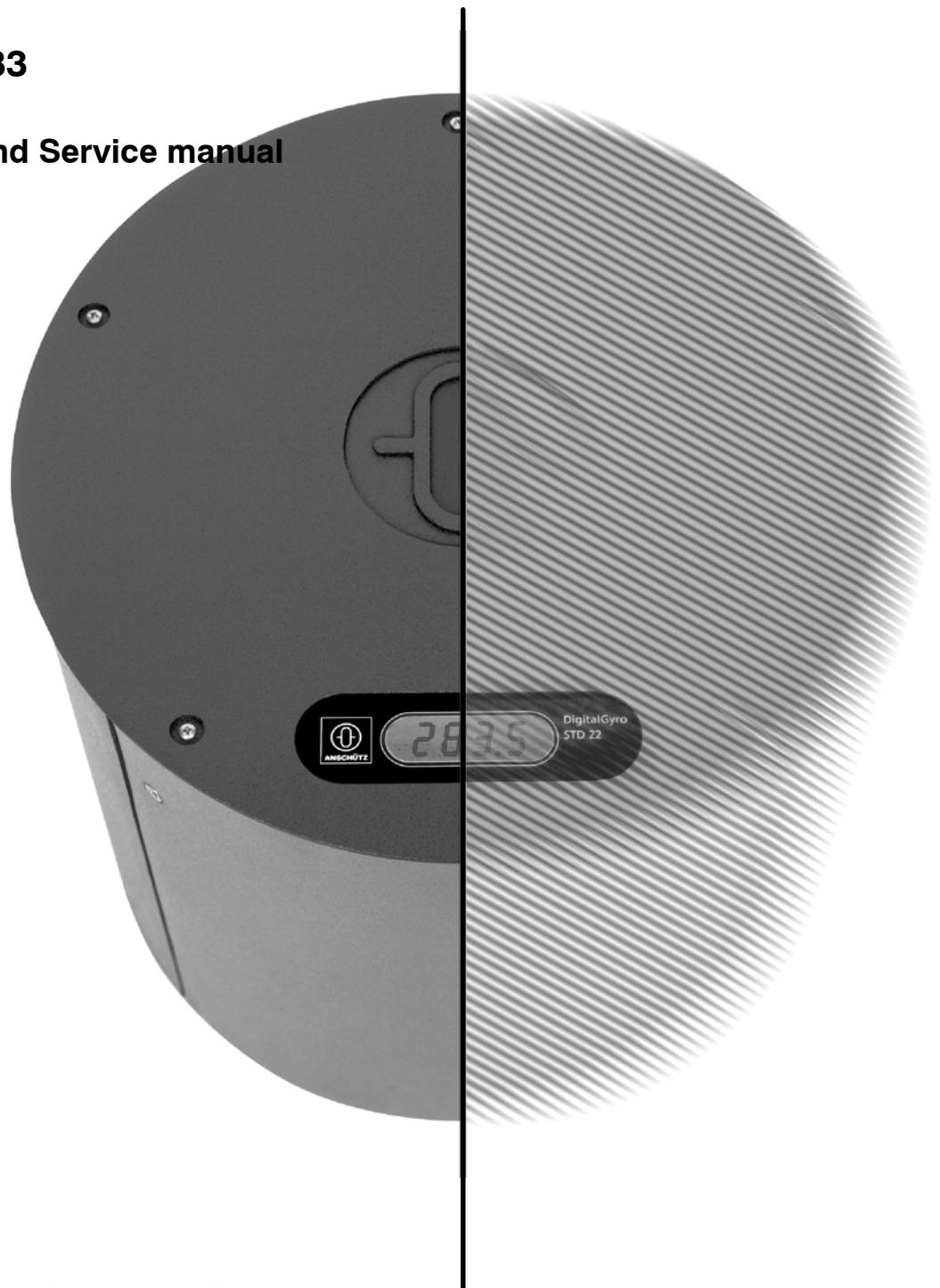




STD 22 Compact GYRO COMPASS and STD 22 GYRO COMPASS

Type 110-233

Installation and Service manual



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**Installation and Service manual
Compass STD 22
Compass STD 22 Compact**



Compass
STD 22

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Gyro Compass <u>STD 22</u> Cable and Connection Diagram	110-233 HP034
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Gyro Compass <u>STD 22 Compact</u>	110-233 HP010
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Additional Output Box	146-103.HP005
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Operator Unit Quick Settling	
Dimensional Drawing	130 E 606 HP005
Gyro Compass STD 22, Wiring Diagram	110-233.HP008
	Sheets 1+2
Terminal Strip PCB, Circuit Diagram	110-233. HP016

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Name of Vessel:
IMO Number:

CAUTION: Maintenance only by authorised service stations (each 18 -24 month)

Compass Maintenance (please tick which sensor is maintained)	Gyrostar 2	STD 20	STD 22	Results:
Attention: Do not disconnect power!				
Check temperature, voltage, current & height of gyrosphere	X	X	X	Temperature: 49,4°-50,1°C Voltage: 53-58V Current: 170-350mA Height: 1,5-2mm
Check error log (if items available, analyse the cause & correct the failure)	X	X	X	
Check and write down heading value (correct alignment error if necessary)	X	X	X	Heading:
Check outersphere visual according density	X	X	X	
Check screw-, clamp- and plug connections visual according solid fit	X	X	X	
Check cables visual according damages	X	X	X	
Now disconnect power and wait 15 minutes!				
Change supporting liquid and distilled water according to manuals	X	X	X	Number of gyrosphere:
Additional look out for				
- gaskets (especially for heating of STD20)				
- check pcb's visual according damages (as the case may be remove foreign parts)				
- check tooth belt according camber and faultless running (do not stretch the belt to much)				
Clean the pump (replace if necessary)	X	X	X	
Check contact resistance of the graphite areas (contacts of the outersphere) – if necessary clean contacts carefully with scotchpad (Raytheon supply) or replace them	X	X	X	
After complete installation connect power again!				
Check outersphere according density again after ending of heating phase (follow up system is starting)	X	X	X	
In the mean time write down software identification	X	X	X	
Check status of speed error correction (input of latitude & speed)	X	X	X	
Check indication of correct heading at connected equipment	X	X	X	
Check correct indication of alarms from/at gyro and connected equipment	X	X	X	
Check outside installed bearing repeaters visual according density	X	X	X	
Fill in the maintenance sticker and fix it at the compass	X	X	X	
Clear error log and check adjustment of dip switches	X	X	X	

Please be so kind and sent a copy of this completed document and the relevant service report to Raytheon Anschutz GmbH in Kiel / Germany – Thanks in advance!

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Installation and Service manual

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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

Installation and Service manual Compass STD 22 Compass STD 22 Compact



Compass
STD 22

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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

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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

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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

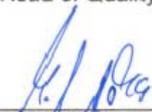
Certificate No.: 26 412 - 05 Lux (Module D)

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)

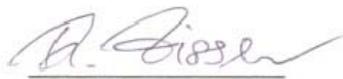
This declaration has been made in the name of the manufacturer by:

Kiel, September 28, 2006

Raytheon Anschütz GmbH
Head of Quality Management


Martin Wloka

Quality Management


Robert Zissen

EG-BPB/GL-47779-03Lux

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Compass
STD 22

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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.

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Compass STD 22

Compass STD 22 Compact

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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: **Anschutz 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

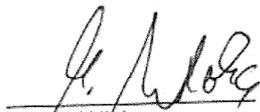
Certificate No.: 33 158 - 06 Lux

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 Anschutz GmbH
Head of Quality Management


Martin Wibka

Quality Management


Robert Zissen

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

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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 :	KLPQ-96WP-D3v96S- KLPQ-144WP-D3v144S- BCI-240-96-D3v96S- BCI-240-144-D3v144S-

¹Optional

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.

Safety notes



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!
- Never switch off the compass at sea, the sphere could be damaged.



- It is advisable to leave the gyro compass switched on when lying in port for periods of up to one week.
- If warnings occur, the operation of the gyro equipment 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 (via the hotline). Refer to the service manual as appropriate.
- When error messages appear, the heading is no longer displayed on the compass; the heading is not followed up on a connected course receiver. The compass must be repaired by well trained staff.



Please note that all ship's 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 during voyages.

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

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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.
Therefore a continuously supply with 24VDC should be guaranteed.



It is recommended to activate speed error correction in order to obtain accurate heading information.
This applies also if the heading information is used by DP systems. Please pay attention to the requirements of the DP system manufacturer.



Supporting liquid should be stored in a cold, dry and dark place.
Please pour away liquid leftovers.
Do not mix supporting liquids.



Caution!
Alarm outputs must be connected to a central Alarm Panel/Signal Unit (alarm outputs from external devices also).
Alarm Panel or Signal Unit must have an acoustical and optical alarm indication.
In case of a individual speed application (Individual SEC) an alarm output must be connected to the respective Distribution Unit additional.



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).

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A Power OFF-ON procedure or a RESET procedure can be necessary after flashing new software or changing configuration, see also section 7.

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1 General information

The STD 22 Compact Compass and the STD 22 Compass are identical gyro compasses.

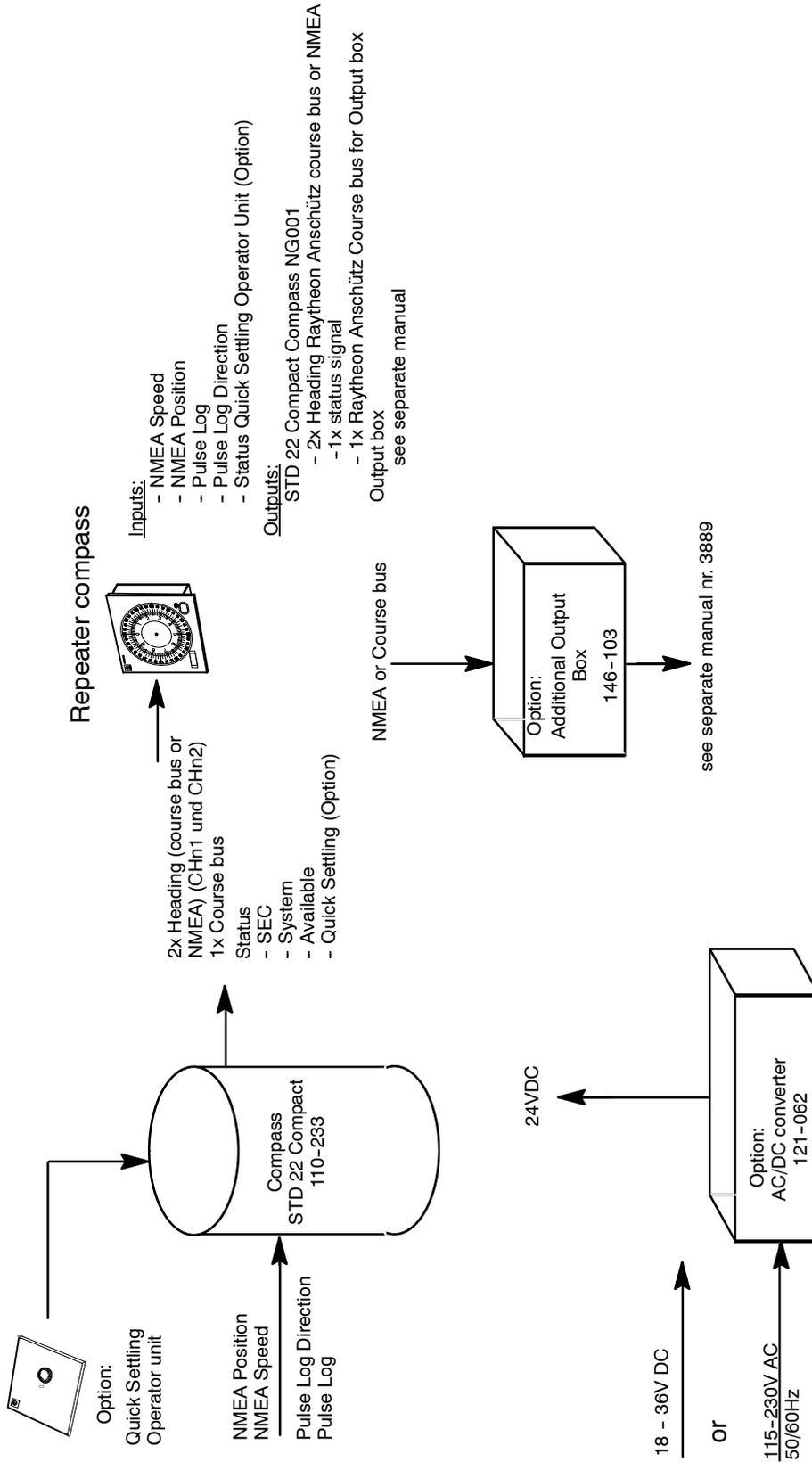
The difference between the two gyro compasses is that the STD 22 Gyro Compass can be operated via a CAN bus system with an Operator Unit and a Distribution Unit. In the case of the STD 22 Compact Gyro Compass, the CAN bus is not enabled.

The following diagrams provide an overview of the possible applications of the STD 22 Compact and STD 22 Gyro Compasses.

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Compass STD 22 Compact



STD 22 Compact Gyro Compass

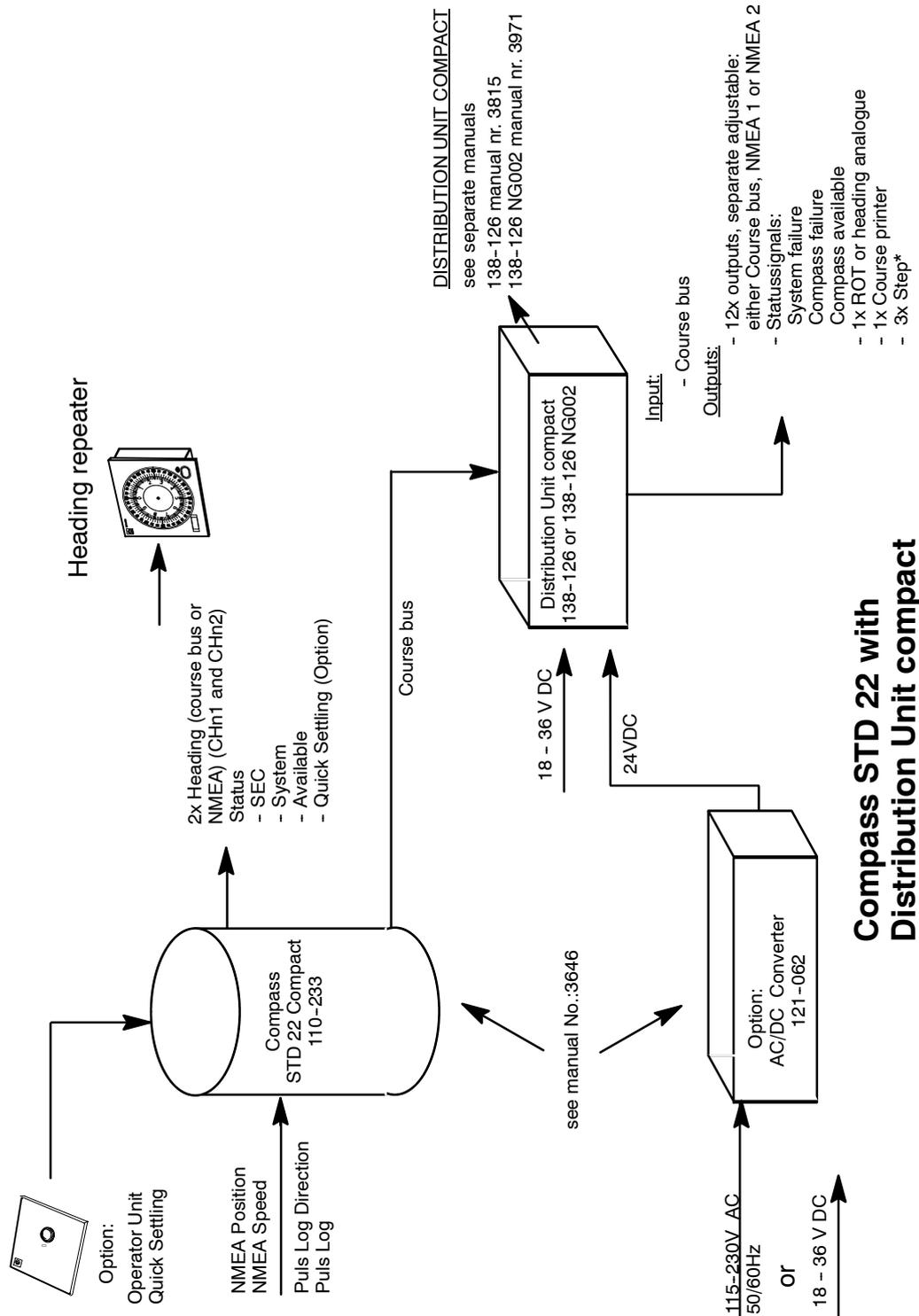
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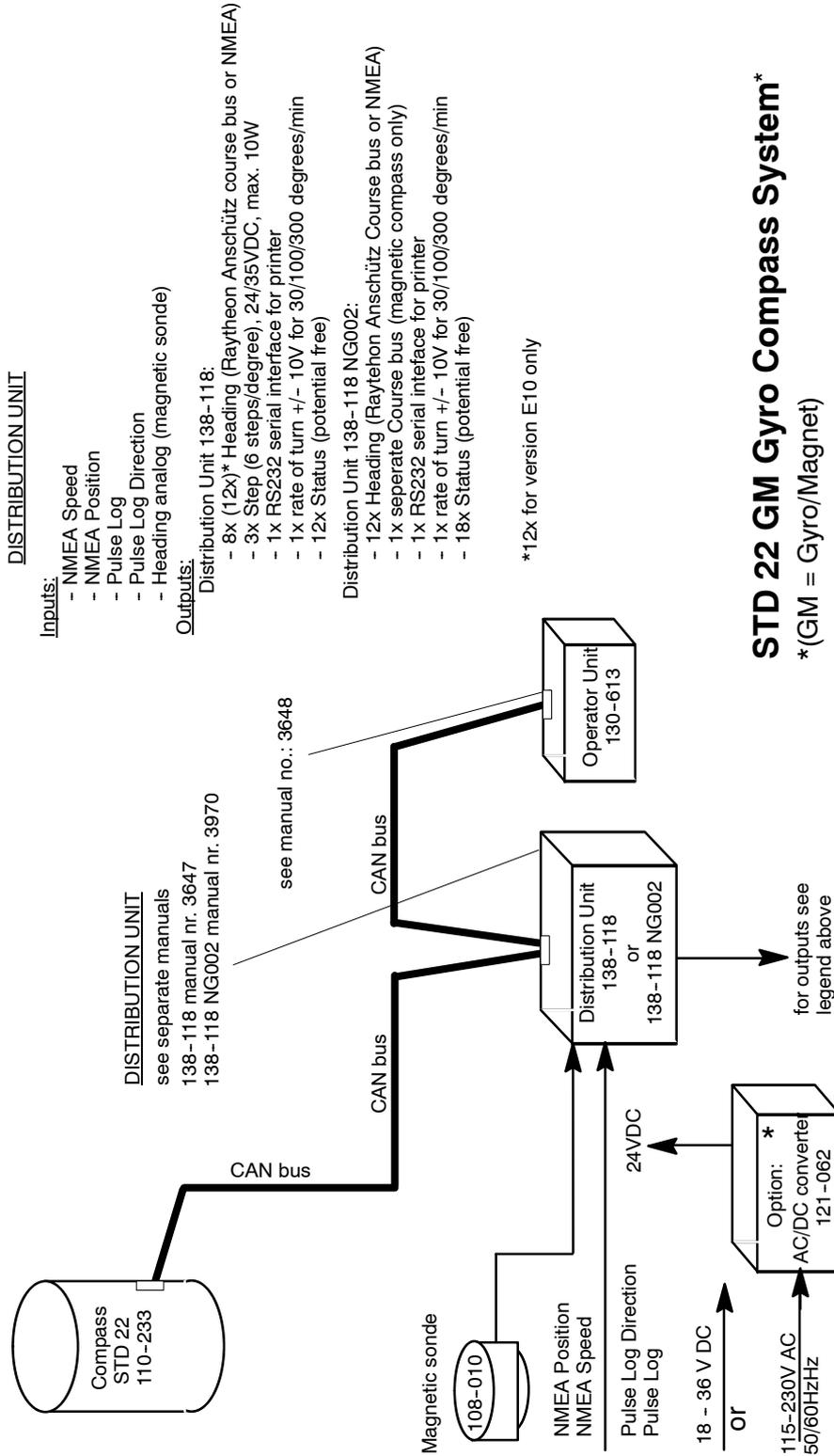


* 3x Step for type 138-126 only

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Compass STD 22

Compass STD 22 Compact



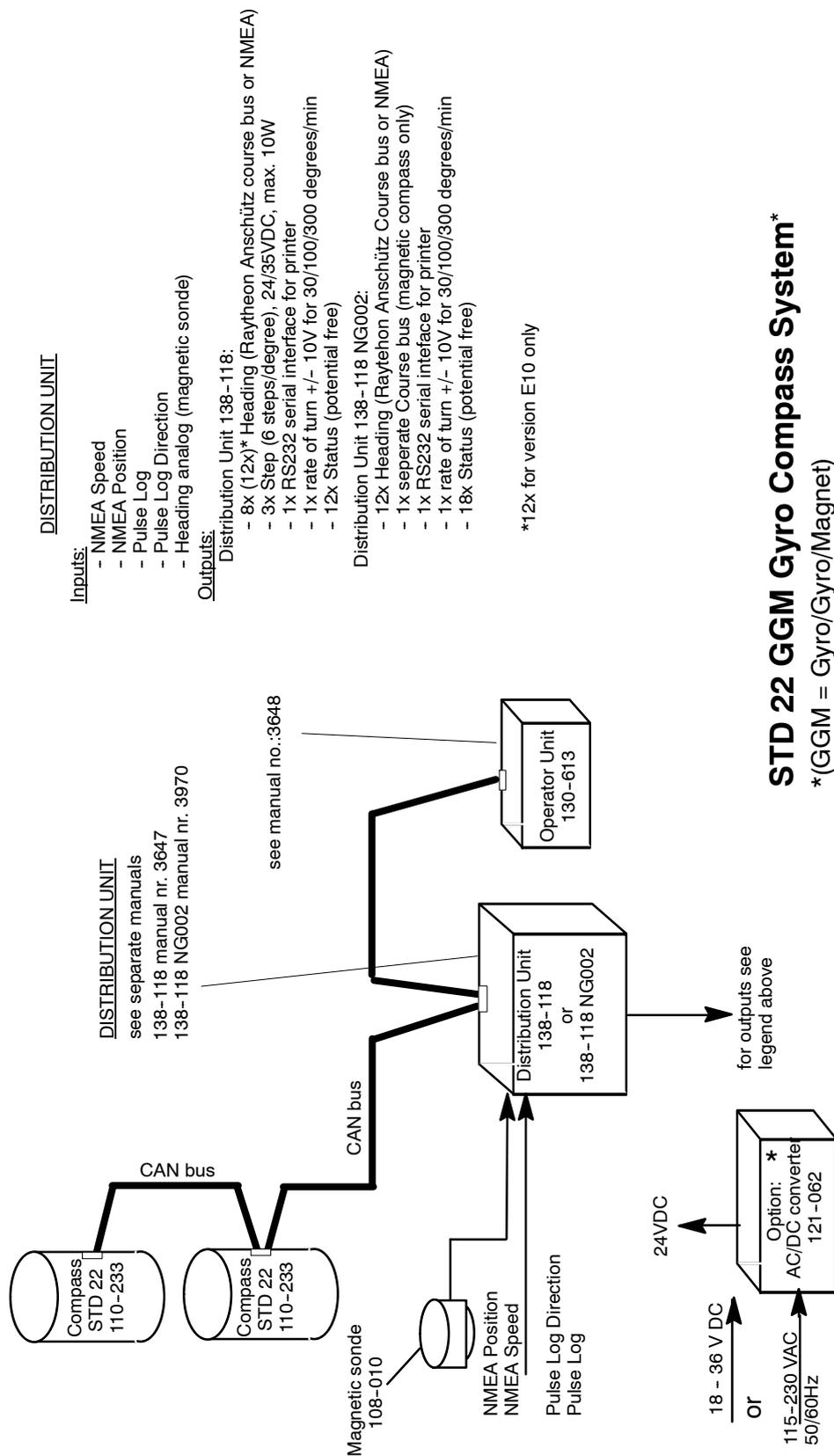
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DISTRIBUTION UNIT

Inputs:

- NMEA Speed
- NMEA Position
- Pulse Log
- Pulse Log Direction
- Heading analog (magnetic sonde)

Outputs:

Distribution Unit 138-118:

- 8x (12x)* Heading (Raytheon Anschutz course bus or NMEA)
- 3x Step (6 steps/degree), 24/35VDC, max. 10W
- 1x RS232 serial interface for printer
- 1x rate of turn +/- 10V for 30/100/300 degrees/min
- 12x Status (potential free)

Distribution Unit 138-118 NG002:

- 12x Heading (Raytheon Anschutz Course bus or NMEA)
- 1x separate Course bus (magnetic compass only)
- 1x RS232 serial interface for printer
- 1x rate of turn +/- 10V for 30/100/300 degrees/min
- 18x Status (potential free)

*12x for version E10 only

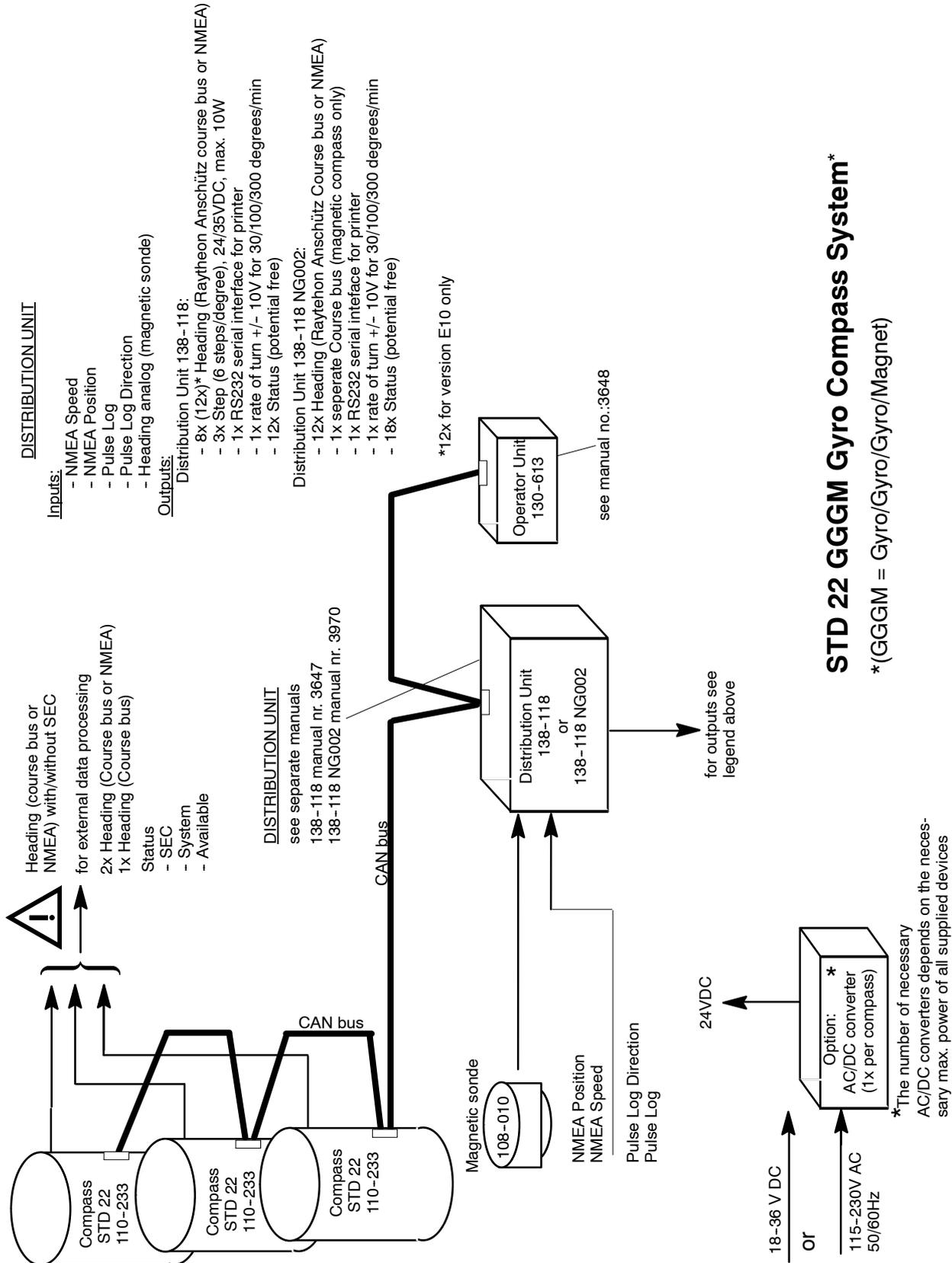
STD 22 GGM Gyro Compass System*

*(GGM = Gyro/Gyro/Magnet)

Installation and Service manual

Compass STD 22

Compass STD 22 Compact



STD 22 GGGM Gyro Compass System*

*(GGGM = Gyro/Gyro/Gyro/Magnet)

