INSTRUCTION MANUAL

SIMRAD GC80/85 EXPANDED

Gyro Compass

20221529D English

Document revisions

Rev	Date	Written by	Checked by	Approved by
A	08.01.04			
B	17.02.05			
C	05.12.05			
D	08.05.07			

Document history

Rev. A	First issue.
Rev. B	Updated for new software release (Master compass: V.1.03, Control unit: V.1.04).
Rev. C	New procedure for how to adjust true heading, updated dimensions for remote panel, other minor updates to text throughout the manual.
Rev.D	Text and illustration updates.

About this manual

This manual is intended as a reference guide for installing, operating and maintaining Simrad GC80 and GC85 Expanded Gyro compasses.

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

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 in the following sections:

1. System overview

An overview of the GC80/GC85 Expanded gyro system and it's components.

2. User interface

Overview of GC80 Expanded Control unit and the user interface.

3. Operation

Main operating procedures for using the GC80/GC85 Expanded Gyro compass.

4. 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.

5. Installation

Mechanical installation, cable connection, and software configuration for the GC80/GC85 Expanded gyro system.

6. Advanced settings

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

7. Technical specifications

Specifications for the system and for all separate units in the GC80/GC85 Expanded gyro system.

8. Drawings

Outline drawings and wiring diagrams for the GC80/GC85 Expanded gyro system.

9. Spare part list

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

10. Terminal layout

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

11. Dip switch settings

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

12. Alarm messages and corrective actions

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

Contents

1 SYSTEM OVERVIEW

This section provides an overview of GC80 and GC85 Expanded Gyro compasses and their components.

1.1 Introduction

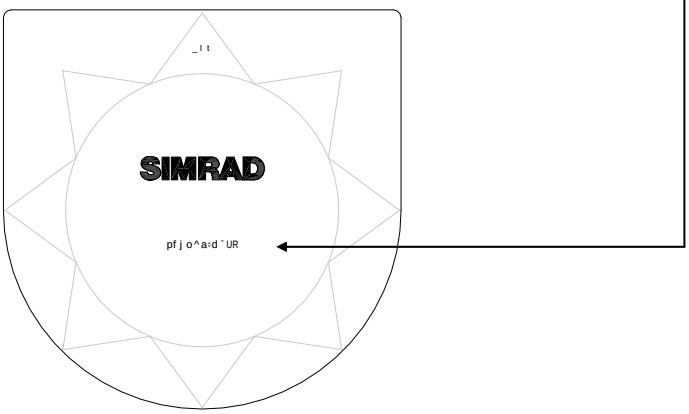
GC80 and GC85 Expanded Gyro compasses have been designated for any size of vessels to enhance the navigation capabilities and reliability. The gyro compasses eliminate the inconvenience and limitations of magnetic compasses, and provide a variety of electrical outputs to supply accurate and consistent heading information to other navigational equipment.

- A GC80 Expanded gyro is designed for vessels with speed up to 30 knots. The system complies with IMO A.424 (11) and Wheel Mark Specifications.
- A GC85 Expanded gyro system is suitable for high speed vessels with speed up to 70 knots. It complies with IMO A.821 (19) HSC.

GC80 and GC85 Expanded gyro systems have different sensitive elements, but use the same GC80 Expanded Control unit. The systems are identified with 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 on the figure below. The labelling on the control unit is identical for both gyro systems.



1.2 Precaution in use

The GC80/GC85 Expanded Gyro compass displays 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/GC85 should be operated manually or switched to other bearing sensors.

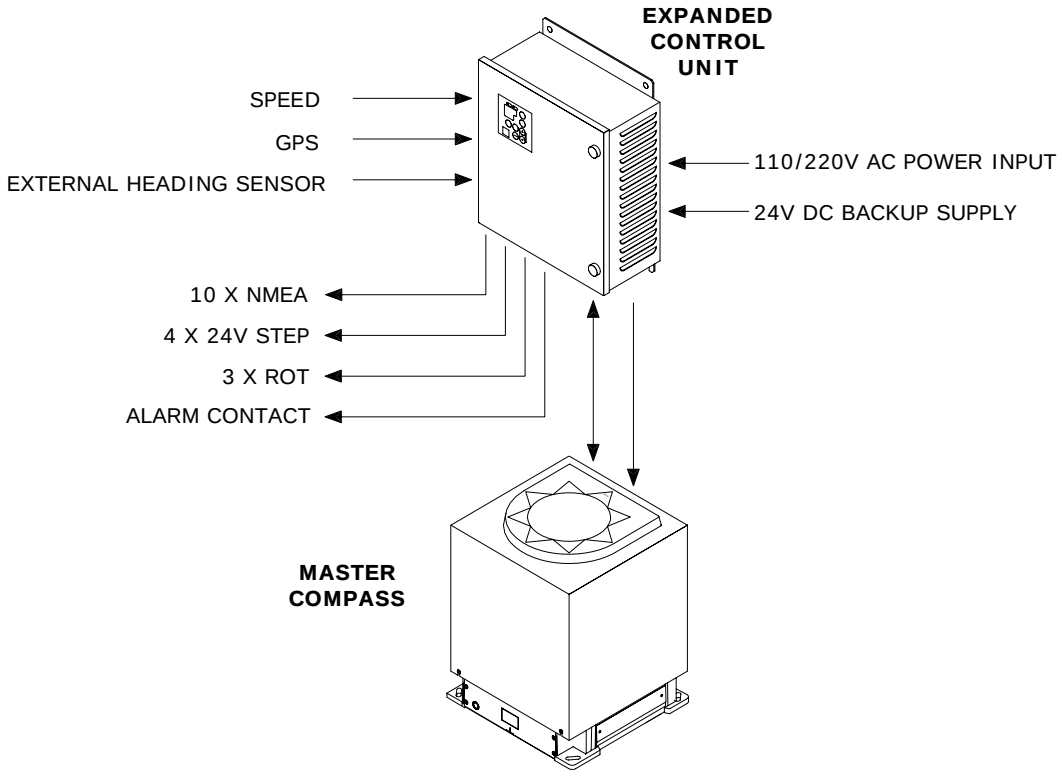
To assure long time safe operation, the following precautions should be taken:

- Assure that the operator is familiar with the use of the gyro compass
- Perform daily check to maintain normal system operation. Refer ***MAINTENANCE***, page 23 onwards
- If any unusual behavior is observed during daily inspection, 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

1.3 System components

A GC80/GC85 Expanded Gyro compass includes the following units:

- Master Compass with Sensitive Element
- Expanded Control unit



Note! *For details, refer **TECHNICAL SPECIFICATION**, page 65.*

1.4 Bearing repeaters

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

The following serial signal may be selected:

Lo speed: IEC61162-1 ed.2, close in comparison with NMEA0183 version 2.30 (4800 baud)

High speed: IEC61162-2, based upon NMEA0183 version 2.30 (4800 and 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 wiring diagrams, page 76 onwards.

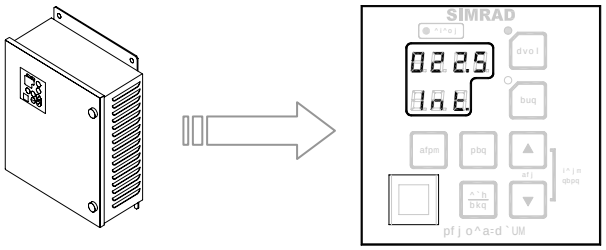
2 USER INTERFACE

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

2.1 GC80 Expanded 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 37.

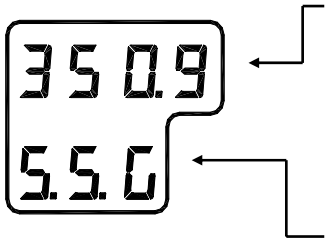


POWER Button

Used for switching the gyro system ON. The button will be lit to indicate that power is applied to the system. Refer ***System Start-up and Shut-down***, page 10.

Display

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



- The Data indicator consists of four 7-segments red LEDs. The indicator is used for displaying the vessel's bearing, latitude and speed. Refer ***Displaying present settings***, page 13.
  The Data indicator is also used for displaying alarm codes as described from page 19 onwards.
- The Mode indicator consists of three 7-segments green LEDs. The Mode indicator displays codes used for identifying input type for bearing, latitude and speed.

GYRO Button

Used for selecting 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 12.

EXT Button

Used for selecting 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 12.

DISP Button

Used for displaying data on the LCD. Refer ***Displaying present settings***, page 13.

SET Button

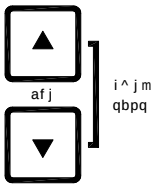
Used for changing data and input sources. Refer ***System start-up and software configuration***, page 50 onwards.

ACK/ENT Button

Used for confirming a change in data and input sources. Refer ***System start-up and software configuration***, page 50 onwards.

The button is also used for acknowledging an alarm as described in ***Acknowledging an alarm,*** page 21.

Arrow Buttons



Used for increasing or decreasing a parameter value. Refer ***System start-up and software configuration***, page 50 onwards

Also used for lamp test and for setting the display illumination as described in page 12.

Alarm Indicator

Used for indicating an alarm situation. Refer ***Alarm messages***, page 20.

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3 OPERATION

This section describes the main operating procedure used when operating the GC80/GC85 Expanded Gyro compass.

3.1 System Start-up and Shut-down

A GC80/GC85 Expanded gyro system is usually left with power on. If the system has to be shut down and restarted, the procedures in the following sections should be followed.

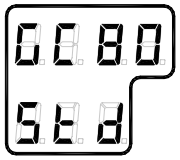
Start-Up

Caution

Before the gyrocompass is turned into normal operation, it has to be configured according to the description in System start-up and software configuration, page 50 onwards.

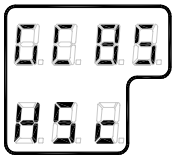
1 Turn ON the gyro system by pressing the **POWER** button on the Control panel. The following start-up sequence will be run:

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

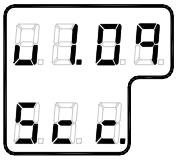


GC80 CONTROL UNIT STD VERSION

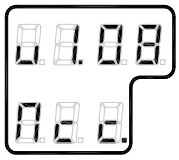
OR



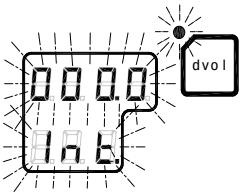
GC80 CONTROL UNIT HIGH SPEED VERSION



SW VERSION CONTROL UNIT



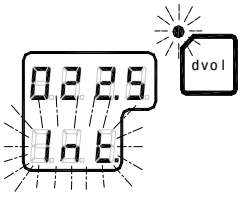
SW. VERSION MASTER COMPASS



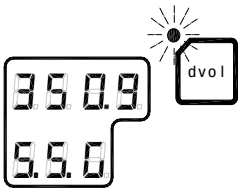
2 If the rotor was not completely stopped when the **POWER** button was pressed, a rotor break function will be activated to stop the rotor.

Active rotor break is indicated with flashing display.

3 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.

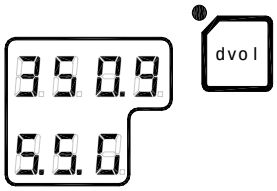


4 When the compass has rotated 360°, start bearing is indicated with flashing text in the display. The start bearing will be the same as active bearing when the compass was turned OFF.



5 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 remains flashing.

6 The rotor will now start rotating, 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.

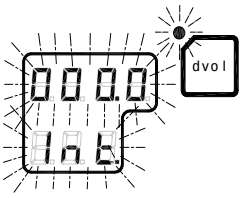
The lamp near the **GYRO** button change from flashing to steady light.

The GC80/GC85 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 Repress the **POWER** button to activate the rotor break function. The light in the **POWER** button will be lit again.



Active rotor break is indicated by:

- flashing display
- a soft clicking sound heard from the gyrocompass

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!

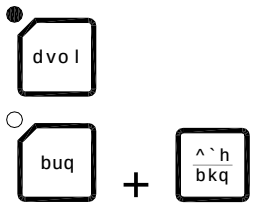
3 Press the **POWER** button again to shut down the gyrocompass when both the data and the dot in the display change from flashing to steady light.

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

3.2 Selecting active compass

If an external heading sensor is connected to GC80/GC85, it is possible to switch between gyro and external heading sensor as active steering sensor.

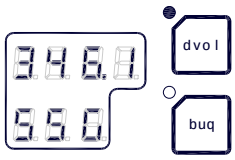
The gyro system will normally be used with the gyro compass selected as active compass. An external heading sensor should only be used as active compass when the gyro compass not is working properly.



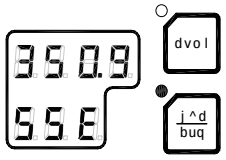
By pressing the **GYRO** or the **EXT** and the **ACK/ENT** buttons simultaneously, the GC80/GC85 will toggle between using the gyrocompass or an external sensor as active sensor.

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



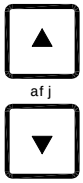
GYRO COMPASS SELECTED AS ACTIVE STEERING SENSOR



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 in operation.**

3.3 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 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.

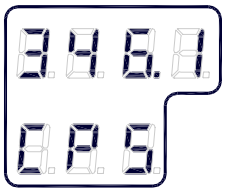
3.4 Displaying present settings

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

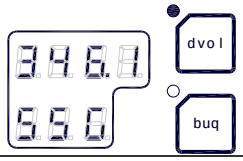
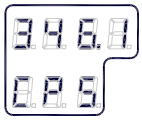
The following sections; ***Displaying settings <u>with no</u> external sensor connected*** and ***Displaying settings <u>with</u> external sensor connected***, show examples of how the present settings are presented by pressing the **DISP** button.

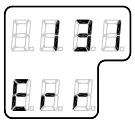
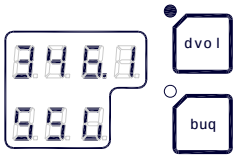
The display will be used as follows:



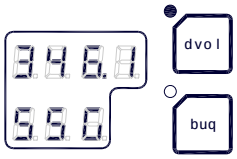
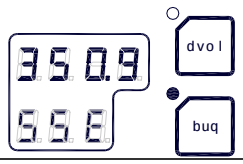
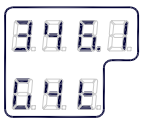
- The first row in the display will show the value
- The second row displays code used for identification

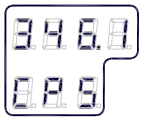
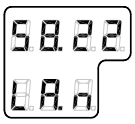
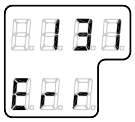
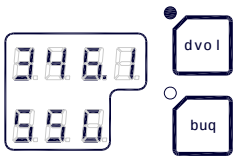
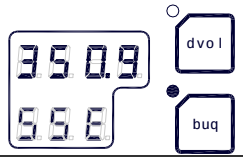
Displaying settings <u>with no</u> external sensor connected

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**)

Display state	Display	Description
afpm 4th press on **DISP** button		- Rate of turn in °/min - Rate of turn indication
afpm 5th press on **DISP** button		- Error codes (up to 4) - Error indication
afpm 6th press on **DISP** button Normal operation		- True output bearing - Active compass

Displaying settings with 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)
afpm 1st press on **DISP** button	 or 	- Bearing - Passive compass

Display state	Display	Description
afpm 2nd press on **DISP** button		- Gyro compass bearing without correction - Active speed input source indication (**GPS**, **Manual**, **Log** or **Serial Log**)
afpm 3rd press on **DISP** button		- Latitude - Latitude indication: North (**LA.n**) or South (**LA.s**)
afpm 4th press on **DISP** button		- Vessel speed - Speed input indication (**GPS**, **Manual**, **Log** or **Serial Log**)
afpm 5th press on **DISP** button		- Rate of turn in °/min - Rate of turn indication
afpm 6th press on **DISP** button		- Error codes (up to 4) - Error indication
afpm 7th press on **DISP** button Normal operation	 or 	- True output bearing - Active compass

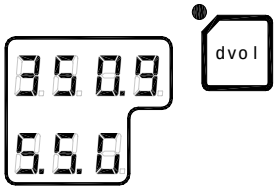
3.5 Confirming present settings

After the GC80 is configured according to the ***System start-up and software configuration***, described in page 50 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 switch to a different input source.

True bearing

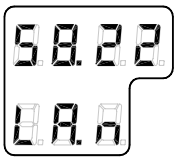
Make sure that the gyro compass is selected as active compass. Refer ***Selecting active*** compass, page 12.



Confirm that the gyro compass's 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 55.

Latitude



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

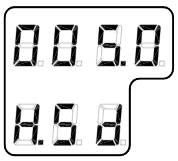
The displayed latitude value is calculated based on the vessel's true bearing and the vessel's actual speed. Refer setting the latitude input source and speed input source, page 53 onwards.

- 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 s***, page 53.

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 build up.*

Speed

The GC80/GC85 gyro compass calculates 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 from the gyro compass.



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

Confirm in 4 hours intervals 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 ***Setting the Speed input source***, page 54.

Speed error correction

All gyro compasses will generate a heading error caused by the vessel speed and earth rotation. GC80/GC85 calculates this error based on latitude and speed input information, and corrects automatically 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 next page may be used for manually calculating the heading error.

