



**ALPHATRON**  
**Marine**

# ***ALPHAMIDICOURSE Mk2*** ***Gyrocompass***

## **Installation and Operation MANUAL**



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# I Preface

The AlphaMidiCourse Mk2 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 Mk2 Compact gyro is designed for vessels with speeds of up to 50 knots.
- The AlphaMidiCourse Mk2 complies with IMO A.424 (11) and Wheelmark MAREd - MED/4.3 Specifications.

## I.1 Revision History

| Revision Nr. | Description                                                  | Date           |
|--------------|--------------------------------------------------------------|----------------|
| V1.0         | First Issue                                                  | February 2016  |
| V1.1         | Update Dip switch settings for HDT/THS                       | September 2018 |
| V1.2         | Textual change, update part numbers                          | March 2019     |
| V2.0         | Updated to newest AlphaMidiCourse version Mk2                | February 2021  |
| V2.1         | Updated Table Jumper, Fuses and terminal connections of ICNT | March 2021     |

## 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. See below shown table.

| 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.                                                          |

## I.4 Storage

Observe the following items when storing:

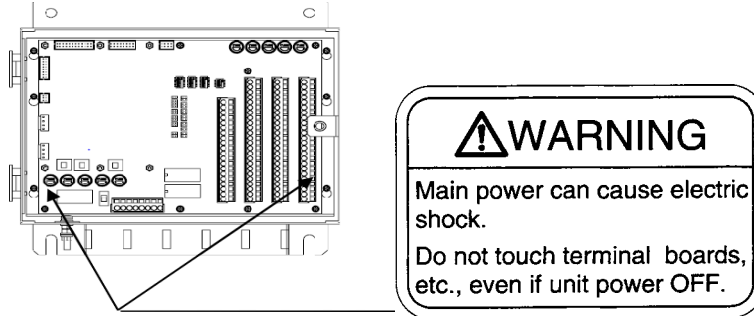
1. Turn all power switches of this system to the OFF position to disconnect the power.
2. Storage temperature should be between -20°C to +55°C.
3. Avoid a place with high humidity as much as possible.
4. Prevent the storage place from generating corrosive gas, breeding of bacteria such as mold or intrusion 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.
6. In case the Gyro Sphere is stored, place its carton box in the direction of the arrows (UP) to prevent leakage.

## 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 paragraph 6.1.3: *Stand alone type Control Unit of One Gyro Compass System*

### 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 anyone 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 Alphasat 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.
4. Conformance to IMO Standards

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 Functions

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 paragraph 2.6 *Heading Sensor Selection*

- 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.
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 paragraph 2.6 *Heading Sensor Selection*).

- 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 paragraph 1.7.3

*Setting the Latitude Input Source* and paragraph 1.7.4 *Setting the Speed Input Source*.

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

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

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

### III.6 Rate of turn signal output function

The rate of turn of the ship can be outputted as an analog signal from this system. Refer to the finished plan maintained in the ship for details of the analog signal.

- When "EXT" is selected: Rate of turn of the vessel is not outputted.

### III.7 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 paragraph 2.5.2 *Set Timer Starting Time*

### III.8 Function of the External Heading Sensor

When the external heading sensor signal (the magnetic compass system, etc.) is connected to the AlphaMidiCourse Mk2, 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 Mk2 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 paragraph 2.6 *Heading Sensor Selection*.

### III.9 Pendulum Function

The AlphaMidiCourse Mk2 includes a pendulum function that enables the heading to be changed by 180°

Once the Gyrocompass has achieved a true heading it is possible to changed 180° by closing an contact also a buzzer will signal 5 times. By opening the contact your heading will be changed 180° back and also a buzzer will signal 5 times.

Refer to paragraph 2.7 *Pendulum Function*.



**Note** For the Pendulum selection, refer to paragraph 1.5 *DIP switch settings*.

### III.10 Warranty Conditions

For Warranty Conditions and period contact Alpatron Marine.

Items to which warranty is not applied:

1. Failures and malfunctions caused by misuse against the described maintenance, handling and operation procedures is in the manual.
2. Failures and malfunctions caused from repairs performed by non Alpatron Marine or the service company not specified by Alpatron Marine.
3. Reworked portion performed by user without relation to Alpatron Marine or failures and malfunctions caused by the reworked portion.
4. Indirect loss and the cause-and-effect relations loss generated by failures of this system.
5. In case of force majeure such as earthquake, fire, ect.
6. In case the Gyro Sphere is not stored according to the indication on its box.

Provided, however, that when other warranty provisions have been established separately in writing should have priority.

### III.11 Ordering of additional items

For Service and maintenance related items, please see paragraph 4 *Maintenance*.

| Part number                             | Description                                                          |
|-----------------------------------------|----------------------------------------------------------------------|
| <b>AlphaMidiCourse Mk2 gyro compass</b> |                                                                      |
| G-007517                                | AlphaMidiCourse Mk2 gyro compass (incl. control box) – 24VDC version |
| <b>Alphaline MFS</b>                    |                                                                      |
| G-002741                                | Alphaline Repeater Display MFS-H grey                                |
| G-002742                                | Alphaline Repeater Display MFS-H black                               |
| G-002743                                | Alphaline Repeater Display MFS-V grey                                |
| G-002744                                | Alphaline Repeater Display MFS-V black                               |
| <b>Alphaline MFM</b>                    |                                                                      |
| G-002749                                | Alphaline Repeater Display MFM grey                                  |
| G-002750                                | Alphaline Repeater Display MFM black                                 |
| G-004531                                | AlphaHeading Indicator MFM grey version                              |
| G-005432                                | AlphaHeading Indicator MFM black version                             |
| <b>Alphaline MFL</b>                    |                                                                      |
| G-002751                                | Alphaline Repeater Display MFL grey                                  |
| G-002752                                | Alphaline Repeater Display MFL black                                 |
| G-004533                                | AlphaHeading Indicator MFL grey version                              |
| G-004534                                | AlphaHeading Indicator MFL black version                             |
| G-004535                                | AlphaHeading+ Indicator grey version                                 |
| G-004536                                | AlphaHeading+ Indicator black version                                |
| <b>Accessories</b>                      |                                                                      |
| G-002327                                | Bearing repeater compass, serial data                                |
| G-002328                                | BB repeater holder, bearing bracket, serial data                     |
| G-002329                                | BH repeater stand                                                    |
| G-002330                                | Azimuth circle (including storage box)                               |
| G-002572                                | NMEA distribution module mk.2                                        |
| G-002714                                | Desktop version for Alphaline MFM repeater                           |

# 1 Installation Instructions

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



- Fill in CHECK SHEET [Maintenance] sheet when installing a AlphaMidiCourse Mk2, refer to paragraph 6.2.
- This will give an overview of your installation regarding for example: Advanced settings, Gyro sphere, slipring and performance of AlphaMidiCourse Mk2.

## 1.1 Installation Guidelines

### Master Compass

- 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 in paragraph 6.1.6 *Installation Drawing*.
- 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.
- 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.
- 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.
- Do **NOT** use a megger for any tests!
- Ensure sufficient servicing space around the gyro compass. Refer dimensional drawing in paragraph 6.1.6 *Installation Drawing*.

### 1.1.1 General and Specific Tools

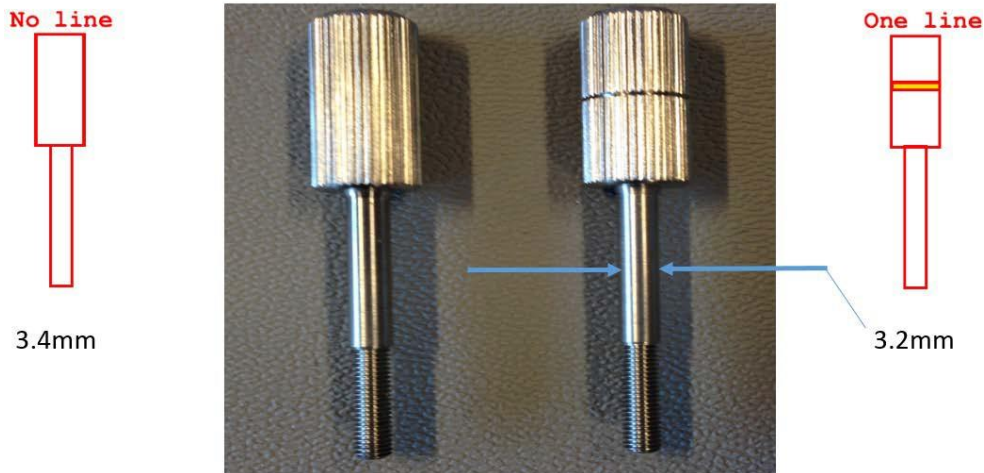
General and Specific tools are required for installing the Gyro Sphere into the Master Compass, as shown in pictures labeled 001, 002 and 003.





- When the Special guide pins are not use a deviation can occur.
- The Special guide screws are ordered separately, contact Alpatron Marine.
- Weights with range from 0.17 gram till 9 grams are ordered separately, contact Alpatron Marine.

Special guide screws are shown below and are required for installation of the sphere into the phantom ring.



### 1.1.2 Unpacking of the AlphaMidiCourse Mk2

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

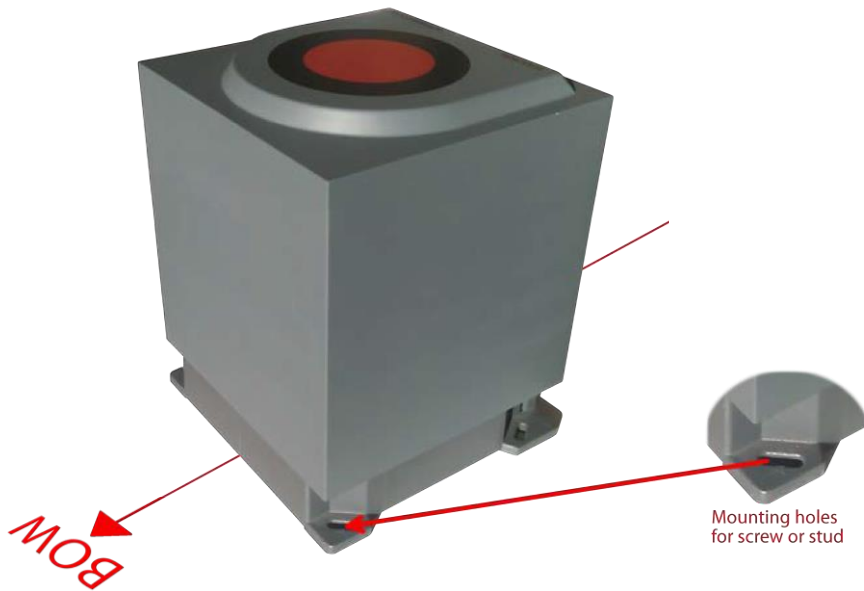
**Note** Care should be take when unpacking and handling the equipment. A visual inspection should be made to see that the equipment has not been damaged during shipment and that all components and parts are present



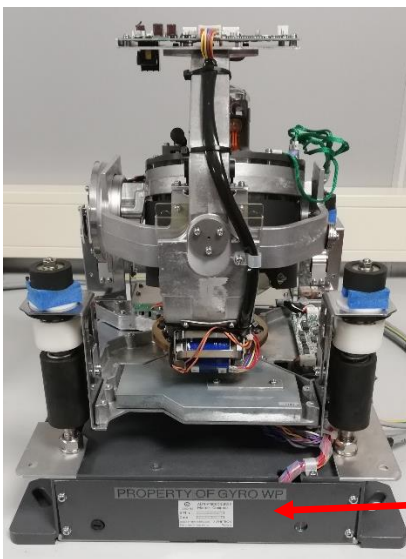
### 1.1.3 Mounting of Master Compass

Mounting of the master compass unit is as shown in below. Its housing can be placed in any direction.

See installation drawing of Master Compass foundation in paragraph 6.1.7.



**Figure: Mounting position**



Inverter Board is located behind this plate

**Figure: Inverter Board Location**

1. Orientate the Inverter Board at the back of the Master Compass to the **Stern of the vessel**.



**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 Master Compass.

2. Fasten the Gyro 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.

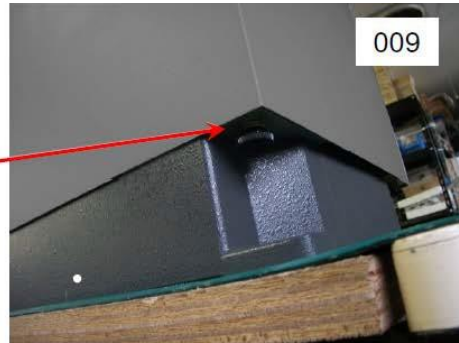
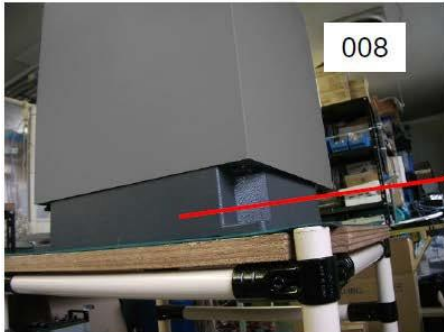
3. Due to cable inlet, it is possible mount 180 degrees reversely.



**Note** Use dipswitch No.7 on MCC Board located on top off Master Compass. See paragraph 1.5.1.

### 1.1.4 Fitting Master Compass

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



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



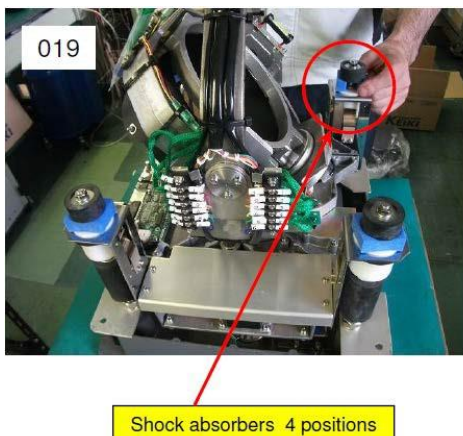
### 1.1.5 Remove Parts from Master Compass Mounting Ring

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



### 1.1.6 Remove Packing Material from Shock Absorbers

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



### 1.1.7 Unpacking of Sensitive Element

Unpack Sensitive Element as shown in pictures labeled 022 to 025. In the box a Gyro sphere settings table is included. Set the shown values in Extension menu of the AlphaMidcourse Mk2 Control Box after installation, see paragraph 1.7.2.



Gyro Sphere Settings Form

| ALPHAMIDCOURSE                  |                       |         |
|---------------------------------|-----------------------|---------|
| Master Compass Serial Number    |                       | 10199   |
| Sensitive Element Serial Number |                       | SX0328F |
| Extension menu item No.         |                       | value   |
| 1.1.U                           | Damping gain          | 0.83    |
| 1.2.F                           | Bearing servo gain    | 1.00    |
| 1.3.S                           | Horizontal servo gain | 1.00    |
| 1.4.u                           | Leveling servo gain   | 0.50    |
| 1.5.L                           | (φ) Phi offset        | 0.00    |
| 1.6.t                           | (θ) Theta offset      | -0.09   |
| 2.1.o                           | Bearing offset        | 000.0   |
| 2.3.h                           | Zero-cross bearing    | 345.5   |

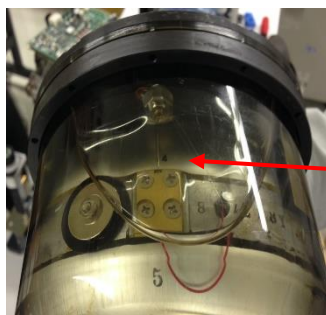
**Note** Handle with care and keep packaging material for reuse when returning for servicing.

Unpack Sensitive Element as shown in pictures labeled 026 and 027.

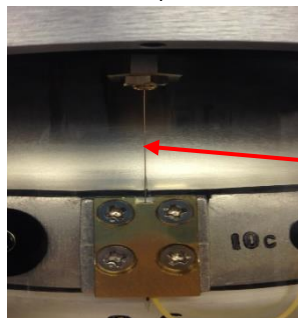


**Note** Handle Sensitive Element with great care. Do **NOT** tilt the element. It is filled with oil and the top is open.

**Note** Check Sensitive Element for leaks, air pockets and see if its suspension wires are intact. See below pictures.



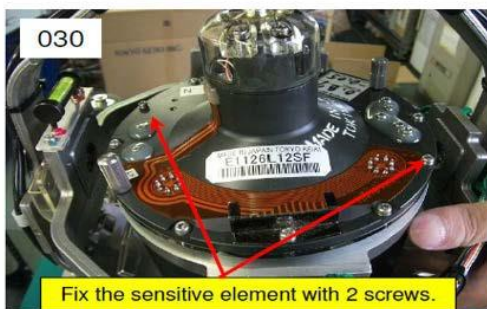
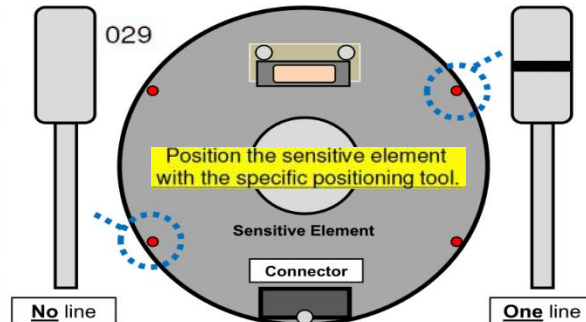
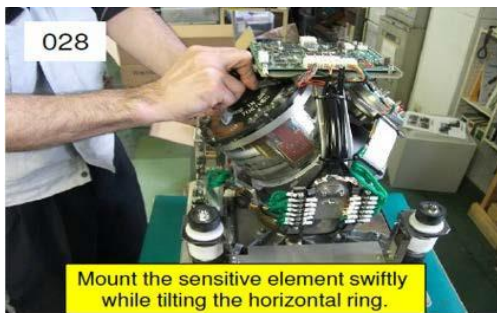
If an air pocket is present, contact Alpatron Marine



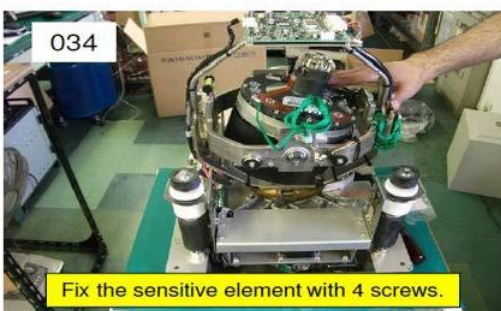
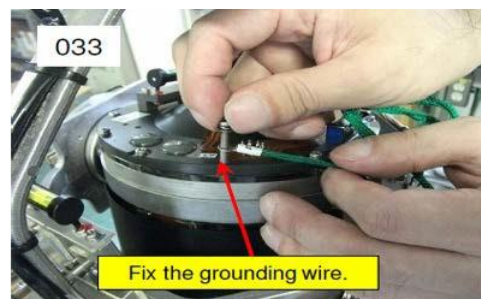
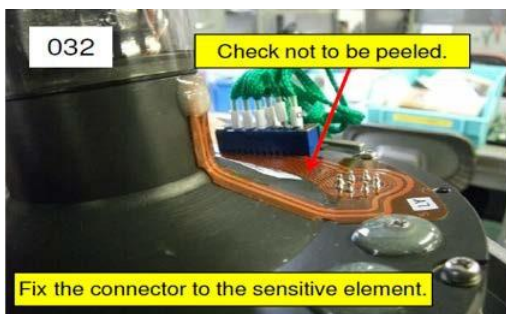
Suspension wire in good condition. If broken, contact Alpatron Marine

### 1.1.8 Mounting of Sensitive Element

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



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



### 1.1.9 Filling with Damping Oil

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

**Note** Keep the cap of the tube closed and cut the bottom of the Damping Oil tube to reduce spilling. Fill the container half full.

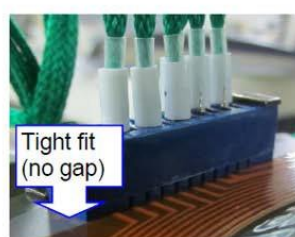


### 1.1.10 Attach Connector to Sensitive Element

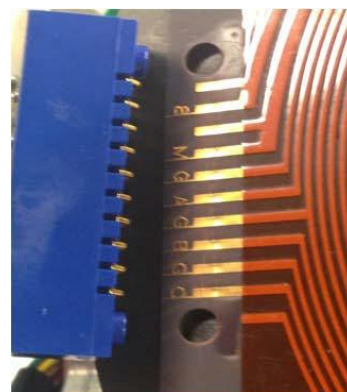
Attach Connector and fix securely to Sensitive Element as shown in pictures below. Make sure the wire marked with 8 is located to the most left, refer to below show picture of the front view.



**Front view**  
(East side of Hor. ring)



**Back side view**  
(East side of Hor. ring)

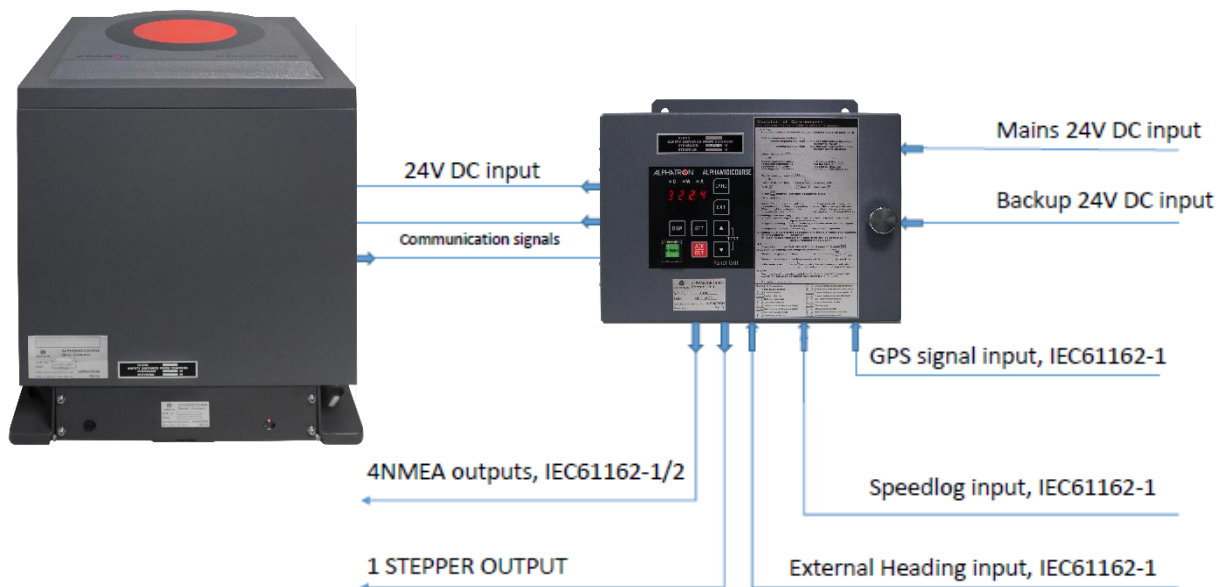


## 1.2 Name and Function of Each Unit

Names and functions of each unit are described in below table

| 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.                                                                                       |
| 5.  | Power switch       | It is used to start and stop this system. The indicator lamp in the power switch alights when started.                                                    |

## 1.3 Configuration



**Figure: System Configuration**

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

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

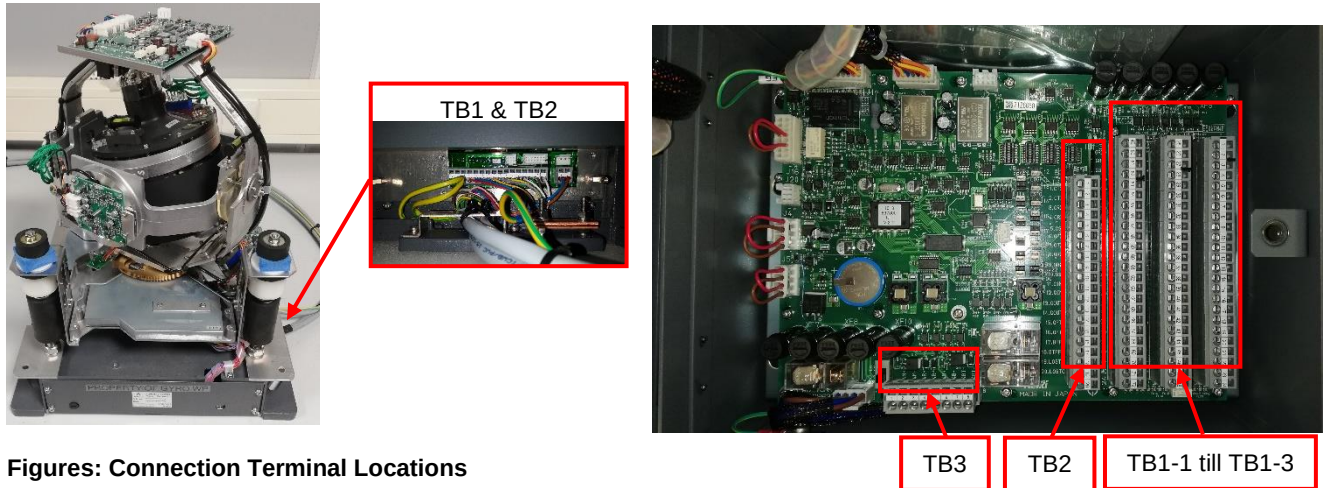
For shipment, the sensitive element in the master compass is packed separately.

## 1.4 Connecting the AlphaMidiCourse Mk2

Refer to paragraph 6.1.5 *Connection Diagram* for connections and refer to paragraph 6.1.6 *Cable Diagram* for cable information. The location of the connection terminals can be seen in below figures.

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

CABLE SPECIFICATIONS - See 6.1.5 *Connection Diagram* and 6.1.6 *Cable Diagram*.