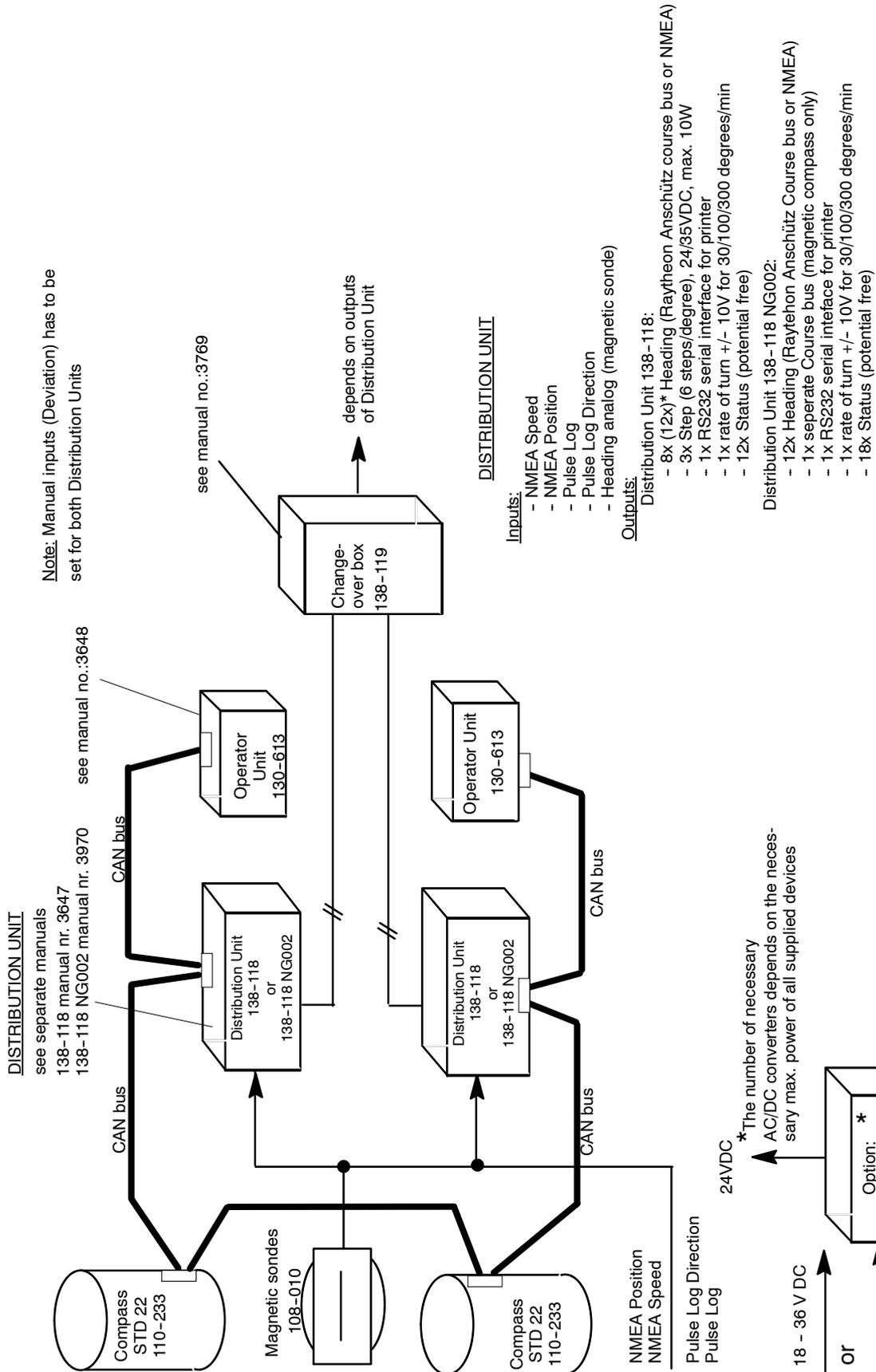
Installation and Service manual

Compass STD 22

Compass STD 22 Compact



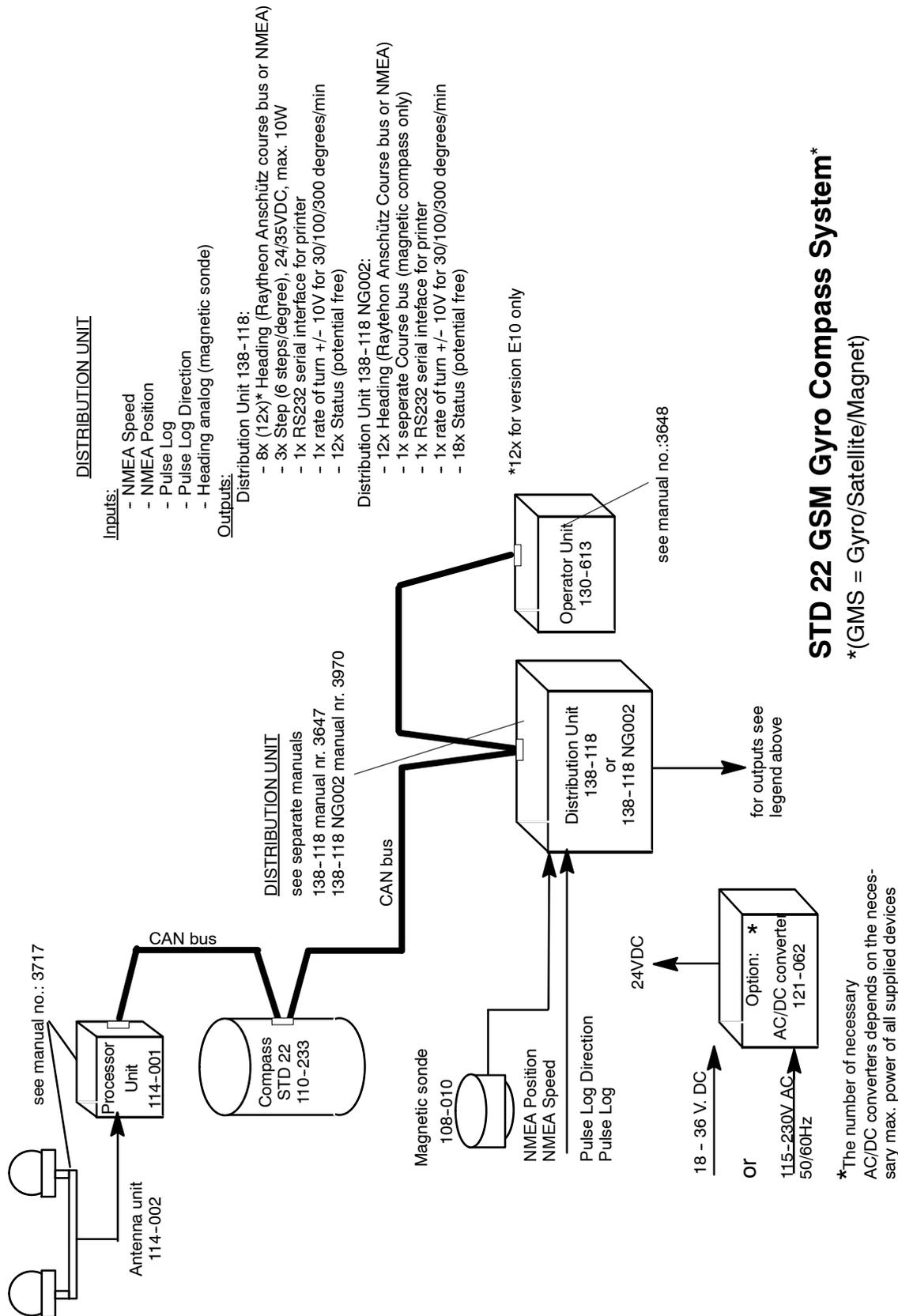
Compass
STD 22



Installation and Service manual

Compass STD 22

Compass STD 22 Compact



STD 22 GSM Gyro Compass System*

*(GMS = Gyro/Satellite/Magnet)

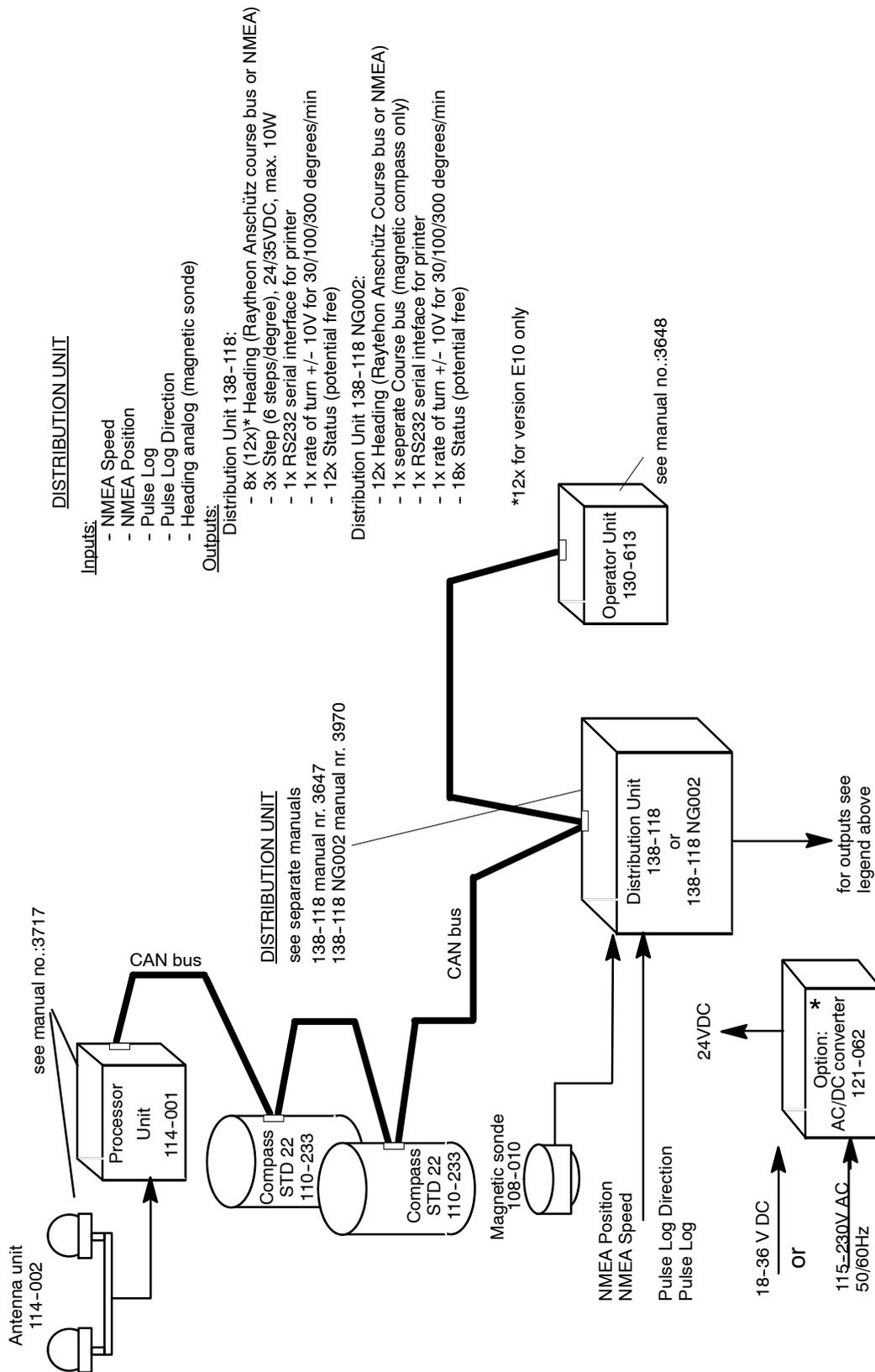
Installation and Service manual

Compass STD 22

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Compass
STD 22



DISTRIBUTION UNIT

Inputs:

- NMEA Speed
- NMEA Position
- Pulse Log
- Pulse Log Direction
- Heading analog (magnetic sonde)

Outputs:

- Distribution Unit 138-118:
 - 8x (12x)* Heading (Raytheon Anschütz course bus or NMEA)
 - 3x Step (6 steps/degree), 24/35VDC, max. 10W
 - 1x RS232 serial interface for printer
 - 1x rate of turn +/- 10V for 30/100/300 degrees/min
 - 12x Status (potential free)
- Distribution Unit 138-118 NG002:
 - 12x Heading (Raytheon Anschütz Course bus or NMEA)
 - 1x separate Course bus (magnetic compass only)
 - 1x RS232 serial interface for printer
 - 1x rate of turn +/- 10V for 30/100/300 degrees/min
 - 18x Status (potential free)

*12x for version E10 only

see manual no.:3648

for outputs see legend above

STD 22 GGMS Gyro Compass System* Typ 110-233

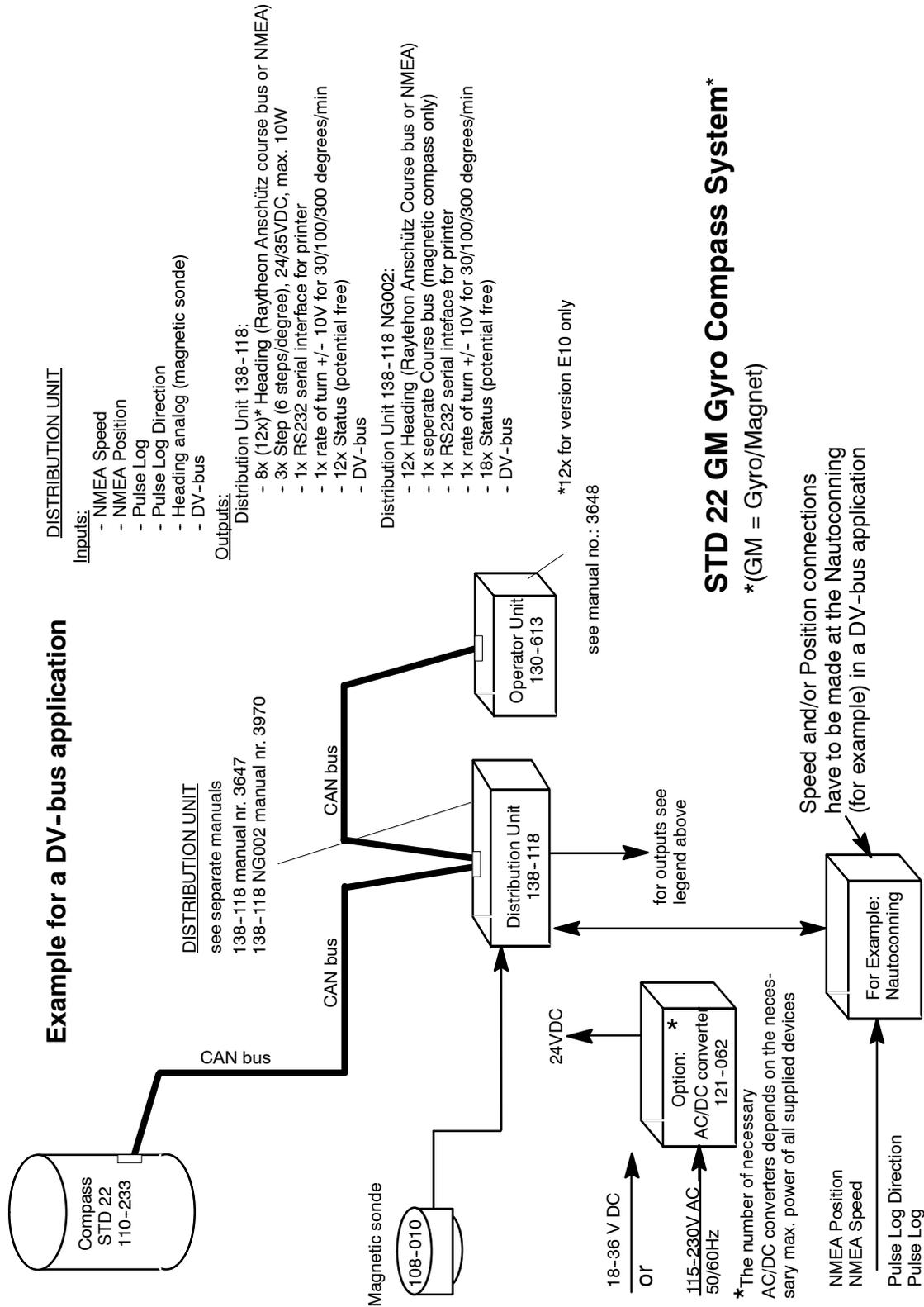
*(GGMS = Gyro/Gyro/Magnet/Satellite Compass)

*The number of necessary AC/DC converters depends on the necessary max. power of all supplied devices

Installation and Service manual

Compass STD 22

Compass STD 22 Compact



STD 22 GM Gyro Compass System*

*(GM = Gyro/Magnet)

1.1 CAN bus (CAN = Controller Area Network)
(CAN = Controller Area Network)

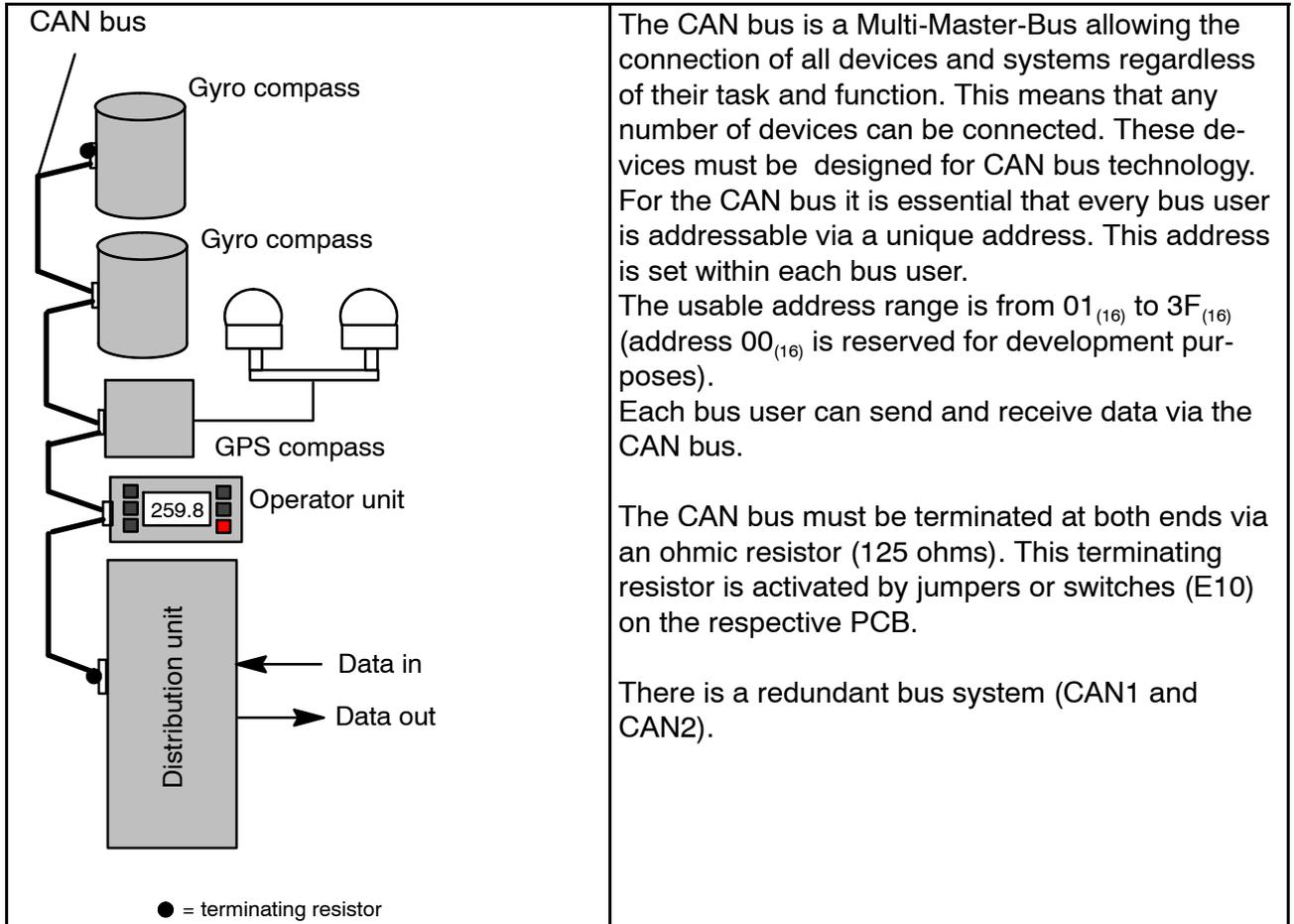


Figure1 : Principle of CAN bus

Installation and Service manual
Compass STD 22
Compass STD 22 Compact

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2 Preparing to install the STD 22 Compact Gyro Compass

To ensure that the STD 22 Compact Gyro Compass is installed and put into operation correctly, these instructions must be followed in the order in which they appear. It must not be installed or put into operation whilst at sea.

2.1 STD 22 Compact Compass – Scope of Supply

The scope of supply consists of:

- Compass (110-233)
 - Outer sphere
 - Distilled water
 - Supporting liquid
 - Gyrosphere (111-006)
- User manual for the STD 22 Compass
- Installation and service manual for the STD 22 Compass
- Tools and spare parts pack
 - Sealing rings
 - Suction cup
 - Filling device
 - Injector

Optional:

- AC/DC converter (121-062)
- Quick Settling Operator Unit (130-606)

- Additional Output Box (146-103)
(Interface extension STEP/SSC)

Installation and Service manual Compass STD 22 Compact

2.2 General information concerning installation of the STD 22 Compact Compass

NOTE:

Installation has to be carried out by a trained technician.

When fitting components, observe the following spacing:

Fit the compass enclosure so that the display can be viewed from above and the cover of the enclosure can be removed (see also Dimensional Drawing 110-233.HP005).

To ensure fault-free operation of the STD 22Compact Compass, it is essential to follow these directions, safety notes and installation instructions.

Instructions relating to cable cross-sections and earth connections must be adhered to.

The tools which are specified for installing the compass must be used.

Only original parts or parts approved by the manufacturer may be used in connection with the STD 22 Compact Compass.

See also Cable Connection Diagram 110-233 HP010 for the STD 22 Compact Compass.

Gyro Compass should not be installed in oil-containing ambient air, not in surrounding in vibration and should installed on a vibration-free platform on the floor, e.g. 6 mm aluminium or 30 mm wooden basis.

Gyro compass should be installed so close as possible to the centre line of the ship (vertical and horizontal), so near as possible to the water line and within steady ambient air temperature

It is nor allowed to use additional spacers or long mounting screws.

The installation of the power supply (AC/DC-Converter) should only be performed by an experienced electrician.



The 24 VDC supply voltage should be engineered as a low-security-voltage according to SELV.

2.3 Creating cable connections

2.3.1 General information concerning on-board wiring

The cables which are to be connected to the STD 22 Compact Gyro Compass are led through one of the cable entries at the top of the compass enclosure and fixed in the cable entry with a cable clip suitable for the size of the cable.

The cable entries are supplied with the compass.



Caution:

Ensure that cables are not live before creating cable connections.

It is vitally important to ensure that all cables are free of voltage; where appropriate, carry out voltage measurements beforehand and/or disconnect the relevant distributor from the power supply.

To ensure that the compass functions correctly, it is essential to adhere to the following sequence when creating cable connections.

- Strip the cable over a length of approximately 180 mm (depending on the distance of the cable entry from the terminal). Be careful not to damage the screening.
- Trim the screening so as to leave approximately 15 mm on the cable.

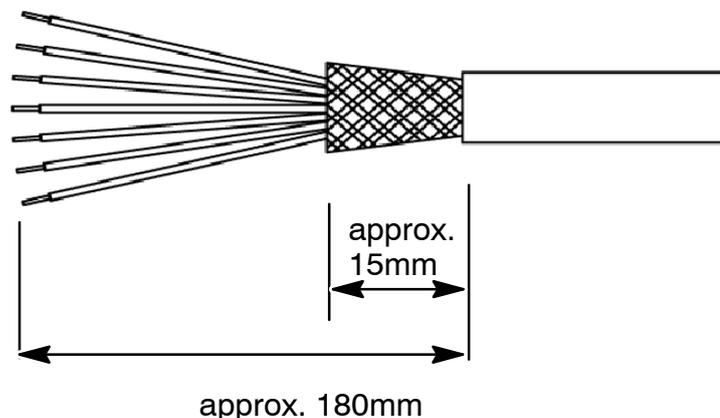


Figure 2: Requirements for stripping the connecting cable

Installation and Service manual Compass STD 22 Compact

- Push the components of the screw fastening over the cable.
It is essential to follow the sequence (as shown in Figure 3).
- Check the cone and the mating piece of the earthing insert for corrosion and if necessary remove corrosion with an emery cloth.
- Push the mating piece of the earthing insert to the end of the cable sheath.
- Push the cone inside the screening and against the mating piece. Ensure that the screening is evenly distributed over the cone (see Figure 3).

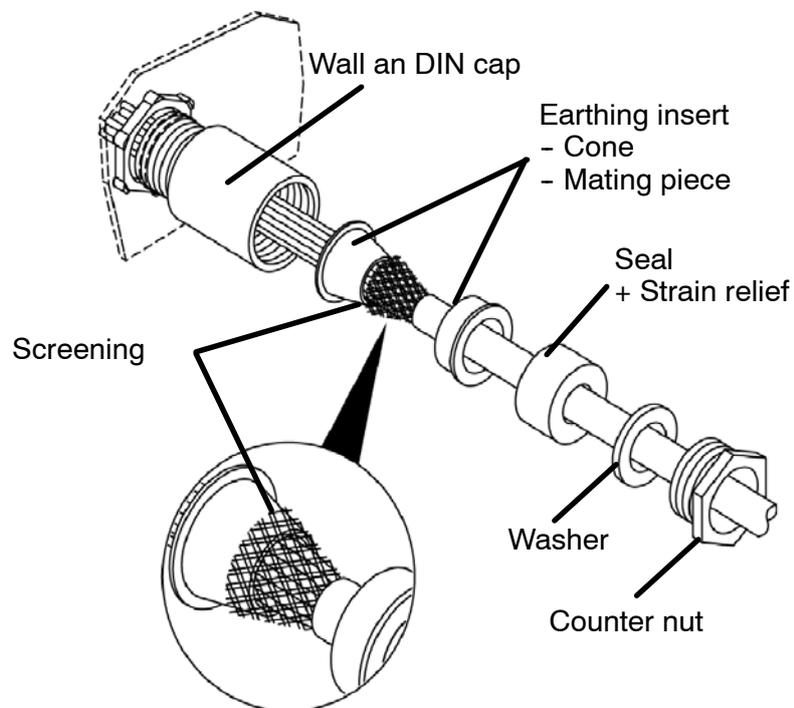


Figure 3: Creating the cable connection

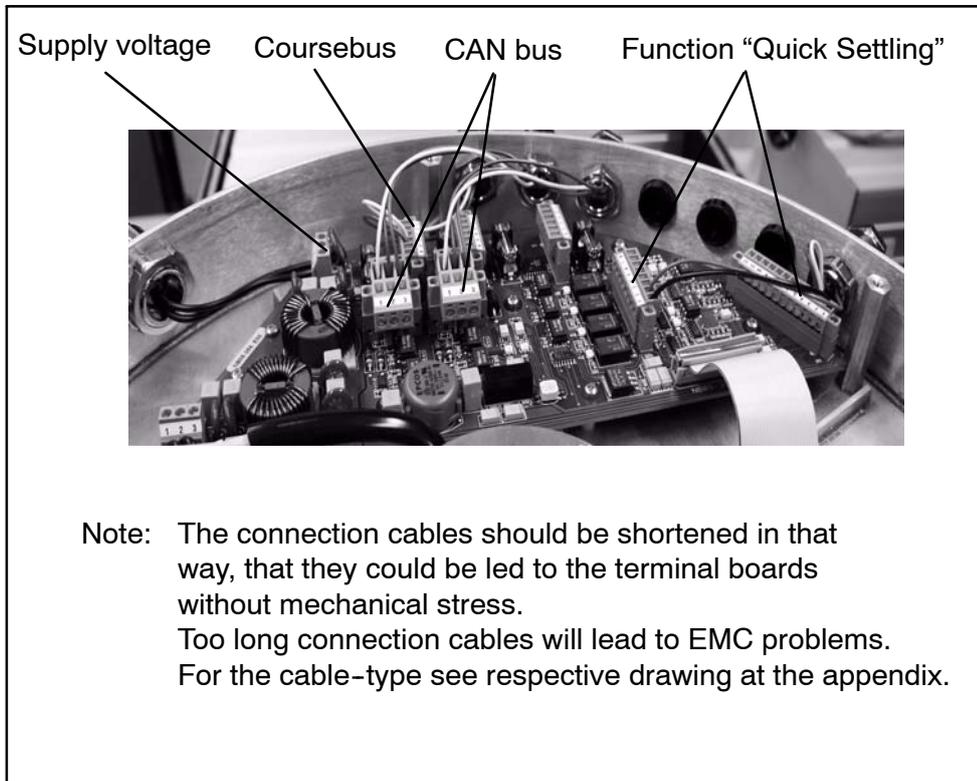


Figure 4: Example of a proper cable connection

- Place the earthing insert, strain relief and washer in the cable entry; fit and tighten the counter nut.
- Strip the cable conductors to a length of about 1.5 cm, lightly twist them and fit cable end sleeves. Connect the cable conductors according to respective drawings and tables. Tighten the terminal screws – check the connection is secure by pulling gently.

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2.3.1.1 General information about creating an earth connection

The following instructions relating to the creation of cable connections must be adhered to in order to comply with the stringent EMC requirements.
The specified cable types must be used.

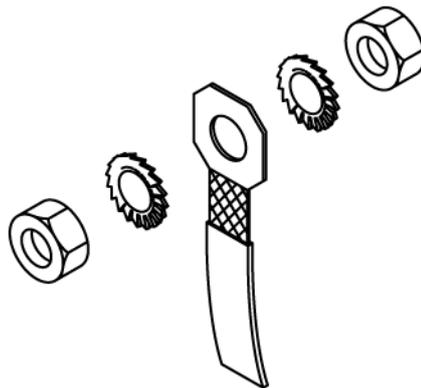
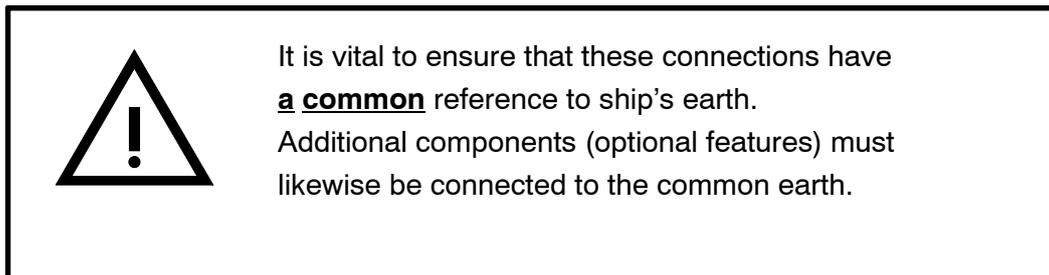


Figure 5: Creating an earth connection

Each earth connection must be made as shown in Figure 5.

The earth cable, to which a cable lug is attached, must have a cross-section of at least 1.5 mm².

The cable lug is mounted between a pair of toothed washers.

Earth connections must be free of all corrosion; they must be screwed tight.

2.4 Installing the compass and putting it into operation

2.4.1 Remove the transportation support with outer sphere, supporting liquid and distilled water.

- Undo the 4 screws (Figure 6 /1) at the top and bottom of the enclosure door, lift out the door and detach the earthing strip (Figure 6/2) on the inside of the door.
- Carefully remove the transport packaging with the outer sphere and the two bottles containing supporting liquid and distilled water from the compass enclosure.
- Take the outer sphere out of the transport packaging and place it on the base plate; the outer sphere must be secured to prevent it from tilting

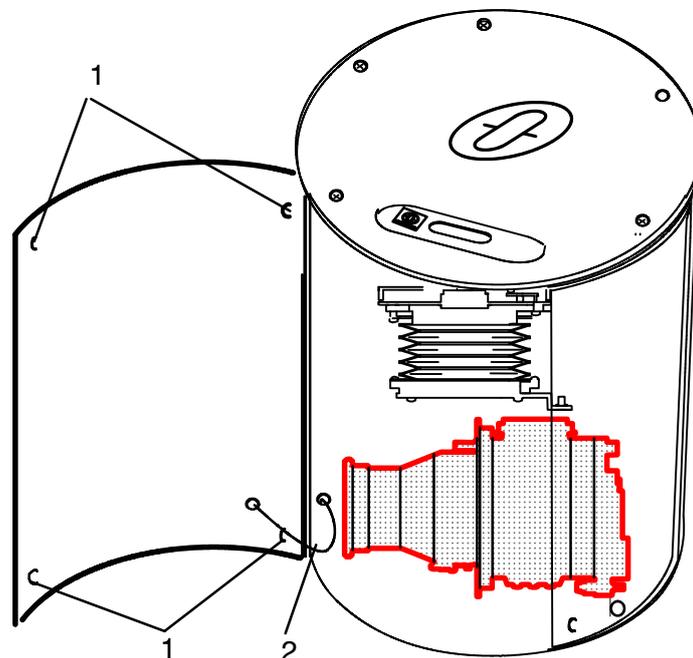
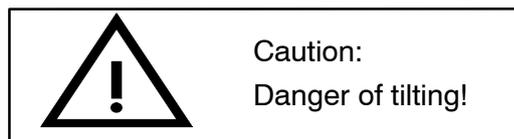


Figure 6: Principle of dismantling the enclosure door

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2.4.1.1 Assembling the compass enclosure

Note: It is not necessary to install the compass enclosure with reference to the ship (e.g. in the ship's forward direction). It can be installed in whatever position is most convenient for servicing and operation.

The installation described below is to be regarded as the maker's recommendation.

Note: The compass STD 22 Compact is approved according to IMO regulations. This compass has a much better performance and exceeds the requirements as defined in ISO 8728 (the normative reference for gyro compasses) conspicuously. However, the accuracy of a compass is subject to dynamic influences caused by ship and environmental conditions. Acceleration forces caused by roll and pitch movement can not be compensated by software and only to a certain amount by the compass hardware. Therefore it is recommended to install the compass as close as possible to the roll and pitch axis of the ship to minimize the dynamical influences to the compass.

