ALPHACOURSE G/MKR056
Analogue heading indicator

Installation & Operation manual

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CAUTION!

DO NOT modify this equipment in any way without obtaining a written permission from ALPHATRON MARINE otherwise you will void the warranty.

CAUTION!

This product is only to be installed by a certified installation company either approved by ALPHATRON MARINE B.V or by one of its distributors, otherwise you will void the warranty. This product must be installed according to the prescribed installation methods in this manual, otherwise you will void the warranty.

CAUTION!

The ALPHACOURSE G contain no operator serviceable parts. Service and repair shall only be done by trained and certified personal.

1 Revision history

REVISION	DATA	COMMENT
V1.0	22-09-2008	Document draft.
V1.1	11-01-2010	Changed/updated appendix connection diagram

2 Introduction

The Alphacourse G/MKR056 is a analog heading indicator, designed to indicate a ships (true)heading in respect to the geographical(true) North of the earth. The Alphacourse has a standardized IEC-61162-1(NMEA0183) data-input for receiving true-heading serial data. From now on the Alphacourse G/MKR056 will be called “Alphacourse G”.

3 Definitions and abbreviations

3.1 Definitions

Gyro compass
this is a compass that finds true north by using an (electrically powered) fast-spinning wheel and friction forces in order to exploit the rotation of the Earth.

LED's
Light emitting diodes, these are used for signaling statuses of hardware and signals to the user.

IEC61162-1/NMEA data
Protocol/standard for transmitting and receiving of asynchronous serial data sentences.

grounding point/stud
Point on the chassis of the instrument which should be connected to the ships mass.

(galvanic)isolated
Electrically separation of two circuits. There is no current flowing directly from one circuit to another. Electrical energy and/or information can still be exchanged between the sections by other means, such as induction or optical means(think of transformers or optocouplers).

baudrate
This is the transmission speed of serial interfaces in bits per second.

compass save distance
This distance determines the distances above which equipment will not cause an unacceptable deviation of the ship's standard and steering compasses.

true-heading
Heading relative to true north of the earth

3.2 Abbreviations used in this manual

A	**Ampere**
DC	**Direct current**
GPS	**Global positioning system**
Gyro	**Gyrocompass**
I/O	**Inputs and Outputs**
LED	**Light emitting diode**
mA	**mill amperes**
mm	**millimeter**
NMEA	**National Marine Electronics Association**
PCB	**Printed circuit board**
VDC	**Volts direct current**
W	**Watt**

4 Installation

In this chapter the hardware and the installation of the Alphacourse G are discussed. Please be advised to strictly meet the prescribed installation methods. If the Alphacourse G is not installed according to the prescribed installation methods it will possible not meet to the specifications.

The Location class/category of the Alphacourse G/MKR056 is:

Protected from the weather (formerly class B)

4.1 Delivered hardware

In this chapter the delivered hardware will be discussed.

4.1.1 Hardware Alphacourse G

The hardware of the Alphacourse G consists of the following parts:

- Analogue heading indicator
- Cable 1x5x0.75mm2, Length 3m

Figure 1: Hardware of the Alphacourse G

4.2 Dimensions Alphacourse G

The physical dimensions of the Alphacourse G are:

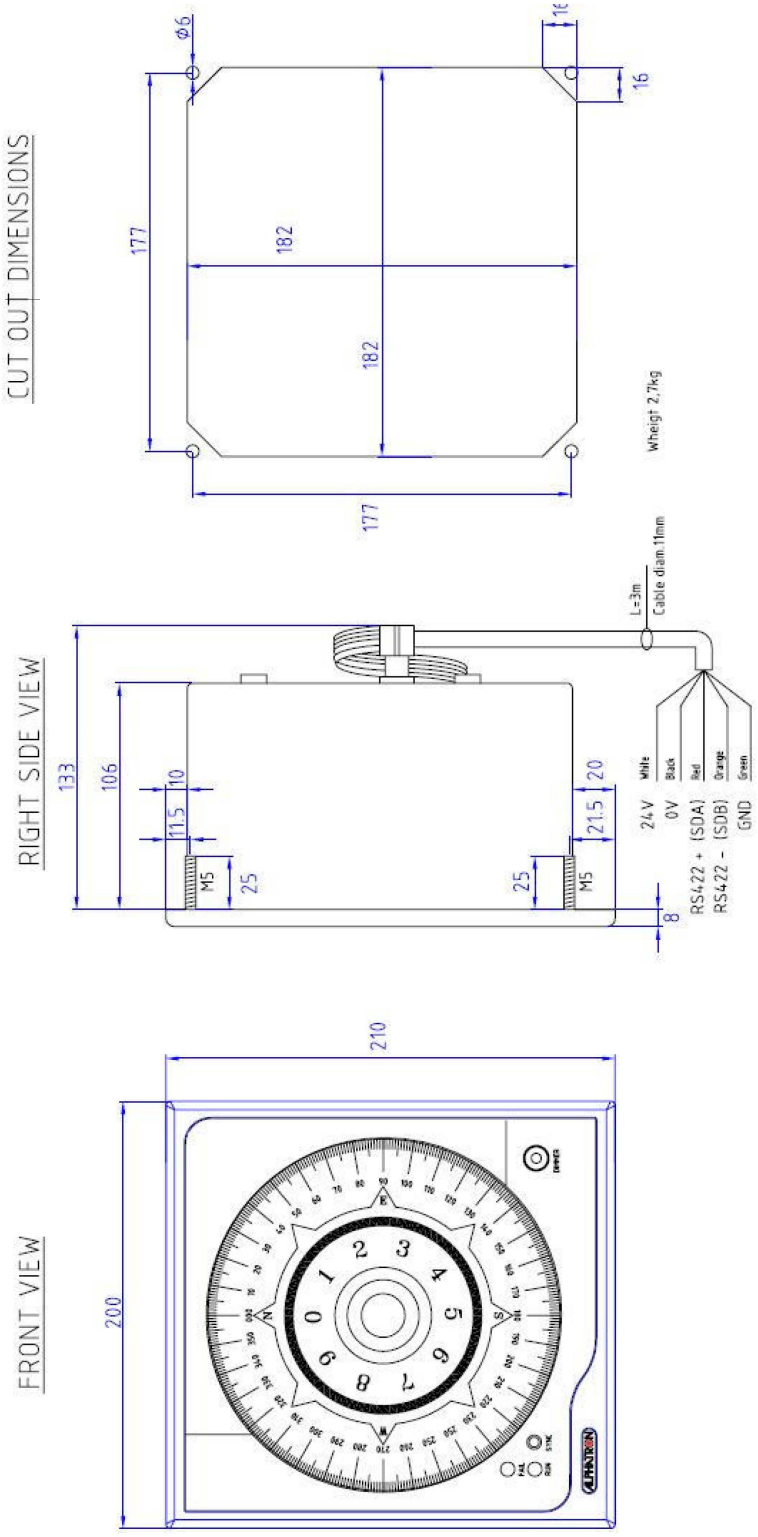

Figure 2: Mechanical dimensions

There is also a dimensional drawing in the appendix of this document.

4.3 Mounting Alphacourse G

The Alphacourse G can be installed a number of different ways; horizontally, vertically as well as at an angle. The possible positions are shown in figure 3. Do consider the placing of the Alphacourse G carefully. Make sure that there is enough room left for the connecting of the cables.

Please also consider the right position/angle for mounting the Alphacourse G in which maximum visibility for the user can be achieved.

