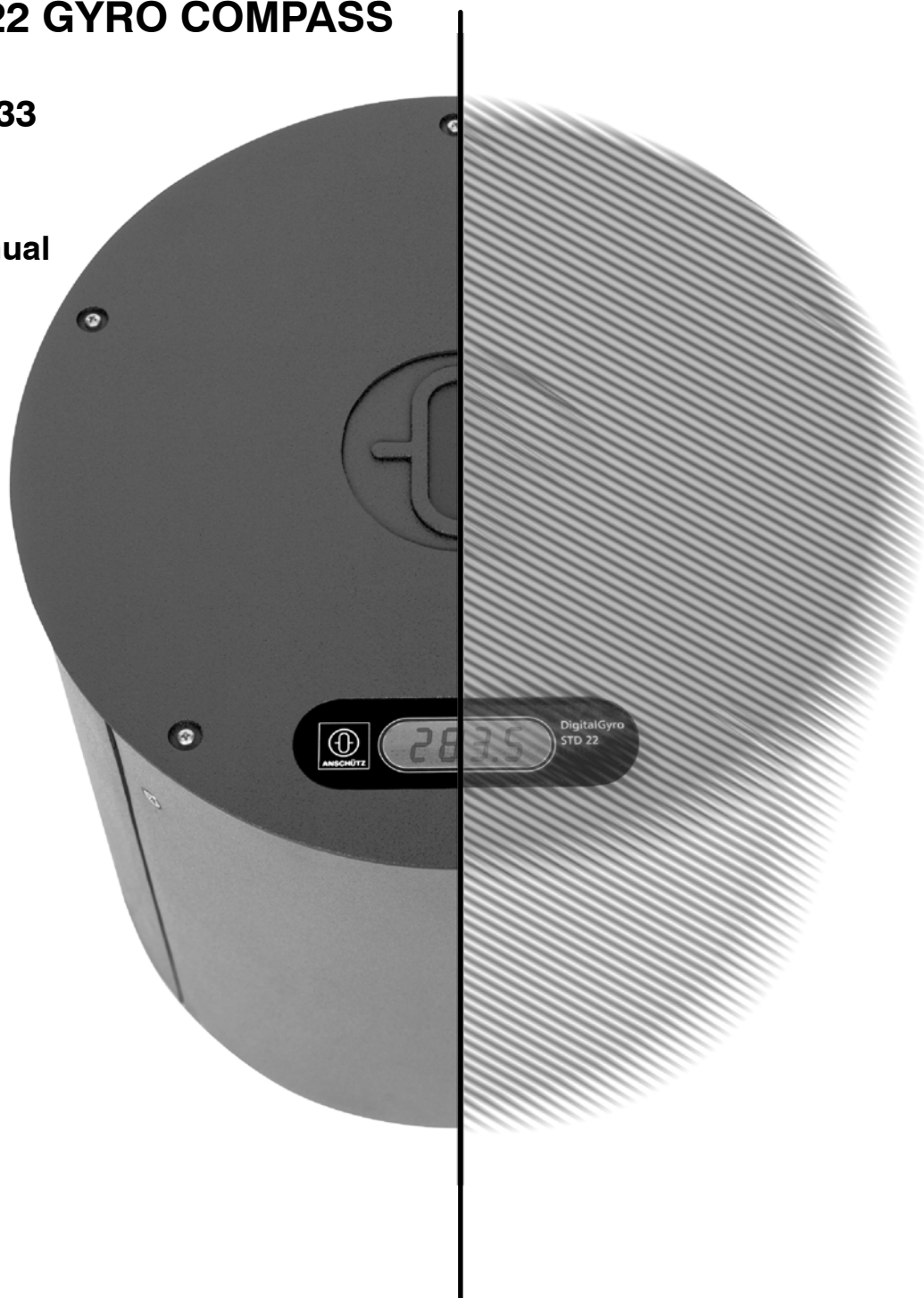




STD 22 Compact GYRO COMPASS and STD 22 GYRO COMPASS

Type 110 -233

Operator manual

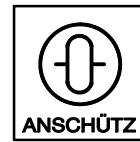


Weitergabe sowie Vervielfältigung dieser Unterlage, Verwertung und Mitteilung ihres Inhaltes nicht gestattet, soweit nicht ausdrücklich zugestanden. Zuwiderhandlungen verpflichten zu Schadenersatz.

Toute communication ou reproduction de ce document, toute exploitation ou communication de son contenu sont interdites, sauf autorisation expresse. Tout manquement à cette règle est illicite et expose son auteur au versement de dommages et intérêts.

Copying of this document, and giving it to others and the use or communication of the contents thereof, are forbidden without express authority. Offenders are liable to the payment of damages.

Sin nuestra expresa autorización, queda terminantemente prohibida la reproducción total o parcial de este documento, así como su uso indebido y/o su exhibición o comunicación a terceros. De los infractores se exigirá el correspondiente resarcimiento de daños y perjuicios.



<u>TABLE OF CONTENTS</u>		<u>Page</u>
	Declaration of Conformity	
1	General	1
1.1	STD 22 <u>Compact</u> Gyro Compass	3
1.1.1	STD 22 <u>Compact</u> Gyro Compass - Scope of Supply	5
1.1.2	STD 22 <u>Compact</u> Gyro Compass optional features	6
1.1.2.1	Quick Settling operator unit	6
1.1.2.2	AC/DC Converter 121-062	7
1.1.2.3	Additional Output Box 146-103	7
1.2	STD 22 Gyro Compass	8
1.2.1	STD 22 Gyro Compass - Scope of Supply	10
1.2.2	Optional features STD 22 Gyro Compass	11
1.2.2.1	AC/DC Converter 121-062	11
1.3	Technical data	12
1.3.1	Mechanical data	12
1.3.2	Electrical data	12
1.3.3	General Technical Data	13
2	Controls and Indicators on the Gyro Compass	14
2.1	Switching on the STD 22 Compass	16
2.1.1	Indications on the compass during the heating stage	17
2.1.2	Indications on the compass during the settling stage	18
2.1.3	Overview of indications (digital display) during operation	19
2.2	Heading correction	20
2.2.1.	Alignment error	20
2.2.1.1	Procedure for setting the compass zero (A-error)	21
2.2.2	Speed error	23
2.2.2.1	Speed error table	25
3	Warning signals	29
3.1	Warnings, their causes, and what to do	30
3.1.1	Warning 1 "Fan failure"	32
3.1.2	Warning 2 "Heater failure"	33
3.1.3	Warning 3 "Supporting liquid > 60 °C."	33
3.1.4	Warning 4 "Supporting liquid level too low"	34
3.1.5	Warning 5 "Voltage cut-off"	38
4	Alarm signalling (in the event of an error)	39
5	Switching off the Gyro Compass	42
6	Maintenance	43

Safety Information



Caution!

Maintenance and repair work should be carried out only by trained and qualified staff who are well versed in national safety regulations.

After the gyro compass has been switched off it is necessary to wait at least 15 minutes before accessing the interior of the gyro compass.

Otherwise the sphere could be damaged!



If no Raytheon repeater compass or other alarm indication device is connected, the warnings and error messages are only displayed visually on the compass.

In such case, the gyro has to be installed in such a way, that the digital display can be monitored at all times - see installation instruction.



If warnings occur, the operation of the gyro compass is not restricted. If the cause of the problem is rectified quickly, it is possible to prevent the equipment from breaking down.

Please inform the authorised service staff.

When an error message appears, the heading is no longer displayed at the compass; the heading is not followed up at a connected heading receiver.

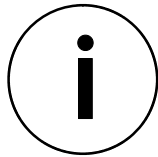
The compass must be repaired by well trained staff.



Please note that all ships of 500 gross tonnage and upwards according to SOLAS regulations must be equipped with a gyro compass.

The gyro compass must be operational. For this reason it is not allowed to have a switched-off gyro compass during voyages.

A switched-off gyro compass during voyages could cause damage to the gyrosphere.



Caused by technical progress the PC-Boards of the Gyro Compass are changed.
Due to that some pictures and/or procedures have been changed.
Respective changes are marked with "E10".



The AC supply voltage (ships mains) may drop out.
This leads to a restart of the gyrocompass and a new settling stage.
The heading information during this settling stage has a reduced accuracy (see section 2.1.2).
Therefore a continuously supply with 24VDC should be guaranteed.



There is a reduced accuracy of the compass during the settling stage.
The compass shows required accuracy after ending of the settling stage (appr. 4 hours after switching ON).

**Operator manual
110-233
STD22 Compact and STD22**

Intentionally left blank

**Operator manual
110-233
STD22 Compact and STD22**



Compass
STD 22

Raytheon

Raytheon Anschütz GmbH
Postfach 11 66
D - 24100 Kiel
Germany
Tel +49-4 31-30 19-0
Fax +49-431-30 19-291
Email info@raykiel.com
www.raytheon-anschuetz.de

Manufacturer's Declaration of Conformity

EC-Directive 96/98/EC, last amended by Directive 2002/75/EC.

We hereby declare that the product identified below has been manufactured in accordance with the type approved units and complies with the above mentioned European Directives.

Product Designation: **Gyrocompass System**

Type: **Anschütz Gyro Compass Standard 22**
(system components see attached)

Type Examination by: GL Luxembourg
26, place de la Gare
L-1616 Luxembourg
Notified Body No. 0801

Type Examination Certificate No.: 47 778 - 03 Lux (Module B)

Assessment of the Production
Quality Assurance by: GL Luxembourg,
Notified Body No. 0801

EC Certificate of Conformity No.: 24 974 – 05 Lux (Module D)

Applied Standards and
Directives: Directive 96/98EC / Additional Directive 2001/53/EC
Additional Directive 2002/75/EC, EN 61162-1(2000),
EN 60945(2003), IEC 60945(2002), IEC 61162-1,
EN ISO 8728(1998), IMO Resolutions A.424 (XI),
A.694 (17)

This declaration has been made in the name of the manufacturer by:

Kiel, March 12, 2007

Raytheon Anschütz GmbH
Head of Quality Management

Quality Management


Klaus-Peter Schohl


Robert Zissen

**Operator manual
110-233
STD22 Compact and STD22**

Raytheon

Raytheon Anschütz GmbH
Postfach 11 66
D - 24100 Kiel
Germany
Tel +49-4 31-30 19-0
Fax +49-431-30 19-291
Email info@raykiel.com
www.raytheon-anschuetz.de

Manufacturer's Declaration of Conformity

EC-Directive 96/98/EC, last amended by Directive 2002/75/EC.

Anschütz Gyro Compass Standard 22

Listing of the system components:

Gyro Compass	110-233
Gyrosphere	111-006
Optional equipment:	
Operator unit	130-613
Distribution unit	138-118
Additional output box	146-103
AC DC Converter	121-062
Distribution unit compact	138-126
Serial 360° Synchro Converter	132-628
Serial/Universal Step Converter	132-629
Course transducer	132-620 or 132-624
Repeater compass	133-560
Repeater compass	133-558
Repeater compass	133-407
with junction box	134-109
Repeater compass	133-811
with Dimmer	148-459NG010
Nav Data Repeater compass	133-812
Multi Display	AN 300
Bearing Sight	143-024
Bearing Sight	143-021
Bearing Sight	CP190
Pelorus Stand	142-117
Bracket non adjustable for Bearing Repeater	142-039
Bracket adjustable for Bearing Repeater	142-048



Raytheon

Raytheon Anschütz GmbH
Postfach 11 66
D - 24100 Kiel
Germany
Tel +49-4 31-30 19-0
Fax +49-431-30 19-291
Email info@raykiel.com
www.raytheon-anschuetz.de

Manufacturer's Declaration of Conformity

EC-Directive 96/98/EC, last amended by Directive 2002/75/EC.

Anschütz Gyro Compass Standard 22

Listing of the system components:

Course and rudder angle printer with operator unit	104-033 NA05U01
Booster	NB03-969 or 132-096 or SA01X01
Power supply	119-023
TMC-Converter	121-061 NG001
Magnetic sonde with junction box	108-010 NG001, NG002, NG004 134-089
Change-over switch	124-167
Change-over box	138-119
Change-over switch	124-187

**Operator manual
110-233
STD22 Compact and STD22**

Intentionally left blank

**Operator manual
110-233
STD22 Compact and STD22**



Compass
STD 22

Raytheon

Raytheon Anschütz GmbH
Postfach 11 66
D - 24100 Kiel
Germany
Tel +49-4 31-30 19-0
Fax +49-431-30 19-291
Email info@raykiel.com
www.raytheon-anschuetz.de

Manufacturer's Declaration of Conformity

Article 10 – EC-Directive 96/98/EC.
As amended by Directive 2001/53/EC , 2002/75/EC.

