JRC

ALPHATRON Marine

# AlphaMidiCourse

## Gyro Compass

## Installation and Operation Manual

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# Contents

# I Preface

The AlphaMidiCourse Gyro compasses have been designated for any size of vessel to enhance the navigation capabilities and reliability. The gyro compasses eliminate the inconvenience and limitations of magnetic compasses, and provide a variety of electrical outputs to supply accurate and consistent heading information to other navigational equipment.

- The AlphaMidiCourse Compact gyro is designed for vessels with speeds of up to 50 knots.
- The AlphaMidiCourse complies with IMO A.424 (11) and Wheel Mark Specifications.

## I.1 Revision History

| Revision Nr. | Description | Date |
|---|---|---|
| V1.0 | First Issue | 19 February 2016 |
| V1.1 | Update Dip switch settings for HDT/THS | 24 September 2018 |
| V1.2 | Textual change, update part numbers | 27 March 2019 |
| | | |

## I.2 Points of Attention

1. Thoroughly read this instruction manual before installation and operation of the equipment.
2. We recommend to keep this manual nearby the equipment to ensure ready access to it. Assign a person in charge for maintaining this manual in an assigned place.
3. Users of this manual are assumed to be qualified personnel according to governmental law for ship's officers, or the corresponding laws.
4. Relevant drawings of the As Built plan of this system should be kept together.
5. Only qualified personnel as described above, or personnel under the supervision of a qualified person should operate this system. Do not permit unqualified personnel operate this system.
6. If the manual is lost, request a new copy from ALPHATRON MARINE.
7. If labels become unreadable, or detached, request new ones from ALPHATRON MARINE.

## I.3 Glossary

The meaning of standard definitions and terms as used in this manual are explained in the table of Definitions *Table 1: Table of Definitions* on page 6.

| Definition | Explanation |
|---|---|
| External Heading Sensor | General term for the Heading Detection Sensor for Magnetic Compass System, Electronic Compass, GPS Compass, etc. |
| External Heading Sensor Signal Processing Unit | Optional unit to this system. It enables to completely backup several circuits of the repeater signal (step signal / serial signal) by attachment of this unit when connected to the external sensor. |
| Fixed Error | Error between this system and keel line depending on the installation. |
| Last Azimuth | This system can set and detect last azimuth of previous stop time. According to this operation, system settling time can be reduced when started the system again. |
| Leveling operation | Operation to keep the sensor horizontal |
| Magnetic Compass System | The heading detector is mounted on the magnetic compass and detected heading signal from the heading detector is sent out as repeater signal and serial signal. |
| Rate of Turn | Speed of ship's turning |
| Sensitive Element | Element to detect north of own ship |
| Speed Error Correction | Gyro-compass generates error from the North depending on the speed and position of ship's navigation. This system automatically calculates and corrects this error using speed and position data. |
| Step Signal | Three phase signal with resolution of 1/6°. Voltage is 24 V standard. 70 V / 35 V output can be put out by expanding with the optional unit. |

**Table 1: Table of Definitions**

## I.4 Storage

Observe the following items when storing:

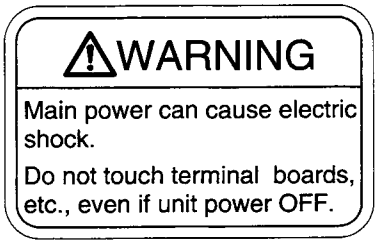
1. Turn all power switches of this system to the OFF position to disconnect the power.
2. Storage temperature should be between –20℃ to +55℃.
3. Avoid a place with high humidity as much as possible.
4. Prevent the storage place from generating corrosive gas, breeding of bacteria such as mold or intrusion of insects and small animals.
5. Cover the system with a plastic sheet, etc., when generation of dust is foreseen. When welding works, etc., are carried out near this system, provide suitable protection to prevent damage caused by sparks, etc.

# II Caution

To safely install and operate this instrument, so as not to adversely affect the warranty, the WARNINGS and CAUTIONS must be adhered to.

## II.1 Warning Label

The following warning label is attached to this system.




## II.2 Location Warning Label

The warning label is attached to the inside of the door of the Control Panel. See *Figure 45: Stand alone type Control Unit of One Gyro Compass System* on page 72

## II.3 Cautions

- WARNING - Clarification
- Indicates potential risk of injury or death to users of the product.

- WARNING - Operations
- Improper operations caused by failure of this product, or malfunctions caused by operator's misunderstanding may cause collision or grounding and may result in property damage and environmental pollution. Also, death or serious injury may happen.
- Full attention must be paid in the use of this product by understanding its limitations in performance and characteristics. Thoroughly familiarize yourself with the operation of this product.

- WARNING - Operations
- Carefully observe the CAUTIONS and WARNINGS prior to starting up and operating this product.
- Read the Operator Manual of the automatic steering system carefully and prepare for the occurrence of trouble or alarm in this product. Ensure the emergency steering method is well understood to quickly respond to trouble.

- WARNING - Maintenance
- During maintenance or check of the product, touching internal parts may cause electric shock, because the ship's power supply is still connected to the system distribution board, even if the main power switch of this product is turned "OFF". Do not touch internal parts such as terminal boards, power supply unit, etc. If necessary, disconnect the power cable from the ship’s distribution board. A warning label is attached to point out this danger.

- WARNING
- Matters requiring attention in starting up and operations during progress are described in chapter Operations and are punctuated with a CAUTION or a WARNING, which must be strictly observed.
- Attentively read the Operator Manual of the automatic steering system carefully preparing for occurrence of trouble or alarm in this system. The emergency steering method should be well understood to easily respond to failures, or alarms.

- WARNING - Power Supply Failure (alarm code 1)
- Pay full attention to avoid electric shock when checking the power supply.
- When checking fuses, turn "OFF" the power switch on the operating panel and further disconnect the power cable from the ship’s distribution board before checking fuses.

- WARNING - Inverter Failure (alarm code 3)
- When checking fuses, turn "OFF" the power switch on the operating panel and disconnect the power cable from the ship's Distribution Terminal Board.

- WARNING
- When checking fuses, turn "OFF" the power switch, and further disconnect the power cable from the ship's distribution terminal board.

- CAUTION - Clarification
- Indicates potential risk of damage to equipment.

- CAUTION - Prohibition
- Do not use insulation tester or other device to test system insulation as it will damage internal electrical components. Always disconnect the wiring connected to this system before testing related power distribution lines with such testers.

- CAUTION - General use
- This system displays Gyro Compass heading and outputs the heading information externally. Although the safety design such as the alarm function against failure, etc., is provided, at the present time there is no perfect safety design. In addition, as this system has many important functions, it is hard to say that any one can use this system without failure. Failures or malfunctions of this system may cause distress, and full attention should be paid in using this product. The use of this equipment does not absolve the user's responsibility and obligation in practicing proper navigational techniques.
- Observe the following CAUTIONS:
- Always perform daily check to maintain normal system condition.
- When anomalies are detected as a result of daily checks, investigate and repair at once to restore to normal conditions and request advice from Alphatron service engineer.
- When the alarm system is activated during use, always check to confirm the cause and reinstate.

- CAUTION - Types of Alarm
- When an alarm regarding GPS (alarm code "c" or "d") is activated and the Gyro Compass' True Heading has not been determined, first turn the steering mode to "MANUAL", or "Non Follow Up", then determine the True Heading, because wrong heading information (repeater signal and serial signal) may be sent out.
- When an alarm regarding LOG (serial) (alarm code "P" or "U") is activated and the Gyro Compass' True Heading has not been determined, first turn the steering mode to "MANUAL" or "Non Follow Up", then determine the True Heading, because wrong heading information (repeater signal and serial signal) may be sent out.
- When an alarm regarding LOG Contact (alarm code "u") is activated and the Gyro Compass' True Heading has not been determined, first turn the steering mode to "MANUAL" or "Non Follow Up", then determine the True Heading because wrong heading information (repeater signal and serial signal) may be sent out.
- When an alarm regarding the EXTERNAL HEADING SENSOR (alarm code "E", "F", "L" and "N") is activated, the heading information immediately before the alarm was activated is sent. First turn the steering mode to "MANUAL" or "Non Follow Up", and then determine the true heading. Once True Heading has been determined, the system's heading is sent out.
- When the system is turned on, first turn the automatic steering system to "MANUAL" or "Non Follow Up" to prevent course turning with larger angle.

- CAUTION - Start Up
- Start up this product after turning the automatic steering system to other mode than "AUTO".

- CAUTION - Setting Latitude Input
- Change of the latitude input system, or a large change of latitude value may cause a large change in the True Heading. When on automatic steering, first turn the steering mode of the automatic steering system to "MANUAL" to prevent a large change of course. Confirm the area around the ship is clear and turn to "AUTO" steering again.

- CAUTION - Setting Latitude Input
- When an alarm regarding GPS (alarm code "c" or "d") is activated and the Gyro Compass' True Heading has not been determined, first turn the steering mode to "MANUAL", or "Non Follow Up", then determine the True Heading, because wrong heading information (repeater signal and serial signal) may be sent out.

- CAUTION - Setting Latitude Input
- When "GYRO" is selected for the latitude input system, latitude is automatically updated by the ship's speed and the Gyro Compass True Heading. (When the ship's speed input system is "MANUAL", it is not updated automatically.) During navigation, confirm once every two hours that the ship's actual latitude coincides with the indicated latitude.

- CAUTION - Setting Latitude Input
- Press ACK/ENT switch (4) to complete the setting. Changed setting is not updated unless pressing ACK/ENT switch (4).

- CAUTION - Setting Speed Input
- Change of the ship's input system or large change of ship's speed may cause large change of the True Heading. When on automatic steering, first turn the steering mode of the automatic steering system to "MANUAL" to prevent a large course change. Confirm the area around the ship is clear and turn to "AUTO" steering again.

- CAUTION - Setting Speed Input
- When an alarm regarding GPS (alarm code "c" or "d") is activated and the Gyro Compass' True Heading has not been determined, first turn the steering mode to "MANUAL", or "Non Follow Up", then determine the True Heading, because wrong heading information (repeater signal and serial signal) may be sent out.

- CAUTION - Setting Speed Input
- When an alarm regarding LOG (serial) (alarm code "P" or "U") is activated and the Gyro Compass' True Heading has not been determined, first turn the steering mode to "MANUAL" or "Non Follow Up", then determine the True Heading, because wrong heading information (repeater signal and serial signal) may be sent out.

- CAUTION - Setting Speed Input
- When an alarm regarding LOG contact (alarm code "u") is activated and the Gyro Compass' True Heading has not been determined, first turn the steering mode to "MANUAL" or "Non Follow Up", then determine the True Heading, because wrong heading information (repeater signal and serial signal) may be sent out.

- CAUTION - Setting Speed Input
- The setting of the ship's speed input system (and its values for "MANUAL") is automatically saved. When re-starting, the previous ship's speed system setting is activated. When "MANUAL" is selected, stop after ship's speed setting is set to zero knots. Also, when turning off and on again with "GPS" selected, confirm that GPS is operating properly.

- CAUTION - Setting Speed Input
- Press ACK/ENT switch to complete the setting. Changed setting is not updated unless pressing ACK/ENT switch.

- CAUTION - Setting "Rate of Turn Filter Constant"
- Press ACK/ENT switch to complete the setting. Changed setting is not updated unless pressing ACK/ENT switch.

- CAUTION - Confirmation True Heading
- When the Gyro Compass' True Heading is set again, the repeater indication value and the serial signal Gyro Compass True Heading will change by the altered angle. When on automatic steering, first turn the steering mode of the automatic steering system to "MANUAL" to prevent a large course change. Confirm the area around the ship is clear and turn to "AUTO" steering again.

- CAUTION - Confirmation True Heading
- Press ACK/ENT switch to complete the setting. Changed setting is not updated unless pushing ACK/ENT switch.

- CAUTION - System Selection
- System selection (switching) may cause a large change of True Heading. When on automatic steering, first turn the steering mode of the automatic steering system to "MANUAL" to prevent a large course change. Confirm the area around the ship is clear and turn to "AUTO" steering again.

- CAUTION - Monitoring in Progress

- Change of the ship's Speed Input System and the Latitude Input System, or large change of the ship's speed and latitude, may cause a large change of the Gyro Compass True Heading. When on automatic steering, first turn the steering mode of the automatic steering system to "MANUAL" to prevent a large course change. Confirm the area around the ship is clear and turn to "AUTO" steering again.

- CAUTION - Confirmation of Latitude
- Change of the latitude input system or large change of the latitude may cause a large change of True Heading. When on automatic steering, first turn the steering mode of the automatic steering system to "MANUAL" to prevent a large course change. Confirm the area around the ship is clear and turn to "AUTO" steering again.

- CAUTION - Confirmation of Ship Speed
- Change of the ship's speed input system or large change of the ship's speed may cause a large change of True Heading. When on automatic steering, first turn the steering mode of the automatic steering system to "MANUAL" to prevent a large course change. Confirm the area around the ship is clear and turn to "AUTO" steering again.

- CAUTION - System Selection
- System selection (switching) may cause large change of True Heading. When on automatic steering, first turn the steering mode of the automatic steering system to "MANUAL" to prevent a large course change. Confirm the area around the ship is clear and turn to "AUTO" steering again.

- CAUTION - Operating Procedure Master Compass Switch (Option)
- DO NOT touch the Master Compass Power Switch while the Gyro Compass operates normally, to prevent serious damage to the sensitive element, reduce the life cycle of the product, or unexpected problems. The Master Compass Power Switch must be operated only when the master compass is in abnormal condition.

- CAUTION - Alarms
- When the following alarms are activated, the heading information from this system may not be sent at all, or may have a large error. All units operated by the heading information from this system (in particular, the automatic steering system, etc.) should be operated immediately according to the individual emergency operating procedure.

- CAUTION - Corrective Measures GPS Communication Failure
- When an alarm related to GPS (alarm code "c" or "d") is activated and the Gyro Compass' True Heading has not been determined, first turn the steering mode to "MANUAL", or "Non Follow Up", then determine the True Heading, because wrong heading information (repeater signal and serial signal) may be sent out.

- CAUTION - Corrective Measures GPS Communication Failure
- Determination of the True Heading may cause large change of sent heading information. During automatic navigation, great care should be taken, because large course changes may have happened.

- CAUTION - Corrective Measures EXTERNAL HEADING SENSOR Communication Failure
- When an alarm regarding the EXTERNAL HEADING SENSOR (alarm code "E", "F", "L" and "N") is activated, the heading information (repeater signal and serial signal) immediately before the alarm generated is sent. First turn the steering mode to "MANUAL" or "Non Follow Up", and then determine the True Heading. Once True Heading has been determined, the system's heading is sent out.

- CAUTION - Corrective Measures EXTERNAL HEADING SENSOR Communication Failure
- Determination of the True Heading may cause large change of sent heading information. During automatic navigation, great care should be taken, because large course changes may have happened.

- CAUTION - Corrective Measures LOG Communication Failure
- When an alarm regarding LOG contact (alarm code "u") is activated and the Gyro Compass' True Heading has not been determined, first turn the steering mode to "MANUAL" or "Non Follow Up", then determine the True Heading because wrong heading information (repeater signal and serial signal) may be sent externally.

- CAUTION - Corrective Measures LOG Communication Failure
- Determination of the True Heading may cause large change of sent heading information. During automatic navigation, great care should be taken, because large course changes may have happened.

- CAUTION - Corrective Measures LOG Contact Communication Failure

- When an alarm regarding LOG Contact (alarm code "u") is activated and the Gyro Compass' True Heading has not been determined, first turn the steering mode to "MANUAL" or "Non Follow Up", then determine the True Heading because wrong heading information (repeater signal and serial signal) may be sent out.

- CAUTION - Troubleshooting
- When an alarm is activated, immediately confirm content of the activated alarm and take appropriate measures. •When a failure has been activated, confirm area around the ship is clear to perform check and take appropriate measures in non-hazardous sea area, stopping the ship as a rule.

- CAUTION - Corrective Measures
- Before checking and replacing of fuses, and disconnecting / connecting of each unit, connector, printed circuit, terminal cable, turn "OFF" the power switch of the operating panel, and disconnect the power cable from the ship's distribution board, etc. It may cause electric shock and failure if left in "ON" position.

- CAUTION - Failure Phenomena Corrective Measures
- Whenever the internal setting of the system is changed, follow instructions of the Alphatron Service Engineer.
- When another failure is activated than appeared in this clause, or a replaced fuse has blown again, turn "OFF" the power switch of the operating panel, disconnect the power cable from the ship's distribution board and request repair from an Alphatron Service Engineer.
- When a failure has occurred and it has not been repaired according to this clause, turn "OFF" the power switch of the operating panel and request an Alphatron Service Engineer to repair it on making a call to port. Even if it has been repaired, request an Alphatron Service Engineer to check it.

- CAUTION - Rotor Level Failure (alarm code 6)
- Turn OFF the power switch.

- CAUTION - Zero Cross Failure (alarm code 8)
- Determination of the Gyro Compass True Heading when alarm code 8 is activated, may cause a large change of the True Heading. During automatic navigation, take great care, because a large course change may have happened.

- CAUTION - Master Compass Heading Failure (alarm code G)
- When an alarm code G is activated, the Gyro Compass True Heading may have an error. New input of the True Heading may cause a large change of the True Heading. When on automatic navigation, first turn the steering mode to "MANUAL", then determine the True Heading to prevent turning course with larger angle. Confirm area around ship is clear and turn to "AUTO" steering again.

- CAUTION - The Gyro Compass does not operate, when turned ON and the power switch on the operating panel is turned ON.
- Be aware of electric shock when checking the main power supply.
- When checking fuses, turn OFF the power switch on the operating panel and disconnect the power cable from the ship's distribution board before checking fuses.

- CAUTION - Not all repeaters operate
- When checking fuses, turn OFF the power switch, and disconnect the power cable from the ship's distribution terminal board.

- CAUTION - No repeaters operate
- When checking fuses, turn OFF the power switch, and disconnect the power cable from the ship's distribution board.

- CAUTION - Maintenance and check
- Main units of this system consist of electronic circuits of high reliability. If a failure occurs, perform the check and maintenance as described in this chapter and correct the fault(s) to prevent further risk of failure and to maintain the system's performance. Failure to carry this out, the detection of the failure sign will be delayed and may cause accidents such as collision or grounding.

# III Introduction

This Gyro Compass provides increased Rate of Turn and a broad range of input/output signals.

- WARNING - Operations
- Improper operations caused by failure of this product, or malfunctions caused by operator's misunderstanding may cause collision or grounding and may result in property damage and environmental pollution. Also, death or serious injury may happen.
- Full attention must be paid in the use of this product by understanding its limitations in performance and characteristics. Thoroughly familiarize yourself with the operation of this product.

- CAUTION - General use
- This system displays Gyro Compass heading and outputs the heading information externally. Although the safety design such as the alarm function against failure, etc., is provided, at the present time there is no perfect safety design. In addition, as this system has many important functions, it is hard to say that any one can use this system without failure. Failures or malfunctions of this system may cause distress, and full attention should be paid in using this product. The use of this equipment does not absolve the user's responsibility and obligation in practicing proper navigational techniques.
- Observe the following CAUTIONS:
- Always perform daily check to maintain normal system condition.
- When anomalies are detected as a result of daily checks, investigate and repair at once to restore to normal conditions and request advice from Alphatron service engineer.
- When the alarm system is activated during use, always check to confirm the cause and reinstate.

It has the following features:

1. Automatic speed error correction.
2. Digital signal processing conform International Standards IEC61162.
3. Long service life.

This system has been designed to build an I - System : One gyro compass system.

Depending on the output signal the following type is provided: Step type : System mainly uses the step signal (repeater signal).

## III.1 Display and Alarm

For navigational safety considerations, various indicators and indicator lamps required for the system's operation and alarm functions, have been built into the operating panel.

## III.2 Types of Alarm Function

Alarms can be related to:

- GPS (alarm code "c" or "d")
- LOG (serial) (alarm code "P" or "U")
- Log Contact (alarm code "u")
- EXTERNAL HEADING SENSOR (alarm code "E", "F", "L" and "N")
- System is switched

- CAUTION - Types of Alarm
- When an alarm regarding GPS (alarm code "c" or "d") is activated and the Gyro Compass' True Heading has not been determined, first turn the steering mode to "MANUAL", or "Non Follow Up", then determine the True Heading, because wrong heading information (repeater signal and serial signal) may be sent out.
- When an alarm regarding LOG (serial) (alarm code "P" or "U") is activated and the Gyro Compass' True Heading has not been determined, first turn the steering mode to "MANUAL" or "Non Follow Up", then determine the True Heading, because wrong heading information (repeater signal and serial signal) may be sent out.

- When an alarm regarding LOG Contact (alarm code "u") is activated and the Gyro Compass' True Heading has not been determined, first turn the steering mode to "MANUAL" or "Non Follow Up", then determine the True Heading because wrong heading information (repeater signal and serial signal) may be sent out.
- When an alarm regarding the EXTERNAL HEADING SENSOR (alarm code "E", "F", "L" and "N") is activated, the heading information immediately before the alarm was activated is sent. First turn the steering mode to "MANUAL" or "Non Follow Up", and then determine the true heading. Once True Heading has been determined, the system's heading is sent out.
- When the system is turned on, first turn the automatic steering system to "MANUAL" or "Non Follow Up" to prevent course turning with larger angle.

## III.3 Step Signal Type Repeater Signal Output Function

This system can drive the ship's repeater by the step signal of the Gyro Compass. Even when the Gyro Compass is operated by the emergency power supply, the connected repeater can be driven (Repeater backup function).

**Note** Refer to the As Built plan kept on board for details of the repeater.

When the external heading sensor signal is connected to this system (magnetic compass system, etc.), the repeater operates as follows, when the system is switched, see *System Selection* on page 45:

- When "GYRO" is selected: The step signal is sent by the Gyro Compass True Heading.
- When "EXT" is selected: The step signal is sent by the True Heading of the external heading sensor.

## III.4 Serial Signal Type Repeater Signal Output Function

This system can drive the ship's repeater by the serial signal of the Gyro Compass.

Even when the Gyro Compass is operated by the emergency power supply, the connected repeater can be driven (Repeater backup function)

When this system's serial signal is not used for the repeater, the following serial signals may be sent:

1. Output conformed to IEC61162-1 ed. 2
2. Output conformed to IEC61162-2

These signals can be individually set for each circuit.

Refer to the As Built plan kept on board for details of the repeater and the serial signal.

When the external heading sensor signal (the magnetic compass system, etc.) is connected to this system, the repeater operates as follows, when the system is switched:

(Refer to *System Selection* on page 45, for system switching.)

- When "GYRO" is selected: The serial signal is sent by the Gyro Compass' True Heading.
- When "EXT" is selected: The serial signal is sent by the True Heading of the External Heading Sensor.

## III.5 Automatic Speed Error Correction Function

This system has functions to calculate speed error, an inherent error to the Gyro Compass, and to correct it automatically.

Required data of latitude and speed to calculate the speed error, are selected and entered into the individual systems of {"GYRO" / "GPS"} and {"LOG (contact signal)" / "LOG (serial signal)" / "GPS" / "MANUAL"}.

**Note** For the selection of latitude and ship's speed input system, operate according to *Set Latitude Input System* on page 40 and*Set Ship Speed Input System* on page 42 in chapter Operations.

When "GPS" is selected as the input system, the serial signal conform IEC61162-1 / IEC61162-1 ed. 2 is received.

