



USER MANUAL

Voyage Data Recorder (VDR) / NVR-9000

&

Simplified Voyage Data Recorder (S-VDR) / NVR-9000S

GENERAL INFORMATION

i. Copyright

The entire contents of this user manual, including any future updates, revisions, and modifications, shall remain the property of NSR at all times. Unauthorized copying or reproduction of this manual, either in part or in whole, in any form of print or electronic media, is prohibited. The contents herein can only be used for the intended purpose of this manual.

ii. Disclaimer

NSR is devoted to publishing and maintaining this user manual. As we continue to improve our products to satisfy customers' needs, the information in this document is subject to change without prior notice. NSR does not make any representations or warranties (implied or otherwise) regarding the accuracy and completeness of this document and shall in no event be liable for any loss of profit or any commercial damage, including but not limited to special, incidental, consequential, or other damage.

iii. Safety Warning



DON'T DISASSEMBLE THE EQUIPMENT

Access to the interior of the NVR-9000 should only be granted to an NSR-certified technician.



PROPER USE OF BATTERIES

The battery should be replaced upon reaching its marked expiry date, even if it has never been used.

iv. Disposal Instruction

Dispose the lithium batteries carefully. Lithium batteries should have two poles insulated prior to disposal because the remaining power could cause severe harm to human beings. Local regulations should be followed when batteries are disposed in order to protect your environments.

MODIFY RECORD

No.	Modify by	Date	Paragraph	Version	Reason
1	Q/A	2015/11/19		01	First edition
2	Q/A	2015/12/22		02	General modification
3	Q/A	2016/01/28	2.5	03	Modify alarm message
4	Q/A	2016/05/03	4	04	Software upgrade
5	Q/A	2016/07/24	Junction Box and Remote Alarm Unit	05	Product improvement
6	Q/A	2016/10/24	2.2	06	Product improvement
7	Q/A	2016/12/08	2.5	07	Alarm message
8	Q/A	2017/03/06		08	General modification
9	Q/A	2018/06/19		09	Cover modification
10	Q/A	2018/12/27		10	General modification
11	Q/A	2020/02/20		11	General modification
12	Q/A	2021/07/30		12	General modification
13	Q/A	2021/09/28		13	BAM description
14	Q/A	2022/07/27		14	IMO new regulations
15	Q/A	2025/05/20	all	15	Some modification
16	Q/A	2025/10/23	1.3, 2.2	16	Some modification

VERSION COMPARISON TABLE

Manual Version	Program Version	Remarks
20251023_16	MCU: 1.36 20250108 APP : 2.19 20240812	

TABLE OF CONTENTS

1. OVERVIEW.....	1
1.1 Outline.....	1
1.2 System Configuration	2
1.3 System Description	5
1.3.1 Data Acquisition Unit (DAU)	6
1.3.2 Data Extension Unit (DEU)	6
1.3.3 Remote Alarm Unit (RAU)	7
1.3.4 Indoor Microphone Unit (IMU) and Outdoor Microphone Unit (OMU).....	7
1.3.5 Fixed Protective Capsule (FPC).....	7
1.3.6 Float-Free Capsule (FFC).....	8
1.3.7 Video Interface Unit (VIU)	8
2. OPERATION	10
2.1 Power On/Off.....	10
2.2 Operation of RAU	11
2.2.1 Screen Components.....	12
2.2.2 Screen dimmer	12
2.3 Normal Operation	13
2.3.1 System Status	13
2.3.2 Data Backup.....	14
2.3.3 Alert List	15
2.3.4 System Setting.....	16
2.3.5 Diagnostics.....	17
2.3.6 Service.....	18
2.4 System Performance Test.....	20
3. DATA RECORDING UNITS.....	21
3.1 Backup of Recorded Data	21
3.2 Long-Term Recording Unit (LRU)	22

3.3 Float-Free Recording Capsule (FFC).....	22
3.4 Fixed Protective Capsule (FPC).....	22
4. DATA PLAYBACK	24
4.1 Set up the Playback Computer	24
4.2 Run the Playback Software	24
4.3 Download the Data.....	26
4.4 Open the Data File	27
4.5 Playback Operation Menu.....	28
4.5.1 Main Interface	29
4.5.2 Serial Data	29
4.5.3 Digital Data	30
4.5.4 Analog Data.....	32
4.5.5 Radar/ECDIS Image.....	35
4.5.6 Door Status.....	35
4.5.7 AIS	35
5. INTERFACE.....	36
6. MAINTENANCE	38
6.1 Fuse Replacement	38
6.2 Consumable Parts.....	38
7. SPECIFICATIONS	40
7.1 Specifications.....	40
7.2 Power Supply	41
7.3 Equipment List.....	41
ANNEX A ALERT LIST	42
ANNEX B ICONS	46
ANNEX C NEB-2000C-VDR USER MANUAL.....	47

1. OVERVIEW

1.1 Outline

Voyage Data Recorder (VDR) is designed to record and store in a secure and retrievable form, information concerning the ship's position, movement, physical status and control command for the period leading up to and following an incident. It enables the accident investigators to review procedures and instructions at the moments leading up to an incident and helps to identify the cause of the accident. The data recorded by VDR can be used for vessel management, such as equipment health management and ship position management.

The NVR-9000 is flexible enough to form a VDR or S-VDR and is easy to install and maintain. The equipment is designed to meet the latest standards, including:

1. MSC.494 (104): Amendments to the Performance Standards for Shipborne Voyage Data Recorders (VDRs) (RESOLUTION MSC.333 (90))
2. MSC493 (104): Amendments to the Performance Standards for Shipborne Simplified Voyage Data Recorders(S-VDRs) (RESOLUTION MSC.163 (78), AS AMENDED)
3. MSC.333 (90): ADOPTION OF REVISED PERFORMANCE STANDARDS FOR SHIPBORNE VOYAGE DATA RECORDS (VDRs)
4. MSC 214 (81): ADOPTION OF AMENDMENTS TO THE PERFORMANCE STANDARD FOR SHIPBORNE VOYAGE DATA RECORDER (VDRS) (RESOLUTION A.861 (20)) AND PERFORMANCE STANDARD FOR SHIPBORNE SIMPLIFIED VOYAGE DATA RECORDER (S-VDRS) (RESOLUTION MSC.163 (78))
5. IEC 61996-1 (2021): Maritime Navigation and Radiocommunication Equipment and Systems - Shipborne Voyage Data Recorder (VDR) - Part 1: Performance Requirements, Methods of Testing and Required Test Results
6. IEC 61996-2{Ed.2.0}: Maritime Navigation and Radiocommunication Equipment and Systems - Shipborne Voyage Data Recorder (VDR) - Part 2: Simplified Voyage Data Recorder (S-VDR) - Performance Requirements, Methods of Testing and Required Test Results
7. IEC 60945: Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results
8. IEC 62923-1 (2018): Maritime navigation and radiocommunication equipment and systems - Bridge alert management - Part 1: Operational and performance requirements, methods of testing and required test results.
9. IEC 62923-2 (2018): Maritime navigation and radiocommunication equipment and systems - Bridge alert management - Part 2: Alert and cluster identifiers and other additional features.

10. IEC 61162-1 (2016): Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 1: Single talker and multiple listeners
11. IEC 61162-2 (1998): Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 2: Single talker and multiple listeners, high-speed transmission
12. IEC 61162-450 (2018): Maritime navigation and radiocommunication equipment and systems - Digital interfaces - Part 450: Multiple talkers and multiple listeners - Ethernet interconnection

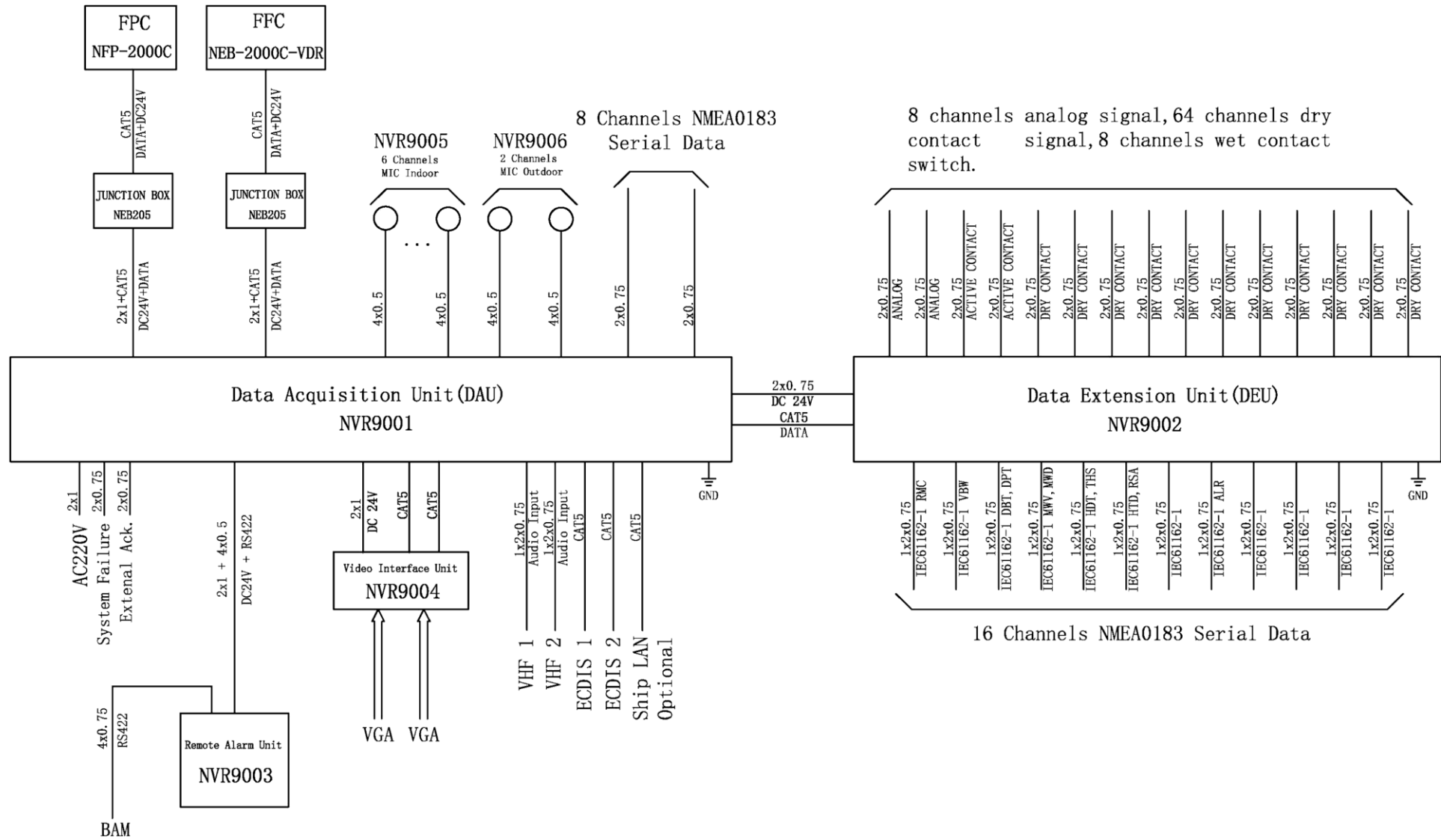
1.2 System Configuration

NVR-9000/NVR-9000S comprises up to 9 components as follows:

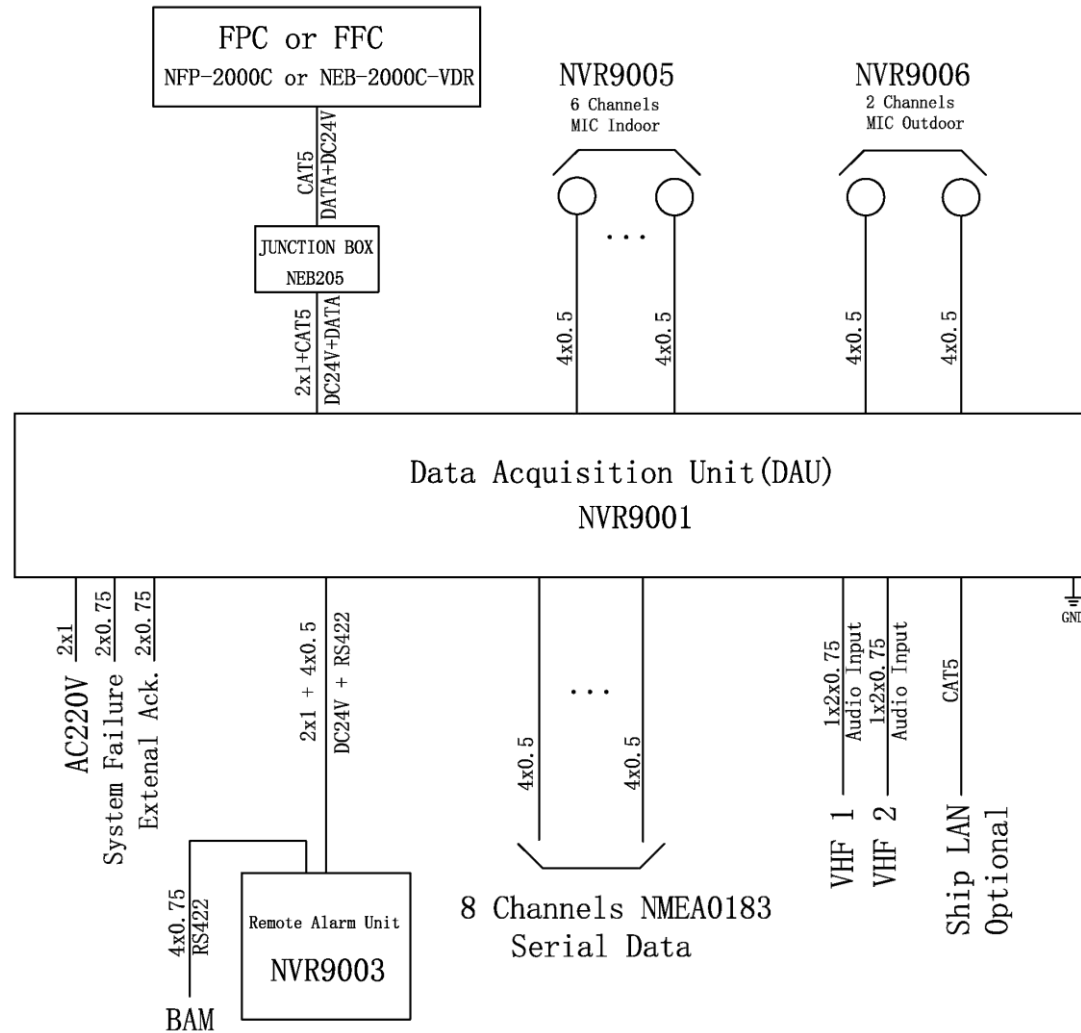
No.	Component Name	Part Type	NVR-9000 VDR	NVR-9000S S-VDR	Environmental Category
1	Data Acquisition Unit (DAU)	NVR9001	X	X	Protected
2	Data Extension Unit (DEU)	NVR9002	X	O	Protected
3	Remote Alarm Unit (RAU)	NVR9003	X	X	Protected
4	Video Interface Unit (VIU)	NVR9004	O	O	Protected
5	Indoor Microphone Unit (IMU)	NVR9005	X	X	Protected
6	Outdoor Microphone Unit (OMU)	NVR9006	X	X	Exposed
7	Fixed Protective Capsule (FPC)	NFP-2000C	X	X ^{Note}	Exposed
8	Float-Free Capsule (FFC)	NEB-2000C-VDR	X		Exposed
9	Junction Box for Capsule (JBC)	NEB205	X	X	Exposed

X: standard, O: optional

NOTE: For S-VDR, either FPC or FFC may be selected.



NVR-9000 VDR SYSTEM CONFIGURATION



NVR-9000S S-VDR SYSTEM CONFIGURATION (standard)

1.3 System Description

The VDR system continuously stores data in FPC and FFC for at least 48 hours and in LRU for at least 720 hours by overwriting the old data with new data.

The following data may be recorded by NVR-9000:

- *Date and time*
- *Ship's Position*
- *Speed*
- *Heading (true)*
- *Heading (magnetic)*
- *Depth (Echo sounder)*
- *Main Alarms*
- *Rudder sensor angle*
- *Rudder order status*
- *Heading/track control command*
- *Heading/track control data*
- *Engine order/response*
- *Hull openings (doors) status*
- *Watertight and fire door status*
- *Accelerations and hull stresses*
- *Wind speed and direction*
- *AIS*
- *VDR alert output*
- *Heartbeat supervision sentence*
- *Electronic logbook*
- *Bridge Audio*
- *Communications Audio*
- *Radar Data*
- *ECDIS*

When the power supply fails:

VDR is powered with AC220V/AC110V. If both the ship's main power and emergency power source fail, the VDR will be powered by an internal backup battery (NBT900) to keep recording bridge audio.

1.3.1 Data Acquisition Unit (DAU)

The Long-Term Recording Unit (LRU), network switch, main board, and audio board are located in the Data Acquisition Unit (DAU). DAU controls the entire system. The Long-Term Recording Unit (LRU) with 512GB SSD records the last 720 hours of data and is accessible via Ethernet while protected from any unauthorized changes with seals. The DAU provides 8 channels of microphone inputs, 2 channels of VHF audio inputs, 2 LAN inputs, and 8 serial inputs.

NOTE: For S-VDR, the LRU is not mandatory. However, a 64GB SSD LRU is typically equipped in the DAU of NVR-9000S S-VDR.

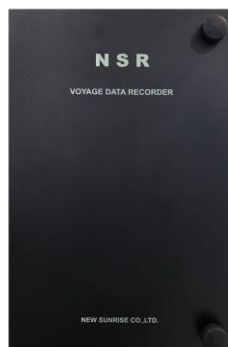


1.3.2 Data Extension Unit (DEU)

Data Extension Unit (DEU) has 64 volt-free dry contact inputs, 8 wet contact inputs, 8 analog inputs for $\pm 10V$ or 4-20mA signal, and 16 serial inputs.

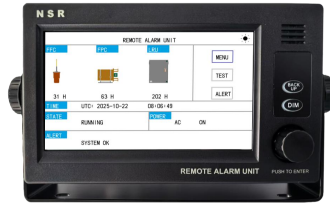
NOTE:

Up to 4 DEUs may be connected to the DAU of NVR-9000 VDR.



1.3.3 Remote Alarm Unit (RAU)

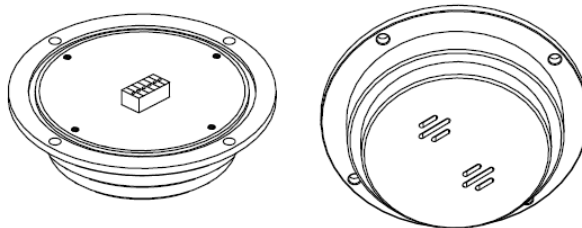
The Remote Alarm Unit (RAU) monitors and displays alarms generated by the DAU.



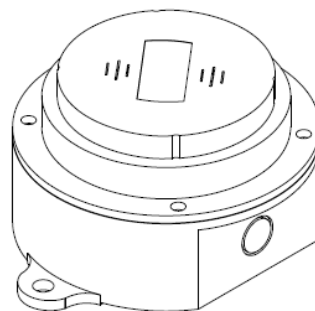
1.3.4 Indoor Microphone Unit (IMU) and Outdoor Microphone Unit (OMU)

The VDR system includes two types of microphones: indoor and outdoor. Outdoor microphones are protected against water ingression.

- **Indoor Microphone Unit (IMU)**



- **Outdoor Microphone Unit (OMU)**



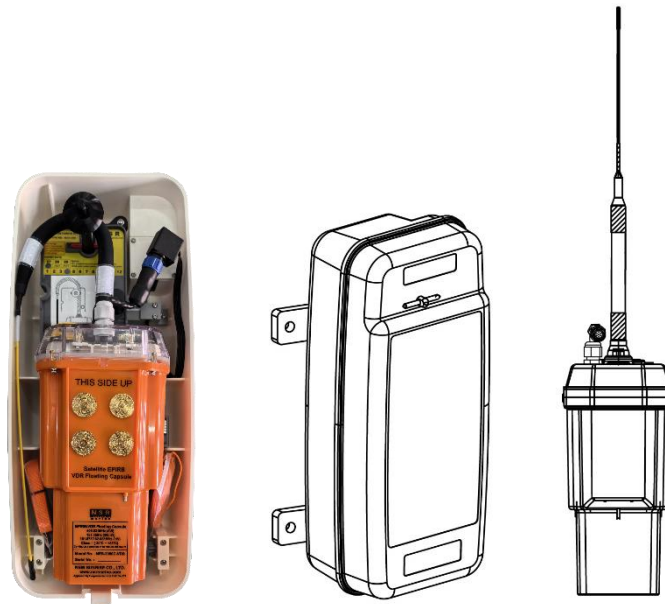
1.3.5 Fixed Protective Capsule (FPC)

The Fixed Protective Capsule (FPC) with a memory capacity of 64GB supports data recording time of at least 48 hours. The capsule is built to withstand extreme environmental conditions such as 1100°C temperature, penetration, 6000m underwater pressure, and immersion while maintaining data integrity.