Figures: Connection Terminal Locations

| TB1 |         |                     |     |         |                     |
|-----|---------|---------------------|-----|---------|---------------------|
| No. | Details | Description         | No. | Details | Description         |
| 1   | N+      | Power Supply +24VDC | 2   | N-      | Power Supply -24VDC |

| TB2 |         |                               |     |         |                               |
|-----|---------|-------------------------------|-----|---------|-------------------------------|
| No. | Details | Description                   | No. | Details | Description                   |
| 1   | AL1     | Inverter Alarm (over current) | 9   | ECA+    | MC (A Phase) Encoder Signal + |
| 2   | AL2     | Inverter Alarm (over voltage) | 10  | ECA-    | MC (A Phase) Encoder Signal - |
| 3   | ALC     | Inverter Alarm (Common)       | 11  | ECB+    | MC (B Phase) Encoder Signal + |
| 4   | MT+     | Serial signal CU → MC         | 12  | ECB-    | MC (B Phase) Encoder Signal - |
| 5   | MT-     | Serial signal MC → CU         | 13  | ECC     | MC Encoder signal Common      |
| 6   | MR+     | Serial signal MC → CU         | 14  | FGND    | Earth                         |
| 7   | MR-     | Serial signal MC → CU         | 15  | NC      | Not Connected                 |
| 8   | MSC     | Serial signal common          | 16  | NC      | Not Connected                 |

Table: Master Compass MTTRM Board Terminal

| TB1-1 |         |                                                                |     |         |                                          |
|-------|---------|----------------------------------------------------------------|-----|---------|------------------------------------------|
| No.   | Details | Description                                                    | No. | Details | Description                              |
| 1     | N+      | Power Supply +24VDC                                            | 13  | ECB+    | MC (B Phase) Encoder Signal +            |
| 2     | N-      | Power Supply -24VDC                                            | 14  | ECB-    | MC (B Phase) Encoder Signal -            |
| 3     | AL1     | Inverter Alarm (over current)                                  | 15  | ECC     | MC Encoder signal Common                 |
| 4     | AL2     | Inverter Alarm (over voltage)                                  | 16  | FGND    | Frame Ground                             |
| 5     | ALC     | Inverter Alarm (Common)                                        | 17  | ST11    | Step signal (open drain signal)          |
| 6     | MT+     | Serial signal CU ➔ MC                                          | 18  | ST12    |                                          |
| 7     | MT-     | Serial signal CU➔ MC                                           | 19  | ST13    |                                          |
| 8     | MR+     | Serial signal MC ➔ CU                                          | 20  | ST14    | -24VDC for Step signal                   |
| 9     | MR-     | Serial signal MC➔ CU                                           | 21  | ST15    | +24VDC for Step signal                   |
| 10    | MSC     | Serial signal common                                           | 22  | -----   | Not Used                                 |
| 11    | ECA+    | MC (A Phase) Encoder Signal+                                   | 23  | ALCN1   | Alarm contact signal output              |
| 12    | ECA-    | MC (A Phase) Encoder Signal-                                   | 24  | ALCN2   |                                          |
| TB1-2 |         |                                                                |     |         |                                          |
| No.   | Details | Description                                                    | No. | Details | Description                              |
| 25    | BZSP+   | Buzzer Stop signal input                                       | 37  | 2R24-   | -24VDC for Serial Repeater               |
| 26    | BZSP-   |                                                                | 38  | 2R24+   | +24VDC for Serial Repeater               |
| 27    | EACK+   | External acknowledge signal input<br>OR Pendulum signal input¹ | 39  | 3TX+    | Serial signal output 3<br>(IEC61162-1/2) |
| 28    | EACK-   |                                                                | 40  | 3TX-    |                                          |
| 29    | 1TX+    | Serial signal output 1<br>(IEC61162-1/2)                       | 41  | 3TSC    | Serial signal common                     |
| 30    | 1TX-    |                                                                | 42  | 3R24-   | -24VDC for Serial Repeater               |
| 31    | 1TSC    | Serial signal common                                           | 43  | 3R24+   | +24VDC for Serial Repeater               |
| 32    | 1R24-   | -24VDC for Serial Repeater                                     | 44  | 4TX+    | Serial signal output 4<br>(IEC61162-1/2) |
| 33    | 1R24+   | +24VDC for Serial Repeater                                     | 45  | 4TX-    |                                          |
| 34    | 2TX+    | Serial signal output 2<br>(IEC61162-1/2)                       | 46  | 4TSC    | Serial signal common                     |
| 35    | 2TX-    |                                                                | 47  | 4R24-   | -24VDC for Serial Repeater               |
| 36    | 2TSC    | Serial signal common                                           | 48  | 4R24+   | +24VDC for Serial Repeater               |
| TB1-3 |         |                                                                |     |         |                                          |
| No.   | Details | Description                                                    | No. | Details | Description                              |
| 49    | GRX+    | GPS serial signal input                                        | 61  | RNCN-   | Running contact signal output            |
| 50    | GRX-    |                                                                | 62  | GCCN+   | Gyro Sensor<br>select signal input       |
| 51    | GSC     | GPS serial signal common                                       | 63  | GCCN-   |                                          |
| 52    | LRX+    | LOG serial signal input                                        | 64  | ECCN+   | EXT Sensor<br>select signal input        |
| 53    | LRX-    |                                                                | 65  | ECCN-   |                                          |
| 54    | LSC     | LOG serial signal common                                       | 66  | PF      | External Power supply alarm input        |
| 55    | ESRX+   | External Sensor serial signal input                            | 67  | POC     |                                          |
| 56    | ESRX-   |                                                                | 68  | POV     |                                          |
| 57    | ESSC    | External Senor Serial common                                   | 69  | PC      |                                          |
| 58    | SL+     | LOG contact signal input                                       | 70  | SWV     | Not Used                                 |
| 59    | SL-     |                                                                | 71  | SW+     | External Power supply<br>switch signal   |
| 60    | RNCN+   | Running contact signal output                                  | 72  | SWC     |                                          |

<sup>1</sup>Dipswitch S2 No.4 must be enabled to use the Pendulum function.

**Table: Terminal TB1-1 till TB1-3 of Control Box ICNT Board Terminal**

| TB2 |         |                                                        |     |         |                                        |
|-----|---------|--------------------------------------------------------|-----|---------|----------------------------------------|
| No. | Details | Description                                            | No. | Details | Description                            |
| 1   | CTX+    | Serial signal output to BAMS (IEC62923-1/2 / 61162-1)  | 11  | CIN+    | Not Used                               |
| 2   | CTX-    |                                                        | 12  | CIN-    | Not Used                               |
| 3   | CRX+    | Serial signal input from BAMS (IEC62923-1/2 / 61162-1) | 13  | COUT1   | Not Used                               |
| 4   | CRX-    |                                                        | 14  | COUT2   | Not Used                               |
| 5   | CSC     | Serial signal common                                   | 15  | 24R     | 24V DC Power supply to DGC             |
| 6   | ESTX+   | Serial signal output + to DGC                          | 16  | 24RC    | GND Power supply to DGC                |
| 7   | ESTX-   | Serial signal output – to DGC                          | 17  | BTPF    | Not Used                               |
| 8   | ORX+    | Not Used                                               | 18  | BTPFC   | Not Used                               |
| 9   | ORX-    | Not Used                                               | 19  | LOST    | Not Used                               |
| 10  | OSC     | Not Used                                               | 20  | LOSTC   | Not Used                               |
| TB3 |         |                                                        |     |         |                                        |
| No. | Details | Description                                            | No. | Details | Description                            |
| 1   | 24M+    | Main Power input +24VDC                                | 5   | 24B+    | Backup supply of Power Supply Unit     |
| 2   | 24M-    | Main Power input -24VDC                                | 6   | 24B-    | Backup supply of Power Supply Unit     |
| 3   | 24R+    | Power Supply Unit 24R input                            | 7   | 24BT+   | Backup (emergency) Power input +24VDC  |
| 4   | 24R-    | Power Supply Unit 24RC input                           | 8   | 24BT-   | Backup (emergency) Power input - 24VDC |

**Table: Terminal TB2 & TB3 of Control Box ICNT Board Terminal**

## 1.5 DIP Switch Settings

The AlphaMidiCourse Mk2 Gyro Systems include several Dip Switch Settings.

There locations are marked in below figure or refer to paragraph 6.1.4 *ICNT Board of Control Unit*.

Setting of the switches are required to be set during installing of the system, for example 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.

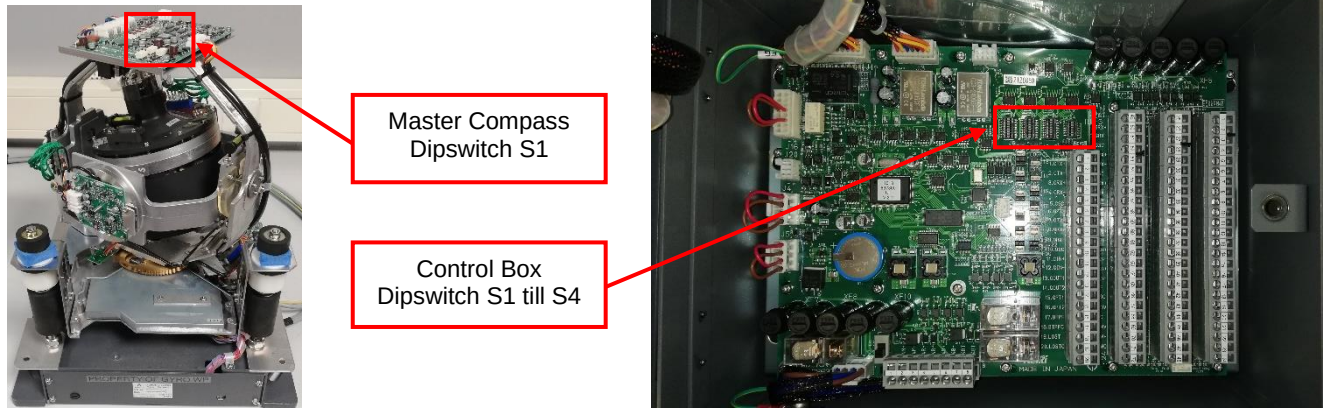


Figure: DIP switch locations

### 1.5.1 Dip Switch Settings Master Compass

| MCC S1 | Default | 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: MCC Board switch assign

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

### 1.5.2 Dip Switch Settings Control Box Part 1

| ICNT S1 | Default | Details                            | Function                                                 |                                                          | Read Timing | Remarks |
|---------|---------|------------------------------------|----------------------------------------------------------|----------------------------------------------------------|-------------|---------|
| NO.1    | [ON]    | Connect External Power Supply Unit | [OFF]: Yes<br>[ON]: No                                   |                                                          | Start Up    |         |
| NO.2    | [OFF]   | Master Compass Type                | [OFF] : Standard<br>[ON] : HSC                           |                                                          | Start Up    |         |
| NO.3    | [OFF]   | Control Box type                   | [OFF] : Type S<br>[ON] : Type D (dual gyro)              |                                                          | Start Up    |         |
| NO.4    | [OFF]   | No.2 Gyro or not                   | [OFF] : No<br>[ON] : Yes                                 |                                                          | Start Up    |         |
| NO.5    | [OFF]   | External (Mag.) Sensor Connection  | NO5.[OFF],<br>NO6.[OFF] : Non                            | NO5. [ON],<br>NO6. [OFF] :<br>Ext. Sensor Connection     | Start Up    |         |
| NO.6    | [OFF]   |                                    | NO5.[OFF]<br>NO6.[ON]:<br>Mag . Sensor conn.<br>(backup) | NO5. [ON]<br>NO6.[ON]:<br>Ext. System Conn.<br>(back up) |             |         |
| NO.7    | [OFF]   | Serial Signal Select Selection     | [OFF] : IEC61162-2<br>[ON] : Tokimec format              |                                                          | Start Up    |         |
| NO.8    | [OFF]   | Alarm Output Setup                 | [OFF] : All alarm output<br>[ON] : only power fail       |                                                          | Start Up    |         |

Table: ICNT Board Dip Switch S1 assign

| ICNT S2 | Default | Details                                             | Function                                                          |                                       | Read Timing | Remarks |
|---------|---------|-----------------------------------------------------|-------------------------------------------------------------------|---------------------------------------|-------------|---------|
| NO.1    | [OFF]   | For debugging<br>(Do Not Touch)                     | -                                                                 |                                       | -           |         |
| NO.2    | [OFF]   | For debugging<br>(Do Not Touch)                     | -                                                                 |                                       | -           |         |
| NO.3    | [ON]    | Operation Panel Type                                | [OFF] : GPANEL PWB (not for BAM)<br>[ON] : GPANEL-A PWB (for BAM) |                                       | Start Up    |         |
| NO.4    | [OFF]   | Pendulum Ferry                                      | [OFF] : No [ON] : Yes                                             |                                       | Start Up    |         |
| NO.5    | [OFF]   | Serial Signal Transmit Frequency<br>IEC61162-1 ed.2 | NO5.[OFF]<br>NO6. [OFF] 1sec                                      | NO5.[ON] NO6.<br>[OFF] ; 200msec      | Start Up    |         |
| NO.6    | [OFF]   |                                                     | NO5.[OFF]<br>NO6.[ON] ;<br>100msec                                | NO5.[ON]<br>NO6.[ON] ; Invalid (1sec) |             |         |
| NO.7    | [OFF]   | Do Not Touch                                        | -                                                                 |                                       | -           |         |
| NO.8    | [OFF]   | System Select Information Contact                   | [OFF] : No [ON] : Yes                                             |                                       | Start Up    |         |

Table: ICNT Board Dip Switch S2 assign

### 1.5.3 Dip Switch Settings Control Box Part 2

| ICNT<br>S3 | Default | Details                                         | Function                                                 |                                               | Read<br>Timing | Remarks |
|------------|---------|-------------------------------------------------|----------------------------------------------------------|-----------------------------------------------|----------------|---------|
| NO.1       | [OFF]   | Timer Start Up                                  | [OFF] : No [ON] : Yes                                    |                                               | Start Up       |         |
| NO.2       | [OFF]   | Talker ID of<br>"ROT" Sentence                  | [OFF] : "HE" [ON] : "TI"                                 |                                               | Start Up       |         |
| NO.3       | [OFF]   | Rate of Turn<br>Scale for Analog<br>meter       | NO3.[OFF],<br>NO4.[OFF] :<br>Max 30.0°/min.              | NO3.[ON]<br>NO4.[OFF] :<br>Max 120.0°/min     | Start Up       |         |
| NO.4       | [OFF]   |                                                 | NO3.[OFF],<br>NO4.[ON] :<br>Max 300.0°/min.              | NO3.[ON]<br>NO4. [OFF] :<br><b>DO NOT SET</b> |                |         |
| NO.5       | [OFF]   | Ban or Permit of<br>an "ROT"<br>Sentence Output | Valid at time of external sensor (standard)<br>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<br>(For factory only)           | [OFF] : No<br>[ON] : Yes                                 |                                               | Start Up       |         |
| NO.8       | [OFF]   | Buzzer stop<br>contact output                   | [OFF] : No<br>[ON] : Yes                                 |                                               | Start Up       |         |

Table: ICNT Board Dip Switch S3 assign

| ICNT S4 | Default | Details                             | Function                                                                           |  | Read Timing | Remarks   |
|---------|---------|-------------------------------------|------------------------------------------------------------------------------------|--|-------------|-----------|
| NO.1    | [OFF]   | <b>Do Not Touch</b>                 | -                                                                                  |  | -           |           |
| NO.2    | [OFF]   | For DGC-01 or not                   | [OFF] : For Single Gyro System [ON] : For DGC-01 Control Unit (Double Gyro System) |  | Start Up    | <b>*1</b> |
| NO.3    | [OFF]   | <b>Do Not Touch</b>                 | -                                                                                  |  | -           |           |
| NO.4    | [OFF]   | Alarm detection time for Main Power | [OFF] : 300ms [ON] : 2sec                                                          |  | Start Up    |           |
|         |         | Fail / Power Unit fail              |                                                                                    |  |             |           |
| NO.5    | [OFF]   | THS sentence output                 | [OFF] : Disable [ON] : Enable                                                      |  | Start Up    |           |
| NO.6    | [OFF]   | Connection to DGC-01 or not         | [OFF] : For Single Gyro System [ON] : For DGC-01 Control Unit (Double Gyro System) |  | Start Up    | <b>*1</b> |

Table: ICNT Board Dip Switch S4 assign

**\*1** Setting for DGC-01 internal board is S4-2:**ON** and S4-6:**ON**  
Setting for Expanded type connection to DGC-01 is S4-2:**OFF** and S4-6:**ON**

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

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

### 1.5.4 Dip Switch Settings GPANEL-A Board

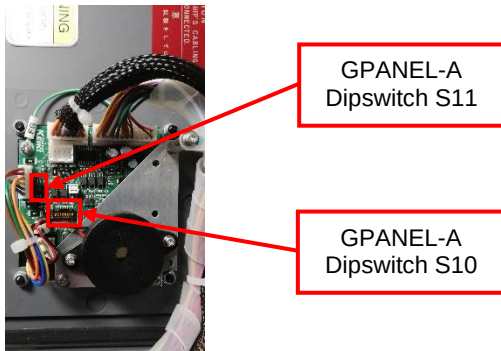


Figure: DIP Switch location on GPANEL-A (Backside of Operating Panel)

| GPANEL S10 | Default | Details      | Function                               |                                 | Read Timing | Remarks |
|------------|---------|--------------|----------------------------------------|---------------------------------|-------------|---------|
| NO.1       | [OFF]   | Product Type | NO.1[OFF] ALPHATRON<br>NO.2[ON] MARINE |                                 | Start Up    |         |
| NO.2       | [ON]    |              | NO.1[OFF]<br>NO.2[OFF]<br>TOKYO KEIKI  | NO.1[ON]<br>NO.2[OFF]<br>SIMRAD |             |         |
| NO.3       | [OFF]   | Do Not Touch | -                                      |                                 | -           |         |
| NO.4       | [OFF]   | Do Not Touch | -                                      |                                 | -           |         |
| NO.5       | [OFF]   | Do Not Touch | -                                      |                                 | -           |         |
| NO.6       | [OFF]   | Do Not Touch | -                                      |                                 | -           |         |
| NO.7       | [OFF]   | Do Not Touch | -                                      |                                 | -           |         |
| NO.8       | [OFF]   | Do Not Touch | -                                      |                                 | -           |         |

Table: GPANEL Dip Switch S10 assign

| GPANEL S11 | Default | Details      | Function | Read Timing | Remarks |
|------------|---------|--------------|----------|-------------|---------|
| NO.1       | [ON]    | Do Not Touch | -        | -           |         |
| NO.1       | [OFF]   |              |          |             |         |

Table: GPANEL Board Dip Switch S11 assign

## 1.6 Jumper Settings

The AlphaMidiCourse Mk2 Gyro Systems include several Jumpers.

There locations are marked in below figure or refer to paragraph 6.1.4 *ICNT Board of Control Unit*.

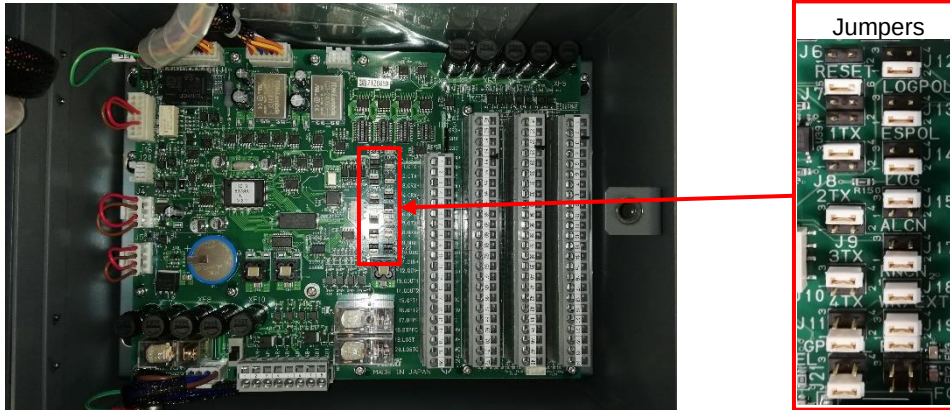


Figure: Jumper location

| Name | Default                        | Details   | Function                                                                                                                            |                                                                      |
|------|--------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| J6   | <b>OPEN</b>                    | Reset CPU | Short: CPU will be reset                                                                                                            |                                                                      |
| J7   | <b>5-6 SHORT</b>               | XT1       | 5-6 short: 4800 bps serial output<br>3-4 short: 38400 bps serial output<br>1-2 short: Unused                                        |                                                                      |
| J8   | <b>3-4 SHORT</b>               | XT2       | 3-4 short: 4800 bps serial output<br>1-2 short: 38400 bps serial output                                                             |                                                                      |
| J9   | <b>3-4 SHORT</b>               | XT3       | 3-4 short: 4800 bps serial output<br>1-2 short: 38400 bps serial output                                                             |                                                                      |
| J10  | <b>3-4 SHORT</b>               | XT4       | 3-4 short: 4800 bps serial output<br>1-2 short: 38400 bps serial output                                                             |                                                                      |
| J11  | <b>1-2 SHORT</b>               | GPSPOL    | 3-4 short: Negative input GPS signal polarity<br>1-2 short: Positive input GPS signal polarity                                      |                                                                      |
| J12  | <b>1-2 SHORT</b>               | LOGPOL    | 3-4 short: Negative input LOG signal polarity<br>1-2 short: Positive input LOG signal polarity                                      |                                                                      |
| J13  | <b>1-2 SHORT</b>               | ESPOL     | 3-4 short: Negative input External Sensor signal polarity<br>1-2 short: Positive input External Sensor signal polarity              |                                                                      |
| J14  | <b>1-2 SHORT</b>               | LOG       | 3-4 short: 400 pulse per nautical mile input LOG signal<br>1-2 short: 200 pulse per nautical mile input LOG signal                  |                                                                      |
| J15  | <b>3-4 SHORT</b>               | ALCN      | 3-4 short: Alarm Contact set to Normal – open / Alarm – close<br>1-2 short: Alarm Contact set to Normal – close / Alarm – open      |                                                                      |
| J17  | <b>1-2 SHORT</b>               | RNCN      | 3-4 short: Running contact set to Running – open / stop – close<br>1-2 short: Running contact set to Running – close / stop – close |                                                                      |
| J18  | <b>SHORT</b>                   | WR/EXT    | Open: For Manufactory only<br>Short: Normal software version of ICNT CPU                                                            |                                                                      |
| J19  | <b>3-4 SHORT<br/>1-2 SHORT</b> | ENC       | J19 1-2 short / 3-4 short<br>J22 1-2 open / 3-4 open                                                                                | Setting of Encoder signal to Gyro.<br>Works together with jumper J22 |
| J21  | <b>1-2 SHORT</b>               | R3SEL     | Unused                                                                                                                              |                                                                      |
| J22  | <b>3-4 OPEN<br/>1-2 OPEN</b>   | FOG       | J19 1-2 open / 3-4 open<br>J22 1-2 short / 3-4 short                                                                                | Setting of Encoder signal to FOG.<br>Works together with jumper J19  |
| E3   | <b>1-2 SHORT</b>               | ESTX+     | 3-4 short: Unused<br>1-2 short: Serial signal output to DGC                                                                         |                                                                      |
| E4   | <b>1-2 SHORT</b>               | ESTX+     | 3-4 short: Unused<br>1-2 short: Serial signal output to DGC                                                                         |                                                                      |

ICNT Board Jumper assign

## 1.7 First Start-up procedure

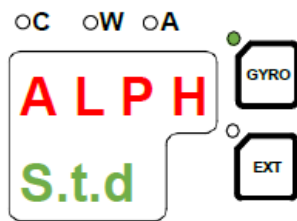
When the AlphaMidicourse Mk2 is installed and the cables are connected to its Control box then the system is ready for the first-time start-up procedure.

### 1.7.1 Start-up Master Compass

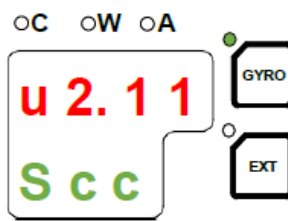


Turn ON the system by pressing the **POWER** button on the Control panel. The following start-up sequence will take place.

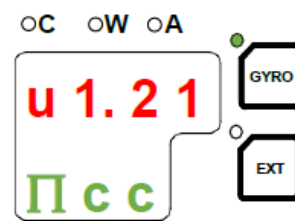
Control Unit type Software version for Control unit and Master compass is displayed in rapid succession. Examples of display text are shown below:



**ALPH:** Alpatron  
**Std:** Standard type  
**HSc:** High Speed type



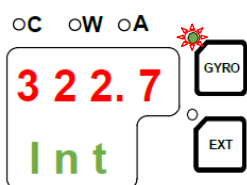
Software version  
 Control Unit



Software version  
 Master Compass

The sensitive element starts rising horizontally and the compass turns 360° clockwise. Its display will show a decreasing in bearing while the compass is turning.

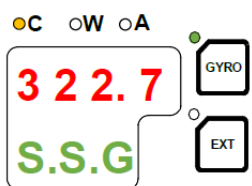
**Note** If the gyro has been turned ON and OFF again, but rotor was still rotating when POWER button was pressed for a new start, a rotor break function will be activated, see paragraph 2.10.



When the rotor rotation is stopped its start bearing will be indicated with *flashing* text **Int**. The start bearing will be the same as active bearing when the compass was turned OFF.

The indicated start bearing is accepted by pressing the **ACK/ENT** button or increase/decrease by using the **▲** or **▼** buttons and then by pressing the **ACK/ENT** button. If no action is taken within 3 minutes the start-up process will continue with the indicated start bearing. The bearing indication stops flashing when the start bearing is accepted, while the green led next to **GYRO** button remains flashing.

The rotor starts spinning and reaches full speed after maximum 30 minutes.



When the rotor has reached full speed the gyrocompass starts its north seeking function. Its display will now change to show the compass actual heading and from now on heading output will be available.

The green led next to the **GYRO** button changes from flashing to constant litted. The AlphaMidicourse Mk2 will be settled within 3 hours when started with a deviation angle of less than 5° respect to its true heading. With a larger deviation angle the compass will be settle within 4 hours.

**Note** AlphaMidiCourse Mk2 **CAUTION** alarm will be active until input sources latitude and speed are set. See paragraph 1.7.3 *Setting the Latitude input source* and 1.7.4 *Setting the Speed input source* how to set them.

## 1.7.2 Configuring the Gyro sphere

Each Sensitive element is tuned to its Master Compass before it is shipped from the factory. This tuning is reflected in a set of parameters specific for this gyrocompass. These parameters are included in the sensitive elements package on the Gyro sphere settings form. This parameter have to be entered into the Control Unit as part of the gyro compass installation procedure. See below example form of AlphaMidiCourse gyrocompass with serial 10008.

The parameters are loaded into the Control Unit from the Extension menu as described below.

| ALPHAMIDICOURSE                 |                       |         |
|---------------------------------|-----------------------|---------|
| Master Compass Serial Number    |                       | 10008   |
| Sensitive Element Serial Number |                       | M6212SF |
| Extension menu item No.         |                       | value   |
| 1.1.U                           | Damping gain          | 0.84    |
| 1.2.F                           | Bearing servo gain    | 1.00    |
| 1.3.S                           | Horizontal servo gain | 1.00    |
| 1.4.u                           | Leveling servo gain   | 0.50    |
| 1.5.L                           | (φ) Phi offset        | 0.00    |
| 1.6.t                           | (θ) Theta offset      | -0.02   |
| 2.1.o                           | Bearing offset        | 000.0   |
| 2.3.h                           | Zero-cross bearing    | 345.6   |

- 1) Enter the Extension menu by pressing and holding the **SET** button and the **ACK/ENT** buttons simultaneously for approx. 3 sec. Main category **A-1** will be displayed.
- 2) Press the **SET** button to enter the sub-category loop. Sub-category **1.1.U** and its parameter value will be displayed.
- 3) Use **▲** or **▼** to increase or decrease the parameter value until the value is according to the value of the form.
- 4) Confirm the entry by pressing **ACK/ENT** button and the display will return to the sub-category.
- 5) Press **DISP** button again until you see **1.4.u**. Repeat step 3 and 4.
- 6) Do the same for sub-category **1.6.t**.
- 7) Press the **SET** button again to return to main category **A-1** and then press the **DISP** button to go to **A-2** main category.
- 8) Press **SET** button and enter the value for **2.3.h**, **2.5.y** (year), **2.6.N** (month and day), **2.7.t** (hour and minute) and **2.8.d** (total days of operation. This value should be reset after installation).

