SIMRAD

GC80/85 Compact MK2

User Manual

ENGLISH

www.navico-commercial.com

Document history

Rev. 001	First issue.
Rev. 002	Added trademark section, disclaimer, and copyright section. Added section about Master compass power switch.
Rev. 003	Updates to BAM conn. ext. cables, alarm code list, notes added.

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1 PREFACE

1.1 Compliance statement

Navico declare under our sole responsibility that the GC80/85 conform with the requirements of:

- The European Council Directive 2014/90/EU on Marine Equipment modified by Commission Implementing Regulation (EU) 2019/1397 - Wheelmark.

All compliance documents are available in the product's section at the following website: www.navico-commercial.com

1.2 Disclaimer

As Navico is continuously improving this product, we retain the right to make changes to the product at any time which may not be reflected in this version of the manual.
Please contact your nearest distributor if you require any further assistance.
It is the owner's sole responsibility to install and use the equipment in a manner that will not cause accidents, personal injury or property damage. The user of this product is solely responsible for observing maritime safety practices.
NAVICO HOLDING AS AND ITS SUBSIDIARIES, BRANCHES AND AFFILIATES DISCLAIM ALL LIABILITY FOR ANY USE OF THIS PRODUCT IN A WAY THAT MAY CAUSE ACCIDENTS, DAMAGE OR THAT MAY VIOLATE THE LAW.
This manual represents the product as at the time of printing. Navico Holding AS and its subsidiaries, branches and affiliates reserve the right to make changes to specifications without notice.

Governing language

This statement, any instruction manuals, user guides and other information relating to the product (Documentation) may be translated to, or has been translated from, another language (Translation). In the event of any conflict between any Translation of the Documentation, the English language version of the Documentation will be the official version of the Documentation.

1.3 Copyright

1.4 Trademarks

Navico® is a registered trademark of Navico Holding AS.

Simrad® is used by license from Kongsberg.

1.5 About this manual

Intended audience

This manual is intended as a reference guide for installing, operating and maintaining the Simrad GC80/85 Expanded MK2 Gyro compass.

The manual assumes that the operator is a qualified ship officer, or is under supervision of a qualified person.

Important text conventions

In this manual, references to buttons on the operator panels are written in boldface, but in a different text style (e.g. **SET** button, **DISP** button, **GYRO** button).

Important text that requires special attention from the reader is emphasized as follows:

Note! *Used to draw the reader's attention to a comment or some important information.*

Caution *Used for warning the reader that a risk of damage to the equipment exists if care is not exercised.*

WARNING **Used when it is necessary to warn personnel that a risk of injury or death exists if care is not exercised.**

This manual is divided into the following sections:

1. Preface

2. System overview

An overview of the GC80/85 Compact Gyro system and its components.

3. User interface

An overview of the GC80 Compact MK2 Control unit and the user interface.

4. Operation

Main operating procedures for using the GC80/85 Compact MK2 Gyro compasses.

5. Maintenance

Simple maintenance procedures that should be performed by the system operator, together with a complete procedure for how to replace the Sensitive element and fuses.

6. Installation

Mechanical installation, cable connection, and software configuration for the GC80/85 Compact Gyro system.

7. Advanced settings

A description of parameters that can be entered or changed in the Extension menu.

8. Technical specifications

Specifications for the system and for all separate units in the GC80/85 Compact Gyro system.

9. Drawings

Dimensional drawings and wiring diagrams for the GC80/85 Compact Gyro system.

10. Part list

List of all standard and optional units that are used in the GC80 and GC85 Compact Gyro systems.

11. Terminal layout

List of all terminal pins and terminal labelling with details on PCBs in the GC80 Control unit.

12. DIP switch settings

Drawings and references of jumpers and DIP switches for the different printed circuits boards in the Control unit.

13. Alarm messages and corrective actions

A description of how system errors are indicated and corrective actions that can be performed by the operator.

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2 SYSTEM OVERVIEW

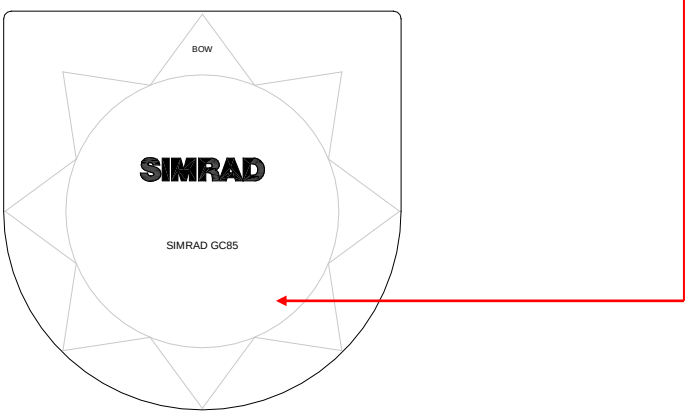
This section provides an overview of the GC80 and GC85 Compact MK2 Gyro compasses and their components.

2.1 Introduction

GC80 and GC85 Compact MK2 Gyro compasses have been designed for any size of vessels to enhance the navigational 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.

GC80 and GC85 Compact Gyro systems have different Sensitive elements, but use the same GC80 Compact MK2 Control unit. The systems are identified by divergent DIP switch settings in Master compass and in the Control unit.

Note! *A GC80 or GC85 system is identified by the labelling on top of the Master compass' case as shown in the figure below.*
The labelling on the Control unit is identical for both Gyro systems.



2.2 Precautions in use

The GC80/85 Compact MK2 Gyro compasses display and outputs bearing information. Although the system continually checks for faults while the system is running, failures or malfunctions may occur.

Any errors in input information will generate an alarm. These errors may also cause large jumps in the output bearing from the Gyro compass. If this happens, any external equipment depending on the bearing output from GC80/85 should be operated manually or switched to other bearing sensors.

To assure long time safe operation, the following precautions should be taken:

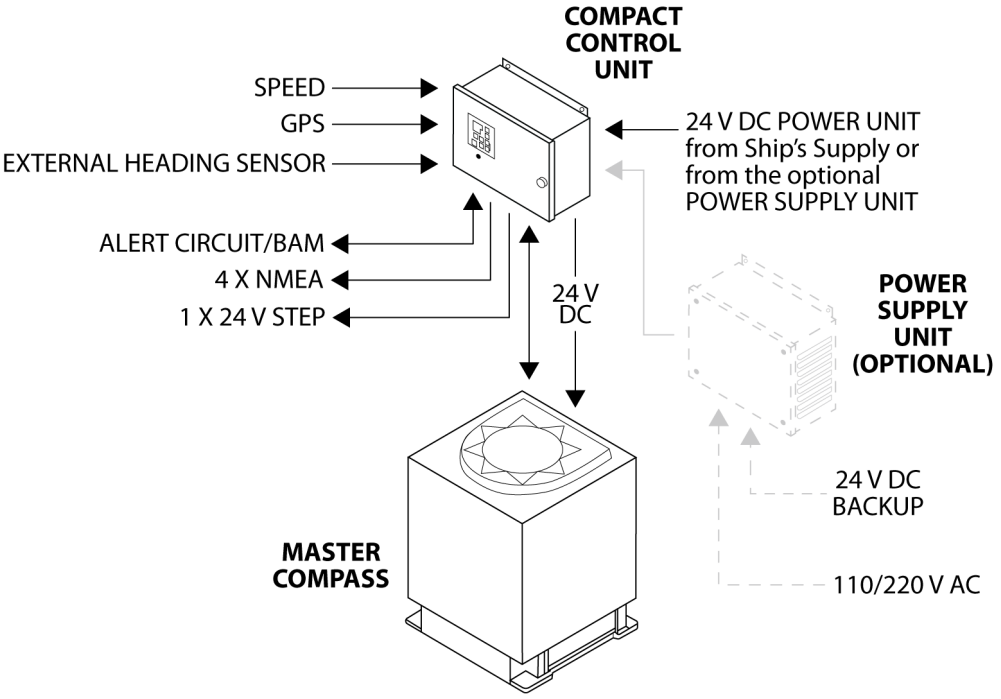
- Assure that the operator is familiar with the use of the Gyro compass.

- Perform daily checks to maintain normal system operation. Refer MAINTENANCE page 33 onwards.
- If any unusual behavior is observed during daily inspections, the cause should be found and corrected. If necessary, the local Simrad dealer should be contacted.
- If any alarm is generated, verify the reason for the alarm.

2.3 System components

A GC80/85 Compact Gyro compass includes the following units:

- Master compass with Sensitive element
- Compact MK2 Control unit
- Power Supply unit (Optional)



Note! *For details, refer **TECHNICAL SPECIFICATIONS**, page 76.*

2.4 Bearing repeaters

GC80 and GC85 outputs step and serial signals used for repeaters. Even when the emergency power supply is used, the connected repeaters will be powered by the repeater backup function included in GC80/85.

The following serial signals may be selected:

Lo speed: IEC61162-1 ed.4 (4800 and 38400 baud possible)

High speed: IEC61162-2 ed.1 (38400 baud possible)

Note! *A proprietary Tokimec serial signal may also be available, but this is normally not used.*

These signals may be set separately for each circuit. For connection of repeaters, refer to the wiring diagrams from page 84 onwards.

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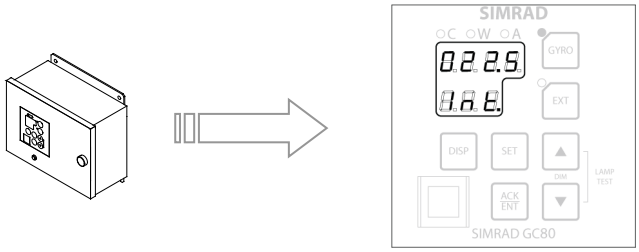
3 USER INTERFACE

This section gives an overview of the GC80 Compact MK2 Control unit and the user interface.

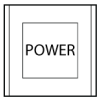
3.1 GC80 Compact MK2 Control unit

The Control unit includes the Control panel for the Gyro compass.

A flush mount kit (part number 27101757) may be ordered from Simrad for remote installation of the Control panel. Refer ***Flush mounting the Control panel***, page 47.



POWER button

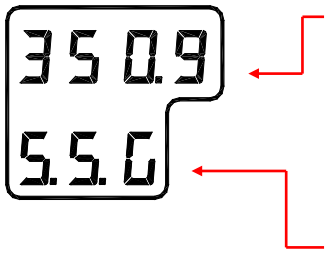


Used for turning the Gyro system ON. The button will be lit to indicate that power is supplied to the system. Refer

System start-up and shut-down, page 19.

Display

The LCD displays data in 2 rows: the upper row shows data and the lower row shows active mode.



- The Data indicator consists of 4 7-segments red LEDs. The indicator is used to display the vessel's bearing, latitude and speed. Refer ***Displaying present settings*** page 22.
  The Data indicator is also used for displaying alarm codes as described from page 29 onwards.
- The Mode indicator consists of 3 7-segments green LEDs. The Mode indicator displays codes used for identifying input type for bearing, latitude and speed.

GYRO button

Used to select the Gyro compass as the active heading reference source. The status lamp is lit to indicate that the Gyro system is active.

Refer ***Selecting active compass*** page 21.

EXT button

Used to select the external heading source as the heading reference. The status lamp will be lit to indicate that the external heading reference source

is active.

Refer *Selecting active compass* page 21.

DISP button

Used to display data on the LCD. Refer *Displaying present settings* page 22.

SET button

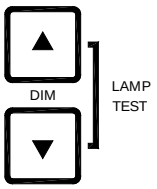
Used to change data and input sources. Refer *System start-up and software configuration* page 61 onwards.

ACK/ENT button

Used to confirm a change in data and input sources. Refer *System start-up and software configuration* page 61 onwards.

The button is also used to acknowledge an alarm as described in *Acknowledging an alarm,* page 31.

ARROW buttons



Used to increase or decrease a parameter value. Refer *System start-up and software configuration* page 61 onwards.

Also used for lamp testing and for setting the display illumination as described on page 21.

Alarm indicators

Used to indicate an alarm situation. Refer *Alarm messages*, page 30.

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4 OPERATION

This section describes the main operating procedures used when operating the GC80/85 Compact MK2 Gyro compasses.

4.1 System start-up and shut-down

A GC80/85 Compact Gyro system is usually left with power on. If the system has to be shut down and restarted, follow the procedures described in the following sections.

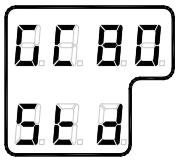
Start-up

Caution

Before the Gyro compass is turned into normal operation, it has to be configured according to the description in System start-up and software configuration page 61 onwards.

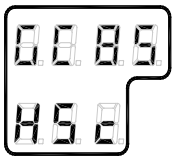
1 Turn ON the Gyro system by pressing the **POWER** button on the Control panel. Follow the start-up sequence.

2 Control unit type (GC80 Std, or GC85 HSc), software version for Control unit and for Master compass is displayed in rapid succession. Examples of display text are shown below:

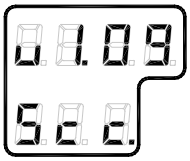


GC80 CONTROL UNIT STD VERSION

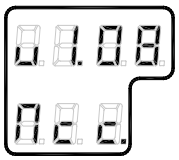
OR



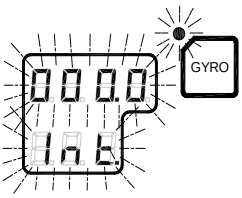
GC80 CONTROL UNIT HIGH SPEED VERSION



SOFTWARE VERSION CONTROL UNIT



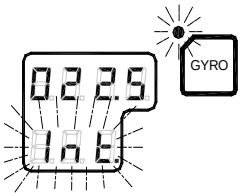
SOFTWARE VERSION MASTER COMPASS



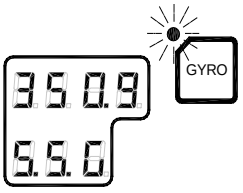
3 If the rotor is not completely stopped when the POWER button is pressed, a rotor break function will be activated to stop the rotor.

Active rotor break is indicated with flashing display.

4 When the turning stops, the Sensitive element starts rising horizontally and the compass rotates 360° clockwise. The display shows decreasing bearing as the compass is turning.



5 When the compass has rotated 360°, start bearing is indicated with flashing text in the display. The start bearing will be the same as active bearing when the compass was turned OFF.



6 The indicated start bearing is accepted by pressing the **ACK/ENT** button, or increased/decreased by using the **ARROW** buttons and then 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 lamp and the S.S.G. (mode) continues to flash.

7 The rotor will now start rotating, and reaches full speed after maximum 30 minutes.

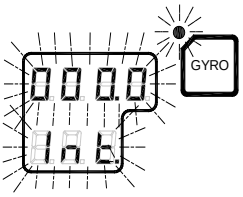
8 When the rotor has reached full speed, the compass starts the north seeking function. The display will now change to show the compass' actual heading, and from now on bearing output will be available.

The lamp near the **GYRO** button changes from flashing to steady light, but the S.S.G. (mode) continues to flash for 3 hours.

The GC80/85 will be settled within 3 hours when started with a deviation angle less than 5°. With a larger deviation angle, the compass will be settled within 4 hours.

Turning the Gyro compass OFF

1 Press the **POWER** button on the Control panel. The light in the **POWER** button will be switched off.



2 Re-press the **POWER** button to activate the rotor break function. The light in the **POWER** button will be lit again.

Active rotor break is indicated with:

- flashing display
- a soft clicking sound heard from the Gyro compass

The rotor break function will be active for maximum 4 minutes.

Caution

It is very important that the rotor break is activated to stop the rotor rotation to prevent any possible damage by ship's movement!

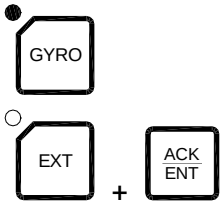
3 Press the **POWER** button again to shut down the Gyro compass when both the data and the dot in the display change from flashing to steady light.

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

4.2 Selecting active compass

If an external heading sensor is connected to the GC80/85, it is possible to toggle between Gyro and external heading sensor as active steering sensor.

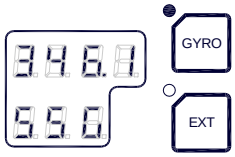
The Gyro system will normally be used with the Gyro compass selected as active compass. An external heading sensor should only be used as active compass when the Gyro compass is not working properly.



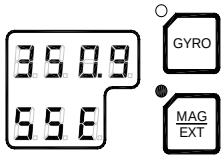
By pressing the **GYRO** or the **EXT** and the **ACK/ENT** buttons simultaneously, the GC80/85 will toggle between using the Gyro compass or an external sensor as active sensor.

When the active sensor is changed, an audible alarm will sound 3 times.

Active compass is identified with light in the button's indicator lamp, and with active compass type in the LCD as shown in the figures below.



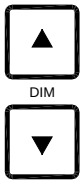
GYRO COMPASS SELECTED AS ACTIVE STEERING SENSOR



EXTERNAL HEADING SENSOR SELECTED AS ACTIVE STEERING SENSOR

WARNING **Changing active compass may result in large change of true bearing. No changes should therefore be made when the system is operating.**

4.3 Adjusting dimming level



The display illumination and the light intensity in the indicator lamps can be increased or decreased in 5 steps by pressing the **ARROW** buttons.

When the illumination is set to the lowest level, a faint light is still present in the display, Alarm indicator, status lamp and **POWER** button.

Panel lamps and display segments may be tested by pressing both **ARROW** buttons simultaneously. All lamps and display segments will be lit, and a short audible alarm will be activated.

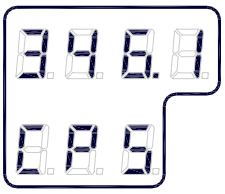
4.4 Displaying present settings

When pressing the **DISP** button on the GC80 Control unit, the system will loop through a display sequence showing present settings for the system.

The sequence will depend on whether an external compass is connected or not. When an external compass is connected, the readout will depend on active compass.

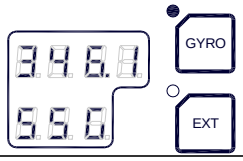
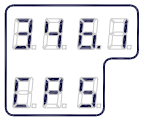
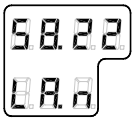
The following sections; ***Displaying settings <u>with no</u> external sensor connected*** and ***Displaying settings <u>with</u> external sensor connected***, show examples of how the present settings are presented by pressing the **DISP** button.

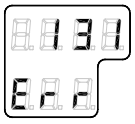
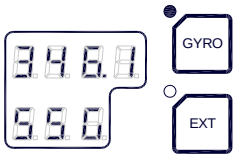
The display will be used as follows:



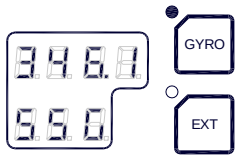
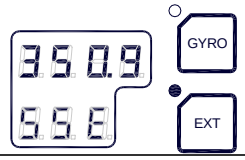
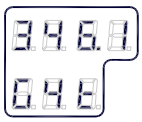
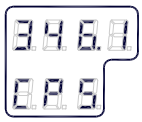
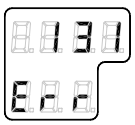
- The first row in the display will show the value
- The second row displays code used for identification

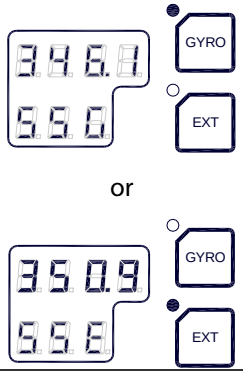
Displaying settings <u>with no</u> external sensor connected

Display state	Display	Description
Normal operation		- True output bearing - Active compass
 1st press on **DISP** button		- Gyro compass bearing without correction - Active speed input source indication (**GPS**, **Manual**, **Log** or **Serial Log**)
 2nd press on **DISP** button		- Latitude - Latitude indication: north (**LA.n**) or south (**LA.s**)
 3rd press on **DISP** button		- Vessel speed - Speed input indication (**GPS**, **Manual**, **Log** or **Serial Log**)
 4th press on **DISP** button		- Rate of turn in °/min - Rate of turn indication

Display state	Display	Description
 5th press on **DISP** button		- Error codes (up to 4) - Error indication
 6th press on **DISP** button Normal operation		- True output bearing - Active compass

Displaying settings <u>with</u> external sensor connected

Display state	Display	Description
Normal operation	 or 	- True output bearing - Active compass The compass indication equals the sensor selected as active compass (Gyro or external)
 1st press on **DISP** button	 or 	- Bearing - Passive compass
 2nd press on DISP button		- Gyro compass bearing without correction - Active speed input source indication (**GPS**, **Manual**, **Log** or **Serial Log**)
 3rd press on DISP button		- Latitude - Latitude indication: north (**LA.n**) or south (**LA.s**)
 4th press on DISP button		- Vessel speed - Speed input indication (**GPS**, **Manual**, **Log** or **Serial Log**)
 5th press on DISP button		- Rate of turn in °/min - Rate of turn indication
 6th press on DISP button		- Error codes (up to 4) - Error indication

Display state	Display	Description
 7th press on DISP button Normal operation		- True output bearing - Active compass

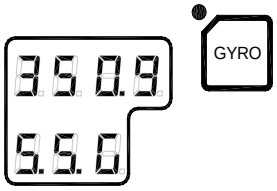
4.5 Confirming present settings

After the GC80 is configured according to the ***System start-up and software configuration*** described on page 61 onwards, it should not be necessary to adjust any settings when operating the Gyro compass.

However, if an error is reported in any of the input sources, it may be necessary to choose a different input source.

True bearing

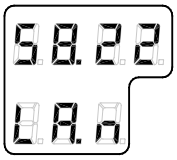
Make sure that the Gyro compass is selected as active compass. Refer ***Selecting active compass*** page 21.



Confirm that the Gyro compass' displayed true bearing is according to a known target or astronomical observation.

If there is any difference, adjust the bearing according to ***Adjusting True heading***, page 66.

Latitude



Press the **DISP** button until the vessel's latitude is displayed.

The displayed latitude value is calculated based on the vessel's true bearing and the vessel's actual speed. Refer ***Setting the Latitude input source*** and

If GYRO is selected you need to verify that GPS connection is set to Non in extension menu A-2, 2.9.G.

