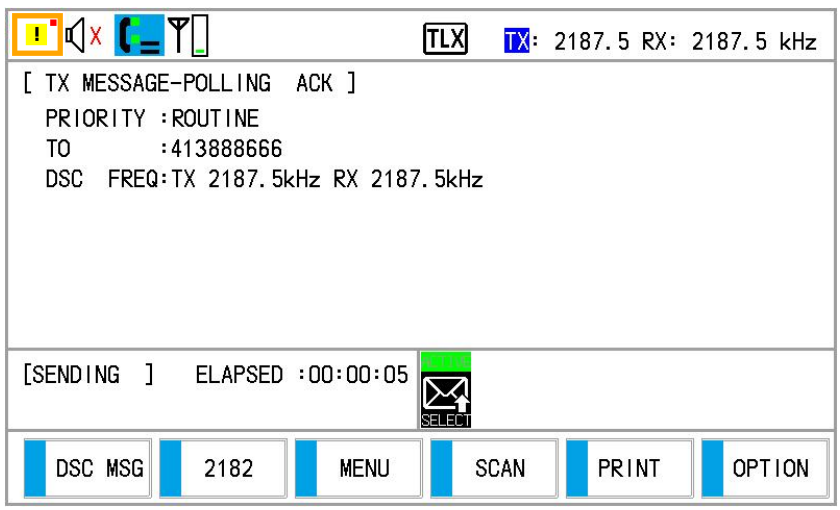
(1) To silence the audio alarm, click **CLICK**.



(2) Click **[OPTION]**, choose one of the operations: **[Hold]**, **[Quit]** or **[Accept]**.



If you click **[Accept]**, the polling acknowledgement will be sent.



After the acknowledgement is finished, click **[OPTION]** to select **[Quit]**.

5. NBDP OPERATION

5.1 NBDP Overview

5.1.1 Terminal Description

No.	Content	Description
1	**Mode**	Communication mode: ARQ/Broadcast FEC/Selective FEC, etc.
2	**State**	Communication status.
3	**Connect**	Connection status of NBDP Terminal and Transceiver Unit. Green: OK
4	Communication Information	Including Station name, ID, Channel, TX frequency, RX frequency, Error rate information.
5	Date & Time	UTC/Local Time
6	**FILE**	Click the key to check the messages to be sent.
7	**SAVE**	Click the key to save what is displayed in the *Dialogue Area*.
8	**HLP**/**CLEAR**/**OVER**/**WRU**	Hot keys for ARQ mode. Click **CLEAR** key to clear the contents in *Dialogue Area*.
9	**BRK**	Exit current mode.
10	**CALL**/**SEND**	Set up ARQ call, or send ARQ/FEC message.
11	**Main Menu**	Menu keys. Refer to Section 5.1.2, Section 5.2.
12	**DIM**	Brightness key for LCD brightness control.
13		Main speaker.
14	**PWR**	Power ON: Press the **PWR** key to turn on the power. Power Off: Press and hold down the **PWR** key until the screen goes blank, approximately three seconds.

5.1.2 Menu Operation

NBDP Terminal (NBD-100) main menu includes the following items:

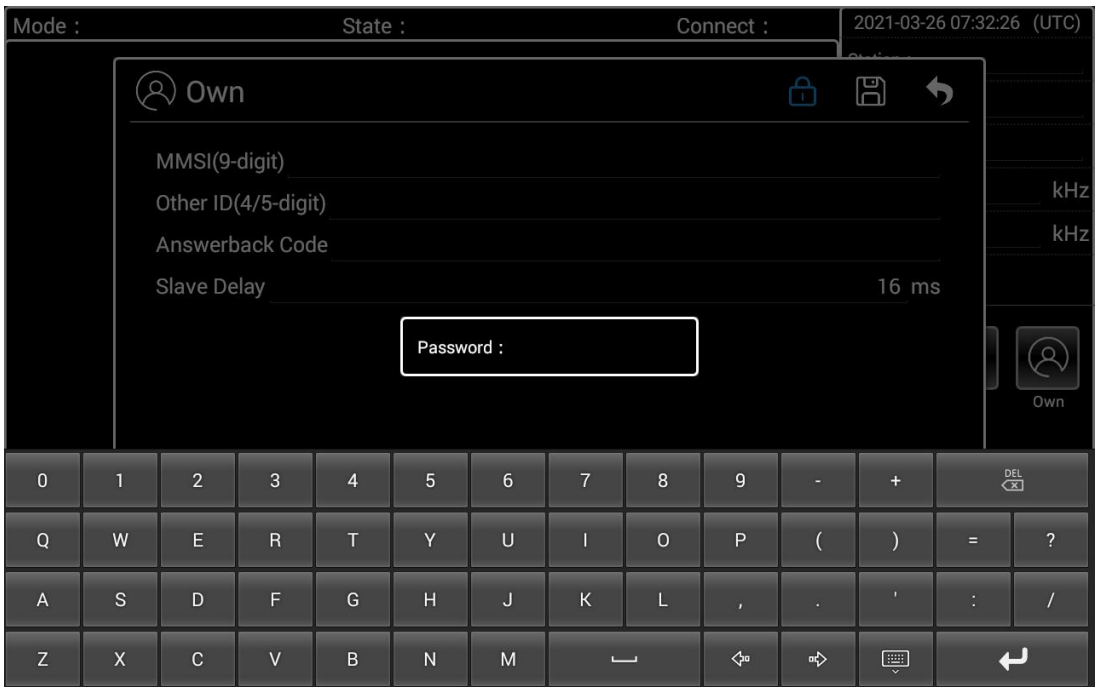
5.1.2.1 Own Data

When NBD-100 is powered on for the first time, typically during installation, the vessel's own data shall be programmed, including MMSI (9-digit identifier assigned to own ship), Other ID (Selective call No), Answerback Code.

For ARQ, Slave Delay also needs to be set, if necessary, to adapt to the coast station or others.

Click **Own** key on the main screen to set own data.

Click  to enter the password. Then you can set Own data if the password is correct.



- **MMSI Setting**

Click the line of [**MMSI**], the soft keypad and cursor appear (as shown below), then enter the MMSI. You can also use the keyboard connected to NBD-100.

You can click  , discard the operation and return to the upper menu.

- **Other ID Setting**

Click the line of [**Other ID**] to enter the other ID. ***Usually, it's not available or not necessary.***

- **Answerback Code Setting**

Click the line of [**Answerback Code]** to enter the Answerback Code.

- **Slave Delay Adjusting**

Click the line of [**Slave Delay]**, adjust the time (range: 0~40 ms) until the ARQ test is successful with the coast station. ***This should be done by the technician when the terminal is installed.***

***Note**: After the above settings completed, click*  *to save and exit the setting menu, otherwise, your settings won't be saved. You may click*  *to change the data if necessary, but a password is needed.*

5.1.2.2 Messages and log files

This is to create, edit, save, delete, open and print messages and log files.

[Outbox Msg]: FEC sent messages which have been saved.

[New Msg]: New messages which are to be sent.

[Inbox Msg]: FEC received messages that have been saved.

[Log File]: ARQ communication logs that have been saved.

Click **File** key on the main screen to manage messages and log files.

- **Outbox Message**

Click **[Outbox Msg]** to check and print the transmitted messages that have been saved.

Click to open the selected message, the following screen appears:

Click **Print** to print the message. Click **Back** to return to the upper menu.

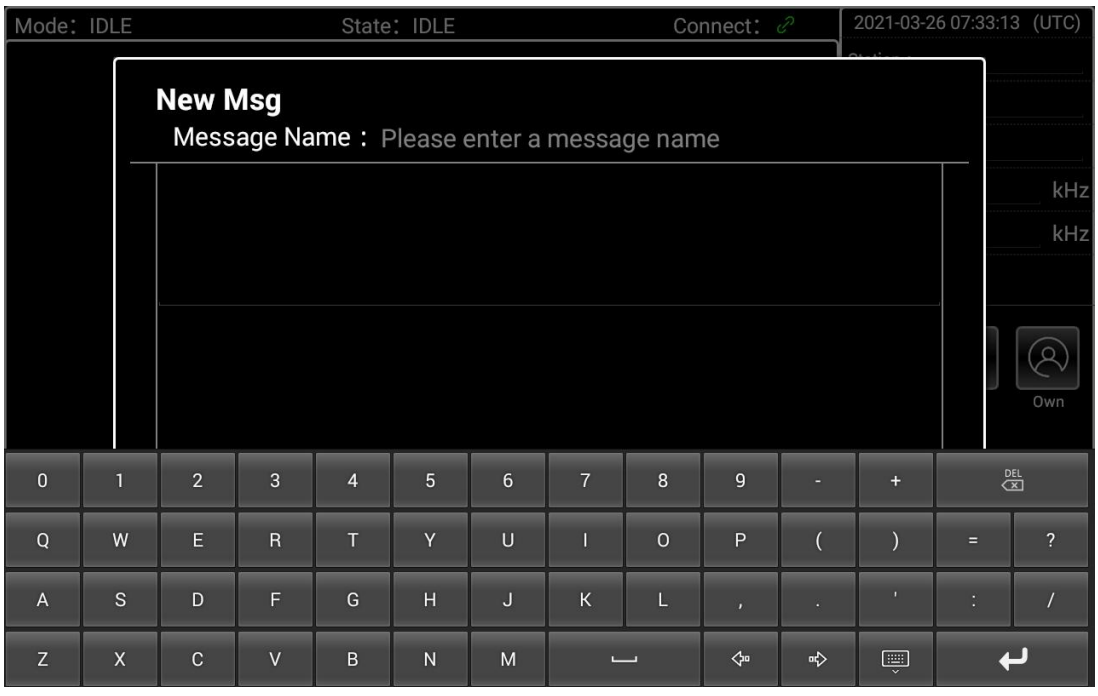
- **New Message**

Click **[New Msg]** to check those new messages that can be sent.

If you want to add a new message, click  and the following window appears:

You can click **New Msg** to input the new message, or click **USB Drive** to select the file from the USB disk. For example：

(1) Click **New Msg**, the following window appears:



① Enter the new message name by the pop-up soft keypad at **[Message Name]**.

② Click the text area to enter the content of the new message by the pop-up soft keypad.

③ After editing, click  to close the soft keypad. Click **Save** to save the message. Click **Back** to return to the upper menu.

(2) Click **USB Drive**, the following window appears:

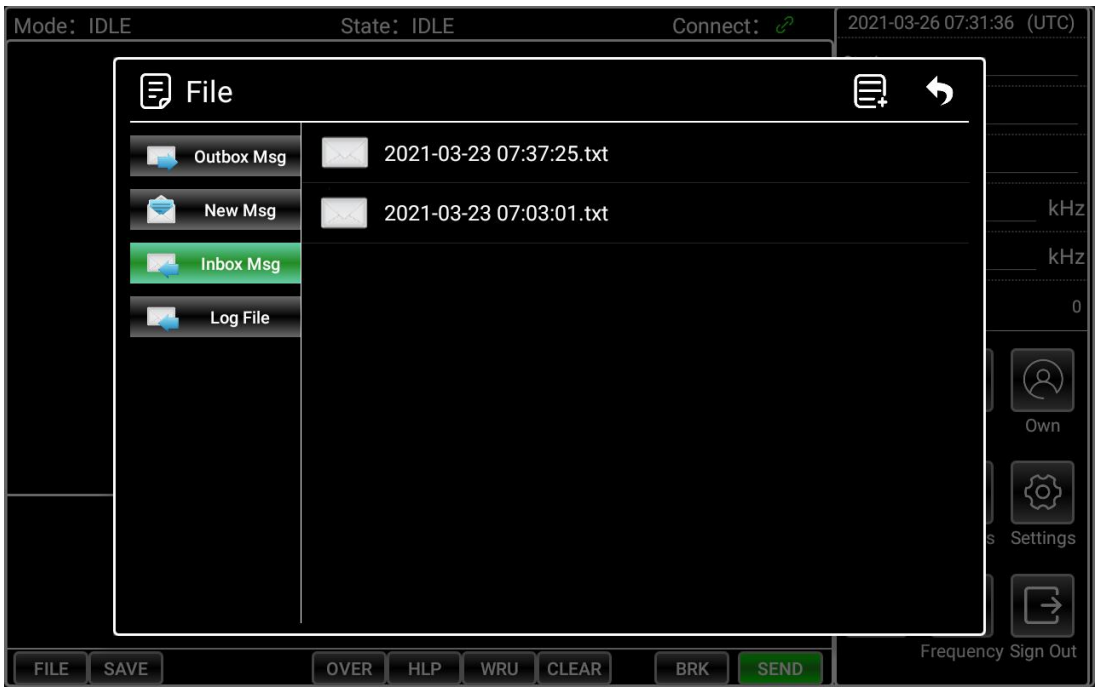
① Click [UDISK0], then click to select the file in it, for example: TEST2.TXT.

② Then the TEST2.TXT.file has been added in **[New Msg]** as follows:

(3) You can also edit the saved new message by clicking **[New Msg]**, and choose the message that you want to edit.

- **Inbox Message**

Click **[Inbox Msg]** to check and print the received FEC messages that have been saved.

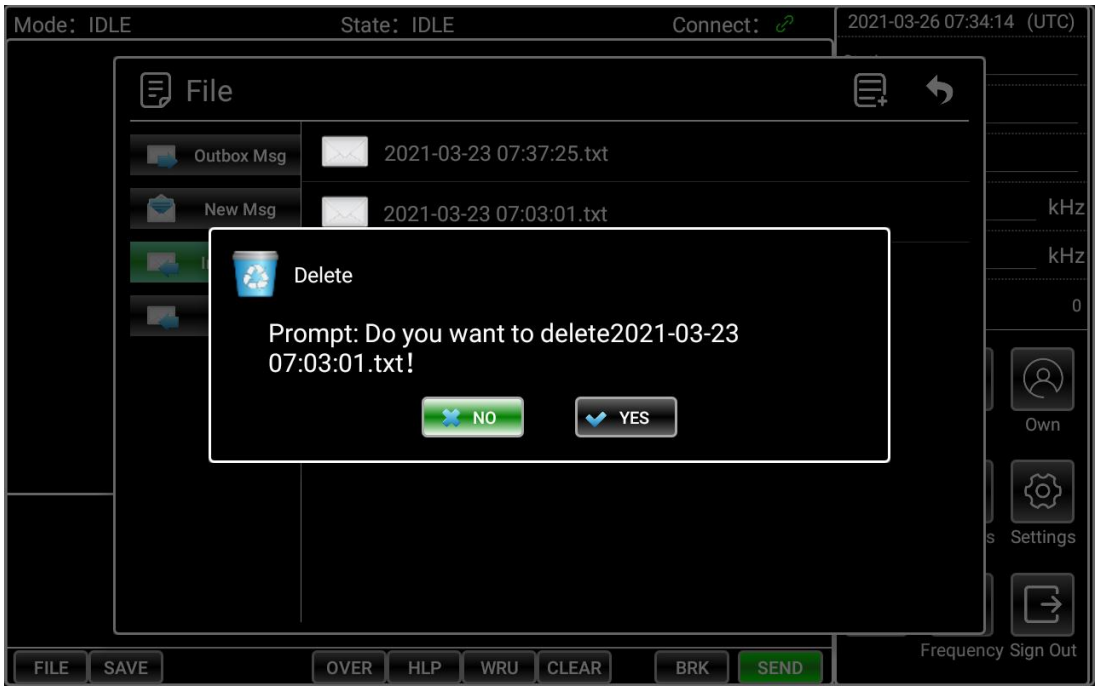


- **Log File**

Click [**Log File]** to check and print ARQ communication logs that have been saved.

- **Delete Message or File**

You can also select a message or a log file by clicking and holding for a while until the following screen appears:

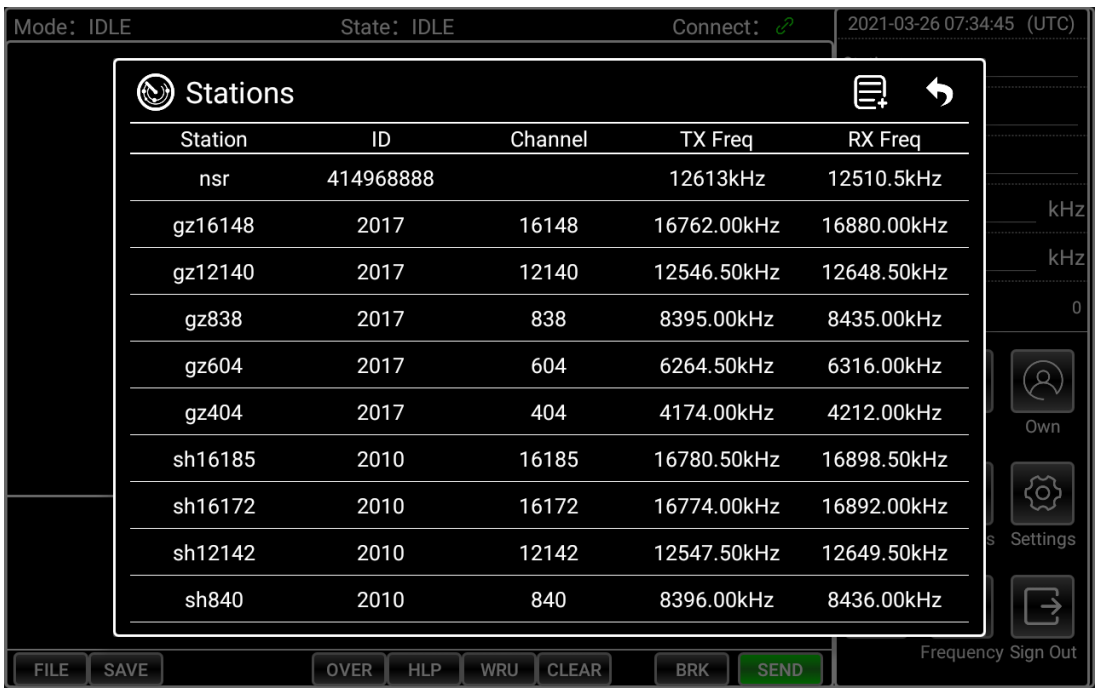


Choose "**YES**" to delete and "**NO**" to discard the operation.

5.1.2.3 Station list

The station list is used to store the frequently used stations with their channels and TX/RX frequencies.
If a station has more than one channel, it's suggested that you add its channel No. to the station, to identify easily. For example, sh16185: Shanghai Coast Station + Channel 16185.

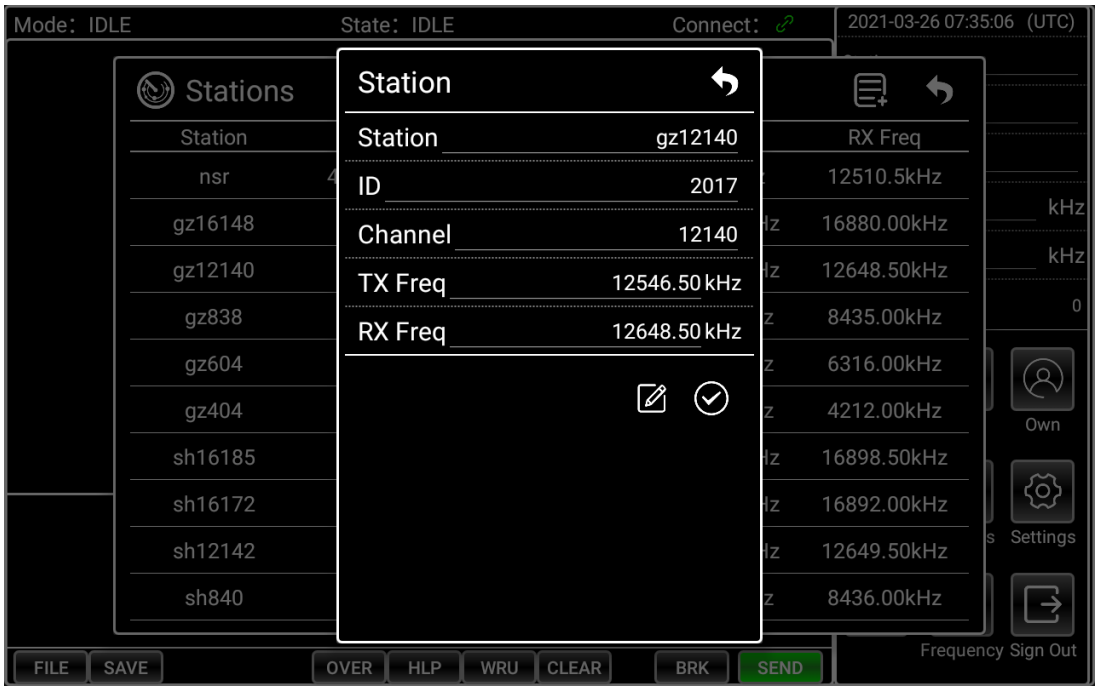
Click **Stations** key on the main screen.



You can use, add, edit or delete a station in the list.

- **Select a station from the list**

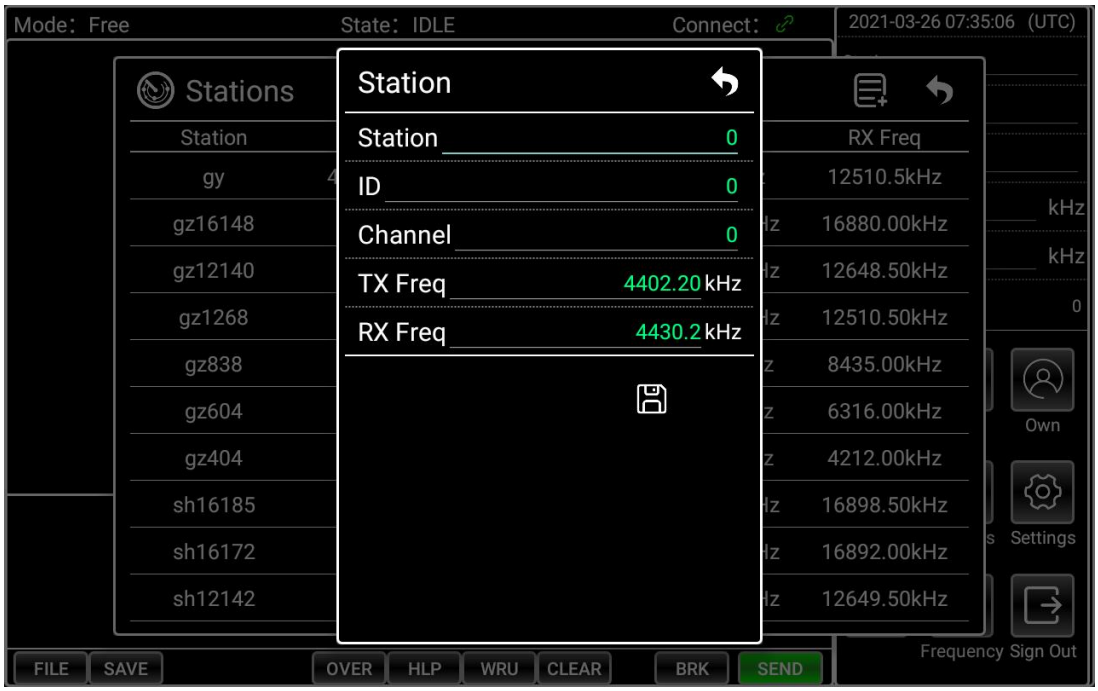
Click one station, for example “gz12140”.



Click  to select the station to communicate with.

- **Add a station to the list**

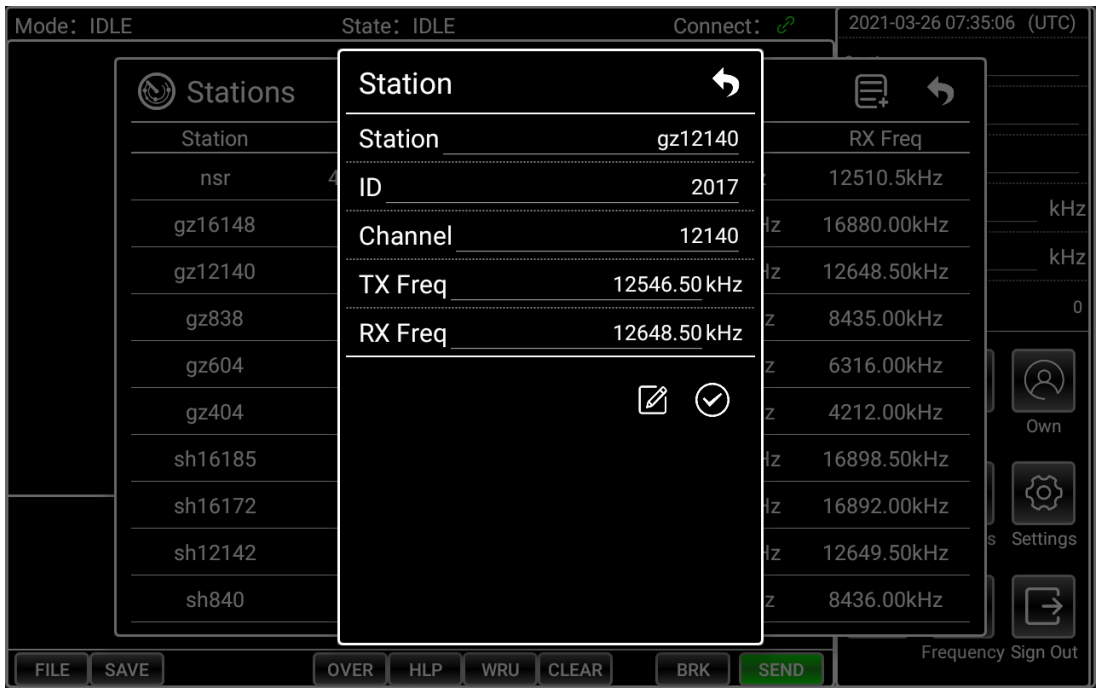
Click  to add a new station. After entering, close the soft keypad and click  to save the setting.



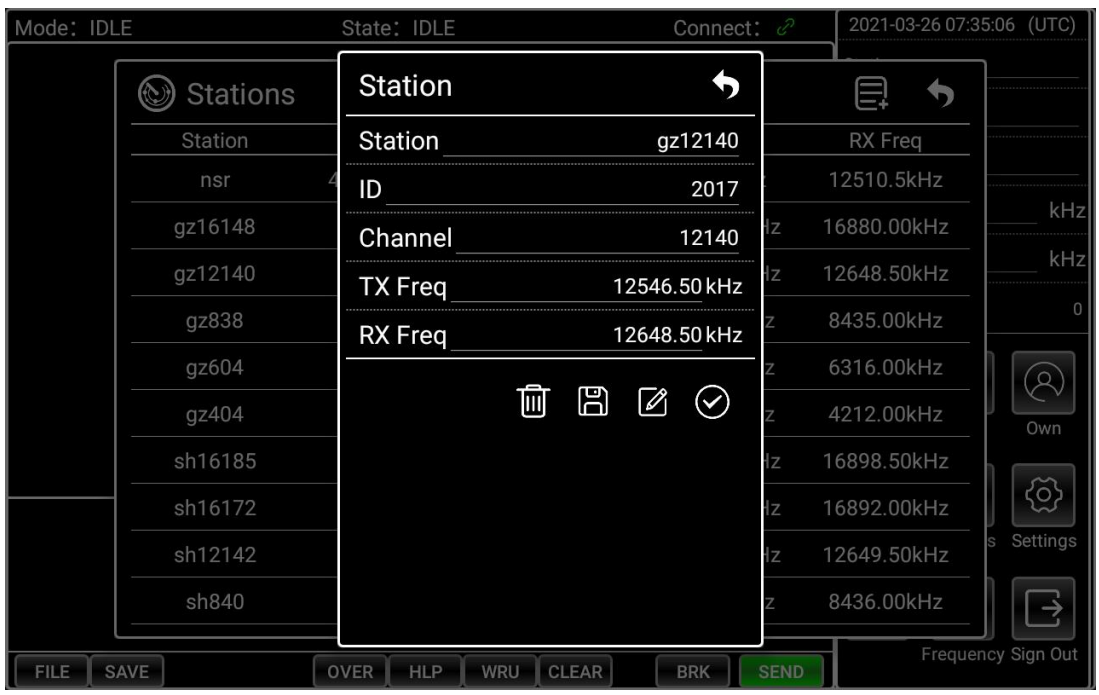
***Note**: If you don't click*  *, the setting will not be saved.*

- **Edit a station**

Click one station, for example: “gz12140”.



Click  to edit the station:



After editing, don’t forget to save the information by clicking  .

You can also click  to select the station to communicate with.

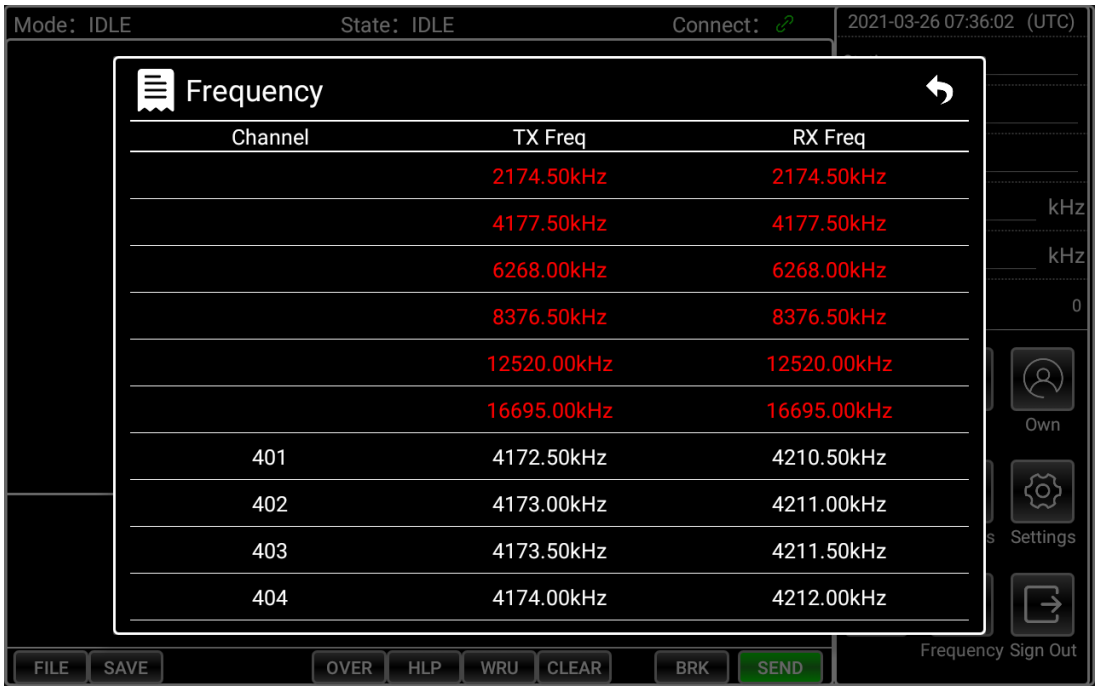
If you want to delete the station (for example: “gz838”), click  .

Choose "**YES**" to delete or "**NO**" to discard the operation.

5.1.2.4 Frequency list

You can check ITU NBDP frequencies in the frequency list. The first six frequencies are used for GMDSS distress communication.

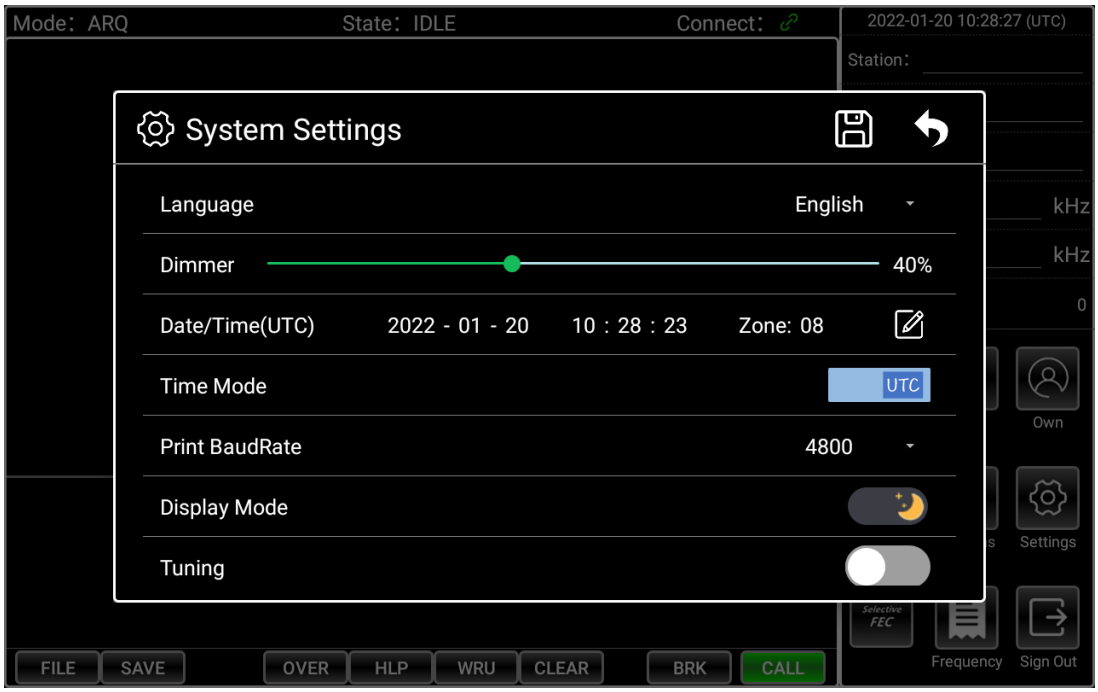
Click **Frequency** key on the main screen to check the frequency list.

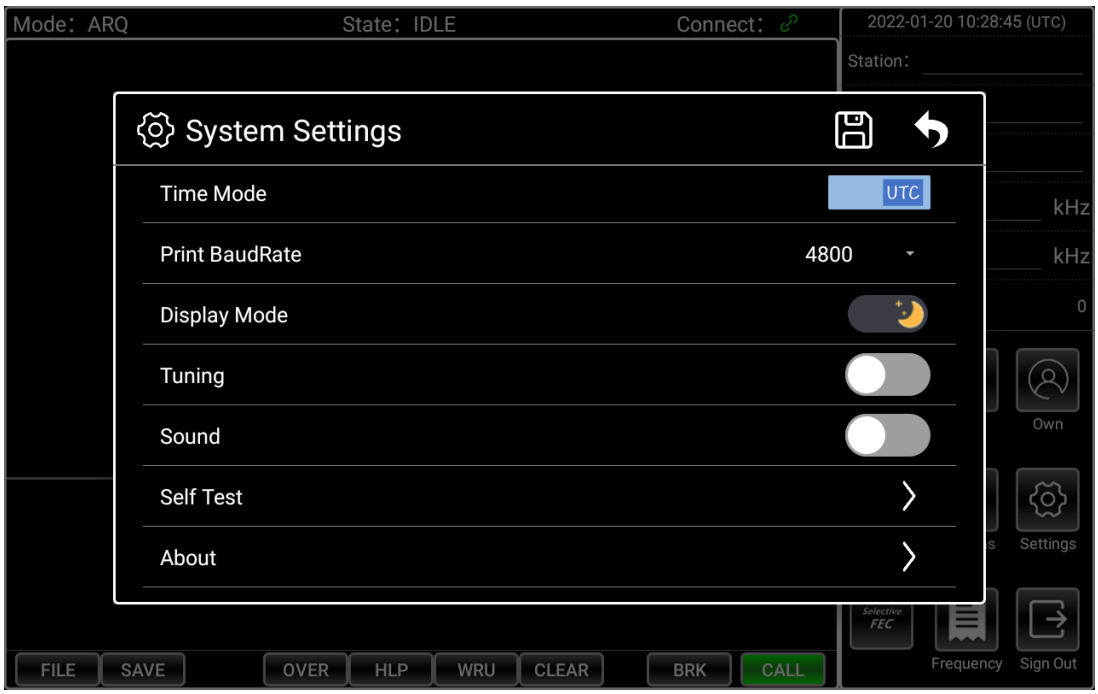


You can also select one pair of frequencies from the list for the current ARQ/FEC communication.

5.1.2.5 System Settings

Click **Settings** key on the main screen to enter System Settings:





- **Language**

The default menu language is English.

Click  to select other languages.

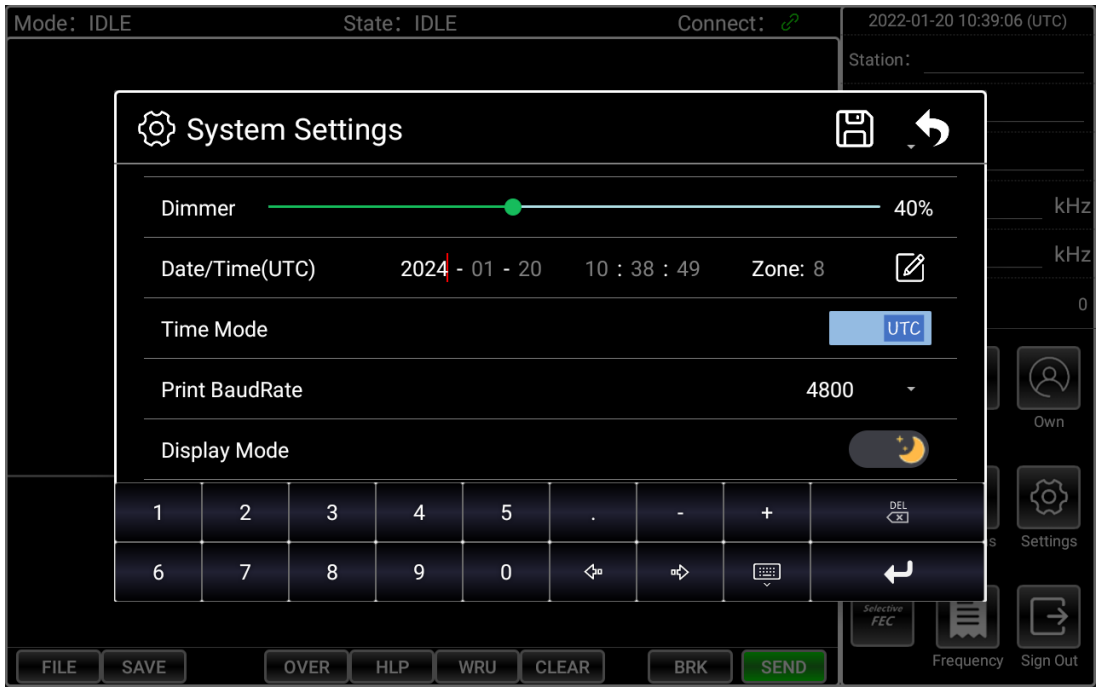
- **Dimmer**

Click the green dot in the **[Dimmer]** and drag left or right to adjust the brightness of the screen.

- **Date/Time Setting**

This is to set the UTC date and time for the system.

Click  in the **[Date/Time]**, enter date and time with the numeric keys by the pop-up soft keypad. There are three items that can be set: Date, Time and Zone. Click each item to set.



- **Time Mode Setting**

Change the time mode between UTC and LMT (local time).

- **Print Baud Rate Setting**

Change the printing baud rate to meet the receiving efficiency of different printers.

- **Display Mode Setting**

Click  /  to set the display mode (DAY or NIGHT) in the **[Display Mode]**.

- **Tuning Setting**

This tuning switch is used to set the tuning function on or off. If **[Tuning]** is set to off (), the NBDP terminal （NBD-100）stops sending tuning commands to the transceiver unit (NHR-1500T).

Note: When [Tuning] is set to on, but NHR-1500T does not have the tuning function, it will be automatically set to off after the first waiting tuning.