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

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

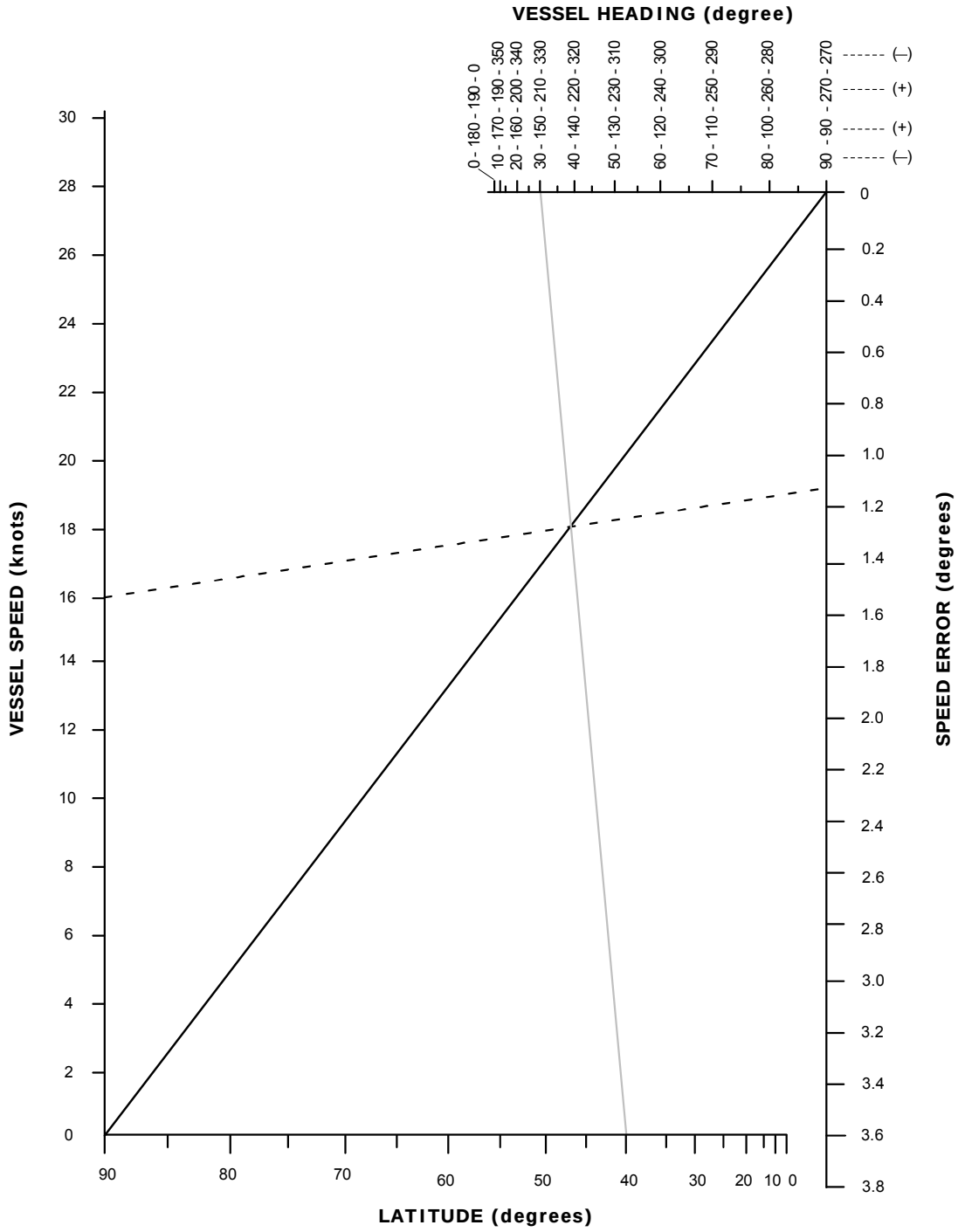
The heading error is found by:

1 Drawing a line between the latitude and the vessel heading (shown with gray line on the figure)

2 Drawing a straight line (broken line in the figure) between the vessel 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 compass heading.


VESSEL HEADING (degree)
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)

3.6 Pendulum function

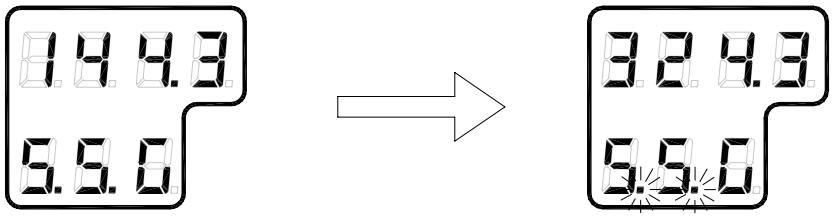
GC80/85 software includes a pendulum function that enables the heading to be changed by 180°.

The heading change is activated by closing a potential free contact connected between TB1, pin 71 and 72 on the GTERM board in GC80/85 control unit.

Note! *To enable the function, S2-4 on the SCC board has to be set to ON. Refer **DIP switch settings on SCC board**, page 93 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 starts flashing. These will remain flashing for as long as the pendulum function is active.



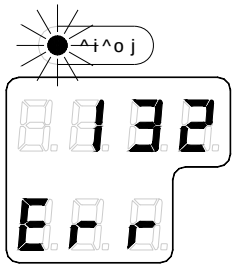
Normal compass operation is resumed by opening the closed potential free contact. The function is indicated by the same acoustic alarm, and the flashing dots returns to fixed illuminated dots.

3.7 Alarm messages

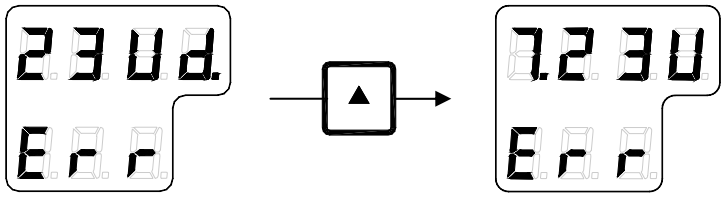
The GC80/GC85 system will continually check for faults while the system is running.

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 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 with code 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 on the figure below. Further alarm codes may then be displayed by pressing the “arrow up” button.



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

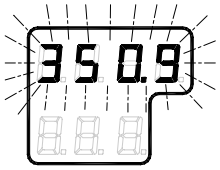
Caution

When an alarm is generated, bearing information from the GC80/GC85 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 on the control panel, or on an external acknowledge button is this is installed.

- 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.

The ***Complete alarm code list*** section, page 111, has a complete list of alarm codes.

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 diagram on page 76 onwards.

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

4 MAINTENANCE

This section holds descriptions for maintenance procedures that should be performed by the system operator.

The section also includes a detailed description for how to replace the sensitive element and the fuses.

4.1 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, a Simrad dealer shall be contacted.

4.2 Precautions

Touching internal parts may cause electric chock 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 when 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.

4.3 Cleaning the operator panels and the cabinet surface

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

4.4 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 correct position.

4.5 Checking mechanical installation

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

4.6 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 is according to the vessel's actual latitude and speed.	Daily
Check connectors	Every six month
Tighten fastening screws	Every six month
Clean panels and cabinet	Once a year or as required
Clean slip rings and brushes. Apply lightly "27102128 gyro slip ring lubrication oil".	Every second year

4.7 Replacing the Sensitive element

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

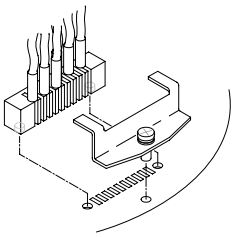
Note! *A special tool (Simrad part no. 44174449) is required when installing the Sensitive element. This tool is delivered together with the gyro, and the sensitive element should not be installed without using this tool.*

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.***

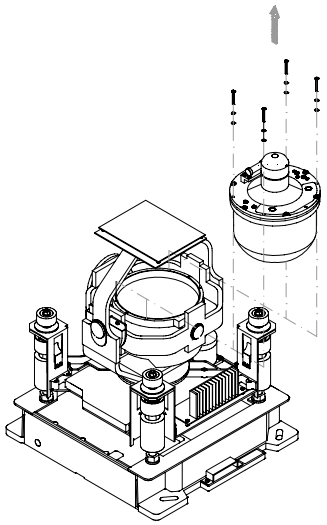
1 Ensure that the power is disconnected from the Control unit.

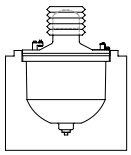
2 Remove the four screws securing the compass case, and lift the case carefully upwards and away.



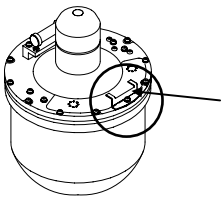
3 Loosen the screw on the plug-holder on the Sensitive element, and disconnect the plug.

4 Remove the four 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.





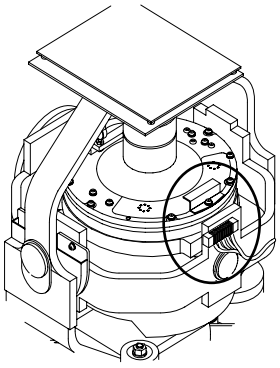
5 Place the defective Sensitive element in its original package, and put the rubber tube on top of the element.



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.

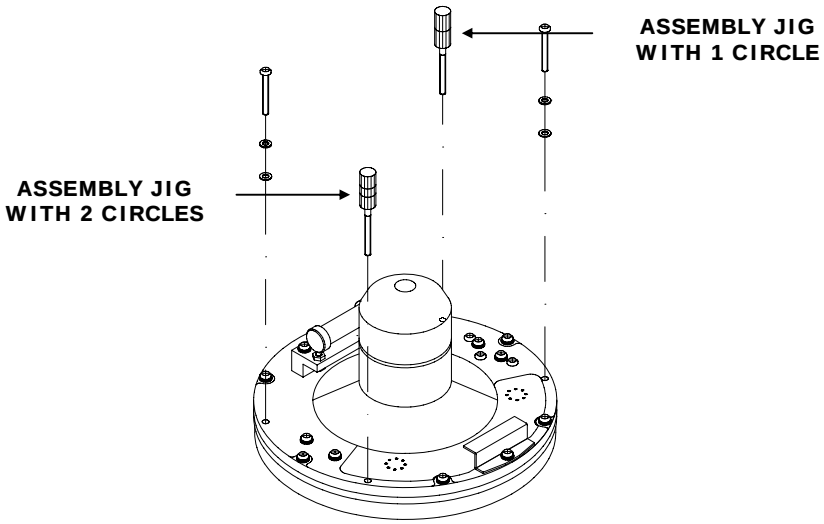
Note! *The package and the rubber tube should be kept for re-use if the Sensitive element has to be sent to factory for service!*

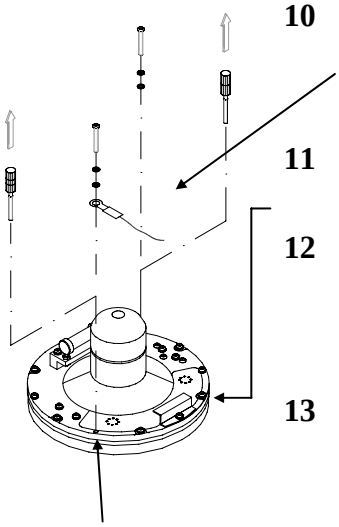


8 Tilt the Horizontal ring to the side where the plug is located, and carefully put the sensitive element into the ring.

- 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 on the figure below. Observe the rings on the jigs to ensure proper positioning. Insert and fasten the two screws in the other holes.



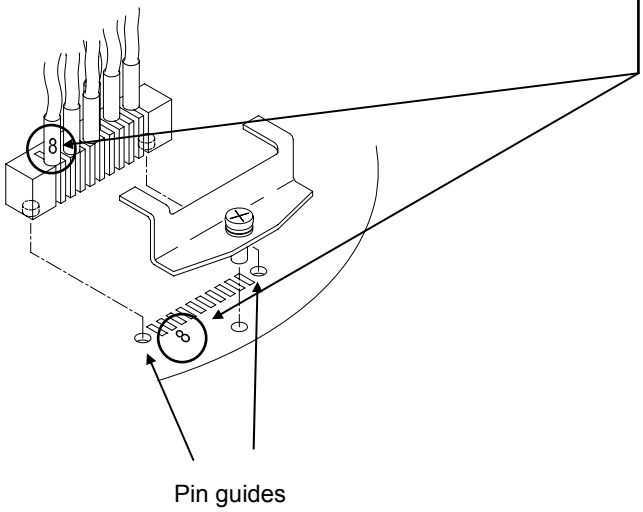


10 Replace the assembly jigs with the two remaining screws after placing the ground wire as shown on the figure.

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.

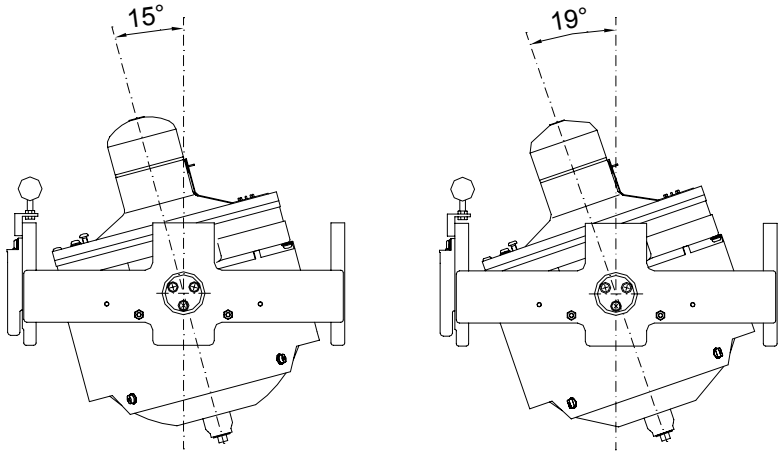


Verifying the element's tilt angle

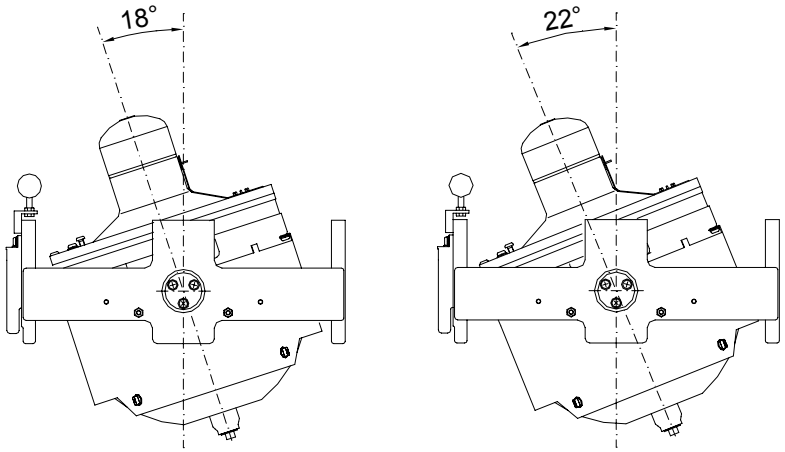
1 Tilt the Sensitive element by hand towards the level tool on the Horizontal ring and keep it tilted for approximately 1 minute. Remove the pressure and observe that the tilt angle remains at:

- GC80: 15° to 19°
- GC85: 18° to 22°

The tilt angle is indicated on the figures below.

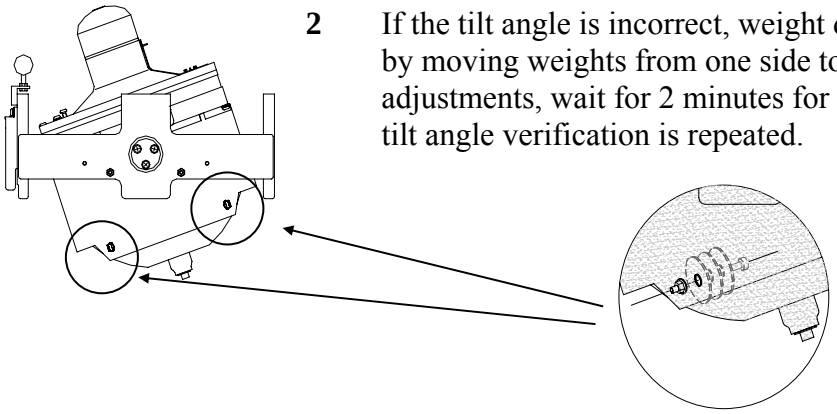


Max and min tilt angle for GC80 std system



Max and min tilt angle for GC85 High Speed system

Note! *The tilt angle shown above is correct for cold condition. The angle may change when the element has reached normal operational temperature!*



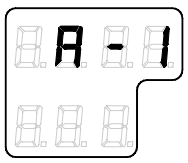
2 If the tilt angle is incorrect, weight disks must be adjusted by moving weights from one side to the other. After adjustments, wait for 2 minutes for the oil to set before the tilt angle verification is repeated.

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

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

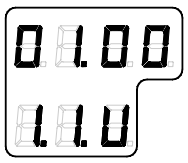
Parameter updates

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 started. This is done from the Extension menu as described below.