After step 8 is done return to the main category by pressing **SET** button and then exit the Extension menu by pressing and holding the **SET** and **ACK/ENT** buttons simultaneously for approx. 3 seconds.

For more information about the Extension menu, see paragraph 1.8 *Advanced Settings*.

**Note** Values 1.1.U (Damping gain) and 1.6.t Theta offset are written on the Gyro sphere.

## 1.7.3 Setting the Latitude input source

When paragraph 1.7.2 *Configuring the Gyro Spere* has been carried out the latitude input source can be changed as described below.

- 1) Press the **DISP** button until the display shows latitude value.
- 2) Press **SET** button once and its upper line in the display starts flashing.
- 3) Use the **▲** or **▼** buttons for selecting **GYro** or **GnSS** as latitude input source. Confirm the entry with **ACK/ENT** button.
  - When **GYro** is selected the display will change to flashing numbers. Use the **▲** or **▼** button to set the latitude manually and press **ACK/ENT**.
  - When **GnSS** is selected the display will show the latitude value from GPS.
- 4) The display will return to show latitude value without flashing.

## 1.7.4 Setting the Speed input source

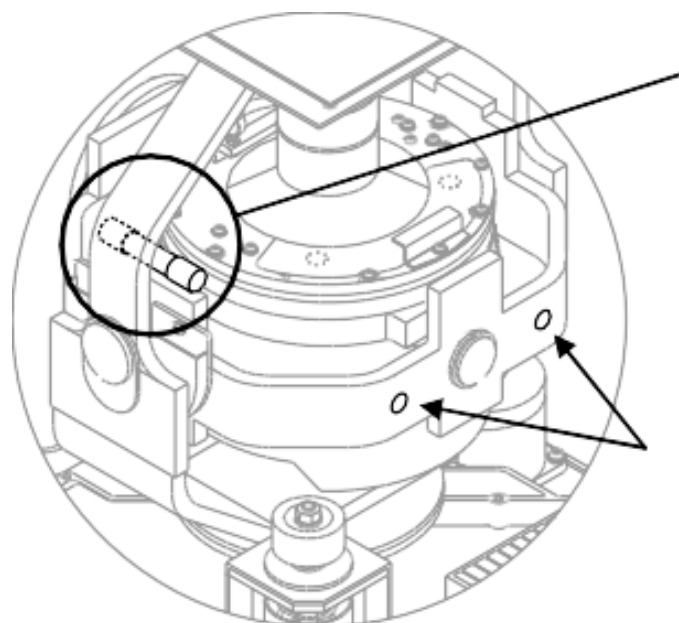
When paragraph 1.7.2 *Configuring the Gyro sphere* has been carried out the latitude input source can be changed as described below.

OR

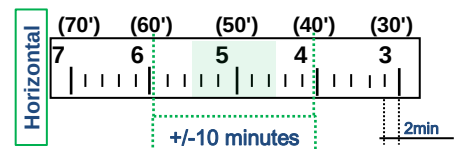
- 1) Press the **DISP** button until the display shows speed value and speed input.
- 2) Press **SET** button once and its upper line in the display starts flashing.
- 3) Use the **▲** or **▼** buttons for toggling between **H.Sd** (manual), **G.Sd** (GPS), **P.Sd** (pulse LOG) and **S.Sd** (serial LOG).
- 4) Select active speed input source and confirm by pressing **ACK/ENT** button.
  - When manual input is selected the display will change to show a flashing numerical values.
  - Use **▲** or **▼** buttons for entering the speed value and confirm by pressing the **ACK/ENT** button.
- 5) The display will return to show the speed value and input source.

## 1.7.5 Balancing the Horizontal ring

After the compass has been running continuously for at least 3 hours it horizontal ring should be adjusted.



- 1) Locate the horizontal bubble indicator on the horizontal ring. Check if its level bubble is **within** +/- 10 minutes. Each division equals 2 minutes.



- 2) If the level bubble is not within these limits then add or remove weights from the horizontal ring until it is leveled.

It is important that the total number of weights on the horizontal ring are as few as possible.



- 3) Let the compass run for at least 20 minutes before the level bubble is rechecked.



- CAUTION – If the horizontal ring is tilted more than +/-10 minutes a bearing error will be generated.
- Weights with range from 0.17 gram till 9 grams are order separately, contact Alpatron Marine.

## 1.7.6 Adjusting True Heading

After the AlphaMidiCourse Mk2 has settled the gyrocompass can be calibrated against an external reference for example:

- A known target
- An astronomical observation
- Heading of the pier or quay the vessel is moored to
- Fixed point on the chart

The observation period for the heading difference should be as long as possible. If there is any difference between the gyro bearing and the confirmed external reference that cannot be corrected by adjusting the mechanical location of its compass, an offset value may be inserted.

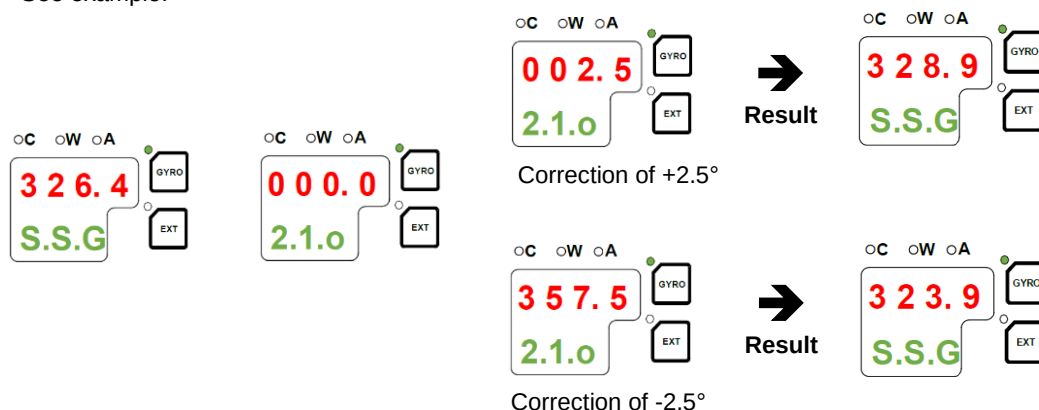
This value is entered by using its Extension Menu as following:

1. Activated Extension Menu by pressing and hold the **SET** and **ACK/ENT** buttons simultaneously for at least 3 seconds. Main category **A-1** will be displayed.
2. Press the DISP button once to display main category **A-2**.
3. Press the SET button to enter the sub-category **2.1.o**.



5. Use the ▲ or ▼ buttons to increase or decrease the offset parameter value. Below the heading is 326.4° and will be corrected with  $\pm 2.5^\circ$ .

See example:



6. Confirm the new value by pressing the **ACK/ENT** button or reject the changes by pressing the **SET** button. Display will return to sub-category **2.1.o**.
7. Exit the Extension Menu by pressing and holding the **SET** and **ACK/ENT** buttons simultaneously for at least 3 seconds.

## 1.8 Advanced Settings



- The Extension Menu should not be entered by unauthorized personnel. Incorrect parameters may result in irregular operation of the AlphaMidiCourse Mk2 Gyrocompass

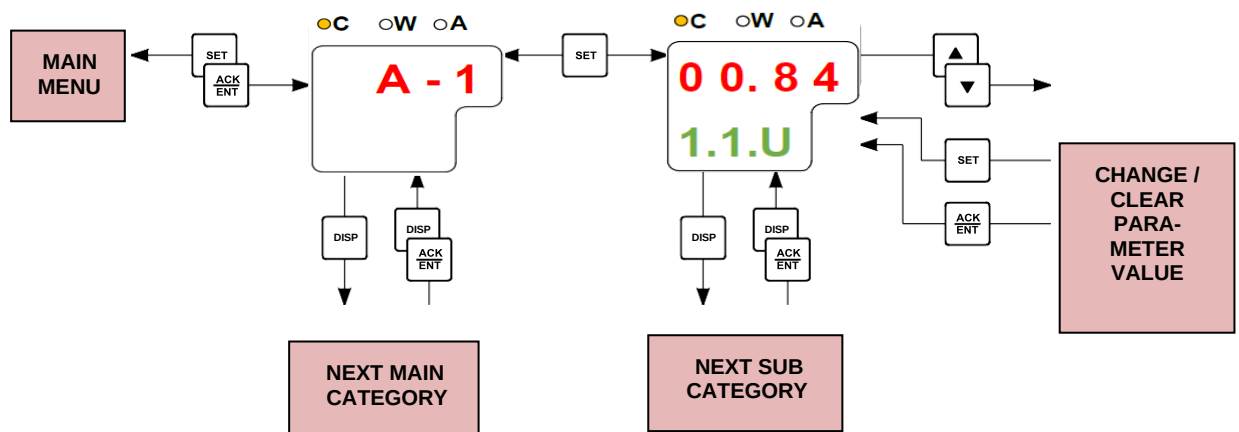
This section gives an overview of the Extension Menu, how to enter the menu and how to change parameter values. The Extension Menu holds internal parameters and communication parameters required to achieve the best possible heading accuracy on the AlphaMidiCourse Mk2 Gyrocompass.

The Extension Menu is grouped in 8 main categories, named **A-1** through **A-8**. Each of these main categories has several sub-categories where parameter values may be set.

All values in the Extension Menu are stored in the nonvolatile memory of the compass.

The Extension Menu can be entered when any display is shown the LCD.

- Active the menu by pressing and holding the **SET** and the **ACK/ENT** buttons simultaneously for at least 3 seconds. Main category **A-1** will be shown.
- Page through the main categories to selected category by pressing the **DISP** button. By pressing the **DISP** and **ACK/ENT** buttons simultaneously will display the main category loop in reversed order.
- Press the **SET** button to enter the sub-category loop and use the **DISP** button to select sub-category that holds the parameter to be changed.
- Use the arrow buttons to increase or decrease the parameter value.
- Confirm the new value by pressing the **ACK/ENT** button or reject the changes by pressing the **SET** button. The display will return to selected sub-category.
- Exit the Extension Menu by pressing and holding the **SET** and **ACK/ENT** buttons simultaneously for at least 3 seconds.



### 1.8.1 Extension Menu overview

| Main Category | Sub Category | Parameter/description                                                                                                                                                                                                                                                                                                                                                                                                          | Default value | Range       |
|---------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------|
| <b>A-1</b>    | 1.1.U        | Damping gain ratio (%)<br><br>Determines the damping (damping operation in north- seeking motion = half cycle attenuation) and actually represents a coefficient (ratio) to the standard value stored in the software.                                                                                                                                                                                                         | 1.00          | 0.00 – 2.00 |
|               | 1.2.F        | Bearing servo gain ratio(%)<br><br>Determines the gain of the bearing servo loop where phi $\Phi$ signal (deviation signal around rotor's vertical axis) is calculated, drives the azimuth step motor and has the sensitive element follow to the gyro-sphere vertical axis (around azimuth axis) rotation. Presents a coefficient (ratio) to the standard value stored in software.                                           | 1.00          | 0.00 – 2.00 |
|               | 1.3.S        | Horizontal servo gain ratio(%)<br><br>Determines the gain of the horizontal servo loop where theta $\theta$ signal (rotor tilting angle signal) is calculated, drives the horizontal DST and has the sensitive element follow to the gyro sphere tilting angle (rotor tilting angle). Present a coefficient (ration) to the standard value stored in software.                                                                 | 1.00          | 0.00 – 2.00 |
|               | 1.4.u        | Leveling servo gain ratio(%)<br><br>Leveling motion (sensitive element erection motion) calculates X signal (equivalent inclination angle) which is output from the sensitive element and relative inclination angle signal from HRZC board, controls to have the sensitive element keep horizontal. The value determines this control loop gain. Presents a coefficient (ratio) to the standard value stored in the software. | 1.00          | 0.00 – 2.00 |

| Main Category    | Sub Category | Parameter/description                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Default value | Range         |
|------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|
| <b>A-1 cont.</b> | 1.5.L        | (φ) Phi offset (°)<br>Offset value (°) around the vertical axis of gyro sphere (rotor axis) and the sensitive element.                                                                                                                                                                                                                                                                                                                                                                     | 0.00          | -3.00 – 3.00  |
|                  | 1.6.t        | (θ) Theta offset (°)<br>Offset value (°) around the horizontal axis of gyro sphere (rotor axis) and the sensitive element.                                                                                                                                                                                                                                                                                                                                                                 | 0.00          | -3.00 – 3.00  |
|                  | 1.7.G        | X signal pickup gain (v/°)<br>Distance of the sensitive element share and the rotor axis direction. Inclination angle around horizontal axis is obtained equivalently by monitoring this signal. For example, when north side of the rotor axis rises, the sensitive element follows to rise its north side, then gyro sphere suspended by the suspension wire moves to south side. X signal represents this amount of movement (v/°). This parameter is only used for AlphaMidiCourse HSC | 2.25          | 0.00 – 5.00   |
|                  | 1.8.c        | Ks/H<br>Suspension wire twist torque. Fixed value.                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1.477         | 1.000 – 2.000 |
|                  | 1.9.r        | Maximum rate of turn (°/sec)<br>Maximum rate of turn in the turn rates which the bearing servo system followed up to this moment (°/sec).<br><u>NOTE:</u> The maximum is measured after 3 hours from system start.<br><u>NOTE:</u> Reset this data certainly after completion of installation!                                                                                                                                                                                             | 0.00          | -             |
|                  | 1.A.F        | Maximum deviation of bearing servo (°)<br>Maximum deviation value in the bearing servo loop that occurred up to this moment (°).<br><u>NOTE:</u> The maximum is measured after 3 hours from system start.<br><u>NOTE:</u> Reset this data certainly after completion of installation!                                                                                                                                                                                                      | 0.00          | -             |
|                  | 1.b.S        | Maximum deviation of horizontal servo (°)<br>Maximum deviation value in the horizontal servo loop that occurred up to this moment (°).<br><u>NOTE:</u> The maximum is measured after 3 hours from system start.<br><u>NOTE:</u> Reset this data certainly after completion of installation!                                                                                                                                                                                                | 0.00          | -             |

| Main Category | Sub Category | Parameter/description                                                                                                                                                                                                                                                                                                                        | Default value | Range       |
|---------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------|
| A-2           | 2.1.o        | Bearing offset A (°)<br>Offset value included in the “master bearing” and used for correction of fixed error (°). If the master compass not can be mounted parallel to the vessel’s fore-aft line, this parameter is used to compensate for a small mounting error.                                                                          | 0.0           | 0.0 – 359.9 |
|               | 2.2.O        | Bearing offset B (°)<br>Value for general bearing error correction to enter to master compass bearing. It is used to correct the bearing if the bearing for some reason deviates from correct heading. This value is cleared when it passes the zero-cross pin or when power is switched OFF.                                                | 0.0           | 0.0 – 359.9 |
|               | 2.3.h        | Zero-cross bearing (°)<br>Absolute bearing set for MCU board when zero-cross pin was passed during start-up sequence (last azimuth operation) and normal running operation. Zero-cross bearing can be set in this menu, but is normally set up be measuring position (angle) of the zero-cross pin in the master compass by the test mode A. | 345.3         | 0.0 – 359.9 |
|               | 2.4.E        | Zero-cross error allowance (°)<br>Zero-cross alarm limit. The compass will generate a zero cross alarm when the difference between the zero- cross bearing and the relative bearing exceeds this zero cross value. This value should be set every time the zero-cross pin is detected.                                                       | 2.0           | 0.0 – 5.0   |
|               | 2.5.y        | Year<br>Used for setting current year.                                                                                                                                                                                                                                                                                                       | -             | 2000 - 2099 |
|               | 2.6.N        | Month and Day<br>Used for setting current month and date.                                                                                                                                                                                                                                                                                    | -             | -           |
|               | 2.7.t        | Hour and Minute<br>Used for setting current hour and minute.                                                                                                                                                                                                                                                                                 | -             | -           |
|               | 2.8.d        | Total days of operation<br>This value should be reset after the installation is completed.                                                                                                                                                                                                                                                   | -             | -           |

| Main Category    | Sub Category | Parameter/description                                                                                                                                                                                                                 | Default value | Range                 |
|------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------|
| <b>A-2 cont.</b> | 2.9.G        | Display/setting of GPS connection<br>The following abbreviations are used: bE: GPS connected<br>Non: No GPS connected<br><i>When this value is set to "Non", GPS cannot be selected as the vessel's input for speed and latitude.</i> | -             | bE or Non             |
|                  | 2.A.L        | Display/setting of LOG connection<br>The following abbreviations are used: bE: with Log (contact)<br>Non: No Log (contact)<br><i>When this value is set to "Non", LOG cannot be selected as the vessel's speed input.</i>             | -             | bE or Non             |
|                  | 2.b.S        | Display/setting of LOG (serial) connection<br>The following abbreviations are used: bE: with Log (serial)<br>Non: No Log (serial)<br><i>When this value is set to "Non", SLOG cannot be selected as the vessel's speed input.</i>     | -             | bE or Non             |
|                  | 2.c.t        | Display/setting of GPS performance index data check<br>The following abbreviations are used: bE: Check performance index<br>Non: Not check performance index                                                                          | -             | bE or Non             |
|                  | 2.d.o        | Analogue signal output offset for ROT (°)<br>Offset value for analogue signal output of Rate Of Turn.<br>Entered value is +/-5% of maximum output ROT.                                                                                | 0.00          | 0.0 – 16 <sup>1</sup> |
|                  | 2.e.F        | Filter time constant for rate of turn (sec)                                                                                                                                                                                           | 2.00          | 0.5 – 10.0            |
|                  | 2.F.G        | Analog output gain for rate of turn                                                                                                                                                                                                   | 1.00          | 0.90 – 1.00           |
|                  | 2.G.P        | PTKM sentence output                                                                                                                                                                                                                  | bE            |                       |
|                  | 2.H.r        | ROT sentence output                                                                                                                                                                                                                   | bE            |                       |
| <b>A-3</b>       | 3.1.E        | Alarm (error)                                                                                                                                                                                                                         | -             | -                     |
|                  | 3.2.n        | Occurred number of zero-cross error                                                                                                                                                                                                   | -             | -                     |
|                  | 3.3.H        | Maximum zero-cross error                                                                                                                                                                                                              | -             | -                     |
|                  | 3.4.y        | Occurred year of zero-cross error                                                                                                                                                                                                     | -             | -                     |
|                  | 3.5.N        | Occurred month/day of zero-cross error                                                                                                                                                                                                | -             | -                     |
|                  | 3.6.t        | Occurred hour/minute of zero-cross error                                                                                                                                                                                              | -             | -                     |
|                  | 3.7.n        | Occurred number of encoder error                                                                                                                                                                                                      | -             | -                     |
|                  | 3.8.r        | Occurred number of reset with WATCH DOC TIMER                                                                                                                                                                                         | -             | -                     |

<sup>1</sup> The maximum value is 5% of the maximum analog output for rate of turn.(32 deg./min: 1.6deg./min., 130deg./min: 6.5deg./min., 320deg./min: 16.0deg./min.)

| Main Category | Sub Category | Parameter/description                                   | Default value | Range        |
|---------------|--------------|---------------------------------------------------------|---------------|--------------|
| <b>A-4</b>    | 4.1.C        | GPS serial data character length                        | 8             | 8 or 7       |
|               | 4.2.P        | GPS serial data parity bit                              | Non           | Non Even Odd |
|               | 4.3.S        | GPS serial data stop bits                               | 1             | 1 or 2       |
| <b>A-5</b>    | 5.1.C        | LOG serial data character length                        | 8             | 8 or 7       |
|               | 5.2.P        | LOG serial data parity bit                              | Non           | Non Even Odd |
|               | 5.3.S        | LOG serial data stop bits                               | 1             | 1 or 2       |
| <b>A-6</b>    | 6.1.C        | External sensor (standard) serial data character length | 8             | 8 or 7       |
|               | 6.2.P        | External sensor (standard) serial data parity bit       | Non           | Non Even Odd |
|               | 6.3.S        | External sensor (standard) serial data stop bits        | 1             | 1 or 2       |
| <b>A-7</b>    | 7.1.t        | Master compass type                                     | Std           | Std or Hsc   |
|               | 7.2.u        | SCC software version number                             | -             | -            |
|               | 7.3.u        | MCC software version number                             | -             | -            |
|               | 7.4.u        | GPANEL-A software version                               | -             | -            |
| <b>A-8</b>    | 8.1.t        | For confirmation of extension menu                      | -             | -            |
|               | 8.2.S        | Filter of speed error correction                        | On            | On or Off    |
|               | 8.3.L        | Level signal monitor(°)                                 | -             | -            |
|               | 8.4.t        | Temperature of Master compass(°C)                       |               |              |
|               | 8.5.H        | HDG sentence output when EXT(standard) selected         | On            | On or Off    |

## 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.

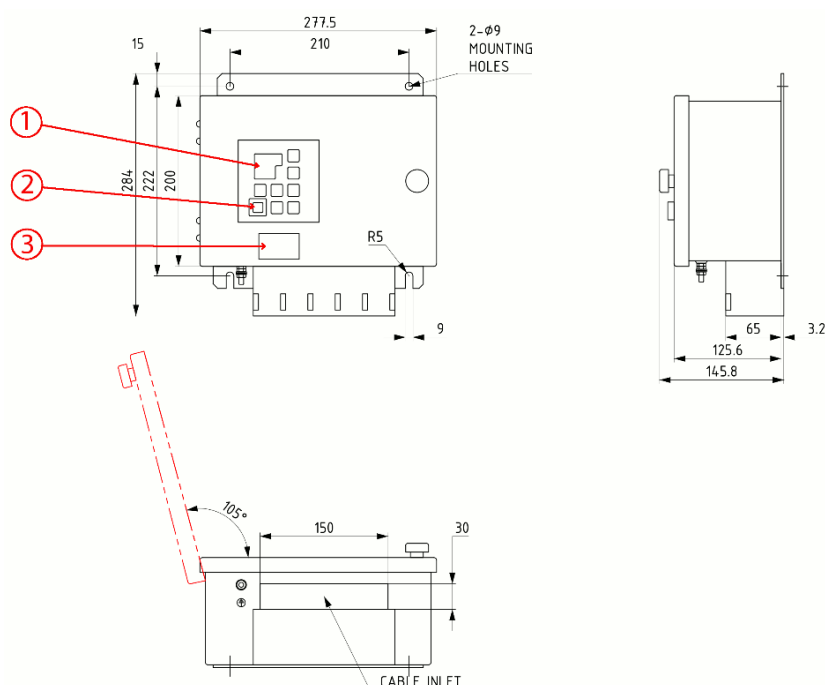


- **WARNING**
- Matters requiring attention in starting up and operations during progress are described in chapter Operations and are punctuated with a CAUTION or a WARNING, which must be strictly observed.
- Attentively read the Operator Manual of the automatic steering system carefully preparing for 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 below.



**Figure 18: Control Unit**

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

## 2.2 Explanation of the Operating Panel



**Figure: Operating Panel**

### POWER switch

Power switch / Power indicator

1. Open cover
2. Press to start/stop system
3. Close cover after start-up, so as not to inadvertently push the button.

### DISP switch

Select the displayed item and the displayed data.

1. Press to display data in order.
2. Press DISP and ACK/ENT simultaneously to display data in reverse order.
3. Refer Data and Mode Display for displayed text.

### SET switch

Change data and change the input system.

- Change data: Gyro Compass True Heading / Ship Speed / Latitude / Rate of Turn.
- Change input system: <sup>1</sup> 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.

Press to stop alarm buzzer when an alarm has been activated.

### ▲▼ switches

Change data and change the input system.

Normally these are used to adjust illumination of the indicator.

1. Press ▲ for brighter.
2. Press ▼ for darker.
3. Press simultaneously for lamp test.
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><ol style="list-style-type: none"> <li>1. Press to select required system.</li> <li>2. "GYRO" system is select.</li> <li>3. For system selection, refer to paragraph 2.6 <i>System Selection</i></li> </ol>                                                                                                                                                                                                                                                                                                                                             |
| EXT switch                    | System selection switch (External).<br><ol style="list-style-type: none"> <li>1. Press to select required system.</li> <li>2. "External Heading Sensor" system is selected.</li> <li>3. For the system select, refer to paragraph 2.6 <i>System Selection</i></li> </ol>                                                                                                                                                                                                                                                                                                                   |
| Data Display                  | 4 figures, 7 segments red LED : Data is displayed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Mode Display                  | 3 figures, 7 segments green LED: Type of data is displayed.<br><div>  <b>Note</b> When the rotor is in stopped situation, the dot at right end of the mode indicator is lit. </div> <div>  <b>Note</b> When the rotor is running, it is blinking. </div> <div>  <b>Note</b> When in the follow up situation, it is extinguished. </div> |
| Alarm Indicator LEDs          | Alarm status is displayed. It blinks when an alarm is generated.<br><ol style="list-style-type: none"> <li>1. Press ACK/ENT to stop alarm.</li> <li>2. If cause of alarm has not been resolved, it continues blinking.</li> </ol>                                                                                                                                                                                                                                                                                                                                                          |
| System select Indicator LEDs. | Displays selected system                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

**Table: Functions Operating Panel**

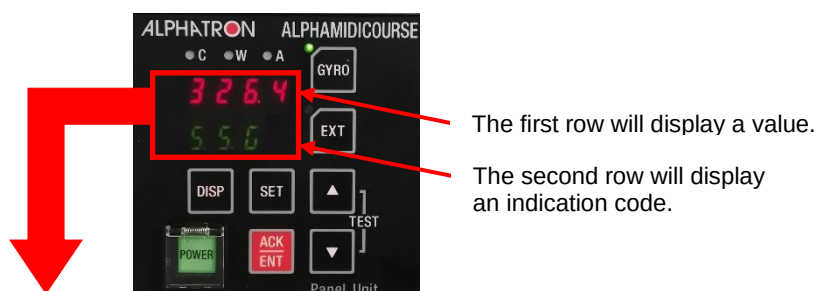
 **Note** <sup>1</sup> Selectable system is different depending on the system type connected to this system.

## 2.3 Data Indications

### Explanation of Display:

When pressing the DISP button on the AlphaMidcourse Mk2 Operation panel the system will loop through a display sequence that will show the present settings. The sequence will be depending on whether an external heading sensor is connected. When an external source is connected the main readout depends on the active sensor.