This is to certify that the product identified below has been manufactured in accordance with type approved units and has been successfully tested according to the Quality Assurance Module D.

Product Designation: **Gyro Compass System for High Speed Craft**

Type: **Anschütz Gyro Compass Standard 22**
(system components see attached)

Type Examination by: GL Luxembourg
26, place de la Gare
L-1616 Luxembourg
Notified Body No. 0801

Type Examination Certificate No.: 47 779 - 03 Lux (Module B)

Assessment of the Production
Quality Assurance by: GL Luxembourg,
Notified Body No. 0801

Certificate No.: 26 412 - 05 Lux (Module D)

Applied Standards and
Directives: Directive 96/98EC / Additional Directive 2001/53/EC
Additional Directive 2002/75/EC, EN 61162-1(2000),
EN 60945(2003), IEC 60945(2002), IEC 61162-1,
EN ISO 8728(1998), ISO 16328(2001), IMO Resolutions
A.424 (XI), A.694 (17), A.813 (19), A.821(19),
MSC.64 (67) Annex 4, MSC.97(73), A.526 (13)

This declaration has been made in the name of the manufacturer by:

Kiel, September 28, 2006

Raytheon Anschütz GmbH
Head of Quality Management


Martin Wloka

Quality Management


Robert Zissen

EG-BPB/GL-47779-03Lux

KE0046E_060928.doc

Seite 1 von 2

**Operator manual
110-233
STD22 Compact and STD22**

Raytheon

Raytheon Anschütz GmbH
Postfach 11 66
D - 24100 Kiel
Germany
Tel: +49-431-30 19-0
Fax: +49-431-30 19-291
Email: info@raykiel.com
www.raytheon-anschuetz.de

Manufacturer's Declaration of Conformity

Article 10 – EC-Directive 96/98/EC.
As amended by Directive 2001/53/EC , 2002/75/EC.

Anschütz Gyro Compass Standard 22

Listing of the system components:

Gyro Compass	110-233
Gyrosphere	111-006
Optional equipment:	
Operator unit	130-613
Distribution unit	138-118
Additional output box	146-103 NG001
AC DC Converter	121-062
Distribution unit compact	138-126
Serial 360° Synchro Converter	132-628
Repeater compass	133-560
Nav Data Repeater compass	133-812
Multi Display	AN 300
Change-over box	138-119
Change-over switch	124-187

Additional configurations:

The master compass STANDARD 22 type 110-233 with Gyrosphere type 111-006.E001 may be also used with the system configurations and equipment listed in EC-type approval certificate No. 6297/0032/00 (STANDARD 20) from Bundesamt für Seeschifffahrt und Hydrographie (BSH) Germany, and listed in EC-type approval certificate No. 17063-00 GL Lux (GYROSTAR II) from GL Luxembourg.

**Operator manual
110-233
STD22 Compact and STD22**



Compass
STD 22

Raytheon

Raytheon Anschütz GmbH
Postfach 11 66
D - 24100 Kiel
Germany
Tel +49-431-30 19-0
Fax +49-431-30 19-291
Email info@raykiel.com
www.raytheon-anschuetz.de

Manufacturer's Declaration of Conformity

Article 10 – EC-Directive 96/98/EC.
As amended by Directive 2001/53/EC , 2002/75/EC.

This is to certify that the product identified below has been manufactured in accordance with type approved units and has been successfully tested according to the Quality Assurance Module D.

Product Designation: **Gyro Compass System with Rate-of-Turn
Functionality**

Type: **Anschütz Gyro Compass Standard 22**
(System components see attached)

Type Examination by: GL Luxembourg
26, place de la Gare
L-1616 Luxembourg
Notified Body No. 0801

Type Examination Certificate No.: 32 981 – 06 Lux

Assessment of the Production
Quality Assurance by: GL Luxembourg
Notified Body No. 0801

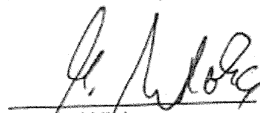
Certificate No.: 33 158 - 06 Lux

Applied Standards and
Directives: Directive 96/98EC / Additional Directive 2001/53/EC
Additional Directive 2002/75/EC
EN 61162-1, EN 60945, IEC 60945, IEC 61162-1
IMO Resolution A.526 (13)

This declaration has been made in the name of the manufacturer by:

Kiel, 29.06.2006

Raytheon Anschütz GmbH
Head of Quality Management


Martin Wibka

Quality Management


Robert Zissen

EG-BPB/GL-32981-06Lux / 33158-06Lux

KE0043E_060629.doc

Seite 1 von 2

**Operator manual
110-233
STD22 Compact and STD22**

Raytheon

Raytheon Anschütz GmbH
Postfach 11 66
D - 24100 Kiel
Germany
Tel: +49-431-30 19-0
Fax: +49-431-30 19-291
Email: info@raykiel.com
www.raytheon-anschuetz.de

Manufacturer's Declaration of Conformity

Article 10 – EC-Directive 96/98/EC.
As amended by Directive 2001/53/EC , 2002/75/EC.

Anschütz Gyro Compass Standard 22 with Rate-of-Turn Functionality

Listing of the system components:

Gyro Compass	110-233
Gyrosphere	111-006
Operator unit	130-613
Distribution unit	138-118
Rate-of-Turn Indicators ¹ :	KL PQ-96WP-D3v96S- KL PQ-144WP-D3v144S- BCI-240-96-D3v96S- BCI-240-144-D3v144S-

¹ Optional

Additional Rate-of-Turn Indicators:

The instruments listed in the certificate no. 6298/0035/02 of the Federal Maritime and Hydrographic Agency of the Federal Republic of Germany and listed in the certificate no. MED0350337 of Lloyd's Register may be used.



1 General

This compass is designed for use as a navigation aid on board ships.

As a sensor, and unaffected by the magnetic earth field, it determines the north bearing, and thus enables a course to be steered in relation to true north.

This compass provides course information and status signals to those responsible for course setting.

In principle we can distinguish between two different applications for the compass:


The **STD22 Compact Compass** as a stand-alone system

and

The **STD 22 Compass** used in conjunction with other system components such as a magnetic compass, GPS or other STD 22 gyro compasses. An Operator Unit and a Distribution Unit are required to connect and to operate these system components.

The overview on the next page illustrates the functional differences between these two versions.

**Operator manual
110-233
STD22 Compact and STD22**

STD 22 Compact as a stand-alone system	STD 22 with other system components (Distribution Unit and Operator Unit)
<p>Inputs:</p> <ul style="list-style-type: none"> - GPS positioning data - Speed data from the GPS - Speed from the Pulse Log - Direction of speed from the Pulse Log - NMEA - 24V d.c. voltage supply 	<p>Inputs (via the Distribution Unit only through a "CAN bus" data bus system):</p> <ul style="list-style-type: none"> - GPS positioning data - Speed data from the GPS - Speed from the Pulse Log - Leading sign for the speed from the Pulse Log - NMEA - 24V d.c. voltage supply - DV-bus (no inputs for speed/position at the Distribution Unit) <p><u>Optional feature:</u></p> <ul style="list-style-type: none"> - Magnetic sonde can be connected
<p>Outputs:</p> <ul style="list-style-type: none"> - 2 x Heading (course bus or NMEA) designated CHn 1 and CHn 2 - 1 x Heading (course bus) - Status signals SEC (<u>s</u>peed <u>e</u>rro<u>r</u> <u>c</u>orrec<u>t</u>ion) System Available <p><u>Optional feature</u> Additional Output Box 146-103</p> <p>Input:</p> <ul style="list-style-type: none"> - 1 x Heading (course bus) <p>Outputs:</p> <ul style="list-style-type: none"> SSC-Interface Step (6 steps/degree) NMEA 0183 superfast 50Hz 	<p>Outputs (at STD 22 compass):</p> <ul style="list-style-type: none"> - 2 x Heading (course bus or NMEA) - 1 x Heading (course bus) - Status signals SEC (<u>s</u>peed <u>e</u>rro<u>r</u> <u>c</u>orrec<u>t</u>ion) System Available <p> Heading (Course bus or NMEA) without SEC</p> <p>Outputs (to the Distribution Unit):</p> <ul style="list-style-type: none"> - 1x RS232 for courseprinter - 1x rate of turn - 3 x Step (6 steps/degree) - 8 x Heading (course bus or NMEA) 12x for version E10 - DV-bus - Status signals
<p>Functions:</p> <ul style="list-style-type: none"> - Integral Speed Error Correction (SEC) <p><u>Optional feature</u></p> <ul style="list-style-type: none"> - Quick Settling with the Operator Unit for Quick Settling 	<p>Functions: (Compass STD 22)</p> <ul style="list-style-type: none"> - Integral Speed Error Correction (SEC) - Quick Settling via the operator unit

1.1 STD 22 Compact Gyro Compass

The position and speed (GPS and Pulse Log) are supplied to the compass as input data. Both types of data are required for the automatic Speed Error Correction function. To activate this function the QS Operator Unit can be connected to the gyro compass as an option.

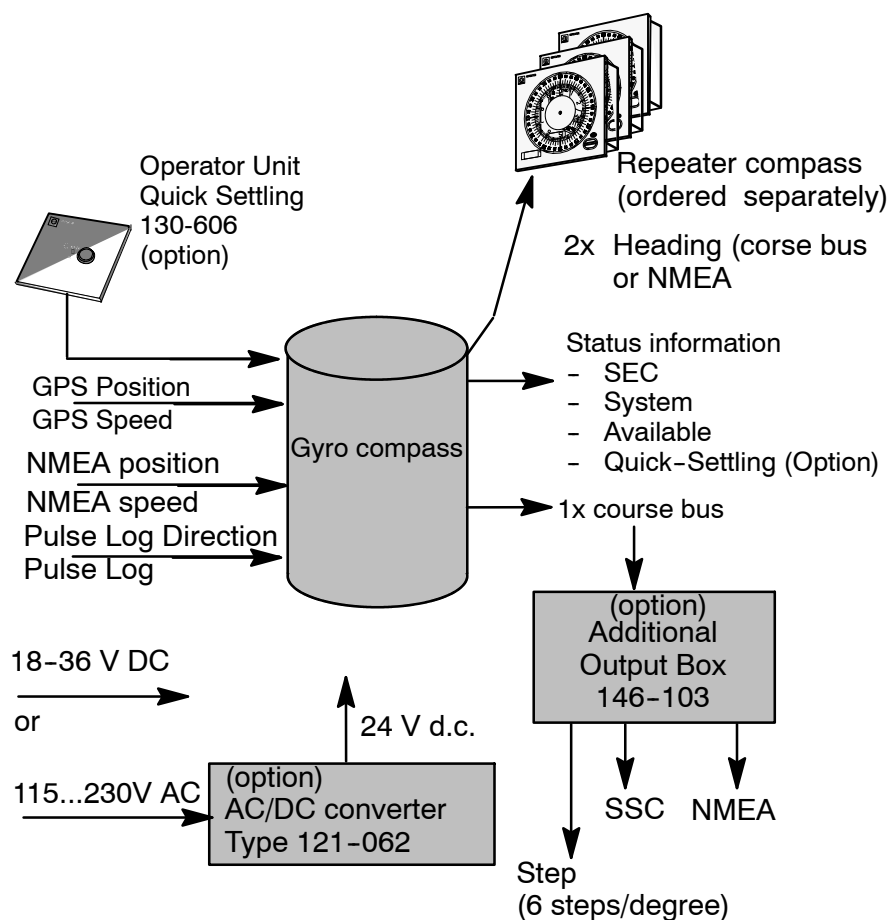


Figure 1 : STD 22 Compact Gyro Compass for small ship navigation

Speed Error Correction (SEC)

This function automatically corrects the latitude error of the gyrosphere error in the gyro compass. The gyro compass receives the data required to make the correction, such as the speed and latitude, from GPS receivers, NMEA 0183 resp. from the Pulse Log.

Operator manual
110-233
STD22 Compact and STD22

Quick Settling operator unit (Option)

This function can be used to reduce the time between switching on the compass and indicating (outputting) a valid course value to one hour (with a precision of $\pm 3^\circ$).

In the STD 22 Compact this function is activated from the

QS Operator Unit (130-606 NG001); in the STD22 this function is activated from the Operator Unit (130-613).

The **Compact** STD 22 gyro compass consists of

- the 110-233NG001 gyro compass
- the 111-006 gyrosphere

Optional features:

- QS Operator Unit, 130 - 606
- AC/DC converter, 121-062
- Additional Output Box, 146-103

The Speed Error Correction function is available only when a GPS or Pulse Log is connected.