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

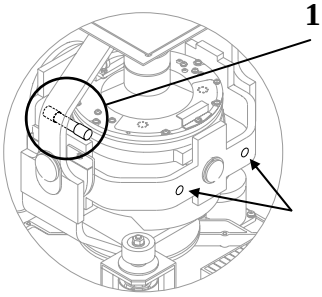
6 Exit the sub-category by pressing the **SET** button, and then exit the Extension main category by pressing and holding the **SET** and **ACK/ENT** buttons simultaneously for appr. 3 seconds.

For more information about the Extension menu, see ***ADVANCED SETTINGS***, page 57 onwards.

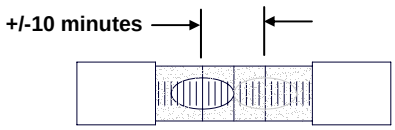
Balancing the Horizontal ring

After the Sensitive element has been replaced, the gyro compass should be started as described on page 10.

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 +/-10 minutes from the center. Each division equals 2 minutes.



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

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

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

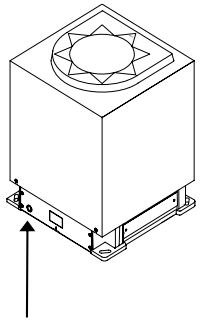
WARNING **If the horizontal ring is tilted more than +/- 10', a bearing error may be generated!**

4.8 Replacing the Fuses

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

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

Master Compass



F1 (12A)

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

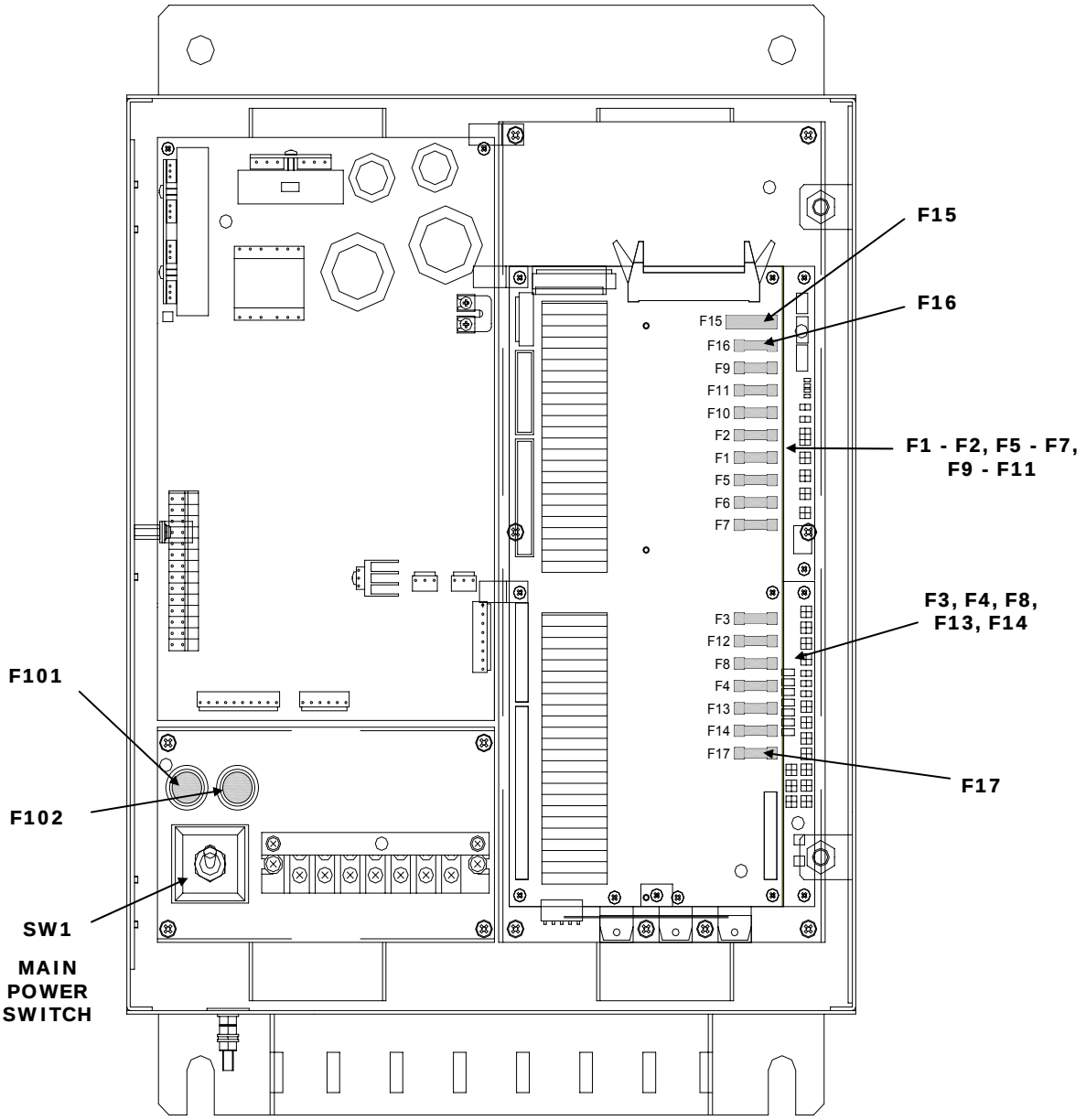
1 Open the fuse holder by pressing and turning the fuse holder edge counter-clockwise with a screw driver.

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

Expanded Control unit

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

FUSE NO	CAPACITY	TB-NO	SIGNAL	DESCRIPTION
F1	1A	TB2-5	1R24+	Power supply for ch.1 serial repeater
F2		TB2-10	2R24+	Power supply for ch.2 serial repeater
F3		TB2-15	3R24+	Power supply for ch.3 serial repeater
F4		TB2-20	4R24+	Power supply for ch.4 serial repeater
F5		TB2-29	5R24+	Power supply for ch.5 serial repeater
F6		TB2-34	6R24+	Power supply for ch.6 serial repeater
F7		TB2-39	7R24+	Power supply for ch.7 serial repeater
F8		TB2-44	8R24+	Power supply for ch.8 serial repeater
F9		TB1-31	9R24+	Power supply for ch.9 serial repeater
F10		TB1-36	10R24+	Power supply for ch.10 serial repeater
F11		TB2-61		Power supply for ch.1 step motor repeater
F12		TB2-66		Power supply for ch.2 step motor repeater
F13		TB2-71		Power supply for ch.3 step motor repeater
F14		TB2-24		Power supply for ch.4 step motor repeater
F15	15A	J9, 1-6		Repeater power supply
F16	3.15A	J4, 23-27		Power supply for SCC and SIFC boards
F17		J9, 15-16		Power supply for HDM part
F101	6.3A	TB101		Main power supply
F102	20A	TB101		Emergency power supply



WARNING **Make sure that the main power switch SW1 is turned OFF before any fuse is replaced!**

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

1 Pull the damaged fuse up from the holder.

2 Re-install a new fuse by carefully pushing it into the holder. When correctly located, it should be fixed 1-2mm above and parallel with the mounting level.

5 INSTALLATION

This section is a reference guide for correctly installing and configuring the GC80/85 Gyro Compasses.

5.1 Unpacking and handling

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

- Master compass
- Sensitive element
- Control unit
- Spare part kit
- Mounting jigs
- 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 have to be done when the Master compass is mounted onboard the vessel. Refer page 45.

Note! *It is strongly recommended to keep the packing material for the Sensitive element. This original packing 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.

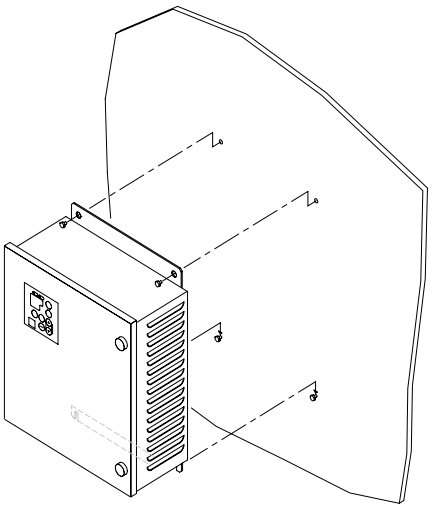
5.2 Mechanical installation

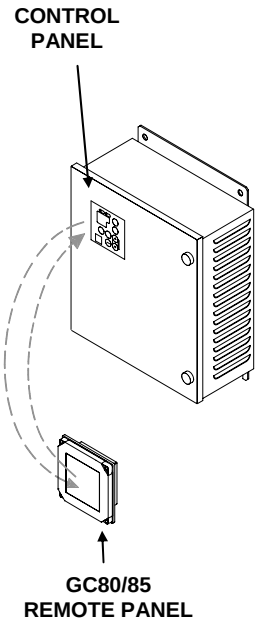
The units included in the GC80/GC85 system should be mounted with special regard to the units' environmental protection, temperature range and cable length. Refer Technical specifications, page 65 onwards.

Note! *A special tool (Simrad part no. 44174449) is required when installing the Sensitive element. This tool is delivered together with the gyro, and the sensitive element should not be installed without using this tool.*

Control unit

The Control unit is bulkhead mounted by 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 by 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, an optional control panel cable must be ordered. The cable is available in three different lengths:

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

Use the following procedure when remotely mounting the control panel:

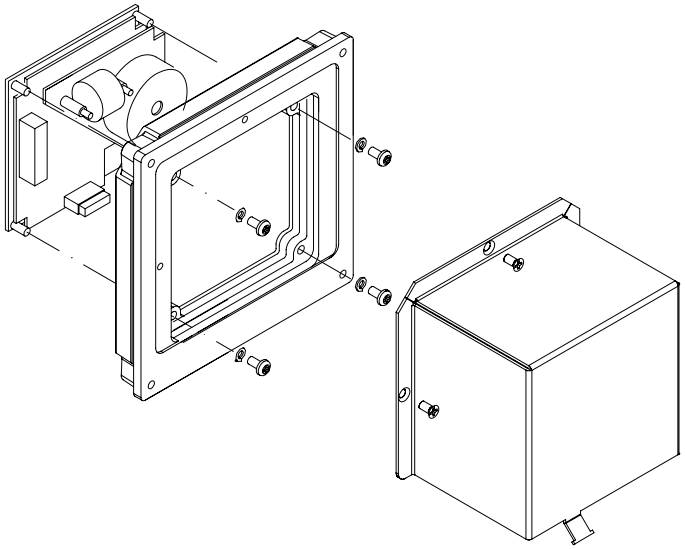
1 Open the control unit, and remove the wiring strips holding the control panel's cable.

2 Disconnect the cable's grounding wires (labelled FG) from the control panel and from the PWB SCC board in the Control unit.

3 Disconnect the plugs and remove the control panel's cable.

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 side as shown on the figure. Fasten the panel with the 4 nuts.



6 Insert the plug on the optional control panel cable, and connect the grounding wire.

7 Mount the cover on the back side.

8 Fasten the cable to the cover by a wire strip.

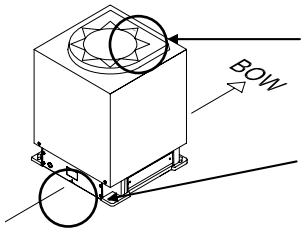
9 Slide the control panel cable through the cable inlet, insert the plug in PWB SCC board and connect the grounding wire. Secure the cable to the control unit by a wire strip.

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

Master compass

Select a mounting location where the deck is horizontally, flat and with little vibration, and where the pitch/roll motion is as small as possible.

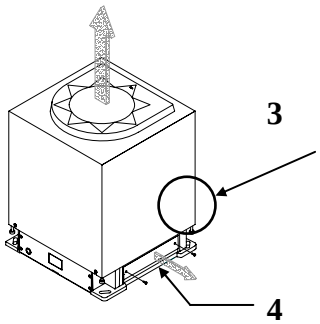
It is also important to select a mounting location with sufficient space for installation and service. Refer dimensional drawing, page 74.



1 Locate 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.

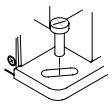
2 Use the datum line in the front and back to of the compass to line up the unit.

- It is possible to compensate for a small mounting offset by using the heading offset feature as described in ***Adjusting True heading***, page 55.



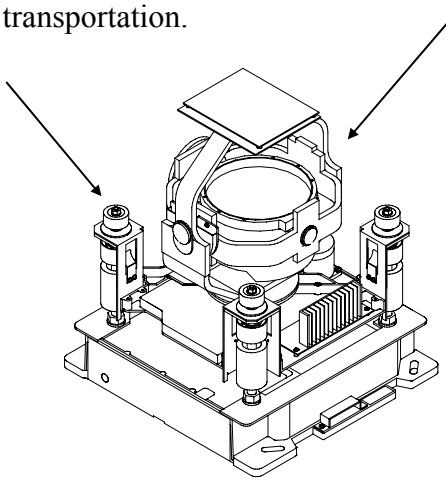
3 Remove the four screws holding the compass case, and lift the case carefully upwards and away.

4 Remove the cable inlet cover.



5 Fasten the compass to the deck with four bolts. The bolts should be located in the center of the trails for later to be able to adjust the compass direction when the heading is tuned in. Refer ***Adjusting True heading***, page 55.

6 Remove strips and foam rubber from the chock absorbers, together with all strips used for securing moving parts during transportation.

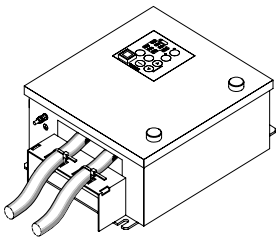


Note! *The foam rubber should be kept for re-use if the Master compass has to be sent to factory for service!*

5.3 Cabling

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

The wiring diagram on page 76 onwards includes cable specification for all cables that have to be used.



Connect power and signal cables according to the wiring diagram on page 76 onwards.

To avoid that vibration should cause the cables to loose connection, the cables could be fastened to the fixing device by using wire straps as illustrated on the figure.

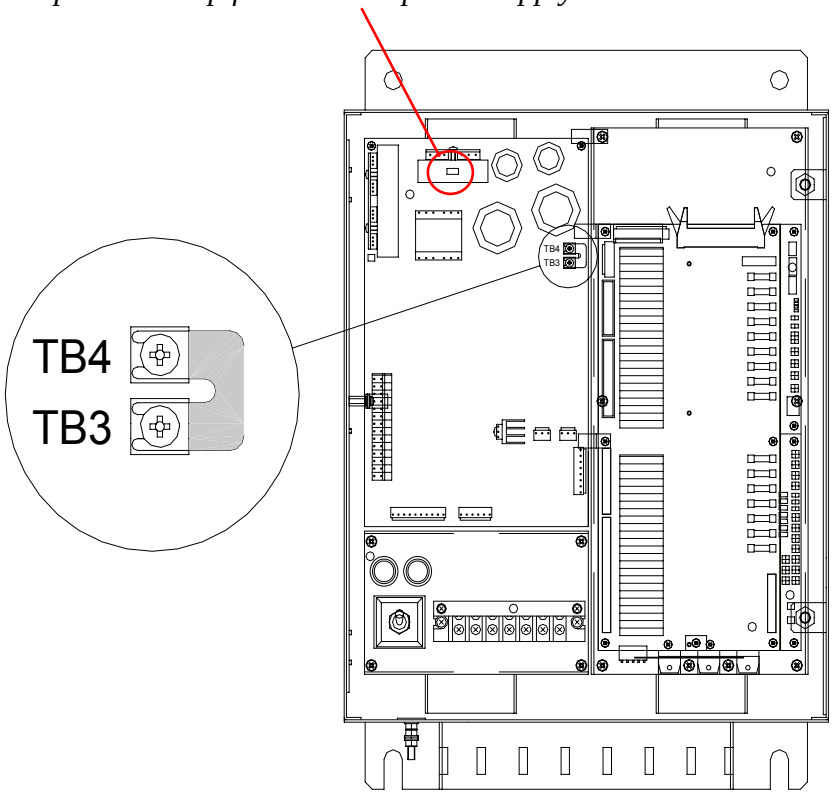
Power supply

GC80/GC85 is to be supplied with 110 or 220V AC.

When delivered from factory, the system is set up for 220V AC. If the system is to be supplied with 110V AC, a strap on the GPOWER board has to be added according to the figure and the table below.

Note!

Replace the 220V AC label with a 110V AC indication if the compass is set up for 110V AC power supply!

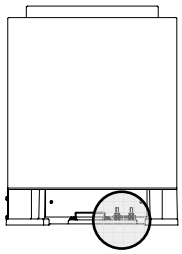


TB3 – TB4	VOLTAGE
Open	220V AC (default)
Short	100/110/115V AC

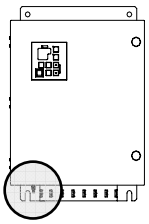
5.4 Grounding the units

All units in the GC80/GC85 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



EXPANDED CONTROL UNIT

5.5 Dip-switch and jumper settings

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

Note! *These dip switch settings are read when the system is started. Any changes when the system is running will therefore not take affect before the system is restarted.*

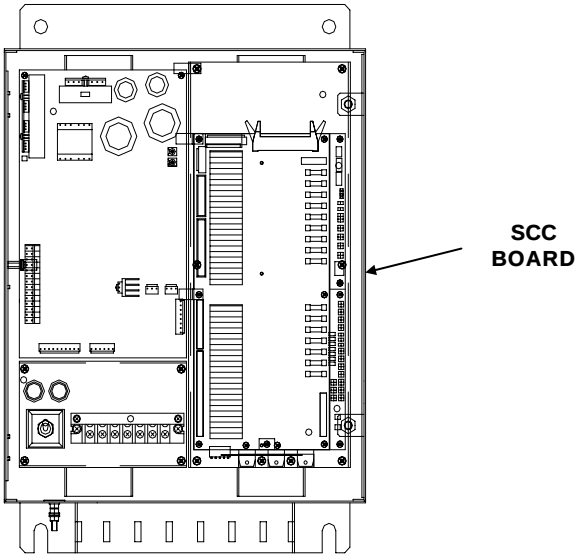
For a complete list of dip switch settings, refer to ***DIP SWITCH SETTINGS***, page 89.