See below table the readout with and without External sensor.



| With External Sensor Connected              | When External Sensor is selected            | Without External Sensor              | Display                                               | Indication                                                                                                                                                            | Paragraph |
|---------------------------------------------|---------------------------------------------|--------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Normal<br>S.S.G                             | Normal<br>S.S.E                             | Normal<br>S.S.G                      | True heading 1<br>***.*<br>S.S.G or S.S.E             | S.S.G = <u>S</u> teering <u>S</u> ensor <u>G</u> yro compass<br>S.S.E = <u>S</u> teering <u>S</u> ensor <u>E</u> xternal sensor                                       | 2.3.1     |
| 1 <sup>st</sup> press on DISP button<br>Est | 1 <sup>st</sup> press on DISP button<br>GYt |                                      | True Heading 2<br>***.*<br>Est or GYt                 | Est = <u>E</u> xternal <u>S</u> ensor <u>t</u> ru bearing<br>GYt = <u>G</u> yro compass <u>t</u> ru bearing                                                           | 2.3.2     |
| 2 <sup>nd</sup> press on DISP button        | 2 <sup>nd</sup> press on DISP button        | 1 <sup>st</sup> press on DISP button | Master Compass Bearing<br>***.*<br>C.P.S              | Gyro Compass bearing without correction<br>C.P.S = <u>C</u> ompass                                                                                                    | 2.3.3     |
| 3 <sup>rd</sup> press on DISP button        | 3 <sup>rd</sup> press on DISP button        | 2 <sup>nd</sup> press on DISP button | Latitude<br>***.*<br>LA.n or LA.s                     | LA.n = <u>L</u> atitude <u>N</u> orth<br>LA.s = <u>L</u> atitude <u>S</u> outh                                                                                        | 2.3.4     |
| 4 <sup>th</sup> press on DISP button        | 4 <sup>th</sup> press on DISP button        | 3 <sup>rd</sup> press on DISP button | Vessel speed<br>***.*<br>G.Sd or H.Sd or L.Sd or S.Sd | G.Sd = <u>G</u> PS <u>S</u> peed<br>H.Sd = <u>H</u> and <u>S</u> peed (manual)<br>L.Sd = <u>L</u> OG <u>S</u> peed (Pulse)<br>S.Sd = <u>S</u> erial LOG <u>S</u> peed | 2.3.5     |
| 5 <sup>th</sup> press on DISP button        | 5 <sup>th</sup> press on DISP button        | 4 <sup>th</sup> press on DISP button | Rate of Turn<br>***.*<br>rt                           | rt = <u>R</u> ate of <u>T</u> urn                                                                                                                                     | 2.3.6     |
| 6 <sup>th</sup> press on DISP button        | 6 <sup>th</sup> press on DISP button        | 5 <sup>th</sup> press on DISP button | Alarm Content<br>****<br>Err                          | Err = <u>E</u> rror                                                                                                                                                   | 2.3.7     |

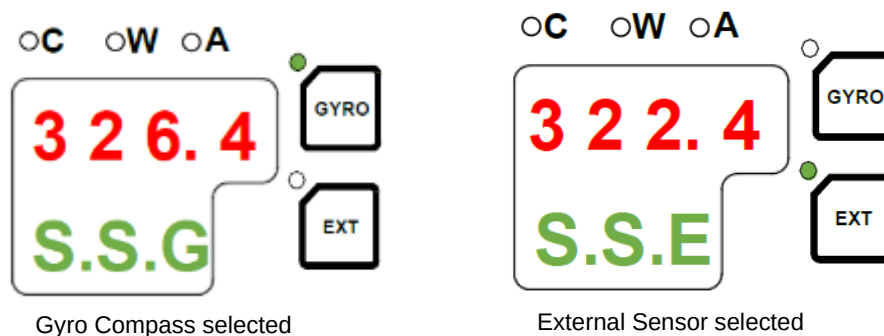
Table: Data / Mode Menu Structure of Operation Panel

### 2.3.1 S.S.G and S.S.E

When the sensor of true heading is selected as system either it can be the Gyro Compass Heading sensor or the external heading sensor as True Heading source and it will be displayed as following.

For the heading sensor selection, refer to paragraph 2.6 *Heading Sensor Selection*

The indicated value data and code indicators are shown below.

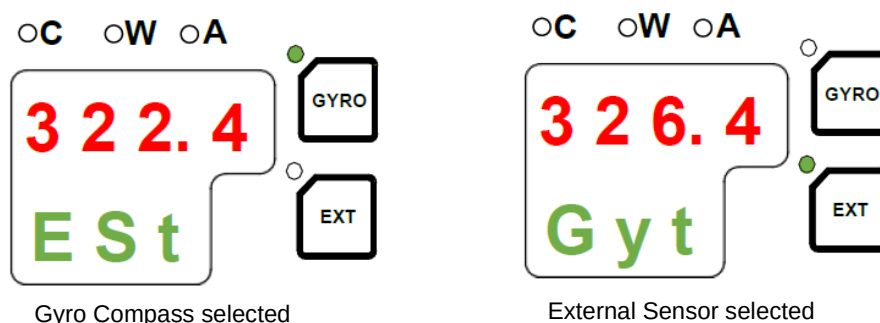


**Note** When a GPS communication failure, LOG (serial signal) communication failure, or LOG (contact) failure is generated, an CAUTION alarm will be generated. If "GYRO" system is selected at the time a WARNING alarm will be generated, operate according to chapter 5 *Troubleshooting*, because the True Heading determination is required.

**Note** When communication failure with "the external heading sensor" is generated, the value of the data indicator **S.S.E** will be blinking when external sensor was selected and a WARNING alarm will be generated. When the "External heading sensor" was selected at the time, operate according to chapter 5 *Troubleshooting* because the True Heading determination is required.

### 2.3.2 E.S.t and GYt

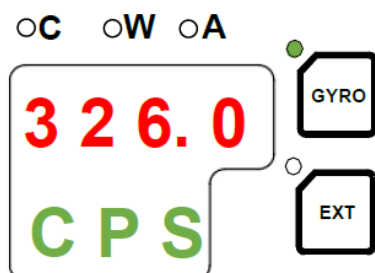
When a True Heading sensor is selected as system, either the Gyro Compass True heading or the external heading sensor True Heading their bearing while be displayed. If Gyro is selected as true heading source its external heading will be display by ESt. When external heading sensor is selected as true heading source and Gyro compass is not settled the indicator GYt will be flashing until Gyro compass is settled.



**Note** When communication failure with "the external heading sensor" is generated, the value of the data indicator **E.S.t** will be blinking when external sensor was selected and a WARNING alarm will be generated. When the "External heading sensor" was selected at the time, operate according to chapter 5 *Troubleshooting*, because the True Heading determination is required

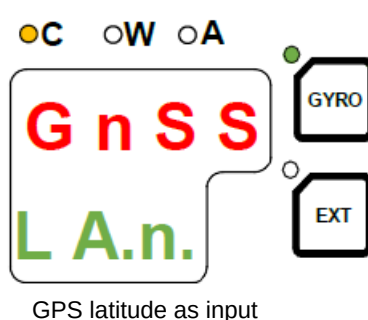
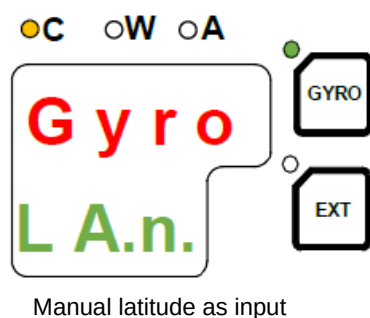
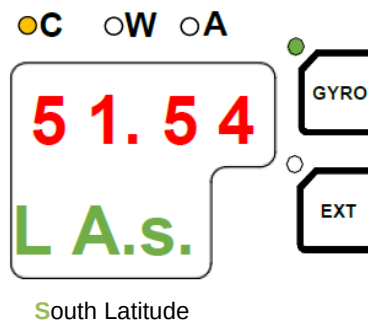
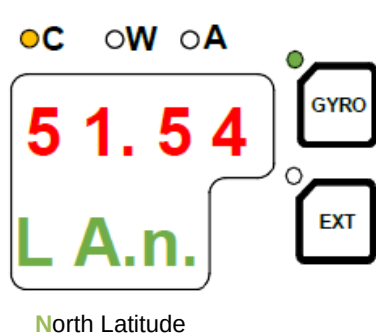
### 2.3.3 C.P.S

Master Compass Heading is displayed without corrections.



### 2.3.4 Latitude

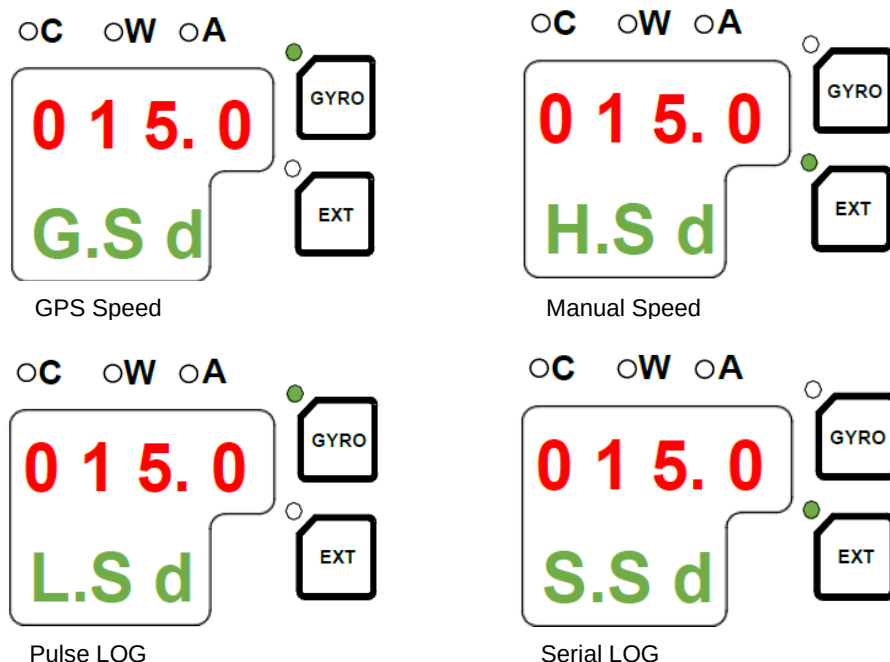
The displayed latitude value is calculated based on the ships true bearing and actual speed. For the latitude input selection, refer to paragraph 1.7.3 *Setting the Latitude input source*.



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

## 2.3.5 Ship Speed

The AlphaMidiCourse Mk2 calculates bearing based on the speed and latitude information that is inputted to the gyro as speed source. For the speed input selection, refer to paragraph 1.7.4 *Setting the Speed input source*.

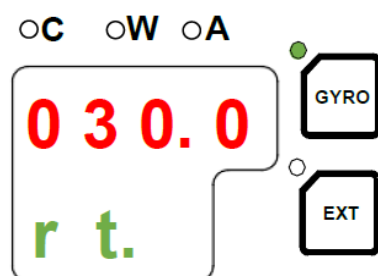


- Note** When a GPS communication failure is generated, the data indicator starts blinking.
- Note** When a LOG (contact) failure is generated, the data indicator starts blinking.
- Note** When a LOG (serial) failure is generated, the data indicator starts blinking.

## 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.

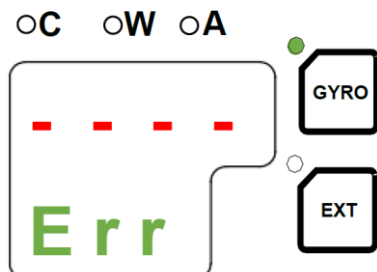


- Note** The Data indicator shows bar indication (blinking) until the master Gyro Compass starts to follow up, or when "External heading sensor" system is selected.
- Note** When the ship makes a left turn, the Mode indicator shows a minus sign (-), which is indicated in the far right space.

## 2.3.7 Error

The AlphaMidiCourse Mk2 will continually check for faults while the system is running. If an error occurs, an alarm code will be displayed, a led indication will be flashing and an audible alarm will be activated. For the alarm code indication, refer to chapter 2.9 *Alarm*.

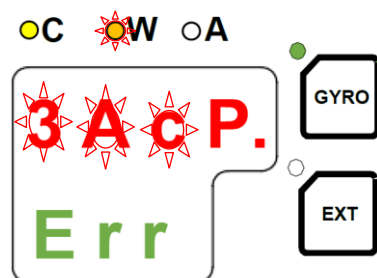
When there are no alarms, the display indication is as shown below:



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

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

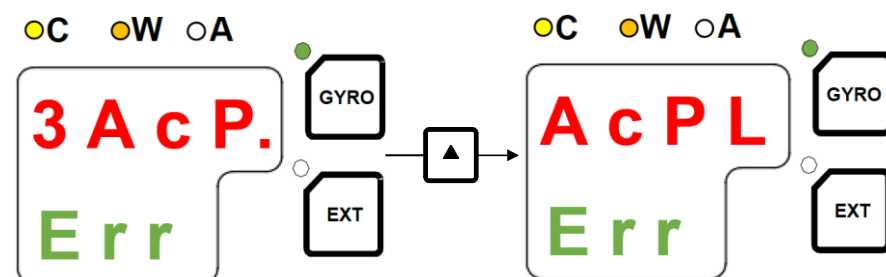
See below example: Presently alarms with code 3 (W), A (W), c (W) and P (C) were activated in order.



**Note** In above example the WARING alarm indication code and led will (blinking) until pressing **ACK/ENT** button, refer to paragraph 2.9.3. *Alert Priority*.

When more than 4 alarms are active, this will be indicated with a dot behind the last number as shown below. Further alarm codes may then be displayed by pressing the ▲.

See below example: When alarms code 3, A, c, P and L were activated.

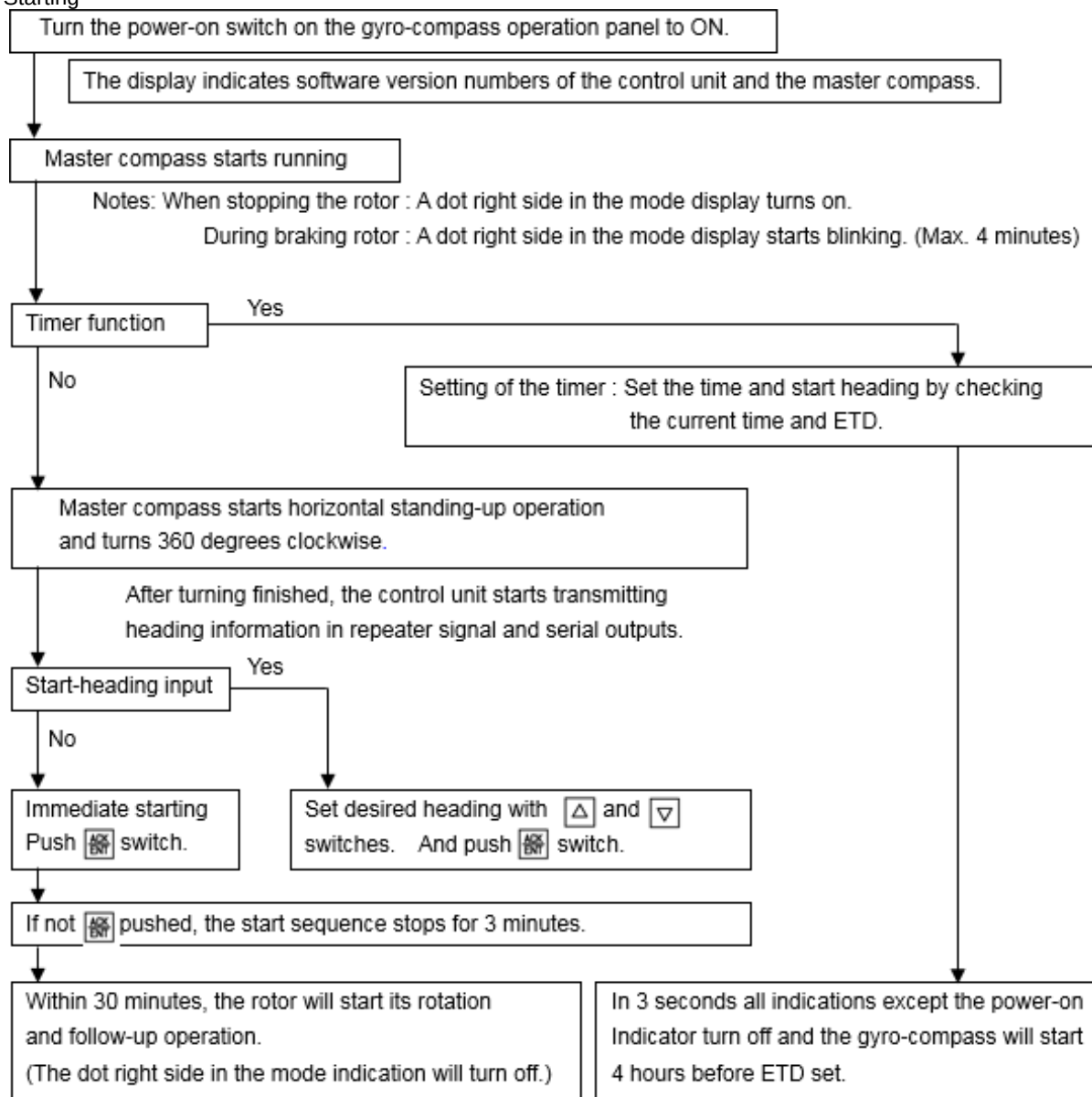


## 2.4 Start and Stop Sequence

The AlphaMidiCourse Mk2 operates in start-up sequence shown in diagram below.

For each operation in the sequence, refer to paragraph 2.5 *Start and Running* and paragraph 2.10 *Turning the Gyro Compass OFF*.

### 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.

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

Repeater synchronization: Synchronize each repeater indication with the selected True Heading information<sup>1</sup>.



**Note** <sup>1</sup> 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".

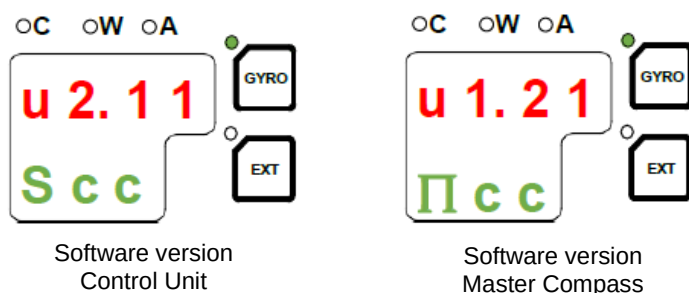
### 2.5.1 Start

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.



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

The Timer Starting Time function will only be active when it was set by the dipswitch according to paragraph 1.5.3.

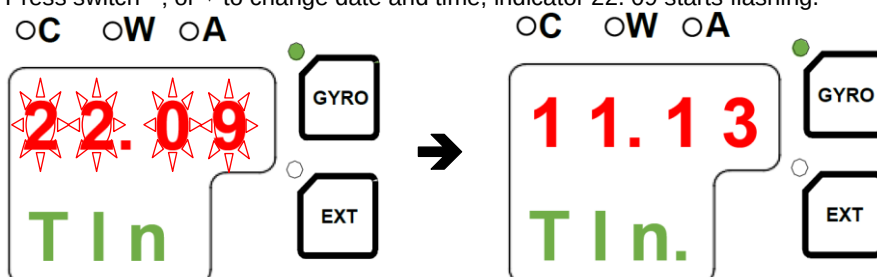
After turning ON the power and the software version number indicates FINISHED, the display automatically shows current date and time<sup>1</sup>.



**Note<sup>1</sup>** In cases where this function is not included, after indicating software version, it will display START HEADING.

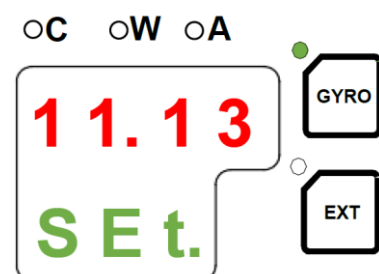
The following below example shows that date and time is 9 am of the day 22 and will be changed to current date and time 13 pm of the day 11.

8. Press switch ▲, or ▼ to change date and time, indicator 22.09 starts flashing.



9. Press switch **ACK/ENT** to confirm.

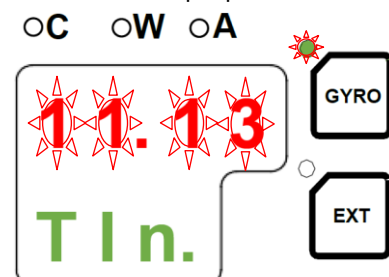
10. Press ▲, or ▼ to set departure day 11 and time 13 pm and press switch **ACK/ENT** to confirm.



11. Data indication **000.0 INT** will be show and press **ACK/ENT** to confirm.

12. Gyro compass does 360 degrees turn.

13. An audible short peep will active and the display will show a flashing set departure date and time.



**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.

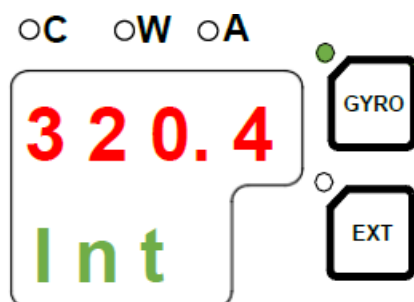
14. The set departure date and time are displayed for 3 seconds after the start heading setting. Then, all indications are extinguished except the power switch and the timer starts.



**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.



#### 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 Confirming Latitude Input



- 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

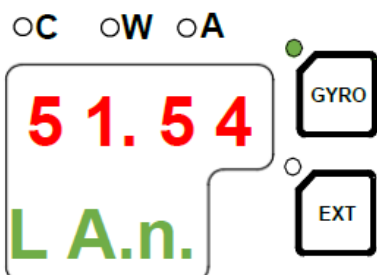
When an alarm regarding GPS (alarm code "c" or "d") is activated and the Gyro Compass' True Heading has not been determined, first turn the steering mode to "MANUAL", or "Non Follow Up", then determine the True Heading, because wrong heading information (repeater signal and serial signal) may be sent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

1. Press **DISP** switch to until display shows the actual latitude setting, see example below:

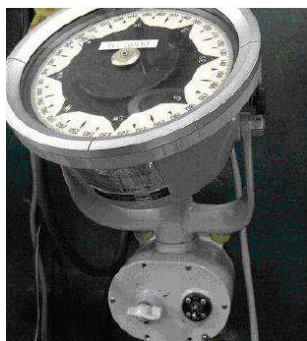


- When Latitude related alarms are active, refer to paragraph 1.7.3 *Setting the Latitude input source* to change its input.
- Follow chapter 5 *Troubleshooting* to resolve the alarm.

## 2.5.5 Synchronization of the Repeater Compass

**Note** <sup>1</sup>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.



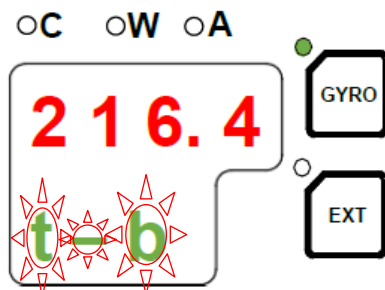
**Bearing Repeater Compass**

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

To stop the master compass. See paragraph 2.10 *Turning the Gyro Compass OFF*. 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 and **POWER** on the operating panel simultaneously, briefly an audible alarm will sound.
2. Last azimuth (the Master Compass rotates for 360°).

Last bearing will be displayed with a flashing t-b, see below example:



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°.
- Note** Serial repeaters should follow up within 0.5°.
- Note** if needed, follow up of the repeaters can be filled in Check Sheet, refer to paragraph 6.2.

4. Turn "OFF" each repeater switch.
5. Adjust it to the Gyro Compass True Heading.
6. Turn "ON" the Repeater Switch.
7. When all repeaters follow up correctly, restart the AlphaMidiCourse Mk2.

## 2.5.6 Settling Time

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

## 2.5.7 Confirming Ship Speed Input



- 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.

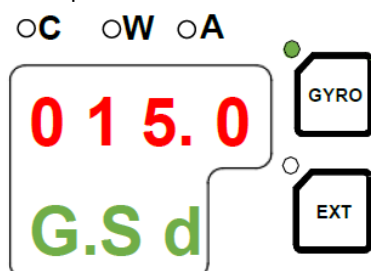


- CAUTION - Setting latitude input

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 until display show actual Ship Speed Setting, see example.

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



2. When Speed related alarms are active, refer to paragraph 1.7.4 *Setting the Speed input source* to change its input.

3. Follow chapter 5 *Troubleshooting* to resolve the alarm.

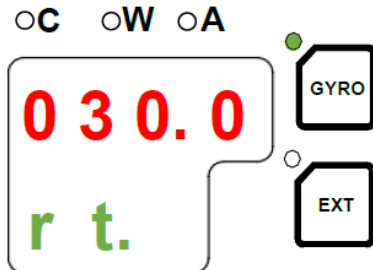
### 2.5.8 Set Rate of Turn Filter Constant



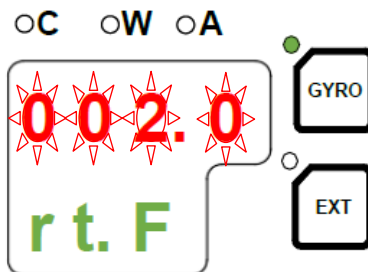
- CAUTION - Setting Speed Input

Press ACK/ENT switch to complete the setting. Changed setting is not updated unless pressing ACK/ENT switch.

1. Press **DISP** switch until the display shows the actual rate of turn, see below example:



2. Press **SET** switch to change Rate of Turn Filter Constant, previous set value will be flashing, see below example:



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



**Note** The "Filter Constant" can be set to 0.5, 1, 2, 4, 6, 8 and 10 in 2 seconds intervals.

4. Press **ACK/ENT** switch to confirm.

## 2.6 Heading Sensor Selection



- CAUTION - System Selection
- Heading sensor 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 the Gyro Compass is selected as True heading sensor. If an external heading sensor is connected to the AlphaMidiCourse Mk2 it is possible to switch between Gyrocompass and External heading sensor. An external heading should only be used when the gyrocompass is not working properly.

1. Turn "OFF" Analog repeaters

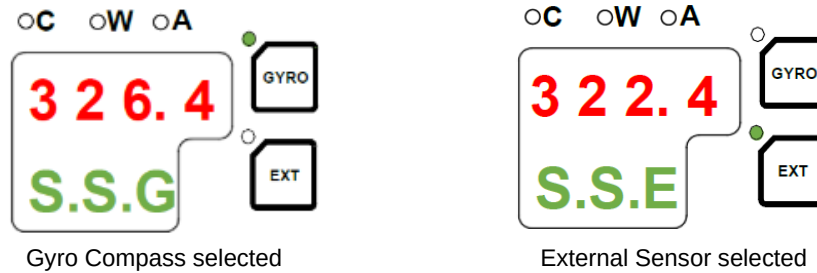


**Note** When the repeater is a serial signal type, this operation is not required, because it will synchronize automatically. However, confirm that the value displayed coincides with "the True Heading" selected by this system, after the repeater switch is turned "ON".

2. By pressing **GYRO** or **EXT** together with **ACK/ENT** switch the AlphaMidiCourse Mk2 will toggle between using the gyrocompass or an external sensor as active sensor.



**Note** When an active sensor is changed, an audible alarm will sound three times. The active sensor will be identified by a green led in the top right corner of the GYRO or EXT button as shown below.