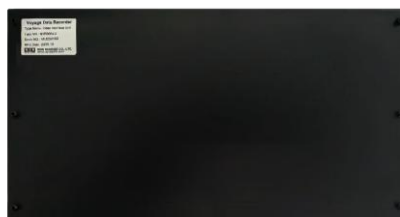
1.3.6 Float-Free Capsule (FFC)

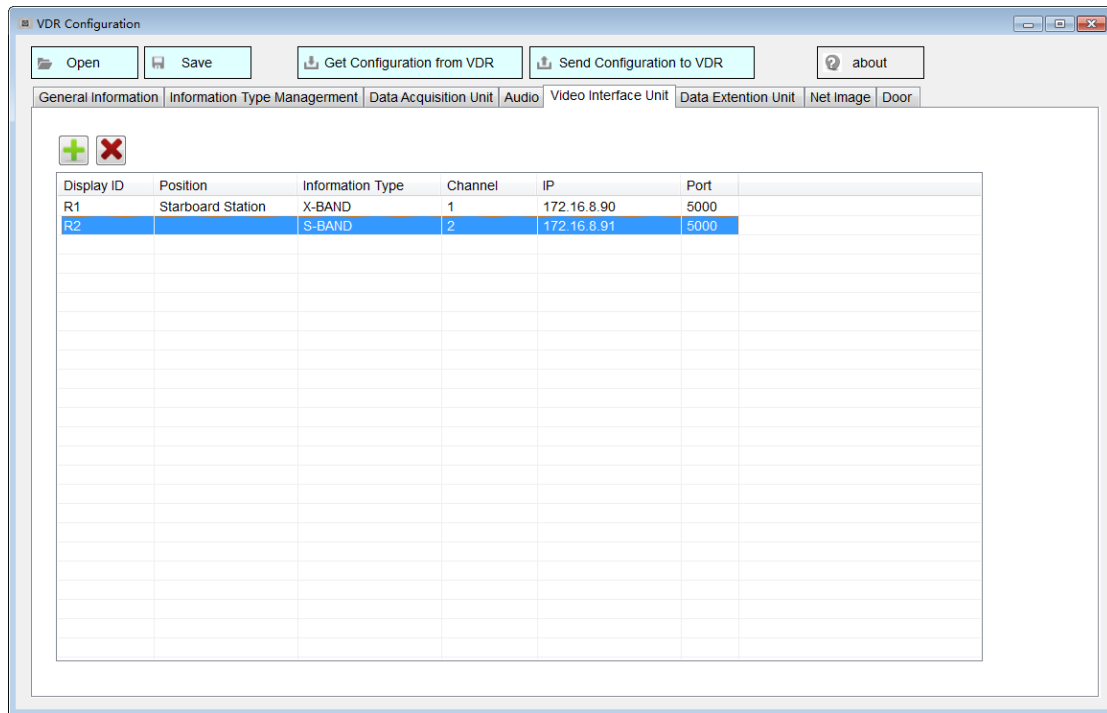
NEB-2000C-VDR Float-Free Capsule (FFC) complies with IMO MSC.471(101), ITU-RM.633-3:2004, IEC61097-2, and IEC61096-7 regulations and requirements. Its memory capacity of 64GB can support more than 48 hours of recorded data. The internal battery (NBT400) can keep the FFC/EPIRB transmitting on 406MHz/121.5MHz/AIS for at least 168 hours.



1.3.7 Video Interface Unit (VIU)

The NVR9004 Video Interface Unit (VIU) converts a VGA signal into an Ethernet signal. The VGA input supports high-definition resolution up to 1920 x 1080.





VIU NVR9004-1 supports one video channel, while VIU NVR9004-2 supports two video channels.

Four channels can be configured to support up to 4 IP addresses: 172.16.8.90, 172.16.8.91, 172.16.8.92, and 172.16.8.93, along with Port 5000.

If only two channels are used, the IP will be 172.16.8.90 and 172.16.8.91.

2. OPERATION

2.1 Power On/Off



NOTICE

In accordance with IMO regulations, the VDR shall be kept operational at all times and be powered off only for maintenance purposes.



- **Power On:**

Use the key to open the Data Acquisition Unit door. The AC power switch and the battery power switch are located in the top-right corner.

Turn on the AC power switch before turning on the battery switch in the respective sequence to start up the VDR system. The VDR will run its startup process for about 1 minute.

NOTE:

AC220V/AC110V is the main supply for the VDR system. When it is missing, the internal backup battery will automatically take over to provide the required power.

- **Power Off:**

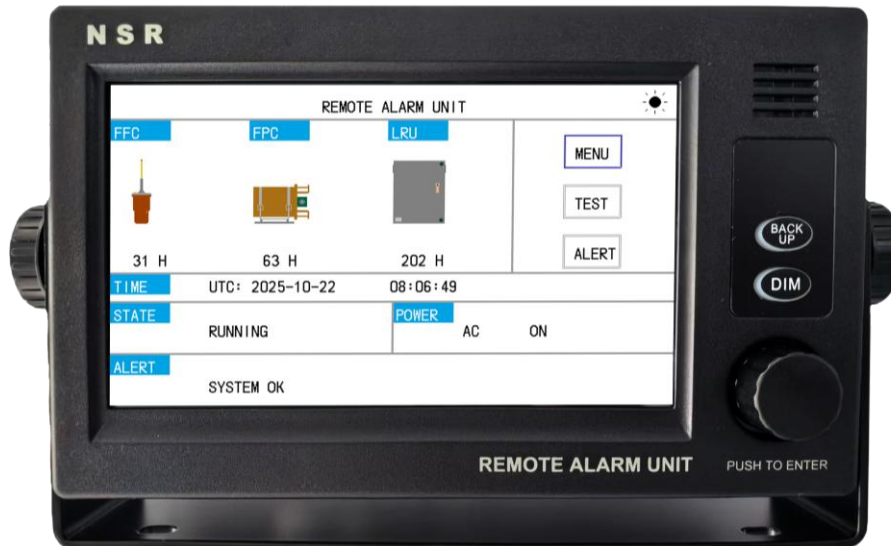
To power off the VDR system, first switch off the battery power, then switch off the AC power switch.

NOTE:

Improperly switching off the sequence may cause the VDR to malfunction.

2.2 Operation of RAU

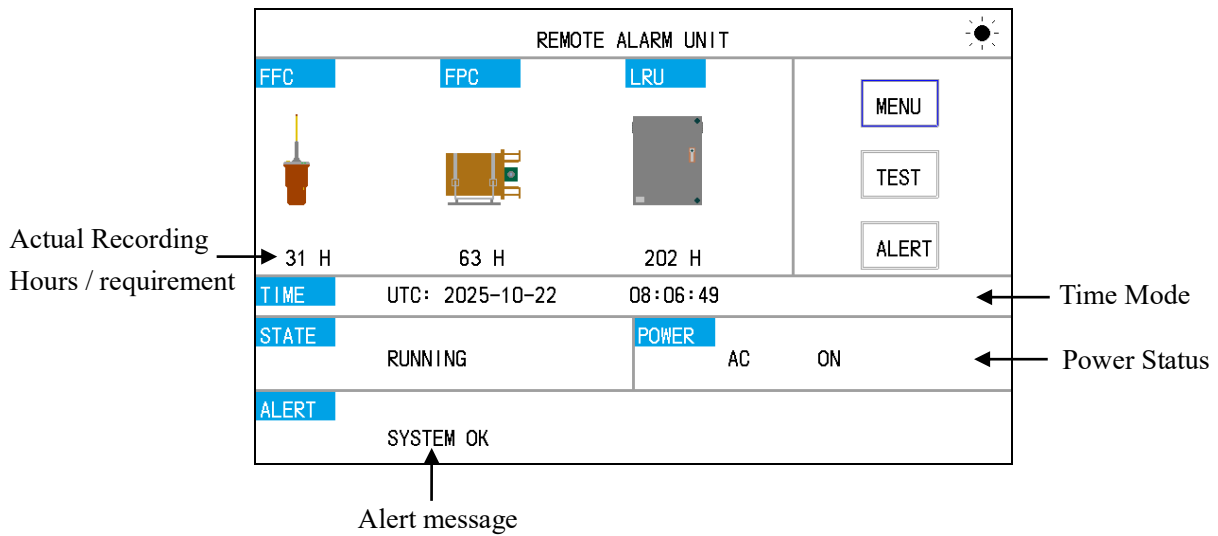
The Remote Alarm Unit (RAU) can be operated by key & knob on panel or touch-screen.



When operating with knob, move the knob to select an item on screen and press the knob to confirm the selection.

Panel Button	Description
	Revolving around to select the item. Press down to confirm the selection or input.
BACK UP	Backup menu; Press to go to the backup interface.
DIM	Brightness key for LCD brightness control.
Touch-screen Button	Description
MENU	Menu - Enter the Menu, and use as delete button in the input option.
TEST	Call system performance test.
ALERT	Enter the alert list

2.2.1 Screen Components



Item	Symbol	Meaning
Time Mode	UTC	UTC
	LMT	Local time
State Status	RUNNING	Normal status
	BACKUPING	Back up status
	Stop	Stop status
Power Status	AC	Powered by AC supply
	DC	Powered by internal backup battery
Alert Message	SYSTEM OK	System run without alert
	Alert	Alert generate
	(Please refer to Annex A for more information.)	

2.2.2 Screen dimmer

There are two ways to adjust the brightness and contrast of the LCD.

- ① Adjust the brightness in the [SYSTEM SETTING] -> [DISPLAY SET].

[DISPLAY SET]	
LCD/KEY DIMMER	2
DISPLAY MODE	DAY
TIME MODE SET	UTC
TIME ZONE SET	+08:00
BACK	

② Press the **DIM** button to adjust the brightness.

NOTE:

When the power is turned off, the last brightness setting is stored. Therefore, when the power is turned on again, the screen will display at the last brightness level before being powered off.

2.3 Normal Operation

Under Normal operation, the operator can:

- View VDR setting
- Initiate Self-test

2.3.1 System Status

Click **[MENU]** item to view the **[SYSTEM STATUS]**.

[MAIN MENU]
SYSTEM STATUS
DATA BACKUP
ALERT LIST
SYSTEM SETTING
DIAGNOSTICS
SERVICE
EXIT MENU

VIEW SYSTEM STATUS

[SYSTEM STATUS]										
NO.	01	02	03	04						BACK
VIU	0	0	-	-						
NO.	01	02	03	04	05	06	07	08		
MIC	0	-	0	-	0	-	0	-		
NO.	01	02	03	04	05	06	07	08		
COM	0	-	-	-	-	-	-	-		
NO.	01	02	03	04	05	06	07	08		
DAU	0	X	X	-	-	-	-	-		

-:NO USE O: NORMAL X: ABNORMAL

VIU: Status of Video Acquisition Unit

MIC: Status of Microphone channels

DAU: Status of Data Acquisition Unit

DEU1: Status of Data Extension Unit 1

Status Indication:

- : Related recording function of the channel is not in use.

O : Related recording function of the channel is normal.

X : Related recording function of the channel is abnormal.

2.3.2 Data Backup

This function is used to back up the stored data in the VDR to the USB memory in the DAU.

Choose the data source among LRU/FFC/FPC to be backed up. And set the time interval to 1h/2h/12h.

Click “START” to start backing up the stored data.



[DATA BACKUP]	
TYPE	LRU
TIME	1H
START	
BACK	

2.3.3 Alert List

VDR generates an alert in the “Alert column” of the main screen when it detects a situation that requires attention. All possible alerts are listed in Annex A.

REMOTE ALARM UNIT			
FFC	FPC	LRU	
			<div style="border: 1px solid gray; padding: 2px; margin-bottom: 2px;">MENU</div> <div style="border: 1px solid gray; padding: 2px; margin-bottom: 2px;">TEST</div> <div style="border: 1px solid gray; padding: 2px;">ALERT</div>
57 H	57 H	387 H	
TIME	UTC: 2021-09-28		08:12:18
STATE	RUNNING		POWER
			AC ON
ALERT	<div style="display: flex; align-items: center;"> <div style="margin-right: 5px; color: yellow;">!</div> <div style="margin-right: 5px;">1 / 1</div> <div style="margin-right: 5px;">3009:021</div> <div> <p>DEU1 LOST</p> <p>Check DEU1 and LAN cable</p> </div> </div>		

There are two ways to enter the Alert list.

- 1) Click [ALERT] in the main screen;
- 2) Select [ALERT LIST] at [MENU].

[ALERT LIST]			
ID	TIME	ALERT-DESCRIPTION	1 / 11
>!	3003	07:44 NET IMAGE4 LOST	
!	3003	07:44 NET IMAGE3 LOST	
!	3003	07:44 NET IMAGE2 LOST	
!	3003	07:44 NET IMAGE1 LOST	
!	3003	07:41 DAU COM8 LOST	
!	3003	07:41 DAU COM7 LOST	
!	3003	07:41 DAU COM6 LOST	
!	3003	07:41 DAU COM5 LOST	

VIEW

TOP

LOG

BACK

Select a alert and click **[VIEW]** to check more information

[ALERT VIEW]	
ID	3003 : 060
CATEGORY	B
PRIORITY	CAUTION
STATE	ACTIVE
TEXT	DAU COM6 LOST Check device on DAU COM6
BACK	

Click **[LOG]** to check alert history

[ALERT LOG]				
ID	TIME	ALERT-DESCRIPTION	1 / 10	
> ! 3003	07:25	DAU COM6 LOST		<div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">BACK</div>
! 3003	07:25	DAU COM5 LOST		
! 3003	07:25	DAU COM4 LOST		
! 3003	07:25	DAU COM3 LOST		
3003	07:17	DAU COM1 LOST		
3009	07:17	UTC LOST		
! 3003	---:--	DAU COM1 LOST		
! 3009	---:--	UTC LOST		

2.3.4 System Setting

[SYSTEM SETTING]	
KEY BUZZER	ON
KNOB BUZZER	OFF
LANGUAGE	ENG
BAM PORT	38400
DISPLAY SET	
DATE/TIME SET	
BACK	

2.3.4.1 KEY BUZZER

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

2.3.4.2 KNOB BUZZER

Click the [KNOB BUZZER] to switch the knob buzzer on or off.

2.3.4.3 LANGUAGE

The default menu language is English.

2.3.4.4 BAM PORT

Click the [BAM PORT] to change the baud rate of the BAM interface

2.3.4.5 DISPLAY SET

Click [DISPLAY SET] to modify the dimmer and display mode.

2.3.4.6 DATE/TIME SET

By setting the [DATE/TIME SET], set the current date and time.

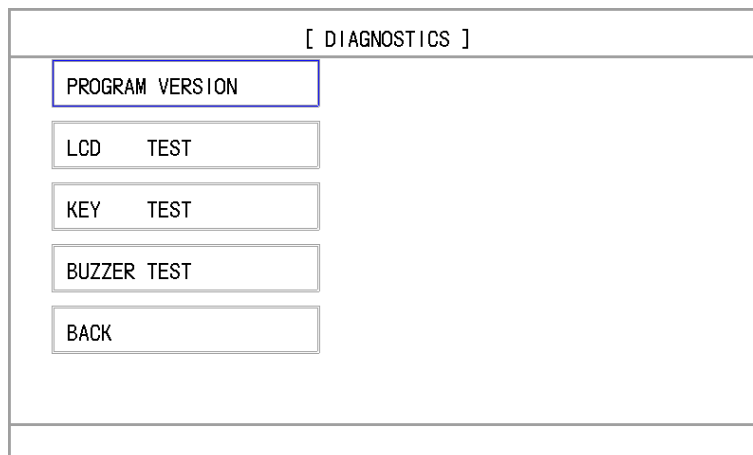
NOTE:

When GPS is connected to VDR, the current time will be updated by GPS data.

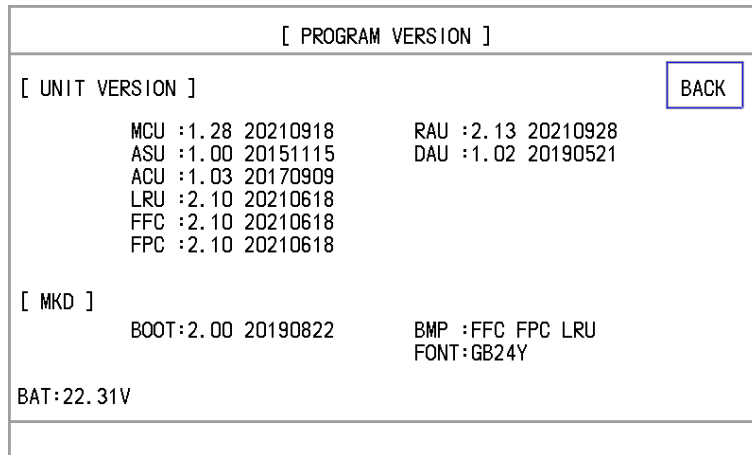
2.3.5 Diagnostics

2.3.5.1 PROGRAM VERSION

It is to check the software versions at [DIAGNOSTICS] menu.



The following screen will be displayed.



2.3.5.2 LCD TEST

Press **[DIM]** to test the Display Brightness.

2.3.5.3 KEY TEST

When any key is clicked, the box corresponding to the key will be filled with a blue color.

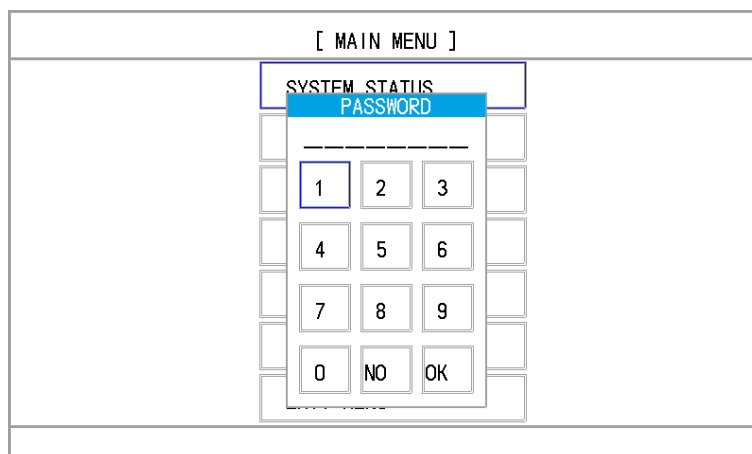
Press **[EXIT]** 3 times consecutively to return to a higher menu.

2.3.5.4 BUZZER TEST

It is to check the buzzer at **[DIAGOSTICS]** menu.

2.3.6 Service

[SERVICE] is for service engineers.



2.3.6.1 RECORD DATA

Click to stop/start recording data.

[SERVICE]	
<input style="width: 100%;" type="button" value="RECORD DATA"/>	START
<input style="width: 100%;" type="button" value="ADVANCED"/>	
<input style="width: 100%;" type="button" value="COM MONITOR"/>	
<input style="width: 100%;" type="button" value="FACTORY SET"/>	
<input style="width: 100%;" type="button" value="BACK"/>	

2.3.6.2 COM MONITOR

It is used to check the communication sentences on the I/O ports.

[COM MONITOR]	
<pre> \$VRALR:013155.056,A,Y,DAU COM02 LOST*67 \$VRALF:2.12,013155.00,B,C,R,,3003.56,5.0,DAU COM2 LOST*1E \$VRALF:2.12,013155.00,B,C,R,,3003.56,5.0,Check device on DAU COM2 *0B \$VRALR:013155.057,A,Y,DAU COM03 LOST*67 \$VRALF:2.13,013155.00,B,C,R,,3003.57,5.0,DAU COM3 LOST*1F \$VRALF:2.13,013155.00,B,C,R,,3003.57,5.0,Check device on DAU COM3 *0R \$NSUTC:210809.032650*5F \$NSTIM:UTC*23 </pre>	<input style="width: 100%;" type="button" value="BACK"/>

2.3.6.3 Factory Set

It is used to restore the system setting to factory settings.

[FACTORY SET]	
<p style="color: red;">System will be restored factory set?</p>	
<input style="width: 50px; height: 20px;" type="button" value="BACK"/>	
<input style="width: 50px; height: 20px;" type="button" value="YES"/>	

NOTE: Please remember that all settings will be cleared if this function is executed.

2.3.6.4 Reboot

Click “REBOOT” to reboot the remote alarm unit.