When "LOG (serial signal)" is selected as the input system, the serial signal conform IEC61162 / IEC61162-1 ed. 2 is received.

Also, when other than "MANUAL" is selected as the input system, speed error correction can be performed in real time.

## III.6 Timer Start

The Gyro Compass can be automatically started according to date and time set for the departure.

**Note** It can be set up to one month maximum.

For setting up the departure date and time, operate according to *Set Timer Starting Time* on page 39 in chapter Operations.

## III.7 Function of the External Heading Sensor

When the external heading sensor signal (the magnetic compass system, etc.) is connected to the AlphaMidiCourse, the repeater signal (serial signal or step signal) can be sent from this system by using the external heading sensor.

Also when the processing unit for the external heading sensor signal is built into the AlphaMidiCourse as an option, the repeater signal (2 circuits for serial signal and 1 circuit for step signal) can be backed up by using the external heading sensor, even if the Gyro Compass stops.

**Note** For the system selection, refer to *System Selection* on page 45 chapter Operation.

## III.8 Warranty Conditions

For Warranty Conditions contact Alphatron Marine.

# 1 Installation Instructions

This chapter explains the configuration, specifications and structure of this system.

## 1.1 Installation Guidelines

**Master Compass**

1. Select a mounting location where the deck is horizontal, flat, has little vibration and pitch/roll is as small as possible.

   **Note** Mounting location should have sufficient space for installation and servicing. Refer dimensional drawing *Figure 48: Installation Drawing* on page 75.

2. Position the compass on or parallel to the vessel's horizontal center line, with the bow indication on the top of the case pointing towards the vessel's bow.
3. Use the datum line in the front and back of the compass to line up the unit.

   **Note** be sure to install all equipment cables more than 5m away from radio equipment feeders.

4. Connect terminals marked ⏚ with the ground terminals of the vessel.

   **Note** Shielded end of shielded cable to be finished close to the terminal board and connect to the ground terminals of the vessel.

5. Do NOT use a megger for any tests!
6. Ensure sufficient servicing space around the gyro compass. Refer dimensional drawing *Figure 48: Installation Drawing* on page 75.

### 1.1.1 General and Specific Tools

General and Specific tools are required for installing the Gyro Sphere into the Master Compass, as shown in pictures labeled 001, 002 and 003.

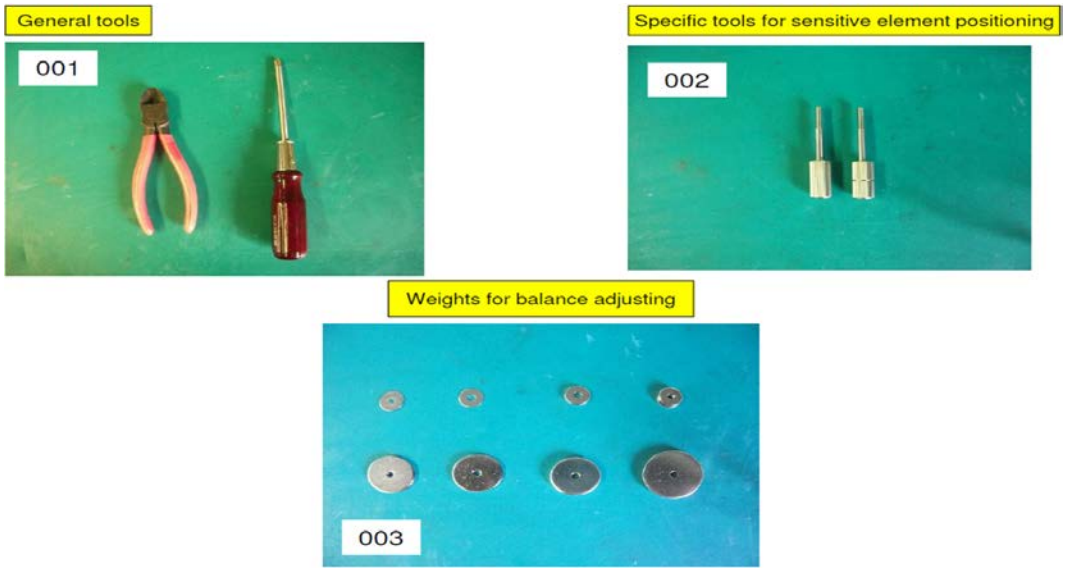



**Figure 1: Special and Specific Tools**

Special guide pins are required for installation of the sphere into the phantom ring.

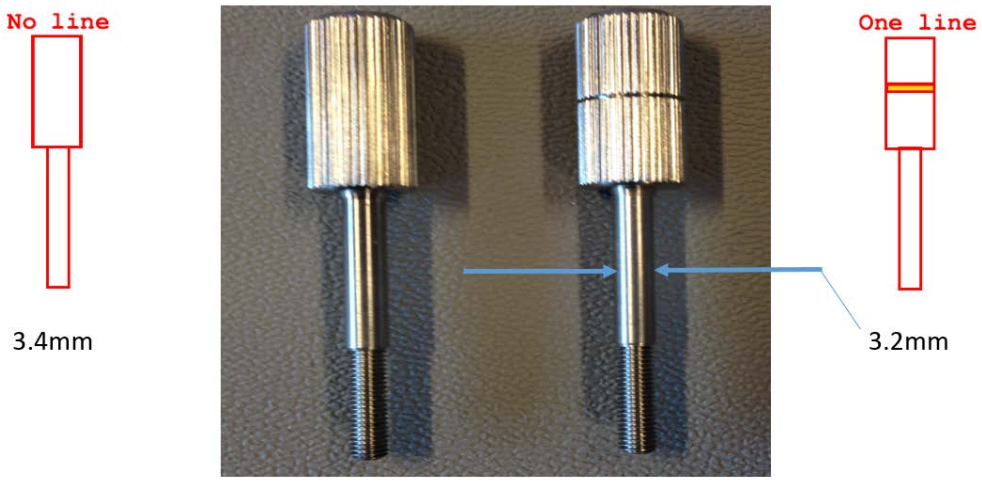



**Figure 2: Guide Pins for Phantom Ring Installation**

## 1.1.2 Unpacking of the Gyro Compass

The three parts: Master Compass, Sensitive Element and Control Panel are supplied in two boxes as shown in pictures labeled 004 to 007.


**Figure 3: Unpacking**

### 1.1.3 Fitting Master Compass Part 1

Fitting the Master Compass part 1, as shown in pictures labeled 008 to 011.

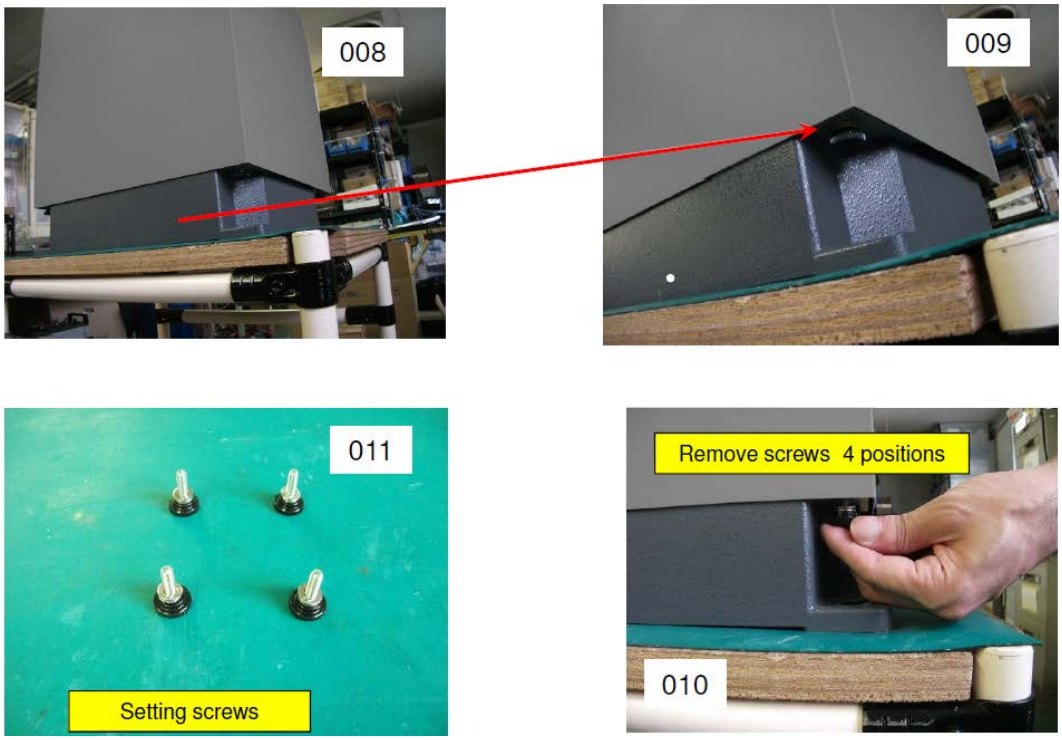



**Figure 4: Fitting master Compass Part 1**

### 1.1.4 Fitting Master Compass Part 2

Fitting the Master Compass part 2, as shown in pictures labeled 012 and 013.

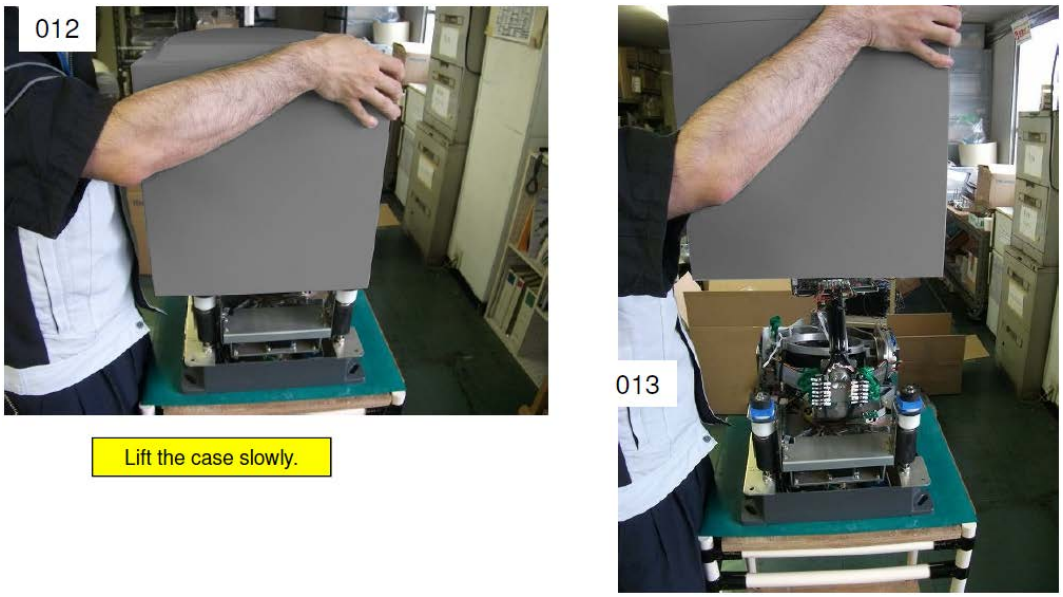



**Figure 5: Fitting Master Compass Part 2**

## 1.1.5 Remove Parts from Master Compass Mounting Ring

Remove parts from Master Compass mounting ring as shown in pictures labeled 014 to 018.

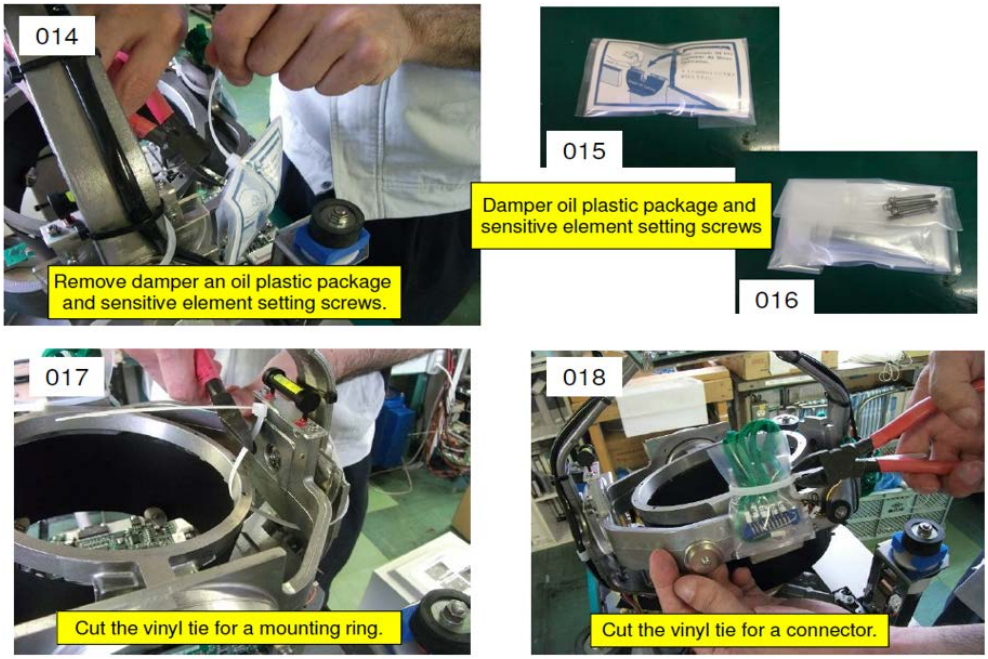



**Figure 6: Remove parts**

## 1.1.6 Remove Packing Material from Shock Absorbers

Remove packing material from shock absorbers as shown in pictures labeled 019 to 021.

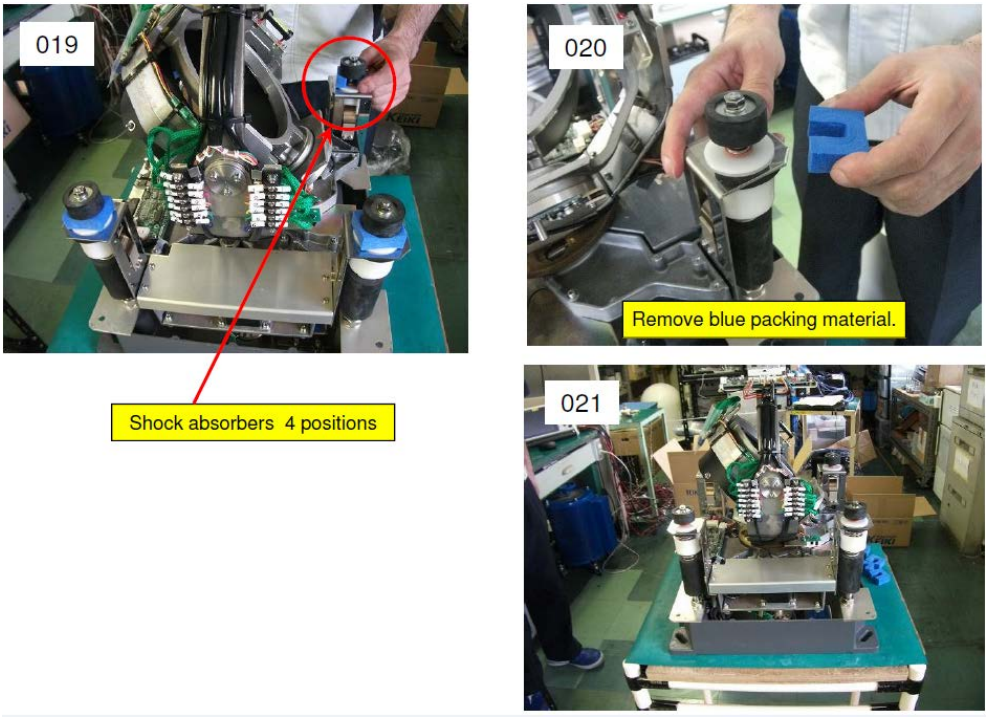



**Figure 7: Remove Packing Material Shock Absorbers**

## 1.1.7 Unpacking of Sensitive Element Part 1

Unpack Sensitive Element as shown in pictures labeled 022 to 025.


**Figure 8: Unpacking Sensitive element part 1**

**Note** Handle with care and keep packaging material for reuse when returning for servicing.

## 1.1.8 Unpacking of Sensitive Element part 2

Unpack Sensitive Element as shown in pictures labeled 026 and 027


**Figure 9: Unpacking Sensitive Element part 2**

**Note** Handle Sensitive Element with great care.

## 1.1.9 Mounting of Sensitive Element Part 1

Mount the Sensitive Element as shown in pictures labeled 028 to 031.

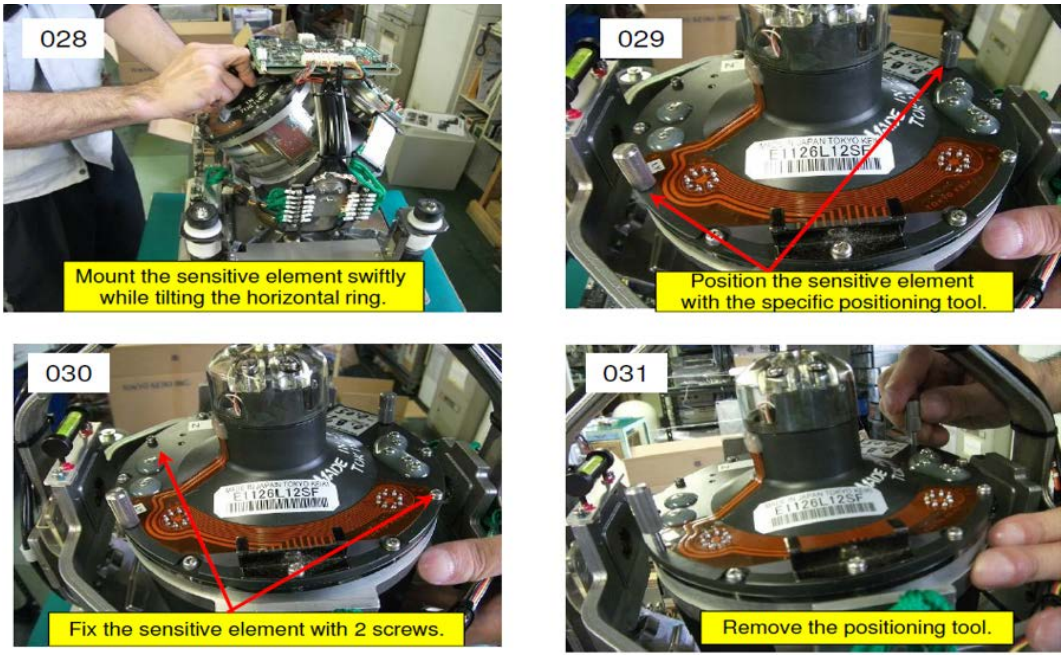



**Figure 10: Mounting of Sensitive Element part 1**

## 1.1.10 Mounting of Sensitive Element Part 2

Mount the Sensitive Element as shown in pictures labeled 032 to 034.

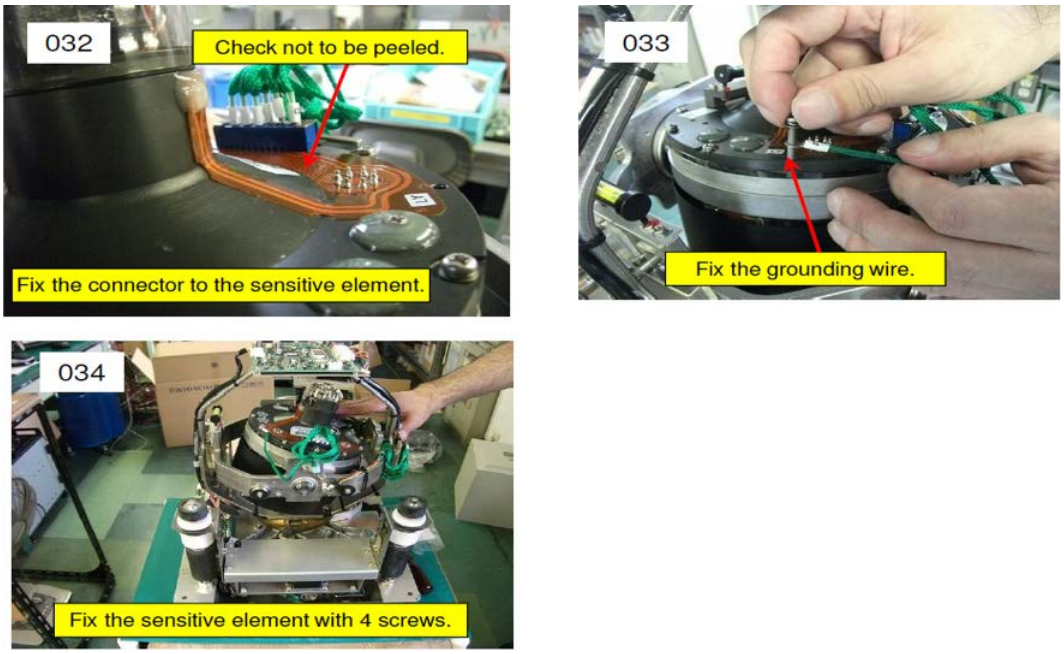



**Figure 11: Mounting of Sensitive Element part 2**

## 1.1.11 Filling with Damping Oil

Fill up container with Damping Oil as shown in pictures labeled 037 to 039.

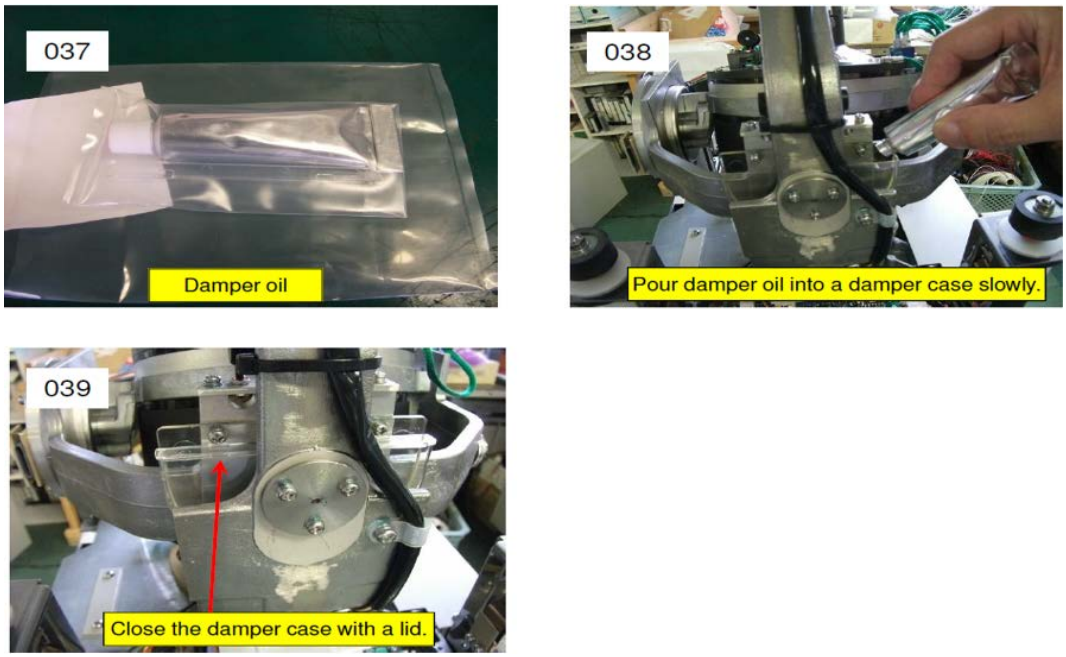



**Figure 12: Filling with Damping Oil**

## 1.1.12 Attach Connector

Attach Connector and fix securely to Sensitive Element as shown in pictures below.