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



**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 Pendulum Function

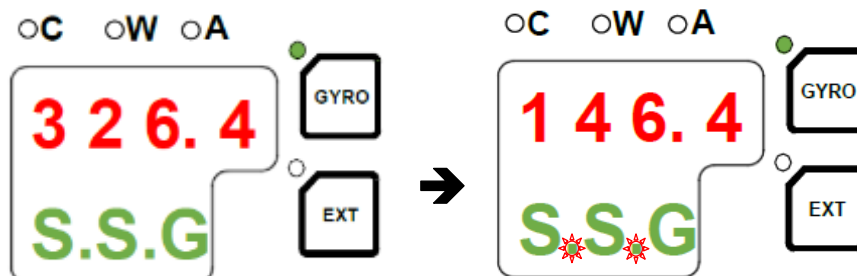
The AlphaMidiCourse Mk2 has a pendulum function that enables the heading to be changed by 180°. To enable this function a dipswitch has to be set, see paragraph 1.5. 2. *DIP switch settings*.

The heading change is active by closing a potential free contact on terminal TB1-2, refer to paragraph 1.4 *Connecting the AlphaMidiCourse Mk2*.

When the switch is set to active the function the following functions are obtained:

- All heading outputs will be changed 180° from the heading.
- An audible alarm will sound 5 times.
- The dots in the indicator field of its display starts flashing.

These will remain flashing for as long as the pendulum function is active, see below example:



- Normal gyro compass operation is resumed by opening the closed potential free contact. The function change will be indicated by the same audible alarm. The dots will stop flashing.

## 2.8 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:

## 2.8.2 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 paragraph 2.9 *Alarm*.

## 2.8.3 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 paragraph 1.7.6 *Adjusting True Heading*.

## 2.8.4 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.

1. 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.

2. Confirm the displayed value every time when berthing (or at anchor) and in two hour intervals when GYRO has been selected.
3. If there is a difference with the ship's actual latitude, set it again according to paragraph 1.7.3 *Setting Latitude Input source*.

## 2.8.5 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 paragraph 1.7.4 *Setting Ship Speed Input source*, if there is a difference with the actual speed.

## 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.

An alarm is acknowledged by pressing the ACK/ENT button on the control panel or on an external acknowledge button that has been installed.

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.



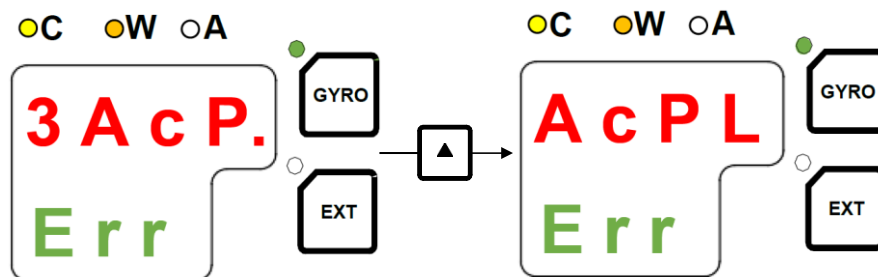
**Note** When the alarm indicator did not extinguish by pressing the ACK/ENT switch, the alarm conditions continues.



**Note** If the alarm situation continues, the alarm indicator will switch from flashing to a steady light. The display will return to show the true bearing with flashing numbers to indicated that the bearing may have large error.

2. When more than 4 alarms are active, this will be indicated with a dot behind the last number as shown below. Further alarm codes may then be displayed by pressing the ▲.

See below example: When alarms code 3, A, c, P and L were activated.



3. Refer to paragraph 2.9.1 *Alarm List* for all available alarm codes.
4. Take appropriate actions referring to chapter 5 *Troubleshooting* , when the alarm conditions continue and confirm the alarm code.
5. When Troubleshooting will not resolve the alarm, contact Alpatron Marine for more assistance.

### 2.9.1 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.                                                                                  |
| h          | INS communication abnormal                | When a failure is generated in the serial signal from INS                                                                                                         |
| 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: Alert List**

## 2.9.2 Alarm list of Alert Management System (AMS)

This system provides alert information which meets the specification of the Alert Management System.  
 The alert list below shows alert codes displayed on the Operation Panel of AlphaMidiCourse Mk2 Gyrocompass and the alerts information to be noticed by the Alert Management System.

| Alert code<br>Operation<br>Panel | Alert code<br>AMS<br>specification | Alarm Description | Alert<br>Priority※4 | Description<br>Category※5 | Remarks |
|----------------------------------|------------------------------------|-------------------|---------------------|---------------------------|---------|
| 「1」                              | 10300                              | MAIN PWR FAIL     | W                   | B                         |         |
| 「2」                              | 10301                              | 24R PWR FAIL      | W                   | B                         |         |
| 「3」                              | 10302                              | INVERTER FAIL     | W                   | B                         |         |
| 「4」                              | 10303                              | CONT.PWR FAIL     | W                   | B                         |         |
| 「5」                              | 10304                              | ROTOR FAIL        | W                   | B                         |         |
| 「6」                              | 10305                              | LEVEL FAIL        | W                   | B                         |         |
| 「8」                              | 10320                              | ZERO CROSS        | W                   | B                         |         |
| 「A」                              | 10308                              | INNER COMM1       | W                   | B                         |         |
| 「b」                              | 10309                              | INNER COMM2       | W                   | B                         |         |
| 「c」                              | 10310                              | GNSS COMM         | W<br>C              | B<br>-                    | ※1      |
| 「d」                              | 10311                              | GNSS DATA         | W<br>C              | B<br>-                    | ※1      |
| 「E」                              | 10316                              | EXT SENSOR COMM   | W                   | B                         |         |
| 「F」                              | 10317                              | EXT SENSOR DATA   | W                   | B                         |         |
| 「G」                              | 10319                              | STEP ERROR        | W                   | B                         |         |
| 「L」                              | 10314                              | EXT UNIT COMM     | W                   | B                         |         |
| 「n」                              | 10315                              | EXT UNIT DATA     | W                   | B                         |         |
| 「P」                              | 10312                              | LOG COMM          | W<br>C              | B<br>-                    | ※2      |
| 「r」                              | 10318                              | E5V FAIL          | W                   | B                         |         |
| 「U」                              | 10313                              | LOG DATA          | W<br>C              | B<br>-                    | ※2      |
| 「u」                              | 10330                              | PLOG ERROR        | W<br>C              | B<br>-                    | ※3      |

※1: Alert priority is Warning if 「c」 and/or 「d」 alert are activated while GPS is selected for ship's latitude and speed sensor.

※2: Alert priority is Warning if 「P」 and/or 「U」 alert are activated while LOG (serial comm.) is selected for ship's speed.

※3: Alert priority is Warning if 「u」 is activated while LOG (Contact) is selected for ship's speed.

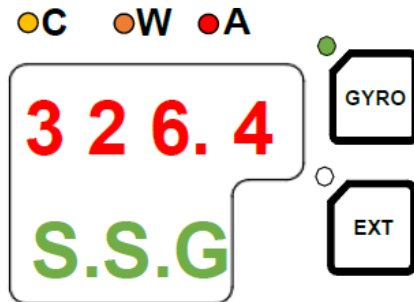
※4: Alert Priority is explained in paragraph 2.9.3

※5: Alert Category is explained in paragraph 2.9.4.

### 2.9.3 Alert Priority (※4)

Alerts are provided with three levels of priority corresponding to alert descriptions: Alarm (A), Warning (W) and Caution (C).

On its Panel Unit three LEDs are installed to give an indication which Alert is active. See below figure and table for more information.



| Alert Priority |            | Description                                                                                                                                                                                                                             | LED Indication   | Buzzer Sound                                                                                                   |
|----------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------------------------------------------------------------------------------------------------------|
| High           | A: Alarm   | Alert requiring immediate attention and action. (The operator should stop the automatic steering and switch to manual steering because it will be unavailable)                                                                          | Red              | Sounds three times with short sounds "beep beep beep". It repeats every seven seconds unless pressing ACK key. |
| Middle         | W: Warning | Alert doesn't require immediate action but immediate attention. (After acknowledging the alert displayed on the Panel, take measures depending on the situation. Some alerts escalate to alarms if acknowledging after a certain time). | Yellowish Orange | Sounds twice with short sounds "beep beep". It repeats every 60 seconds until pressing ACK key.                |
| Low            | C: Caution | Alerts aren't falling under Alarm and Warning priority. (The alert does not have an influence on the current steering. Recover it before switching the steering mode from manual to automatic).                                         | Yellow           | None                                                                                                           |

**Note** The AlphaMidiCourse Mk2 has no alert which priority is specified as Alarm level.

### 2.9.4 Alert Categories (※5)

The Alert Categories are described of the AlphaMidiCourse Mk2 in below shown table.

| Category | Description                                                                                                                                                                     |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A        | Alert which allows an operator to acknowledge (ACK key) alerts activated in the AlphaMidiCourse Mk2 only by operating the Gyrocompass                                           |
| B        | Alert which allows an operator to acknowledge (ACK key) alerts activated on the AlphaMidiCourse Mk2 by operating the Gyrocompass or external Central Alert Management (CAM-HMI) |

**Note** The AlphaMidiCourse Mk2 has no Category A.

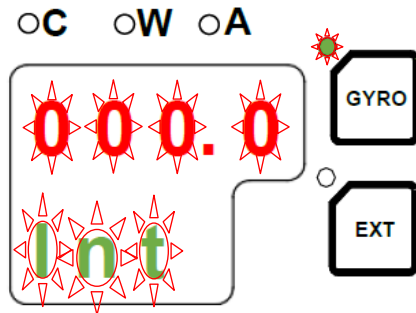
## 2.10 Turning the Gyro Compass OFF

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

When Rotor brake is active it will be indicated by:



**Note** Display will show a flashing Int 000.0 as shown below:



**Note** A soft clicking sound will be heard from Master Compass.



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



- CAUTION
- It is very important that the rotor brake is activated to stop the rotor rotation to prevent any possible damage by vessel movement.

3. Press the POWER button again to shut down the gyrocompass when both the data and the dot in the display change from flashing to steady light.

The light in the POWER button will now be turned OFF.

## 3 Specifications

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

| Model             | Description                       | AlphaMidiCourse Mk2                                                             |
|-------------------|-----------------------------------|---------------------------------------------------------------------------------|
| 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                                                        |
|                   | Heading                           | IEC61162-1/2                                                                    |
|                   | BAM                               | IEC62923-1/2 / 61162-1                                                          |
|                   | 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                              |
|                   | Heading                           | NMEA 0183 via RS422 from external heading source                                |
| 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)                                                         |
|                   |                                   | 7 kg. (Control unit)                                                            |
| Accessories       | Included                          | Control Unit (Wall mount type)<br>Gyro Sphere<br>Manual and Spare Parts (Fuses) |
| Standards         |                                   | IMO A424(XI), ISO8728, Marine Equipment Directive 2014/90/EU                    |

**Table: Specifications**

### 3.1 Input Signal Specifications

| Sensor                  | Type of signal             | Protocol   |                       | Sentence                                                                                                                                                                                                                                 |
|-------------------------|----------------------------|------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GPS                     | IEC61162                   | Baud rate  | 4800 bps              | \$--GGA,x,xxx.x,x,N,xx.x,E,x,*~hh<CR><LF> <sup>1</sup><br>↑ Latitude                                                                                                                                                                     |
|                         |                            | Data Bits  | 8 bits                | \$--GLL,xxx.x,x,N,xxx.x,x,E,*hh<CR><LF><br>↑ Latitude                                                                                                                                                                                    |
|                         |                            | Parity     | none                  | \$--VTG,xx,T,xx,M,xx.x,N,xx,K*hh<CR><LF><br>↑ Speed(knots)                                                                                                                                                                               |
| SPEED LOG               |                            | Stop Bits  | 1                     | \$--VBW,x.x,x,x,A,x.x,x,x,A~*hh<CR><LF> <sup>2</sup><br>↑ Ground Speed(knots)<br>↑ Water Speed(knots)<br>↑ Speed(knots)                                                                                                                  |
|                         |                            | Frequen cy | 1 – 5Hz               |                                                                                                                                                                                                                                          |
| SPEED LOG               | Dry Contacts               | ----       |                       | 200 or 400 pulses per nautical mile <sup>3</sup><br>5V / 5mA                                                                                                                                                                             |
| EXTERNAL HEADING SOURCE | IEC61162-1<br>IEC61162-2   | Baud rate  | 38400 bps             | \$--HDT,xxx.x*hh<CR><LF><br>↑ Heading(deg)<br><br>\$--HDG,xxx.x,x,x,A,x.x,A*hh<CR><LF><br>↑ Magnetic Heading(deg)                                                                                                                        |
|                         |                            | Data Bits  | 8 bits                |                                                                                                                                                                                                                                          |
|                         |                            | Parity     | none                  |                                                                                                                                                                                                                                          |
|                         |                            | Stop Bits  | 1                     |                                                                                                                                                                                                                                          |
|                         |                            | Frequen cy | 1 – 50Hz<br>20 – 50Hz |                                                                                                                                                                                                                                          |
| BAM INS STATION         | IEC62923-1/2<br>IEC61162-1 | Baud rate  | 4800/38400 bps        | \$--ACN,xxxxxx.x,x,aaa,xx,xx,C,a*hh<CR><LF><br>↑ Command<br>↑ Alert Instance<br>↑ Alert Identifier<br>↑ Manufacturer MNEMONIC Code<br>↑ Time<br><br>\$--HBT,xx.x,A,x*hh<CR><LF><br>↑ Sequential Sentence Identifier<br>↑ Repeat Interval |
|                         |                            | Data Bits  | 8 bits                |                                                                                                                                                                                                                                          |
|                         |                            | Parity     | none                  |                                                                                                                                                                                                                                          |
|                         |                            | Stop Bits  | 1                     |                                                                                                                                                                                                                                          |
|                         |                            | Frequen cy | 0.2Hz                 |                                                                                                                                                                                                                                          |

**Table: Input Signal Specifications**

<sup>1</sup> GGA sentence is high priority.

<sup>2</sup> Ground speed is high priority.

<sup>3</sup> Jumper J14 can be used to select 200 or 400 pulses per nautical mile.

## 3.2 Output Signal Specifications

| Sensor           | Type of signal                                          | Protocol       |                                                  | Sentence                                                                                                                                                                                                                                                                                                                                 |
|------------------|---------------------------------------------------------|----------------|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SELECTED COMPASS | 24VDC<br>Step 1/6°                                      | ----           |                                                  | ---                                                                                                                                                                                                                                                                                                                                      |
| GYRO COMPASS     | Alarm Output                                            | Potential Free |                                                  | NO/NC                                                                                                                                                                                                                                                                                                                                    |
| GYRO COMPASS     | Running Contact                                         | Potential Free |                                                  | NO/NC                                                                                                                                                                                                                                                                                                                                    |
| GYRO COMPASS     | +/-10V<br>+/-5V                                         | ----           |                                                  | +/-120°(Default),<br>+/-30°, +/-300°                                                                                                                                                                                                                                                                                                     |
| GYRO COMPASS     | IEC61162-1<br>IEC61162-2<br>Heading Signal <sup>3</sup> | Baud rate      | 4800/38400 bps                                   | \$HEHDT,xxx.xT*hh<CR><LF><br>↑ Heading(deg)                                                                                                                                                                                                                                                                                              |
|                  |                                                         | Data Bits      | 8 bits                                           |                                                                                                                                                                                                                                                                                                                                          |
|                  |                                                         | Parity         | none                                             | \$HETHS,xxx.x,A*hh<CR><LF> <sup>1</sup><br>↑ Mode identifier<br>↑ Heading(deg)                                                                                                                                                                                                                                                           |
|                  |                                                         | Stop Bits      | 1                                                |                                                                                                                                                                                                                                                                                                                                          |
|                  |                                                         | Frequency      | 1,5,10,50 Hz                                     | \$HEROT,-xxx.x,A*hh<CR><LF> <sup>2</sup><br>↑ Rate of Turn(deg/min)    -PORT                                                                                                                                                                                                                                                             |
| GYRO COMPASS     | IEC62923-1/2<br>IEC61162-1<br>BAM Signal                | Baud rate      | 4800                                             | \$HEALC,x,x,x,x,xx,aaa,xx,xx,xx.... *hh<CR><LF><br>↑ Revision Number<br>↑ Alert Instance<br>↑ Alert Identifier<br>↑ Manufacturer Identifier<br>↑ Number of Alert Entry<br>↑ Sequential Message Identifier<br>↑ Sentence Number<br>↑ Total Number of ALC                                                                                  |
|                  |                                                         | Data Bits      | 8 bits                                           |                                                                                                                                                                                                                                                                                                                                          |
|                  |                                                         | Parity         | none                                             | \$HEHBT,xx.x,A,x*hh<CR><LF><br>↑ Sequential Sentence Identifier<br>↑ Repeat Interval                                                                                                                                                                                                                                                     |
|                  |                                                         | Stop Bits      | 1                                                |                                                                                                                                                                                                                                                                                                                                          |
|                  |                                                         | Frequency      | 30sec(ALC)<br>5sec(HBT)<br>Indeterminately (ALF) | \$HEALF,x,x,x,xxxxxx.xx,a,a,a,aaa,xx,xx,aa*hh<CR><LF><br>↑ Alert Text<br>↑ Revision Counter<br>↑ Alert Instance<br>↑ Alert Identifier<br>↑ Manufacturer MNEMONIC Code<br>↑ Alert State<br>↑ Alert Priority<br>↑ Alert Category<br>↑ Time of Last Change<br>↑ Sequential Message Identifier<br>↑ Sentence Number<br>↑ Total Number of ALF |

**Table: Output Signal Specifications**

<sup>1</sup> Mode identifier: A = autonomous, E = computed (accurate trajectory calculation),

M = manual input, S = simulation mode and V = data not valid (including idle mode).

<sup>2</sup> Talker ID change to "TI" (\$TIROT...) from "HE" is available when connected to a Rate of Turn indicator.

<sup>3</sup> Frequency of heading output signal IEC61162-1 can be set by Dipswitch S2.

Frequency of heading output signal IEC61162-2 is 50Hz.

Jumper J7 till J10 can be used to Selection between IEC61162-1 or IEC61162-2.

## 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.

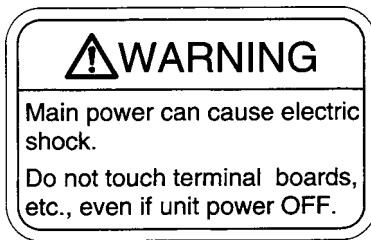


Figure: Warning Label



- **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 logbook.

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 Alphasatron Marine Service Engineer, or agent.
6. Have the system checked periodically by Alphasatron Service Engineer, or agent.
7. Have the checklist table and the logbook evaluated by the engineer.



**Note** The troubleshooting 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 tables for the periodical check. See paragraph 6.3 *Periodical Check Tables*.  
 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 paragraph 6.3.1.  
 Mark the request checks accordingly.



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

2. Copy and use periodical check table (including operational check) [once a half year/ a year], in the paragraph 6.3.2  
 Mark the requested check accordingly.



**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 Alpatron Marine.

## 4.4 Spare Parts

As mentioned before a spare box is includes with the AlphaMidiCourse, this contains all required fuses. They can be replaced when broken, refer to paragraph 5.8 *Fuse replacement*.

Contact Alpatron Marine for prices and availability of the required parts. See below table that includes all part numbers for the AlphaMidiCourse Gyrocompass.

| Available items |                                 |                   |
|-----------------|---------------------------------|-------------------|
| Article number  | Description                     | Interval in years |
| G-002331        | Sensitive Element (Gyro Sphere) | 2~3               |
| G-003943        | Brushes                         | 2                 |
| G-004556        | Step Motor                      | 6                 |
| G-002332        | Belt                            | 6                 |
| G-004557        | HRZC Board                      | 6                 |
| G-002333        | Inverter Board                  | 6                 |
| G-004558        | Slipring                        | 8                 |
| G-004559        | Flexible Wire (east)            | 8                 |
| G-004560        | GPower Board                    | 6                 |
| G-003944        | Damper Oil                      | 2~3               |
| G-007290        | ICIF Board                      | 6                 |



- Weights with range from 0.17 gram till 9 grams are ordered separately, contact Alpatron Marine.

## 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.

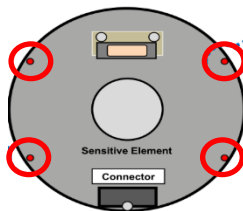
## 4.6 Replacement of Sensitive Element S/E



- CAUTION
- The Sensitive element should only be replaced by authorized personnel in possession of a AlphaMidiCourse certificate.
- Use extreme caution when handling the Sensitive Element. **Do not** tilt the S/E it is filled with damping oil.
- Specific tools are required when installing the Sensitive Element, refer to paragraph 1.1.1 *Specific Tools*.

Follow below procedure for placing its Sensitive element.

1. Ensure the POWER is disconnected from Control Unit. When Gyro Compass is running, turn it OFF by following the procedure described in paragraph 2.10 *Turning the Gyro compass OFF*.
2. Remove the four screws securing the Housing of the Master Compass, refer to paragraph 1.1.4 *Fitting Master Compass*.
3. Loosen the screw on the plug-holder on the Sensitive element and disconnect the connector. (reverse actions described in paragraph 1.1.13 *Attach Connector to Sensitive Element*).
4. Unpack the new Sensitive element and check for damage according to paragraph 1.1.8 *Unpacking of Sensitive Element*. If any damage or leaks are detected contact Alpatron Marine.  
Leave the new Sensitive element in its package, it be exchanged with defected one by step 6.
5. Remove the four screws encircled in red securing the Sensitive element as indicated in below shown picture.



Tilt the Horizontal ring to the side where the connector is located. Carefully remove the defected Sensitive element as shown in above picture 028.

6. Carefully swap out the defected Sensitive element with new Sensitive element. Install the new sensitive element according to paragraph 1.1.8 *Mounting of Sensitive Element*.
7. After replacement, place the rubber tube on the defected Sensitive element.
8. Attach the connector on the new Sensitive element according to paragraph 1.1.10 *Attach Connector to Sensitive Element*.
9. Start-up the AlphaMidiCourse by pressing its POWER button and configure the Gyro sphere according to paragraph 1.7.2 *Configuring the Gyro sphere*.
10. If needed Horizontal ring can be balanced according to paragraph 1.7.5 *Balancing the Horizontal ring*.
11. Fill in the Return Slip for the defected Sensitive element that was included in the package of the new Sensitive element.

In case it was not present or lost, the form can be found in paragraph 6.4 *Return Slip Sensitive element*.

12. Return defected Gyro sphere and Return Slip form to Alpatron Marine.

## 5 Troubleshooting

When a alarm is generated and not removed by pressing the ACK/ENT button further actions should be taken to correct the alarm situation.

The following pages present an overview of symptoms and corrective action for fault that may be corrected by the owner of the system. When none of the below describes counter measures resolve the alarm contact Alphatron Marine for advice or request on board service.

### 5.1 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.

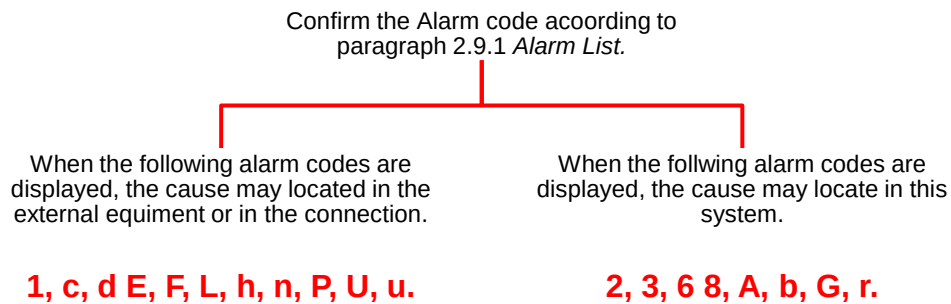
Two things must be considered when a failure has become apparent in this system, or in the connected external equipment:

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

### 5.2 Before Troubleshooting

Before starting troubleshooting procedures consider the following:

1. First 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 chapter 2.9 *Alarm*.



2. Tools (instruments) required for checking:
  - Flat head screwdriver and general tools
  - Circuit tester

## 5.3 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.

### 5.3.1 Corrective Measures when an Alarm is Activated

When an alarm is activated, follow procedures below:

1. Confirm that the alarm indicator lights 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 paragraph 2.9 *Alarm* and check according to paragraph 5.4 *Failure Phenomena and Corrective Measures*, regarding the displayed alarm content corrective measures.

## 5.4 Failure Phenomena and Corrective Measures

When a failure has occurred, take the following actions.

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



- CAUTION
- Whenever the internal setting of the system is changed, follow instructions of the Alpatron 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 Alpatron 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 Alpatron Service Engineer to repair it on making a call to port. Even if it has been repaired, request an Alpatron Service Engineer to check it.

### 5.4.1 Alarm code 1: Power Supply Failure

This Alarm code is generated when main power is lost.

1. Confirm that the power is connected to terminal TB3 24M+ and 24M-.  
Incoming voltage is 24 VDC (+30% / -20%)
2. Check the cabling from power source to Control Unit.
3. Remove TB3 connector plug and check the fuse F6: 6.3A. For fuse location refer to paragraph 5.8 *Fuse Replacement*.
4. Contact Alpatron Marine service engineer, or agent, immediately after checking steps 1,2 and 3 above.

### 5.4.2 Alarm code 2: Power Supply Abnormal

This alarm code is generated when the Control Unit's power is over current or over voltage.

1. Turn OFF the power switch.
2. Wait approx. 20 seconds before turning ON again.
3. Take action according to paragraph 2.5.1 *Start*, if no alarm code 2 was activated.
4. When alarm code 2 is activated again, turn OFF the power switch and request repair from Alpatron Marine service engineer, or agent.

### 5.4.3 Alarm code 3: Inverter Failure



- 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.

Alarm is generated when in the Inverter of Master Compass, an over current or over voltage is detected.

1. Turn OFF the power switch.
2. Turn ON again after approx. 20 seconds.
3. Take action according to paragraph 2.5.1 *Start*, if no alarm code 3 was activated.
4. Check the inverter fuse F1: 12A, located in the base of the master compass, refer to paragraph 5.8.1 *Master Compass Inverter Fuse*.
5. When alarm code 3 is activated again, turn OFF the power switch and request repair from Alpatron Marine service engineer, or agent.

### 5.4.4 Alarm code 6: Rotor Level Failure



- CAUTION
- The Gyrocompass True heading may have an error.

1. Turn OFF the power switch.
2. Turn ON again after approx. 20 seconds.
3. Take action according to paragraph 2.5.1 *Start*.
4. Observe the heading of the Gyro Compass for two hours or more.
5. Contact Alpatron Service Engineer, or agent, after checking heading of the Gyro Compass.

### 5.4.5 Alarm code 8: Zero Cross Failure



- CAUTION
- 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.

This Alarm is generated when the reference angle for the gyro compass bearing not can be properly detected, or if a fault is generated in the bearing calculations.

1. Press DISP button until flashing bearing is displayed by S.S.G or GYt.
2. Adjust the bearing with arrow buttons until the bearing corresponds with ship's actual bearing and press ACK/ENT button to confirm the change.  
If the bearing input was accepted by the control unit its display will show the current bearing without flashing.
3. Contact Alpatron Marine, or agent, even when True Heading has been recovered.