2.4 System Performance Test

Click “TEST” to initiate the system performance test. The system performance test checks the power supplies, microphones, image, and data recording functions. It generates a test report, restores data from the FPC/FFC/LRU, and saves it to the USB memory in the DAU.

3. DATA RECORDING UNITS



NOTICE

A portable USB disk in the NVR-9000 is a mandatory peripheral for the proper operation of the VDR system.

Removal, stealing, unauthorized possession, or illegal use of the disk drive is strictly prohibited.

3.1 Backup of Recorded Data

When required to back up the last recorded data, it can be manually saved to a USB flash drive. The USB flash drive is installed in the Data Acquisition Unit.



Follow the steps below to back up the data.

- Press the “Backup” button on the Remote Alarm Unit, and the backup menu will pop up.
- Select a backup source.
 - LRU: Long-Term Recording Unit
 - FFC: Float-Free Capsule
 - FPC: Fixed Protective Capsule
- Select the period of the recorded data to be backed up.
 - Period of recorded data: last 1 hour, 2 hours, or 12 hours of data
- Initiate the backup process. Normally, it will take about ten minutes to back up one hour of data.
 - When the backup is completed, the RAU displays “Backup Finish” for several seconds.

3.2 Long-Term Recording Unit (LRU)

The Long-Term Recording Unit (LRU) is installed inside the Data Acquisition Unit (DAU). It is labeled as LRU within the NVR9001 DAU.

For the NVR-9000 VDR, the LRU has a memory size of 512GB. Before abandoning ship, the recorded data can be manually saved to a USB flash drive or just take away the LRU (SSD) instead. The LRU (SSD) can be physically removed from the Data Acquisition Unit by following the below procedure.

- 1) Open the door of the Data Acquisition Unit. The LRU is located at the top right corner and is identified with the marking “LRU”.
- 2) Loosen the bolts on the left and right handles.
- 3) Draw out the LRU (SSD) from the Data Acquisition Unit.



NOTE:

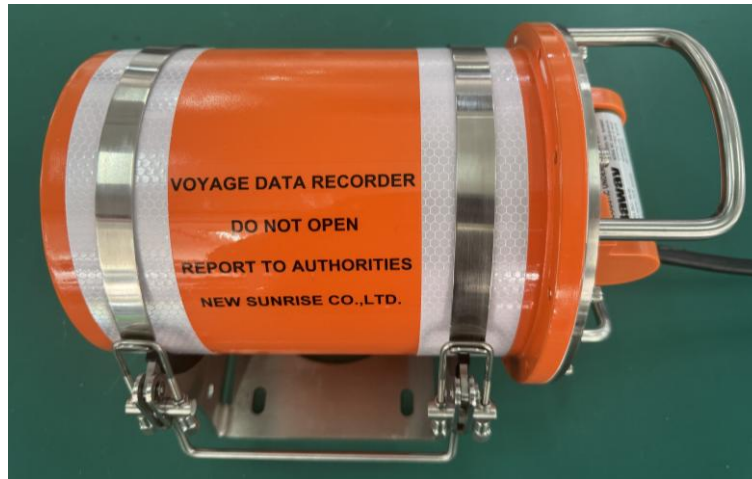
According to IMO regulation, an LRU is not required for an S-VDR. But an LRU with 64GB SSD is typically equipped in the DAU of NVR-9000S S-VDR.

3.3 Float-Free Recording Capsule (FFC)

For details, please refer to the User's Manual of NEB-2000C-VDR.

3.4 Fixed Protective Capsule (FPC)

A Fixed Protective Capsule (FPC) can be released by the steps below:



Step 1: Find the drawbar in the photo below.



Step 2: Pull out the drawbar to release the two belts.



Step 3: Lift the FPC by two handles.

4. DATA PLAYBACK

NVR-9000 Playback software is supplied together with the equipment. The package, which is located behind the door of the Data Acquisition Unit, contains:

- CD containing the playback software
- Introduction of the playback operation
- 3m length of LAN cable

Before installing the playback application, ensure that the computer for playback meets the minimum system requirements. Copy the software to the computer where the playback shall operate. Double-click the “NVR-9000 Playback Software” icon to start the application. If the recorded data has been copied to the computer, it can be played back directly. If the data has not been downloaded, connect the playback computer to the VDR using an LAN cable, attaching it to the “DATA” Ethernet port on the Data Acquisition Unit to download the data.

4.1 Set up the Playback Computer

Computer requirements (minimum):

RAM: minimum 2.00GB

Hard disk: minimum 100G

Processor: Intel Core 2 or higher

OS: Windows 10/7/2000/XP

After connecting with the VDR, set up the IP address in the network configuration on the computer as follows:

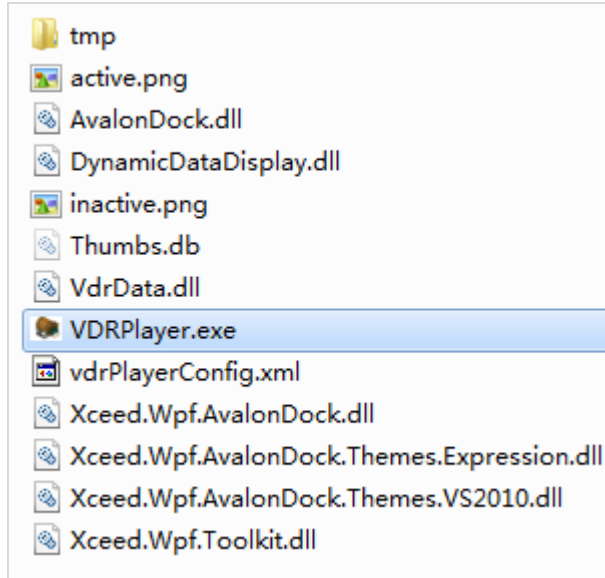
IP Address: 172.16.8.175

Subnet Mask: 255.255.0.0

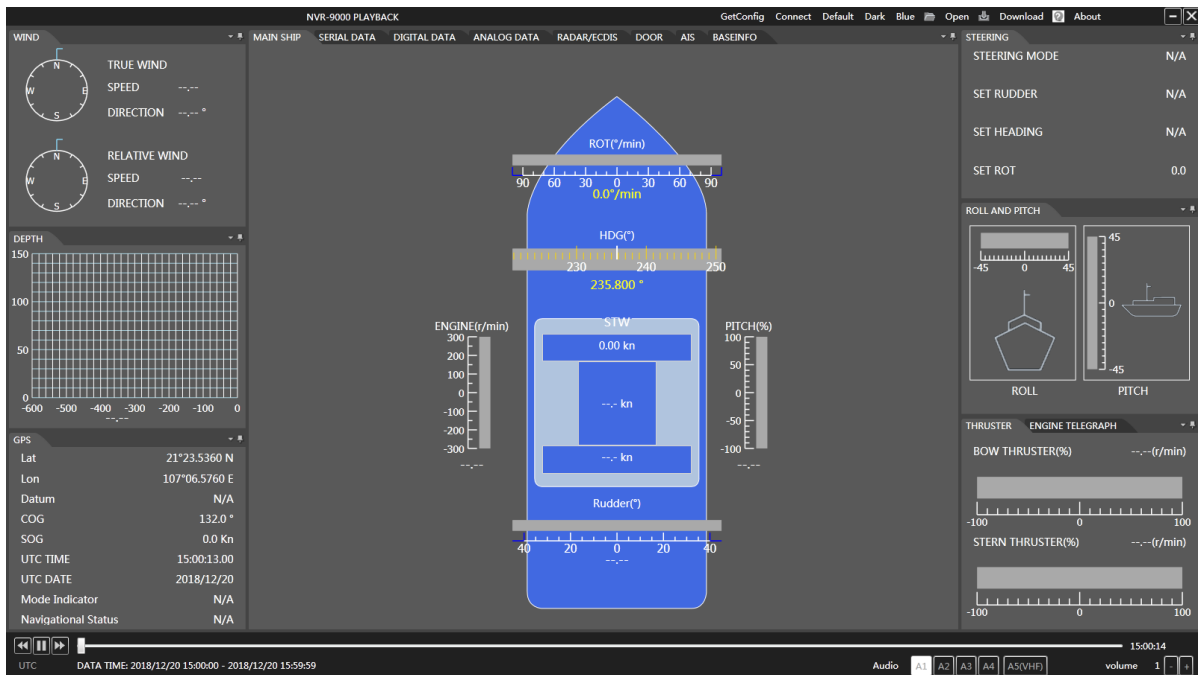
Gateway: 172.16.8.1

4.2 Run the Playback Software

After installing the playback software, click on the “VDRPlayer.exe” file in the playback software.



The playback page will appear in the next window:



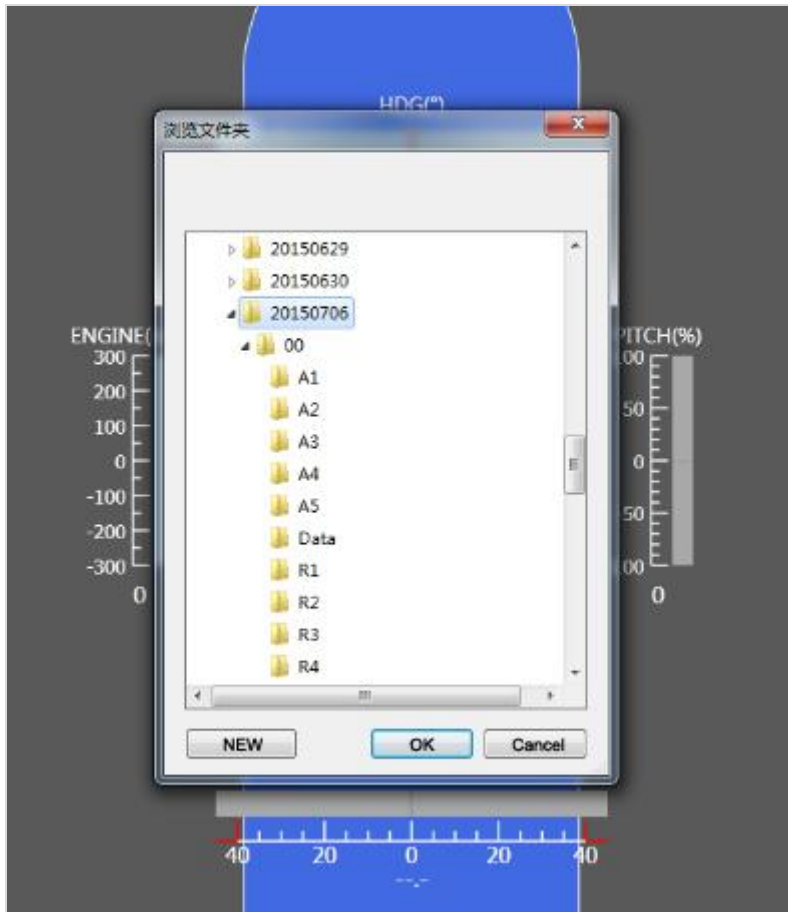
The “Open” and “Download” menus are located on the top right corner of the page.

Download: Download data to the desired directory.

Open: Open the data in the selected directory.

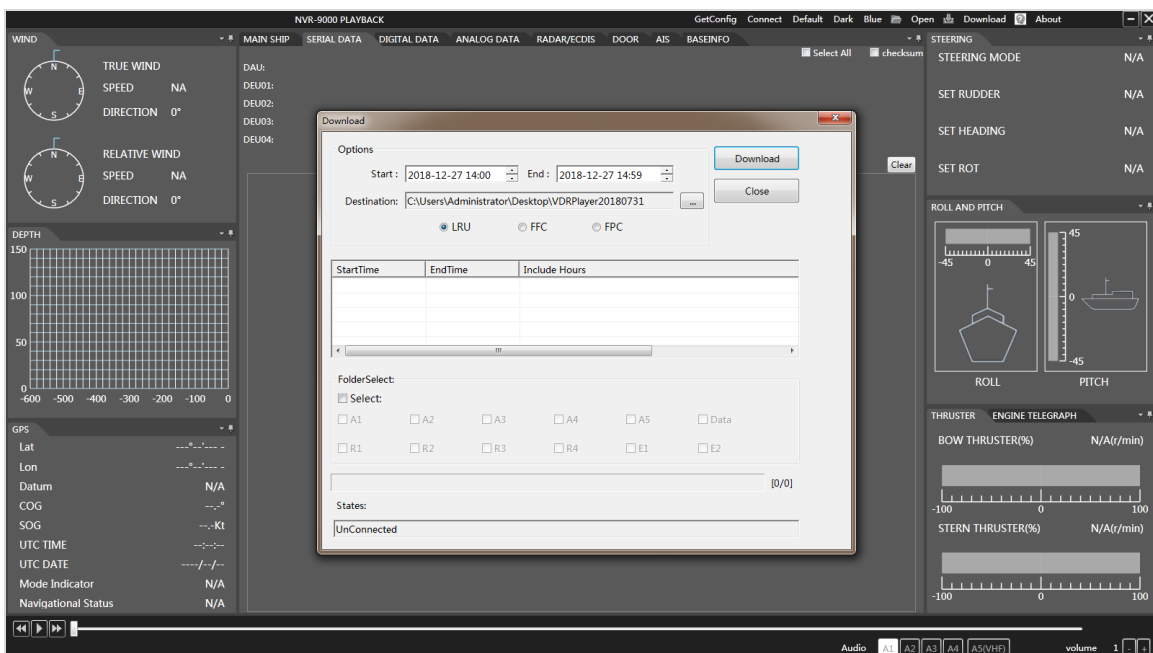
Data folder Format: YYYYMMDD (example: 20150706).

It is recommended to open no more than an hour of recorded data when accessing a data file.



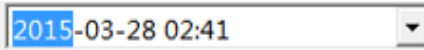
4.3 Download the Data

Click on the DOWNLOAD menu, and the following page will be displayed.

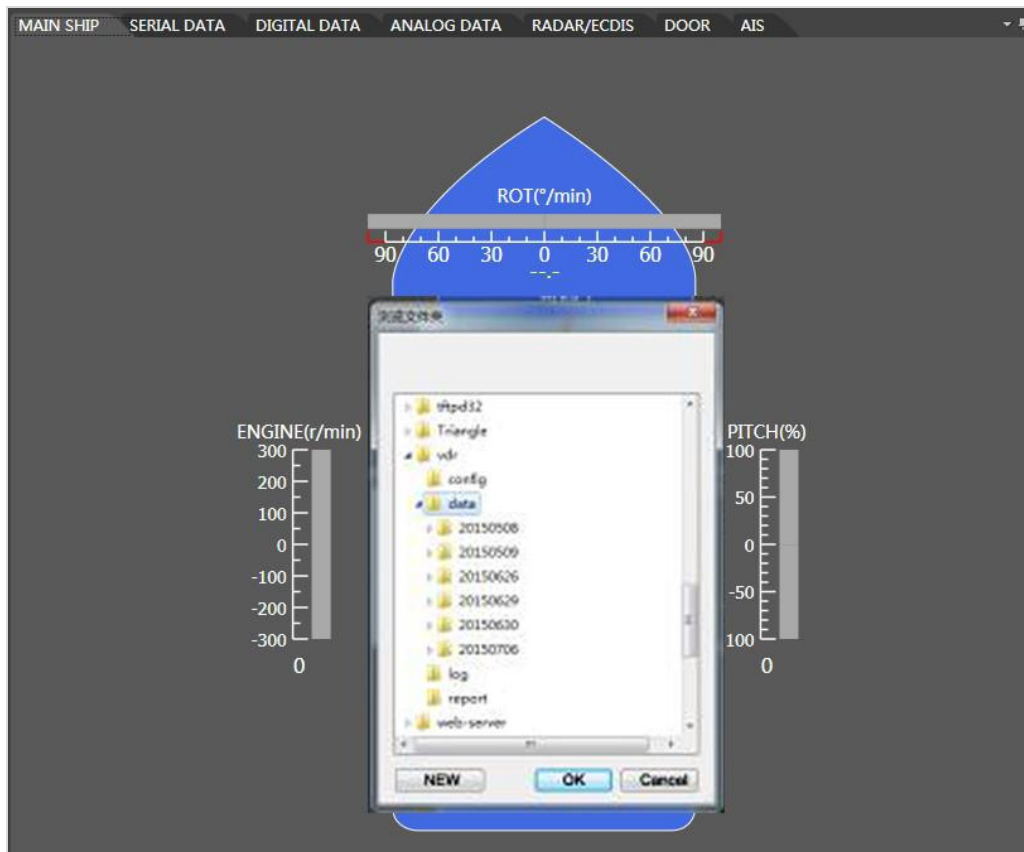


- 1) Set the Start date and time for the data to be downloaded.
- 2) Set the End date and time for the data to be downloaded.
- 3) Select Data source from:
 - Float-Free Capsule (FFC);
 - Fixed Protective Capsule (FPC); or
 - Long-Term Recording Unit (LRU).
 It is recommended to download from Float-Free Capsule (FFC).
- 4) Save data in the desired file directory.





Download Procedure:

- 1) Enter the start and end date and time of the record to be downloaded in the  window.
- 2) Select the destination file in which the data is to be stored
- 3) Click on the Download button to start the download
- 4) Open the data file after the download is complete.

4.4 Open the Data File



When the data has been downloaded or saved in the destination file, the playback procedure as follows:

- 1) Click on OPEN menu;
- 2) Choose the File to be playback. (File name format: YYYYMMDD), click on OK;
3. Click on  to playback the data;
4. Click on  or  to reverse or forward the playback;
5. Click on  bar to move to playback the desired time of record.
6. To playback a certain selected audio communication channel, click on



The highlighted channel is the selected channel for playback. Only one audio communication channel can be playback at a time.

4.5 Playback Operation Menu

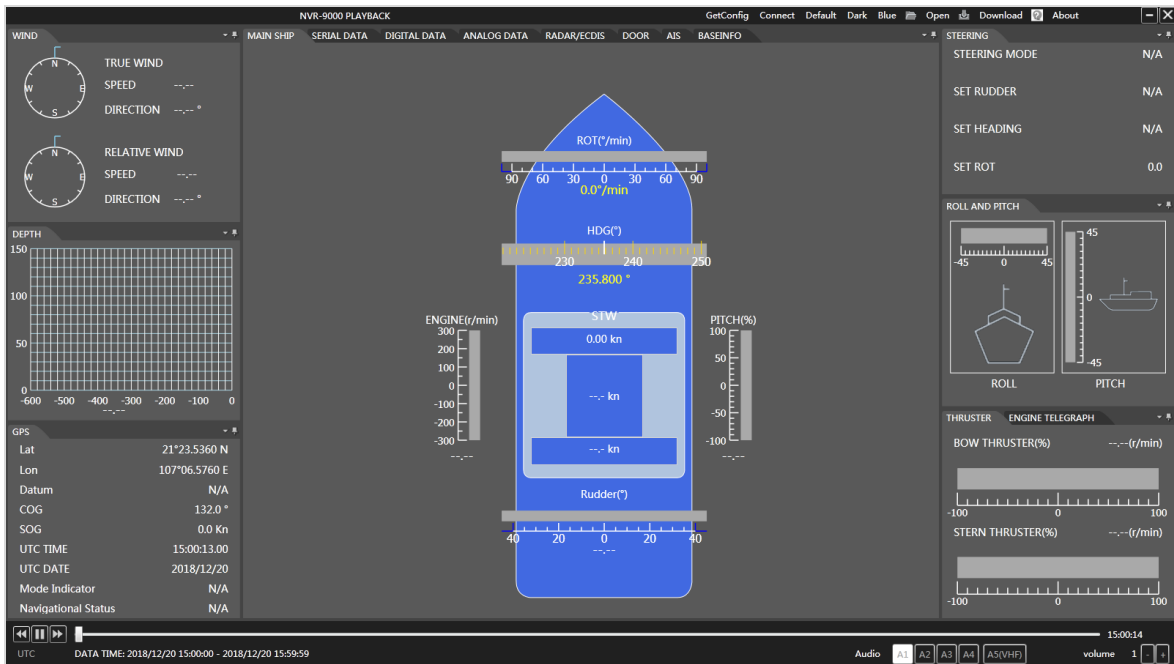
Open a data file:	 Open
Download a data file:	 Download
Help menu:	 About
Data playback period:	DATA TIME: 2015/5/8 0:00:00 - 2015/5/8 0:59:59
Select Audio Channel:	Voice CH1 CH2 CH3 CH4 VHF
Main Interface page:	MAIN SHIP
IEC 61162 Serial Data:	SERIAL DATA
Digital Data:	DIGITAL DATA
Analog Data:	ANALOG DATA
Displays Radar Image/ECDIS:	RADAR/ECDIS
Door Info:	DOOR
AIS:	AIS

4.5.1 Main Interface

The Main Interface page displays the following standard information:

- GPS
- Wind
- Depth
- Heading
- Speed
- Rudder
- Steering Order and Response
- Engine Order and Response
- Thruster
- Roll

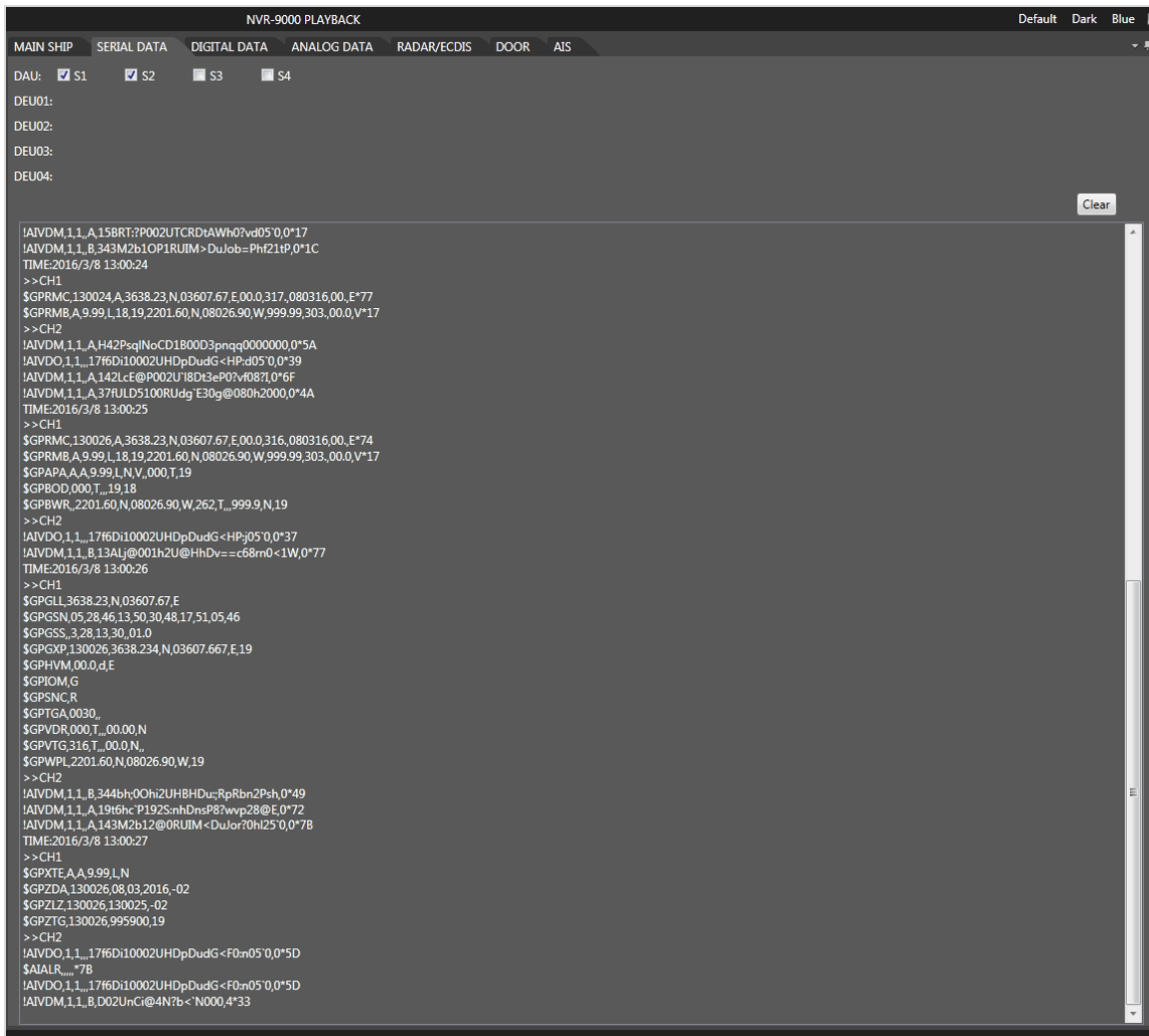
For a customized display, please contact the NSR service department with your requirements.



4.5.2 Serial Data

The Serial Data interface page displays the status of the serial channel according to the IEC61162 format in compliance with IMO requirements. Click on the desired channel to display its status during the period of playback.

VDR	VDR Player
	Serial Data
DAU COM1~COM8	S1~S8
DEU1 COM1~COM16	S9~S24
DEU2 COM1~COM16	S25~S40
DEU3 COM1~COM16	S41~S56
DEU4 COM1~COM16	S57~S72

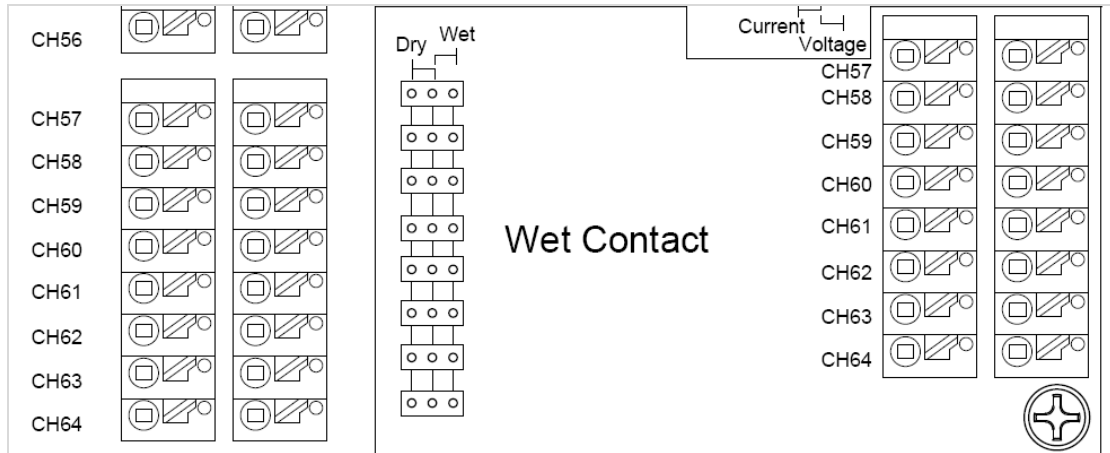


4.5.3 Digital Data

Digital Data records changes in state, using 0 and 1 to indicate the meaning of each status.

Switch "1" represents the input of the closed state (dry contact) and high level (wet contacts). At this moment, the LED on the board next to the switch interface is bright.

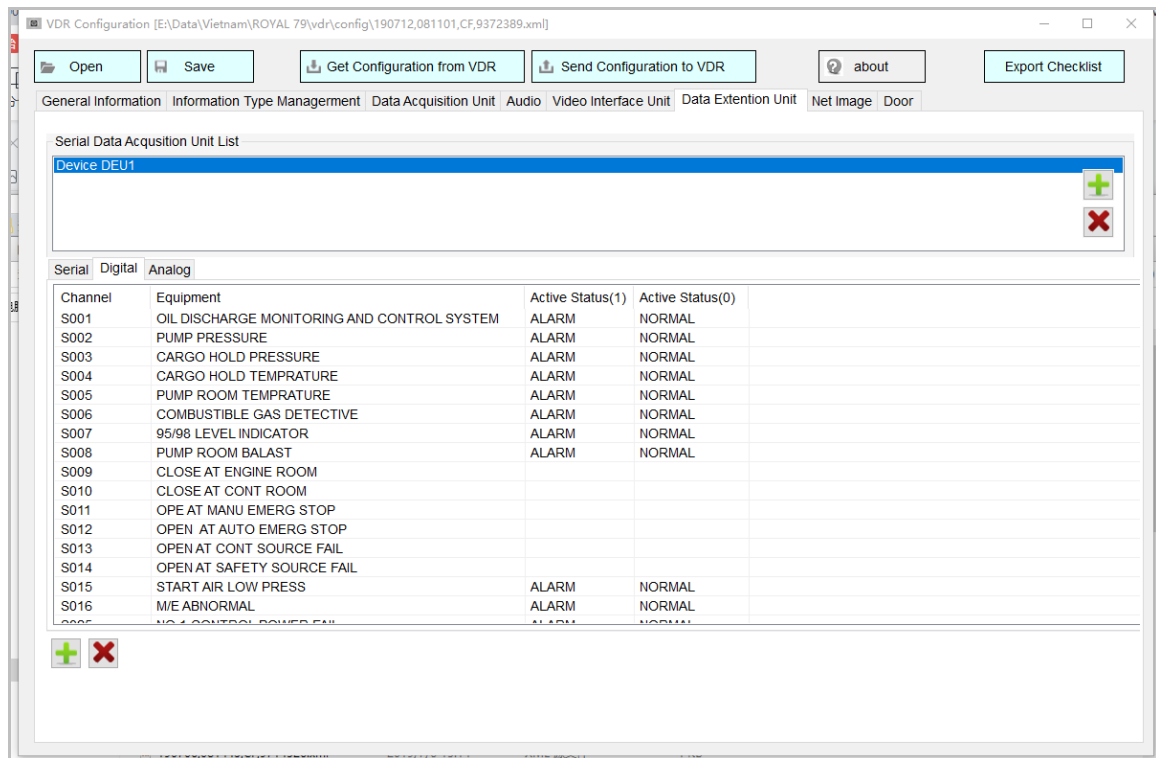
Switch "0" represents the open circuit state (dry contact) and low level (wet contact). At this time, the LED on the board next to the switch interface board is off.



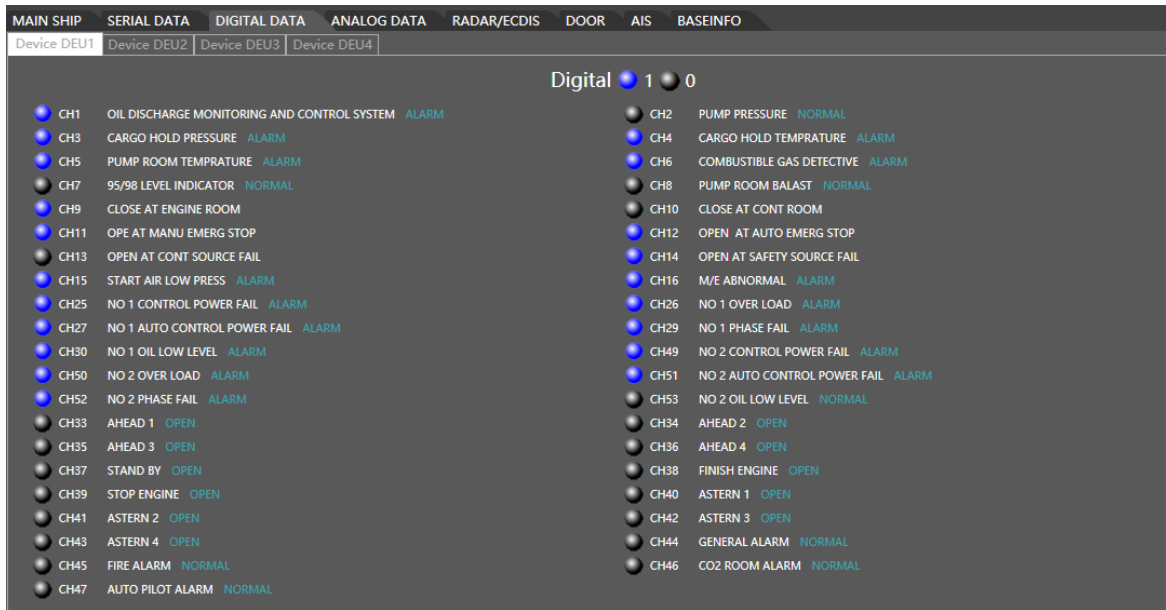
The CH57-CH64 switch can be configured as either a dry or wet contact. The configuration is done via the jumper on the circuit board.

"1" and "0" represent the state, which the user can customize according to the specific circumstances.

Configuration software:

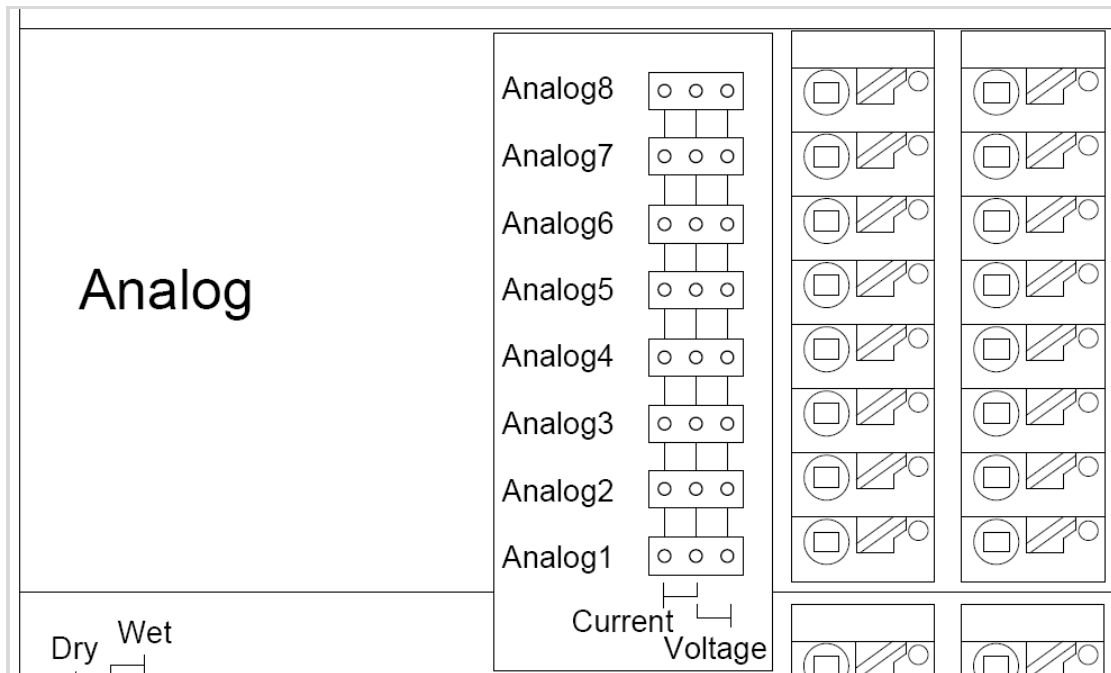


In the VDR Player:



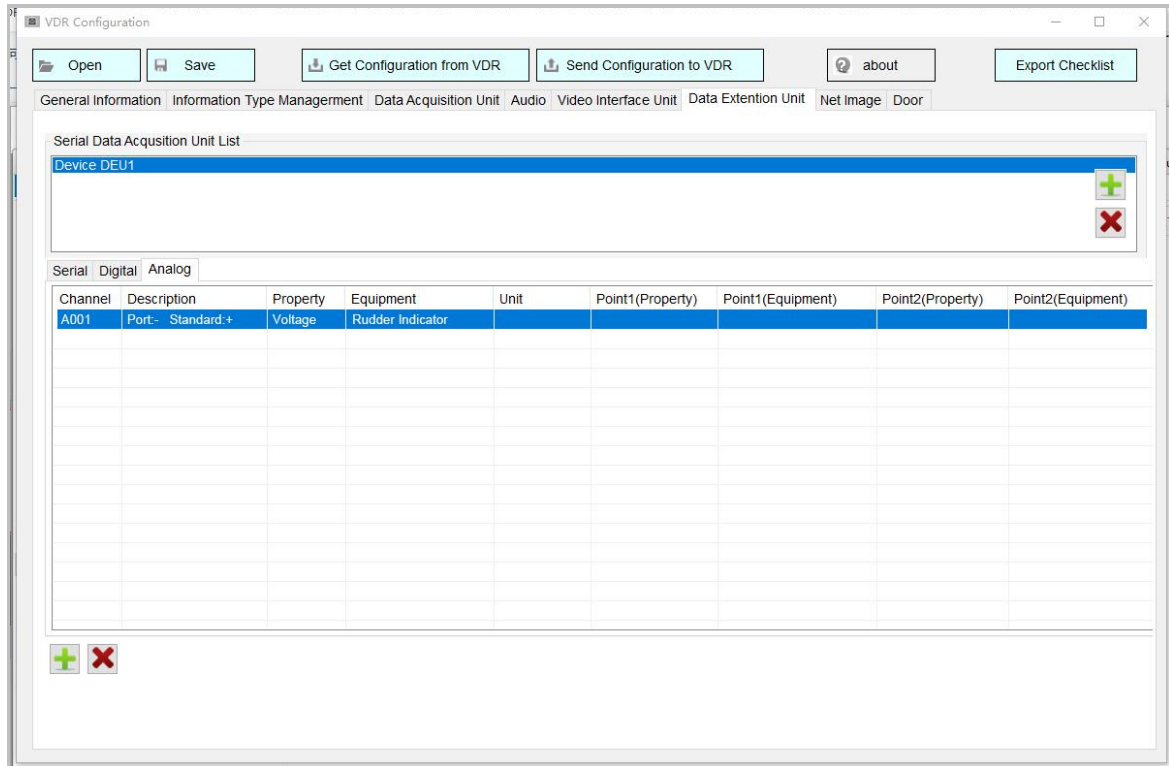
4.5.4 Analog Data

Analog Data displays the status of the analog signals. Analog Data includes Point Value, Property (Voltage and Current), Value, and Unit.



The amount of species simulated by the jumper cap to select input can choose Current or Voltage.

Configuration software:



Below the Analog table, there are Channel, Description, Property, and so on.

- **Channel:** Corresponding to the A001-A008 DEU expansion box. (Note: Because the analog interface in the expansion enclosure is only 8, please don't add more than 8 devices.)
- **Description:** The details of the collection information are in the description item.
- **Property:** Choose current or voltage in the property. Voltage (the default unit is V), Current (the default unit is mA).
- **Unit:** Actual unit of equipment. Such as degree (°).
- **Equipment:** User-connected device.
- **Calibration Point 1, Calibration Point 1 Value, Calibration Point 2, Calibration Point 2 Value:** The purpose of analog calibration is to convert the analog quantity of the actual input to the physical quantity to be displayed.

For example:

A001 analog channel input ±10V (4~20ma) analog, playback displays the rudder blade angle, -10V (4mA) corresponding to the left 35°, 10V (20mA) corresponding to the right 35°. The unit is " ° ".

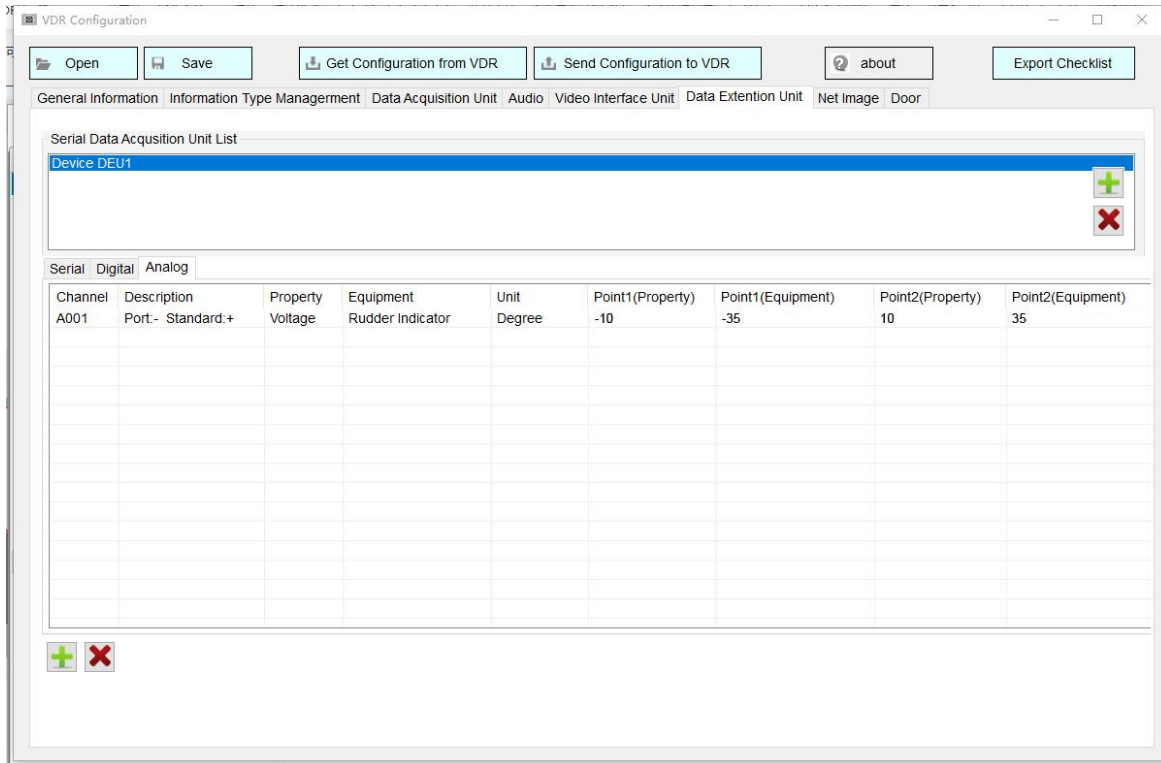
Input -10 in Calibration Point 1, input -35 in Calibration Point 1 Value.