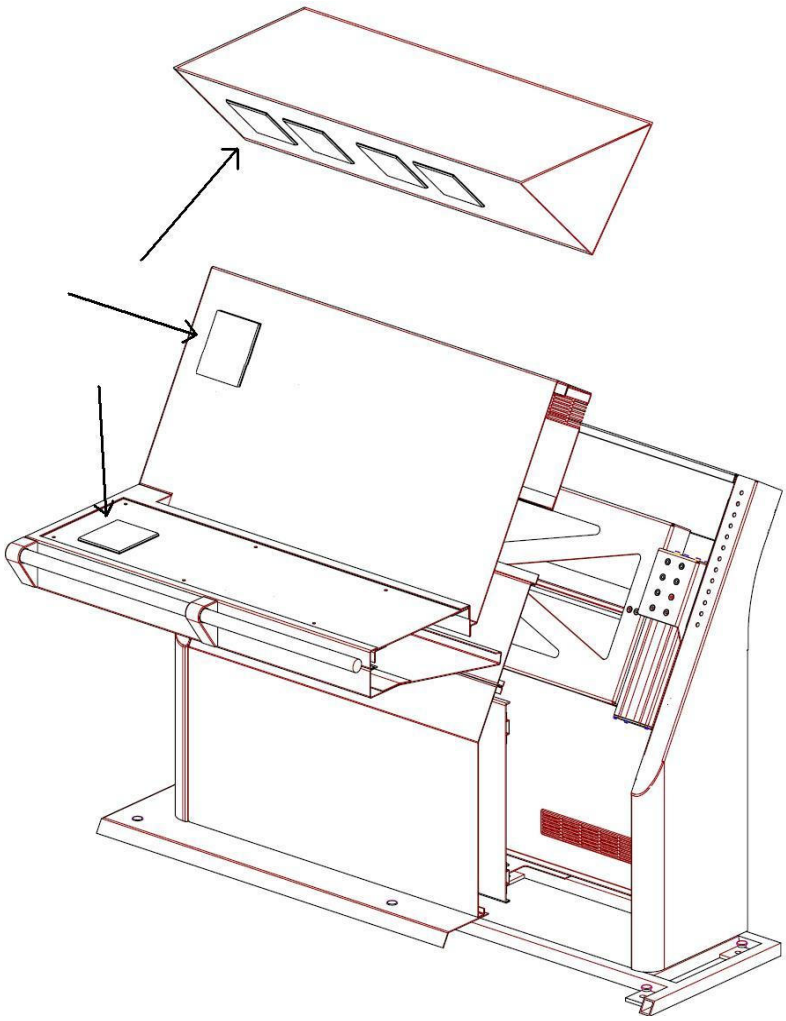

Figure 3: Possible mounting positions

4.4 Connecting hardware

In this chapter the connecting of the Alphacourse G is explained.

NOTE: Use only recommended cable as described in the cable diagram in the appendix.

NOTE: Install the Alphacourse G according to the prescribed installation methods in this manual.

4.4.1 Connecting Alphacourse G

The Alphacourse G has one internal connector located on the back side of the instrument. This connector is for connecting both power supply and serial data input to the instrument. It has 6 terminals with the following functions:

Serial input:

1. GND
2. RX-(SDB)(RS485)
3. RX+(SDA)(RS485)

Power supply input:

4. 0V
5. GND(**DO NOT USE**)
6. 24VDC input

NOTE: terminal 5 should not be used for powering the instrument only terminals 4 and 6 should be used for this.