The output interfaces on the STD 22 Compact are as follows:

- Course (corrected - SEC) as NMEA or course bus
- Status signals (alarms, error messages, warnings)

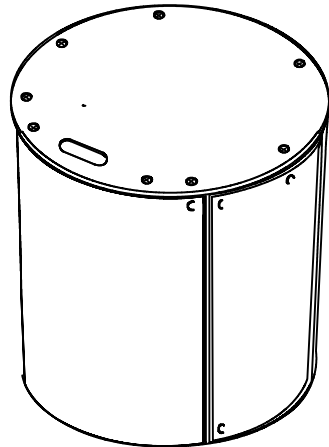
Optional via the Additional Output Box box:

- NMEA 0183 superfast (50Hz)
- Step (6steps/degree)
- SSC

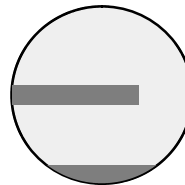
The input interfaces on the STD 22 Compact are as follows:

- NMEA Position
 - NMEA Speed
 - Pulse Log Direction
 - Pulse Log
- } Status signals or pulses

1.1.1 STD 22 Compact Gyro Compass - Scope of Supply



Gyro compass with outer sphere,
distilled water and
supporting liquid



Gyrosphere
packed separately

- Tool and spare parts pack
- User and service manual

Figure 2 : STD 22 Compact Gyro Compass - Scope of Supply

1.1.2 STD 22 Compact Gyro Compass optional features

1.1.2.1 Quick Settling operator unit

The “Quick Settling” function reduces the time the compass requires to settle to approximately one hour.

The most recent heading is stored when the gyro compass is switched off. When it is switched on the compass uses that value to make a default setting so that the settling time is reduced.



The Quick Settling function can only be used if the ship's heading has not been changed between switching off and switching on again and the compass has been switched off for a duration of min. 1 hour. Furthermore this Quick Settling function cannot be used after first installation.

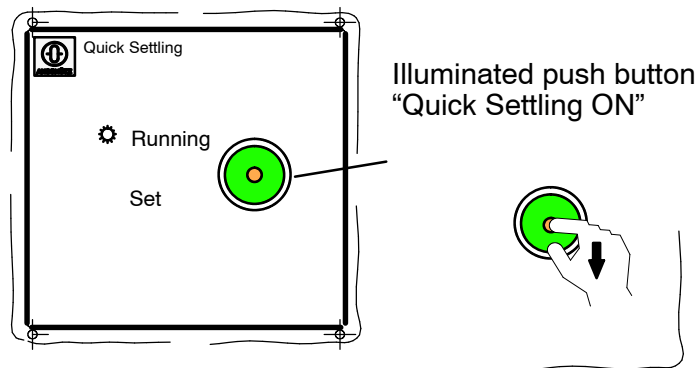


Figure 3 : Controls and indicators on the Quick Settling Control Unit

The “Quick Settling ON” button → activates this function.

→ Flashes if it is possible to activate this function.

It flashes for maximum 3 minutes.

→ Illuminates if the Quick Settling function is active.

Installation and assembly instructions are in the Service section of this manual.

1.1.2.2 AC/DC converter, 121-062

The AC/DC converter is supplied with 115 to 230 V a.c. on the input side, and delivers 24 V d.c. as output voltage with a maximum output power of 240 W.



Figure 4 : AC/DC Converter 121-062

1.1.2.3 Additional Output Box 146-103

(not illustrated)

This connection box is used to convert the serial course bus into a Fast NMEA data format.

The connection box is connected to the 24 V d.c. power supply.

1.2 STD 22 Gyro Compass

In this application the gyro compass is operated on a bus system (CAN bus). With this application there are more extended options for connecting external equipment, and considerably more course receivers can be operated.

This application needs to be equipped with a minimum of a type 130-613 Operator Unit and a type 138-118 Distribution Unit.

A magnetic sonde can be connected directly to the Distribution Unit.

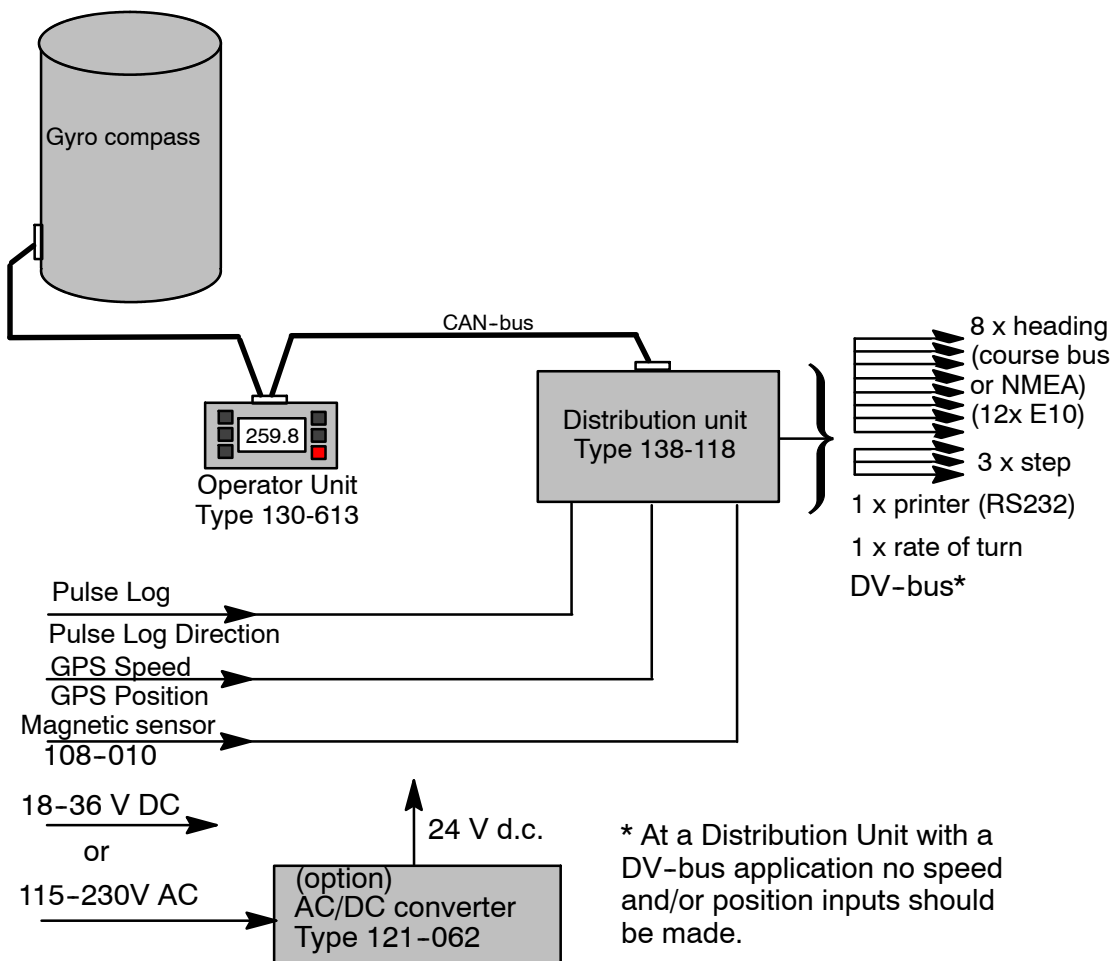


Figure 5 : STD 22 gyro compass



The STD 22 gyro compass consists of

- the 110-233NG001 gyro compass
- Operator Unit, 130-613
- Distribution Unit, 138-118

Optional features:

- AC/DC converter, 121-062

The output interfaces on the STD 22 are as follows:

- Course (corrected - SEC) as NMEA or course bus
- Data bus (CAN-Bus)
- Status signals (alarms, error messages, warnings)
- Step (6steps/degree)
- RS 232 for courseprinter connection
- Rate of turn
- DV-bus

The input interfaces on the STD 22 are as follows:

- NMEA Position
 - NMEA Speed
 - Pulse Log Direction
 - Pulse Log
- } Status signals or pulses

Optional features:

Course data from a magnetic sonde (108-010)

Voltage is supplied to the gyro compass via the Distribution Unit or is directly connected to the compass itself.

There are separate manuals for the Operator Unit and for the Distribution Unit.

The Quick Settling function is activated via the Operator Unit.

The Speed Error Correction function is available only when a GPS or Pulse Log is connected. The relevant data must be supplied via the Distribution Unit.

1.2.1 STD 22 Gyro Compass - Scope of Supply

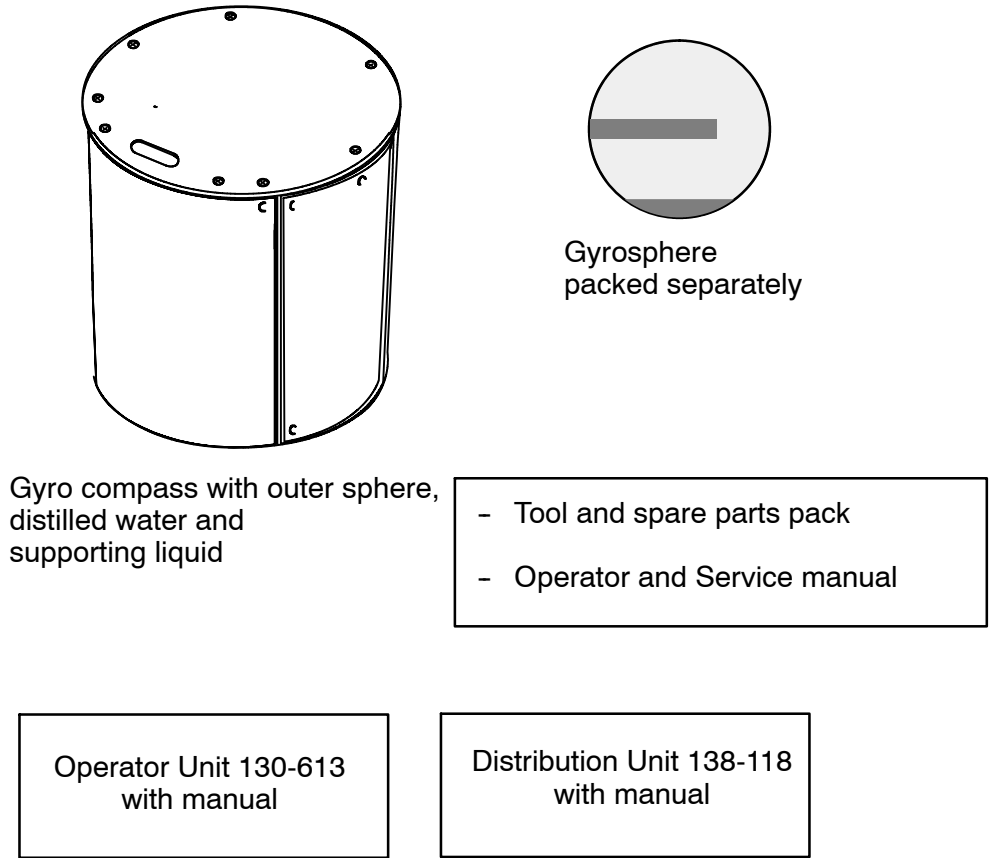


Figure 6 : STD 22 Gyro Compass - Scope of Supply

1.2.2 Optional features for the STD 22 Gyro Compass

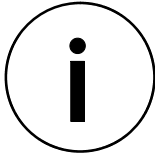
1.2.2.1 AC/DC converter, 121-062

The AC/DC converter is supplied with 115 to 230 V a.c. on the input side, and delivers 24 V d.c. as output voltage with a maximum output power of 240 W.



Figure 7 : AC/DC Converter 121-062

1.3 Technical data



The technical data stated here apply equally to the STD 22 Compact Gyro Compass and the STD 22 Gyro Compass

1.3.1 Mechanical data

Gyro compass

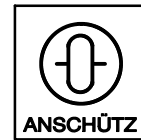
Height: approx. 429 mm
Diameter: approx. 414 mm
Weight approx. 16 kg
Type of enclosure: IP23

(see also dimensional drawing 110 D 233 HP005)

1.3.2 Electrical data

Gyro compass

Supply voltage: 18-36 V d.c.
Current consumption: maximum approx. 5A (heating stage)



1.3.3 General Technical Data

“Quick Settling” function

Reduces the settling in phase to approximately 1 hour.

Quick Settling should only be used when the heading of the vessel has not been changed during the period between switching off the compass and switching it back on and if the compass has been switched off for a duration of min. 1 hour before.