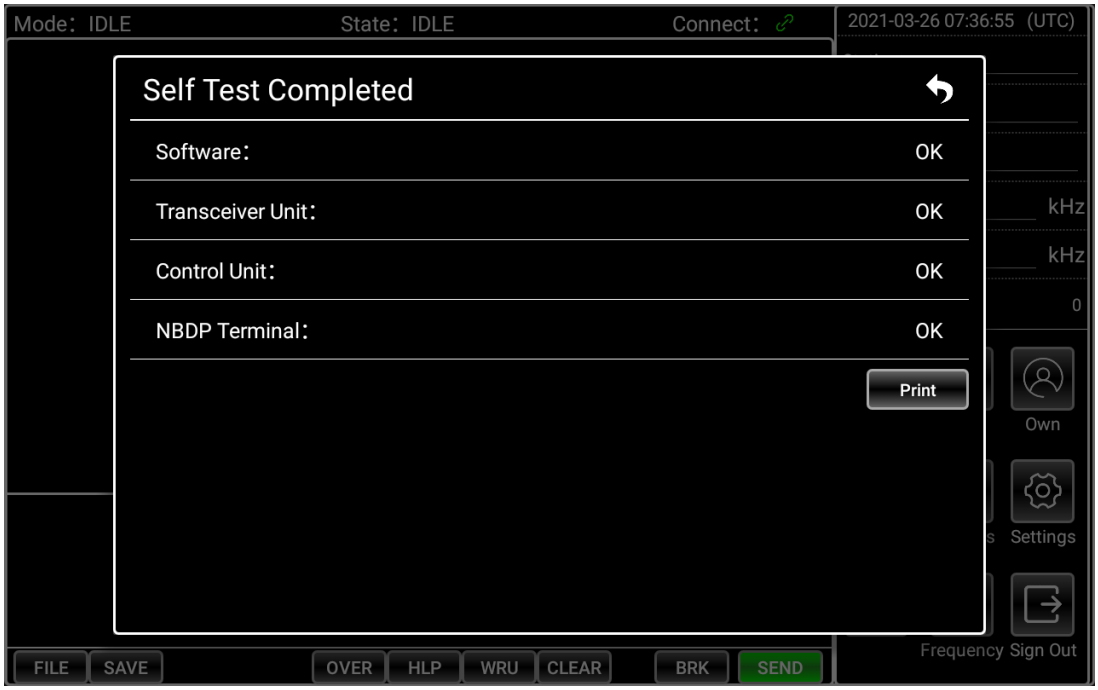
- **Sound Setting**

Swipe up the screen of **[System Setting]**, you can see “Sound” item. Click  in **[Sound]** to switch on/off the sound of the buzzer.

- **Self-Test**

Swipe up the screen of **[System Setting]**, you can see “Self Test” item. Click  in **[Self Test]** to start the self-test.

After the test is completed, the test results will be displayed. The test results can be printed out by clicking **Print**.

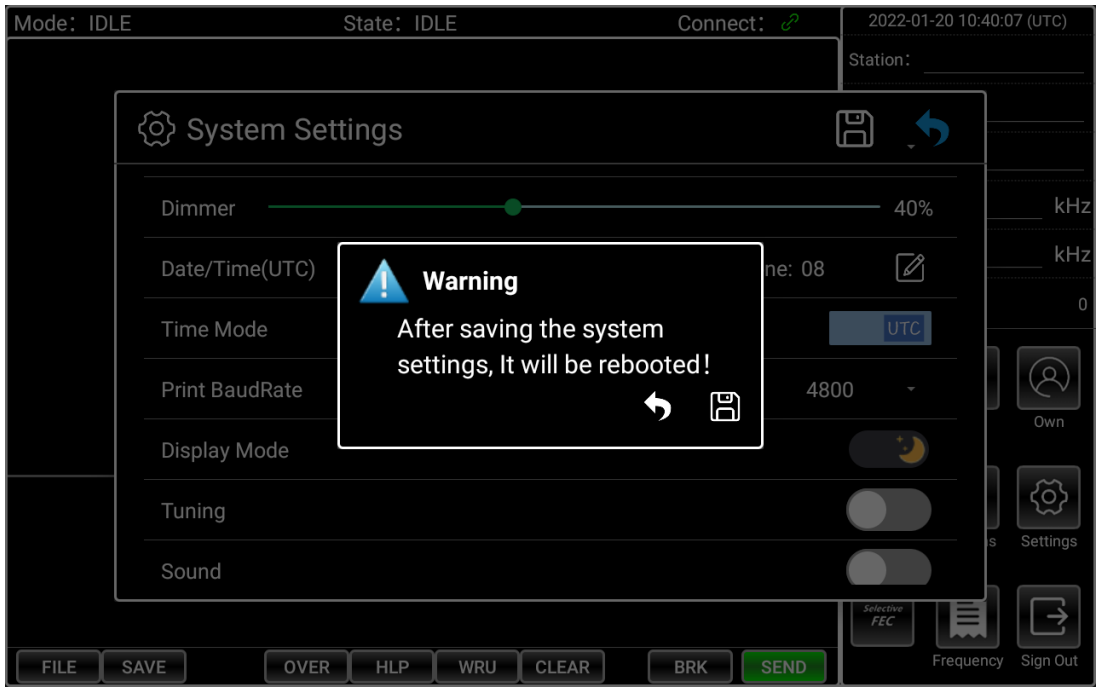


- **About**

Swipe up the screen **[System Setting]**, you can see "About" item. Click  in **[About] to** check the software and hardware version.

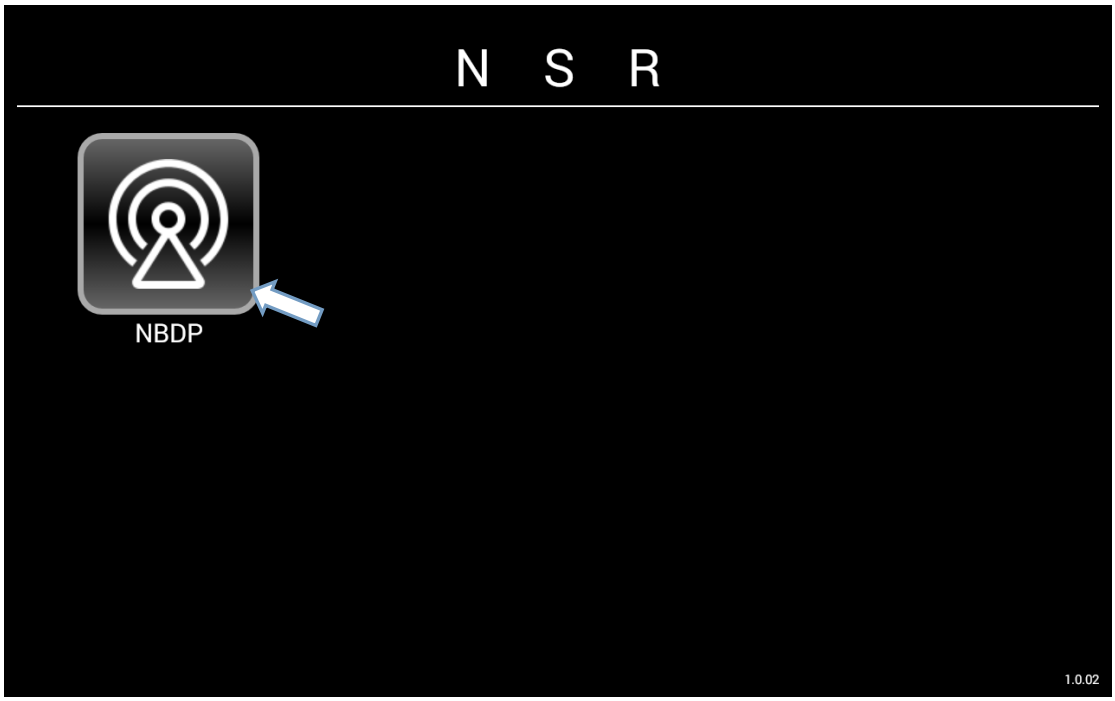
[Detect Updates] is used for detecting an updatable version in the U disk.

***Note**: After the system settings are completed, click*  *to save the settings. The system will be rebooted.*



5.1.2.6 Sign Out

Click **Sign Out** key on the main screen to quit the system. The following screen appears:



Click “NBDP” to enter again.

5.2 NBDP Communication

There are three modes, ARQ, Broadcast FEC and Selective FEC, in NBDP. You can initiate a call by selecting one mode.

ARQ (Automatic Repetition Request): a mode where two stations can communicate simultaneously. The direction is changed with an “over” command, between a ship and a coast station or perhaps two ships. This mode provides error detection and error correction.

Broadcast FEC (Forward Error Correction): a one-way broadcast to all stations, which may be used in distress, urgency situations or coast stations’ traffic lists, weather and navigation warnings. This mode provides error detection only.

Selective FEC: a one-way mode to a particular receiving station (by addressing the call to the appropriate MMSI) .

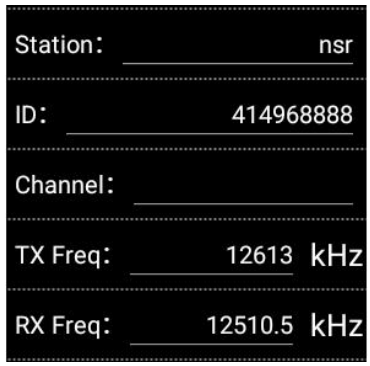
5.2.1 Preparations

① Own ship's MMSI/ID and answerback code should be set already. Please refer to Section 5.1.2.1.

② NBD-100 should be connected to NHR-1500T Transceiver properly.

③ Prepare the channel/frequencies by one of the following ways:

- Select the channel/frequencies from the Station List. Mainly used for ARQ communication. Please refer to Section 5.1.2.3.
- Select the channel/frequencies from the Frequency List. Mainly used for FEC communication. Please refer to Section 5.1.2.4.
- Enter the channel or frequencies at the main screen.



Click the line of **[Channel]** to enter the channel number by the pop-up soft keypad. Or,

Click the line of **[TX Frequency]/ [RX Frequency]** to enter the frequency by the pop-up soft keypad.

5.2.2 ARQ Communication

***Note 1*: Before communication, be sure the operation frequency is not occupied.**

***Note 2*: If this is your first time to communicate with a certain coast station, you should register your ship name, call sign, MMSI and company name with the coast station. After that, if your answerback code is correct, ARQ is possible.**

① While you click **ARQ** key on the main screen, the following screen with tips may appear:

② In ARQ mode, the default status is to wait for receiving (connection). To call (connect) actively, you need to click **CALL** below, and wait for connecting (**State** changes to "Calling"). A message can be sent while the connection is successful (**State** changes to "Waiting to TX").

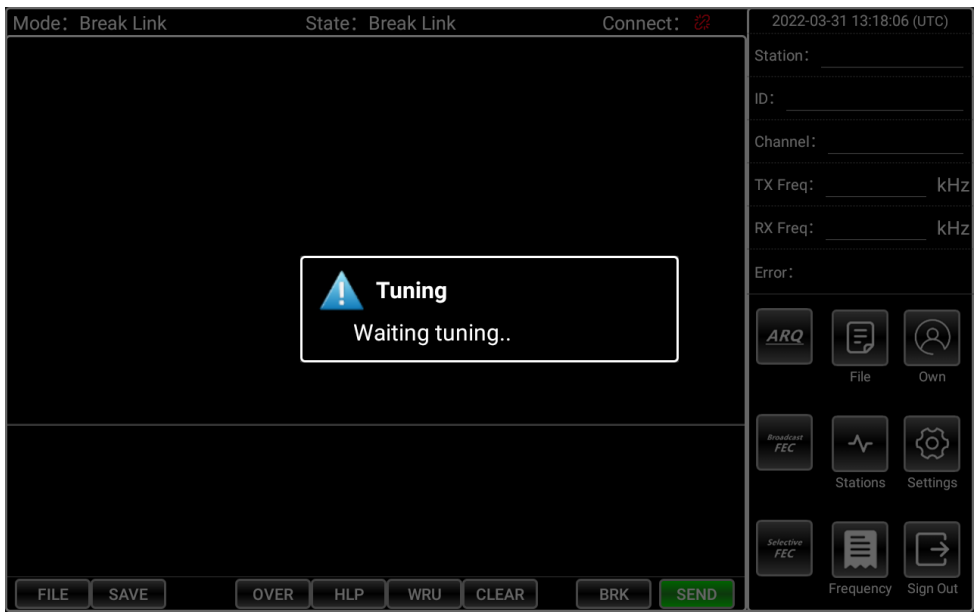
***Note**: If the connection fails, the State changes to "IDLE", and the following notice appears. Please wait at least 120s before recall.*

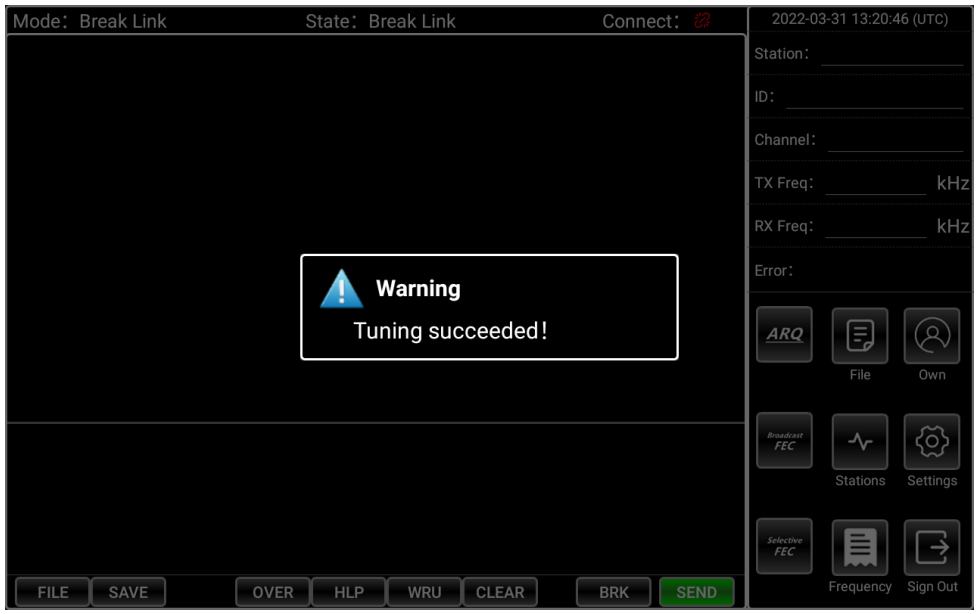
Description:

If **[System Setting] - [Tuning]** is set to on, click **CALL** to start the automatic tuning. Wait for up to 15s, the result will be fed back when NHR-1500T has the tuning function:

- Tuning succeeded! - Continue the subsequent calls.
- Tuning failed! Whether to insist send? - Select "⊘" to continue trying to call; select "↰" to return.

Note: For FEC communication, tuning is the same as above.





③ There are two methods to prepare the message to be sent.

- Load a message from **[NEW Msg]**, **[Inbox Msg]** or **[Outbox Msg]** which was compiled in Section 5.1.2.2.
  Click **FILE** in the lower left corner of the screen, the following screen appears.

For example: click **[NEW Msg]**. Select a message "NSR TEST.TXT" to load it into the *Message Area*:

The message can also be edited after loaded.

- Type in a message directly.
  Enter the message by the pop-up soft keypad in the *Message Area*.

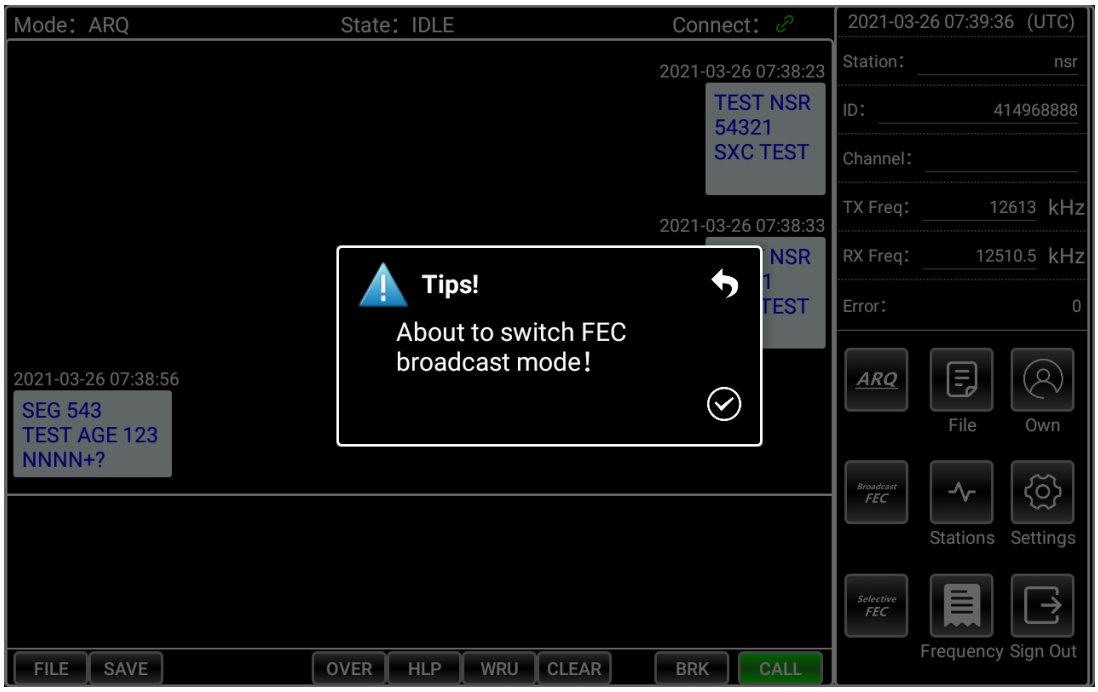
④ Click **SEND** to send the message.

⑤ After the communication is completed, click **SAVE** to save the communication log. The log will be stored in **[Log File]**.

5.2.3 FEC Communication

There are two FEC modes, Broadcast FEC and Selective FEC. The operation is almost the same. For example: Broadcast FEC.

① Click **Broadcast FEC** key on the main screen, the following screen with tips may appear:



② Then wait to receive the broadcast FFC. After finishing receiving, you can click **SAVE** to save the message in **[Inbox Msg]**.

Sample of FEC message received:

SH0005 EAST CHINA SEA REPORTED ONE PERSON OVERBOARD IN 31-54.85N

122-05.30E VESSEL IN VICINITY PAY ATTENTION TO SEARCH AND RESCUE

SHANGHAI MSA CHINA

③ In FEC mode, you can send the message at the Waiting to RX status.

- Prepare the message to be sent. Refer to Section 5.2.2 ③.

- Click **SEND** to send the message. The screen changes as follows:

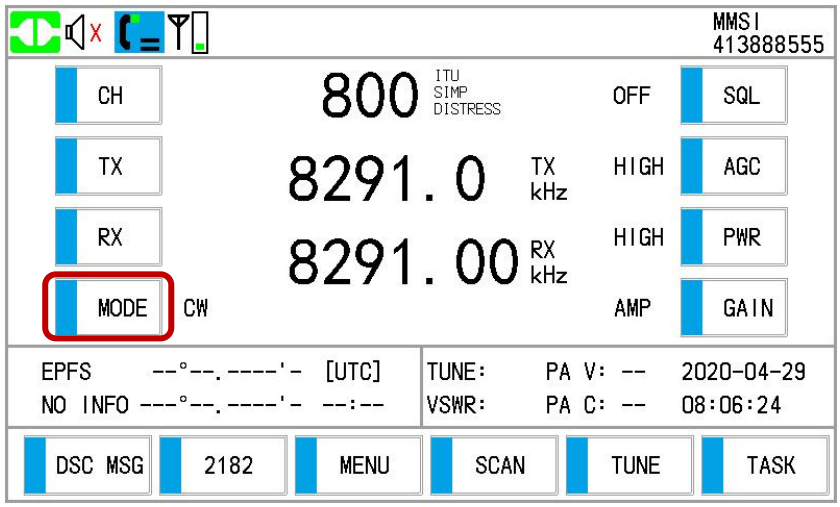
- After the communication is completed, click **SAVE** to save the sent message. The message will be stored in **[Outbox MSG]**.


Mode: FEC Broadcast
State : WAITING FOR PHASING
Connect:
2021-03-26 07:46:55
NSR TEST
ZCZC HY25
TEST MESSAGE
NNNN
2021-03-26 07:47:20 (UTC)
Station: nsr
ID: 414968888
Channel: 1
TX Freq: 12613 kHz
RX Freq: 12510.5 kHz
Error: 0
ARQ
File
Own
Broadcast FEC
Stations
Settings
Selective FEC
Frequency
Sign Out
FILE
SAVE
OVER
HLP
WRU
CLEAR
BRK
SEND


Mode : FEC Broadcast
State : WAITING FOR PHASING
Connect :
2021-06-11 02:20:35 (UTC)
File
Outbox Msg
New Msg
Inbox Msg
Log File
2021-03-26 07_46_55.TXT
FILE
SAVE
OVER
HLP
WRU
CLEAR
BRK
SEND

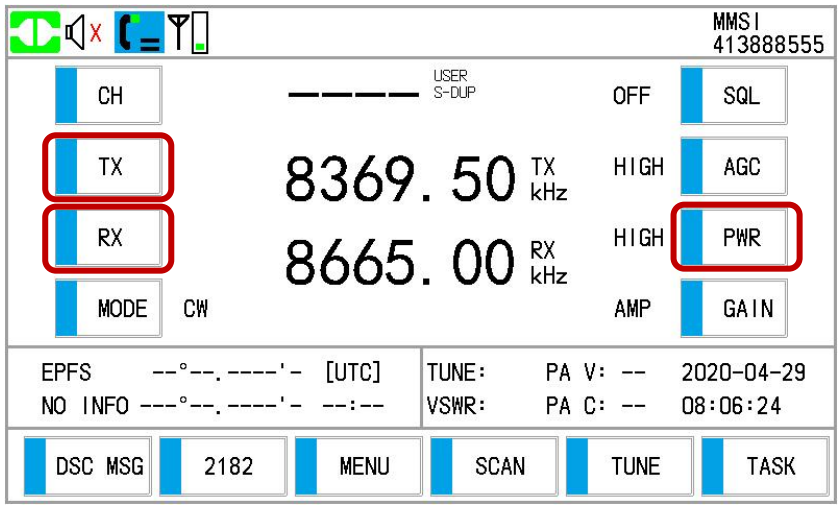
6. CW OPERATION

(1) At the SSB screen, click **[MODE]** to select the type of emission as **[CW]**.



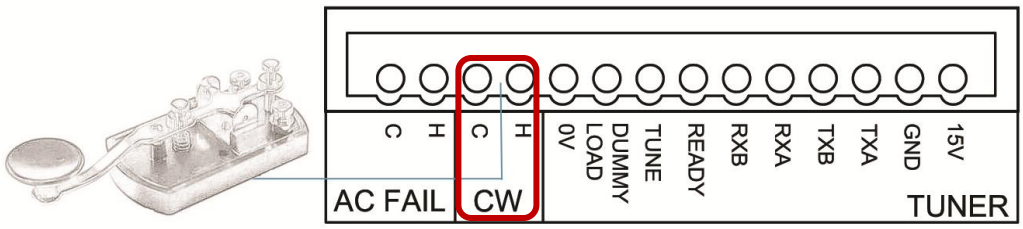
(2) Rotate the **VOLUME** knob to adjust the volume of the main speaker (Clockwise: volume up, Anti-clockwise: volume down until muted).

(3) Click **[TX]**/**[RX]** to set the CW communication frequency.



(4) Click **[PWR]** to adjust the power.

(5) Connect the MORSE key to the transceiver, and start CW communication.



7. INSTALLATION

7.1 Antenna

Special attention should be paid to the location and installation of the different antennas on a ship in order to ensure effective and efficient communication. Incorrectly installed antennas will degrade the performance of the radio equipment and will reduce the range of radiocommunications.

There are two antennas for NHR-1500, one TX/RX antenna and one DSC WK antenna.

7.1.1 TX/RX Antenna

Location and choice of TX/RX antenna:

a. The mounting arrangement of the antenna or pedestal should be constructed in order to withstand the strain from swaying and vibration.
b. Wire antennas should be protected against breakage by having a weak link installed.
c. Whip antennas should be installed as vertically as possible and located in an elevated position on the ship at least 1 metre away from conductive structures.
d. Attention should be paid to self-supportive vertical antennas and their swaying radius.
e. The recommended minimum length of the antenna is 8 metres.
f. The down lead from the base of the antenna to the antenna tuner should be insulated and run as vertically as possible and not less than 45° towards the horizontal plane.
g. The transmitting antenna should have an insulation resistance to earth, which is recommended to be of more than 50 MΩ in dry weather and of no less than 5 MΩ in humid weather (transmitter to be disconnected when measuring).

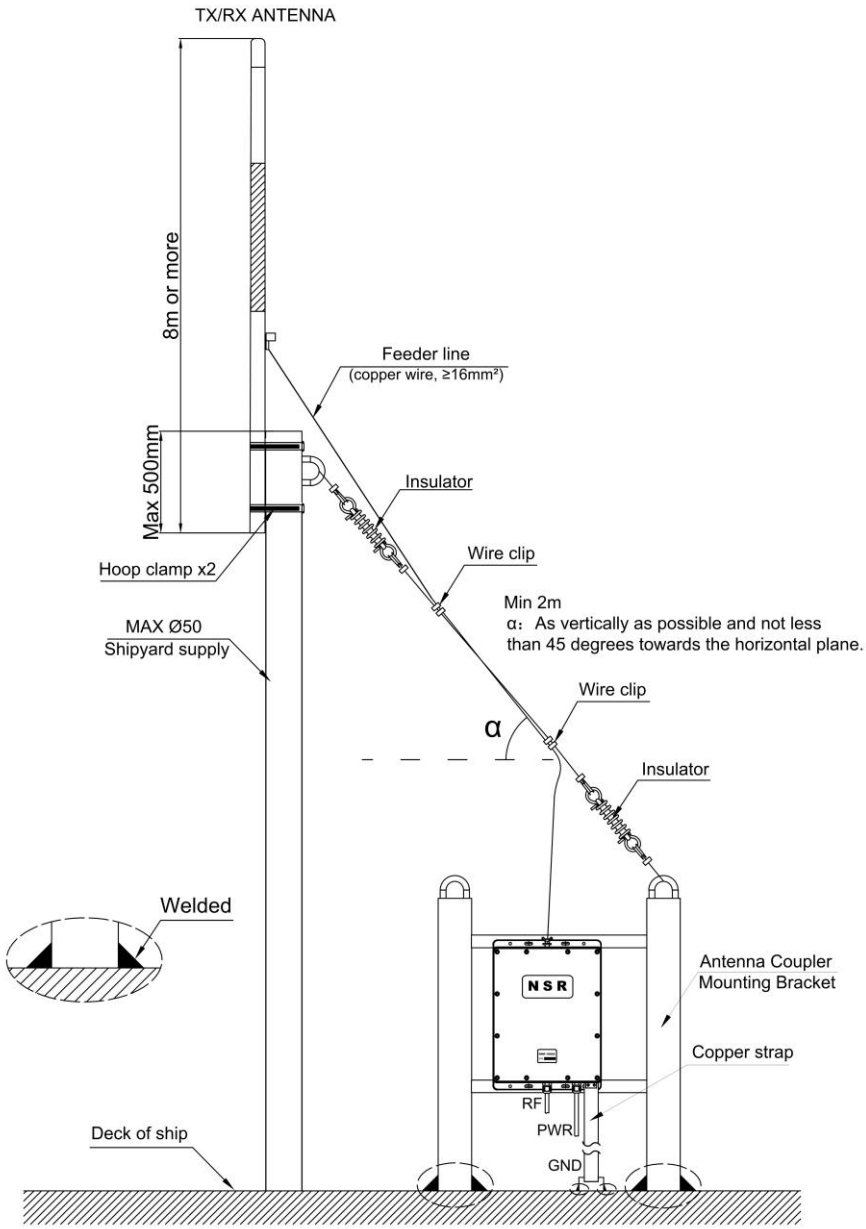
Normally, there are two types of MF/HF TX/RX antenna, wire antenna and whip antenna.

The technical requirements for antennas are as follows:

Wire Antenna	
Frequency	1.6 ~ 30MHz
Maximum Power	1200W
Polarization	Vertical
Length	10 ~ 18m
Connector	Wire connection
Standard	IEC 60945, exposed

Whip Antenna	
Frequency	1.6 ~ 30MHz
Maximum Power	1200W
Polarization	Vertical
length	Min 8m
Connector	Wire connection
Standard	IEC 60945, exposed

Below is the example of installation of whip antenna. The lead-in wire should be not shorter than 2m and the elevation angle should be not less than 45°.



The following instructions are helpful:

- The antenna should be kept as far away as possible from metallic objects.
- Locate the antenna min 5m from the Satellite antenna.
- Keep the insulator away from funnels to avoid dirt.
- Put a sign “DANGER HIGH VOLTAGE” aside the antenna or on an enclosure around it to prevent it from being touched.

Notice:
Alternative antenna (customer supplied) instead of NSR antenna can be used on NHR-1500. Such an antenna should meet the requirements set above and be approved by NSR in advance.

7.1.2 DSC Watch RX Antenna

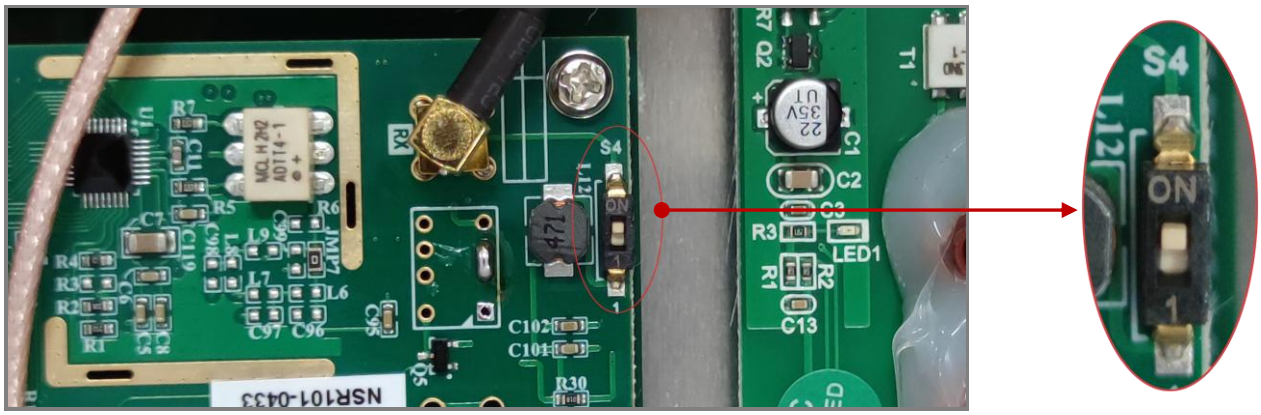
DSC watch RX antenna should be located as far away as possible from MF/HF transmitting antenna in order to

minimize receiver blocking.

DSC watch RX antenna can be an active antenna or a passive antenna.

A setting for using an active or a passive antenna is needed on the NSR101 RX PCB.

There is a small DIP switch (S4) on the NSR101 RX PCB as follows.



If the switch is at position "ON", there will be 8V voltage at the antenna port for the active antenna.

If the switch is in another position, no voltage at the antenna port, which is for the passive antenna.

For the passive antenna, it's usually a whip antenna. The technical requirements are as follows:

Frequency	1.6 ~ 30MHz
Polarization	Vertical
length	Min 6m
Connector	Wire connection
Standard	IEC 60945, exposed

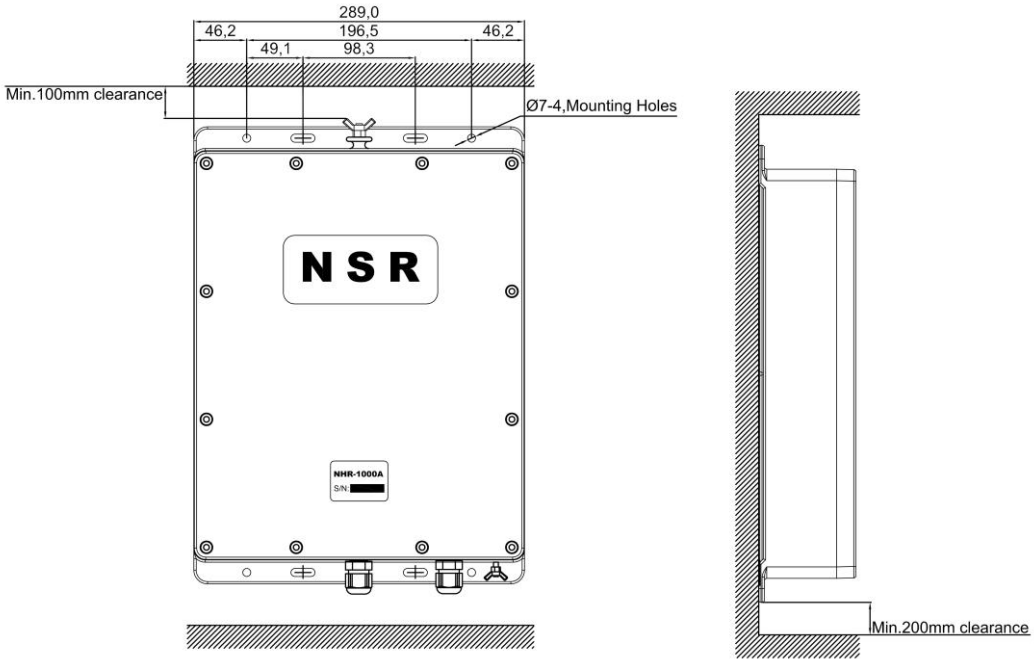
For the active antenna, it's usually a whip antenna together with a preamplifier. The technical requirements are as follows:

Frequency	1.6 ~ 30MHz
Polarization	Vertical
Length	Min 1.2m
Impedance	50Ω
Voltage	5 ~ 9V
Connector	M type (with cable)
Standard	IEC 60945, exposed

NXA100 whip antenna with NXA100A pre-amplifier is supplied by NSR for DSC watch keeping.

Notice:
Alternative antenna (customer supplied) instead of NSR antenna can be used on NHR-1500. Such an antenna should meet the requirements set above and be approved by NSR in advance.

7.2 Antenna Coupler



The Antenna Coupler is used with the TX/RX antenna.
The Antenna Coupler is located between the antenna and the Transceiver Unit, and tunes the antenna to the transmitter. The coupler should be well grounded to ensure proper function.

7.2.1 Installation

The Antenna Coupler is designed to be watertight. The Antenna Coupler should, as a general rule, be located in an outdoor position below and close to the antenna.

The Antenna Coupler should normally be located as close to the antenna as possible, and so that the down lead wire/cable from the antenna should be as vertical as possible.

7.2.2 Grounding

Grounding of antenna coupler is crucial for MF/HF communications, especially for the range to be reached.
It's recommended to have two groundings to the coupler:

a. **Use a copper strap**
   For vessels with conducting hulls, the strap shall be min 60mm wide and max1m long.
   For FRP vessels, the strap shall be min 60mm wide and max 5m long.

***Note*: Coat the copper strap between the ground plate and ground terminal of the antenna coupler with marine paint to prevent corrosion.**

Coat the junction where the copper strap connects to the ground terminal of the antenna coupler with silicone sealant.
Grounding example:

b. Use ground wire

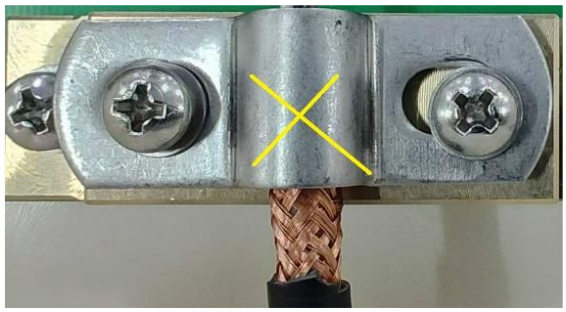
It is recommended to add an additional ground wire (local supply, more than 14 sq.) and fasten it to the ground terminal of the antenna coupler.

c. Grounding levels

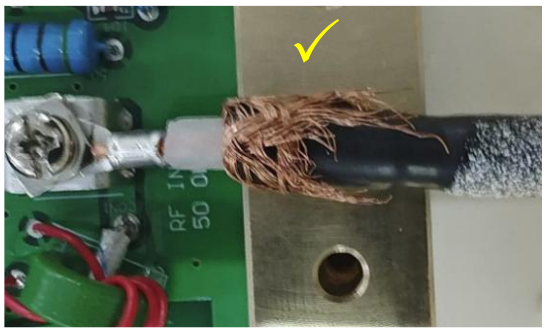
Best ground points	External ground plate Copper screen Copper foil
Acceptable ground point	Stainless steel stanchion Through mast Through hull Metal water tank
Undesirable ground points	Engine block Ship's DC battery ground
Un-usable ground points	Gas or electrical pipe Fuel tank Oil-catch pan

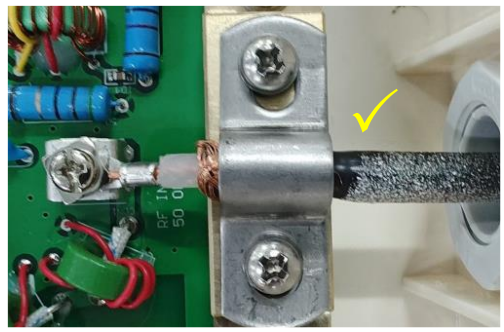
Notice:

1) Install the antenna coupler correctly.
2) Connect the RF cable. It is better not to press the shielding layer directly with the sheet metal, as it may not be tight enough to cause poor contact.

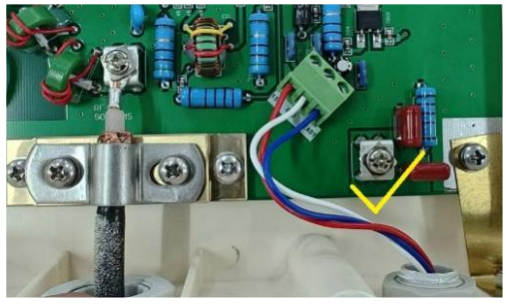


As shown in the photos below, place the shielding layer on the outside of the cable, and then fasten the cable with the sheet metal.





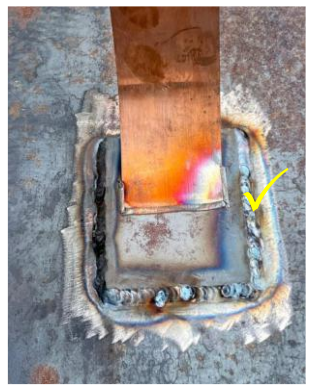
3) The shield of the POWER/READY cable should not be connected to the ground at the antenna tuner.



Only at the transceiver unit, should the shield of the cable be connected to the ground.

4) Since April 2025, an upgraded grounding copper strap has been supplied, which is attached with an iron plate. Please weld the plate to the hull for better grounding.

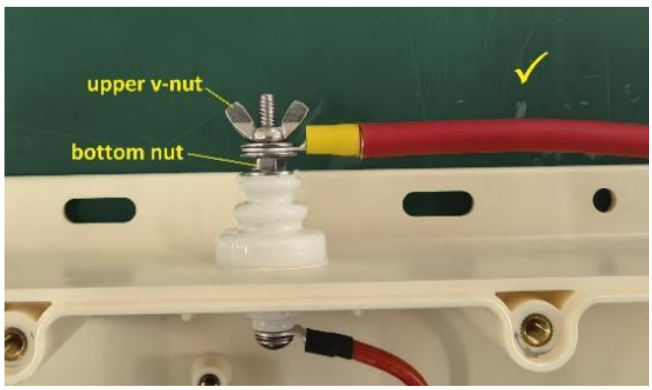




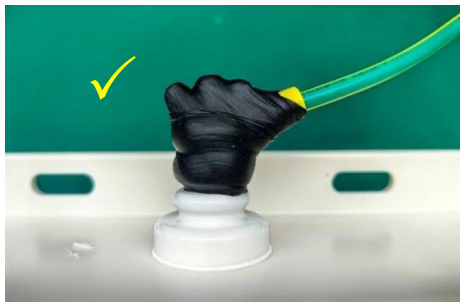
Use a suitable waterproof adhesive to protect the strap from corrosion.

5) The feeder line of TX/RX antenna should be properly connected to the antenna coupler.

Do not move the bottom nut used to secure the bolt! Use only the upper V-nut to connect the feeder line. Using the bottom nut to connect the feeder line will damage the water tightness of the coupler case!

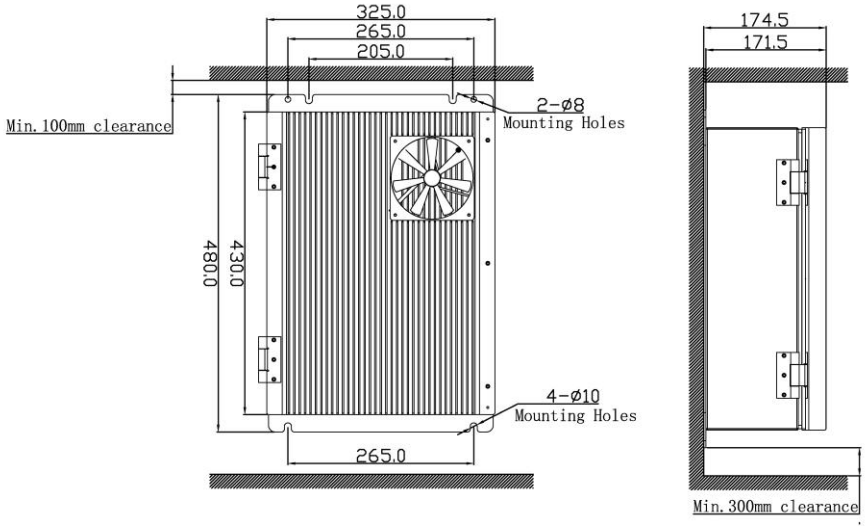


6) Wrap bolts and nuts with the waterproof tape to protect them from corrosion.