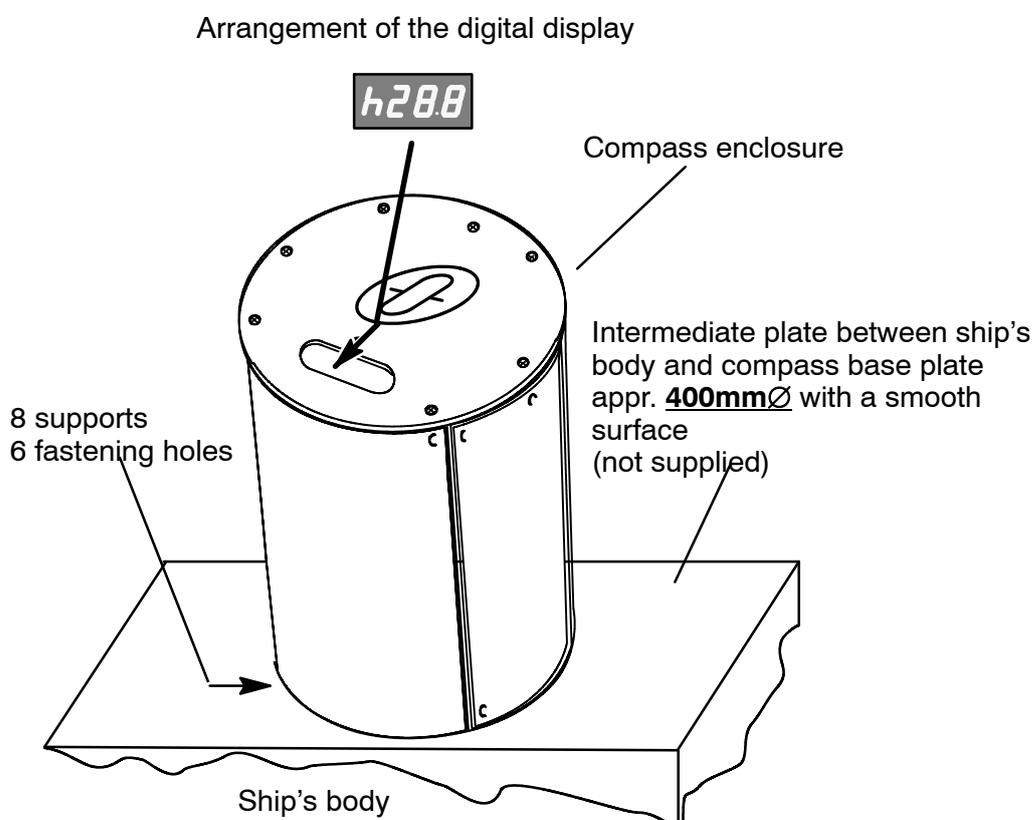


Figure 7: Installation of the compass enclosure

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The compass enclosure must be installed in such a way that the following requirements are met:

- The 8 supports must all stand on a flat, firm surface.
If necessary, the user should himself create an intermediate plate (marine quality hardwood or metal) suited to the local conditions.
- The compass enclosure must be screwed to the intermediate plate in a sea-resistant fashion.
- The intermediate plate must also be screwed to the ship's body in a sea-resistant fashion; this fastening is the responsibility of the user of the STD 22 Compact himself.
- The compass enclosure must be mounted so that the digital display can be seen easily after installation, the door of the compass enclosure can be opened and closed easily and the cover of the compass enclosure can be detached.
- The fastenings of the compass enclosure are indicated in the dimensional drawing "Gyro Compass" (110 D 233 HP005) in the appendix to this manual.

The compass enclosure is fastened to the intermediate plate with 6 screws

- for woodscrews $\varnothing 11$ x length depending on the thickness of the intermediate plate
- for metal screws M10 x length depending on the thickness of the intermediate plate.

The compass enclosure can also be mounted directly on a flat metal surface; in this case, suitable stud bolts (M10) must be welded on; alternatively the compass housing can be fastened on the underlying surface with threaded holes and screws M10-A4.

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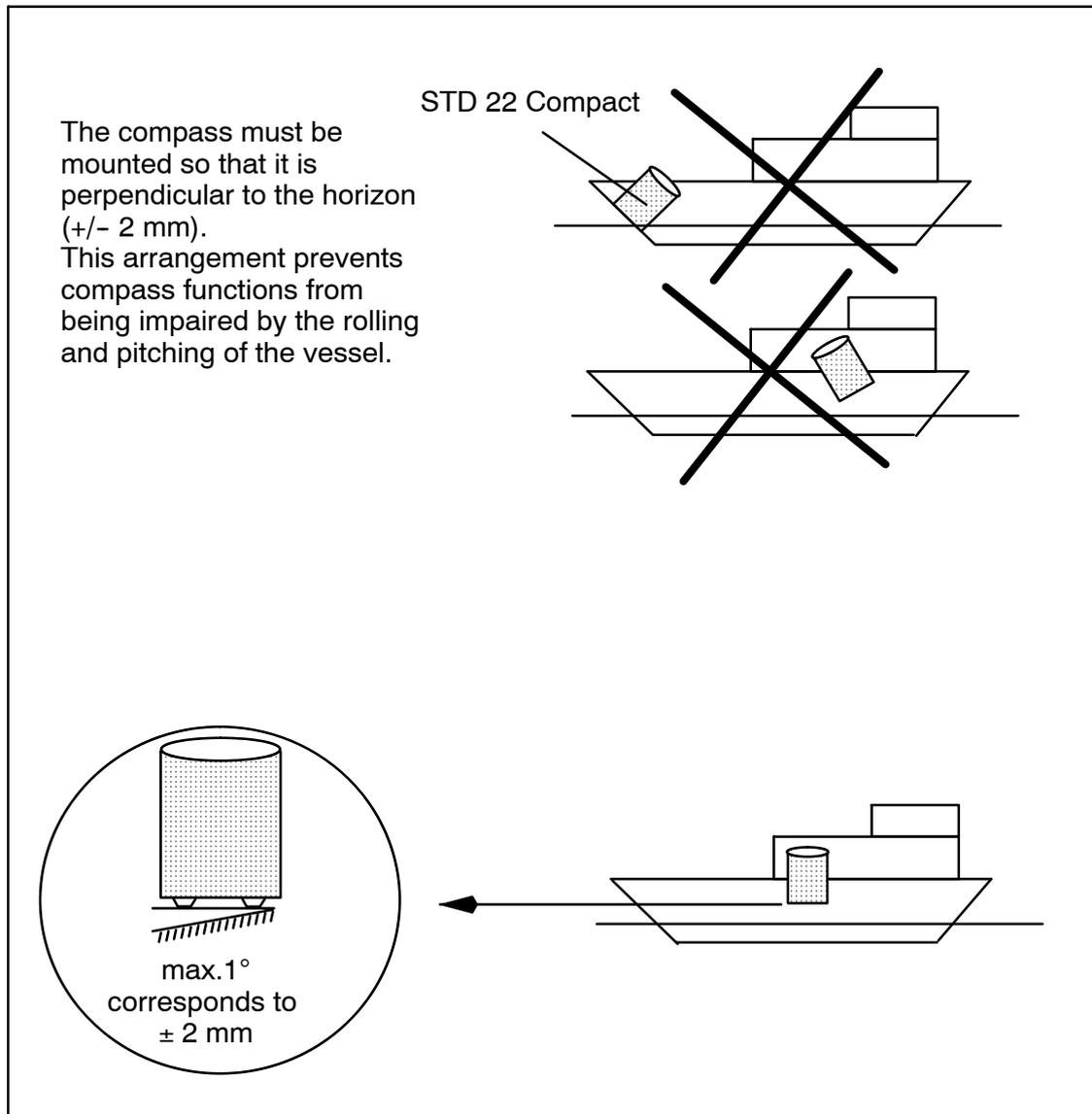
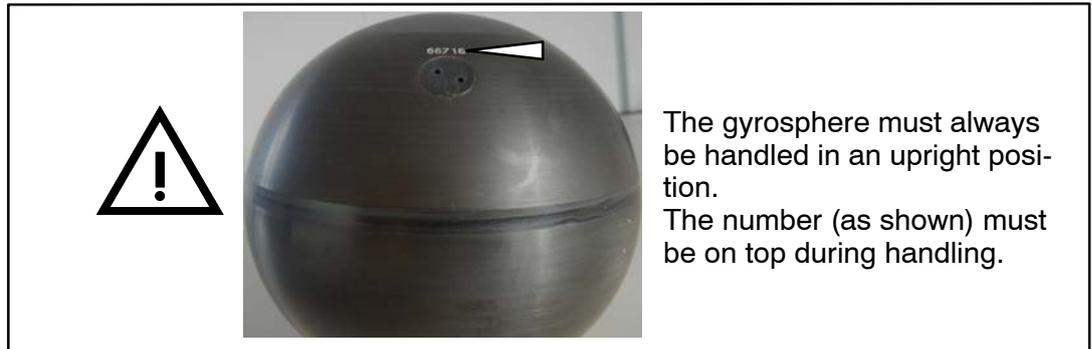


Figure 8: Horizontal alignment for installation of the compass enclosure

(see also appended Dimensional Drawing 110-233 HP005, 2 sheets)

2.4.1.2 Installation of the gyrosphere

Special tool required:
Suction cup



Installation procedure:

- Undo the six screws (Figure 9/1) fastening the upper and lower halves of the outer sphere (Figure 9/2 and 3).
- Remove plug B3 (Figure 9/4) from the plug plate.



Figure 9: Outer sphere

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- Remove the upper half of the outer sphere (Figure 9/2).
Take the gyrosphere (Figure 10/2) out of the transportation box and carefully insert it using the suction cup (Figure 10/3) in the lower outer sphere (see Figure 10).

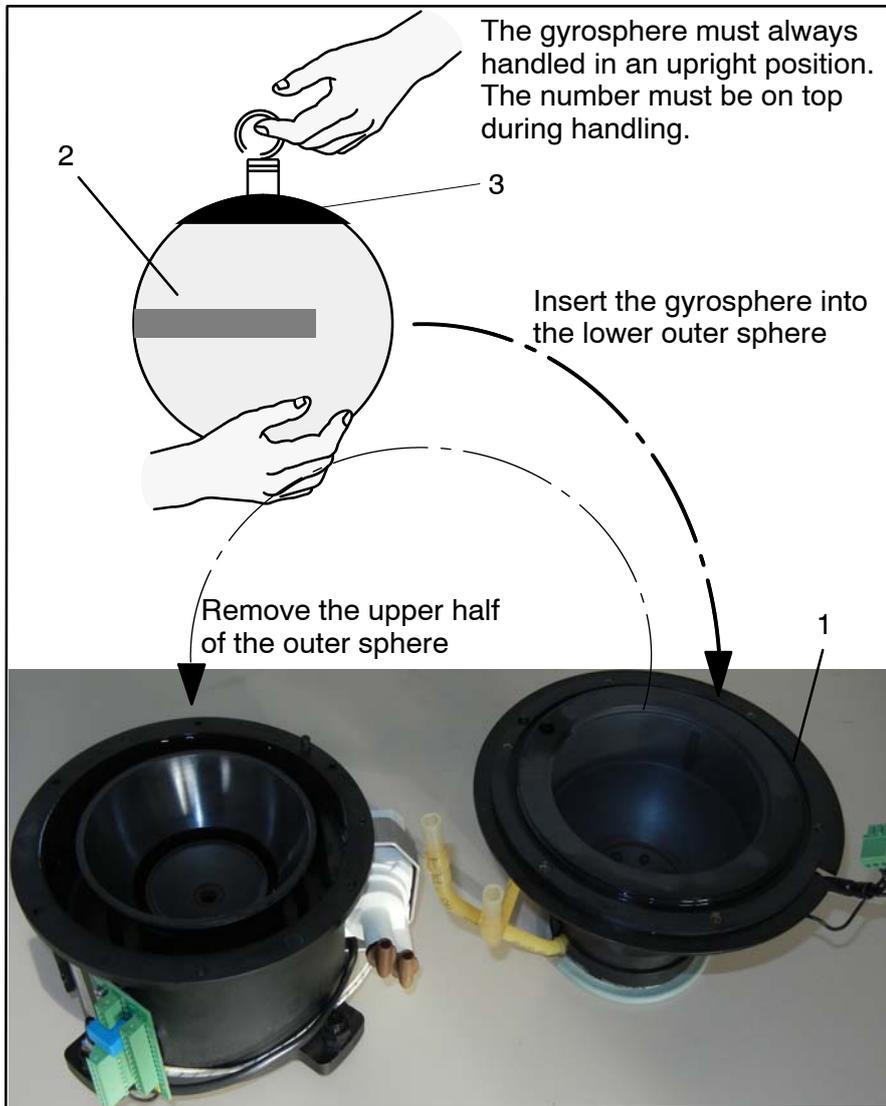


Figure 10: Principle of separating the upper and lower halves of the outer sphere
– inserting the gyrosphere

- Replace the upper half of the outer sphere on the lower half.



Check that there is a proper seal between the two halves of the outer sphere (see Figure 10/1)!

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-
- Retighten the six screws (see Figure 9/1).
 - Insert plug B3 (Figure 9/4) again.
 - Fix the hoses at the pump again
(from the bottom of the outer sphere to the right input of the pump and from the side of the outer sphere to the left input of the pump - see Figure 9).

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2.4.1.3 Filling with distilled water and supporting liquid.

(see Figure 11)

- Undo the three plastic screws (Figure 11/1-3) on the upper outer sphere

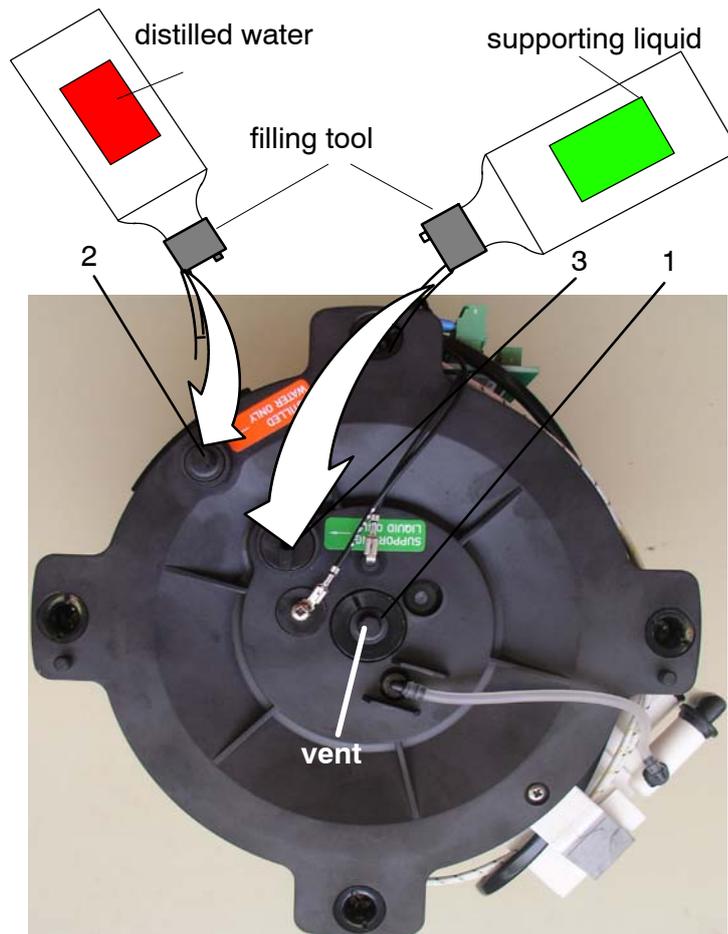
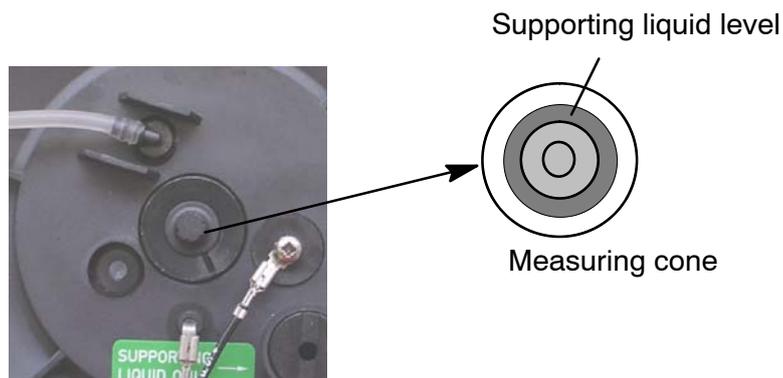


Figure 11: Filling with liquids

- Fit the supplied filling device on the distilled water bottle.
- Pour in all the distilled water (230 cm³) (look for the identifying label on the outer sphere).
- Re-close the distilled water filling opening with the screw, check that it is properly sealed.
- Remove the filling device from the distilled water bottle and attach it to the supporting liquid bottle.

- Pour approximately 840 cm³ of supporting liquid in the appropriate filling opening (look for the identifying label).
The supporting liquid must be at room temperature (over 25° C) and the measuring cone should fill half the measuring range (diameter).
The following photograph shows the measuring cone for the liquid level.



This picture only shows the situation at the start of operation (after filling for the first time or after changing the supporting liquid -> cold supporting liquid); during operation, the dark circle in the measuring cone is smaller.

Figure 12: Measuring cone for supporting liquid level

- Discard any unused supporting liquid; no special measures are needed for disposal.
- Re-close the filling opening for supporting liquid, check that it is properly sealed.
- Re-insert the ventilation screw, check that it is properly sealed.



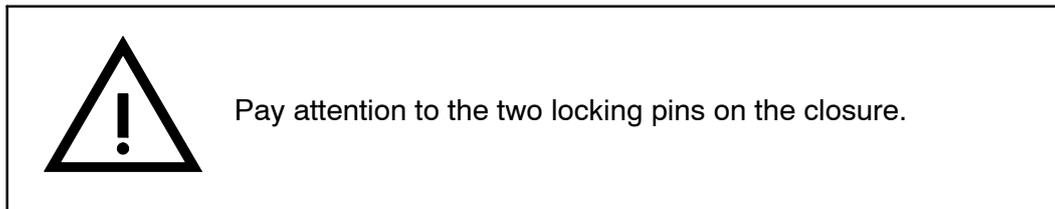
Supporting liquid should be stored in a cold, dry and dark place.
Please pour away liquid leftovers.
Do not mix supporting liquids.

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2.4.1.4 Inserting the outer sphere in the compass enclosure

(see Figure 13)

- Carefully insert the gyrosphere in the compass enclosure:



- Using both hands, hold the outer sphere and guide it under the snap closures (Figure 13/1) on the pendulum joint (Figure 13/2).

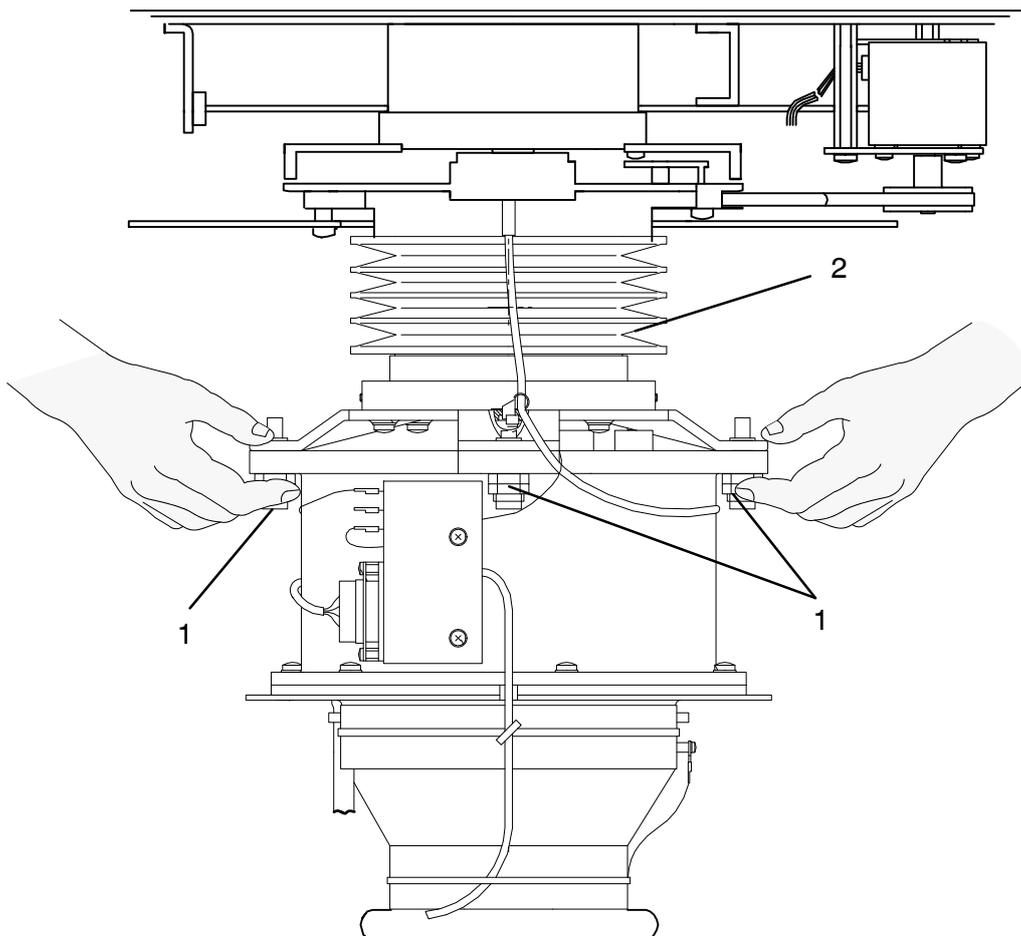


Figure 13: Principle of inserting the outer sphere in the compass enclosure

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- Using the thumbs, press down and engage two snap closures (Figure 13/1).
- Turn the outer sphere through 90° and repeat the process with the two other snap closures. The outer sphere is now fastened to the pendulum joint

- Guide the cable around the outer sphere and attach the plugs to the small PCB of the outer sphere, tighten the fastening screws

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2.5 Creating cable connections and plug connections

2.5.1 Overview of plug connections and fuses on PCB's

(see also section 4 for more information about LED's, plugs, push buttons and jumper)

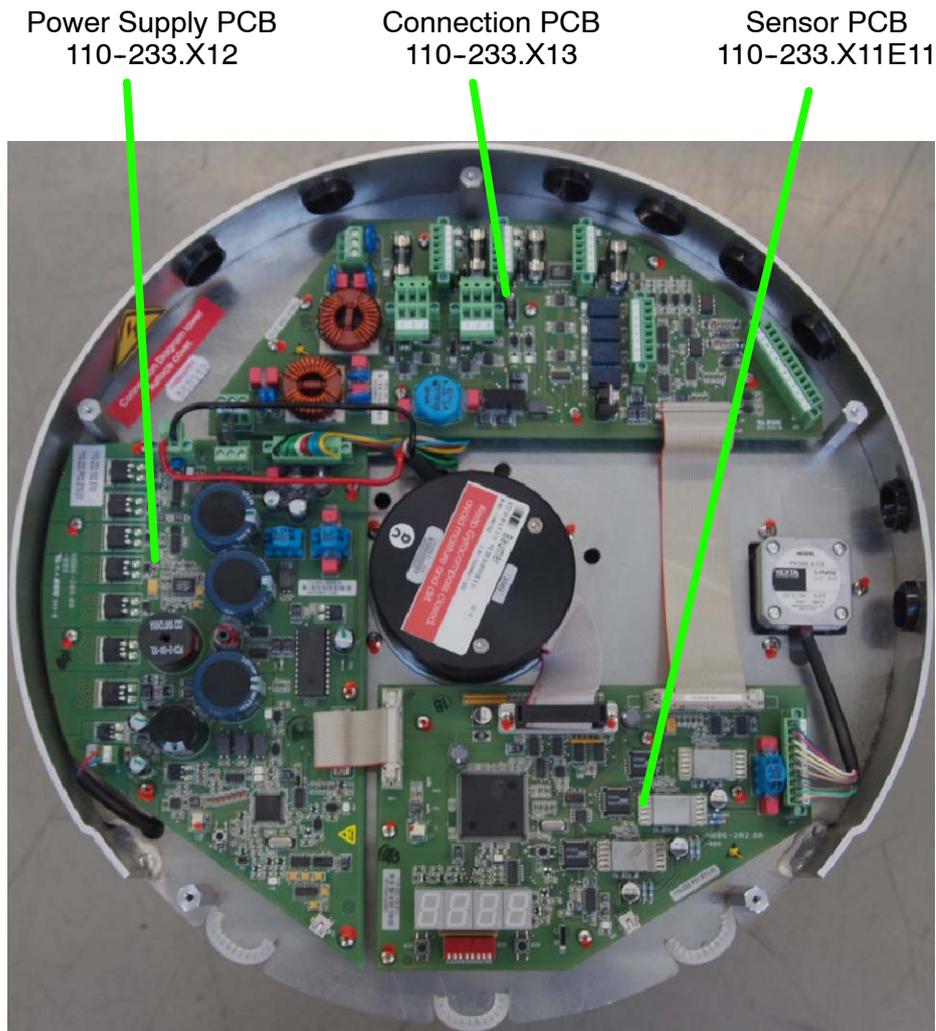
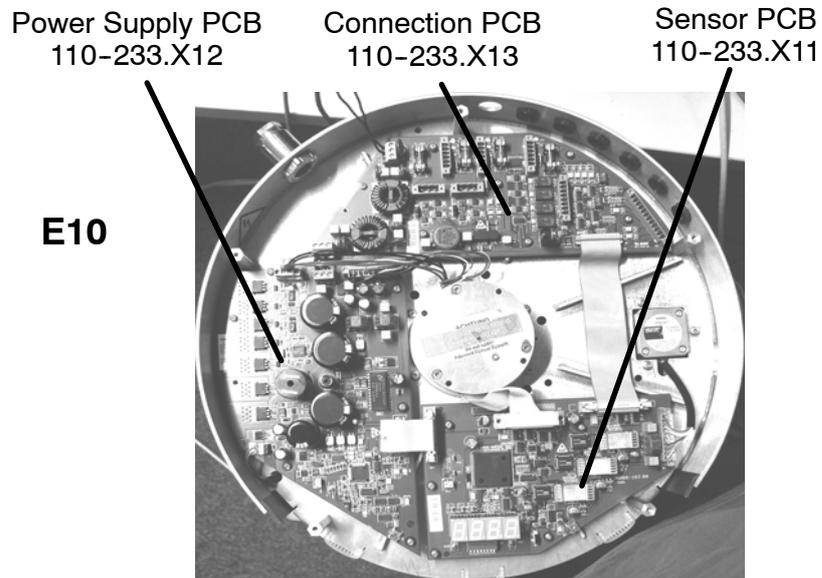


Figure 14: Arrangement of PCB's in the STD 22 Compact Compass (cover removed)

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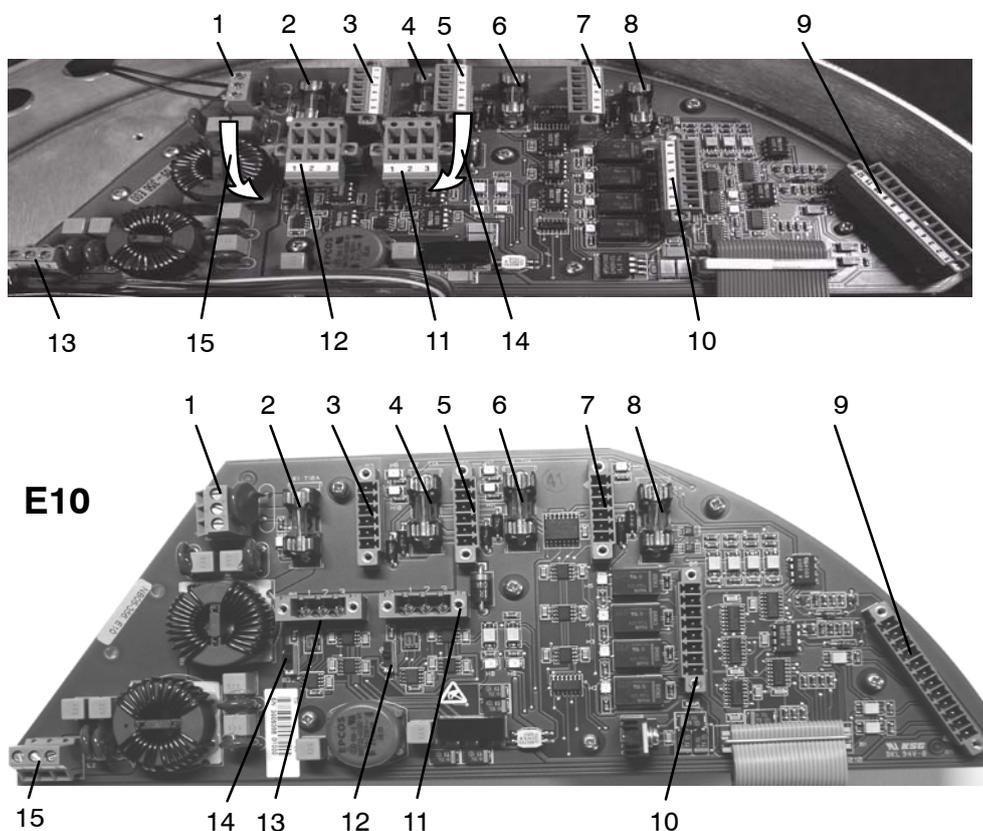


Figure 15: Arrangement of plugs, terminal boards and fuses

1	Terminal L1	Power supply (24VDC)	
2	Fuse E1 (T10A)	Power supply (24VDC)	
3	Plug B2	Output Channel1 Course Bus/NMEA	
4	Fuse E2 (T1A)	Channel1 +24V	
5	Plug B3	Output Channel2 Course Bus/NMEA	
6	Fuse E3 (T1A)	Channel2 +24V	
7	Plug B4	Output Course Bus	
8	Fuse E4 (T1A)	Course Bus +24V	
9	Plug B5	Input (+24V/Set QS/ Pulse Log/Pulse Log Dir./NMEA Log/GPS-receiver) (observe NMEA standard!!)	
10	Plug B6	Output (QS/SEC/System/Available)	
12	Plug B7	CAN1 bus	
	Plug B8	CAN2 bus	
13	Switch B32	for CAN1 bus terminating resistor	E10
	Terminal Board L2	24V connection to Power Supply PCB	
14	Plug B8	CAN2 bus	E10
	Jumper B31	for the CAN2 bus terminating resistor	
15	Switch B31	for the CAN2 bus terminating resistor	E10
	Jumper B32	for the CAN1 bus terminating resistor	
	Terminal Board L2	24V connection to Power Supply PCB	E10

2.5.1.1 Connecting the course receiver in the STD 22 Compact Gyro Compass

(see also Cable and Connection Diagram 110-233.HP010)

Three outputs are provided on the Connection PCB of the gyro compass for course data:

Output 1 (also Channel 1) for NMEA or Course bus (RS 422)

Output 2 (also Channel 2) for NMEA or Course bus (RS 422)

Output 3 for Course bus only (RS 422)

The setting of output data for Output 1 and Output 2 is described in section 2.6.4.6

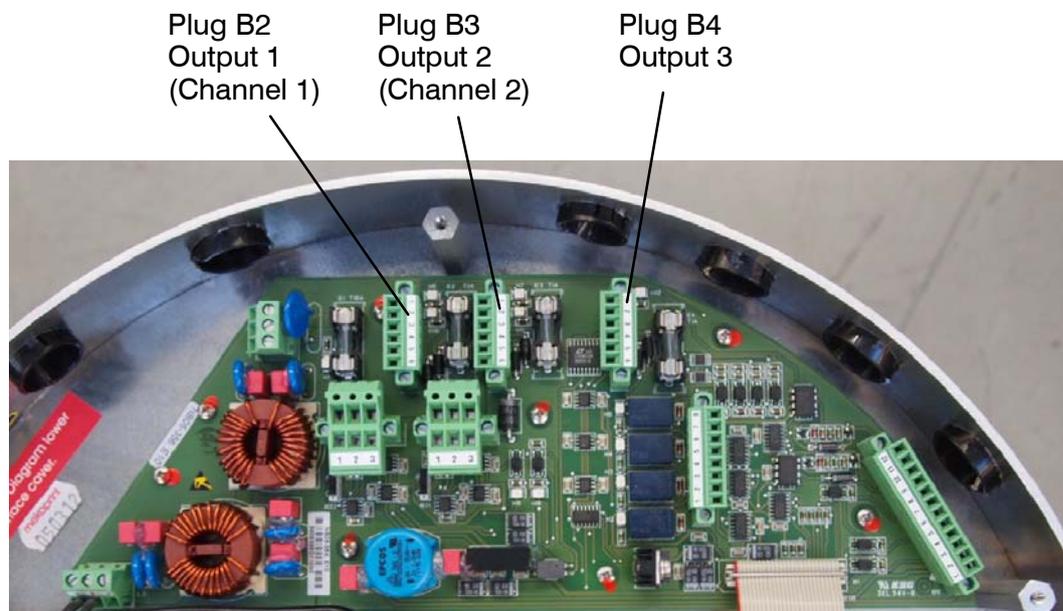


Figure 16: Course receiver connections

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Course receivers should be connected with a screened cable having up to 6 poles (appr. 0.5mm² per conductor).

