



Operation & Installation Manual

STEERING REPEATER COMPASS

NGC-518




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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.

MODIFY RECORD

No	Modify by	Date	Paragraph	Version	Reason
1	Q/A	2026/01/21		01	First edition

SAFETY INSTRUCTIONS FOR THE OPERATOR

	<p>Warning Keep away from heat sources or direct sunshine. For the safety of the ship, it is prohibited to interrupt or arbitrarily the power supply to the compass during navigation.</p>
	<p>Prohibition Don't open the equipment. Don't disassemble or try to modify the equipment.</p>
	<p>Dangerous Turn off the power immediately when smoke or fire is emitted.</p>

SAFETY INSTRUCTIONS FOR THE INSTALLER




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

TABLE OF CONTENTS

1. PRODUCT OVERVIEW	1
1.1 Product Purpose.....	1
1.2 Product Features.....	1
2. INSTALLATION AND OPERATION	2
2.1 Installation	2
2.2 Basic Operation.....	2
2.2.1 Startup indication.....	2
2.2.2 Self-check.....	2
2.2.3 Enter the normal working condition.....	3
2.2.4 Brightness adjustment.....	3
2.2.5 Close the compass	3
2.3 Settings and Calibration.....	3
2.3.1 Manually start self-check.....	3
2.3.2 Enter the setting mode	4
2.3.3 Check mode.....	4
2.3.4 Calibration mode	4
2.3.5 Scan mode.....	5
2.3.6 Exit the setting mode.....	5
3. MAINTENANCE AND REPAIR	6
4. TECHNICAL SPECIFICATIONS	7
APPENDIX I DATA FORMAT	8
APPENDIX II SIZE DRAWING.....	9

1. PRODUCT OVERVIEW

1.1 Product Purpose

NGC-518 is a steering repeater compass. After receiving the heading information from the compass (FOG/GYRO/magnetic compass/GNSS Compass), it can be used to display the heading of the ship.

1.2 Product Features



- **High-Precision Indication:** With a resolution of 0.1° and a reading accuracy of 0.5° , it ensures high reliability of navigation data.
- **Dual Display Mode:** Equipped with both 360° analog dial indication and 4-digit LED digital display. The scale dial offers adjustable brightness for measuring target bearings, with a digital display ensuring rapid and precise readings.
- **Wide Compatibility:** Supports RS422 interface (complying with IEC 61162-1 / NMEA-0183), compatible with HEHDT, HCHDT, HCHDG, and HCHDM sentences, and can be connected with various gyrocompasses and magnetic compasses.
- **Stable Performance:** The housing is made of die-cast aluminum with IP44 protection level. Designed for indoor environments, it features good dustproof, waterproof and anti-interference performance.
- **Multi-Functional Buttons:** Integrated with three functions - brightness adjustment, dial synchronization matching, and setting calibration, easy to operate and meet different usage needs.

2. INSTALLATION AND OPERATION

2.1 Installation

There is one data interface (IEC 61162-1/NMEA 0183) for receiving heading information. The parameters for this interface of RS422:

- baud rate: 4800bps
- 1 start bit
- 8 data bits
- no polarity check
- 1 stop bit

The data formats HDT, HDG and HDM are supported automatically. For details, refer to Appendix I.

For the connection with the compass, for example:

NGC-518 Steering Repeater Compass		NGC-512 Interface Unit of NGC-50X0	
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
Green	RX-	31	TX-
White	RX+	32	TX+
Black	GND (24V-)	33	GND
Red	DC24V (24V+)	34	24V

2.2 Basic Operation

When the equipment is powered on, it will automatically perform a self-check. After the self-check is completed, it will indicate the heading information.

2.2.1 Startup indication




: The power supply is on, perform a self-check.

2.2.2 Self-check



: After the self-check, the automatic calibration is matched. At the beginning, the compass card slowly rotates, stops at a certain position and the 000.0 position, and then enters the normal working state, indicating the heading of the ship.


Note: After automatic calibration and matching, the compass card reading should be basically consistent with the digital display reading.


: If this symbol appears, it indicates: self-check, automatic matching correction failed.

Err 1: The set signal was not received within 30 seconds.



Err 2: Adjustment button is on.

2.2.3 Enter the normal working condition

: After a few seconds, the system will automatically match the correction and enter the normal operation.