7.3 Transceiver

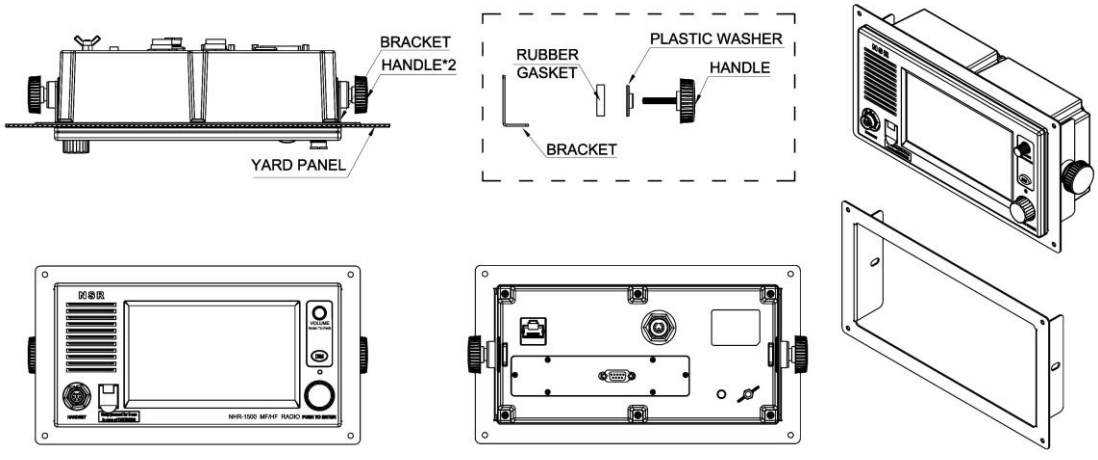
Four screws are supplied to mount the transceiver. The transceiver can be installed either on the table or on the wall.
Care must be taken when mounting the transceiver to ensure that there is sufficient space for cables and connectors. Especially, sharp bending of the RF cable must be avoided.
Select a proper place to install the unit to avoid seawater and don't be exposed to direct sunlight.
Fasten the unit with 6×30 self-tapping screws. Refer to the drawings in Appendix 7.



***Note**: The grounding for the transceiver unit is very important for the proper operation of the unit. The transceiver and antenna coupler MUST have an adequate RF ground connection. Otherwise, the overall efficiency of the transceiver and antenna coupler installation will be reduced. Electrolysis, electrical shocks and interference from other equipment could also occur. For best results, use a 60mm wide copper strap and make the connection as short as possible.*
If possible, ground the transceiver and antenna coupler to one ground point, otherwise, the voltage difference (in RF level) between 2 ground points may cause electrolysis.

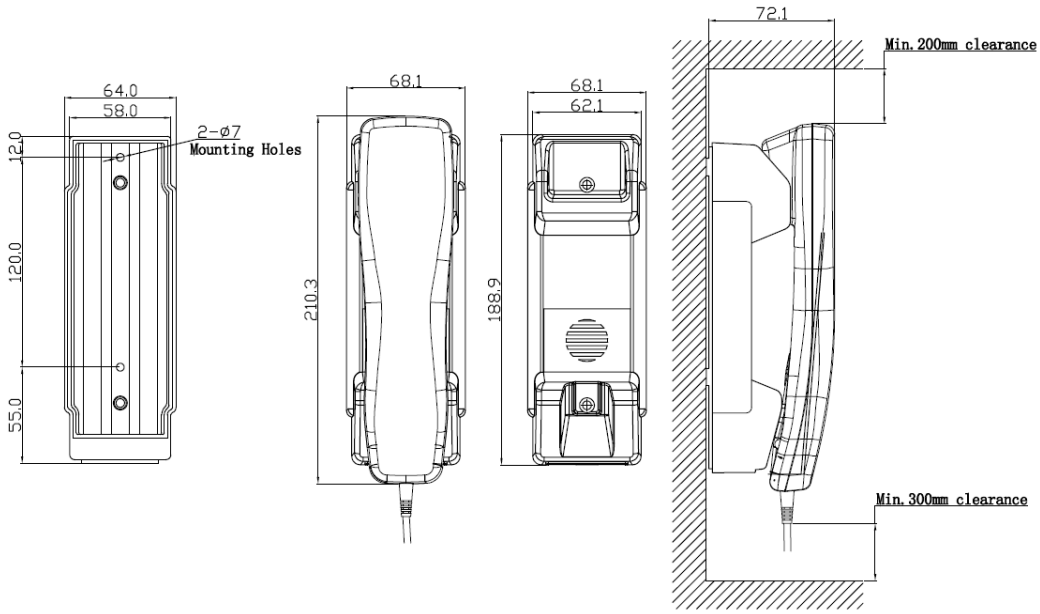
7.4 Control Unit

The control unit could be mounted on the table, on the wall, the bulkhead using the bracket supplied. For the flush-type mount, refer to the cutting drawing in this manual.
Select a proper place to install the unit to avoid seawater and don't be exposed to direct sunlight.
The length of the connection cable (between the Control Unit & Transceiver Unit) should not exceed 15m.



7.5 Handset

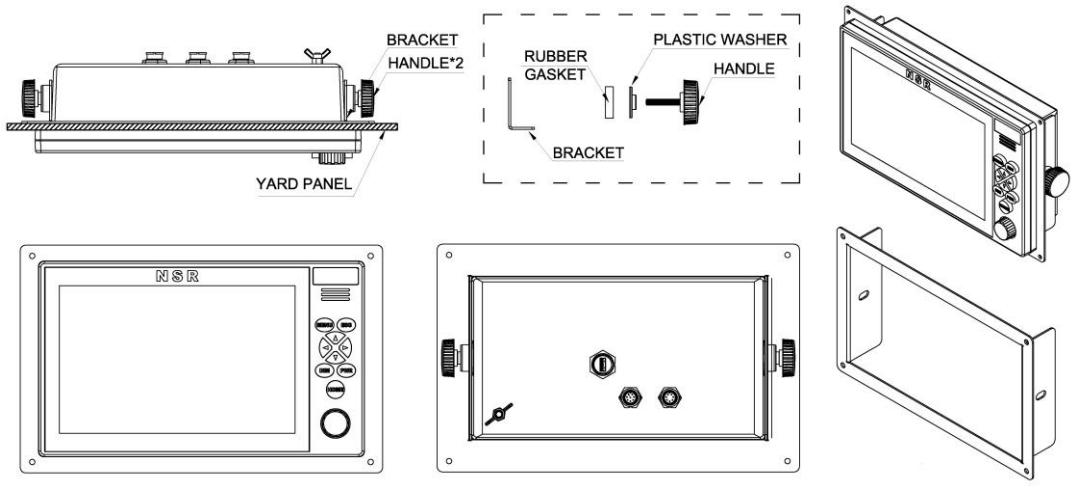
Unfasten 2 bolts to remove the pedestal cover. Fix the pedestal base with two self-tapping screws 4x16 (supplied), and then install the cover.



7.6 NBDP Terminal

The terminal could be mounted on the table by using the bracket supplied or in the console with flush mount brackets.

Select a proper place to install the terminal to avoid seawater and don't be exposed to direct sunlight.

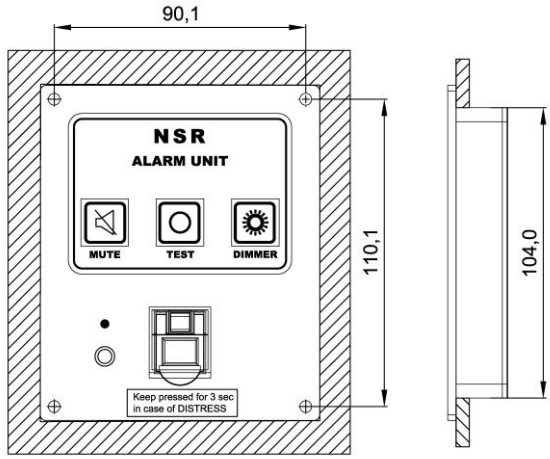


7.7 Alarm Unit

Both the distress alarm panel and the distress panel are combined in NAU-100 Alarm Unit. One unit can only be connected to one radio equipment. Several units may be needed if several MF/HF and VHF are installed.

The alarm unit provides visual and aural indications of any distress alert or alerts received.

The alarm unit could be mounted as a table-type or flush-type. Please refer to the drawings in this manual.



7.8 Power Supply

The NHR-1500 installation should be powered from the ship's main source of electrical energy. In addition, it should be possible to operate the installation from an alternative source of electrical energy, including a reserve source of energy. It's suggested NHR-1500 be connected to the ship's main source and emergency sources through an automatic switchboard (AC220V) and a battery backup system (DC24V). This applies irrespective of whether the NPS-300 or any alternative power supply unit is used for the installation.

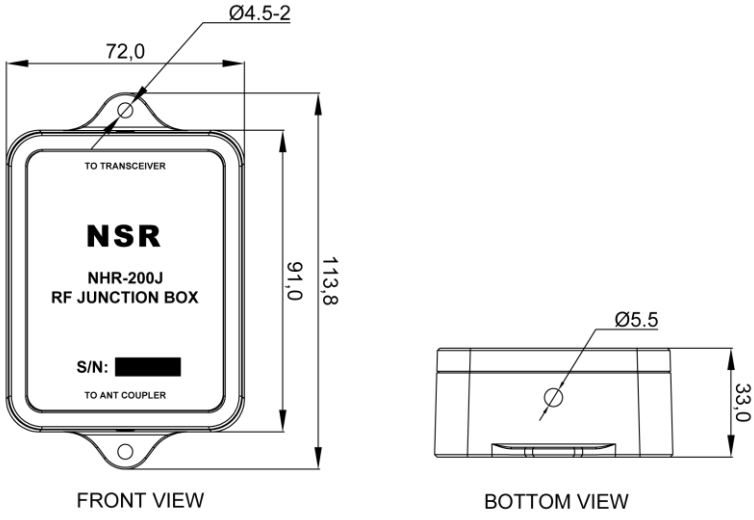
The technical requirements of the power supply unit are as follows:

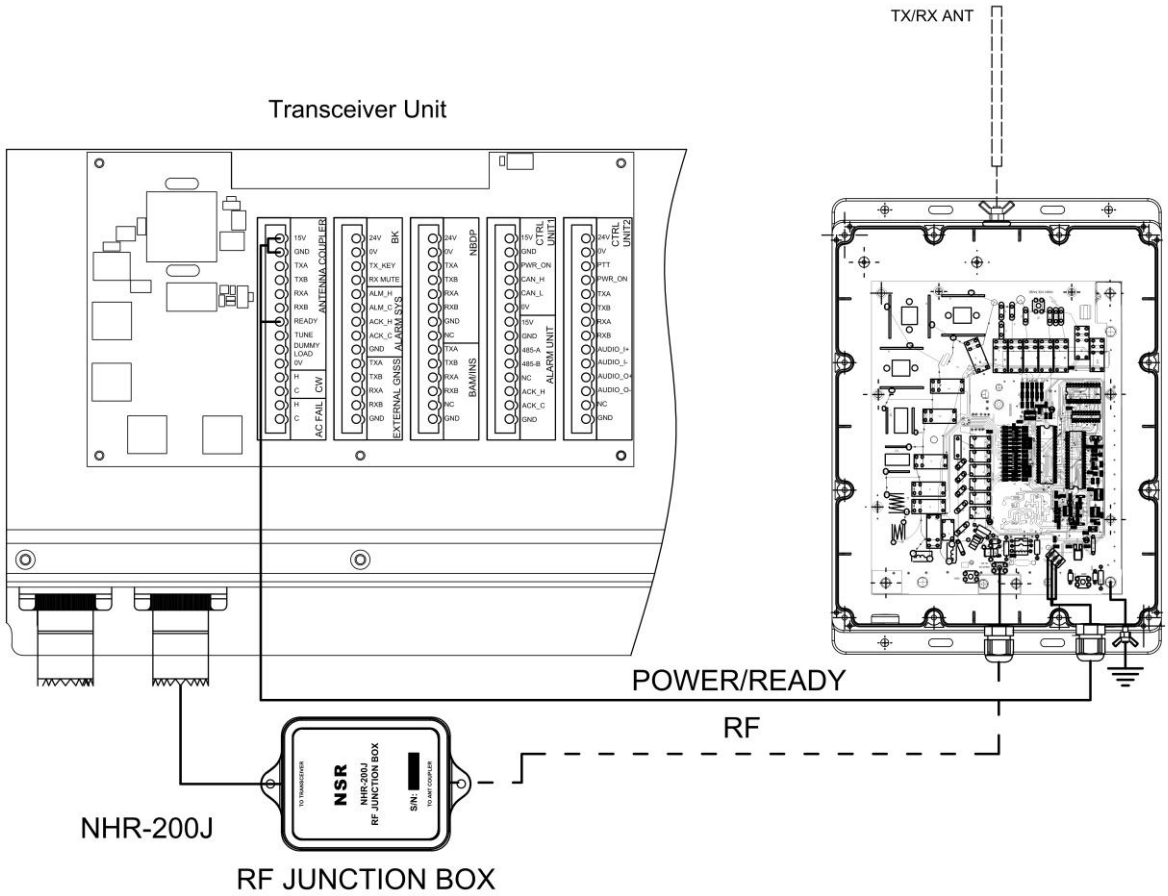
Input	AC110V/220V, DC24~36V
Output	DC 24V, 30A
Environmental and EMC standard	IEC 60945, protected

7.9 Connection

7.9.1 Connection between Transceiver and Antenna Coupler

An additional NHR-200J RF junction box is suggested to be installed between the transceiver unit and antenna coupler. It is used to suppress current variations for improving antenna matching.





As shown above, there are two cables, one RF cable (not provided) and one power cable.

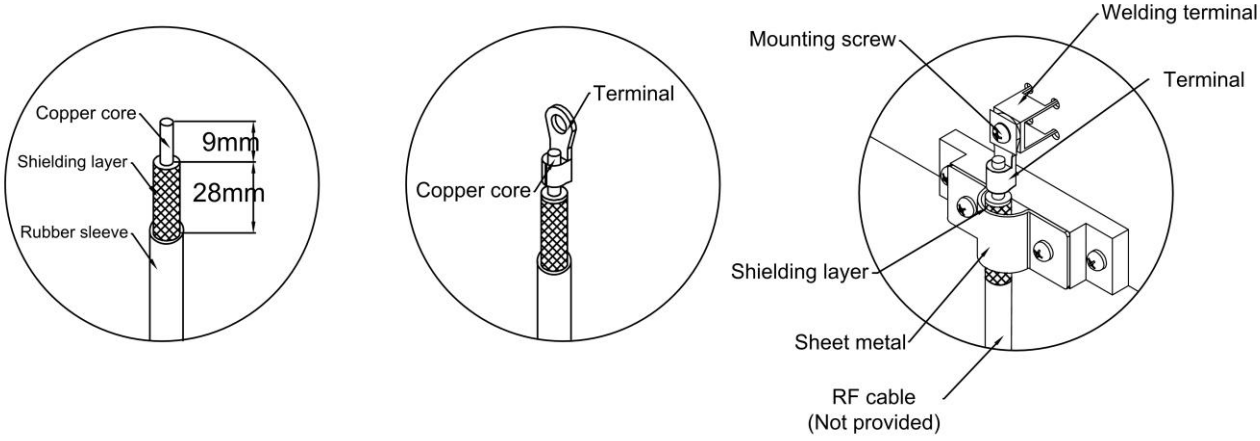
RF Cable Installation Instructions

① Peel off the cable rubber sleeve to expose the shielding layer;

② Press the copper core with terminal;

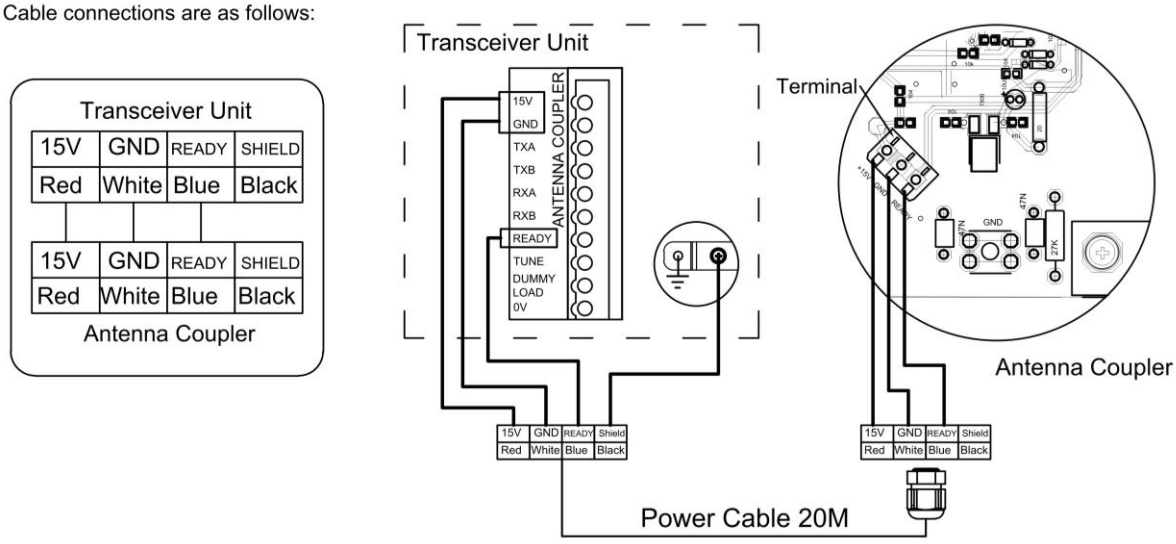
③ Press the terminal onto the welded terminal and fix it with screws;

④ Press the sheet metal against the shielding layer and fix it with screws.

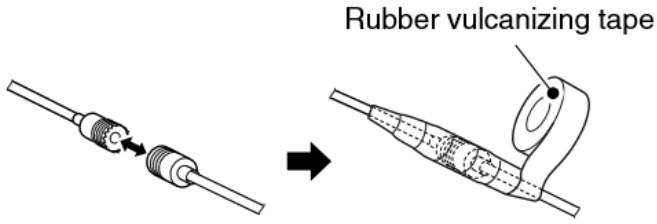


Power Cable Installation Instructions

Cable connections are as follows:

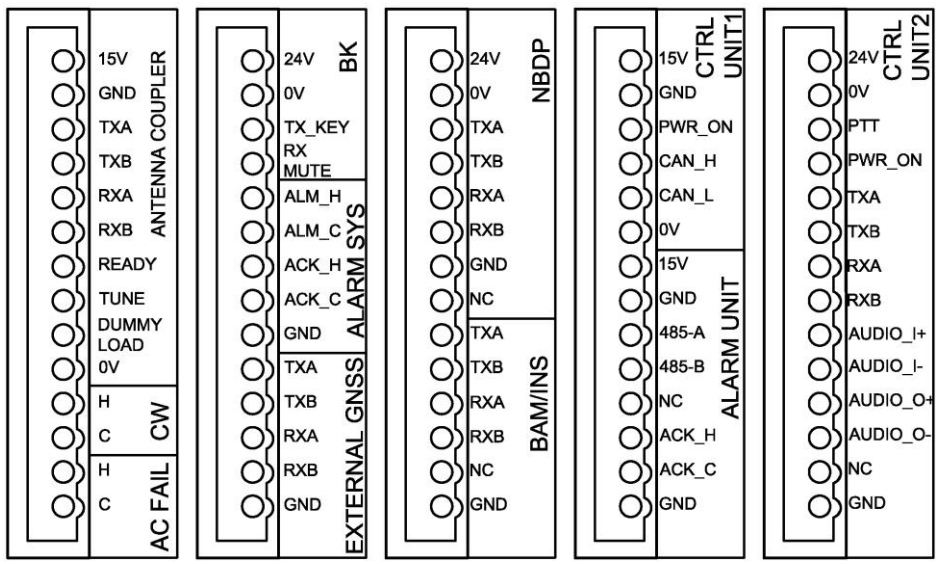


After connecting the RF cable and the power cable, cover the connectors with a rubber vulcanizing tape, etc., as shown below, to prevent water seeping into the connector.



7.9.2 I/O Connection

There are five terminal blocks for I/O connection. Each block has 14 pins.



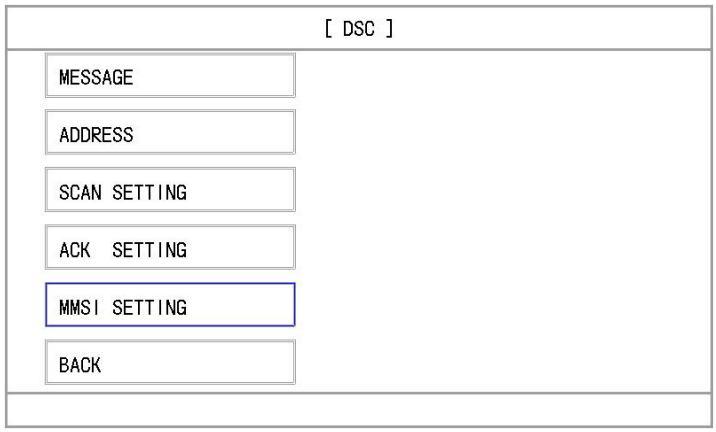
Please refer to the attached drawings for the connection and wiring.

7.10 MMSI Setting

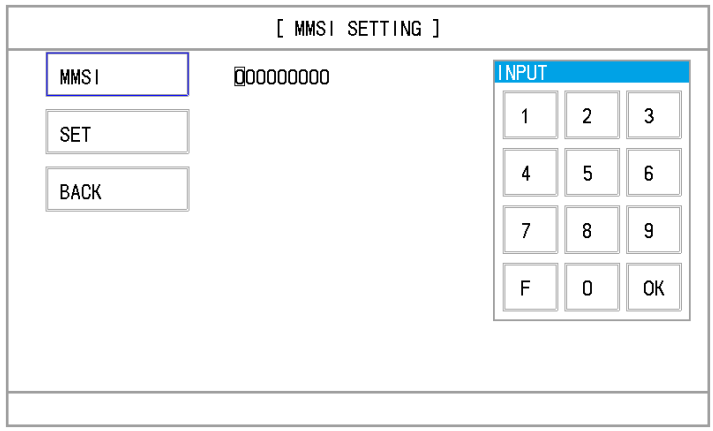
When the MF/HF radio is powered on for the first time, typically during installation, the vessel's MMSI number can be entered. Hereafter, the MMSI number is briefly displayed after power up. The MMSI is a unique, 9-digit identifier assigned to own ship.

Do the following steps to set own ship's MMSI.

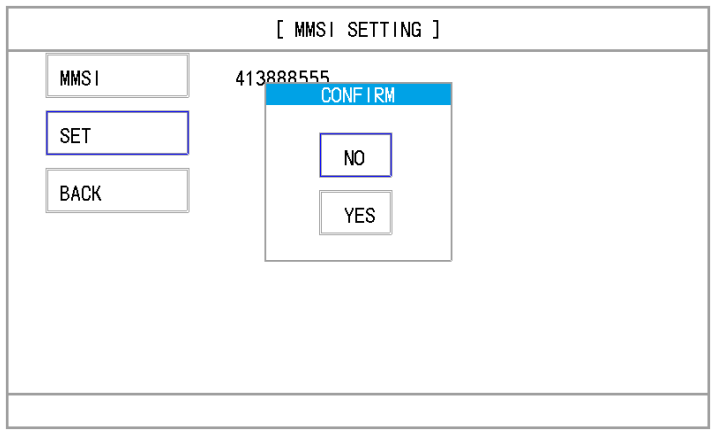
① Click **[MENU]** – **[DSC]** – [MMSI **SETTING**] on the SSB screen.



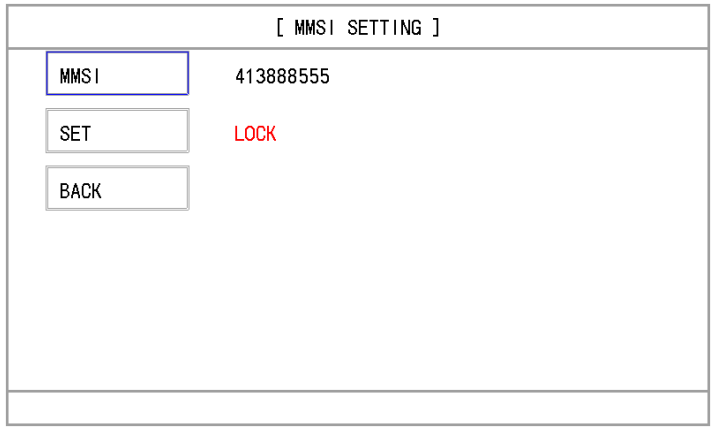
② With [**MMSI**] selected, the screen shown below appears. Enter the MMSI. Click **OK** to confirm the input.



③ Click **[SET]** and choose **YES** to confirm the setting. And MMSI will be locked afterwards.



The "**LOCK**" appears after clicking [**MMSI SETTING**] again.



***NOTE**: Without a programmed MMSI, the **DISTRESS** button will not work! The [DSC MSG] cannot be opened either if the MMSI has not been programmed during installation.*
To change or reprogram a new MMSI, please contact NSR or the local agent.

8. MAINTENANCE

8.1 Maintenance

Regular maintenance helps to keep your equipment in good condition and prevents future problems. Check the items shown in the table below.

Item	Check point	Remedy/Remarks
Antenna	Check for physical damage and corrosion.	Replace damaged parts.
Wire antenna	Check that the antenna is properly spanned and separated sufficiently from metallic structures.	If necessary, re-span the antenna.
Insulators for antenna	Check for saltwater deposits on insulators. Check that the connection at the leading insulator is tight and rust-free.	Replace damaged insulator(s). Remove saltwater deposits. Clean with fresh water, then dry. Remove rust, then tighten bolts and lock nuts. Cover the metallic surface with sealing compound.
Antenna coupler	Check the condition of the antenna terminal, grounding, coaxial cable and power cable.	Tighten the loosened connections.
	Check that the coupler lid and cable glands are firmly secured.	Fasten the lid firmly and evenly to prevent water leakage.
	Check for physical damage, corrosion and saltwater deposits.	Replace if damaged.
Control unit / NBDP terminal	Check grounding and cable connections.	Tighten the loosened connections.
	Remove dust from the control unit / NBDP terminal with a soft cloth. ***Note: Do not use chemical cleaners to clean the control unit / NBDP terminal; they can remove paint or markings and deform the equipment.***	Wipe the LCD carefully to prevent scratching, using tissue paper and an LCD cleaner. To remove dirt or salt deposits, use an LCD cleaner, wiping slowly with tissue paper so as to dissolve the dirt or salt. Change paper frequently so the salt or dirt does not scratch the LCD.
Transceiver unit	Check condition of grounding.	Make sure the grounding is OK.
	Check the connection of all cables.	Tighten loosened connections.
	Check the heat sink (case cover) and cooling fan.	Clean the heat sink (case cover) and cooling fan.
Power supply	Check that the supply voltage at transmission is within the rated range (21.6 to 31.2 VDC at the input of the Power Supply Unit.	If not within the range, check the power source. Low or over voltage may cause abnormal operation.

8.2 Simple Troubleshooting

The table below provides possible problems and the means with which to restore normal operation. If normal operation cannot be restored, do not attempt to check inside the equipment. Any servicing should be referred to a qualified technician.

Problem	Probable cause	Remedy
Power cannot be turned on.	Mains switchboard is off.	Turn on the mains switchboard.
	(DC) voltage is too high.	Check supply voltage.
	Battery has discharged, or poor contact at the terminals.	Recharge the battery and tighten the battery terminals.
Dark display.	Display brightness is too low.	Press the **DIM** button to adjust the display brightness.
Power is on, but no sound from the main speaker.	The main speaker is off.	Press the **VOLUME** knob to turn on the main speaker.
Poor articulation.	Wrong class of emission.	Class of emission should match that of incoming signal.
Output power reduced to LOW.	Power is automatically reduced to protect against overheating due to continuous transmission or high VSWR .	Wait until the unit cools. Check the antenna and coupler.
Antenna coupler cannot tune the antenna.	The antenna is disconnected or shorted to ground.	Check the antenna connection.
	The antenna is out of the tunable length.	Recommended length for wire antenna is 10 to 18 meters.
	Poor grounding of antenna coupler.	Check coupler grounding.
	Connection cable loosened or disconnected.	Check the cable.

8.3 Error Messages

The table below shows error messages, their meanings, and remedies. Please refer to Section 2.12.2. If other error occurs, contact your dealer.

Alert ID Reference	Error Message	Additional Description	Meaning & Remedy
3122	DISTRESS: RX	Receipt of distress call.	Check DSC Task.
3008	TX POWER: FAILURE	TRANSCEIVER FAIL	Not transmitting. Check equipment status.
3062	GENERAL: FAULT	HW error.	Check Version menu, contact the manufacturer.
		HW error: FLASH.	Flash chip failure. Check Version menu, contact the manufacturer.
		HW error: RTC.	RTC circuit failure. Check Version menu, contact the manufacturer.
		HW error: AUDIO.	Audio chip failure (excluding the audio PA and volume circuit). Check Version menu, contact the manufacturer.
		HW error: NET.	Network chip failure. Check Version menu, contact the manufacturer.
3062	SELFTEST: FAULT	Built in self test failure.	Check failure information, contact manufacturer.

Alert ID Reference	Error Message	Additional Description	Meaning & Remedy
3016	POSITION: LOST	No position data received.	Position data is not updated for 15 minutes. Check external GNSS data input or manual enter the position.
3115	ANTENNA: FAILURE	VSWR high.	VSWR exceeds limit. Check Antenna.
		VSWR high_In Tuning.	VSWR exceeds limit in turning. Check Antenna.
		VSWR high_LastTime_TuneError.	VSWR is high and also exceeded limit in previous turning. Check Antenna.
		VSWR high_LastTime_TuneOK.	VSWR is high but was OK in previous turning. Check Antenna.
3019	MMSI: WRONG	Check MMSI setting.	MMSI is not set. Enter MMSI of own ship.
3009	CONTROL: LOST	Check control unit.	Lost Communication interface. Check equipment, contact the manufacturer.
3009	TRANSCEIVER: LOST	Check transceiver.	Internal interface failure. Check equipment, contact the manufacturer.
3009	CORE: LOST	Check transceiver.	Lost Core interface. Check equipment, contact the manufacturer.
3009	NBDP: LOST	Check NBDP.	Lost NBDP interface. Check equipment, contact the manufacturer.
3009	PA: OVERHEATING	Reduced Transmission power.	PA temperature is too high. Test after the amplifier cools down.
3023	AC POWER FAIL	Check AC power supply.	AC Power input fail. Check equipment, contact the manufacturer.

APPENDIX 1 TECHNICAL SPECIFICATIONS

General Specifications

Transmitting frequency	1605.0 ~ 27500.0 kHz (100 Hz steps)
Receiving frequency	300.0 ~ 29999.9 kHz (100 Hz steps)
Frequency error	Within ±10 Hz
Type of emission	J3E (USB) F1B (FSK) A1A (CW)
Channels	User definable channels: Max. 100 CH ITU preset channels: SSB - 402 CH, DSC - 31 CH
Scan channels	Max 12 (6 distress, 6 routine)
Nominal frequency	J3E/ A1A: Carrier frequencies F1B: Assigned frequency
Communication method in SSB voice	Push-to-talk (simplex, semi-duplex)
DSC log	DSC RX : Distress: 50, General: 50 DSC TX : 50
Antenna impedance	50Ω unbalanced
Channel switching duration	≤10 sec
Interface	IEC61162-1 (GNSS/BAM/INS)
Compass safe distance	Standard Compass: 1.20m, Steering Compass: 0.75m (Transceiver Unit) Standard Compass: 1.25m, Steering Compass: 0.85m (Control Unit)
Power supply	DC 24 V (range 18 V ~ 29 V), 30A
Current consumption	Max 16 A, @transmitting at 150W Max 2A, @receiving
Operating temperature range	-15°C ~ +55°C (parts exposed to condensation -25°C ~ +55°C)
Storage temperature range	-15°C ~ +55°C (parts exposed to condensation -25°C ~ +70°C)
Humidity resistance	No abnormality after standing 4 hours in +40°C, 93%RH
IP grade	IP22 (Control Unit, Transceiver Unit, NBDP terminal, Handset) IP66 (Antenna Coupler)
Size and weight	**Transceiver Unit:** 480 (H) x 325 (W) x 174.5 (D) mm, about 16kg **Antenna Coupler:** 400 (H) x 289 (W) x 85 (D) mm, about 3kg **Control Unit:** 146.9 (H) x 311.4 (W) x 81 (D) mm, about 1.5kg **NBDP Terminal:** 189.8 (H) x 319.6 (W) x 103.1 (D) mm, about 3kg

Transmitter

Output power	1605.0 ~ 27500.0 kHz, 150/120/80 W PEP
Occupied bandwidth	J3E/ H3E: Within 3 kHz F1B/ A1A: Within 0.5 kHz
Carrier suppression (J3E)	40 dB or more
Unwanted emissions in the out-of-band domain	Mean power of 50 mW or lower, or 43 dB or more lower than the mean power of the basic frequency
Overall distortion and noise	-20 dB or less
AF frequency response	Deviation is within 6 dB in 350 Hz to 2700 Hz range
Tone frequency	1700 Hz or 1100 Hz

Receiver

Receiving frequency error	Within ±10 Hz
Sensitivity (SINAD 20dB)	J3E: 2.5μV or less (1605.0 to 27500.0 kHz) F1B: 0.7μV or less (1605.0 to 27500.0 kHz) A1A: 1.4μV or less (1605.0 to 27500.0 kHz)
Overall distortion and noise	When an input signal level of 30μV is applied, the ratio between low-frequency output 1000 Hz and unwanted components contained in that output is 30 dB or more.
Conducted spurious emission	Power emitted from antenna terminal is 2 nW or less (9kHz - 2GHz) and 20 nW or less (2GHz - 4GHz).

DSC Watch Keeping Receiver

Receiving frequency	Distress and safety frequencies of 2187.5 kHz / 8414.5 kHz / 4207.5 kHz / 6312.0 kHz / 12577.0 kHz / 16804.5 kHz Simultaneously
Frequency error	Within ±10 Hz
Sensitivity	1% or lower symbol error rate at reception input voltage of 1μV
Antenna impedance	50Ω unbalanced

Antenna Coupler

Frequency range	1605.0 ~ 27500.0 kHz
Max. input power	1605.0 ~ 27500.0 kHz : 150W
SWR after tuning	2:1 or less
Tuning method	Auto-tuning
Tuning time	Max. 15 s
Power supply	DC 15V

Control Unit

Communication interface	CAN
Handset input impedance	150Ω balanced
Audio output	Internal loud speaker (8Ω) : 5W max External speaker impedance: 8Ω or more Handset phone (150Ω) : Rated 1mW or more
LCD display	7 inch color LCD, touch screen operation (Resolution: 800×480)

NBDP Terminal

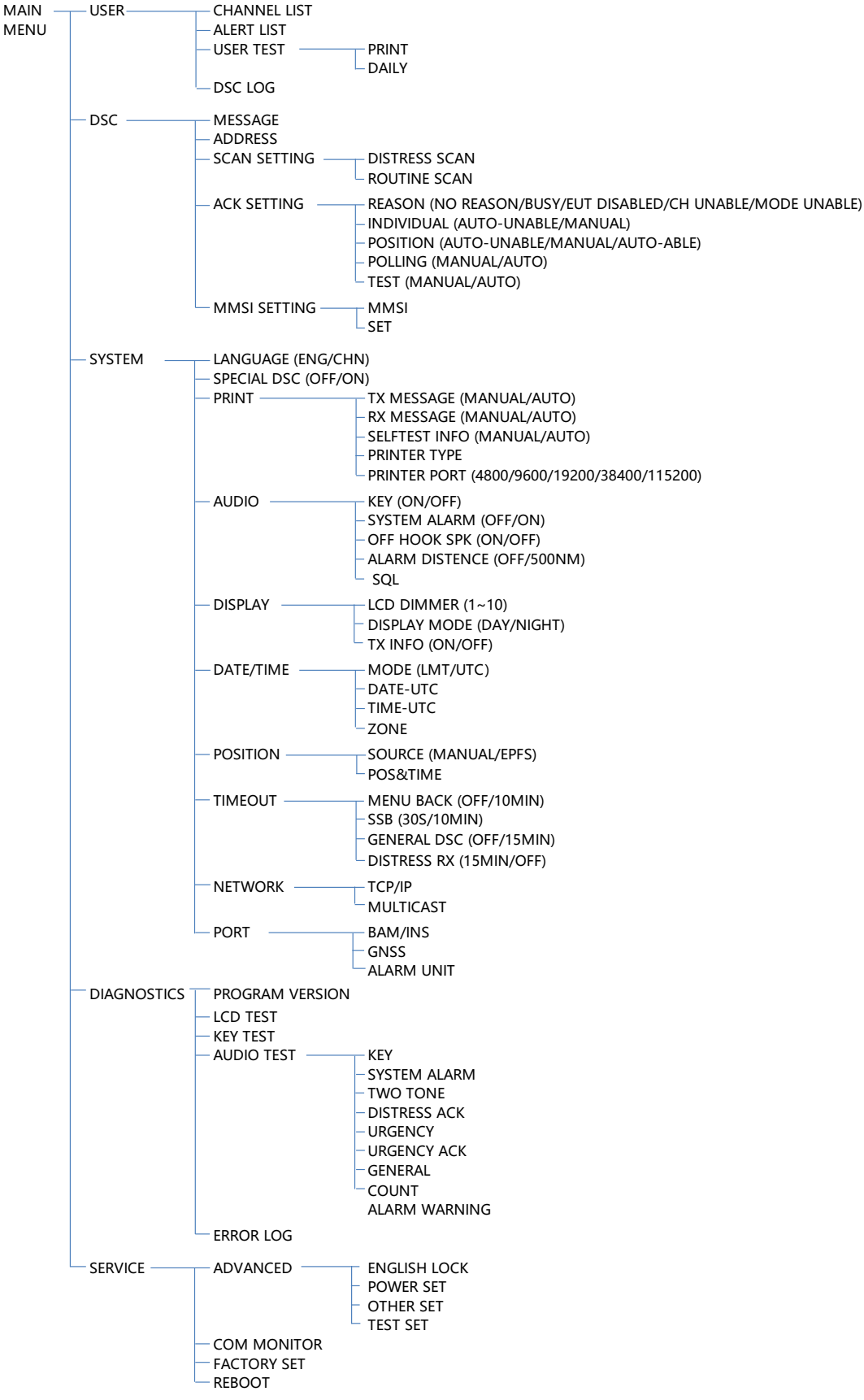
Type of emission	F1B (FSK)
Communication mode	ARQ, FEC
LCD display	10.1 inch color LCD, touch screen operation (Resolution: 1280×800)

Power supply (NPS-300)

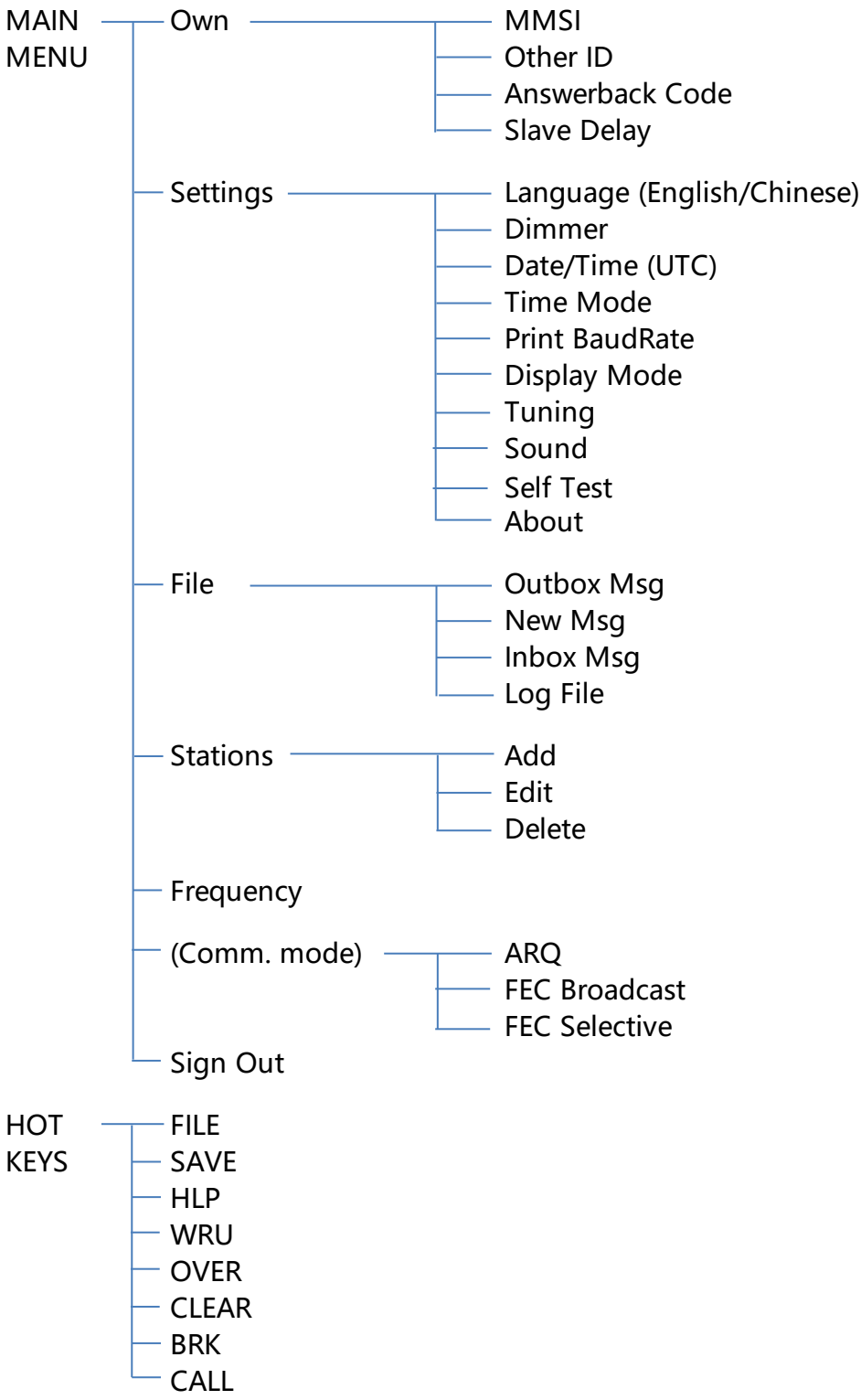
Source voltage	AC 90 V ~ AC 132 V or AC 180 V ~ AC 264 V (50/60 Hz) and DC 24 V (range 21.6 V ~ 31.2 V)
Output voltage	DC 24 V
Maximum output current	30 A
Source switching function	Automatic switching to DC power when AC power is cut off. (uninterrupted output) Automatic switching from DC to AC when AC power is restored.