Speed Error Correction

Automatic correction of a course, related to speed and degree of latitude
(see also section 2.2)

Pulse log input (200 Pulses/Nm)

Pulse log - Direction - input (+) → “Speed ahead”

(-) → “Speed astern”

or “reverse speed” status

GPS input (NMEA 0183)

Log input (NMEA 0183)

Indicator precision

4 digit digital display

Resolution 0.1°.

Heading accuracy

Settle point error: $\pm 0.1^\circ \times \text{secLAT.}, \text{RMS}$

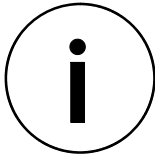
Static error: $\pm 0.1^\circ \times \text{secLAT.}, \text{RMS}$

Dynamic error $\pm 0.4^\circ \times \text{secLAT.}, \text{RMS}$

(periodic roll and pitch + horizontal acceleration)

$\text{secLat.} = 1/\cos\text{Latitude}$

Controls and Indicators on the Gyro Compass



The user information stated here applies equally to the STD 22 Compact Gyro Compass and the STD 22 Gyro Compass.

Viewed from above (see Figure 8)

- Digital indication of the following:
 - Compass course
 - Operating status
 - Warnings
 - Error messages

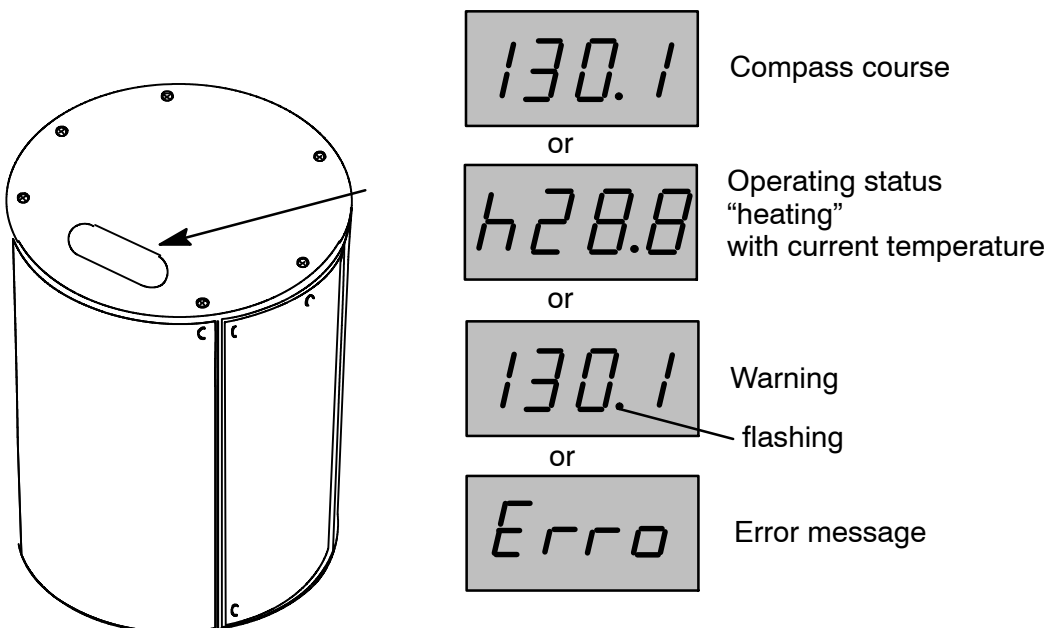
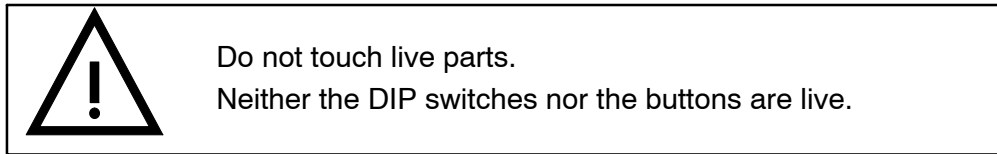


Figure 8 : The indicators on the gyro compass with examples of the type of indication

After removing the cover:



A DIP switch (B37) and two push-buttons (B38 and B39) are used to adjust the settings as follows:

- Course and correction data
- Settings for functional checks
- System settings such as data formats or transmission speeds.

Only authorised personnel are authorised to change system settings!!

Please observe the relevant instructions in the service manual.

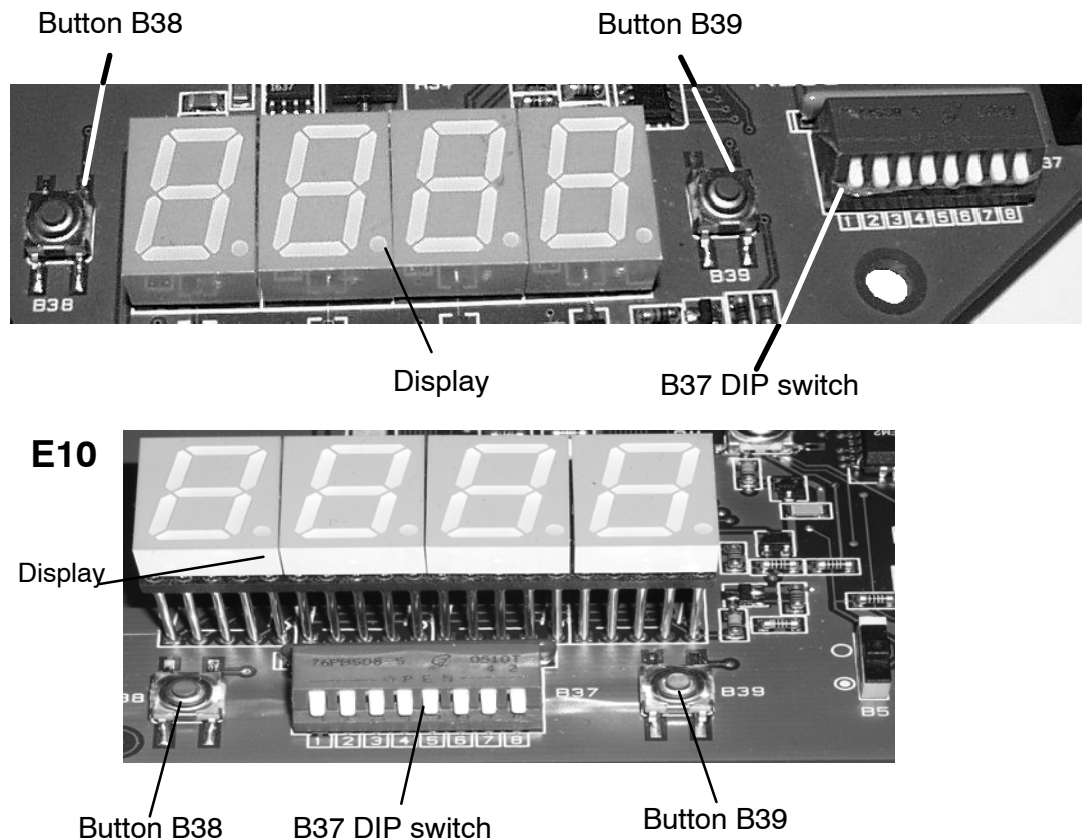


Figure 9 : Operating elements on the compass (after removing the cover)

2.1 Switching on the STD 22 Compass

The compass goes into operation when the power supply is switched on from the ship's mains.

The compass goes into the heating stage for the first 30 minutes (this period will vary depending on the temperature of the supporting liquid) and the letter "h" is displayed as the leading sign on the digital display. The follow-up system is switched off - no course can be output.

When the temperature of the supporting liquid reaches 45 °C the follow-up system switches on automatically, and the course is displayed on the compass; **however deviation from actual course may still be considerable.**

This settling in phase (indicated by an additional dot on the digital display) ends 4 hours after switching on. Accuracy is now $< 2^\circ$

After about five hours (from switching on) the compass shows an accurate heading (see Technical Data, section 1.3.3).

The "Quick Settling" option reduces the settling in phase to one hour. With it, precision (after one hour) is better than $\pm 3^\circ$.

2.1.1 Indications on the compass during the heating stage

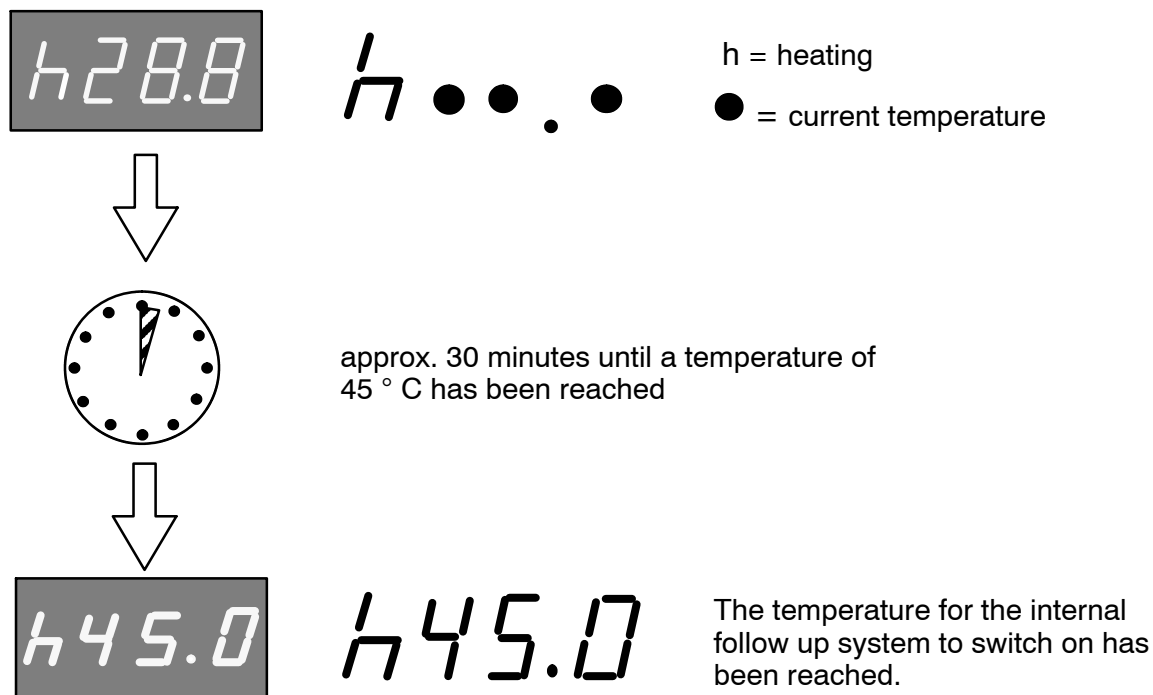
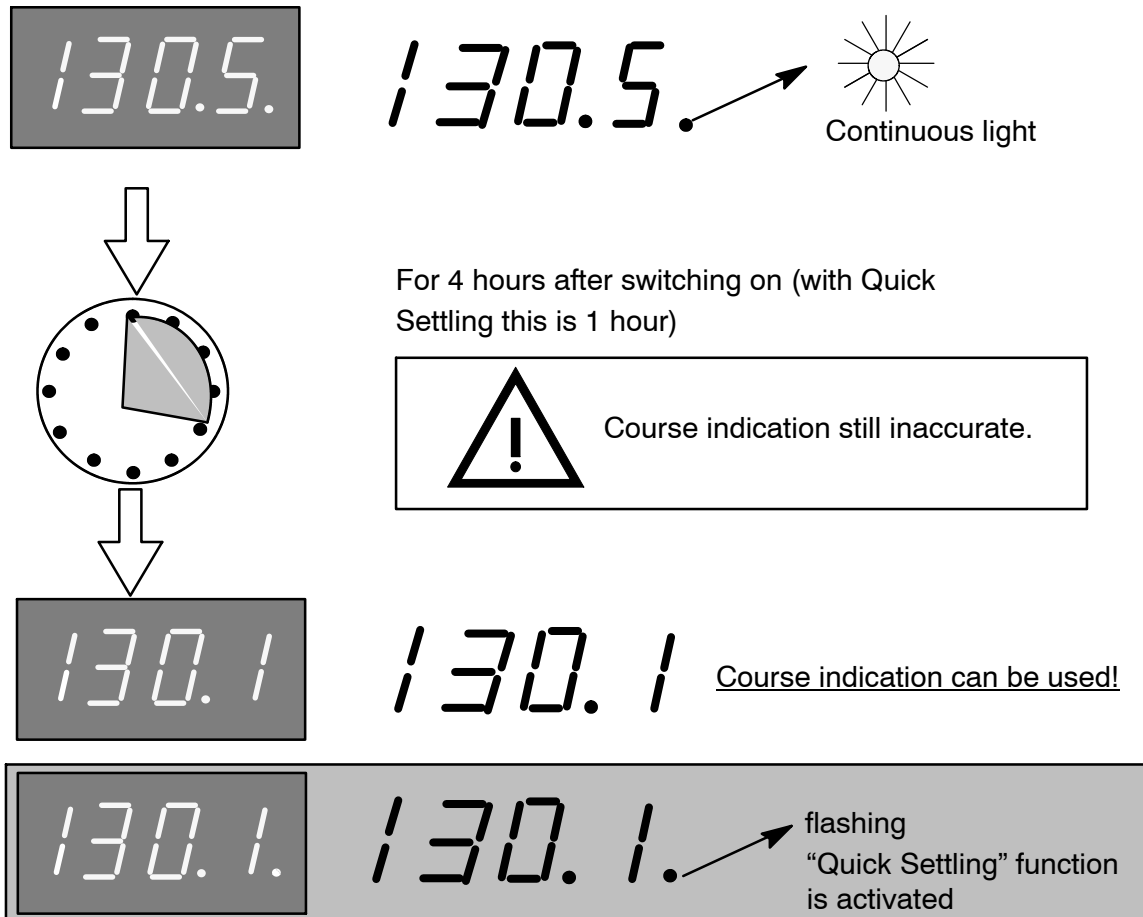


Figure 10 : Indications during the heating stage

2.1.2 Indications on the compass during the settling in stage






Note: If the Quick settling function is activated, the heading to which it will followed-up is displayed.