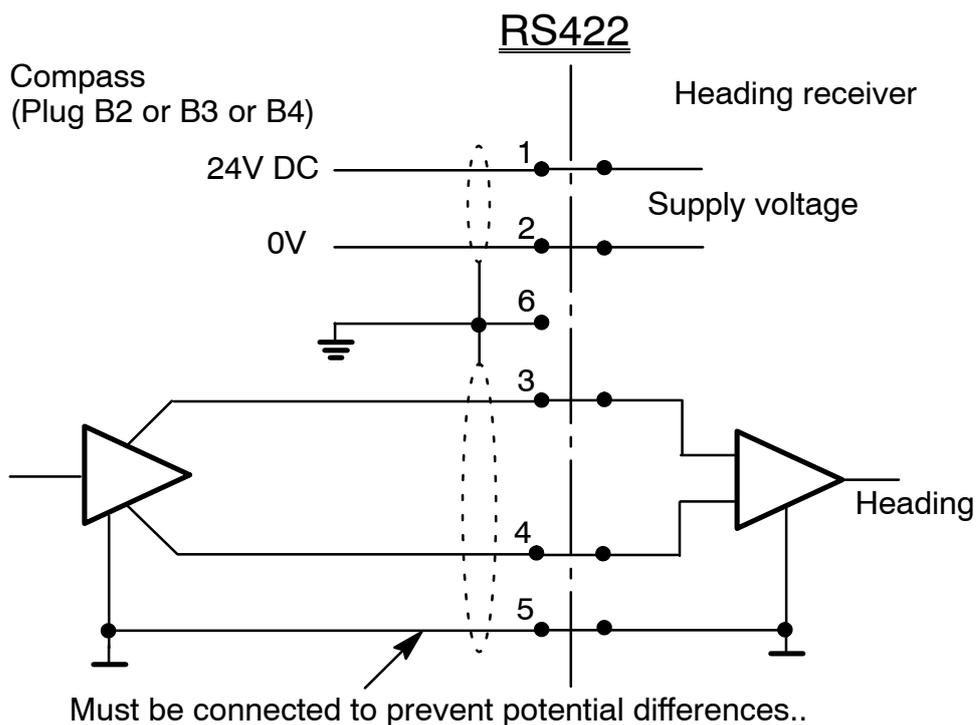
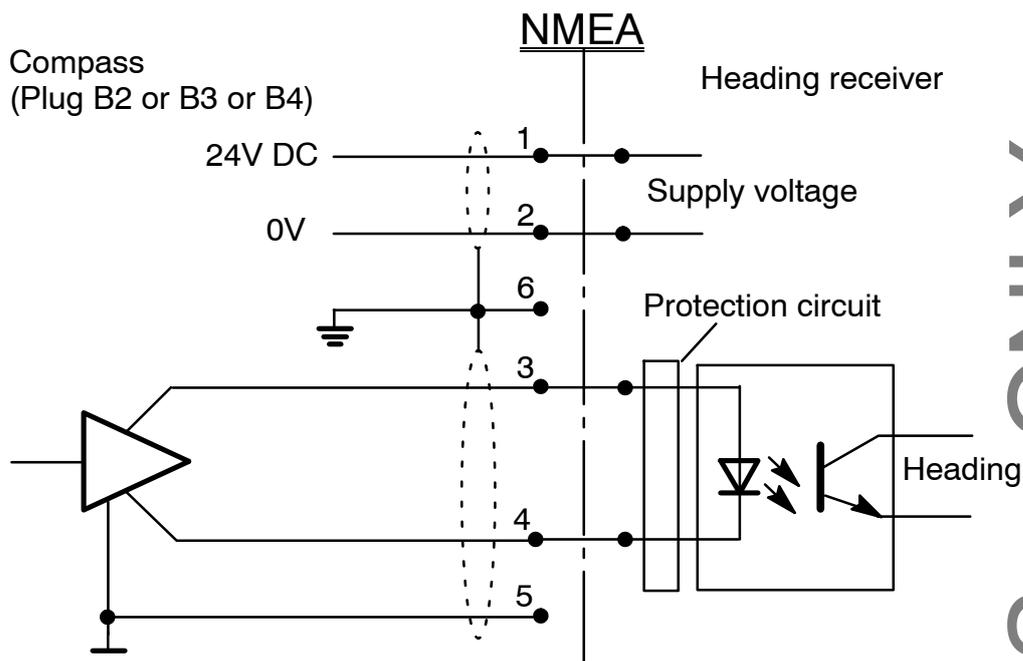
Output 1 (Channel 1)	Plug B2	Connection 3 Connection 4 Connection 5 Connection 1 Connection 2 Connection 6	Tx+ Tx- Tx GND 24VDC 0V ⏚
Output 2 (Channel 2)	Plug B3	Connection 3 Connection 4 Connection 5 Connection 1 Connection 2 Connection 6	Tx+ Tx- Tx GND 24VDC 0V ⏚
Output 3	Plug B4	Connection 3 Connection 4 Connection 5 Connection 1 Connection 2 Connection 6	Tx+ Tx- Tx GND 24VDC 0V ⏚

Please note: The adjusted NMEA formats must match to the adjusted formats of the connected repeater.



Conclusion for the connection of NON RAYTHEON Anschütz products to the compass STD22:

If the NMEA input interface or the coursebus input interface contains a “signal common / signal ground” connection, then this connection has to be connected to “signal common / signal ground” connection of the compass.



COMPASS ONLY

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2.5.1.2 Connecting status and control signal outputs in the STD 22 Compact Gyro Compass

The following status signals and signals for external signalling can be tapped from the Connection PCB of the Gyro compass.

AVAILABLE	compass data available
SYSTEM	general alarm, system error
QS	Quick Settling status information
SEC	Speed Error Correction status information

A LED is assigned to each of these connections on the Connection PCB.

AVAILABLE	LED lights up green when the gyro compass is ready for use (4 hours after the power supply is switched on QS activated -after appr. 1 h)
SYSTEM	LED lights up red if a fault occurs in the gyro compass
QS	LED flashes green if Quick Settling is possible. LED lights up green during Quick Settling. LED goes off when Quick Settling is completed.
SEC	LED goes off if Speed Error Correction is faulty or is impossible because Pulse Log/GPS-receiver information is unavailable LED lights up green if Speed Error Correction is possible.

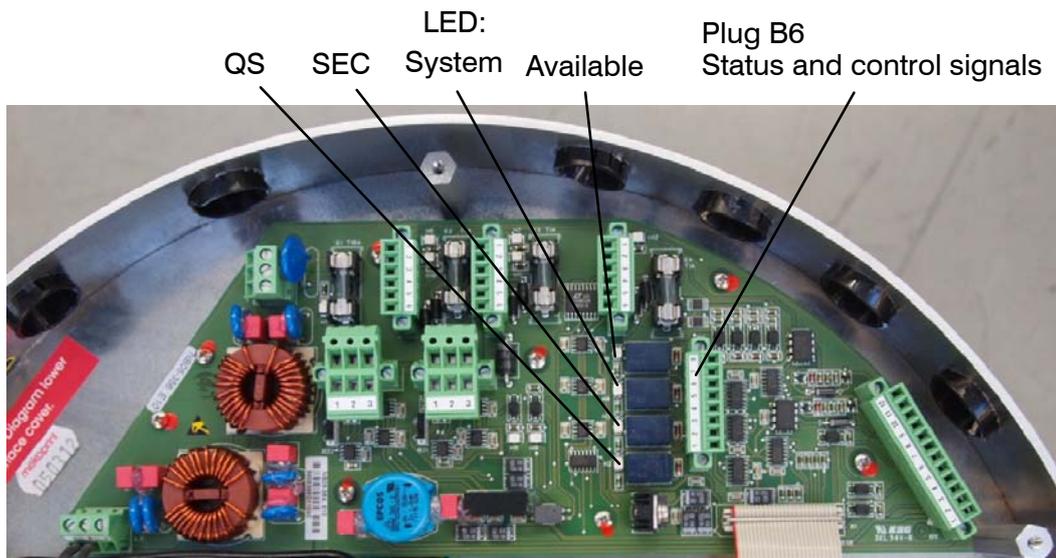


Figure 17: Connection for status and control signals

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AVAILABLE	Plug B6	Connection 7 Connection 8	
SYSTEM	Plug B6	Connection 5 Connection 6	
SEC	Plug B6	Connection 1 Connection 2	
QS	Plug B6	Connection 3 Connection 4	see also section 2.6.3.1



A system alarm has to be connected to a central alarm device (if available).

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2.5.1.3 Connecting signal inputs for QS and SEC in the STD 22 Compact gyro compass

Signal inputs for enabling the Quick Settling function and Pulse Log/GPS-receiver information for Speed Error Correction (SEC) can be connected on the Connection PCB.

The following inputs are available:

SET QS INPUT	for enabling the QS function (via the Quick Settling operator unit)
PULSLOG INPUT	for entering speed information from Pulse Log for the SEC
PULSLOG DIR.INPUT	for entering the direction (forwards/reverse) of the speed information from a Pulse Log for SEC
GPS INPUT	for entering position information and where appropriate the speed input from GPS-receiver for the SEC
NMEA LOG INPUT	for entering speed information from a Log with NMEA format for the SEC

To operate the Speed Error Correction it is necessary to connect a Pulse Log or a GPS-receiver.

Setting the source of the speed sensor for Speed Error Correction is explained in section 2.6.4.7 .

The connecting cable cross section should not be less than 0.5mm²
(see also drawings: Cable and Connection Diagram 110-233.HP009 ,HP010or HP029).

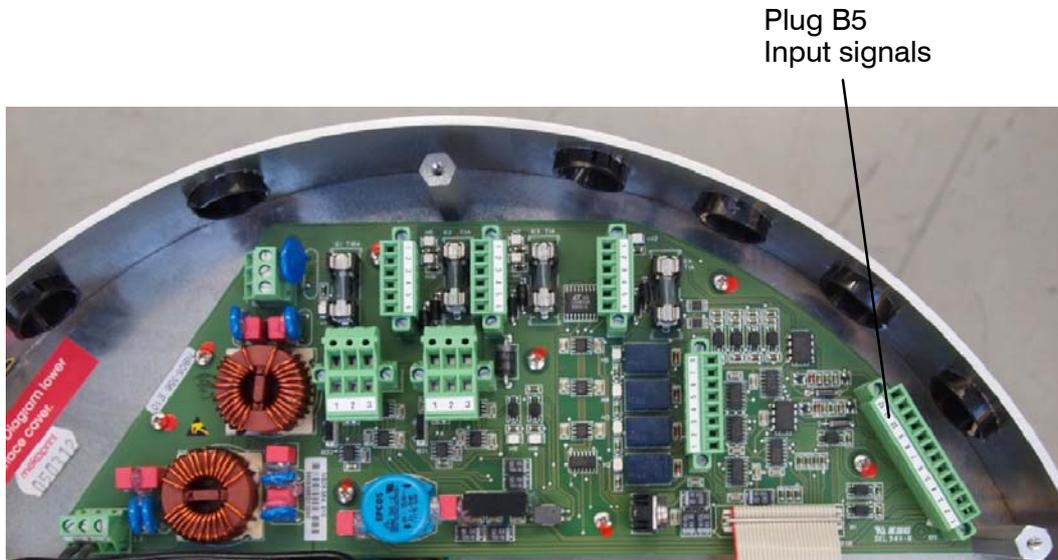


Figure 18: Connection of signal inputs for QS and SEC

SET QS INPUT see also section 2.6.3.1	Plug B5	Terminal 2 Terminal 3	
PULSLOG INPUT	Plug B5	Terminal 4 Terminal 5	
PULSLOG DIR. INPUT	Plug B5	Terminal 6 Terminal 7	
GPS-receiver INPUT	Plug B5	Terminal 12 Terminal 11	Rx+ Rx-
NMEA LOG INPUT	Plug B5	Terminal 10 Terminal 9	Rx+ Rx-

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2.5.1.4 Connecting the power supply cable

The STD 22 Compact Compass operates at 24VDC.

This voltage can be generated directly using an AC/DC converter (see section 2.6.2) or fed directly from the 24VDC ship's mains to the compass.

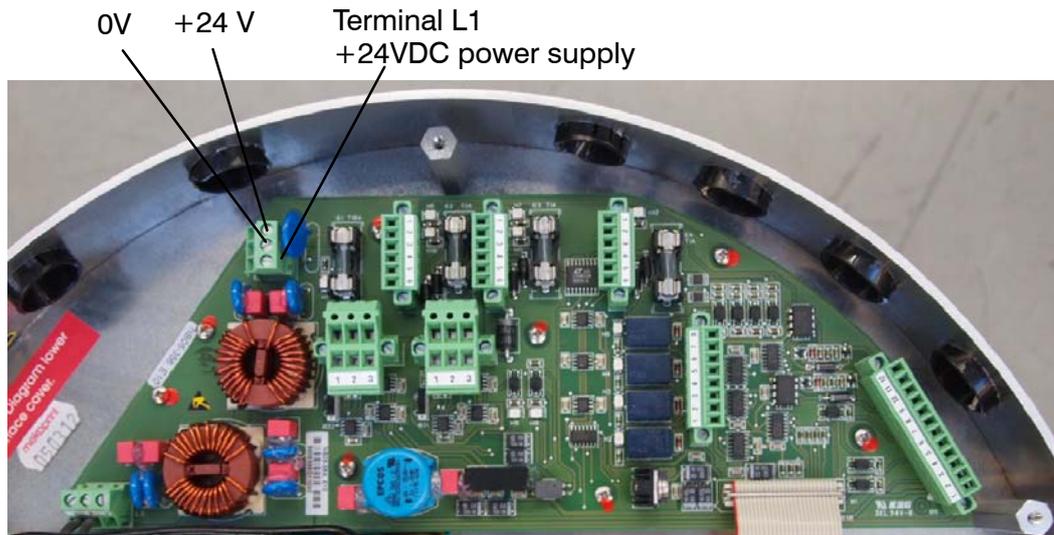


Figure 19: Connection of the +24VDC power supply

The 3-core cable that is used should have a conductor cross-section of $\geq 2.5\text{mm}^2$

At terminal L1 (see Figure 19) connect a power supply of
with +24VDC at terminal 1

0V at terminal 2

2.5.1.5 Connecting the compass to earth

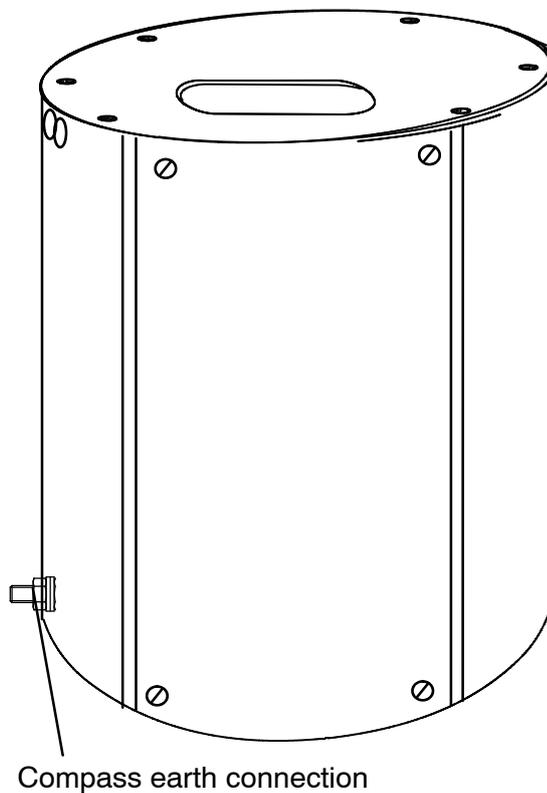


Figure 20: Connection of compass to earth

An earth connection (ship's earth) must be made using the earthing shown in Figure 20. The earth connection must have a common reference to the other components!

Installation and Service manual

Compass STD 22 Compact

2.6 Installation and commissioning of optional features

2.6.1 Installation and commissioning of the Additional Output Box 143-103

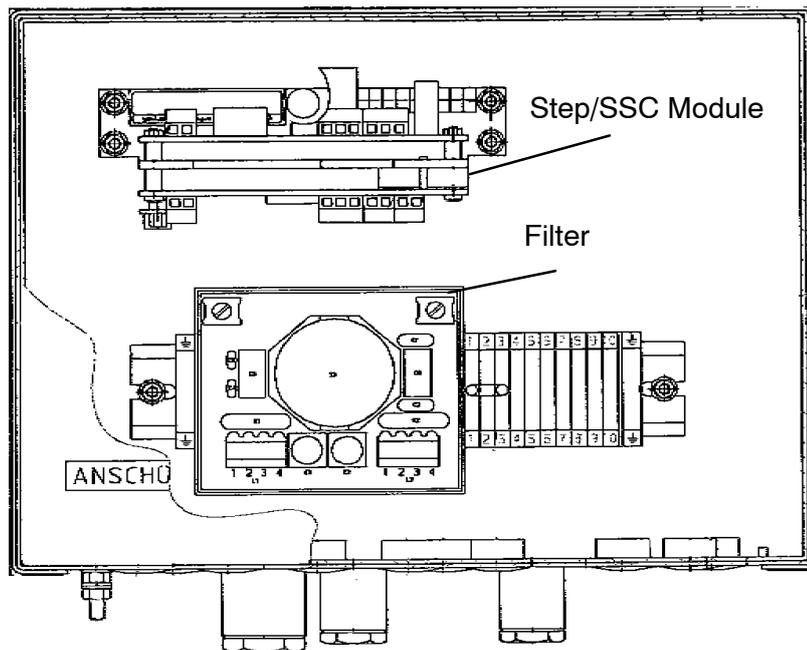


Figure 21: Additional Output Box 146-103 (device open)

Install the Additional Output Box as shown in dimensional drawing 146-103HP005. Ensure that it is properly connected to the ship's earth.

Connecting the power supply:

24VDC at terminal L1, terminals 3 (+) and 4(-) of the mains filter.

The power supply can be taken directly from the ship's supply (24VDC) or from terminals 6, 7, 8 or 9 (+) and 11, 12, 13 or 14 (-) of the AC/DC-Converters (if supplied) (see also section 2.6.2).

Making a signal connection:

(see also Cable and Connection Diagram 110-233.HP010
and wiring diagram 146-103.HP007)

A 2-core, screened cable with conductor cross-section $\geq 1\text{mm}^2$ is used to create a connection between:

Plug B4 on Connection PCB of the STD 22 Compact Gyro Compass

Terminal 3 (TX+) und 4 (TX-)

and

terminal board L4, terminals 1 (Rx-) und 2 (RX+) of the Step/SSC Modules in the
Additional Output Box (siehe Figure 21).

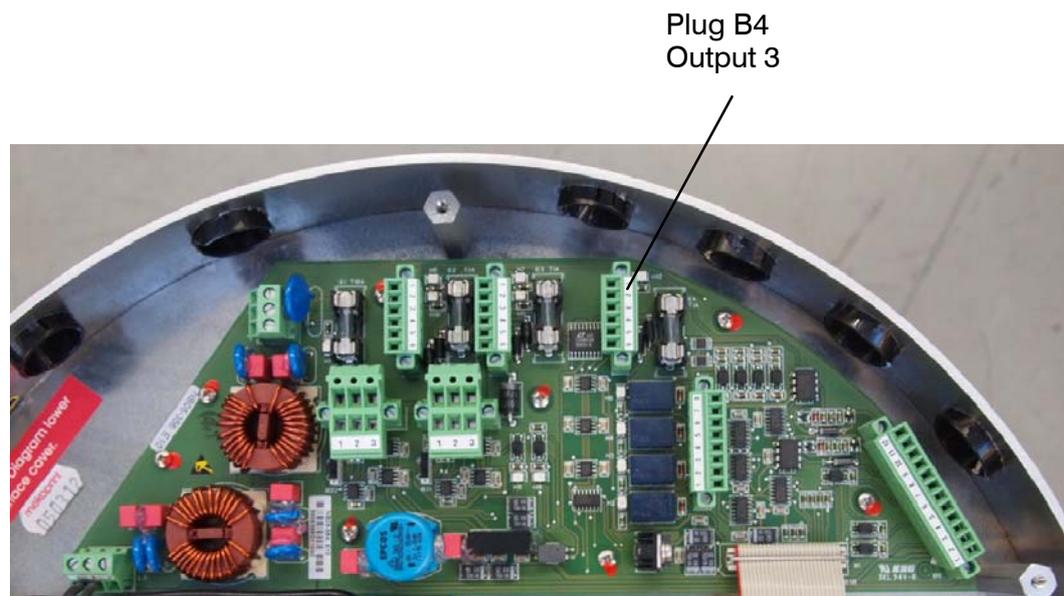


Figure 22: Connection of Course Bus in the STD 22 Compact Gyro Compass

The signal outputs from the Additional Output Box are created as shown in the drawings

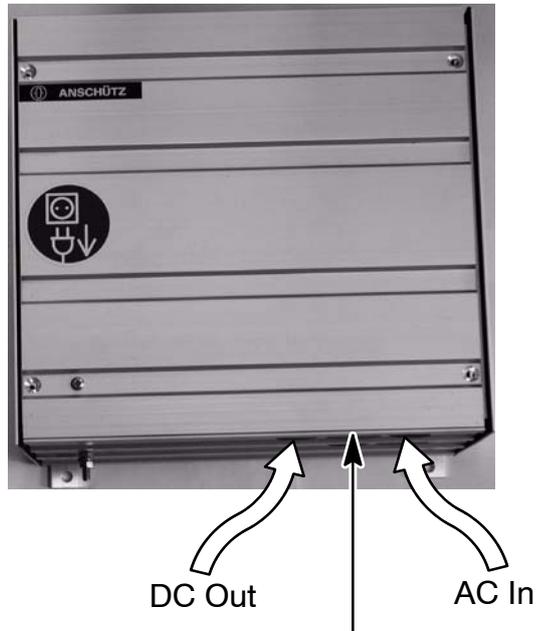
- Cable and Connection Diagram 110-233.HP010

and

- Wiring diagram 146-103.HP007.

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2.6.2 Installation and commissioning of the AC/DC Converters 121-062



One cable inlet must not be used between AC In and DC out!!

Figure 23: AC/DC Converter

NOTE: Detailed dimensions can be found in drawing 121 D 062.HP005.
For connecting the AC/DC Converter, see also Cable and Connection Diagram STD 22 Compact 11-233.HP010.
and connection diagram on the cover.

Fasten the AC/DC Converter on a firm surface with 4 screws.

The installation of the power supply (AC/DC-Converter) should only be performed by an experienced electrician.



The 24 VDC supply voltage should be engineered as a low-security-voltage according to SELV.



Caution:

Before connecting the cable, the AC/DC Converter must be disconnected from the power supply and safeguarded against reconnecting until it is set into operation.

Take care to ensure that a common earth is used for all components of the STD 22or STD 22 Compact Gyro Compass.

To connect the AC/DC Converter to the ship's mains, use a cable which meets following minimum requirements:

2 x 1,5mm² (with screen, single-side connected to the housing)

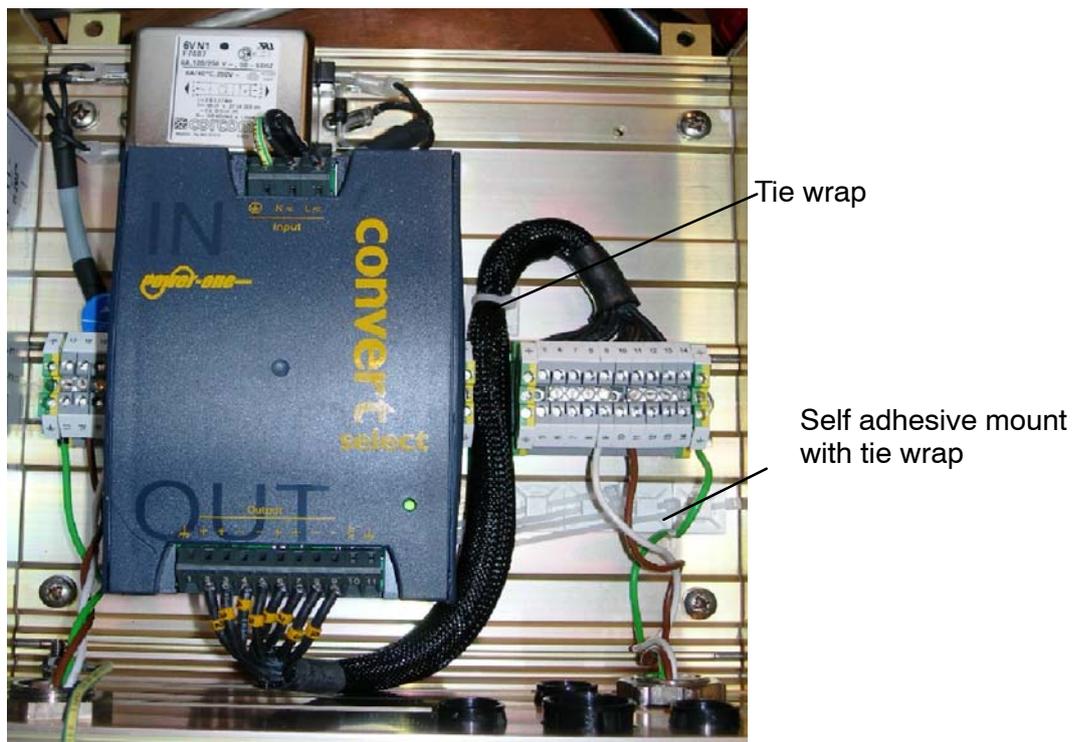


Figure 24: AC/DC Converter (Terminal board)

Installation and Service manual Compass STD 22 Compact



To connect the cables to the terminal board, the plastic cover has to be pulled off from the terminal board.

Cables should not be lengthened too long, to prevent a short circuit to a neighbour terminal by an inadvertently loosening.

Additionally the cable should be fixed (as shown in Figure 24) with tie wraps and self adhesive tie mounts. After that the plastic cover has to be pulled on the terminal board.

The ship's electrical supply ($AC_{IN} = 115...230V, 50/60Hz$) must be connected to the terminal board at terminals **17** and **19** or **18** und **20** see Figure 24.

To connect the AC/DC Converter with a 24VDC load, use cables which meet the following minimum requirements:

- 2 x 2,5mm² (with screen) gyro compass
- 2 x 0,5mm² (with screen) Additional Output Box

The output voltage (24VDC supply) is taken from the terminals:

6(24VDC) and **11**(0V) or

7(24VDC) and **12**(0V) or

8(24VDC) and **13**(0V) or

9(24VDC) and **14**(0V) .

Before connecting the 24VDC load to the AC/DC Converter, the output voltage must be measured. It must be within the tolerance range of 18 VDC to 36 VDC.

After the ship's mains is switched on, the AC/DC Converter is supplied at 24VDC.

The AC/DC Converter does not need to be switched on separately.

**2.6.3 Installation and commissioning of the Operator Unit Quick Settling (QS)
130-606**

(see also manual no.: 3764)

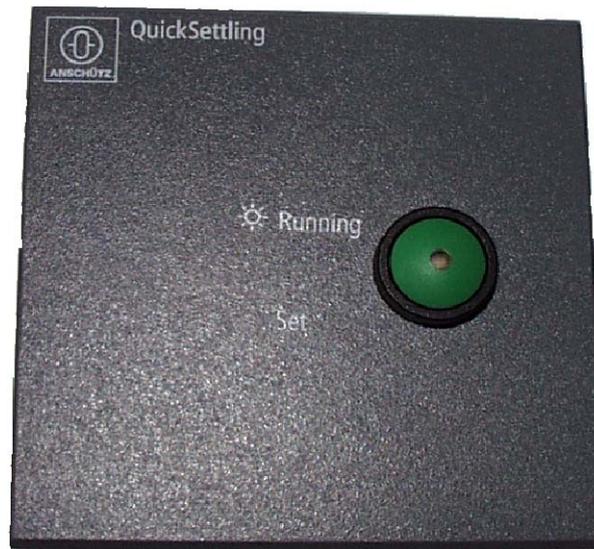


Figure 25: Operator Unit Quick-Settling (front view)

Installation and Service manual Compass STD 22 Compact

2.6.3.1 Installing the Operator Unit Quick-Settling

NOTE: Detailed dimensions can be found in drawing 130 E 606.HP005.
For connecting the Operator Unit Quick Settling, see also Cable and Connection diagram STD 22 Compact 110-233.HP010.

The Operator Unit Quick Settling is designed for desk mounting.

When installing ensure there is sufficient clearance underneath the operator unit (minimum 32mm, see drilling scheme)

The Operator Unit Quick Settling can be fixed in a panel up to 17 mm thick.

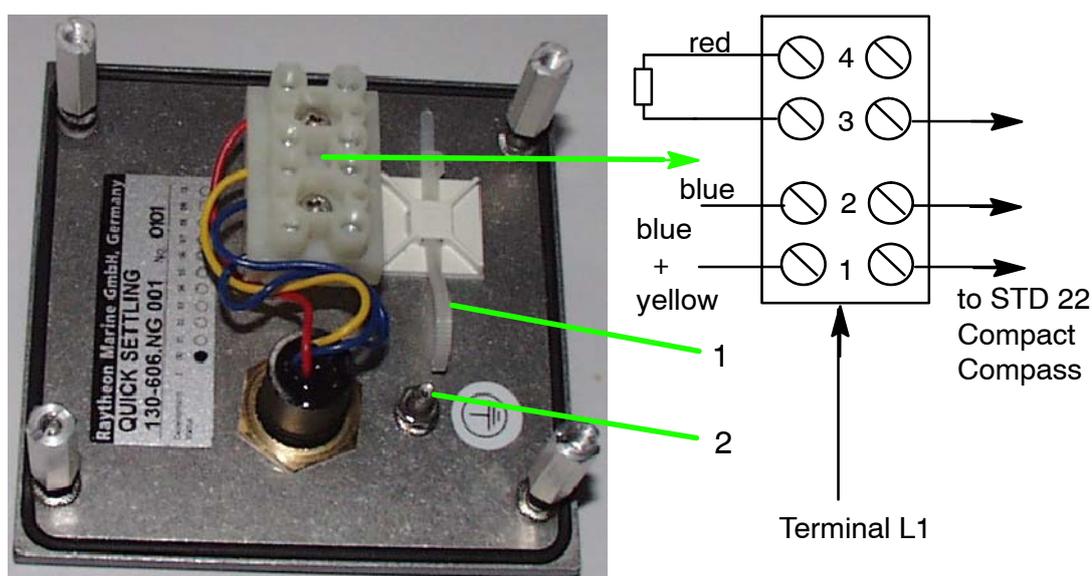


Figure 26: Operator Unit Quick Settling (rear view)

The Operator Unit Quick Settling should be connected to the compass by a cable which meets the following minimum requirements (see also Figure 27).

- 4 x 0,5²mm with screen
- 1 x 0,5²mm (for jumper to be installed)

The screening of the cable is connected to earth in the Operator Unit Quick Settling (Figure 26/2).

The cable is fastened with the strain relief (cable grip) (Figure 26/1) in the Operator Unit Quick-Settling.

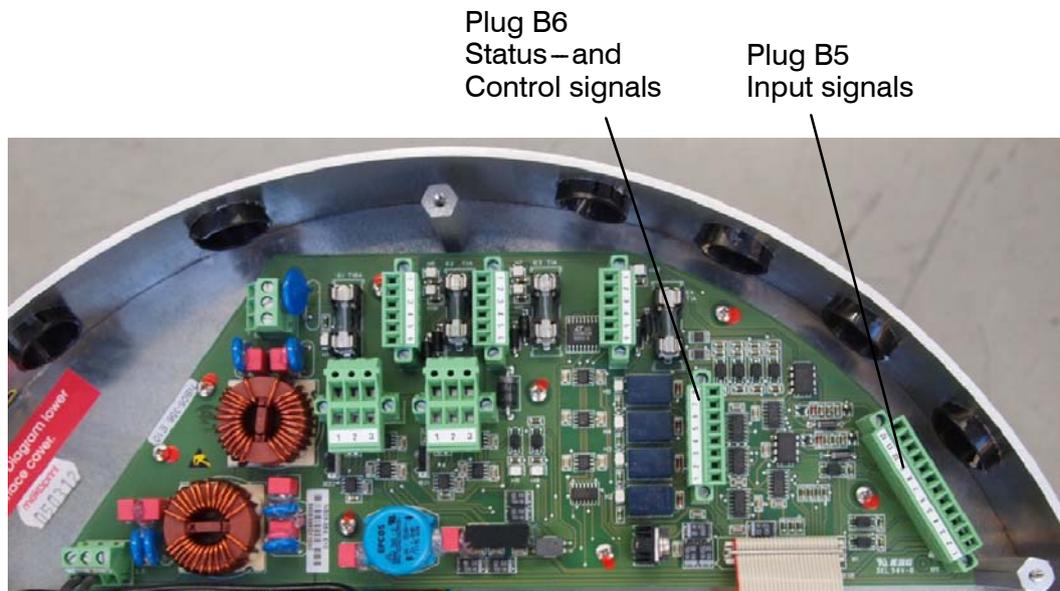


Figure 27: Connecting the Operator Unit Quick Settling in the STD22 Compact Gyro Compass

Operator Unit Quick-Settling	STD 22 Compact Gyro Compass
Terminal L1, connection 1	Plug B5, connection 3
Terminal L1, connection 2	Plug B5, connection 2
Terminal L1, connection 3	Plug B6, connection 2
STD 22 Compact Gyro Compass: jumper from plug B6, Pin 1 to plug B5, Pin 1 (24VDC)	

Installation and Service manual

Compass STD 22 Compact

2.6.4 Switching on, settling and adjustment

2.6.4.1 Switching on the compass

The compass unit switches on when the power supply is activated on the main control panel.