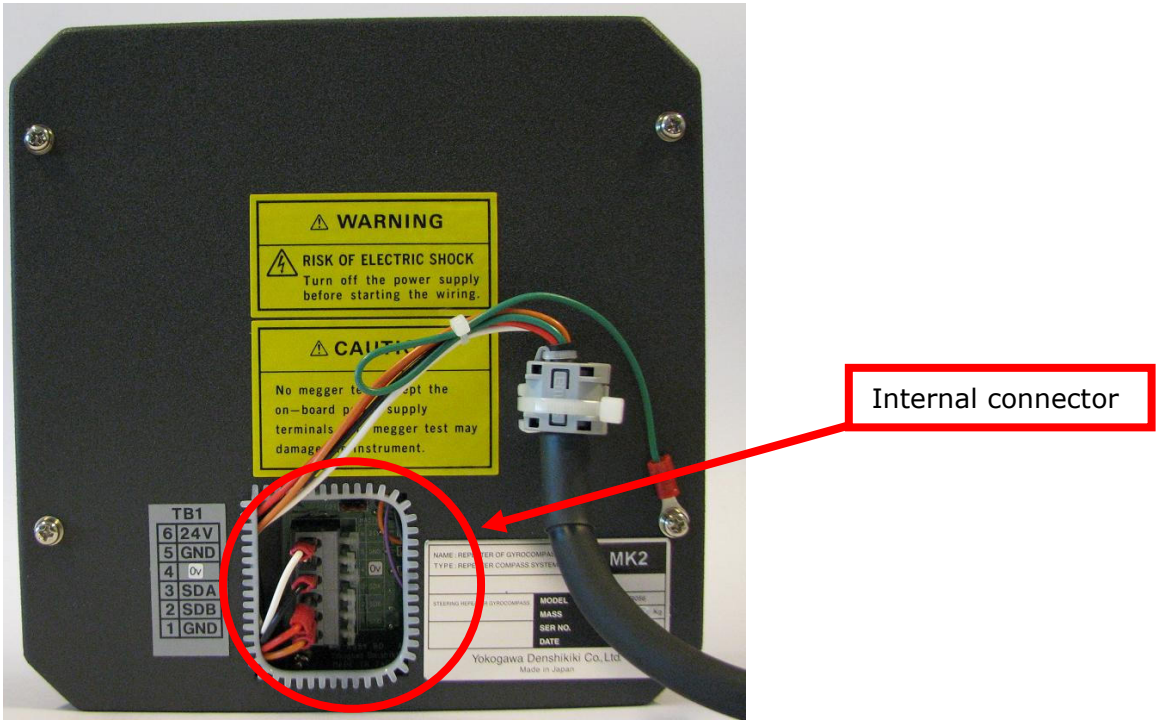

Figure 4: Location of connector on back side of the Alphacourse G

4.4.1.1 Preparing and terminating the cables

For the instrument to operate correctly it is essential that all cables are installed and terminated correctly. The Alphacourse G comes with a pre-installed cable with a length of 3 meters. This cable is already connected and mounted on to the Alphacourse G's back side. It is highly recommended to use this cable and to connect it in a external connection box to the installed cable(s) on the ship. See also figure 4 and the complete connection diagram that can be found in the appendix of this manual.

4.4.1.2 Grounding the Alphacourse G

The instrument must be grounded to the ships structure/mass to operate correctly. There is a grounding point on the back of the instrument on the right of the internal connector. Via the green wire in the pre-installed cable this grounding point should be connected to the ships structure/mass. See Figure 5: Correct grounding of the instrument

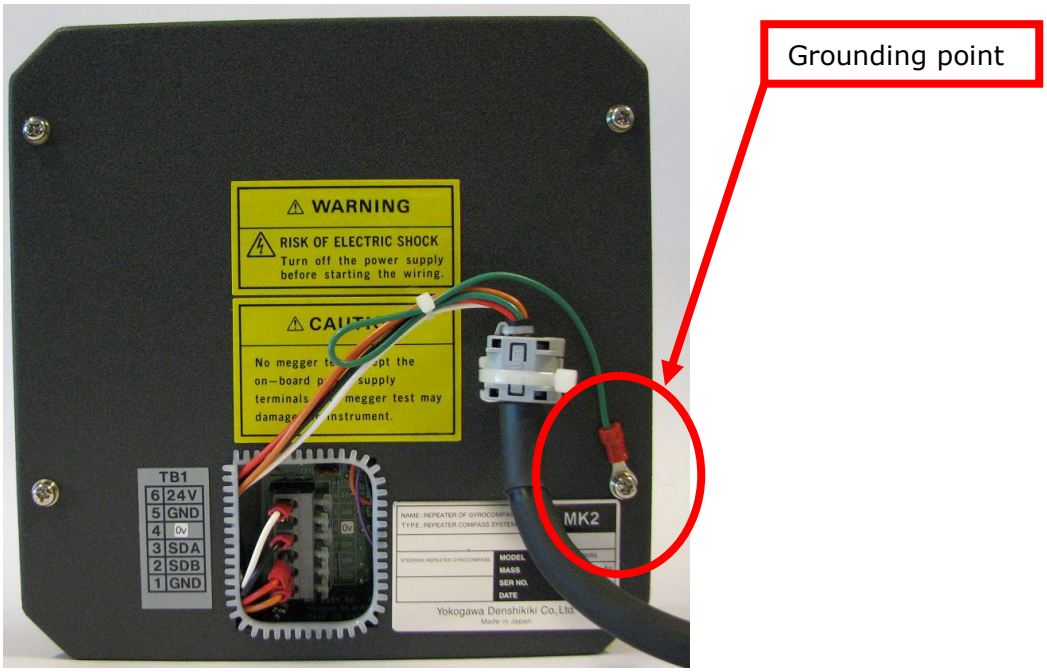

Figure 5: Correct grounding of the instrument

4.4.1.3 Connecting power supply Alphacourse G

The Alphacourse G must be connected to a 24VDC power supply that can supply at least 0.75 ampere. Connector terminals 4 and 6 should be used to connect the power supply. The polarity of the power connectors is shown on both the printed circuit board and the connection label on the back of the instrument. The maximum core thickness that can be connected is 2.5mm². The power supply input is galvanic isolated.

The complete connection diagram of the Alphacourse G is included in the Appendix of this manual.

