



# **SERVICE MANUAL**

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## **FIBER OPTIC GYROCOMPASS**

**NGC-5010**

**NGC-5030**




**NGC-5050**

**NGC-5070**




# NOTICE TO USERS

- Thanks for purchasing this product, NGC-5010/5030/5050/5070 Series Fiber Optic Gyrocompass.
- The copyright of this manual is owned by the manufacturer, NEW SUNRISE CO., LTD (NSR). Prior written permission is required for copying or reproducing the manual or any part of the manual.
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- Please read this manual carefully to ensure proper use before installation and use of the product.
- Please keep the manual for your future reference.

## SAFETY INSTRUCTIONS FOR THE OPERATOR

	<p><b>Warning</b> Keep away from heat sources or direct sunshine. <b>After turning off the Fiber Optic Gyrocompass, wait 5 seconds before restarting it to avoid malfunctioning due to an instantaneous power surge.</b> For the safety of the ship, it is prohibited to interrupt or arbitrarily cut off the power supply to the fiber optic gyrocompass during navigation.</p>
	<p><b>Prohibition</b> Don't open the equipment. Only authorized and qualified personnel should work inside the equipment. Don't disassemble or try to modify the equipment.</p>
	<p><b>Dangerous</b> Turn off the power immediately when smoke or fire is emitted.</p>

## SAFETY INSTRUCTIONS FOR THE INSTALLER

	<p><b>Warning</b> Connect the earthing cord to the ship's body. Observe the compass safe distance to prevent deviation of an onboard magnetic compass.</p>
	<p><b>Prohibited</b> Don't open the equipment unless you have fully understood the structure and circuits of the equipment. Only authorized and qualified personnel should work inside the equipment. Don't disassemble or try to modify the equipment.</p>
	<p><b>Dangerous</b> Turn off the power at the power distribution board before installation.</p>

# PREFACE

This manual provides installation and commissioning information for the NGC-50X0. It is intended for use by qualified installation personnel only.

Installation and maintenance must only be undertaken by qualified service engineers, New Sunrise Co., Ltd., and approved agents. Unauthorized repair of equipment during the warranty period may invalidate the warranty. If you wish to undertake the equipment maintenance, please ensure that the service engineers hold a valid authorization certificate from New Sunrise Co., Ltd.

If a unit exhibits an issue that cannot be resolved on board, and a service engineer is required to attend to your vessel, please don't hesitate to get in touch with our Service Centre and provide all the following details:

- 1) Name of vessel (Phone number if available)
- 2) Equipment type and serial number
- 3) Software status (version number)
- 4) Next port of call, ETA/ETD, and ship's agents
- 5) Fault description (with as much detail as possible)
- 6) Contact name

You can find detailed contact information on the website: [www.nsrmarine.com](http://www.nsrmarine.com).

# MODIFY RECORD

No.	Modify by	Date	Paragraph	Version	Reason
1	Q/A	2026/02/14		01	First edition

# VERSION COMPARISON TABLE

Manual Version	Program Version	Remarks
20260214_01	Display Unit: v1.0.13, 06/02/2026 Interface Unit: v1.0.10, 06/02/2026	

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# 1. OVERVIEW

## 1.1 Outline

NGC-5010/5030/5050/5070 Series Fiber Optic Gyrocompass (hereinafter referred to as NGC-50X0) uses advanced optical technology and signal processing algorithms to accurately determine the heading, attitude, position and speed of a ship.

The main features of NGC-50X0 are:

- Multiple heading accuracies up to 0.1° secant latitude.
- Fast settling time and flexible operating modes.
- Extremely reliable for increased operational safety.
- Large LCD, 7-inch/color, touch screen operation.
- Highly accurate HDG, ROT.
- Multi-outputs of RS422.
- Data interface to BAM System/INS.
- Maintenance-free design.
- Dual compass available.

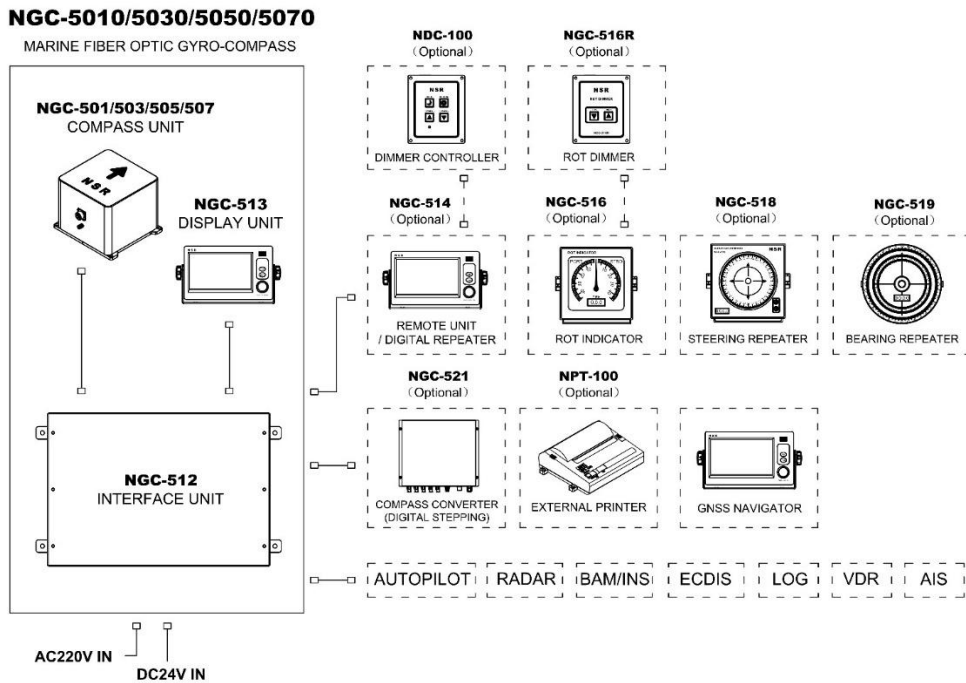
The product is designed to meet the following standards:

- IMO A.424 (XI): Performance standards for gyro-compasses
- IMO A.526 (13): Performance standards for rate-of-turn indicators
- IMO A.694 (17): General requirements for shipborne radio equipment forming part of the global maritime distress and safety system (GMDSS) and for electronic navigational aids
- IMO A.821 (19): Performance standards for gyro-compasses for high-speed craft
- ISO 8728: Ships and marine technology – Marine gyro-compass
- ISO 16328: Ships and marine technology – Gyro-compasses for high-speed craft
- ISO 20672: Ships and marine technology – Rate of turn indicators

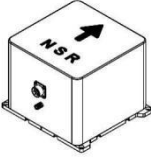

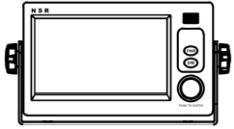
## 1.2 System configuration

NGC-50X0 consists of a compass unit, a display unit, and an interface unit.