2.6.4.2 Checks on the compass

Measuring the compass power supply voltage (on the compass).

This voltage must be within the tolerance range (18 VDC to 36 VDC).

Terminal board L1
Power supply connection

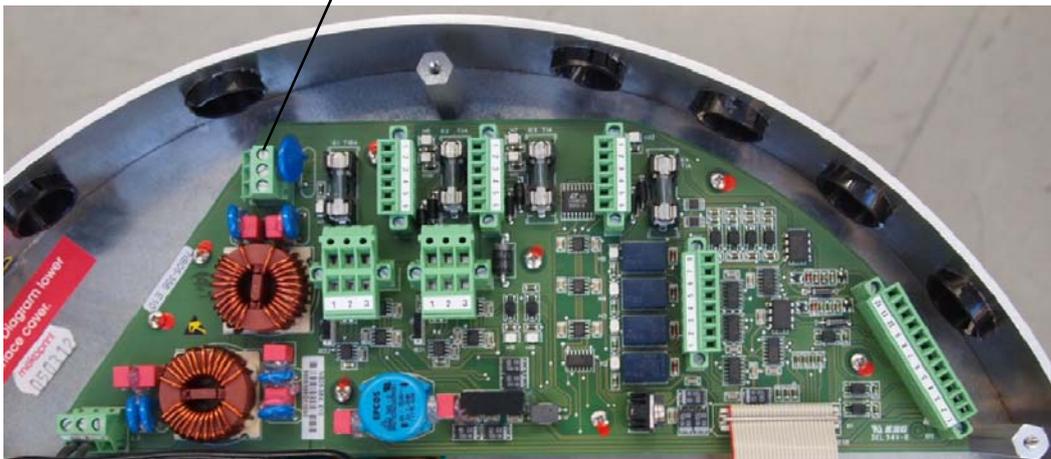


Figure 28: Measuring the compass power supply voltage

Terminal board L1 terminal 1 +24VDC

Terminal board L1 terminal 2 0V

NOTE: The absolute lower limit for the power supply voltage is 18VDC, the absolute upper limit is 36VDC!

When connecting cables, ensure that these values are adhered to.

Checking the DIP switch settings on the compass (see Figure 29):

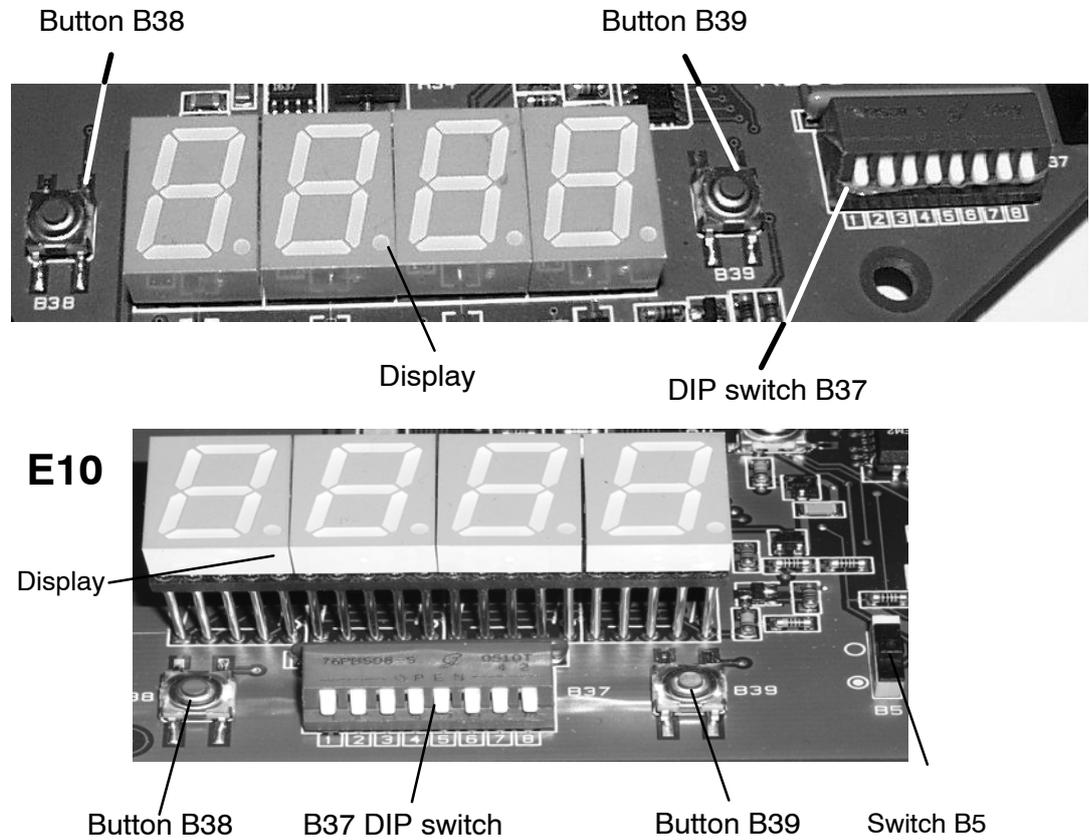
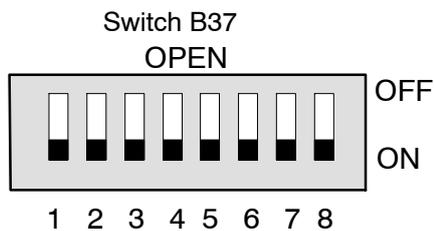


Figure 29: Checks on the compass before setting into operation

All DIP switches in the “ON” position.



Switch position B5:

- Operation
- Development and service only

Installation and Service manual

Compass STD 22 Compact

2.6.4.3 Setting the STD 22 Compact Compass into operation

The compass goes into heating stage for the first 30 minutes (this period will vary depending on the temperature of the supporting liquid), during which time the course output of the compass should not be used, and the letter “h” is displayed as the leading sign on the digital display (see Figure 30).

During the settling in stage (for 4 hours after switching on), the course output of the compass may be used; **however, the deviation from the actual course may still be considerable (as well as it is at all connected course receivers).**

During this period, an additional dit appears in the digital display of the compass (see Figure 31).

(The “Quick Settling” option reduces the settling in stage to appr. 1 hour).

After 4 hours from switching on, the compass course may be used.
4 hours after switching on, the compass has a accuracy of $<2^\circ$.

After appr. 5 hours (after switching on), the compass has an accuracy of $0,1^\circ \times 1/\cos$ latitude.

on the compass

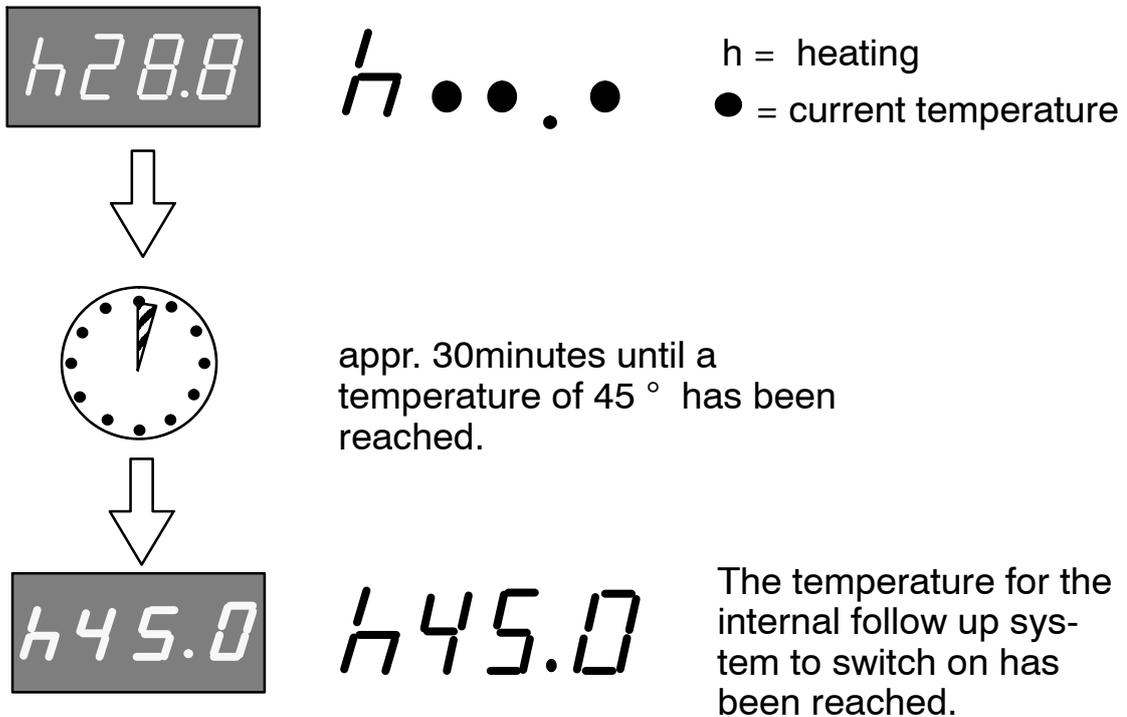


Figure 30: Indications on the compass during the heating stage

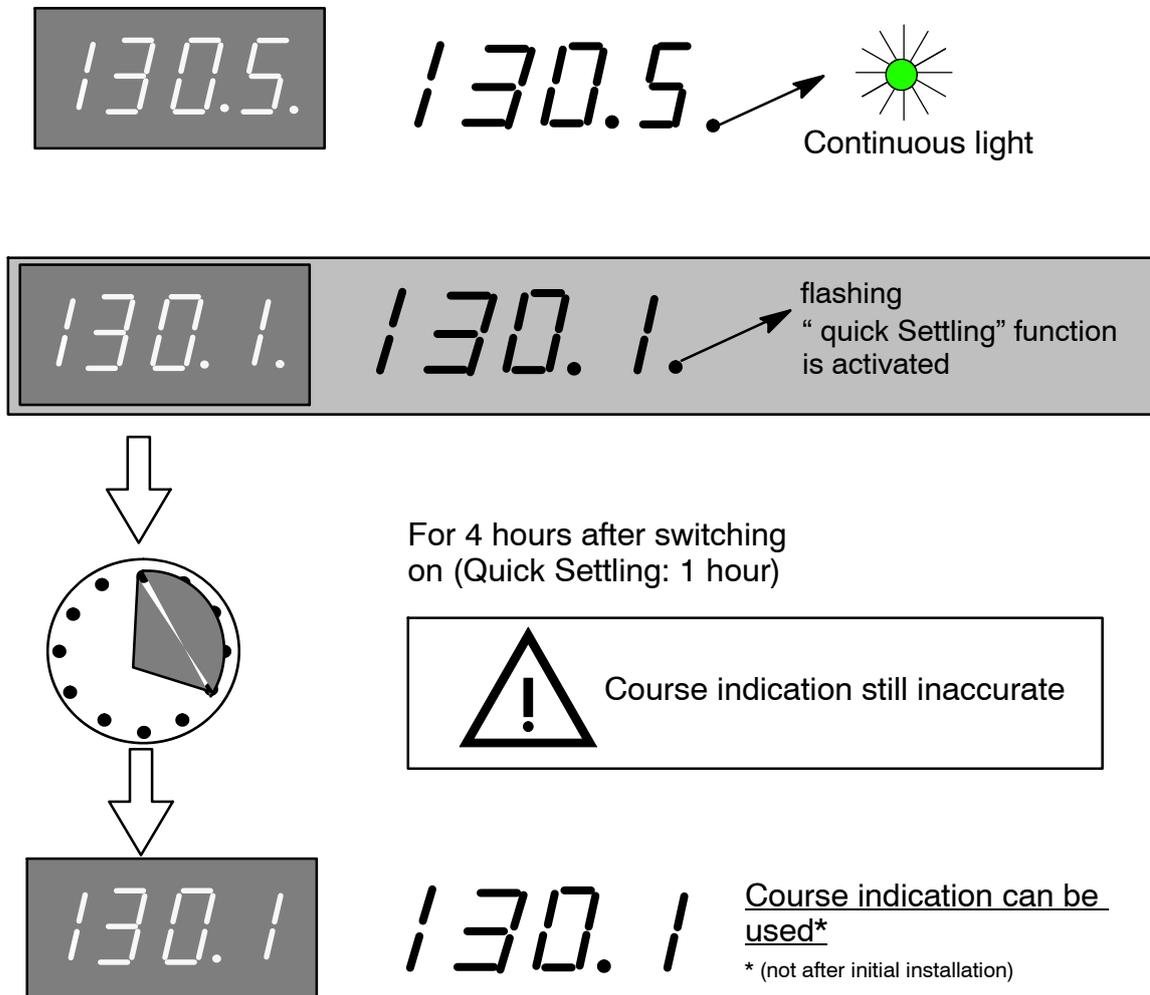


Figure 31: Indications on the compass during the settling stage

Installation and Service manual

Compass STD 22 Compact

2.6.4.4 Setting the compass zero (reference course)

Once the compass has been installed, it must be aligned according to its installation location. The compass zero is set using DIP switch B 37 and buttons B 38 and B 39.

The compass must have been in operation for at least 5 hours and/or the ship must be moored for the same time before the compass zero is set.

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).

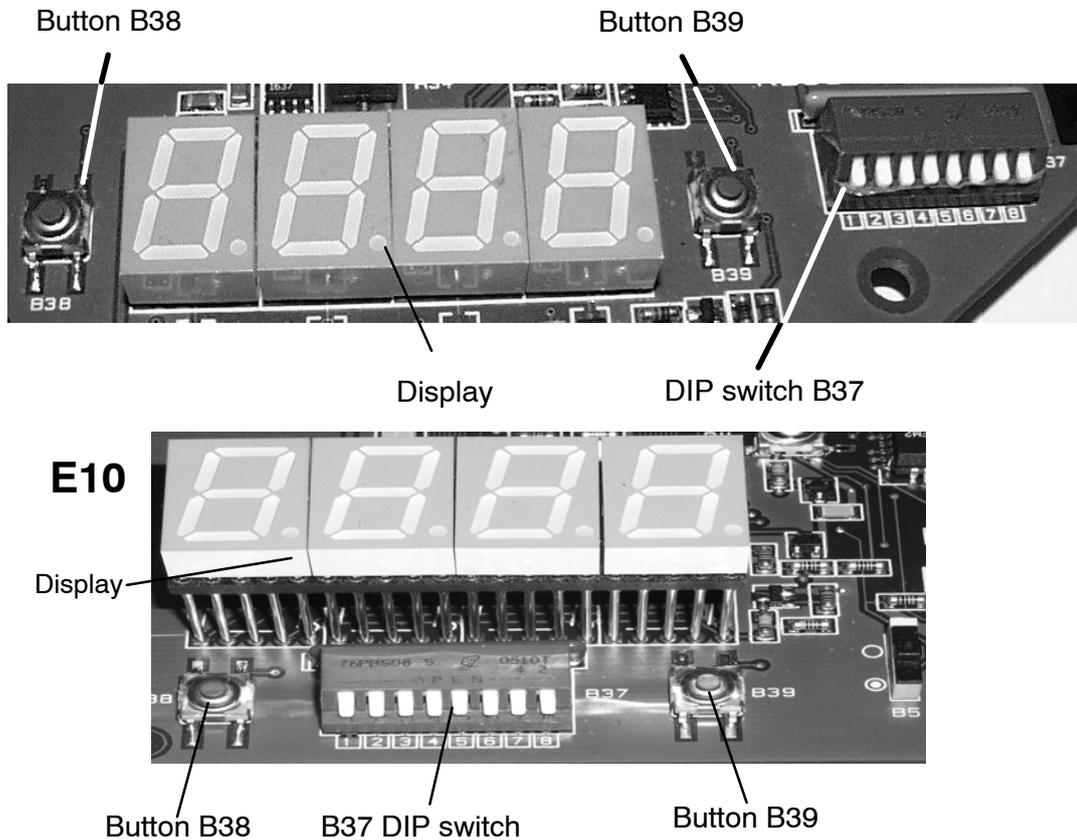


Figure 32: DIP switch B37 and buttons B38/B39



The reference course to be set is determined from the ship's fore-and-aft line (e.g. take a bearing or obtain the pier course from the sea chart).

This reference course is entered according to the following procedure.

- Set DIP switch B37 "1" to the "OFF" position.
The digital indicator is now indicating "ALEr" = Alignment Error
- Press button B38 or button B39 until the heading you require is displayed (B38 changes the value downwards and B39 changes it upwards).
- If you hold down the button the speed at which it changes will increase.
Set DIP switch B37 "1" to the "ON" position. This saves the set value in the compass.

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

- After the reference course has been set, read the alignment error (see next section). (See also Figure 33)

Installation and Service manual Compass STD 22 Compact

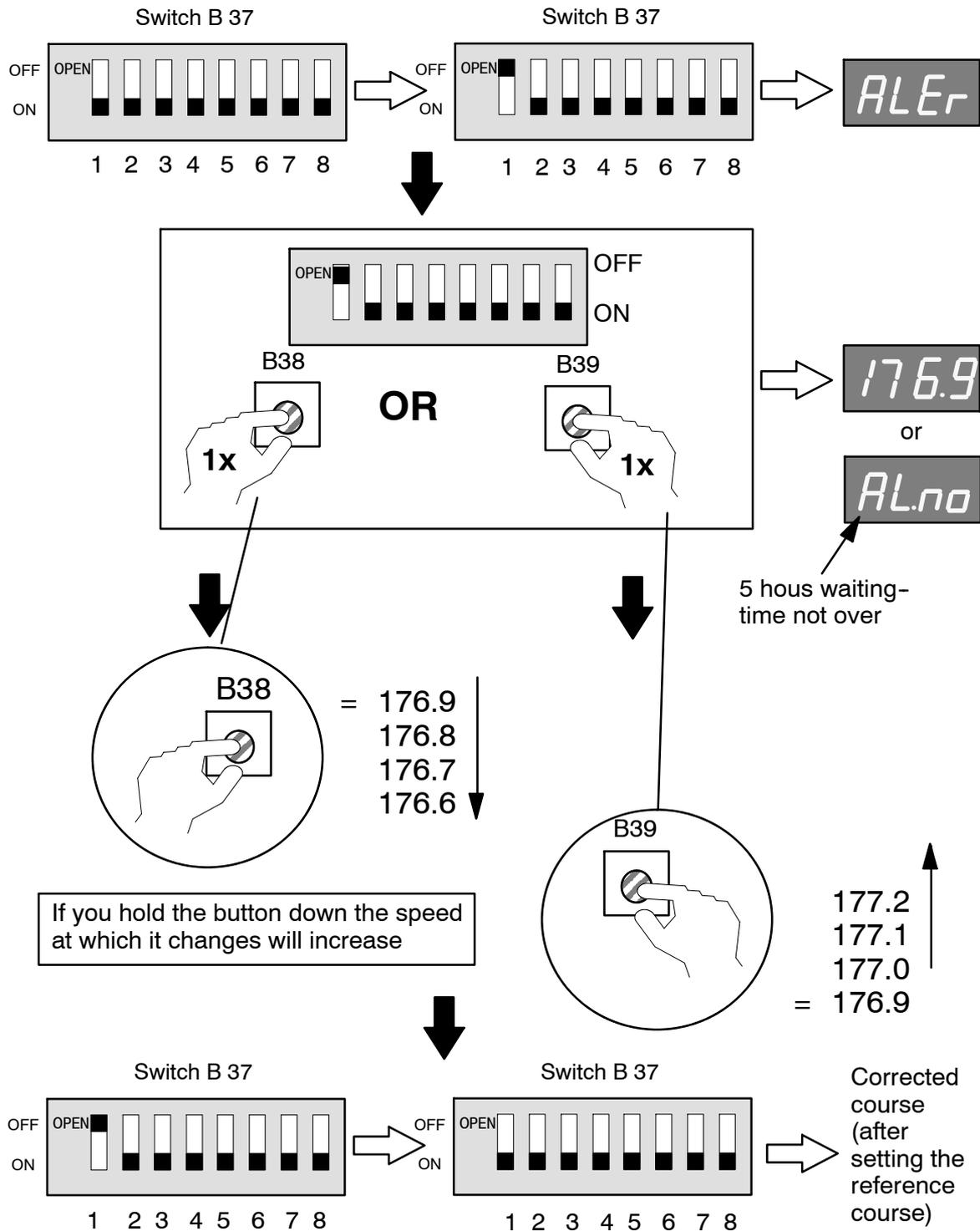


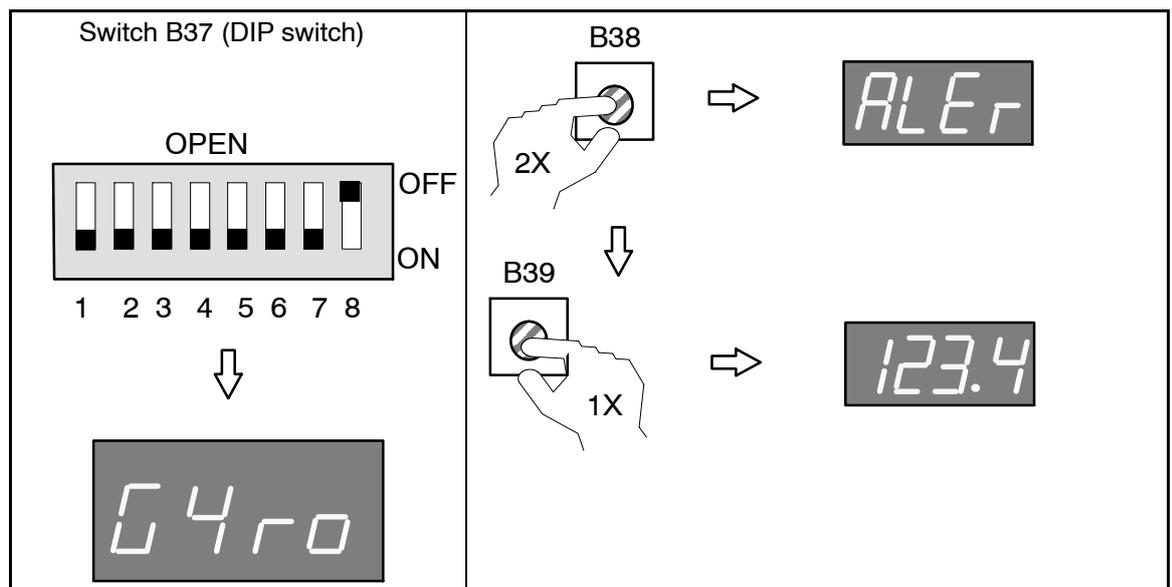
Figure 33: Procedure for setting the compass zero

2.6.4.5 Reading the alignment error

The alignment error must be entered in the table provided for that purpose on the inside of the cover.

Alignment Error	
123.4	

Figure 34: Table at compass cover (inner side)



DIP-switch "8" in "OFF" position.

NOTE: It is essential to enter this value, because the alignment error will be needed if the sensor electronics are replaced, in order to determine the reference course for the new PCB.

DIP switch "8" in "ON" position.

The STD 22 Compass is ready for use.

Replace the cover of the compass and screw it tight.

Installation and Service manual Compass STD 22 Compact

2.6.4.6 Setting Channel 1 and Channel 2

Unscrew and remove the cover of the compass housing.

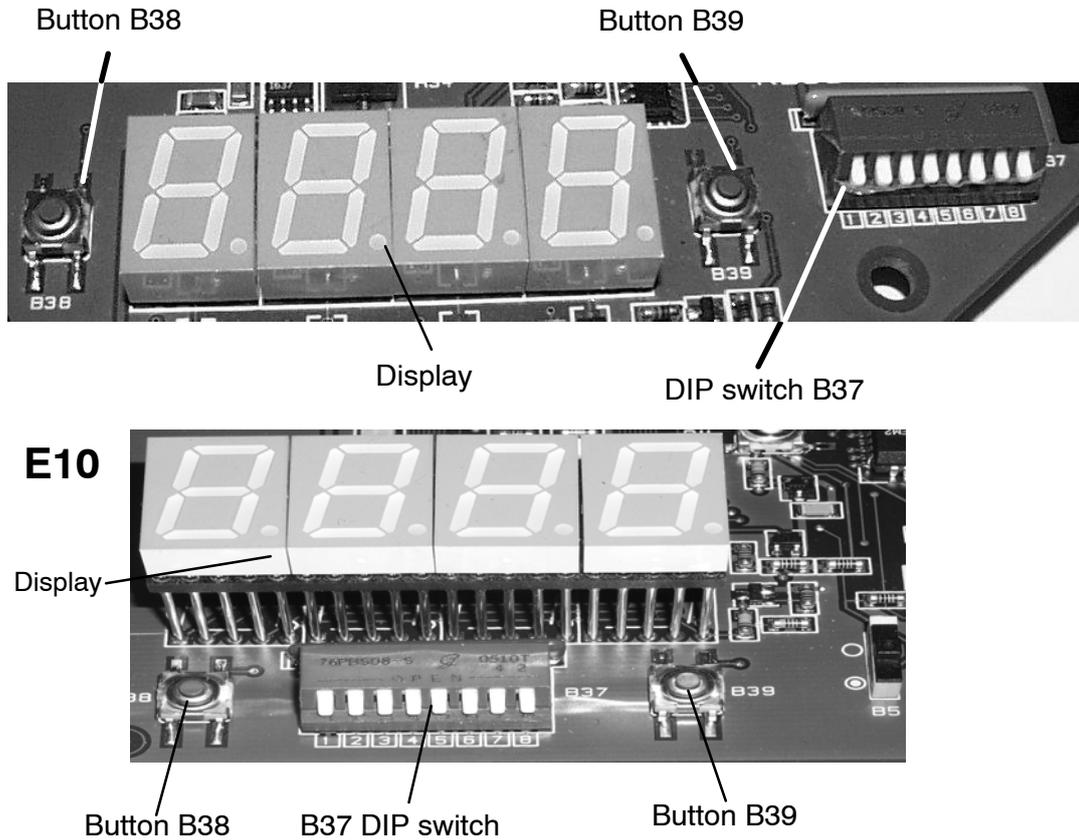
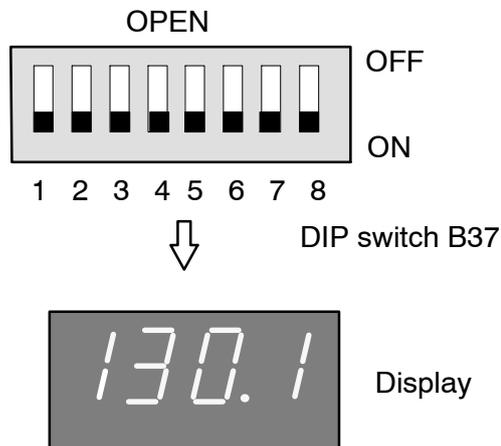
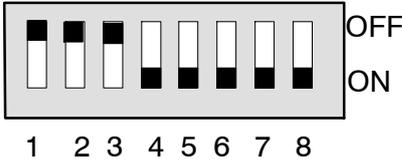
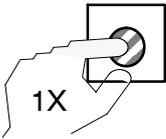
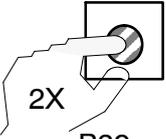


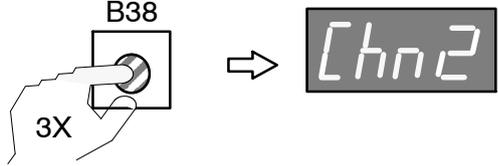
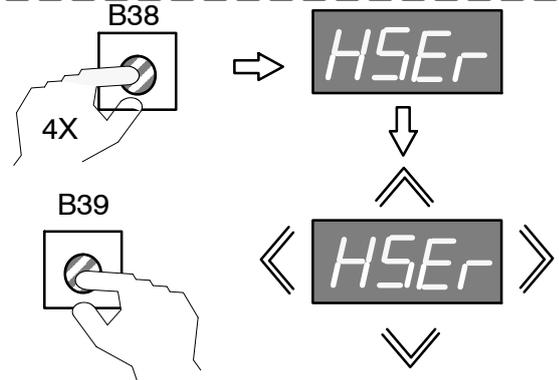
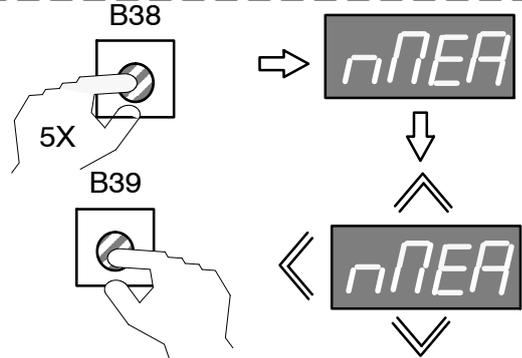
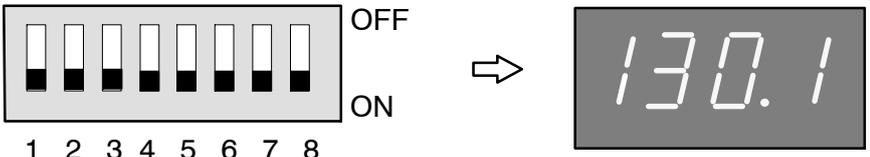
Figure 35: DIP switch B37 and buttons B38/B39

Initial status:



Indications	Comments, Information
<p>Setting the interface for Channel 1 and Channel 2.</p> <p>HSEr = Heading serial (Course Bus) nMEA = NMEA (according to IEC 61162-1)</p> <p>The “flashing” setting is accepted.</p>	
<p style="text-align: center;">Switch B37 (DIP switch)</p> <div style="text-align: center;"> <p>OPEN</p>  <p>1 2 3 4 5 6 7 8</p> <p>OFF ON</p> </div> <p style="text-align: center;">↓</p> <div style="text-align: center;">  </div>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>B38</p>  <p>1X</p> </div> <div style="text-align: center;">  </div> </div> <p style="text-align: center;">↓</p> <div style="text-align: center;">  </div> <p style="text-align: center;">↓</p> <hr style="border-top: 1px dashed black;"/> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>B38</p>  <p>2X</p> </div> <div style="text-align: center;">  </div> </div> <p style="text-align: center;">↓</p> <div style="text-align: center;">  </div> <p style="text-align: center;">↓</p> <hr style="border-top: 1px dashed black;"/> <p style="text-align: right; margin-top: 20px;">Continued on next page</p>

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Indications	Comments, Information
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<p style="text-align: center;">OPEN</p> 	<p style="text-align: right;">Display</p>

2.6.4.7 Setting the information source for Speed Error Correction

Unscrew and remove the cover of the compass housing.