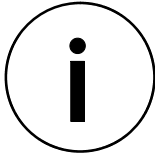
Figure 11 : Indications during the settling stage

2.1.3 Overview of indications (digital display) during operation

Once the compass is switched on the digital display indicates as follows:

Indications	Comments, Information
<p>① Heating stage</p>	
<p>Example</p> 	<p>The temperature of the supporting liquid is displayed during the heating stage. Example: h 28.8 = 28.8 °C heating stage</p>
<p>② Settling stage</p>	
<p>Example</p> 	<p>The gyro compass is settling in.</p> <ul style="list-style-type: none"> - The course is indicated with an illuminated dot after the last figure during the settling stage (approx. 4 hours) <p>The course value is still not accurate!</p>
<p>③ Course indication</p>	
<p>Example</p> 	<p>Once the settling process has ended: Course accuracy:</p> <ul style="list-style-type: none"> - 4 hours after switching on is better than 2° or - with Quick-Settling 1 hour after switching on is better than 3° - Approximately 5 hours after switching on 0.4° dynamic, 0.1° static

2.2 Heading correction



The information given here, in particular with regard to Speed Error Correction, applies in general to the STD 22 Compact compass and the STD 22 compass. Where there is an exception, your attention is drawn to this.

The heading has to be corrected::

- a correction depending on the alignment error
- a correction depending on a speed error

2.2.1 Alignment error

The **alignment error** (A-error) occurs if the compass was not correctly aligned when it was installed, i.e. when the compass zero line does not agree with the ship's-line pre-alignment. An alignment error can be corrected at max. 5 h after switching on and/or max. 5 h when the ship is moored by making readjustments (see also service manual).

To try to perform a readjustment within this 5 hours, will lead to a displayed message "AL.no" after pressing the button B38 or B39 (it means: actually no readjustment possible).

2.2.1.1 Procedure for setting the compass zero (A-error)

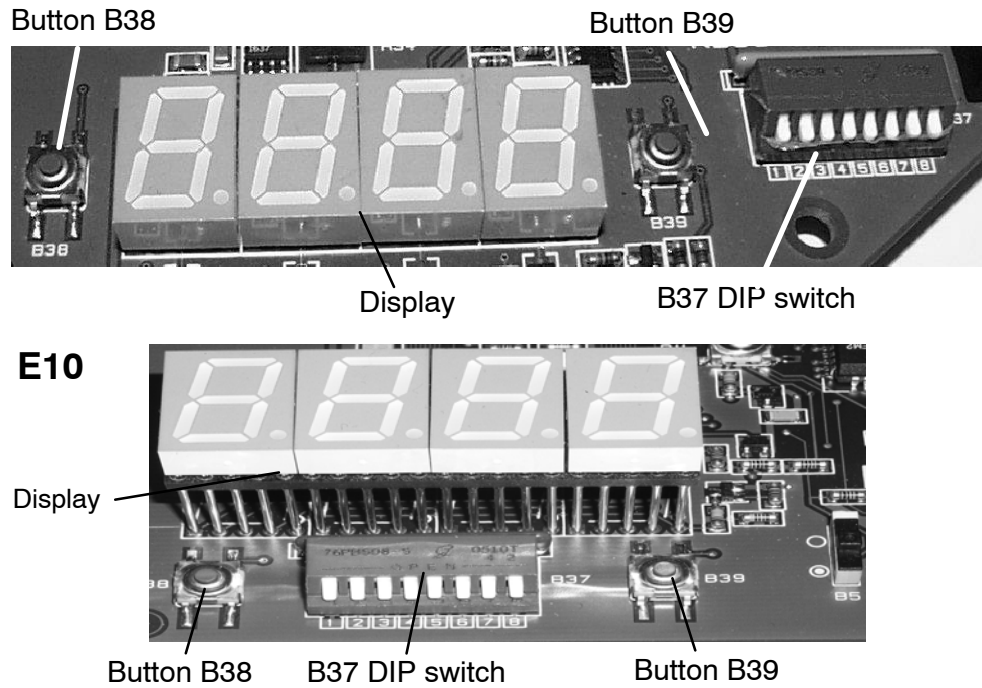


Figure 12 : Arrangement of operating elements inside the compass

- 1.) Remove the cover of the compass (unfasten the 5 cross-slotted screws)
- 2.) Move switch B37 (DIP switch), contact (1) to the "OPEN" position.
- 3.) The digital indicator is now indicating "ALer" = Alignment Error
- 4.) Press button B38 or B39 until the heading you require displays.

As you do so the course value changes (B38 changes the value downwards and B39 changes it upwards).

If you hold down the button the speed at which it changes will increase.

NOTE: If the message "AL.no" is displayed, then the a. m. restriction of 5 hours is not over.

- 5.) Move switch B37 (DIP switch), contact (1) back to the "OFF" position.

**Operator manual
110-233
STD22 Compact and STD22**

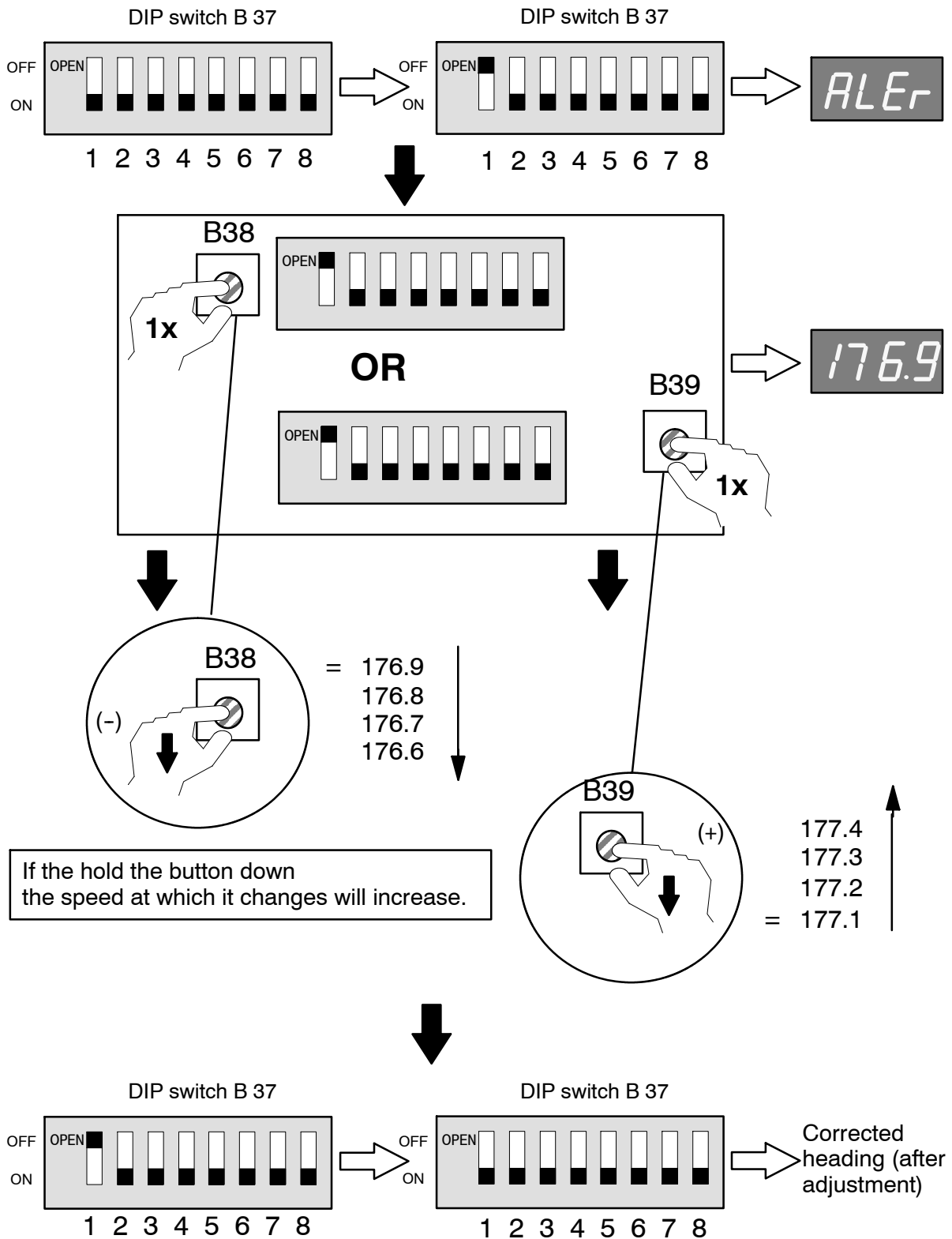
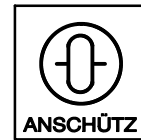


Figure 13: Procedure for setting compass zero



2.2.2

Speed error

A speed error occurs while the ship is travelling. This becomes greater as the speed increases and is more pronounced on northerly and southerly courses than on easterly and westerly courses.

Speed error is a physical deviation from the steering course indicated on the gyro compass (compass course) from the true course (chart course). It depends on the speed of the ship, the course it is steering and the latitude.

The speed error is typically within the range of 0° - 2° , and with fast ships, it can even reach 5° or more.

With automatic speed error correction the compass course is continually corrected using the values shown in the speed error table (see section 2.2.2.1). The digital display on the compass and the connected repeater displays will always indicate the true (corrected) course.

For automatic speed error correction the ship's speed and the latitude are read into the gyro compass.

The speed error correction function on the STD22 Compact Gyro Compass

Only the automatic speed error correction function applies; in order for it to operate GPS or Pulse Log and GPS data (speed and degree of latitude) must be supplied to the compass.

CAUTION: If the speed and latitude are not available for automatic speed error correction (Pulse Log or GPS failure), no automatic correction can take place. The gyro compass will be showing the uncorrected value.

The speed error correction function on the STD22 Gyro Compass

In this version, besides the automatic speed error correction function (with GPS and Pulse Log data) the speed error correction function can also be carried out (with manual speed and latitude values input) manually. The speed error can be corrected manually on the Operator unit by entering the speed and latitude manually (see also Manual no. 3648 "Operator Unit 130-613")

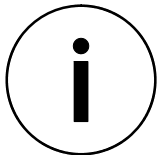
Add the correction value taken from the table to the uncorrected course (making sure you note the leading sign).

**Operator manual
110-233
STD22 Compact and STD22**

Example of course calculation	1	2
Compass course	345°	223.7°
Latitude	55°	55°
Speed	16 Kts	16 Kts
Correction value from table	- 1.7°	+ 1.3°
True course	$345^\circ - 1.7^\circ = \underline{343.3^\circ}$	$223.7^\circ + 1.3^\circ = \underline{225^\circ}$

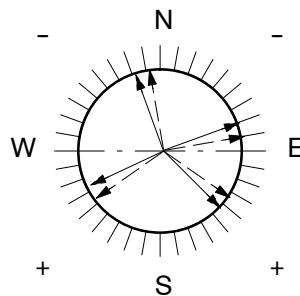
Example of a bearing:

Compass course 255°
 Latitude: 55°
 Speed: 16 Kts
 Direction of bearing: 135°
 Correction value as per table: +0.5°
 True bearing: $135^\circ + 0.5^\circ = \underline{135.5^\circ}$



The following statement applies:
 The TRUE COURSE is always to the west of the compass course.