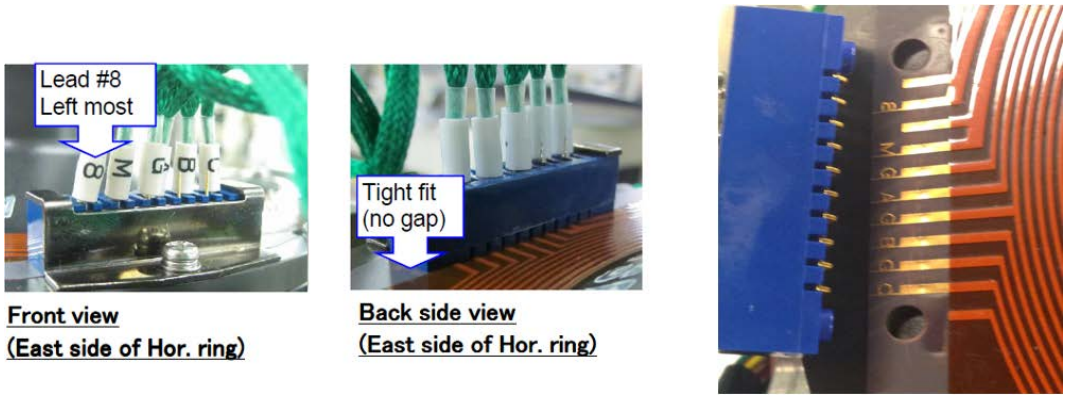



**Figure 13: Attach Connector**

## 1.2 Name and Function of Each Unit

Names and functions of each unit.

| No. | Name | Function |
|---|---|---|
| 1. | Master compass | The sensitive element is built-in. It is a unit to detect the ship's heading. |
| 2. | Control Unit | This unit has various indicators for True Heading, Latitude, Rate of Turn, Ship Speed and Alarms, and the operating switches. |
| 3. | Indicators | It indicates operating conditions of this system and value data of all settings value data. Indicated contents can be selected by operating the switches. |
| 4. | Operating switches | They are used for all kinds of operations required for this system. |
| | Power switch | It is used to start and stop this system. The indicator lamp in the power switch alights when started. |

**Table 2: Name and function**

## 1.3 Configuration

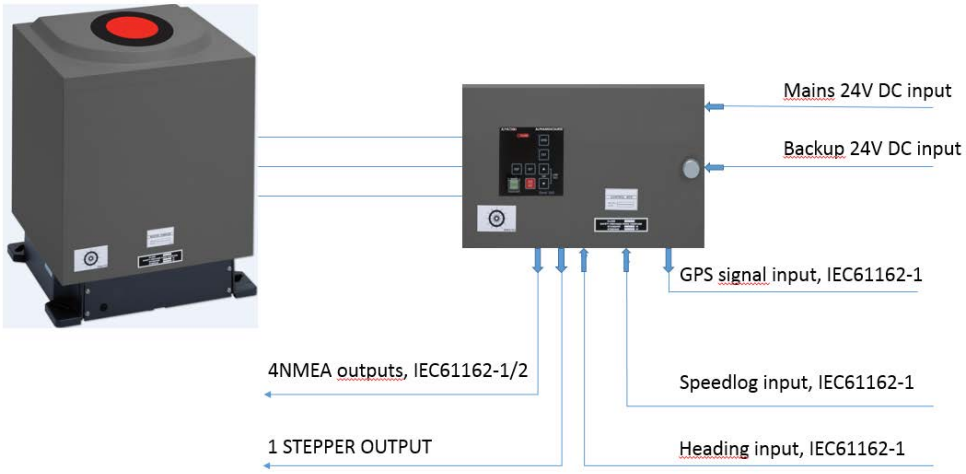



**Figure 14: System Configuration**

This system consists of the following units and the spare parts box.

1. Master Compass
2. Control Unit
3. Spare Parts box

For shipment, the sensitive element in the master compass is packed separately.

## 1.4 Mounting the Master Unit

Mounting of the master compass unit is as shown in *Figure 15: Mounting position* on page 23.

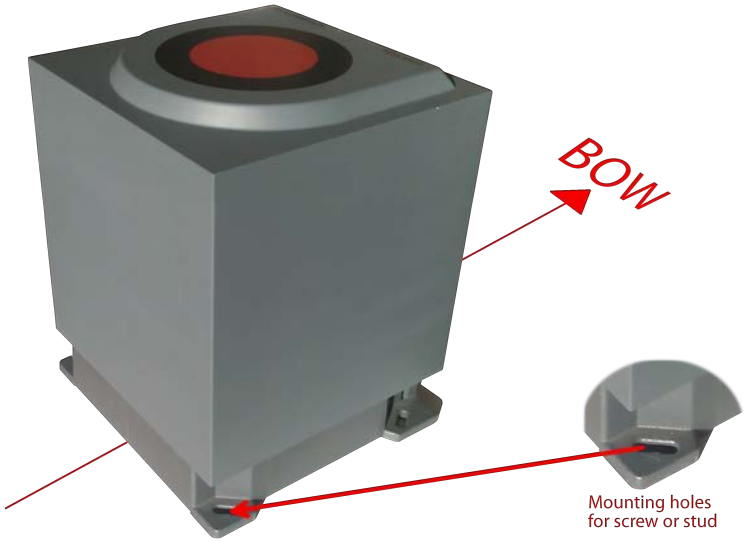



**Figure 15: Mounting position**

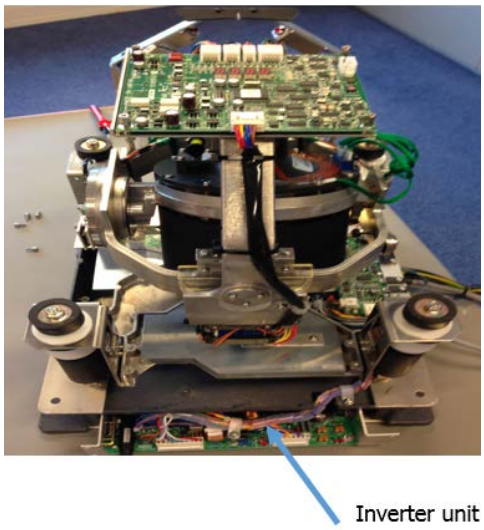



**Figure 16: Inverter Unit Location**

1. Orientate the Inverter Unit at the back of the Master Compass to the Stern of the ship.

   **Note** Install the Gyro Compass with in 5˚ accuracy in order to be able to apply a correction by loosening the fastening bolts and fine tune placement by turning the Mater Compass.

2. Fasten the compass to the deck with the four bolts provided.

   **Note** Locate the bolts in the center of the trails to be able to finely adjust the direction of the unit. With the aid of the heading offset feature a small mounting offset may be made.

## 1.5 Connecting the AlphaMidiCourse

Refer Connection Diagram and Cable Diagram for cable connections *Figure 46: Connection Diagram* on page 73, *Figure 47: Cable Diagram* on page 74.

1. Connect power and signaling cables as indicated in the connection diagram.
2. Use wire straps to fasten cables.

CABLE SPECIFICATIONS - See Connection Diagram and Cable Diagram *Figure 46: Connection Diagram* on page 73, *Figure 47: Cable Diagram* on page 74.

## 1.6 Alarm List

| Alarm Code | Alarm Content | Possible Cause |
|---|---|---|
| 1 | Main power is abnormal | When the main power was lost. |
| 2 | Power is abnormal | When the power supply in the control unit went over-voltage or over-current. |
| 3 | Inverter is abnormal | When the inverter in the master compass went over-voltage or over-current. |
| 6 | Rotor level is abnormal | When the "rotor" (Sensitive Element) in the Master Compass behaves abnormally. |
| 8 | Zero cross is abnormal | When the reference heading of the master compass was not detected properly or an failure is generated in heading calculation. |
| A | System communication failure (1) | When a failure is generated in communication function of the master compass. |
| b | System communication failure (2) | When a failure is generated in communication function of the control unit. |
| c | GPS communication break | When GPS operation stopped or the serial signal from GPS has stopped. |
| d | Abnormality of GPS data | When a failure is generated in the serial signal from the GPS. |
| E | System internal communication failure (1) | When the External Heading Sensor Signal Processing Unit stopped its operation, or the serial signal from the External Heading Sensor Processing Unit has stopped. |
| F | System internal communication failure (2) | When a failure is generated in the serial signal from the External heading sensor signal processing unit. |
| G | Master compass heading failure | When a failure is generated in the heading monitor signal of the master compass. |
| L | External heading sensor communication off | When the External heading sensor signal processing unit stopped its operation, or the serial signal of the external sensor has stopped. |
| n | External heading Sensor data failure | When a failure is generated in the serial signal from the External heading sensor. |
| P | LOG (serial) communication off | When the LOG stopped its operation, or the serial signal from LOG has stopped. |
| U | LOG (serial) data failure | When a failure is generated in the serial signal from LOG. |
| u | LOG contact failure | When a failure is generated in the LOG contact. |
| r | E5V failure | When a failure is generated in the power supply for the serial signal. |

**Table 3:**

## 1.7 DIP Switch Settings

The AlphaMidiCourse Gyro Systems include several Dip Switch Settings.

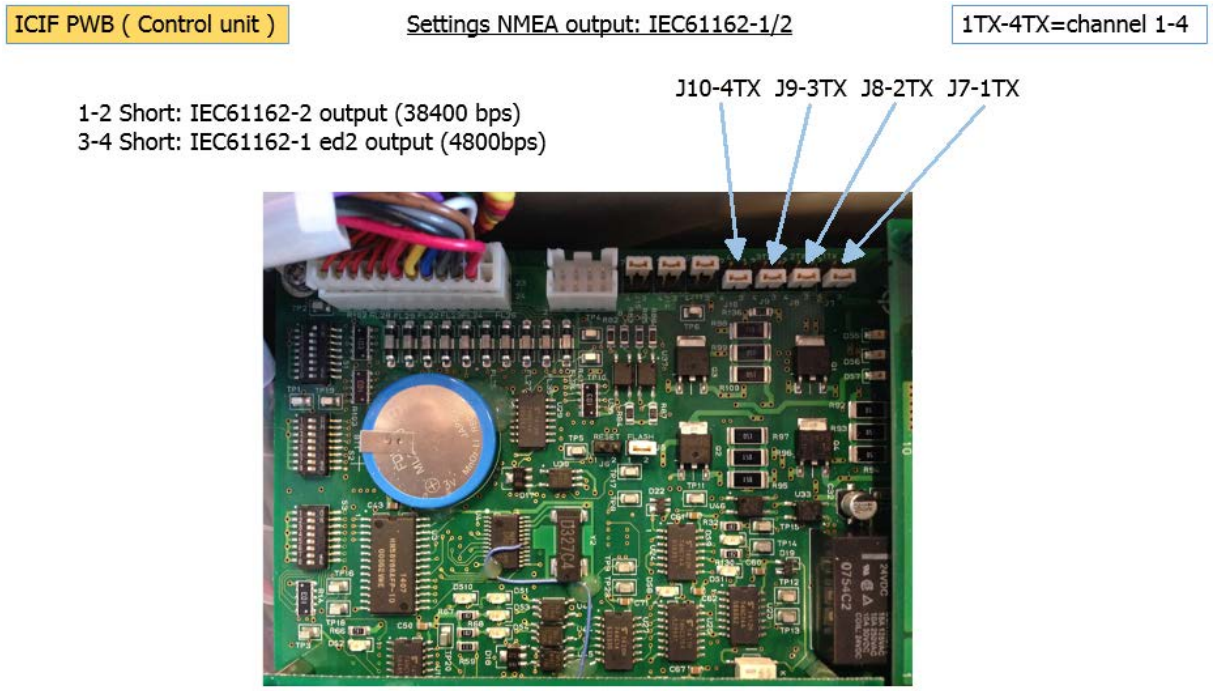



**Figure 17: DIP Switch Settings**

No switches are required to be set during installing of the system, although on IOPT board there is possibility to change NMEA sentence from HDT to THS.

**Note** These Dip Switch Settings are read when the system is started up. Any changes made while the system is running will therefore not take effect before the system is restarted.

**Dip Switch Setting Master Compass**

| S1 | Standard Setting | Details | Function | Read Timing | Remarks |
|---|---|---|---|---|---|
| NO.1 | [OFF] | Master Compass type | [OFF] : Standard [ON] : HSC | Start Up | |
| NO.2 | [OFF] | Display of Master Compass Type | [ON] : In standard case displayed as "Std". In HSC case displayed as "HIGH". (LED on mcc PWB) | All Time | |
| NO.3 | [OFF] | Rate Limiter | [ON] : Rotation of Master Compass is stopped at turning rate of more than 30˚/sec. | All Time | |
| NO.4 | [OFF] | Start Up Sequence | Standard [ON] : Leveling time is 2 minutes | Start Up | |
| | | | HSC [ON] : Special sequence for dumping test | | |
| NO.5 | [OFF] | Do Not Touch | * | | |
| NO.6 | [OFF] | Do Not Touch | * | | |
| NO.7 | [OFF] | Master Compass Installation | [ON] : Master Compass is installed reversely 180˚ | Start Up | |
| NO.8 | [OFF] | Do Not Touch | * | | |

**Table 4: MCC pwb switch assign**

* For MCC pwb check mode : S1 all [ON].

**Interval Setting NMEA: 100msec, or 200msec, or 1sec.**[1] Set standard to off, for Pendulum Ferry use external Interface!

| ICIF pwb S1 | Standard Setting | Details | Function | | Read Timing | Remarks |
|---|---|---|---|---|---|---|
| NO.1 | [ON] | Connect External Power Supply Unit | [OFF] :yes [ON: no | | Start Up | |
| NO.2 | [OFF] | Master Compass type | [OFF] : Standard Type [ON] : HSC type | | Start Up | |
| NO.3 | [OFF] | Control Box type | [OFF] : Type S [ON] : Type D (dual gyro) | | Start Up | |
| NO.4 | [OFF] | No.2 Gyro or not | [OFF] : No [ON] : Yes | | Start Up | |
| NO.5 | [OFF] | External Sensor Connection | NO5.[OFF], NO6.[OFF] : Non | NO5. [ON], NO6. [OFF] : External Sensor Connection | Start Up | |
| NO.6 | [OFF] | | | | | |
| NO.7 | [OFF] | Serial Signal Select | [OFF] : IEC61162-2 [on] : Tokimec format | | Start Up | |
| NO.8 | [OFF] | Alarm Output Setup | [OFF] : All alarm output [ON] : only power fail | | Start Up | |

**Table 5: ICIF PWB Dip Switch assign :**

| ICIF pwb S2 | Standard Setting | Details | Function | | Read Timing | Remarks |
|---|---|---|---|---|---|---|
| NO.1 | [OFF] | For debugging (Do Not Touch) | | | - | |
| NO.2 | [OFF] | For debugging (Do Not Touch) | | | - | |
| NO.3 | [ON] | Alphatron or other | [OFF] : Standard [ON] : AlphaMidiCourse[1] | | | |
| NO.4 | [OFF] | Pendulum Ferry | [OFF] : No [ON] : Yes | | Start Up | |
| NO.5 | [OFF] | Serial Signal Transmit Frequency IEC61162-1 ed.2 | NO5.[OFF] NO6. [OFF] ; 1sec | NO5.[ON] NO6. [OFF] ; 200msec | Start Up | |
| NO.6 | [OFF] | | NO5.[OFF] NO6. [ON] ; 100msec | NO5.[ON] NO6. [ON] ; Invalid (1sec) | | |
| NO.7 | [OFF] | Do Not Touch | - | | | |
| NO.8 | [OFF] | System Select Information Contact | [OFF] : no [ON] : yes | | Start Up | |

[1] Standard set to off, for pendulum ferry use external interface!

| ICIF pwb S3 | Standard Setting | Details | Function | | Read Timing | Remarks |
|---|---|---|---|---|---|---|
| NO.1 | [OFF] | Timer Start Up | [OFF] : no [ON] : yes | | Start Up | |
| NO.2 | [OFF] | Talker ID of "ROT" Sentence | [OFF] : "HE" [ON] : "TI" | | Start Up | |
| NO.3 | [OFF] | Rate of Turn Scale for Analog meter | NO3.[OFF], NO4.[OFF] : Max 30.0˚/min. | [NO3.[ON] NO4.[OFF] : Max 300.0˚/min | Start Up | |
| NO.4 | [OFF] | | NO3.[OFF], NO4.[ON] : Max 300.0˚/min. | [NO3.[ON] NO4.[OFF] : Do Not Set | | |
| NO.5 | [OFF] | Ban or permission of an "RoT" Sentence Output | Valid at time of external sensor (standard) selection | | Start Up | |
| | | | [OFF] : disable [ON] : enable | | | |
| NO.6 | [ON] | Alphatron or other | [OFF] :no [ON] : AlphaMidiCourse | | Start Up | |
| NO.7 | [OFF] | Unit check mode | [OFF] : no [ON] : yes for factory inspection only | | Start Up | |
| NO.8 | [OFF] | Buzzer stop contact output | [OFF] : no [ON] : yes | | Start Up | |

| IOPT pwb | Standard Setting | Details | Function | Read Tuning | Remarks |
|---|---|---|---|---|---|
| NO.1 | [OFF] | Do Not Touch | | - | |
| NO.2 | [OFF] | For AGI-80 or not | [OFF] : For normal TG-8000/8500 [ON] : For AGI-80 | Start Up | |
| NO.3 | [OFF] | Able/Disable for HDG sentence output | [OFF] : Able to output [ON] : Disable to output | Start Up | |
| NO.4 | [OFF] | Alarm detection time for main power | [OFF] : 300ms [ON] : 2sec | Start Up | |
| | | Fail / Power Unit fail | | | |
| NO.5 | [OFF] | HDT / THS sentence | [OFF] : HDT [ON] : THS | Start Up | |
| NO.6 | [OFF] | Do Not Touch | | - | |

* For SCC pwb check mode : S1, S2, S3 all [ON]

* For ICIF pwb check mode : S1, S2 all [ON] S3 (except No.8 all [ON]

# 2 Operation

In this chapter, procedure of operation, starting and stopping of this system are explained. Before operation, confirm that each unit of the master compass and the control unit are properly installed.

- WARNING
- Matters requiring attention in starting up and operations during progress are described in chapter Operations and are punctuated with a CAUTION or a WARNING, which must be strictly observed.
- Attentively read the Operator Manual of the automatic steering system carefully preparing for occurrence of trouble or alarm in this system. The emergency steering method should be well understood to easily respond to failures, or alarms.

For the automatic steering system, carefully read the related Operator Manual in separate volume supplied by the manufacturer and perform appropriate preparation and handling before its operations.

## 2.1 Operating panel

The operating panel is located in the Control Unit, see .

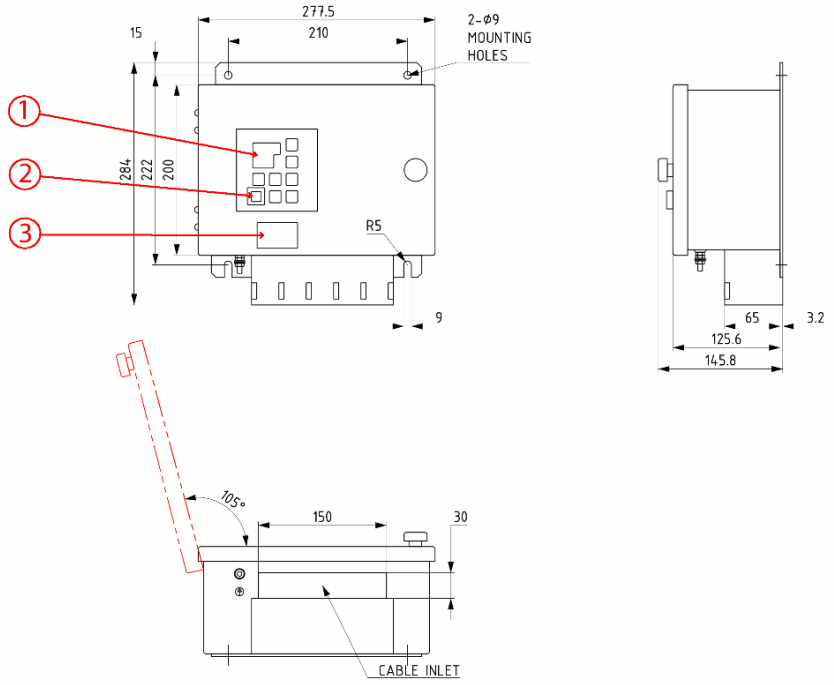



**Figure 18: Control Unit**

| No. | Name |
|---|---|
| 1 | Operating panel |
| 2 | Power switch |
| 3 | Name plate |

## 2.2 Explanation of the Operating Panel

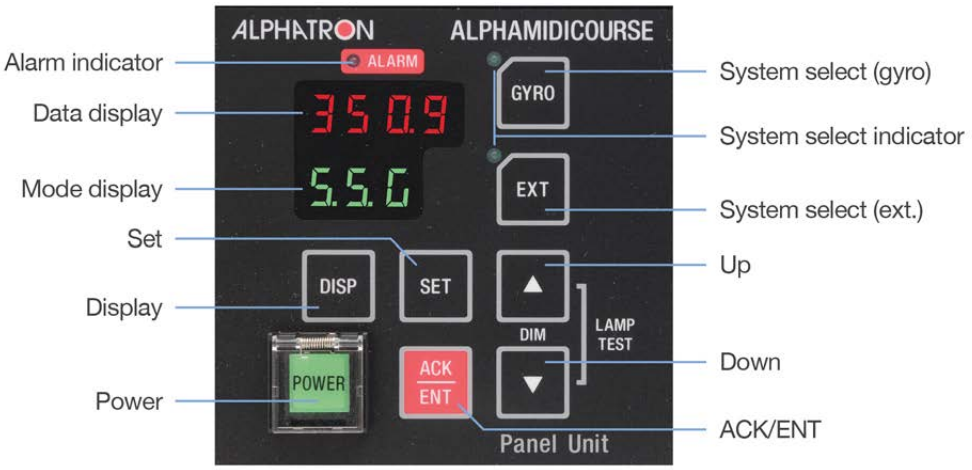



**Figure 19: Operating Panel**

| | |
|---|---|
| POWER switch | Power switch / Power indicator<br>**1.** Open cover<br>**2.** Press to start/stop system<br>**3.** Close cover after start-up, so as not to inadvertently push the button. |
| DISP switch | Select the displayed item and the displayed data.<br>**1.** Press to display data in order.<br>**2.** Press DISP and ACK/ENT simultaneously to display data in reverse order.<br>**3.** Refer Data and Mode Display for displayed text. |
| SET switch | Change data and change the input system.<br>• Change data: Gyro Compass True Heading / Ship Speed / Latitude / Rate of Turn.<br>• Change input system: [1] Ship Speed (MANUAL, GPS, LOG and LOG (serial signal)) Latitude (GYRO and GPS). |
| ACK/ENT switch | Determines the changed data and the changed input system.<br>Press to stop alarm buzzer when an alarm has been activated. |
| ▲▼ switches | Change data and change the input system.<br>Normally these are used to adjust illumination of the indicator.<br>**1.** Press ▲ for brighter.<br>**2.** Press ▲ for darker.<br>**3.** Press simultaneously for lamp test.<br>**4.** Data Display, the Mode Display and all lamps light up and it buzzes during the lamp test. |

| | |
|---|---|
| GYRO switch | System selection switch (Gyro).<br>**1.** Press to select required system.<br>**2.** "GYRO" system is select.<br>**3.** For system selection, refer to *System Selection* on page 45 |
| EXT switch | System selection switch (External).<br>**1.** Press to select required system.<br>**2.** "External Heading Sensor" system is selected.<br>**3.** For the system select, refer to *System Selection* on page 45 |
| Data Display | 4 figures, 7 segments red LED : Data is displayed. (*Figure 42: Operating Panel* on page 69) |
| Mode Display | 3 figures, 7 segments green LED: Type of data is displayed. (*Figure 42: Operating Panel* on page 69)<br>**Note** When the rotor is in stopped situation, the dot at right end of the mode indicator is lit.<br>**Note** When the rotor is running, it is blinking.<br>**Note** When in the follow up situation, it is extinguished. |
| Alarm Indicator | Displays alarm status. It blinks when an alarm is generated.<br>**1.** Press ACK/ENT to stop alarm.<br>**2.** If cause of alarm has not been resolved, it continues blinking. |
| System select Indicator | Displays selected system. |

**Table 6: Functions Operating Panel**

**Note** [1] Selectable system is different depending on the system type connected to this system.

**Explanation of Display:**

Press **DISP**


| | | |
|---|---|---|
| **1** | **True Bearing 1: *****<br>***.*<br>S.S.G or S.S.E or GYt | S.S.G = Steering.Sensor.Gyro-compass<br>S.S.E = Steering.Sensor.External sensor<br>Gyt |

| | | |
|---|---|---|
| 2 | **True Bearing 2: ***<br>***.*<br>ESt or GYt | ESt = External Sensor true bearing<br>GYt = Gyro-compass true bearing |
| 3 | **Master Compass Bearing:**<br>***.*<br>C.P.S | C.P.S. = Compass |
| 4 | **Latitude: ***.***<br>***.*<br>LA.n or LA.S | LA.n = Latitude North<br>LA.S = Latitude South |
| 5 | **Ship's speed: ***.***<br>***.*<br>G.Sd or H.Sd or L.Sd or S.Sd | G.Sd = Gps.Speed<br>H.Sd = Hand.Speed<br>L.Sd = Log.Speed<br>S.Sd = Serial.Log.Speed |
| 6 | **Rate of turn: ***.***<br>****<br>rt. | rt. = Rate of turn |
| 7 | **Alarm content:**<br>****<br>Err | Err = Error |

**Table 7: Data / Mode Menu Structure**

### 2.2.1 Steering Sensor Selection

1. Press the GYRO button to select the Gyro Compass and press ACK/ENT.
2. Press the EXT button to select the External Heading Sensor and press ACK/ENT.