### 5.4.6 Alarm code A: System Communication Failure (1)

Alarm is generated when there is a failure in communication from the Master Compass to the Control Unit.

1. Turn OFF the power switch.
2. Turn ON again after approx. 20 seconds.
3. Take action according to paragraph 2.5.1 *Start*, if no alarm code A was activated.
4. If alarm code A is activated, turn OFF the power switch of this system.
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.

Master Compass MTTRM Board TB2 connection No.6 (MR+) and No.7 (MR-).

Control Unit ICNT Board TB1-1 connection No.8 (MR+) and No.9 (MR-).

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

### 5.4.7 Alarm code b: System Communication Failure (2)

Alarm is generated when there is a failure in communication from the Master Compass to the Control Unit.

1. Turn OFF the power switch.
2. Turn ON again after approx. 20 seconds.
3. Take action according to paragraph 2.5.1 *Start*, if no alarm code b was activated.
4. If alarm code b is activated, turn OFF the power switch of this system.
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.

Master Compass MTTRM Board TB2 No.4 (MT+) and No.5 (MT-)

Control Unit ICNT Board TB1-1 connection No.6 (MT+) and No.7 (MT-)

7. Contact Alphasat Marine Service Engineer, or their agent, after checking steps 2 to 6.

### 5.4.8 Alarm code c or d: GPS Communication Stop or Failure of GPS data



- CAUTION

- Any alarm generated by failure in the GPS may cause large errors in bearing output.

1. Confirm that GPS operates properly.



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

2. Change the input system according to paragraph 1.7.3 *Setting the Latitude input source*, if it was not recovered after executing step 2.
3. Contact Alphasat Marine Service Engineer immediately, after checking steps 1 and 2.

#### 5.4.9 Alarm code E or F: System Internal Communication Failure (1) or System Internal Communication Failure (2)



- CAUTION
- When these alarms are generated the bearing information from external heading sensor may have large errors.

Alarms are generated when the communication of the External Heading sensor has stopped or a failure in its communication.

1. Confirm that the external heading sensor operates properly to system documentation.
2. Contact Alpatron Service Engineer, or agent, after checking step 1.

#### 5.4.10 Alarm code G: Master Compass Heading Failure



- CAUTION
- When an alarm code G is activated, the Gyro Compass True Heading may have an error.

1. Confirm that the Gyro Compass True Heading displayed in this system coincides with the heading by some target, or by observation.
2. If a heading error exists in step 1. Make the correction according to paragraph 1.7.6 *Adjusting True Heading*,
3. Contact Alpatron Marine Service Engineer, or agent, after checking steps 1 and 2.

#### 5.4.11 Alarm code L or n: External Heading Sensor Communication Stop or External Heading Sensor Data Failure

1. Confirm that the external heading sensor operates properly.



**Note** These alarms are only generated when EXT source is selected as active bearing source.

2. Operate it according to the Operator's Manual for the external heading sensor, if it does not operate properly.
3. Change the Heading Sensor according to paragraph 2.6 *Heading Sensor Selection* if it was not recovered after executing step 2.
4. Contact Alpatron Marine Service Engineer, or agent, after checking steps 1 to 3.

#### 5.4.12 Alarm code P or U: LOG (serial signal) Communication Stop or LOG (serial signal) Data Failure

1. Confirm that LOG operates properly.



**Note** These alarms are only generated when GYRO selected an active bearing source and when S.S.d is selected as Speed input source.

2. Operate it according to the Operator's Manual of LOG, if it does not operate properly.
3. Change the input system according to paragraph 1.7.4 *Setting the Speed input source*, if it was not recovered after executing step 2.
4. Contact Alpatron Marine Service Engineer, or agent, after checking steps 1 to 3.

#### 5.4.13 Alarm code u: LOG Contact Failure

1. Confirm that LOG operates properly.



**Note** These alarms are only generated when GYRO selected an active bearing source and when L.S.d is selected as Speed input source.

2. Operate it according to the Operator's Manual of LOG, if it does not operate properly.
3. Change the input system according to paragraph 1.7.4 *Setting the Speed input source* if it was not recovered after executing step 2.
4. Contact Alpatron Marine Service Engineer, or agent, after checking steps 1 to 3.

#### 5.4.14 Alarm code r: E5V Failure

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 Alpatron Marine Service Engineer, or agent, after checking steps 1 and 2.

### 5.5 Gyro Compass does not Function, when Power Switch turned ON.



- WARNING
- 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.



**Note** To confirm this, execute as in paragraph 5.4.1 *Alarm code 1: Power Supply Failure*.

2. Check fuses F6 till F9 according to paragraph 5.8 *Fuse Replacement* if there is no problem with the power supply.
3. Contact Alpatron Marine Service Engineer, or agent, immediately after checking steps 1 and 2.

### 5.6 Alarm 3 and A are activated at the Same Time when Powering 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 inverter fuse F1: 12A, located in the base of the master compass, refer to paragraph 5.8.1 *Master Compass Inverter Fuse*.

### 5.7 Each repeater does not operate



- WARNING
- 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 the power switch of the repeater(s) side.
2. Check fuses F1 till F5 according to paragraph 5.8 *Fuse Replacement* if there is no problem with step 1.
3. Contact Alpatron Marine Service Engineer, or agent, immediately after checking steps 1 and 2.

### 5.7 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 Alpatron Marine Service Engineer, or agent, immediately.



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

## 5.8 Fuse Replacement



- WARNING
- 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.

Replace a fuse when it has blown according to the following procedure.

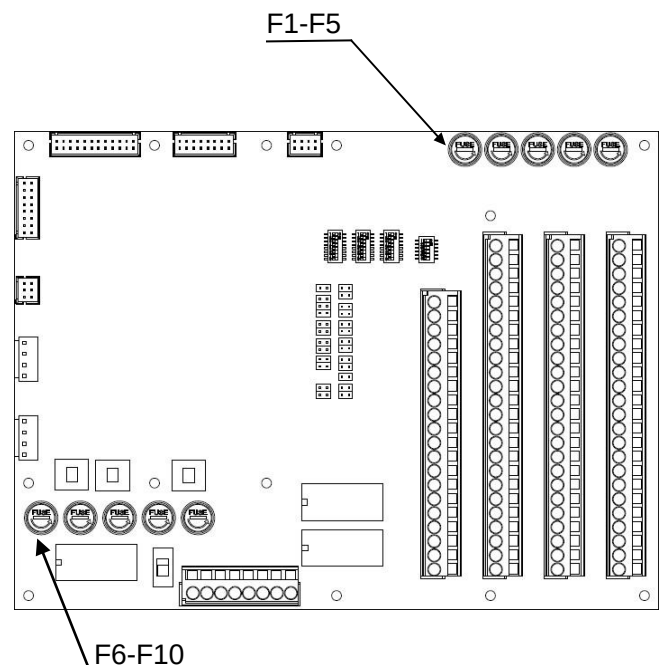
1. Turn OFF the power switch on the operating panel.



**Note** Confirm that the voltage at terminal TB3 is zero. To confirm this, perform action as in described in paragraph 5.4.1 *Alarm code 1: Power Supply Failure*.

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. It will occur again unless the cause is resolved.
4. See below table with their description and below image for their location.

| Fuse No. | Capacity | Signal | Description                                  |
|----------|----------|--------|----------------------------------------------|
| F1       | 1A       | 1R24+  | Power supply for ch. 1 serial repeater       |
| F2       |          | 2R24+  | Power supply for ch. 2 serial repeater       |
| F3       |          | 3R24+  | Power supply for ch. 3 serial repeater       |
| F4       |          | 4R24+  | Power supply for ch. 4 serial repeater       |
| F5       |          | ST15   | Power supply for ch. 1 step motor repeater   |
| F6       | 10A      | 24M+   | 24VDC Main power supply                      |
| F7       | 3.15A    | 24B+   | 24VDC Power supply for Control unit          |
| F8       | 10A      | 24R+   | 24VDC Power supply for repeaters (Main fuse) |
| F9       | 10A      | 24BT+  | Battery power supply (standard type)         |
| F10      | 1A       | Unused | Unused                                       |



**Note** All fuses are  $\varnothing 5.2 \times 20 \text{ mm}$ .

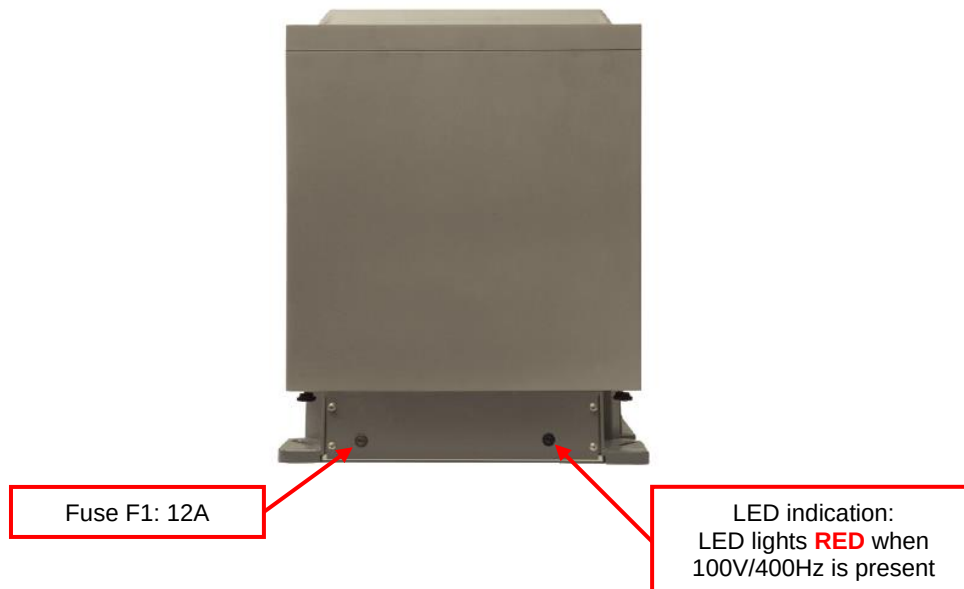
5. Press and turn the fuse holder counterclockwise to open it.
6. Replace the blown fuse with a new fuse and close the holder by turning it clockwise.

### 5.8.1 Master Compass Inverter Fuse



- WARNING
- 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.

Fuse F1 is located inside the fuse holder in the front of the Master Compass and is  $\varnothing 6.35 \times 31,8\text{mm}$ .  
See below picture for more information.



1. Turn OFF the power switch on the operation panel.
2. Open the fuse holder by pressing and turning the fuse holder edge counterclockwise with a screwdriver.
3. Replace the fuse and turn clockwise to close it.

## 6 Appendices

The Appendix contains Drawings and Periodic Check Tables.

### 6.1 Drawings

Drawing Contents:

1. Dimensions of Control Unit
2. Dimensions of Master Compass.
3. Master Compass without housing
4. ICNT Terminal Board.
5. Connection Diagram.
6. Cable Diagram
7. Installation Drawing.