---> Compass course
 —> true course





2.2.2.1 Speed error table

Latitude in °	north		south		Speed in Kts											
	Courses in ° sign for correction value				4	8	12	16	20	24	28	32	36	40	44	
	-		+													
0 to 20	0	360	180	180	0.3	0.5	0.8	1.0	1.3	1.5	1.8	2.1	2.4	2.6	2.9	
	15	345	165	195	0.3	0.5	0.8	1.0	1.3	1.4	1.7	2.0	2.3	2.5	2.8	
	30	330	150	210	0.2	0.4	0.6	0.9	1.1	1.3	1.5	1.8	2.0	2.3	2.5	
	45	315	135	225	0.2	0.4	0.5	0.7	0.9	1.1	1.3	1.5	1.7	1.9	2.1	
	60	300	120	240	0.1	0.3	0.4	0.5	0.7	0.8	0.9	1.1	1.2	1.3	1.4	
	75	285	105	255	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.6	0.7	0.8	
90	270	90	270	0	0	0	0	0	0	0	0	0	0	0		
30	0	360	180	180	0.3	0.6	0.9	1.2	1.5	1.7	2.0	2.3	2.6	2.9	3.2	
	15	345	165	195	0.3	0.6	0.9	1.1	1.4	1.6	1.9	2.3	2.6	2.8	3.1	
	30	330	150	210	0.2	0.5	0.7	1.0	1.2	1.5	1.7	2.0	2.3	2.5	2.8	
	45	315	135	225	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.7	1.9	2.1	2.3	
	60	300	120	240	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.3	1.5	1.6	
	75	285	105	255	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6	0.7	0.8	0.8	
90	270	90	270	0	0	0	0	0	0	0	0	0	0	0		
40	0	360	180	180	0.3	0.7	1.0	1.3	1.7	2.0	2.3	2.7	3.0	3.3	3.7	
	15	345	165	195	0.3	0.7	1.0	1.2	1.5	1.9	2.2	2.6	2.9	3.2	3.5	
	30	330	150	210	0.3	0.6	0.8	1.1	1.4	1.7	2.0	2.3	2.6	2.9	3.2	
	45	315	135	225	0.2	0.4	0.7	0.9	1.2	1.4	1.6	1.9	2.1	2.4	2.6	
	60	300	120	240	0.2	0.3	0.6	0.7	0.9	1.0	1.2	1.3	1.5	1.7	1.8	
	75	285	105	255	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0.9	
90	270	90	270	0	0	0	0	0	0	0	0	0	0	0		
45	0	360	180	180	0.4	0.7	1.1	1.4	1.8	2.2	2.5	2.9	3.2	3.6	4.0	
	15	345	165	195	0.3	0.7	1.0	1.4	1.7	2.1	2.4	2.8	3.1	3.5	3.8	
	30	330	150	210	0.3	0.6	0.9	1.2	1.6	1.9	2.2	2.5	2.8	3.1	3.4	
	45	315	135	225	0.3	0.5	0.8	1.0	1.2	1.5	1.8	2.0	2.3	2.5	2.8	
	60	300	120	240	0.2	0.4	0.5	0.7	0.9	1.1	1.3	1.4	1.6	1.8	2.0	
	75	285	105	255	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.7	0.8	0.9	1.0	
90	270	90	270	0	0	0	0	0	0	0	0	0	0	0		
50	0	360	180	180	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0	4.3	
	15	345	165	195	0.4	0.8	1.1	1.5	1.8	2.2	2.6	3.1	3.4	3.8	4.2	
	30	330	150	210	0.3	0.7	1.0	1.3	1.6	2.0	2.3	2.7	3.1	3.4	3.8	
	45	315	135	225	0.3	0.6	0.8	1.1	1.4	1.7	2.0	2.2	2.5	2.8	3.1	
	60	300	120	240	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	
	75	285	105	255	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	
90	270	90	270	0	0	0	0	0	0	0	0	0	0	0		

**Operator manual
110-233
STD22 Compact and STD22**

Latitude in °	north		south		Speed in Kts										
	Courses in ° sign for correction value														
	-		+		48	52	56	60	64	68	72				
0 to 20	0	360	180	180	3,1	3,4	3,7	3,9	4,2	4,4	4,9				
	15	345	165	195	3,0	3,3	3,5	3,8	4,0	4,3	4,7				
	30	330	150	210	2,7	3,0	3,2	3,4	3,6	3,8	4,2				
	45	315	135	225	2,2	2,4	2,6	2,8	3,0	3,1	4,3				
	60	300	120	240	1,6	1,7	1,8	2,0	2,1	2,2	2,4				
	75	285	105	255	0,8	0,9	1,0	1,0	1,1	1,2	1,3				
90	270	90	270	0	0	0	0	0	0	0					
30	0	360	180	180	3,5	3,8	4,1	4,4	4,7	5,5	5,3				
	15	345	165	195	3,4	3,7	4,0	4,3	4,5	4,8	5,1				
	30	330	150	210	3,0	3,3	3,6	3,8	4,1	4,3	4,6				
	45	315	135	225	2,5	2,7	2,9	3,1	3,3	3,5	3,7				
	60	300	120	240	1,8	1,9	2,1	2,2	2,3	2,5	2,6				
	75	285	105	255	0,9	1,0	1,1	1,1	1,2	1,3	1,4				
90	270	90	270	0	0	0	0	0	0	0					
40	0	360	180	180	4,0	4,3	4,6	5,0	5,3	5,6	6,0				
	15	345	165	195	3,8	4,2	4,5	4,8	5,1	5,5	5,8				
	30	330	150	210	3,5	3,7	4,0	4,3	4,6	4,9	5,2				
	45	315	135	225	2,8	3,1	3,3	3,5	3,6	4,0	4,2				
	60	300	120	240	2,0	2,2	2,3	2,5	2,7	2,8	3,0				
	75	285	105	255	1,0	1,1	1,2	1,3	1,4	1,5	1,5				
90	270	90	270	0	0	0	0	0	0	0					
45	0	360	180	180	4,3	4,7	5,0	5,4	5,8	6,1	6,5				
	15	345	165	195	4,2	4,5	4,9	5,2	5,6	5,9	6,3				
	30	330	150	210	3,8	4,0	4,4	4,7	5,0	5,3	5,6				
	45	315	135	225	3,1	3,3	3,6	3,8	4,1	4,3	4,6				
	60	300	120	240	2,2	2,3	2,5	2,7	2,9	3,1	3,2				
	75	285	105	255	1,1	1,2	1,3	1,4	1,5	1,6	1,7				
90	270	90	270	0	0	0	0	0	0	0					
50	0	360	180	180	4,8	5,1	5,5	5,9	6,3	6,7	7,1				
	15	345	165	195	4,6	5,0	5,4	5,7	6,1	6,5	6,9				
	30	330	150	210	4,1	4,5	4,8	5,1	5,5	5,8	6,2				
	45	315	135	225	3,4	3,6	3,9	4,2	4,5	4,8	5,0				
	60	300	120	240	2,4	2,6	2,8	3,0	3,2	3,4	3,6				
	75	285	105	255	1,2	1,3	1,4	1,5	1,6	1,7	1,8				
90	270	90	270	0	0	0	0	0	0	0					

**Operator manual
110-233
STD22 Compact and STD22**



Compass
STD 22

Latitude in °	north		south		Speed in Kts											
	Courses in ° sign for correction value				4	8	12	16	20	24	28	32	36	40	44	
	-		+													
55	0	360	180	180	0.4	0.9	1.3	1.8	2.2	2.7	3.1	3.6	4.0	4.4	4.9	
	15	345	165	195	0.4	0.9	1.3	1.7	2.1	2.6	3.0	3.4	3.9	4.3	4.7	
	30	330	150	210	0.4	0.8	1.1	1.5	1.9	2.3	2.7	3.1	3.5	3.8	4.2	
	45	315	135	225	0.3	0.6	0.9	1.3	1.6	1.9	2.2	2.5	2.8	3.1	3.5	
	60	300	120	240	0.2	0.4	0.7	0.9	1.1	1.3	1.6	1.8	2.0	2.2	2.4	
	75	285	105	255	0.1	0.2	0.3	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.3	
	90	270	90	270	0	0	0	0	0	0	0	0	0	0	0	
60	0	360	180	180	0.5	1.0	1.5	2.0	2.5	3.1	3.6	4.1	4.6	5.1	5.6	
	15	345	165	195	0.5	0.9	1.4	1.9	2.4	2.9	3.4	3.9	4.4	4.9	5.4	
	30	330	150	210	0.4	0.8	1.3	1.7	2.1	2.6	3.1	3.5	4.0	4.4	4.9	
	45	315	135	225	0.4	0.7	1.1	1.4	1.8	2.2	2.5	2.9	3.2	3.6	4.0	
	60	300	120	240	0.3	0.5	0.8	1.0	1.3	1.5	1.8	2.0	2.3	2.5	2.8	
	75	285	105	255	0.2	0.3	0.4	0.6	0.7	0.8	0.9	1.1	1.2	1.3	1.5	
	90	270	90	270	0	0	0	0	0	0	0	0	0	0	0	
65	0	360	180	180	0.6	1.2	1.8	2.4	3.0	3.6	4.2	4.8	5.4	6.0	6.7	
	15	345	165	195	0.6	1.2	1.7	2.3	2.9	3.5	4.1	4.7	5.2	5.8	6.4	
	30	330	150	210	0.5	1.0	1.6	2.1	2.6	3.1	3.6	4.2	4.7	5.2	5.7	
	45	315	135	225	0.4	0.9	1.3	1.7	2.1	2.6	3.0	3.4	3.8	4.3	4.7	
	60	300	120	240	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0	3.3	
	75	285	105	255	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	1.6	1.7	
	90	270	90	270	0	0	0	0	0	0	0	0	0	0	0	
70	0	360	180	180	0.7	1.5	2.2	3.0	3.7	4.5	5.2	6.0	6.7	7.5	8.2	
	15	345	165	195	0.7	1.4	2.2	2.9	3.6	4.3	5.0	5.8	6.5	7.2	7.9	
	30	330	150	210	0.6	1.3	2.0	2.6	3.2	3.9	4.5	5.2	5.8	6.5	7.1	
	45	315	135	225	0.5	1.1	1.6	2.1	2.6	3.2	3.7	4.2	4.7	5.3	5.8	
	60	300	120	240	0.4	0.7	1.1	1.5	1.9	2.2	2.6	3.0	3.4	3.7	4.1	
	75	285	105	255	0.2	0.4	0.6	0.8	0.9	1.2	1.4	1.5	1.7	1.9	2.1	
	90	270	90	270	0	0	0	0	0	0	0	0	0	0	0	
75	0	360	180	180	1.0	2.0	3.0	3.9	4.9	5.9	6.9	7.9	8.9	9.9	10.9	
	15	345	165	195	0.9	1.9	2.9	3.8	4.8	5.7	6.7	7.6	8.6	9.5	10.5	
	30	330	150	210	0.8	1.7	2.6	3.4	4.3	5.1	6.0	6.8	7.7	8.6	9.4	
	45	315	135	225	0.7	1.4	2.1	2.8	3.5	4.2	4.9	5.6	6.3	7.0	7.7	
	60	300	120	240	0.5	1.0	1.5	2.0	2.5	3.0	3.4	3.9	4.4	4.9	5.4	
	75	285	105	255	0.3	0.5	0.8	1.0	1.3	1.5	1.8	2.0	2.3	2.5	2.8	
	90	270	90	270	0	0	0	0	0	0	0	0	0	0	0	