: If this symbol appears, it indicates that no effective heading signal was received within 3s.

2.2.4 Brightness adjustment



Press  or  button to adjust the brightness of the digital display and the compass card.

2.2.5 Close the compass

Disconnect the power supply.




2.3 Settings and Calibration

2.3.1 Manually start self-check

Press the buttons   together to start the self-check. When the compass card stops at a specific position, the self-check is complete.


Note: After the automatic self-check, the compass card should be basically consistent with the digital display reading.


2.3.2 Enter the setting mode


Press the buttons   together and hold for more than 5 seconds until the  appears. Then release the buttons.

Press  or  button to select setting items:

 (CHEC): Check mode.






 ([-|-]): Calibration mode.

 (Scan): Dynamic scan mode.






 (Quit): Exit the setting mode.

Then press the buttons   together to select the item.

2.3.3 Check mode







Select check mode . Then press the buttons   together to enter the check mode: the dial returns to 000.0, and the digital display shows 000.0. Press  or  button will increase or decrease the indicated step distance by 0.1 degrees. When keeping pressing the up/down buttons, the compass card will keep rotating. Releasing the button to stop. Press these two buttons together to set. Check if the digital display and dial reading change in sync. If the deviation exceeds 0.2 degrees, return to calibration mode to adjust.

2.3.4 Calibration mode






Select Calibration mode . Then press the buttons   together to enter the calibration mode. Use  or  button to adjust the compass card until it matches the digital display.

Press these two buttons together to confirm the calibration of the compass card. After calibration, enter Check mode to verify calibration results and ensure digital display changes in sync with dial readings.


2.3.5 Scan mode

Select scan mode . Then press the buttons   together to enter the scan mode. After the compass card turns to its specific position, the digital display starts at 000.0 and rotates back and forth continuously in a 5-degree advance and 3-degree retreat manner to check if there is any step loss during the scanning process. If a lost step is detected, the scan results will be shown: . Press the buttons   together to exit the scan mode. The compass will return to normal operation after 5s.

2.3.6 Exit the setting mode

In the setting mode, press  or  button until the  appears. Then press the buttons   together to exit the setting mode. After exiting, the compass will enter automatic correction matching mode.

3. MAINTENANCE AND REPAIR

Display	Probable Reason	Remedy
	Mistakes in the sentence	Check input sentences. Refer to Appendix I.
	Connection error	Check the connection. Refer to Section 2.1.
	Heading is invalid	Check the heading source.

Note: NGC-518 cannot be repaired and needs to be replaced entirely.

4. TECHNICAL SPECIFICATIONS

No.	Item	Description
1	Mechanical parameters	Resolution: 0.1° Reading accuracy: 0.05° IP grade: IP44
2	Electrical parameters	Voltage: 24V Power Consumption: About 2W Interface: RS422, 4800bps
3	Ambient temperature	-25°C to + 70°C
4	Compass Safe Distance	Standard: 0.55m, Steering: 0.35m
5	Size	192 (W) x 192 (H) x 126.5 (D) mm Refer to the appendix drawings.
6	Weight	About 2.1kg

APPENDIX I DATA FORMAT

HDT - Heading true

```
$--HDT,x.x,T*hh<CR><LF>
  | |
  +-+-----1
```

1. Heading, degrees true

Note: Talker ID "--" could be HE/HC

HDG - Heading, deviation and variation

```
$--HDG,x.x,x.x,a,x.x,a*hh<CR><LF>
  |  | |  | |
  |  | |  +-+-----3
  |  +-+-----2
  +-+-----1
```

1. Magnetic sensor heading, degrees

2. Magnetic deviation, degrees E/W

3. Magnetic variation, degrees E/W

Note: Talker ID "--" should be HC

HDM - Heading, Magnetic

```
$HCHDM,x.x,M*hh<CR><LF>
  | |
  | +-+-----2
  +-+-----1
```