4.4.1.4 Connecting Alphacourse G to serial data source

Via the terminals 2 and 3 serial data can be connected to the Alphacourse G. This data should comply with the IEC61162-1 norm. The by the Alphacourse G accepted sentence is:

HDT – Heading true

Actual vessel heading in degrees true produced by any device or system producing true heading.

$--HDT, x.x, T*hh<CR><LF>

Heading, degrees true

Via dipswitches inside the Alphacourse G the type of data source should be selected. To change the dipswitch settings the (back-side)housing of the Alphacourse G should be opened. Via the dipswitches there are three selectable data source types, these are:

- HE -> Gyrocompass
- HC -> Magnetic compass
- GP -> GPS compass

Via the dipswitches one of these data source types can be selected at a time. See figure below for the location of the dipswitches and the configuration settings.

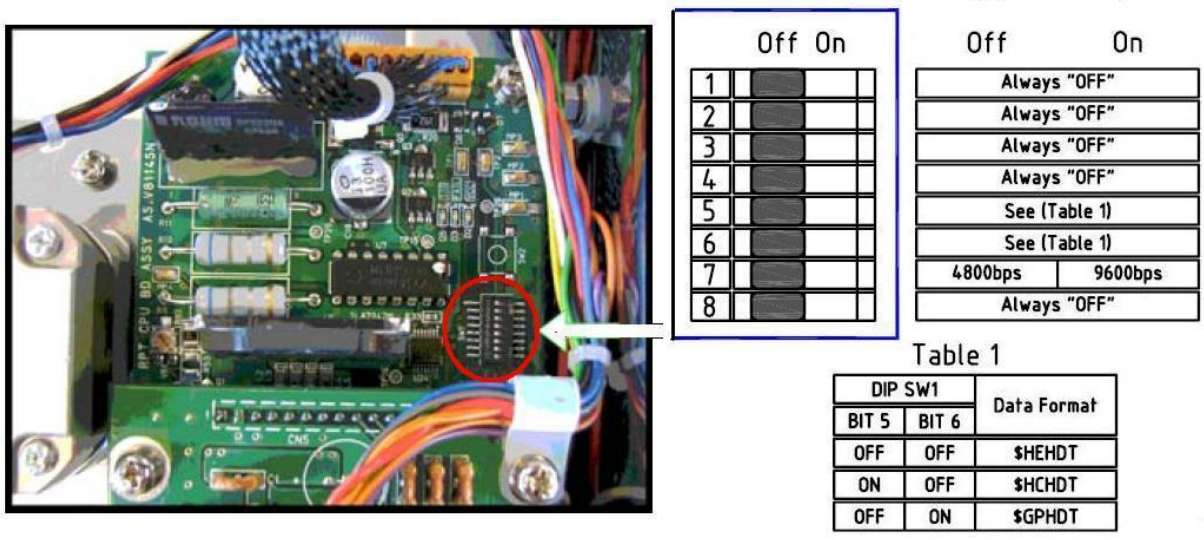

Figure 6: Dipswitch setting Alphacourse G

By default the Alphacourse G is set to:

- 4800 bps(Baudrate)
- Accepted sentence: $HEHDT

5 OPERATING Alphacourse G

In this section the operating of the Alphacourse G is explained.

5.1 Operation ESSENTIALS

For operation, the Alphacourse G has one push-button(SYNC) and one rotating knob(Dimmer).