Setting the Speed input source, page 63 onwards.

- If GPS is selected as latitude input source, the latitude obtained from the GPS is displayed on the LCD. Confirm that the displayed latitude is the same as indicated on the GPS indicator.
- If GYRO (manual setting of latitude) is selected as latitude input source and other than MANUAL selected as the vessel's speed input source, the latitude will be automatically updated. In this case, the indicated latitude should be confirmed every 4th hour

when the vessel is in harbor. If there is any significant difference between the displayed value and the vessel's actual latitude, the value should be adjusted according to ***Setting the Latitude input source***, page 63.

Note! *When **GYRO** is selected as latitude input source and **MANUAL** is selected as the speed input source, the indicated latitude value will not be updated and hence an error may occur.*

Speed

The GC80/85 Gyro compasses calculate bearing based on the speed and latitude information that is input to the Gyro as speed source. Any error in speed input will therefore cause incorrect true bearing.

Press the **DISP** button until the vessel's speed information is displayed.

Confirm every 4th hour that the displayed speed is the same as the vessel's actual speed.

Any discrepancy between displayed speed and actual speed is corrected as described in

If GYRO is selected you need to verify that GPS connection is set to Non in extension menu A-2, 2.9.G.

Setting the Speed input source, page 64.

Speed error correction

All Gyro compasses will generate a heading error caused by the vessel's speed and earth rotation. GC80/85 calculates this error based on latitude and speed input information, and automatically corrects the bearing signal output. If no speed information is available, the Gyro compass will output a heading error either westwards or eastwards depending on the vessel's course.

If speed information is unavailable, the figure on the next page may be used to manually calculate the heading error.

In this figure, the following values are used as examples:

- Latitude: 40°
- Vessel speed: 16 knots
- Vessel heading: 30°

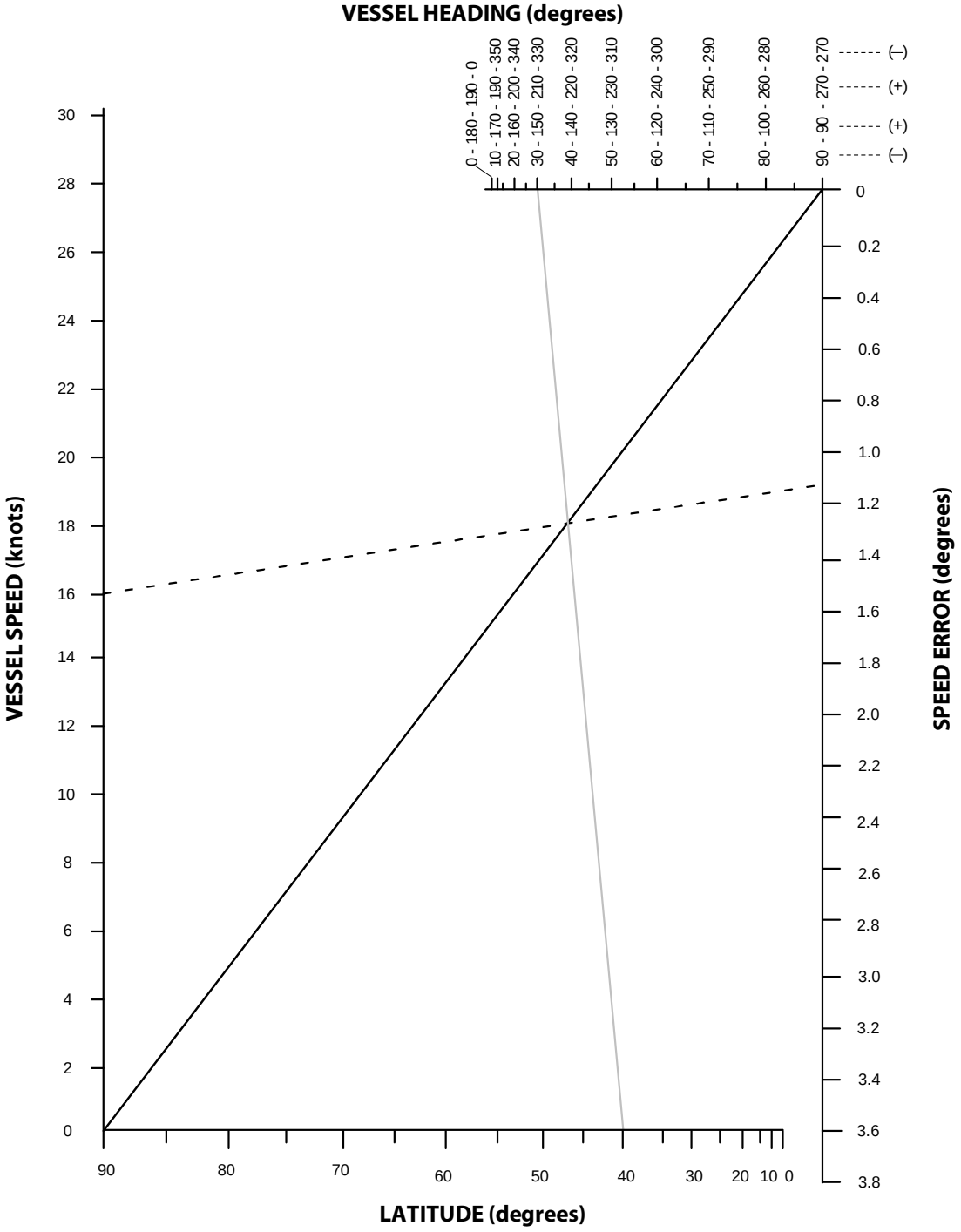
The heading error is found by:

1 Drawing a line between the latitude and the vessel's heading (shown with gray line in the figure).

2 Drawing a straight line (broken line in the figure) between the vessel's speed and the point where the latitude/heading line intersects with the solid black line in the figure.

In the example above, the figure shows a speed error of appr. 1.1° and the true bearing should then be 30°-1.1° = 28.9°.

Note! *When the course is within 270° - 0° - 90°, true heading is found by subtracting the speed error from the compass heading.*
If the course is within 90° - 180° - 270°, true heading is found by adding the speed error to the compass heading.


VESSEL HEADING (degrees)
0 - 180 - 190 - 0
10 - 170 - 190 - 350
20 - 160 - 200 - 340
30 - 150 - 210 - 330
40 - 140 - 220 - 320
50 - 130 - 230 - 310
60 - 120 - 240 - 300
70 - 110 - 250 - 290
80 - 100 - 260 - 280
90 - 90 - 270 - 270
------ (–)
------ (+)
------ (+)
------ (–)
VESSEL SPEED (knots)
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
SPEED ERROR (degrees)
0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
2.2
2.4
2.6
2.8
3.0
3.2
3.4
3.6
3.8
90
80
70
60
50
40
30
20
10
0
LATITUDE (degrees)

4.6 Pendulum function

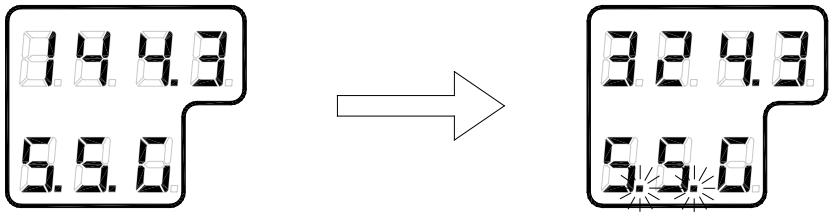
GC80/85 software includes a pendulum function that enables the heading to be changed by 180°.

The heading change is activated by closing a potential free contact connected between TB1-2, pin 25 and 26 in the GC80/85 Control unit.

Note! *To enable the function, S2-4 on the ICNT board has to be set to ON. Refer* ***DIP switch settings on ICNT board****, page 103 onwards.*

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

- The compass heading and repeaters change by 180° from the heading.
- An acoustic alarm sounds 5 times.
- The dots in the indicator field in the display start flashing. These will remain flashing for as long as the pendulum function is active.



Normal compass operation is resumed by opening the closed potential free contact. The function is indicated with the same acoustic alarm, and the flashing dots return to fixed illuminated dots.

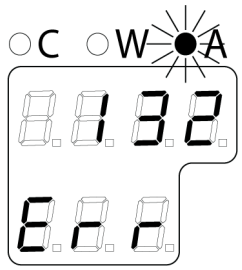
Note! *When this pendulum function input is activated, the external buzzer stop input will not be available. Refer* ***DIP switch settings on ICNT board****, page 103 onwards.*

4.7 Alarm messages

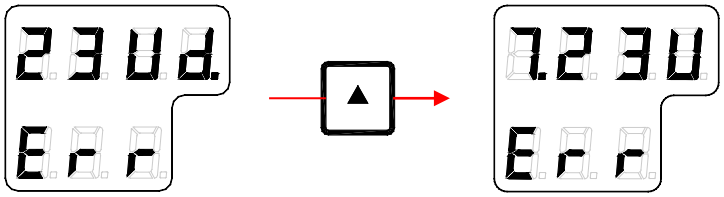
The GC80/85 system will continually check for faults while the system is running.

If a fault occurs, an alarm code will be displayed in the LCD, the Alarm lamp will be flashing, and an audible alarm will be activated.

Up to 4 alarm codes may be displayed in the LCD at the same time to indicate that several alarm situations are present. The last activated alarm will be displayed on the right side of the display. The figure shows that alarm codes 1, 3 and 2 were generated in that order.



If more than 4 alarms are active, this will be indicated with a dot behind the last number as shown in the figure below. Further alarm codes may then be displayed by pressing the "**ARROW UP**" button.



The example shows that alarm codes 2, 3, U, d and 7 were activated.

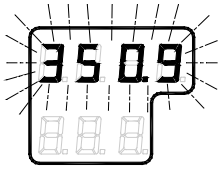
Caution

When an alarm is generated, bearing information from the GC80/85 may not be present or may have large error. Any equipment using bearing information from the Gyro compass should therefore immediately be operated according to the equipment's emergency operating procedure.

Acknowledging an alarm

An alarm is acknowledged by pressing the **ACK/ENT** button.

- The audible alarm will be silenced.
- If the alarm situation has disappeared, the alarm lamp will be switched off and the alarm code will be removed from the LCD.
- If the alarm situation continues, the alarm lamp will switch from flashing to steady light. The LCD will return to show true bearing with flashing numbers to indicate that the bearing may have large errors.



An alarm code for an active error may be recalled by pressing the **DISP** button until the alarm code is shown on the display. It is possible to recall any alarm code in the LCD as long as the alarm situation is present.

The *Complete alarm code list* section, page 116, has a complete list of alarm codes.

Internal buzzer silence only

By installing an external acknowledging switch, it is possible to silence the buzzer while the alarm code remains in the display.

Install the switch to the Control unit according to the Wiring diagrams on page 83 onwards.

Note! *Could only be used if no pendulum switch is installed!*

External buzzer silence output

By using an internal output contact, it is possible to silence an external buzzer when alarm ack. is operated.

Ref. Wiring diagrams on page 83 onwards.

Note! *Could only be used when RUNNING contact is not required.*

Central Alarm Panel

On some installations, it is required to connect the Gyro to an external bridge alarm panel. In these types of installations, the functions mentioned above and the alarm contact output are used to fulfil this requirement.

BAMS

It is possible to connect to a BAM system via serial connection, ref. *BAMS complete alarm code list* on page 118 onwards.

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5 MAINTENANCE

This section describes maintenance procedures that should be performed by the system operator.

The section also includes a detailed description of how to replace the Sensitive element and the fuses.

5.1 General

All units in the GC80 system are designed for optimum safety and reliability. However, a limited amount of preventive maintenance should be performed to verify safe operation and durability.

If any strange motion, smell, sound or heat is generated from any unit, please contact a Simrad dealer.

5.2 Precautions

Touching internal parts may cause electric shock if power is connected to the system, even if the **POWER** button is turned OFF. Do not touch any terminal board or power supply unit while maintaining and checking the system. If necessary, disconnect the power cable from the Control unit.

Electrostatic charges may damage components on the circuit boards inside the units. Always wear a correctly connected earthing strap when opening the units.

5.3 Cleaning the operator panels and the cabinet surface

Use a vacuum cleaner with a soft brush to avoid damaging the buttons and the panel. If required, clean the buttons and panel with a non-abrasive cloth moistened with mild soap solution.

5.4 Checking the connectors

The connectors should be checked by visual inspection only. Push the connector plugs into the connector. If the connector plugs are equipped with a lock, ensure that this is in the correct position.

5.5 Checking mechanical installation

Vibration and shock may cause mechanical parts to loosen. All fastening screws should therefore be checked regularly and eventually tightened.

5.6 Preventive maintenance intervals

Local evaluations should be made to determine site-specific maintenance intervals.

ACTION	INTERVAL RECOMMENDED
Confirm that the value of each repeater synchronizes with the displayed true bearing on the Operator panel.	Daily
Confirm that the displayed latitude and speed are according to the vessel's actual latitude and speed.	Daily
Check connectors	Every 6 months
Tighten fastening screws	Every 6 months
Clean panels and cabinet	Once a year or as required
Clean slip rings and brushes. Lightly apply "WD40 oil".	Every 2nd year
Replace sensitive element	MTBF (Mean Time Before Failure) is 35000 hours (4 years). On vessels in critical operations we recommend 4-5 years. On vessels in non-critical operation (can operate with backup) we recommend 6-8 years or when it fails.

5.7 Replacing the Sensitive element

Caution ***The Sensitive element should only be replaced by authorized Simrad personnel.***

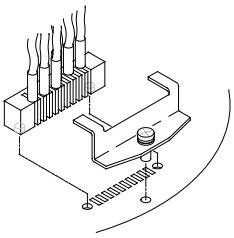
Note! *A special tool is required when installing the Sensitive element. This tool is optional and must be ordered from Simrad (part no. 44174449).*

Mechanical installation

Caution ***Use extreme caution when handling the Sensitive element! Do not tilt the element. It is filled with oil and the top includes a ventilation opening.***

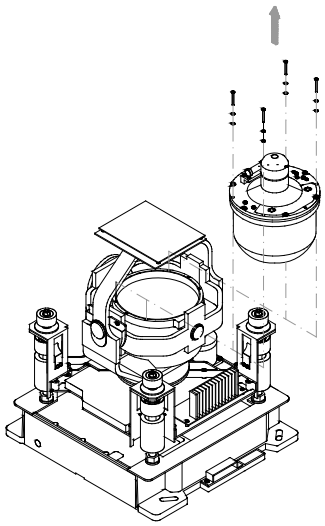
1 Ensure that the power is disconnected from the Control unit.

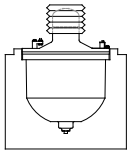
2 Remove the 4 screws securing the compass case, and carefully lift the case upwards and away.



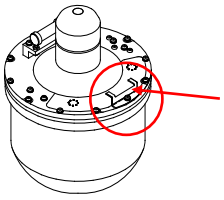
3 Loosen the screw on the plug-holder on the Sensitive element, and disconnect the plug.

4 Remove the 4 screws securing the Sensitive element. Tilt the Horizontal ring to the side where the plug is located, and carefully remove the element from the compass.





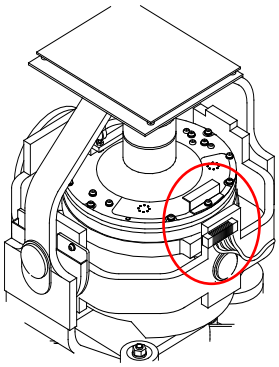
5 Place the defective Sensitive element in its original package, and put the rubber tube on top of the element.



6 Fasten the screw on the plug holder on the defective Sensitive element.

7 Lift the new element carefully from its package, and remove the rubber tube on top of the element.

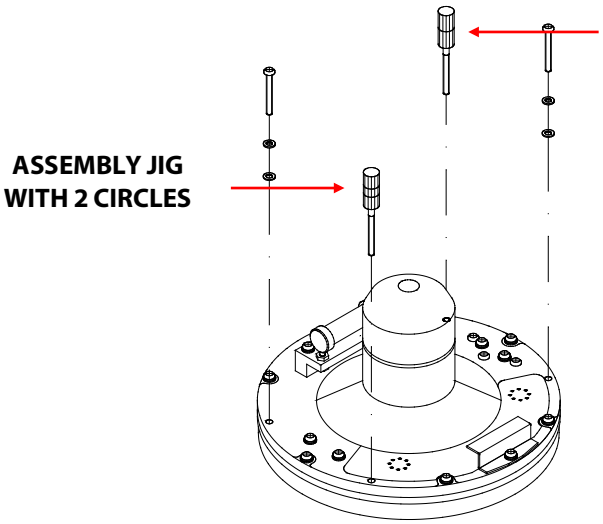
Note! *The package and the rubber tube should be kept for re-use if the Sensitive element has to be sent to factory for service!*

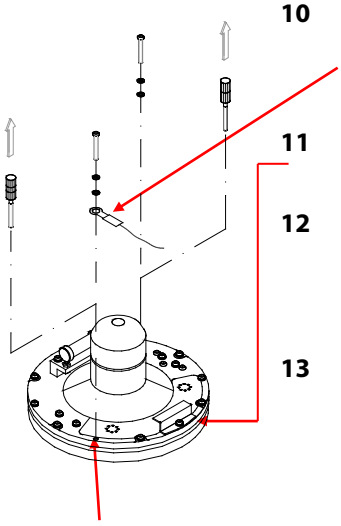


8 Tilt the Horizontal ring to the side where the plug is located, and carefully put the Sensitive element into the ring.

- The socket on the Sensitive element should be located right above the plug attached to the Horizontal ring.

9 Position the Sensitive element on the Horizontal ring by putting the assembly jigs into the holes as indicated in the figure below. Observe the rings on the jigs to ensure proper positioning. Insert and fasten the 2 screws in the other holes.



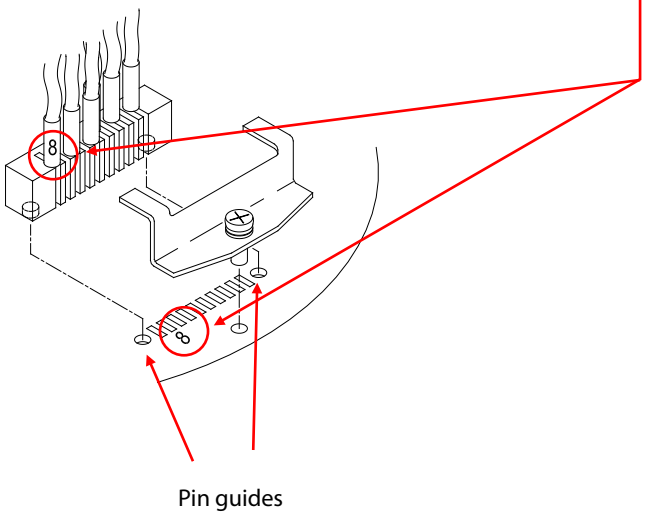


10 Replace the assembly jigs with the 2 remaining screws after placing the ground wire as shown in the figure.

11 Loosen the screw on the plug holder on the Sensitive element, and lift the holder 2-3 mm upwards.

12 Connect the plug to the connectors on the Sensitive element's PCB according to the labelling on the PCB and on the wires. Make sure that the pin guides on the plug are properly entered, and that the wires are not twisted.

13 Firmly tighten the screw on the holder.

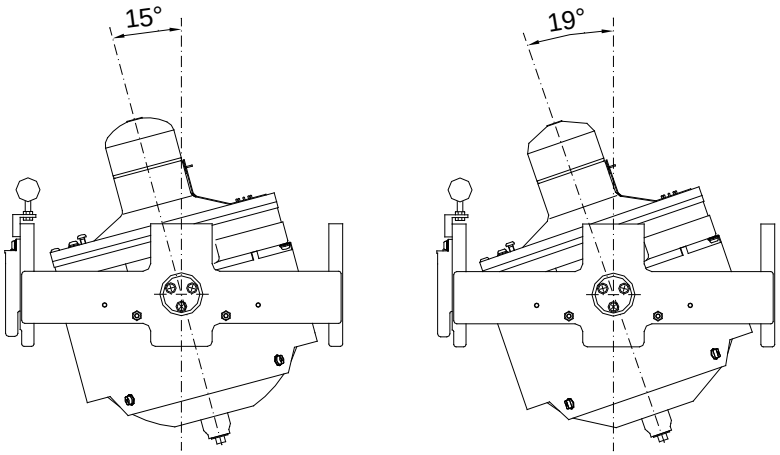


Verifying the element's tilt angle

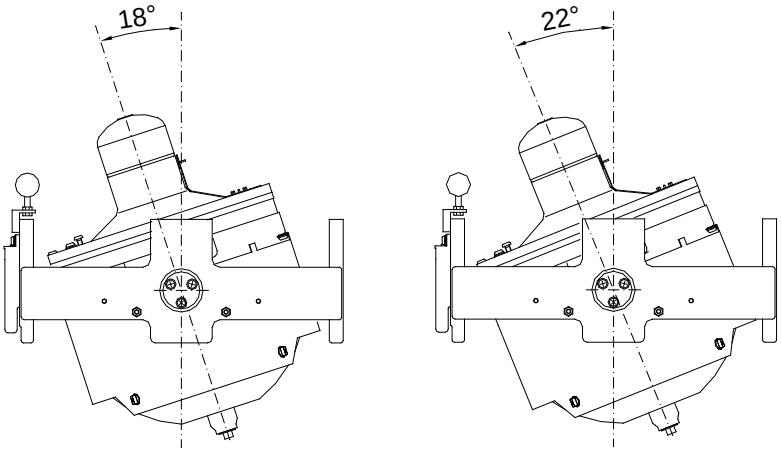
1 Tilt the Sensitive element by hand towards the reference level tool on the Horizontal ring and keep it tilted for approximately 1 minute. Remove the pressure and observe that the tilt angle remains at:

- GC80: 15° to 19°
- GC85: 18° to 22°

The tilt angle is indicated in the figures below.