### 6.2 Check Sheet [Maintenance] AlphaMidiCourse Mk2

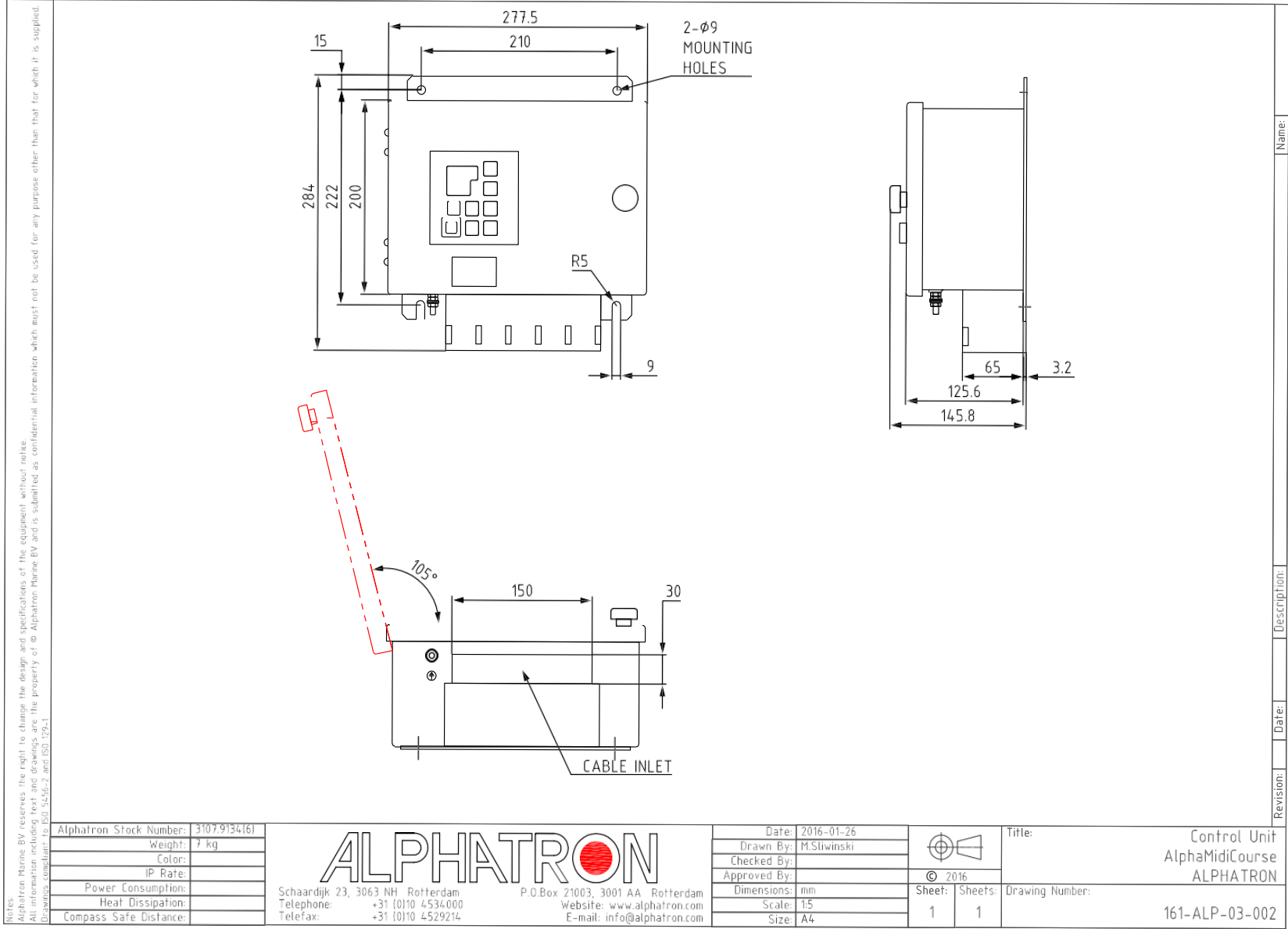
### 6.3 Periodical Check Tables

1. Periodical Table (Once a day)
2. Periodical Table (Once a (halve) year)

### 6.4 Return Slip Sensitive element

### 6.5 Installation Drawing of AlphaHeading+

### 6.6 Installation Drawing of Bearing Repeater RP-51-1

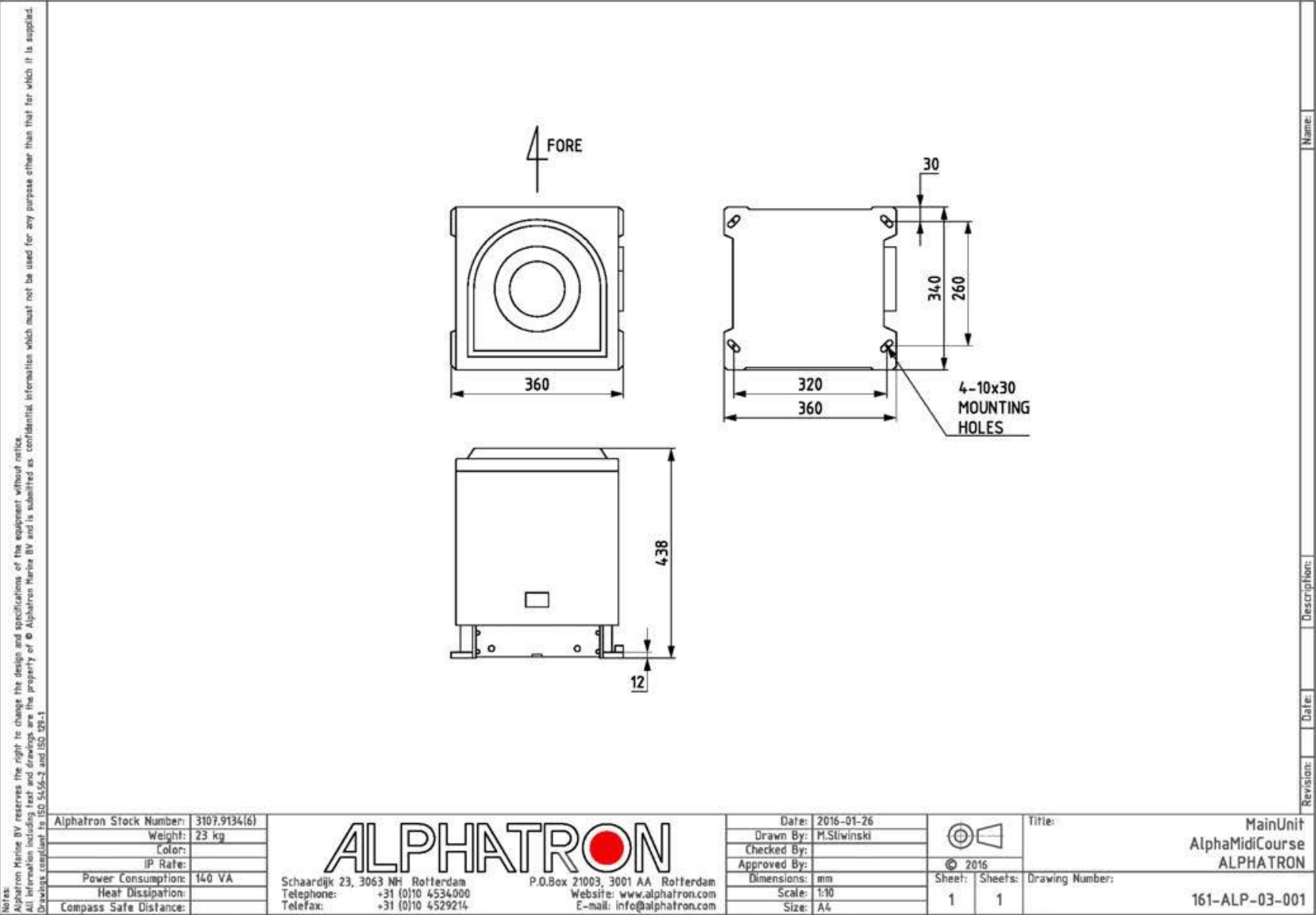


6.1.1 Dimensions of Control Unit

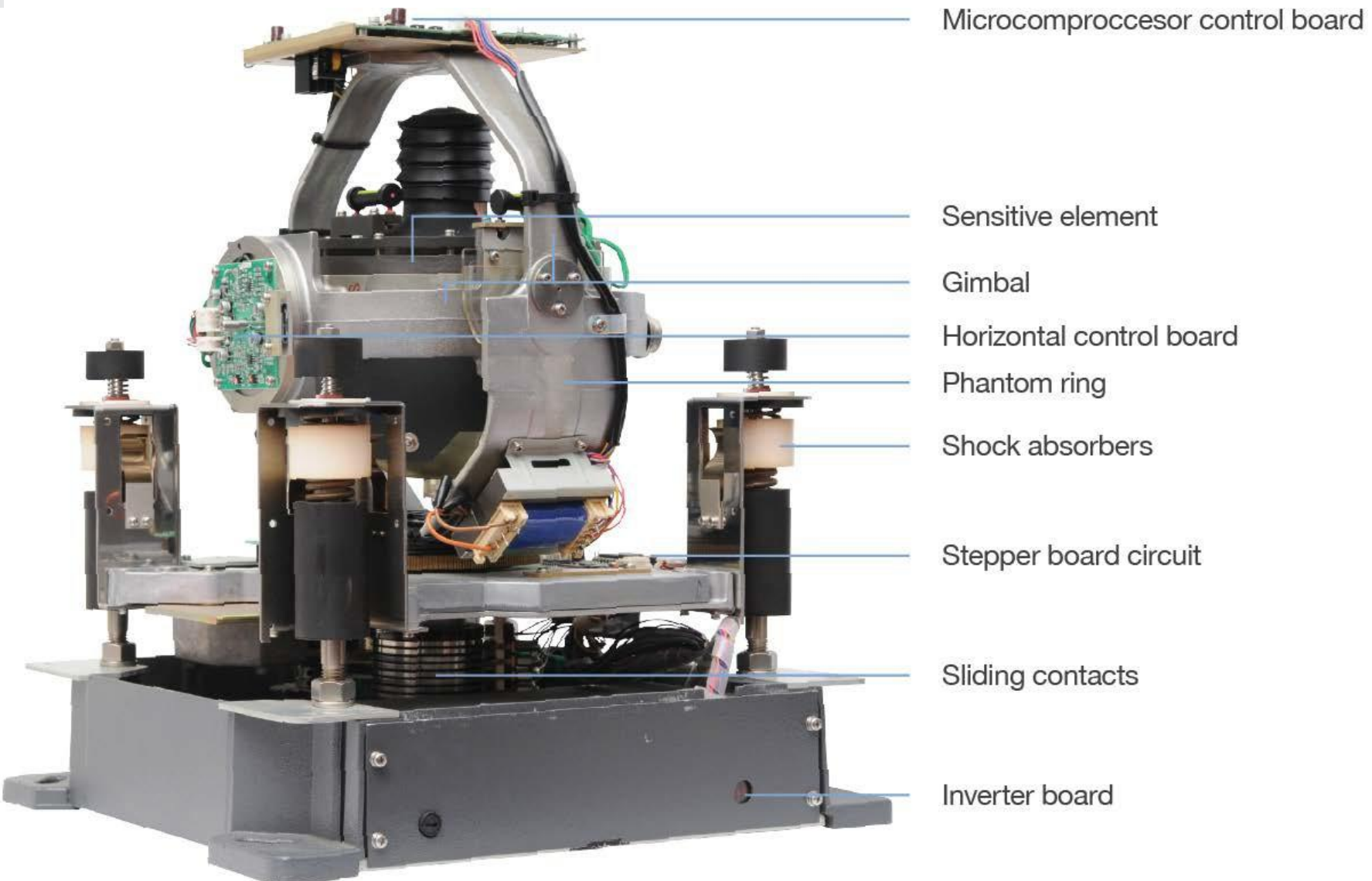




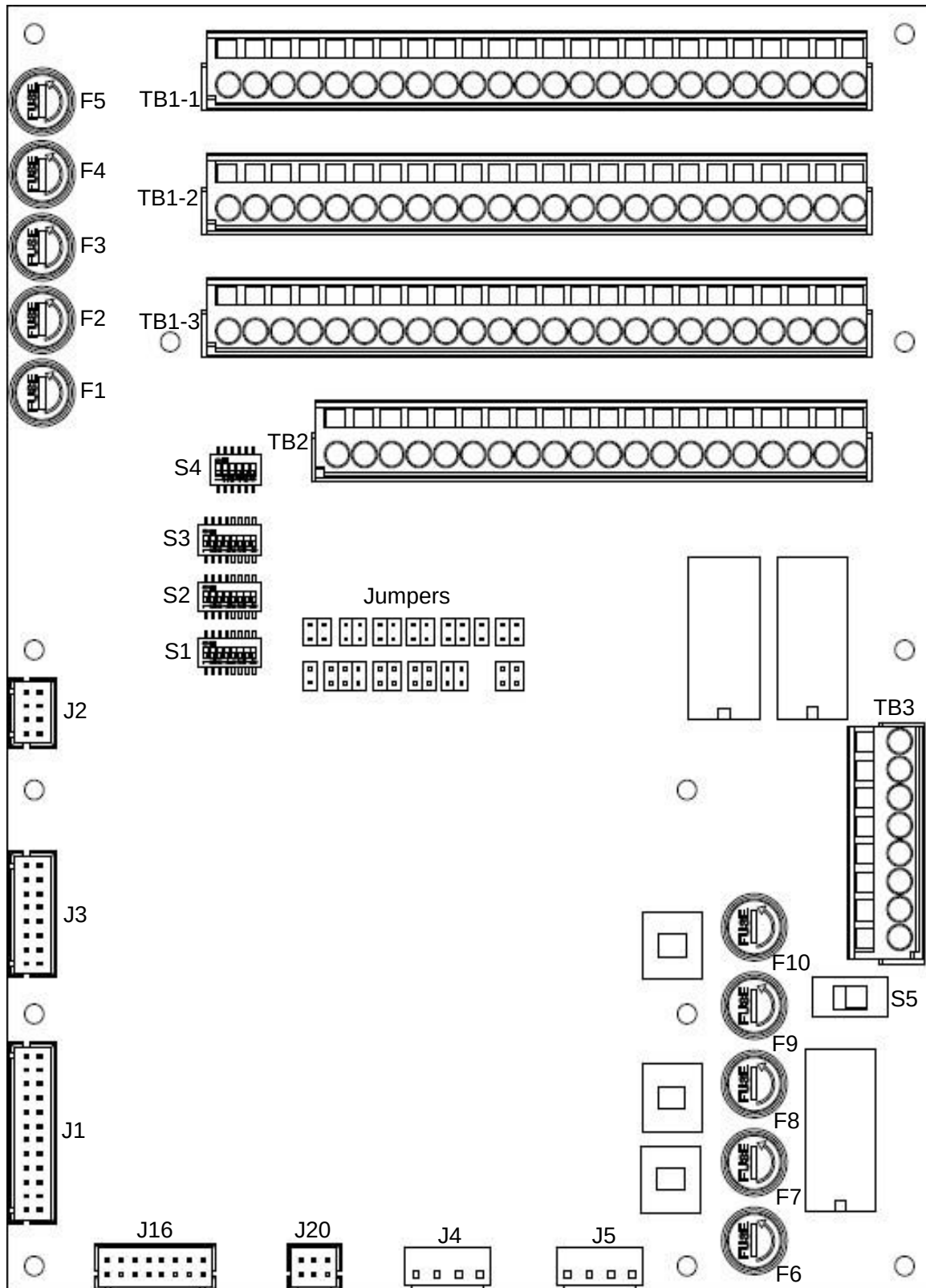
## 6.1.2 Dimensions of Master Compass

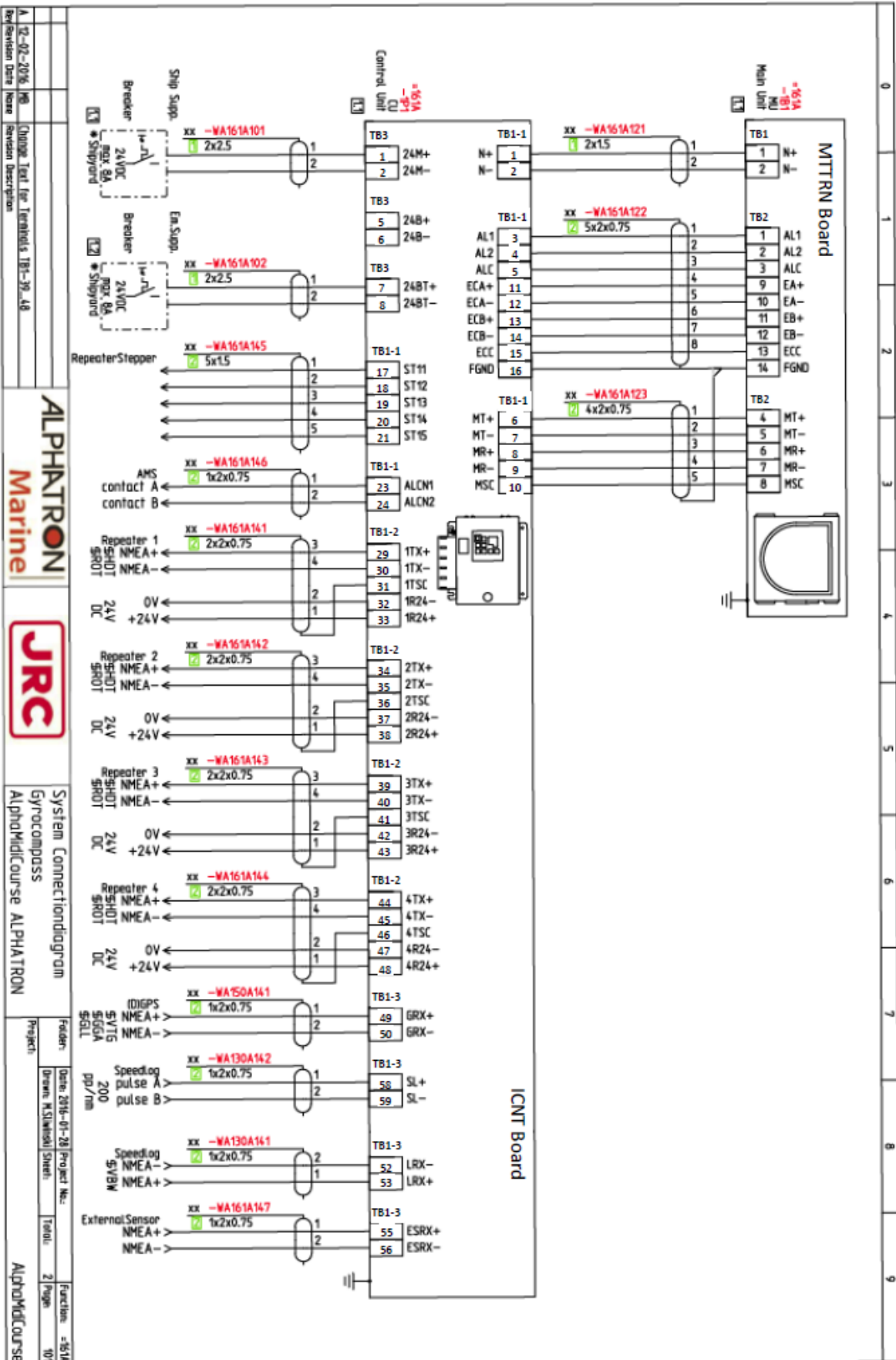


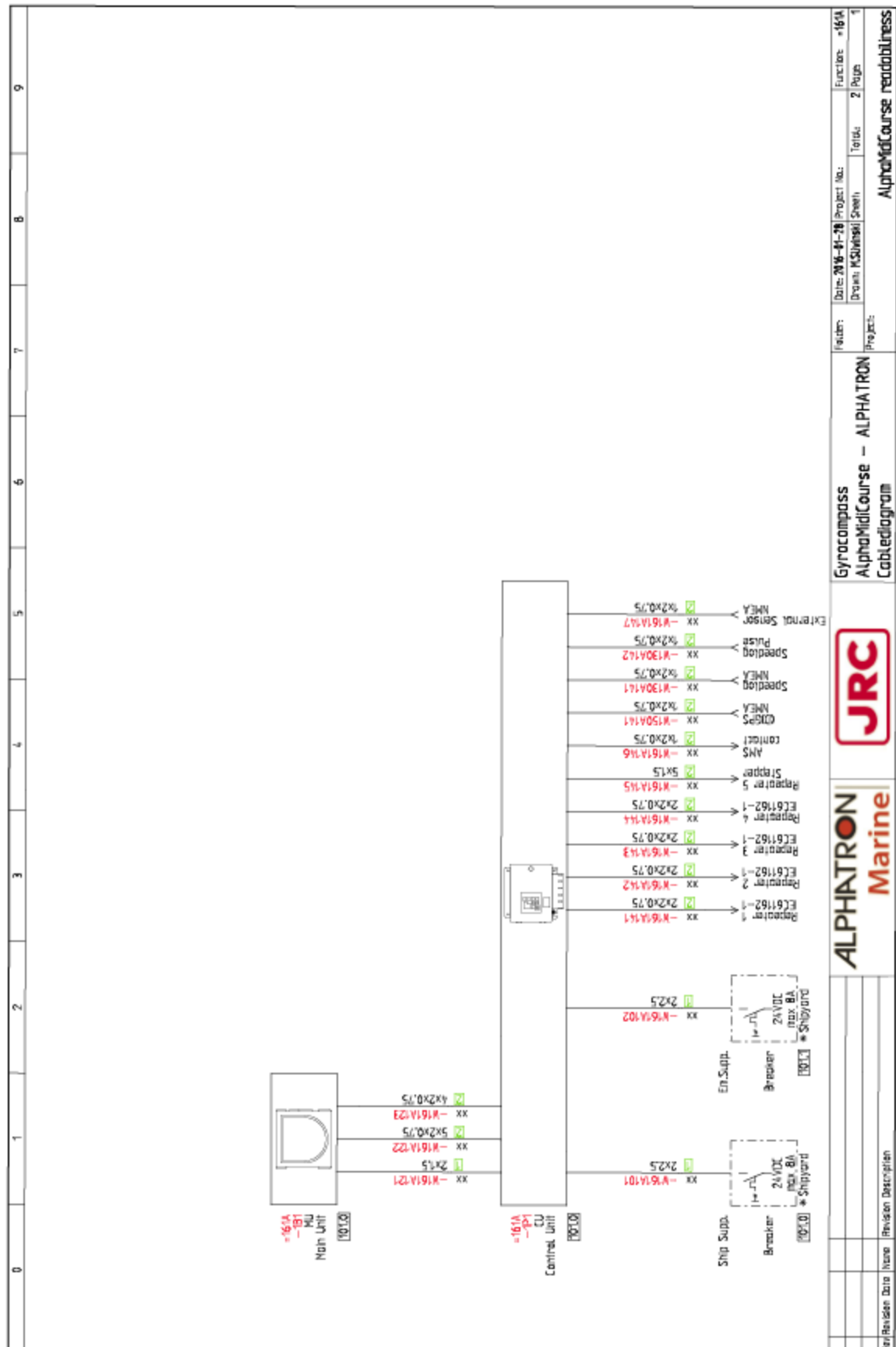
### 6.1.3 Master Compass without housing



### 6.1.4 ICNT Board of Control Unit

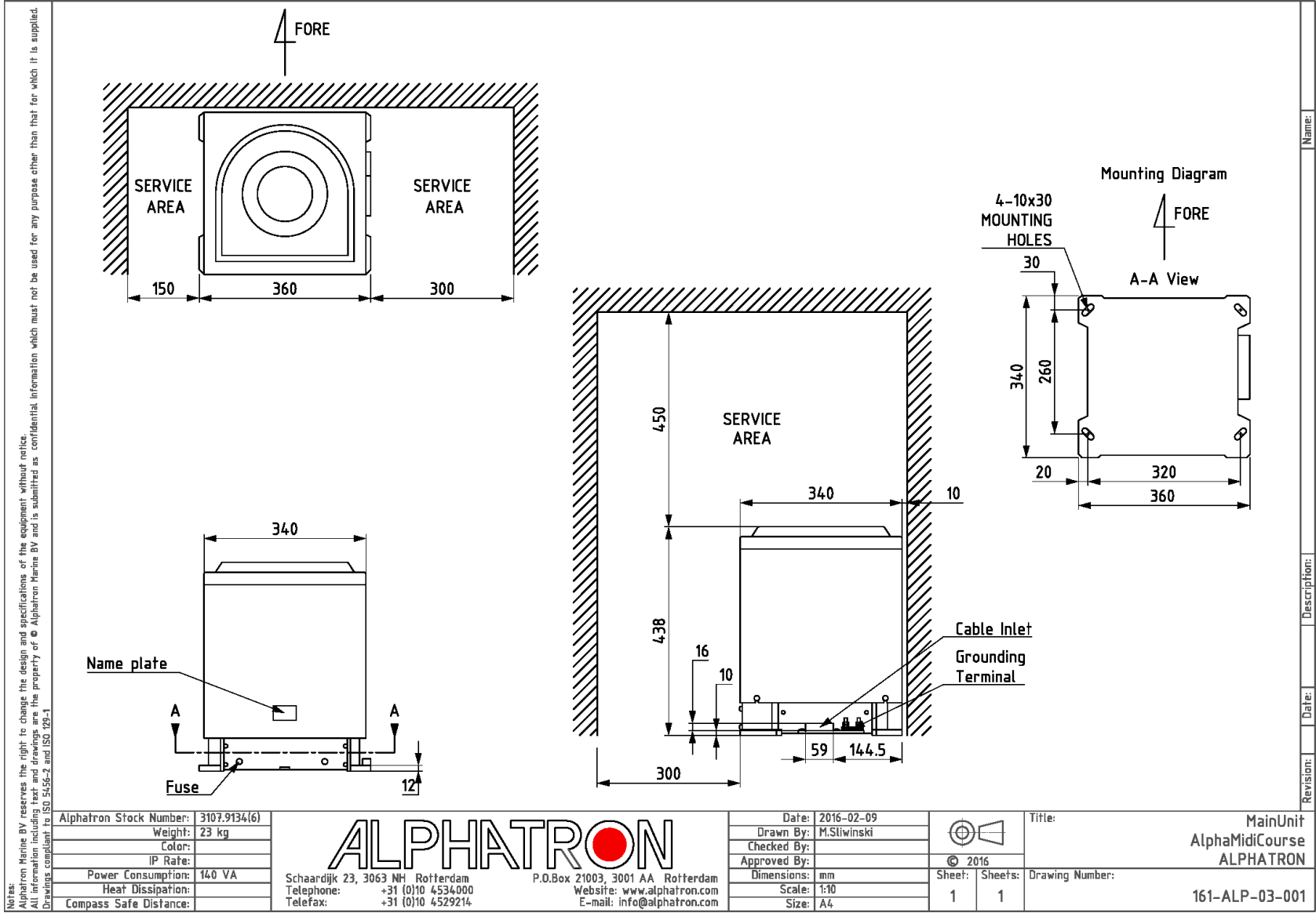








6.1.7 Installation Drawing





# AlphaMidiCourse Mk2 Check [Maintenance] Sheet

ALPHATRON  
Marine

|             |                                                                                                                                      |           |  |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------|-----------|--|
| Ship's Name | Which Gyro <input type="checkbox"/> Single <input type="checkbox"/> No.1 <input type="checkbox"/> No.2 <input type="checkbox"/> No.3 |           |  |
| IMO No.     | Master Compass Ser. No.                                                                                                              |           |  |
| Engineer    | Sensitive Element Ser. No.                                                                                                           | Existed:  |  |
| TKID        | Date                                                                                                                                 | Replaced: |  |

## 1. Internal parameters (Pressing [ACK/ENT]&[SET] 3sec)

**!!! Check all internal parameters before start work. Check and correct when finish work.**

| Address       | Description [Standard value / Range / Unit]       | Existed | Changed             |
|---------------|---------------------------------------------------|---------|---------------------|
| 1) A-1 1.1.U  | Damping gain [1.00 / 0.5~2.0]                     | ##      | →                   |
| 2) 1.2.F      | Azimuth servo gain [1.00 / 0.5~2.0]               |         | →                   |
| 3) 1.3.S      | Horizontal servo gain [1.00 / 0.5~2.0]            |         | →                   |
| 4) 1.4.u      | Leveling servo gain [1.00 / 0.5~2.0]              |         | →                   |
| 5) 1.5.L      | φ(phi) offset [0 / ±3(deg)]                       |         | →                   |
| 6) 1.6.t      | θ(theta) offset [0 / ±3(deg)]                     | ##      | →                   |
| 7) 1.7.G      | X pickup gain (for HSC) [02.25 / 2~5(V/deg)]      |         | →                   |
| 8) 1.8.c      | Ks/H (Suspension wire twist torque) [1.300 / 1~2] |         | →                   |
| 9) 1.9.r      | Maximum rate of turn [(deg/sec)]                  | *       | → 000.0             |
| 10) 1.A.F     | Maximum deviation Azimuth servo [(deg)]           | *       | → 00.00             |
| 11) 1.b.S     | Maximum deviation horizontal servo [(deg)]        | *       | → 00.00             |
| 12) A-2 2.1.o | Azimuth offset A [0(deg)]                         |         | →                   |
| 13) 2.2.O     | Azimuth offset B (Don't use, keep "0") [0(deg)]   | *       | → 000.0             |
| 14) 2.3.h     | Zero cross azimuth [345.3(deg)]                   |         | →                   |
| 15) 2.4.E     | Zero cross error width [2 / 0~5(deg)]             |         | →                   |
| 16) 2.5.y     | Calendar "Year" [yyyy]                            | #       | →                   |
| 17) 2.6.N     | Calendar "Month, Day" [mm.dd]                     | #       | →                   |
| 18) 2.7.t     | Calendar "Hour, minute" [hh.mm]                   | #       | →                   |
| 19) 2.8.d     | Total operating days [* * * *]                    | **      | →                   |
| 20) 2.9.G     | GPS connection [be,non]                           |         | →                   |
| 21) 2.A.L     | LOG(pulse) connection [be,non]                    |         | →                   |
| 22) 2.b.S     | LOG(serial) connection [be,non]                   |         | →                   |
| 23) 2.c.t     | "GGA" performance status check [be,non]           |         | →                   |
| 24) 2.d.o     | Analog output offset for ROTI [0 / ±1.6(deg/min)] |         | →                   |
| 25) 2.e.F     | Filter time constant for ROTI [2 / 0.5~10(sec)]   |         | →                   |
| 26) 2.F.G     | Analog output gain for ROTI [1.0 / 0.9~1.0]       |         | →                   |
| 27) A-3 3.1.E | Alarm History [Err]                               | *       | Record to next page |

These should be corrected to actual "UTC"

These must be cleared to "0" after put master compass back to original position

[\*] should clear every time      [\*\*] should clear at replace Sensitive Element  
[#] should correct every time      [##] should correct at replace Sensitive Element

27) A-3 3.1.E Record most recent data, and then clear.

[Err]

\*

☐ Record

☐ Clear

!!! If same data (code and time) had continuously been recorded, write number of times to "times" column and then skip to next data.

| [Year] | [Month . Day] | [Hour . Code] | times | [Year] | [Month . Day] | [Hour . Code] | times |
|--------|---------------|---------------|-------|--------|---------------|---------------|-------|
| 1      | .             | .             | X     | 11     | .             | .             | X     |
| 2      | .             | .             | X     | 12     | .             | .             | X     |
| 3      | .             | .             | X     | 13     | .             | .             | X     |
| 4      | .             | .             | X     | 14     | .             | .             | X     |
| 5      | .             | .             | X     | 15     | .             | .             | X     |
| 6      | .             | .             | X     | 16     | .             | .             | X     |
| 7      | .             | .             | X     | 17     | .             | .             | X     |
| 8      | .             | .             | X     | 18     | .             | .             | X     |
| 9      | .             | .             | X     | 19     | .             | .             | X     |
| 10     | .             | .             | X     | 20     | .             | .             | X     |

!!! In all of A3 parameters, if found alarms that occurs currently or frequently, discuss with captain/owner and take necessary action to rectify problem.

| Address       | Description [Standard value / Range / Unit]                | Existed | Changed     |
|---------------|------------------------------------------------------------|---------|-------------|
| 28) A-3 3.2.n | Zero cross error number of occurrences [0000]              | *       | → 0000      |
| 29) 3.3.H     | Zero cross error maximum [000.0(deg)]                      | *       | → 000.0     |
| 30) 3.4.y     | Zero cross error occurrences year [- - - -]                | *       | → - - - -   |
| 31) 3.5.N     | Zero cross error occurrences month day [- . - . -]         | *       | → - . - . - |
| 32) 3.6.t     | Zero cross error occurrences hour minute [- . - . -]       | *       | → - . - . - |
| 33) 3.7.n     | Encoder error number of occurrences [0000]                 | *       | → 0000      |
| 34) 3.8.r     | SCC reset number of occurrences [0000]                     | *       | → 0000      |
| 35) A-4 4.1.C | GPS data character length [8,7]                            |         | →           |
| 36) 4.2.P     | GPS data parity check [Non,Even,Odd]                       |         | →           |
| 37) 4.3.S     | GPS data stop bit [1,2]                                    |         | →           |
| 38) A-5 5.1.C | Serial LOG data character length [8,7]                     |         | →           |
| 39) 5.2.P     | Serial LOG data parity check [Non,Even,Odd]                |         | →           |
| 40) 5.3.S     | Serial LOG data stop bit [1,2]                             |         | →           |
| 41) A-6 6.1.C | External sensor data character length [8,7]                |         | →           |
| 42) 6.2.P     | External sensor data parity check [Non,Even,Odd]           |         | →           |
| 43) 6.3.S     | External sensor data stop bit [1,2]                        |         | →           |
| 44) A-7 7.1.t | Master compass type (V1.01~) [Std,HSC]                     |         | →           |
| 45) 7.2.u     | SCC Software version (V1.01~) [ * . * * ]                  |         | →           |
| 46) 7.3.u     | MCC Software version (V1.01~) [ * . * * ]                  |         | →           |
| 47) A-8 8.1.t | Output all parameter by serial (V1.01~) [---,trns]         |         | → - - - -   |
| 48) 8.2.S     | Filter of speed error correction (V1.01~) [on,off]         | #       | → on        |
| 49) 8.3.L     | Rotor tilting angle monitor (V1.10~) [deg]                 |         | →           |
| 50) 8.4.t     | Master compass inside temperature (V1.12~) [-25~+75(degC)] |         | →           |

[\*] should clear every time

[#] should correct every time

## 2. Actual condition

- 1) Measure "main power" voltage (1AC1~1AC2/2AC1~2AC2) [100 or 220VAC  $\pm 10\%$ ]
- 2) Measure "back-up power" voltage (1B+~1B-/2B+~2B-) [24VDC -20%~+30%]
- 3) Measure "HDM back-up power" voltage (TB31 24A+~24A-) [24VDC -20%~+30%]
- 4) Measure "repeater compass power" voltage (GTERM\_PWB ST14~ST15) [24 $\pm 4$ VDC]
- 5) Measure "master compass power" voltage (MTTRM\_PWB TB1\_1~2) [24 $\pm 2$ VDC]
- 6) Measure "sensitive element power" voltage and frequency  
(phantom ring left-terminal 5~6)  
[100 $\pm 2$ VAC(by True RMS) or 110 $\pm 2$ VAC(by Average) / 400 $\pm 2$ Hz]
- 7) Does sensitive element rotor rotate without abnormal sound?
- 8) Is there any alarm or abnormality?

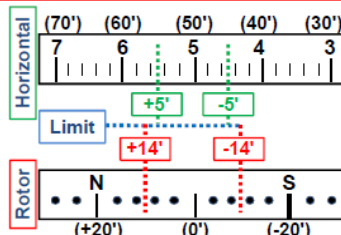
☐ True RMS  
☐ Average  
Tester Type

## Result

|    |     |
|----|-----|
| 1) | VAC |
| 2) | VDC |
| 3) | VDC |
| 4) | VDC |
| 5) | VDC |
| 6) | VAC |
|    | Hz  |
| 7) |     |
| 8) |     |

**Check below items if master compass settled or past 3 hours after startup.**

- 9) Read center of air bubble position of horizontal ring level [within  $\pm 5$ min from center] \*1div=2min
- 10) Read center of air bubble position of rotor level [within  $\pm 14$ min from center] \*1div=4min
- 11) Is master compass bearing stable? (how much is range of bearing variation?)

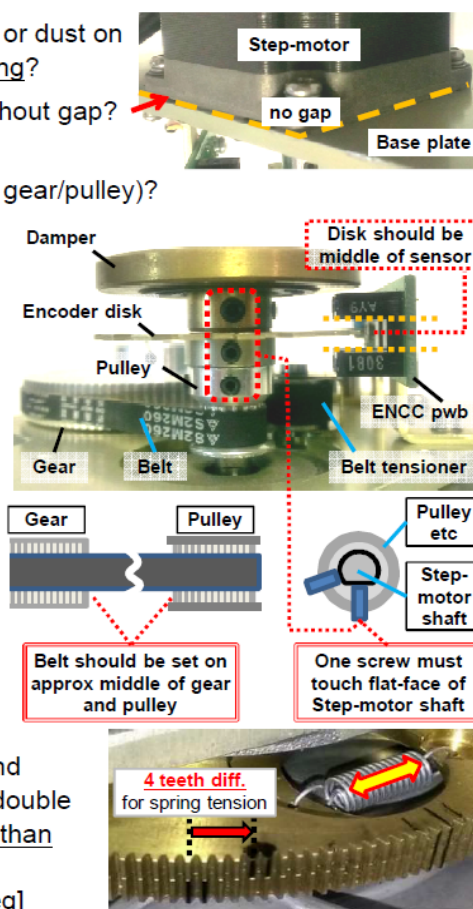


|     |     |
|-----|-----|
| 9)  | min |
| 10) | min |
| 11) | deg |

**STOP THE SUPPLYING POWER**

## 3. Step motor assembly

- 1) Is not there any damage, contamination or dust on gear of step-motor ass'y and phantom ring?
- 2) Is step-motor mounted on base plate without gap?
- 3) Is not there any damage on belt?
- 4) Is belt position correct (approx middle of gear/pulley)?
- 5) Is belt tensioner move smoothly?
- 6) Is not there any damage on pulley?
- 7) Is not there any damage on encoder disk?
- 8) Is encoder disk position correct (approx middle of optocoupler)?
- 9) Is not there dust, damp or any damage on optocoupler of ENCC pwb?
- 10) Is not there any damage on damper?
- 11) Is damper position correct (does not touch optocoupler)?
- 12) Does each one of screw for pulley, encoder disk and damper touch flat face of step-motor shaft?
- 13) Does step-motor shaft turn smoothly?
- 14) Engage both gear of step-motor ass'y and phantom ring with 4teeth difference at double gear. Can phantom ring be turned more than 360deg for both direction in smoothly? [Backlash should be within approx 0.1deg]
- 15) Are connectors for step-motor and J3/J4 of SMCC pwb connected certainly?
- 16) Are all screws for step-motor ass'y and its cover fixed firmly?



|     |                                                               |
|-----|---------------------------------------------------------------|
| 1)  |                                                               |
| 2)  |                                                               |
| 3)  |                                                               |
| 4)  |                                                               |
| 5)  |                                                               |
| 6)  |                                                               |
| 7)  |                                                               |
| 8)  |                                                               |
| 9)  |                                                               |
| 10) |                                                               |
| 11) |                                                               |
| 12) |                                                               |
| 13) |                                                               |
| 14) |                                                               |
| 15) | <input type="checkbox"/> Step-motor                           |
|     | <input type="checkbox"/> J3 <input type="checkbox"/> J4       |
| 16) | <input type="checkbox"/> Ass'y <input type="checkbox"/> Cover |

## 4. Slip-ring and Brush

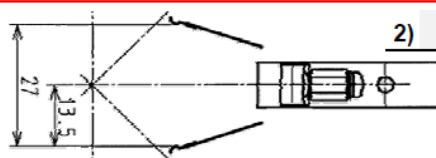
Result

- 1) Clean and polish surface of all slip-ring with cotton tape or similar goods. And then apply "WD-40". Are slip-ring and brush clean and no damage?

- 1) ☐ Slip-ring  
☐ Brush

**[!!] When clean and lubricate them... DON'T SPRAY anything**  
**DON'T USE "abrasive", "CRC5-56", "solvent" and "volatile chemicals (acetone/benzine etc)".**

- 2) Is angle of all brushes correct ?  
As shown right figure at dismounted condition, and they should be symmetry. It should be replaced when found abnormality.



2)

- 3) Are all brush heads touch with slip-ring firmly, be in middle of each ring and no damage?



3)

- 4) Measure contact resistance at below terminals of brush and MCC pwb.

4) Fill in below

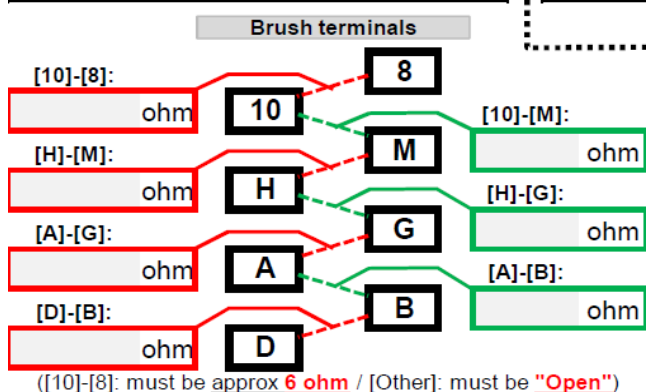
**Check below items in disconnecting cables from brush terminal and J2/J5 connector of MCC pwb.**

### 4) -1

Measure resistance of each brush terminal as shown below combinations to find shorting with next stage.

### 4) -2

Measure "maximum" resistance between brush and MCC pwb through slipring as shown below combinations. To find maximum value, keep measuring during turn slowly phantom-ring more than 360deg by hand.

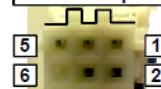


### [Brush]-[MCC harness]

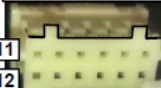
|               |     |
|---------------|-----|
| [A] -[J2-1]:  | ohm |
| [D] -[J2-2]:  | ohm |
| [M] -[J2-3]:  | ohm |
| [B] -[J2-4]:  | ohm |
| [H] -[J2-5]:  | ohm |
| [10] -[J5-9]: | ohm |
| [8] -[J5-10]: | ohm |
| [G] -["G"]:   | ohm |

(must be less approx "0.5 ohm")

### J2 of MCC pwb



### J5 of MCC pwb



### "G" of MCC pwb

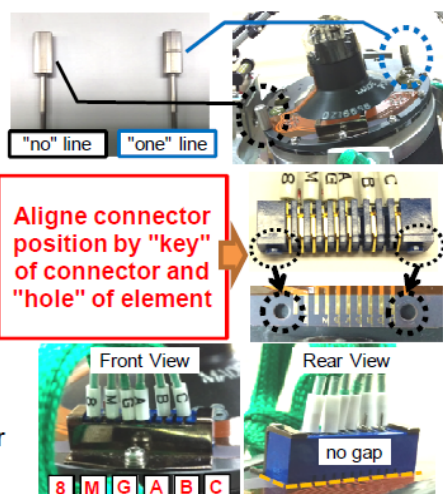


- 5) Are all wires/connectors of brush, MCC pwb and SMCC pwb connected certainly? 5) ☐ Brush

☐ MCC ☐ SMCC

## 5. Sensitive element

- 1) Is **not** there oil leakage, damage or any abnormality on sensitive element?
- 2) Was sensitive element aligned by special guide screws?
- 3) Is sensitive element connector placed on correct position and direction?
- 4) Does sensitive element connector contact firmly (no gap)?
- 5) Can "sensitive element" and "horizontal ring" move smoothly until it hits the stopper for N-S/E-W direction?
- 6) Is **not** there anything touches harness and others during turning phantom ring more than 360deg by hand?