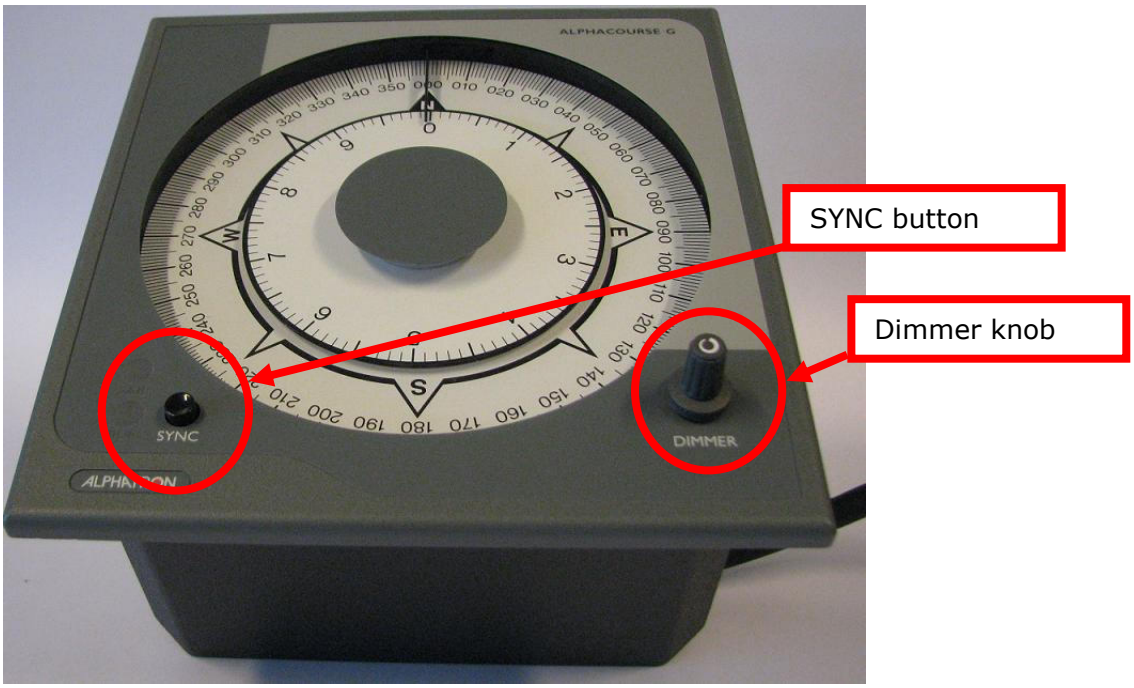

Figure 7: Operation knops of Alphacourse G

5.2 SYNC button

With the SYNC button the user can calibrate the analogue indicator of the Alpgacourse G. Once pushed on this button both analogue scales(inner and outer) will turn to zero and calibrate them selfs. During calibration the green RUN let will blink. After calibration the indicator will turn to the heading received on the serial input port.

5.3 Dimmer knob

The brightness of the backlight of the instrument can be set by rotating the dimmer knob. Turning clock-wise will increase brightness and turning anti-clock wise will decrease the brightness.

5.4 OPERATING MODES

The Alphacourse G has two working statuses:

1. Normal mode
2. Alarm mode

5.4.1 Normal operating mode

During normal mode the Alphacourse G will indicate the ships heading with one decimal accuracy. The "outer" analogue scale will indicate the heading without decimals, 0 till 360 degrees per revolution). The "inner" scale will indicate only the heading part of one decimal in front and one decimal behind the comma.