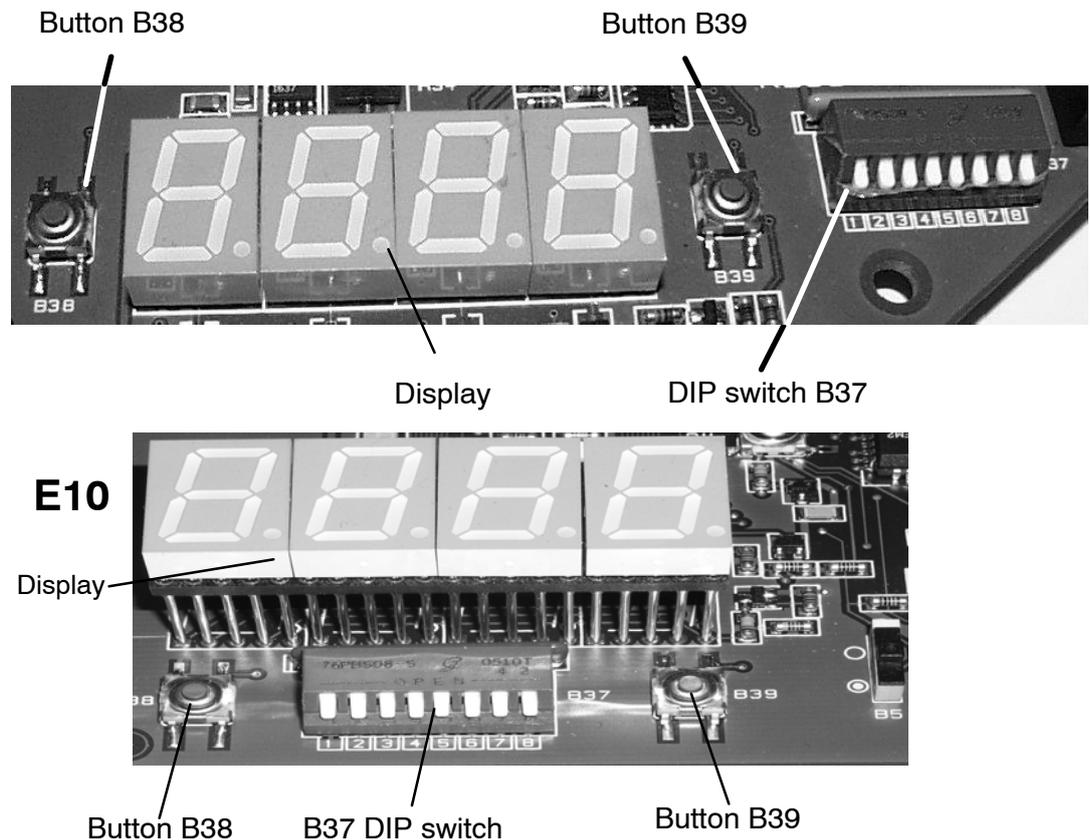
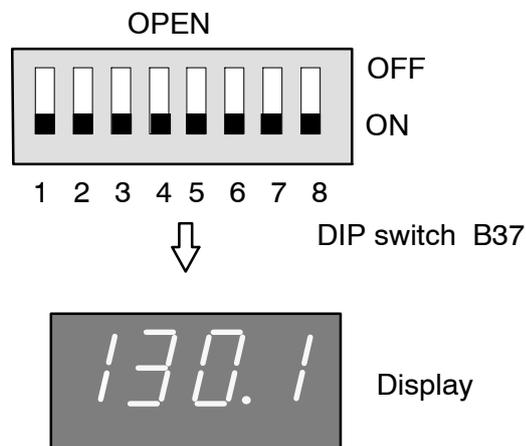


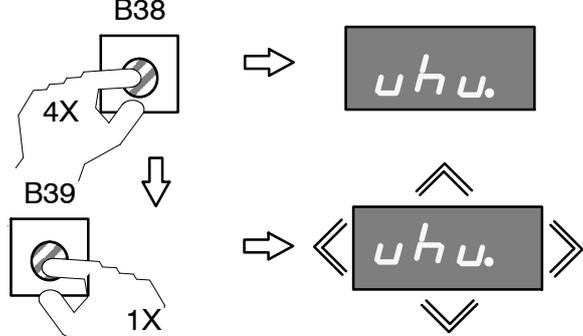
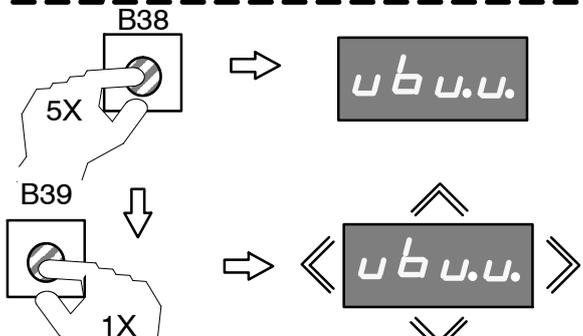
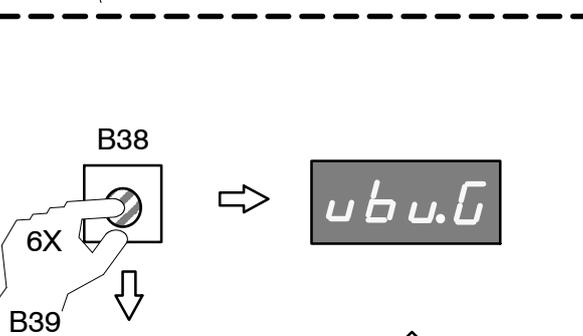
Figure 36: DIP switch B37 and buttons B38/B39

Initial status:

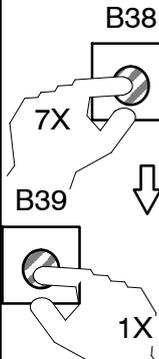
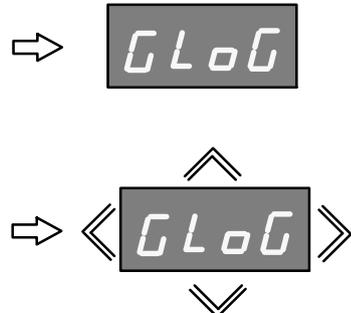
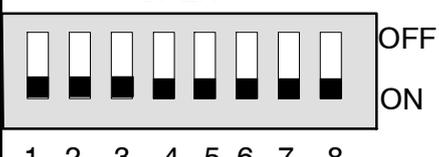


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Indications	Comments, Information
<p>PLoG = Pulse-Log PLd- = Puls-Log (polarity of the input interface inverted) PLd = Puls-Log (polarity of the input interface <u>not</u> inverted) uhu. = NMEA-Log (means water speed in general) ubu.u. = means NMEA Log specified with speed through the water ubu.G = means NMEA Log specified with speed over ground GLoG = Satellite-receiver-speed and Satellite-receiver-position The indications in the flashing display are selected. If the setting does not correspond to the connected device, the course correction relay responds and gives an appropriate warning only to devices which are connected to this alarm output.</p>	
<p style="text-align: center;">Switch B37 (DIP switch)</p> <div style="text-align: center;"> <p>OPEN</p> <p>1 2 3 4 5 6 7 8</p> <p>OFF ON</p> </div> <p style="text-align: center;">↓</p> <div style="text-align: center;"> </div>	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; align-items: center; margin-bottom: 10px;"> → <div style="border: 1px solid black; padding: 5px; background-color: #ccc;">PLoG</div> </div> <div style="display: flex; align-items: center; margin-bottom: 10px;"> → <div style="border: 1px solid black; padding: 5px; background-color: #ccc;"> PLoG <div style="display: flex; justify-content: space-between; width: 100%; border-top: 1px dashed black; border-bottom: 1px dashed black;"> << >> </div> </div> </div> <hr style="border-top: 1px dashed black;"/> <div style="display: flex; align-items: center; margin-bottom: 10px;"> → <div style="border: 1px solid black; padding: 5px; background-color: #ccc;">PLd-</div> </div> <div style="display: flex; align-items: center; margin-bottom: 10px;"> → <div style="border: 1px solid black; padding: 5px; background-color: #ccc;"> PLd- <div style="display: flex; justify-content: space-between; width: 100%; border-top: 1px dashed black; border-bottom: 1px dashed black;"> << >> </div> </div> </div> <hr style="border-top: 1px dashed black;"/> <div style="display: flex; align-items: center; margin-bottom: 10px;"> → <div style="border: 1px solid black; padding: 5px; background-color: #ccc;">PLd</div> </div> <div style="display: flex; align-items: center;"> → <div style="border: 1px solid black; padding: 5px; background-color: #ccc;"> PLd <div style="display: flex; justify-content: space-between; width: 100%; border-top: 1px dashed black; border-bottom: 1px dashed black;"> << >> </div> </div> </div> </div>
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Installation and Service manual Compass STD 22 Compact

Indications	Comments, Information
	
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2.6.4.8 Adjustment of essential operating modes

Unscrew and remove the cover of the compass housing.

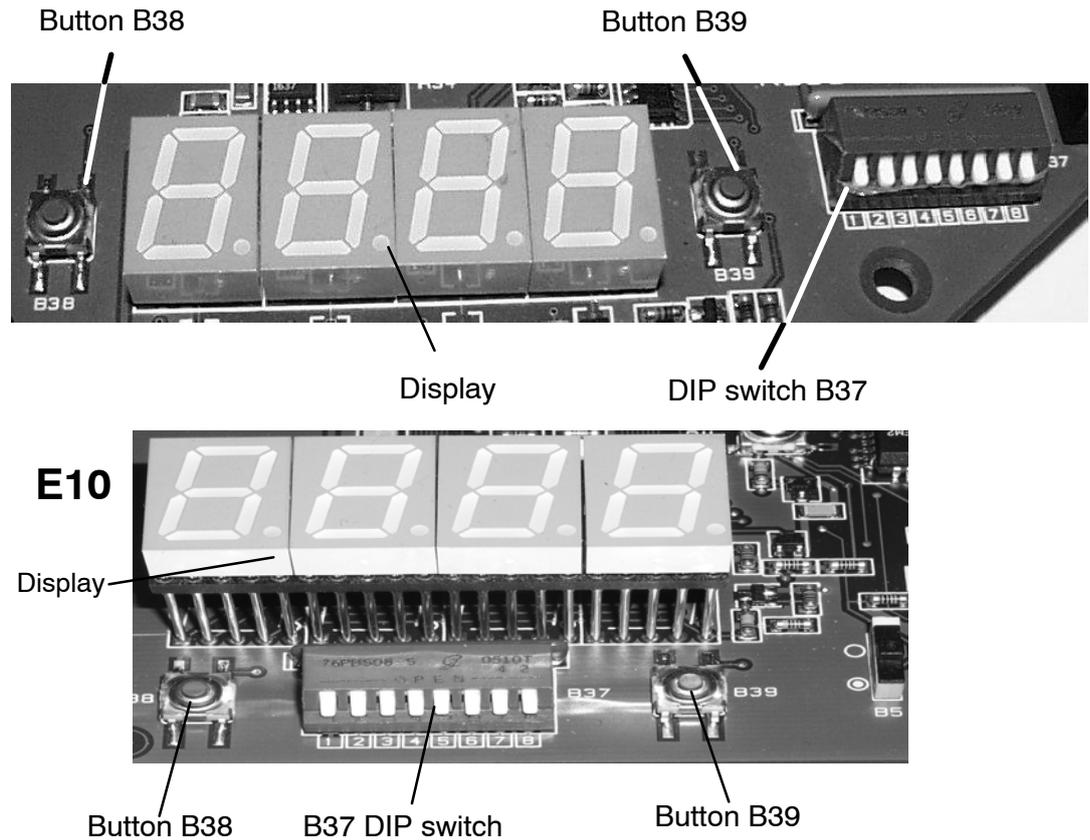
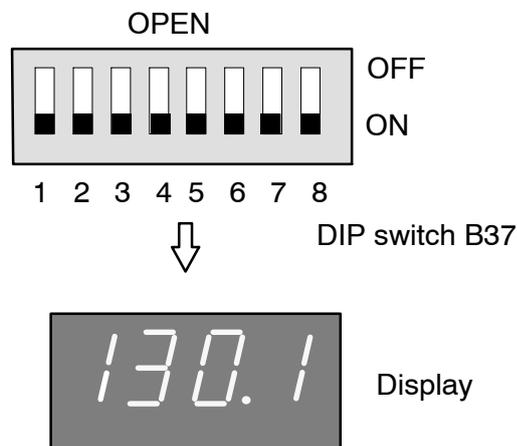


Figure 37: DIP switch B37 and buttons B38/B39

Initial status:



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Note: The procedure to adjust essential operating modes is described on the next four pages.

Set the repetition rate of the NMEA heading data output, the output with or without ROT (Rate of Turn), with or without oil residual error for the speed error correction and the setting of a connected Data Distribution Unit (**Data Distribution Unit is not for STD 22 Compact Gyro Compass**).

1 heading data transmission 1 telegram per second.

10 heading data transmission 10 telegrams per second.

HE.ro heading with ROT.

HE.-- heading only

SECY heading data incorporating Speed Error Correction

SECn heading data without Speed Error Correction

oELY Speed Error Correction with oil residual error (**recommended setting → SEC**)

oELn Speed Error Correction without oil residual error

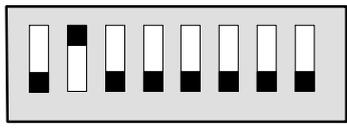
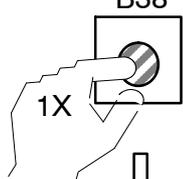
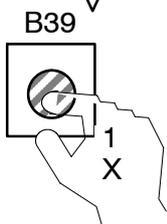
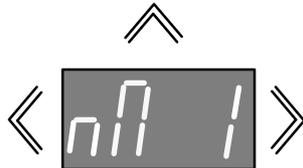
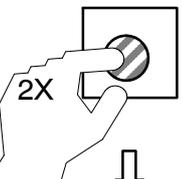
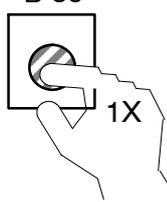
ddUY with connected Data Distribution Unit (**only for STD 22**)

ddUn without Data Distribution Unit (**for STD 22 Compact absolute necessary**)

nMSY NMEA output with SEC

nMSn NMEA output without SEC

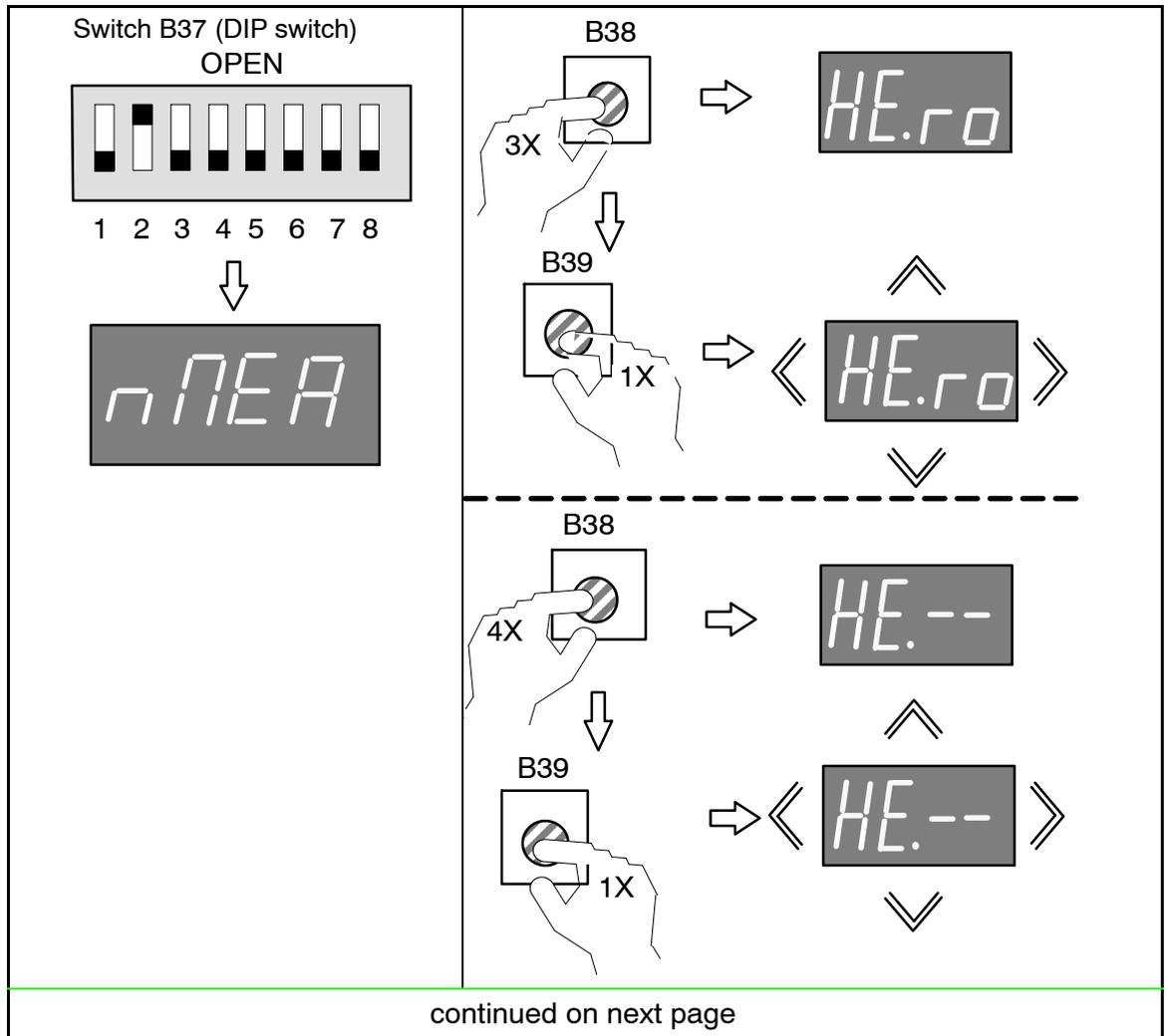
The indications in the flashing display are selected.

<p>Switch B37 (DIP switch) OPEN</p>  <p style="text-align: center;">↓</p> 	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>B38</p>  <p>1X</p> </div> <div style="text-align: center;">  </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> <p>B39</p>  <p>1X</p> </div> <div style="text-align: center;">  </div> </div> <hr style="border-top: 1px dashed black;"/> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>B 38</p>  <p>2X</p> </div> <div style="text-align: center;">  </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> <p>B 39</p>  <p>1X</p> </div> <div style="text-align: center;">  </div> </div>
<p>continued on next page</p>	

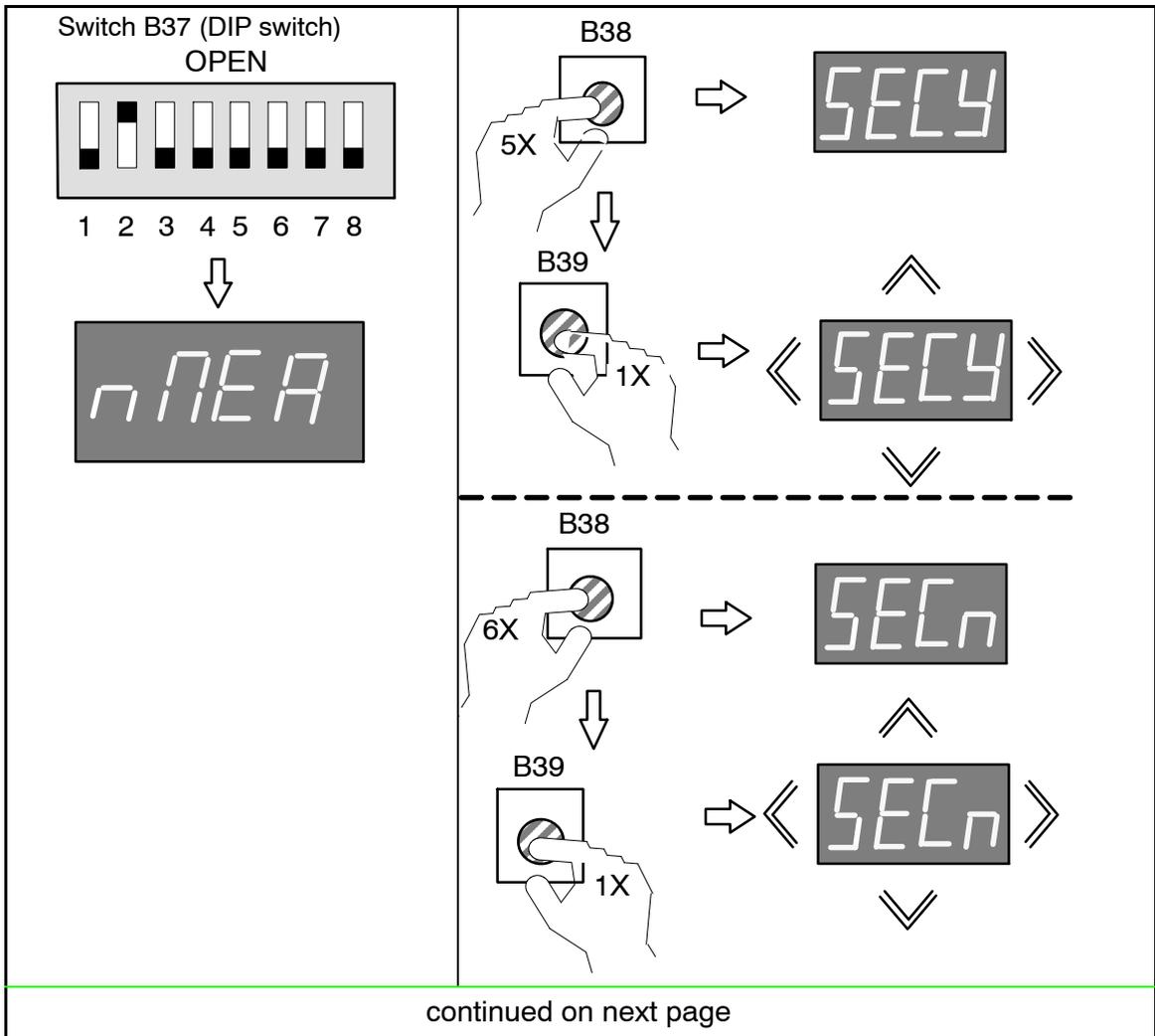
Installation and Service manual Compass STD 22 Compact

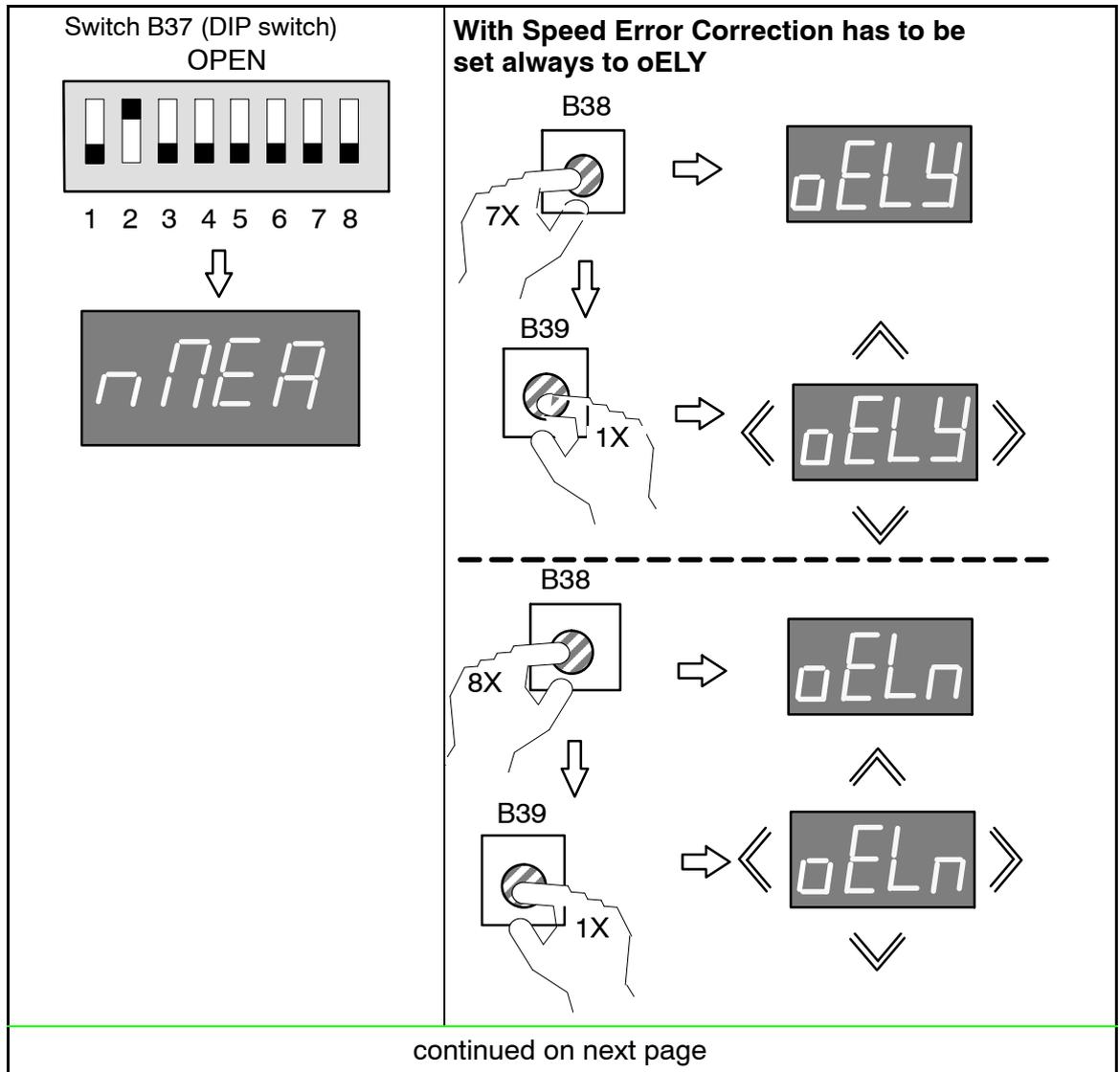


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STD 22

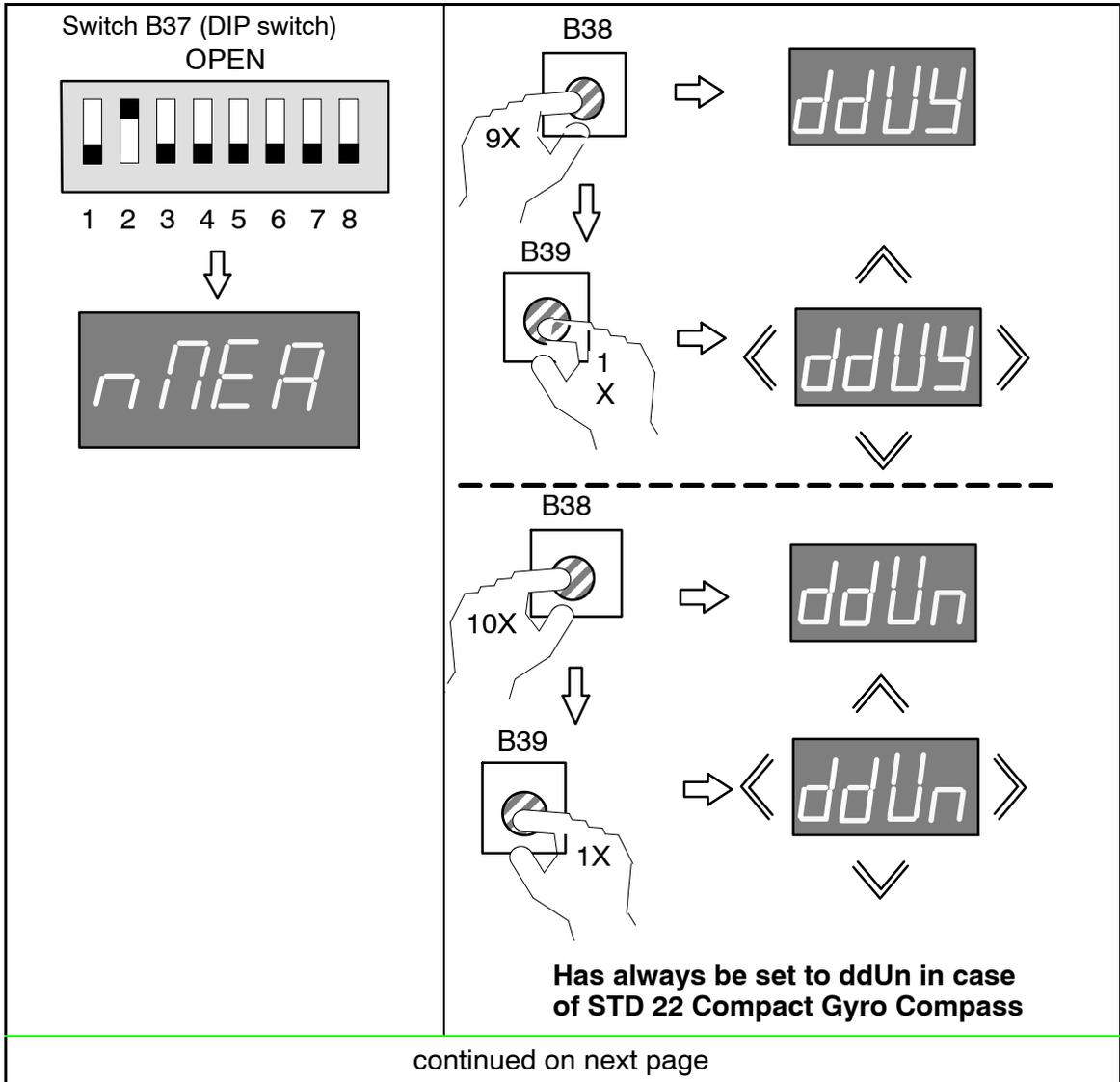


Installation and Service manual Compass STD 22 Compact





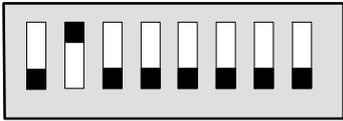
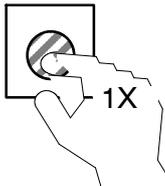
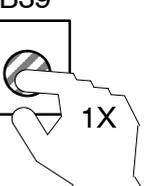
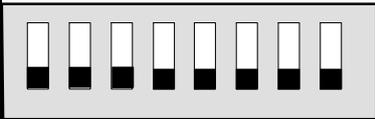
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<p>Switch B37 (DIP switch) OPEN</p>  <p>1 2 3 4 5 6 7 8</p> <p>↓</p> 	<p>B38</p>  <p>11X</p> <p>↓</p> <p>B39</p>  <p>1X</p> <p>→</p>  <p>↕</p> <p>↕</p>  <p>-----</p> <p>B38</p>  <p>12X</p> <p>↓</p> <p>B39</p>  <p>1X</p> <p>→</p>  <p>↕</p> <p>↕</p> 
<p>OPEN</p>  <p>1 2 3 4 5 6 7 8</p> <p>OFF</p> <p>ON</p> <p>⇒</p>  <p>Display</p>	
 <p>Should be set to Y always. Exception: Setting to N only if there is a manual Speed Error Correction (according to values from the table shown in the Operator Manual) or if there are other applicable measurements determining the heading to perform a heading correction. Exception can be a Direct Positioning System (DP) with an Individual SEC (not for Compass STD 22 Compact).</p>	

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2.6.4.9 Function check on externally connected course receivers

Unscrew and remove the cover of the compass housing.