APPENDIX 2 MENU TREE

Control Unit:



NBDP Terminal:



APPENDIX 3 NBDP COMMAND AND ABBREVIATION

Command	Description
+	Instruction for converting the communication flow. i.e. **OVER** key
BRK+	Indicate that the use of the radio path needs to be cleared. i.e. **BRK** key.
HLP+	Indicate that the ship station needs to receive a list of available facilities in system. i.e. **HLP** key.
MED+	Indicate an urgent medical message follows.
MSG+	Indicate that the ship station needs to receive the message held for it from the coast station.
OPR+	Indicate that need to call operator.
TST+	Indicate that request coast station to send a test message for checking the ship station.
TGM+	Indicate that the following message is a radio telegram.
URG+	Only be used in case of emergency.
WRU+	Who are you. i.e. **WRU** key.

Abbreviation	Description
MOM	Wait a moment.
NNNN or KKKK(K)	Terminate the message.

APPENDIX 4 FREQUENCY TABLES

DSC Frequency Table

DESCRIPTION	CH	TX (kHz)	RX (kHz)	REMARKS (*)
Distress & Safety Frequencies	2M	2187.5	2187.5	
	4M	4207.5	4207.5	
	6M	6312.0	6312.0	
	8M	8414.5	8414.5	
	12M	12577.0	12577.0	
	16M	16804.5	16804.5	
INTL (International Frequencies)	2M	2189.5 (2177.0*)	2177.0	ship to ship
	4M	4208.0	4219.5	
	6M	6312.5	6331.0	
	8M	8415.0	8436.5	
	12M	12577.5	12657.0	
	16M	16805.0	16903.0	
	18M	18898.5	19703.5	
	22M	22374.5	22444.0	
	25M	25208.5	26121.0	
LOCAL1 (Local Frequencies)	4M	4208.5	4220.0	
	6M	6313.0	6331.5	
	8M	8415.5	8437.0	
	12M	12578.0	12657.5	
	16M	16805.5	16903.5	
	18M	18899.0	19704.0	
	22M	22375.0	22444.5	
	25M	25209.0	26121.5	
LOCAL2 (Local Frequencies)	4M	4209.0	4220.5	
	6M	6313.5	6332.0	
	8M	8416.0	8437.5	
	12M	12578.5	12658.0	
	16M	16806.0	16904.0	
	18M	18899.5	19704.5	
	22M	22375.5	22445.0	
	25M	25209.5	26122.0	

Custom channels (to be programmed by NSR dealers)

CH NO.	Ship Receive (kHz)	Ship Transmit (kHz)	Remarks

SSB Channels on 2MHz band, J3E, carrier frequencies (kHz)

NSR CH NO.	Ship RX	Ship TX	Remarks
241	1635	2060	Duplex
242	1638	2063	Duplex
243	1641	2066	Duplex
244	1644	2069	Duplex
245	1647	2072	Duplex
246	1650	2075	Duplex
247	1653	2078	Duplex
248	1656	2081	Duplex
249	1659	2084	Duplex
250	1662	2087	Duplex
251	1665	2090	Duplex
252	1668	2093	Duplex
253	1671	2096	Duplex
254	1674	2099	Duplex
255	1677	2102	Duplex
256	1680	2105	Duplex
257	1683	2108	Duplex
258	1686	2111	Duplex
259	1689	2114	Duplex
260	1692	2117	Duplex
261	1695	2120	Duplex
262	1698	2123	Duplex
263	1701	2126	Duplex
264	1704	2129	Duplex
265	1707	2132	Duplex
266	1710	2135	Duplex
267	1713	2138	Duplex
268	1716	2060	Duplex
269	1719	2063	Duplex
270	1722	2066	Duplex

NSR CH NO.	Ship RX	Ship TX	Remarks
271	1725	2069	Duplex
272	1728	2072	Duplex
273	1731	2075	Duplex
274	1734	2078	Duplex
275	1737	2081	Duplex
276	1740	2084	Duplex
277	1743	2087	Duplex
278	1746	2090	Duplex
279	1749	2093	Duplex
280	1752	2096	Duplex
281	1755	2099	Duplex
282	1758	2102	Duplex
283	1761	2105	Duplex
284	1764	2108	Duplex
285	1767	2111	Duplex
286	1770	2114	Duplex
287	1773	2117	Duplex
288	1776	2120	Duplex
289	1779	2123	Duplex
290	1782	2126	Duplex
291	1785	2129	Duplex
292	1788	2132	Duplex
293	1791	2135	Duplex
294	1794	2138	Duplex
295	1797	2060	Duplex

ITU SSB Channels on 4MHz band, J3E, carrier frequencies (kHz)

ITU CH NO.	NSR CH NO.	Ship RX	Ship TX	Remarks
401	401	4357	4065	Duplex
402	402	4360	4068	Duplex
403	403	4363	4071	Duplex
404	404	4366	4074	Duplex
405	405	4369	4077	Duplex
406	406	4372	4080	Duplex
407	407	4375	4083	Duplex
408	408	4378	4086	Duplex
409	409	4381	4089	Duplex
410	410	4384	4092	Duplex
411	411	4387	4095	Duplex
412	412	4390	4098	Duplex
413	413	4393	4101	Duplex
414	414	4396	4104	Duplex
415	415	4399	4107	Duplex
416	416	4402	4110	Duplex
417	417	4405	4113	Duplex
418	418	4408	4116	Duplex
419	419	4411	4119	Duplex
420	420	4414	4122	Duplex
421	421	4417	4125	Duplex
422	422	4420	4128	Duplex
423	423	4423	4131	Duplex
424	424	4426	4134	Duplex
425	425	4429	4137	Duplex
426	426	4432	4140	Duplex
427	427	4435	4143	Duplex
428	428	4351	4351	Simplex
429	429	4354	4354	Simplex
430	430	4146	4146	Simplex
431	431	4149	4149	Simplex
1	432	4000	4000	Simplex
2	433	4003	4003	Simplex
3	434	4006	4006	Simplex
4	435	4009	4009	Simplex
5	436	4012	4012	Simplex
6	437	4015	4015	Simplex
7	438	4018	4018	Simplex
8	439	4021	4021	Simplex
9	440	4024	4024	Simplex
10	441	4027	4027	Simplex
11	442	4030	4030	Simplex
12	443	4033	4033	Simplex
13	444	4036	4036	Simplex
14	445	4039	4039	Simplex
15	446	4042	4042	Simplex
16	447	4045	4045	Simplex
17	448	4048	4048	Simplex
18	449	4051	4051	Simplex
19	450	4054	4054	Simplex
20	451	4057	4057	Simplex
21	452	4060	4060	Simplex

Note: According to APPENDIX 17 (REV.WRC-12)

ITU SSB Channels on 6MHz band, J3E, carrier frequencies (kHz)

ITU CH NO.	NSR CH NO.	Ship RX	Ship TX	Remarks
601	601	6501	6200	Duplex
602	602	6504	6203	Duplex
603	603	6507	6206	Duplex
604	604	6510	6209	Duplex
605	605	6513	6212	Duplex
606	606	6516	6215	Duplex
607	607	6519	6218	Duplex
608	608	6522	6221	Duplex
609	609	6224	6224	Simplex
610	610	6227	6227	Simplex
611	611	6230	6230	Simplex

Note: According to APPENDIX 17 (REV.WRC-12)

ITU SSB Channels on 8MHz band, J3E, carrier frequencies (kHz)

ITU CH NO.	NSR CH NO.	Ship RX	Ship TX	Remarks
801	801	8719	8195	Duplex
802	802	8722	8198	Duplex
803	803	8725	8201	Duplex
804	804	8728	8204	Duplex
805	805	8731	8207	Duplex
806	806	8734	8210	Duplex
807	807	8737	8213	Duplex
808	808	8740	8216	Duplex
809	809	8743	8219	Duplex
810	810	8746	8222	Duplex
811	811	8749	8225	Duplex
812	812	8752	8228	Duplex
813	813	8755	8231	Duplex
814	814	8758	8234	Duplex
815	815	8761	8237	Duplex
816	816	8764	8240	Duplex
817	817	8767	8243	Duplex
818	818	8770	8246	Duplex
819	819	8773	8249	Duplex
820	820	8776	8252	Duplex
821	821	8779	8255	Duplex
822	822	8782	8258	Duplex
823	823	8785	8261	Duplex
824	824	8788	8264	Duplex
825	825	8791	8267	Duplex
826	826	8794	8270	Duplex
827	827	8797	8273	Duplex
828	828	8800	8276	Duplex
829	829	8803	8279	Duplex
830	830	8806	8282	Duplex
831	831	8809	8285	Duplex
832	832	8812	8288	Duplex
833	833	8291	8291	Simplex
834	834	8707	8707	Simplex
835	835	8710	8710	Simplex
836	836	8713	8713	Simplex
837	837	8716	8716	Simplex
838	838	8294	8294	Simplex
839	839	8297	8297	Simplex

ITU CH NO.	NSR CH NO.	Ship RX	Ship TX	Remarks
1	840	8101	8101	Simplex
2	841	8104	8104	Simplex
3	842	8107	8107	Simplex
4	843	8110	8110	Simplex
5	844	8113	8113	Simplex
6	845	8116	8116	Simplex
7	846	8119	8119	Simplex
8	847	8122	8122	Simplex
9	848	8125	8125	Simplex
10	849	8128	8128	Simplex
11	850	8131	8131	Simplex
12	851	8134	8134	Simplex
13	852	8137	8137	Simplex
14	853	8140	8140	Simplex
15	854	8143	8143	Simplex
16	855	8146	8146	Simplex
17	856	8149	8149	Simplex
18	857	8152	8152	Simplex
19	858	8155	8155	Simplex
20	859	8158	8158	Simplex
21	860	8161	8161	Simplex
22	861	8164	8164	Simplex
23	862	8167	8167	Simplex
24	863	8170	8170	Simplex
25	864	8173	8173	Simplex
26	865	8176	8176	Simplex
27	866	8179	8179	Simplex
28	867	8182	8182	Simplex
29	868	8185	8185	Simplex
30	869	8188	8188	Simplex
31	870	8191	8191	Simplex

Note: According to APPENDIX 17 (REV.WRC-12)

ITU SSB Channels on 12MHz Band, J3E, carrier frequencies (kHz)

ITU CH NO.	NSR CH NO.	Ship RX	Ship TX	Remarks
1201	1201	13077	12230	Duplex
1202	1202	13080	12233	Duplex
1203	1203	13083	12236	Duplex
1204	1204	13086	12239	Duplex
1205	1205	13089	12242	Duplex
1206	1206	13092	12245	Duplex
1207	1207	13095	12248	Duplex
1208	1208	13098	12251	Duplex
1209	1209	13101	12254	Duplex
1210	1210	13104	12257	Duplex
1211	1211	13107	12260	Duplex
1212	1212	13110	12263	Duplex
1213	1213	13113	12266	Duplex
1214	1214	13116	12269	Duplex
1215	1215	13119	12272	Duplex
1216	1216	13122	12275	Duplex
1217	1217	13125	12278	Duplex
1218	1218	13128	12281	Duplex
1219	1219	13131	12284	Duplex
1220	1220	13134	12287	Duplex
1221	1221	13137	12290	Duplex
1222	1222	13140	12293	Duplex
1223	1223	13143	12296	Duplex
1224	1224	13146	12299	Duplex
1225	1225	13149	12302	Duplex
1226	1226	13152	12305	Duplex
1227	1227	13155	12308	Duplex
1228	1228	13158	12311	Duplex
1229	1229	13161	12314	Duplex
1230	1230	13164	12317	Duplex
1231	1231	13167	12320	Duplex
1232	1232	13170	12323	Duplex
1233	1233	13173	12326	Duplex
1234	1234	13176	12329	Duplex
1235	1235	13179	12332	Duplex
1236	1236	13182	12335	Duplex
1237	1237	13185	12338	Duplex
1238	1238	13188	12341	Duplex
1239	1239	13191	12344	Duplex
1240	1240	13194	12347	Duplex
1241	1241	13197	12350	Duplex
1242	1242	12353	12353	Simplex
1243	1243	12356	12356	Simplex
1244	1244	12359	12359	Simplex
1245	1245	12362	12362	Simplex
1246	1246	12365	12365	Simplex

Note: According to APPENDIX 17 (REV.WRC-12)

ITU SSB Channels on 16/18/19MHz bands, J3E, carrier frequencies (kHz)

ITU CH NO.	NSR CH NO.	Ship RX	Ship TX	Remarks
1651	1651	17392	16510	Duplex
1652	1652	17395	16513	Duplex
1653	1653	17398	16516	Duplex
1654	1654	17401	16519	Duplex
1655	1655	17404	16522	Duplex
1656	1656	17407	16525	Duplex
1657	1657	16528	16528	Simplex
1658	1658	16531	16531	Simplex
1659	1659	16534	16534	Simplex
1660	1660	16537	16537	Simplex
1661	1661	16540	16540	Simplex
1662	1662	16543	16543	Simplex
1663	1663	16546	16546	Simplex

ITU CH NO.	NSR CH NO.	Ship RX	Ship TX	Remarks
1801	1801	19755	18780	Duplex
1802	1802	19758	18783	Duplex
1803	1803	19761	18786	Duplex
1804	1804	19764	18789	Duplex
1805	1805	19767	18792	Duplex
1806	1806	19770	18795	Duplex
1807	1807	19773	18798	Duplex
1808	1808	19776	18801	Duplex
1809	1809	19779	18804	Duplex
1810	1810	19782	18807	Duplex
1811	1811	19785	18810	Duplex
1812	1812	19788	18813	Duplex
1813	1813	19791	18816	Duplex
1814	1814	19794	18819	Duplex
1815	1815	19797	18822	Duplex
1816	1816	18825	18825	Simplex
1817	1817	18828	18828	Simplex
1818	1818	18831	18831	Simplex
1819	1819	18834	18834	Simplex
1820	1820	18837	18837	Simplex
1821	1821	18840	18840	Simplex
1822	1822	18843	18843	Simplex

Note: According to APPENDIX 17 (REV.WRC-12)

ITU SSB Channels on 22/25MHz bands, J3E, carrier frequencies (kHz)

ITU CH NO.	NSR CH NO.	Ship RX	Ship TX	Remarks
2201	2201	22696	22000	Duplex
2202	2202	22699	22003	Duplex
2203	2203	22702	22006	Duplex
2204	2204	22705	22009	Duplex
2205	2205	22708	22012	Duplex
2206	2206	22711	22015	Duplex
2207	2207	22714	22018	Duplex
2208	2208	22717	22021	Duplex
2209	2209	22720	22024	Duplex
2210	2210	22723	22027	Duplex
2211	2211	22726	22030	Duplex
2212	2212	22729	22033	Duplex
2213	2213	22732	22036	Duplex
2214	2214	22735	22039	Duplex
2215	2215	22738	22042	Duplex
2216	2216	22741	22045	Duplex
2217	2217	22744	22048	Duplex
2218	2218	22747	22051	Duplex
2219	2219	22750	22054	Duplex
2220	2220	22753	22057	Duplex
2221	2221	22756	22060	Duplex
2222	2222	22759	22063	Duplex
2223	2223	22762	22066	Duplex
2224	2224	22765	22069	Duplex
2225	2225	22768	22072	Duplex
2226	2226	22771	22075	Duplex
2227	2227	22774	22078	Duplex
2228	2228	22777	22081	Duplex
2229	2229	22780	22084	Duplex
2230	2230	22783	22087	Duplex

ITU CH NO.	NSR CH NO.	Ship RX	Ship TX	Remarks
2231	2231	22786	22090	Duplex
2232	2232	22789	22093	Duplex
2233	2233	22792	22096	Duplex
2234	2234	22795	22099	Duplex
2235	2235	22798	22102	Duplex
2236	2236	22801	22105	Duplex
2237	2237	22804	22108	Duplex
2238	2238	22807	22111	Duplex
2239	2239	22810	22114	Duplex
2240	2240	22813	22117	Duplex
2241	2241	22816	22120	Duplex
2242	2242	22819	22123	Duplex
2243	2243	22822	22126	Duplex
2244	2244	22825	22129	Duplex
2245	2245	22828	22132	Duplex
2246	2246	22831	22135	Duplex
2247	2247	22834	22138	Duplex
2248	2248	22837	22141	Duplex
2249	2249	22840	22144	Duplex
2250	2250	22843	22147	Duplex
2251	2251	22846	22150	Duplex
2252	2252	22849	22153	Duplex
2253	2253	22852	22156	Duplex
2254	2254	22159	22159	Simplex
2255	2255	22162	22162	Simplex
2256	2256	22165	22165	Simplex
2257	2257	22168	22168	Simplex
2258	2258	22171	22171	Simplex
2259	2259	22174	22174	Simplex
2260	2260	22177	22177	Simplex

ITU CH NO.	NSR CH NO.	Ship RX	Ship TX	Remarks
2501	2501	26145	25070	Duplex
2502	2502	26148	25073	Duplex
2503	2503	26151	25076	Duplex
2504	2504	26154	25079	Duplex
2505	2505	26157	25082	Duplex
2506	2506	26160	25085	Duplex
2507	2507	26163	25088	Duplex
2508	2508	26166	25091	Duplex
2509	2509	26169	25094	Duplex
2510	2510	26172	25097	Duplex
2511	2511	25100	25100	Simplex
2512	2512	25103	25103	Simplex
2513	2513	25106	25106	Simplex
2514	2514	25109	25109	Simplex
2515	2515	25112	25112	Simplex
2516	2516	25115	25115	Simplex
2517	2517	25118	25118	Simplex

Note: According to APPENDIX 17 (REV.WRC-12)

ITU NBDP Channels on 4/6/8MHz bands, paired frequencies (kHz)

ITU CH NO.	NSR CH NO.	Ship RX	Ship TX
1	4001	4210.5	4172.5
2	4002	4211.0	4173.0
3	4003	4211.5	4173.5
4	4004	4212.0	4174.0
5	4005	4212.5	4174.5
6	4006	4213.0	4175.0
7	4007	4213.5	4175.5
8	4008	4214.0	4176.0
9	4009	4214.5	4176.5
10	4010	4215.0	4177.0
11	4011	4177.5	4177.5
12	4012	4215.5	4178.0
13	4013	4216.0	4178.5

ITU CH NO.	NSR CH NO.	Ship RX	Ship TX
1	6001	6314.5	6263.0
2	6002	6315.0	6263.5
3	6003	6315.5	6264.0
4	6004	6316.0	6264.5
5	6005	6316.5	6265.0
6	6006	6317.0	6265.5
7	6007	6317.5	6266.0
8	6008	6318.0	6266.5
9	6009	6318.5	6267.0
10	6010	6319.0	6267.5
11	6011	6268.0	6268.0
12	6012	6319.5	6268.5
13	6013	6320.0	6269.0
14	6014	6320.5	6269.5

ITU CH NO.	NSR CH NO.	Ship RX	Ship TX
1	8001	8376.5	8376.5
2	8002	8417.0	8377.0
3	8003	8417.5	8377.5
4	8004	8418.0	8378.0
5	8005	8418.5	8378.5
6	8006	8419.0	8379.0
7	8007	8419.5	8379.5
8	8008	8420.0	8380.0
9	8009	8420.5	8380.5
10	8010	8421.0	8381.0
11	8011	8421.5	8381.5
12	8012	8422.0	8382.0
13	8013	8422.5	8382.5
14	8014	8423.0	8383.0
15	8015	8423.5	8383.5

Note: According to APPENDIX 17 (REV.WRC-12)

ITU NBDP Channels on 12MHz bands, paired frequencies (kHz)

ITU CH NO.	NSR CH NO.	Ship RX	Ship TX
1	12001	12579.5	12477.0
2	12002	12580.0	12477.5
3	12003	12580.5	12478.0
4	12004	12581.0	12478.5
5	12005	12581.5	12479.0
6	12006	12582.0	12479.5
7	12007	12582.5	12480.0
8	12008	12583.0	12480.5
9	12009	12583.5	12481.0
10	12010	12584.0	12481.5
11	12011	12584.5	12482.0
12	12012	12585.0	12482.5
13	12013	12585.5	12483.0
14	12014	12586.0	12483.5
15	12015	12586.5	12484.0
16	12016	12587.0	12484.5
17	12017	12587.5	12485.0
18	12018	12588.0	12485.5
19	12019	12588.5	12486.0
20	12020	12589.0	12486.5
21	12021	12589.5	12487.0
22	12022	12590.0	12487.5
23	12023	12590.5	12488.0
24	12024	12591.0	12488.5
25	12025	12591.5	12489.0
26	12026	12592.0	12489.5
27	12027	12592.5	12490.0
28	12028	12593.0	12490.5
29	12029	12593.5	12491.0
30	12030	12594.0	12491.5
31	12031	12594.5	12492.0
32	12032	12595.0	12492.5
33	12033	12595.5	12493.0
34	12034	12596.0	12493.5
35	12035	12596.5	12494.0
36	12036	12597.0	12494.5
37	12037	12597.5	12495.0
38	12038	12598.0	12495.5
39	12039	12598.5	12496.0
40	12040	12599.0	12496.5
41	12041	12599.5	12497.0
42	12042	12600.0	12497.5
43	12043	12600.5	12498.0
44	12044	12601.0	12498.5
45	12045	12601.5	12499.0
46	12046	12602.0	12499.5
47	12047	12602.5	12500.0
48	12048	12603.0	12500.5
49	12049	12603.5	12501.0
50	12050	12604.0	12501.5
51	12051	12604.5	12502.0
52	12052	12605.0	12502.5
53	12053	12605.5	12503.0
54	12054	12606.0	12503.5
55	12055	12606.5	12504.0
56	12056	12607.0	12504.5
57	12057	12607.5	12505.0
58	12058	12608.0	12505.5
59	12059	12608.5	12506.0
60	12060	12609.0	12506.5
61	12061	12609.5	12507.0
62	12062	12610.0	12507.5
63	12063	12610.5	12508.0
64	12064	12611.0	12508.5
65	12065	12611.5	12509.0
66	12066	12612.0	12509.5
67	12067	12612.5	12510.0
68	12068	12613.0	12510.5
69	12069	12613.5	12511.0
70	12070	12614.0	12511.5
71	12071	12614.5	12512.0
72	12072	12615.0	12512.5
73	12073	12615.5	12513.0
74	12074	12616.0	12513.5
75	12075	12616.5	12514.0
76	12076	12617.0	12514.5
77	12077	12617.5	12515.0
78	12078	12618.0	12515.5
79	12079	12618.5	12516.0
80	12080	12619.0	12516.5
81	12081	12619.5	12517.0
82	12082	12620.0	12517.5
83	12083	12620.5	12518.0
84	12084	12621.0	12518.5
85	12085	12621.5	12519.0
86	12086	12622.0	12519.5
87	12087	12520.0	12520.0
88	12088	12622.5	12520.5
89	12089	12623.0	12521.0
90	12090	12623.5	12521.5
91	12091	12624.0	12522.0
92	12092	12624.5	12522.5

Note: According to APPENDIX 17 (REV.WRC-12)

ITU NBDP Channels on 16/18/19/22MHz bands, paired frequencies (kHz)

ITU CH NO.	NSR CH NO.	Ship RX	Ship TX
1	16001	16807.0	16683.5
2	16002	16807.5	16684.0
3	16003	16808.0	16684.5
4	16004	16808.5	16685.0
5	16005	16809.0	16685.5
6	16006	16809.5	16686.0
7	16007	16810.0	16686.5
8	16008	16810.5	16687.0
9	16009	16811.0	16687.5
10	16010	16811.5	16688.0
11	16011	16812.0	16688.5
12	16012	16812.5	16689.0
13	16013	16813.0	16689.5
14	16014	16813.5	16690.0
15	16015	16814.0	16690.5
16	16016	16814.5	16691.0
17	16017	16815.0	16691.5
18	16018	16815.5	16692.0
19	16019	16816.0	16692.5
20	16020	16816.5	16693.0
21	16021	16817.0	16693.5
22	16022	16817.5	16694.0
23	16023	16818.0	16694.5
24	16024	16695.0	16695.0
25	16025	16818.5	16695.5
26	16026	16819.0	16696.0
27	16027	16819.5	16696.5
28	16028	16820.0	16697.0
29	16029	16820.5	16697.5
30	16030	16821.0	16698.0
31	16031	16821.5	16698.5

ITU CH NO.	NSR CH NO.	Ship RX	Ship TX
7	18007	19684.0	18873.5
8	18008	19684.5	18874.0
9	18009	19685.0	18874.5
10	18010	19685.5	18875.0
11	18011	19686.0	18875.5
12	18012	19686.5	18876.0
13	18013	19687.0	18876.5
14	18014	19687.5	18877.0
15	18015	19688.0	18877.5
16	18016	19688.5	18878.0
17	18017	19689.0	18878.5
18	18018	19689.5	18879.0
19	18019	19690.0	18879.5
20	18020	19690.5	18880.0

ITU CH NO.	NSR CH NO.	Ship RX	Ship TX
13	22013	22382.5	22290.5
14	22014	22383.0	22291.0
15	22015	22383.5	22291.5
16	22016	22384.0	22292.0
17	22017	22384.5	22292.5
18	22018	22385.0	22293.0
19	22019	22385.5	22293.5
20	22020	22386.0	22294.0
21	22021	22386.5	22294.5
22	22022	22387.0	22295.0
23	22023	22387.5	22295.5
24	22024	22388.0	22296.0
25	22025	22388.5	22296.5
26	22026	22389.0	22297.0

Note: According to APPENDIX 17 (REV.WRC-12)

ITU NBDP Channels, non-paired frequencies (kHz)

1. One or more frequencies are assigned to each ship station as transmitting frequencies.
2. All frequencies appearing in this Appendix may be used for NBDP duplex operation.

Frequency Bands							
CH NO.	**4MHz**	**6MHz**	**8MHz**	**12MHz**	**16MHz**	**18/19MHz**	**25/26MHz**
1	4170.50	6260.25	8339.25	12419.25	19691.00	22290.00	26101.00
2	4171.00	6260.75	8339.75	12419.75		22297.50	26101.50
3	4171.50	6321.00	8375.00	12422.00		22298.00	26102.00
4	4172.00	6321.50	8375.50	12476.50		22298.50	26102.50
5	4179.00		8376.00	12655.00		22299.00	
6	4179.50			12655.50		22443.50	
7	4180.00			12656.00			
8				12656.50			

** Above frequencies are not programmed in NBDP terminal.*

Note: According to APPENDIX 17 (REV.WRC-12)

APPENDIX 5 SENTENCE DESCRIPTION

I/O Sentences

Input sentences (IEC 61162-1&2)
GNSS port: GGA, ZDA, GNS, RMC
BAM port: ACN, HBT

Output sentence (IEC 61162-1&2)
BAM port: ALF, ALC, ARC, DSC, DSE

Format of GNSS port and BAM port
Baud rate: 4800, 38400
Bits: 8, N, 1

Multicast Sentence

Output sentence (IEC 61162-450)
RCOM Group: DSC, DSE, HBT

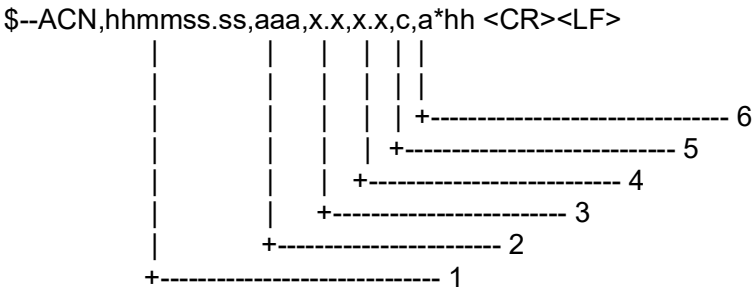
Input / Output sentence (IEC 61162-450)
NETA Group: SRP

Format

Interface	Lan RJ45, Cable≤100m CAT5 10BaseT/100BaseTX
Standard	IEC61162-450
Protocol	IPv4, IGMPv1, UDP Multicast
SFI	CT0001-CT9999
Multicast address: port	RCOM: 239.192.0.6: 60006 NETA: 239.192.0.56: 60056
Message type	HBT, DSC, DSE SRP
Output speed	HBT: 60s DSC, DSE: If receive DSC message SRP: Boot, 1min, 5min, every set SFI

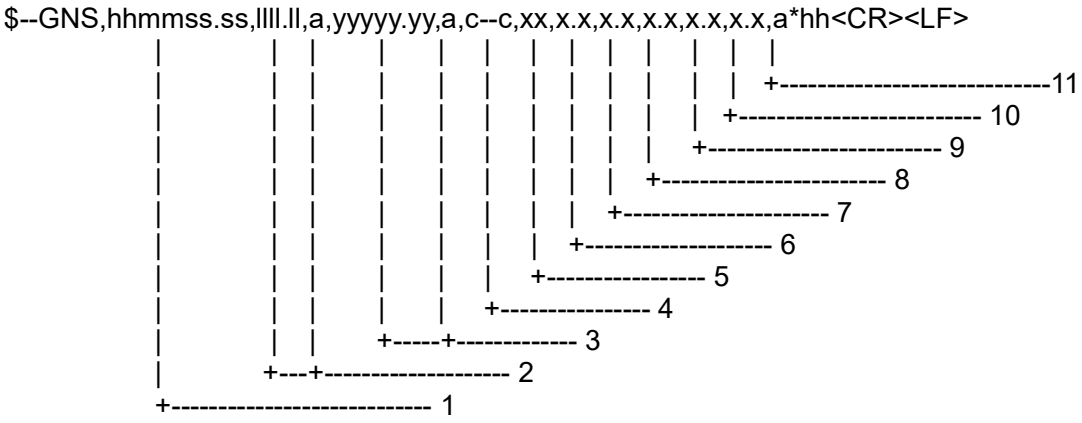
Maximum input rate	Item
100 kb/sec	a) the maximum number of datagrams per second received, intended for and processed by the equipment
500 kb/sec	b) the maximum number of datagrams per second received by, but not intended for, the equipment
250 kb/sec	c) the maximum number of datagrams per second received by, but not intended for, the equipment at 50 % of the maximum load for item a).

ACN – Alert command



1. Time
2. Manufacturer’s mnemonic code
3. Alert Identifier
4. Alert Instance, 0 to 999999
5. Alert command, A, Q, O or S
6. Sentence status flag

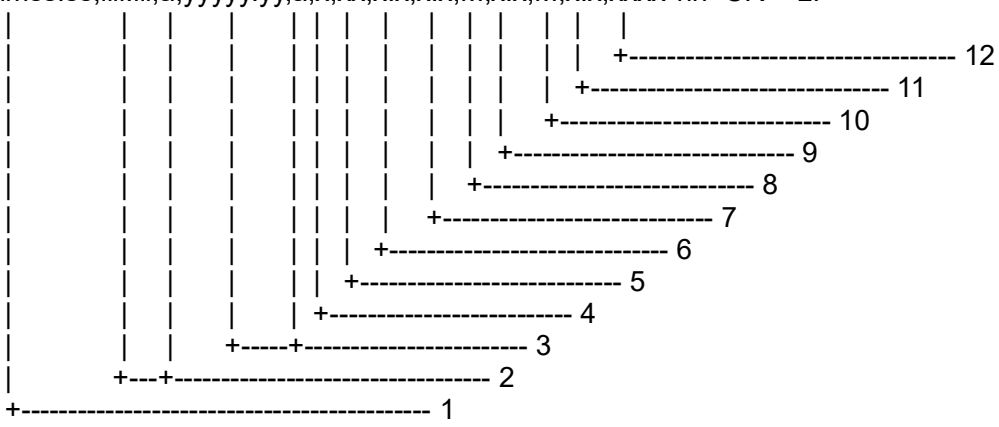
GNS - GNSS fix data



1. UTC of position
2. Latitude, N/S
3. Longitude, E/W
4. Mode indicator
5. Total number of satellites in use, 00-99
6. HDOP
7. Antenna altitude, m, re: mean-sea-level (geoid)
8. Geoidal separation, m
9. Age of differential data
10. Differential reference station ID
11. Navigational status indicator

GGA -Global positioning system (GPS) fix data

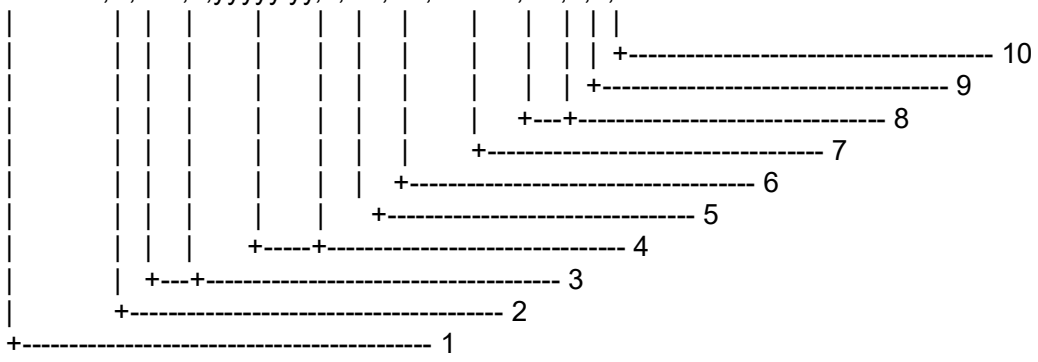
$--GGA,hhmmss.ss,llll.lll,a,yyyyy.yy,a,x,xx,x.x,x.x,M,x.x,M,x.x,xxxx*hh<CR><LF>



1. UTC of position
2. Latitude, N/S
3. Longitude, E/W
4. GPS quality indicator
5. Number of satellite in use,00-12, may be different from the number in view
6. Horizontal dilution of precision
7. Antenna altitude above/below
8. Unit of Antenna altitude, m
9. Geoidal separation
10. Unit of geoidal separation, m
11. Age of differential GPS data
12. Differential reference station ID, 0000-1023

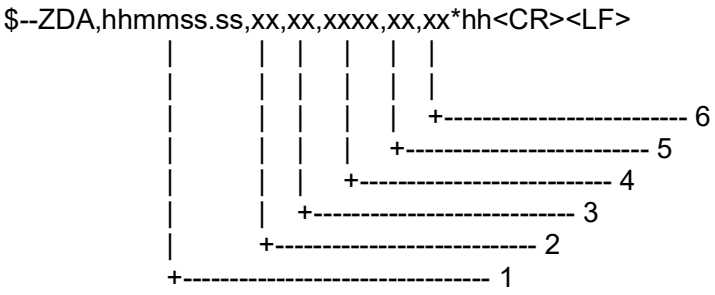
RMC- Recommended minimum specific GNSS data

$--RMC,hhmmss.ss,A,llll.ll,a,yyyyy.yy,a,x.x,x.x,xxxxxx,x.x,a,a,a*hh<CR><LF>



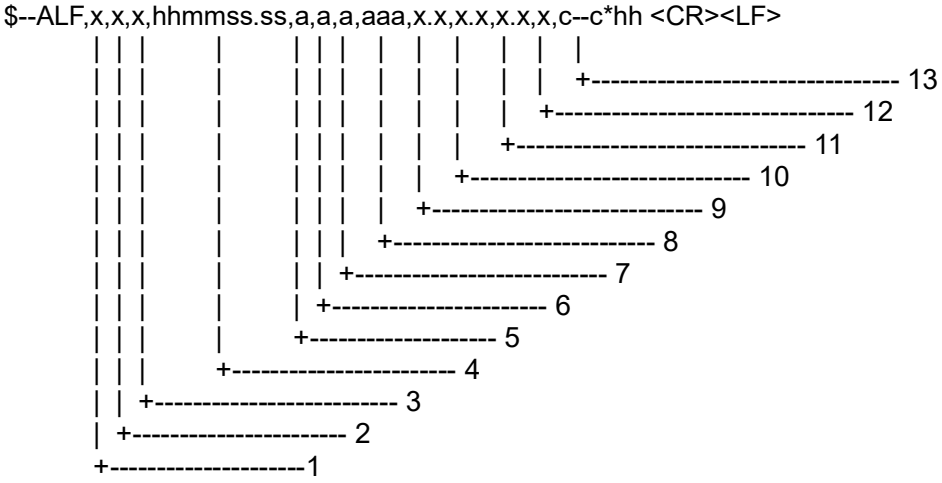
1. UTC of position fix
2. Status: A=data valid, V=navigation receiver warning
3. Latitude, N/S
4. Longitude, E/W
5. Speed over ground, knots
6. Course over ground, degrees true
7. Date: dd/mm/yy
8. Magnetic variation, degrees E/W
9. Mode indicator
10. Navigational status

ZDA - Time and date



1. UTC
2. Day, 01 to 31 (UTC)
3. Month, 01 to 12 (UTC)
4. Year (UTC)
5. Local zone hours, 00h to ±14 h
6. Local zone minutes, 00 to +59

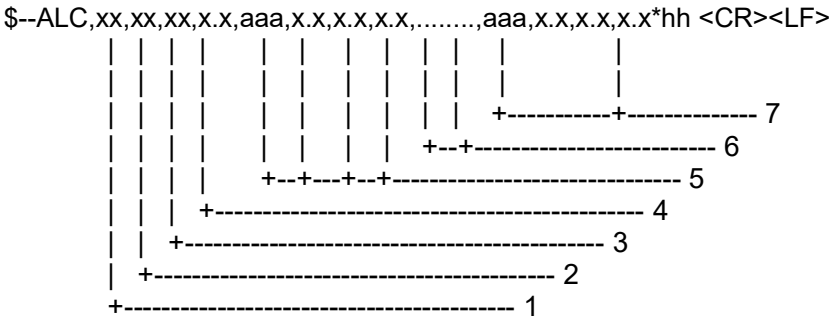
ALF - Alert sentence



1. Total number of ALF sentences for this message, 1 to 2
2. Sentence number, 1 to 2
3. Sequential message identifier, 0 to 9
4. Time of last change, see NOTE A
5. Alert category, A, B or C
6. Alert priority, E, A, W or C
7. Alert state, A, S, N, O, U or V
8. Manufacturer’s mnemonic code
9. Alert identifier
10. Alert instance, 0 to 999999
11. Revision counter, 1 to 99
12. Escalation counter, 0 to 9
13. Alert text

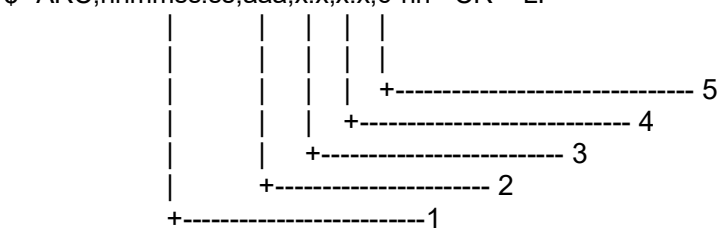
NOTE A: If the system time is out of sync with valid ZDA sentence, this filed is NULL.