The system diagram is as follows:



The unit functions are as follows:

Unit	Description
 <p>Compass Unit NGC-501/NGC-503/ NGC-505/NGC-507</p>	<ul style="list-style-type: none"> <li>● Generate heading and attitude.</li> </ul>
 <p>Interface Unit NGC-512</p>	<ul style="list-style-type: none"> <li>● Input/Output interface.</li> <li>● Protocol adaptation.</li> <li>● Optional units access.</li> <li>● HDT information output.</li> <li>● BAM management.</li> <li>● External GNSS data input.</li> </ul>
 <p>Display Unit NGC-513</p>	<ul style="list-style-type: none"> <li>● Heading Display.</li> <li>● BAM display and operation.</li> <li>● Manual input of the position.</li> <li>● Menu operation: language selection, brightness adjustment, application upgrade, etc.</li> </ul>

### 1.3 Equipment list

Model		Part No.	Description
Standard (one of them)	NGC-5010	NGC-501	0.1° Compass Unit
		NGC-512	Interface Unit
	NGC-5030	NGC-503	0.3° Compass Unit
		NGC-512	Interface Unit
	NGC-5050	NGC-505	0.5° Compass Unit
		NGC-512	Interface Unit
	NGC-5070	NGC-507	0.7° Compass Unit
		NGC-512	Interface Unit
Standard		NGC-513	Display Unit
Options		NGC-514	Remote Unit
		NGC-516	ROT Indicator (Note)
		NGC-516R	ROT Dimmer
		NGC-518	Steering Repeater Compass
		NGC-519	Bearing Repeater Compass
		NGC-519A	Azimuth Reading Device
		NGC-519B	Wall Mounting Bracket
		NGC-519J	Junction Box
		NGC-519S	Floor-Standing Mounting Bracket
		NGC-521	Compass Converter
		NPT-100	Thermal Printer
		NDC-100	Dimmer Controller

*Note: To comply with the standards of A.526 (13) and ISO 20672, an NGC-516 ROT Indicator should be included.*

## 2. MAINTENANCE

### 2.1 Software update

#### 2.1.1 Interface unit (NGC-512)

*Note: The upgrade may reset the device to factory default settings. Please confirm your current configuration first.*

##### 1) Enter the boot mode



Find the two keys **RESET** and **BOOT** on the interface board.

Power on and insert the network cable.

- a) Press and hold the **BOOT** key, then press the **RESET** key at the same time. Release the **RESET** key first, followed by the **BOOT** key.
- b) Then, the boot program will run automatically, the RUN LED will blink quickly. If there is no operation for more than two minutes, the system will exit boot mode and enter app mode, with the RUN LED blinking normally.

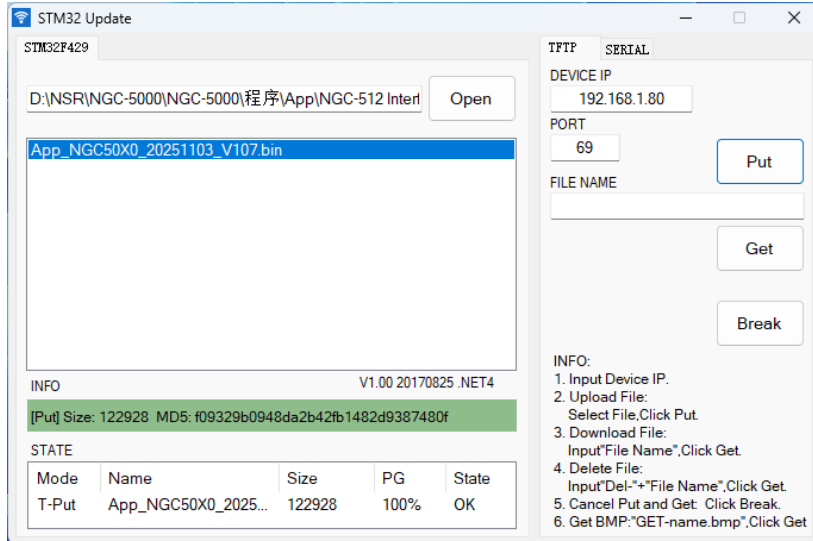
*Note: the IP address of the PC should be 192.168.1.x (x can't be set to 80).*

##### 2) Upload Upgrade File

There are two methods for upgrading.

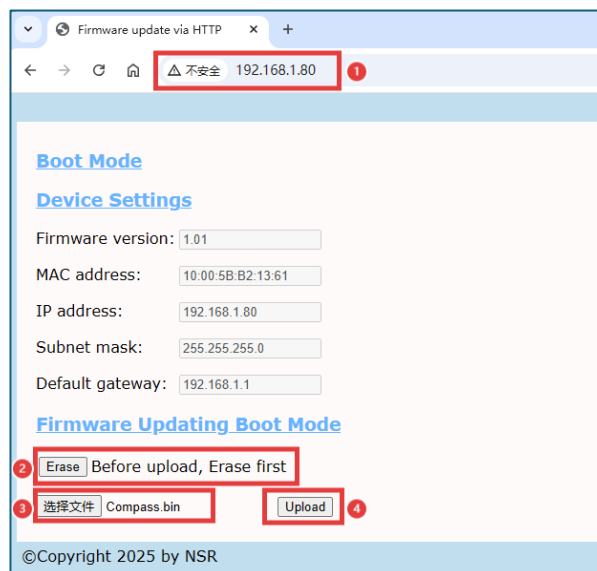
### Method 1: TFTP Upgrade

- a) Enter boot mode.
- b) Open the Update software on the computer. "STM32Update.exe".
- c) Set the device IP: 192.168.1.80, port: 69. As shown below:

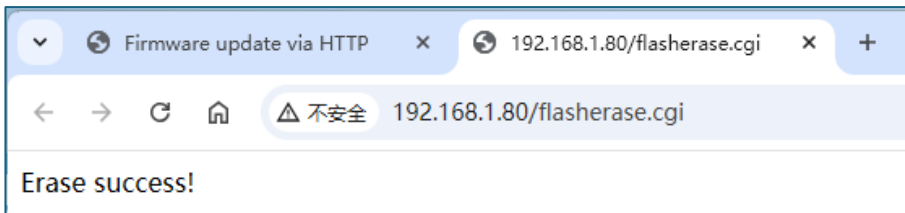


- d) Select the upgrade file and click "Put". After the upgrade is completed, the program will restart automatically.
- e) If the RUN LED doesn't blink after the upgrade, please manually click the button **RESET** first. If it still does not blink after resetting, please repeat the upgrade according to the steps.