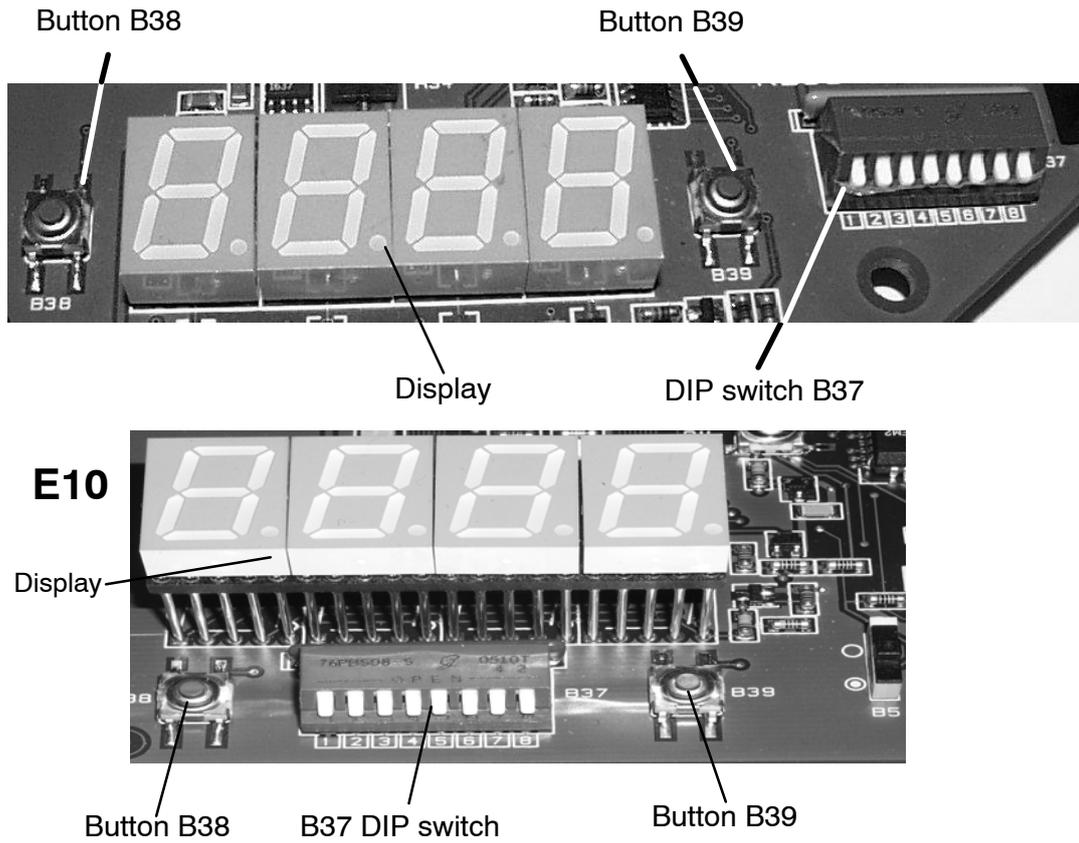
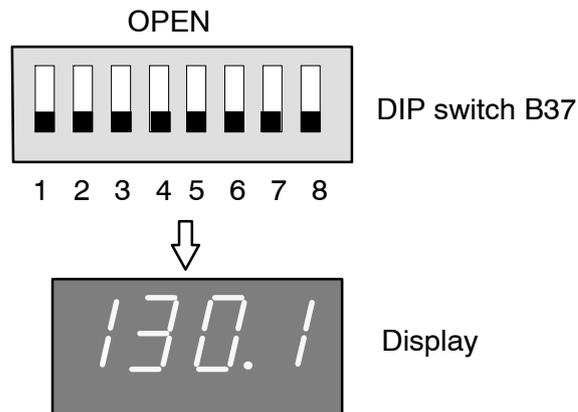


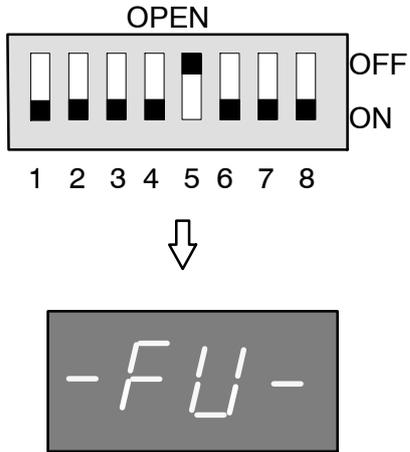
Figure 38: DIP switch B37 and button B38/B39

Initial status:

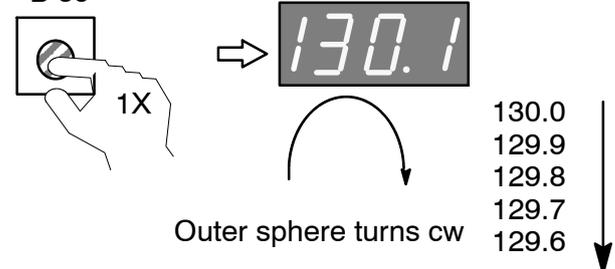


Checking connected course receivers (course data)

Switch B 37 (DIP switch)



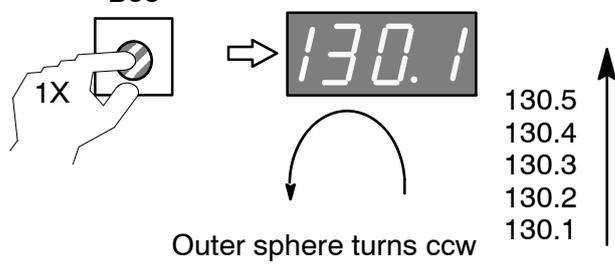
B 39



Outer sphere turns cw

130.0
129.9
129.8
129.7
129.6

B38



Outer sphere turns ccw

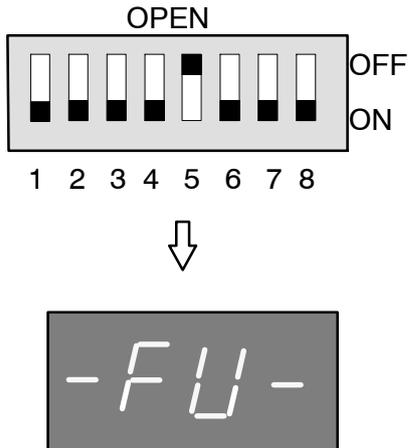
130.5
130.4
130.3
130.2
130.1

Start with push button B39 first.

Or (depending on the development status)

Checking connected course receivers (course data).
Connected course receiver follow with 20°/minute (cw or ccw) and a follow-up and encoder test is performed.

Switch B 37 (DIP switch)



B 39



or

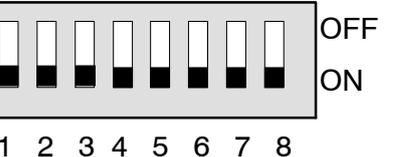
B38



The number of transmission errors is displayed

After 60° - according to 3 minutes - (independent of cw or ccw) one segment lights up (starting with the upper one).

Switch B 37 (DIP switch)





Display

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Intentionally left blank



3 Preparing to install the STD 22 Gyro Compass

To ensure that the STD 22 Gyro Compass is installed and put into operation correctly, these instructions must be followed in the order in which they appear.
It must not be installed or put into operation whilst at sea.

3.1 STD 22 Compass – Scope of Supply

The scope of supply consists of:

- Compass (110-233)
 - Outer sphere
 - Distilled water
 - Supporting liquid
 - Gyrosphere (111-006)
- User manual for the STD 22 Compass
- Installation and service manual for the STD 22 Compass
- Tools and spare parts pack
 - Sealing rings
 - Suction cup
 - Filling device
 - Injector

The STD 22 Gyro Compass is used in conjunction with at least the following items of equipment:

- Distribution Unit 138-118 (separate manual)
- Operator Unit 130-613 (separate manual)

3.1.1 General information concerning installation of the STD 22 Compass

NOTE:

Installation has to be carried out by a trained technician.

When fitting components, observe the following spacing:

Fit the compass enclosure so that the display can be viewed from above and the cover of the enclosure can be removed (see also Dimensional Drawing 110-133.HP005).

To ensure fault-free operation of the STD 22 Compass, it is essential to follow these directions, safety notes and installation instructions.

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Instructions relating to cable cross-sections and earth connections must be adhered to.

The tools which are specified for installing the compass must be used.

Only original parts or parts approved by the manufacturer may be used in connection with the STD 22 Compass.

See also Cable Connection Diagram 110-233 HP009 or HP0029 for the STD 22 Compass.

Gyro Compass should not be installed in oil-containing ambient air, within surrounding in vibration and should be installed on a vibration-free platform on the floor, e.g. 6 mm aluminium or 30 mm wooden basis.

Gyro compass should be installed so close as possible to the centre line of the ship (vertical and horizontal), so near as possible to the water line and within steady ambient air temperature.

It is not allowed to use additional spacers or long mounting screws.

The installation of the power supply (AC/DC-Converter) should only be performed by an experienced electrician.



The 24VDC supply voltage should be engineered as a low-security-voltage according to SELV.



In some system configurations it is necessary to take off heading information from the compass direct - additional to the heading information on the CAN bus. This heading information is uncorrected (without SEC)!

Corrected heading information (with SEC) can be taken off in these system configurations from the distribution unit only.

3.2 Creating cable connections

3.2.1 General information concerning on-board wiring

The cables which are to be connected to the STD 22 Gyro Compass are led through one of the cable entries at the top of the compass enclosure and fixed in the cable entry with a cable clip suitable for the size of the cable.

The cable entries are supplied with the compass.



Caution:

Ensure that cables are not live before creating cable connections.

It is vitally important to ensure that all cables are free of voltage; where appropriate, carry out voltage measurements beforehand and/or disconnect the relevant distributor from the power supply.

To ensure that the compass functions correctly, it is essential to adhere to the following sequence when creating cable connections.

- Strip the cable over a length of approximately 180 mm (depending on the distance of the cable entry from the terminal). Be careful not to damage the screening.
- Trim the screening so as to leave approximately 15 mm on the cable.

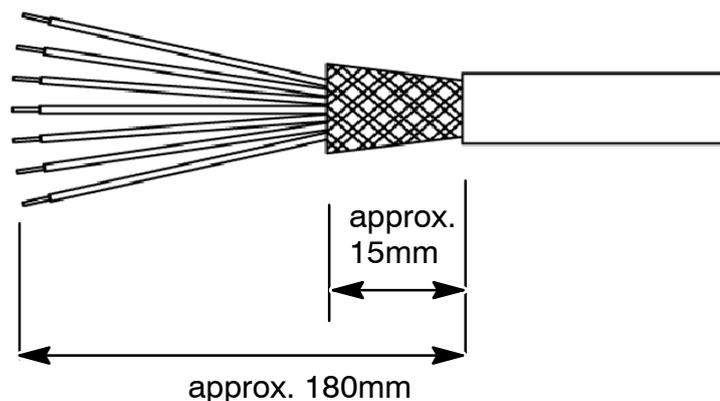


Figure 37: Requirements for stripping the connecting cable

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- Push the components of the screw fastening over the cable.
It is essential to follow the sequence (as shown in Figure 38).
- Check the cone and the mating piece of the earthing insert for corrosion and if necessary remove corrosion with an emery cloth.
- Push the mating piece of the earthing insert to the end of the cable sheath.
- Push the cone inside the screening and against the mating piece. Ensure that the screening is evenly distributed over the cone (see Figure 38).

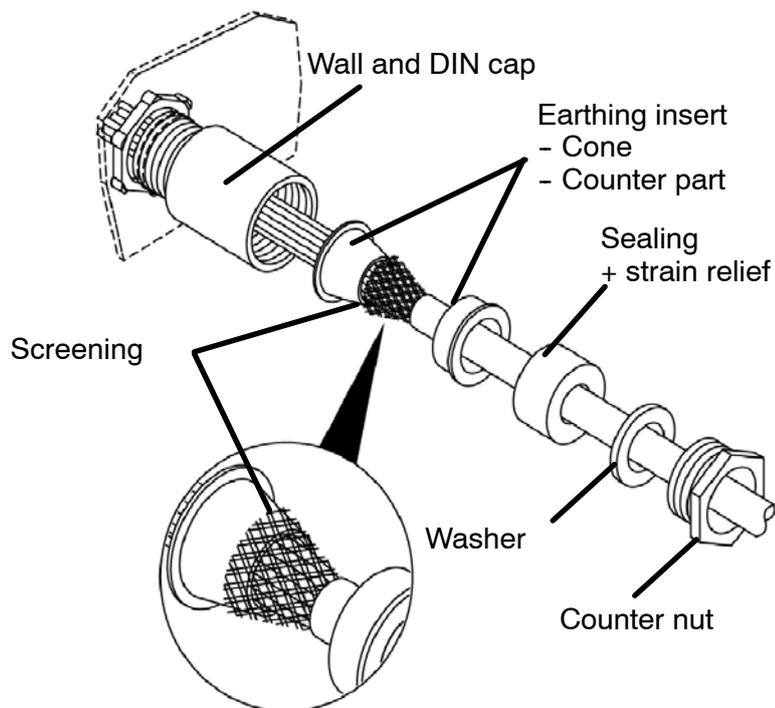


Figure 38: Creating the cable connection

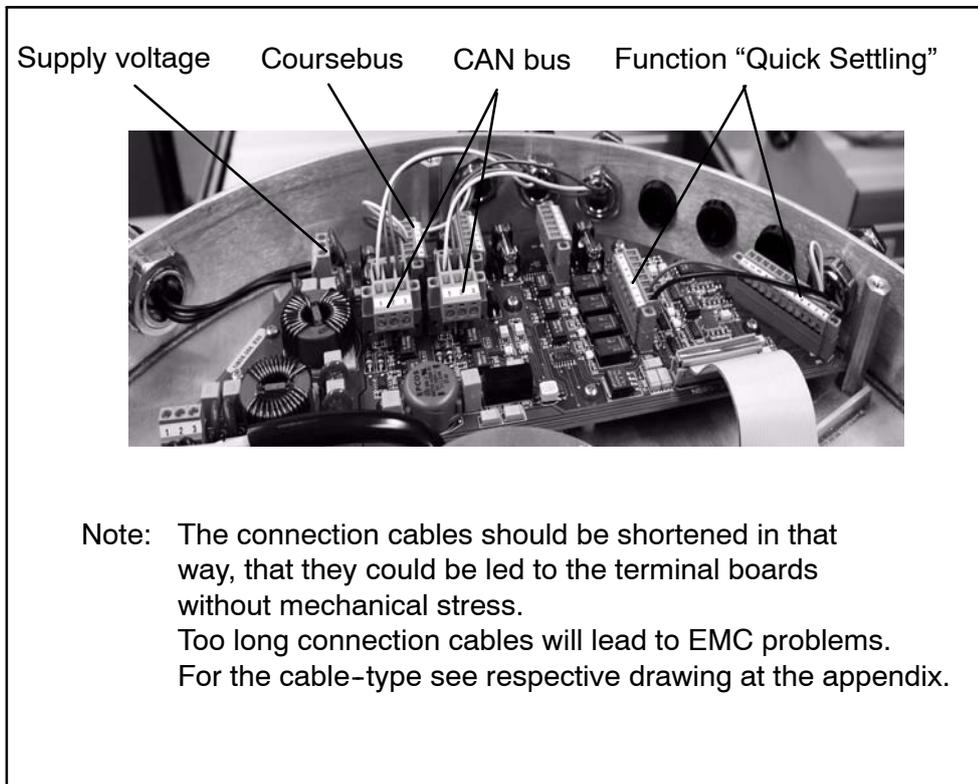


Figure 39: Example of a proper cable connection

- Place the earthing insert, strain relief and washer in the cable entry; fit and tighten the counter nut.
- Strip the cable conductors to a length of about 1.5 cm, lightly twist them and fit cable end sleeves.
Tighten the terminal screws – check the connection is secure by pulling gently.

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3.2.1.1 General information about creating an earth connection

The following instructions relating to the creation of cable connections must be adhered to in order to comply with the stringent EMC requirements.
The specified cable types must be used.



It is vital to ensure that these connections have **a common** reference to ship's earth.
Additional components (optional features) must likewise be connected to the common earth.

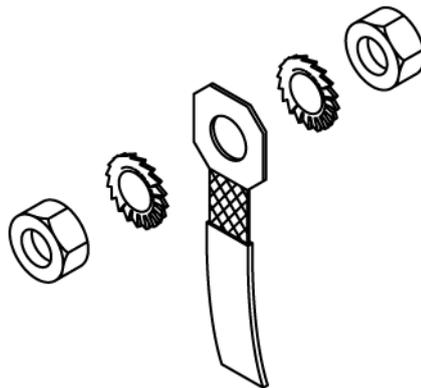


Figure 40: Creating an earth connection

Each earth connection must be made as shown in Figure 40.
The earth cable, to which a cable lug is attached, must have a cross-section of at least 1.5 mm².

The cable lug is mounted between a pair of toothed washers.
Earth connections must be free of all corrosion; they must be screwed tight.

3.3 Installing the compass and putting it into operation

3.3.1 Remove the transportation support with outer sphere, supporting liquid and distilled water.

- Undo the 4 screws (Figure 41 /1) at the top and bottom of the enclosure door, lift out the door and detach the earthing strip (Figure 41/2) on the inside of the door.
- Carefully remove the transport packaging with the outer sphere and the two bottles containing supporting liquid and distilled water from the compass enclosure.
- Take the outer sphere out of the transport packaging and place it on the base plate; the outer sphere must be secured to prevent it from tilting

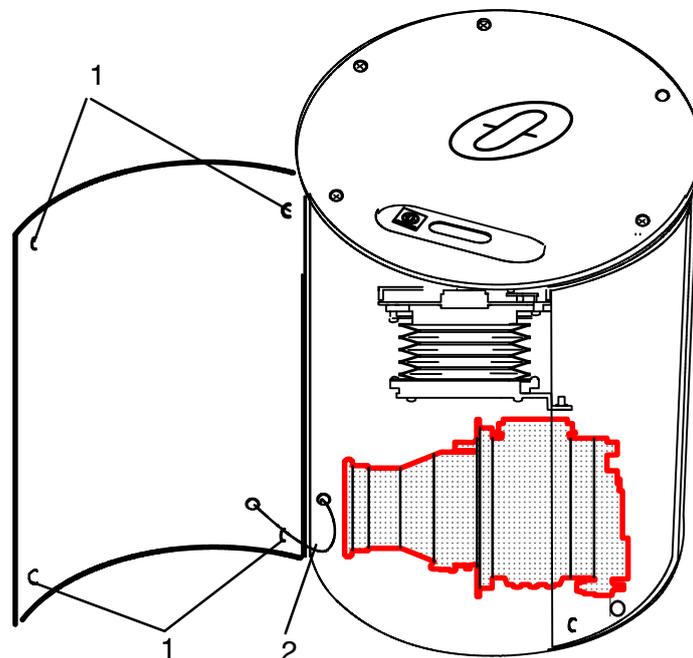
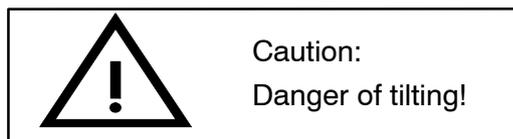


Figure 41: Principle of dismantling the enclosure door

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3.3.1.1 Assembling the compass enclosure

Note: It is not necessary to install the compass enclosure with reference to the ship (e.g. in the ship's forward direction). It can be installed in whatever position is most convenient for servicing and operation (compass enclosure removable and it must be possible to open the compass door - observe the size of tools).

The installation described below is to be regarded as the manufacturer's recommendation.

Note: The compass STD 22 is approved according to IMO regulations. This compass has a much better performance and exceeds the requirements as defined in ISO 8728 (the normative reference for gyro compasses) conspicuously.

However, the accuracy of a compass is subject to dynamic influences caused by ship and environmental conditions. Acceleration forces caused by roll and pitch movement can not be compensated by software and only to a certain amount by the compass hardware. Therefore it is recommended to install the compass as close as possible to the roll and pitch axis of the ship to minimize the dynamical influences to the compass.

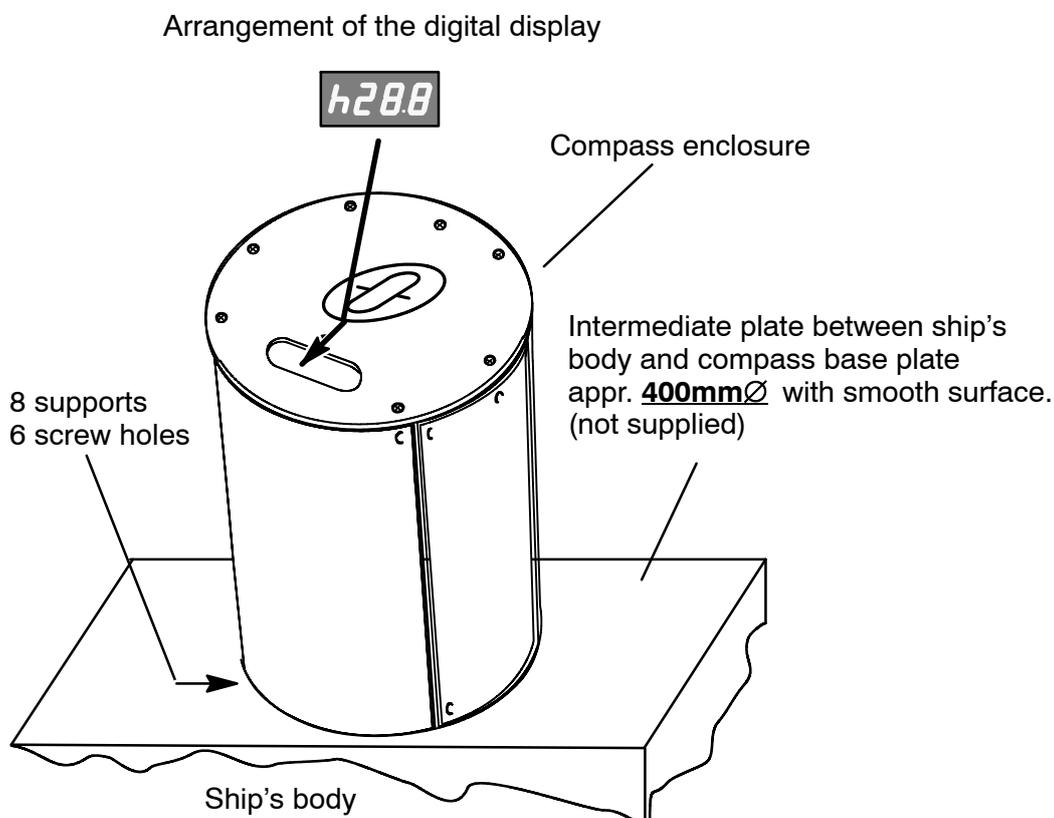


Figure 42: Installation of the compass enclosure



The compass enclosure must be installed in such a way that the following requirements are met:

- The 8 supports must all stand on a flat, firm surface.
If necessary, the user should himself create an intermediate plate (marine quality hardwood or metal) suited to the local conditions.
- The compass enclosure must be screwed to the intermediate plate in a sea-resistant fashion.
- The intermediate plate must also be screwed to the ship's body in a sea-resistant fashion; this fastening is the responsibility of the user of the STD 22 himself.
- The compass enclosure must be mounted so that the digital display can be seen easily after installation, the door of the compass enclosure can be opened and closed easily and the cover of the compass enclosure can be detached.
- The fastenings of the compass enclosure are indicated in the dimensional drawing "Gyro Compass" (110 D 233 HP005) in the appendix to this manual.

The compass enclosure is fastened to the intermediate plate with 6 screws

- for woodscrews $\varnothing 11$ x length depending on the thickness of the intermediate plate
- for metal screws M10 x length depending on the thickness of the intermediate plate.

The compass enclosure can also be mounted directly on a flat metal surface; in this case, suitable stud bolts (M10) must be welded on; alternatively the compass housing can be fastened on the underlying surface with threaded holes and screws M10-A4.

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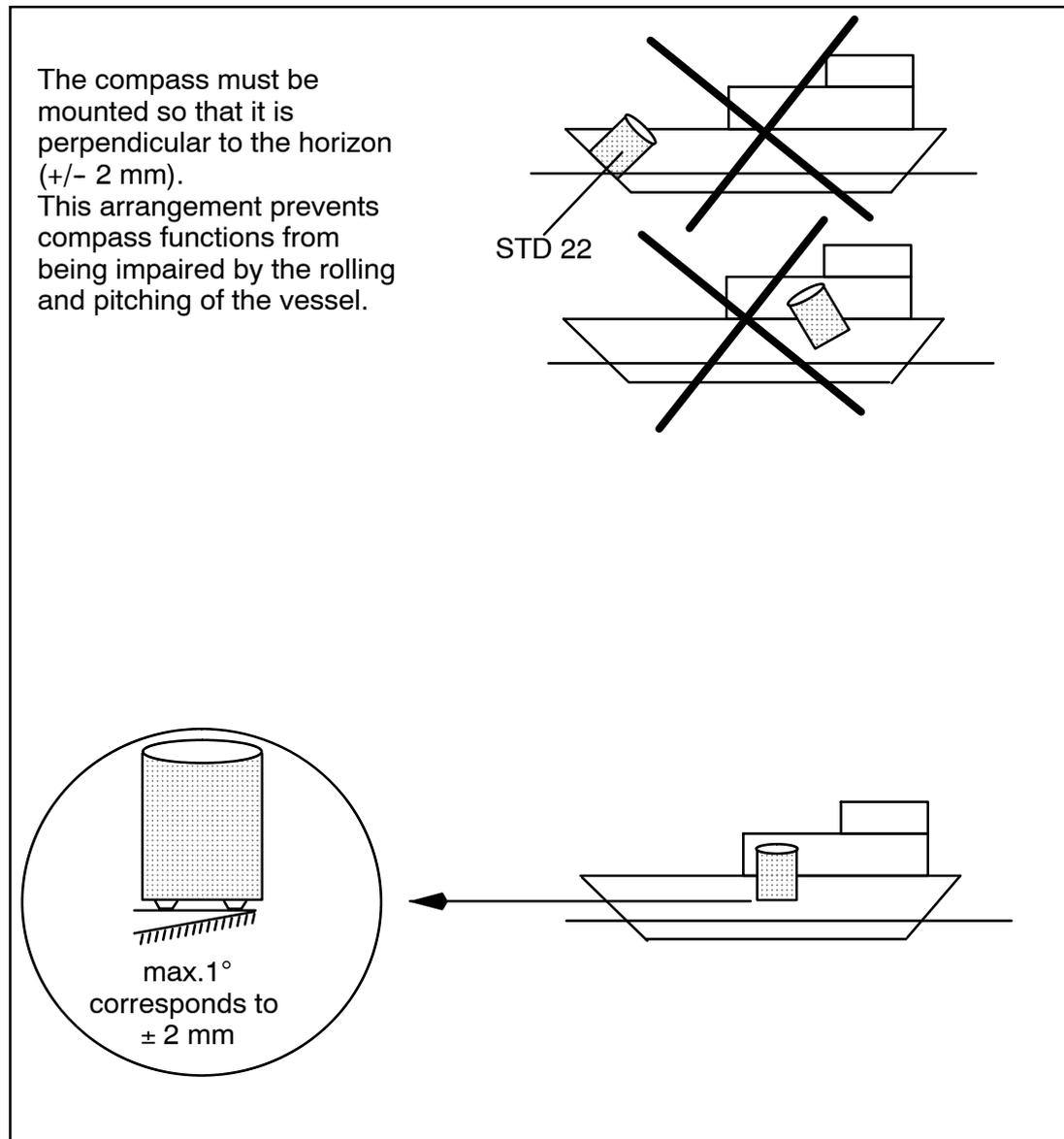
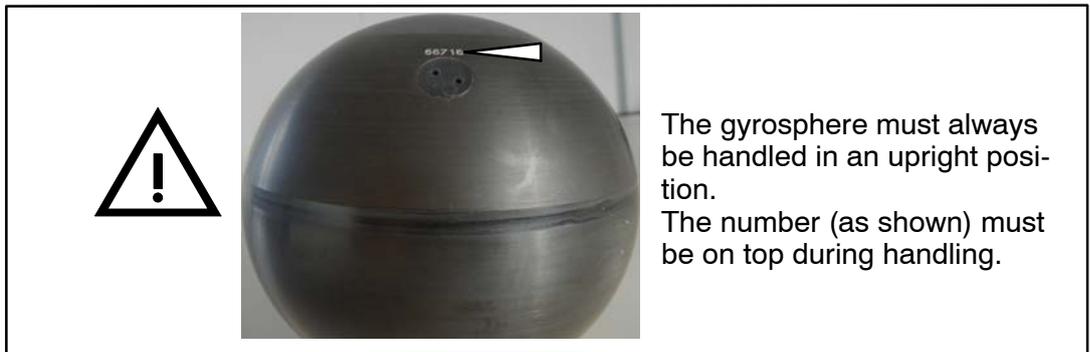


Figure 43: Horizontal alignment for installation of the compass enclosure

(see also appended Dimensional Drawing 110-233 HP005, 2 sheets)

3.3.1.2 Installation of the gyrosphere

Special tool required:
Suction cup



Installation procedure:

- Remove the hose connections (Figure 44/5).
- Undo the six screws (Figure 44/1) fastening the upper and lower halves of the outer sphere (Figure 44/2 and 3).
- Remove plug B3 (Figure 44/4) from the plug plate.

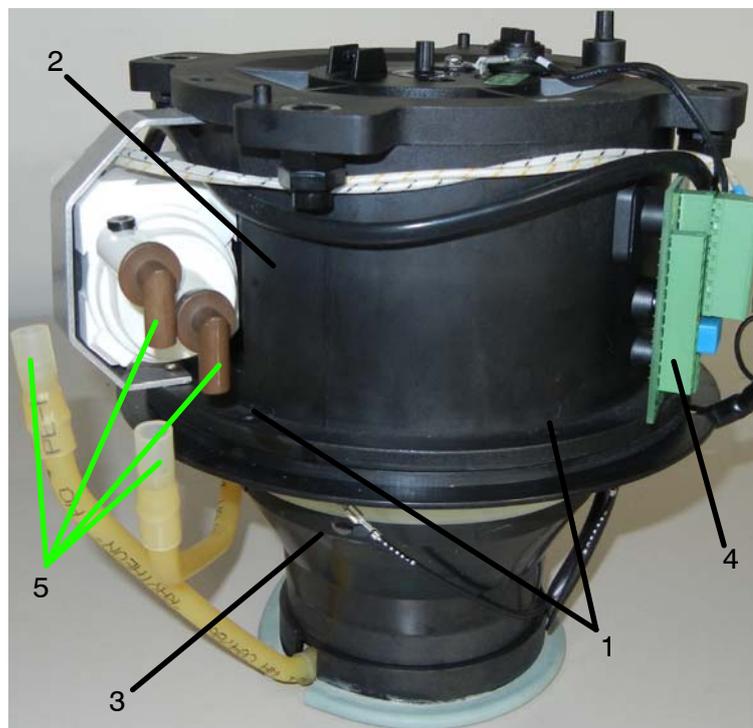


Figure 44: Outer sphere

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- Remove the upper half of the outer sphere (Figure 44/2). Take the gyrosphere (Figure 45/2) out of the transportation box and carefully insert it using the suction cup (Figure 45/3) in the lower outer sphere (see Figure 45).

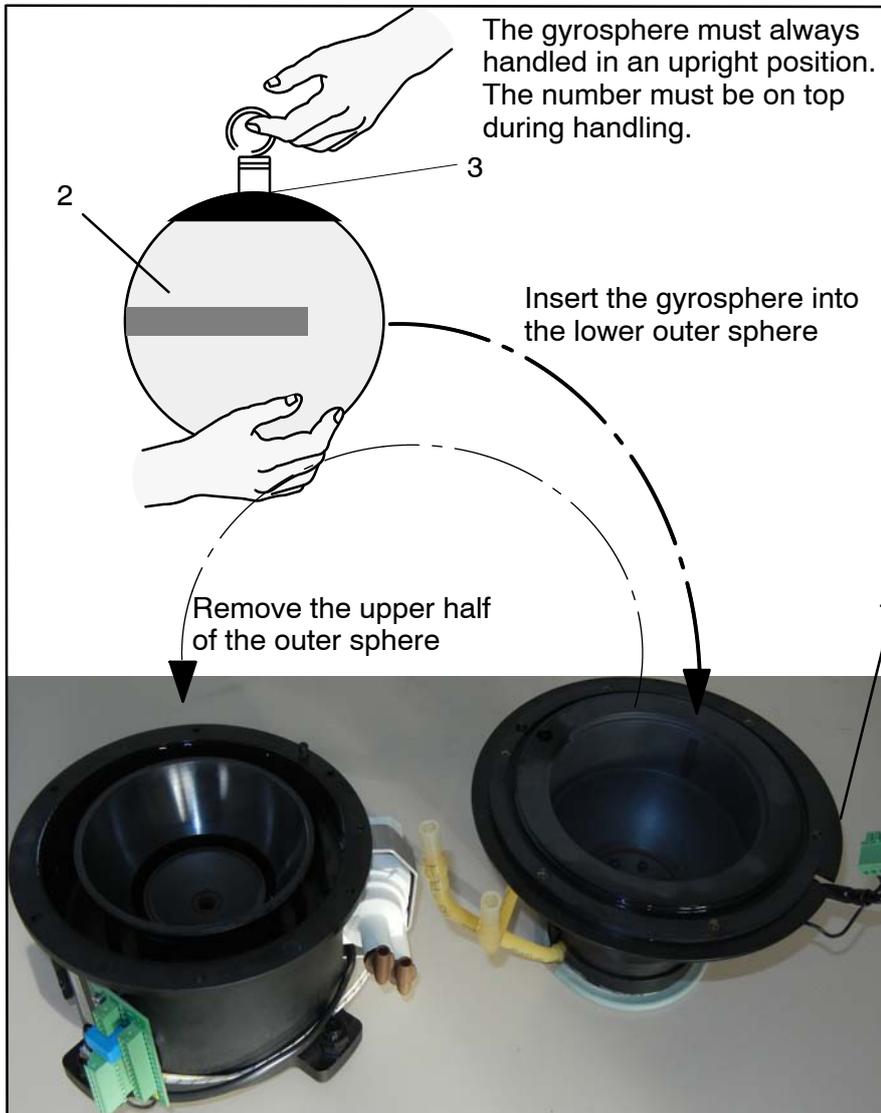


Figure 45: Principle of separating the upper and lower halves of the outer sphere
– inserting the gyrosphere

- Replace the upper half of the outer sphere on the lower half.