ALC - Cyclic alert list



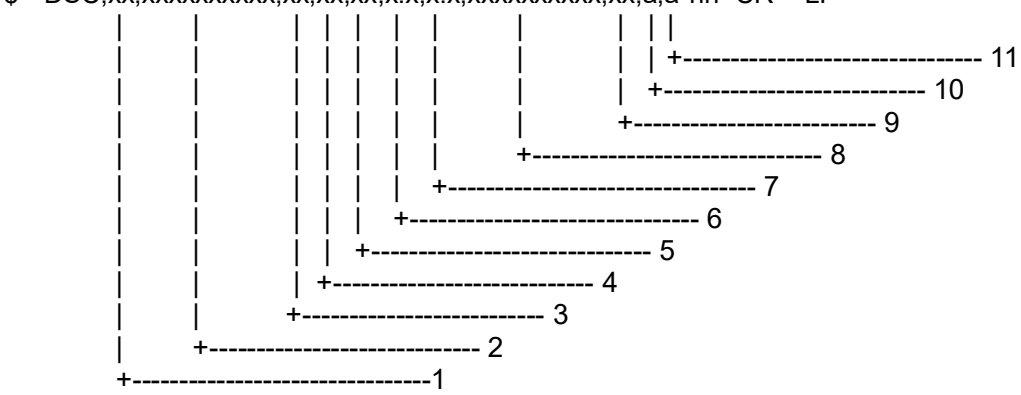
1. Total number of sentences for this message, 01 to 99
2. Sentence number, 01 to 99
3. Sequential message identifier, 00 to 99
4. Number of alert entries
5. Alert entry 1
6. Additional Alert entries
7. Alert entry n

ARC - Alert command refused



1. Time
2. Manufacturer’s mnemonic code
3. Alert identifier
4. Alert instance, 1 to 999999
5. Refused alert command, A, Q, O or S

DSC – Digital selective calling information



1. Format specifier

2. Address
3. Category
4. Nature of distress or first telecommand
5. Type of communication or second telecommand
6. Position or Channel/frequency
7. Time or Tel. No.
8. MMSI of ship in distress
9. Nature of distress
10. Acknowledgement
11. Expansion indicator

DSE – Expanded digital selective calling

```
$--DSE,x,x,a,xxxxxxxxxx,xx,c--c,.....,xx,c--c*hh<CR><LF>
          | | |         |      |   |    |   |    |    |
          | | |         |      |   |    |   |    |    |
          | | |         |      |   |    |   |    +---+------------------------- 7
          | | |         |      |   |    |   +--+------------------------------ 6
          | | |         |      |   +--+-------------------------------------- 5
          | | |         |      +--+----------------------------------------- 4
          | | |         +-------------------------------------------------- 3
          | | +------------------------------------------------------------ 2
          | +-------------------------------------------------------------- 2
          +---------------------------------------------------------------- 1
```

1. Total number of sentences
2. Sentence number
3. Query/reply flag
4. Vessel MMSI
5. Data set ‘1’
6. Additional data sets
7. Data set ‘n’

HBT – Heartbeat supervision sentence

```
$--HBT,x.x,A,x*hh<cr><lf>
          | | |
          | | +---------------------- 3
          | +-------------------- 2
          +------------------ 1
```

1. Configured repeat interval
2. Equipment status
3. Sequential sentence identifier

SRP – System function ID resolution protocol

```
$--SRP,x,hhhhhhhhhhhh,c--c*hh<CR><LF>
          |         |              |
          |         |              +---------------------- 3
          |         +--------------------------- 2
          +--------------------------- 1
```

1. Instance number
2. MAC address
3. IP address

APPENDIX 6 ALARM UNIT

A.6.1 General

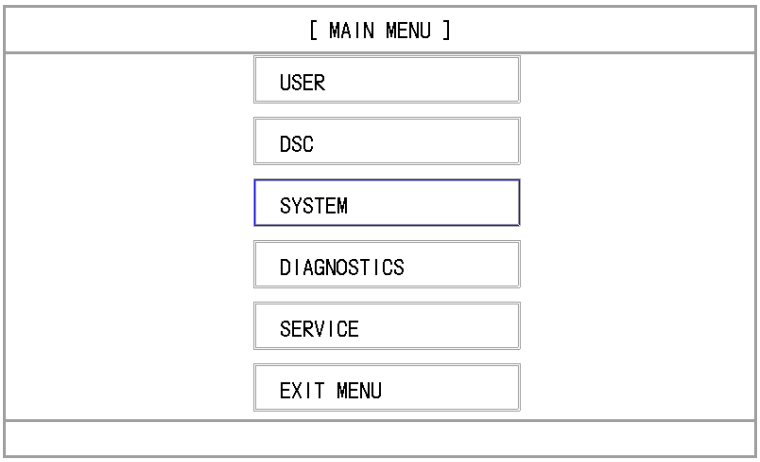
NAU-100 Alarm Unit can be installed at the position of navigation to monitor the DSC receiving of NHR-1500.
Main features of NAU-100 include:

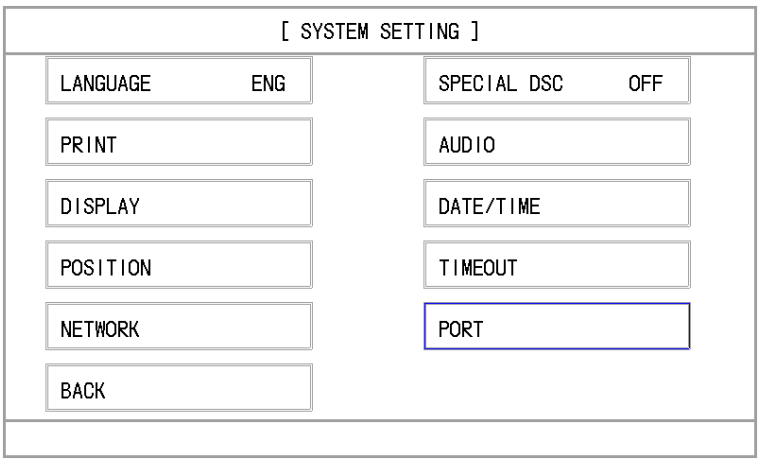
- Generate audio and visual alarms when NHR-1500 receives distress calls.
- Mute the alarms.

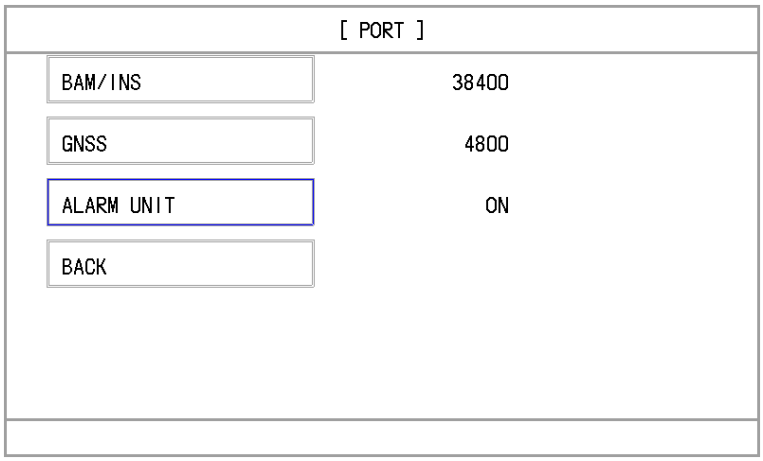
Press and hold **DISTRESS** button on the unit to send a DSC call from NHR-1500.

A.6.2 Enable the unit on NHR-1500

To enable the alarm unit, click **[MAIN MENU]** - **[SYSTEM SETTING]** - **[PORT]** - **[ALARM UNIT]** on NHR-1000C, set the port **ON** as follows:

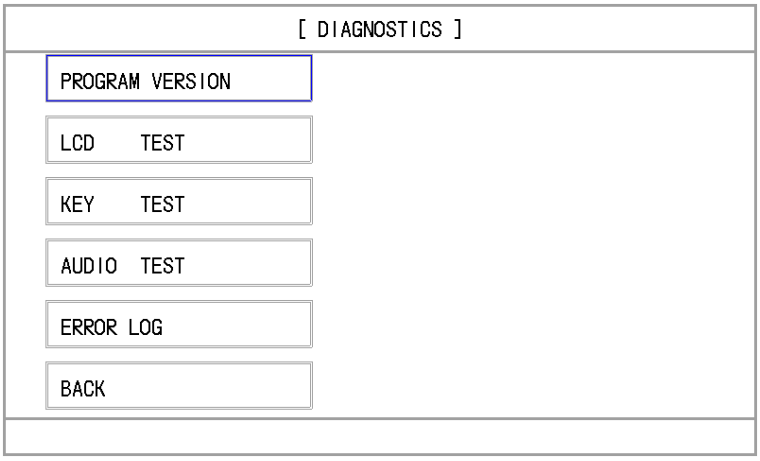




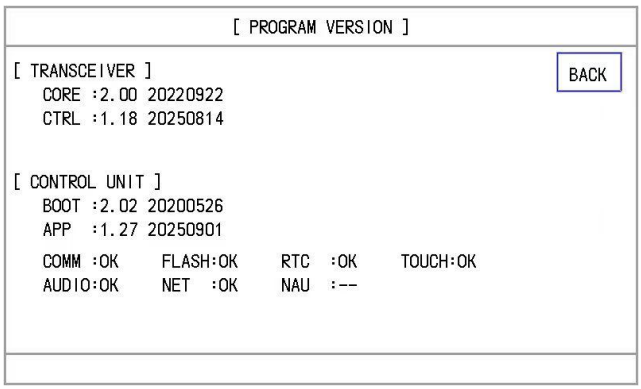


A.6.3 Check the unit connection on NHR-1500

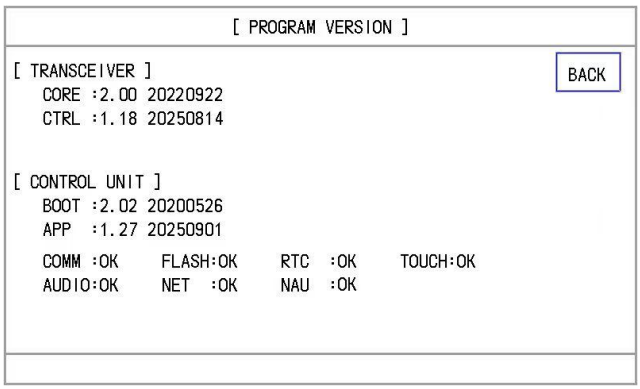
Click **[MAIN MENU]** - **[DIAGNOSTICS]** - **[PROGRAM VERSION]** on NHR-1000C, you can check the status of NAU-100 as follows.



◆ NAU-100 not connected:



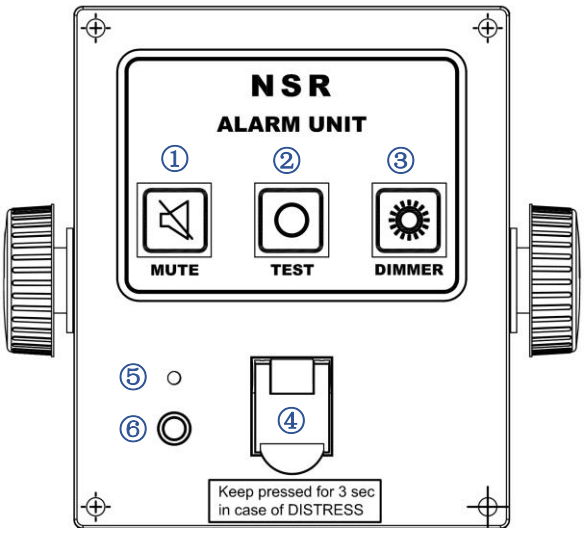
◆ NAU-100 connected:



***Note**: The TEST key of NAU-100 is blinking when it is not connected to NHR-1500.*

A.6.4 Operation

A.6.4.1 Panel Introduction



Description:

No.	Panel	Function
①		MUTE key, mute the alarm of NHR-1500 and NAU-100.
②		TEST key, hardware test (Key backlight, Alarm indicator, Buzzer).
③		DIMMER key, adjust the backlight of the keys (0~5 steps).
④		DISTRESS button, press and hold down the button for 3 seconds to transmit a distress alert (by remote controlling NHR-1500). ***Note: The DISTRESS button is covered to prevent false alarms.***
⑤	Alarm indicator	Visual alarm.
⑥	Buzzer	Audible alarm.

A.6.4.2 DSC Distress Alert

Press and hold  button for 3 seconds to send the DSC distress alert request to NHR-1500, and then NHR-1500 will transmit the DSC distress call.

Note: During the long press of 3S, the buzzer alternately alarms, at this time you can release the button to cancel the request. Then the buzzer beeps for 1.5 seconds, and at this time the request cannot be cancelled. It must be cancelled on NHR-1500.

A.6.4.3 Key Backlight Adjustment

Press 

key on the panel to adjust the backlight of the keys by 0~5 steps.

A.6.4.4 Alarm Mute

Press 

key on the panel to mute the alarm for both NAU-100 and NHR-1500.

Note: The communication between NAU-100 and NHR-1500 should be maintained.

A.6.4.5 Test Function

Press and hold 

key for 3 seconds to test the hardware (Key backlight, Alarm indicator, Buzzer).

Note: During the long press of 3s, the backlight is all off, and the alarm indicator flashes twice. Then the backlight will turn on again, and the buzzer and alarm indicator will turn off at the same time.

A.6.5 Maintenance

A.6.5.1 Regular Maintenance

Item	Check point	Remedy/Remarks
Communication	Check the data cable connections.	Tighten the loosened connections.
Power supply	Check that the supply voltage at transmission is within the rated range (Standard 15VDC).	If not within the range, check the power source. Low or over voltage may cause abnormal operation.

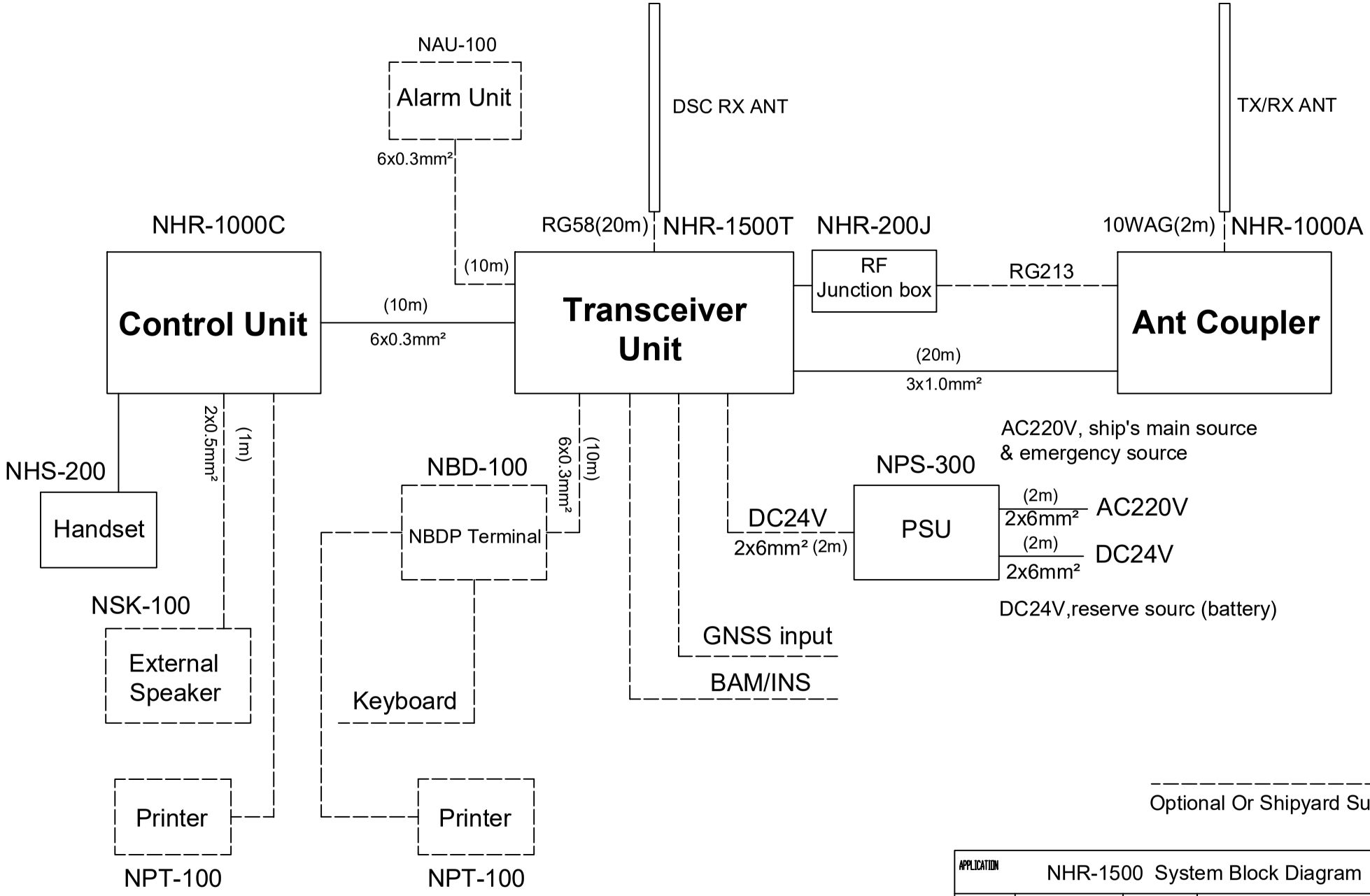
A.6.5.2 Simple Troubleshooting

The table below provides possible problems and the means with which to restore normal operation. If normal operation cannot be restored, do not attempt to check inside the equipment. Any servicing should be referred to a qualified technician.

Problem	Probable cause	Remedy
Power supply faulty	● Power supply is abnormal.	● Check the power supply.
	● Low or over voltage.	● Check the voltage.
TEST key backlight flashing	No communication with NHR-1500.	Check the data cable and NHR-1500 settings.

APPENDIX 7 INSTALLATION DRAWINGS

Drawing No.	Description
NHR1500-ID-001	NHR-1500 System Block Diagram
NHR1500-ID-002	NHR-1500 System Wiring Diagram
NHR1500-ID-003	NHR-1500 System Diagram
NHR1500-ID-004	Connection Diagram between Transceiver Unit and ACU
NHR1500-ID-005	Antenna Coupler Cable Installation Instructions
NHR1500-ID-006	Connection Diagram between Transceiver Unit and Control Unit
NHR1500-ID-007	Transceiver Unit Interface Layout
NHR1500-ID-008	Control Unit Connector Description
NHR1500-ID-009	NBD-100 NBDP Terminal Connector Description
NHR1500-ID-010	NBD-100 NBDP Terminal Connection Diagram
NHR1500-ID-011	Transceiver Unit Size Drawing
NHR1500-ID-012	Transceiver Unit Mounting Drawing
NHR1500-ID-013	Control Unit Size Drawing
NHR1500-ID-014	Control Unit Mounting Drawing (Table Type)
NHR1500-ID-015	Control Unit Mounting Drawing (Flush Type)
NHR1500-ID-016	Antenna Coupler Size Drawing
NHR1500-ID-017	Antenna Coupler Mounting Drawing
NHR1500-ID-018	Mounting Drawing for TX/RX Antenna & Antenna Coupler
NHR1500-ID-019	Antenna Coupler Mounting Bracket Drawing
NHR1500-ID-020	NHA100 TX/RX Antenna Size Drawing
NHR1500-ID-021	Mounting Drawing for NXA100&NXA100A DSC RX Antenna
NHR1500-ID-022	NHS-200 Handset Size Drawing
NHR1500-ID-023	NHS-200 Handset Mounting Drawing
NHR1500-ID-024	NBD-100 NBDP Terminal Size Drawing
NHR1500-ID-025	NBD-100 NBDP Mounting Drawing (Table Type)
NHR1500-ID-026	NBD-100 NBDP Mounting Drawing (Flush Type)
NHR1500-ID-027	NAU-100 Alarm Unit Size Drawing
NHR1500-ID-028	NAU-100 Alarm Unit Mounting Drawing (Table Type)
NHR1500-ID-029	NAU-100 Alarm Unit Mounting Drawing (Flush Type)
NHR1500-ID-030	NSK-100 External Speaker Size Drawing
NHR1500-ID-031	NPT-100 Printer Size Drawing
NHR1500-ID-032	NHR-200J RF Junction Box Size & Mounting Drawing
NHR1500-ID-033	NKB-100 Keyboard Size Drawing
NHR1500-ID-034	NPS-300 Power Supply Unit Size Drawing



NO.	DATE	REVISION & DESCRIPTION	REVIEWED / CHECKED SIGNATURE
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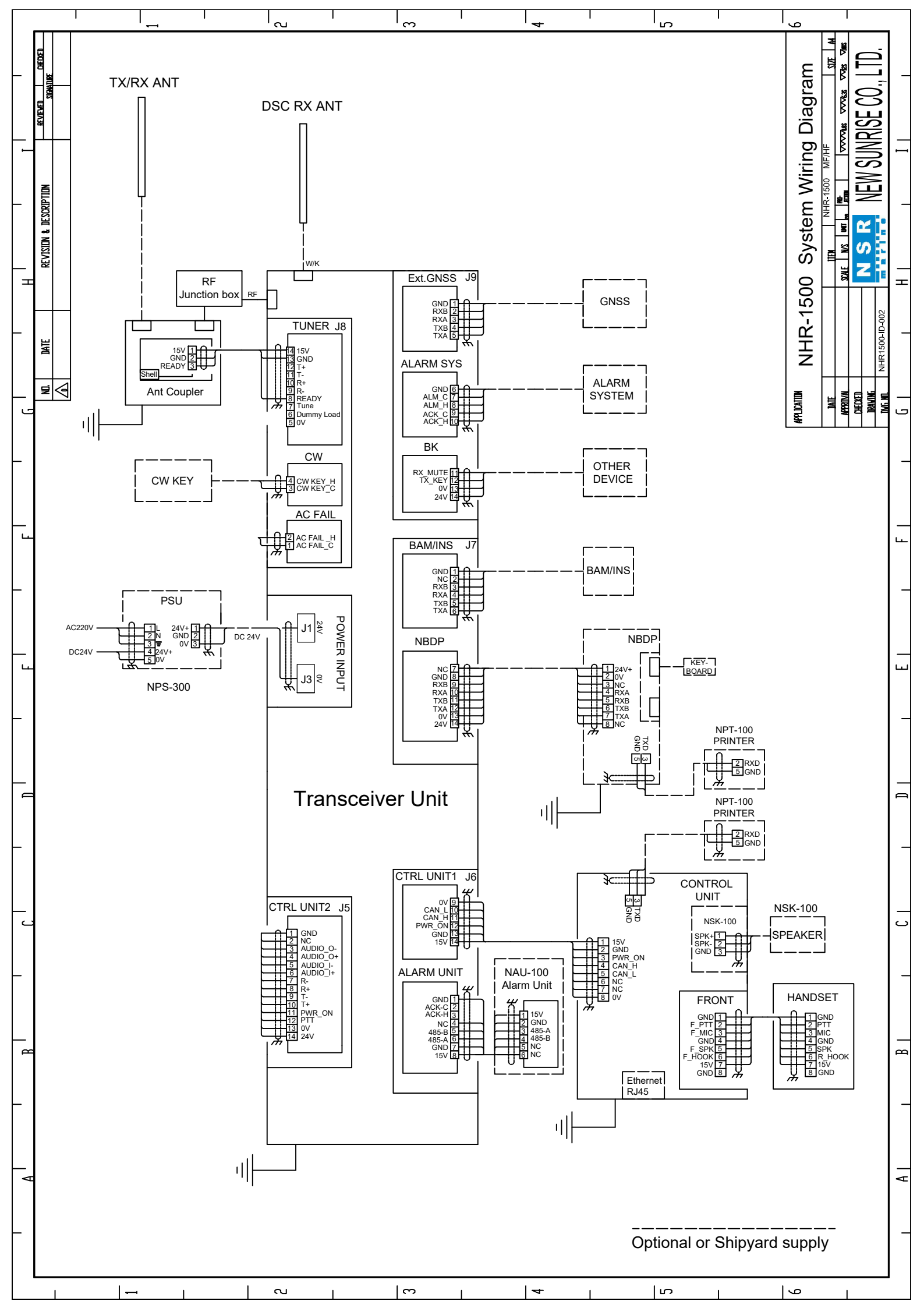
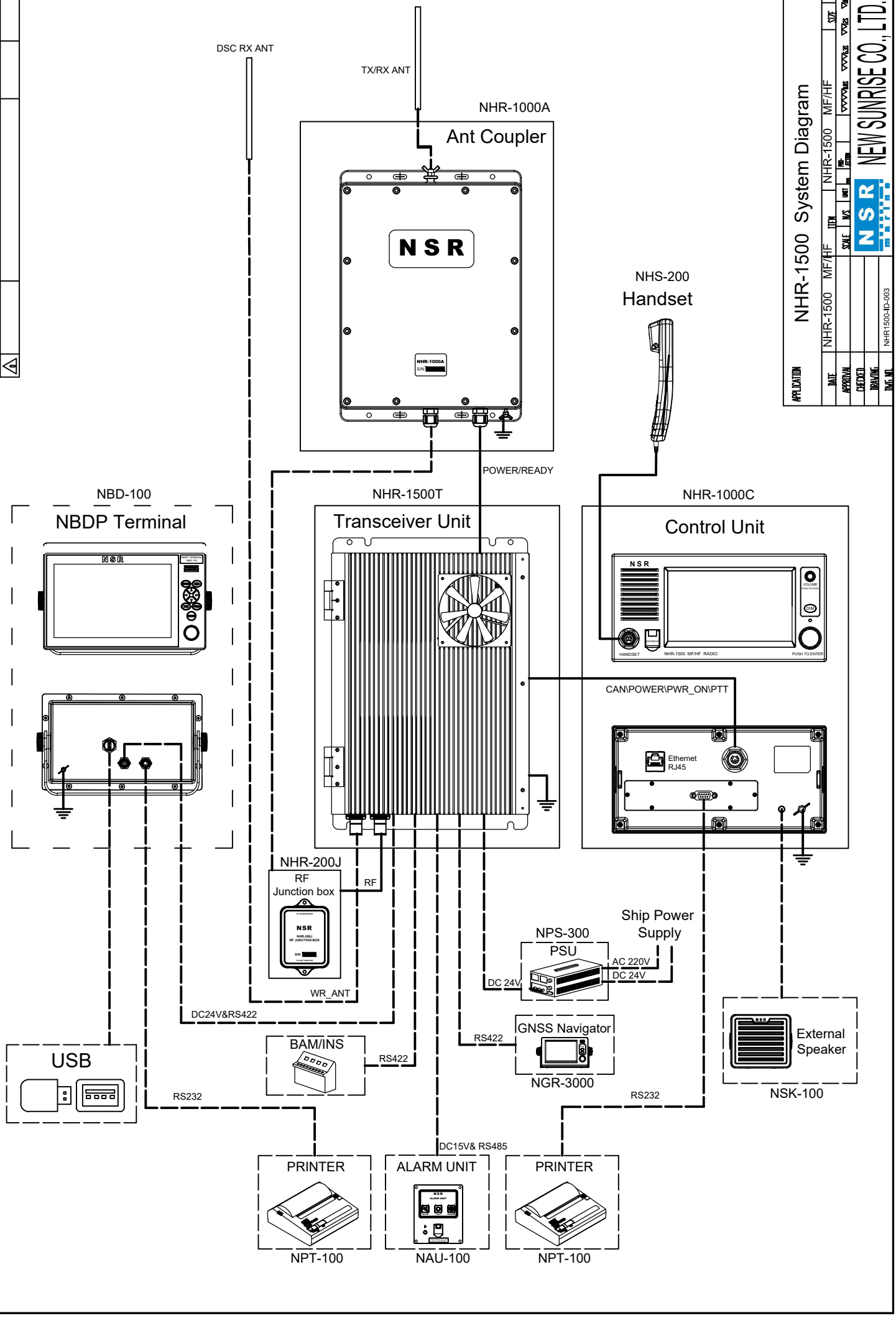
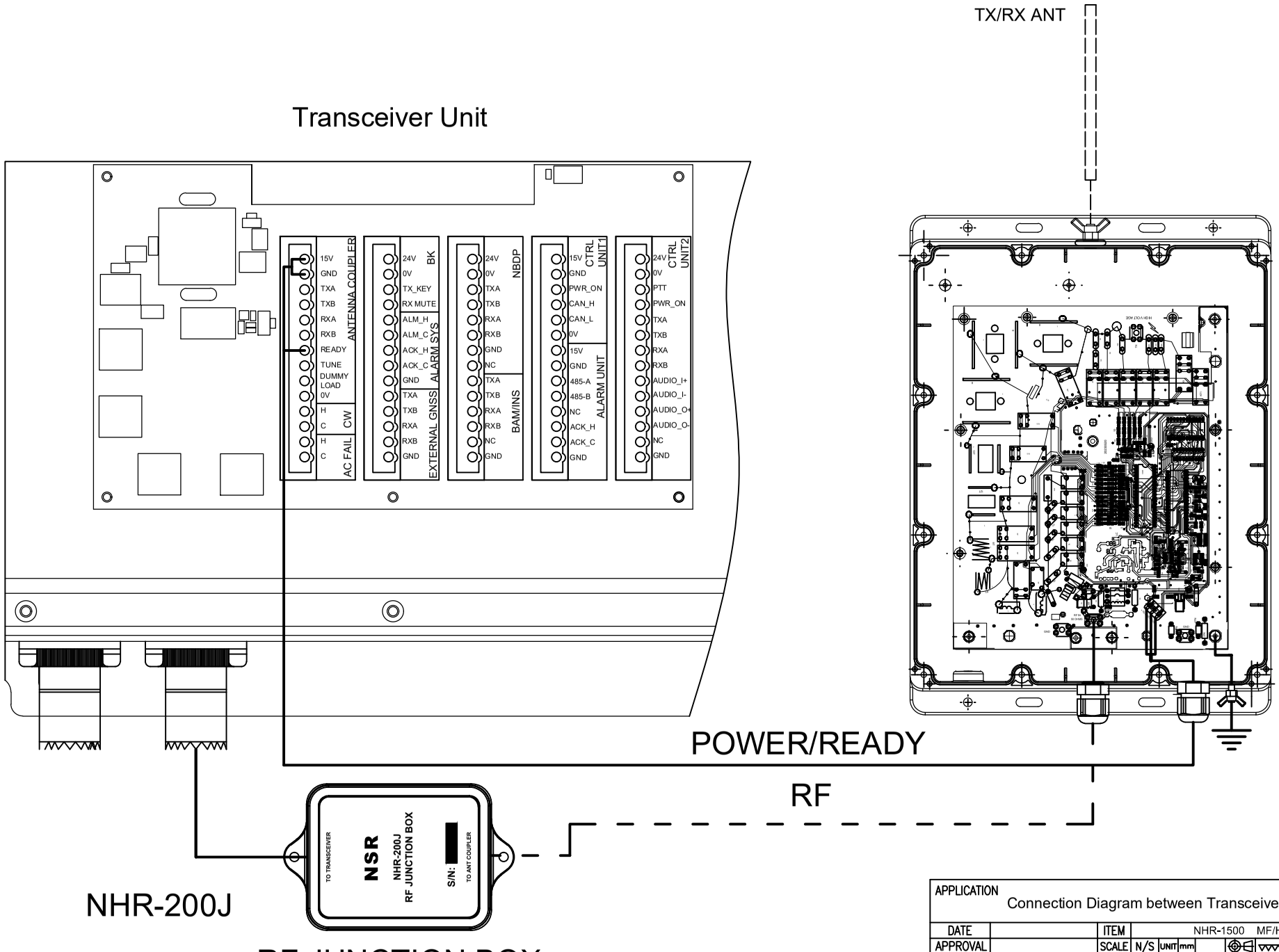
APPLICATION	NHR-1500 System Block Diagram
DATE	
APPROVAL	
CHECKED	
DRAWING	
DWG NO.	NHR1500-ID-001
ITEM	NHR-1500 MF/HF
SIZE	A4
SCALE	N/S
UNIT	mm

NSR marine NEW SUNRISE CO., LTD.


NHR-1500 System Wiring Diagram
NHR-1500 MF/HF
NEW SUNRISE CO., LTD.
NHR1500-ID-002
REVISION & DESCRIPTION
DATE
NO.
TX/RX ANT
DSC RX ANT
W/K
RF Junction box
RF
Ant Coupler
15V
GND
READY
Shell
TUNER J8
15V
GND
T+
T-
R+
R-
READY
Tune
Dummy Load
0V
CW
CW KEY
CW KEY_H
CW KEY_C
AC FAIL
AC FAIL_H
AC FAIL_C
PSU
AC220V
DC24V
L
N
24V+
0V
NPS-300
DC 24V
POWER INPUT
J1
J3
Ext.GNSS J9
GNSS
GND
RXB
RXA
TXB
TXA
ALARM SYS
ALARM SYSTEM
GND
ALM_C
ALM_H
ACK_C
ACK_H
BK
OTHER DEVICE
RX_MUTE
TX_KEY
0V
24V
BAM/INS J7
BAM/INS
GND
NC
RXB
RXA
TXB
TXA
NBDP
NBDP
KEY-BOARD
24V+
0V
NC
RXA
RXB
TXB
TXA
NC
GND
TXD
NPT-100 PRINTER
RXD
GND
Transceiver Unit
CTRL UNIT1 J6
0V
CAN_L
CAN_H
PWR_ON
GND
15V
CONTROL UNIT
NSK-100
SPK+
SPK-
GND
SPEAKER
CTRL UNIT2 J5
GND
NC
AUDIO_O-
AUDIO_O+
AUDIO_I-
AUDIO_I+
R-
R+
T-
T+
PWR_ON
PTT
0V
24V
ALARM UNIT
ACK-C
ACK-H
NC
485-B
485-A
NAU-100 Alarm Unit
485-A
485-B
FRONT
F_PTT
F_MIC
F_SPK
F_HOOK
HANDSET
PTT
MIC
SPK
R_HOOK
Ethernet RJ45
Optional or Shipyard supply


DSC RX ANT
TX/RX ANT
NHR-1000A
Ant Coupler
NSR
NHR-1000A
NHS-200
Handset
POWER/READY
NBD-100
NBDP Terminal
NHR-1500T
Transceiver Unit
NHR-1000C
Control Unit
HANDSET
NHR-1500 MF/HF RADIO
PUSH TO ENTER
CAN\POWER\PWR_ON\PTT
Ethernet
RJ45
NHR-200J
RF
Junction box
RF
WR_ANT
DC24V&RS422
NPS-300
PSU
Ship Power
Supply
AC 220V
DC 24V
DC 24V
USB
BAM/INS
RS422
RS422
GNSS Navigator
NGR-3000
External
Speaker
NSK-100
RS232
RS232
DC15V& RS485
PRINTER
ALARM UNIT
PRINTER
NPT-100
NAU-100
NPT-100
NHR-1500 System Diagram
NHR-1500 MF/HF
NHR-1500 MF/HF
NHR1500-ID-003
NEW SUNRISE CO., LTD.
REVISION & DESCRIPTION
DATE
NO.
CHECKED
SIGNATURE
REVIEWED



APPLICATION	Connection Diagram between Transceiver Unit and ACU				
DATE		ITEM	NHR-1500 MF/HF	SIZE	A4
APPROVAL		SCALE	N/S UNIT mm		
CHECKED		NSR marine	NEW SUNRISE CO., LTD.		
DRAWING					
DWG NO.	NHR1500-ID-004				

NO.	DATE	REVISION & DESCRIPTION	REVIEWED / SIGNATURE	CHECKED
0				

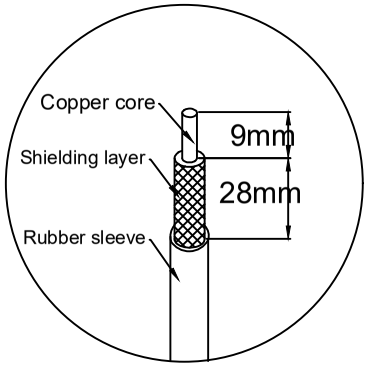
RF Cable Installation Instructions

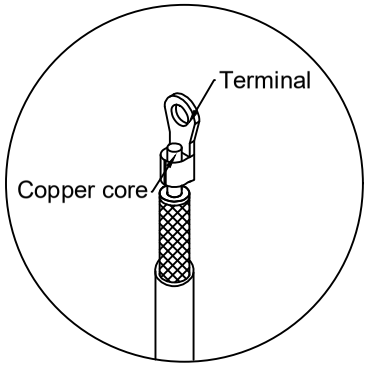
① Peel off the cable rubber sleeve to expose the shielding layer;

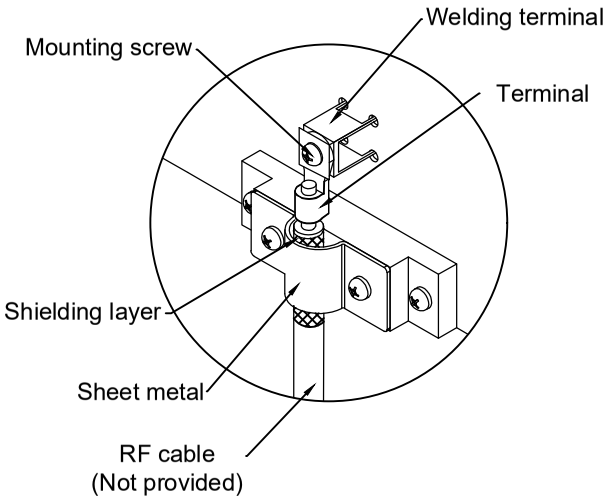
② Press the copper core with terminal;

③ Press the terminal onto the welded terminal and fix it with screws;

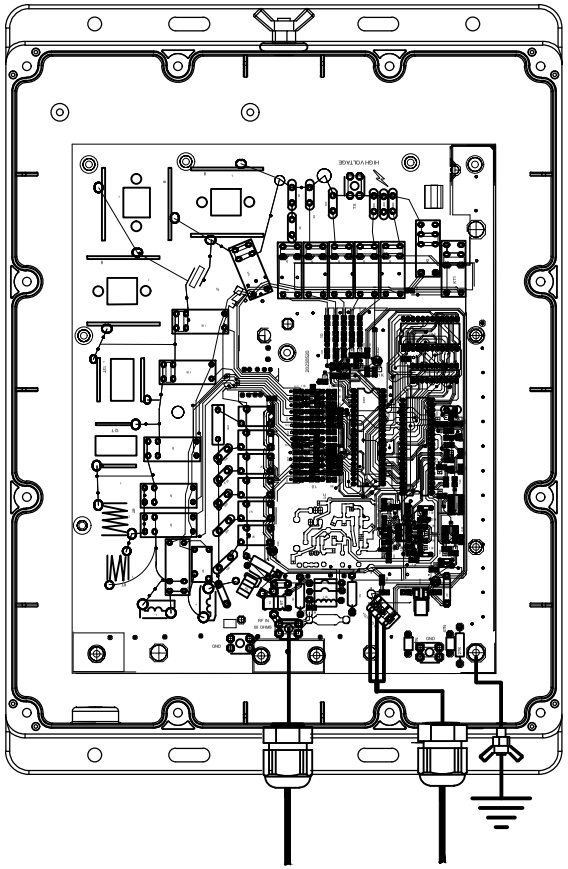
④ Press the sheet metal against the shielding layer and fix it with screws.