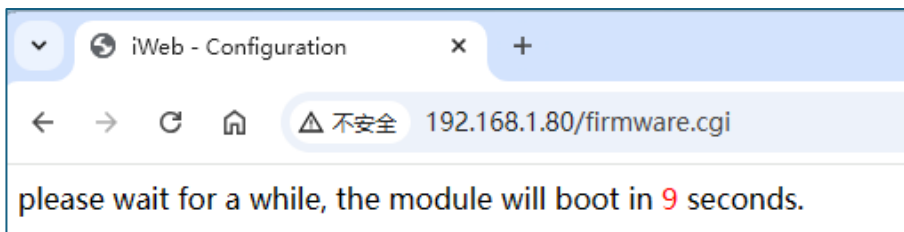
### Method 2: Web Upgrade



- a) Open the browser, enter 192.168.1.80, and enter the web upgrade interface.
- b) Before uploading for the upgrade, click "Erase" first.



- c) Open the **.bin** file (Note: it should be **.bin** format.),  
e.g., App\_NGC50X0\_2025103\_V107.bin.
- d) Click "Upload". After the countdown ends, the program will restart automatically. Meanwhile, the network connection will be disconnected.

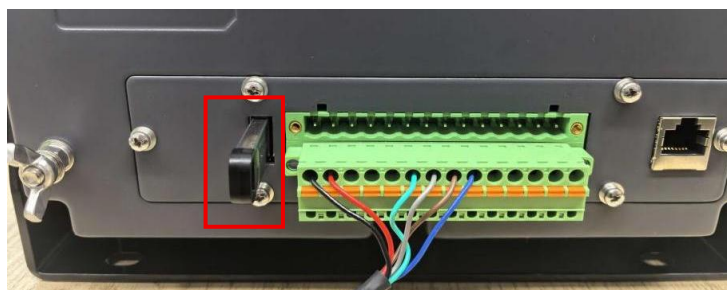


- e) If the RUN LED doesn't blink after the upgrade, please manually click the button **RESET** first. If it still does not blink after resetting, please reflash the upgrade according to the steps.

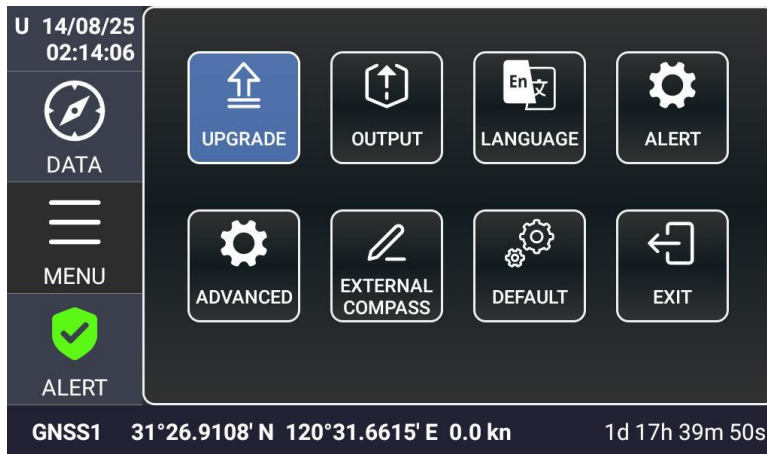
**If the upload fails, please first verify the connection. It should work normally when pinging 192.168.1.80 in cmd.**

## 2.1.2 Display unit (NGC-513)

- 1) Prepare a USB disk, copy the upgrade .apk to the USB disk,  
e.g., NGC-513\_Display\_20250813\_V106.apk.
- 2) Insert the USB disk into the display unit's USB port.



- 3) Enter the upgrade menu in [MENU]→[SERVICE]→[UPGRADE], password: 777777.



- 4) Click [UPGRADE], then the system will search for the apk, click the new software, and the system will upgrade automatically.

*Note: Do not remove the USB disk during the upgrade process.*



If "No flash driver found" appears, please try reinserting the USB disk and check the upgrade file.

- 5) Check the software version [MENU]→[DIAGNOSIS].

## 2.2 Replace the power module in the interface unit

- 1) Disconnect all connected communication cables.
- 2) Remove the fixing screws of the Interface PCB board and the shielding cover. Then take out the base plate.
- 3) Rotate the base plate 180° and remove the fixing screws of the power module located at the back of the base plate. (Please disassemble it according to the actual situation.)
- 4) Replace the new power module. First, install the shielding cover, then install the Interface PCB.



### 3. TROUBLESHOOTING

When one of the following conditions is detected, an alert will be generated:

ID	Ins	Cat	Prio	Escal	Resp	Alert Title	Alert description
3016	1	B	C	/	/	Loss of position	Loss of position - check GNSS
3016	2	B	C	/	/	Loss of speed	Loss of speed - check GNSS
3023	3	B	C	/	/	Power fail	Loss of main power
3023	4	B	C	/	/	Power fail	Loss of backup power
3062	5	B	W	W	Yes	System fault	Loss of heading - check compass unit
3062	6	B	W	W	Yes	System fault	Lost communication with compass unit

**Ins:** Instance of an alert;

**Prio:** Alert priority (W – Warning, C – Caution);

**Cat:** Alert category;

**Escal:** Alert escalation, W – An unacknowledged warning will be repeated as a warning after 3 minutes;

**Resp:** Transfer responsibility, the timeout is 90 seconds.

For alerts with a caution priority, the device will not produce any audible signals. Alerts with a warning priority will produce audible signals when activated and not acknowledged.

#### 3.1 Loss of position

It means that the interface unit cannot get valid GNSS sentences from the GNSS1/GNSS2 port.

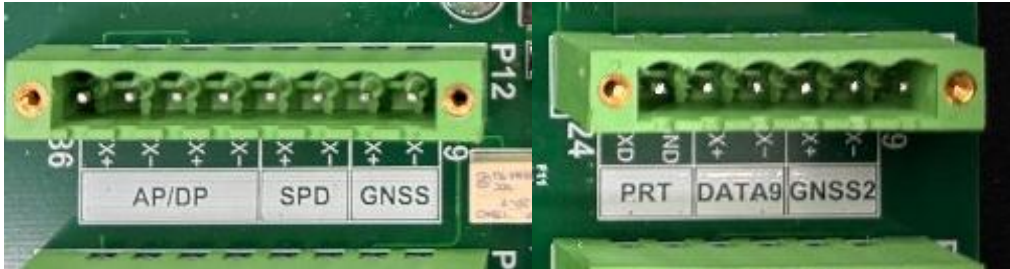
Check as follows:

- 1) Check in monitor: Click [MENU]→[MONITOR], select [GNSS1] / [GNSS2].



Check the GNSS sentences containing position information: RMC > GNS > GLL > GGA.