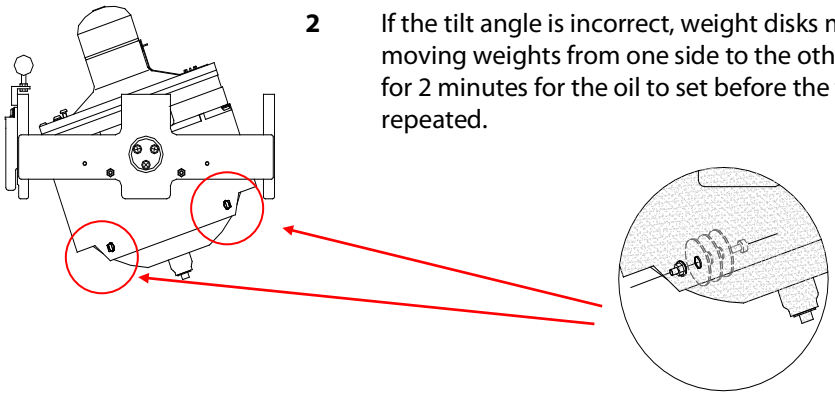


Max and min tilt angle for GC80 std system



Max and min tilt angle for GC85 High Speed system

Note! *The tilt angles shown above are correct for cold conditions. The angles may change when the element has reached normal operational temperature!*



2 If the tilt angle is incorrect, weight disks must be adjusted by moving weights from one side to the other. After adjustments, wait for 2 minutes for the oil to set before the tilt angle verification is repeated.

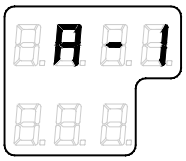
Caution

The Sensitive element must have equal number of weight disks on both weight points on the tilting side (north and south sides)!

3 Carefully rotate the Horizontal ring at least 1 complete rotation. Verify that all movable parts will rotate without making mechanical or electrical contact with any item or component.

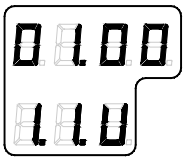
Parameter updates

When a Sensitive element is replaced, parameters for the new element have to be loaded into the GC80 Control unit before the Gyro compass is turned ON. This is done from the Extension menu as described below.



1 Open the Extension menu by pressing and holding the **SET** button and the **ACK/ENT** button simultaneously for appr. 3 seconds.

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 values will be displayed.

3 Use the **ARROW** buttons to increase or decrease the parameter value until the value is according to the table supplied with the new Sensitive element.

4 Confirm the entry by pressing the **ACK/ENT** button. The display will return to sub-category **1.1.U**, and the data will be transferred to the Gyro immediately.

5 Press the **DISP** button again to select sub-category **1.6.t**, and use the **ARROW** buttons to increase or decrease the parameter value until the value corresponds with the parameter for the new Sensitive element. Confirm the entry by pressing the **ACK/ENT** button.

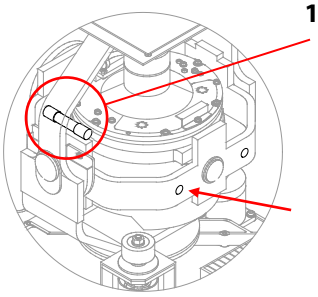
6 Exit the sub-category by pressing the **SET** button, and then exit the Extension main category by pressing and holding the **SET** and **ACK/ENT** buttons simultaneously for appr. 3 seconds.

For more information about the Extension menu, see *ADVANCED SETTINGS*, page 68 onwards.

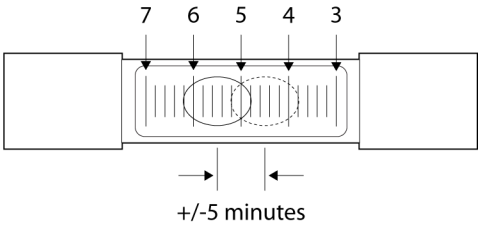
Balancing the Horizontal ring

After the Sensitive element has been replaced, the Gyro compass should be turned ON as described on page 19.

When the compass has been running continuously for at least 2 hours, the Horizontal ring should be adjusted.



1 Locate the reference level tool on the Horizontal ring, and check that the level bubble is within +/-5 minutes from the center. Each division equals 2 minutes.



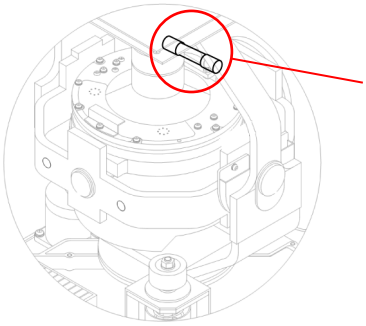
2 If the level bubble is not within this limit, add or remove weights from the Horizontal ring until it is level.

Note! *It is important that there are as few weights as possible on the Horizontal ring.*

3 Let the compass run for at least 20 minutes before the level is rechecked and eventually confirmed.

WARNING **If the Horizontal ring is tilted more than +/-5', a bearing error will be generated!**

Adjusting the Rotor balance

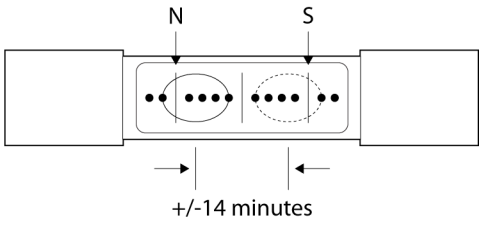


After replacing a Sensitive element, it is very important to verify the rotor balance. If necessary, adjust the rotor balance. On the Sensitive element, the reference level tool is mounted on the opposite side of the blue plug.

When the compass has been running continuously for at least 3 hours, the balancing process can start.

1 The reference center of the rotor level depends on the latitude, ref. graph on next page.

2 The rotor level can only be balanced/adjusted using the "Theta Offset" parameter (1.6.t in the extension menu A-1). The Bubble will react when the value is changed. However, it will take at least 1 hour before it is stabilized. The Bubble level should be checked again after 24 hours and adjusted if needed. The rotor level must be within +/-14 minutes from the reference center.

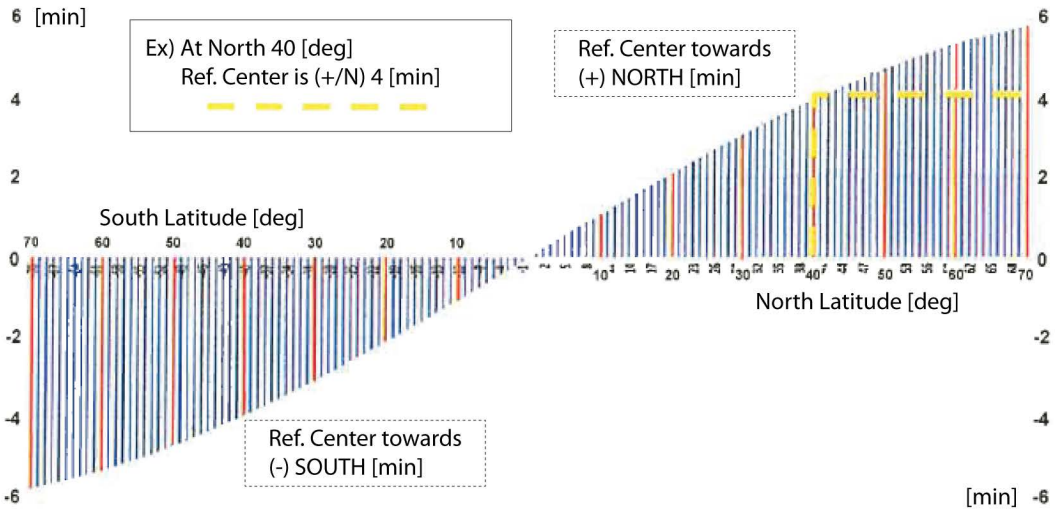


Increase Theta Offset = Bubble towards NORTH

Decrease Theta Offset = Bubble towards SOUTH

Note! *The Theta Offset should not be changed more than +/-0.1 from the element's original parameter value.*

3 If the rotor level bubble still touches the end of the reference level tool after 3 hours, even if the Theta Offset value is correct according to parameter list/label, the Sensitive element is damaged and must be replaced.

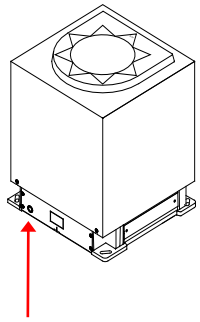


5.8 Replacing the fuses

WARNING **Before a fuse is replaced, disconnect the respective power for the damaged fuse.**

Use the procedures described on the following pages when replacing the fuses.

Master compass



F1 (12 A)

Fuse F1 is located inside the fuse holder in the front of the Master compass.

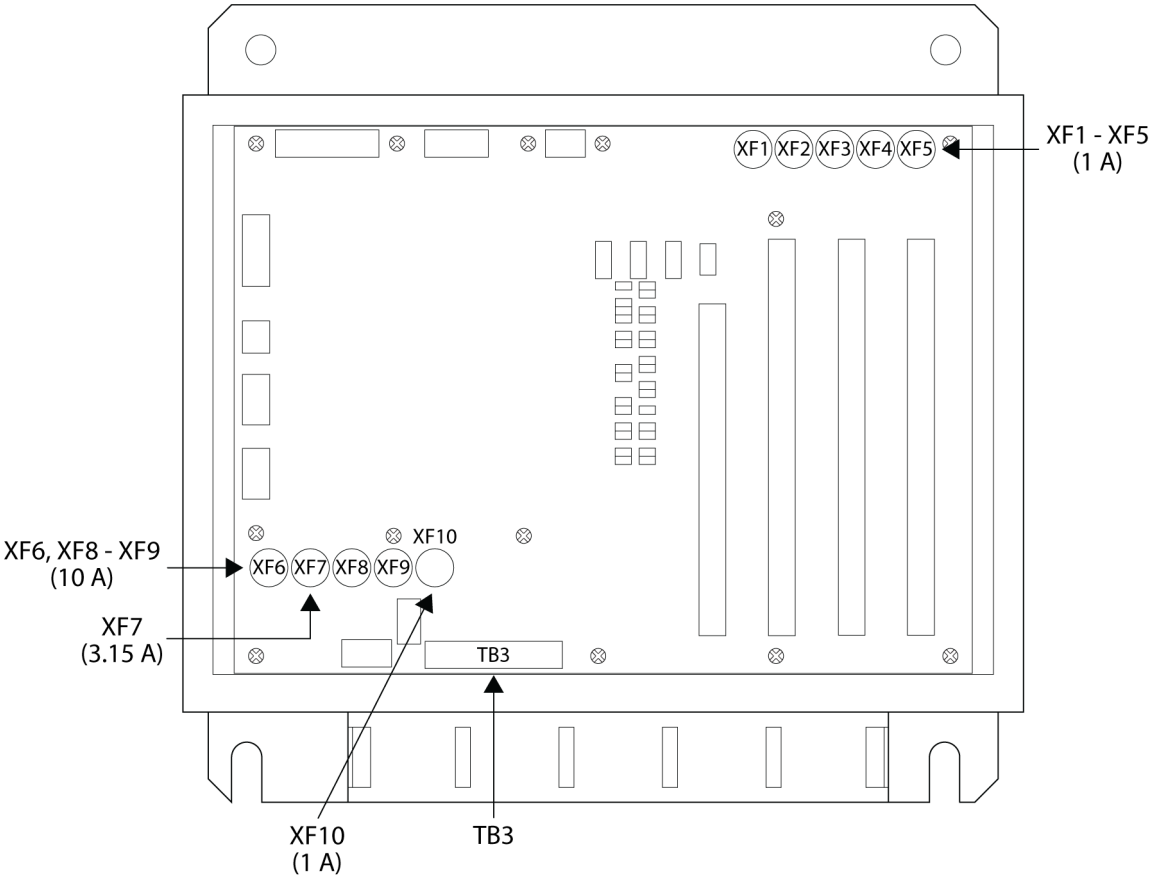
1 Open the fuse holder by pressing and turning the fuse holder edge counter-clockwise with a screwdriver.

2 Replace fuse F1, and close the holder by turning it clockwise.

Compact MK2 Control unit

For location of the fuses, refer to the drawing on the next page.

FUSE NO	CAPACITY	TB NO, PIN	SIGNAL	DESCRIPTION
XF1	1 A	TB1-2, 9	1R24+	Power supply for ch.1 serial repeater
XF2		TB1-2, 14	2R24+	Power supply for ch.2 serial repeater
XF3		TB1-2, 19	3R24+	Power supply for ch.3 serial repeater
XF4		TB1-2. 24	4R24+	Power supply for ch.4 serial repeater
XF5		TB1-1, 21	ST15	Power supply for ch.1 step motor repeater
XF6	10 A	TB3, 1	24M+	Main power supply (standard type) Master compass power supply (with Power supply unit
XF7	3.15 A	TB3, 5	24B+	Power supply for Control unit (with Power supply unit)
XF8	10 A	TB3, 3	24R+	Power supply for repeaters (with Power supply unit)
XF9	10 A	TB3, 7	24BT+	Emergency power supply (standard type)
XF10	1 A	???	???	Unused



WARNING **Make sure that power is disconnected from pin 1-8 on TB3 before any fuse is replaced!**

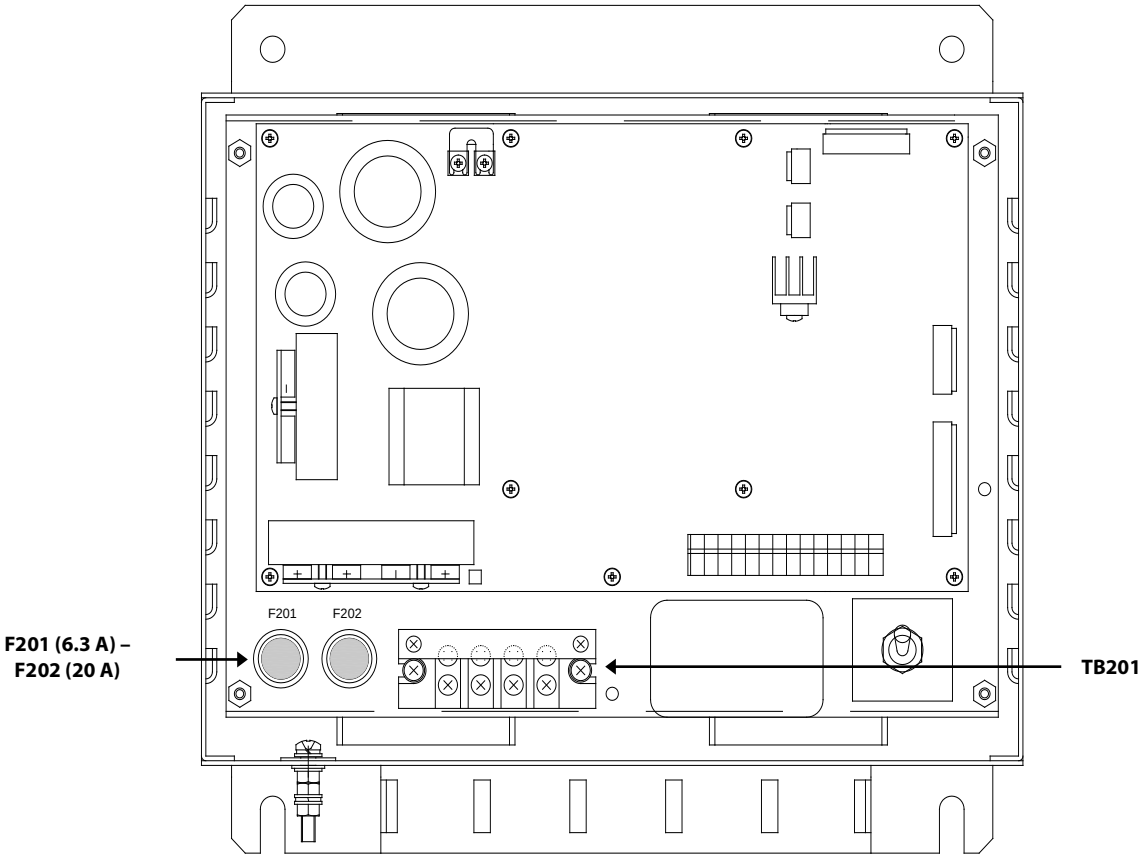
Note! *The fuses in the Compact MK2 Control unit are open glass type and may be damaged if handled with force.*

1 Push down and rotate the fuse holder top CCW. Remove damaged fuse.

2 Re-install new fuse in the fuse holder top. Install in fuse holder by pushing down and rotating CW.

Power supply unit (option)

FUSE NO	CAPACITY	TB-NO	SIGNAL	DESCRIPTION
F201	6.3A	TB201	2AC1/2	Main power supply
F202	20A	TB201	2B+/-	Emergency power supply



WARNING **Make sure that power is disconnected from TB201 before any fuses are replaced.**

The fuses in the Power Supply unit are located inside a fuse holder.

1 Open the fuse holder by pressing and turning the fuse holder edge counter-clockwise with a screwdriver.

2 Replace fuse F201 and F202, and close the holder by turning it clockwise.

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6 INSTALLATION

This section is a reference guide to correctly install and configure the GC80/85 Gyro compasses.

6.1 Unpacking and handling

A GC80/85 Gyro compass consists of the following units:

- Master compass
- Sensitive element
- Control unit
- Power Supply unit (Option)
- Spare part kit
- Documentation

The Sensitive element is shipped from the factory packed separately in a carton box to protect it from excessive shock and vibration. The final assembly of the Sensitive element into the Master compass has to be done when the Master compass is mounted onboard the vessel. Refer page 57.

Note! *It is strongly recommended to keep the Sensitive element's packaging material. This original packaging should be used if the element is sent to the factory for overhaul or repair.*

Care should be taken 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 included.

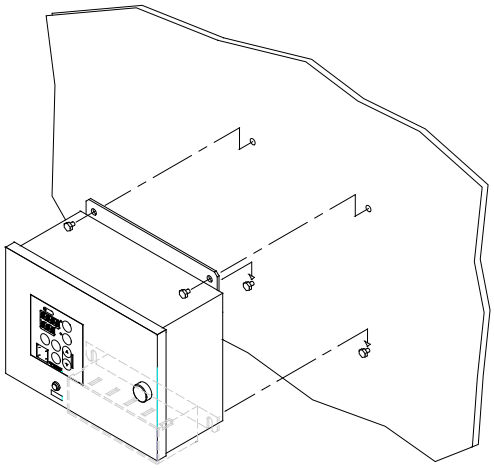
6.2 Mechanical installation

The units included in the GC80/85 system should be mounted with special regard to the units' environmental protection, temperature range and cable length. Refer *TECHNICAL SPECIFICATIONS*, page 76 onwards.

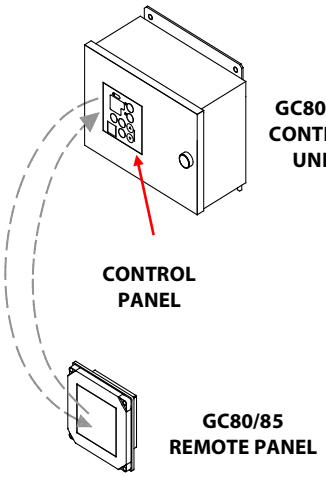
Note! *A special tool (part no. 44174449) is required when installing the Sensitive element. This tool is included in the Gyro packaging, and the Sensitive element should not be installed without using this tool.*

Control unit

The Control unit is bulkhead mounted using 4 bolts as shown in the illustration.



Flush mounting the Control panel



The Control panel may be removed from the Control unit and mounted in a remote location using the optional flush mounting kit (part number 27101757).

The flush mounting kit includes:

- 1 flush mounting panel
- 4 corners
- 4 mounting screws
- 1 blind cover

In addition to this kit, two optional Control panel cables can be ordered.

Mandatory cable (GPANNEL-A J1 - ICNT J1) available in 3 different lengths:

- 5 m (part no. 44170736)
- 10 m (part no. 44170744)
- 15 m (part no. 44170751)

Optional cable (GPANNEL-A J10 - ICNT J3), if BAM communications is used, available in 3 different lengths:

- 5 m BAM (part no. 000-15835-001)
- 10 m BAM (part no. 000-15836-001)
- 15 m BAM (part no. 000-15837-001)

Use the following procedure when mounting the remote Control panel:

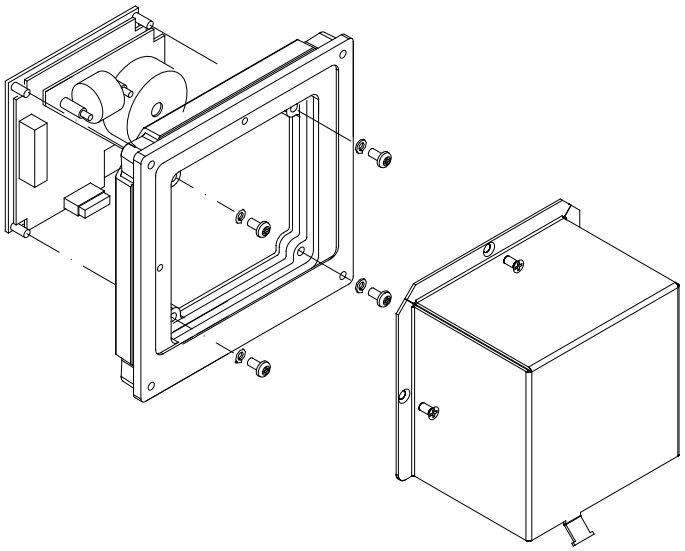
1 Open the Control unit and remove the wiring strips holding the Control panel's cables.

2 Disconnect the cable's grounding wires (labelled FG) from the Control panel and from the ICNT board.

3 Disconnect the plugs and remove the Control panel's cable(s).

4 Loosen the 4 nuts holding the Control panel and remove the panel. These nuts are to be re-used when fastening the Control panel to the flush mounting panel.