Antenna Coupler Interface Layout



Power Cable Installation Instructions

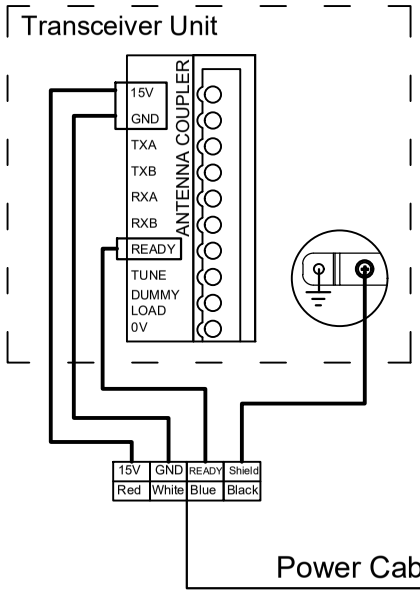
Cable connections are as follows:

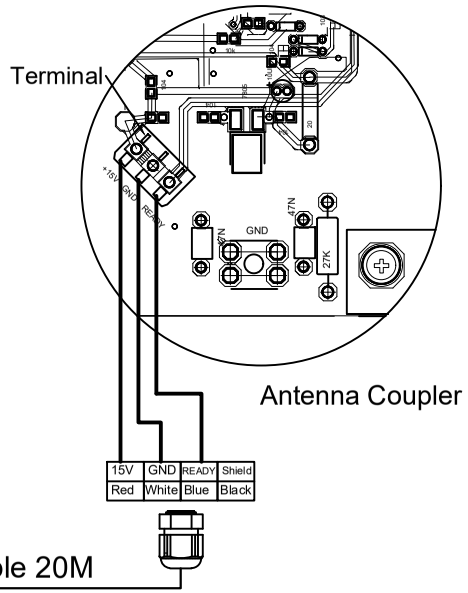
Transceiver Unit

15V	GND	READY	SHIELD
Red	White	Blue	Black

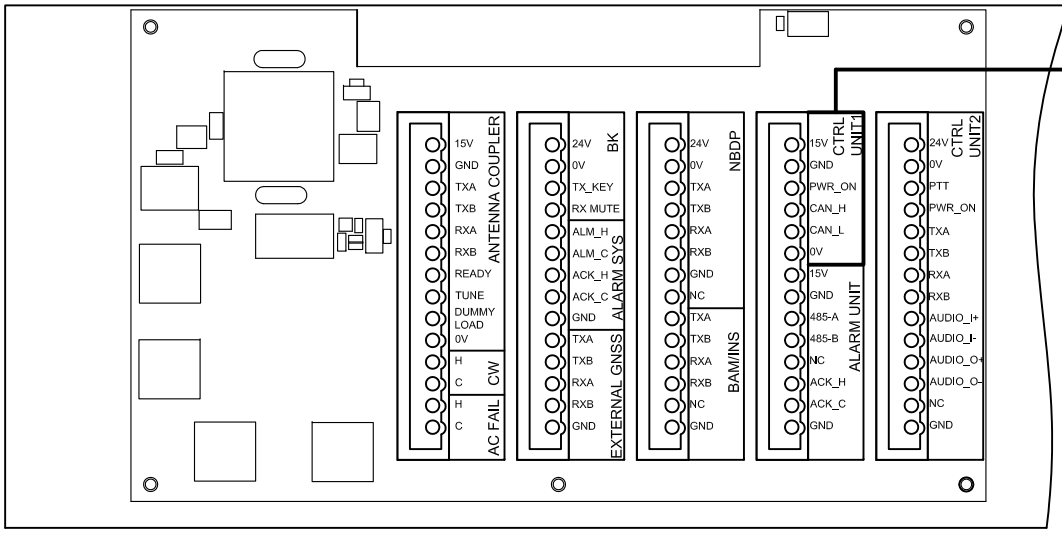
15V	GND	READY	SHIELD
Red	White	Blue	Black

Antenna Coupler



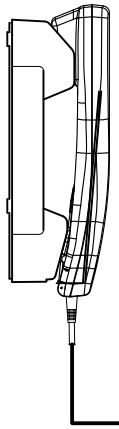


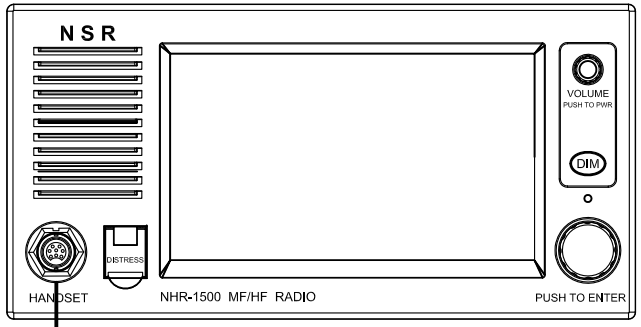
APPLICATION	Antenna Coupler Cable Installation Instructions		
DATE		ITEM	SIZE A4
APPROVAL		SCALE N/S UNIT mm PROJECTION	
CHECKED			
DRAWING		NSR marine	NEW SUNRISE CO., LTD.
DWG NO.	NHR1500-ID-005		



Transceiver Unit

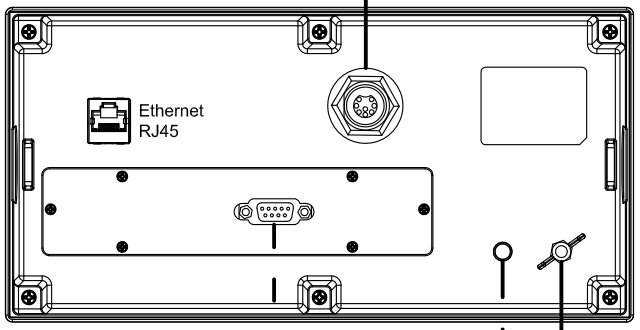
Handset





Control Unit

POWER/PWR_ON/CAN



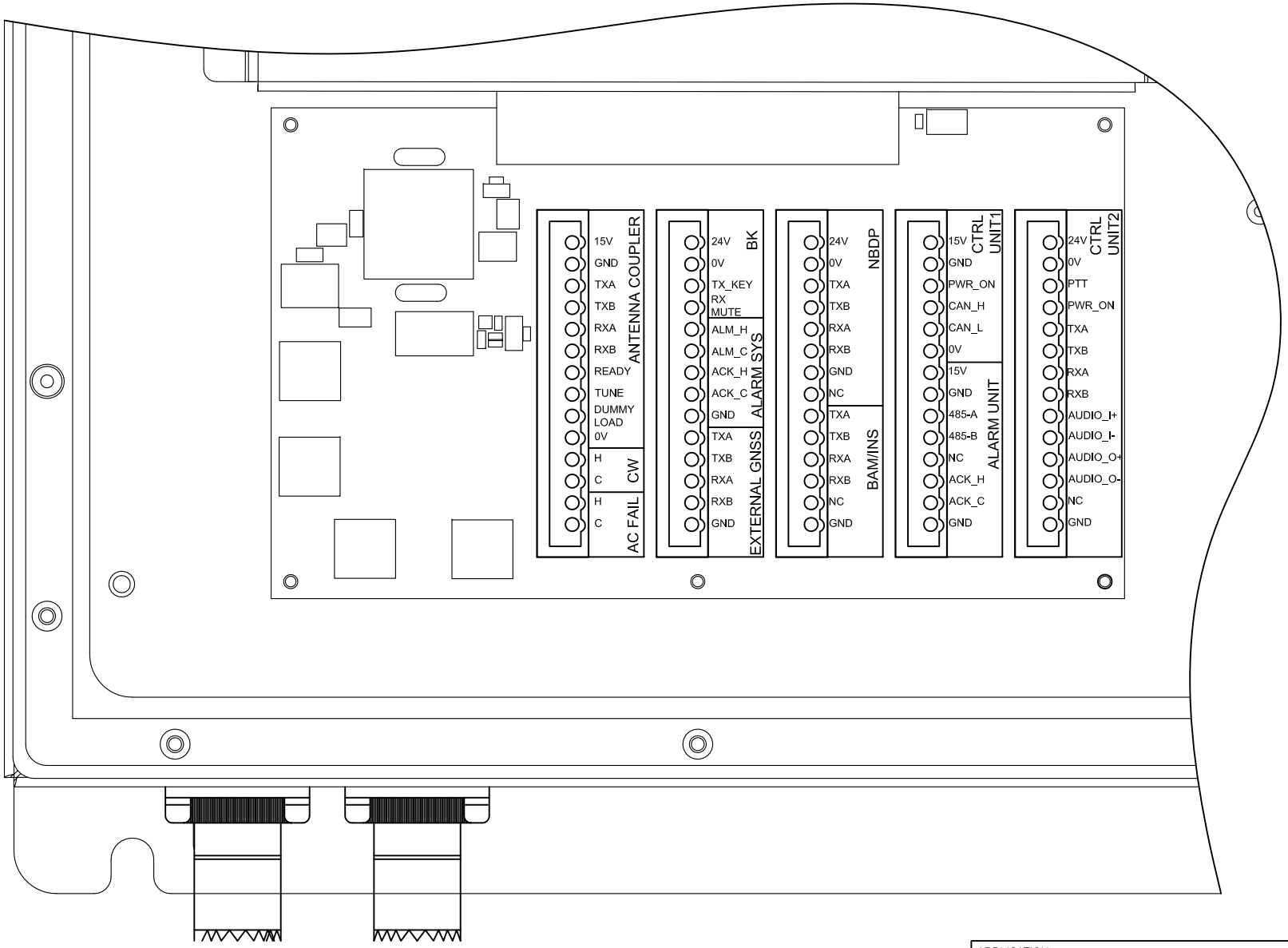
NSK-100

External Speaker

Printer

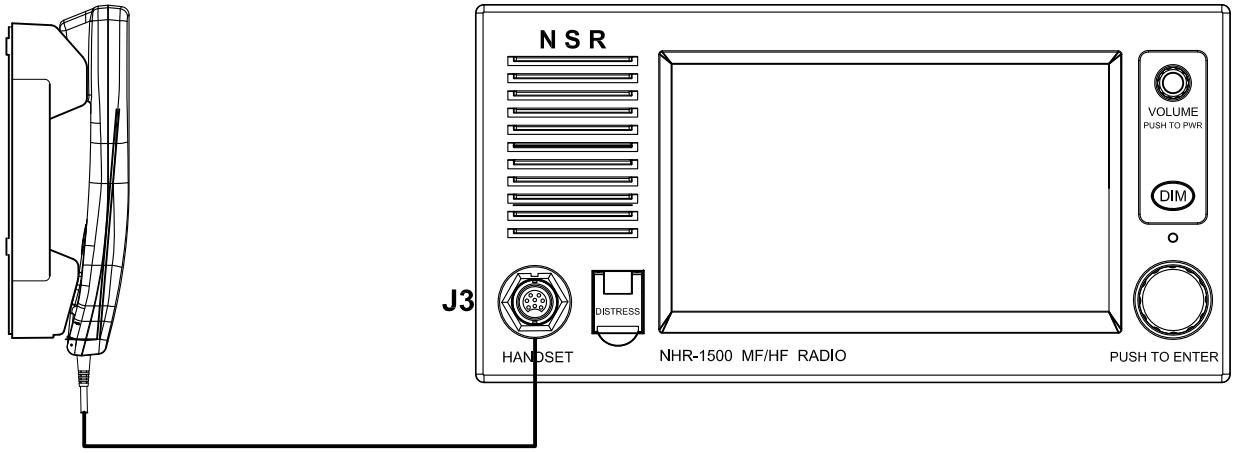
NPT-100

APPLICATION	Connection Diagram between Transceiver Unit and Control Unit		
DATE		ITEM	NHR-1500 MF/HF SIZE A4
APPROVAL		SCALE	N/S UNIT mm
CHECKED		NSR marine	NEW SUNRISE CO., LTD.
DRAWING			
DWG NO.	NHR1500-ID-006		



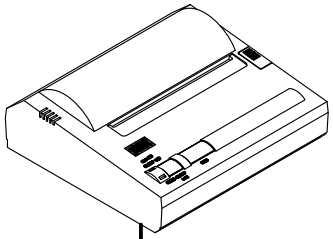
APPLICATION	Transceiver Unit Interface Layout				
DATE		ITEM	NHR-1500 MF/HF	SIZE	A4
APPROVAL		SCALE	N/S UNIT mm		
CHECKED		NSR marine	NEW SUNRISE CO., LTD.		
DRAWING					
DWG NO.	NHR1500-ID-007				

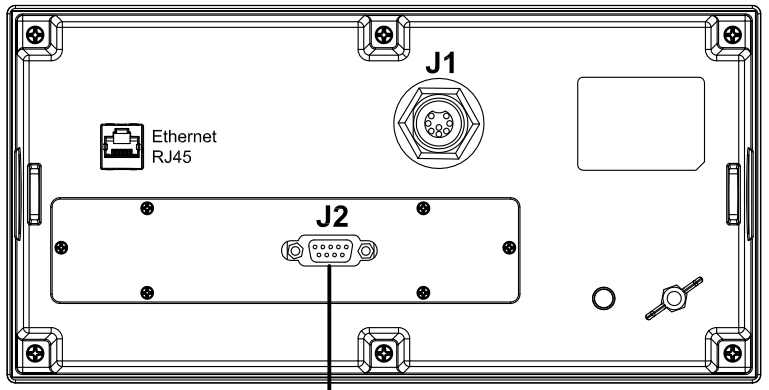
NHS-200



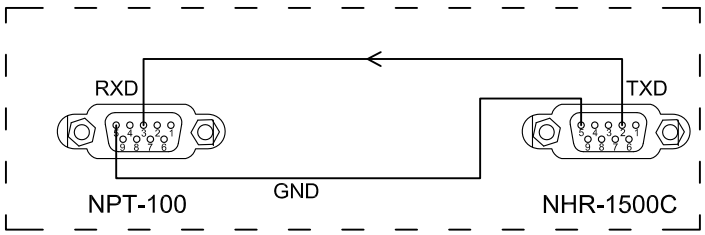
J3
1.GND
2.F_PTT
3.F_MIC
4.GND
5.F_SPK
6.F_HOOK
7.15V
8.GND

NPT-100



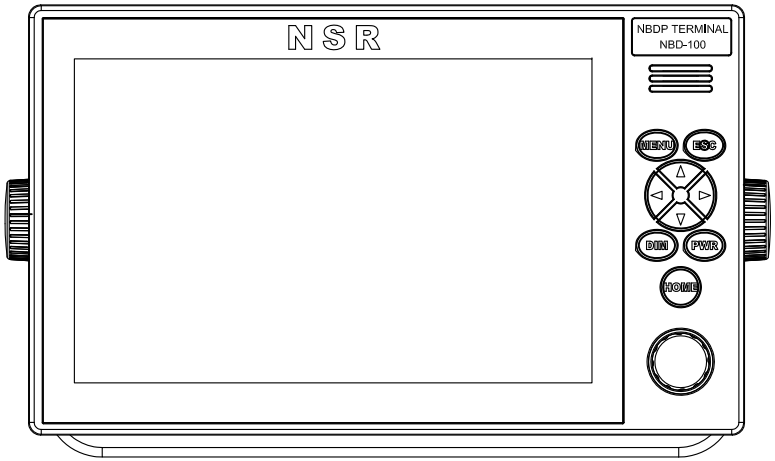


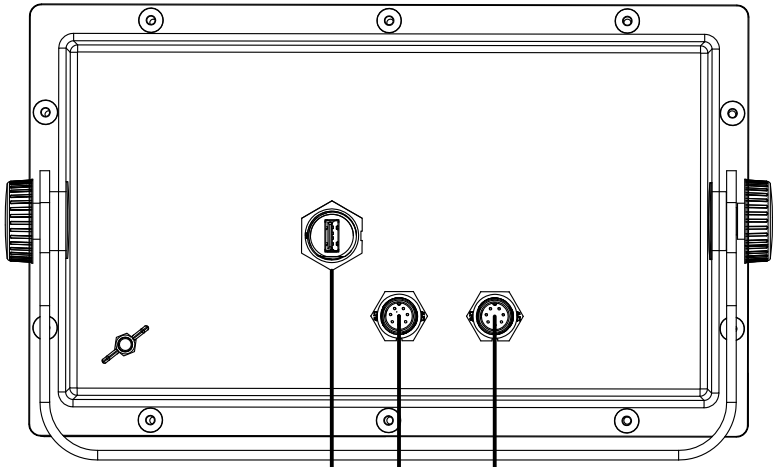
J1	J2
1.15V	1.NC
2.GND	2.TXD
3.PWR_ON	3.RXD
4.CAN_H	4.NC
5.CAN_L	5.GND
6.NC	6.NC
7.NC	7.NC
8.0V	8.NC
	9.NC



APPLICATION	Control Unit Connector Description			
DATE		ITEM	NHR-1500 MF/HF	SIZE A4
APPROVAL		SCALE	N/S UNIT mm	
CHECKED		NSR marine	NEW SUNRISE CO., LTD.	
DRAWING				
DWG NO.	NHR1500-ID-008			

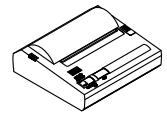
NO.	DATE	REVISION & DESCRIPTION	REVIEWED	CHECKED
0			SIGNATURE	



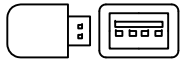


NPT-100

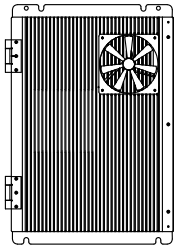
PRINTER



USB



TRANSCEIVER UNIT

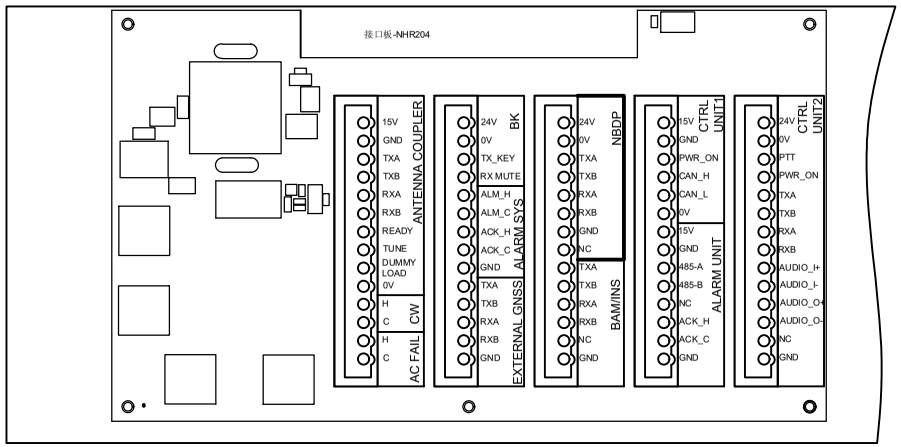


TRANSCEIVER	PRINTER
1. Data RXB	1. PRINT-
2. Data RXA	2. PRINT+
3. Data TXA	3. NC
4. Data TXB	4. NC
5. 24V+	5. NC
6. 0V	6. NC
7. GND	7. NC
8. NC	

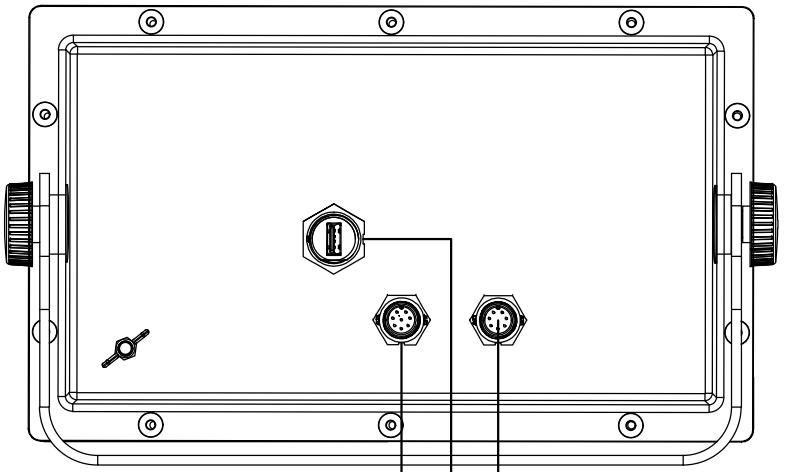
APPLICATION	NBD-100 NBDP Terminal Connector Description		
DATE		ITEM	NHR-1500 MF/HF
APPROVAL		SCALE N/S UNIT	SIZE A4
CHECKED			
DRAWING		NSR marine	NEW SUNRISE CO., LTD.
DWG. NO.	NHR1500-ID-009		

NO.	DATE	REVISION & DESCRIPTION	REVIEWED / SIGNATURE	CHECKED
0				

Transceiver Unit

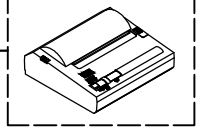


NBDP TERMINAL

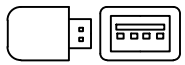


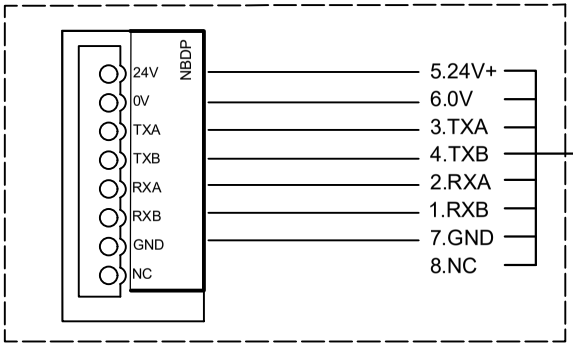
NPT-100

PRINTER



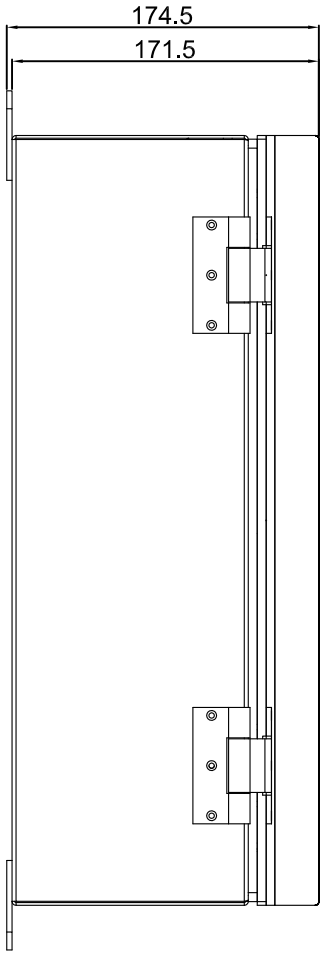
USB

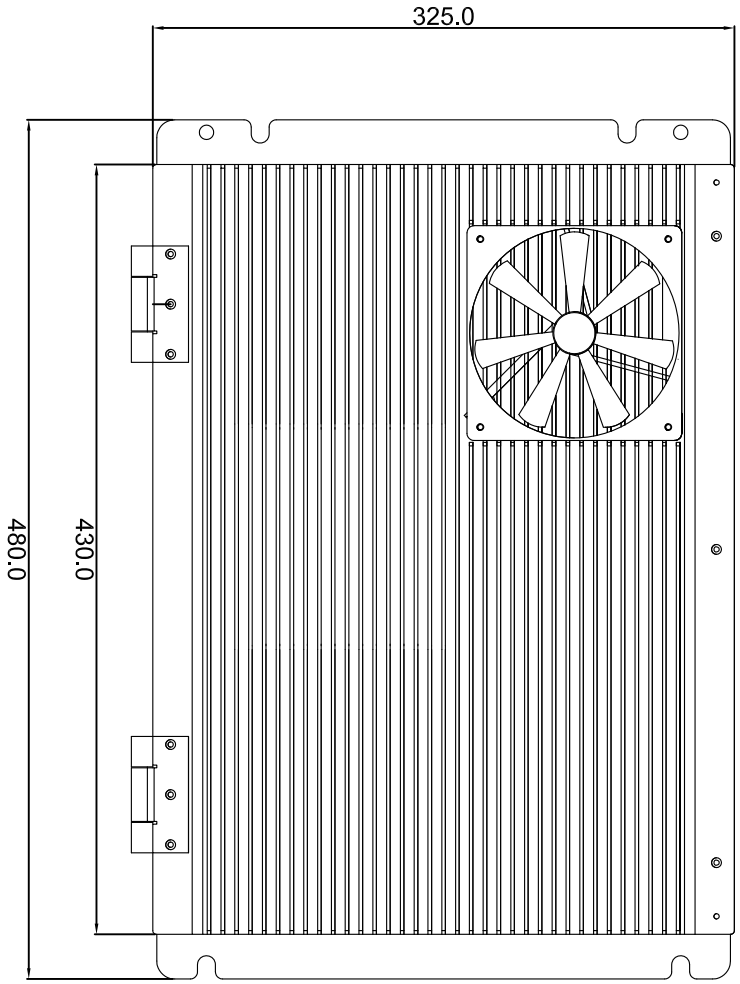


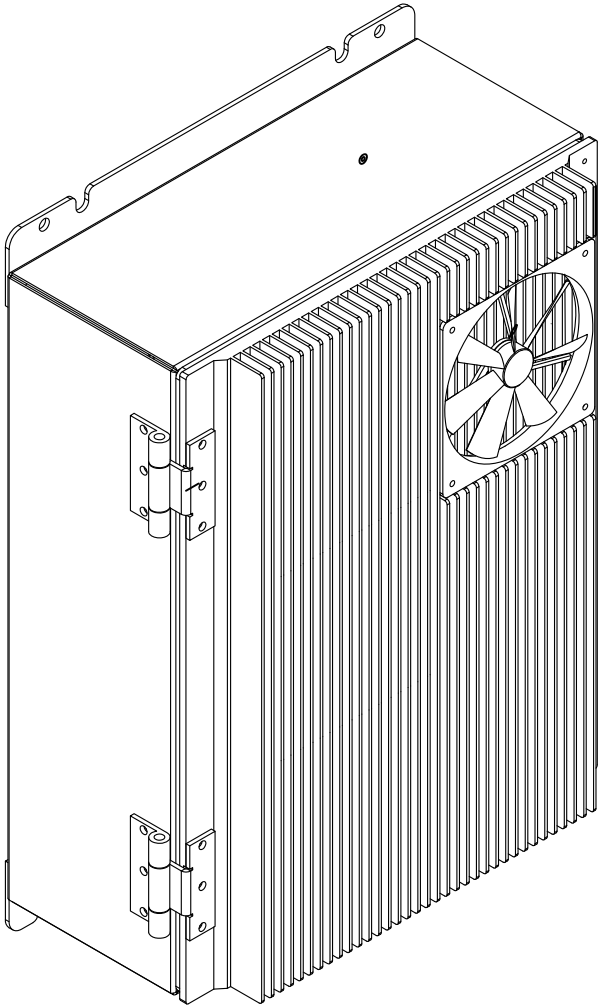


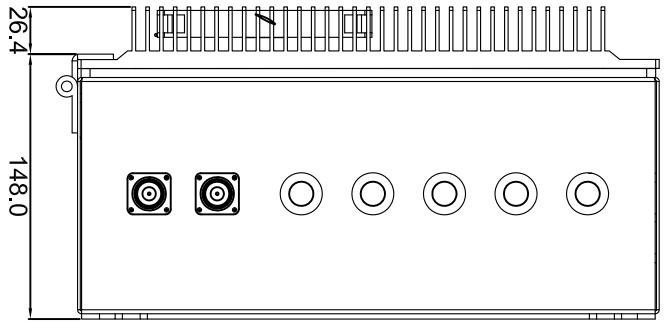
APPLICATION	NBD-100 NBDP Terminal Connection Diagram		
DATE		ITEM	NHR-1500 MF/HF
APPROVAL		SCALE	N/S
CHECKED		UNIT	mm
DRAWING			
DWG NO.	NHR1500-ID-010		

NEW SUNRISE CO., LTD.

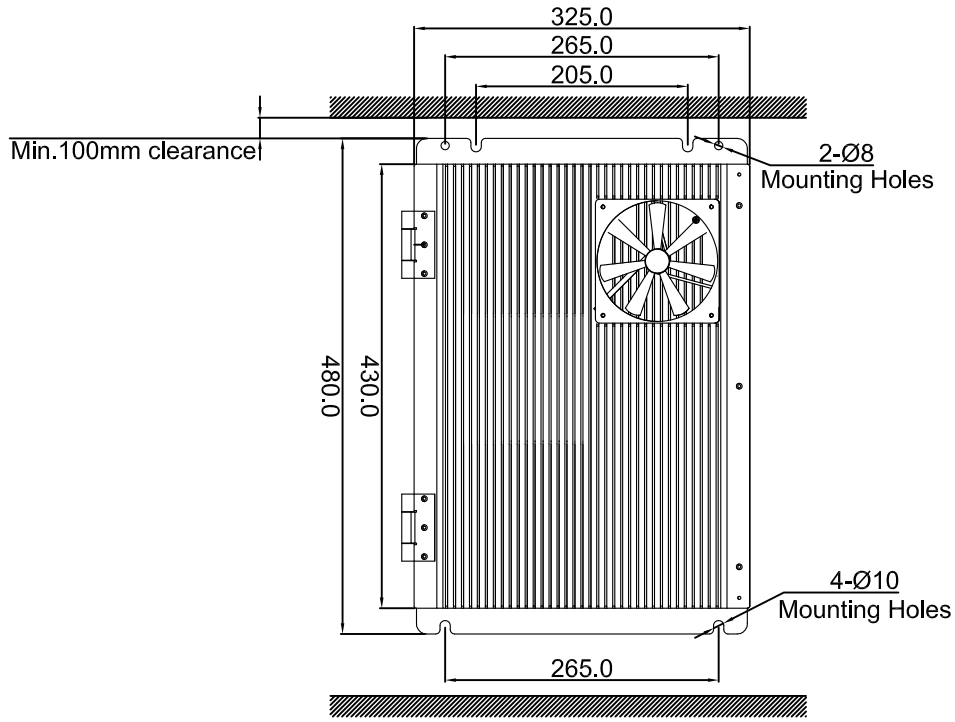


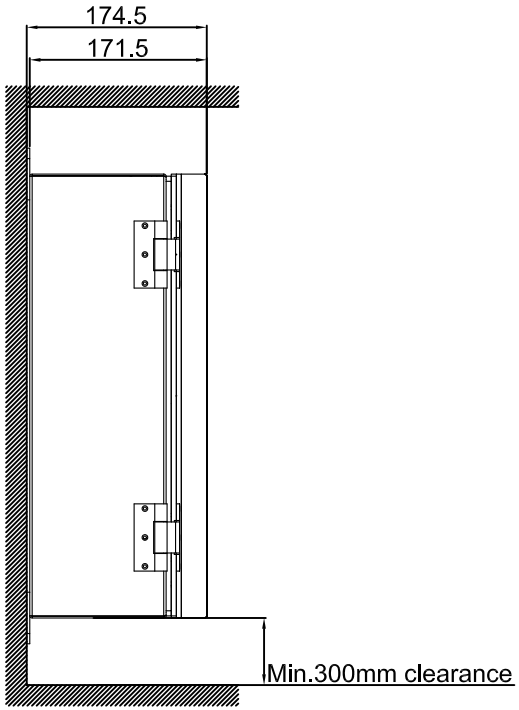


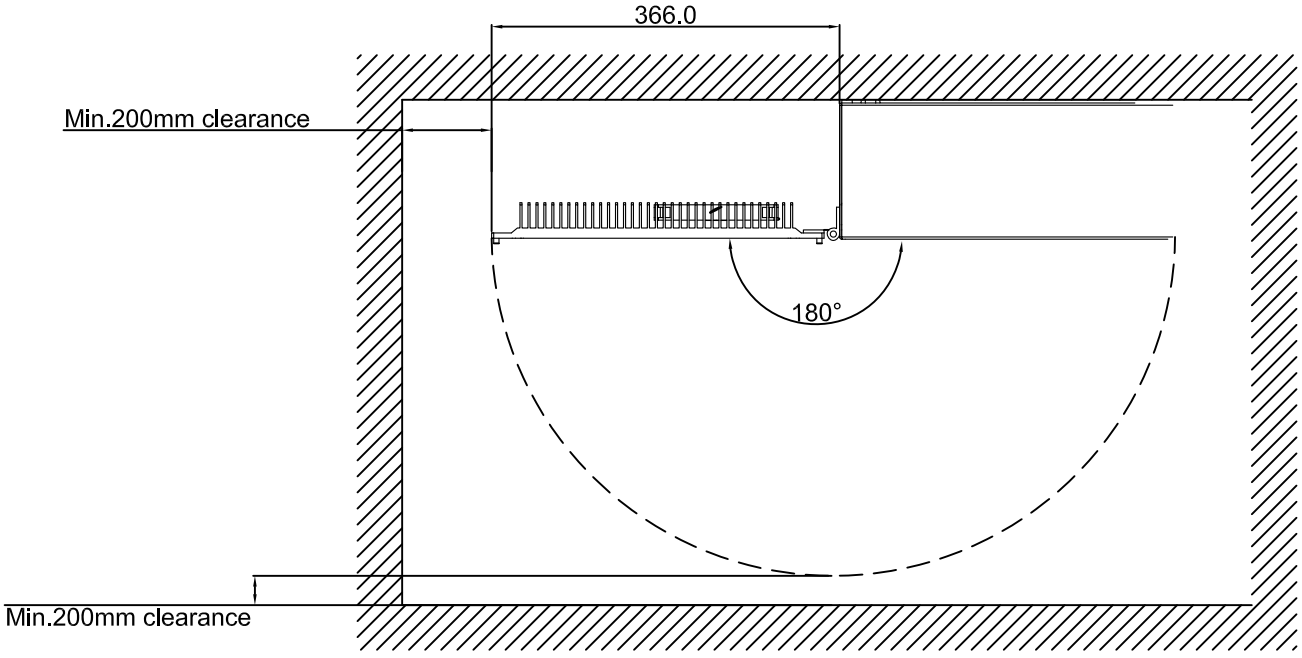




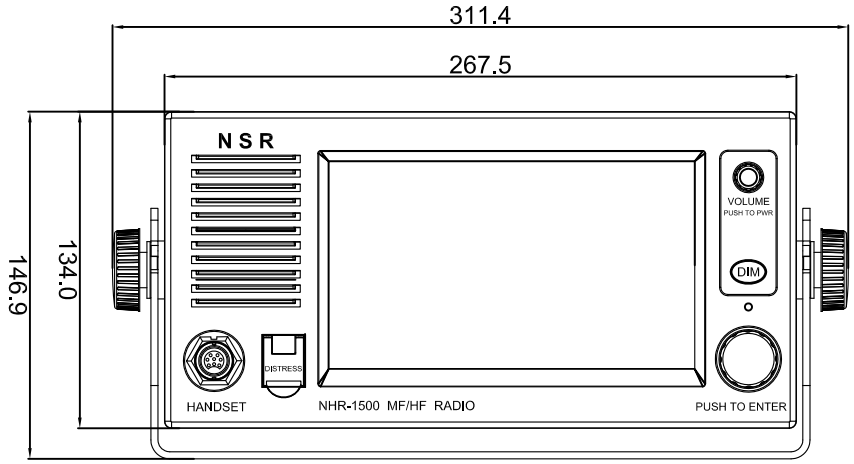
APPLICATION	Transceiver Unit Size Drawing		
DATE		ITEM	NHR-1500 SIZE A4
APPROVAL		SCALE	N/S UNIT mm
CHECKED		NSR marine	NEW SUNRISE CO., LTD.
DRAWING			
DWG NO.	NHR1500-ID-011		

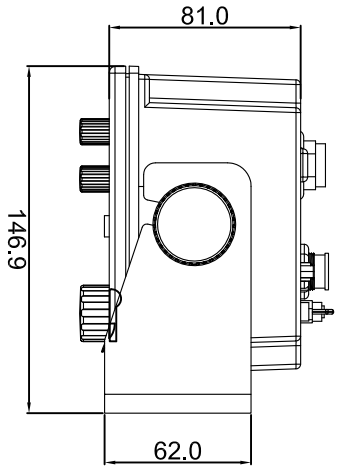


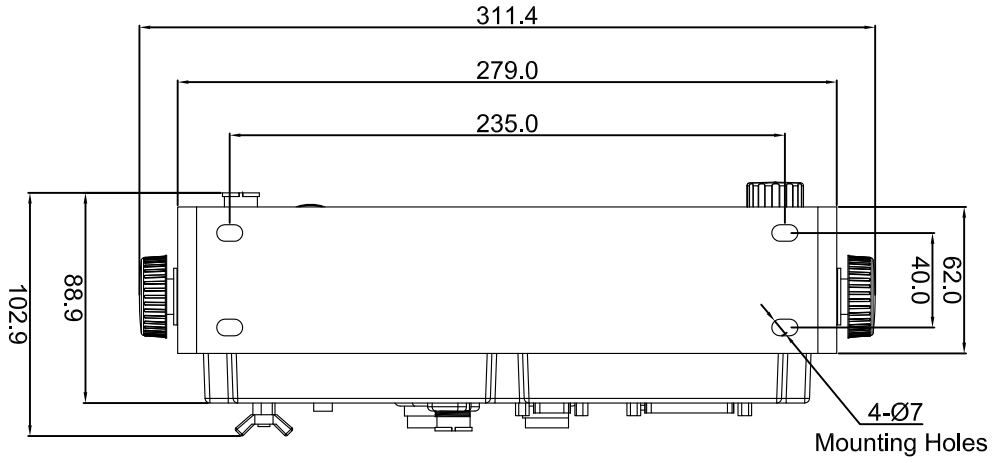




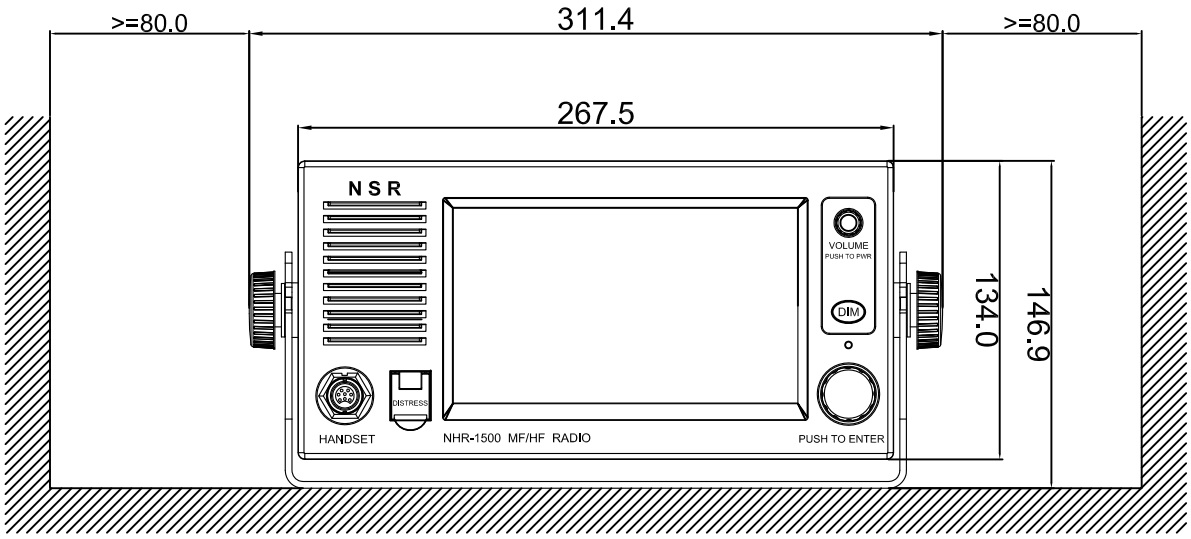
APPLICATION	Transceiver Unit Mounting Drawing				
DATE		ITEM	NHR-1500	SIZE	A4
APPROVAL		SCALE	N/S UNIT mm		
CHECKED		NSR marine	NEW SUNRISE CO., LTD.		
DRAWING					
DWG NO.	NHR1500-ID-012				



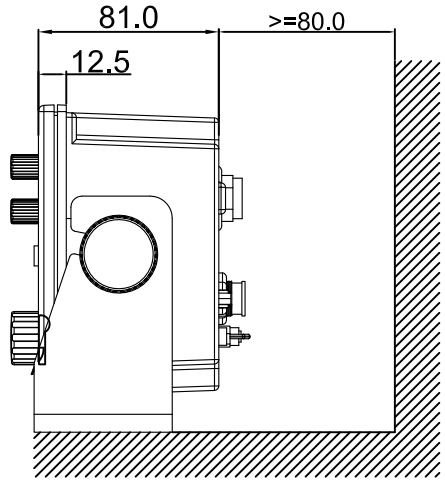




APPLICATION	Control Unit Size Drawing				
DATE		ITEM	NHR-1500	SIZE	A4
APPROVAL		SCALE	N/S	UNIT	mm
CHECKED		NSR marine	NEW SUNRISE CO., LTD.		
DRAWING					
DWG NO.	NHR1500-ID-013				



FRONT VIEW



SIDE VIEW

NOTE: TABLE TYPE

1.USE SELF-TAPPING SCREWS M5X20 FOR FIXING THE UNIT.

2.80MM IS MINIMUM SPACE FOR OPERATION AND CABLING.