### 2.2.2 Setting of the Latitude Input

1. Press the SET button.
2. Press ▼or▲ to select either GPS or GYro.
3. Press ACK/ENT to enter selection.

**Note** When H.Sd (MANUAL) was selected, as the latitude is displayed in the Data Indicator, press ▼or▲ to set the latitude and press ACK/ENT again. The herein after calculated latitude by the ship's speed and the True bearing is indicated by using the manually entered latitude.

### 2.2.3 Setting of the Ship's Speed Input

1. Press the SET button and use ▼or▲ to select one of the following modes: G.Sd (GPS), H.Sd (MANUAL), l.sD (LOG PULSE), or S.Sd (LOG SERIAL).
2. Press ACK/ENT to enter selection.

### 2.2.4 Setting of the Rate of Turn Filter Constant

1. Press the SET button when the Rate of Turn Filter Constant is changed.
2. Press ▾or▴ to select the Filter Constant.

   **Note** The Filter Constant can be set to 0.5, 1 or 2 through to 10 in 2second steps.

3. Press ACK/ENT to enter the selection.

## 2.3 Data Indications

Explanations of indicated data.

### 2.3.1 True Heading 1

When True Heading of the sensor is selected as system, either the Gyro Compass True Heading or the external heading sensor True Heading, is displayed. For the system selection, refer to *System Selection* on page 45

The indicated data in the data and mode indicators are shown in table below.

| System Selection | Heading | Data Indicator | Mode Indicator |
|---|---|---|---|
| Gyro | 123.4 | 123.4 |  |
| Heading | 345.6 | 345.6 |  |

**Table 8: Data and Mode Indicators True Heading 1**

**Note** The meaning of a display of a “mode indicator” is as follows:

**Figure 20: S.S.G = Steering Sensor Gyro Compass**

**Figure 21: Gyt = Gyro Compass true heading**

**Note** When a GPS communication failure, LOG (serial signal) communication failure, or LOG (contact) failure is generated, the data indicator is blinking. If "GYRO" system is selected at the time, operate according to *Corrective Measures GPS Communication Failure* on page 51 is activated, *Corrective Measures LOG (serial signal) Communication Failure* on page 51 is activated, or *Corrective Measures LOG (contact) Failure* on page 52 is activated, in chapter Operations, because the True Heading determination is required.

**Note** When communication failure with "the external heading sensor" is generated, the data indicator is blinking. If "External heading sensor" system is selected at the time, operate according to *Corrective Measures External Heading Sensor Communication Failure* on page 51 is activated, because the True Heading determination is required.

### 2.3.2 True Heading 2

If the True Heading of the sensor is not selected as system, either the Gyro Compass true heading or the external heading sensor True Heading, is displayed.

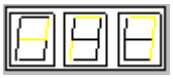
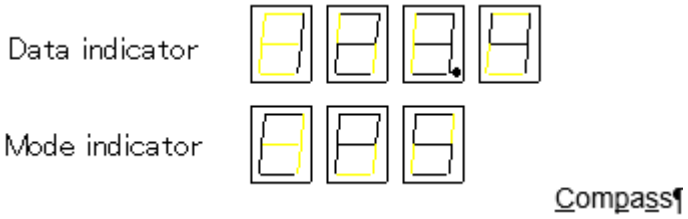
| System Selection | Heading | Data Indicator | Mode Indicator |
|---|---|---|---|
| Gyro | 123.4 | 345.6 |  |
| External Heading | 345.6 | 123.4 |  |

**Table 9: Data and Mode Indicators True Heading 2**

**Note** When a communication failure with "External heading sensor" is generated, the data indicator is blinking.

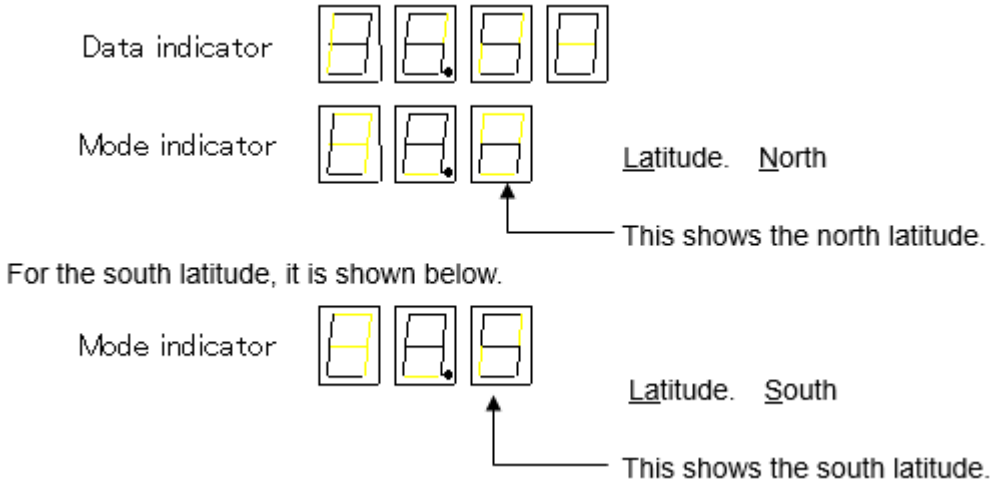
### 2.3.3 Master Heading

Master Compass Heading is displayed.




### 2.3.4 Latitude

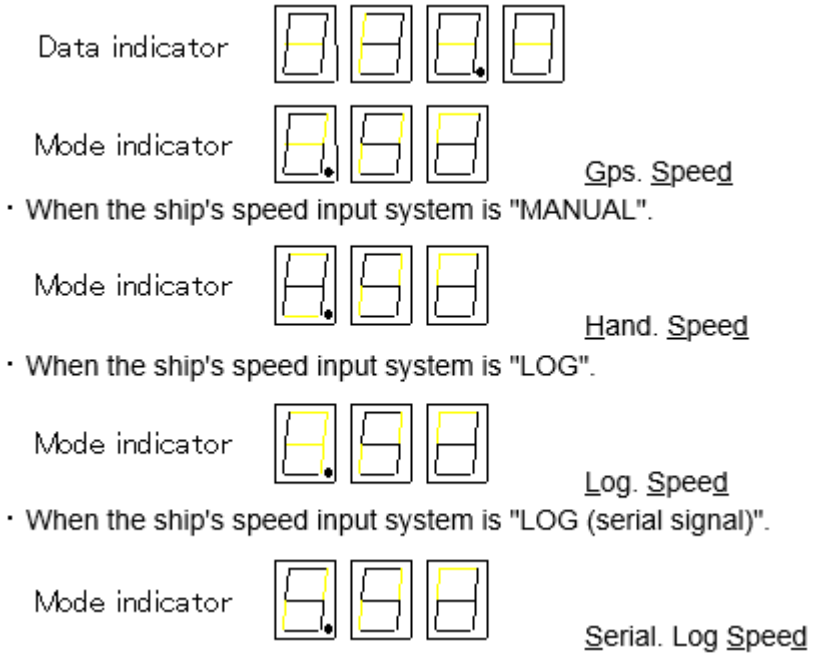
Current ship Latitude is displayed. See example: Present Latitude is 36 degree 50 minutes North.




**Note** When a GPS communication failure is generated, the data indicator starts blinking.

### 2.3.5 Ship Speed

Current Ship Speed is displayed. See example: Present Speed input system is "GPS".



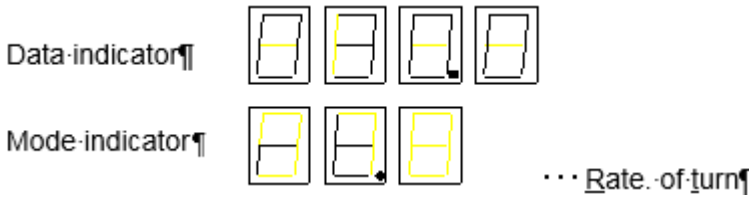

**Note** When a GPS communication failure is generated, the data indicator starts blinking.

**Note** When a LOG (contact) failure is generated, the data indicator starts blinking.

**Note** When a LOG (serial) failure is generated, the data indicator starts blinking.

### 2.3.6 Rate of Turn

Current ship's turn rate is displayed. Unit of the indicated Rate of Turn is in degrees / minutes. See example: Presently right turn with 30 degrees / 0 minutes.



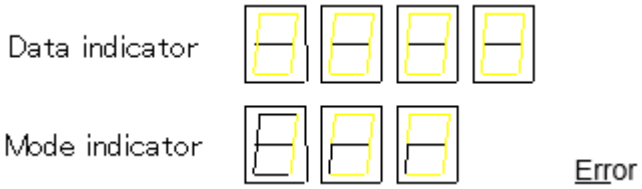

**Note** The Data indicator shows bar indication (blinking) until the master Gyro Compass starts to follow up, or when "External heading sensor" system is selected.

**Note** When the ship makes a left turn, the Mode indicator shows a minus sign (-), which is indicated in the far right space.

### 2.3.7 Alarm Content

An alarm activated in the Gyro Compass is displayed by an alarm code. For the alarm code indication, refer to *Alarm* on page 47.

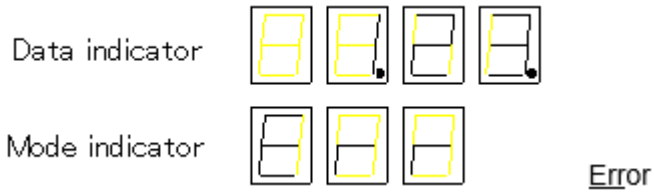
When there are no alarms, the display indication is as shown:




When an alarm is activated the display indication is as shown.

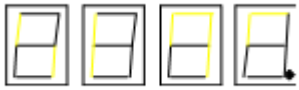
Alarms are displayed in the data indicator in the activated order from the left as shown below.

See example: Presently alarms with code 1, 2 and 3 were activated in order.

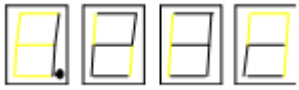



When 4 alarm codes are displayed at the same time and the dot in fourth place is not present, means more than 5 alarms were activated.

Example: When alarms of alarm code 1, 2, 3, c and d were activated in order.



In this case, not-indicated alarm code can be confirmed by pressing ▲ switch as shown below.



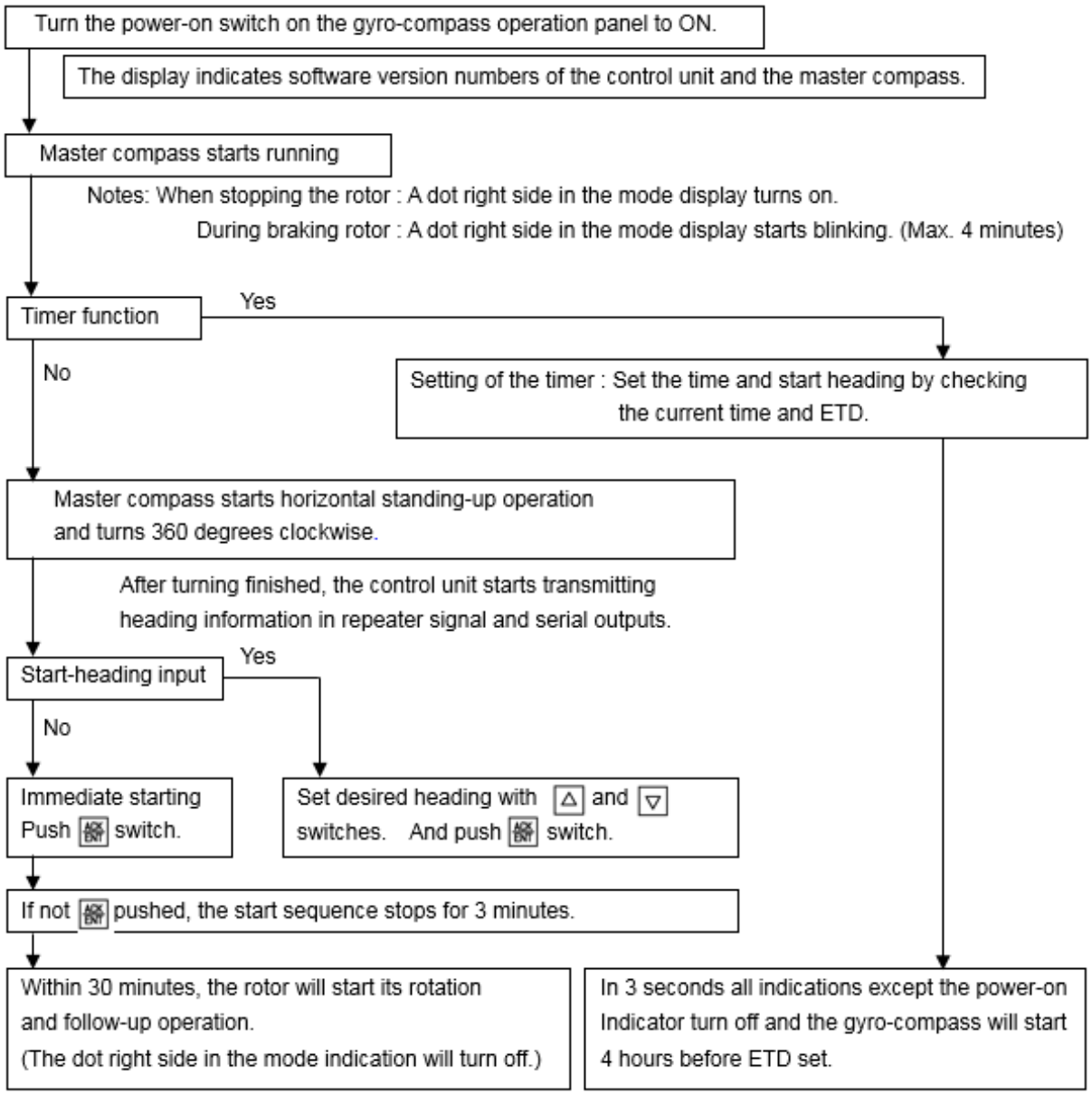
To return to the previous indication, press ▼.

## 2.4 Start and Stop Sequence

This system operates in the sequence shown in the diagram

For each operation in the sequence, refer to *Start and Running* on page 38 and *Turning the Gyro Compass OFF* on page 52.

**1.** Starting




**2.** Setting (after start-up)

- Latitude setting: Confirm the latitude indication and set again if necessary.
- Speed setting: Confirm the speed indication and set again if necessary.
- Repeater synchronization: Synchronize each repeater.

**3.** Setting (Just before departure, or 6 hours or more after starting)

- Item 2 above: Reconfirm.
- Heading error correction: Fixed error can be corrected in output heading if necessary.

**4.** Alarm

If any alarm is activated, check the alarm code and press ACK/ENT switch.

**5.** System selection( Gyro-compass to be selected normally)

System selection (switching) may cause large change of the True Heading.

1. During automatic steering, first turn the steering mode of the automatic steering system to "MANUAL" to prevent large change of course.
2. Confirm surrounding area of ship is clear and turn to "AUTO" steering again.
   - Select the Gyro Compass: While pressing ACK/ENT switch press GYRO switch.
   - Select the external heading sensor: While pressing ACK/ENT switch press GYRO switch.

   Repeater synchronization: Synchronize the each repeater indication with the selected True Heading information[1].

   **Note** [1] When repeater is a serial signal type, this operation is not required because it will synchronize automatically. However, confirm that the indicated value coincides with "the True Heading" selected by this system after the repeater switch is turned "ON".

6. Stop

   Turn each repeater switch to OFF and turn the Power Switch on the Gyro Compass operation panel to OFF. The Gyro Compass stops.

## 2.5 Start and Running

- CAUTION - Start Up
- Start up this product after turning the automatic steering system to other mode than "AUTO".

### 2.5.1 Start

**Turn power on.**

1. Press the Power Switch on the operating panel.

**Note** System software version number of the Control Unit and the Master Compass are displayed in order, as shown below.

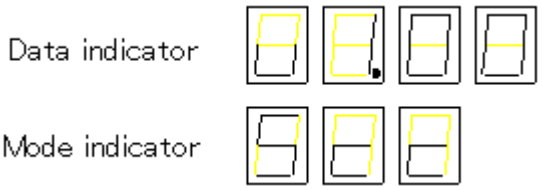



**Figure 22: Software version of the Control Unit**

**Note**

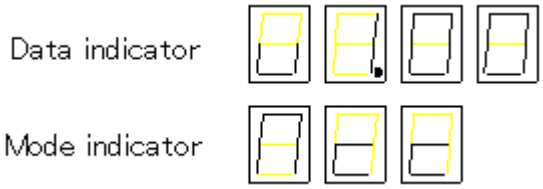



**Figure 23: Software version of the Master Compass**

2. Confirm that the rotor has stopped after the power is turned ON.
3. Confirm that the Master Compass is rotated clockwise 360˚. (Last azimuth operation)

## 2.5.2 Set Timer Starting Time

After turning ON the power and the software version number indicates FINISHED, the display automatically shows current date and time[1].

**Note** [1] In cases where this function is not included, after indicating software version, it will display START HEADING.

The following example shows that current date and time is 9 am of the day 22.

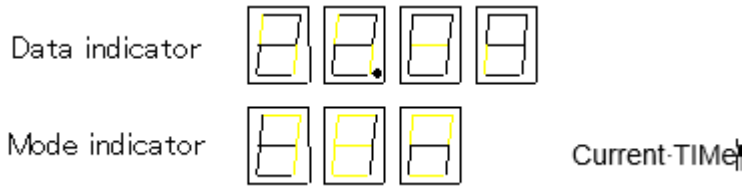



**Figure 24: Timer starting time**

**Change the current date and time.**

1. Press switch ▲, or ▼.
2. Press switch ACK/ENT to confirm.

   **Note** Only push ACK/ENT switch, if the current date and time are not changed.

   Display automatically shows departure date and time.

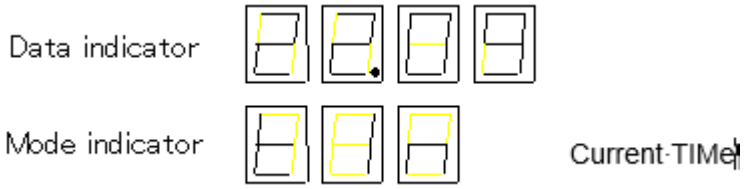



   **Figure 25: Departure date and time**

3. Press switch ▲, or ▼ to set departure date and time.
4. Press switch ACK/ENT to confirm.

   **Note** When the current date and time is not displayed, the previously set departure date and time is displayed in the data indicator.

   Indication automatically moves back to START heading setting.

5. The set departure date and time are displayed for 3 seconds after the start heading setting. Then, all indications are extinguished except the power switch and the timer starts.

   **Note** This system will start automatically when finishing last azimuth operation and turns to the set heading 4 hours before the set date and time.

## 2.5.3 Set Start Heading

After the software version number is displayed, in cases without timer start function, or after departure date and time is shown in cases with timer start function, the display shows "start heading input", as shown below.

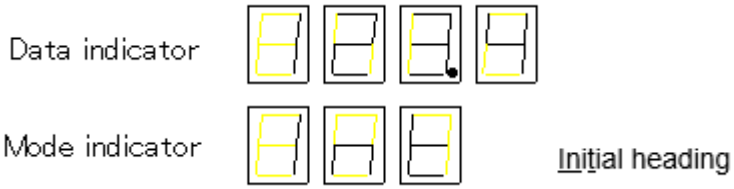



**Figure 26: Start Heading**

**Set Start Heading:**

1. Press switch ▲, or ▼.
2. Press switch ACK/ENT to confirm.
   The display indicates the Gyro Compass True Heading and the Master Compass turns to the entered heading.

**Note** When the system starts from the heading when the last azimuth operation was completed, setting of the "start heading" is not necessary, but pressing ACK/ENT switch is. If not pressed, this system automatically proceeds to the next sequence after 3 minutes.

## 2.5.4 Set Latitude Input System

- CAUTION - Setting Latitude Input
- Change of the latitude input system, or a large change of latitude value may cause a large change in the True Heading. When on automatic steering, first turn the steering mode of the automatic steering system to "MANUAL" to prevent a large change of course. Confirm the area around the ship is clear and turn to "AUTO" steering again.

- CAUTION - Setting Latitude Input
- When an alarm regarding GPS (alarm code "c" or "d") is activated and the Gyro Compass' True Heading has not been determined, first turn the steering mode to "MANUAL", or "Non Follow Up", then determine the True Heading, because wrong heading information (repeater signal and serial signal) may be sent out.