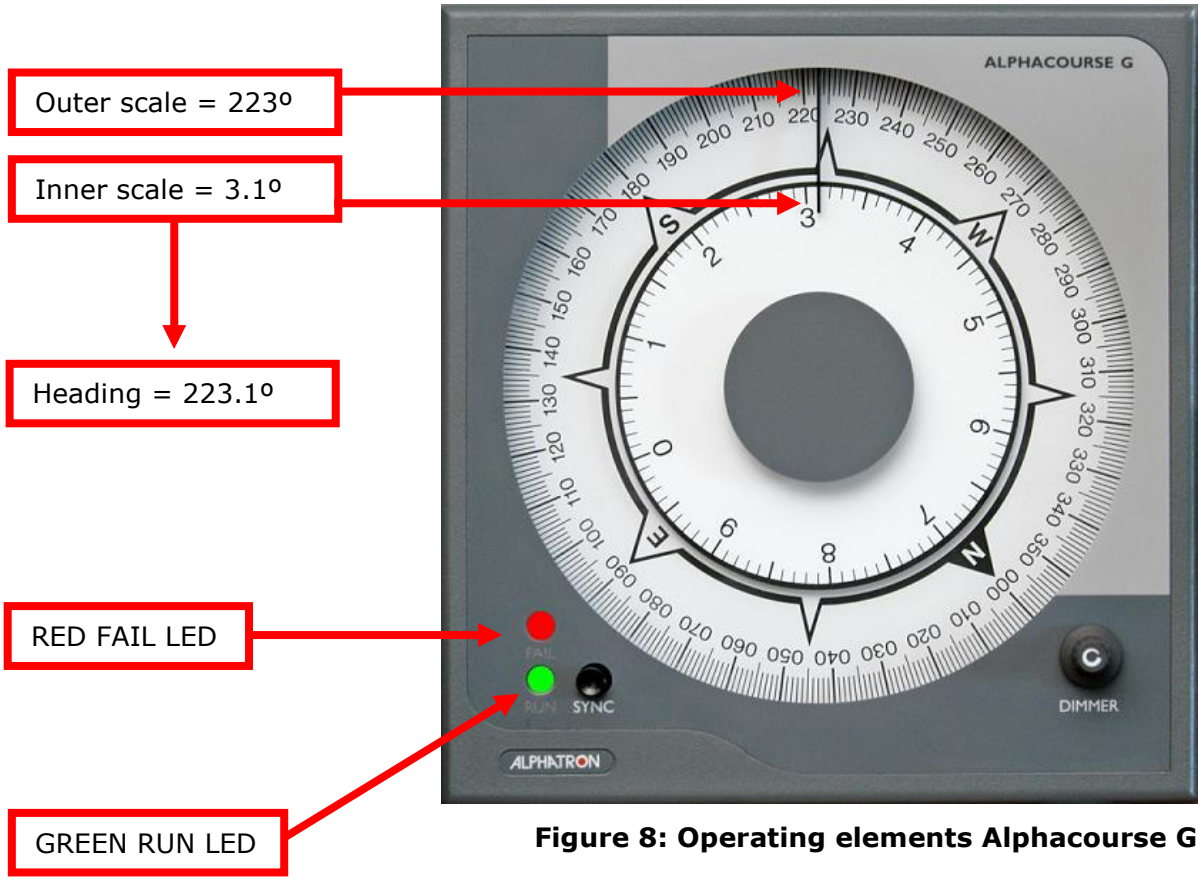

Figure 8: Operating elements Alphacourse G

If the instrument is powered the green RUN LED is lit. When the instrument is calibrating(directly after start-up or via SYNC button) the green LED will blink. See figure above.

5.4.2 Alarm mode

When the instrument has detected an error the red fail LED is lit or will blink.

<u>NOTE:</u> most of the errors are related to wrong serial data received on the serial input. Check the wire polarity and the dipswitch setting in the Alphacourse G.

The type of error indicated by the instrument can be found in Table 1: Error codes Alphacourse G.

Fail indicator lamp condition		Error contents	Causes	Countermeasure
Light off ○		Normal		
Light on ●		CPUI RAM failure or ROM failure	Broken down CPU board in connection box	Exchange CPU board
blink	Light on one time per 1.6 seconds.	Null point detection failure	Broken down optical sensor inside of repeater compass	Exchange optical sensor (It is possible to adjust null point by manually)
	●○○●○○●○○ 1.6 sec		The snapping of a wire for Optical sensor	Restore connection (It is possible to adjust null point by manually)
	Light on two times per 1.6 seconds.	Communication failure between master compass and repeater compass	•Not connected signal wire •Thesnapping of signal wire •Connected signal wire inversely	Restore connection
	●●○●●○●●○			

●: Light on ○: Light off

Table 1: Error codes Alphacourse G

If the optical sensor is broken the analogue pointer can be calibrated manually. This has to be done in the following way.

It is possible to adjust the null point manually when the automatic calibration fails. The procedure is as follows:

1. Push SYNC button for more than 2 seconds.
2. Push SYNC button(The analogue scales will turn around rapidly)
3. Push SYNC button when the outer scale value is within 0 till 10 degrees(rough adjustment) The compass will start to turn slowly now.
4. Pus SYNC button when the compass inner scale aligns with the 0 degrees lubber mark.(fine adjustment)

After 3 seconds the fail indicator LED will be turned off and the Alphacourse G should indicate the same heading as the ships master compass. CHECK if this is so!!!

If there is still a miss-alignment than repeat the above procedure till there is no difference between the master compass and the Alphacourse G.

6 COMPASS SAFE DISTANCE

The magnetic compass save distance of the Alphacourse G is given below:

STANDARD MAGNETIC COMPASS: 0.8m
STEERING MAGNETIC COMPASS: 0.8m

7 TECHNICAL SPECIFICATIONS

In this chapter the technical specifications of the Alphacourse G are given. The technical specifications are divided into electrical, environmental and mechanical specifications.