APPLICATION	Control Unit Mounting Drawing (Table Type)				
DATE		ITEM	NHR-1500 MF/HF	SIZE	A4
APPROVAL		SCALE	N/S UNIT mm		
CHECKED		NSR marine	NEW SUNRISE CO., LTD.		
DRAWING					
DWG NO.	NHR1500-ID-014				

NO.	DATE	REVISION & DESCRIPTION	REVIEWED / CHECKED SIGNATURE
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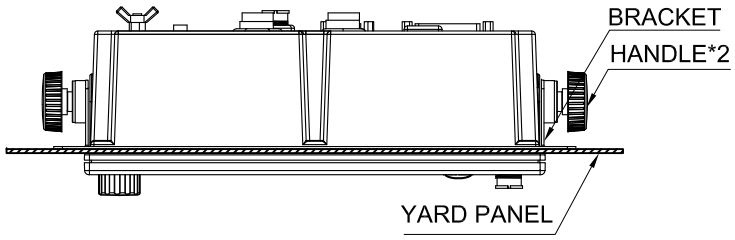
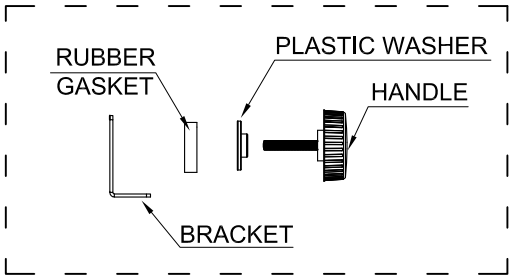
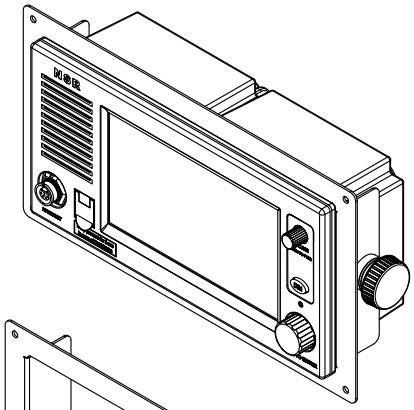
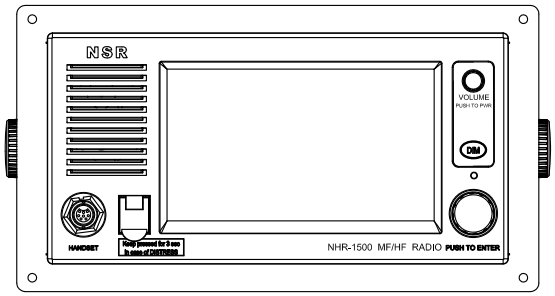
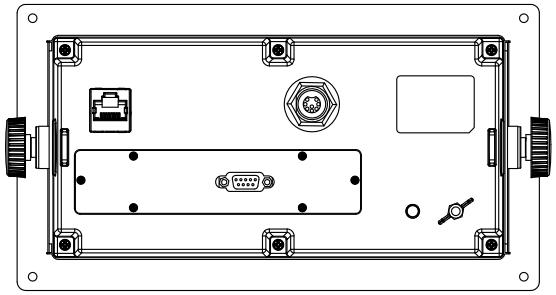
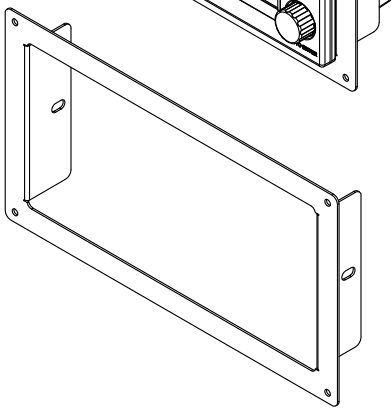


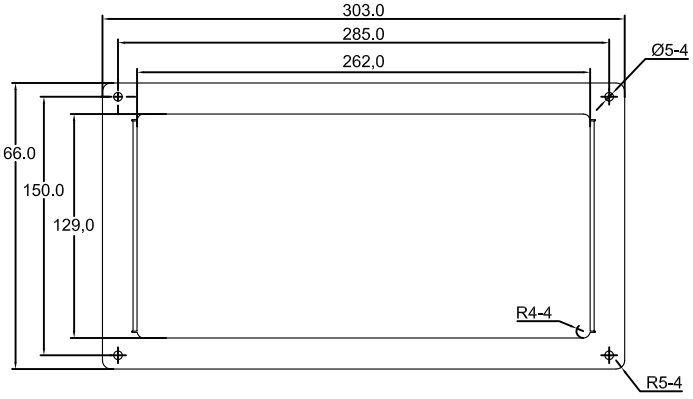




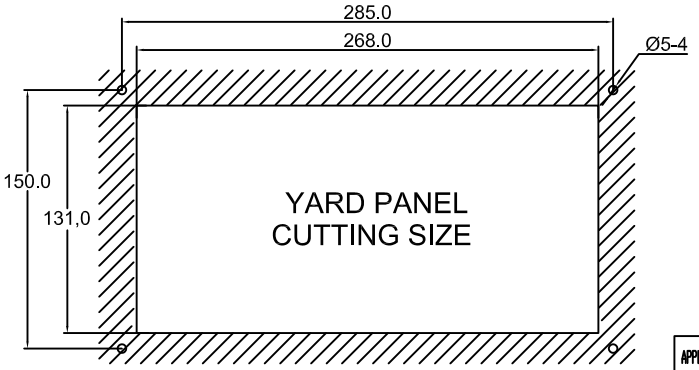


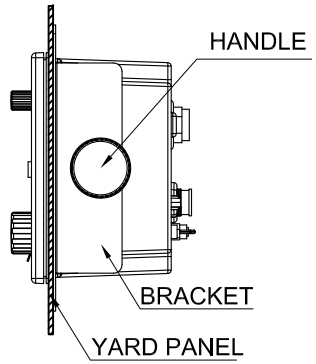






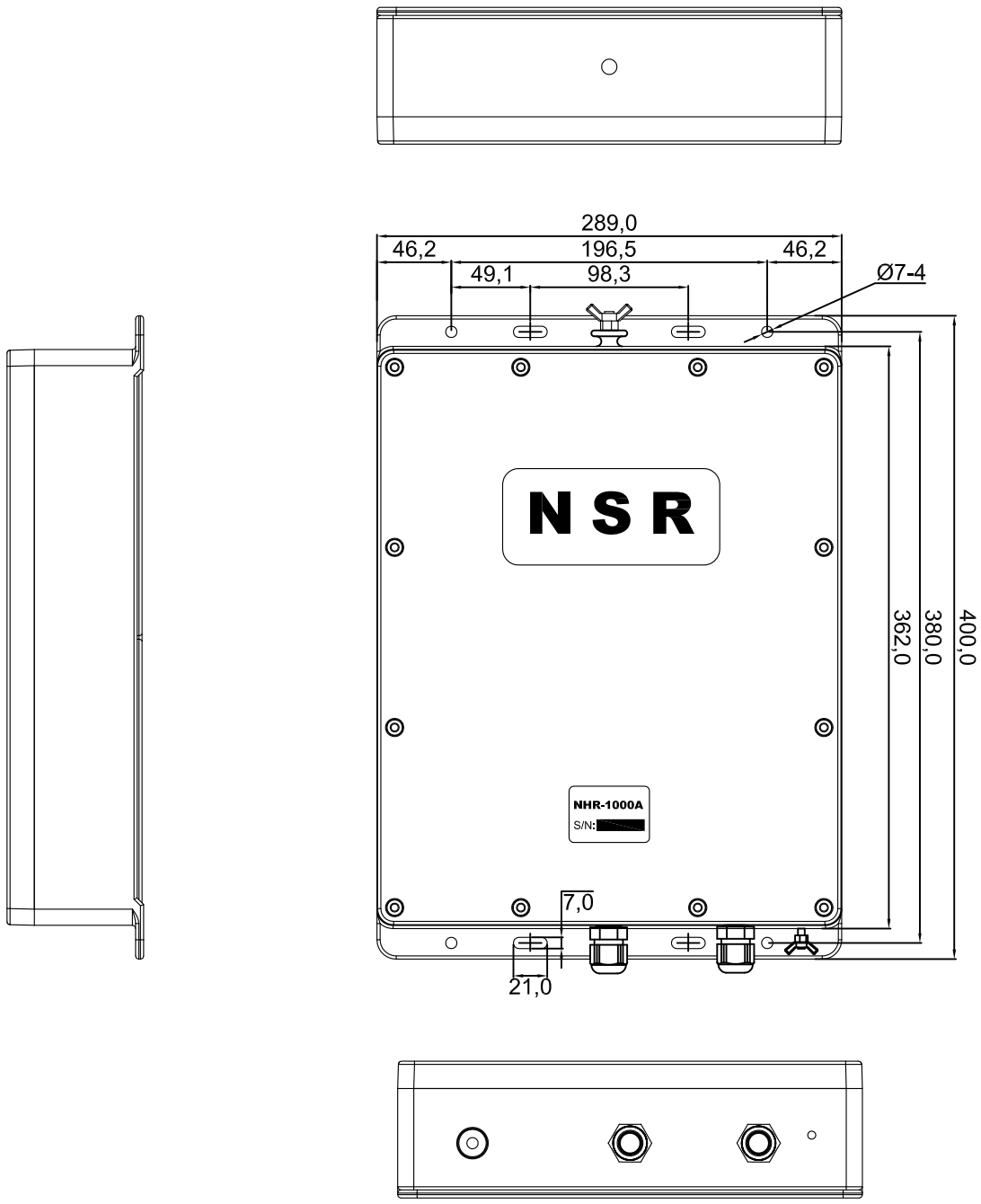
MOUNTING BRACKET SIZE



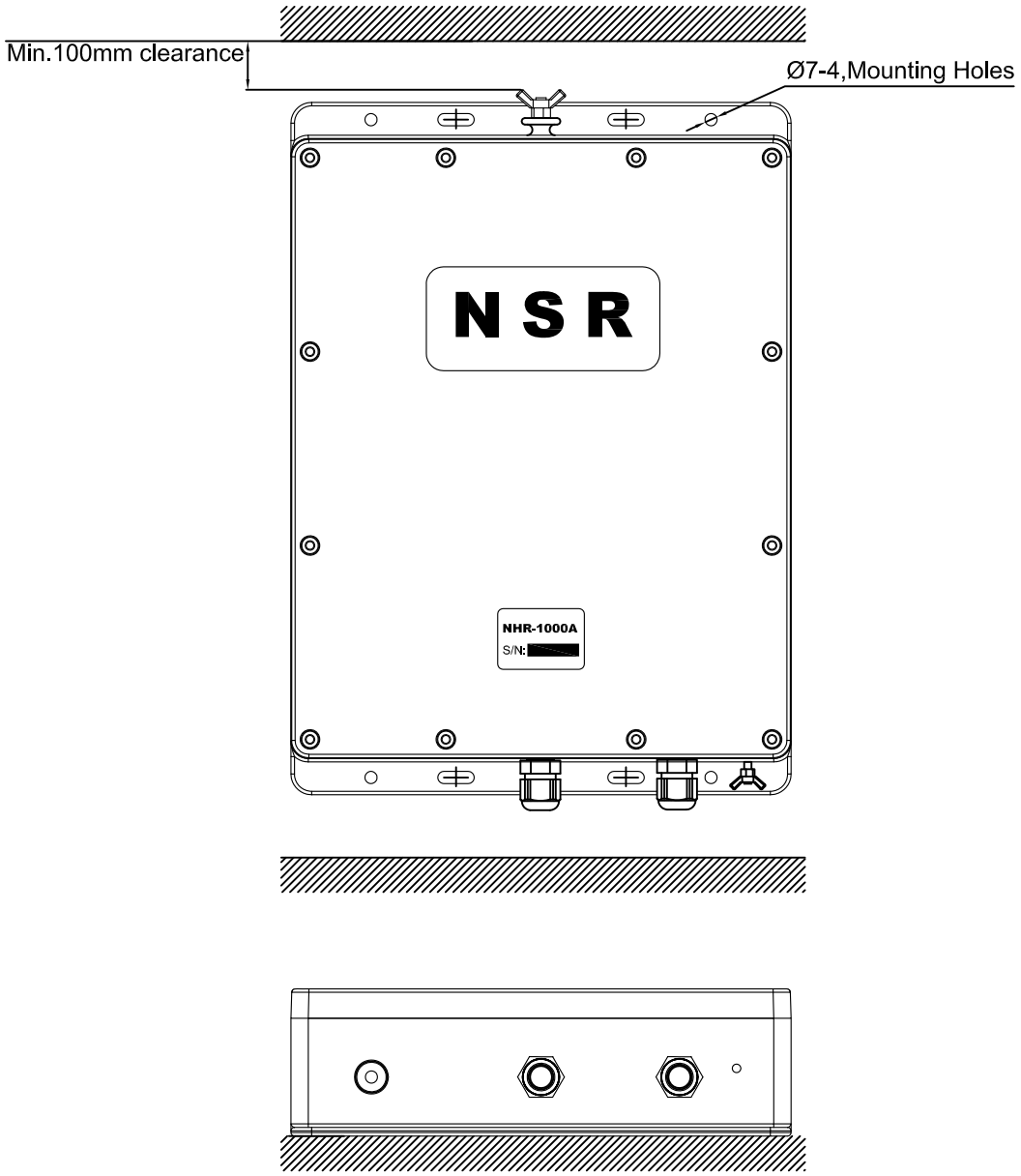


APPLICATION	Control Unit Mounting Drawing (Flush Type)
DATE	
APPROVAL	
CHECKED	
DRAWING	
DWG. NO.	NHR1500-ID-015
ITEM	NHR-1500 MF/HF
SCALE	N/S
UNIT	mm
SIZE	A4

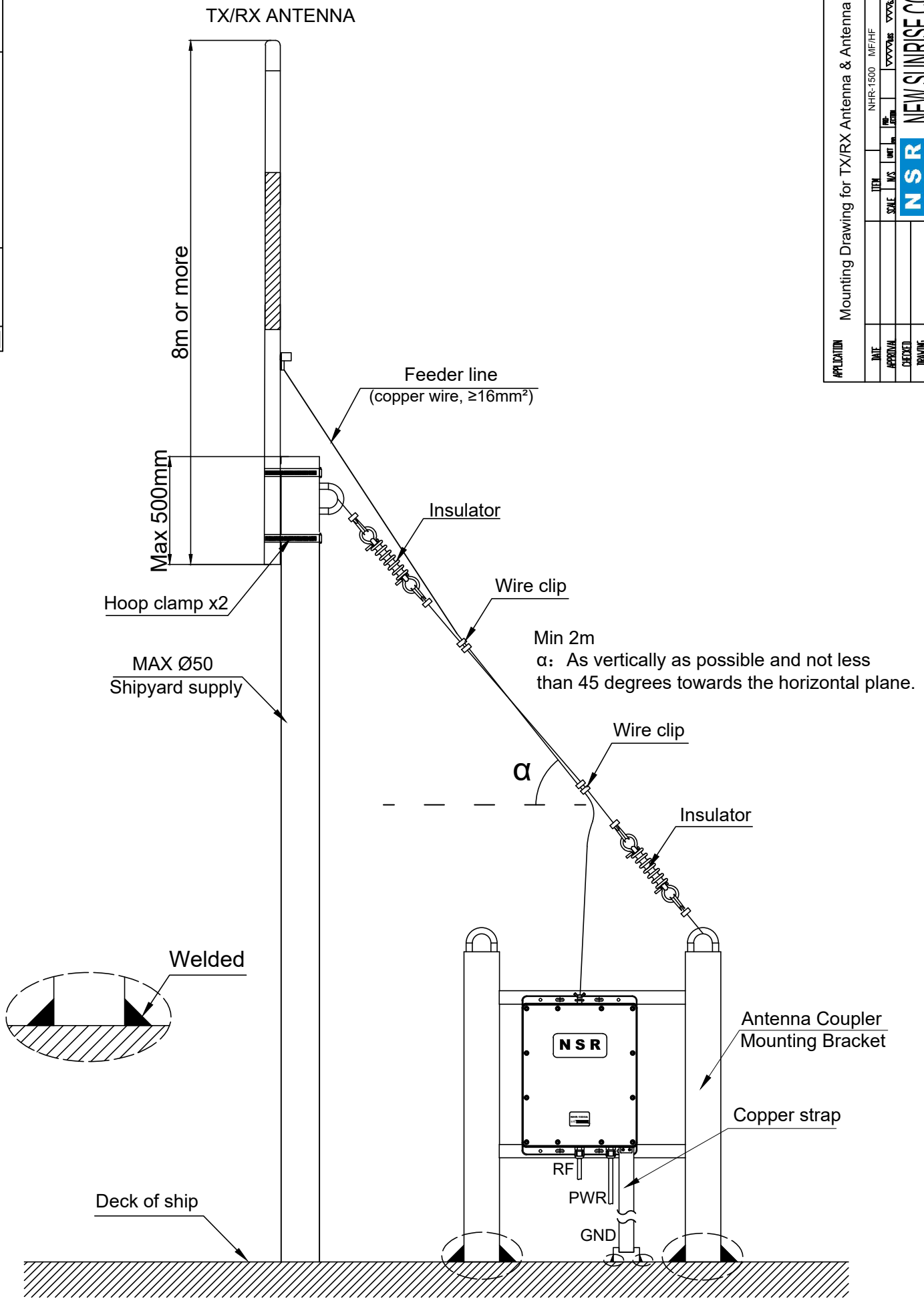
NSR marine NEW SUNRISE CO., LTD.



APPLICATION	Antenna Coupler Size Drawing				
DATE		ITEM	NHR-1500 MF/HF	SIZE	A4
APPROVAL		SCALE	N/S UNIT mm		
CHECKED		NSR marine	NEW SUNRISE CO., LTD.		
DRAWING					
DWG NO.	NHR1500-ID-016				



APPLICATION	Antenna Coupler Mounting Drawing				
DATE		ITEM	NHR-1500 MF/HF	SIZE	A4
APPROVAL		SCALE	N/S UNIT mm		
CHECKED		NSR marine	NEW SUNRISE CO., LTD.		
DRAWING					
DWG NO.	NHR1500-ID-017				

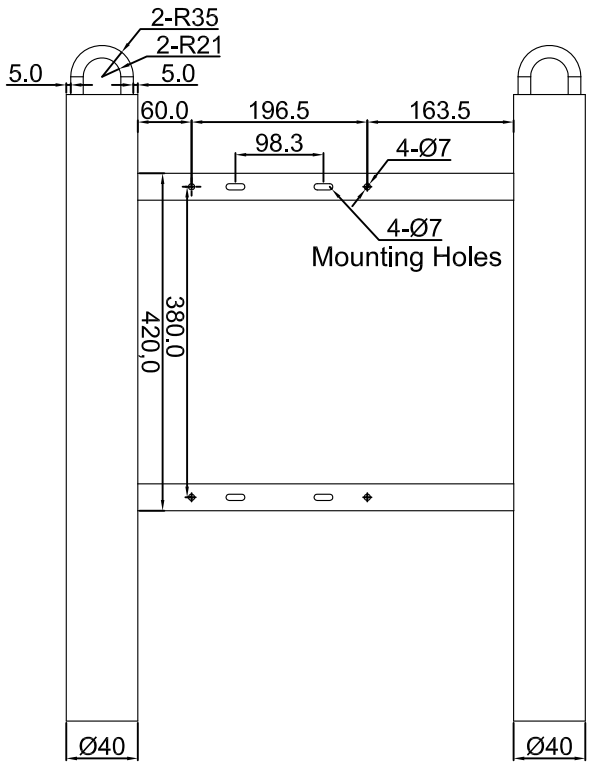


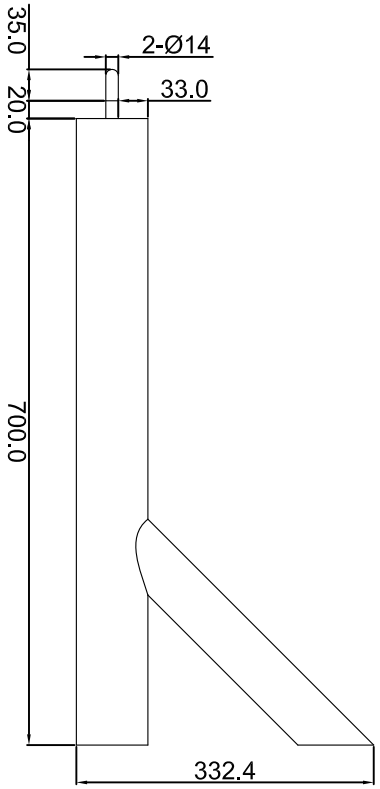
Mounting Drawing for TX/RX Antenna & Antenna Coupler

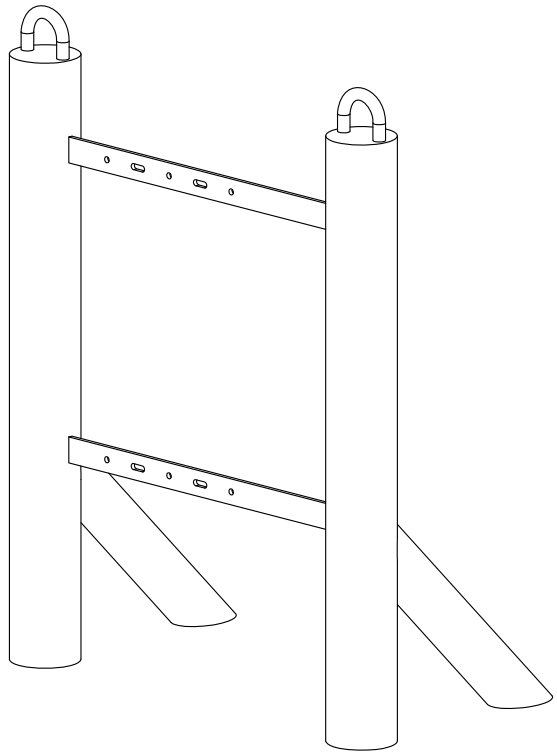
NHR-1500 MF/HF

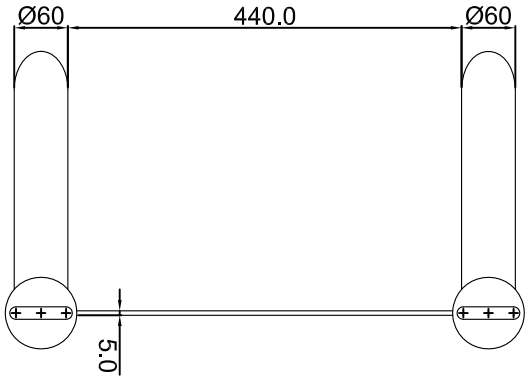
NEW SUNRISE CO., LTD.

NHR1500-ID-018









Notes:

The Bracket supplied by Shipyard.

APPLICATION	Antenna Coupler Mounting Bracket Drawing				
DATE		ITEM	NHR-1500 MF/HF	SIZE	A4
APPROVAL		SCALE	N/S UNIT mm		
CHECKED		NSR marine	NEW SUNRISE CO., LTD.		
DRAWING					
DWG NO.	NHR1500-ID-019				

NO.	DATE	REVISION & DESCRIPTION	REVIEWED / CHECKED SIGNATURE
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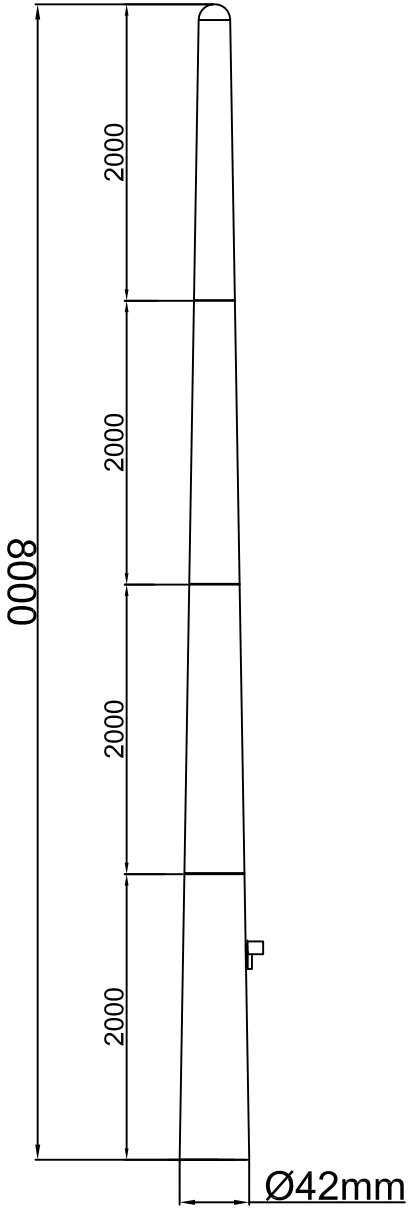


MF/HF TX/RX ANTENNA

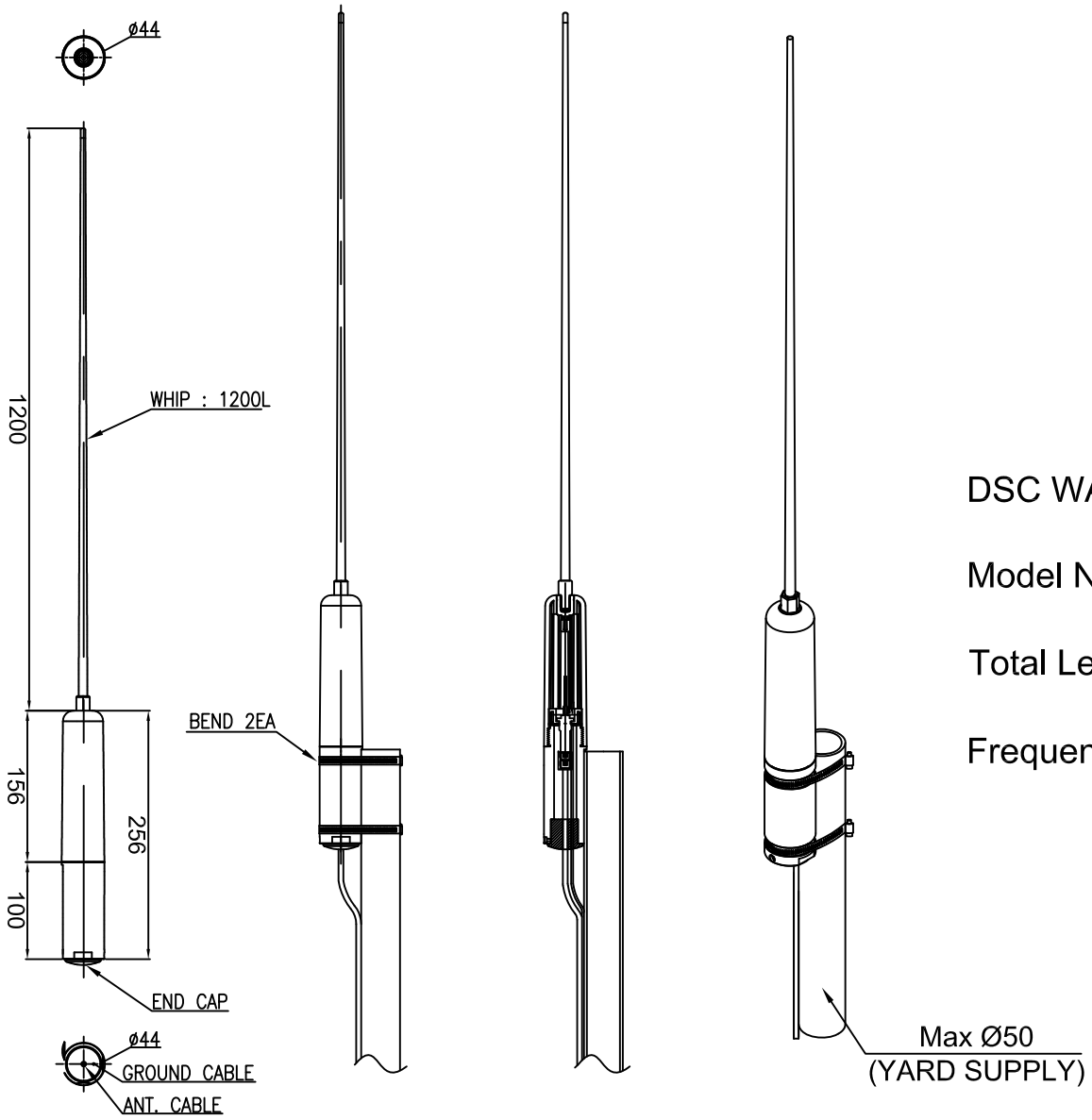
Model NO.: NHA100

Total Length:8000mm

Frequency:1.6-30.0MHz

Max power:1200W

APPLICATION	NHA100 TX/RX Antenna Size Drawing		
DATE		ITEM	NHR-1500 MF/HF SIZE A4
APPROVAL		SCALE N/S UNIT mm PROJECTION	
CHECKED		NSR marine	NEW SUNRISE CO., LTD.
DRAWING			
DWG. NO.	NHR1500-ID-020		



DIMENSION

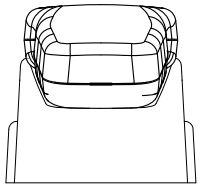
DSC WATCH RX ANTENNA

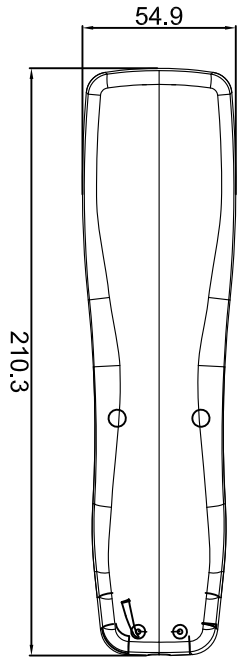
Model NO.: NXA100&NXA100A

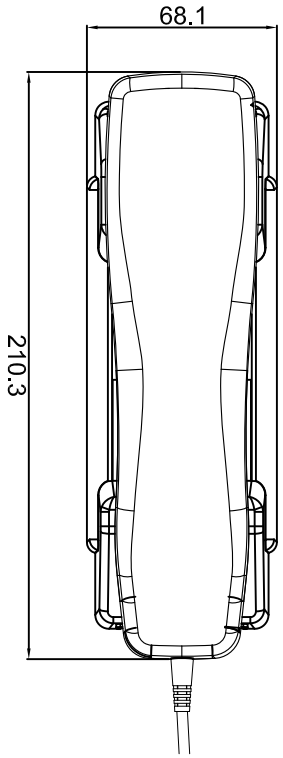
Total Length:1.456m（ANTENNA WITH PREAMP）

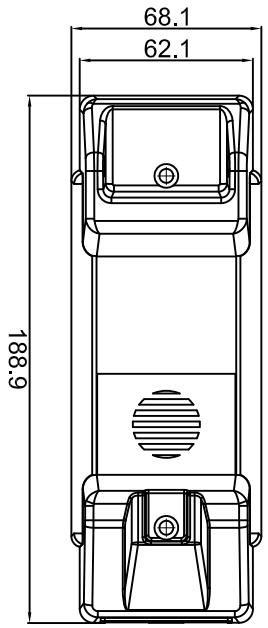
Frequency:1.6-30.0MHz

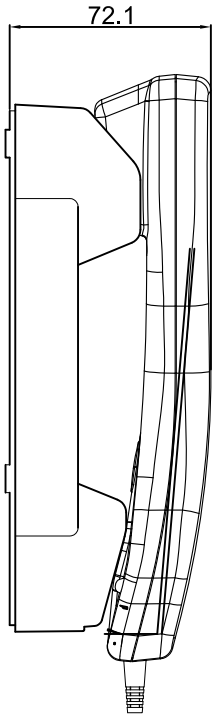
APPLICATION	Mounting Drawing for NXA100&NXA100A DSC RX Antenna				
DATE		ITEM	NHR-1500 MF/HF	SIZE	A4
APPROVAL		SCALE	N/S UNIT mm		
CHECKED		NSR marine	NEW SUNRISE CO., LTD.		
DRAWING					
DWG NO.	NHR1500-ID-021				



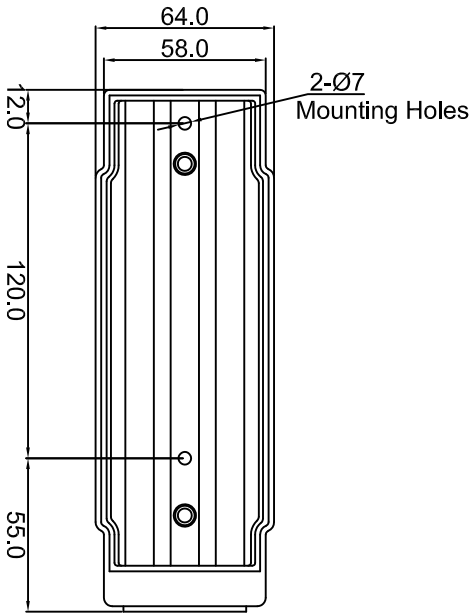


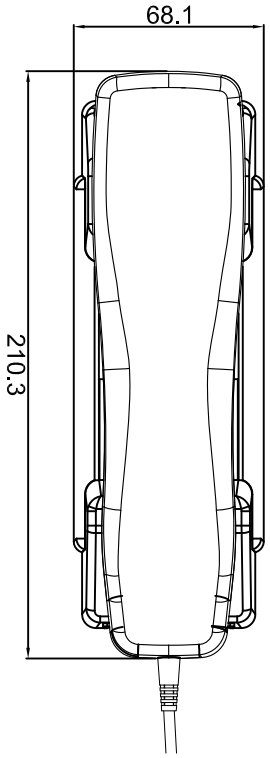


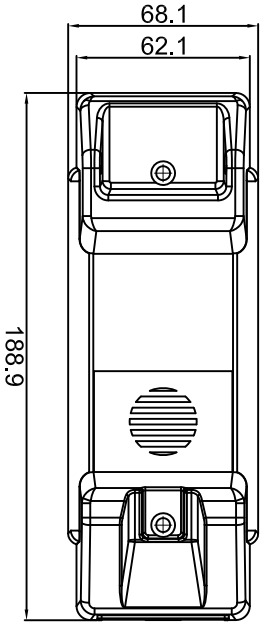


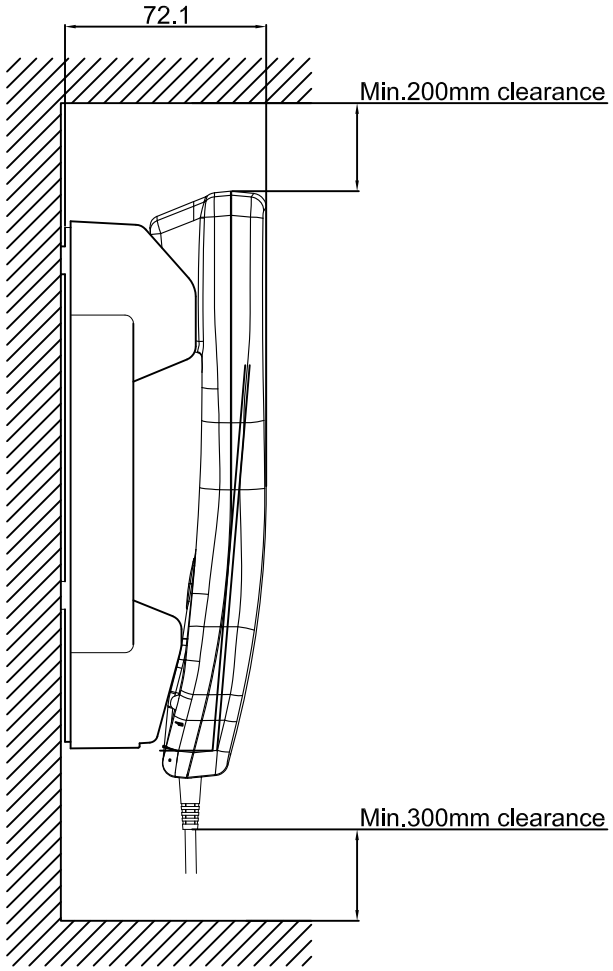


APPLICATION	NHS-200 Handset Size Drawing				
DATE		ITEM	NHR-1500 MF/HF	SIZE	A4
APPROVAL		SCALE	N/S UNIT mm		
CHECKED		NSR marine	NEW SUNRISE CO., LTD.		
DRAWING					
DWG NO.	NHR1500-ID-022				









APPLICATION	NHS-200 Handset Mounting Drawing		
DATE		ITEM	NHR-1500 MF/HF SIZE A4
APPROVAL		SCALE	N/S UNIT mm
CHECKED		NSR marine	NEW SUNRISE CO., LTD.
DRAWING			
DWG NO.	NHR1500-ID-023		

NO.	DATE	REVISION & DESCRIPTION	REVIEWED / CHECKED SIGNATURE
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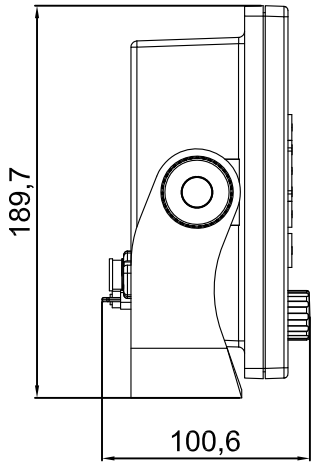
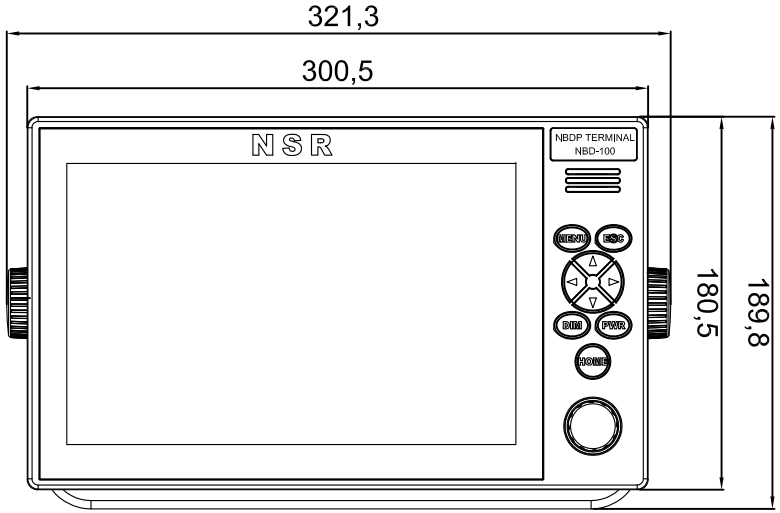
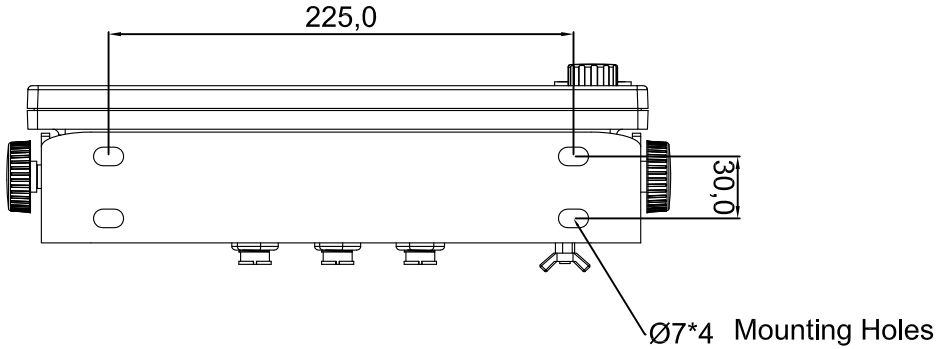


SIDE VIEW



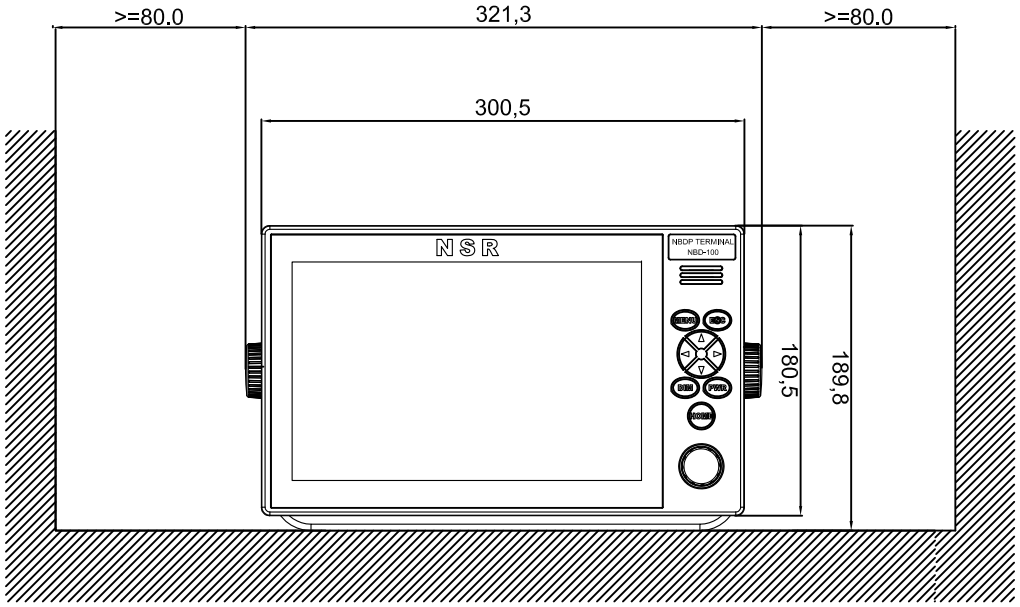
FRONT VIEW



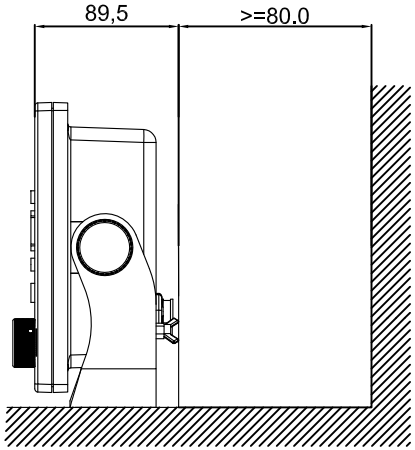
BOTTOM VIEW

APPLICATION	NBD-100 NBDP Terminal Size Drawing		
DATE		ITEM	NHR-1500 MF/HF SIZE A4
APPROVAL		SCALE N/S UNIT mm PROJECTION	
CHECKED		NSR marine	NEW SUNRISE CO., LTD.
DRAWING			
DWG. NO.	NHR1500-ID-024		

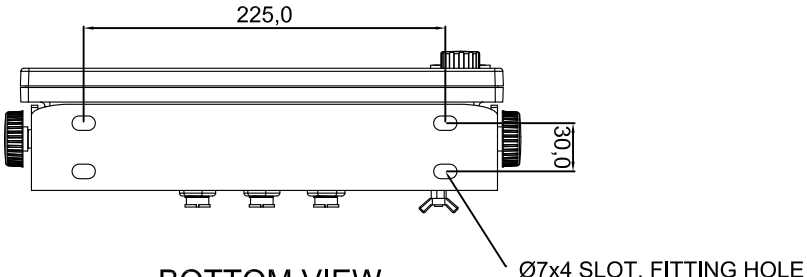
NO.	DATE	REVISION & DESCRIPTION	REVIEWED / CHECKED SIGNATURE
0			



FRONT VIEW



SIDE VIEW



BOTTOM VIEW

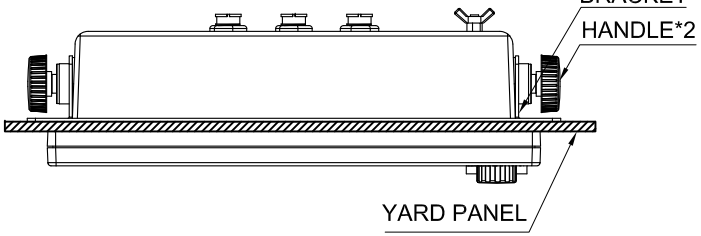
NOTE: TABLE TYPE

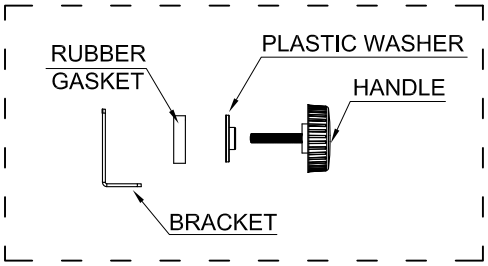
1.USE SELF-TAPPING SCREWS M5X20 FOR FIXING THE UNIT.