5 Insert the Control panel in the flush-mounting kit from the front as shown in the figure. Fasten the panel using the 4 nuts.



6 Insert the plug(s) on the optional Control panel cable(s) and connect the grounding wire.

7 Mount the cover on the back side.

8 Fasten the cable(s) to the cover using a wire strip.

9 Slide the Control panel cable through the cable inlet, insert the plug(s) in the ICNT board and connect the grounding wire. Secure the cable(s) to the Control unit using a wire strip.

10 Insert the blind cover in the Control unit by using the 4 bolts included in the kit.

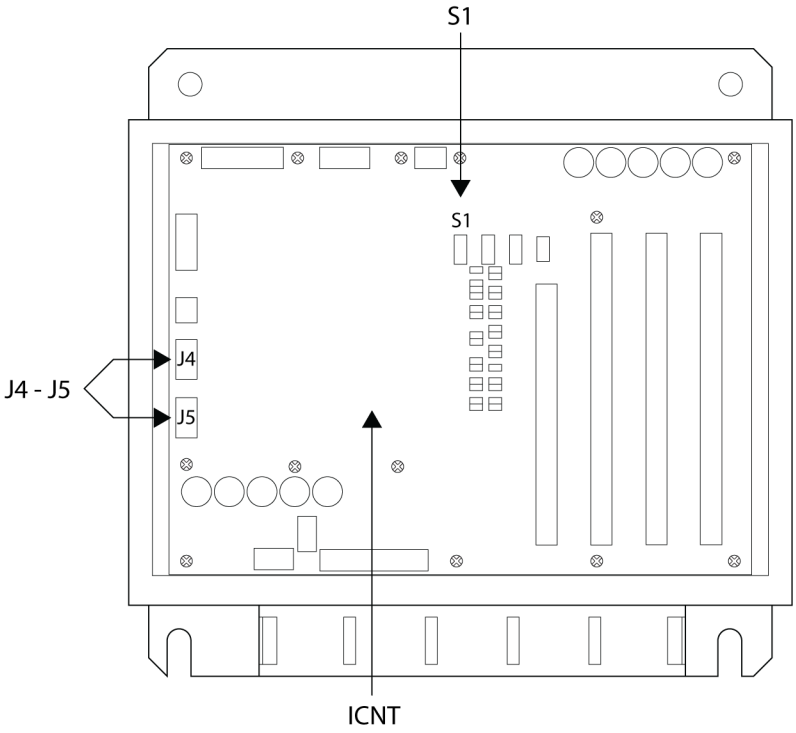
Power supply unit (option)

Refer mounting description of the Control unit above.

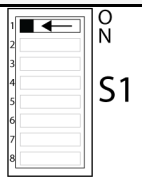
Dimensional drawings for the optional Power supply unit are found on page 87.

Jumper settings in Compact MK2 Control unit

When the optional Power supply unit is included in the GC80/85 Compact Gyro system, the GC80/85 Control unit's jumper settings have to be modified as follows:



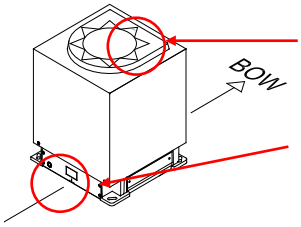
1. Disconnect connectors J4 and J5
2. Connect POWER UNIT and COMPACT TYPE
3. Set DIP-switch S1-1 to OFF

Optional Power supply unit enabled


Master compass

Select a mounting location where the deck is horizontal, flat and with little vibration, and where the pitch/roll motion is minimal.

It is also important to select a mounting location with sufficient space for installation and service. Refer dimensional drawing, page 86.

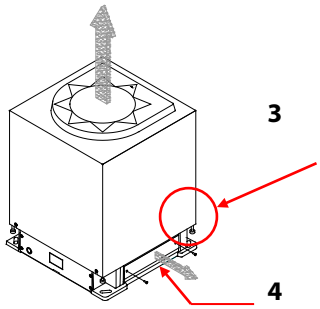


1 Place the compass on or parallel to the vessel's horizontal centerline, with the bow indication on the top of the case pointing towards the vessel's bow.

2 Use the datum line in the front and back to of the compass to line up the unit.

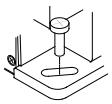
- It is possible to compensate for a small mounting offset by using the heading offset feature as described in ***Adjusting True heading***, page 66.
- It is also possible to mount the Master Gyro with 180 degree offset. Then the S1-7 on MCC board must be set to ON.

WARNING **The Master Gyro must never be mounted with 90 degree offset.**



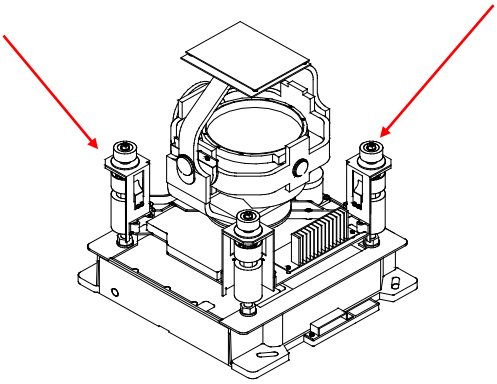
3 Remove the 4 screws holding the compass case, and carefully lift the case up and away.

4 Remove the cable inlet cover.



5 Fasten the compass to the deck using 4 bolts. The bolts should be located at the center of the trails in order to later be able to adjust the compass direction when the heading is tuned in. Refer ***Adjusting True heading***, page 66.

6 Remove strips and foam rubber from the shock absorbers, together with all strips used to secure moving parts during transportation.

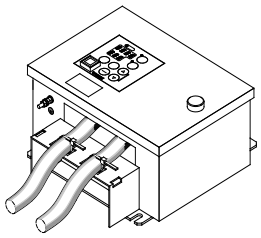


Note! *The foam rubber should be kept for re-use if the Master compass has to be sent to factory for service!*

6.3 Cabling

Note! *No cables are included when the Gyro system is delivered from factory.*

The wiring diagrams on page 84 onwards include cable specifications for all cables.



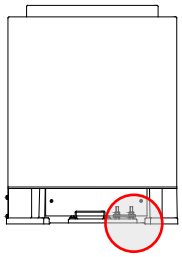
Connect power and signal cables according to the wiring diagrams on page 84 onwards.

To avoid cables to loosen due to vibration; the cables could be fastened to the fixing device using wire straps as illustrated in the figure.

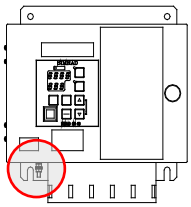
6.4 Grounding the units

All units in the GC80/85 system should have a proper ground connection from the unit's ground terminal.

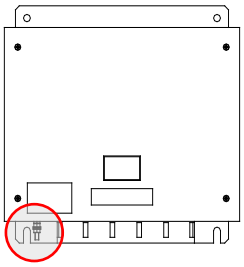
The wires should be as short as possible and have a cross section of at least AWG13 (2.5mm^2).



MASTER COMPASS



COMPACT MK2 CONTROL UNIT



POWER SUPPLY UNIT (OPTION)

6.5 DIP switch and jumper settings

GC80 and GC85 Gyro systems include several DIP switches and jumpers. With the exception of 2 switches on the ICNT board in the Control unit, no switches have to be set when installing the system. These 2 switches are set to configure the Control unit to match the type of Gyro system (GC80 or GC85), and to activate an external heading sensor.

Note! *All DIP switch settings are read when the system is started. Any changes made while the system is running will therefore not take effect until the system is restarted.*

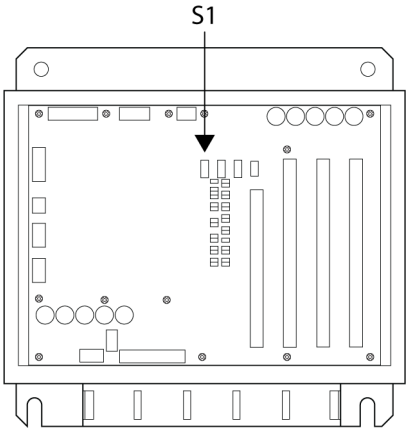
For a complete list of DIP switch settings, refer to ***DIP SWITCH SETTINGS***, page 101.

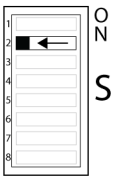
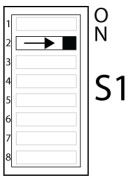
Activating the GC80 or GC85 Control unit

When the Gyro system is shipped from factory, all DIP switches in the Control unit are set as a standard GC80 system.

Before the system is started, the switch settings described below have to be changed to match a GC85 system.

DIP switch no.2 on S1 on the ICNT board identifies the Gyro as a GC80 or GC85 system.



GC80 system	GC85 system
	

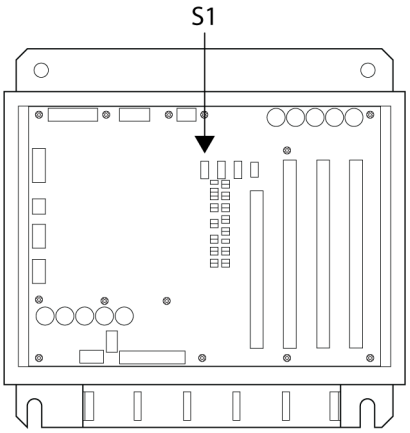
All outputs are selectable for 1, 5, 10 or 50 Hz.

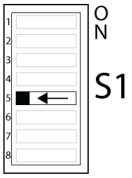
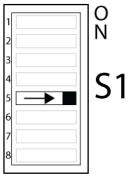
Refer *DIP SWITCH SETTINGS* on page 101 onwards.

Note! *A GC85 system is recommended to be set for 50 Hz output!*

Activating an external heading sensor

If an external heading sensor is connected to the GC80/85 system, DIP switch no.5 on S1 on the ICNT board has to be set to enable the external heading sensor.



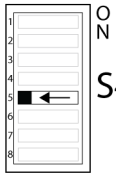
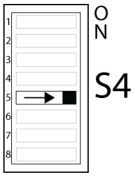
No external sensor	Active external sensor
	

The external heading sensor data received must be THS, HDT or HDG (with magnetic corrections). If output is set to THS, the input from the external sensor must be THS as well. The same goes for HDT. When powered ON, the Gyro will automatically detect the external sensor's baud-rate.

HDT/THS

Selecting HDT/THS heading output data from the Gyro

The serial data output can be set as HDT or THS using DIP switch S4-5 on the ICNT board.

THS is disabled = HDT output	THS is enabled = THS output
	

To output HDT and THS at the same time, S2-5 and S4-5 must both be set to ON and S2-6 must be set to OFF. When outputting both at the same time, the only available output frequency is 1 Hz.

Selection of PTKM and ROT output

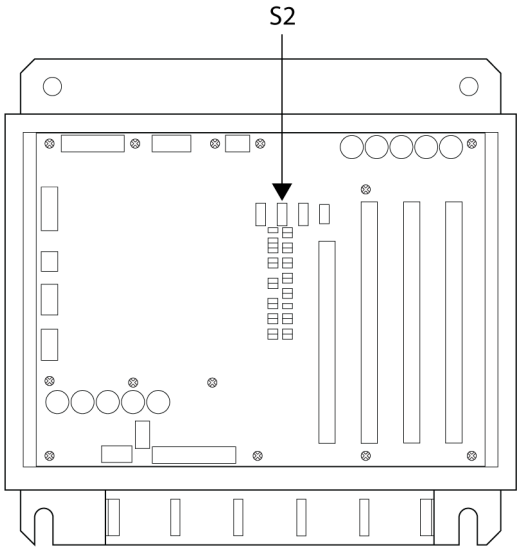
It is possible to set the sentences PTKM and ROT to output at the same time as the heading data.

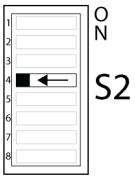
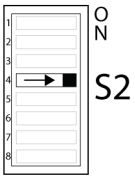
To do so, use the extension menu A-2:

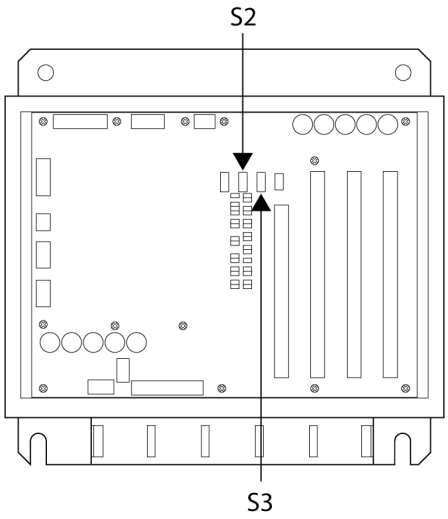
2.G.P	PTKM sentence output	bE = ON/send Non = OFF/not send
2.H.r	ROT sentence output	bE = ON/send Non = OFF/not send

Activating the pendulum function

If an external switch is connected to GC80/85 to operate the pendulum function, DIP switch no.4 on S2 on the ICNT board has to be set to activate the pendulum function.



Pendulum function disabled	Pendulum function enabled
	

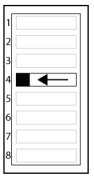
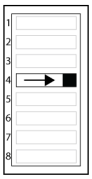


Activating external/internal reset of external/internal buzzer alarm

In some installations, it is required to have the Gyro system connected to an external alarm panel (central bridge alarm panel). To be able to have the right handshake available from GC80/85 systems some DIP switches must be set.

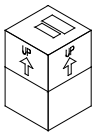
The external buzzer reset uses the same input as pendulum function. That means the pendulum function must be disabled. DIP switch no.4 on S2 on the ICNT board has to be set to OFF to activate the EXTERNAL BUZZER STOP input.

The external buzzer stop output is the same as RUNNING CONTACT (Gyro 1) output. To use output as external buzzer stop to external alarm panel, DIP switch no.8 on S3 on the ICNT board must be set to ON to activate EXTERNAL BUZZER STOP output function.

External buzzer stop enabled (Pendulum switch disabled)	Pendulum switch enabled
	
External buzzer stop disabled (Gyro Running cont. enabled)	**External buzzer stop enabled**
	

For a complete list of DIP switch settings, refer *DIP SWITCH SETTINGS*, page 101 onwards.

6.6 Installing the Sensitive element

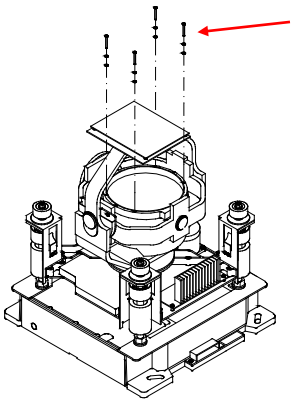


The Sensitive element is shipped from the factory in a separate package. The element has to be installed in the Master compass according to the description below.

Note! *A special tool (part no. 44174449) is required when installing the Sensitive element. This tool is included in the Gyro packaging, and the Sensitive element should not be installed without using this tool.*

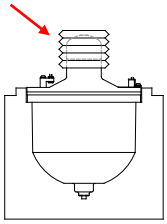
Caution ***Use extreme caution when handling the Sensitive element! Do not tilt the element. It is filled with oil and the top includes a ventilation opening.***

1 Make sure that the Master compass is installed and cables connected according to the description on page 50 onwards.

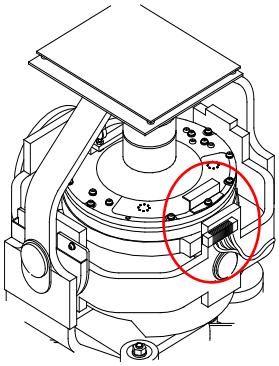


2 Remove the 4 screws on the Horizontal ring.

3 Carefully lift the Sensitive element from its packaging, and remove the rubber tube on top of the element.



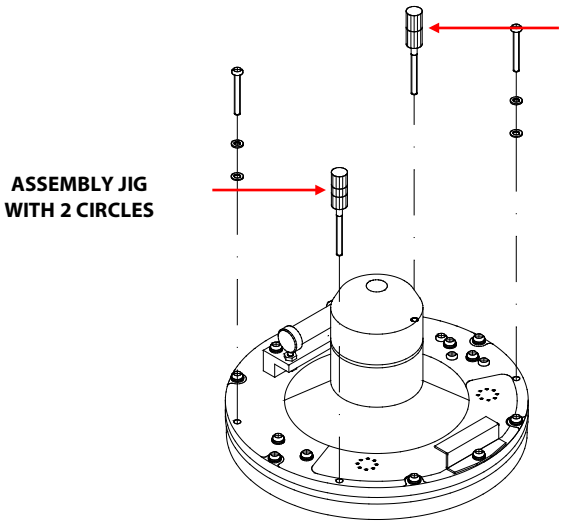
Note! *The packaging and the rubber tube should be kept for re-use if the Sensitive element has to be sent to factory for service!*

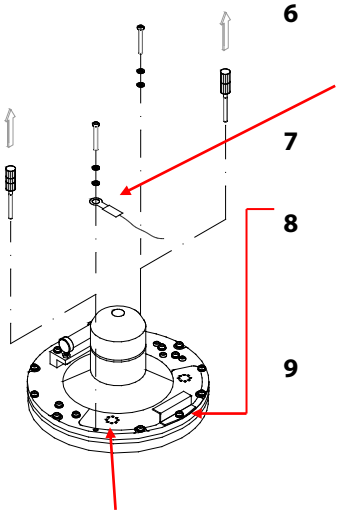


4 Tilt the Horizontal ring to the side where the plug is located, and carefully put the Sensitive element into the ring.

- The socket on the Sensitive element should be located right above the plug attached to the Horizontal ring.

5 Position the Sensitive element on the Horizontal ring by putting the assembly jigs into the holes as indicated in the figure below. Observe the labelling and the diameter on the jigs. Fasten 2 screws in the other 2 holes.





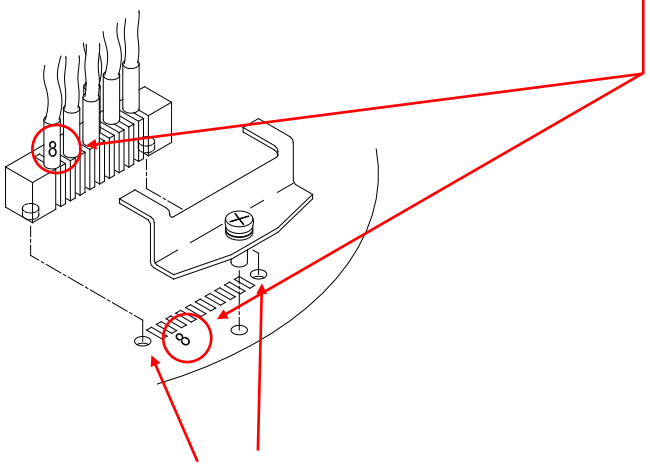
Ground wire connection

6 Replace the assembly jigs with the 2 remaining screws. Locate the ground wire on 1 of the screws as shown in the figure.

7 Loosen the screw on the plug holder on the Sensitive element and lift the holder 2-3 mm upwards.

8 Connect the plug to the connectors on the Sensitive element's PCB according to the labelling on the PCB and on the wires. Make sure that the pin guides on the plug are properly entered, and that the wires are not twisted.

9 Firmly tighten the screw on the holder.



Pin guides

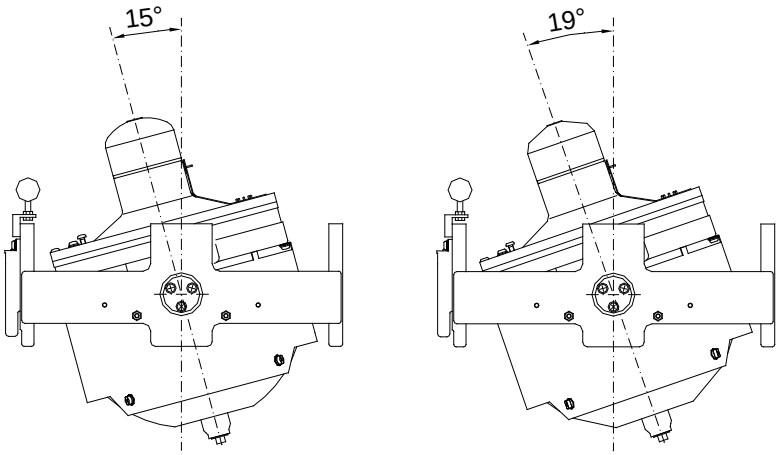
Verifying the element's tilt angle

1 Tilt the Sensitive element by hand towards the reference level tool on the Horizontal ring and keep it tilted for approximately 1 minute. Remove the pressure and observe that the tilt angle remains at:

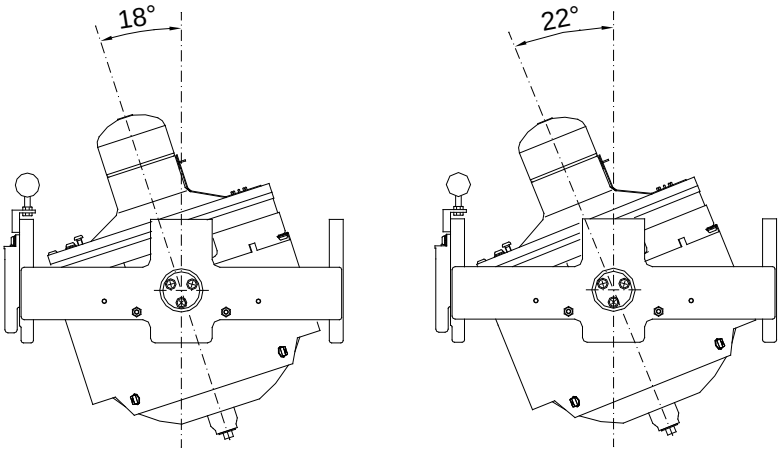
GC80: 15° to 19°

GC85: 18° to 22°

The tilt angle is indicated in the figures below.