**Operator manual
110-233
STD22 Compact and STD22**

Latitude in °	north		south		Speed in Kts										
	Courses in ° sign for correction value														
	-		+		48	52	56	60	64	68	72				
55	0	360	180	180	5,3	5,8	6,2	6,7	7,1	7,5	8,0				
	15	345	165	195	5,1	5,6	6,0	6,4	6,9	7,3	7,7				
	30	330	150	210	4,6	5,0	5,4	5,8	6,1	6,5	6,9				
	45	315	135	225	3,8	4,1	4,4	4,7	5,0	5,3	5,6				
	60	300	120	240	2,7	2,9	3,1	3,3	3,5	3,8	4,0				
	75	285	105	255	1,4	1,5	1,6	1,7	1,8	2,0	2,1				
90	270	90	270	0	0	0	0	0	0	0					
60	0	360	180	180	6,1	6,6	7,1	7,6	8,2	8,7	9,2				
	15	345	165	195	5,9	6,4	6,9	7,4	7,9	8,4	8,9				
	30	330	150	210	5,3	5,7	6,2	6,6	7,1	7,5	7,9				
	45	315	135	225	4,3	4,7	5,0	5,4	5,8	6,1	6,5				
	60	300	120	240	3,0	3,3	3,6	3,8	4,1	4,3	4,6				
	75	285	105	255	1,6	1,7	1,8	2,0	2,1	2,2	2,4				
90	270	90	270	0	0	0	0	0	0	0					
65	0	360	180	180	7,2	7,8	8,4	9,1	9,7	10,3	10,9				
	15	345	165	195	7,0	7,6	8,2	8,7	9,3	9,9	10,5				
	30	330	150	210	6,3	6,8	7,3	7,8	8,4	8,8	9,4				
	45	315	135	225	5,1	5,5	6,0	6,4	6,8	7,2	7,7				
	60	300	120	240	3,6	3,9	4,2	4,5	4,8	5,1	5,4				
	75	285	105	255	1,9	2,0	2,2	2,3	2,5	2,6	2,8				
90	270	90	270	0	0	0	0	0	0	0					
70	0	360	180	180	8,9	9,7	10,5	11,2	12,0	12,7	13,5				
	15	345	165	195	8,6	9,4	10,1	10,8	11,6	12,3	13,0				
	30	330	150	210	7,7	8,4	9,0	9,7	10,3	11,0	11,7				
	45	315	135	225	6,3	6,8	7,4	7,9	8,4	9,0	9,5				
	60	300	120	240	4,5	4,8	5,2	5,6	6,0	6,3	6,7				
	75	285	105	255	2,3	2,5	2,7	2,9	3,1	3,3	3,5				
90	270	90	270	0	0	0	0	0	0	0					
75	0	360	180	180	11,9	12,9	13,9	14,9	15,9	16,9	17,9				
	15	345	165	195	11,4	12,4	13,4	14,4	15,3	16,3	17,3				
	30	330	150	210	10,2	11,1	12,0	12,9	13,7	14,6	15,5				
	45	315	135	225	8,4	9,1	9,8	10,5	11,2	11,9	12,6				
	60	300	120	240	5,9	6,4	6,9	7,4	7,9	8,4	8,9				
	75	285	105	255	3,1	3,3	3,6	3,8	4,1	4,3	4,6				
90	270	90	270	0	0	0	0	0	0	0					

3 Warning signals

All warnings (see also section 3.1) are indicated on the compass by means of a flashing decimal point.

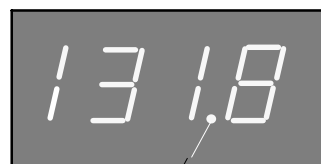
It is not necessary to acknowledge the warning on the compass.

The warning (the flashing decimal point) remains until the fault that caused the warning has been corrected.

The course indicated on the digital display unit is not affected by the warning.

EXCEPT for warning 5 "Voltage cut-off" (see section 3.1)

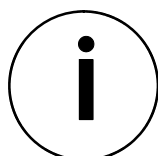
When a warning occurs the decimal point flashes on the compass's digital display unit for as long as the warning is pending.



Decimal point (flashes)
on the digital display unit



The procedures indicated here to temporarily remove the warning signal in some degree restrict the compass's operational safety (if the door is open, the system's electrical operational security, spray protection and electromagnetic compatibility are all restricted).



If warnings occur, the operation of the gyro compass is not restricted. If the cause of the problem is rectified quickly, it is possible to prevent the equipment from breaking down.

3.1 Warnings, their causes, and what to do

There are five different warnings (numbered 1 to 6, warning 6 is not used).

These warnings are displayed on the compass's digital display after the B38 or B39 buttons have been pressed once.

Warnings 1 to 3 are displayed when button B39 is pressed, and warnings 4-6 are displayed when button B38 is pressed.

If several warnings occur at the same time, all of the warnings are displayed.

The warnings are as follows:

1 = fan failure	}	Button B39
2 = heater failure		
3 = supporting liquid temperature is higher than 60°C		
4 = supporting liquid level is too low	}	Button B38
5 = after voltage cut-off		
6 = not used		

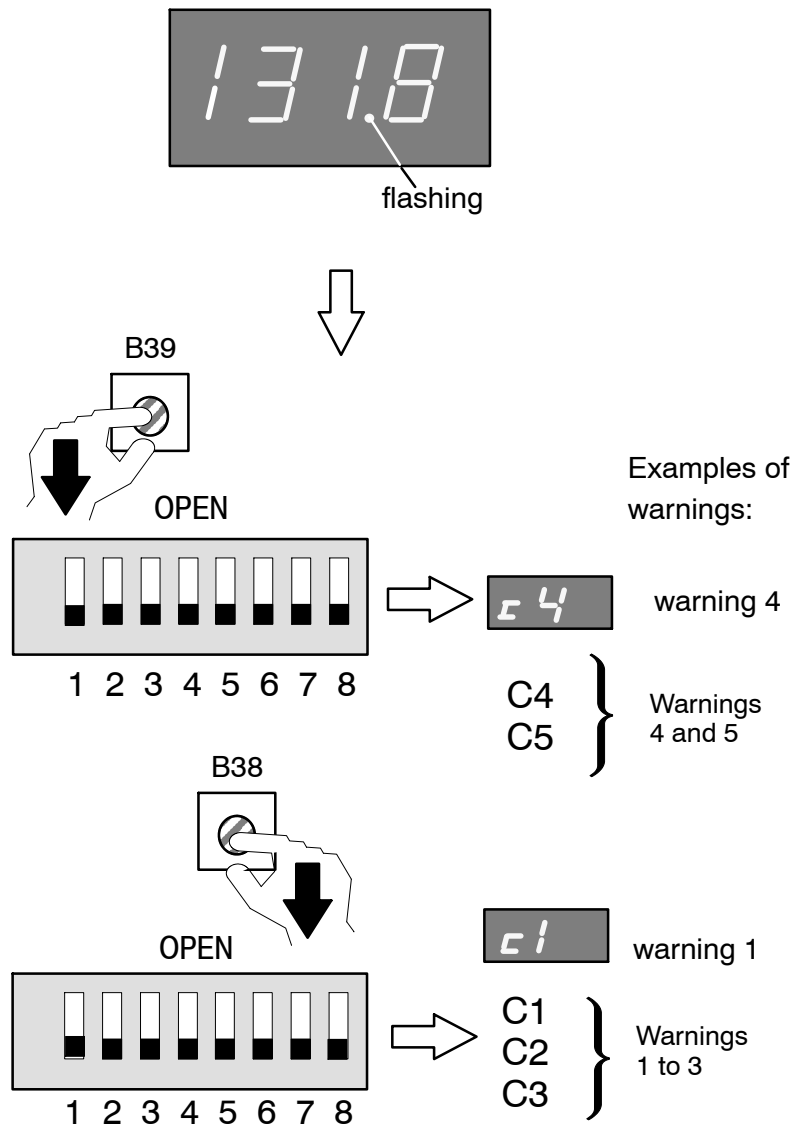


Figure 14 : How to display the warning messages

3.1.1 Warning 1 “Fan failure”

This warning is generated if the fan does not switch itself on as a result of the temperature of the supporting liquid (it should switch on when the supporting liquid reaches 51°C).

Whether the fan is operational or not is registered from the fan’s current consumption; it therefore follows that the fan is defective if this warning is displayed.

To prevent overheating due to fan failure, it is recommended that you do the following:

- Check whether the fan screen is covered and check to see that air can enter the enclosure unhindered at the base.
- If necessary cool the outer sphere using an external fan.

Continue this until warning 1 stops.

It is essential that the fan be replaced at the earliest opportunity.

NOTE: A critical situation occurs, if the ambient temperature is extremely high and warning 3 is displayed “Temperature of supporting liquid more than 60°C”. Constant high temperature may effects to the life cycle of the gyro compass. A higher temperature for a short moment has no importance.

3.1.2 Warning 2 “Heater failure”

This warning is output when the heater ($\geq 45^{\circ}\text{C}$) has failed.

Compass operation is not restricted if the temperature is more than 45°C (see also warning “fan failure”).

A temperature drop down below 45°C leads to an error message “Error” and the heading information will not longer displayed (as well as the heading information to the connected heading receivers).

To prevent the supporting liquid from cooling further, it is recommended that to do the following:

- Close the door on the compass, or
- introduce warm air.

These measures should be continued until warning 2 stops.

It is essential that the heater be repaired at the earliest opportunity.

3.1.3 Warning 3 “Supporting liquid $> 60^{\circ}\text{C}$.”

This warning is output when the temperature of the supporting liquid is higher than 60°C .

To prevent the temperature from rising further, it is recommended that you do the following:

- Open the door on the compass
- If necessary cool the outer sphere using an external fan.
- Check the ambient temperature. If the ambient temperature is higher than 60°C steps should be taken to cool it down.

These measures should be continued until warning 3 stops.

If warning 3 is displayed in combination with warning 1, the fan must be replaced at the earliest opportunity.

See also warning “fan failure

3.1.4 Warning 4 “Supporting liquid level too low”

This warning is output when the level of the supporting liquid in the outer sphere is too low. The supporting liquid is determined by an immersion probe installed in the upper part of the outer sphere.

The measure below does not compensate the planned replacement of the supporting liquid!!!

In certain circumstances (if the level of the supporting liquid falls suddenly) you must establish the cause (possibly a leak) and correct the fault.

If the level of supporting liquid is too low, the compass can be destroyed.

Immediate measure



Caution!

It is strongly recommended to perform a service within the next 6 months to check the compass.



Caution!

This immediate measure is only an exception to cancel the warning and to initiate normal operating conditions.



Caution!

Due to warning “4”, we advice to arrange a service for a routine check during the next port stay to be on safe side.

- Switch off the compass and wait approx. 15 minutes (otherwise the gyrosphere can be damaged).
- Open the door of the compass housing, paying attention to the earthing strip.
- Place both hands under 2 of the 4 snap closures and release them by pressing with the thumbs.

- Carefully turn the outer sphere through 90° and repeat the process with the other two snap closures. The outer sphere is now free and can be removed.
- Still holding the outer sphere with both hands, lower it slightly (this releases the locking device), carefully remove it from the compass enclosure and set it down.
- Open the ventilation outlet (Figure 15 /1), the supporting liquid screw (Figure 15 /3) and the distilled water screw (Figure 15 /2).
- Fill in distilled water (**only** distilled water from Raytheon Anschütz, part number 148-398, one 230cm³ bottle) into the inlet for supporting liquid until the measuring cone shows "Level O.K.", see Figure 16 .
- Fill in the remaining content of the bottle into the inlet for distilled water until the Dip-Stick shows a level according to Figure 17 .
- Close all in- and outlets, if applicable use new sealing rings.
- Place the outer sphere in the compass enclosure.



- Pay attention to the two locking pins on the closure.
- Hold the outer sphere with both hands and guide it under the snap closures on the pendulum joint.
- Using the thumbs, press down and engage the two snap closures.
- Carefully turn the outer sphere through 90° and repeat the process with the other two snap closures. The outer sphere is now fastened to the pendulum joint.
- Close the door of the enclosure and fasten it with screws, paying attention to the earthing strip.
- When the power supply is switched on, the compass is ready for use again.
Run the heating and settling in stages as described in section 2.1.