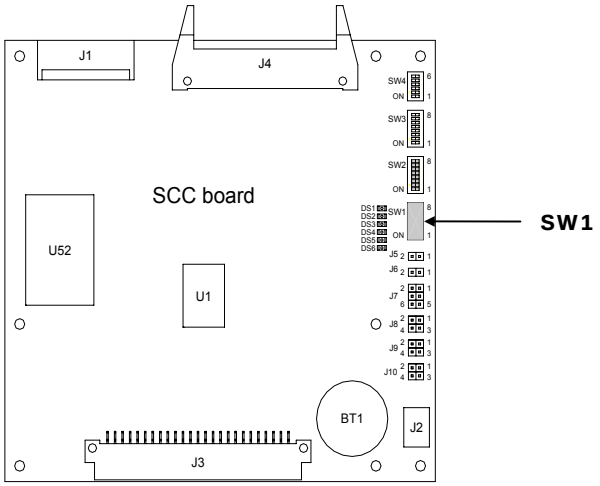
Activating the control unit for GC80 or GC85 system

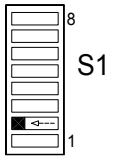
When the gyro system is shipped from factory, all dip switches in the Control unit are set as for a standard GC80 system.

Before the system is started, dip switch no.2 on S1 on the SCC board have to be changed to identify the system as a GC85 system.

The SCC board is located underneath the GTERM board.





GC80 system	GC85 system
	

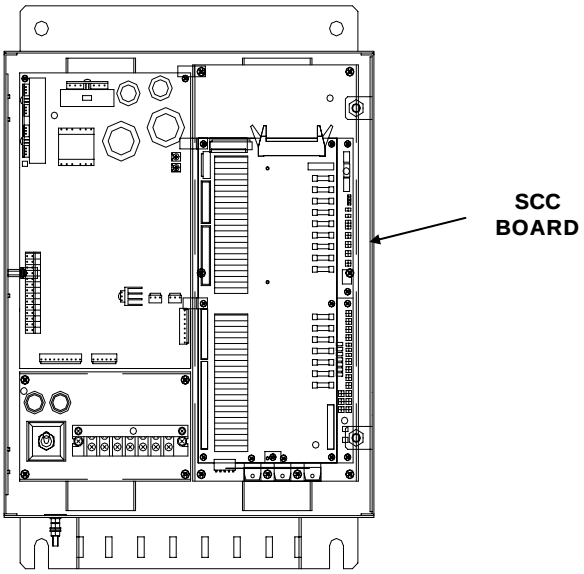
All outputs are selectable for 1, 5, 10 or 50Hz.

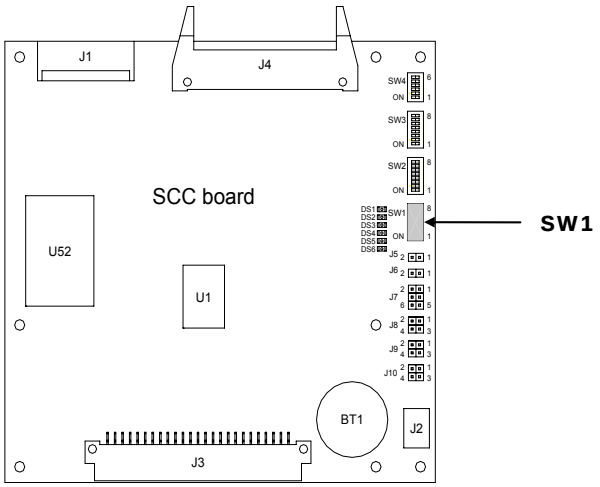
Refer dip switch and jumper settings on page 89 onwards.

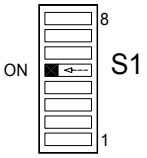
Note! *A GC85 system is recommended to be set for 50Hz output!*

Activating an external heading sensor

If an external heading sensor is connected to the GC80/GC85, dip switch no.5 on S1 on the SCC board has to be set to enable the external heading sensor.

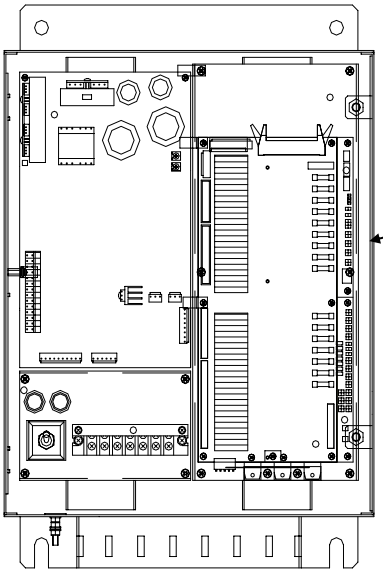


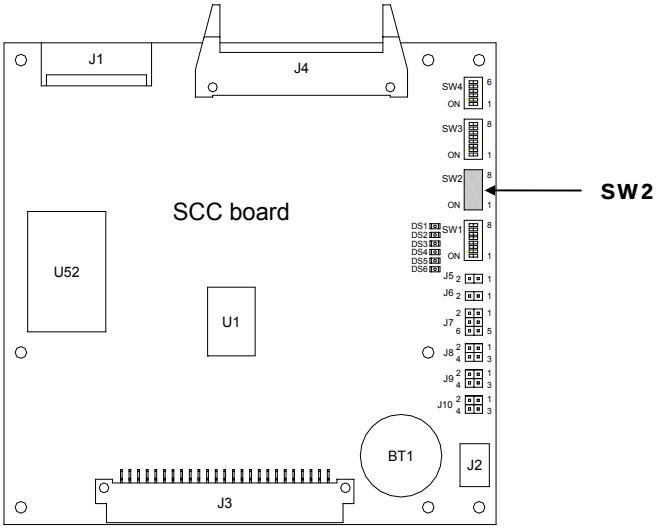


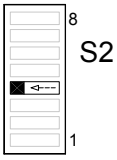
No external sensor	Active external sensor
	

Activating the pendulum function

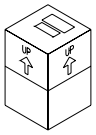
If an external switch is connected to GC80/85 to operate the pendulum function, dip switch no.4 on S2 on the SSC board has to be set to activate the pendulum function.





Pendulum function disabled	Pendulum switch enabled
	

5.6 Installing the Sensitive element

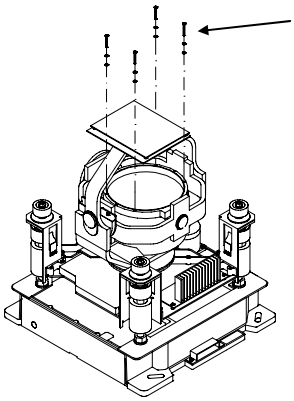


The Sensitive element is shipped from the factory packed separately, and the element has to be installed in the Master compass according to the description below.

Note! *A special tool (Simrad part no. 44174449) is required when installing the Sensitive element. This tool is delivered together with the gyro, and the sensitive element should not be installed without using this tool.*

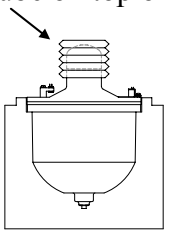
Caution ***Use extreme caution when handling the Sensitive element! Do not tilt the element. It is filled with oil and the top includes a ventilation opening.***

1 Make sure that the master compass is installed and cables connect according to the description on page 39 onwards.

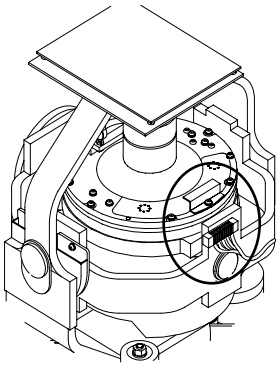


2 Remove the four screws on the Horizontal ring.

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



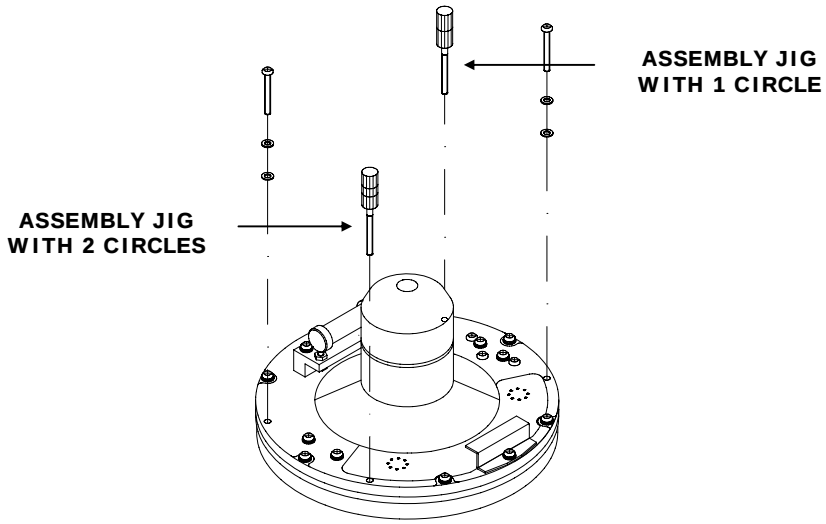
Note! *The package and the rubber tube should be kept for re-use if the Sensitive element has to be sent to factory for service!*

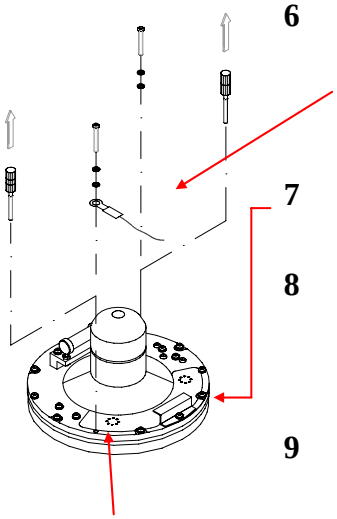


4 Tilt the Horizontal ring to the side where the plug is located, and carefully put the sensitive element into the ring.

- 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 on the figure below. Observe the labelling and the diameter on the jigs. Fasten two screws in the other two holes.



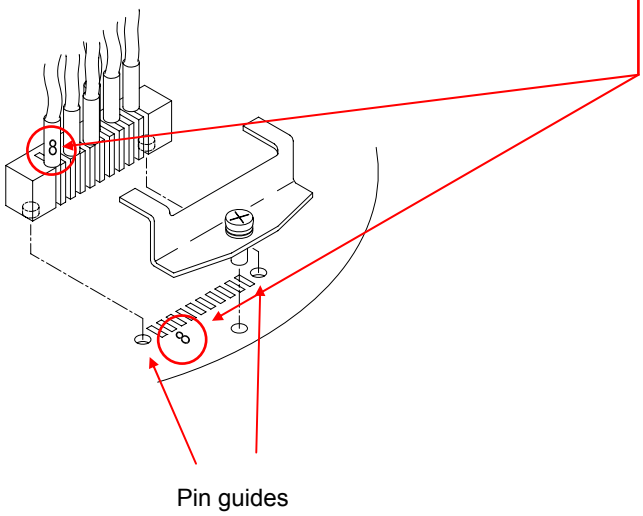


6 Replace the assembly jigs with the two remaining screws. Locate the ground wire on one of the screws as shown on the figure.

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 not are twisted.

9 Firmly tighten the screw on the holder.

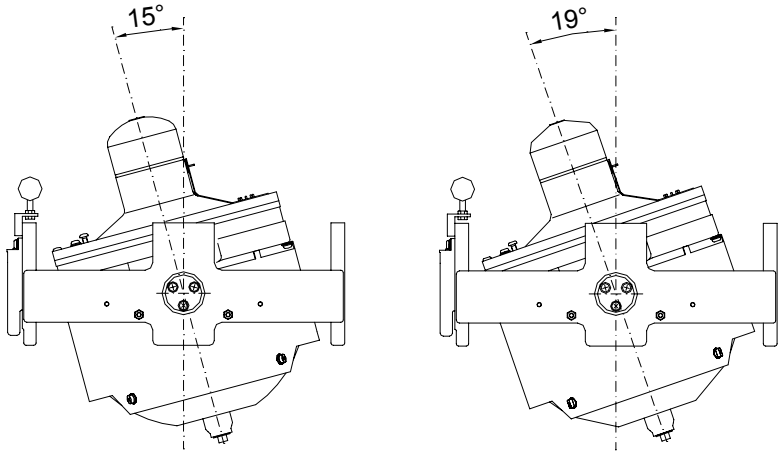


Verifying the element's tilt angle

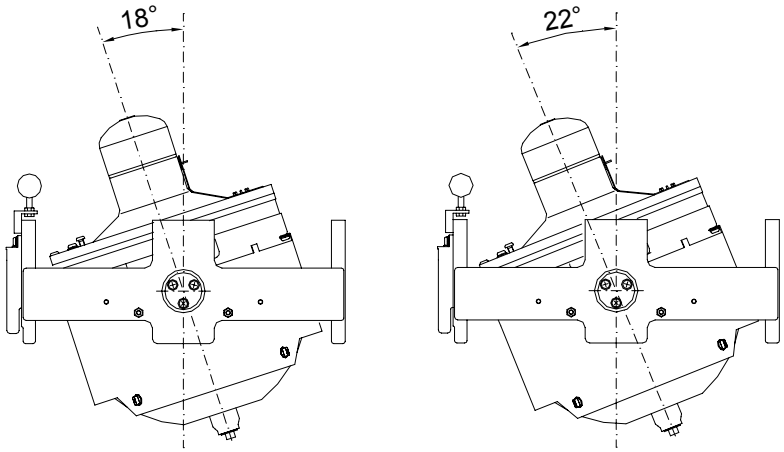
1 Tilt the Sensitive element by hand towards the level tool on the Horizontal ring and keep it tilted for approximately 1 minute. Remove the pressure and observe that the tilt angle remains at:

- GC80: 15° to 19°
- GC85: 18° to 22°

The tilt angle is indicated on the figures below.

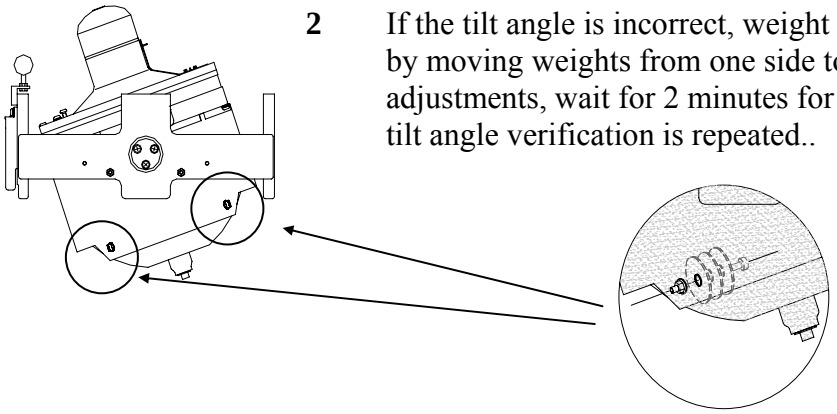


Max and min tilt angle for GC80 std system



Max and min tilt angle for GC85 High Speed system

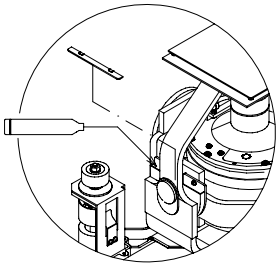
Note! *The tilt angle shown above is correct for cold condition. The angle may change when the element has reached normal operational temperature!*



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 side)!***

3 Carefully rotate the Horizontal ring at least one 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 taken 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.

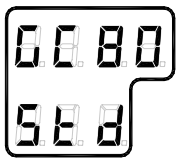
5.7 System start-up and software configuration

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

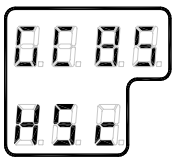
1 Turn ON the gyro system by pressing the **POWER** button on the Control panel. The following start-up sequence will take place:

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

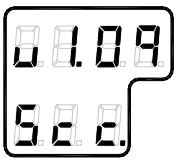


GC80 CONTROL UNIT STD VERSION

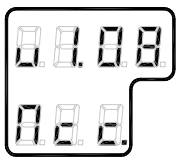
OR



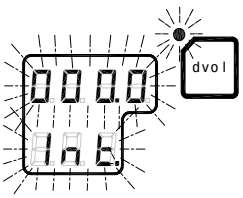
GC80 CONTROL UNIT HIGH SPEED VERSION



SW VERSION CONTROL UNIT



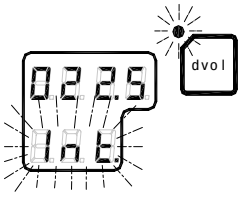
SW. VERSION MASTER COMPASS



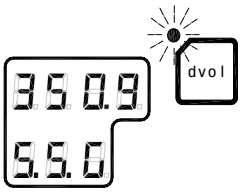
2 The sensitive element starts rising horizontally, and the compass turns 360° clockwise. The display shows decreasing bearing as the compass is turning.