Input 10 in Calibration Point 2, input 35 in Calibration Point 2 Value.

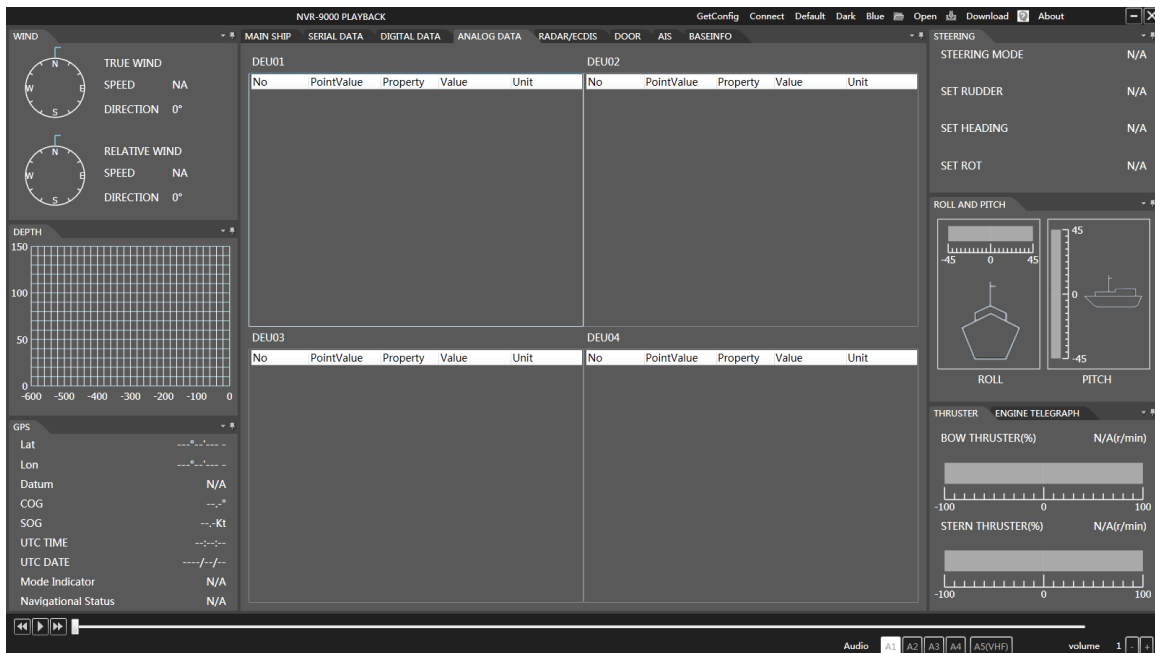
In an ideal situation, the playback interface will be following the acquisition of the value and the four points of the linear relationship between the received analog conversion to physical quantity for playback.

NOTE: Two sets of data must be filled in to be able to correct the real analog conversion; otherwise, the default values will be displayed as 0.

As shown below, Group A001 consists of two pairs: (-10, -35) and (10, 35).



In VDR, playback software is shown in Figure:



4.5.5 Radar/ECDIS Image

Radar/ECDIS is connected through VGA/NET.

- **VGA Image**

The VGA page displays the recorded image captured by VGA (VIU) during the period of playback. VGA images from 4 different equipment can be selected for playback. Only 1 VGA image is displayed at a time.

- **NET Image**

The Net Image playback page displays the captured image through the network (IEC61162-450) and information during the period of playback. Net images from 4 different equipment can be selected for playback. Only 1 Net image is displayed at a time.

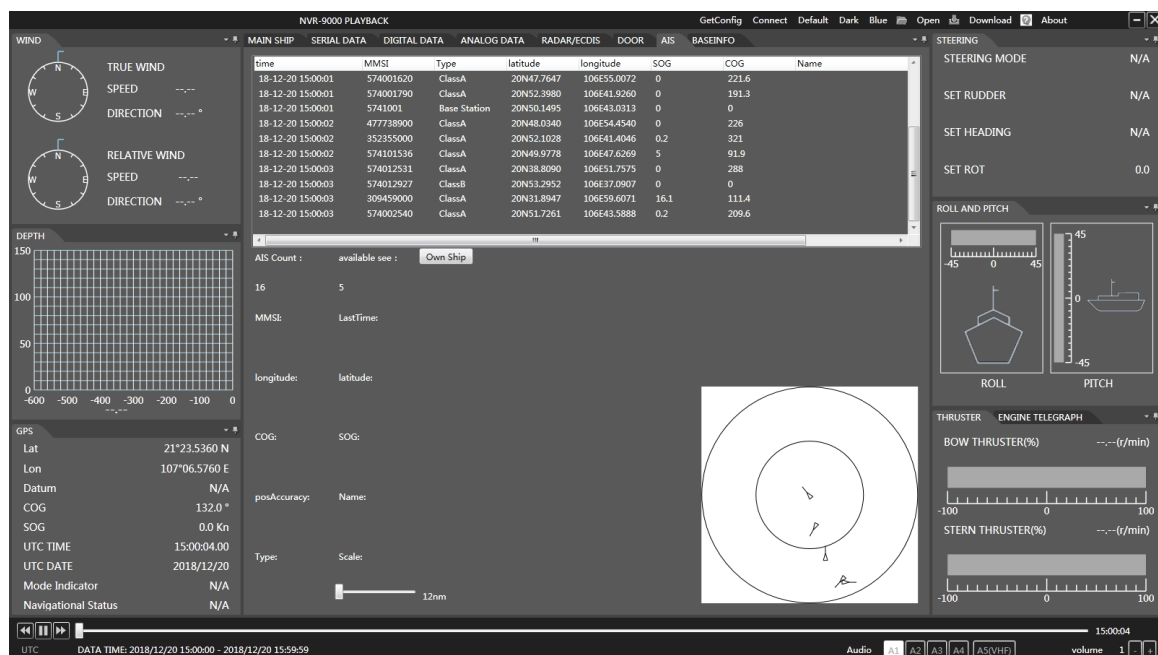
4.5.6 Door Status

The door page displays information about watertight door and fireproof door.

4.5.7 AIS

AIS messages will be listed on the page. And the relative position point on the AIS panel. When clicks the message or triangle, the AIS message detail will be shown.

In VDR, playback software is shown in Figure:



5. INTERFACE

The following data formats are accepted by the NVR-9000:

Data	NVR-9000
Date and Time	√
Ship's Position	√
Speed	√
Heading	√
Bridge audio	√
Communication audio	√
Radar	√
AIS	√
BNWAS	√
Echo sounder	√
ECDIS	√
Rolling Motion	√
Electronic Logbook	√
Main Alarms	√
Rudder order and response	√
Engine and thruster order and response	√
Hull openings status	√
Watertight and fire door status	√
Accelerations and hull stresses	√
Wind speed and direction	√
Any other equipment providing data in IEC61162 Format	√

Serial Data received by NVR-9000/NVR-9000S is in NMEA format as defined in the IEC61162 and IEC61996 standards.

Parameter to be Recorded	Sentence Format
Date and time	ZDA
Ship's position and datum used	GNS, DTM, GLL, GGA, RMC, NSR ^a
Speed (water and/ or ground)	VBW, VLW, VTG
Heading (true)	THS, HDT
Heading (magnetic)	HDG
Depth (echo sounder)	DPT
Alarms	ALR, ALA, FIR, WAT, ACM ^a , HBT, ALC ^a , ALF ^a
Rudder order/ response manual	HTC, HTD
Rudder order/ response automatic (heading or track control)	ETL, PRC, TRC, TRD, RPM, XDR, ROR, RSA
Engine order/ response	ETL, PRC, TRC, TRD, RPM, XDR, ROR, RSA
Hull openings, watertight doors	DOR, GEN, XDR
Accelerations and hull stress	HSS, XDR
Wind speed and direction	MWV, MWD
AIS	VDM, VDO, ALR
VDR alert output	ALC ^a , HBT

a: These sentences are described in IEC 62923.

6. MAINTENANCE

6.1 Fuse Replacement

After opening the DAU door, you will see the fuses behind it: 3A for the Battery and 5A for the AC power.

If the fuse is blown, select the correct fuse for replacement. Remove the front cover and the shelter on the PCB boards and find the Main Power or the BATT.

Push the head of the black column and spin it a bit; the fuse will come out.

Pull out the fuse, and put a new fuse back.

Insert the new fuse into the right place, and everything will be normal.



6.2 Consumable Parts

The lifetimes of consumable parts are as follows:

Location	Part Name	Part Type	Shelf Life	Service Life
NVR9001 DAU	Backup Battery	NBT900	1 year	4 years
NFP-2000C FPC	Acoustic Beacon	BC90	1 year	3 years
NEB-2000C-VDR FFC	FFC Battery	NBT400	1 year	5 years
	FFC Container Kit	NCC-100	1 year	2 years

It's very important to replace all the above parts supplied or made by NSR when they expire. **NSR guarantees the quality of NSR VDR only when original NSR parts are used.**

When the VDR was tested and type approved, all parts were integral parts of the VDR equipment. If a counterfeit part is used, this VDR equipment will automatically lose the guarantee of all type approval certificates unless all tests needed for type approvals have been done again for the unit installed with

the counterfeit part. Those tests and approval processes usually take 1-3 years and the cost shall be borne by the supplier or buyer of the counterfeit battery.

If a counterfeit part is used on NSR VDR, NSR will be exempted from the responsibility of warranty and other service guarantees. The counterfeit part will affect the VDR from operating properly when the unit is activated in an emergency. No CoC will be issued for APT on VDR installed with counterfeit parts.

The battery pack replacement should be performed by NSR, or the NSR-authorized VDR maintenance facility, or an NSR-authorized, trained and certified person.

WARNING

Batteries should have both terminals insulated before disposal, as any remaining power could cause severe harm to human safety. Local regulations should be followed when batteries are disposed of to protect the environment.

7. SPECIFICATIONS

7.1 Specifications

Item		Specification	
Data Acquisition Unit (DAU)	Interface	Ethernet IEC61162-450	4 ch
		Serial IEC61162-1/2	8 ch
		VHF Audio	2 ch
		Microphone	8 ch
		Remote Alarm Unit	1 ch
		USB	1 ch
	DC 24V output	Remote Alarm Unit (RAU)	1 ch
		Fixed Protective Capsule (FPC)	1 ch
		Float-Free Capsule (FFC)	1 ch
	LRU	Memory Size	512GB (VDR) 64GB (SVDR)
		Recording Duration	720 hours (VDR) 48 hours (SVDR)
Backup Battery Capacity		2 hours	
Fixed Protective Capsule (FPC)		Memory Size	64 GB
		Recording Duration	48 hours
		Beacon Battery Capacity	90 days
		Beacon Battery Life	3 years
Float-Free Capsule (FFC)		Memory Size	64 GB
		Recording Duration	48 hours
		Battery Capacity	168 hours
		Battery Life	5 years
Data Extension Unit (DEU)	Interface	Analog Input	8 ch
		Digital Input	64 ch
		Serial IEC61162-1/2	16 ch
		Ethernet	1 ch
Video Interface Unit (VIU)	Interface	VGA	1-2 ch
		Ethernet	1-2 ch
Remote Alarm Unit (RAU)	Interface	Serial IEC 61162-1/2, RS422	1 ch

7.2 Power Supply

Item	Specification
Data Acquisition Unit (DAU)	AC100V/220V, 0.5~1.5A, 50/60Hz
Data Extension Unit (DEU)	DC24V, 0.5A
Video Interface Unit (VIU)	DC24V, 0.3A

7.3 Equipment List

Part Type	Description	NVR-9000 VDR	NVR-9000S S-VDR
NVR9001	Data Acquisition Unit (DAU)	1 unit	1 unit
NVR9002	Data Extension Unit (DEU)	1 unit	Optional
NVR9003	Remote Alarm Unit (RAU)	1 unit	1 unit
NVR9004	Video Interface Unit (VIU)	0~4 channels (Optional)	0~4 channels (Optional)
NVR9005	Indoor Microphone Unit (IMU)	1~8 units	1~8 units
NVR9006	Outdoor Microphone Unit (OMU)		
NFP-2000C	Fixed Protective Capsule (FPC)	1 unit	1 unit
NEB-2000C-VDR	Float-Free Capsule (FFC)	1 unit	
NEB205	Junction Box for capsule (JBC)	2 units	1 unit

NOTE:

For S-VDR, either FPC or FFC can be selected.

ANNEX A ALERT LIST

Alert Identifier	Ins	Alert Title	Alert Description	Prio	Cat	Reason
3009	2	RAU LOST	Check RAU	C	B	DAU lost connection with RAU
3009	3	DAU LOST	Check DAU	C	B	RAU lost connection with DAU
3023	4	AC POWER LOST	Check AC power and switch	C	B	AC 110V/220V Lost
3023	5	BAT LOST	Check battery	C	B	Battery Voltage Lost
3023	6	BAT LOW	Check battery	C	B	Battery Voltage Low
3009	7	UTC LOST	Check GPS	C	B	UTC Source Lost
3009	8	USB RW FAIL	Check USB disk	C	B	USB Disk Read and Write Fail
3009	9	LOG W FAIL	Check MCU	C	B	MCU Write Log File Fail
3009	10	CONFIG R FAIL	Check MCU	C	B	MCU Write Config File Fail
3009	11	FPC LAN LOST	Check FPC LAN cable	C	B	FPC Lan Connection Lost
3009	12	FFC LAN LOST	Check FFC LAN cable	C	B	FFC Lan Connection Lost
3009	13	LRU LAN LOST	Check LRU LAN cable	C	B	LRU Lan Connection Lost
3009	14	FPC LOST	Check FPC	C	B	SSD of FPC Not Detected
3009	15	FPC LOW CAPACITY	Check FPC	C	B	Low SSD Capacity of FPC
3009	16	FFC LOST	Check FFC	C	B	SSD of FFC Not Detected
3009	17	FFC LOW CAPACITY	Check FFC	C	B	Low SSD Capacity of FFC
3009	18	LRU LOST	Check LRU	C	B	SSD of LRU Not Detected
3009	19	LRU LOW CAPACITY	Check LRU	C	B	Low SSD Capacity of LRU
3009	20	DAU COM LAN	Check NVR909 in DAU	C	B	Lost connection with NVR901
3009	21	DEU1 LOST	Check DEU1 and LAN cable	C	B	DEU1 Lan Connection Lost
3009	22	DEU2 LOST	Check DEU2 and LAN cable	C	B	DEU2 Lan Connection Lost
3009	23	DEU3 LOST	Check DEU3 and LAN cable	C	B	DEU3 Lan Connection Lost
3009	24	DEU4 LOST	Check DEU4 and LAN cable	C	B	DEU4 Lan Connection Lost
3009	25	VIU1 LAN LOST	VIU1 LAN LOST AT [Information type]	C	B	VIU1 Lan Connection Lost
3009	26	VIU2 LAN LOST	VIU2 LAN LOST AT [Information type]	C	B	VIU2 Lan Connection Lost
3009	27	VIU3 LAN LOST	VIU3 LAN LOST AT [Information type]	C	B	VIU3 Lan Connection Lost
3009	28	VIU4 LAN LOST	VIU4 LAN LOST AT [Information type]	C	B	VIU4 Lan Connection Lost
3003	29	VIU1 SAMPLE FAIL	VIU1 SAMPLE FAIL AT [Information type]	C	B	VIU1 Sample Image Fail
3003	30	VIU2 SAMPLE FAIL	VIU2 SAMPLE FAIL AT [Information type]	C	B	VIU2 Sample Image Fail
3003	31	VIU3 SAMPLE FAIL	VIU3 SAMPLE FAIL AT [Information type]	C	B	VIU3 Sample Image Fail
3003	32	VIU4 SAMPLE FAIL	VIU4 SAMPLE FAIL AT [Information type]	C	B	VIU4 Sample Image Fail
3003	33	DAU COM	Check DAU COM	C	B	DAU Com Port Connection Fail
3003	34	DEU1 COM	Check DEU1 COM	C	B	DEU1 Com Port Connection Fail
3003	35	DEU2 COM	Check DEU2 COM	C	B	DEU2 Com Port Connection Fail
3003	36	DEU3 COM	Check DEU3 COM	C	B	DEU3 Com Port Connection Fail
3003	37	DEU4 COM	Check DEU4 COM	C	B	DEU4 Com Port Connection Fail
3003	38	MIC FAIL	Check MIC	C	B	Microphone Fail

Alert Identifier	Ins	Alert Title	Alert Description	Prio	Cat	Reason
3009	39	ACU LOST	Check ACU in DAU	C	B	ACU Connection Lost
3009	40	ASU1 LOST	Check ASU1 in DAU	C	B	ASU1 Connection Lost
3009	41	ASU2 LOST	Check ASU2 in DAU	C	B	ASU2 Connection Lost
3009	42	ASU3 LOST	Check ASU3 in DAU	C	B	ASU3 Connection Lost
3003	43	NET IMAGE1 LOST	NET IMAGE 1 LOST AT [Information type]	C	B	Device on NET IMAGE1 is lost
3003	44	NET IMAGE2 LOST	NET IMAGE 2 LOST AT [Information type]	C	B	Device on NET IMAGE2 is lost
3003	45	NET IMAGE3 LOST	NET IMAGE 3 LOST AT [Information type]	C	B	Device on NET IMAGE3 is lost
3003	46	NET IMAGE4 LOST	NET IMAGE 4 LOST AT [Information type]	C	B	Device on NET IMAGE4 is lost
3003	47	MIC1 LOST	MIC1 FAIL AT [Location]	C	B	MIC1 LOST
3003	48	MIC2 LOST	MIC2 FAIL AT [Location]	C	B	MIC2 LOST
3003	49	MIC3 LOST	MIC3 FAIL AT [Location]	C	B	MIC3 LOST
3003	50	MIC4 LOST	MIC4 FAIL AT [Location]	C	B	MIC4 LOST
3003	51	MIC5 LOST	MIC5 FAIL AT [Location]	C	B	MIC5 LOST
3003	52	MIC6 LOST	MIC6 FAIL AT [Location]	C	B	MIC6 LOST
3003	53	MIC7 LOST	MIC7 FAIL AT [Location]	C	B	MIC7 LOST
3003	54	MIC8 LOST	MIC8 FAIL AT [Location]	C	B	MIC8 LOST
3003	55	DAU COM1 LOST	DAU COM1 [Information type] LOST	C	B	Device on DAU COM1 LOST
3003	56	DAU COM2 LOST	DAU COM2 [Information type] LOST	C	B	Device on DAU COM2 LOST
3003	57	DAU COM3 LOST	DAU COM3 [Information type] LOST	C	B	Device on DAU COM3 LOST
3003	58	DAU COM4 LOST	DAU COM4 [Information type] LOST	C	B	Device on DAU COM4 LOST
3003	59	DAU COM5 LOST	DAU COM5 [Information type] LOST	C	B	Device on DAU COM5 LOST
3003	60	DAU COM6 LOST	DAU COM6 [Information type] LOST	C	B	Device on DAU COM6 LOST
3003	61	DAU COM7 LOST	DAU COM7 [Information type] LOST	C	B	Device on DAU COM7 LOST
3003	62	DAU COM8 LOST	DAU COM8 [Information type] LOST	C	B	Device on DAU COM8 LOST
3003	63	DEU1 COM1 LOST	DEU1 COM01 [Information type] LOST	C	B	Device on DEU1 COM1 LOST
3003	64	DEU1 COM2 LOST	DEU1 COM02 [Information type] LOST	C	B	Device on DEU1 COM2 LOST
3003	65	DEU1 COM3 LOST	DEU1 COM03 [Information type] LOST	C	B	Device on DEU1 COM3 LOST
3003	66	DEU1 COM4 LOST	DEU1 COM04 [Information type] LOST	C	B	Device on DEU1 COM4 LOST
3003	67	DEU1 COM5 LOST	DEU1 COM05 [Information type] LOST	C	B	Device on DEU1 COM5 LOST
3003	68	DEU1 COM6 LOST	DEU1 COM06 [Information type] LOST	C	B	Device on DEU1 COM6 LOST
3003	69	DEU1 COM7 LOST	DEU1 COM07 [Information type] LOST	C	B	Device on DEU1 COM7 LOST
3003	70	DEU1 COM8 LOST	DEU1 COM08 [Information type] LOST	C	B	Device on DEU1 COM8 LOST
3003	71	DEU1 COM9 LOST	DEU1 COM09 [Information type] LOST	C	B	Device on DEU1 COM9 LOST
3003	72	DEU1 COM10 LOST	DEU1 COM10 [Information type] LOST	C	B	Device on DEU1 COM10 LOST
3003	73	DEU1 COM11 LOST	DEU1 COM11 [Information type] LOST	C	B	Device on DEU1 COM11 LOST
3003	74	DEU1 COM12 LOST	DEU1 COM12 [Information type] LOST	C	B	Device on DEU1 COM12 LOST
3003	75	DEU1 COM13 LOST	DEU1 COM13 [Information type] LOST	C	B	Device on DEU1 COM13 LOST
3003	76	DEU1 COM14 LOST	DEU1 COM14 [Information type] LOST	C	B	Device on DEU1 COM14 LOST
3003	77	DEU1 COM15 LOST	DEU1 COM15 [Information type] LOST	C	B	Device on DEU1 COM15 LOST
3003	78	DEU1 COM16 LOST	DEU1 COM16 [Information type] LOST	C	B	Device on DEU1 COM16 LOST