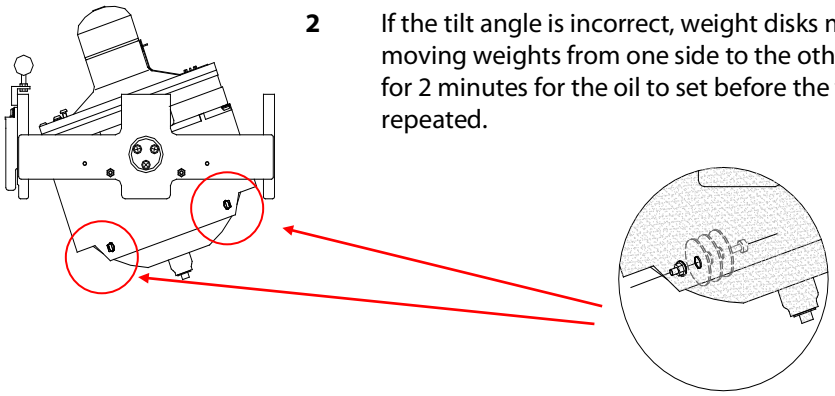


Max and min tilt angle for GC80 std system



Max and min tilt angle for GC85 High Speed system

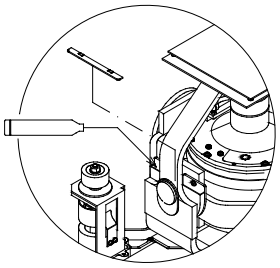
Note! *The tilt angles shown above are correct for cold conditions. The angles may change when the element has reached normal operational temperature!*



2 If the tilt angle is incorrect, weight disks must be adjusted by moving weights from one side to the other. After adjustments, wait for 2 minutes for the oil to set before the tilt angle verification is repeated.

Caution ***The Sensitive element must have equal number of weight disks on both weight points on the tilting side (north and south sides)!***

3 Carefully rotate the Horizontal ring at least 1 complete rotation. Verify that all movable parts will turn around without making any contact with mechanical or electrical components.



4 Lift the lid from the damper oil case, and fill the container with the supplied damper oil. The oil has high viscosity, and care should be exercised when pouring the damper oil into the container to avoid spill. Reinstall the lid on the damper oil case.

Any oil spilled on the outside should be cleaned.

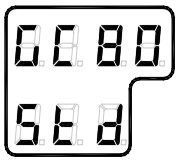
6.7 System start-up and software configuration

When all GC80 units are installed and the cables connected according to the procedures described in previous chapters, the system is ready for the first time start-up procedure.

System start-up

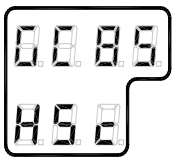
1 Turn ON the Gyro system by pressing the **POWER** button on the Control panel. Follow the start-up sequence.

- Control unit type (GC80 Std, or GC85 HSc), software version for Control unit and for Master compass is displayed in rapid succession. Examples of display text are shown below:

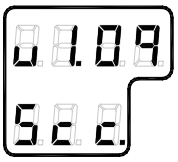


GC80 CONTROL UNIT STD VERSION

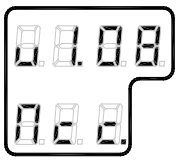
OR



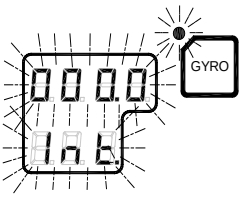
GC80 CONTROL UNIT HIGH SPEED VERSION



SOFTWARE VERSION CONTROL UNIT



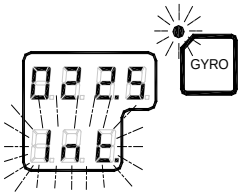
SOFTWARE VERSION MASTER COMPASS



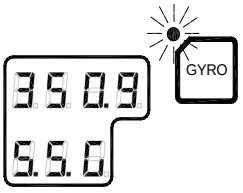
2 The Sensitive element starts rising horizontally, and the compass turns 360° clockwise. The display shows decreasing bearing as the compass is turning.

3 If the Gyro has been turned ON and OFF again, but the rotor is still rotating when the **POWER** button is pressed for new start, a rotor break function will be activated to completely stop the rotor.

4 Active rotor break is indicated with flashing display.



5 When the rotor rotation has stopped, start bearing is indicated with flashing text in the display. The start bearing will be the same as active bearing when the compass was turned OFF.



6 The indicated start bearing is accepted by pressing the **ACK/ENT** button, or increased/decreased by using the **ARROW** buttons and then 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 lamp and S.S.G. (mode) remain flashing.

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

7 When the rotor has reached full speed, the compass starts the north seeking function. The display will now change to show the compass' actual heading, and from now on bearing output will be available.

The lamp next to the **GYRO** button changes from flashing to steady light, but the S.S.G. (mode) continues to flash for 3 hours.

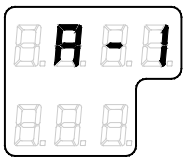
The GC80/85 will be settled within 3 hours when started with a deviation angle less than 5°. With a larger deviation angle, the compass will be settled within 4 hours.

Configuring the Gyro system

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 Gyro compass. These parameters are included in the Sensitive element's packaging, and they have to be entered into the Control panel as part of the Gyro compass' installation procedure.

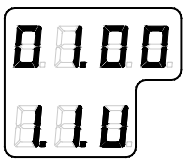
Parameters used for time settings should also be entered. These parameters are essential when monitoring the occurrence of alarms.

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



1 Access the Extension menu by pressing and holding the **SET** button and the **ACK/ENT** button simultaneously for appr. 3 seconds.

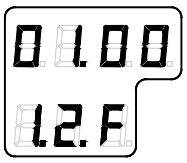
Main category **A-1** will be displayed.



2 Press the **SET** button to access the sub-category loop. Sub-category **1.1.U** and its parameter values will be displayed.

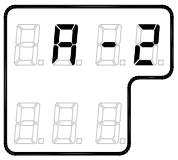
3 Use the **ARROW** buttons to increase or decrease the parameter value until the value is according to value in the table included with the Sensitive element.

4 Confirm the entry by pressing the **ACK/ENT** button. The display will return to sub-category **1.1.U**, and the data will be transferred to the Gyro immediately.



5 Press the **DISP** button again to select sub-category **1.2.F**, and use the **ARROW** buttons to increase or decrease the parameter value until the value corresponds with the parameter for the new Sensitive element. Confirm the entry by pressing the **ACK/ENT** button.

6 Repeat step 5 for sub-category **1.3.S**, **1.4.u**, **1.5.L** and **1.6.t.**



7 Press the **SET** button again to return to main category **A1**, and then press the **DISP** button to go to **A2** main category.

8 Press the **SET** button, and enter values for **2.1.o** and **2.3.h** as described above.

9 While still in **A2** main category, enter values for **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).

Note! *All time parameters should preferably be in CET (Central European Time) or, if not possible, in local time.*

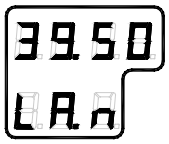
10 Press the **SET** button again to return to main category **A2**, and then press the **DISP** button until main category **A7** is displayed.

11 Exit the sub-category by pressing the **SET** button, and then exit the Extension main category by pressing and holding the **SET** and **ACK/ENT** buttons simultaneously for appr. 3 seconds.

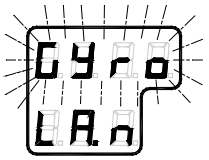
For more information about the Extension menu, see *ADVANCED SETTINGS*, page 68 onwards.

Setting the Latitude input source

When the system is configured as described in *Configuring the Gyro system* on page 62 onwards, the latitude input source can be changed as described below:

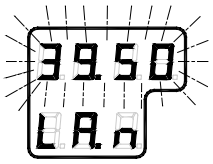


1 Press the **DISP** button until the display shows latitude value.



2 Press the **SET** button once, and the upper line in the display starts flashing.

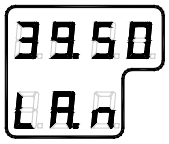
3 Use the **ARROW** buttons to select **Gyro** or **GPS** as the latitude input source, and confirm the entry by pressing the **ACK/ENT** button.



- If **Gyro** is selected, the display will change to flashing numbers
- If **GPS** is selected, the display will show the latitude value read from the GPS

4 When **Gyro** is selected and the numbers are flashing, press the **ARROW** buttons to increase/decrease the latitude value and confirm the entry with the **ACK/ENT** button.

- This entered latitude value is used, together with speed and bearing information, to calculate the vessel's current latitude.

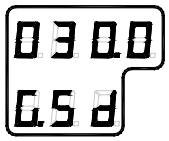


5 The display will return to show latitude value without flashing.

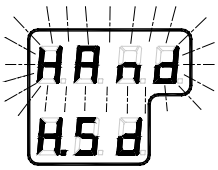
Note! *If GYRO is selected you need to verify that GPS connection is set to Non in extension menu A-2, 2.9.G.*

Setting the Speed input source

When the system is configured as described in ***Configuring the Gyro system*** on page 62 onwards, the speed input source can be changed as described below:



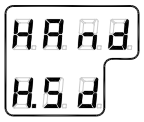
1 Press the **DISP** button until the display shows speed value and speed input source.



2 Press the **SET** button once, and the upper line in the display starts flashing.

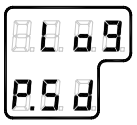
3 Use the **ARROW** buttons to toggle between available speed input sources:

Manual



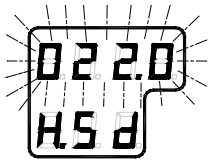
GPS

LOG (pulse)



LOG (serial)

4 Select active speed input source and confirm the selection by pressing the **ACK/ENT** button.



5 If Manual input source is selected, the display will change to show flashing numerical values.

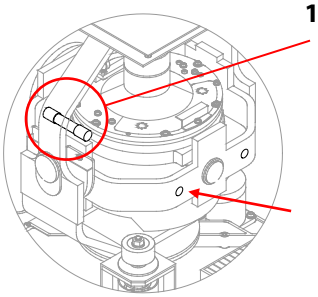
6 Use the **ARROW** buttons to enter the speed value, and confirm the input by pressing the **ACK/ENT** button.

7 The display will return to show speed value and speed input source without flashing.

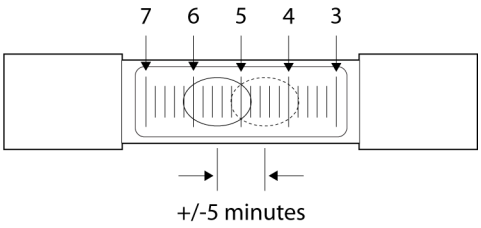
Note! *If Manual or GPS is selected (used) and no pulse or serial data for speed is connected you need to verify that LOG connections is set to Non in extension menu A-2, 2.A.L and 2.b.S.*

6.8 Balancing the Horizontal ring

After the compass has been running continuously for at least 2 hours, the Horizontal ring should be adjusted.



1 Locate the reference level tool on the Horizontal ring, and check that the level bubble is within +/-5 minutes from the center. Each division equals 2 minutes.



2 If the level bubble is not within this limit, add or remove weights from the Horizontal ring until it is leveled.

Note! *It is important that there are as few weights as possible on the Horizontal ring.*

3 Let the compass run for at least 20 minutes before the level is rechecked and eventually confirmed.

WARNING **If the Horizontal ring is tilted more than +/-5', a bearing error will be generated!**

Adjusting True heading

After the GC80/85 is settled, the Gyro compass has to be calibrated against an external reference, e.g.:

- a known target
- astronomical observation
- the heading of the pier or quay the vessel is moored to
- fixed points on the chart that the vessel is sailing between

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 the Master compass, an offset value may be inserted in the GC80. This value is entered by using the Extension menu as follows:

1 Activate the Extension menu by pressing and holding the **SET** button and the **ACK/ENT** button 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**.

4 Use the **ARROW** buttons to increase or decrease the offset parameter value.

Note!

*To correct for +1.5°, press the **ARROW UP** button until the display shows 1.5°.*
*To correct for -1.5°, press the **ARROW DOWN** button until the display shows 358.5°!*

5 Confirm the new value by pressing the **ACK/ENT** button, or reject the changes by pressing the **SET** button. The display will return to sub-category **2.1.o**.

6 Exit the Extension menu by pressing and holding the **SET** and **ACK/ENT** buttons simultaneously for at least 3 seconds.

For further information about the Extension menu, refer ***Using the Extension menu*** from page 68 onwards.

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7 ADVANCED SETTINGS

This section gives an overview of the Extension menu: how to enter the menu and how to change parameter values.

7.1 General

The Extension menu holds internal parameters and communication parameters required to achieve the best possible heading accuracy on the GC80/85 Gyro compass.

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.

7.2 Using the Extension menu

Caution

The Extension menu should not be accessed by unauthorized personnel. Incorrect parameters may result in irregular operation of the GC80/85 Gyro compass!

The extension menu can be accessed when any display is shown in the LCD.

1 Activate the menu by pressing and holding the **SET** button and the **ACK/ENT** button simultaneously for at least 3 seconds.

- Main category **A-1** will be displayed

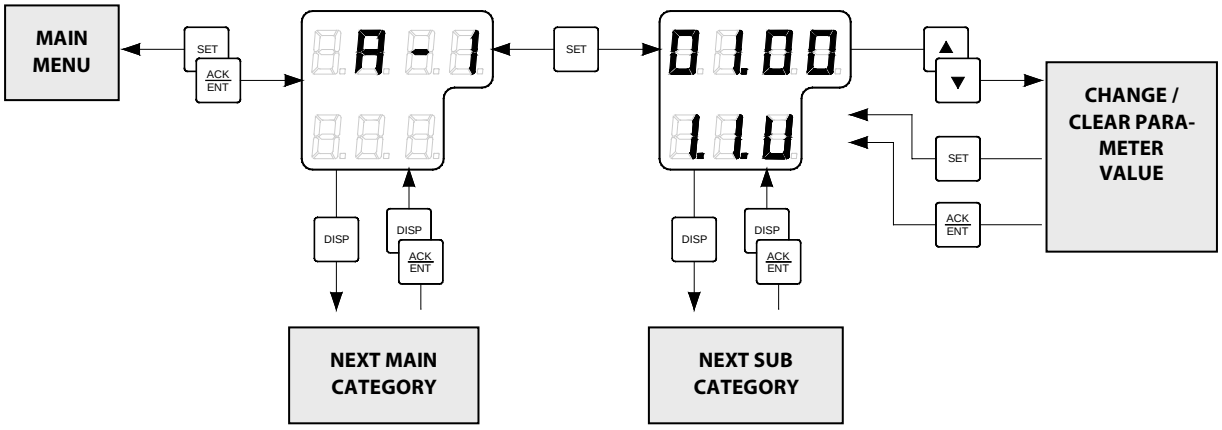
2 Page through the main categories to the selected category by pressing the **DISP** button. Pressing the **DISP** and **ACK/ENT** buttons simultaneously will display the main category loop in reversed order.

3 Press the **SET** button to enter the sub-category loop, and use the **DISP** button to select the sub-category that holds the parameter to be changed.

- Use the **ARROW** buttons to increase or decrease the parameter value.

4 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.

5 Exit the Extension menu by pressing and holding the **SET** and **ACK/ENT** buttons simultaneously for at least 3 seconds.



7.3 The Extension menu overview

Main category	Sub category	Parameter/description	Default value	Range
A-1	1.1.U	Damping gain Determines the damping (damping operation in north-seeking motion = half cycle attenuation) and represents a coefficient (ratio) to the standard value stored in the software.	1.00	0.00 – 2.00
	1.2.F	Bearing servo gain Determines the gain of the bearing servo loop where phi Φ 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 Determines the gain of the horizontal servo loop where theta θ 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). Presents a coefficient (ration) to the standard value stored in software.	1.00	0.00 – 2.00
	1.4.u	Leveling servo gain 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
	1.5.L	(φ) Phi offset (°) 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 (°) Offset value (°) around the horizontal axis of Gyro-sphere (rotor axis) and the Sensitive element.	0.00	-3.00 – 3.00

Main category	Sub category	Parameter/description	Default value	Range
A-1	1.7.G	X signal pickup gain (v/°) 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 and 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 GC85.	2.32	0.00 – 5.00
	1.8.c	Ks/H Suspension wire twist torque. Fixed value.	1.477	1.000 – 2.000
	1.9.r	Maximum rate of turn (°/sec) Maximum rate of turn in the turn rates which the bearing servo system followed up to this moment (°/sec). NOTE: The maximum is measured after 3 hours from system start. NOTE: Reset this data after completion of installation!	0.00	-
	1.A.F	Maximum deviation of bearing servo (°) Maximum deviation value in the bearing servo loop that occurred up to this moment (°). NOTE: The maximum is measured after 3 hours from system start. NOTE: Reset this data after completion of installation!	0.00	-
	1.b.S	Maximum deviation of horizontal servo (°) Maximum deviation value in the horizontal servo loop that occurred up to this moment (°). NOTE: The maximum is measured after 3 hours from system start. NOTE: Reset this data after completion of installation!	0.00	-

Main category	Sub category	Parameter/description	Default value	Range
A-2	2.1.o	Bearing offset A (°) Offset value included in the "master bearing" and used for correction of fixed error (°). If the Master compass cannot be mounted parallel to the vessel's fore-after line, this parameter is used to compensate for a small mounting error.	0.0	0.0 – 359.9
	2.2.O	Bearing offset B (°) 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 (°) 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 by 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 (°) 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 Used for setting current year.	-	2000 - 2099
	2.6.N	Month and Day Used for setting current month and date.	-	-
	2.7.t	Hour and Minute Used for setting current hour and minute.	-	-
	2.8.d	Total days of operation This value should be reset after the installation is completed.	-	-

Main category	Sub category	Parameter/description	Default value	Range
A-2	2.9.G	Display/setting of GPS connection The following abbreviations are used: bE: GPS connected Non: No GPS connected *NOTE: When this value is set to "Non", GPS cannot be selected as the vessel's input for speed and latitude.*	-	bE or Non
	2.A.L	Display/setting of LOG connection The following abbreviations are used: bE: with Log (contact) Non: No Log (contact) *NOTE: When this value is set to "Non", LOG cannot be selected as the vessel's speed input.*	-	bE or Non
	2.b.S	Display/setting of LOG (serial) connection The following abbreviations are used: bE: with Log (serial) Non: No Log (serial) *NOTE: When this value is set to "Non", SLOG cannot be selected as the vessel's speed input.*	-	bE or Non
	2.c.t	Display/setting of GPS performance index data check The following abbreviations are used: bE: Check performance index Non: Do not check performance index	-	bE or Non
	2.d.o	Analogue signal output offset for ROT (°) Offset value for analogue signal output of Rate Of Turn. Entered value is +/-5% of maximum output ROT.	0.00	0.0 – 16[1]
	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 or Non
	2.H.r	ROT sentence output	-	bE or Non

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

Main category	Sub category	Parameter/description	Default value	Range
A-3	3.1.E	Alarm (error)	-	-
	3.2.n	Occurred number of zero-cross errors	-	-
	3.3.H	Maximum zero-cross errors	-	-
	3.4.y	Occurred year of zero-cross errors	-	-
	3.5.N	Occurred month/day of zero-cross errors	-	-
	3.6.t	Occurred hour/minute of zero-cross errors	-	-
	3.7.n	Occurred number of encoder errors	-	-
	3.8.r	Occurred number of reset with WATCH DOC TIMER	-	-
A-4	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
A-5	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
A-6	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
A-7	7.1.t	Master compass type	Std	Std or Hsc
	7.2.u	SCC software version number	-	-
	7.3.u	MCC software version number	-	-
A-8	8.1.t	For confirmation of extension menu	-	-
	8.2.S	Filter of speed error correction	On	On or Off

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8 TECHNICAL SPECIFICATIONS

This section lists all specifications for the GC80/85 Gyro compasses.

8.1 Accuracy

Settling time:..... within 3 hours
(If startup heading is within +/-5° of actual heading)

Settle point error:.....less than ±0.3º

RMS value of the difference:..... less than 0.1º

Repeatability of settle point error:.....less than ±0.2°

Roll and pitch error:.....less than ±0.5°

Static error:.....less than ±0.1°

Settle point error under general conditions: .....less than ±0.5°

GC85

Speed and acceleration error .....less than ±2.0°

Maximum acceleration must not exceed $2m^2$.

Note! *Accuracy at equator. For other latitudes, accuracy to be multiplied by *(1/COS f), where f = Latitude.*

8.2 General specifications

Follow-up speed (follow-up system)..... > 75°/sec

Gimbal freedom .....for both roll and pitch: ±45°

Range of speed correction:
..... 0-50 knots (GC80) / latitude (0° - +70°)
..... 0-70 knots (GC85) / latitude (0° - +70°)

Main power supply:.....24V DC or
Option: ..... 100/110/115/200 V AC, 50/60 Hz

Power supply for alarm and backup:..... 24 V DC, 70 W

Voltage fluctuation:..... AC ±10%
DC -20% - +30%

Power consumption:
Start (Master):..... within 140 VA
Ordinary (Master):..... within 70 VA
Repeater:.....within 150 VA

Repeater type:.....24 V DC – 6 step/°

Number of step repeater connections:..... 1

Number of NMEA connections: 4

Repeater backup circuits: ..... 1+4

Pendulum function ..... refer page 29

8.3 Input specifications

Serial input signal (GPS)

Circuits: 1
Electrical: RS422/NMEA0183
Baud rate: ..... 4800 bps
Data bits: ..... 8 bits
Parity: ..... None
Stop bits: 1
Transmit freq.: ..... 1 – 5 Hz
Input format:

$--GGA,x,xx.x,N,xx.x,E,x,~*hh<CR><LF> *
$--GLL,xxxx.xx,N,xxxx.xx,E~*hh<CR><LF>
$--VTG,xx,T,xx,M,xx.x,N,xx,K*hh<CR><LF>
$--ZDA,xxxxxx.xx,xx,xx,xxxx,xx,xx*hh<CR><LF>

* Priority

Serial input signal (External heading)

Circuits: 1
Electrical: RS422/NMEA0183
Baud rate: ..... 4800/38400 bps
Data bits: ..... 8 bits
Parity: ..... None
Stop bits: 1
Transmit freq.: ..... 1 – 50 Hz/20 – 50 Hz
Input format:

$--HDT,xxx.x,T*hh<CR><LF>
$--THS,xxx.x,a*hh<CR><LF>
$--ROT,x.x,a*hh<CR><LF>
$--HDG,xxx.x,xx.x,a,xx.x,a*hh<CR><LF>

Input data format must be the same as selected output data format from the Control unit (HDT/THS). When powered ON, the Gyro will automatically detect the external sensor's baud-rate.