- CAUTION - Setting Latitude Input
- When "GYRO" is selected for the latitude input system, latitude is automatically updated by the ship's speed and the Gyro Compass True Heading. (When the ship's speed input system is "MANUAL", it is not updated automatically.) During navigation, confirm once every two hours that the ship's actual latitude coincides with the indicated latitude.

- CAUTION - Setting latitude input
- To complete a setting, always press ACK/ENT switch (4) to confirm. Changed setting is not updated unless confirmed with ACK / ENT switch (4).

1. Press DISP switch to display a setting, see example

   *INFO:*

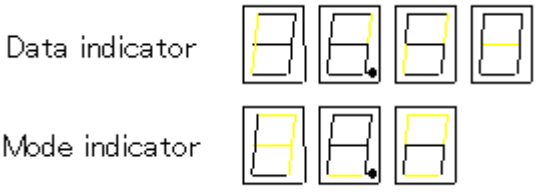



**Figure 27: Example setting**

2. Press SET switch to display selection.
3. Press switch ▲, or ▼ to select GPS or GYRO.
   Every time the ▲, or ▼ are pressed the display blinks alternately GYRO and GPS, see figure Latitude Input..


**Figure 28: Set Latitude Input**

4. Press ACK/ENT switch to confirm.
5. Press switch ▲, or ▼, when GYRO is selected, to select the latitude.
6. Press ACK/ENT switch to confirm.
   The calculated latitude by ship's speed and True Heading is indicated.

## 2.5.5 Synchronization of the Repeater Compass

**Synchronization of the Repeater Compass[1].**

**Note** [1]When the repeater is a serial signal type, this operation is not required, because it will synchronize automatically. However, ensure that the displayed value coincides with the True Heading selected by this system after the repeater switch is turned "ON".

After the last azimuth operation has been completed, the repeater signal and the serial signal are sent.

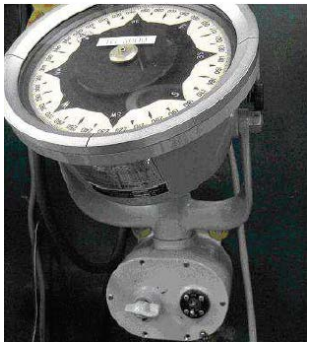


**Figure 29: Repeater Compass**

Prior to synchronization of the Master Compass carry out the Repeater Stepper Output Check (Test Mode B).

To stop the master compass. See *Turning the Gyro Compass OFF* on page 52. The phantom ring starts rotating 360˚. The Sensitive Element rotor should have stopped spinning completely (approx. 4 minutes), for preparation of the various tests and adjustments.

1. Press the DISP + SET buttons on the operating panel simultaneously.
2. Press the POWER switch (Test Mode B).
3. Set 0˚, 90˚, 180˚ and 270˚ by pressing the ▼ ▲ buttons and press ACK/ENT.

   **Note** Step signals reception instrument (repeater compass) should follow up within 0.5˚.
4. Turn "OFF" each repeater switch.
5. Adjust it to the Gyro Compass True Heading.
6. Turn "ON" the Repeater Switch.

## 2.5.6 Settling Time

The time to "SETTLE" takes approx. 3 hours maximum depending on the starting condition.

## 2.5.7 Set Ship Speed Input System

- CAUTION - Setting Speed Input
- Change of the ship's input system or large change of ship's speed may cause large change of the True Heading. When on automatic steering, first turn the steering mode of the automatic steering system to "MANUAL" to prevent a large course change. Confirm the area around the ship is clear and turn to "AUTO" steering again.

- CAUTION - Setting Speed Input
- When an alarm regarding GPS (alarm code "c" or "d") is activated and the Gyro Compass' True Heading has not been determined, first turn the steering mode to "MANUAL", or "Non Follow Up", then determine the True Heading, because wrong heading information (repeater signal and serial signal) may be sent out.

- CAUTION - Setting Speed Input
- When an alarm regarding LOG (serial) (alarm code "P" or "U") is activated and the Gyro Compass' True Heading has not been determined, first turn the steering mode to "MANUAL" or "Non Follow Up", then determine the True Heading, because wrong heading information (repeater signal and serial signal) may be sent out.

- CAUTION - Setting Speed Input
- When an alarm regarding LOG contact (alarm code "u") is activated and the Gyro Compass' True Heading has not been determined, first turn the steering mode to "MANUAL" or "Non Follow Up", then determine the True Heading, because wrong heading information (repeater signal and serial signal) may be sent out.

- CAUTION - Setting Speed Input
- The setting of the ship's speed input system (and its values for "MANUAL") is automatically saved. When re-starting, the previous ship's speed system setting is activated. When "MANUAL" is selected, stop after ship's speed setting is set to zero knots. Also, when turning off and on again with "GPS" selected, confirm that GPS is operating properly.

- CAUTION - Setting latitude input
- To complete a setting, always press ACK/ENT switch to confirm. Changed setting is not updated unless confirmed with ACK / ENT switch.

1. Press DISP Switch to display a Ship Speed Setting, see example.

   *INFO:* The example shows when GPS has been selected for the ship's input system.

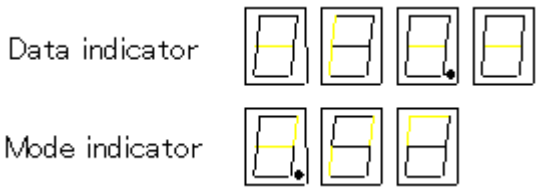



**Figure 30: Ship Speed Indicator**

2. Press SET switch to display selection.
3. Press switch ▲, or ▼ to select "MANUAL", "GPS", "LOG" or "LOG (serial signal)".
   The display blinks successively, see figures.

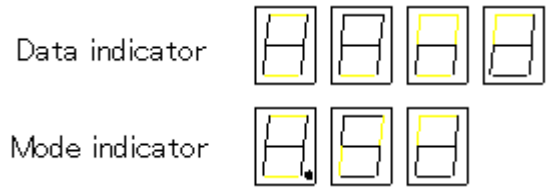



**Figure 31: MANUAL Input System**

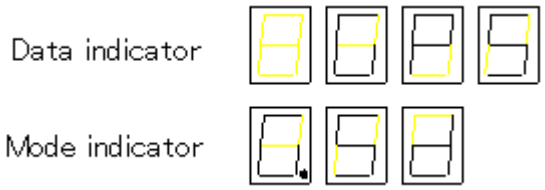



**Figure 32: GPS Input System**

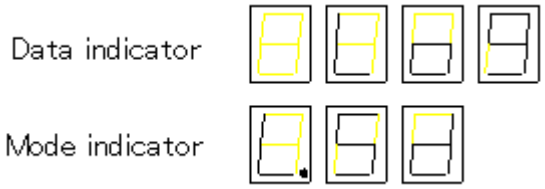



**Figure 33: LOG (contact signal) Input System**

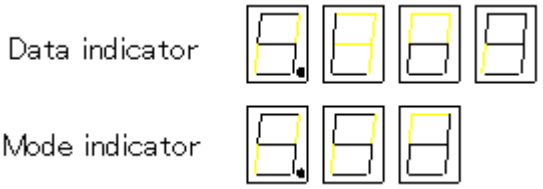



**Figure 34: LOG (serial signal) Input System**

4. Press ACK/ENT switch to confirm.
   When "MANUAL" was selected, the ship's speed is displayed in the indicator.
5. Press switch ▲, or ▼ when MANUAL is selected, to set the ship's speed.
6. Press ACK/ENT switch to confirm.

## 2.5.8 Set Rate of Turn Filter Constant

- CAUTION - Setting Speed Input
- Press ACK/ENT switch to complete the setting. Changed setting is not updated unless pressing ACK/ENT switch.

1. Press DISP switch to display a “rate of turn filter constant” , see example:

   *INFO:*

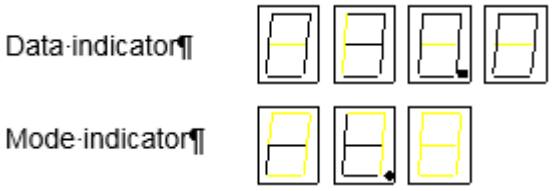



**Figure 35: Rate of Turn filter constant**

2. Press SET switch When Rate of Turn Filter Constant has changed.

*INFO:*

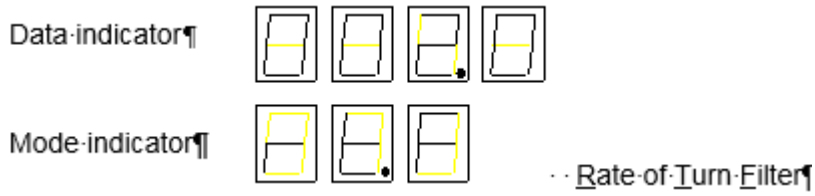



**Figure 36: Changed Rate of Turn filter constant**

3. Press switch ▲, or ▼ to select the "Filter Constant".

**Note** The “Filter Constant” can be set to 0.5, 1 or 2 through to 10 in 2 seconds intervals.

4. Press ACK/ENT switch to confirm.

## 2.5.9 Confirmation of True Heading

- CAUTION - Confirmation True Heading
- When the Gyro Compass' True Heading is set again, the repeater indication value and the serial signal Gyro Compass True Heading will change by the altered angle. When on automatic steering, first turn the steering mode of the automatic steering system to "MANUAL" to prevent a large course change. Confirm the area around the ship is clear and turn to "AUTO" steering again.

- CAUTION - Confirmation True Heading
- Press ACK/ENT switch to complete the setting. Changed setting is not updated unless pushing ACK/ENT switch.

Confirm that the Gyro Compass' True Heading displayed in this system, coincides with the heading by some target or by observation.

If there is some deviation, set the Gyro Compass True Heading according to the following procedure.

1. Press DISP switch to display a True Heading.
2. Press SET switch to change the display.
3. Press switch ▲, or ▼ to set the True Heading.

*INFO:*

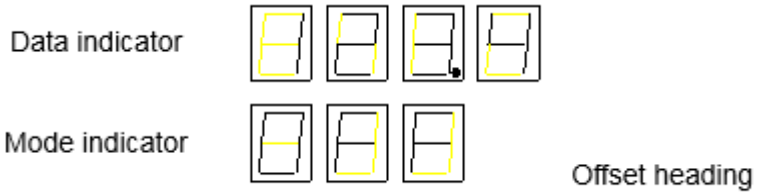



**Figure 37: Confirmation True Heading**

**Note** The offset displayed is cleared when the system is turned off, or when the master compass has passed through the reference angle of the master compass heading.

4. Press ACK/ENT switch to confirm.

### 2.5.10 True Heading Indication

When all settings have been completed, press DISP switch to display the True Heading in the indicators. If there is another display in the indicator, the True Heading will be displayed within 30 seconds, if no switch is pressed.

## 2.6 System Selection

- CAUTION - System Selection
- System selection (switching) may cause a large change of True Heading. When on automatic steering, first turn the steering mode of the automatic steering system to "MANUAL" to prevent a large course change. Confirm the area around the ship is clear and turn to "AUTO" steering again.

Normally use the system selected by the Gyro Compass.

1. Turn "OFF" the repeater switch.

**Note** When the repeater is a serial signal type, this operation is not required, because it will synchronize automatically. However, confirm that the value displayed coincides with "the True Heading" selected by this system, after the repeater switch is turned "ON".

2. Press System Selection Switch GYRO together with ACK/ENT switch to select GYRO System.
   - In the gyro compass system, press System Selection Switch GYRO together with ACK/ENT switch on the operating panel to select the Gyro Compass system.
   - Press the system selection switch EXT switch together with the ACK / ENT switch to select the "External heading sensor" system, .

**Note** When a change of system has been selected, it buzzes shortly three times.

3. Synchronize the repeater indication connected to this system with the selected system's heading.
4. Turn "ON" the repeater switch.

**Note** For steps 3 and 4 applies that, when the repeater is a serial signal type, this operation is not required, because it will synchronize automatically However, confirm that the indicated value coincides with "the True Heading" selected by this system after the repeater switch is turned "ON".

## 2.7 Monitoring while Running

- CAUTION - Monitoring in Progress
- Change of the ship's Speed Input System and the Latitude Input System, or large change of the ship's speed and latitude, may cause a large change of the Gyro Compass True Heading. When on automatic steering, first turn the steering mode of the automatic steering system to "MANUAL" to prevent a large course change. Confirm the area around the ship is clear and turn to "AUTO" steering again.

Perform monitoring while running as follows:

## 2.7.1 Confirmation of Alarm Status

1. Confirm that the alarm indicator lamp on the operation panel is off.

   **Note** When a failure is activated in the system, the alarm indicator blinks and buzzes.

2. Confirm the alarm code displayed in the indicator.
3. Press ACK/ENT switch to stop buzzer.

   **Note** If the alarm indicator lamp is still on after pressing the ACK/ENT switch, the failure continues.

   **Note** If the failure is only momentarily, the alarm indicator lamp extinguishes at the same time the ACK/ENT switch is pressed.

4. Take appropriate action according to *Alarm* on page 47 conditions.

## 2.7.2 Confirmation of Gyro Compass True Heading

1. Confirm that the Gyro Compass True Heading indicated in this system coincides with the heading by some target or by observation.
2. Make corrections according to *Confirmation of True Heading* on page 44.

## 2.7.3 Confirmation of Latitude

- CAUTION - Confirmation of Latitude
- Change of the latitude input system or large change of the latitude may cause a large change of True Heading. When on automatic steering, first turn the steering mode of the automatic steering system to "MANUAL" to prevent a large course change. Confirm the area around the ship is clear and turn to "AUTO" steering again.

- Confirm that the latitude value displayed on GPS coincides with the latitude value displayed on the indicator.

  **Note** When "GPS" is selected as the latitude input system, the latitude obtained by GPS is displayed.

  **Note** When "GYRO" is selected as the latitude input system and other than "MANUAL" is selected as the ship's speed input system, the latitude is automatically updated.

- Confirm the displayed value every time when berthing (or at anchor) and in two hour intervals when GYRO has been selected.

  **Note** If there is a difference with the ship's actual latitude, set it again according to *Set Latitude Input System* on page 40.

## 2.7.4 Confirmation of Ship Speed

- CAUTION - Confirmation of Ship Speed
- Change of the ship's speed input system or large change of the ship's speed may cause a large change of True Heading. When on automatic steering, first turn the steering mode of the automatic steering system to "MANUAL" to prevent a large course change. Confirm the area around the ship is clear and turn to "AUTO" steering again.

The Gyro Compass generates an error due to the ship's speed. The system calculates this error and corrected True Heading is sent out as repeater signal and serial signal.

1. Confirm that the ship's speed displayed coincides with the ship's actual speed at 2 hour intervals.
2. Set it again according to *Set Ship Speed Input System* on page 42, if there is a difference with the actual speed.

## 2.8 Operation Procedure of Master Compass Power Switch (Option)

- CAUTION - System Selection
- System selection (switching) may cause large change of True Heading. When on automatic steering, first turn the steering mode of the automatic steering system to "MANUAL" to prevent a large course change. Confirm the area around the ship is clear and turn to "AUTO" steering again.

- CAUTION - Operating Procedure Master Compass Switch (Option)
- DO NOT touch the Master Compass Power Switch while the Gyro Compass operates normally, to prevent serious damage to the sensitive element, reduce the life cycle of the product, or unexpected problems. The Master Compass Power Switch must be operated only when the master compass is in abnormal condition.

With the optional Master Compass Power Switch the running of the compass can be stopped and the output of heading information to the external heading sensor can be changed, if connected. This minimizes the loss of heading signal when any abnormal condition or failure occurs in the master compass. The Master Compass Power-off Switch is located inside the optional Power Supply Unit.

When any abnormal condition or failure occurs in the master compass, operate the Gyro Compass as follows:

### 2.8.1 Operation Procedure

1. Change the heading output to external heading sensor system (GPS compass or magnetic compass). see *System Selection* on page 45.
2. Turn the master compass power switch, optionally provided in the steering stand or the control unit, to OFF.

- CAUTION
- DO NOT turn the main power-on switch on the operation panel to OFF.

**Note** Although the alarm code 「3」 or 「A」 will appear and be kept indicating, the output with the external heading sensor selected will be transmitted and kept on.

### 2.8.2 Return Procedure

1. First turn the steering mode of the steering control system to HAND.
2. Turn the Compass Power Switch of the operation panel to OFF.
3. Turn the Master Compass Power Switch, located either in the steering stand or in the control unit of the Gyro Compass, to ON.
4. Turn the Power Switch in the operation panel of the Gyro Compass to ON.
5. Synchronize the repeater heading with the heading information provided from the external heading sensor as selected in (1) changeover procedure.

**Note** changeover to the Gyro Compass heading should be done in about three hours after re-starting the Gyro Compass.

6. Synchronize the heading of each repeater with the heading of the Gyro Compass, once the heading information is changed on the Gyro Compass

## 2.9 Alarm

- CAUTION - Alarms
- When the following alarms are activated, the heading information from this system may not be sent at all, or may have a large error. All units operated by the heading information from this system (in particular, the automatic steering system, etc.) should be operated immediately according to the individual emergency operating procedure.

When an alarm is activated, the buzzer will provide an audible alarm and an alarm code will be displayed in the indicator.

1. Confirm alarm code and press ACK/ENT switch to stop buzzer, when an alarm has been generated.

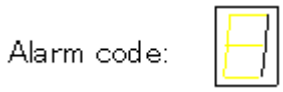
**Note** If the alarm occurs only momentarily, the alarm indicator extinguishes by pressing the ACK/ENT switch.

**Note** When the alarm indicator did not extinguish by pressing the ACK/ENT switch, the alarm conditions continues.

2. Take appropriate actions referring to *Troubleshooting* on page 59, when the alarm conditions continue and confirm the alarm code.

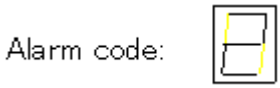
### 2.9.1 Alarm Content

1. Power supply failure.



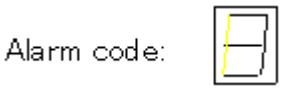

Is displayed when the power supply for this system was lost.

2. Power supply unit failure.



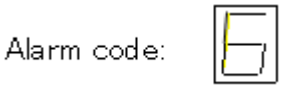

Is activated when the control unit of the power supply shows over current or over voltage, or the power supply output falls away.

3. Inverter failure.



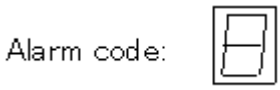

Is activated when the inverter unit in the master compass shows over current or over voltage.

4. Rotor level failure.



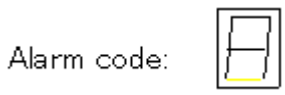

Is activated when "rotor"(sensitive element) in the master compass level is abnormal.

5. Zero cross failure.




Is activated when reference angle (zero cross angle) of the master compass heading can not be detected properly, or a failure is generated in the heading calculation.

6. System communication failure (1).




Is activated when a failure is generated in the communication from the master compass to the control unit.

7. System communication failure (2).

Alarm code: 

Is activated when a failure is generated in the communication from the control unit to the master compass.

**8.** GPS communication break.

Alarm code: 

Is activated when the serial signal from GPS stops, or GPS operation stops. When this alarm is activated, operate according to *Corrective Measures GPS Communication Failure* on page 51.

**Note** This alarm is activated only when "GYRO" is selected as the system selection and "GPS" is selected as the ship's speed input system or the latitude input system.

**9.** GPS communication data failure.

Alarm code: 

Is activated when an failure is generated in the serial signal from GPS. When this alarm is activated, operate according to *Corrective Measures GPS Communication Failure* on page 51.

**Note** This alarm is activated only when "GYRO" is selected as the system selection and "GPS" is selected as the ship's speed input system or the latitude input system.

**10.** System internal communication failure (1) (Option).

Alarm code: 

Is activated when internal communication from the external heading sensor signal processing unit, built into this system, to the Gyro Compass operation processing unit (in this system) has stopped.

**Note** When "External heading sensor" is selected as system, operate according to *Corrective Measures External Heading Sensor Communication Failure* on page 51.

**11.** System internal communication failure (2) (Option).

Alarm code: 

Is activated when a failure is generated in internal communication from the external heading sensor signal processing unit, built into this system, to the Gyro Compass operation processing unit (in this system).

**Note** When "External heading sensor" is selected as system, operate according to *Corrective Measures External Heading Sensor Communication Failure* on page 51.

**12.** Master compass heading failure.

Alarm code: 

Is activated when a failure is generated in the monitor signal of the master compass heading.

**13.** External heading sensor communication stop.

Alarm code: 

Is activated when the serial signal from the external heading sensor has stopped or the external heading sensor has stopped operating.

**14.** External heading sensor data failure.

Alarm code: 

Is activated when a failure is generated in the serial signal from the external heading sensor.

**Note** When this alarm is activated, operate according to *Corrective Measures External Heading Sensor Communication Failure* on page 51.

**15.** LOG (serial signal) communication stop.

Alarm code: 

Is activated when the serial signal from LOG (serial signal) has stopped, or LOG (serial signal) has stopped operating.

**Note** This alarm is activated only when "GYRO" is selected in the system selection and "LOG (serial signal)" is selected as the ship's speed input system.

**16.** LOG (serial signal) data failure.

Alarm code: 

Is activated when a failure is activated in the serial signal from LOG.

**Note** When this alarm is activated, operate according to *Corrective Measures LOG (serial signal) Communication Failure* on page 51.

**Note** This alarm is activated only when "GYRO" is selected in the system and "LOG (serial signal)" is selected as the ship's speed input system.

**17.** LOG (contact) failure.

Alarm code: 

Is activated when a failure is activated in LOG (contact).

**Note** This alarm is activated only when "LOG" is selected for the ship's speed input system.

**18.** E5V failure

Alarm code: 

Is activated when failure is generated in the power supply for the serial signal.

## 2.9.2 Corrective Measures GPS Communication Failure

- CAUTION - Corrective Measures GPS Communication Failure
- When an alarm related to GPS (alarm code "c" or "d") is activated and the Gyro Compass' True Heading has not been determined, first turn the steering mode to "MANUAL", or "Non Follow Up", then determine the True Heading, because wrong heading information (repeater signal and serial signal) may be sent out.

- CAUTION - Corrective Measures GPS Communication Failure
- Determination of the True Heading may cause large change of sent heading information. During automatic navigation, great care should be taken, because large course changes may have happened.

The True Heading, which currently is displayed and sent is the corrected value based on the corrected value immediately before the GPS alarm was activated.

1. Select other mode than GPS, when GPS has been selected as the ship's speed input system.

   **Note** Refer to *Set Ship Speed Input System* on page 42.

2. Select other mode than GPS, when GPS has been selected as the latitude input system.
   The True Heading indication is blinking showing the True Heading calculated, based on the changed ship's speed and latitude
3. Press ACK/ENT switch to confirm True Heading.
   The True Heading indication lights up and the True Heading sent is also confirmed.

## 2.9.3 Corrective Measures External Heading Sensor Communication Failure

- CAUTION - Corrective Measures EXTERNAL HEADING SENSOR Communication Failure
- When an alarm regarding the EXTERNAL HEADING SENSOR (alarm code "E", "F", "L" and "N") is activated, the heading information (repeater signal and serial signal) immediately before the alarm generated is sent. First turn the steering mode to "MANUAL" or "Non Follow Up", and then determine the True Heading. Once True Heading has been determined, the system's heading is sent out.