- 2) Verify that the GNSS receiver is operating normally.
- 3) Check whether the GNSS cable connection is loose.



- 4) Check the polarity of the signal cable. Attempt to swap the connections, then check as Step 1).
- 5) Check sentences on the cable with the RS422 checker (on computer/NMEA monitor).

## 3.2 Loss of speed

It means that the interface unit cannot get valid SDME sentences from the GNSS1/GNSS2/SPD port.

Check as follows:

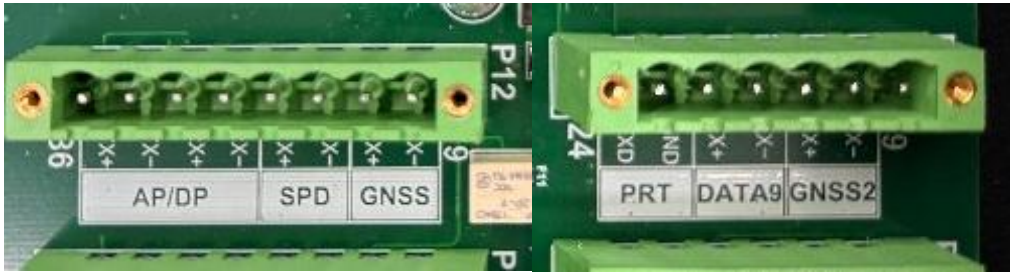
- 1) Check in monitor: Click [MENU]→[MONITOR], select [GNSS1] / [GNSS2]/[SPD].



Check the sentences containing speed: RMC > VTG > VBW (contains ground speed).

- 2) Verify that the GNSS receiver or Speed log is operating normally.

- 3) Check whether the cable connection is loose.



- 4) Check the polarity of the signal cable. Attempt to swap the connections, then check as Step 1).
- 5) Check sentences on the cable with the RS422 checker (on computer/NMEA monitor).

### 3.3 Loss of main power

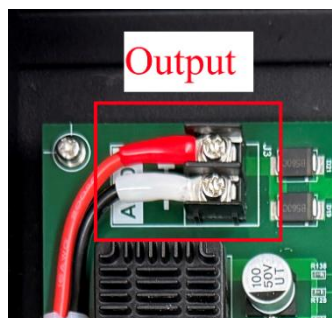
This means NGC-512 can not detect the power from the main power input.

Check as follows:

- 1) Check whether the AC power switch is on, and the light is on.



- 2) Measure the DC 24V output from the AC power module. If it is abnormal, please replace the power module.

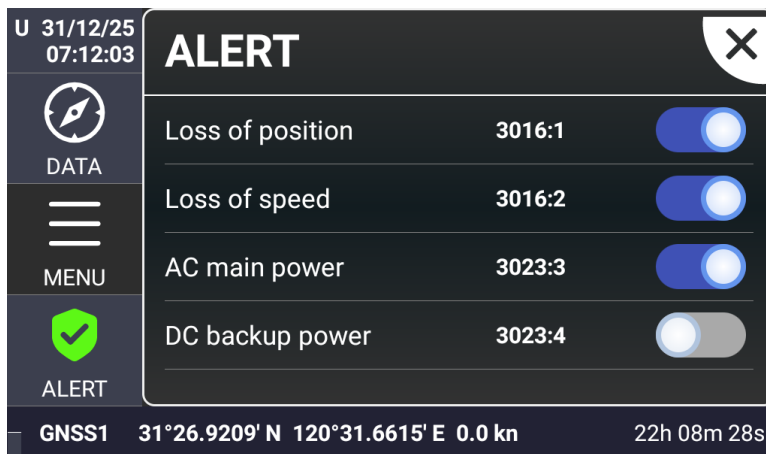


### 3.4 Loss of backup power

If the display unit shows “Loss of back power”, please check the connection cable of the backup power supply, and measure the voltage.



If back power is not in use, you can turn off the alert in [SERVICE]→[ALERT] on the display unit.



*Note: When backup power DC 24V is not in use, the AC power supply must include both main power and emergency power.*

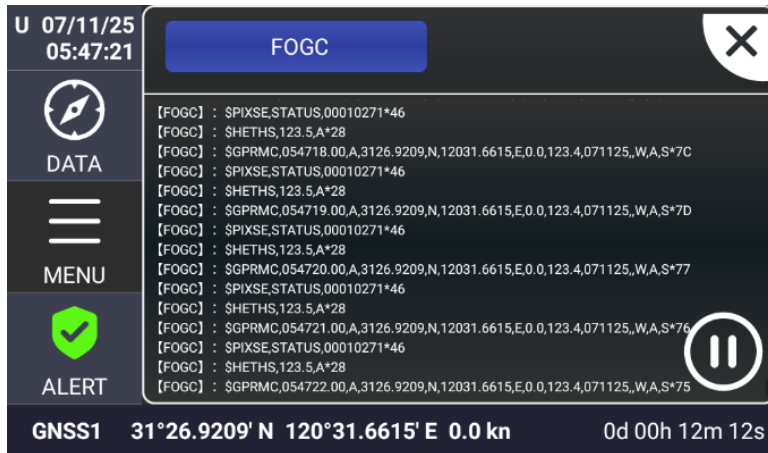
### 3.5 Loss of heading

This means that the interface unit cannot get valid heading info from the compass unit.

Check as follows:

- 1) Check whether the gyro-compass has been started for more than 10 minutes.
- 2) Click [MENU]→[MONITOR], select [FOGC] on the NGC-513 display unit.

Check whether there are valid Heading sentences input at the FOGC1 port.



### 3.6 Lost communication with the compass unit

This means that the interface unit lost communication with the compass unit.

Check as follows:

- 1) Please measure the **24V output** of the FOGC1 section on the interface unit.



- 2) Check the cable connections

The compass unit should be connected to **P2** of the interface unit.

Interface Unit		Compass Unit	
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
7	FOGC RX-	9 PIN-6	TX-
8	FOGC RX+	9 PIN-5	TX+
9	FOGC TX-	9 PIN-4	RX-
10	FOGC TX+	9 PIN-3	RX+
11	FOGC GND	9 PIN-2	GND
12	FOGC 24V	9 PIN-1	24V

- 3) Click [MENU]→[MONITOR], select [FOGC] on the NGC-513 display unit.  
Check whether there are valid sentences input at the FOGC1 port.
- 4) Use an external RS422 serial port, connect it to the 9-PIN connection cable of the compass unit, and check if there are sentences output from the gyro compass.  
Send a sentence of GNSS position data to start the compass.  
If there is data, replace the interface board. If not, please contact the after-sales service.



### 3.7 Lost communication with the display unit

The display unit shows " Not Connected ", which means that the display unit cannot communicate with the interface unit.