3 If the gyro has been turned ON and OFF again, but rotor still rotating when the **POWER** button was 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.

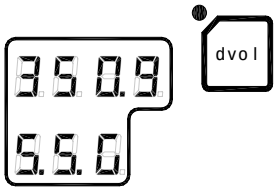


5 When the rotor rotation is stopped, start bearing is indicated with flashing text in the display. The start bearing will be the same as active bearing when the compass was turned OFF.



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 remains 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.

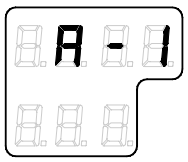
The lamp next to the **GYRO** button changes from flashing to steady light.

The GC80/GC85 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

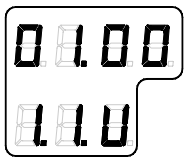
Each Sensitive element is tuned to its Master compass before it is shipped from the factory. This tuning is reflected in a set of parameters specific for this gyro compass. These parameters are included in the sensitive element's package, and they have to be entered into the Control unit as part of the gyro compass' installation procedure.

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



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

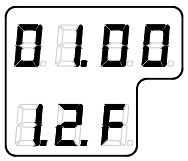
Main category **A-1** will be displayed.



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

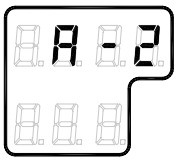
3 Use the arrow buttons to increase or decrease the parameter value until the value is according to value in the table included with the sensitive element.

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.**

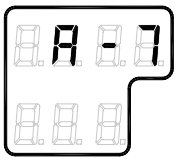


7 Press the **SET** button again to return to main category **A1**, and then press the **DISP** button to go to **A2** main category.

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 eventually in local time.*



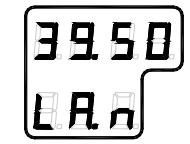
10 Press the **SET** button again to return to main category **A2**, and then press the **DISP** button until main category **A7** is displayed.

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 at appr. 3 seconds.

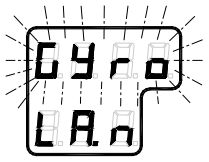
For more information about the Extension menu, see ***ADVANCED SETTINGS***, page 57 onwards.

Setting the Latitude input source

When the system is configured as described in ***Configuring the gyro system*** page 51 onwards, the latitude input source can be changed as described below.

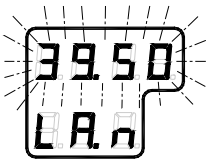


1 Press the **DISP** button until the display shows latitude value.



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

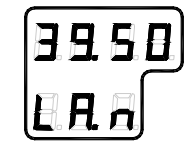
3 Use the arrow buttons for selecting **Gyro** or **GPS** as the latitude input source, and confirm the entry with the **ACK/ENT** button.



- 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 for increasing/decreasing the latitude value, and confirm the entry with the **ACK/ENT** button.

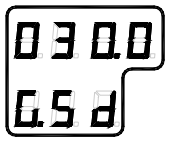
- This entered latitude value will now be used, together with speed and bearing information, for calculating the vessel's current latitude.



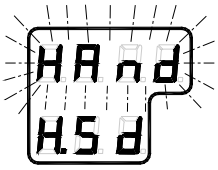
5 The display will return to show latitude value without flashing.

Setting the Speed input source

When the system is configured as described in ***Configuring the gyro system*** page 51 onwards, the speed input source can be changed as described below.



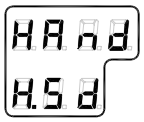
1 Press the **DISP** button until the display shows speed value and speed input source.



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

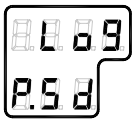
3 Use the arrow buttons for toggling between available speed input source:

Manual



GPS

LOG (pulse)



LOG (serial)

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

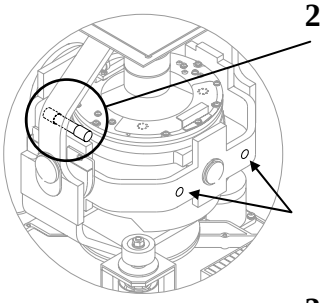
5 If Manual input source is selected, the display will change to show flashing numerical values.

6 Use the arrow buttons for entering the speed value, and confirm the input by the **ACK/ENT** button.

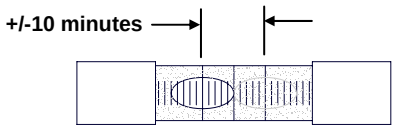
7 The display will return to shown speed value and speed input source without flashing.

5.8 Balancing the Horizontal ring

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



2 Locate the reference level tool on the horizontal ring, and check that the level bubble is within +/-10 minutes from the center. Each division equals 2 minutes.



3 If the level bubble not is within this limit, add or remove weights from the horizontal ring until it is levelled.

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

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

Caution ***If the horizontal ring is tilted more than +/-10', a bearing error will be generated.***

Adjusting True heading

After the GC80/85 is settled, the gyrocompass 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
- two 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 not can 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** buttons simultaneously for at least 3 seconds.

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

2 Press the **DISP** button once to display main category **A-2**.

3 Press the **SET** button to enter the sub-category **2.1.o**.

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***, page 58 onwards.

6 ADVANCED SETTINGS

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

6.1 General

The Extension menu holds internal parameters and communication parameters required to achieve the best possible heading accuracy on the GC80/GC85 Gyro compass.

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

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

6.2 Using the Extension menu

Caution

The Extension menu should not be entered by unauthorized personnel. Incorrect parameters may result in irregular operation of the GC80/GC85 gyro compass!

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

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

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

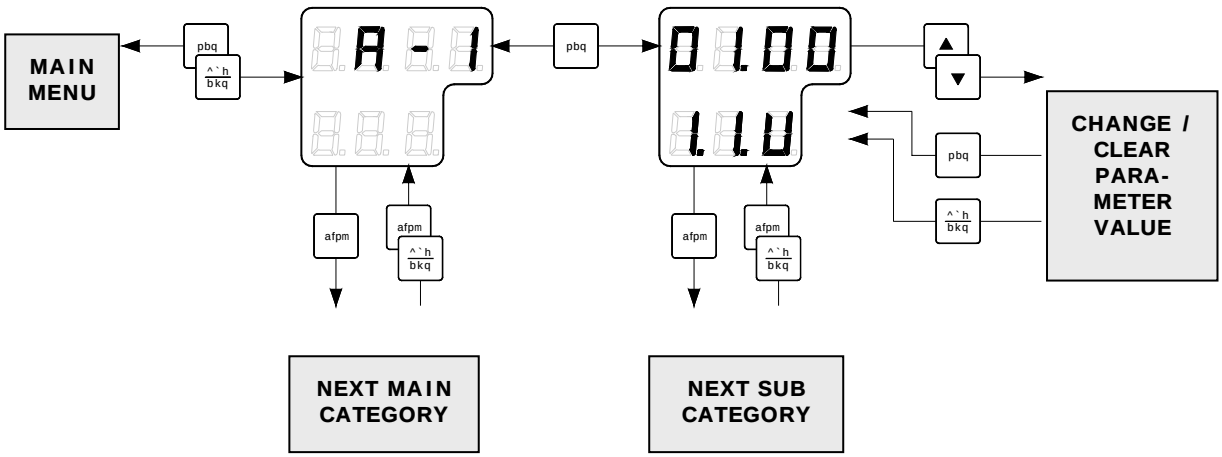
2 Page through the main categories to the selected category by pressing the DISP button. Pressing the DISP and ACK/ENT buttons simultaneously will display the main category loop in reversed order.

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

4 Use the arrow buttons to increase or decrease the parameter value.

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 selected sub-category.

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



6.3 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 actually represents a coefficient (ratio) to the standard value stored in the software.	1.00	0.00 – 2.00
	1.2.F	Bearing servo gain 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). Present 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

Main Category	Sub Category	Parameter/description	Default value	Range
A-1 cont.	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
	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, 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 certainly 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 certainly 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 certainly 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 not can 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 be measuring position (angle) of the zero-cross pin in the master compass by the test mode A.	345.3	0.0 – 359.9
	2.4.E	Zero-cross error allowance (°) 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 cont.	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 can not 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 can not 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 can not 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: 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
A-3	3.1.E	Alarm (error)	-	-
	3.2.n	Occurred number of zero-cross error	-	-
	3.3.H	Maximum zero-cross error	-	-
	3.4.y	Occurred year of zero-cross error	-	-
	3.5.N	Occurred month/day of zero-cross error	-	-
	3.6.t	Occurred hour/minute of zero-cross error	-	-
	3.7.n	Occurred number of encoder error	-	-
	3.8.r	Occurred number of reset with WATCH DOC TIMER	-	-

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

Main Category	Sub Category	Parameter/description	Default value	Range
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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7 TECHNICAL SPECIFICATION

This section list all specifications for GC80/85 gyro compass.

7.1 Accuracy

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

Settle point error: ..... less than ±0.1º

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

Repeatability of settle point error: ..... less than ±0.1°

Roll and pitch error: ..... less than ±0.4°

Static error: ..... less than ±0.1°

Settle point error under general conditions: ..... less than ±0.4°

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

7.2 General specification

Follow-up speed ..... > 75°/sec

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

Range of speed correction:

GC80 ..... 0-50 knots / latitude (0° - +70°)
GC85 ..... 0-70 knots / latitude (0° - +70°)

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

Power supply for alarm and back-up: ..... 24V DC, 70W

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

Frequency variation: ..... ±5%

Power consumption:

Start: ..... within 140VA
Ordinary: ..... within 70VA
Repeater: ..... within 17VA

Repeater type: ..... 24V DC – 6 step/°

Number of step repeater connections: 4

Number of NMEA connections: 10

Repeater back-up circuits: ..... 4+10

Pendulum function ..... refer page 19

7.3 Input specification

Serial input signal (GPS)

Circuits: 1
Electrical: ..... RS422/MNEA0183/Current loop
Baud rate: ..... 4800 bps
Data bits: ..... 8 bits
Parity: ..... None
Stop bits: 1
Freq.: ..... 1 – 5Hz
Input format:

```
$--GGA,x,xxxx.xx,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>
```

Serial input signal (External heading)

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

```
$--HDT,xxx.x*hh<CR><LF>
$--HDG,xxx.x*hh<CR><LF>
```

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 - 50Hz
Input format:

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

PULSE signal (LOG)

Circuits: 1
Electrical: ..... 200/400 p.p.n.m., dry contact

7.4 Output specification

When Gyro is selected

Serial output signal 1

Circuits: 10
Electrical: RS422/485
Baud rate:
GC80: ..... 4800/38400 bps
GC85 ..... 38400 bps

Note! *Baud Rate for GC85, refer Jumper settings on SIFC board, output serial signal selection, page 97.*

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

When External heading sensor is selected

Serial output signal 2 *1

Circuits: 10
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, 50Hz
GC85: 1, 5, 10, 50Hz
Output format:
Data no.1
`$ HEHDT,xxx.x,T*hh<CR><LF>`
Data no.2
`$ PTICM,--xxxx,x,xx,*hh<CR><LF>`

STEP signal

Circuits: 4
Electrical: ..... 24V DC – 6 step/°

RATE OF TURN signal

Circuits 1
Electrical: ..... +/-10V (+/-120°) (default),
+/-10V (+/-30°),
+/-10V (+/-300°),
+/-5V (+/-120°),
+/-5V (+/-300°),
+/-5V (+/-30°)

Note! *Refer Rate of Turn scale dip switch settings, page 94, and to the separate manual delivered for Rate of Turn Instrument.*

Alarm output

Potential free ..... NO/NC

Running contact

Potential free ..... NO/NC

Refer Jumper settings on SCC board, page 95.

7.5 Physical Dimensions

GC80/GC85 Master Compass

Height: ..... 438 mm (17.2”)
Width: ..... 340 mm (13.4”)
Depth: ..... 340 mm (13.4”)
Weight: ..... 23 kg (51lbs)

GC80 Expanded Control Unit

Height: ..... 495 mm (19.5”)
Width: ..... 364 mm (14.3”)
Depth: ..... 182 mm (7.2”)
Weight..... 14kg (31 lbs)

7.6 Power

GC80 / GC85 Master Compass

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

GC80 Expanded Control Unit

Voltage input: ..... 110/220V AC

Backup voltage: ..... 24V DC

Power consumption, including Master compass:

Starting..... 1.5A at 100V AC

Running:..... 1.2A at 100V AC

7.7 Environmental Specification

GC80 / GC85 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 Expanded 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)

8 DRAWINGS

This section contains outline drawings showing mechanical dimensions of the different GC80/GC85 units, together with wiring diagrams for the gyro system.

8.1 Drawings included

The following mechanical drawings are enclosed:

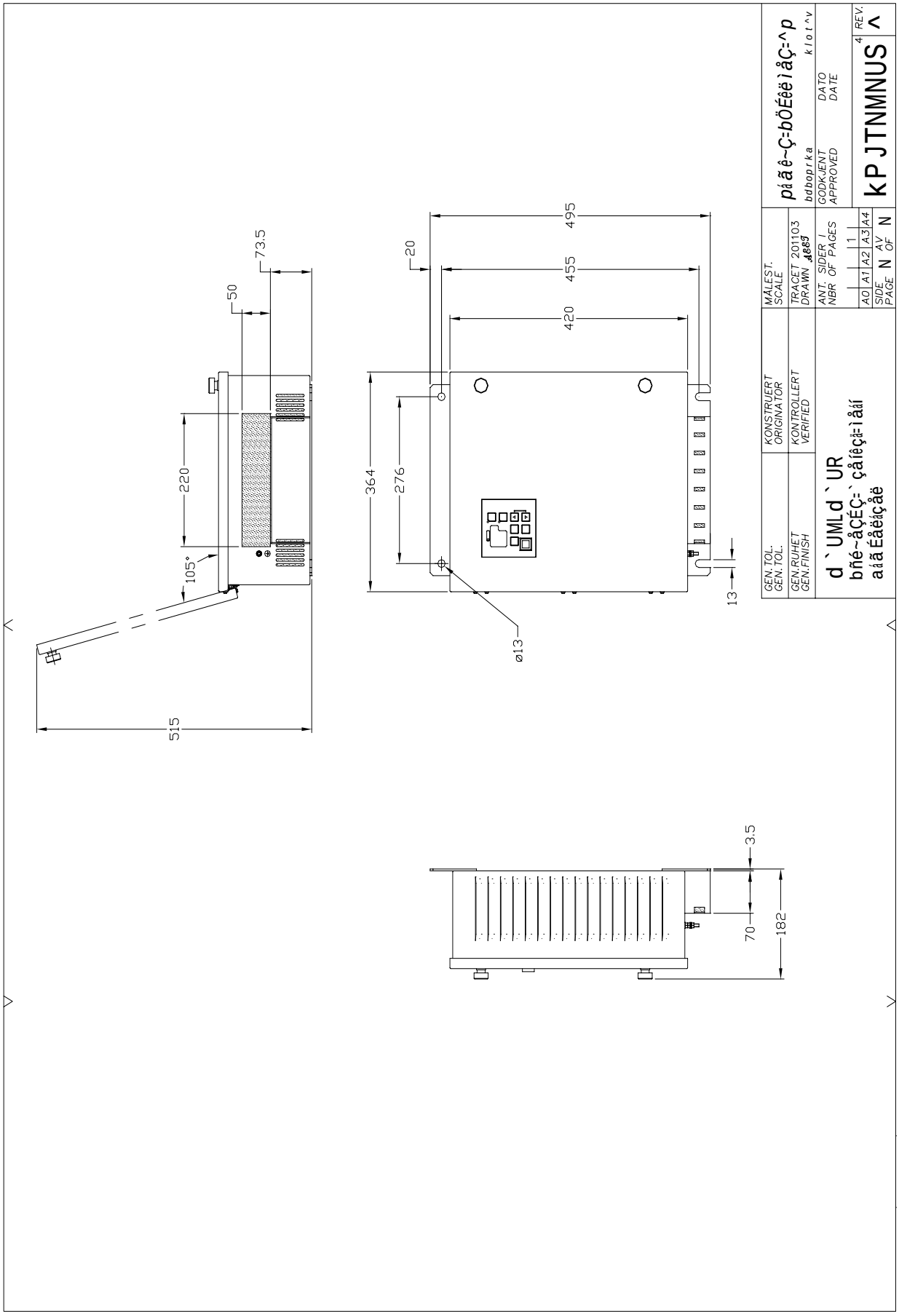
Name	Drw. no	Rev.
GC80 Expanded Control unit, dimensions	N3-710186	A
GC80/85 Master Compass, dimensions	N3-710179	A
GC80/85 Remote panel, dimensions	D4-710208	B