- CAUTION - Corrective Measures EXTERNAL HEADING SENSOR Communication Failure
- Determination of the True Heading may cause large change of sent heading information. During automatic navigation, great care should be taken, because large course changes may have happened.

When the alarm related to the External Heading Sensor is activated, the True Heading of the data indicator is blinking.

The True Heading that is currently displayed on the indicator was the True Heading before an alarm was activated. When the alarm has been recovered the received heading will be indicated.

When the alarm continues, the True Heading cannot be determined.

The True Heading sent out, is the heading immediately before the alarm was activated.

1. Confirm that the alarm related to the external heading sensor has been recovered.
2. Press the ACK/ENT switch as the True Heading is displayed in the indicator.
   The External Heading Sensor True Heading indicator for the True Heading lights up and the sent out True Heading is the confirmed true heading.

## 2.9.4 Corrective Measures LOG (serial signal) Communication Failure

- CAUTION - Setting Speed Input
- When an alarm regarding LOG (serial) (alarm code "P" or "U") is activated and the Gyro Compass' True Heading has not been determined, first turn the steering mode to "MANUAL" or "Non Follow Up", then determine the True Heading, because wrong heading information (repeater signal and serial signal) may be sent out.

- CAUTION - Corrective Measures LOG Communication Failure
- Determination of the True Heading may cause large change of sent heading information. During automatic navigation, great care should be taken, because large course changes may have happened.

When a failure related to LOG (serial signal) is activated, the data indicator is blinking.

The Gyro Compass True Heading and the heading information sent out, which are currently displayed, is the corrected value based on the ship's speed immediately before the alarm was activated.

1. Select other mode than "LOG (serial signal)" for the ship's speed input system. See *Set Ship Speed Input System* on page 42
2. Press ACK/ENT switch to confirm True Heading, when the Gyro Compass true heading, calculated from the corrected ship's speed, display is blinking in the indicator.
   The True Heading indicator lights up and the True Heading sent out is also confirmed.

### 2.9.5 Corrective Measures LOG (contact) Failure

- CAUTION - Corrective Measures LOG Contact Communication Failure
- When an alarm regarding LOG Contact (alarm code "u") is activated and the Gyro Compass' True Heading has not been determined, first turn the steering mode to "MANUAL" or "Non Follow Up", then determine the True Heading because wrong heading information (repeater signal and serial signal) may be sent out.

When a failure related to LOG (contact) is activated, the data indicator is blinking.

The Gyro Compass True Heading and the heading information sent out, which are currently indicated, is the corrected value based on the ship's speed immediately before the alarm was activated.

1. Select other mode than "LOG" for the ship's speed input system.

   **Note** Refer to *Set Ship Speed Input System* on page 42.

2. Press ACK/ENT switch to confirm True Heading, when the Gyro Compass true heading, calculated from the corrected ship's speed, display is blinking in the indicator.
   The True Heading indicator lights up and the True Heading sent out is also confirmed.

## 2.10 Turning the Gyro Compass OFF

1. Press the POWER button on the Control Panel.
   The light in the Power Button will extinguish.
2. Press the POWER button again to activate the rotor brake function.
   The light in the Power Button will light up again.

Rotor brake active is indicated by:

- Flashing display.
- The Gyro Compass makes a soft clicking sound.

**Note** The rotor brake function will be active for a maximum of 4 minutes.

**Note** The sensitive element may be damaged, if the rotor brake is not activated.

# 3 Specifications

Refer to the As Built plan kept aboard and table below.

| Model | Description | AlphaMidiCourse |
|---|---|---|
| Display | | Digital with 7 digits |
| Performance | Settle point error | < 0.3° |
| | Settle point repeatability | < 0.2° |
| | Static accuracy | < 0.3° |
| | Dynamic accuracy | < 0,5° |
| | Follow-up speed | max. 75°/second |
| | Settling time | < 4 hours |
| Outputs | Stepper | 1x Stepper DC24V, 6 steps/° |
| | Serial data | 4x output RS-422/ RS-485 |
| | | IEC61162-1/2 |
| | Status/alarm | Dry contacts (alarm ack, buzzer stop) |
| Inputs | Latitude | NMEA 0183 via RS-422 from GPS |
| | Speed | 200 or 400 pulses/nm from log NMEA 0183 via RS-422 |
| Compensation | Latitude | 70°N to 70°S |
| | Speed | 0-50 knots |
| Environmental | Ambient operating temperature | –10°C – +50°C |
| | Gimbal limits | ± 45° roll and pitch |
| | Mean time between failures (MTBF) | 35000 |
| Operating Voltage | Input voltage | 24VDC |
| Power | Start-up | 140 VA AC 70 VA AC (Operating) |
| Dimensions | Size | 340mm (h) x 340mm (w) x 438mm (d) |
| | Weight | 23 kg. (Master Compass)<br>7 kg. (Control unit) |
| Accessories | Included | Control Unit |
| Standards | | IMO A424(XI), ISO8728, Marine Equipment Directive 96/98/EC |

**Table 10: Specifications**

| No. | Name | Type | Qty | Mass (kg) | Finish | Remarks | Dwg. No. |
|---|---|---|---|---|---|---|---|
| 1 | BASIC SPECIFICATIONS | - | - | - | - | | - |
| | 1 GYRO COMPASS | Alpha-MidiCourse | - | - | - | GENERAL | |
| | | | | | | INPUT SIGNAL | |
| | | | | | | INPUT SIGNAL SENTENCE | |
| | | | | | | OUTPUT SIGNAL | |
| | | | | | | OUTPUT SIGNAL SENTENCE | |
| 2 | INSTALLATION NOTES | Alpha-MidiCourse | - | - | - | | |
| 3 | ENTER UNIT WIRING DIAGRAMS | Alpha-MidiCourse | - | - | - | | |
| 4 | EXTERNAL FORM | - | - | - | - | | |
| | 1 MASTER COMPASS | Alpha-MidiCourse | 1 | 23 | RAL - 7012 Basalt grey | | |
| | 2 CONTROL UNIT | Alpha-MidiCourse | 1 | 7 | | Wall mount type | |
| | 3 SPARE PARTS & TOOL BOX | | 1 | | CLEAR | | |
| 5 | SPARE PARTS & TOOLS LIST | - | - | - | - | | |
| | 1 GYRO COMPASS | | 1 | - | - | | |

**Table 11: Contents and Components List**

| Sensor | Type of Signal | Protocol[2] | Sentence |
|---|---|---|---|
| GPS | IEC61162-1 / IEC61162-1 Ed.2 | A | Refer to Input Signal Sentence |
| SPEED LOG[3] | IEC61162-1 / IEC61162-1 Ed.2 | A | Refer to Input Signal Sentence |
| SPEED LOG[3] | DRY CONTACT | - | 200 or 400 Pulses/n mile |
| | | | 5V / 5mA |

**Table 12: Input Signal Specifications**

[2] Refer to Type of Protocol
[3] Input either or both signal

| | A |
|---|---|
| BAUD RATE | 4800 bps |
| DATA BITS | 8 bits |
| PARITY | none |
| STOP BITS | 1 |
| TRANSMIT FREQ. | 1 s |

**Table 13: Type of Protocol**

| | |
|---|---|
| GPS | DATA NO.1<br>$-GGA,x,xx,x,N,xx.x,E,x,~*hh<CR><LF><br>↑LAT.: ↑GPSQI:GPS<br>$-GLL,xxxx.xx,N,xxxx.xx,E~*hh<CR><LF><br>↑LAT.:<br>**Note** GGA sentence is high priority.<br>DATA NO.2<br>$-VTG,xx,T,xx,M,xx.x,N,xx,K*hh<CR><LF><br>↑SPEED (knots) |
| SPEED LOG | DATA NO.1<br>$-VBW.x.x.x.x.A.x.x.x.x.A~*hh<CR><LF><br>↑SPEED (knots) STATUS<br>↑GROUND SPEED (knots)<br>↑WATER SPEED (knots)<br>**Note** Ground speed is high priority |

**Table 14: Input Signal Sentence**

| Circuit | Type of Signal | Protocol[4] | Sentence |
|---|---|---|---|
| SELECTED COMPASS | DC24V STEP 1/6˚ | - | - |
| SELECTED COMPASS[5] | IEC61162-1 Ed. / IEC61162-2 | A / B | Refer to output signal sentence. |

**Table 15: Output Signal Specifications**

| | A | B |
|---|---|---|
| BAUD RATE | 4800 bps | 38400 bps |
| DATA BITS | 8 bits | 8 bits |
| PARITY | none | none |
| STOP BITS | 1 | 1 |
| TRANSMIT FREQ. | 1sec/200msec/100msec | 20 ms |

**Table 16: Type of Protocol**

[4] Refer to Type of Protocol
[5] Type of Protocol can be selected for each circuit. (Refer to wiring diagram regarding number of circuits)

# 4 Maintenance

- WARNING - Maintenance
- During maintenance or check of the product, touching internal parts may cause electric shock, because the ship's power supply is still connected to the system distribution board, even if the main power switch of this product is turned "OFF". Do not touch internal parts such as terminal boards, power supply unit, etc. If necessary, disconnect the power cable from the ship's distribution board. A warning label is attached to point out this danger.

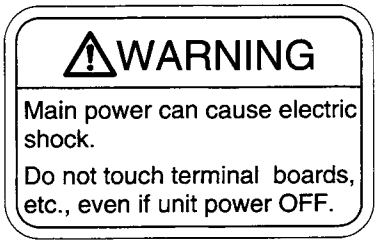



**Figure 38: Warning Label**

- CAUTION - Maintenance and check
- Main units of this system consist of electronic circuits of high reliability. If a failure occurs, perform the check and maintenance as described in this chapter and correct the fault(s) to prevent further risk of failure and to maintain the system's performance. Failure to carry this out, the detection of the failure sign will be delayed and may cause accidents such as collision or grounding.

- CAUTION - Prohibition
- Do not use insulation tester or other device to test system insulation as it will damage internal electrical components. Always disconnect the wiring connected to this system before testing related power distribution lines with such testers.

## 4.1 General Procedures

This system consists of carefully selected parts based on safety design. Periodical checks (operational checks) and maintenance must still be performed for long term satisfactory operation.

Main purpose of the periodical checks and maintenance is to catch signs of equipment failure at an early stage. Repairs on call in port as a result of these checks will prevent unexpected failures to a minimum while sailing.

For the periodical checks and maintenance of the equipment connected to this system, like the automatic steering system, magnetic compass system, etc., refer to the separate individual Operator's Manuals.

Record content of the checks and maintenance performed in the log book.

1. Assign a person in charge of periodical checks and maintenance for this system to be executed under his responsibility.
2. Check and re-tighten loosened screws of mechanical connections, due to body shock and resonance vibration.
3. Re fix parts, fixing screws, mounting parts, reinsert connectors and repair loosened cables and wires.

   **Note** Most parts used in the main sections of this system are electronic (electric) parts. Occurrence of electronic parts trouble themselves is very seldom, and troubles in mounting sections of electronic (electric) parts, being about to disconnect wires at roots or lead wires of electric parts, occur easily due to hull body shock or resonance vibration. These are the points to be checked.
4. Record strange motions, smells, sounds and heat generation, etc. different from those that exist in normal operations.
5. Request repair from Alphatron Marine Service Engineer, or agent.
6. Have the system checked periodically by Alphatron Service Engineer, or agent.
7. Have the checklist table and the log book evaluated by the engineer.

**Note** The trouble shooting and repair should be carried out by the engineer according to the results of the checks of the faulty items.

## 4.2 Periodical Checks

Use the periodical check table for the periodical check. See *Periodic Check Table 1* on page 78

Frequency of the checks are:

1. Items to be executed once a day.
2. Once a half year / once a year.

Checked items are regarded as normal, or not, by comparing their condition as at installation time on the ship as a standard.

1. Copy and use periodical check table (including operational check) [once a day], in the Appendix. See *Figure 51: Periodic Check Table 1* on page 78

   **Note** When table is full file it.

2. Copy and use periodical check table (including operational check) [once a half year / once a year], in the Appendix. See *Figure 52: Periodic Check Table 2* on page 79

   **Note** When table is full file it.

## 4.3 Warning Label Check

Always check and clean warning labels so they are easy to read.

When warning labels become dirty or detached, request new ones from Alphatron Marine.

## 4.4 Spare Parts

| Part Name | Part No. | Old No. |
|---|---|---|
| Weight 9.0 G | 10210101- | |
| Weight 3.0 G | 10210102- | |
| Weight 3.8 G | 10210103- | |
| Weight 2.3 G | 10210104- | |
| Weight 1.2 G | 10210105- | |
| Weight 0.95 G | 10210106- | |
| Weight 0.6 G | 10210107- | |
| Weight 0.3 G | 10210108- | |
| Weight 0.17 G | 10210109- | |
| Weight 6.6 G | 10210110- | |
| Guide Screw [A] | 11002595- | |
| Guide Screw [A] | 11002596- | |
| Sensitive Element | G-002331 | 3107.9152 |
| Brush | G-003943 | 3107.9154 |
| Step Motor | G-004556 | 3107.9158 |

| Part Name | Part No. | Old No. |
|---|---|---|
| Belt | G-002332 | 3107.9160 |
| HRZC PWB | G-004557 | 3107.9162 |
| Inverter PWB | G-002333 | 3107.9164 |
| Slip Ring | G-004558 | 3107.9166 |
| Flexibel Wire (east) | G-004559 | 3107.9168 |
| Gpower PWB | G-004560 | 3107.9170 |

**Table 17: Spare Parts List**

## 4.5 Disposal Method

When disposing of this system, it should be treated as industrial waste and disposed of in accordance with the laws and regulations.

## 4.6 Troubleshooting

When a failure occurs it may be corrected by following the steps contained in list below.

### 4.6.1 General

- CAUTION - Troubleshooting
- When an alarm is activated, immediately confirm content of the activated alarm and take appropriate measures. •When a failure has been activated, confirm area around the ship is clear to perform check and take appropriate measures in non-hazardous sea area, stopping the ship as a rule.

Two things must be considered when a failure has become apparent in this system, or in the connected external equipment:

1. An alarm is displayed in this system.
2. A failure exists in part, or in all functions of this system.

### 4.6.2 Before Troubleshooting

Before starting the troubleshooting procedure consider the following:

1. Firstly ensure the ship's safety. Then identify where the cause of the failure is located; in the system side, or in the external equipment side.
   - Identify the side of the failure.
   - Confirm the alarm content according to *Alarm* on page 47.

| When the following alarms are displayed, the cause may be in the external equipment, or the connected line. | | When the following alarms are displayed, the cause may be in this system. | |
|---|---|---|---|
| E-1 | E-n | E-2 | E-G |
| E-c | E-P | E-3 | E-r |
| E-d | E-U | E-6 | |
| E-E | E-u | E-8 | |
| E-F | | E-A | |
| E-L | | E-b | |

2. Tools (instruments) required for checking:
   - Minus head screw driver and general tools
   - Circuit tester

### 4.6.3 Corrective Measures

Measures can be taken to rectify some failures.

- CAUTION - Corrective Measures
- Before checking and replacing of fuses, and disconnecting / connecting of each unit, connector, printed circuit, terminal cable, turn "OFF" the power switch of the operating panel, and disconnect the power cable from the ship's distribution board, etc. It may cause electric shock and failure if left in "ON" position.

### 4.6.4 Corrective Measures when an Alarm is Activated

When an alarm is activated, follow procedures below:

1. Confirm that the alarm indicator light on the Operating Panel blinks and check alarm content displayed in the Data Display when the alarm buzzes.
2. Press ACK/ENT switch to stop the buzzer.
   If the alarm indicator light extinguishes, the system has been restored.

   **Note** Wait a while to observe whether the alarm is repeated, then take appropriate action. Write down the setting values and the other data related to the alarm, and various status conditions including sea conditions.

   **Note** If the alarm indicator light continues blinking after pressing ACK/ENT switch, shows that the failure still exists.
3. Confirm alarm occurrence number and alarm content from the data indicator, refer to *Alarm* on page 47 and check according to *Failure Phenomena and Corrective Measures* on page 60, regarding the displayed alarm content.

### 4.6.5 Failure Phenomena and Corrective Measures

When a failure has occurred, take the following actions.

Contact Alphatron Marine, or agency if the failure was not repaired.

- CAUTION - Failure Phenomena Corrective Measures
- Whenever the internal setting of the system is changed, follow instructions of the Alphatron Service Engineer.
- When another failure is activated than appeared in this clause, or a replaced fuse has blown again, turn "OFF" the power switch of the operating panel, disconnect the power cable from the ship's distribution board and request repair from an Alphatron Service Engineer.
- When a failure has occurred and it has not been repaired according to this clause, turn "OFF" the power switch of the operating panel and request an Alphatron Service Engineer to repair it on making a call to port. Even if it has been repaired, request an Alphatron Service Engineer to check it.

#### 4.6.5.1 Power Supply Failure (alarm code 1)

1. Confirm that the power is connected.
2. Confirm the automatic steering system type according to the As Built plan of the ship.

*INFO:*

| Stand alone type (Model - I) | Voltage |
|---|---|
| The system where both the master compass and the control unit are not built into the automatic steering system. | |
| Input terminals of the emergency power supply (between 1B+ and 1B- of the external terminal board TB3-5 and TB3-6. | 24 V DC, within -20 % to +30 % |

3. Contact Alphatron Marine service engineer, or agent, immediately after checking steps 1 and 2 above.

#### 4.6.5.2 Power Supply Failure (alarm code 2)

1. Turn OFF the power switch.
2. Wait approx. 20 seconds before turning ON again.
3. Take action according to *Start* on page 38, if no alarm code 2 was activated.
4. Turn OFF the power switch and request repair from Alphatron Marine service engineer, or agent, if an alarm is activated again in alarm code 2.

#### 4.6.5.3 Inverter Failure (alarm code 3)

- CAUTION - Not all repeaters operate
- When checking fuses, turn OFF the power switch, and disconnect the power cable from the ship's distribution terminal board.

1. Turn OFF the power switch.
2. Turn ON again after approx. 20 seconds.
3. Take action according to *Start* on page 38, if no alarm code 3 was activated.
4. Check the inverter fuse (F1-12A), located in the base of the master compass, *Master Compass* on page 70, if an alarm is activated again in alarm code 3.
5. Turn OFF the power switch and request repair from Alphatron Marine service engineer, or agent.

#### 4.6.5.4 Rotor Level Failure (alarm code 6)

- CAUTION - Rotor Level Failure (alarm code 6)
- Turn OFF the power switch.

1. Turn OFF the power switch.
2. Turn ON again after approx. 20 seconds.
3. Take action according to *Start* on page 38.
4. Observe the heading of the Gyro Compass for two hours or more.
5. Contact Alphatron Service Engineer, or agent, after checking heading of the Gyro Compass.

#### 4.6.5.5 Zero Cross Failure (alarm code 8)

- CAUTION - Zero Cross Failure (alarm code 8)
- Determination of the Gyro Compass True Heading when alarm code 8 is activated, may cause a large change of the True Heading. During automatic navigation, take great care, because a large course change may have happened.

1. Press DISP switch.

**Note** Ensure SSG or GYT is shown in Mode Display.

**Note** Data Display will be blinking.

2. Press ACK/ENT switch to determine the Gyro Compass True Heading.

**Note** Set True Heading again according to *Confirmation of True Heading* on page 44, if the determined True Heading has an error.

3. Contact Alphatron Marine, or agent, even when True Heading has been recovered.

#### 4.6.5.6 System Communication Failure (1) (alarm code A)

1. Turn OFF the power switch.
2. Turn ON again after approx. 20 seconds.
3. Take action according to *Start* on page 38, if no alarm code A was activated.
4. Turn OFF the power switch of this system, when this alarm is generated again.
5. Disconnect the power cable from the ship's distribution board.
6. Confirm the connection / contact between the external terminal board of the master compass and the external terminal board (connector) inside of the control unit.

*INFO:* **One Gyro Compass system.**

| | |
|---|---|
| External terminal board of the master compass: | MTTRM, PWB, TB2, MR+ / - |
| External terminal board of the control unit: | GTERM, PWB, TB1, MR+ / - |

**Table 18: Stand alone type (Model - I)**

7. Contact Alphatron Marine Service Engineer, or their agent, after checking steps 2 to 7.

#### 4.6.5.7 System Communication Failure (2) (alarm code b)

1. Turn OFF the power switch.
2. Turn ON again after approx. 20 seconds.
3. Take action according to *Start* on page 38, if no alarm code b was activated.
4. Turn OFF the power switch of this system, when this alarm is generated again.
5. Disconnect the power cable from the ship's distribution board.
6. Confirm the connection / contact between the external terminal board of the master compass and the external terminal board (connector) inside of the control unit.
7. Contact Alphatron Marine Service Engineer, or their agent, after checking steps 2 to 6.

**Note** Refer to the As Built plan of the ship to confirm type.

#### 4.6.5.8 GPS Communication Stop (alarm code c) or Failure of GPS data (alarm code d)

1. Select other mode other than "AUTO" of the automatic steering system.
2. Confirm that GPS operates properly.

**Note** Operate GPS according to "GPS Operator Manual", if it does not operate properly.

3. Change the input system according to *Corrective Measures GPS Communication Failure* on page 51, if it was not recovered after executing step 2.
4. Contact Alphatron Marine Service Engineer immediately, after checking steps 1 to 3.

### 4.6.5.9 System Internal Communication Failure (1) (alarm code E) or System Internal Communication Failure (2) (alarm code F)

1. Confirm that the external heading sensor signal processing unit of this system operates properly.
2. Contact Alphatron Service Engineer, or agent, after checking step 1.

### 4.6.5.10 Master Compass Heading Failure (alarm code G)

- CAUTION - Master Compass Heading Failure (alarm code G)
- When an alarm code G is activated, the Gyro Compass True Heading may have an error. New input of the True Heading may cause a large change of the True Heading. When on automatic navigation, first turn the steering mode to "MANUAL", then determine the True Heading to prevent turning course with larger angle. Confirm area around ship is clear and turn to "AUTO" steering again.

1. Confirm that the Gyro Compass True Heading displayed in this system coincides with the heading by some target, or by observation.
2. Make correction according to *Confirmation of True Heading* on page 44, if there is an error is detected in step 2.
3. Contact Alphatron Marine Service Engineer, or agent, after checking steps 1 and 2.

### 4.6.5.11 External Heading Sensor Communication Stop (alarm code L) or External Heading Sensor Data Failure (alarm code n)

1. Confirm that the external heading sensor operates properly.
2. Operate it according to the Operator's Manual for the external heading sensor, if it does not operate properly.
3. Take appropriate actions according to *Corrective Measures External Heading Sensor Communication Failure* on page 51, if it was not recovered after executing step 2.
4. Contact Alphatron Marine Service Engineer, or agent, after checking steps 1 to 3.

### 4.6.5.12 LOG (serial signal) Communication Stop (alarm code P) or LOG (serial signal) Data Failure (alarm code U)

1. Confirm that LOG operates properly.
2. Operate it according to the Operator's Manual of LOG, if it does not operate properly.
3. Change the input system according to *Corrective Measures LOG (serial signal) Communication Failure* on page 51, if it was not recovered after executing step 2.
4. Contact Alphatron Marine Service Engineer, or agent, after checking steps 1 to 3.