- 1) Check the running status.  
Please check the LED status on the PCB inside the interface unit. In normal conditions, the RUN LED keeps flashing every second.
- 2) Check the cable connections.

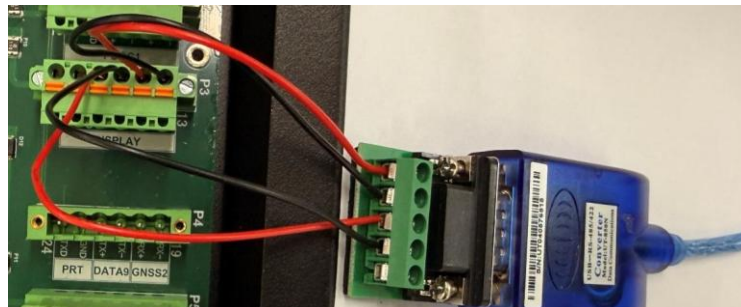
The display unit should be connected to P3 of the interface unit.

Interface Unit		Display Unit	
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
13	DISPLAY RX-	7	TX1-
14	DISPLAY RX+	6	TX1+
15	DISPLAY TX-	9	RX1-
16	DISPLAY TX+	8	RX1+
17	DISPLAY GND	1	0V
18	DISPLAY 24V	2	24V

### 3) Check the DISPLAY TX port of the interface unit.

Please use an external RS422 serial port cable to connect to the port and check on the computer if there is any data output. Baud rate is 115200bps.

- If there is data, it means that the problem lies in the display unit. Refer to Step 4).
- If not, it means a problem with the PCB of the interface unit. Replace the PCB.

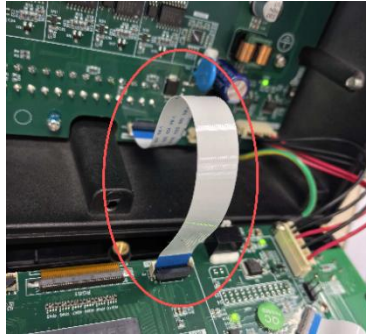


```

[09:48:21.282]IN+◆GNSS1$GPRMC:014820.11,A,3126.92090,N,12031.66150,E,0.000,0.051,0.220126,0.0,W,A,S*67
RTTC1$GPRMC:014820.11,A,3126.92090,N,12031.66150,E,0.000,0.051,0.220126,0.0,W,A,S*67
$HEHTS:055,0,A*2D
$TIDBT:0,0,A*3B
$HEHTS:055,0,A*2D
$HYBD:055,000,0,000,0,000,0,0000,0,000,*64
$GPRMC:014820.00,A,3126.9209,N,12031.6615,E,0.0,0.51,0.220126,,W,A,S*49
$GPVTG:51.0,T,M,0.0,N,K,A*17
$ _XDR:STX:59,2,0,1,0*09
$ _XDR:STA:1,1,1,1*34
$HEHTS:055,0,A*2D
$TIDBT:0,0,A*3B
RTTC1$HEHTS:55,0,A*1D
GNSS1$HEHTS:55,0,A*1D
$HEHTS:055,0,A*2D
$HYBD:055,000,0,000,0,000,0,0000,0,000,*64
$HEHTS:055,0,A*2D
$TIDBT:0,0,A*3B
$HEHTS:055,0,A*2D
$HYBD:055,000,0,000,0,000,0,0000,0,000,*64
$HEHTS:055,0,A*2D
$TIDBT:0,0,A*3B
$HEHTS:055,0,A*2D
$HYBD:055,000,0,000,0,000,0,0000,0,000,*64
$HEHTS:055,0,A*2D
$TIDBT:0,0,A*3B
    
```

#### 4) Check the display unit

Check that the display cable inside the display unit is not loose, as shown in the red circle in the figure. Try reinserting to ensure a secure connection and then restart. If the problem persists, replace the display unit.



## 4. FAQ

### 4.1 What are the requirements for the installation of the compass unit?

- It should be installed on a platform with good rigidity and small deformation. Preferentially choose a vibration-free area near the ship's center line and keep away from oil-polluted and dusty environments.
- Care must be taken when mounting the compass unit to ensure that there is sufficient space for cables and connectors. The cables should not be laid near or in parallel with other power cables.
- Observe the compass safe distances to prevent deviation of a magnetic compass.
- Master compass and any repeaters used for taking visual bearings shall be installed or adjusted in a ship with their fore and aft datum lines parallel to the ship's fore and aft datum line to within  $\pm 0.5^\circ$ . The lubber line shall be in the same vertical plane passing through the center of the card of the compass and shall be aligned accurately in the fore and aft direction. If an error exists after installation, you can correct it by adjusting the heading deviation on the display unit.

You can set the heading/pitch/roll deviation in [SERVICE]→[ADVANCED].



## 4.2 What environments should be avoided when installing the display unit?

- Locate the unit away from exhaust pipes and vents.
- The mounting location should be well-ventilated.
- Mount the unit where shock and vibration are minimal.
- Locate the unit away from equipment that generates electromagnetic fields, such as a motor or generator.
- Allow sufficient maintenance space at the sides and rear of the unit and leave sufficient slack in cables, to facilitate maintenance and servicing.
- Observe the compass safe distances to prevent deviation of a magnetic compass.
- The nominal viewing distance is 60 cm.

## 4.3 What are the key precautions for grounding operations?

- All system components (compass unit, interface unit, display unit) must be properly grounded to avoid malfunctions caused by live equipment casings.
- The grounding wire should be made of copper-core wire with a cross-sectional area of  $\geq 1.5\text{mm}^2$ .
- Spring washers and nuts must be used to secure the grounding wire to ensure reliable grounding.

## 4.4 What principles should be followed when connecting cables?

- It is strictly prohibited to plug in or unplug the cables of any unit when the equipment is powered on.
- Cables with different functions should be connected to the interfaces specified in the manual (for example, the compass unit is connected to P2, and the display unit is connected to P3 of the interface unit).
- Avoid sharp bends in the cables. Cables of specified specifications should be selected as required.

## 4.5 What are the limitations of the equipment when powered by DC24V only?

- When only a DC24V power supply is connected, the system can operate normally, but it will not supply power to the repeater.
- The backup power DC 24V is used to keep running when the main power is lost. If it is not in use, the AC power supply must include both main power and emergency power.

## 4.6 What startup modes does the device support?

- **Automatic mode:** When external GNSS data input is detected, the system automatically starts up and enters this mode. When lost position from GNSS, the system will enter manual mode.
- **Manual mode:** When there is no GNSS data, click [START] and manually input the latitude and longitude to startup. In manual mode, the system will calculate the location by itself and keep working. However, the heading accuracy will degrade. It is recommended to manually input the current position every two hours.