Serial input signal (LOG)

Circuits: 1
Electrical: RS422/NMEA0183
Baud rate: ..... 4800 bps
Data bits: ..... 8 bits
Parity: ..... None
Stop bits: 1
Transmit freq.: ..... 1 – 50 Hz

Input format:

$--VBW,x.x,x.x,A~*hh<CR><LF>

INS (BAMS)

Circuits: 1
Electrical: RS422/NMEA0183
Baud rate: ..... 4800 bps
Data bits: ..... 8 bits
Parity: ..... None
Stop bits: 1
Transmit freq.: ..... INDETERMINATELY
Input format:

$--ACN,xxxxxx.xx,aaa,x.x,x.x,a,C*hh<CR><LF>

$--ACK,xxx*hh<CR><LF>

$--HBT,x.x,a,x*hh<CR><LF>

PULSE signal (LOG)

Circuits: 1
Electrical: ..... 200/400 p.p.n.m., dry contact
Voltage/Current ..... 5 V/5 mA

Heading sensor select

Circuits: 2
Voltage/Current ..... 32 V/20 mA

Alarm ACK

Circuits: 1
Voltage/Current ..... 5 V/5 mA

Buzzer stop

Circuits: 1
Voltage/Current ..... 5 V/5 mA

8.4 Output Specifications

Serial output signal 1

When Gyro is selected

Circuits: 4
Electrical: RS422/485
Baud rate:
GC80: ..... 4800/38400 bps
GC85: ..... 38400 bps

Note! *Baud Rate for GC85, refer **Jumper settings on ICNT board**, output serial signal selection, page 106.*

Data bits: ..... 8 bits
Parity: ..... None
Stop bits: 1
Transmit freq.:
GC80: ..... 1, 5, 10, 50 Hz
GC85: ..... 1, 5, 10, 50 Hz
Output format:
Data no.1
$ HEHDT,xxx.x,T*hh<CR><LF>
Data no.2
$ HETHS,xxx.x,a*hh<CR><LF>
Data no.3
$ HEROT,-xxx.x,a*hh<CR><LF>
Data no.5
$ PTKM,HEALM,xxxx,x,xx*hh<CR><LF>

Serial output signal 2 *1

When External heading sensor is selected

Circuits: 4
Electrical: RS422/485
Baud rate:
GC80: ..... 4800 bps
GC85: ..... 38400 bps
Data bits: ..... 8 bits
Parity: ..... None
Stop bits: 1
Transmit freq.:
GC80: ..... 1, 5, 10, 50 Hz
GC85: ..... 1, 5, 10, 50 Hz
Output format:
Data no.1
$--HDT,xxx.x,T*hh<CR><LF>
Data no.2
$--THS,xxx.x,a*hh<CR><LF>
Data no.3
$--HDG,xxx.x,xx.x,a,xx.x,a*hh<CR><LF>

Data no.4

$--ROT,-xxx.x,a*hh<CR><LF>

Data no.5

$--PTKM,--ALM,xxxx,x,xx*hh<CR><LF>

INS (BAMS)

Circuits: 1
Electrical: RS422/NMEA0183
Baud rate: ..... 4800 bps
Data bits: ..... 8 bits
Parity: ..... None
Stop bits: 1
Transmit freq.:
Data no.1, 4: ..... 30 s
Data no.2, 3: ..... INDETERMINATELY
Output format:
Data no.1

$--HEALC,x,x,x,x.x,aaa,x.x,x.x,x.x… … *hh<CR><LF>

Data no.2

$--HEALF,x,x,x,xxxxxx.xx,a,a,a,aaa,x.x,x.x,x.x,a---a*hh<CR><LF>

Data no.3

$--HEARC,xxxxxx.xx,aaa,x.x,x.x,a*hh<CR><LF>

Data no.4

$--HEHBT,x.x,a,x*hh<CR><LF>

STEP signal

Circuits: 1
Electrical: ..... 24 V DC – 6 step/°

Alarm output

Potential free ..... NO/NC

Running contact

Potential free ..... NO/NC

*Refer **Jumper settings on ICNT board**, page 106.*

8.5 Physical dimensions

GC80 Master compass

Height:.....438 mm (17.2″)

Width:.....340 mm (13.4″)

Depth:.....340 mm (13.4″)

Weight:..... 23 kg (51 lbs)

GC80 Compact MK2 Control unit

Height:.....252 mm (9.9″)

Width:.....278 mm (10.9″)

Depth:.....126 mm (5.0″)

Weight.....7 kg (15 lbs)

GC80 Power supply unit (option)

Height:.....290 mm (11.4″)

Width:.....307 mm (12.1″)

Depth:.....140 mm (5.5″)

Weight.....8 kg (18 lbs)

8.6 Power

GC80/85 Master compass

Voltage input: ..... Supplied from Control unit

GC80 Compact MK2 Control unit

Voltage input: .....24 V DC

Backup voltage:.....24 V DC

Power consumption, including Master compass:

Starting..... 3.3 A at 24 V DC

Running:..... 2.6 A at 24 V DC

GC80 Power supply unit (option)

Voltage input: .....110/220 V AC ±10%

Frequency: .....50/60 Hz ±5%

Backup voltage:.....24 V DC -20%, +30%

8.7 Environmental specifications

GC80/85 Master compass

Enclosure material: ..... Aluminum

Color: ..... Black

Temperature range:

Operating: ..... -10 - 50°C (14 - 122°F)

Storage: ..... -25 – 70°C (-13 – 158°F)

Angular freedom of gimbal: ..... ±45° for roll and pitch

GC80 Compact MK2 Control unit

Enclosure material: ..... Aluminum

Environmental protection: IP22

Color: ..... Black

Temperature range:

Operating: ..... -10 - 50°C (14 - 122°F)

Storage: ..... -25 – 70°C (-13 – 158°F)

Number of repeater ports: 1

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9 DRAWINGS

This section contains dimensional drawings showing mechanical dimensions of the different GC80/85 units, together with wiring diagrams of the Gyro system.

9.1 Drawings included

The following mechanical drawings are enclosed:

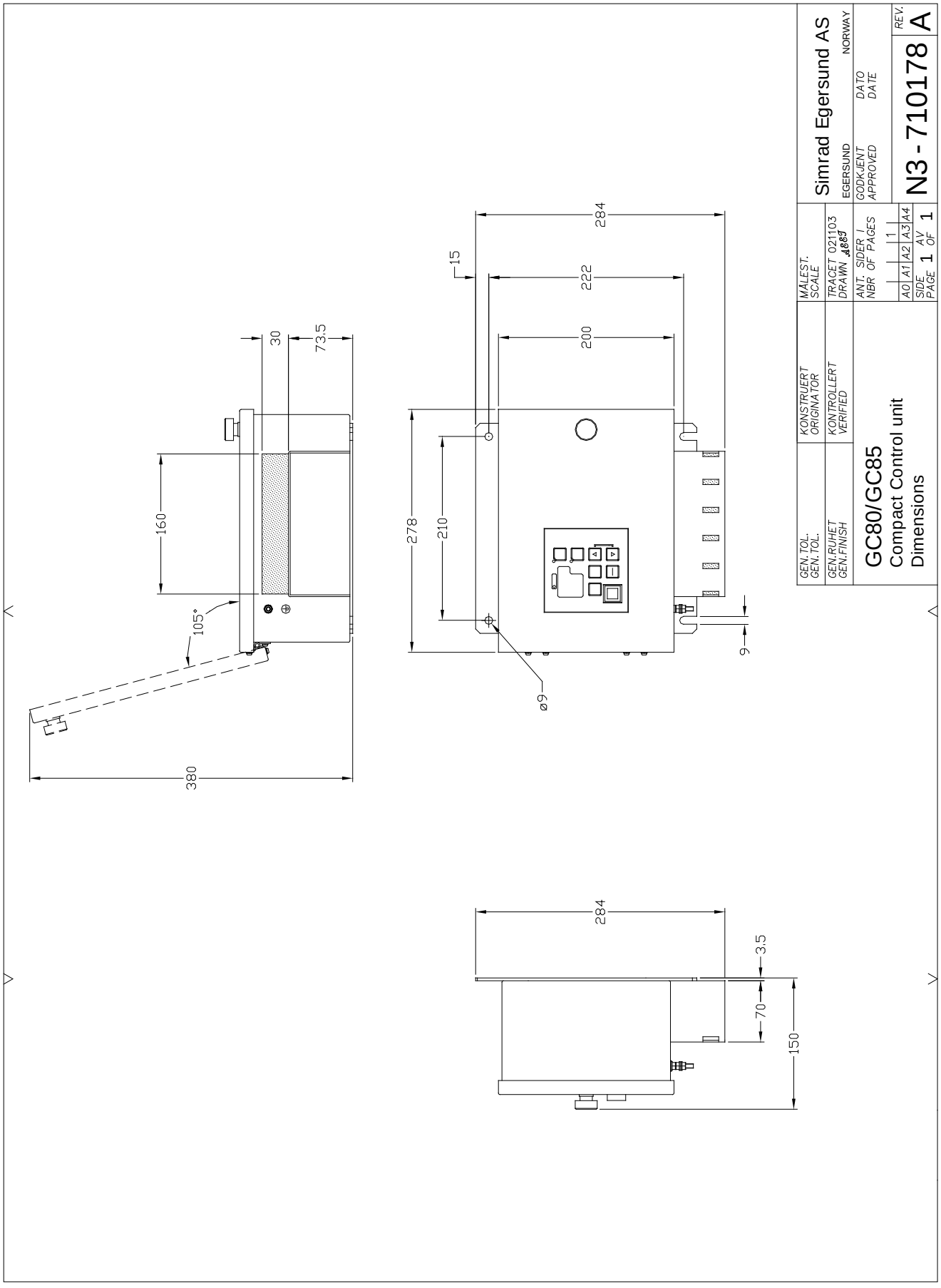
Name	Drw. no	Rev.
GC80 Compact MK2 Control unit, dimensions	N3-710178	A
GC80/85 Master compasses, dimensions	N3-710179	A
GC80/85 Power Supply unit, dimensions	N3-710180	A
GC80/85 Remote panel, dimensions	D4-710208	B

Dimensional drawings are available upon request.

The following wiring diagrams are enclosed:

Name
GC80/85 Gyro Compasses, Compact system. Wiring diagram
GC80/85 Gyro Compasses, Compact system with Power supply unit. Wiring diagram

Note! *The original signed drawings are recorded at Simrad Egersund.*


Simrad Egersund AS
EGERSUND NORWAY
N3 - 710178 A
REV.
GC80/GC85
Compact Control unit
Dimensions
GEN.TOL.
GEN.RUHET
GEN.FINISH
KONSTRUERT
ORIGINATOR
KONTROLLERT
VERIFIED
MÅLEST.
SCALE
TRAGET 021103
DRAWN
ANT. SIDER I
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DATE
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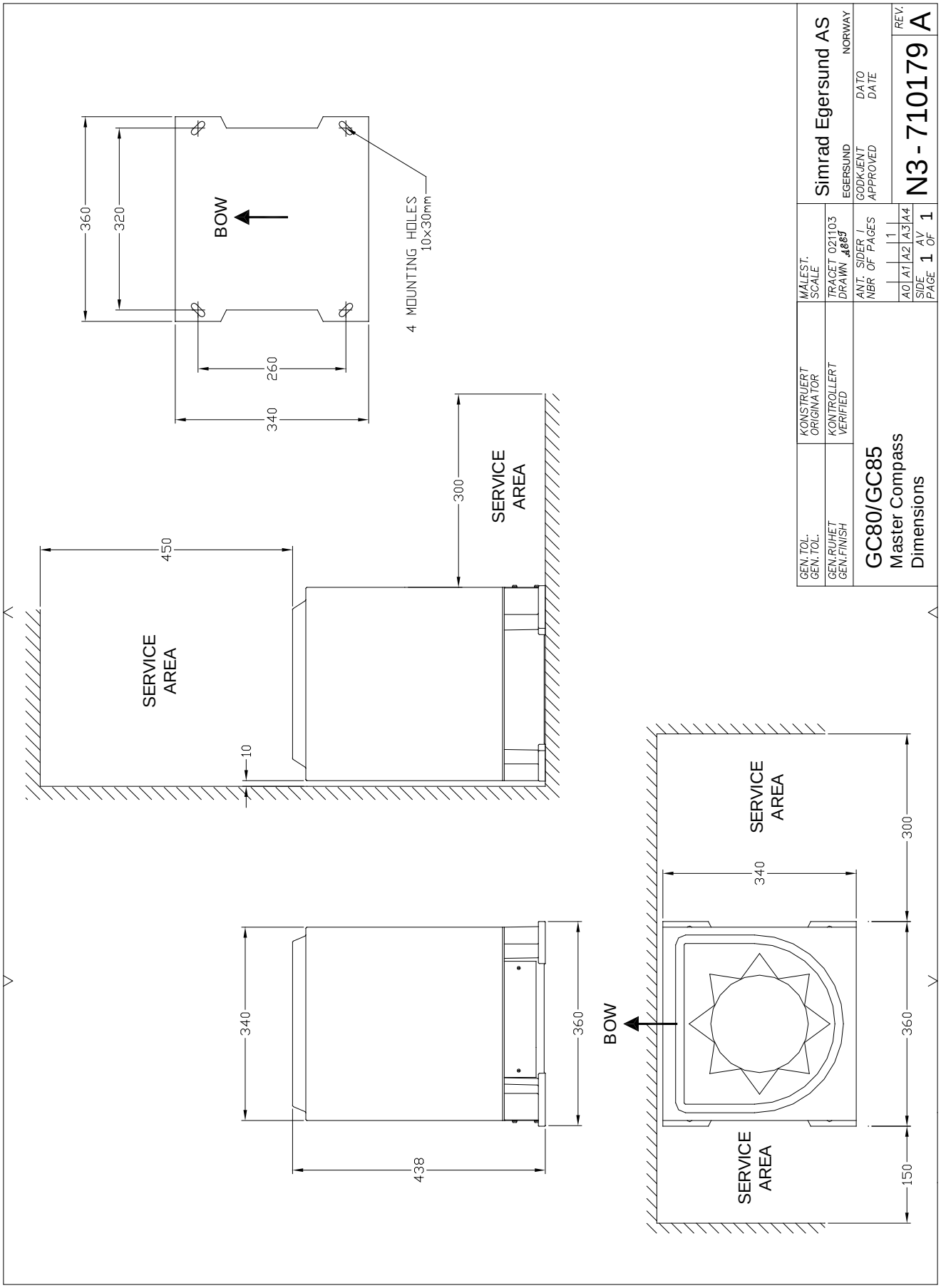
222
200
15
278
210
9
ø9
30
73.5
160
105°
380
284
3.5
70
150


BOW
360
320
260
340
4 MOUNTING HOLES
10x30mm
SERVICE
AREA
450
300
10
340
360
438
BOW
SERVICE
AREA
340
300
360
150
GEN. TOL.
GEN. TOL.
GEN.RUHET
GEN.FINISH
KONSTRUERT
ORIGINATOR
KONTROLLERT
VERIFIED
MÅLEST.
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SIDE
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GC80/GC85
Master Compass
Dimensions
Simrad Egersund AS
EGERSUND
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APPROVED
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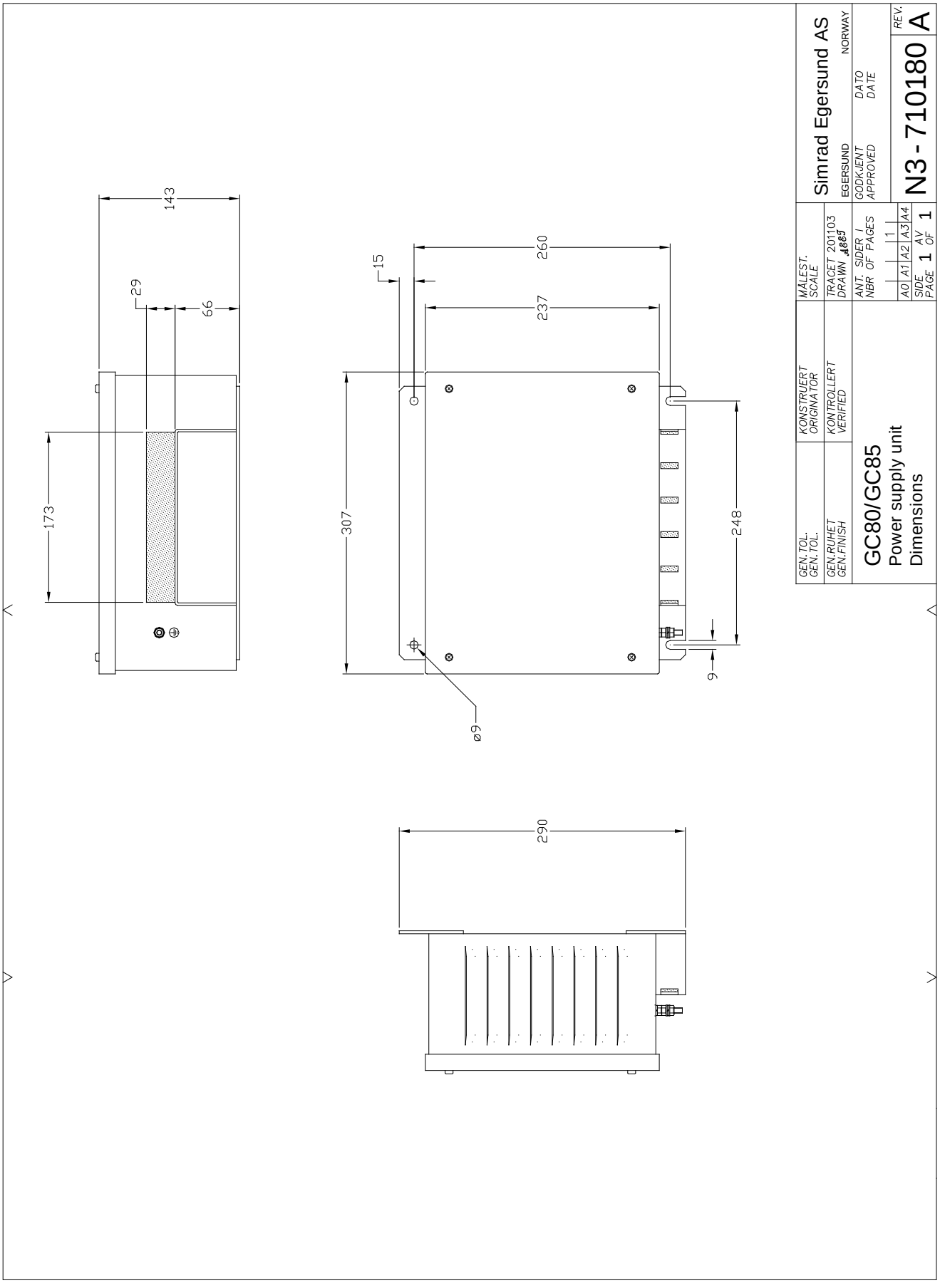
DATE
N3 - 710179
REV.
A


143
29
66
173
260
15
237
307
248
9
ø9
290
Simrad Egersund AS
EGERSUND NORWAY
N3 - 710180 A
REV.
GC80/GC85
Power supply unit
Dimensions
GEN. TOL.
GEN. TOL.
GEN.RUHET
GEN.FINISH
KONSTRUERT
ORIGINATOR
KONTROLLERT
VERIFIED
MÅLEST.
SCALE
TRAGET 201103
DRAWN 4683
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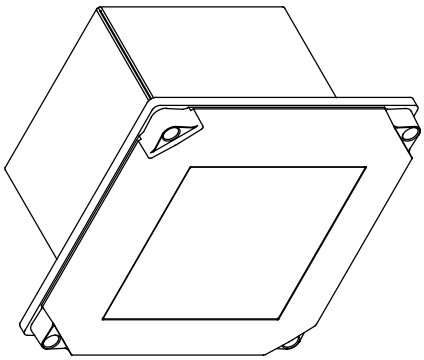
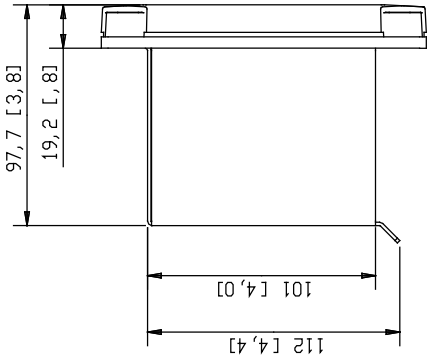
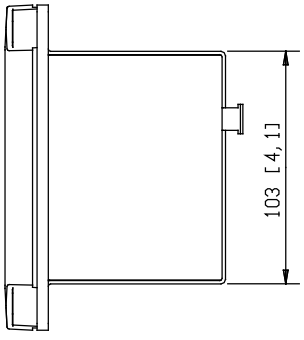
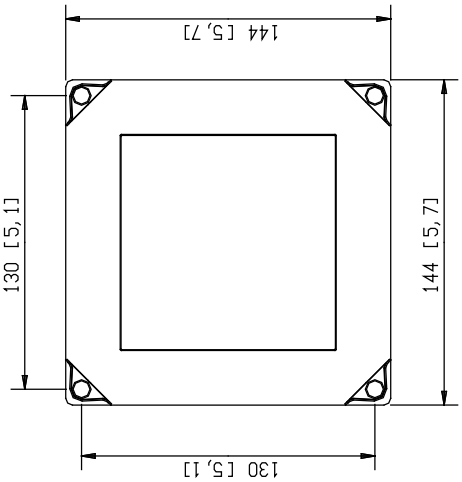
A0 A1 A2 A3 A4
SIDE 1 AV 1
PAGE 1 OF 1