Result

1)

2)

3)

4)

5) ☐ N-S ☐ E-W

6)

## 6. Damper oil

- 1) Is damper oil filled in approx. half of damper case?
- 2) Is **not** damper oil dirty?
- 3) Does damper case have its cover?

Use below oil to supplement  
p/n: 10160162- [Red-cap]



### Result

|    |  |
|----|--|
| 1) |  |
| 2) |  |
| 3) |  |

## 7. All terminals and connectors

- 1) Are all cables/harnesses/connectors connected in firmly and certainly?

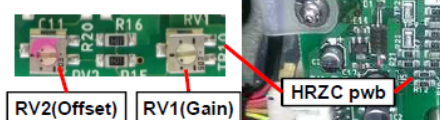
**[!!] Most carefully check at J1~J4 of SMCC pwb, J1~J4/J6/J11/J12 of MTTRM pwb and J7/J8/J11/J12 of GTERM pwb.**

- ☐ Control Unit  
☐ GTERM pwb

### Result

|    |                                         |
|----|-----------------------------------------|
| 1) | <input type="checkbox"/> Master Compass |
|    | <input type="checkbox"/> SMCC pwb       |
|    | <input type="checkbox"/> MTTRM pwb      |

- 2) Is harness for "**DST~P2 of HRZC pwb**" arranged **around pwb** from upper to left of pwb as shown right picture?



- 3) Are **RV1 and RV2 of HRZC pwb** set to its approx. middle position? (RV1 will be adjusted if hunting happens)

|    |                                                              |
|----|--------------------------------------------------------------|
| 2) |                                                              |
| 3) | <input type="checkbox"/> RV1<br><input type="checkbox"/> RV2 |

## 8. Shock absorber

- 1) Is **not** there any contamination, discoloration or any damage on plastic part?
- 2) Are all parts placed on their correct position?
- 3) Does the shock absorber move smoothly for all directions?

- 3) ☐ Vertical ☐ Horizontal ☐ Fore-Aft

### Result

|    |  |
|----|--|
| 1) |  |
| 2) |  |
| 3) |  |

## 9. Fuse & Holder

**[!!] All supply power for control unit (AC and DC) must be turned "OFF" during checking this item.**

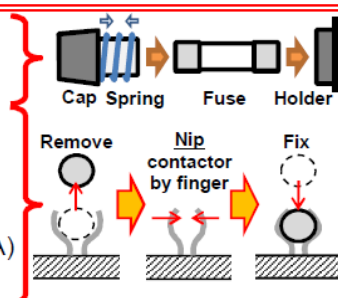
**a.** Make all fuse holders hold with its fuse certainly as below.

At below items 1)~2), **fuse and cap** must **move smoothly** by spring pressure and must **not be stuck**.

At below items 3)~6), **nip contactor** of each holder gently by finger.

**b.** Are all fuses **not debased and blowout**?

- 1) INVERTER pwb F1(12A)
- 2) Control unit F101/F201(6.3A) and F102/F202(20A)
- 3) GTERM pwb F1~F14(1A), F15(15A) and F16~F17(3.15A)
- 4) DTERM pwb F17(15A) and F18~F19(3.15A)
- 5) MTERM pwb F1~2(1A), F4(5A), F5(1A) and F11(1A)
- 6) ESCC pwb XF1(5A) and XF2~XF4(1A)



### Result

|    |                                                               |
|----|---------------------------------------------------------------|
| 1) | <input type="checkbox"/> Holder <input type="checkbox"/> Fuse |
| 2) | <input type="checkbox"/> Holder <input type="checkbox"/> Fuse |
| 3) | <input type="checkbox"/> Holder <input type="checkbox"/> Fuse |
| 4) | <input type="checkbox"/> Holder <input type="checkbox"/> Fuse |
| 5) | <input type="checkbox"/> Holder <input type="checkbox"/> Fuse |
| 6) | <input type="checkbox"/> Holder <input type="checkbox"/> Fuse |

**RESUME THE SUPPLYING POWER**

## 10. Power supply

- 1) Measure "main power" voltage (1AC1~1AC2/2AC1~2AC2) [100 or 220VAC  $\pm 10\%$ ]
- 2) Measure "back-up power" voltage (1B+~1B-/2B+~2B-) [24VDC -20%~+30%]
- 3) Measure "HDM back-up power" voltage (TB31 24A+~24A-) [24VDC -20%~+30%]
- 4) Is sequence of "Last azimuth"~"Rotor rotating"~"Follow-up start" normal?
- 5) Measure "repeater compass power" voltage (GTERM\_PWB ST14~ST15) [24 $\pm 4$ VDC]
- 6) Measure and adjust "master compass power" voltage (MTTRM\_PWB TB1\_1~2) [24 $\pm 2$ VDC, Adjust by **VR1 of GPOWER pwb**]
- 7) When turn OFF "main power"...  
Is **alarm "1"** generated? And does gyro compass keep its operation?

### Result

|    |                                                                               |
|----|-------------------------------------------------------------------------------|
| 1) | VAC                                                                           |
| 2) | VDC                                                                           |
| 3) | VDC                                                                           |
| 4) |                                                                               |
| 5) | VDC                                                                           |
| 6) | VDC                                                                           |
| 7) | <input type="checkbox"/> Alarm "1"<br><input type="checkbox"/> Keep operation |

## 11. Output signals (Test mode-b: [DISP]+[SET] / ROTI mode: [ACK/ENT]+[▼] and then turn ON)

- 1) Are all step signal receivers (repeaters) follow-up gyro within  $\pm 0.5^\circ$  error?
- 2) Are all serial signal receivers (repeaters) follow-up gyro within  $\pm 0.5^\circ$  error?
- 3) Check and adjust all ROT analog indicators by ROTI-mode.  
Are all indicators follow-up gyro within  $\pm 0.5^\circ @ 0^\circ/\text{min}$ ,  $\pm 1.5^\circ @ 20^\circ/\text{min}$  error?
- 4) Is brightness of all repeater compasses adjustable by its dimmer VR?

Result

|    |  |
|----|--|
| 1) |  |
| 2) |  |
| 3) |  |
| 4) |  |

## 12. Operating panel

- 1) Do all switches/keys operate normally?
- 2) Do all LED and display light up and sound buzzer during "LAMP TEST"([▲]+[▼])?
- 3) Is brightness of LED possible to adjust by "DIMMER"([▲]/[▼])?
- 4) Are all data/value/information indicated normally?
- 5) Is heading sensor possible to switch to other one by [ACK/ENT]+[GYRO(EXT)]?

Result

|    |                                                                                      |
|----|--------------------------------------------------------------------------------------|
| 1) |                                                                                      |
| 2) |                                                                                      |
| 3) |                                                                                      |
| 4) |                                                                                      |
| 5) | <input type="checkbox"/> 1G <input type="checkbox"/> 2G <input type="checkbox"/> EXT |

## 13. Input signals and Speed error correction

- 1) Does gyro receive GPS signal for Speed and Latitude?
- 2) Does gyro receive LOG signal (Serial / Pulse) for Speed?
- 3) Does gyro correct its heading depend on Speed and Latitude?

Result

|    |                                                                                       |
|----|---------------------------------------------------------------------------------------|
| 1) | <input type="checkbox"/> NC <input type="checkbox"/> Spd <input type="checkbox"/> Lat |
| 2) | <input type="checkbox"/> NC <input type="checkbox"/> Ser <input type="checkbox"/> Pls |
| 3) |                                                                                       |

## 14. Performance

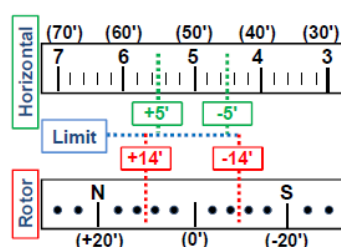
- 1) Measure and adjust "sensitive element power" voltage and frequency (phantom ring left-terminal 5~6) [100 $\pm$ 2VAC(by True RMS) or 110 $\pm$ 2VAC(by Average) / 400 $\pm$ 2Hz, Adjust by VR1 of INVERTER pwb]
- 2) Does sensitive element rotor rotate without abnormal sound?
- 3) Do not phantom ring and horizontal ring vibrate when giving a shock/vibration to shock absorber?
- 4) More than 30 min past starting up, read center of air bubble position of horizontal ring level. It should be within  $\pm 5\text{min}$  from center. Adjust by balance weight at horizontal ring. \*1div=2min
- 5) After settling (3~4 hours past start up), read center of air bubble position of rotor level. It should be within  $\pm 14\text{min}$  from center. Adjust by internal parameter "1.6.t.  $\theta$ (theta) offset". \*1div=4min

Tester Type

Result

☐ True RMS ☐ Average

|    |  |     |
|----|--|-----|
| 1) |  | VAC |
|    |  | Hz  |
| 2) |  |     |
| 3) |  |     |



|    |  |     |
|----|--|-----|
| 4) |  | min |
| 5) |  | min |

- 6) Measure "true bearing" by sun azimuth/target bearing/chart etc.  
And then correct "gyro bearing" to "true bearing".

6) True bearing:  deg

Measured by:

Corrected Gyro bearing:  deg

- 7) Is gyro bearing steady? (variation range should be within 0.7deg)
- 8) Check, clear and correct internal parameter after put master compass back to original position or when leave vessel. **[Refer to item 1]**

|    |  |     |
|----|--|-----|
| 7) |  | deg |
| 8) |  |     |

## 15. Note

## 6.3 Periodical Check Tables

### 6.3.1 Periodical Table (Once a day)

Once a day: Periodical Check Table (including operation check).

| <b>Check marks</b><br>○ : Normal,<br>△ : Normal after rework or repair                                       | AlphaMidiCourse Mk2  |  |  |  |  |  |  |  |  |  |
|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|
| <b>Date checked</b>                                                                                          |                                                                                                         |  |  |  |  |  |  |  |  |  |
| <b>Inspector Name &amp; Function</b>                                                                         |                                                                                                         |  |  |  |  |  |  |  |  |  |
| <b>Check items</b>                                                                                           |                                                                                                         |  |  |  |  |  |  |  |  |  |
| Confirm that the value of each repeater synchronizes with the displayed true heading on the operating panel. |                                                                                                         |  |  |  |  |  |  |  |  |  |
| Confirm that the displayed latitude on the operating panel coincides with the current latitude.              |                                                                                                         |  |  |  |  |  |  |  |  |  |
| Measure error with observation if possible.                                                                  |                                                                                                         |  |  |  |  |  |  |  |  |  |
| Confirm that ship's power supply voltage is stable and within specifications.                                |                                                                                                         |  |  |  |  |  |  |  |  |  |
| Confirm that all indicators and lamps are lit and it buzzes, when "lamp test" operate.                       |                                                                                                         |  |  |  |  |  |  |  |  |  |
| Items to be dealt with, and items to be informed.                                                            |                                                                                                         |  |  |  |  |  |  |  |  |  |
| <b>REMARKS</b>                                                                                               |                                                                                                         |  |  |  |  |  |  |  |  |  |

### 6.3.2 Periodical Table (Once a (halve) year)

Once a (halve) year: Periodical Check Table (including operation check).

| <b>Check marks</b><br>○ : Normal,<br>△ : Normal after rework or repair                                                             | <div>AlphaMidiCourse Mk2</div> <div>ALPHATRON Marine</div> |  |  |  |  |
|------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|--|--|--|--|
| <b>Date checked</b>                                                                                                                |                                                            |  |  |  |  |
| <b>Inspector Name &amp; Function</b>                                                                                               |                                                            |  |  |  |  |
| <b>Check items</b>                                                                                                                 |                                                            |  |  |  |  |
| Confirm tightness of fixing screws in mechanical sections and connecting screws in the terminal board.<br>(e-tighten if loosened.) |                                                            |  |  |  |  |
| Confirm connecting and wire wearing conditions at connecting wire mounting points and wire bases                                   |                                                            |  |  |  |  |
| Confirm operating conditions of switches, and displayed state of LEDs and indicators.                                              |                                                            |  |  |  |  |
| Confirm that warning labels and other indication labels are not dirty or detached.<br>(Clean if they become dirty.)                |                                                            |  |  |  |  |
| Items to be dealt with, and item to be informed.                                                                                   |                                                            |  |  |  |  |
| <b>REMARKS</b>                                                                                                                     |                                                            |  |  |  |  |

**Gyrocompass AlphaMidiCourse Sensitive Element (S/E) Checksheet****ALPHATRON**  
**Marine**

This checksheet must be filled and sent back together with the removed (old) S/E.

Ship's Name : \_\_\_\_\_

Type AlphaMidiCourse : ☐ Mk1 ☐ Mk2

IMO No. : \_\_\_\_\_

Which Gyro : ☐ Single ☐ No.1 ☐ No.2 ☐ No.3

Engineer Name : \_\_\_\_\_

Master compass Ser. No. : \_\_\_\_\_

Engineer Company : \_\_\_\_\_

Work Order No. : \_\_\_\_\_

Date : \_\_\_\_\_

**1. Removed (Old) S/E Ser. No.****1.1 Reason for replacement**-1 ☐ Periodic Maintenance-2 ☐ Heading ErrorError Characteristics . . . . . ☐ A : Fixed Bias Error  
(Refer to Fig. 1 thru 4) ☐ B : Unstabled  
☐ C : Unstabled with offset  
☐ D : Other

Error from True heading \_\_\_\_\_ deg.

Range of Unstabled . . . . . \_\_\_\_\_ deg.

Horiz. Ring (EW) slant . . . . . \_\_\_\_\_ min.

Rotor (NS) slant . . . . . \_\_\_\_\_ min.

-3 ☐ Compass card (Az.) turningTurning speed . . . . . ☐ LT (<) 1deg./sec. ☐ GT (>=) 1deg./sec.Inclination of S/E . . . . . ☐ LT (<) 10deg. ☐ GT (>=) 10deg.-4 ☐ Heading Unstable

Unstable range . . . . . \_\_\_\_\_ deg.

-5 ☐ Rotor abnormal sound-6 ☐ Excess oil leakageExternal oil leakage is observed at : . . . . . ☐ Top cover of S/E ☐ Bottom container of S/E-7 ☐ Other \_\_\_\_\_

-8 S/E voltage at TB 5 and 6 on the phantom ring (applicable if item 2 thru 7 is checked) AC \_\_\_\_\_ V

Tester type . . . . . ☐ Vrms (R.M.S.) ☐ Vavg (Average)

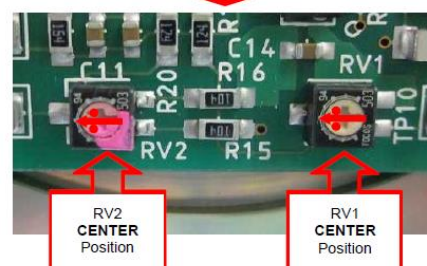
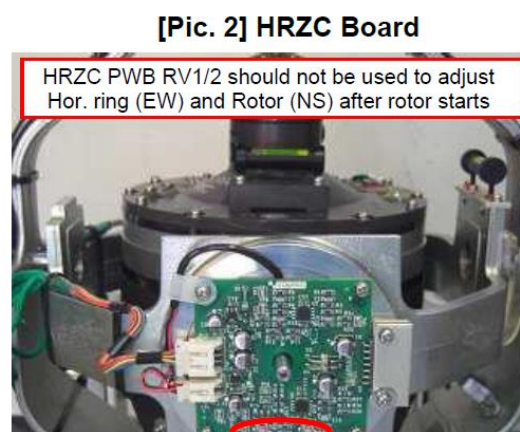
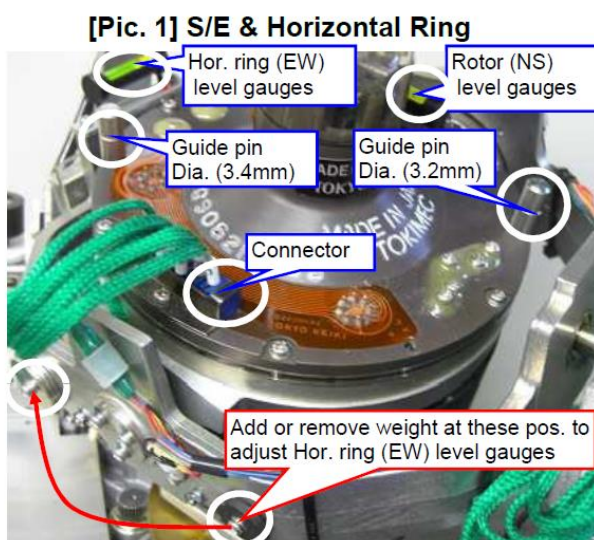
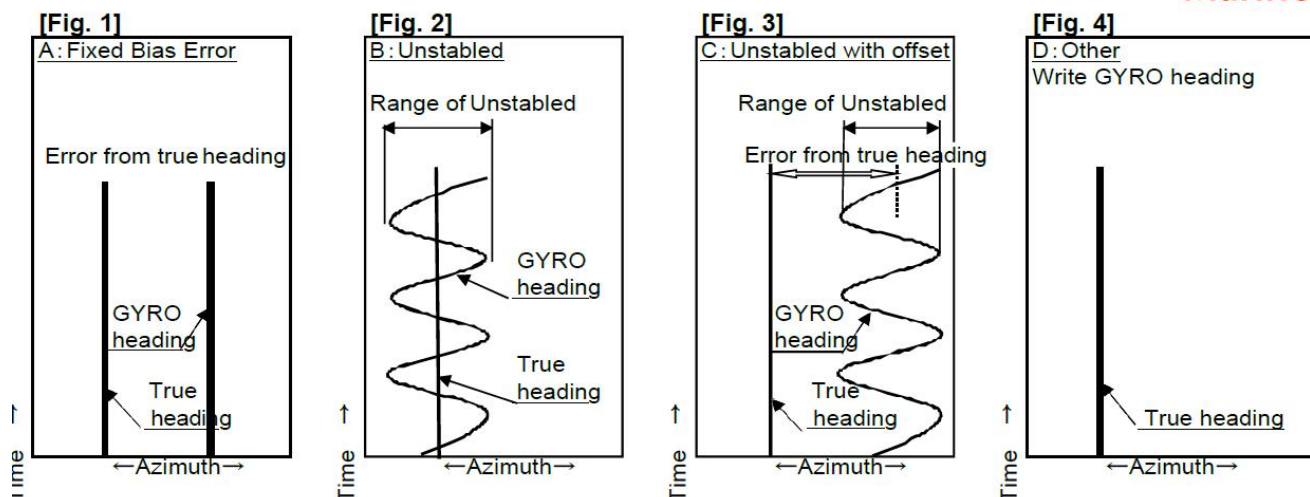
Previously

installed date

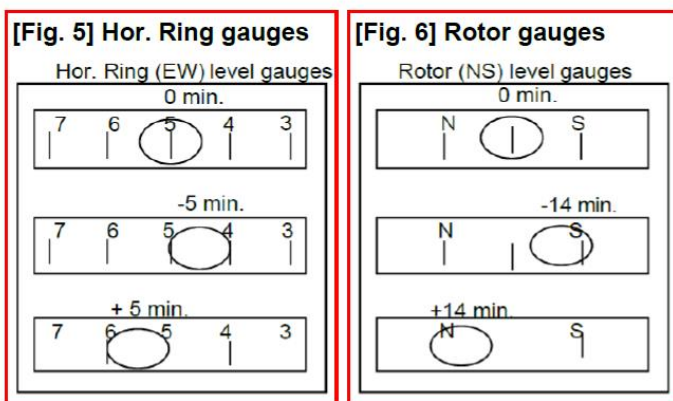
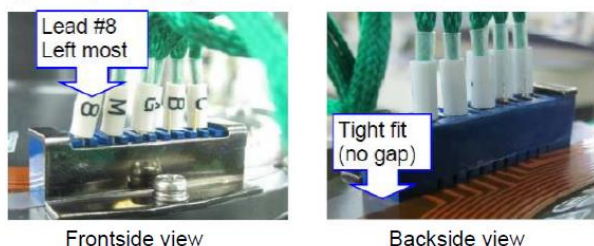
**1.2 Error Occurrence condition**-1 Sea ☐ Calm ☐ Rough sea-2 Ship ☐ Straight ☐ Turning☐ Anchoring

-3 Error Code

**2. Installed (New) S/E Ser. No.****2.1 Tools and parts**-1 Did you bring special guide pin(2types) to install S/E ? . . . . . ☐ Y ☐ N-2 Did you bring set of weights to adjust EW level on the horizontal ring ? . . . . . ☐ Y ☐ N**2.2 Opening S/E package**-1 Package is in good condition (not damaged) . . . . . ☐ Y ☐ N-2 S/E is clean without excess oil leakage . . . . . ☐ Y ☐ N**2.3 Installation**-1 S/E was kept vertical position (not leaning GT (>=) 45deg. for GT (>=) 10 sec.) . . . . . ☐ Y ☐ N-2 Installed S/E using special guide pins (See Pic. 1) . . . . . ☐ Y ☐ N-3 Connector lead #8 is located at the left side and has good contact (See Pic. 1 & 3) . . . . . ☐ Y ☐ N-4 Master Compass HRZC PWB RV1/RV2 to be in a half position (See Pic. 1 & 2) . . . . . ☐ Y ☐ N-5 Damping gain 1.1.U and 0offset 1.6.t (written on the package) must be entered in Extension menu . . . . . ☐ Y ☐ N**2.4 Operation test**-1 Before starting Gyrocompass, make sure to enter(match) the ship's heading . . . . . ☐ Y ☐ N-2 Rotor should be quiet (no abnormal sound) . . . . . ☐ Y ☐ N-3 S/E voltage at TB 5 and 6 should be AC100 ±2Vrms (AC110 ±2Vavg) . . . . . ☐ Y ☐ N-4 Hor. Ring (EW) inclination should be within ±5Min. after 30 minutes. (Pic. 1 & Fig. 5) . . . . . ☐ Y ☐ N-5 Rotor (NS) inclination should be within ±14 min. after 3 hours of operation. (Pic. 1 & Fig. 6) . . . . . ☐ Y ☐ N

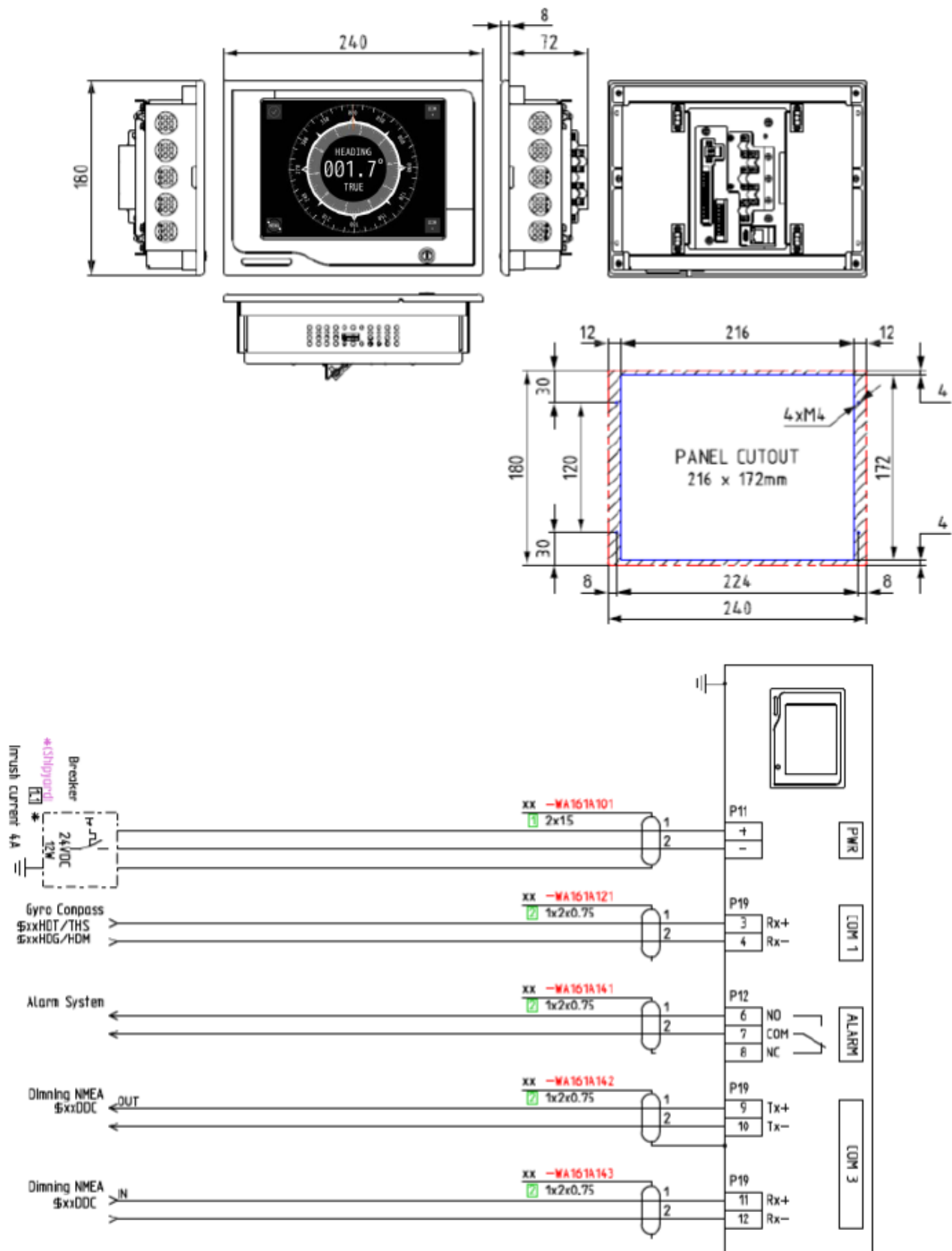


**[Pic. 3] Gyro Sphere connector**



## 6.5 Installation Drawing of AlphaHeading+

The AlphaHeading+ is the steering repeater in the AlphaMidiCourse Gyro system. Its installation is as following:



## 6.6 Installation Drawing of Bearing Repeater RP-51-1

The Bearing repeater RP-51-1 can be part of an AlphaMidiCourse Gyro system. The bearing repeater can be installed in a compass stand. Its installation is as following.