## 4.7 What should be noted during the startup period?

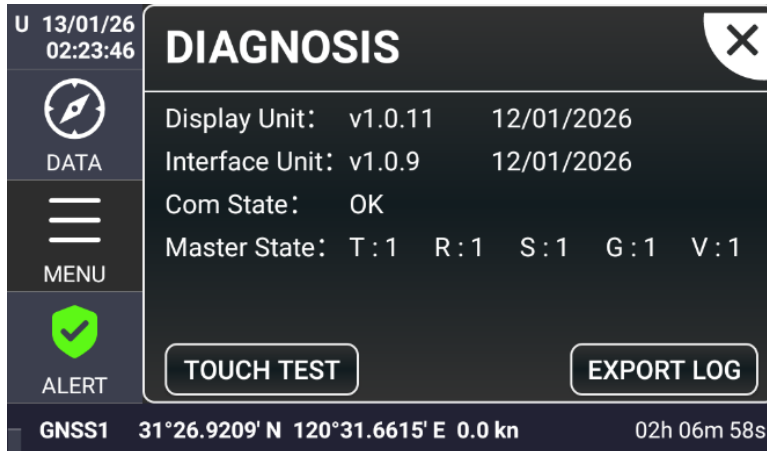
- After startup, it requires approximately 10 minutes to settle. Do not move the compass unit significantly before it stabilizes.
- During the stabilization period, the heading data may be displayed as invalid (in red). It will turn normal and become valid after the system completes initialization.

## 4.8 How do the main and backup power supplies switch?

- The device supports the input of an AC220V main power supply and a DC24V backup power supply. By default, the AC220V power supply is used preferentially.
- When the main power supply is interrupted, the system automatically switches to the backup power supply (the backup power supply interface needs to be connected in advance), and triggers a power failure alert (ID 3023).

## 4.9 How to export the system log?

- Insert the USB disk.
- Enter the [DIAGNOSIS] menu and click [EXPORT LOG], then the data log will be exported to the USB disk.



*Note: Disabled by default, if you need to use the [EXPORT LOG], please enable it manually in [menu] – [SYSTEM SETTING] - [Save log].*

## 4.10 How to connect the ready signal for DP?

The DP system usually requires a "ready" signal. The interface unit has a SYS contact signal that can be used as the output ready signal.

PIN NO.	DESCRIPTION	TYPE
88	SYS COM	Contact signal for ready and system fault. NC/NO can be switched by S4 on the PCB.
87	SYS ALM	



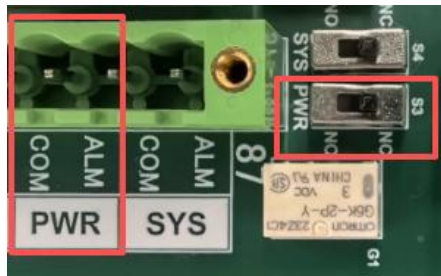
The status of this contact point is as follows:

S4	Situation	Status
NC	Ready (Startup > 10 min)	Open
	Alert: 3062 - System fault Total power lost Not ready (Startup < 10 min)	Close
	Alert: 3062 - System fault Total power lost Not ready (Startup < 10 min)	Open
NO	Ready	Close

## 4.11 How to connect the power loss signal?

There is a contact signal for total power lost.

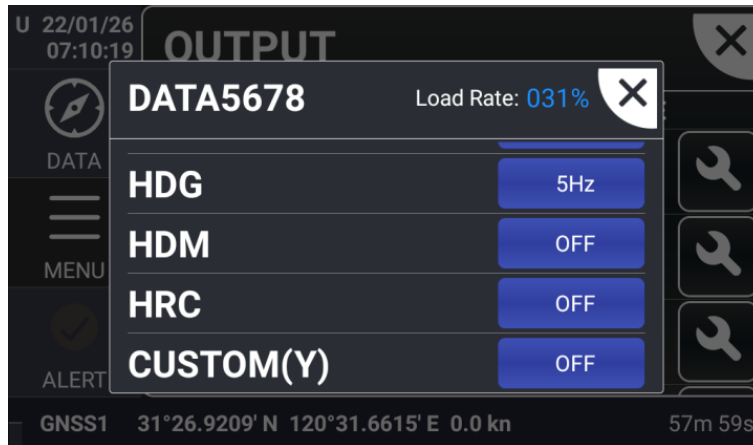
PIN NO.	DESCRIPTION	TYPE
90	PWR COM	Contact signal for power failure. NC/NO can be switched by S3 on the PCB.
89	PWR ALM	



S3	Situation	Status
NC	Power normal	Open
	Total power lost	Close
NO	Total power lost	Open
	Power normal	Close

## 4.12 How to configure outputs?

Get in [Service]→[OUTPUT] on the display unit. There are some kinds of outputs could be configured. Every output supports data format: THS, HDT, ROT(5Hz), HCR, HDM, HDG, HRC, Custom(A), Custom(T), Custom(Y). Please refer to Appendix I for details. The main difference is the baud rate.



Output	Baud rate
DATA 1-4	Fix to 4800 bps
DATA 5-8	2400, 4800, 9600, 19200, 38400, 115200 bps, configurable
DATA 9	2400, 4800, 9600, 19200, 38400, 115200 bps, configurable Linked to EXT Compass 1
REPEATER 1-4	Fix to 4800 bps
REPEATER 5-8	2400, 4800, 9600, 19200, 38400, 115200 bps, configurable
AP/DP	2400, 4800, 9600, 19200, 38400, 115200 bps, configurable
BACKUP	2400, 4800, 9600, 19200, 38400, 115200 bps, configurable

### 4.13 Maintenance cycle and maintenance content

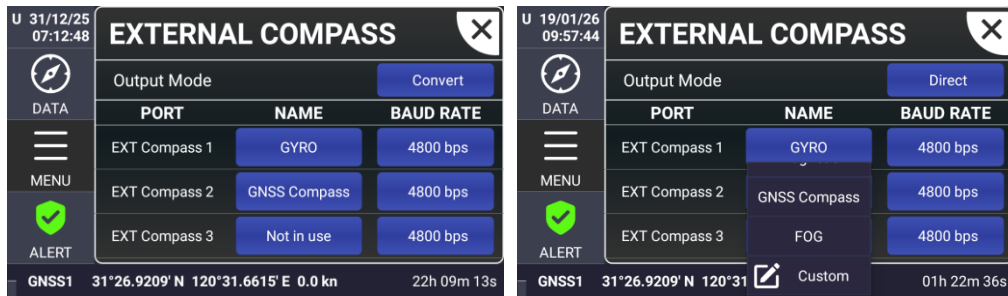
- Maintenance-free: The equipment is designed to be maintenance-free and does not require regular disassembly for maintenance.
- Daily maintenance: Keep the device clean, check whether the cable connections are secure, ensure reliable grounding, and check the alerts.