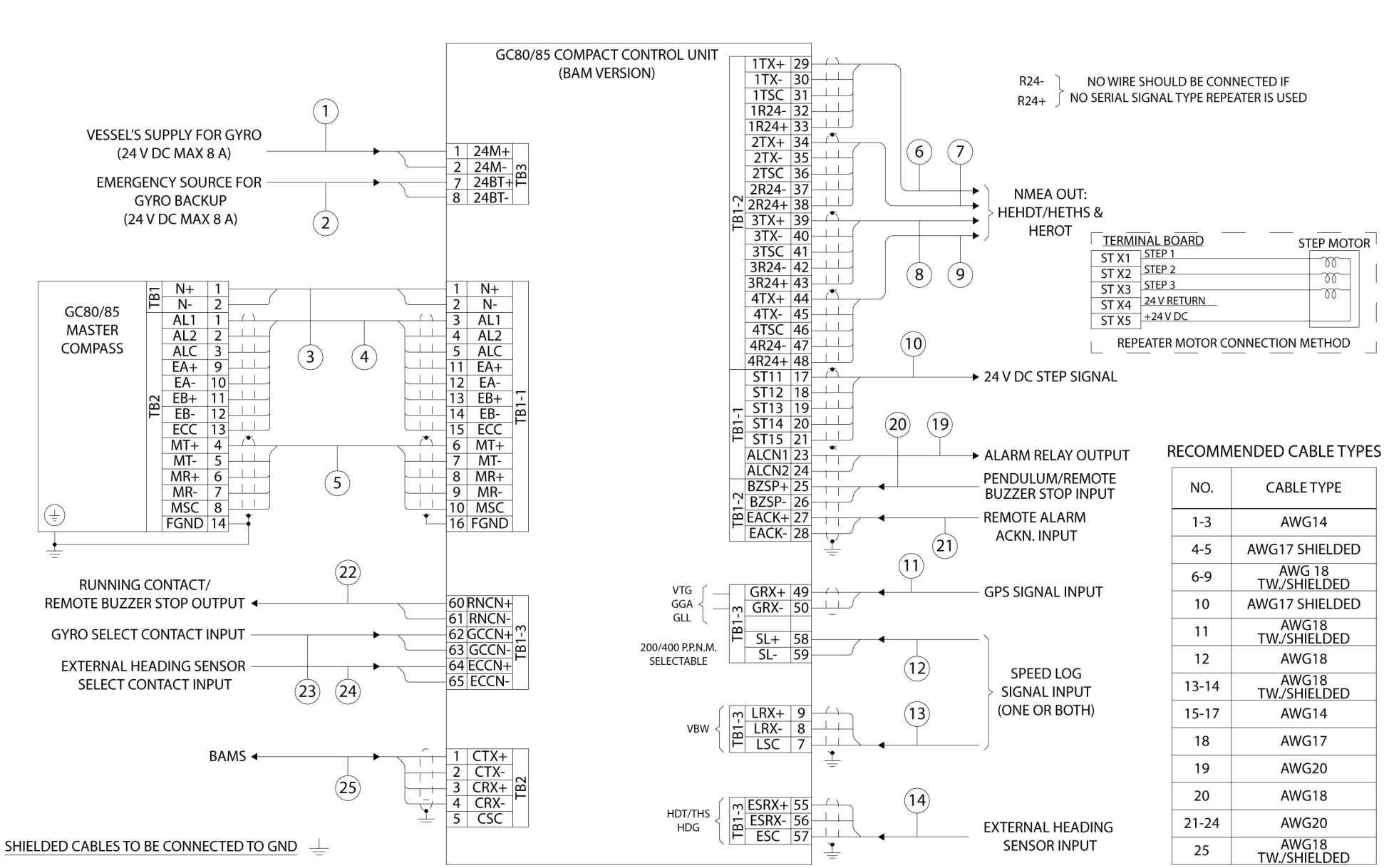






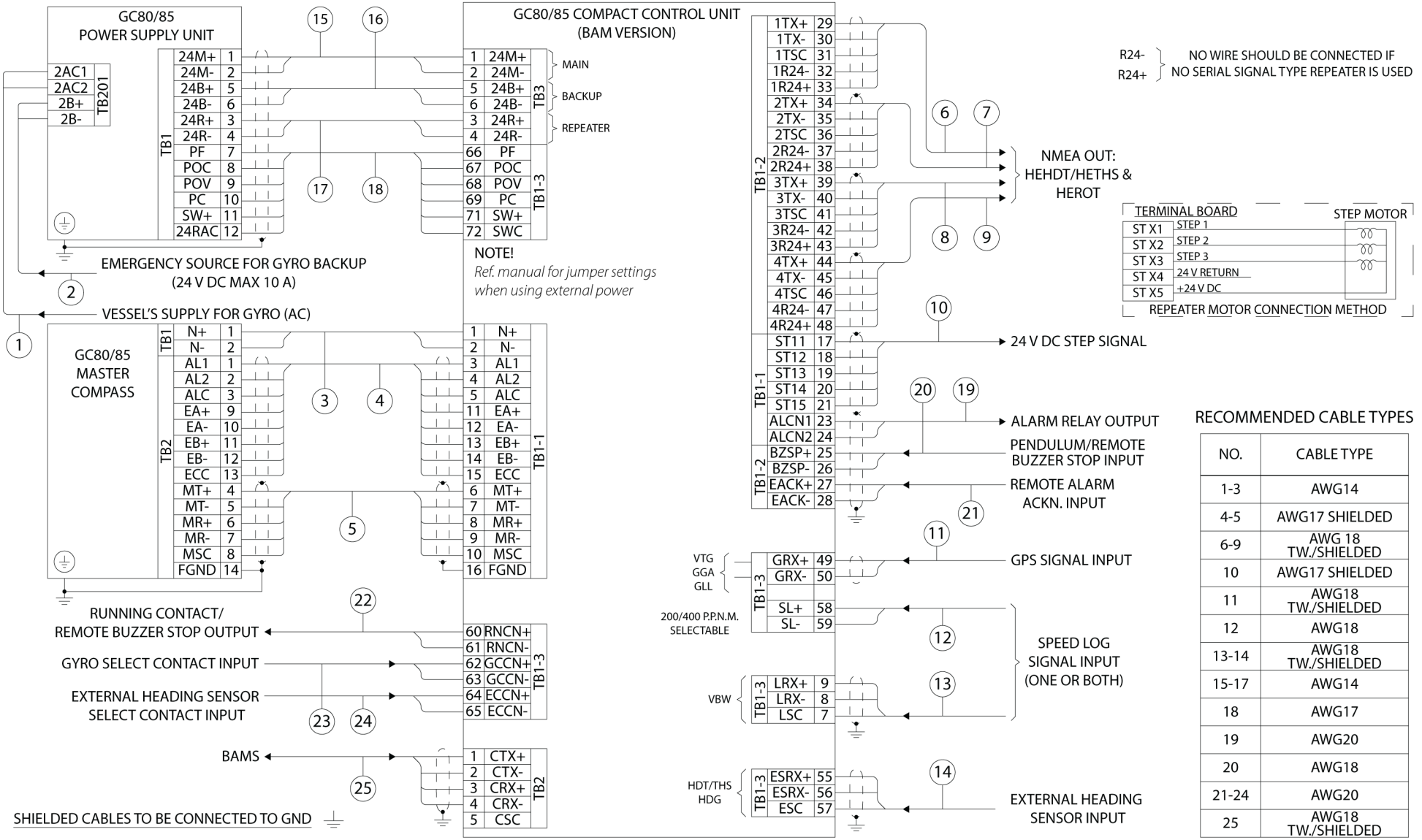


B	4965	28/09-05	Nils	Page 1							
First Angle Projection	Gen.Tol. ±0,x	Design 05/05-04 Nils		Scale 1:2	SIMRAD						
	Gen.Finish xx Ra µm	Drawn 05/05-04 Nils		Verified	SIMRAD EGERSUND AS, NORWAY						
	GC80 Remote Panel kit			Number of Pages 0 0 0 0	Approved	Date					
	Dimensions						A1	A2	A3	A4	Format
	For more details, see 3D model			Page 1 of 1							Drawing number D3-710208 6 Rev. B



RECOMMENDED CABLE TYPES

NO.	CABLE TYPE
1-3	AWG14
4-5	AWG17 SHIELDED
6-9	AWG 18 TW./SHIELDED
10	AWG17 SHIELDED
11	AWG18 TW./SHIELDED
12	AWG18
13-14	AWG18 TW./SHIELDED
15-17	AWG14
18	AWG17
19	AWG20
20	AWG18
21-24	AWG20
25	AWG18 TW./SHIELDED



RECOMMENDED CABLE TYPES

NO.	CABLE TYPE
1-3	AWG14
4-5	AWG17 SHIELDED
6-9	AWG 18 TW./SHIELDED
10	AWG17 SHIELDED
11	AWG18 TW./SHIELDED
12	AWG18
13-14	AWG18 TW./SHIELDED
15-17	AWG14
18	AWG17
19	AWG20
20	AWG18
21-24	AWG20
25	AWG18 TW./SHIELDED

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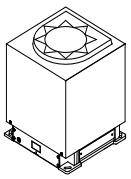
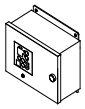
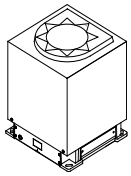
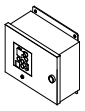
10 PART LIST

This section includes part numbers for all standard and optional units that may be included in a GC80 and GC85 Gyro system.

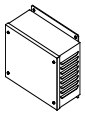
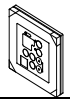
10.1 GC80 Compact Gyro system

PART NO		DESCRIPTION
27101674		GC80 Master compass
44174027		GC80 Sensitive element
000-15036-001		GC80 Compact MK2 Control unit
988-12718-00x		GC80/85 Compact MK2 Gyro compasses User manual
44174449		Special tool required when installing the Sensitive element

10.2 GC85 Compact Gyro system

PART NO		DESCRIPTION
27101682		GC85 Master compass
44170728		GC85 Sensitive element
000-15036-001		GC80 Compact MK2 Control unit
988-12718-00x		GC80/85 Compact MK2 Gyro compasses User manual
44174449		Special tool required when installing the Sensitive element

10.3 GC80/85 Optional equipment, Compact system

PART NO		DESCRIPTION
27101724		GC80/85 Power supply unit
27101757		GC80 Flush mounting kit in Simrad design for remote installation of operating panel
44170736		GC80 Extension cable 5 m for remote installation of operating panel normally mounted in Control unit
44170744		GC80 Extension cable 10 m for remote installation of operating panel normally mounted in Control unit
44170751		GC80 Extension cable 15 m for remote installation of operating panel normally mounted in Control unit
000-15835-001		Extension cable 5m MK2 BAM, compact and expanded
000-15836-001		Extension cable 10 m MK2 BAM, compact and expanded
000-15837-001		Extension cable 15 m MK2 BAM, compact and expanded

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11 TERMINAL LAYOUT

This section includes tables that list all terminal pins and terminal labelling on PCBs in the GC80 Control unit. The tables include detailed descriptions of each terminal.

11.1 ICNT board

TB1

TB1-1

PIN NO	NAME	DETAILS
1	N+	Master compass power supply (24 V DC)
2	N-	Master compass power supply (24 V DC GND)
3	AL1	Master compass inverter alarm (over current)
4	AL2	Master compass inverter alarm (over voltage)
5	ALC	Inverter abnormal (GND)
6	MT+	Control unit – Master compass serial signal
7	MT-	
8	MR+	Master compass – Control unit serial signal
9	MR-	
10	MSC	Serial signal output (GND)
11	EA+	Master compass encoder signal (Phase A)
12	EA-	
13	EB+	Master compass encoder signal (Phase B)
14	EB-	
15	ECC	Serial signal output (GND)
16	FGND	Frame Ground
17	ST11	Step signal 1 (open drain signal)
18	ST12	Step signal 2 (open drain signal)
19	ST13	Step signal 3 (open drain signal)
20	ST14	Step signal 4 (24 V DC GND)
21	ST15	Step signal GND (+24 V DC)
22	-	Not used
23	ALCN1	Alarm contact signal output
24	ALCN2	

TB1-2

PIN NO	NAME	DETAILS
25	BZSP+	Pendulum/Remote buzzer stop signal input
26	BZSP-	
27	EACK+	External alarm acknowledge signal input
28	EACK-	
29	1TX+	Serial signal output (+)
30	1TX-	Serial signal output (-)
31	1TSC	Serial signal output (GND)
32	1R24-	Serial repeater power supply (24 V DC GND)
33	1R24+	Serial repeater power supply (24 V DC)
34	2TX+	Serial signal output (+)
35	2TX-	Serial signal output (-)
36	2TSC	Serial signal output (GND)
37	2R24-	Serial repeater power supply (24 V DC GND)
38	2R24+	Serial repeater power supply (24 V DC)
39	3TX+	Serial signal output (+)
40	3TX-	Serial signal output (-)
41	3TSC	Serial signal output (GND)
42	3R24-	Serial repeater power supply (24 V DC GND)
43	3R24+	Serial repeater power supply (24 V DC)
44	4TX+	Serial signal output (+)
45	4TX-	Serial signal output (-)
46	4TSC	Serial signal output (GND)
47	4R24-	Serial repeater power supply (24 V DC GND)
48	4R24+	Serial repeater power supply (24 V DC)

TB1-3

PIN NO	NAME	DETAILS
49	GRX+	GPS serial signal input
50	GRX-	
51	GSC	Serial signal input (GND)
52	LRX+	Speed Log serial signal input
53	LRX-	
54	LSC	Serial signal input (GND)
55	ESRX+	External sensor serial signal input
56	ESRX-	
57	ESC	External sensor serial signal GND
58	SL+	Input dry contact of Speed Log 200/400 p.p.n.m.
59	SL-	
60	RNCN+	Running contact/remote buzzer stop output
61	RNCN-	
62	GCCN+	Gyro select signal input (External switch)
63	GCCN-	
64	ECCN+	External sensor select signal input (External switch)
65	ECCN-	
66	PF	Power unit alarm input
67	POC	
68	POV	
69	PC	Power unit alarm input (GND)
70	SWV	Not used
71	SW+	
72	SWC	

TB2

PIN NO	NAME	DETAILS
1	CTX+	Serial signal output (+) to BAMS (alert)
2	CTX-	Serial signal output (-) to BAMS (alert)
3	CRX+	Serial signal input (+) from BAMS (alert)
4	CRX-	Serial signal input (-) from BAMS (alert)
5	CSC	Serial signal output (GND)
6	OTX+	Not used
7	OTX-	
8	ORX+	
9	ORX-	
10	OSC	
11	CIN+	
12	CIN-	
13	COUT1	
14	COUT2	
15	-	
16	-	
17	BTPF	
18	BTPFC	
19	LOST	
20	LOSTC	

TB3

When used with 24 V DC main:

PIN NO	NAME	DETAILS
1	24M+	Input power supply (main 24 V DC)
2	24M-	Input power supply (main GND)
3	24R+	Normally not used (Only when connecting a Simrad Power supply unit)
4	24R-	
5	24B+	
6	24B-	
7	24BT+	Input power supply (Battery 24 V DC)
8	24BT-	Input power supply (Battery GND)

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12 DIP SWITCH SETTINGS

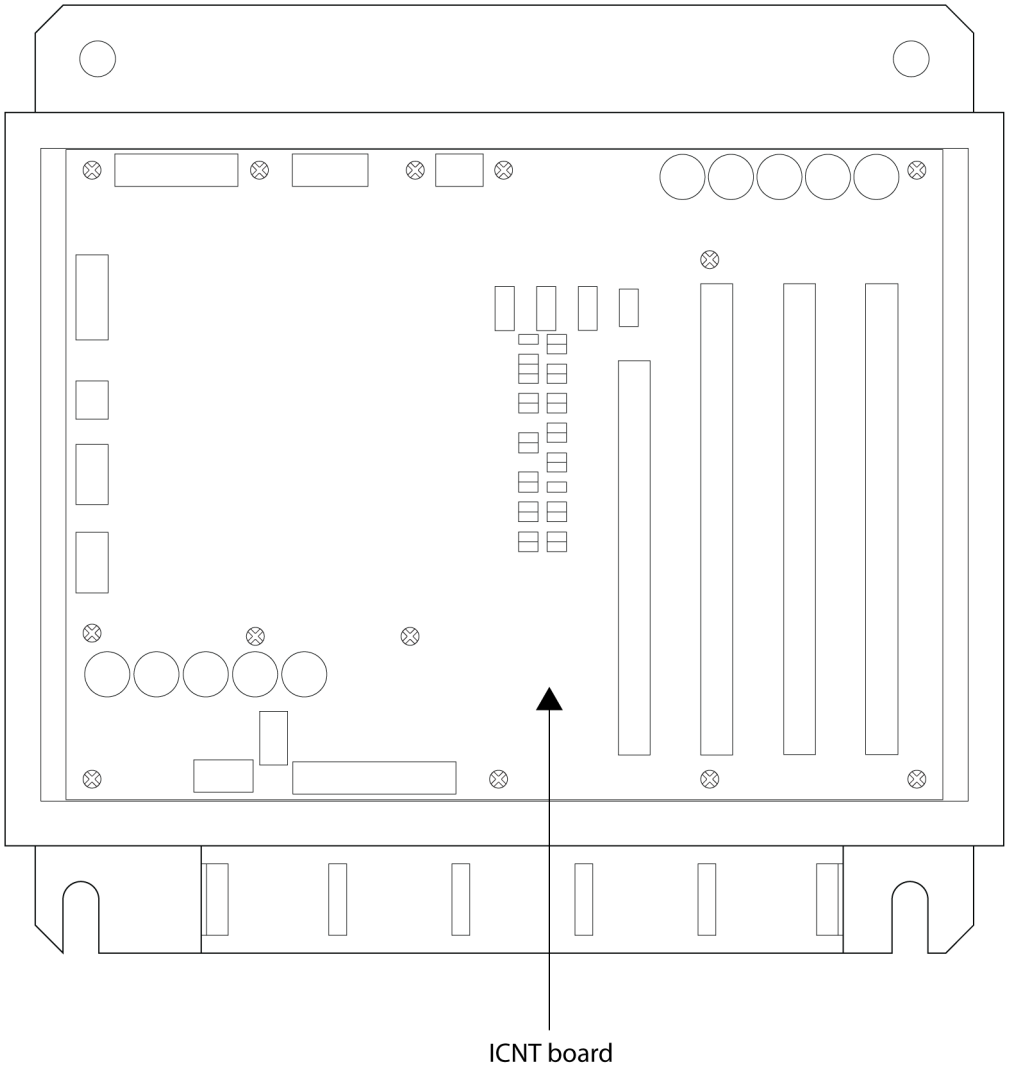
This section includes drawings of the different printed circuits boards in the Control unit that include jumpers and DIP switches.

12.1 Compact MK2 Control unit

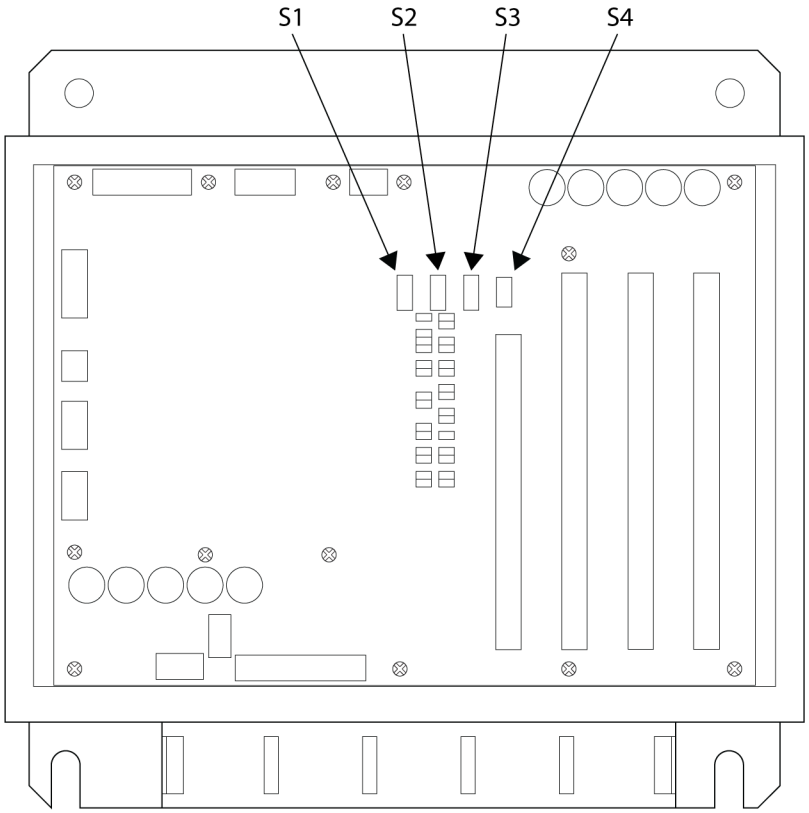
1 board in the Compact MK2 Control unit has jumpers and/or DIP switches that may be used to configure the GC80/85 system.

Only a few of these jumpers/DIP switches are used in installation and pre-running procedures for the Gyro compass. Refer ***Jumper settings in Compact MK2 Control unit***, page 49, and ***DIP switch and jumper settings***, page 51.

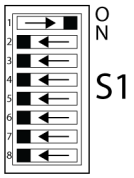
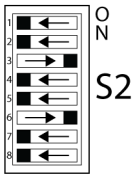
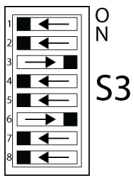
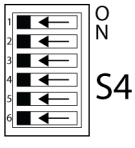
The following pages include drawings that show the location of jumpers and/or DIP-switches, together with a short description of the different settings.