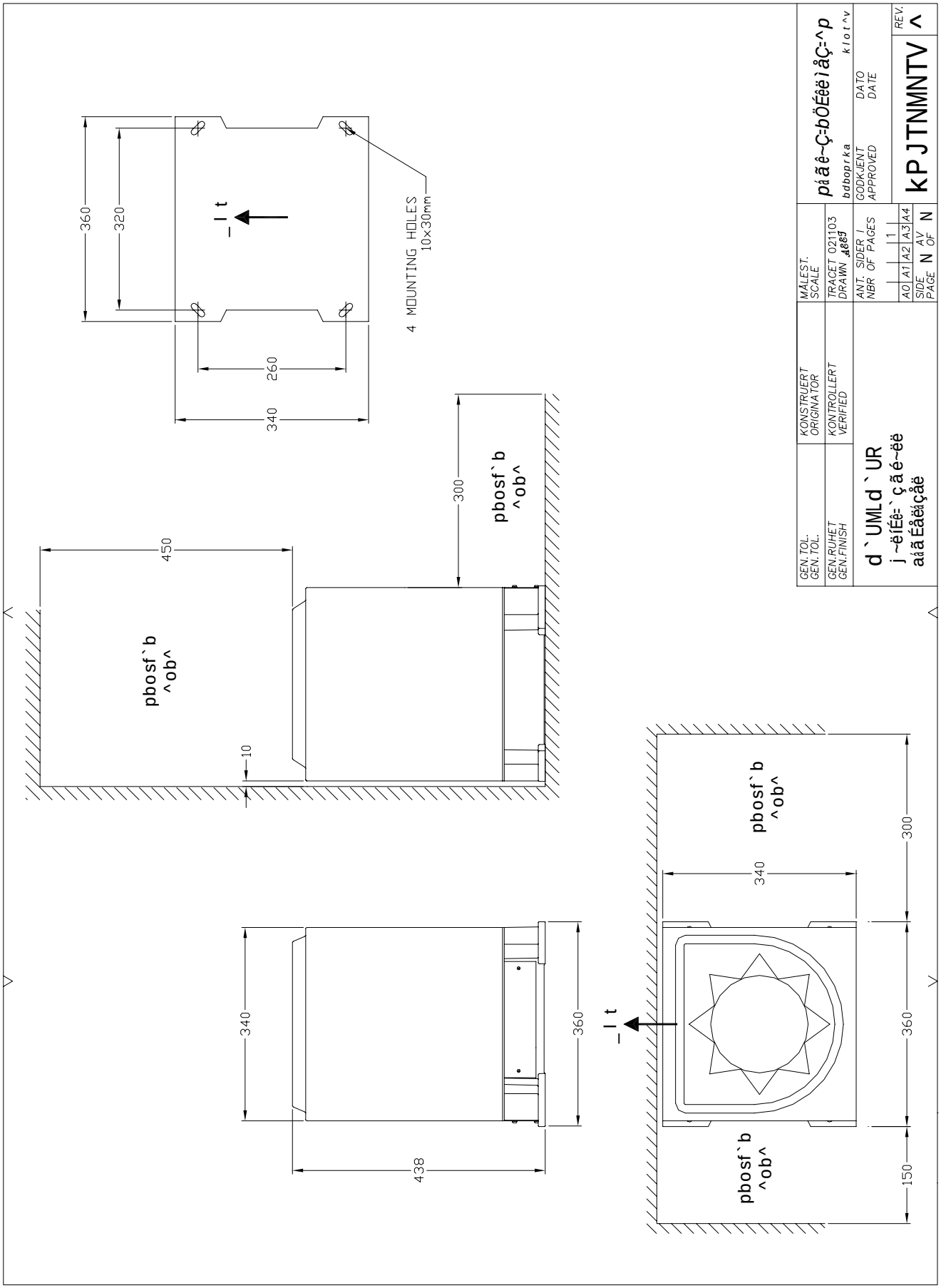
To scale drawings are available upon request.

The following wiring diagrams are enclosed:

Name	Drw. no	Rev.
GC80/85 Gyro Compass, Expanded system. Wiring diagram (page 1 and 2)	N4/N3-710185	D

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


73.5
50
220
105°
515
495
20
455
420
364
276
ø13
13
3.5
70
182
GEN.TOL.
GEN.TOL.
GEN.RUHET
GEN.FINISH
KONSTRUERT
ORIGINATOR
KONTROLLERT
VERIFIED
MÅLEST.
SCALE
TRACET 201103
DRAWN
ANT. SIDER I
NBR OF PAGES
A0 A1 A2 A3 A4
SIDE N AV N
PAGE OF
GODKJENT
APPROVED
DATO
DATE
REV.
4


360
320
260
340
4 MOUNTING HOLES
10x30mm
300
450
10
340
360
438
150
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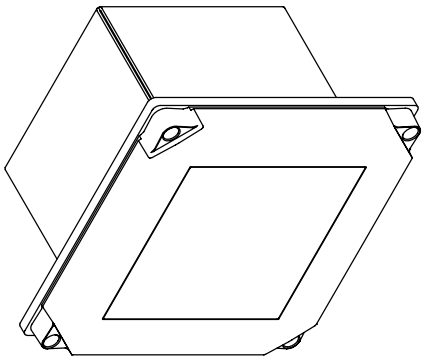
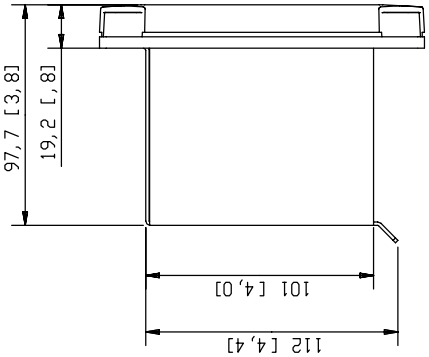
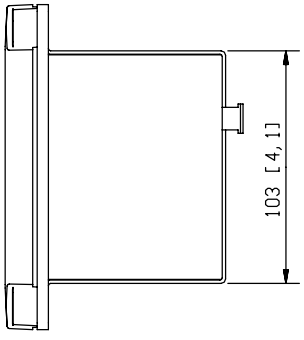
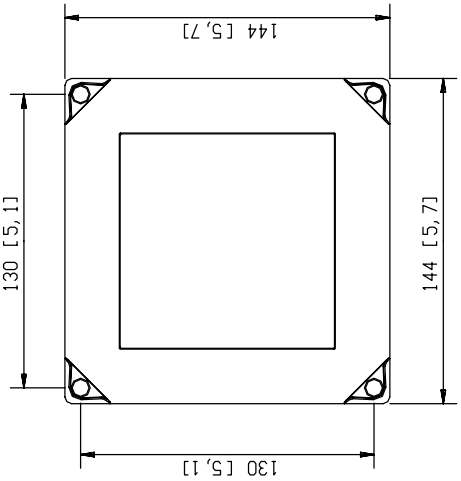
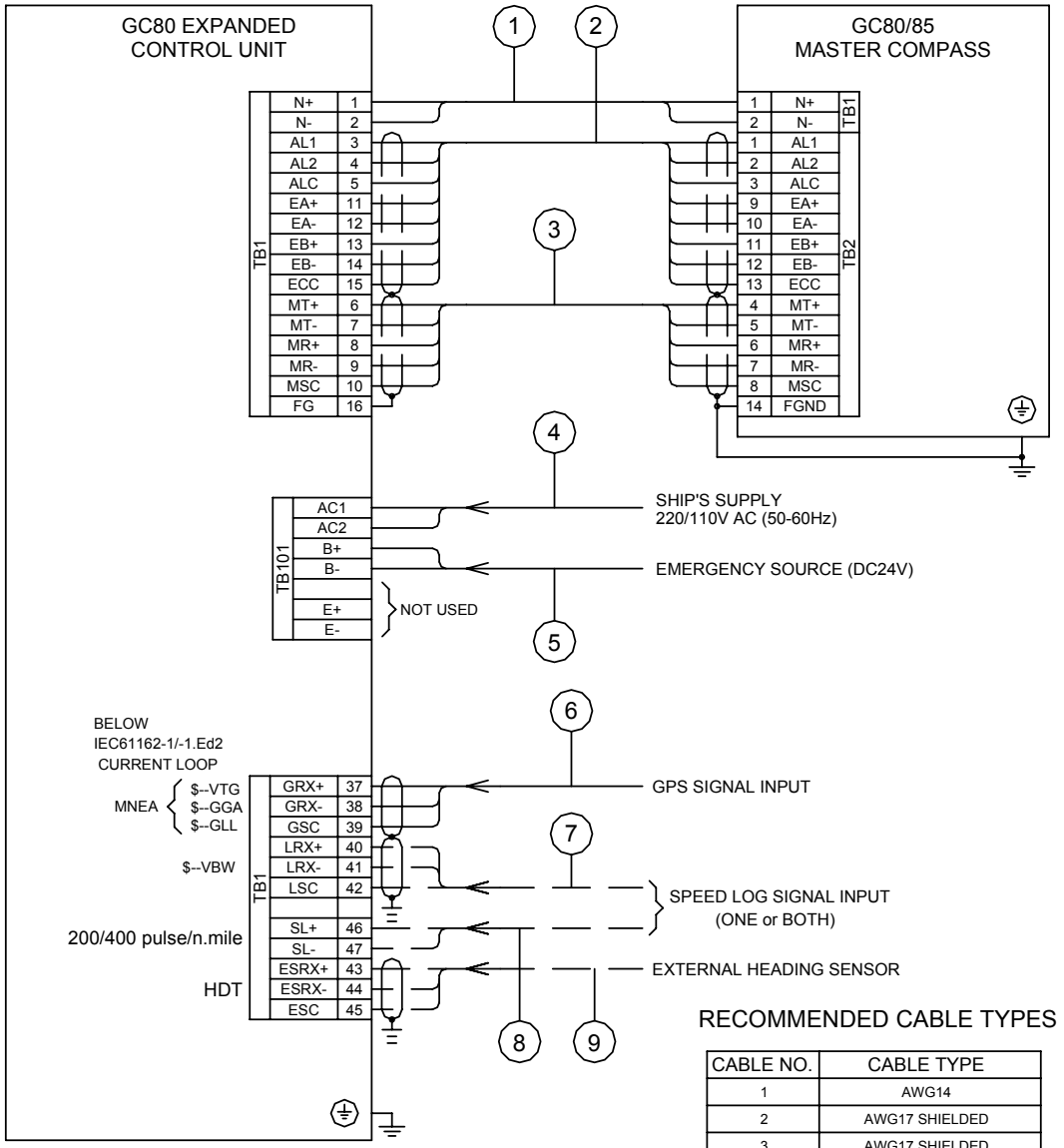








B	4965	28/09-05	Nils	Page 1		SIMRAD	
First Angle Projection	Gen. Tol. ±0,x	Design 05/05-04 Nils		Scale 1:2		SIMRAD EGERSUND AS, NORWAY	
	Gen. Finish xx Ra µm	Drawn 05/05-04 Nils		Verified		Approved	Date
	GC80 Remote Panel kit			Number of Pages 0 0 0 0		Format A1 A2 A3 A4	Drawing number D3-710208 6 Rev.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



RECOMMENDED CABLE TYPES

CABLE NO.	CABLE TYPE
1	AWG14
2	AWG17 SHIELDED
3	AWG17 SHIELDED
4	AWG14
5	AWG14
6	AWG18 TWISTED / SHIELDED
7	AWG18 TWISTED / SHIELDED
8	AWG18
9	AWG18 TWISTED / SHIELDED

Shielded cables to be connected to GND ⏚

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REV: C	NO: 4834	DATE: 100105	SIGN: AEEJ	PAGE(S): 1, 2
REV: B	NO: 4617	DATE: 190204	SIGN: AEEJ	PAGE(S): 1, 2

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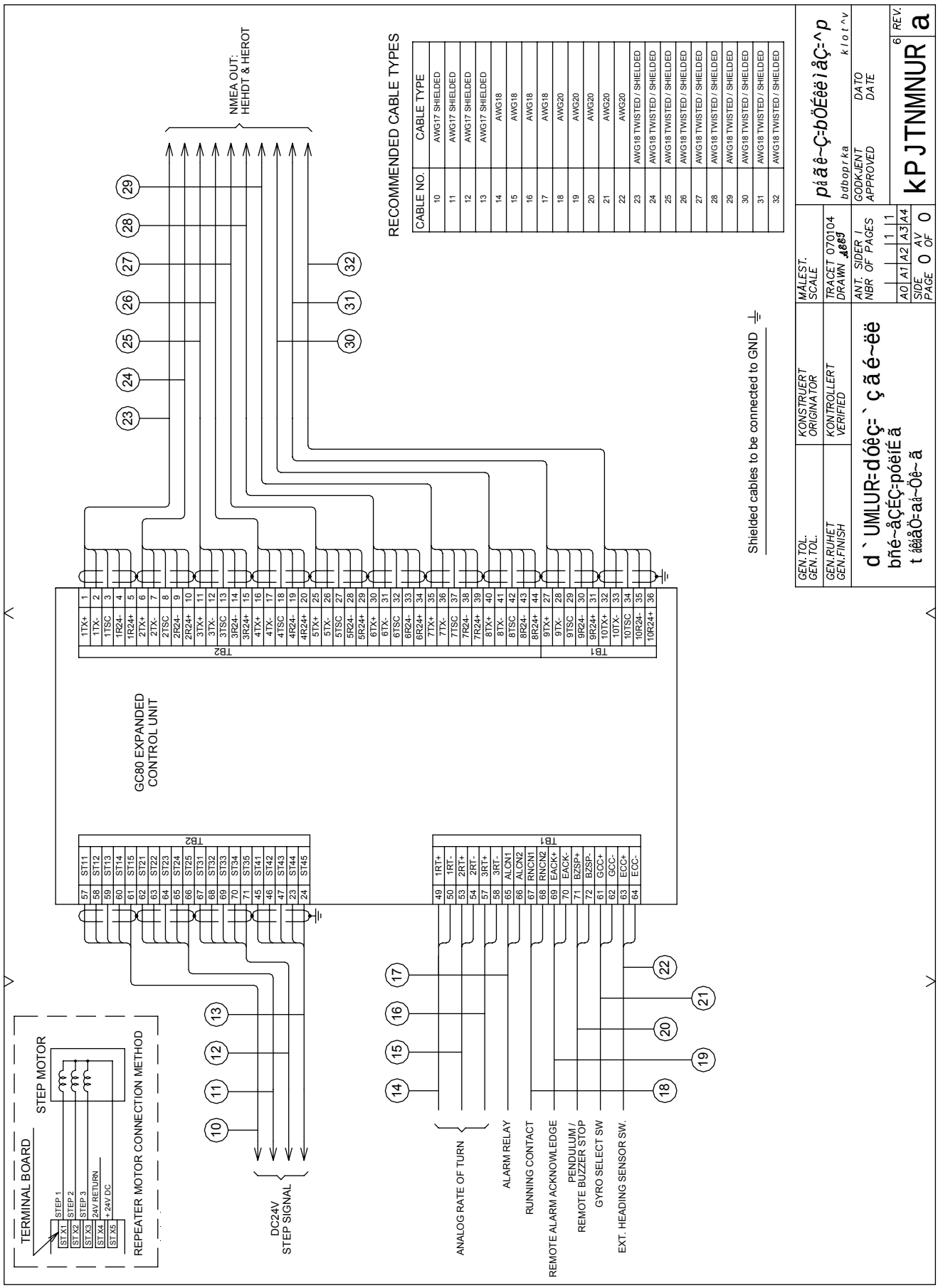
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RECOMMENDED CABLE TYPES
CABLE NO. | CABLE TYPE
10 AWG17 SHIELDED
11 AWG17 SHIELDED
12 AWG17 SHIELDED
13 AWG17 SHIELDED
14 AWG18
15 AWG18
16 AWG18
17 AWG18
18 AWG20
19 AWG20
20 AWG20
21 AWG20
22 AWG20
23 AWG18 TWISTED / SHIELDED
24 AWG18 TWISTED / SHIELDED
25 AWG18 TWISTED / SHIELDED
26 AWG18 TWISTED / SHIELDED
27 AWG18 TWISTED / SHIELDED
28 AWG18 TWISTED / SHIELDED
29 AWG18 TWISTED / SHIELDED
30 AWG18 TWISTED / SHIELDED
31 AWG18 TWISTED / SHIELDED
32 AWG18 TWISTED / SHIELDED
Shielded cables to be connected to GND
GC80 EXPANDED
CONTROL UNIT
TB2
TB1
TERMINAL BOARD
STEP MOTOR
REPEATER MOTOR CONNECTION METHOD
STEP 1
STEP 2
STEP 3
24V RETURN
+ 24V DC
DC24V
STEP SIGNAL
ANALOG RATE OF TURN
ALARM RELAY
RUNNING CONTACT
REMOTE ALARM ACKNOWLEDGE
PENDULUM /
REMOTE BUZZER STOP
GYRO SELECT SW
EXT. HEADING SENSOR SW.
GEN. TOL.
GEN. I TOL.
GEN.RUHET
GEN.FINISH
KONSTRUERT
ORIGINATOR
KONTROLLERT
VERIFIED
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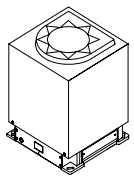
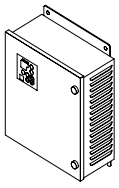
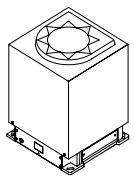
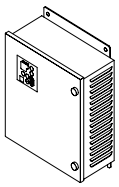
9 SPARE PART LIST

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

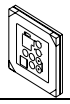
9.1 GC80 Expanded Gyro system

PART NO		DESCRIPTION
27101674		GC80 Master compass
44174027		GC80 Sensitive element
27101708		GC80 Expanded Control unit
20221529		GC80/GC85 Expanded gyro compass Instruction manual
44174449		Special tool required when installing the Sensitive element

9.2 GC85 Expanded Gyro system

PART NO		DESCRIPTION
27101682		GC85 Master compass
44170728		GC85 Sensitive element
27101708		GC80 Expanded Control unit
20221529		GC80/GC85 Expanded gyro compass Instruction manual
44174449		Special tool required when installing the Sensitive element

9.3 Optional equipment, GC80/85 Expanded system

PART NO		DESCRIPTION
27101757		GC80 Flush mounting kit in Simrad design for remote installation of operating panel
44170736		GC80 Extension cable 5 meter for remote installation of operating panel normally mounted in Control unit
44170744		GC80 Extension cable 10 meter for remote installation of operating panel normally mounted in Control unit
44170751		GC80 Extension cable 15 meter for remote installation of operating panel normally mounted in Control unit

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10 TERMINAL LAYOUT

This section includes tables which list all terminal pins and terminal labelling on GTERM board in the GC80 Expanded Control unit. The tables include detailed description for each terminal.