### 4.14 How to connect an external compass?

NGC-50X0 has three external compass input ports on the P1.

PIN NO.	DESCRIPTION	TYPE
6	RX1+	IEC 61162-1/2
5	RX1-	THS > HDT >HDM ...
4	RX2+	IEC 61162-1/2
3	RX2-	THS > HDT >HDM ...
2	RX3+	IEC 61162-1/2
1	RX3-	THS > HDT >HDM ...

After connecting the cables, set the baud rate of the signal on the display unit. You can also set a name to distinguish it.



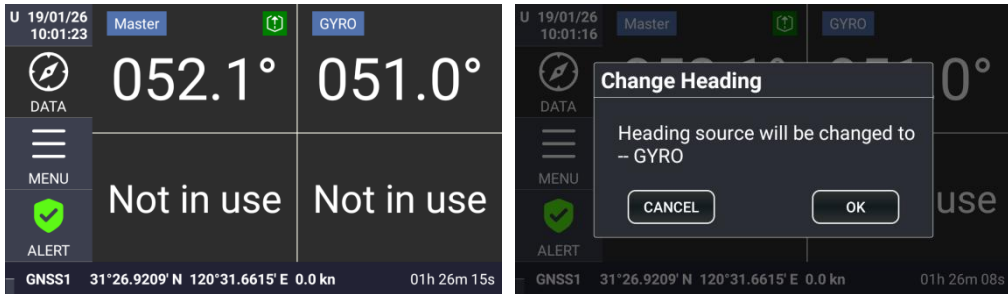
[Output mode] can be set as **DIRECT** and **CONVERT**. This is the sentence output mode when an external compass source is selected as the heading source.

- **DIRECT**: Default setting, the system will forward the external compass sentences directly. This is the standard application.
- **CONVERT**: System will convert the external compass sentences into the sentences configured in **Section 4.12**. This mode enables the data to be compatible with the connected devices.

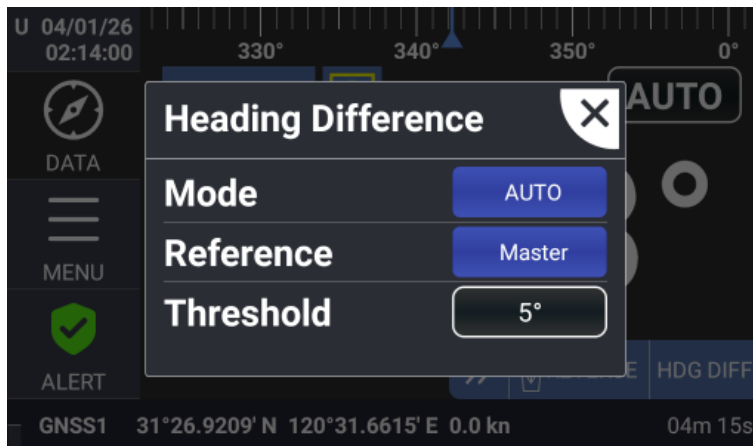
You may first check the input data on the monitor. EXTC1 - EXT COMPASS RX1.



When an external compass signal is detected, data from the external compass will be shown in [ALL headings] on the display unit. Click the heading to change the heading source.



After an external compass signal is connected, you can also enable the heading difference monitoring, as described in the User Manual / Section 2.6.2.



## 4.15 How to connect the second compass unit?

### Applicable Version Instructions

Display Unit: Version v1.0.13 and above (Release Date: 10/02/2026)

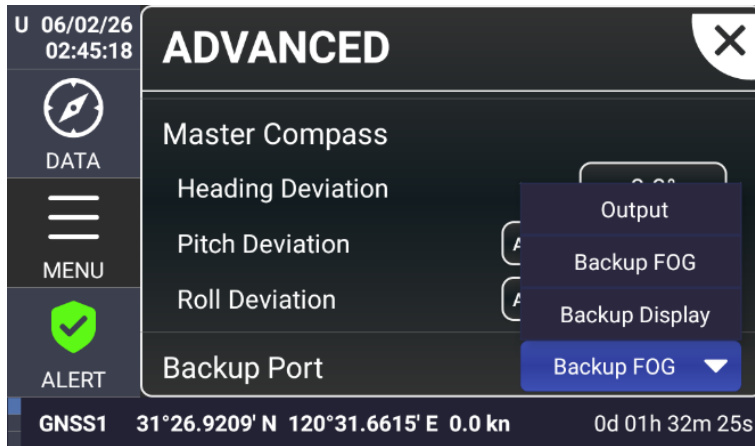
Interface Unit: Version v1.0.10 and above (Release Date: 10/02/2026)

*Note: The use of this function is restricted by version compatibility.*

The second compass unit should be connected to **P5** of the interface unit.

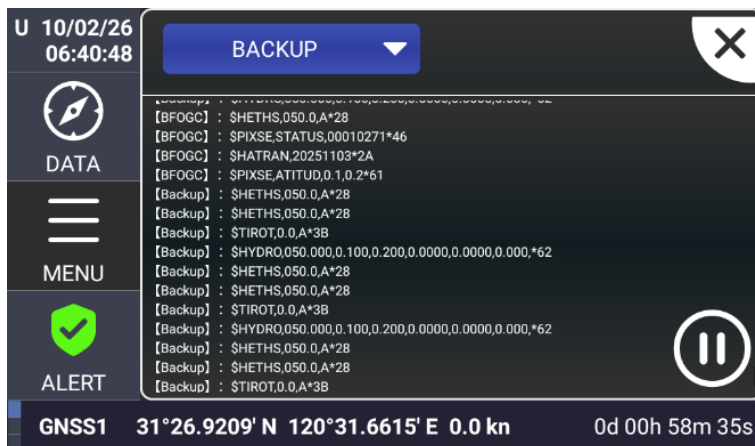
Interface Unit		Compass Unit	
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
25	BACKUP RX-	9 PIN-6	TX-
26	BACKUP RX+	9 PIN-5	TX+
27	BACKUP TX-	9 PIN-4	RX-
28	BACKUP TX+	9 PIN-3	RX+
29	BACKUP GND	9 PIN-2	GND
30	BACKUP 24V	9 PIN-1	24V

On the [MEUN]→[SERVICE]→[ADVANCED] window, configure the Backup Port as [Backup FOG].