Alert Identifier	Ins	Alert Title	Alert Description	Prio	Cat	Reason
3003	79	DEU2 COM1 LOST	DEU2 COM01 [Information type] LOST	C	B	Device on DEU2 COM1 LOST
3003	80	DEU2 COM2 LOST	DEU2 COM02 [Information type] LOST	C	B	Device on DEU2 COM2 LOST
3003	81	DEU2 COM3 LOST	DEU2 COM03 [Information type] LOST	C	B	Device on DEU2 COM3 LOST
3003	82	DEU2 COM4 LOST	DEU2 COM04 [Information type] LOST	C	B	Device on DEU2 COM4 LOST
3003	83	DEU2 COM5 LOST	DEU2 COM05 [Information type] LOST	C	B	Device on DEU2 COM5 LOST
3003	84	DEU2 COM6 LOST	DEU2 COM06 [Information type] LOST	C	B	Device on DEU2 COM6 LOST
3003	85	DEU2 COM7 LOST	DEU2 COM07 [Information type] LOST	C	B	Device on DEU2 COM7 LOST
3003	86	DEU2 COM8 LOST	DEU2 COM08 [Information type] LOST	C	B	Device on DEU2 COM8 LOST
3003	87	DEU2 COM9 LOST	DEU2 COM09 [Information type] LOST	C	B	Device on DEU2 COM9 LOST
3003	88	DEU2 COM10 LOST	DEU2 COM10 [Information type] LOST	C	B	Device on DEU2 COM10 LOST
3003	89	DEU2 COM11 LOST	DEU2 COM11 [Information type] LOST	C	B	Device on DEU2 COM11 LOST
3003	90	DEU2 COM12 LOST	DEU2 COM12 [Information type] LOST	C	B	Device on DEU2 COM12 LOST
3003	91	DEU2 COM13 LOST	DEU2 COM13 [Information type] LOST	C	B	Device on DEU2 COM13 LOST
3003	92	DEU2 COM14 LOST	DEU2 COM14 [Information type] LOST	C	B	Device on DEU2 COM14 LOST
3003	93	DEU2 COM15 LOST	DEU2 COM15 [Information type] LOST	C	B	Device on DEU2 COM15 LOST
3003	94	DEU2 COM16 LOST	DEU2 COM16 [Information type] LOST	C	B	Device on DEU2 COM16 LOST
3003	95	DEU3 COM1 LOST	DEU3 COM01 [Information type] LOST	C	B	Device on DEU3 COM1 LOST
3003	96	DEU3 COM2 LOST	DEU3 COM02 [Information type] LOST	C	B	Device on DEU3 COM2 LOST
3003	97	DEU3 COM3 LOST	DEU3 COM03 [Information type] LOST	C	B	Device on DEU3 COM3 LOST
3003	98	DEU3 COM4 LOST	DEU3 COM04 [Information type] LOST	C	B	Device on DEU3 COM4 LOST
3003	99	DEU3 COM5 LOST	DEU3 COM05 [Information type] LOST	C	B	Device on DEU3 COM5 LOST
3003	100	DEU3 COM6 LOST	DEU3 COM06 [Information type] LOST	C	B	Device on DEU3 COM6 LOST
3003	101	DEU3 COM7 LOST	DEU3 COM07 [Information type] LOST	C	B	Device on DEU3 COM7 LOST
3003	102	DEU3 COM8 LOST	DEU3 COM08 [Information type] LOST	C	B	Device on DEU3 COM8 LOST
3003	103	DEU3 COM9 LOST	DEU3 COM09 [Information type] LOST	C	B	Device on DEU3 COM9 LOST
3003	104	DEU3 COM10 LOST	DEU3 COM10 [Information type] LOST	C	B	Device on DEU3 COM10 LOST
3003	105	DEU3 COM11 LOST	DEU3 COM11 [Information type] LOST	C	B	Device on DEU3 COM11 LOST
3003	106	DEU3 COM12 LOST	DEU3 COM12 [Information type] LOST	C	B	Device on DEU3 COM12 LOST
3003	107	DEU3 COM13 LOST	DEU3 COM13 [Information type] LOST	C	B	Device on DEU3 COM13 LOST
3003	108	DEU3 COM14 LOST	DEU3 COM14 [Information type] LOST	C	B	Device on DEU3 COM14 LOST
3003	109	DEU3 COM15 LOST	DEU3 COM15 [Information type] LOST	C	B	Device on DEU3 COM15 LOST
3003	110	DEU3 COM16 LOST	DEU3 COM16 [Information type] LOST	C	B	Device on DEU3 COM16 LOST
3003	111	DEU4 COM1 LOST	DEU4 COM01 [Information type] LOST	C	B	Device on DEU4 COM1 LOST
3003	112	DEU4 COM2 LOST	DEU4 COM02 [Information type] LOST	C	B	Device on DEU4 COM2 LOST
3003	113	DEU4 COM3 LOST	DEU4 COM03 [Information type] LOST	C	B	Device on DEU4 COM3 LOST
3003	114	DEU4 COM4 LOST	DEU4 COM04 [Information type] LOST	C	B	Device on DEU4 COM4 LOST
3003	115	DEU4 COM5 LOST	DEU4 COM05 [Information type] LOST	C	B	Device on DEU4 COM5 LOST
3003	116	DEU4 COM6 LOST	DEU4 COM06 [Information type] LOST	C	B	Device on DEU4 COM6 LOST
3003	117	DEU4 COM7 LOST	DEU4 COM07 [Information type] LOST	C	B	Device on DEU4 COM7 LOST
3003	118	DEU4 COM8 LOST	DEU4 COM08 [Information type] LOST	C	B	Device on DEU4 COM8 LOST

Alert Identifier	Ins	Alert Title	Alert Description	Prio	Cat	Reason
3003	119	DEU4 COM9 LOST	DEU4 COM09 [Information type] LOST	C	B	Device on DEU4 COM9 LOST
3003	120	DEU4 COM10 LOST	DEU4 COM10 [Information type] LOST	C	B	Device on DEU4 COM10 LOST
3003	121	DEU4 COM11 LOST	DEU4 COM11 [Information type] LOST	C	B	Device on DEU4 COM11 LOST
3003	122	DEU4 COM12 LOST	DEU4 COM12 [Information type] LOST	C	B	Device on DEU4 COM12 LOST
3003	123	DEU4 COM13 LOST	DEU4 COM13 [Information type] LOST	C	B	Device on DEU4 COM13 LOST
3003	124	DEU4 COM14 LOST	DEU4 COM14 [Information type] LOST	C	B	Device on DEU4 COM14 LOST
3003	125	DEU4 COM15 LOST	DEU4 COM15 [Information type] LOST	C	B	Device on DEU4 COM15 LOST
3003	126	DEU4 COM16 LOST	DEU4 COM16 [Information type] LOST	C	B	Device on DEU4 COM16 LOST

Ins: Instance of an alert;

Prio: Alert priority: E - Emergency Alarm
 A - Alarm
 W - Warning
 C - Caution

Cat: Alert category,



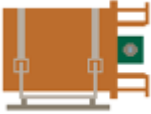


NOTE:

All alerts are Caution, not allowed to transfer responsibility.

All alerts are Caution, with no escalation properties.

[Information type] is displayed according to the configuration. [Location] is also.

ANNEX B ICONS

No.	Icon	Meaning
1		Alert: "Active" Caution.
2		FFC is configured.
3		FPC is configured.
4		LRU is configured.
5		Display mode: DAY.

ANNEX C NEB-2000C-VDR USER MANUAL



USER MANUAL

406 MHz EPIRB & VDR Float-Free Capsule (FFC)
(COSPAS-SARSAT)

NEB-2000C-VDR

SAFETY NOTICES

- ☑ Use this EPIRB/FFC only during situations of GRAVE and IMMEDIATE danger.
- ☑ Read this manual carefully before installation and use.
- ☑ NEW SUNRISE is devoted to publishing and maintaining this user manual. As we continue to improve our products to satisfy customers' needs, the information in this document is subject to change without prior notice.
- ☑ To prevent a FALSE ALERT, it is recommended that the user should be aware of and understand the basic use of this EPIRB/FFC. If any false alert occurs, SAR operations will be initiated, which may result in a penalty.
- ☑ Before using this product, you need to register it with the appropriate national authority. You can visit the web page Beacon Registration Contacts to see where you can register your beacon (<https://www.406registration.com/countriesupported.aspx>).
- ☑ Lithium batteries are used in this product, which is not allowed to be modified, shorted or burned.
- ☑ This Product emits a radio signal that is not harmful to the human body. However, it is recommended not to touch the antenna of the EPIRB/FFC when it is activated.
- ☑ If the EPIRB/FFC is activated in a situation except an imminent danger, prompt action needs to be taken to deactivate it and inform the Local SAR Service to cancel the false alert.
- ☑ **Don't disassemble the equipment.** Access to the interior of the EPIRB/FFC should only be by an NSR-certified technician.

MODIFY RECORD

No.	Modify by	Date	Paragraph	Version	Reason
1	Q/A	2015/11/19		01	First edition
2	Q/A	2015/12/22		02	Photos replaced
3	Q/A	2017/03/06		03	Product improvement
4	Q/A	2018/06/19		04	Cover modification
5	Q/A	2018/12/27		05	General modification
6	Q/A	2020/02/20		06	General modification
7	Q/A	2022/04/15		07	General modification
8	Q/A	2022/07/27	1, 2, 3, 4, 5	08	Add RLS function, etc.
9	Q/A	2025/05/20	all	09	Some modification
10	Q/A	2025/10/23	1.3, 4.4, 5	10	Some modification

TABLE OF CONTENTS

1. DESCRIPTION.....	1
1.1 Product Overview	1
1.2 Cospas-Sarsat System Overview.....	1
1.3 Features And Components	4
1.4 Specifications.....	7
2. INSTALLATION.....	8
2.1 Mounting.....	8
2.2 Placing.....	8
2.3 VDR Connection.....	9
3. OPERATION	10
3.1 Activation.....	10
3.2 Test Mode	14
3.3 Deactivation	14
3.4 Operation of VDR Module.....	14
4. MAINTENANCE	15
4.1 Regular Check.....	15
4.2 Self Test	15
4.3 Replace FFC Container Kit.....	17
4.4 Replace FFC Battery	18
4.5 VDR Module.....	19
4.6 AIS Transmitter in EPIRB/FFC	19
4.7 Return Link Service (RLS)	20
5. WARRANTY.....	22

1. DESCRIPTION

1.1 Product Overview

NEB-2000C-VDR (406MHz Satellite EPIRB & VDR Float-Free Capsule) is used to transmit distress signals. This is designed to comply with IMO SOLAS requirements (GMDSS) and Cospas-Sarsat technical standards (T.001). This is a powerful, self-contained distress transmitter.

NEB-2000C-VDR with a built-in GNSS receiver transmits distress signals, including a position with an accuracy of less than 10 meters. In distress, the signal is transferred to the Rescue Coordination Center (RCC) without delay through the Local User Terminal (LUT) so that Search and Rescue can be initiated immediately.

When the vessel sinks, the Hydrostatic Release Unit releases the container cover automatically to eject the EPIRB to float to the water's surface. The EPIRB/FFC can also be manually operated while on board or in a life raft. The EPIRB/FFC transmits on 406MHz frequency with an AIS signal on VHF and a homing signal on 121.5MHz.

NEB-2000C-VDR is a VDR Float-Free Capsule that includes a Satellite EPIRB with VDR memory PCBs inside. When the vessel sinks, the Hydrostatic Release Unit automatically releases the container cover, cuts the data cable, and ejects the EPIRB/FFC, allowing it to float to the water's surface.

NEB-2000C-VDR meets the following regulations and standards for VDR and 406MHz EPIRB used in search and rescue operations at sea:

- IEC 61996-1 (2021)
- IEC 61097-2 ed.4.0 (2021)
- IEC 60945 ed.4.0 (2002)
- C/S T.001 and C/S T007
- IMO MSC.471 (101)
- IMO MSC.493 (104)
- IMO MSC.494 (104)

1.2 Cospas-Sarsat System Overview

The basic Cospas-Sarsat concept is illustrated in the adjacent figure. The System is composed of:

- distress radiobeacons (ELTs for aviation use, EPIRBs for maritime use, and PLBs for personal use) which transmit signals during distress situations;
- instruments on board satellites in geostationary and low-altitude Earth orbits which detect the signals transmitted by distress radiobeacons;



- ground receiving stations, referred to as Local Users Terminals (LUTs), which receive and process the satellite downlink signal to generate distress alerts; and
- Mission Control Centers (MCCs), which receive alerts produced by LUTs and forward them to Rescue Coordination Centers (RCCs), Search and Rescue Points Of Contacts (SPOCs), or other MCCs.

The Cospas-Sarsat System includes two types of satellites:

- Satellites in low-altitude Earth orbit (LEO), which form the LEOSAR System
- Satellites in geostationary Earth orbit (GEO), which form the GEOSAR System

The future Cospas-Sarsat System will include a new type of satellite in the medium-altitude Earth orbit (MEO), which will form the MEOSAR System.

Additional information on the three satellite systems is provided below.

LEOSAR

Cospas-Sarsat has demonstrated that the detection and location of 406 MHz distress beacon signals can be greatly facilitated by global monitoring based on low-altitude spacecraft in near-polar orbits. Complete, yet non continuous coverage of the Earth is achieved using simple emergency beacons operating on 406 MHz to signal a distress. The coverage is not continuous because polar orbiting satellites can only view a portion of the Earth at any given time (see figure at left). Consequently, the System cannot produce distress alerts until the satellite is in a position where it can "see" the distress beacon. However, since the satellite onboard 406 MHz processor includes a memory module, the satellite can store distress beacon information and rebroadcast it when the satellite comes within view of a LUT, thereby providing global coverage.

As described above, a single satellite circling the Earth around the poles eventually views the entire Earth's surface. The "orbital plane", or path of the satellite, remains fixed, while the Earth rotates underneath it. At most, it takes only one-half rotation of the Earth (i.e., 12 hours) for any location to pass under the orbital plane. With a second satellite, having an orbital plane at right angles to the first, only one-quarter of a rotation is required, or 6 hours maximum. Similarly, as more satellites orbit the Earth in different planes, the waiting time is further reduced. The Cospas-Sarsat System design constellation is four satellites that provide a typical waiting time of less than one hour at mid-latitudes.

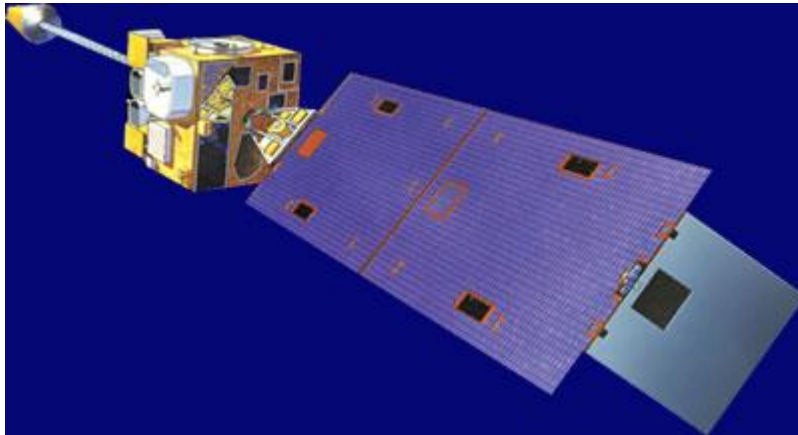
The LEOSAR system calculates the location of distress events using [Doppler processing techniques](#). Doppler processing is based upon the principle that the frequency of the distress beacon, as "heard" by the satellite instrument, is affected by the relative velocity of the satellite for the beacon. By monitoring the change of the beacon frequency of the received beacon signal and knowing the exact position of the satellite, the LUT can calculate the location of the beacon.

GEOSAR

The GEOSAR system consists of 406 MHz repeaters carried on board various geostationary satellites and the associated ground facilities called GEOLUTs, which process the satellite signal.

As a GEOSAR satellite remains fixed relative to the Earth, there is no Doppler effect on the received frequency, and Doppler radio location positioning techniques cannot be used to locate distress beacons. To provide rescuers with beacon position information, such information must be either:

- acquired by the beacon through an internal or an external navigation receiver and encoded in the beacon message, or
- derived, with possible delays, from the LEOSAR System.



MEOSAR

Cospas-Sarsat is in the process of upgrading its satellite system by placing search-and-rescue receivers (i.e., repeaters or transponders) on new GPS satellites operated by the United States, navigation satellites of Russia (GLONASS) that began deployment last year, and European GALILEO navigation satellites that began launching 12 October 2012. Once qualified as operational, this system augmentation will dramatically improve both the speed and location accuracy for detecting beacons.

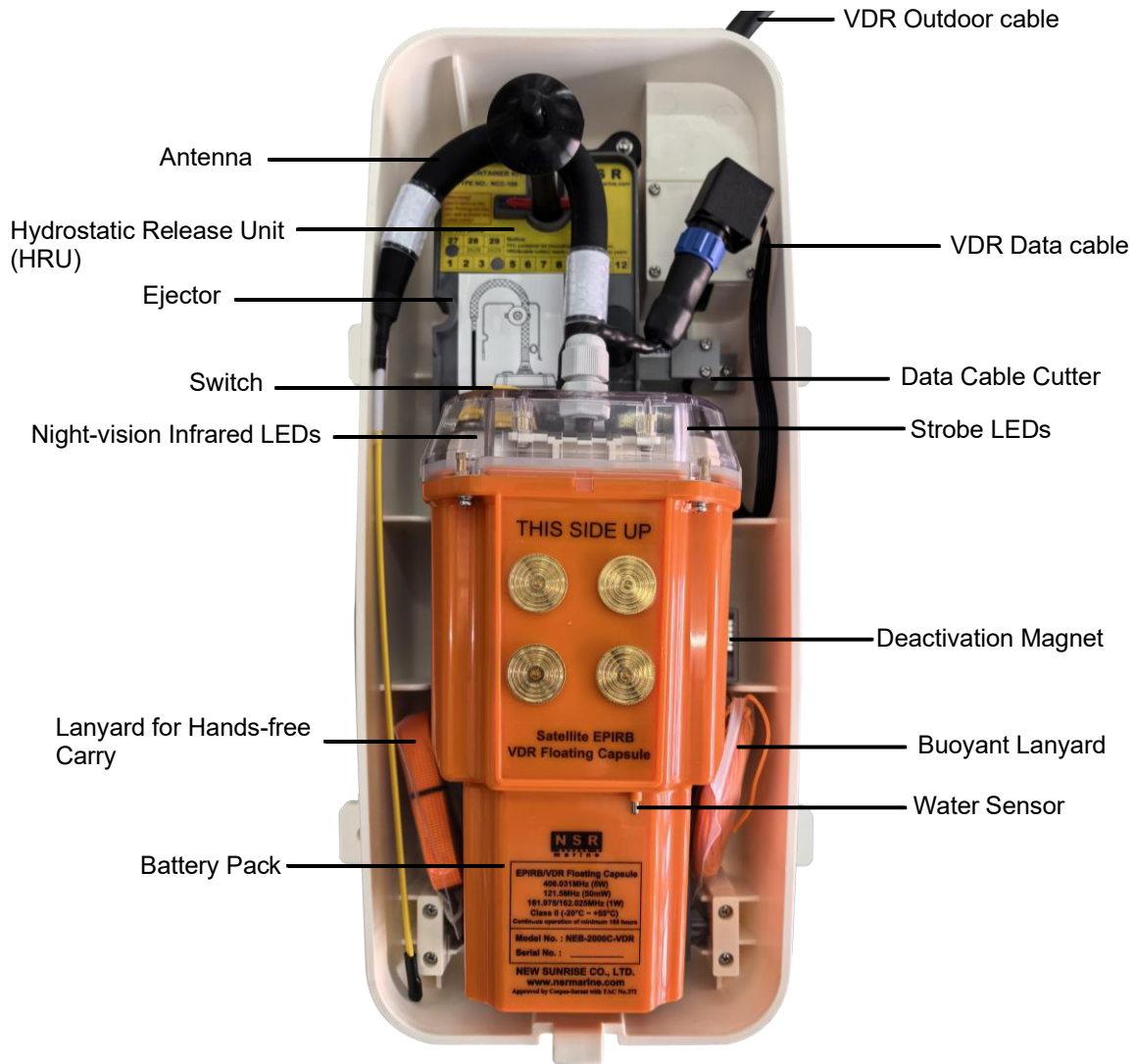
Those satellites orbit the Earth at an altitude between 19,000 and 24,000 km, a range considered as medium-altitude Earth orbit. Hence, this component of Cospas-Sarsat is known as the Medium-altitude Earth Orbit Search and Rescue system or MEOSAR. It will complement the existing LEOSAR and GEOSAR systems.