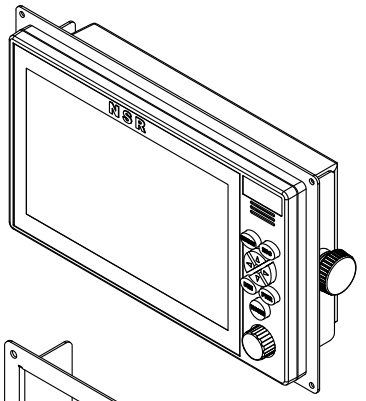
2.80MM IS MINIMUM SPACE FOR OPERATION AND CABLING.

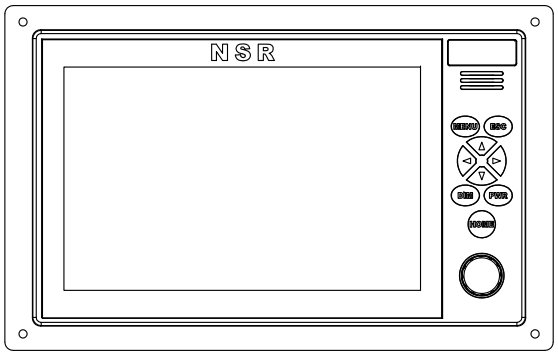
APPLICATION	NBD-100 NBDP Terminal Mounting Drawing (Table Type)		
DATE		ITEM	NHR-1500 MF/HF SIZE A4
APPROVAL		SCALE N/S UNIT mm PROJECTION	▽▽▽ 6.3S ▽▽ 12.5 ▽ 25S
CHECKED		NSR marine	NEW SUNRISE CO., LTD.
DRAWING			
DWG. NO.	NHR1500-ID-025		

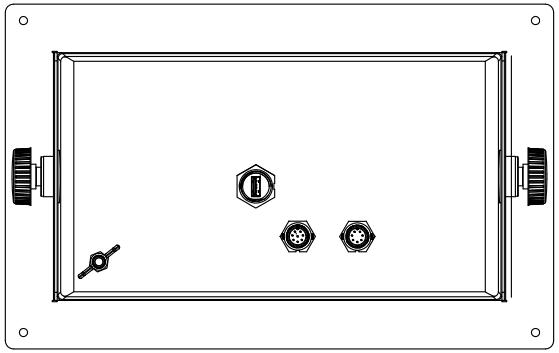
NO.	DATE	REVISION & DESCRIPTION	REVIEWED / SIGNATURE	CHECKED
0				

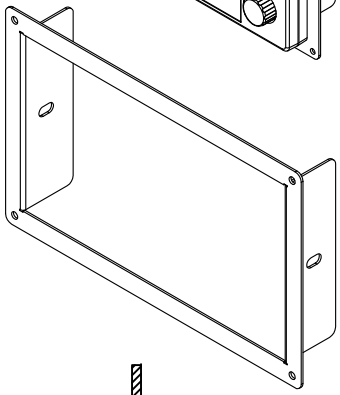


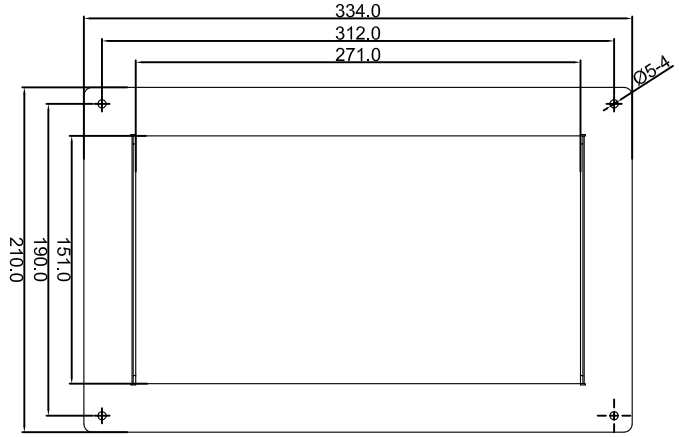




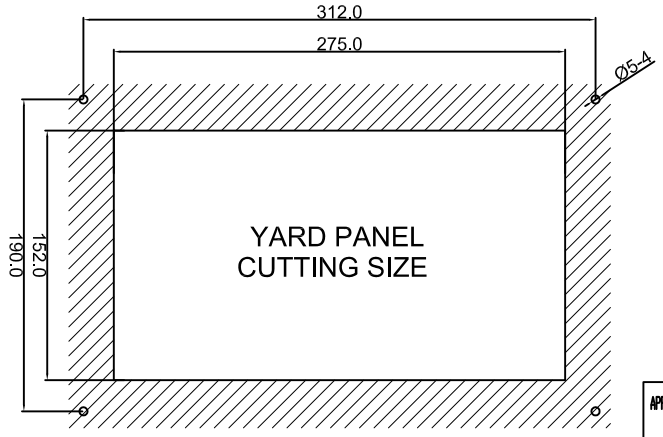


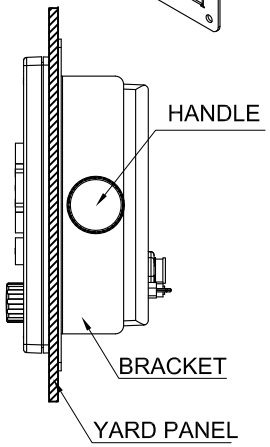






MOUNTING BRACKET SIZE

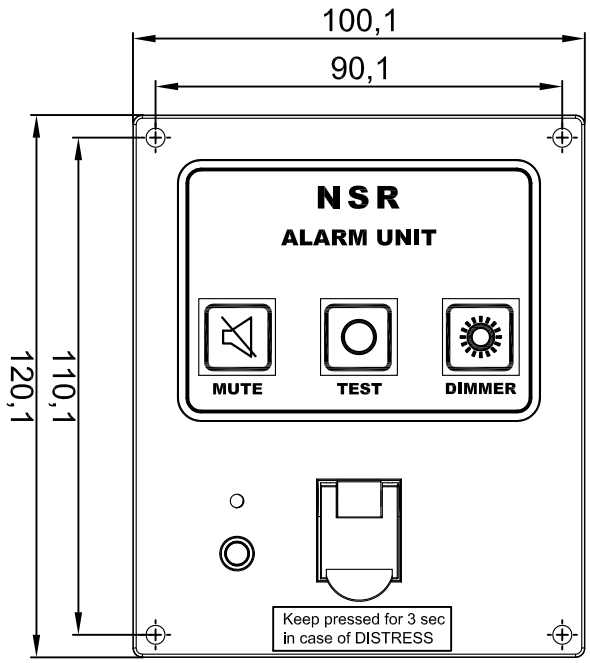




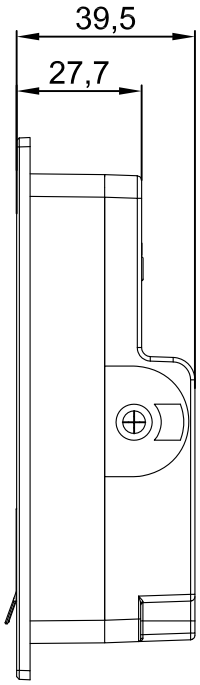
APPLICATION	NBD-100 NBDP Terminal Mounting Drawing (Flush Type)
DATE	
APPROVAL	
CHECKED	
DRAWING	
DWG. NO.	NHR1500-ID-026
ITEM	NHR-1500 MF/HF
SIZE	A4
SCALE	N/S
UNIT	mm

NEW SUNRISE CO., LTD.

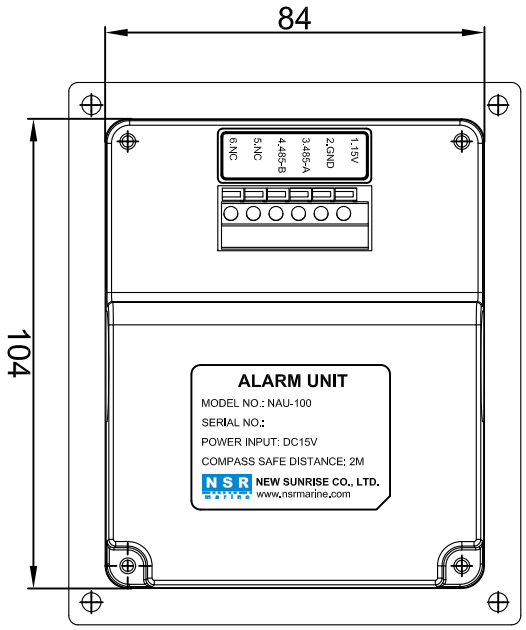
NO.	DATE	REVISION & DESCRIPTION	REVIEWED / SIGNATURE	CHECKED
0				



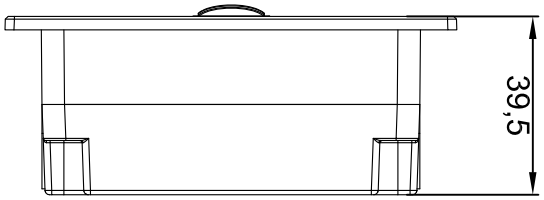
FRONT VIEW



SIDE VIEW



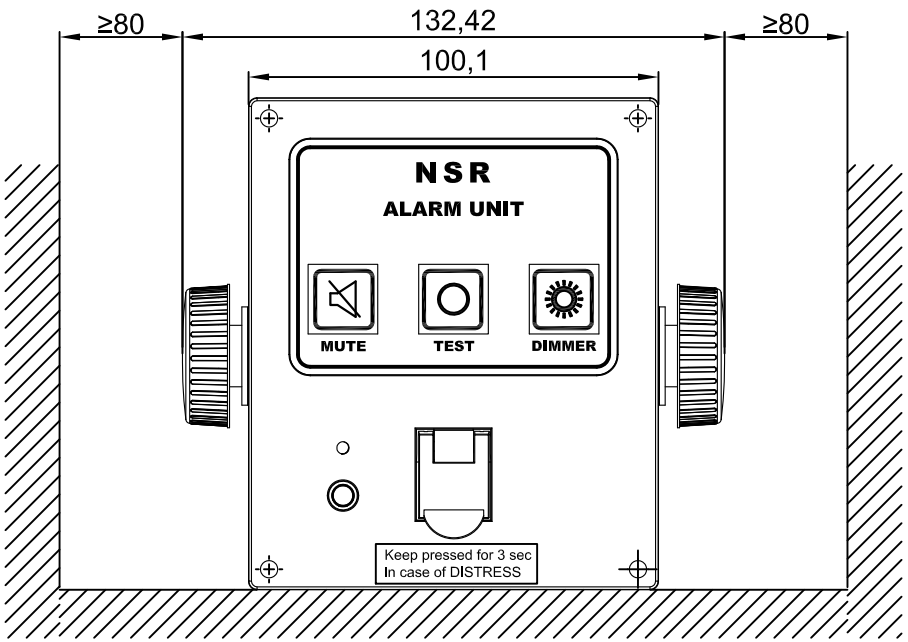
REAR VIEW



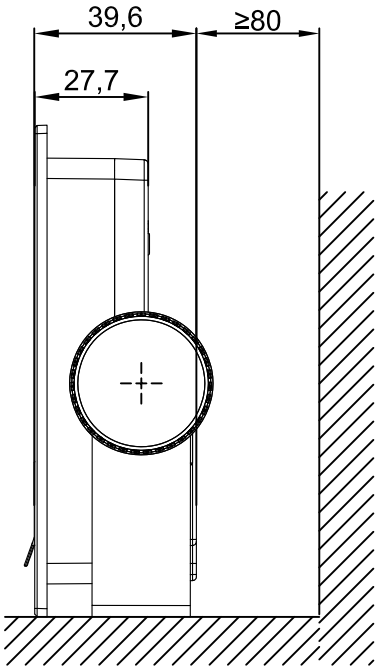
BOTTOM VIEW

APPLICATION	NAU-100 Alarm Unit Size Drawing		
DATE		ITEM	SIZE A4
APPROVAL		SCALE N/S UNIT mm PROJECTION	
CHECKED		NSR marine NEW SUNRISE CO., LTD.	
DRAWING			
DWG NO.	NHR1500-ID-027		

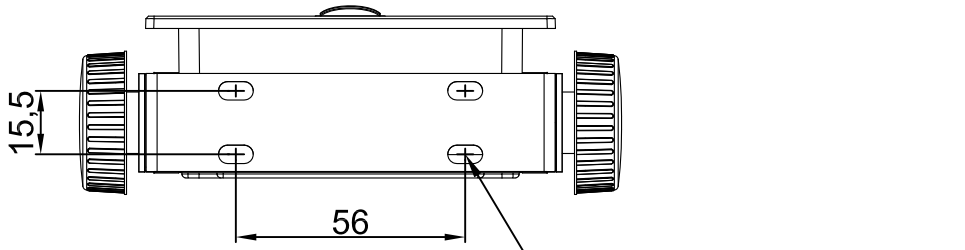
NO.	DATE	REVISION & DESCRIPTION	REVIEWED	CHECKED
0			SIGNATURE	



FRONT VIEW



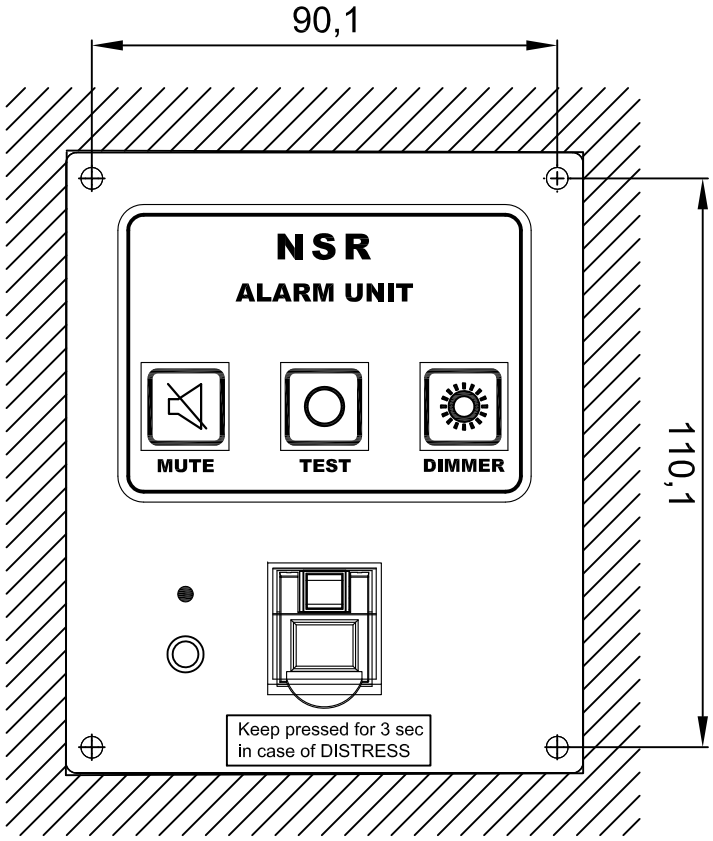
SIDE VIEW

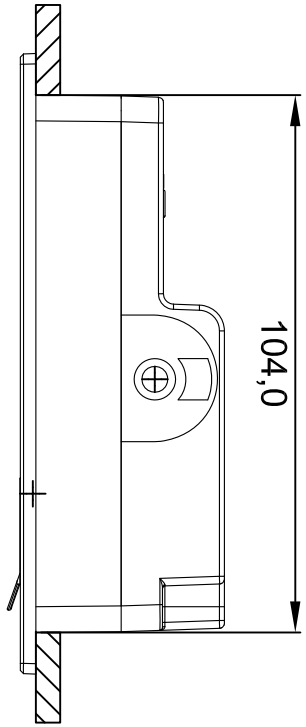


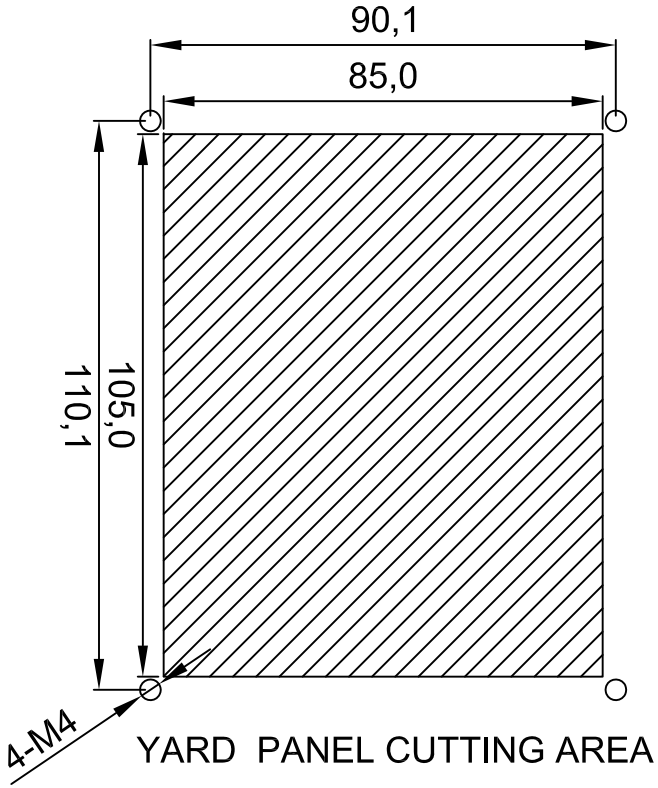
BOTTOM VIEW

APPLICATION	NAU-100 Alarm Unit Mounting Drawing (Table Type)		
DATE		ITEM	SIZE A4
APPROVAL		SCALE N/S UNIT mm PROJECTION	
CHECKED		NSR marine	NEW SUNRISE CO., LTD.
DRAWING			
DWG. NO.	NHR1500-ID-028		

NO.	DATE	REVISION & DESCRIPTION	REVIEWED	CHECKED
0			SIGNATURE	







YARD PANEL CUTTING AREA

APPLICATION	NAU-100 Alarm Unit Mounting Drawing (Flush Type)		
DATE		ITEM	SIZE A4
APPROVAL		SCALE N/S UNIT mm PROJECTION	
CHECKED		NSR marine	NEW SUNRISE CO., LTD.
DRAWING			
DWG. NO.	NHR1500-ID-029		

NO.	DATE	REVISION & DESCRIPTION	REVIEWED / CHECKED SIGNATURE
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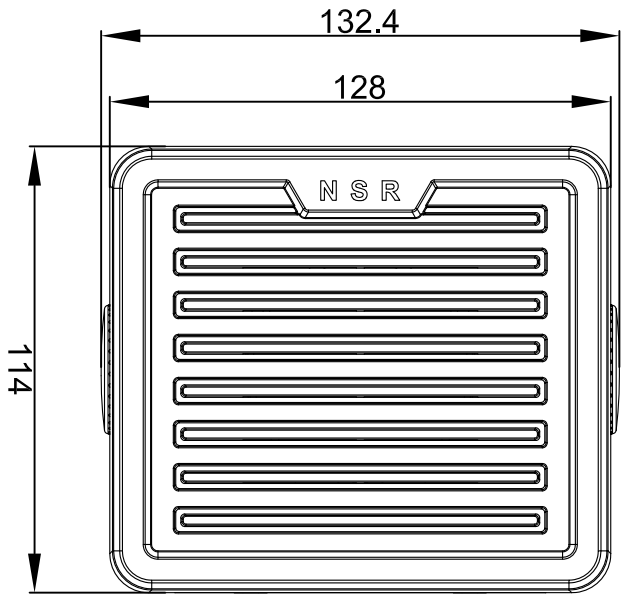
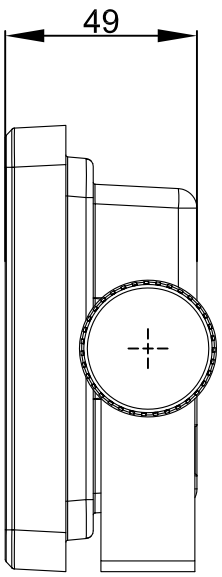
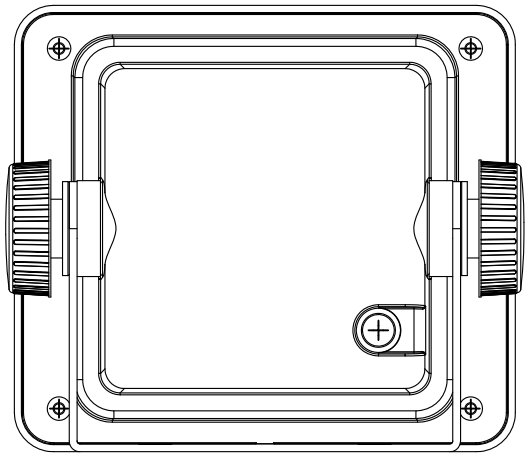


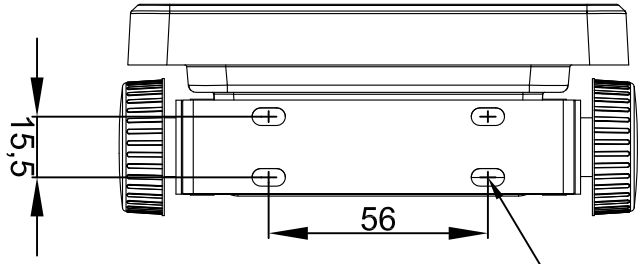
FRONT VIEW



SIDE VIEW

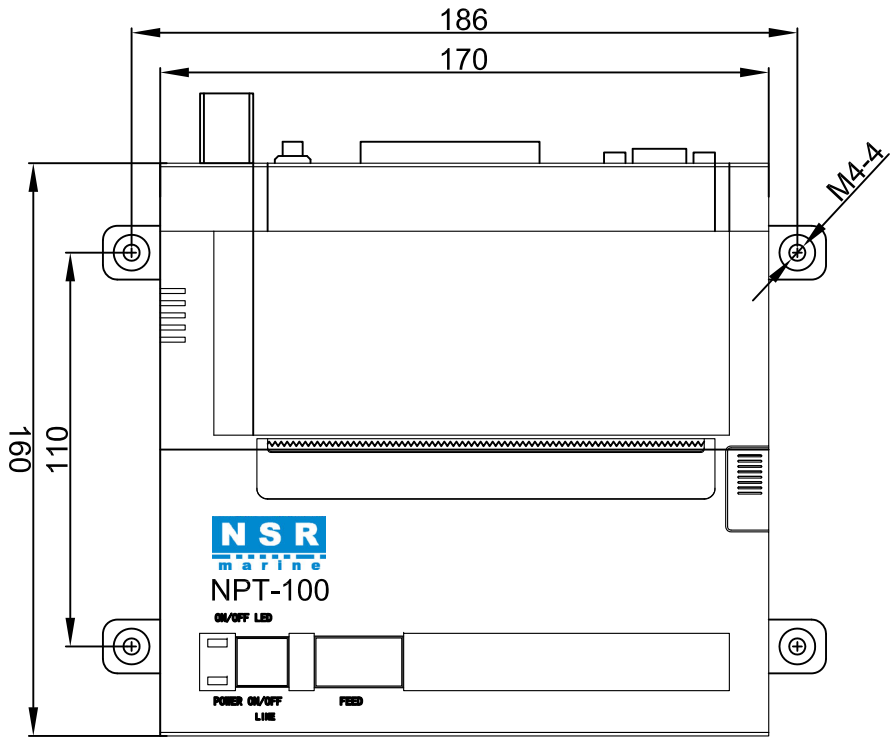


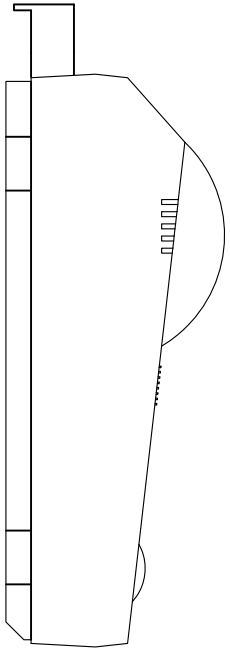
REAR VIEW

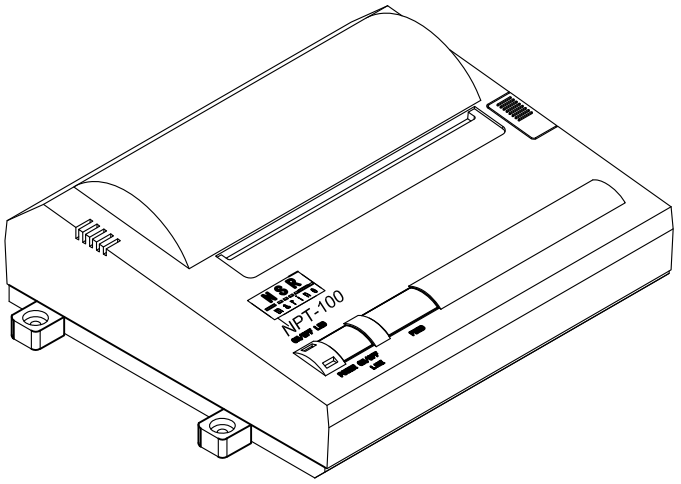


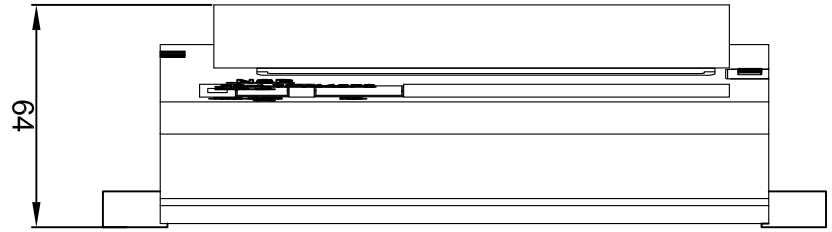
BOTTOM VIEW

APPLICATION	NSK-100 External Speaker Size Drawing		
DATE		ITEM	SIZE A4
APPROVAL		SCALE N/S UNIT mm PROJECTION	▽▽▽ 1.65 ▽▽ 1.35 ▽▽ 25 ▽ 100
CHECKED		NSR marine	NEW SUNRISE CO., LTD.
DRAWING			
DWG. NO.	NHR1500-ID-030		



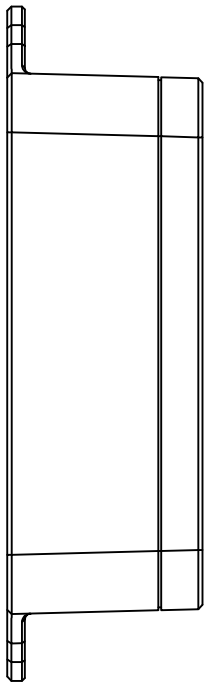




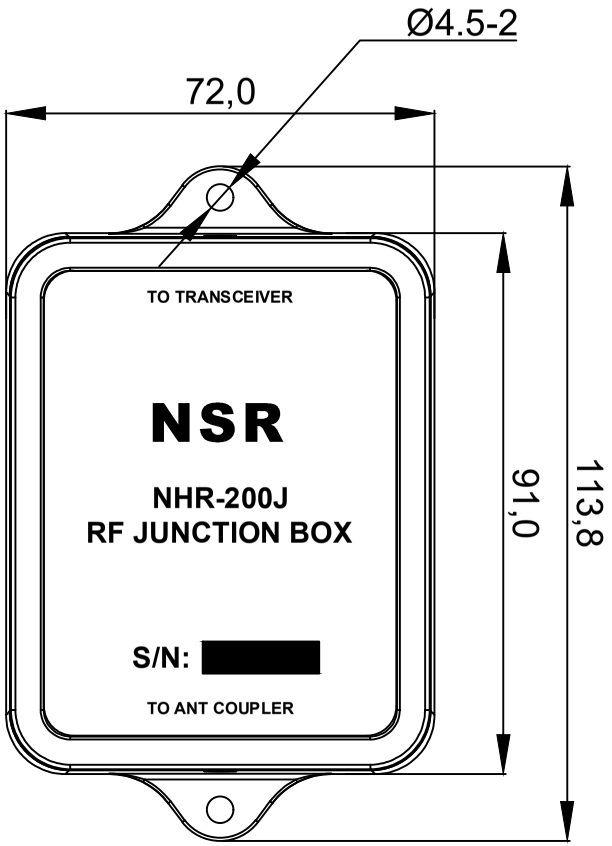


APPLICATION	NPT-100 Printer Size Drawing				
DATE		ITEM	NHR-1500 MF/HF	SIZE	A4
APPROVAL		SCALE	N/S UNIT mm		
CHECKED		NSR marine	NEW SUNRISE CO., LTD.		
DRAWING					
DWG NO.	NHR1500-ID-031				

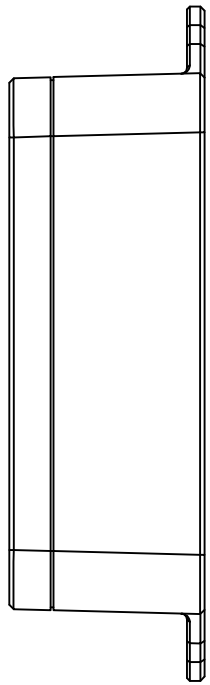
NO.	DATE	REVISION & DESCRIPTION	REVIEWED / CHECKED SIGNATURE
0			



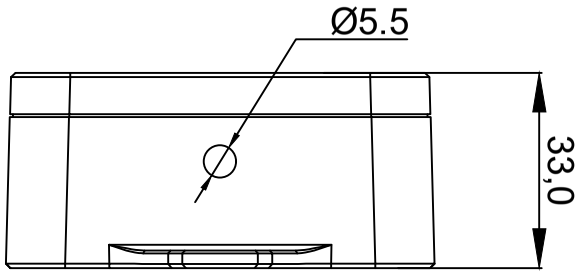
SIDE VIEW



FRONT VIEW



SIDE VIEW



BOTTOM VIEW

APPLICATION	NHR-200J RF Junction Box Size & Mounting Drawing
DATE	
APPROVAL	
CHECKED	
DRAWING	
DWG NO.	NHR1500-ID-032
ITEM	
SCALE	N/S
UNIT	mm
SIZE	A4

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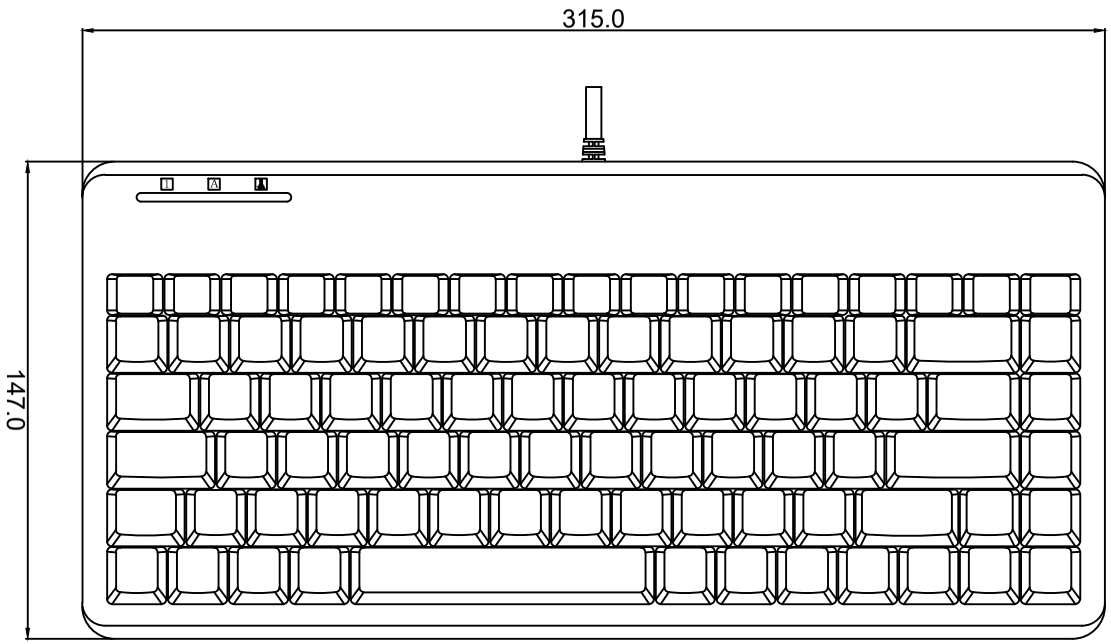
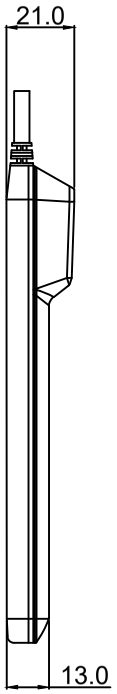
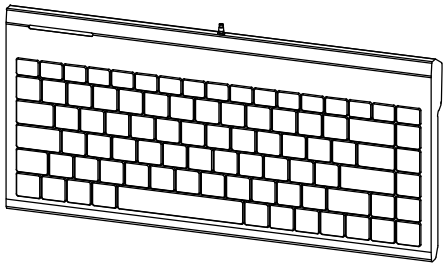
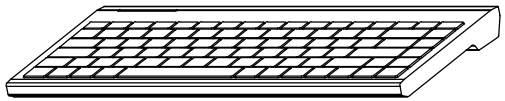
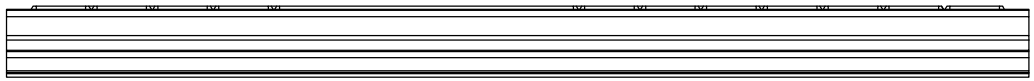






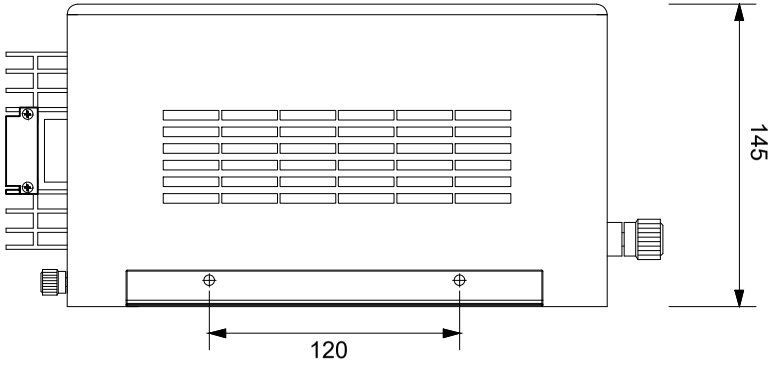




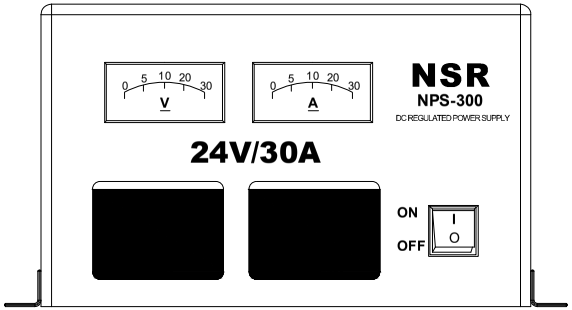
APPLICATION	NKB-100 Keyboard Size Drawing		
DATE		ITEM	SIZE A4
APPROVAL		SCALE N/S UNIT mm	
CHECKED		NSR marine	NEW SUNRISE CO., LTD.
DRAWING			
DWG NO.	NHR1500-ID-033		

NO.	DATE	REVISION & DESCRIPTION	REVIEWED	CHECKED
1			SIGNATURE	

SIDE VIEW

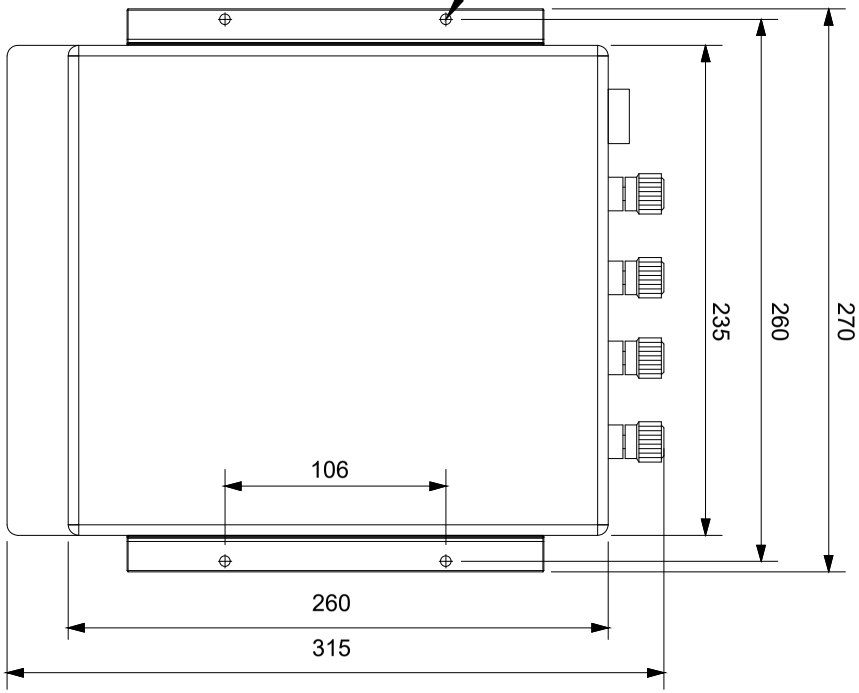


FRONT VIEW

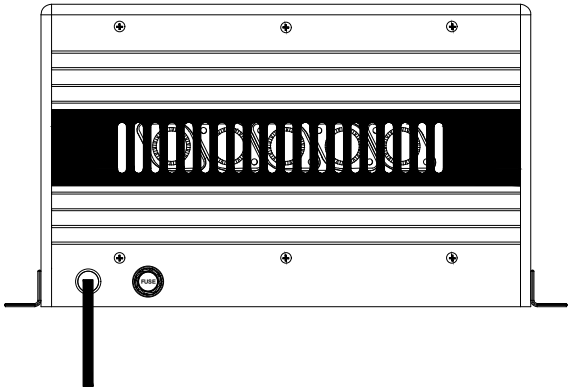


TOP VIEW

Ø5 MOUNTING HOLE



REAR VIEW



APPLICATION	NPS-300 Power Supply Unit Size Drawing
DATE	
APPROVAL	
CHECKED	
DRAWING	
DWG NO.	NHR1500-ID-034
ITEM	
SIZE	A4
SCALE	N/S
UNIT	mm
PROJECTION	

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October, 2025