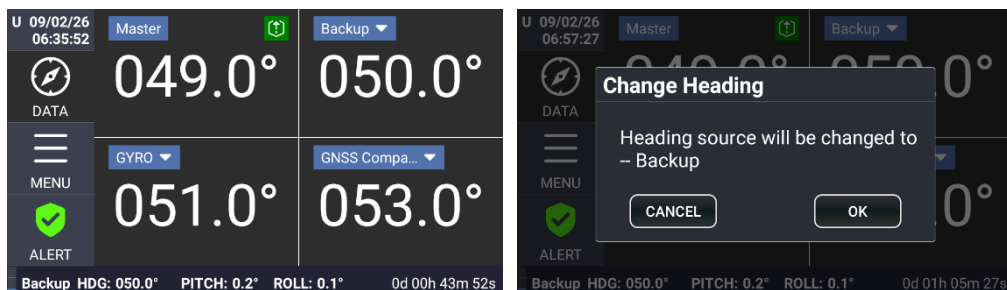


After setting, the baud rate of the Backup port will be changed to 115200.

You can check the input data on the monitor. BACKUP - BACKUP COMPASS:



When a backup compass signal is detected, data from the backup compass will be shown in [ALL headings] on the display unit. Click the heading to change the heading source.



When the heading of the main compass fails, if a backup compass is connected, the heading source will automatically switch to the backup one. The same applies if the backup compass fails.

When there is no data has been detected or unavailable, the system will display the following notification.



**Backup Compass Failure:** Either the backup compass data is unavailable or no data has been detected.

**Backup Compass – TX Failure:** The interface unit to the backup compass is abnormal.

## 4.16 How to connect the second display unit?

### Applicable Version Instructions

Display Unit: Version v1.0.13 and above (Release Date: 10/02/2026)

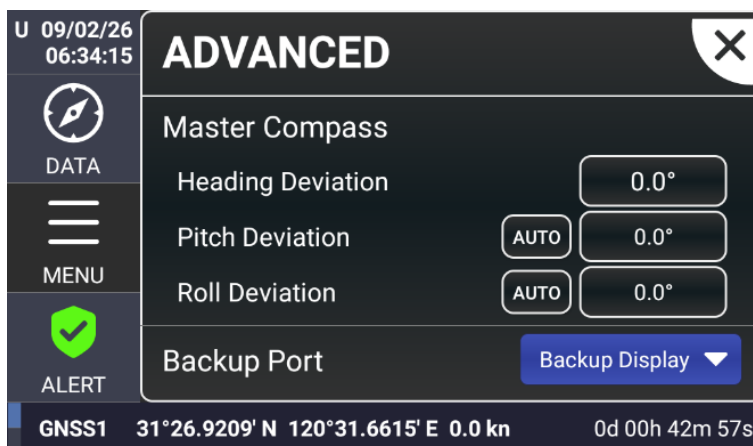
Interface Unit: Version v1.0.10 and above (Release Date: 10/02/2026)

*Note: The use of this function is restricted by version compatibility.*

The second display unit should be connected to **P5** of the interface unit.

Interface Unit		Display Unit	
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
25	BACKUP RX-	7	TX1-
26	BACKUP RX+	6	TX1+
27	BACKUP TX-	9	RX1-
28	BACKUP TX+	8	RX1+
29	BACKUP GND	1	0V
30	BACKUP 24V	2	24V

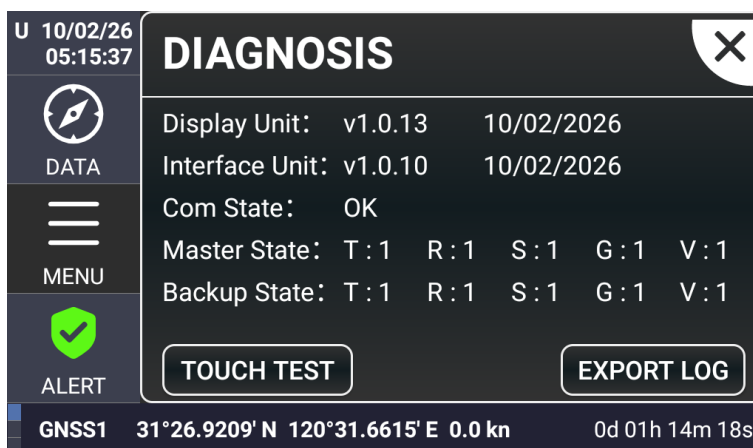
On the [ADVANCED] window of the main display unit, configure the Backup Port as [Backup Display].



You can perform any operation on the Backup display, just like on the main display.

*Note: The [Backup Port] cannot be set in the Backup Display Unit.*

## 4.17 How to read the status in DIAGNOSIS?



Item	Description
Com State	OK - Communication with the interface is normal
	Err - The COM1 serial port of the display unit is faulty
	Tx Fail - The TX1 serial port of the display unit fails to send
	Rx Fail- The RX1 serial port of the display unit fails to receive
Master State Backup State	0 - Error / Not obtained, 1 - Normal
	T: Tx, the status from the interface unit to the compass unit
	R: Rx, the status from the compass unit to the interface unit
	S: System, working state of the compass unit
	G: GNSS, state of GNSS sentences received by the compass unit

## 4.18 How to connect NDC-100

### Applicable Version Instructions

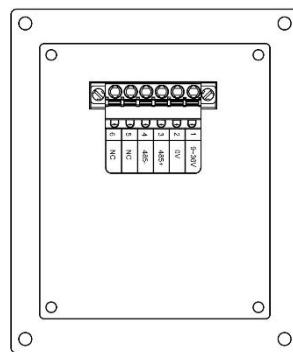
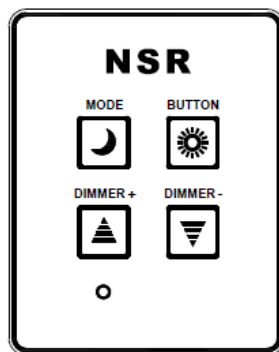
Display Unit: Version v1.0.13 and above (Release Date: 10/02/2026)

Interface Unit: Version v1.0.10 and above (Release Date: 10/02/2026)

*Note: The use of this function is restricted by version compatibility.*

The cable connection is shown below:

NDC-100 DIMMER CONTROLLER		NGC-513/NGC-514 Display Unit/Remote Unit	
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	9~36V	18	12V OUT
2	0V	19	GND OUT
3	485+	22	RX3+
4	485-	23	RX3-



Key	Description
MODE	Unavailable. Reserved for future day/night mode.
BUTTON	Adjust the backlight brightness of NDC-100 keys.
DIMMER+	Increase the brightness of the display unit.
DIMMER-	Reduce the brightness of the display unit.

## APPENDIX DATA FORMAT

### HDG - Heading, deviation and variation

\$HCHDG,x.x,,,\*hh<CR><LF>

```

|
+-----1
    
```

1. Heading, degrees true

Example: \$HCHDG,012.3,,,\*42<CR><LF>

### HDM - Heading, Magnetic

\$HCHDM,x.x,M\*hh<CR><LF>

```

| |
| +-----2
+-----1
    
```

1. Heading, degrees true

2. Magnetic

Example: \$HCHDM,012.3,M\*29<CR><LF>

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