10.1 GTERM board

TB1

PIN NO	NAME	DETAILS
1	N+	Master compass power supply (24V DC)
2	N-	Master compass power supply (24V DC common)
3	AL1	Master compass inverter alarm (over current)
4	AL2	Master compass inverter alarm (over voltage)
5	ALC	Master compass inverter alarm (common)
6	MT+	Control unit – master compass serial signal
7	MT-	
8	MR+	Master compass – control unit serial signal
9	MR-	
10	MSC	Serial signal common
11	EA+	Master compass encoder signal (A phase +)
12	EA-	Master compass encoder signal (A phase -)
13	EB+	Master compass encoder signal (B phase +)
14	EB-	Master compass encoder signal (B phase -)
15	ECC	Master compass encoder signal (common)
16	FGND	Earth
17	24R+	Ext. power supply input (no connection)
18	24R-	
19	24B+	
20	24B-	
21	PF	Ext. power supply alarm input (no connection)
22	POC	
23	POV	
24	PC	
25	24M+	Ext. power supply input (no connection)
26	24M-	
27	9TX+	Serial signal output (IEC61162-1 ed.2/-2)
28	9TX-	
29	9TSC	Serial signal common
30	9R24-	Serial repeater power supply, -24V DC
31	9R24+	Serial repeater power supply, +24V DC
32	10TX+	Serial signal output (IEC61162-1 ed.2/-2)
33	10TX-	

PIN NO	NAME	DETAILS
34	10TSC	Serial signal common
35	10R24-	Serial repeater power supply, -24V DC
36	10R24+	Serial repeater power supply, +24V DC
37	GRX+	GPS serial signal input
38	GRX-	
39	GSC	GPS serial signal common
40	LRX+	LOG serial signal input
41	LRX-	
42	LSC	LOG serial signal common
43	ESRX+	External sensor serial signal input
44	ESRX-	
45	ESC	External sensor serial signal common
46	SL+	LOG contact signal input
47	SL-	
48	SW+	External power supply switch (Not used)
49	1RT+	Rate of turn analog signal output
50	1RT-	Rate of turn signal common
51	1SO+	Rate of turn scale over signal output
52	1SO-	Rate of turn signal common
53	2RT+	Rate of turn analog signal output
54	2RT-	Rate of turn signal common
55	2SO+	Rate of turn scale over signal output
56	2SO-	Rate of turn signal common
57	3RT+	Rate of turn scale over signal output
58	3RT-	Rate of turn signal common
59	3SO+	Rate of turn scale over signal output
60	3SO-	Rate of turn signal common
61	GCC+	Sensor select signal input (gyro select)
62	GCC-	
63	ECC+	Sensor select signal inut (Ext. sensor select)
64	ECC-	
65	ALCN1	Alarm contact signal output
66	ALCN2	
67	RNCN1	Running contact signal output
68	RNCN2	

PIN NO	NAME	DETAILS
69	EACK+	External acknowledge signal input
70	EACK-	
71	BZSP+	Buzzer stop signal input/Pendulum
72	BZSP-	

TB2

PIN NO	NAME	DETAILS
1	1TX+	Serial signal output (IEC61162-1 ed.2/-2)
2	1TX-	
3	1TSC	Serial signal common
4	1R24-	Serial repeater power supply, -24V DC
5	1R24+	Serial repeater power supply, +24V DC
6	2TX+	Serial signal output (IEC61162-1 ed.2/-2)
7	2TX-	
8	2TSC	Serial signal common
9	2R24-	Serial repeater power supply, -24V DC
10	2R24+	Serial repeater power supply, +24V DC
11	3TX+	Serial signal output (IEC61162-1 ed.2/-2)
12	3TX-	
13	3TSC	Serial signal common
14	3R24-	Serial repeater power supply, -24V DC
15	3R24+	Serial repeater power supply, +24V DC
16	4TX+	Serial signal output (IEC61162-1 ed.2/-2)
17	4TX-	
18	4TSC	Serial signal common
19	4R24-	Serial repeater power supply, -24V DC
20	4R24+	Serial repeater power supply, +24V DC
21	DFCN1	Not used
22	DFCN2	
23	ST44	-24V DC for step signal output 4
24	ST45	+24V DC for step signal output 4
25	5TX+	Serial signal output (IEC61162-1 ed.2/-2)
26	5TX-	
27	5TSC	Serial signal common

PIN NO	NAME	DETAILS
28	5R24-	Serial repeater power supply, -24V DC
29	5R24+	Serial repeater power supply, +24V DC
30	6TX+	Serial signal output (IEC61162-1 ed.2/-2)
31	6TX-	
32	6TSC	Serial signal common
33	6R24-	Serial repeater power supply, -24V DC
34	6R24+	Serial repeater power supply, +24V DC
35	7TX+	Serial signal output (IEC61162-1 ed.2/-2)
36	7TX-	
37	7TSC	Serial signal common
38	7R24-	Serial repeater power supply, -24V DC
39	7R24+	Serial repeater power supply, +24V DC
40	8TX+	Serial signal output (IEC61162-1 ed.2/-2)
41	8TX-	
42	8TSC	Serial signal common
43	8R24-	Serial repeater power supply, -24V DC
44	8R24+	Serial repeater power supply, +24V DC
45	ST41	Step signal (open drain signal)
46	ST42	
47	ST43	
48	OCACN1	Not used
49	ST1/OPRX+	
50	ST2/OPRX-	
51	ST3/OPSC	
52	OPMC+	
53	OPMC-	
54	GTX+	
55	GXT-	
56	GTSC	
57	ST11	Step signal (open drain signal)
58	ST12	
59	ST13	
60	ST14	-24V DC for step signal output 1
61	ST15	+24V DC for step signal output 1

PIN NO	NAME	DETAILS
62	ST21	Step signal (open drain signal)
63	ST22	
64	ST23	
65	ST24	-24V DC for step signal output 2
66	ST25	+24V DC for step signal output 2
67	ST31	Step signal (open drain signal)
68	ST32	
69	ST33	
70	ST34	-24V DC for step signal output 3
71	ST35	+24V DC for step signal output 3
72	OCACN2	Not used

11 DIP SWITCH SETTINGS

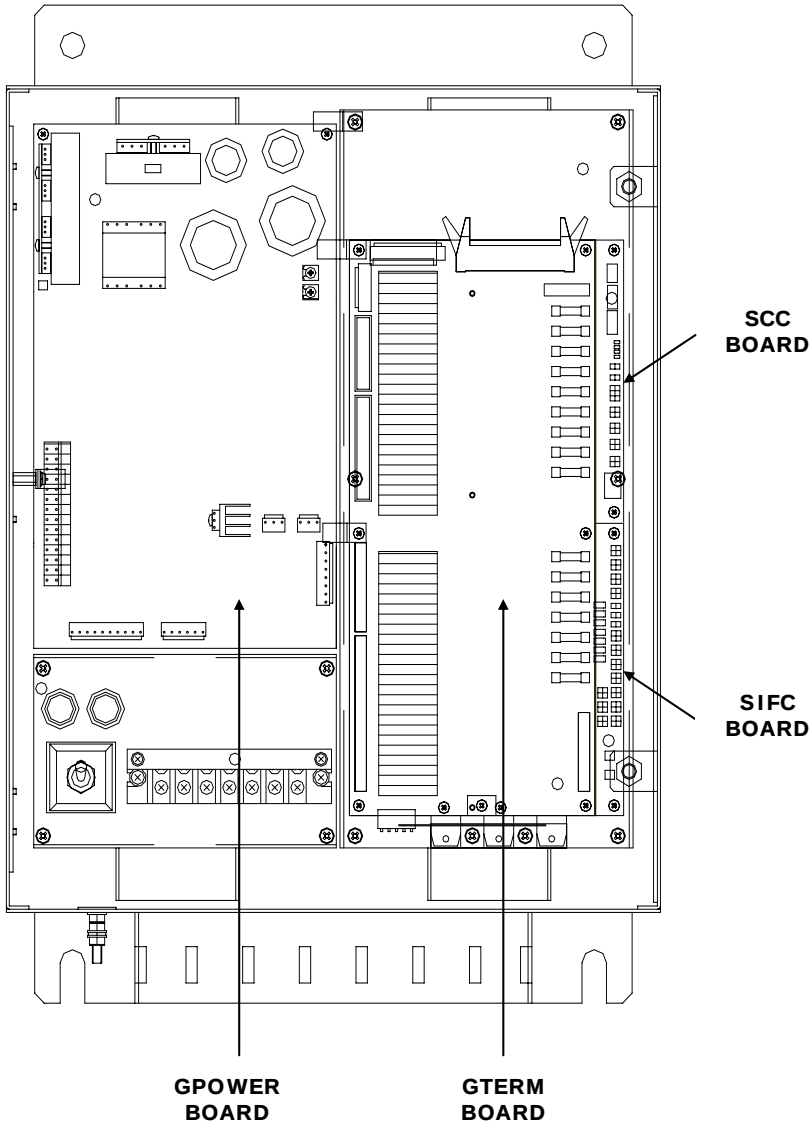
This section includes drawings for the different printed circuits boards in the Control unit that include jumpers and dip switches.

11.1 Expanded control unit

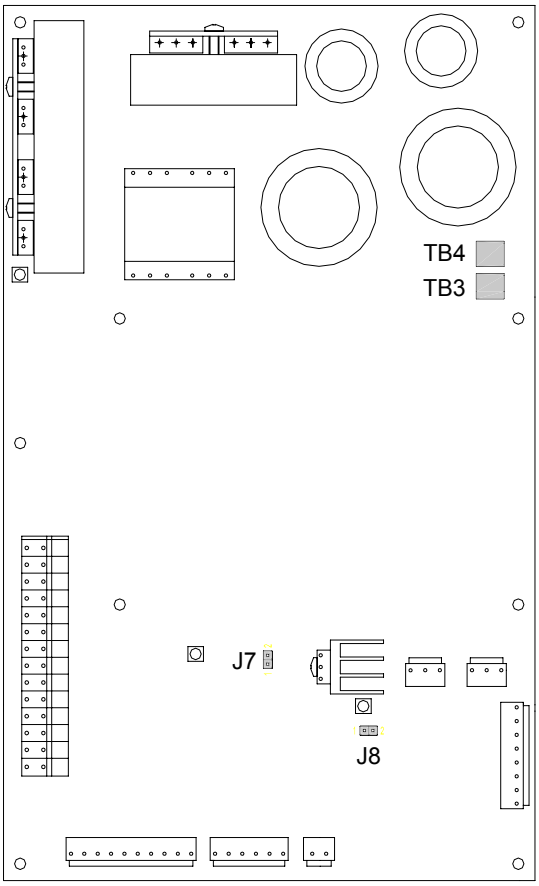
Three different boards in the Expanded control unit have jumpers and/or dip switches that may be used for configuring the GC80/85 system.

Only a few of these jumpers/dip switches are used in installation and pre-running procedure for the gyro compass. Refer Power supply, page 41, and ***Dip-switch and*** jumper settings, page 42.

The following pages includes drawings showing location of jumpers and/or dip switches, together with a short description for the different settings.



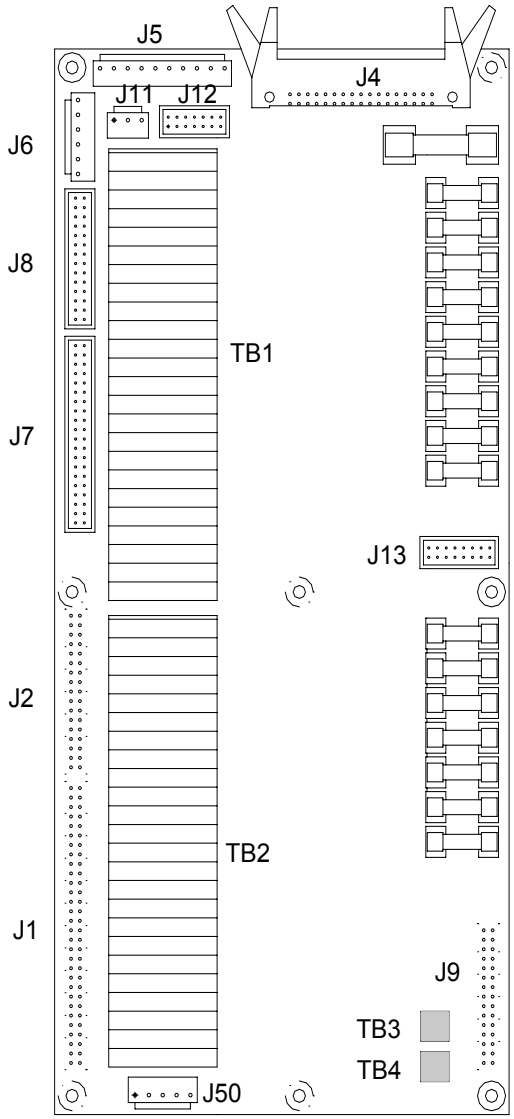
GPOWER board



Jumper settings on GPOWER board

JUMPER	DEFAULT	FUNCTION	DESCRIPTION
J7	Open or Short	Over-current limit set	Over-current value of dc24v for Master compass is set up. *NOTE: Should not be changed.*
J8	Open	Over-current limit change time	Used for inspection at a factory. *NOTE: Should not be changed.*
TB3 – TB4	Open	Main power supply setting	Open = 220V AC Short = 100/110/115V AC

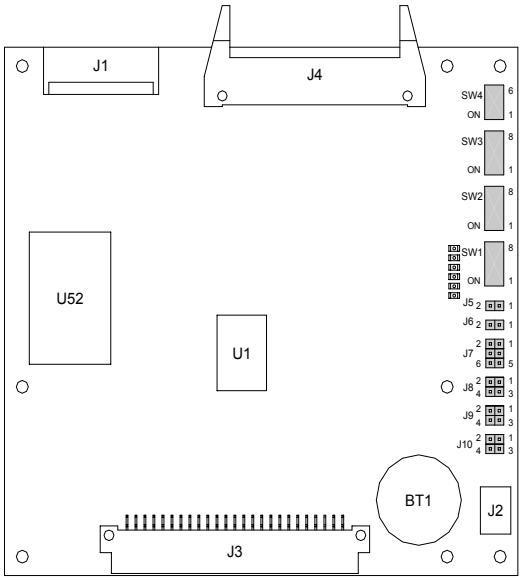
GTERM board



Jumper settings on GTERM board

JUMPER	DEFAULT	FUNCTION	DESCRIPTION
TB3 – TB4	-	Gyro system	Open = Two gyro systems Short = One gyro system

SCC board



DIP switch settings on SCC board

SWITCH	DEFAULT	FUNCTION	DESCRIPTION	
S1-1	OFF	Control unit type	OFF = Expanded,	ON =Compact
S1-2	-	Master compass type	OFF = Standard,	ON =High Speed
S1-3	-	2 gyros used	OFF = Single,	ON =Dual
S1-4	-	Active gyro system	OFF = System No.1,	ON =System No.2
S1-5	OFF	External sensor connection	SW1-5 OFF SW1-6 OFF	= No external sensor
			SW1-5 OFF SW1-6 ON	= Magnetic system connected (back-up)
S1-6	OFF		SW1-5 ON SW1-6 OFF	= External sensor connected
			SW1-5 ON SW1-6 ON	= External system connected (back-up)
S1-7	OFF	Serial signal format	OFF = IEC61162-2 (NMEA0183, ref. page 4), ON = Tokimec	
S1-8	OFF	Alarm output setup	OFF = All alarms, ON = Only power failures	