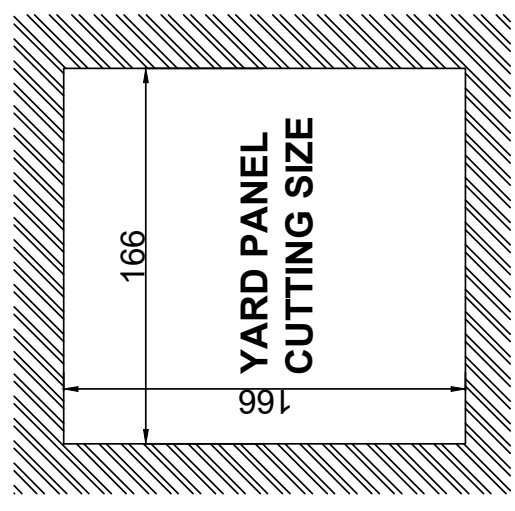
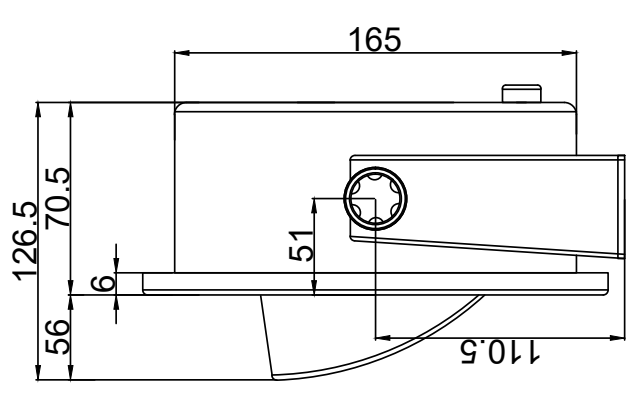
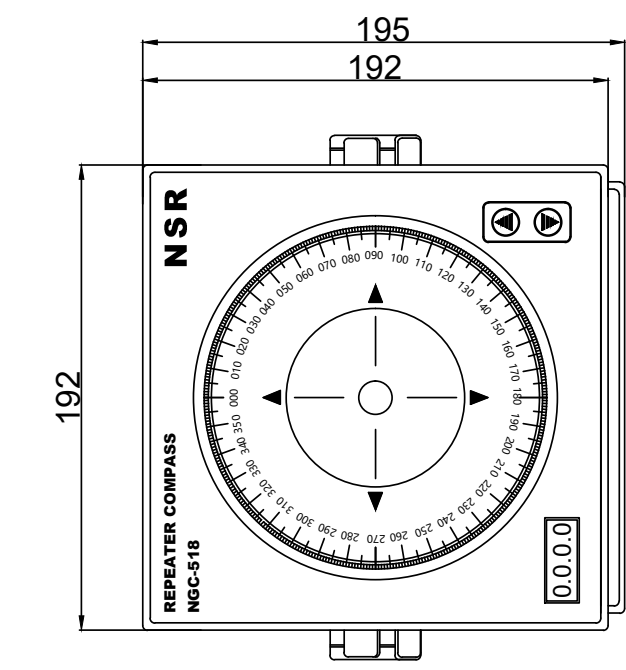
1. Heading, degrees

2. Magnetic

Note: Talker ID "--" should be HC

APPENDIX II SIZE DRAWING

NO.	DATE	REVISION & DESCRIPTION	CHECKED	DRAWN

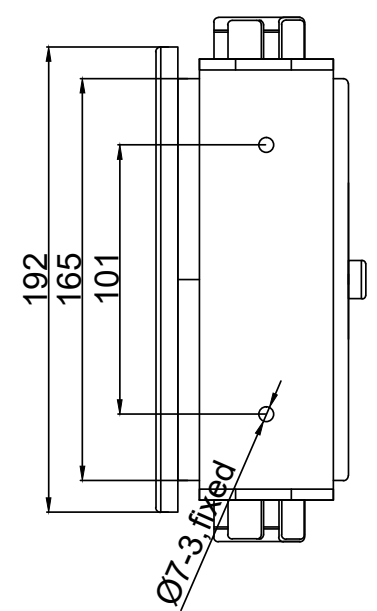


NGC-518 STEERING REPEATER

NGC-512 INTERFACE UNIT

RED	DC24V
BLACK	GND
WHITE	RX+
GREEN	RX-
YELLOW & GREEN	GND

24V	RED
GND	BLACK
TX+	WHITE
TX-	GREEN



APPLICATION: NGC-518 STEERING REPEATER SIZE DRAWING

DATE	ITER	DATE	DATE	DATE	DATE	DATE	DATE

APPROVAL: NEW SUNRISE CO., LTD.

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