The current LEOSAR and GEOSAR systems contribute respective advantages to the detection and location of distress beacons that have been activated. The GEOSAR system constantly covers the entire Earth except for the high-latitude (e.g., polar) regions. While the GEOSAR system can receive beacons' distress messages across most of the globe, it cannot locate the beacon unless the location is encoded in the beacon's message from a local navigation receiver. The LEOSAR system can locate a beacon without the aid of a GPS or other navigation signal to the beacon, but the LEOSAR satellites have a view of only a small part of the Earth at any given time, so there may be a delay in receiving the distress signal over LEOSAR.

Once fully operational, the MEOSAR system will offer the advantages of both LEOSAR and GEOSAR systems without their current limitations by providing transmission of the distress message and independent location of the beacon, with near real-time worldwide coverage.

The MEOSAR system will also facilitate other planned enhancements for Cospas-Sarsat beacons, such as a return link transmission that will allow the beacon to provide the user a confirmation that the distress message has been received.

The large number of MEOSAR satellites that will be in orbit when the system is fully operational will allow each distress message to be relayed at the same time by several satellites to several ground antennas, improving the likelihood of detection and the accuracy of the location determination.



- a) **Antenna:** The antenna is a flexible stick used to transmit signal. During operation, it must be stuck up vertically.
- b) **Ejector:** The ejector is to push the EPIRB/FFC out of the container when NEB-2000C-VDR is released at about 4m underwater.
- c) **Strobe LEDs:** There are four strong strobe LEDs. When the EPIRB/FFC is activated, the bright LEDs will flash every 3 seconds, which is visible through the clear lens dome.
- d) **Night-vision Infrared LEDs:** There are four night-vision infrared LEDs (night-vision infrared emitting diodes). When activated, the EPIRB/FFC can be detected by all types of night vision devices for the operating lifetime of the EPIRB/FFC.
- e) **Switch:** The slide switch is hidden under the yellow cover. When off, the switch is left in the middle position as READY. Press the TEST button to test the EPIRB/FFC. Slide to the ON position to manually activate the EPIRB/FFC.
- f) **Water Sensor:** Two bare copper contacts form the water sensor. In water, the contacts will be conducted to automatically activate the EPIRB/FFC.

NOTE:

The WATER SENSOR only operates when the EPIRB/FFC has escaped from the container. In the container, the EPIRB/FFC will never be activated, even in water, as the deactivation magnet in the ejector will prevent the EPIRB/FFC from being activated.

- g) **Buoyant Lanyard:** The 6-meter durable lanyard is used to tie the EPIRB/FFC when in a raft or in the sea. It can be used as a tether (to a life raft, lifeboat, or person in the water but not to the ship).
- h) **Lanyard for hands-free carry:** This lanyard is used as a hands-free carriage. (e.g., for transfer to a survival craft). It may be used to hang the EPIRB/FFC on the neck or around the shoulders, for example.
- i) **Hydrostatic Release Unit:** The HRU is used to close the bottom part and upper part (cover) of the container.
 - When the EPIRB/FFC is immersed about 4 meters underwater, the HRU pole will automatically be pulled out. Then, the upper cover of the container is opened, and the EPIRB/FFC will be ejected to float to the water's surface.
- j) **Battery Pack:** The battery pack is included in the bottom case of the EPIRB/FFC.
- k) **Deactivation Magnet:** The magnet in the ejector will prevent the EPIRB/FFC from being activated, no matter whether the EPIRB/FFC is in water or not.
- l) **VDR Data cable:** The VDR data cable connects the EPIRB/FFC to the Outdoor cable.
- m) **VDR Outdoor Cable:** The VDR Outdoor cable from the capsule to the junction box.
- n) **Data Cable Cutter:** The data cable cutter will cut the VDR data cable when the Hydrostatic Release Unit releases.

Summary of EPIRB/FFC Control Functions

Control position		EPIRB/FFC condition		EPIRB/FFC-mount or release mechanism status		Transmitter status	
ON	READY	WET*	DRY	OUT	IN	ON	OFF
√		√		√		√	
√		√			√		√
√			√	√		√	
√			√		√		√
	√	√		√		√	
	√	√			√		√
	√		√	√			√
	√		√		√		√

* Floating or immersed in water.

1.4 Specifications

General	Model	NEB-2000C-VDR
	Material	ABS Plastic
	EPIRB/FFC Color	High visibility orange
	Watertight	At a depth of 10m for at least 5 min
	Buoyant	Yes
	Deployment	Automatic hydrostatic release Manual switch control
	Accessories	Buoyant lanyard Lanyard for hands-free carry
	Controls	Manual activation / Self-Test switches
Weight	EPIRB	1.5 kg
	Container	1.6 kg
Size	EPIRB	116 (W) × 692 (H) × 116 (D) mm
	Container	220 (W) × 415 (H) × 144 (D) mm
406MHz Transmitter	Operating Frequency	406.031MHz
	Power Output	5W
AIS Transmitter	Operating Frequency	AIS1(161.975MHz) / AIS2(162.025MHz)
	Power Output	1W
121.5MHz Homer	Operating Frequency	121.5MHz
	Power Output	50mW
GNSS Receiver	Type	u-Blox
	System Supported	GPS, BDS, Glonass, Galileo
Battery	Part Type	NBT400
	Type	Lithium battery
	Total Voltage Rating	14.4 V
	Battery life	Up to 6 years* (including 5 years on board)
	Operating Life	More than 168hrs (-20°C)
VDR Module	Flash Disk	64 GB
	Power Supply	DC 24V
	Interface	Ethernet 10BaseT (10Mbit)
Strobe light	Type	LED
	Color	White
	Flash Rate	20/min
Environment	Operating Temperature	-20°C to +55°C
	Storage Temperature	-30°C to +70°C
	Automatic Release Depth	about 4 meters max (13 feet)

*The exact date is marked on the battery expiry label.

2. INSTALLATION

Before installing the EPIRB/FFC, find a suitable mounting position on the vessel. It should be mounted upright against a vertical bulkhead. It is critical that you choose a position where the released EPIRB/FFC will not get trapped by overhangs, even in case the vessel sinks.

Mount the EPIRB/FFC by the following rules:

- Consider easy access in an emergency.
- Mount on the outside of the vessel's structure.
- Mount close to the vessel's navigation position.

Avoid the following position when the EPIRB/FFC is mounted:

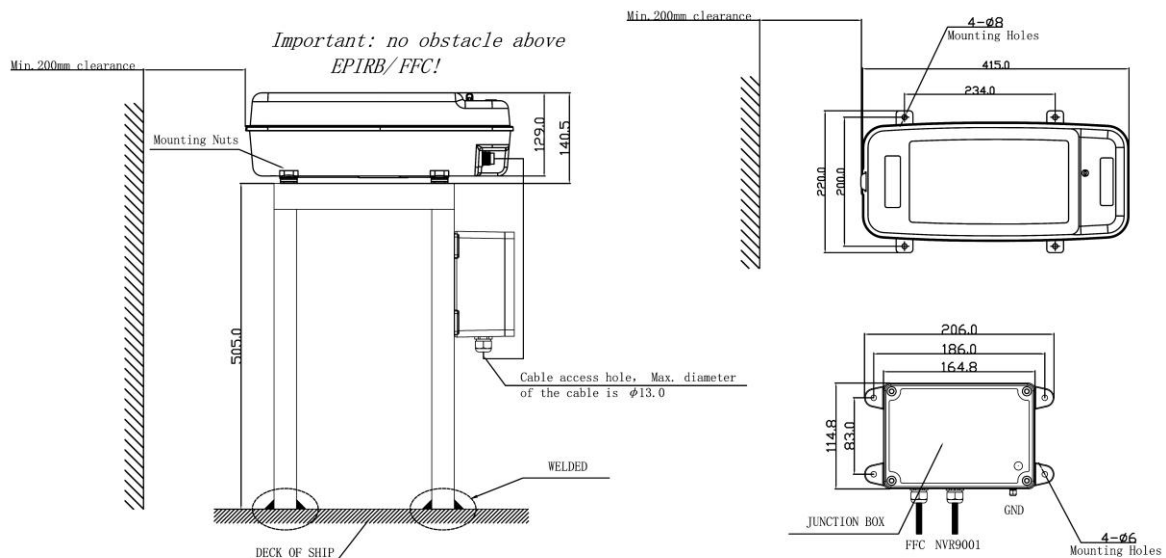
- Position with insufficient space for ejection and maintenance.
- Position within 1 meter of any compass equipment.
- Position within 2 meters of any Radar antenna.
- Direct impact from waves.
- Exhaust fumes, chemical and oil sources.

2.1 Mounting

The container is recommended to be installed horizontally.

Use four screws supplied to fix the container on ship.

Two brackets with four holes are with the container.



Horizontal installation

2.2 Placing

Follow the steps below to place the EPIRB/FFC into the container.

Step 1. Install the data cable.



- Step 2. Bend the antenna along the pole of the HRU.
- Step 3. Set the EPIRB/FFC in the container.
- Step 4. “THIS SIDE UP” should be upside.
- Step 5. Press down the upper cover.
- Step 6. Fix the lock pin into the hole of the HRU pole.

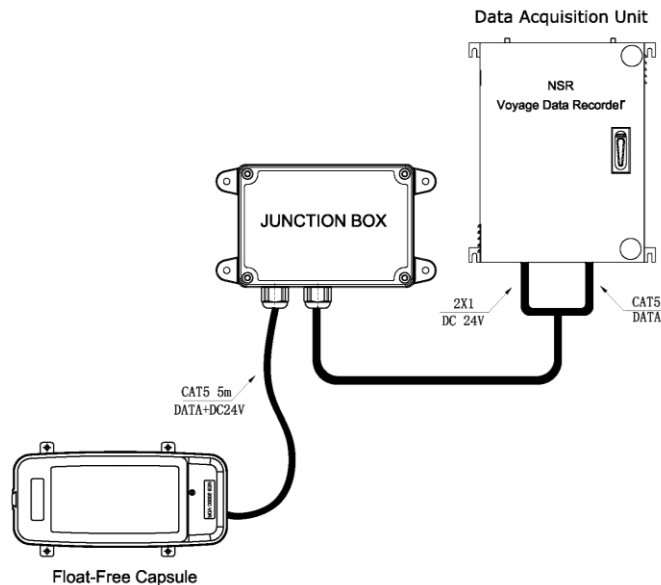


CAUTION:

When the EPIRB/FFC is placed into the container, make sure it is in the right direction. The side labelled THIS SIDE UP should face upward, while the EPIRB/FFC stays in the container. Otherwise, a false alert may easily be triggered.

2.3 VDR Connection

The FFC connects to the VDR DAU with a junction box.



3. OPERATION

3.1 Activation

The EPIRB/FFC can be activated in two ways: automatically or manually. When activated, the EPIRB/FFC will behave in the following steps.

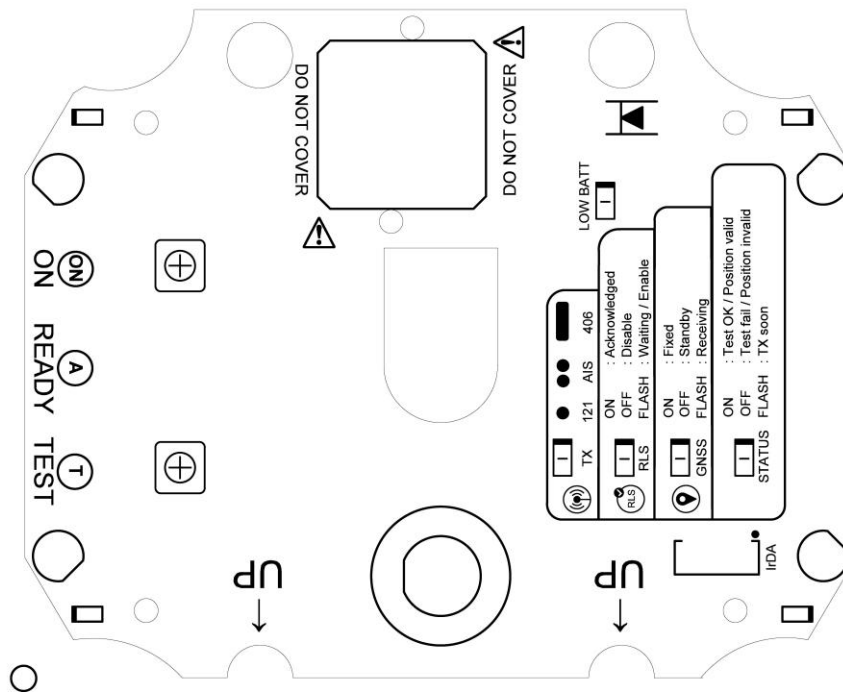
- Step 1. All LEDs flicker once, one by one.
- Step 2. The strobe light flickers every 3 seconds.
- Step 3. **GNSS** LED flickers while acquiring GNSS data.
- Step 4. **RLS** LED flashes every 1 second after the first transmission on 406 MHz. After acknowledgement is received, the LED turns to ON. (Note: only when the RLS protocol is programmed)
- Step 5. **TX** LED flashes long once while transmitting on 406 MHz.
- Step 6. **TX** LED flashes short once while transmitting on 121.5 MHz.
- Step 7. **TX** LED flashes short twice while transmitting on AIS1 or AIS2.

NOTE:

Once the EPIRB/FFC is activated, a strobe light will begin flashing immediately at 3-second intervals, however, it won't transmit a distress alert for approximately 2 minutes. This gives you time to turn it off immediately in case of being activated by mistake.

When the EPIRB/FFC is activated, the guidance below is helpful.

- The EPIRB/FFC should be kept upright. If possible, it would be better to be held.
- The EPIRB/FFC should be placed in an open place to sky.
- There should be no overhangs above the EPIRB/FFC.
- Do not place the EPIRB/FFC close to any large structures.
- Do not lay down the EPIRB/FFC.
- In a life raft, hold the EPIRB/FFC up as high as possible.
- Let the EPIRB/FFC float in the sea when necessary.
- Do not touch the antenna with your hand.



Summary of LED status in Activation

EPIRB/FFC State	LED LOW BATT	LED TX	LED GNSS	LED STATUS	LED RLS	Strobe Light
Normal	OFF	TX: Flash	--	--	--	Flash every 3 seconds
GNSS receiving	OFF	OFF	Flash	--	--	Flash every 3 seconds
GNSS fixed	OFF	OFF	ON	--	--	Flash every 3 seconds
GNSS standby	OFF	OFF	OFF	--	--	Flash every 3 seconds
Position valid	OFF	OFF	--	ON	--	Flash every 3 seconds
Position invalid	OFF	OFF	--	OFF	--	Flash every 3 seconds
406MHz TX soon	OFF	OFF	--	Flash 11 times	--	Flash every 3 seconds
406MHz TX	OFF	Long Flash Once	--	--	--	Flash every 3 seconds
AIS TX one message	OFF	Short Flash Twice	--	--	--	Flash every 3 seconds
121.5MHz TX	OFF	Short Flash Once	--	--	--	Flash every 3 seconds
TX failed	OFF	ON	--	--	--	Flash every 3 seconds
Insufficient Battery Energy	ON	OFF	--	--	--	Flash every 3 seconds
RLS enable/Waiting RLS	OFF	OFF	--	--	Flash	Flash every 3 seconds
RLS acknowledged	OFF	OFF	--	--	ON	Flash every 3 seconds
RLS disable	OFF	OFF	--	--	OFF	Flash every 3 seconds

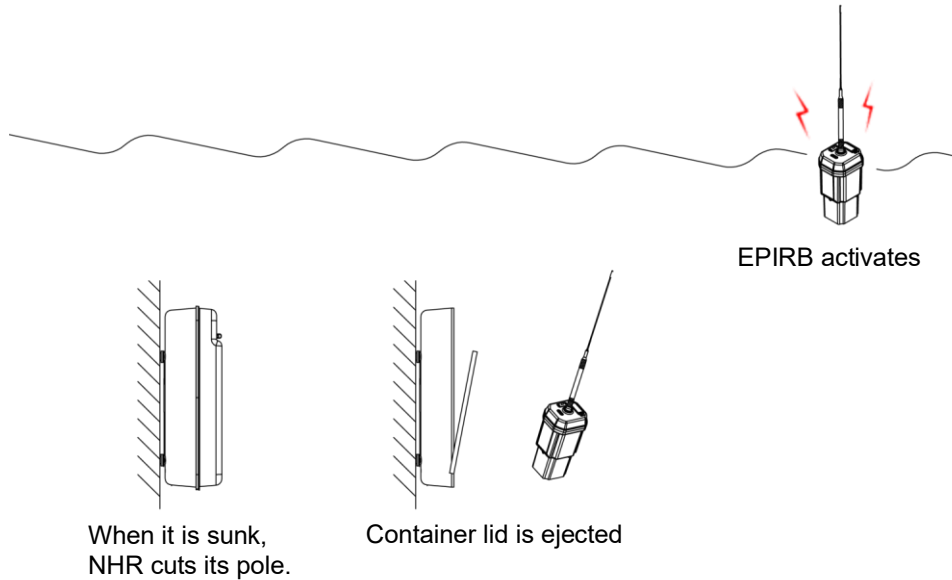
NOTE:

The status "--" for LED of **GNSS**, **STATUS**, or **RLS** can be "Flash", "ON", or "OFF" based on EPIRB/FFC state relative to the LED.

AUTOMATIC ACTIVATION

NEB-2000C-VDR is designed with float-free activation. It contains a spring-loaded ejector which automatically pushes the container cover off and releases the EPIRB/FFC if a vessel sinks. This automatic ejection is controlled by a Hydrostatic Release Unit. The plastic pole is pulled out before the container reaches about 4 meters in depth. After the container cover is open, the EPIRB/FFC is ejected to float on the surface and is switched on automatically by the water sensor.

- 1) When the vessel sinks, the container is filled with seawater. The HRU will operate when the container descends to a depth of about 4 meters below the water's surface. The plastic pole of HRU is pulled out while the internal coil spring is pressed by water pressure.
- 2) The cable cutter is activated to cut the data cable.
- 3) The ejector pushes the EPIRB/FFC out of the container.
- 4) As the EPIRB/FFC floats away from the magnet, its sea sensor activates automatically.
- 5) Floating on the surface of the water, the EPIRB/FFC transmits distress signals.



MANUAL ACTIVATION

If there is enough time when in distress, the EPIRB/FFC can be taken out from the container and brought to a life raft. In such cases, the EPIRB/FFC can be manually activated.

Take the following steps to remove the EPIRB from the container:

- Pull out the lock pin and open the cover of the container.



- There are two ways to remove the cable:
 1. Unplug the connector of the data cable.
 2. Cut the cable with the tool.



- Take the EPIRB/FFC out of the container.

Then, take the following steps to manually activate the EPIRB/FFC:

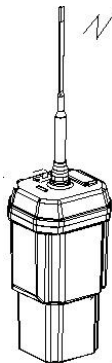
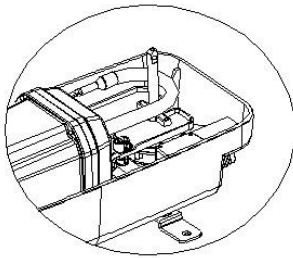


- 1) Open the switch cover. The protector tab will be broken.
- 2) Slide the switch fully to the left side at the **ON** position.
- 3) The EPIRB/FFC is activated and transmits distress signals.
- 4) Hold or place the EPIRB/FFC as upright as possible on the surface, ensuring it has a clear view of the sky for proper operation.

NOTE:

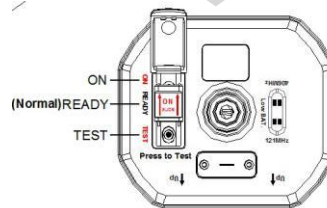
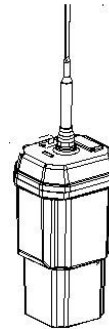
1. Do not break the protector tab or open the switch cover unless in distress;
2. If the EPIRB/FFC stays near a metal wall or is held by the antenna with a hand, signal transmission may be affected.