### 4.6.5.13 LOG Contact Failure (alarm code u)

1. Confirm that LOG operates properly.
2. Operate it according to the Operator's Manual of LOG, if it does not operate properly.
3. Change the input system according to *Corrective Measures LOG (contact) Failure* on page 52, if it was not recovered after executing step 2.
4. Contact Alphatron Marine Service Engineer, or agent, after checking steps 1 to 3.

### 4.6.5.14 E5V Failure (alarm code r)

1. Confirm that all equipment connected to this system operates properly.

**Note** Refer to the As Built plan kept on board of the ship for the connected equipment.

2. Operate it according to the particular Operator Manual of the equipment, when a failure has been activated.
3. Contact Alphatron Marine Service Engineer, or agent, after checking steps 1 and 2.

### 4.6.5.15 Gyro Compass does not Function, when Power Switch on the Operating Panel turned ON.

- WARNING - Power Supply Failure (alarm code 1)
- Pay full attention to avoid electric shock when checking the power supply.
- When checking fuses, turn "OFF" the power switch on the operating panel and further disconnect the power cable from the ship's distribution board before checking fuses.

1. Confirm there is power on the power supply cable and the emergency power supply.

   *INFO:* To confirm this, execute as in *Power Supply Failure (alarm code 1)* on page 60.

2. Check fuses if there is no problem with the power supply.

   **Note** First disconnect the main/emergency power supply.

   *INFO:* **One Gyro Compass system**

   Fuse F6 (Main Supply) and F9 (Emergency Supply, see *Table 19: Fuse Replacement* on page 65) are located in the upper side of the ITERM terminal board of the control unit, see *Figure 45: Stand alone type Control Unit of One Gyro Compass System* on page 72 and *Figure 49: Terminal Board* on page 76

3. Contact Alphatron Marine Service Engineer, or agent, immediately after checking steps 1 and 2.

### 4.6.5.16 Alarm is Activated at the Same Time when Power Switch Turned ON

1. Turn OFF the power switch, when error code "3" and "A" are activated at the same time
2. Turn back ON after approx. 1 minute.
3. Check the fuse of the inverter, if the status does not change after step 1.

**Note** The fuse (F1 - 12A) is situated in the base of the master compass, see *Master Compass* on page 70.

### 4.6.5.17 Others

When failures and alarms, other than those mentioned before, are activated and when the replaced fuse has blown again, take following actions:

1. Turn OFF the power switch on the operating panel.
2. Disconnect the power supply from the ship's distribution board, etc.
3. Contact Alphatron Marine Service Engineer, or agent, immediately.

**Note** In such event, prompt service action is available when the alarm code is advised.

### 4.6.5.18 When Failures cannot be fixed On Board

Refer *Information to be supplied to Alphatron Marine* on page 80 when failures cannot be fixed on board.

### 4.6.6 Fuse Replacement

To replace a fuse when it has blown:

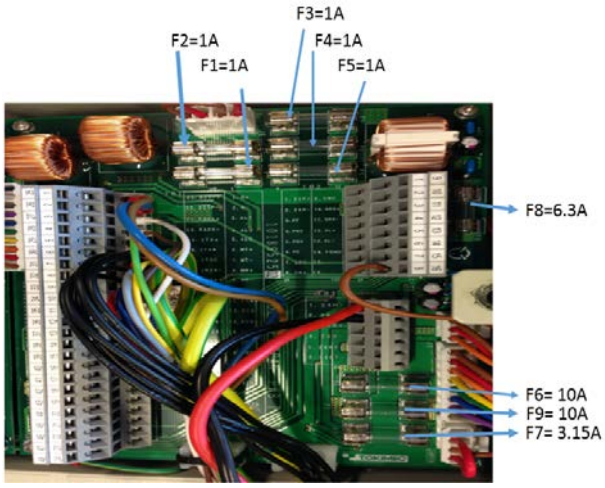



**Figure 39: Fuses Control Unit**

1. Turn OFF the power switch on the operating panel.
2. Disconnect the power supply from the ship's distribution board and the emergency power supply of this system.
3. Investigate the cause of the fuse blowing.

**Note** It will blow again, unless the cause is removed when replaced with the same capacity fuse and it recovered for a while. Note that there is some characteristic dispersion for the same capacity fuse.

**Note** Confirm that the voltage at the following external terminal board is zero. To confirm this, perform action as in *Power Supply Failure (alarm code 1)* on page 60.

| Fuse No. | Capacity | TB-No. | Signal | Description |
|---|---|---|---|---|
| F1 | 1A | TB1-33 | 1R24+ | Power supply for ch. 1 serial repeater |
| F2 | | TB1-38 | 2R24+ | Power supply for ch. 2 serial repeater |
| F3 | | TB1-43 | 3R24+ | Power supply for ch. 3 serial repeater |
| F4 | | TB1-48 | 4R24+ | Power supply for ch. 4 serial repeater |
| F5 | | TB1-21 | ST15 | Power supply for ch. 1 step motor repeater |
| F6 | 10A | TB3-1 | 24M+ | Main power supply (standard type)<br>Master compass power supply (with Power supply unit) |
| F7 | 3.15A | TB3-3 | 24B+ | Power supply for ICIF and IOPT board (with Power supply unit) |
| F8 | 6.3A | TB2-1 | 24R+ | Power supply for repeaters (with Power supply unit) |
| F9 | 10A | TB3-5 | 24BT+ | Emergency power supply (standard type) |

**Table 19: Fuse Replacement**

**Note** All fuses are ∅5.2x20mm, except Master Compass fuse.

### 4.6.6.1 Master Compass (Inverter fuse F1)

Fuse F1 is located inside the fuse holder in the front and is ∅6.35x31,8mm . All other fuses are ∅5.2x20mm.


**Figure 40: Master Compass Inverter Unit**

1. Press and turn the fuse holder edge counterclockwise with a screw driver to open the fuse holder.
2. Turn clockwise to close it, after fuse has been replaced.

# 5 Appendices

The Appendix contains Drawings and Periodic Check Tables.

## 5.1 Drawings

Drawing Contents:

1. Outline Control Unit (One Gyro Compass System).
2. Operating Panel.
3. Master Compass.
4. Stand alone type Control Unit of One Gyro Compass System.
5. Connection Diagram.
6. Installation Drawing.
7. Terminal Board.
8. ITERM pwb.