7.1 ELECTRICAL SPECIFICATIONS

Electrical:

Parameter	Value	Comments
Operating voltage	18-36 Volts	DC voltage
Power consumption	0.6A max	
Reverse battery protection	No	Automatic fuse will trip
Output(s)	No	
Safe compass distance	0.8 meter	

7.2 ENVIRONMENTAL SPECIFICATIONS

Environmental:

Parameter	Value	Comments
Operation temperature	-10°C to +50°C	
Storage temperature	-10°C to +50°C	

7.3 MECHANICAL SPECIFICATIONS

Mechanical:

Parameter	Value	Comments
Size	200x210x141mm	
Weight	2.7 Kg	

8 TECHNICAL SUPPORT

Please contact Alphatron Marine B.V. for technical support regarding the ALPHACOURSE G:

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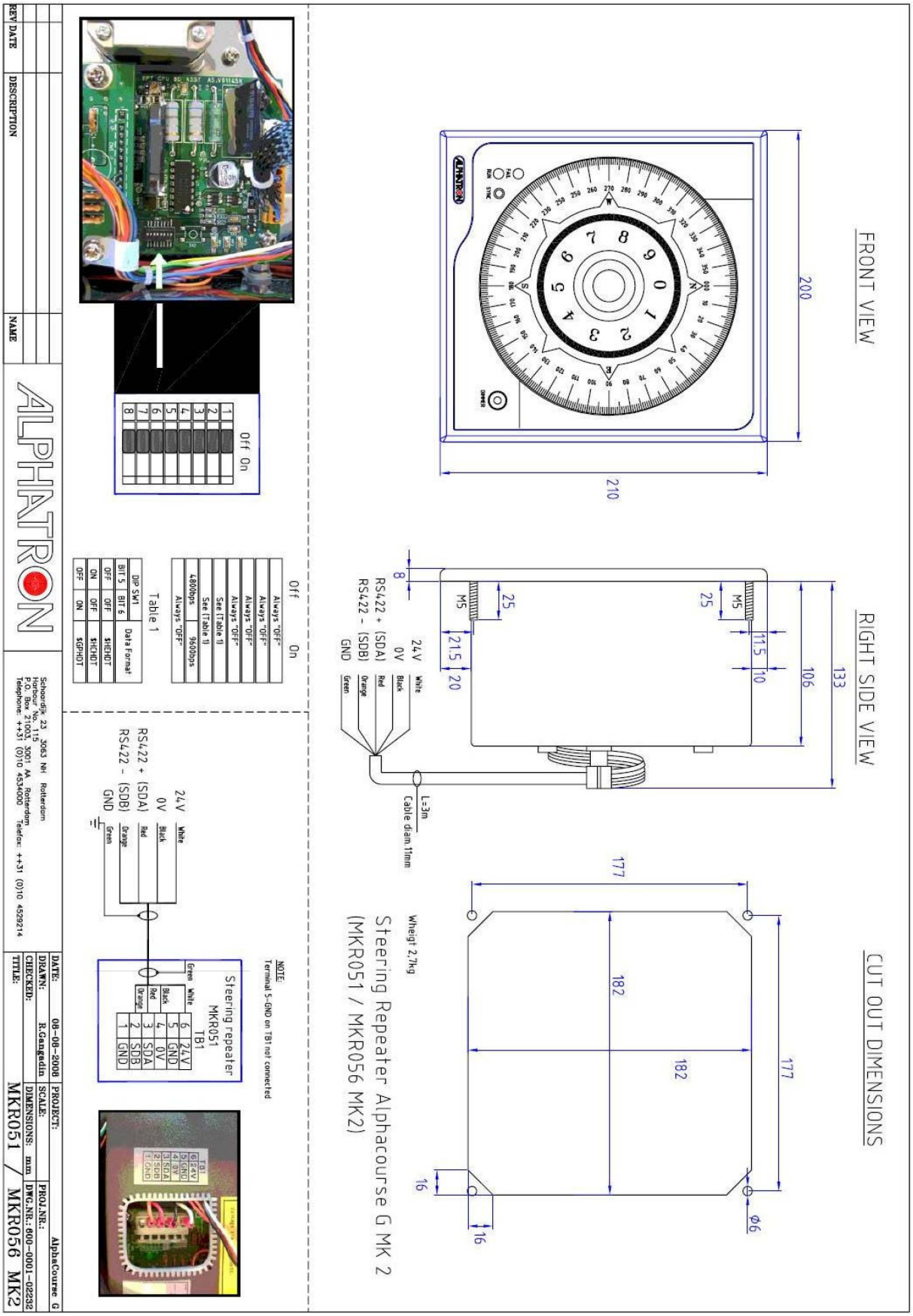
9 Appendix 1: Connection diagram



10 Notes:

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