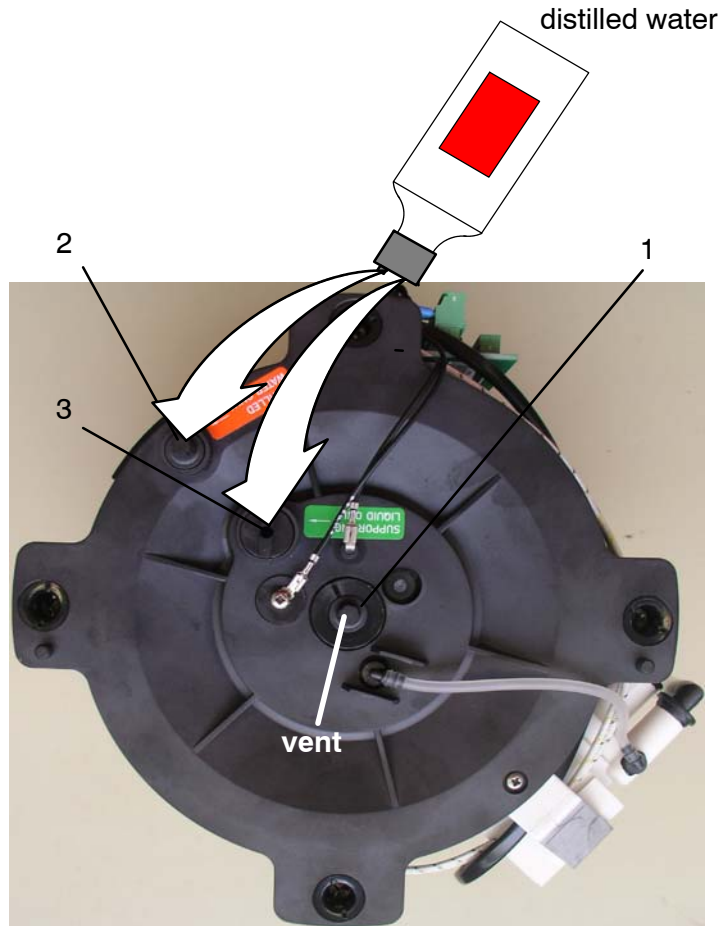


Figure 15 : Immediate measure to fill up with distilled water

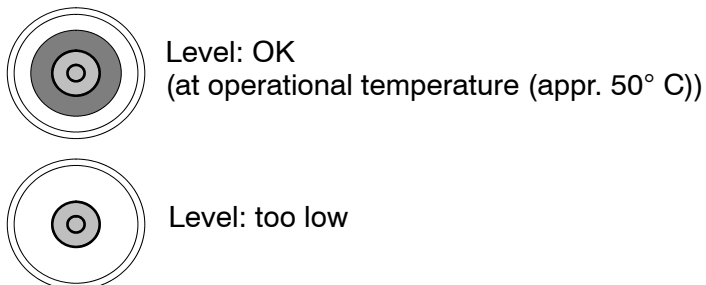


Figure 16 : Measuring cone (top view)

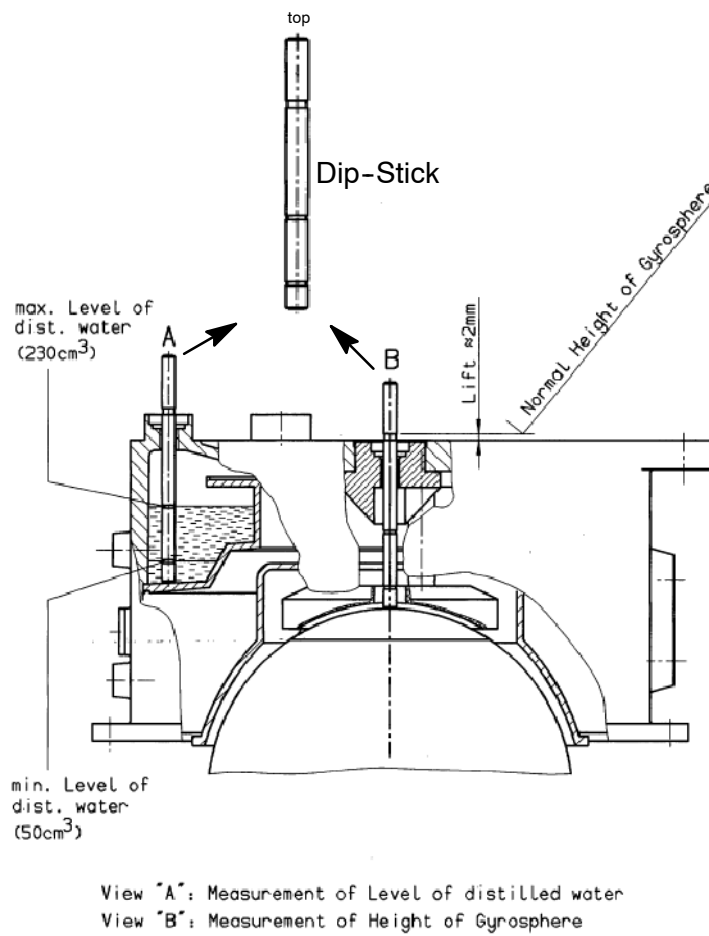


Figure 17 : Dip-Stick levels

3.1.5 Warning 5 “Voltage cut-off”

This warning is output if the supply voltage is cut off for a short time. The cut-off period is determined by the fall in supporting liquid temperature. If the temperature falls below 45°C the compass recognises that the voltage supply has been switched off in the conventional way.

In the case of a voltage cut-off (supporting liquid temperature does not fall to below 45°C) and the voltage supply has been restored, the settling stage is indicated again (see also section 2.1.1 “Compass indications during the settling stage”).

Note: Heading indication can be incorrect. Wait for a complete follow up,
Check voltage supply to the gyro compass!

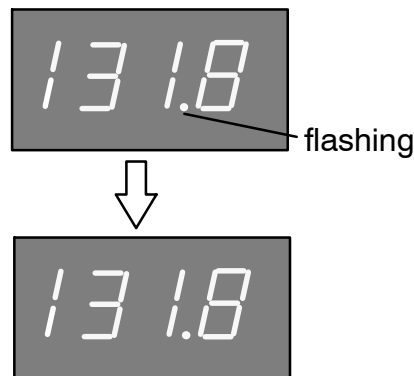


Figure 18 : Digital display for “Voltage cut-off”

If voltage cut-offs occur often, the following checks should be made:

- check the on-board power supply
- or
- check the the on-board power supply ⇒ distribution unit ⇒ compass cable connections
- or
- check the the on-board power supply ⇒ AC/DC converter ⇒ compass cable connections

4 Alarm signalling (in the event of an error)

Alarms are indicated on the compass as follows:

The course is not displayed, as well as at the connected heading receivers !

An alarm signal is indicated on the digital display by means of a flashing Erro (for Error) (flashing "OFF"), flashing "OFF" occurs only when the voltage is too low.

After the blinking "Erro" the compass internal PC-board which fails and an error code is displayed (detailed information -> see Service manual).

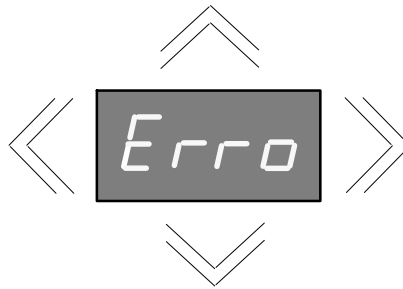


Figure 19 : Digital display for "error indication"

**Operator manual
110-233
STD22 Compact and STD22**

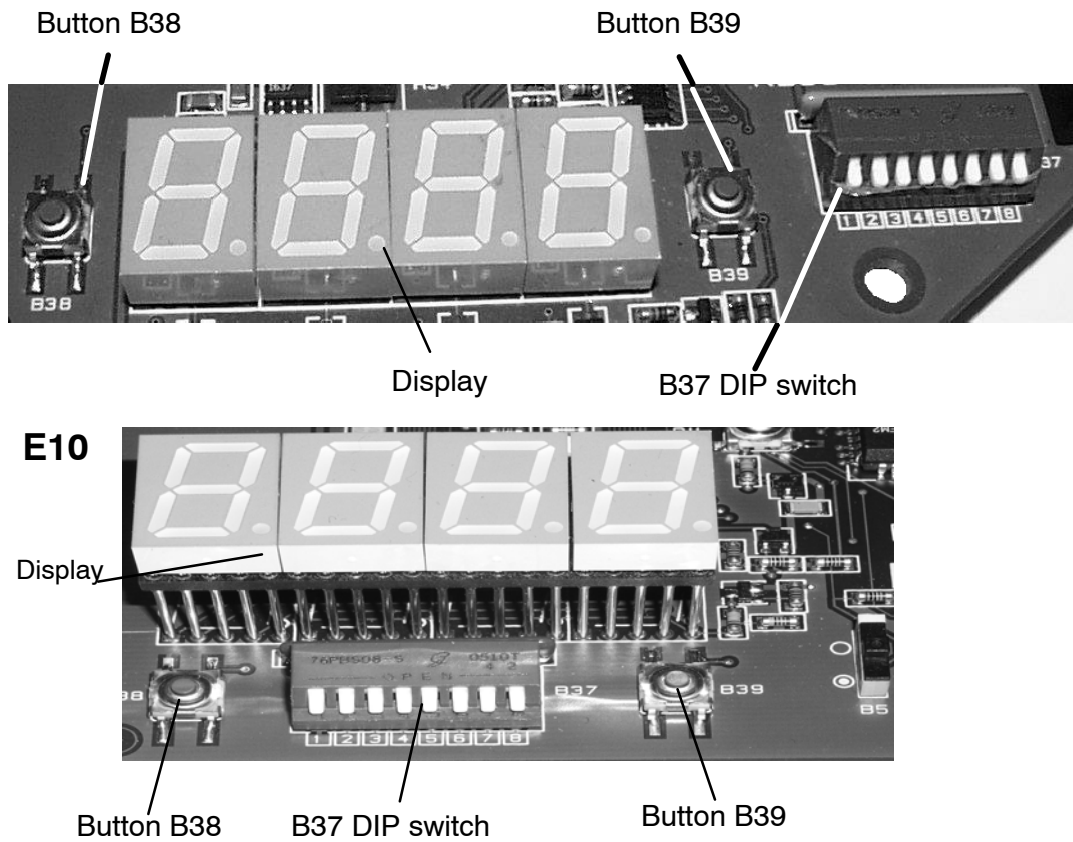


Figure 20 :Operating elements on the compass (after removing the cover)

The following failed PC-boards are possible:

PCbP = power PCB faulty

PCbS = sensor PCB faulty

PCBC = connection PCB faulty

PCbG = outer sphere PCB faulty

See the service manual for more details.

Error group	Comment	Error-code
PCbP	Serial connection of sensor PCB to power PCB faulty	E.L.01
PCbP	Inductive transmission faulty	E.L.02
PCbP	System voltage (B5.5 ⇒ B5.8) on power PCB faulty	E.L.03
PCbP	Encoder voltage faulty	E.L.04
PCbP	System voltage (B5.1 ⇒ B5.4) on power PCB faulty	E.L.05
PCbS	Encoder faulty	E.L.06
PCbS	CAN dialogue from gyro card to sensor PCB faulty	E.L.07
PCbS	Follow-up system faulty	E.L.08
PCbC	CAN1 and CAN2 operating voltage faulty	E.L.09
PCbG	Supporting liquid error	E.L.10
PCbG	System voltage (B21.5 ⇒ B21.8) on outer sphere PCB faulty	E.L.11
PCbG	Operating voltage 24V faulty	E.L.12
PCbG	Operating voltage 15V faulty	E.L.13
PCbG	Heating operating voltage (B21.1 ⇒ B21.4) faulty	E.L.14
PCbG	Operating voltage 72V faulty	E.L.15
PCbG	Operating voltage 78V faulty for 400 Hz	E.L.16
PCbG	Gyro supply 55V _{eff} faulty	E.L.17
PCbG	Gyro current faulty	E.L.18
PCbG	Pump voltage faulty	E.L.19
PCbG	Pump current faulty	E.L.20
PCbG	Temperature sensor faulty	E.L.21
PCbG	Serial interface MC1 to MC2 faulty	E.L.22
PCbG	CAN interface from sensor PCB to outer sphere PCB faulty	E.L.23
PCbG	Heating system faulty	E.L.24
Status	Watchdog counter	E.L.25
Status	Power-ON counter	E.L.26
Status	OFF-status counter	E.L.27
Warning	Fan failure	C.L.1
Warning	Heater failure	C.L.2
Warning	Supporting liquid > 60°C	C.L.3
Warning	Supporting liquid too low	C.L.4
Warning	Voltage cut-off	C.L.5

5 Switching off the Gyro Compass

The gyro compass ceases to operate when its power supply (ship's mains, AC/DC converter) is switched off.



Caution!

- Maintenance and repair work should be carried out only by trained and qualified staff who are well versed in national safety regulations.
- After the gyro compass has been switched off it is necessary to wait at least 15 minutes before accessing the interior of the gyro compass.

Otherwise the gyro system could be damaged!



6 Maintenance

Supporting liquid and distilled water have to be replaced every 18 - 24 months. In this association the respective O-rings should be replaced as well.

A cleaning of the internal of the housing at the bottom case is practically.

Instructions for carrying out this operation and a maintenance plan (for authorized service personnel only) are given in the service manual.

**Operator manual
110-233
STD22 Compact and STD22**

intentionally left blank