## 5.1.1 Outline Control Unit (One Gyro Compass System)

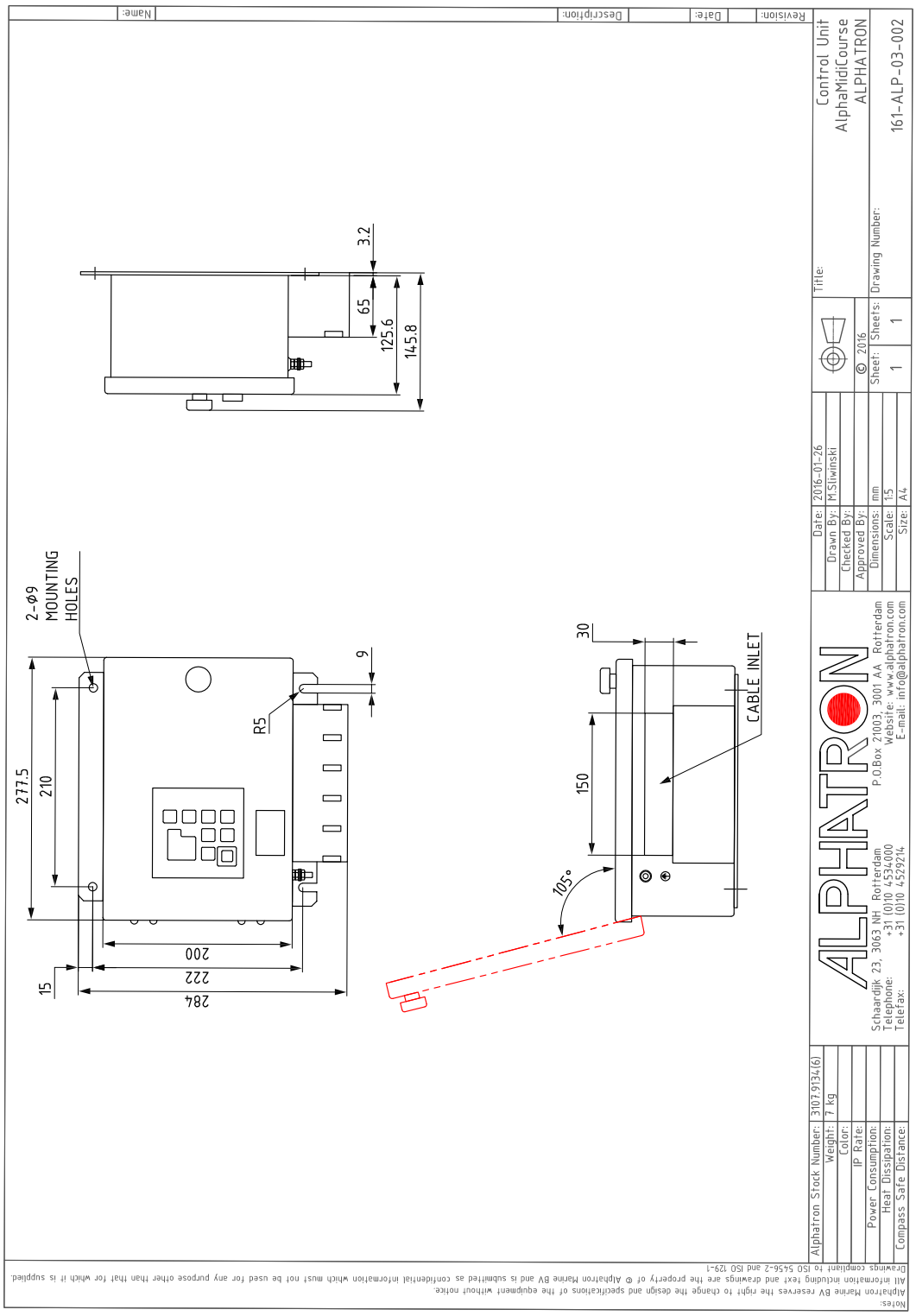



**Figure 41: Control Box**

### 5.1.2 Operating Panel

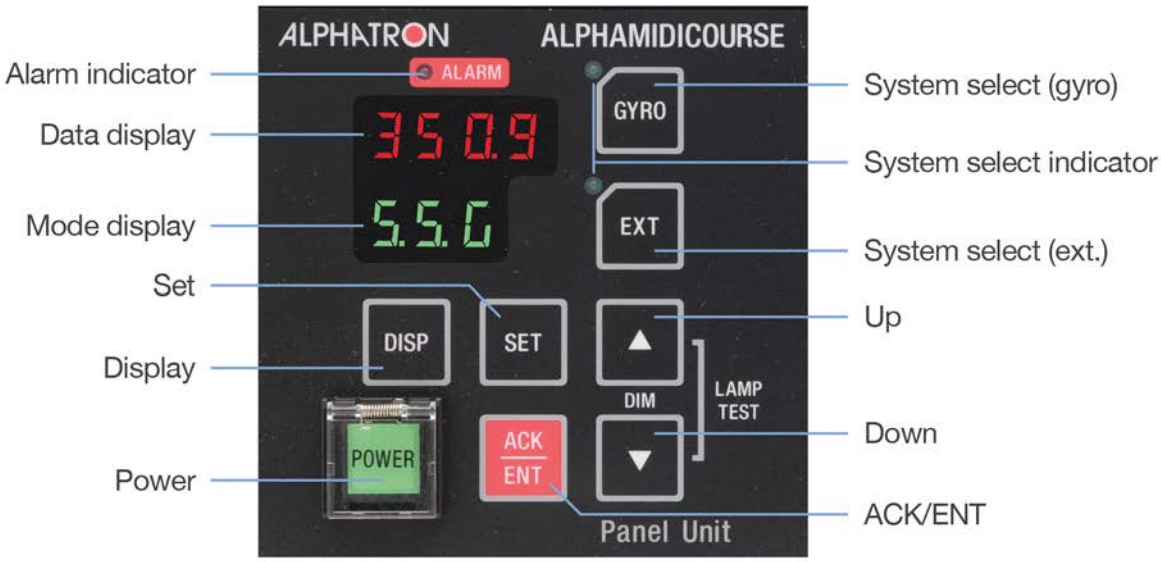



**Figure 42: Operating Panel**

### 5.1.3 Master Compass

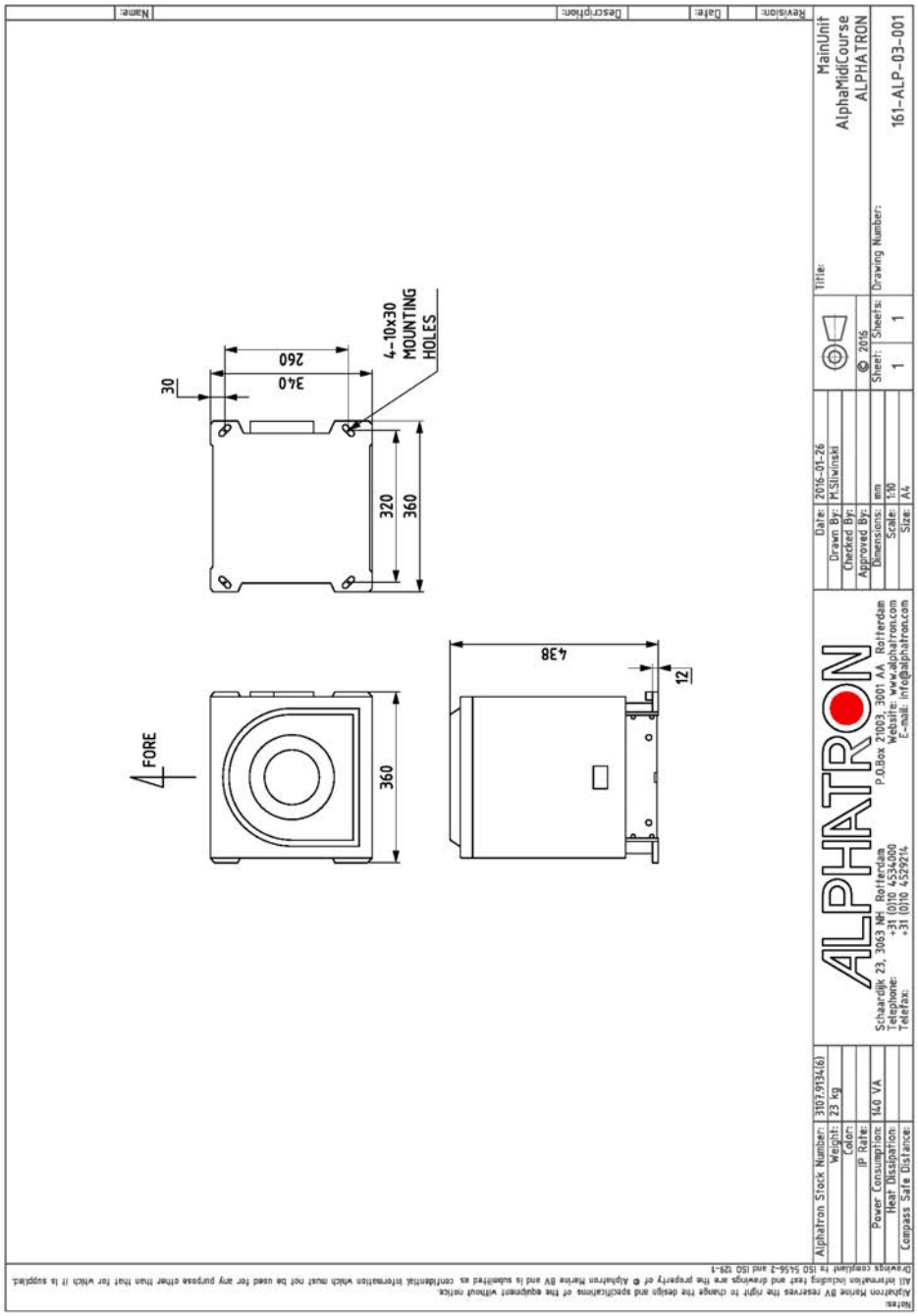



**Figure 43: Main Unit**

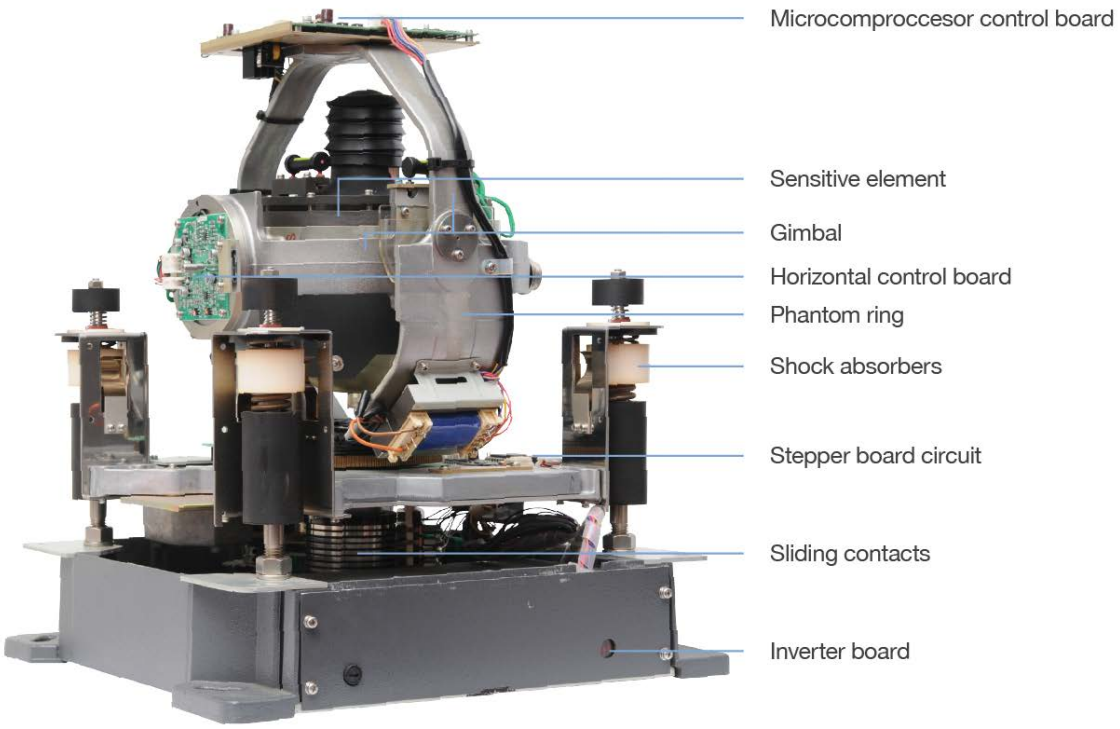



**Figure 44: Open Gyro Compass**

## 5.1.4 Stand Alone Type Control Unit of One Gyro Compass System

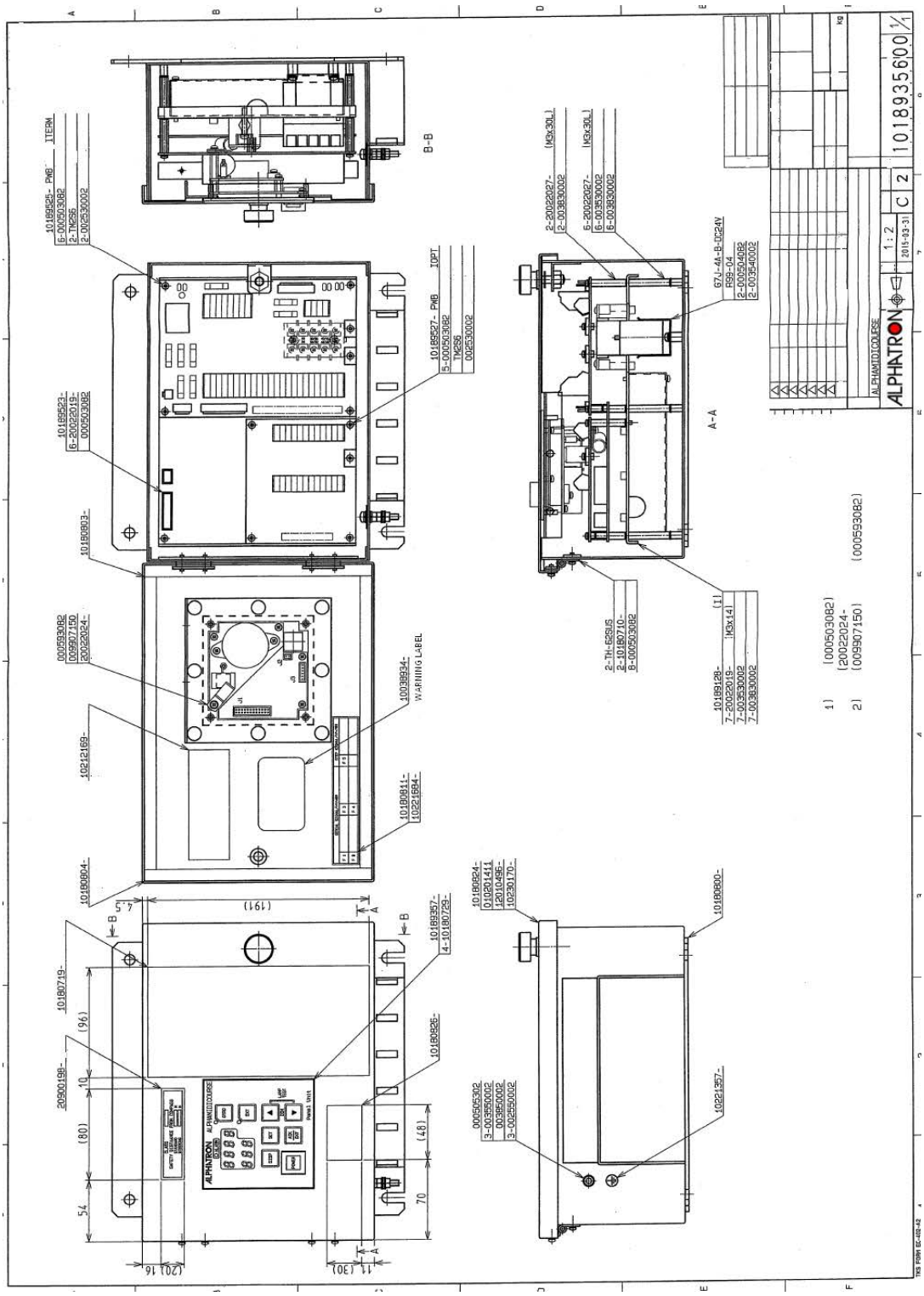



**Figure 45: Stand alone type Control Unit of One Gyro Compass System**

## 5.1.5 Connection Diagram

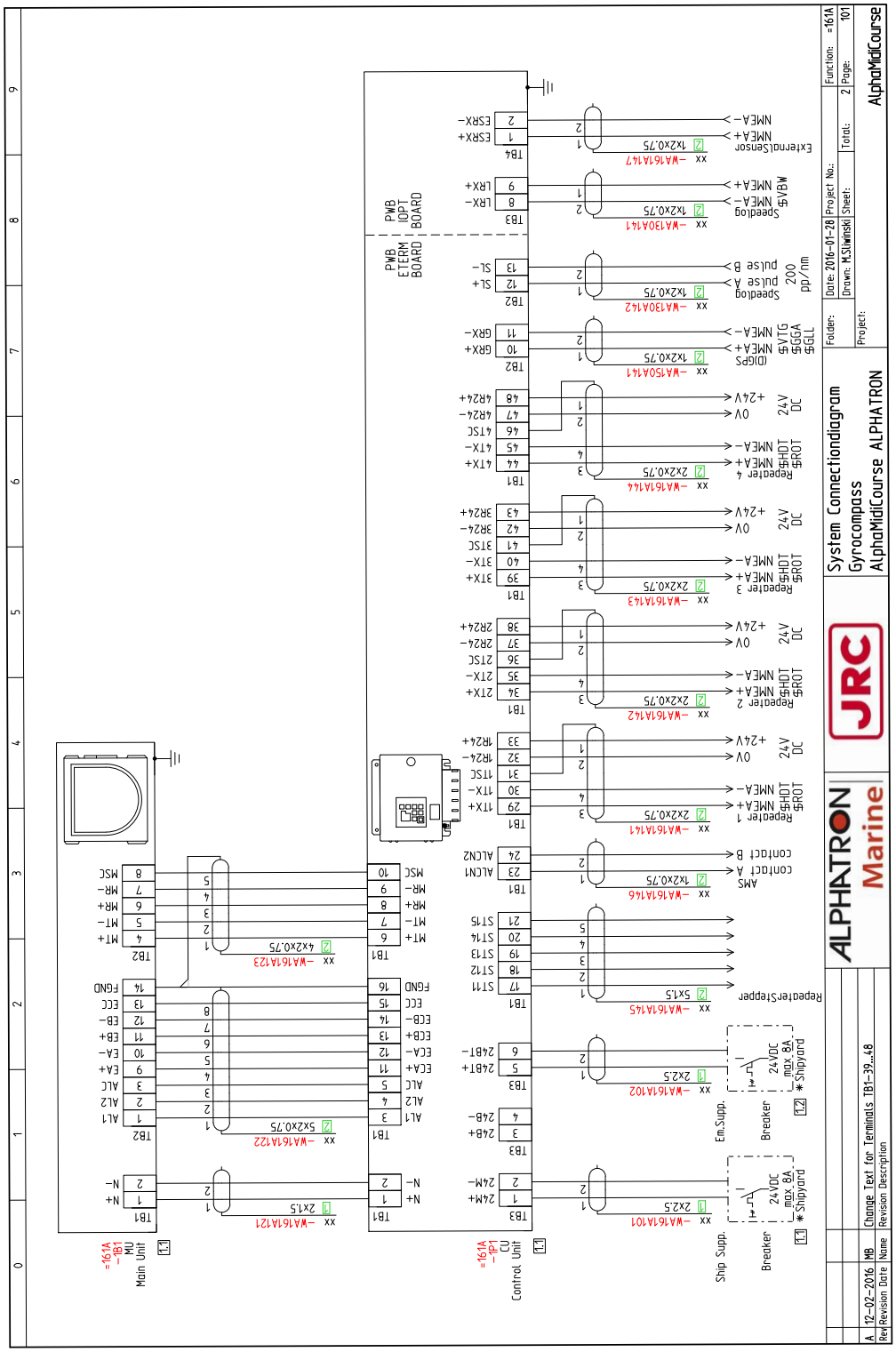



**Figure 46: Connection Diagram**

## 5.1.6 Cable Diagram

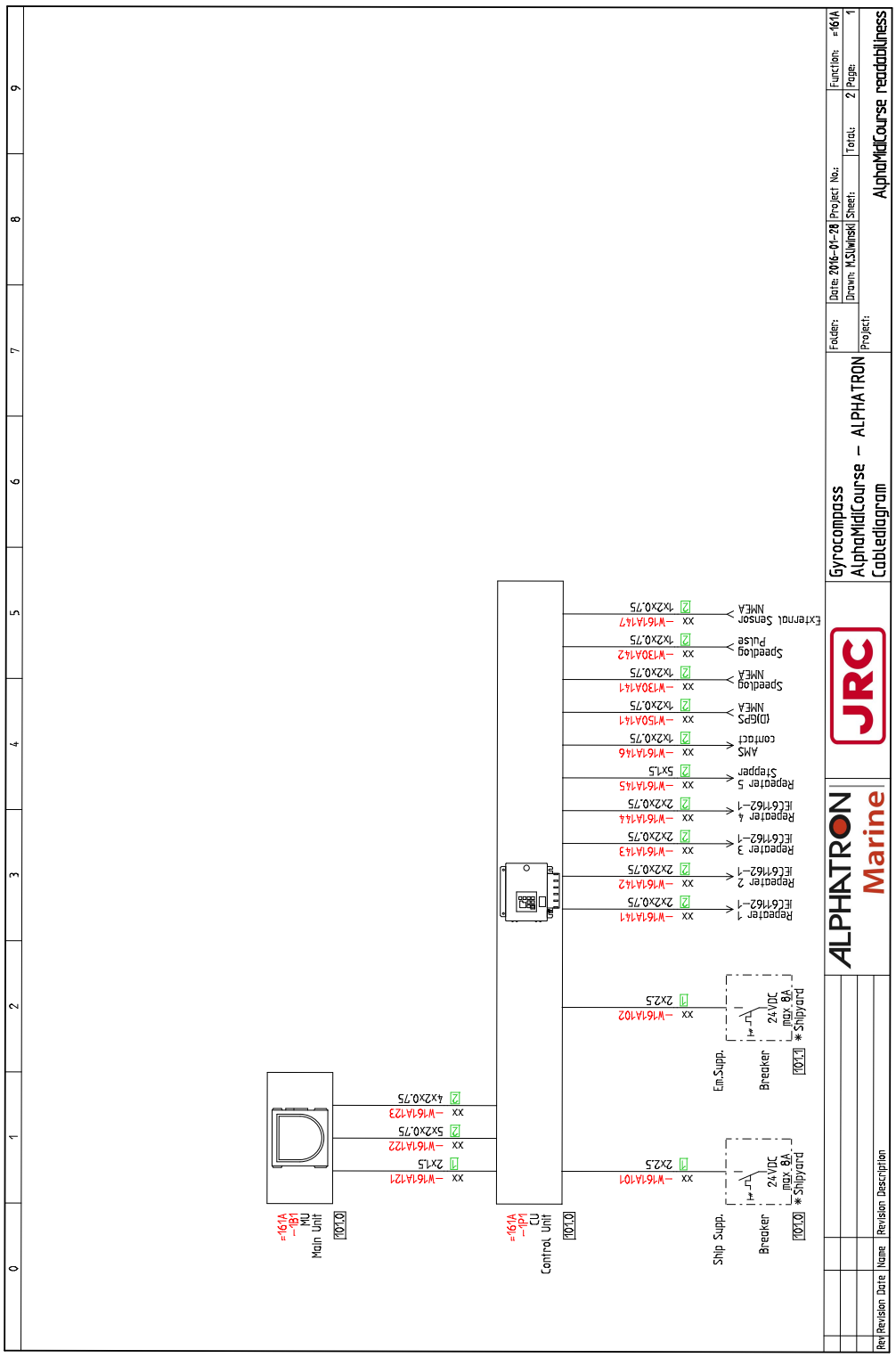



**Figure 47: Cable Diagram**

## 5.1.7 Installation Drawing

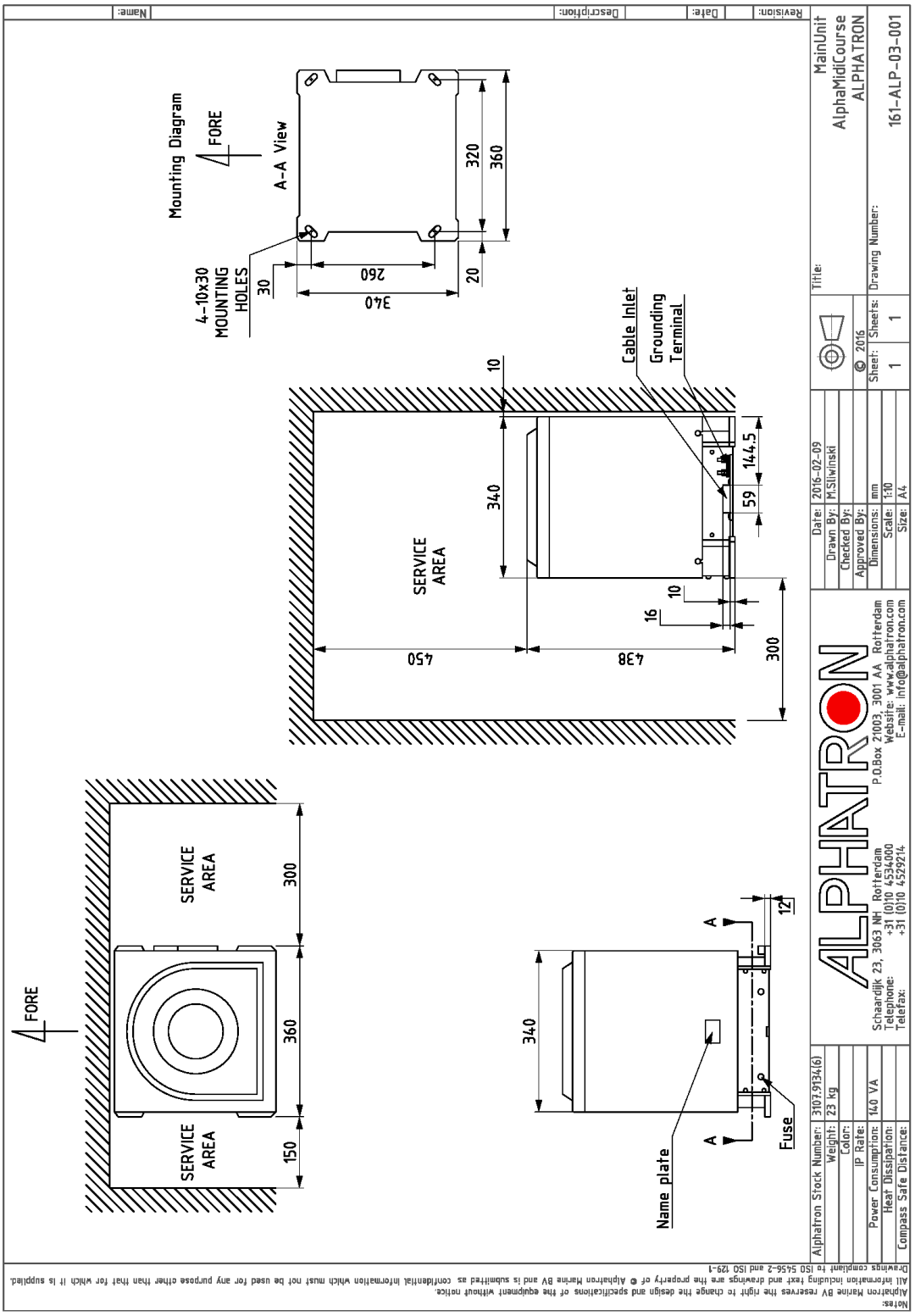



**Figure 48: Installation Drawing**

### 5.1.8 Terminal Board

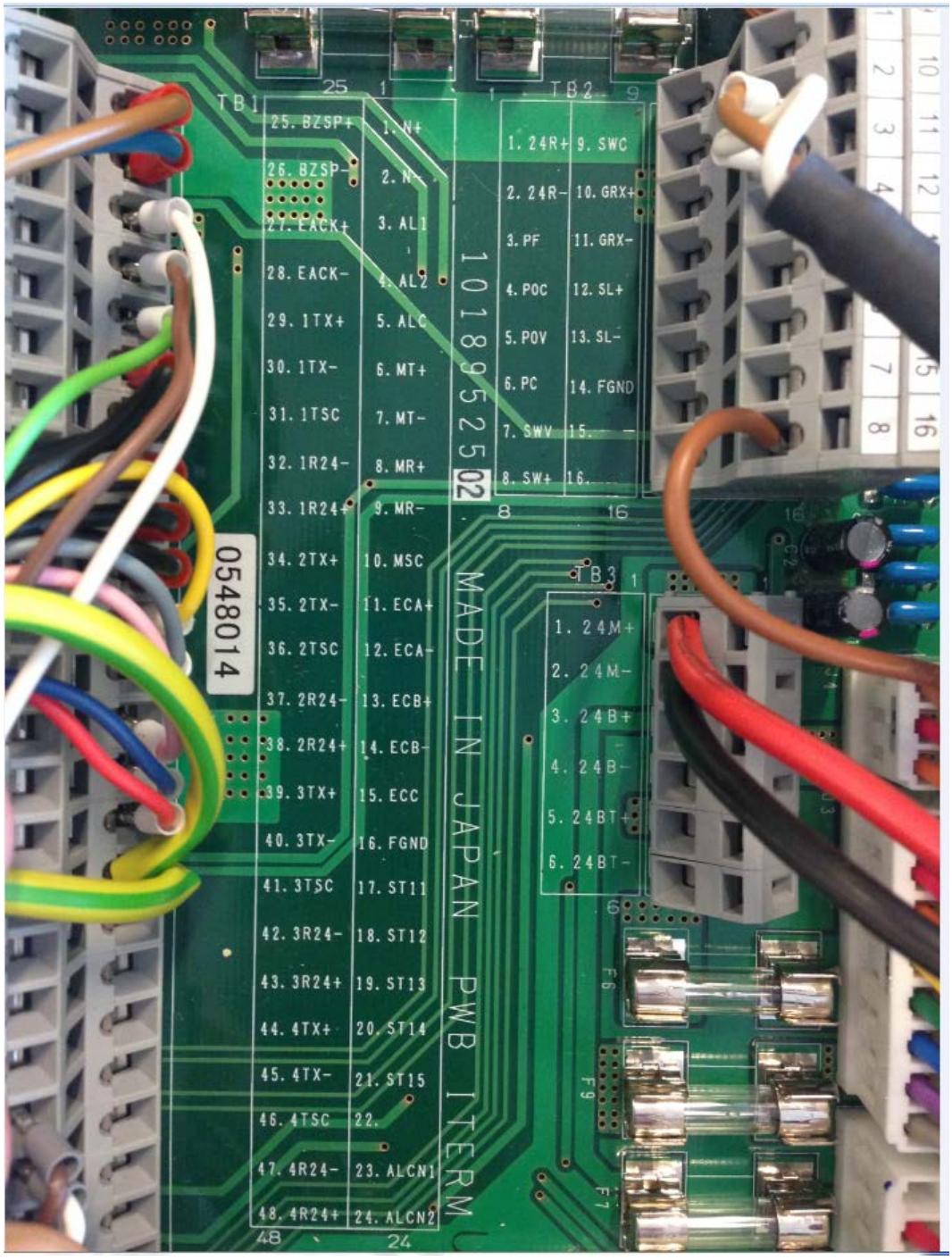
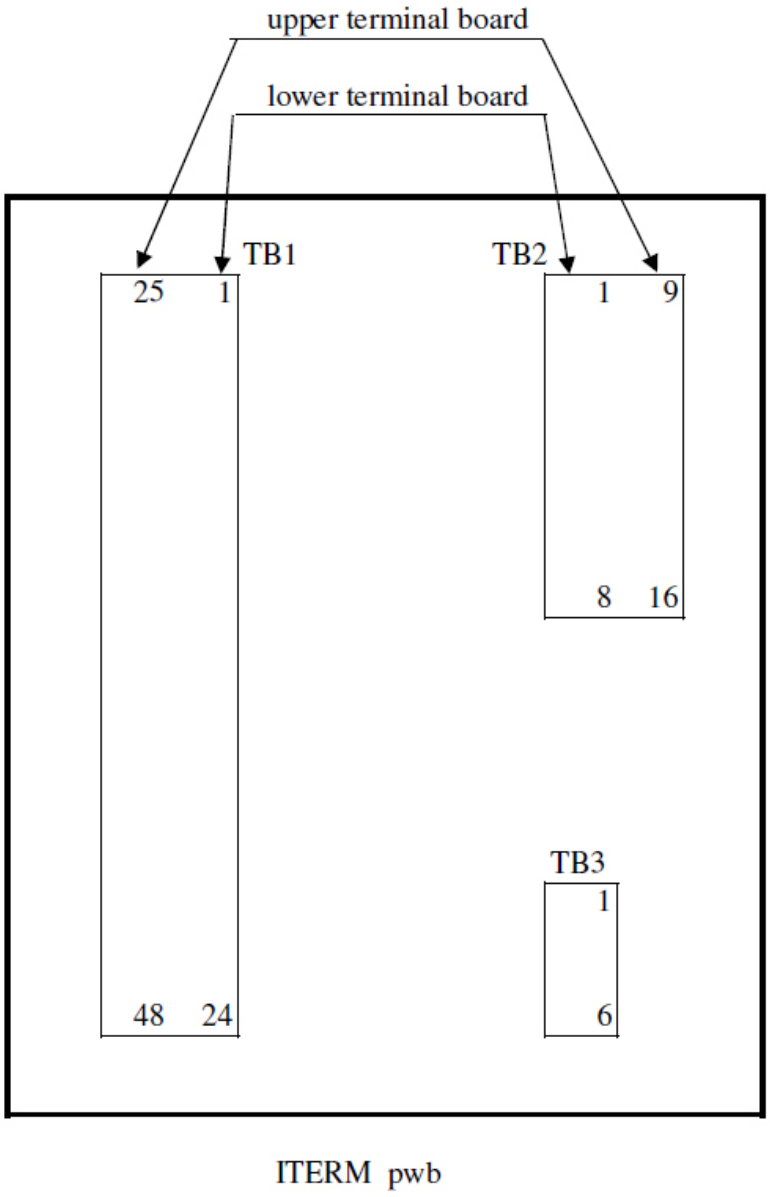



**Figure 49: Terminal Board**

### 5.1.9 ITERM pwb




ITERM pwb

**Figure 50: ITERM pwb**

## 5.2 Periodic Check Tables

Periodic Check Table Contents:

1. Periodic Check Table 1.
2. Periodic Check Table 2.
3. Periodic Check Table 3.

### 5.2.1 Periodic Check Table 1

Check mark ○ : Normal,
△ : Normal after rework or repair

(Example of filling up)

| | | | | |
|---|---|---|---|---|
| Date checked | Installation completed on '02.06.14 | | | |
| Inspector | service engineer name ○○○○ | | | |
| Check items | | | | |
| a. Confirm that the value of each repeater synchronizes with the displayed true heading on the operating panel. | ○ | | | |
| b. Confirm that the displayed latitude on the operating panel coincides with the current latitude. | ○ | | | |
| c. Measure error with observation if possible. | ○ | | | |
| d. Confirm that ship's power supply voltage is stable and within specifications. | ○ | | | |
| e. Confirm that all indicators and lamps are lit and it buzzes, when “lamp test” operate. | ○ | | | |
| f. Items to be dealt with, and items to be informed. | | | | |

Periodical Check Table (1)

**Figure 51: Periodic Check Table 1**

### 5.2.2 Periodic Check Table 2

Check mark ○ : Normal,
△ : Normal after rework or repair

(example filling in)

| Date checked | Installation completed on '02.06.14 | | | |
|---|---|---|---|---|
| Inspector | service engineer name ○○○○ | | | |
| Check items | | | | |
| a. Confirm tightness of fixing screws in mechanical sections and connecting screws in the terminal board. (Re-tighten if loosened.) | ○ | | | |
| b. Confirm connecting and wire wearing conditions at connecting wire mounting points and wire bases | ○ | | | |
| c. Confirm operating conditions of switches, and displayed state of LEDs and indicators. | ○ | | | |
| d. Confirm that warning labels and other indication labels are not dirty or detached. Clean if they become dirty. | ○ | | | |
| e. Items to be dealt with, and item to be informed. | | | | |

Periodical Check Table (2)

**Figure 52: Periodic Check Table 2**

### 5.2.3 Periodic Check Table 3

Perform maintenance and check once a year.

| Part Name | Part No. | Old number | Interval |
|---|---|---|---|
| Sensitive Element | G-002331 | 3107.9152 | 2 - 3 |
| Brush | G-003943 | 3107.9154 | 2 |
| Step Motor | G-004556 | 3107.9158 | 6 |
| Belt | G-002332 | 3107.9160 | 6 |
| HRZC PWB | G-004557 | 3107.9162 | 6 |
| Inverter PCB | G-002333 | 3107.9164 | 6 |
| Gpower PWB | G-004560 | 3107.9170 | 6 |
| Flexible wire (EAST) | G-004559 | 3107.9168 | 8 |
| Slop Ring | G-004558 | 3107.9166 | 8 |

**Table 20: Maintenance and Check Interval**

## 5.3 Information to be supplied to Alphatron Marine

When failures can not be corrected on board by the solutions described in this manual, immediately contact Alphatron Marine, or nearest agency in your area, to request advice and supply the following information:

| | | | | | |
|---|---|---|---|---|---|
| 1 | Ship's name and owner | | | | |
| 2 | Equipment name, type and serial no. | | | | |
| 3 | Where is the ship now? | | | | |
| 4 | Symptoms failure (Error code/name) | | | | |
| 5 | When did it occur? | Year | Month | Day | Hour |
| 6 | Where did it occur? | Sea area | | Channel/River | |
| 7 | Does it still continue? | Continues | | Intermittently | |
| 8 | Does it occur repeatedly? | Yes | Intermittently | No | |
| 9 | Check results | | | | |
| 10 | Other points observed | | | | |
| 11 | | | | | |

## 5.4 Accessories

The following accessories may be added to the AlphaMidiCourse:

| | | |
|---|---|---|
| Repeater Compass | The repeater compass receives the ship's heading bearing signal transmitted from the master compass and remotely indicates the bearing.<br><br>The repeater (weight: 5 kg) has an analogue display for the indication of the heading display. The case is made of GRP (Glass fiber Reinforced Plastic, thus corrosion free) and has a waterproof construction, able to use on open deck.<br><br>The repeater (ø246,3 mm) will be delivered with 1.8 meter cable. |  |
| Repeater Holder | The repeater compass mounting bracket has a gimbal ring to support the repeater compass horizontally when the ship is rolling and pitching. The repeater compass is supported with the pins in the gimbal ring.<br><br>A junction box, fixed on the bracket, consists of a switch, a dimmer for illumination and terminal boards to connect the signal cable from the master compass and the cable to the repeater compass.<br><br>The bracket weighs 8 kg and has a diameter of 354 mm. |  |
| Repeater Stand | The repeater stand (height: 1330 mm, weight: 25 kg) can be used when a repeater compass is installed on the deck.<br><br>It has a gimbal ring at the upper part of the stand to support the repeater compass horizontally, even when the wipe is rolling and pitching. The stand body is made of GRP (Glass fiber Reinforced Plastic, thus corrosion free) and has a waterproof construction, able to use on open deck. At the middle part of the stand, there is a switch for dimmer and illumination. |  |
| Azimuth Circle & Storage Box | The azimuth circle is placed on the bezel ring of the repeater compass to support the repeater compass horizontally with two levels. In this condition, astronomical observation can be made with the mirror and the slit located on the azimuth circle, and measurements of objects with the lubber's line and the slit. Weight 2.2 kg, ∅260,5 mm. |  |

**Table 21: Accessories**

# All over the world, close to the customer


## JRC/Alphatron Marine B.V.

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Document name : AlphaMidiCourse
Document nr. : 1002
Version : V1.2



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