ICNT board



Default settings

S1	S2
	
S3	**S4**
	

DIP switch settings on ICNT board

SWITCH	DEFAULT	FUNCTION	DESCRIPTION	
S1-1	ON	Power unit	OFF = Yes	ON = No
S1-2	OFF	Master compass type	OFF = Standard	ON = High Speed
S1-3	OFF	Control unit type	OFF = Type S	ON = Type D (Dual)
S1-4	OFF	2 Gyros used	OFF = No	ON = Yes
S1-5	OFF	External sensor connection	SW1-5 OFF SW1-6 OFF	= No external sensor
			SW1-5 OFF SW1-6 ON	Not used
S1-6	OFF		SW1-5 ON SW1-6 OFF	= External sensor connected
			SW1-5 ON SW1-6 ON	Not used
S1-7	OFF	Serial signal format	OFF = IEC61162-2 ed.1 (NMEA0183, ref. page 13) ON = Tokimec	
S1-8	OFF	Alarm output setup	OFF = All alarms ON = Only power failures	
S2-1	OFF	Used for debugging (Do not touch)	-	
S2-2	OFF			
S2-3	ON	Operation panel type	OFF = GPANEL OLD Control unit ON = GPANEL-A NEW Control unit	
S2-4	OFF	Pendulum ferry	OFF = Not connected/Buzzer stop enabled ON = Pendulum function in use/Buzzer stop disabled	
S2-5	OFF	Serial signal transmit frequency IEC61162-1 ed.4	SW2-5 OFF SW2-6 OFF	= 1 sec (1 Hz)
			SW2-5 OFF SW2-6 ON	= 100 msec (10 Hz)
S2-6	ON		SW2-5 ON SW2-6 OFF	= 200 msec (5 Hz)
			SW2-5 ON SW2-6 ON	= Invalid (1 sec)
S2-7	OFF	Not used	-	

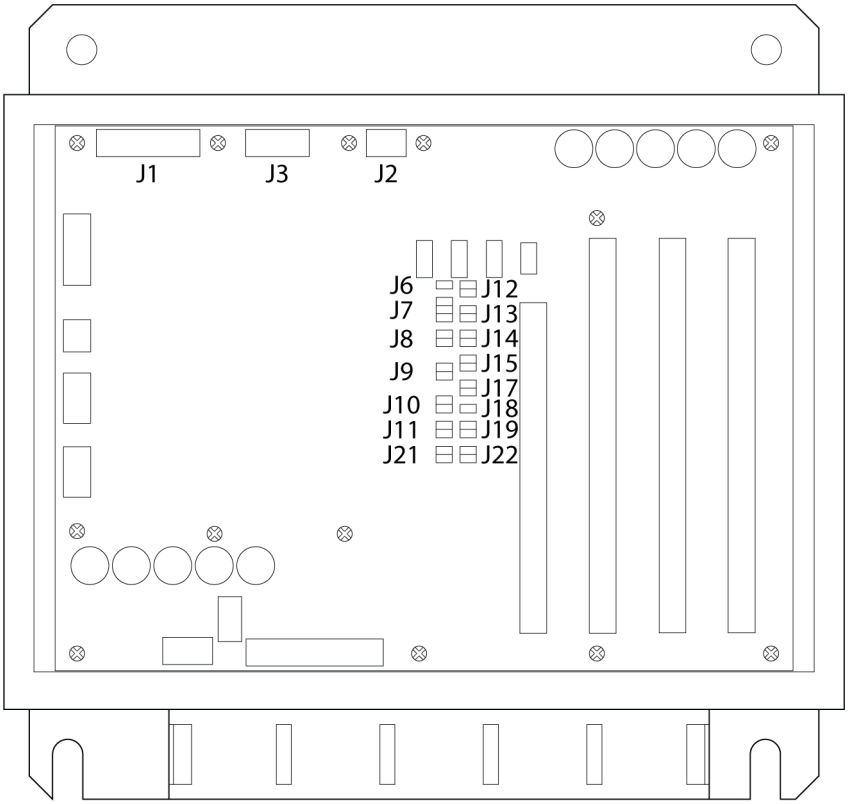
SWITCH	DEFAULT	FUNCTION	DESCRIPTION
S2-8	OFF	System select information contact	OFF = No ON = Yes
S3-1	OFF	Timer startup	OFF = No ON = Yes
S3-2	OFF	Talker ID of "ROT" sentence	OFF = "HE" ON = "TI"
S3-3	ON	Not used	-
S3-4	OFF		
S3-5	OFF	Ban or permission of a "ROT" sentence output	Valid at the time of external sensor (standard) selection. OFF = Disabled ON = Enabled
S3-6	ON	For Simrad use	OFF = Not used ON = Simrad GC type (80 or 85) shown in display at start-up according to S1-2 setting.
S3-7	OFF	Not used	-
S3-8	OFF	External buzzer stop/Gyro Running Contact	OFF = External buzzer stop disabled, Gyro Running Contact enabled ON = External buzzer stop enabled
S4-1	OFF	Do not touch	-
S4-2	OFF		
S4-3	-		
S4-4	OFF	Alarm detection time for Main Power Fail/Power Unit Fail	OFF = 300 ms ON = 2 sec
S4-5	ON (THS)	Able/Disable for THS sentence output	OFF = Disable to output ON = Enable to output
S4-6	OFF	Do not touch	-

GPANEL-A board

DIP switch settings on GPANEL-A board

SWITCH	DEFAULT	FUNCTION	DESCRIPTION
S10-1	ON	For Simrad use	OFF = No ON = for Simrad
S10-2	OFF	Do not touch	-
S10-3			
S10-4			
S10-5			
S10-6			
S10-7			
S10-8			

Jumper settings on ICNT board



JUMPER	DEFAULT	FUNCTION	DESCRIPTION
J6 (RESET)	Open	CPU reset	Used when resetting the CPU
J7 (1TX)	5-6 short	Output serial signal selection	Output port: "1TX" 3-4 short = IEC61162-2 ed.1 or TOKIMEC version 5-6 short = IEC61162-1 ed.4 (ref. page 13) *NOTE: Never use both jumpers at the same time!*
J8 (2TX)	3-4 short		Output port: "2TX" 1-2 short = IEC61162-2 ed.1 or TOKIMEC version 3-4 short = IEC61162-1 ed.4 (ref. page 13) *NOTE: Never use both jumpers at the same time!*

JUMPER	DEFAULT	FUNCTION	DESCRIPTION
J9 (3TX)	3-4 short		Output port: "3TX" 1-2 short = IEC61162-2 ed.1 or TOKIMEC version 3-4 short = IEC61162-1 ed.4 (ref. page 13) *NOTE: Never use both jumpers at the same time!*
J10 (4TX)	3-4 short		Output port: "4TX" 1-2 short = IEC61162-2 ed.1 or TOKIMEC version 3-4 short = IEC61162-1 ed.4 (ref. page 13) *NOTE: Never use both jumpers at the same time!*
J11 (GPSPOL)	1-2 short	Polarity for "GPS" signal setting	Input port: "GRX" 1-2 short = Standard 3-4 short = Reversed polarity *NOTE: If no signal is received with 1-2 short, set 3-4 to short.* *NOTE: Never use both jumpers at the same time!*
J12 (LOGPOL)	1-2 short	Polarity of "LOG" signal setting	Output port: "LOGPOL" 1-2 short = Standard 3-4 short = Reversed polarity *NOTE: Never use both jumpers at the same time!*
J13 (ESPOL)	1-2 short	Polarity of the "external heading sensor" signal setting	Input port: "ESPOL" 1-2 short = Standard 3-4 short = Reversed polarity *NOTE: Never use both jumpers at the same time!*

JUMPER	DEFAULT	FUNCTION	DESCRIPTION
J14 (LOG)	1-2 short	LOG pulse selection	Input port: "SL" 1-2 short = 200 p.p.n.m. 3-4 short = 400 p.p.n.m. *NOTE: Never use both jumpers at the same time!*
J15 (ALCN)	1-2 short	Setting of alarm contact	Output port: "ALCN" 1-2 short = Normal CLOSED, Alarm OPEN 3-4 short = Normal OPEN, Alarm CLOSED *NOTE: Never use both jumpers at the same time!*
J17 (RNCN)	1-2 short	Setting of running contact	Output port: "RNCN" 1-2 short = Running CLOSED, Stop OPEN 3-4 short = Running OPEN, Stop CLOSED *NOTE: Never use both jumpers at the same time!*
J18 (WR/EXT)	1-2 short	Version up of software (ICNT pwb: CPU)	Output port: "WR/EXT" Short = Normal Open = Software version up
J19 (ENC)	1-2 short 3-4 short	Setting of encoder signal	Output port: "ENC" 1-2 short/3-4 short = Encoder signal (GC80/85)
J21 (R3SEL)	1-2 short 3-4 open	Not used	Output port: "R3SEL" 1-2 short/ 3-4 open = Not used
J22 (FOG)	1-2 open 3-4 open	Setting of encoder signal	Output port: "FOG" 1-2 open/ 3-4 open = Encoder signal (GC80/85)

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13 ALARM MESSAGES AND CORRECTIVE ACTIONS

This section provides a description of system errors and corrective actions that should be performed by the system operator.

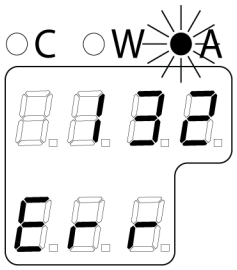
13.1 The alarm system

The GC80/85 compass will continually check for faults while the system is running.

If a fault occurs an alarm code will be displayed in the LCD, the Alarm lamp will be flashing, and an audible alarm will be activated.

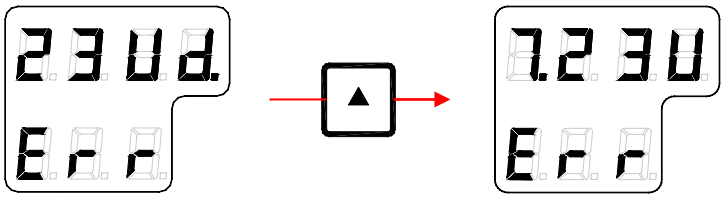
Note! *The audible and visual alarm may be disabled by DIP switch S1-8 on the ICNT board (refer page 103). A failure will then only be indicated with flashing display.*

Up to 4 alarm codes may be displayed in the LCD to indicate that several alarm situations are present. The last activated alarm will be displayed on the right side of the display. The figure below shows that alarm codes 1, 3 and 2 were generated in that order.



For a complete list of alarm codes and explanation of the alert priority system, refer page **116** onwards.

If more than 4 alarms are active, this will be indicated with a dot behind the last number as shown in the figure below. Further alarm codes may then be displayed by pressing the "**ARROW UP**" button.



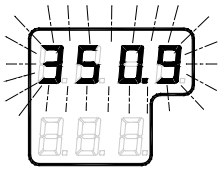
The example above shows that alarm codes 2, 3, U, d and 7 were activated.

Caution ***When an alarm is generated, bearing information from the GC80/85 may not be present or may have large error. Any equipment using bearing information from the Gyro compass should therefore immediately be operated according to the equipment's emergency operating procedure.***

13.2 Acknowledging an alarm

An alarm is acknowledged by pressing the **ACK/ENT** button.

- The audible alarm will be silenced.
- If the alarm situation has disappeared, the alarm lamp will be switched off, and the alarm code will be removed from the LCD.
- If the alarm situation continues, the alarm lamp will switch from flashing to steady light. The LCD will return to show true bearing with flashing numbers to indicate that the bearing may have large errors.



An alarm code for an active error may be recalled by pressing the **DISP** button until the alarm display is shown. It is possible to recall any alarm code in the LCD for as long as the alarm situation is present.

13.3 Fault finding

When an 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 actions for errors that may be corrected by the operator. If none of these procedures correct the problem, contact the local Simrad dealer for advice or to request on-board service.

Before any fault-finding procedure is started, the following actions should be performed to verify a system error:

1 Shut down and restart the Gyro compass.

2 Verify that all cables are properly connected according to the wiring diagrams, page 84 onwards.

3 Check the cables from the main power supply to the Control unit.

Main power failure

Alarm generated when the main power supply is lost.

Caution *Turn OFF the power as described on page 20 before checking the main power supply.*

1 Verify that the main power switch inside the Control unit is switched ON.

2 Check the input from the power supply to the Control unit:

Terminal board/Terminal:.....ICNT/TB3, 24M+ and 24M-

Voltage:.....24 V DC +30% / -20%

3 Check the cables from the main power supply to the Control unit

4 Remove power to the Control unit and check the fuse:

XF6: 10 A

For location and replacement of the fuses, refer to page 42 onwards.

Internal power failure in Control unit

The alarm is generated when the Control unit's power supply is over current or over voltage.

1 Turn the power OFF by pressing the **POWER** button. Re-press the button after 20 seconds.

2 If no alarm is activated, continue the start-up procedure as described in ***Start-up***, page 19.

3 If the alarm continues, contact Simrad's local dealer for assistance.

Inverter malfunction

The alarm is generated if the Inverter in the Master compass is over current or over voltage.

1 Turn the power OFF by pressing the **POWER** button. Re-press the button after 20 seconds.

2 If no alarm is activated, continue the start-up procedure as described in ***Start-up***, page 19.

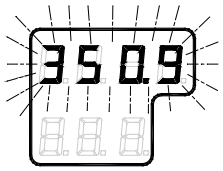
3 If the alarm continues, turn the power OFF and check the inverter fuse:

XF1: 12 A.

For location and replacement of the fuses, refer to page 42 onwards.

Zero cross failure

This alarm is generated when the reference angle for the compass bearing cannot be detected, or if there is an error in the bearing calculation.



1 Press the **DISP** button until the flashing bearing is displayed in the LCD.

2 Adjust the bearing using the **ARROW** buttons until the bearing corresponds to the vessel's actual bearing. Confirm the entry by pressing the **ACK/ENT** button.

If the bearing input is accepted by the system, the LCD will display current bearing without flashing.

3 Report the error to Simrad even if the bearing is accepted and the alarm removed.

System communication failure

Alarms generated when there is a malfunction in the communication from the Master compass to the Control unit.

1 Turn the power OFF by pressing the **POWER** button. Re-press the button after 20 seconds.

2 If no alarm is activated, continue the start-up procedure as described in ***Start-up***, page 19.

3 If the alarm continues, turn the power OFF and disconnect the power cable from the Control unit.

4 Confirm the connection between the terminal board in the Master compass and the terminal board in the Control unit as described below:

GC80 Master compass:

TB1, MR+/-

GC80 Compact MK2 Control unit:

ICNT, TB1-1, MR+/-

GPS communication or data malfunction

Generated if the communication from GPS has stopped (**C**), or when there is a malfunction in the communication line from the GPS (**d**).

Note! *This alarm is only generated when GPS is selected as the vessel's input source for latitude or speed.*

1 Verify that the GPS operates according to the GPS documentation.

2 If the GPS has an error, change the input source as described in ***Setting the Latitude input source***, page 63 and

3 ***If GYRO is*** selected you need to verify that GPS connection is set to Non in extension menu A-2, 2.9.G.

4 Setting the Speed input source, page 64.

Caution ***Any alarm generated by a failure in the GPS may cause large errors in the bearing output.***

Internal communication error

Generated when the communication from the external bearing sensor has stopped (E), or when an error is detected in the communication (F).

Caution

When these alarms are generated, the bearing information from the external bearing sensor may have large error.

Verify that the external bearing sensor operates correctly according to the system documentation.

External bearing sensor error

Generated when the serial signal from the external bearing sensor has stopped (L), or when an error is detected in this serial signal (n).

Note!

This alarm is only generated when the external bearing sensor is selected as active bearing output source.

Verify that the external bearing sensor operates correctly according to the system documentation.

LOG (serial) communication or data malfunction

Activated when the serial signal from LOG (serial) has stopped (P), or when a malfunction is detected in the serial signal from the LOG (U).

Note!

This alarm is only generated when GYRO is selected as the active bearing output source, and when LOG (serial) is selected as the vessel's speed input source.

1 Verify that the LOG operates according to the LOG documentation.

2 If the LOG has an error, change the input source as described in

3 ***If GYRO is selected*** you need to verify that GPS connection is set to Non in extension menu A-2, 2.9.G.

4 Setting the Speed input source, page 64.

Repeater error

No output on single repeaters

1 Check that the repeater is connected to the Gyro according to the repeater's documentation.

2 Each repeater output has a separate fuse in the Control unit. Disconnect the power from the Control unit, and check the fuses:

Step repeater:

XF5: 1 A

Serial repeater:

XF1 to XF4: 1 A

For location and replacement of the fuses, refer to page 42 onwards.

No output on any repeater

Disconnect the power from the Control unit, and check the following fuse:

XF8: 10 A

For location and replacement of the fuses, refer to page 42 onwards.

Failure when powering ON the Gyro compass

If alarm codes and are generated simultaneously when the GC80 system is turned ON, the following procedure should be used to correct the alarm situation:

1 Press the **POWER** button to turn OFF the system. Re-press the button after 1 second.

2 If the alarm status remains, remove the power from the system and verify the fuse for the inverter.

For location and replacement of the fuses, refer to page 42 onwards.

13.4 Complete alarm code list

Alarm code	Alarm content	Detailed code	Possible cause
E-1	Main power is abnormal	1	When the main power (AC power source) is lost.
E-2	Power is abnormal	2	Power supply unit in the control box becomes over current.
		3	Power supply unit in the control box becomes over voltage.
		4	24R is lost.
E-3	Inverter is abnormal	5	Inverter in the Master compass becomes over current.
		6	Inverter in the Master compass becomes over voltage.
E-4 *1	Control power is abnormal	7	+12.5V is abnormal.
		8	-12.5V is abnormal.
		9	+10V is abnormal.
		10	-10V is abnormal.
E-5 *1	Rotor current is abnormal	11	Gyro rotor current is abnormal.
E-6	Rotor tilting angle is abnormal	12	Rotor tilting angle is abnormal.
E-7 *1	Servo loop is abnormal	13	Horizontal servo loop is abnormal.
		14	Bearing servo loop is abnormal.
		15	Rate limit is abnormal.
E-8	Zero cross is abnormal	36	Zero cross azimuth angle sensor is abnormal.
E-9 *1	Memory is abnormal	16	Memory is abnormal
		17	
		18	
		19	
		20	
E-A	Communication error (1)	21	Communication error (MCC→SCC).
		23	MCC is reset.
E-b *1	Communication error (2)	22	Communication error (SCC→MCC).
		24	SCC is reset.
E-c	GPS communication off	25	When GPS system is stopped or serial signal from GPS is cut (Timeout is 15 sec.).
E-d	GPS data abnormal	26	GPS latitude data abnormal (Timeout is 17 sec.).
		27	GPS speed data abnormal (Timeout is 17 sec.).

Alarm code	Alarm content	Detailed code	Possible cause
E-E	MAG/EHS communication off	32	MAG/EHS system is stopped or serial signal from GPS is cut (Timeout is 15 sec.).
E-F	MAG/EHS data abnormal	33	EHS data abnormal (Timeout is 17 sec.).
E-L	EXT. sensor communication off	30	EXT. sensor system is stopped or serial signal from EXT. sensor is cut (Timeout is 15 sec.).
E-n	EXT. sensor data abnormal	31	EXT. sensor data abnormal (Timeout is 17 sec.).
E-P	LOG(serial) communication off	28	LOG (serial) source is stopped or serial signal from LOG (serial) is cut (Timeout is 15 sec.).
E-U	LOG(serial) data abnormal	29	LOG (serial) data abnormal (Timeout is 17 sec.).
E-r	E5V is lost	34	E5V (power supply of serial signal) is lost.
E-G	Master bearing is abnormal	35	Compensation of the bearing by the encoder signal is not completed.
E-u *1	LOG (contact) data abnormal	37	LOG (contact) is abnormal.
E-t	I/F unit communication abnormal	42	The communication from I/F unit to SCC/ICNT is abnormal. Verify that switch S4-2 is set to OFF on ICNT board.
E-q	SCC/ICNT to GPANEL communication abnormal	-	Communication fail from SCC board to GPANEL-A board. Verify dip switches on GPANEL-A and SCC board.
E-H	GPANEL to SCC/ICNT communication abnormal	40	Communication fail from GPANEL-A to SCC board. Caused by offset out of range (360.0 deg)

*1: This alarm code is not displayed to customer.

BAMS complete alarm code list

Alarm code	Alarm code to meet BAMS specification	Name	Priority	Category	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 C	B -	※1
d	10311	GNSS DATA	W C	B -	※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 C	B -	※2
r	10318	E5V FAIL	W	B	
U	10313	LOG DATA	W C	B -	※2
u	10330	PLOG ERROR	W C	B -	※3

※1: Alarm priority is Warning if “c” and/or “d” alarms are activated while GNSS is selected for vessel’s latitude and speed sensor.

※2: Alarm priority is Warning if “P” and/or “U” alarms are activated while Speed Log (serial comm) is selected for vessel’s speed.

※3: Alarm priority is Warning if “u” alarm is activated while Speed Log (contact) is selected for vessel’s speed.

Alarm Priority list

Alarm priority		Description	Indication	Buzzer sound
High	A (Alarm)	Alarm requires immediate attention and action. (The operator should switch to manual steering because the automatic steering may be unavailable).	Red	3 short beeps. Repeated every 7 seconds until the **ACK** button is pressed.
Middle	W (Warning)	Alarm requires immediate attention, but not immediate action. (After acknowledging the alarm, take appropriate action. Some alarms escalate from middle to high priority if they are not acknowledged within a certain time.)	Yellowish orange	2 short beeps. Repeated every 60 seconds until the **ACK** button is pressed.
Low	C (Caution)	Alarms not categorized as High (A) priority or Middle (W) priority. (The alarm does not influence the current steering. Recover it before switching from manual to automatic steering mode.)	Yellow	None

Note! *This equipment does not have any High (A) priority alarms.*

※5: The description of Categories

Category A	Alarm that can only be acknowledged (**ACK** button) by operating the system.
Category B	Alarm that can be acknowledged (**ACK** button) by operating either the system or external equipment (CAM-HMI).

Note! *This equipment has no Category A alarm.*

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