① In the container.



④ Activated and Keep Upright.

② Take out of the container.



③ Open Cover and Slide to ON.

3.2 Test Mode



- 1) Take the EPIRB/FFC out of the container.
- 2) Through the hole on the switch cover, use a screw driver or a pen to press the **TEST** button for 3 seconds and release the button.
- 3) The test operation begins and will last for about 30 seconds.
- 4) **STATUS** LED indicates the result of the Self-Test.
- 5) After the Self-Test completes, the EPIRB/FFC will be powered off automatically.

This action serves as a Self-Test for both the user and the inspector. See Section 4.1 Self Test & Inspection for more details.

NOTE:

During the test, do not break the protector tab and do not open the switch cover.

3.3 Deactivation

If the EPIRB/FFC has been activated for a cumulative period of more than 2 hours, the battery pack needs to be replaced. Make sure that the EPIRB/FFC can continuously operate for at least 168 hours in an emergency. See Section 4.3 for battery replacement instructions.

If the EPIRB/FFC has been activated by mistake or the emergency ends, the EPIRB/FFC must be switched off by sliding the switch back to the **READY** position.

If the EPIRB/FFC has been automatically activated in water, deactivate the EPIRB/FFC by taking it out of water and drying it for about 10 seconds.

3.4 Operation of VDR Module

The software operating system of the VDR module is Linux. The system includes SAMBA, which enables other software platforms to access the Linux file system, and an FTP (File Transfer Platform) server.

For more details, please see the VDR technical manual.

4. MAINTENANCE

4.1 Regular Check

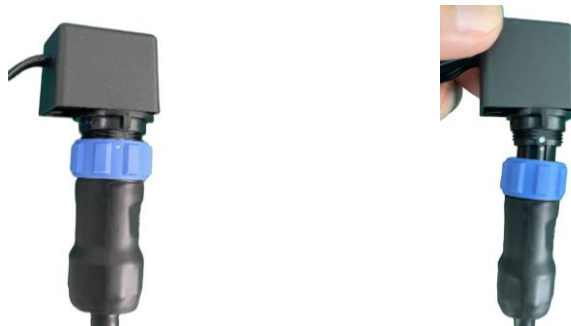
As an important part of the GMDSS, the EPIRB should be checked regularly. NEB-2000C-VDR has a built-in test capability that can check the status of the battery, strobe light, and both 406MHz and AIS/121.5MHz distress transmitters.

Checklists are provided at the back of this manual, and you should check the EPIRB/FFC regularly using these forms.

The check intervals are listed below.

Every 2 months	Conducting Self-Test
Every year	Annual inspection by authorized radio companies
Every 2 years	FFC Container Kit (including HRU & Cable Cutter) replacement
Every 5 years	Shore-based maintenance by authorized radio companies
Every 5 years	Battery pack replacement

If the EPIRB/FFC needs taking to bridge or office for test or service, for example, during SBM, you may remove the EPIRB from the container. In this case, you have to disconnect the data cable first as shown below:



4.2 Self Test

It is recommended to perform a Self-Test every two months.

To perform the Self-Test, through the hole on the switch cover, use a tool to press and hold the **TEST** button for 3 seconds, and then release the button. During Self-Test, the transmitting messages won't be regarded as a distress alert even if received by satellite.

Check the LED status as below:

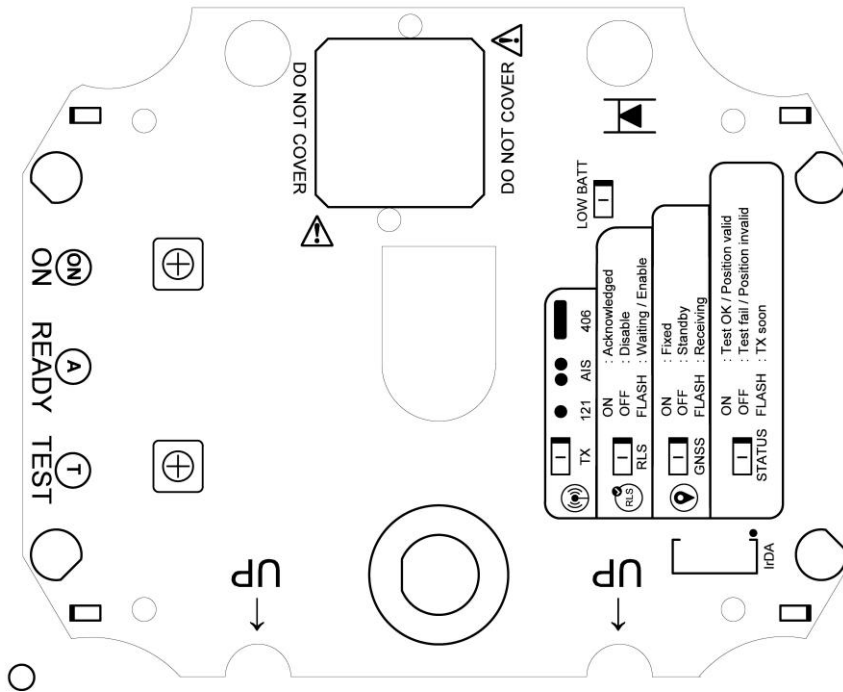
- Step 1. All LEDs flicker once, one by one.
- Step 2. The strobe light fast flickers twice to indicate the Self-Test mode.
- Step 3. The strobe light flickers every 3 seconds during the Self-Test.
- Step 4. If the RLS protocol is programmed, the **RLS** LED flashes every second, otherwise **RLS** LED remains OFF.

- Step 5. Sending a 121.5 MHz test homing signal to check the power and Frequency.
 - **TX** LED flashes short once.
- Step 6. Sending two AIS test messages to check the power and frequency.
 - **TX** LED flashes short twice on each message.
- Step 7. Sending a 406MHz test message to check the power and frequency.
 - **TX** LED flashes long once.
- Step 8. The Self-Test ends.

The SELF-TEST lasts for 32 seconds. The last 5 seconds are to indicate the test result.

- If passed, **STATUS** LED keeps ON.
- If it fails, **TX** LED keeps ON.
- If PIE, **LOW BATT** LED keeps ON.

After 32 seconds, the SELF-TEST ends, and the EPIRB/FFC is powered off automatically.



Summary of LED status in Self-test

EPIRB/FFC STATE	LOW BATT	TX	GNSS		STATUS	RLS*	Strobe Light
Self-Test OK	OFF	OFF	OFF		ON	Flash	Flash every 3s
Normal	OFF	Flash	OFF		OFF	Flash	Flash every 3s
Self-Test failed	OFF	ON	OFF		OFF	OFF	Flash every 3s
Insufficient Battery Energy	ON	OFF	OFF		OFF	OFF	Flash every 3s

*: Only when the RLS protocol is programmed.

If any failure is found in the Self-Test, it MUST be serviced by a qualified technician.

NOTE:

1. The GNSS receiver inside the EPIRB/FFC is powered off during the Self-Test. So **GNSS** LED status does not mean GNSS position is locked or not at Self-Test.
2. During the test, do not break the protection tab, and do not open the switch cover.
3. PIE: Potentially Insufficient Battery Energy, when the total Self-Test times exceed 60.

IMPORTANT NOTICE

- a. The water sensor switch has two exposed contacts in the air. The unexpected seawater or rainstorm at sea may make two contacts conducting. Even though the magnetic bar on the ejector will keep the EPIRB/FFC from being activated. So, it's very important to place the EPIRB/FFC in the container in the proper direction and keep the container closed always, except for regular testing or maintenance.
- b. If a false alert is activated, please carry out the following procedures to cancel:
 - Inform the nearest rescue organizations, as soon as possible, to stop all rescue services, if any.
 - Open the switch cover and slide the switch to the READY position to turn off the EPIRB/FFC.
 - In case the EPIRB/FFC can't be turned off, remove or bend the antenna and put the EPIRB/FFC into a sealed metal case for more than 7 days until the battery is exhausted. Consult the local agent for service.

4.3 FFC Container Kit

The lifetime of consumable parts can be seen in the table below:

PART NAME	PART TYPE	INTERVAL
FFC Battery	NBT400	5 years on board
FFC Container Kit	NCC-100	2 years on board

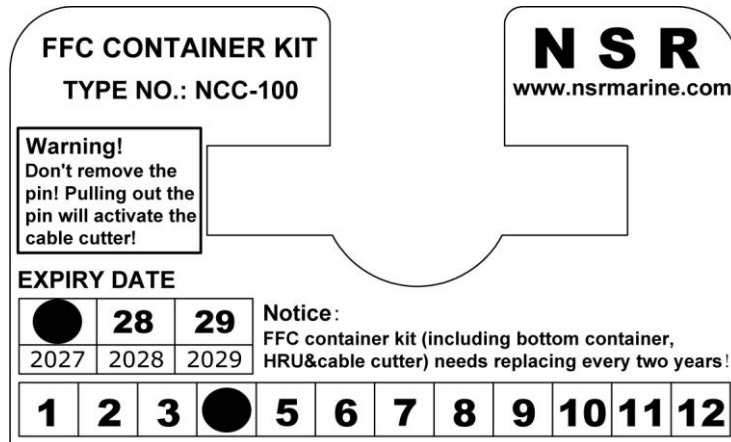
The NCC-100 FFC Container Kit (including the Hydrostatic Release Unit and Cable Cutter) should be replaced every 2 years. It's strongly recommended that the whole container bottom part be replaced together with the Hydrostatic Release Unit (HRU) and Cable Cutter.



FFC Container Kit

An expiry Hydrostatic Release Unit (HRU) may result in failure in operation and the EPIRB/FFC may be mis-released, and an expiry Cable Cutter may result in failure in cutting the cable properly. The expiry date is marked on the ejector to be checked regularly.

Please contact the NSR authorized agent to carry out the replacement.



For example, the sticker above shows an expiry date of April 2027.

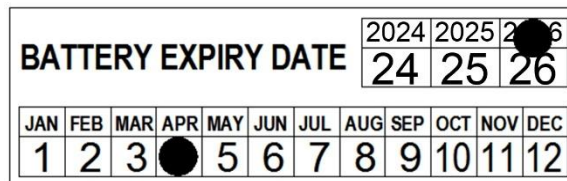
4.4 Replace FFC Battery

The expiry date is marked on the EPIRB/FFC (BEACON), and it should be checked regularly.

The NBT400 battery pack for the beacon comprises four 3.6V Lithium batteries. The NBT400 battery pack should be replaced when one of the following cases below happens:

- The EPIRB/FFC (BEACON) has been used in an emergency.
- A false activation exceeds 2 hours of use.
- The expiry date has been reached.

The expiry date can be found on the beacon by the attached expiry sticker.



For example, the sticker above shows an expiry date of April 2026.

It's very important to replace with NBT400 battery pack originally supplied/made by NSR (together with a seal and a protector tab for replacement), when it is expired. **NSR guarantees the quality of NEB-2000C-VDR only when the original NSR battery pack (NSR NBT400) is used.**

When NEB-2000C-VDR was tested and type approved, NSR NBT400 was an integral part of the EPIRB/FFC unit. If a counterfeit battery pack is used, this EPIRB/FFC unit will automatically lose the guarantee of all type approval certificates unless all tests needed for type approvals have been done again for the unit installed with a counterfeit battery pack. Those tests and approval usually take 1-3 years, and the cost shall be borne by the supplier or buyer of the counterfeit battery.

If a counterfeit battery pack is used on the NEB-2000C-VDR, NSR will be exempted from the responsibility of warranty and other service guarantees. The counterfeit battery pack will affect the EPIRB/FFC from operating properly when the EPIRB/FFC unit is activated in an emergency.

The battery pack replacement should be performed by NSR, or the NSR-authorized EPIRB maintenance facility, or an NSR-authorized, trained and certified person.

The following instructions need to be observed:

- Do not charge the battery or throw it into a fire.
- Do not expose the battery to an environment with a temperature higher than 70°C.
- Short-circuiting the positive and negative terminals is strictly prohibited, and the terminals should be well insulated with tape after the battery is replaced.

NOTE :

Lithium batteries should have both terminals insulated before disposal, as any remaining power could cause severe harm to human safety. Local regulations should be followed when batteries are disposed of to protect the environment.

The transportation of the battery pack must strictly comply with regulations on the transportation of lithium batteries. Before transportation, the positive and negative terminals of the battery should be well insulated to prevent exposure.

4.5 VDR Module

In accordance with SOLAS Chapter V Regulation 18.8, the VDR shall be subject to an annual performance check. A ship is required under International rules to carry a functioning VDR. The person carrying out the annual checks should be approved by the ship's Flag Administration and have been authorized by NSR.

4.6 AIS Transmitter in EPIRB/FFC

An AIS transmitter can provide accurate positioning with a built-in GNSS receiver, which can significantly aid rescue operations. It transmits on dual AIS channels, AIS 1 and AIS 2.

The maximum communication range depends on both the heights of the transmitting antenna and the receiving antenna.

$$A=2.5(\sqrt{H}+\sqrt{h}) \quad (\text{nm})$$

H and **h** refer to the heights in meters of antennas above sea.

AIS transmission can cover at least 5nm on the condition that the transmitting antenna at the life raft is 1m high and the receiving antenna 16m high on the rescue vessel, both above sea level.

A unique identifier (User ID) is used in EPIRB/FFC to ensure the integrity of the VHF data link. The ID is programmed during production and marked on the case. The ID can not be changed after being programmed unless done by the manufacturer.

The ID for an EPIRB/FFC is 974xxyyyy, where xx represents the manufacturer ID, as 26/28 for NSR; yyyy is the serial number set by the manufacturer. For example, 974280008 is an AIS EPIRB, produced by NSR.

When a position report is received with such an MMSI, together with a safety message “EPIRB ACTIVE”, it should be transmitted from an EPIRB/FFC.

During the Self-Test, the AIS message transmitted by the EPIRB/FFC can be received by the shipborne AIS and displayed on its MKD.

- **Check the target list on MKD. There should be a target with the same MMSI as the USER ID of the AIS EPIRB/FFC.**
- **A safety-related message, “EPIRB TEST,” should be received from the same MMSI as the USER ID of the EPIRB/FFC.**

NOTE :

If the above messages are not displayed on the AIS MKD, please check the settings of the AIS MKD. Usually, test messages are muted on AIS MKD, but can be set in the menu by following the manufacturer’s instructions.

4.7 Return Link Service (RLS)

RLS SYSTEM

The EPIRB/FFC, when activated, transmits the RLS status together with the distress signal on 406MHz. When the earth station receives this message, an acknowledgment can be returned to the EPIRB/FFC through the Galileo system (the only operational system for the time being). Then, the EPIRB/FFC receives this acknowledgment from its GNSS module. In this way, the user can be notified that a distress signal has been received and located.

To enable the RLS function, the EPIRB/FFC needs configuring with the Cospas-Sarsat RLS protocol. You can check your 15-digit HEX code on this webpage <http://www.cospas-sarsat.int/en/pro> and look for the link "Beacon Message Decoder Program" to check if your EPIRB/FFC has been programmed with RLS protocol.

RLS function is designed to send an acknowledgment to the user within 30 minutes of EPIRB/FFC activation (actual acknowledgement times are typically much quicker). The transmission of a distress alert to SAR authorities is independent of (and may have occurred before) the RLS acknowledgment indication on the EPIRB/FFC. The specification is described in the Galileo SAR Service Definition Document:

<https://www.gsc-europa.eu/sites/default/files/sites/all/files/Galileo-SAR-SDD.pdf>

RLS function is an option and may not be allowed in all countries. You can visit the webpage "Countries Allowing RLS Beacons" for the latest information about countries/regions supporting RLS: <https://cospas-sarsat.int/en/beacon-ownership/rls-enabled-beacon-purchase>

RLS FUNCTION

RLS function is an indication to the user that confirms the distress signal has been received and is being transferred to the responsible Search and Rescue authority (SAR). It does not mean that a rescue has been organized/launched. It just means that the distress signal has been received and transferred to the appropriate SAR.

NEB-2000C-VDR is able to use the RLS function, which is available in the Galileo satellite navigation system.

To enable the RLS function, NEB-2000C-VDR must be programmed with the RLS protocol using its coding software.

5. WARRANTY

All goods manufactured by NSR are warranted to be free from defect in workmanship and material for the period of 18 months from the date of delivery (unless stated otherwise and confirmed in writing), or 12 months from the date of installation, whichever comes first.

PROVIDED:

- (a) NSR is given full particulars in writing of any claim before the expiration of such a period and within fourteen days of the discovery of the alleged defect.
- (b) The goods have been stored, installed, maintained, and used properly, having regard in particular to this manual.
- (c) Liability shall be limited at NSR to replacement or repair or to a sum not exceeding the net invoice value of the defective goods.
- (d) Upon request, the alleged faulty goods are returned to NSR at the Buyer's expense.
- (e) Unless expressly stipulated in the acceptance of the order, NSR gives no warranty or guarantee of the fitness or suitability of the goods for any purpose, whether disclosed or otherwise.
- (f) All other warranties or conditions expressed or implied are hereby excluded, and NSR shall in no circumstances be liable for consequential damages.

NSR guarantees the quality of NEB-2000C-VDR only when the original FFC container kit (NSR NCC-100) and battery pack (NSR NBT400) are used. If a counterfeit kit or battery pack is used on NEB-2000C-VDR, NSR will be exempted from the responsibility of warranty and other service guarantees.

For details, please refer to NSR's official warranty policy.

NOTE:

The above warranty is subject to adjustment by the latest **Warranty Terms for NSR Products**.

PRE-DELIVERY INSPECTION LOG

- Battery pack:
 Batch date:
 Replacement date:
- FFC Container Kit (including Hydrostatic Release Unit and Cable Cutter):
 Batch date:
 Replacement date:
- Housing inspection:.....
- Watertight verification:
- 121.5MHz transmission:
- 406MHz transmission:
- AIS transmission:
- Frequency:
- General operation:
- Next Inspection due on:
- Remark:

- Inspection service:

Date:

Signature and Stamp:

PERIODIC INSPECTION LOG

- Battery pack:
Batch date:
Replacement date:
- FFC Container Kit (including Hydrostatic Release Unit and Cable Cutter):
Batch date:
Replacement date:
- Housing inspection:
- Watertight verification:
- 121.5MHz transmission:
- 406MHz transmission:
- AIS transmission:
- Frequency adjustment:
- General operation:
- Next inspection due on:
- Remark:
.....
- Inspection service:

Date:

Signature and Stamp:

PERIODIC INSPECTION LOG

- Battery pack:
Batch date:
Replacement date:

- FFC Container Kit (including Hydrostatic Release Unit and Cable Cutter):
Batch date:
Replacement date:

- Housing inspection:

- Watertight verification:

- 121.5MHz transmission:

- 406MHz transmission:

- AIS transmission:

- Frequency adjustment:

- General operation:

- Next inspection due on:

- Remark:
.....

- Inspection service:

Date:

Signature and Stamp:

PERIODIC INSPECTION LOG

- Battery pack:
Batch date:
Replacement date:
- FFC Container Kit (including Hydrostatic Release Unit and Cable Cutter):
Batch date:
Replacement date:
- Housing inspection:
- Watertight verification:
- 121.5MHz transmission:
- 406MHz transmission:
- AIS transmission:
- Frequency adjustment:
- General operation:
- Next inspection due on:
- Remark:
.....
- Inspection service:

Date:

Signature and Stamp:

PERIODIC INSPECTION LOG

- Battery pack:
Batch date:
Replacement date:
- FFC Container Kit (including Hydrostatic Release Unit and Cable Cutter):
Batch date:
Replacement date:
- Housing inspection:
- Watertight verification:
- 121.5MHz transmission:
- 406MHz transmission:
- AIS transmission:
- Frequency adjustment:
- General operation:
- Next inspection due on:
- Remark:
.....
- Inspection service:

Date:

Signature and Stamp:

EPIRB/FFC LOCATION LOG

Vessel Name:

ID No.:

Port of Registry:

 Installation Date:

Registration Date:

Inspection Stamp:

Date, Signature:

EPIRB/FFC LOCATION LOG

Vessel Name:

ID No.:

Port of Registry:

 Installation Date:

Registration Date:

Inspection Stamp:

Date, Signature:

EPIRB/FFC LOCATION LOG

- Vessel Name:
 - ID No.:
 - Port of Registry:
 -
 - Installation Date:
 - Registration Date:
-

Inspection Stamp:

Date, Signature:

Copyright by NEW SUNRISE CO., LTD. (NSR)

www.nsrmarine.com

info@nsrmarine.com

October, 2025