SWITCH	DEFAULT	FUNCTION	DESCRIPTION	
S2-1	OFF	Data output for record	SW2-1 OFF	No output
			SW2-2 OFF	
			SW2-1 OFF	Output for old monitor
			SW2-2 ON	
S2-2	OFF		SW2-1 ON	Output for new monitor
			SW2-2 OFF	
			SW2-1 ON	No output
			SW2-2 ON	
S2-3	OFF	Not used.		
S2-4	OFF	Pendulum ferry	OFF = Not connected/Buzzer stop enable ON = Pendulum function in use/Buzzer stop disable	
S2-5	OFF	Serial signal transmit frequency IEC61162-1 ed.2	SW2-5 OFF	= 1sec (1Hz)
			SW2-6 OFF	
			SW2-5 OFF	= 100msec (10Hz)
			SW2-6 ON	
S2-6	ON		SW2-5 ON	= 200msec (5Hz)
			SW2-6 OFF	
			SW2-5 ON	= Invalid
			SW2-6 ON	
S2-7	OFF	Alarm mask setting	OFF = No alarm mask ON = Control power abnormal	
S2-8	OFF	Not used.		
S3-1	OFF	Timer startup	OFF = No, ON = Yes	
S3-2	OFF	Talker ID of “ROT” sentence	OFF = “HE”, ON = “TI”	
S3-3	ON	Rate of turn scale	SW3-3 OFF	Max 30.0 °/min.
			SW3-4 OFF	
			SW3-3 OFF	Max 300.0 °/min.
			SW3-4 ON	
S3-4	OFF		SW3-3 ON	Max 120.0 °/min.
			SW3-4 OFF	
			SW3-3 ON	Invalid
			SW3-4 ON	
S3-5	OFF	Ban or permission of a “ROT” sentence output	Valid at the time of external sensor (standard) selection. OFF = Disabled, ON = Enabled	

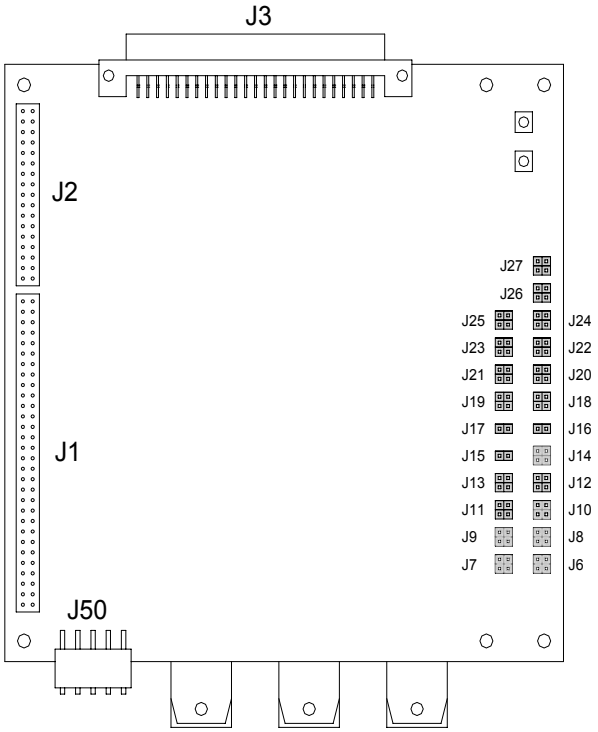
SWITCH	DEFAULT	FUNCTION	DESCRIPTION
S3-6	ON	For Simrad use	OFF = Not used ON = Simrad GC type (80 or 85) shown in display at start-up according to S1-2 setting.
S3-7	OFF	Not used	
S3-8	OFF		
S4-1	OFF	Forward bow rate	38400 bps
S4-2	OFF		9600 bps
S4-3	ON		4800 bps
S4-4	OFF	LOG serial receipt bow rate	38400 bps
S4-5	OFF		9600 bps
S4-6	ON		4800 bps

Jumper settings on SCC board

JUMPER	DEFAULT	FUNCTION	DESCRIPTION
J5	Open	CPU reset	Used for resetting the CPU
J6	Short	Software installation	OPEN: Used when installing sw in the CSS board *NOTE: Be sure to also set "J25 and J26" on the SCOIF or MCOIF boards to OPEN.* *NOTE: A damage will be given to a circuit if software is installed while this jumper has been short.*
J7	3-4 short	Serial signal output setting	Output port: GTERM board, TB2 "1TX" 1-2 Short = Not used. 3-4 Short = IEC61162-2 or TOKIMEC version 5-6 Short = IEC61162-1 ed.2 Ref. page 4. *NOTE: Never use both jumpers at the same time!*
J8	3-4 short		Output port: GTERM board, TB2 "2TX" 1-2 Short = IEC61162-2. 3-4 Short = IEC61162-1 ed.2 *NOTE: Never use both jumpers at the same time!*

JUMPER	DEFAULT	FUNCTION	DESCRIPTION
J9	3-4 short	Alarm contact setting	Output port: GTERM board, TB1 "ALCN" 1-2 Short = Alarm "CLOSES", Normal "OPEN" 3-4 Short = Alarm "OPEN", Normal "CLOSES" *NOTE: Never use both jumpers at the same time!*
J10	3-4 short	Running contact setting	Output port: GTERM board, TB1 "RNCN" 1-2 Short = Alarm "CLOSES", Normal "OPEN" 3-4 Short = Alarm "OPEN", Normal "CLOSES" *NOTE: Never use both jumpers at the same time!*

SIFC board



Jumper settings on SIFC board

JUMPER	DEFAULT	FUNCTION	DESCRIPTION
J6	3-4 short	Serial signal output setting	Output port: GTERM board, TB2: "3TX" 1-2 short = IEC61162-2 or TOKIMEC version 3-4 short = IEC61162-1 ed.2 Ref. page 4. *NOTE: Never use both jumpers at the same time!*
J7	3-4 short		Output port: GTERM board, TB2: "4TX" 1-2 short = IEC61162-2 or TOKIMEC version 3-4 short = IEC61162-1 ed.2 Ref. page 4. *NOTE: Never use both jumpers at the same time!*

JUMPER	DEFAULT	FUNCTION	DESCRIPTION
J8	3-4 short	Serial signal output setting, cont.	Output port: GTERM board, TB2: "5TX" 1-2 short = IEC61162-2 or TOKIMEC version 3-4 short = IEC61162-1 ed.2 Ref. page 4. *NOTE:* *Never use both jumpers at the same time!*
J9	3-4 short		Output port: GTERM board, TB2: "6TX" 1-2 short = IEC61162-2 or TOKIMEC version 3-4 short = IEC61162-1 ed.2 Ref. page 4. *NOTE:* *Never use both jumpers at the same time!*
J10	3-4 short		Output port: GTERM board, TB2: "7TX" 1-2 short = IEC-61162-2 or TOKIMEC version 3-4 short = IEC-61162-1 ed.2 Ref. page 4. *NOTE:* *Never use both jumpers at the same time!*
J11	3-4 short		Output port: GTERM board, TB2: "8TX" 1-2 short = IEC61162-2 or TOKIMEC version 3-4 short = IEC61162-1 ed.2 Ref. page 4. *NOTE:* *Never use both jumpers at the same time!*
J12	3-4 short		Output port: GTERM board, TB1: "9TX" 1-2 short = IEC61162-2 or TOKIMEC version 3-4 short = IEC61162-1 ed.2 Ref. page 4. *NOTE:* *Never use both jumpers at the same time!*

JUMPER	DEFAULT	FUNCTION	DESCRIPTION
J13	3-4 short	Serial signal output setting, cont.	Output port: GTERM board, TB1: "10TX" 1-2 short = IEC61162-2 or TOKIMEC version 3-4 short = IEC-61162-1 ed.2 Ref. page 4. *NOTE: Never use both jumpers at the same time!*
J14	3-4 short		Output port: GTERM board, TB2: "GTX" 1-2 short = IEC61162-2 or TOKIMEC version 3-4 short = IEC61162-1 ed.2 Ref. page 4. *NOTE: The true heading information on "Gyro-compass" is output regardless of a system change.(with HDM or EHS unit). However, when a "standard external heading sensor" is connected, the true direction of the selected sensor is outputted.* *NOTE: Never use both jumpers at the same time!*
J15	Open	Type setting	Short = Standard Open = With an external heading sensor (with HDM or EHS unit)
J16	Open		
J17	Short	Software install or internal	Short = Internal communication with "External heading sensor " Open = Software is installed in SCCpwb *NOTE: Be sure to set "J6" of "SCCpwb" to "OPEN".* *NOTE: A damage will be given to a circuit if software is installed while this jumper has been short.*

JUMPER	DEFAULT	FUNCTION	DESCRIPTION
J18	1-2 short	"Rate of turn" Analog signal level selection	Output port: GTERM board, TB1 "1RT～3RT" 1-2 short = Output voltage 0v to ±5v DC or 0v to ±10v DC 3-4 short = Output voltage 0v to +5v DC or 0v to +10v DC *NOTE: Never use both jumpers at the same time!*
J19	1-2 short	LOG contact signal selection	Input port: GTERM board, TB1 "SL" 1-2 short = 200p.p.n.m. 3-4 short = 400p.p.n.m. *NOTE: Never use both jumpers at the same time!*
J20	1-2 short	Polarity for "GPS" signal setting	Input port: GTERM board, TB1 "GRX" 1-2 short = Standard 3-4 short = Polarity is carried out reversely. *NOTE: When a signal cannot be received by "1-2 short", it is set as "3-4 short."* *NOTE: Never use both jumpers at the same time!*
J21	1-2 short	Setting of polarity for "LOG" signal	Input port: GTERM board, TB1 "LRX" 1-2 short = Standard 3-4 short = Polarity is carried out reversely. *NOTE: When a signal cannot be received by "1-2 short", it is set as "3-4 short."* *NOTE: Never use both jumpers at the same time!*

JUMPER	DEFAULT	FUNCTION	DESCRIPTION
J22	1-2 short	Setting of polarity for "external heading sensor" signal	Input port: GTERM board, TB1 "ESRX" 1-2 short = Standard 3-4 short = Polarity is carried out reversely. NOTE: *When a signal cannot be received by "1-2 short", it is set as "3-4 short."* NOTE: *Never use both jumpers at the same time!*
J23	1-2 short	Selection of receiving port of CPU in SCC board	1-2 short = An option serial signal is received. 3-4 short = "GPS"serial signal (38400bps only) is received. NOTE: *Never use both jumpers at the same time!*
J24	1-2 short	Selection of Output serial signal	Output port: GTERM board, TB2 "5TX" 1-2 short = The signal set up by "J6" is output. 3-4 short = The true heading information on "Gyro-compass" is output regardless of a system change (with HDM or EHS unit). NOTE: *When a "standard external heading sensor" is connected, the true direction of the selected sensor is output.* NOTE: *Never use both jumpers at the same time!*

JUMPER	DEFAULT	FUNCTION	DESCRIPTION
J25	1-2 short	Output port setup of "GTERM board"	Output port: GTERM board, TB2 "ST1/OPRX+" 1-2 short = The step signal for "Step signal type repeater" is output. (ST1) 3-4 short = Serial signal receive (OPTION) (OPRX+). NOTE: *Never use both jumpers at the same time!*
J26	1-2 short		Output port: GTERM board, TB2 "ST2/OPRX-" 1-2 short = The step signal for "Step signal type repeater" is output. (ST2) 3-4 short = Serial signal receive (OPTION) (OPRX-). NOTE: *Never use both jumpers at the same time!*
J27	1-2 short		Output port: GTERM board, TB2 "ST2/OPRXC" 1-2 short = The step signal for "Step signal type repeater" is output. (ST3) 3-4 short = Serial signal receive (OPTION) (OPRXC). NOTE: *Never use both jumpers at the same time!*

12 ALARM MESSAGES AND CORRECTIVE ACTIONS

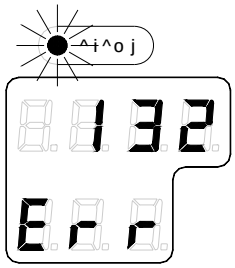
This section provides a description which system errors that are displayed, and which corrective actions that could be performed by the system operator.

12.1 The alarm system

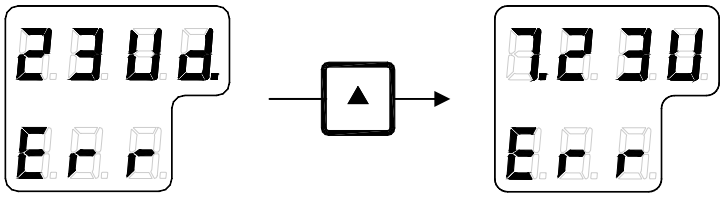
The GC80/GC85 system will continually check for faults while the system is running.

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 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 with code 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 on the figure below. Further alarm codes may then be displayed by pressing the “arrow up” button.



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

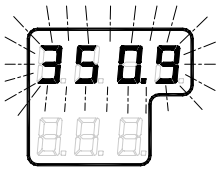
Caution

When an alarm is generated, bearing information from the GC80/GC85 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.

12.2 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.

12.3 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 faults that may be corrected by the operator. If none of these procedures correct the problem, contact the local Simrad dealer for advice or for requesting on board service.

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

- Shut down and restart the gyro compass
- Verify that all cables are properly connected according to the wiring diagrams, page 71 onwards
- 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 in page 11 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: ....ITERM/ TB1, 24M+ and 24M-

Voltage:.....24V 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:

F101: 6.3A

For location and replacement of the fuses, refer to page 31 onwards.

Internal power failure in Control unit

Generated when the Control unit's power supply are over current or over voltage.

1 Turn OFF the power by pressing the **POWER** button, and repress the **POWER** button after 20 seconds.

2 If no alarm is activated, continue the start-up procedure as described in ***Start-Up***, page 10.

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

Inverter failure

Alarm generated in the Inverter in the Master compass is over current or over voltage.

1 Turn OFF the power by pressing the **POWER** button, and repress the **POWER** button after 20 seconds.

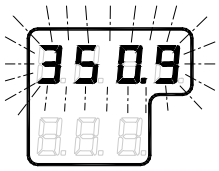
2 If no alarm is activated, continue the start-up procedure as described in ***Start-Up***, page 10.

3 If the alarm is repeated, turn OFF the power and check the inverter fuse, F1:12A.

For location and replacement of the fuses, refer to page 31 onwards.

Zero cross failure

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



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

2 Adjust the bearing with the arrow buttons until the bearing corresponds to the vessel's actual bearing, and confirm the entry with the **ACK/ENT** button.

If the bearing input was 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 failure in communication from the Master compass to the Control unit.

1 Turn OFF the power by pressing the **POWER** button, and repress the **POWER** button after 20 seconds.

2 If no alarm is activated, continue the start-up procedure as described in ***Start-Up***, page 10.

3 If the alarm is repeated, turn OFF the power and disconnect the power cable to the Control unit.

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

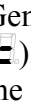
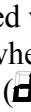
- GC80 Master compass:

  TB1, MR+/-

- GC80 Compact Control unit:

  GTERM PWB, TB1, MR+/-

GPS communication or data failure

Generated when if the communication from GPS has stopped (), or when there is a failure in the communication line from the GPS ().

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

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

2 If the GPS has a failure, change the input system as described in ***Setting the Latitude input s***, page 53 and ***Setting the Speed input source***, page 54.

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

Internal communication failure

Generated when the communication from the external bearing sensor has stopped (E), or when a failure 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's documentation.

External bearing sensor failure

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

Note!

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

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

LOG (serial) communication or data failure

Activated when the serial signal from LOG (serial) has stopped (P), or when a failure 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 system, and when LOG (serial) is selected as the vessel's speed input system.

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

2 If the LOG has a failure, change the input system as described in ***Setting the Speed input source***, page 54.

Repeater failure

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 to the Control unit, and check the fuse for the repeater not working:

- Step repeater:

  F11 to F14, F5 to F9: 1A

- Serial repeater:

  F1 to F10: 1A

For location and replacement of the fuses, refer to page 31 onwards.

No output on any repeater

Disconnect the power to the Control unit, and check the following fuses:

F16: 20A

For location and replacement of the fuses, refer to page 31 onwards.

Failure when powering ON the gyro compass

If alarm code E and A 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, and repress the button after 1 second.

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

For location and replacement of the fuses, refer to page 31 onwards.

12.4 Complete alarm code list

Alarm code	Alarm content	Datailed 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	Memory is abnormal
		18	Memory is abnormal
		19	Memory is abnormal
		20	Memory is abnormal
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.)

Alarm code	Alarm content	Datailed code	Possible cause
E-d	GPS data abnormal	26	GPS latitude data abnormal. (timeout is 17 sec.)
		27	GPS speed data abnormal.(timeout is 17 sec.)
E-E	MAG/EHS communication off	32	When 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	When 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	When LOG (serial) system 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	When compensation of the bearing by the encorder signal is not completed.
E-u *1	LOG(contact) data abnormal	37	LOG (contact) is abnormal.

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