Check that there is a proper seal between the two halves of the outer sphere (see Figure 45/1).

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-
- Retighten the six screws (see Figure 44/1).
 - Insert plug B3 (Figure 44/4) again.
 - Fix the hoses at the pump again
(from the bottom of the outer sphere to the right input of the pump and from the side of the outer sphere to the left input of the pump – see Figure 44).

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3.3.1.3 Filling with distilled water and supporting liquid.

(see Figure 46)

- Undo the three plastic screws (Figure 46/1-3) on the upper outer sphere

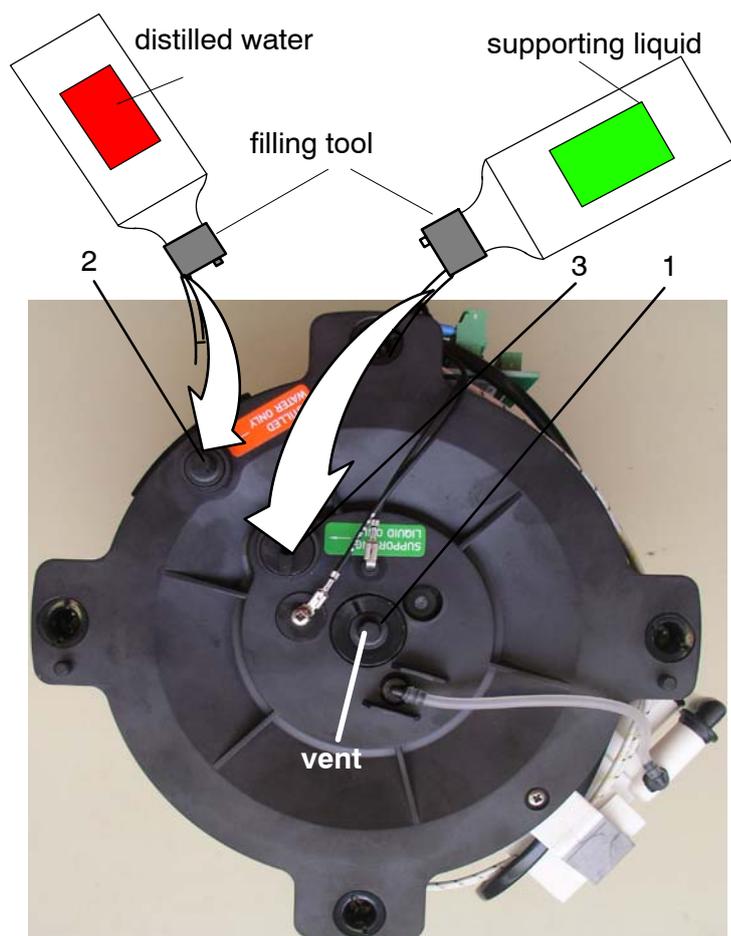
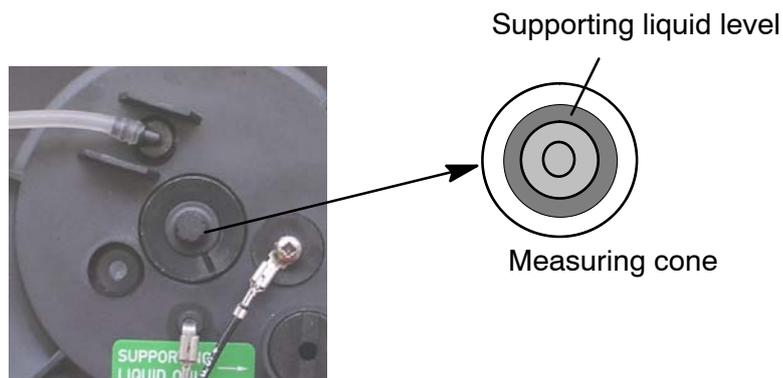


Figure 46: Filling with liquids

- Fit the supplied filling device on the distilled water bottle.
- Pour in all the distilled water (230 cm³) (look for the identifying label on the outer sphere).
- Re-close the distilled water filling opening with the screw, check that it is properly sealed.
- Remove the filling device from the distilled water bottle and attach it to the supporting liquid bottle.

- Pour approximately 840 cm³ of supporting liquid in the appropriate filling opening (look for the identifying label).
The supporting liquid must be at room temperature (over 25° C) and the measuring cone should fill half the measuring range (diameter).
The following photograph shows the measuring cone for the liquid level.



This picture only shows the situation at the start of operation (after filling for the first time or after changing the supporting liquid -> cold supporting liquid); during operation, the dark circle in the measuring cone is smaller.

Figure 47: Measuring cone for supporting liquid level

- Discard any unused supporting liquid; no special measures are needed for disposal.
- Re-close the filling opening for supporting liquid, check that it is properly sealed.
- Re-insert the ventilation screw, check that it is properly sealed.



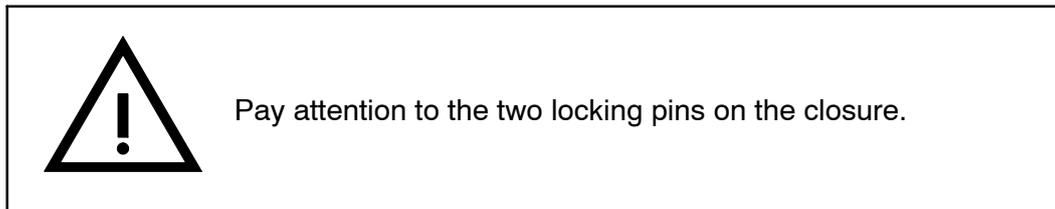
Supporting liquid should be stored in a cold, dry and dark place.
Please pour away liquid leftovers.
Do not mix supporting liquids.

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3.3.1.4 Inserting the outer sphere in the compass enclosure

(see Figure 48)

- Carefully insert the gyrosphere in the compass enclosure:



- Using both hands, hold the outer sphere and guide it under the snap closures (Figure 48/1) on the pendulum joint (Figure 48/2).

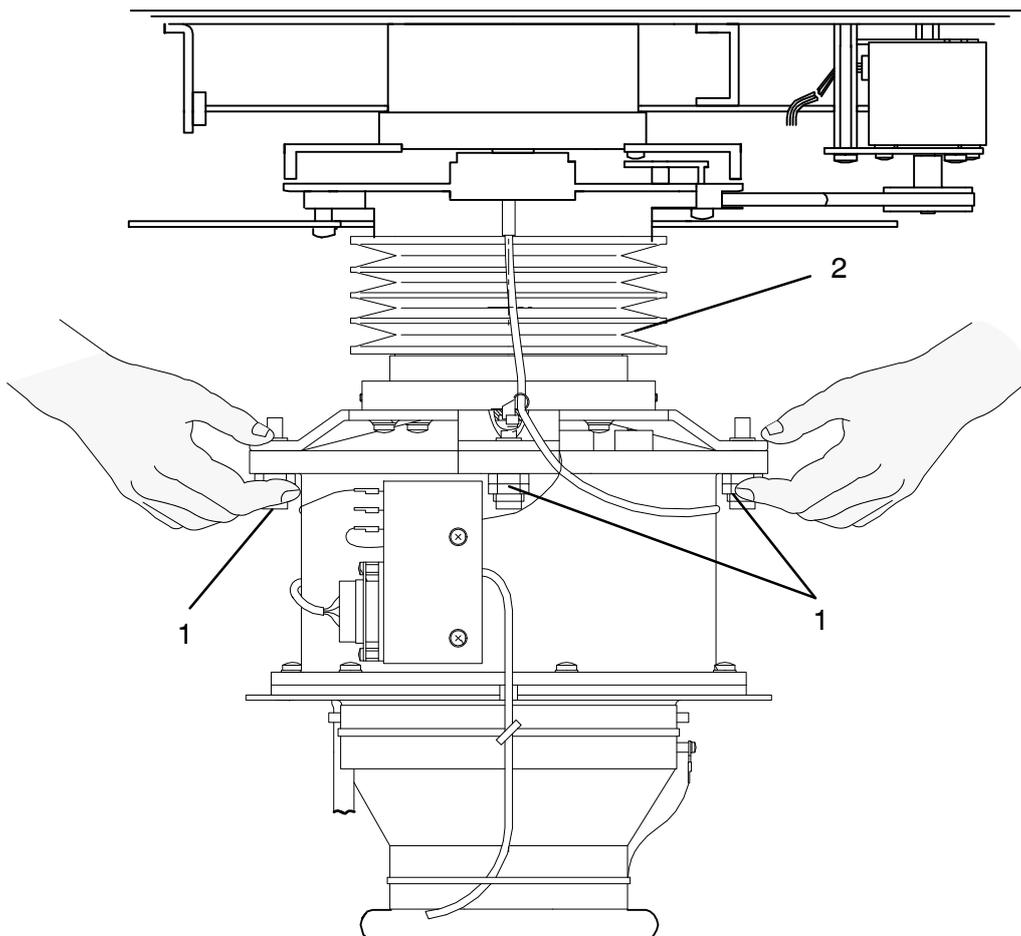


Figure 48: Principle of inserting the outer sphere in the compass enclosure

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-
- Using the thumbs, press down and engage two snap closures (Figure 48/1).
 - Turn the outer sphere through 90° and repeat the process with the two other snap closures. The outer sphere is now fastened to the pendulum joint.

 - Guide the cable around the outer sphere and attach the plugs to the small PCB of the outer sphere, tighten the fastening screws.

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3.4 Creating cable connections and plug connections

3.4.1 Overview of plug connections and fuses on PCB's

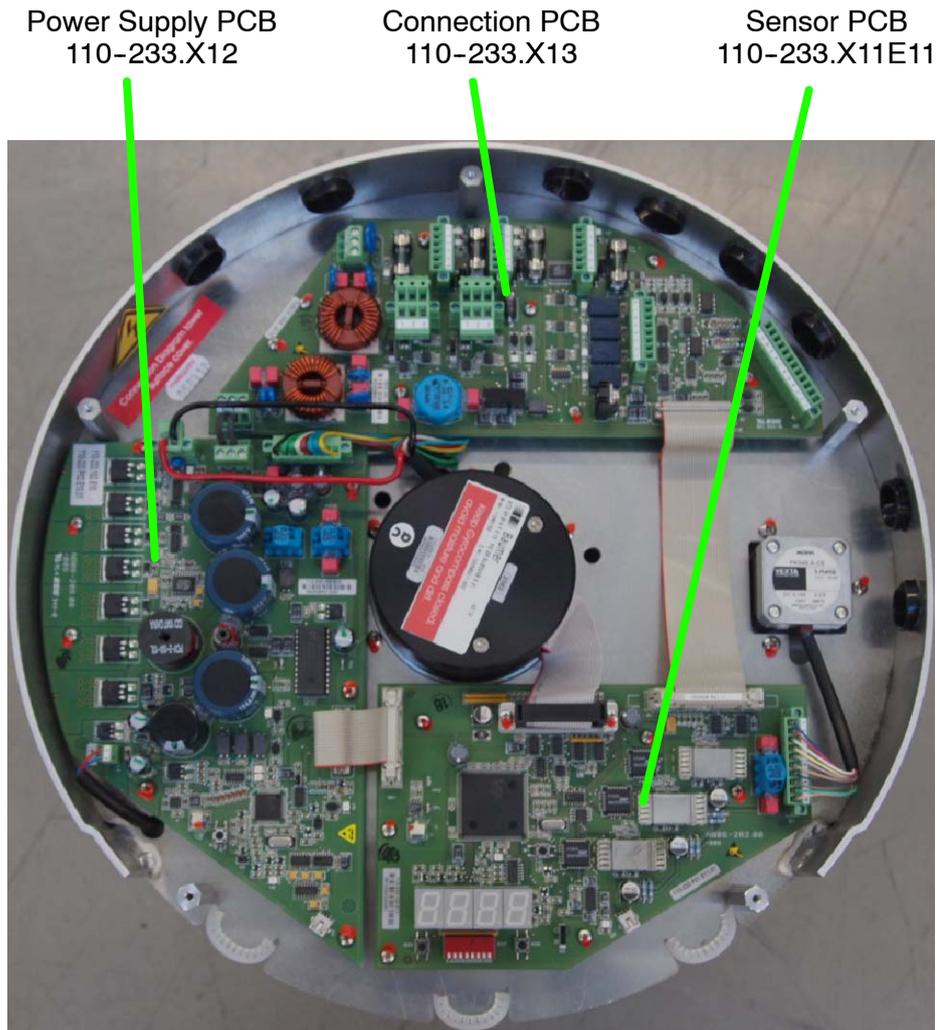
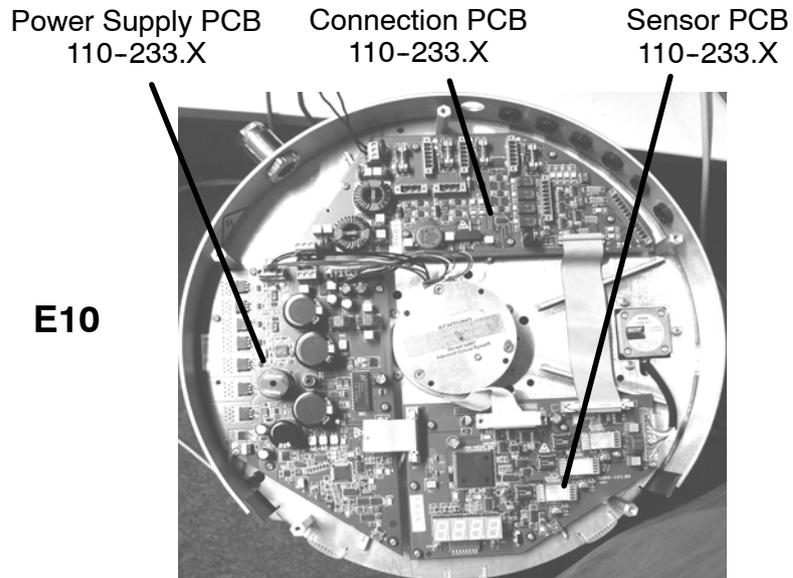


Figure 49: Arrangement of PCB's in the STD 22 Compass (cover removed)

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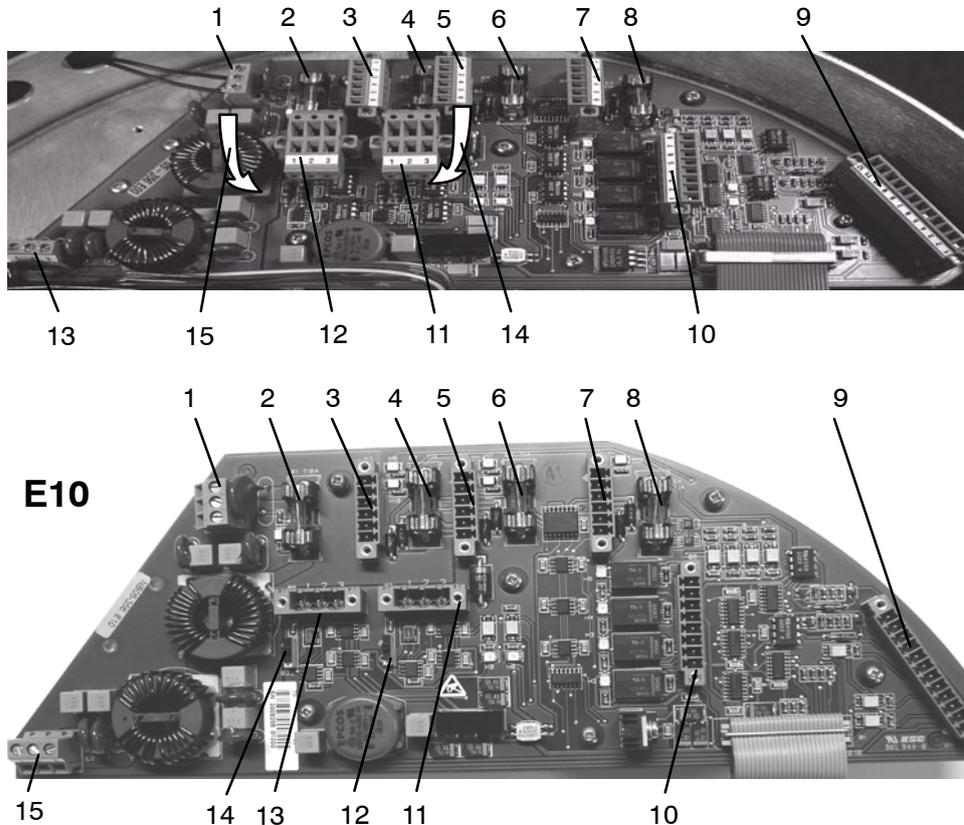


Figure 50: Arrangement of plugs, terminal boards and fuses on the Connection PCB.

1	Terminal L1	Power supply (24VDC)	
2	Fuse E1 (T10A)	Power supply (24VDC)	
3	Plug B2	Output Channel1 Course Bus/NMEA	
4	Fuse E2 (T1A)	Channel1 +24V	
5	Plug B3	Output Channel2 Course Bus/NMEA	
6	Fuse E3 (T1A)	Channel2 +24V	
7	Plug B4	Output Course Bus	
8	Fuse E4 (T1A)	Course Bus +24V	
9	Plug B5	Input (+24V/Set QS/ Pulse Log/Pulse Log Dir./NMEA Log/GPS-receiver) (observe NMEA standard!!)	
10	Plug B6	Output (QS/SEC/System/Available)	
11	Plug B7	CAN1 bus	
12	Plus B8	CAN2 bus	
	Switch B32	for CAN1 bus terminating resistor	E10
13	Terminal Board L2	24V connection to Power Supply PCB	
	Plus B8	CAN2 bus	E10
14	Jumper B31	for the CAN2 bus terminating resistor	
	Switch B31	for the CAN2 bus terminating resistor	E10
15	Jumper B32	for the CAN1 bus terminating resistor	
	Terminal Board L2	24V connection to Power Supply PCB	E10

3.4.2 Creating a cable connection from STD 22 Compass → Distribution Unit

NOTE: The installation and commissioning of the Distribution Unit are described in the Distribution Unit manual.

To create cable connections to the Distribution Unit, see also Cable and Connection Diagram 110-233. HP009 or HP029.

This connection is made using cables with CAN bus plugs at both ends (see also section 3.4.2.2 - Connecting the CAN bus plug).

For each CAN bus, a screened 2-core twisted cable with a conductor cross-section of $\geq 0.5\text{mm}^2$ must be used.

There is a redundant CAN bus:

- CAN1 bus
- CAN2 bus

Each CAN bus must be connected.

Missing or disconnected plug connections will cause an error message to be sent to the Operator Unit (see manual 3648, Operator Unit 130-613).

The plugs must be inserted on the Connection PCB as shown in Figure 50.

If several STD 22 gyro compasses are combined with one another, they are connected to each other from compass to compass via the CAN bus.

For this purpose, each device is equipped with 2 sockets (CAN1 = B7 and CAN2 = B8) (e.g. CAN1 and CAN 1 OUT), whereby CAN OUT does not have to be connected if the compass in question is installed virtually as a terminal device.

The compass or compasses can also be connected via any other CAN bus user.



When inserting plugs, be sure not to get the plugs mixed up.
The CAN1 bus must always be connected to the CAN1 bus of the subsequent device.



If a compass is operated within a CAN bus configuration as a terminal device on the CAN bus, terminating resistors must be activated for each CAN bus (see section 3.4.2.3).



The total length of the CAN bus cable must not exceed a length of 300 m.

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3.4.2.1 Connecting to the power supply (Distribution Unit)

The STD 22 Compact Compass operates at 24VDC.
This voltage is generated via the Distribution Unit or fed directly to the compass.

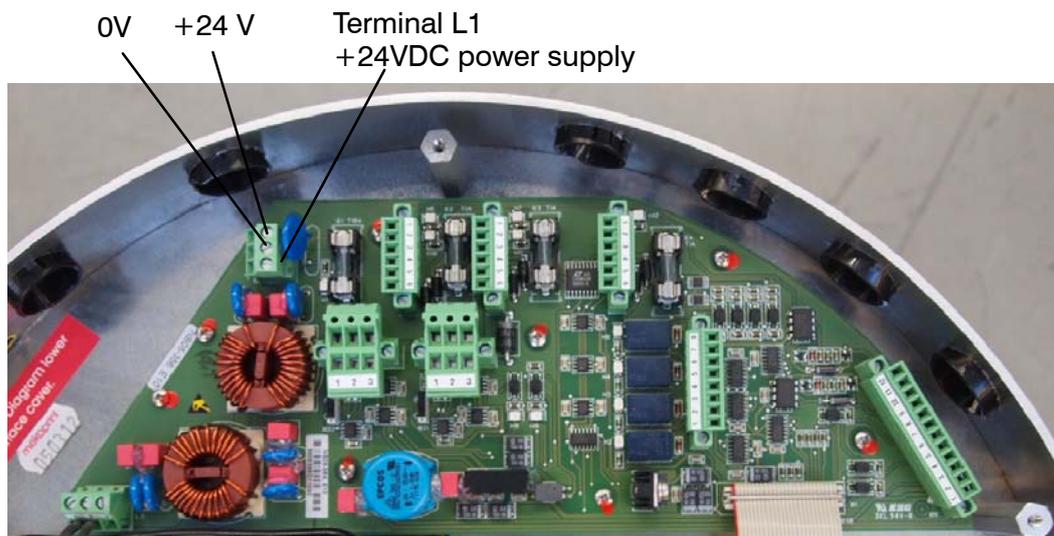


Figure 51: Connection of the +24VDC power supply

The 2-core cable that is used should have a conductor cross-section of $\geq 2.5\text{mm}^2$.

At terminal L1 (see Figure 51), connect a power supply
of +24VDC at terminal 1
0V at terminal 2.

3.4.2.2 Connecting the CAN bus plug

For each CAN bus, a screened 3-core twisted cable with a conductor cross-section of $\geq 0.5\text{mm}^2$ must be used.

All the CAN bus connections to be used are identical.

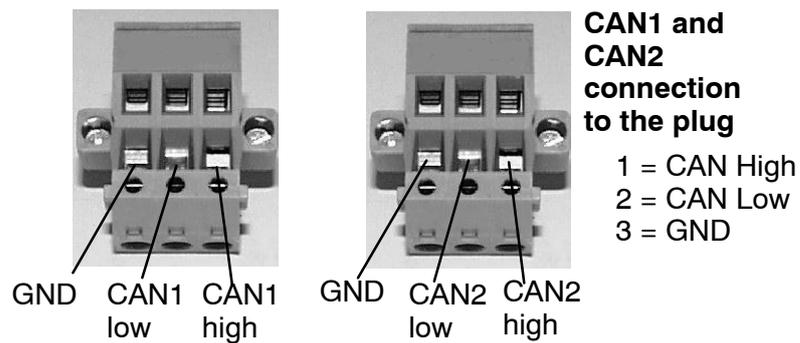


Figure 52: CAN bus plug

The screening of the cable is connected to the enclosure earth.

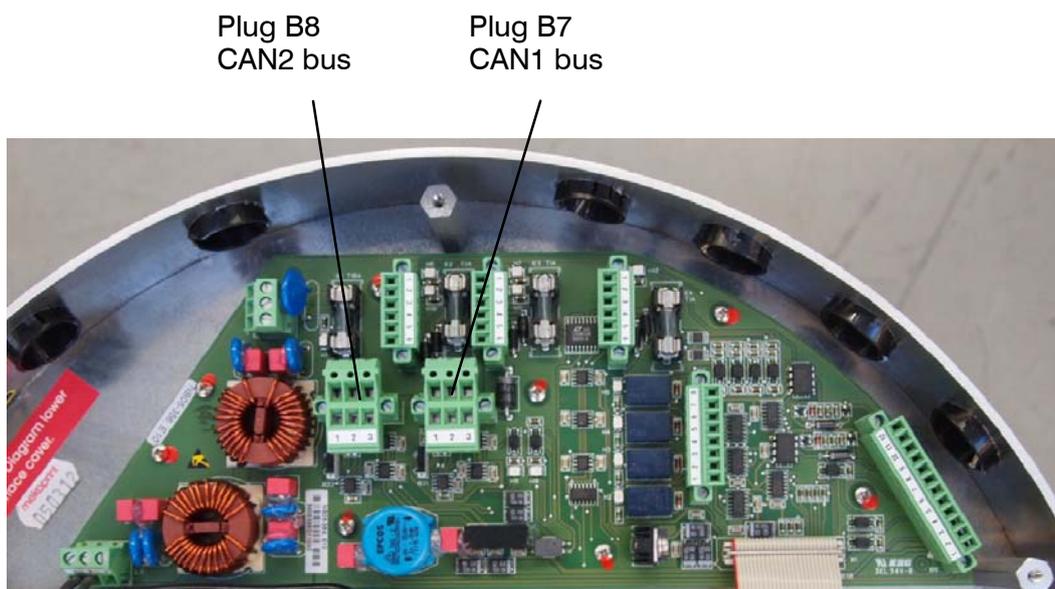


Figure 53: CAN1 and CAN2 connections in the STD 22 Gyro Compass

Installation and Service manual

Compass STD 22

3.4.2.3 Setting the jumpers for the CAN bus

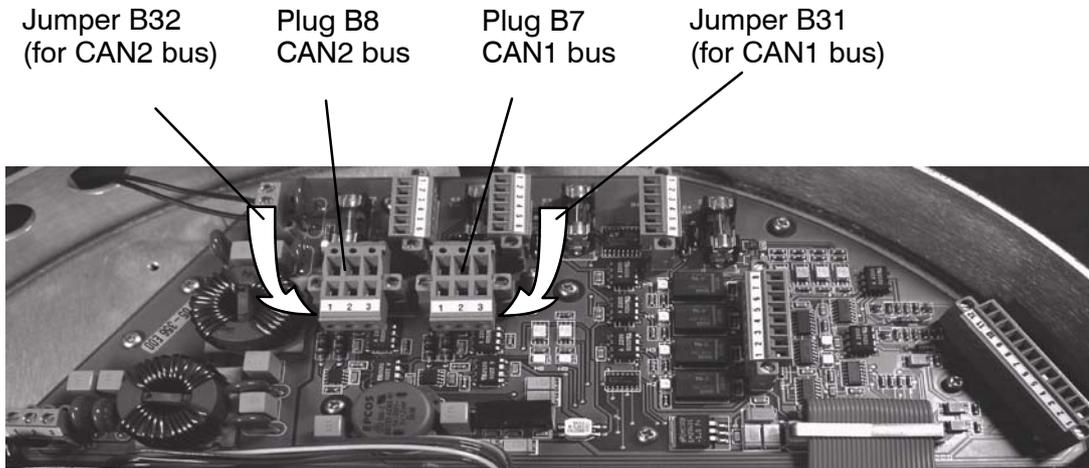


Figure 54: Jumpers B32 and B31 for CAN1 and CAN2 in the STD 22 Gyro Compass

If a compass is to be used as a terminal device in a CAN bus application, both jumpers (B32 and B31) must be inserted. These jumpers activate the terminating resistor at the end of each CAN bus.

Each end of the CAN busses must be terminated with a terminating resistor.

Failure to insert jumpers (open bus) will cause sporadic error messages from the bus concerned (see also manual 3648, Operator Unit 130-613).

3.4.2.4 Switching the termination resistors for the CAN bus (E10 only)

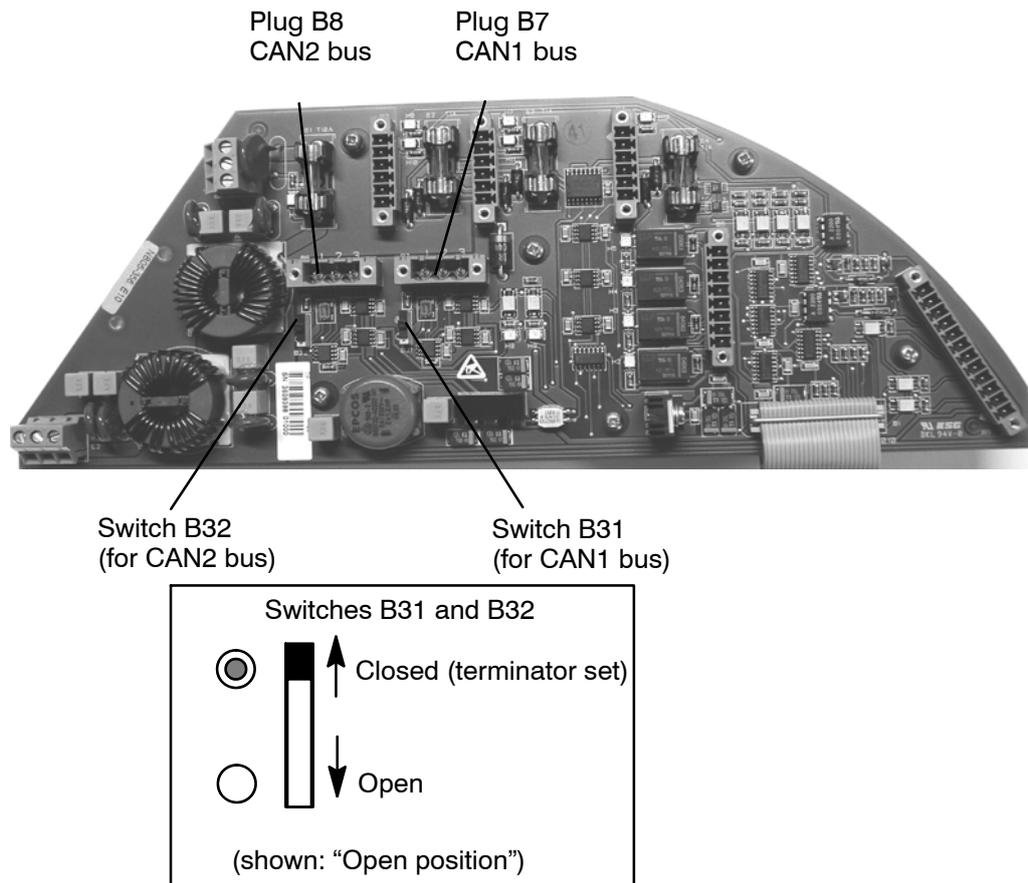


Figure 55: Switches B32 and B31 for CAN1 and CAN2 termination resistors

If a compass is to be used as a terminal device in a CAN bus application, both switches (B32 and B31) must be set to the closed position. This position activates the terminating resistors at the end of each CAN bus.

Each end of the CAN busses must be terminated with a terminating resistor.

Failure not to set termination resistors (open bus) will cause sporadic error messages from the bus concerned (see also manual 3648, Operator Unit 130-613).

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3.4.2.5 Connecting the compass to earth

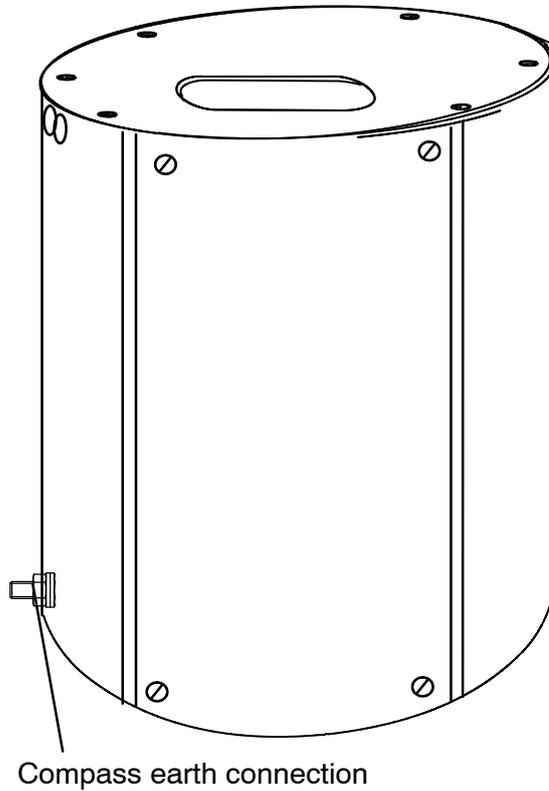


Figure 56: Connection of compass to earth

An earth connection (ship's earth) must be made using the earthing screw shown in Figure 56.

The earth connection must have a common reference to the other components (Operator Unit, Distribution Unit and repeater compasses).

3.4.3 Switching on, settling and adjustment

The STD 22 Compass switches on when the power supply is activated on the main control panel for the Distribution Unit (once the Distribution Unit has been connected to the STD 22 Compass).

3.4.3.1 Checks on the compass

Measuring the compass power supply voltage (on the compass).

This voltage must fall within the tolerance range (18 VDC to 36 VDC).

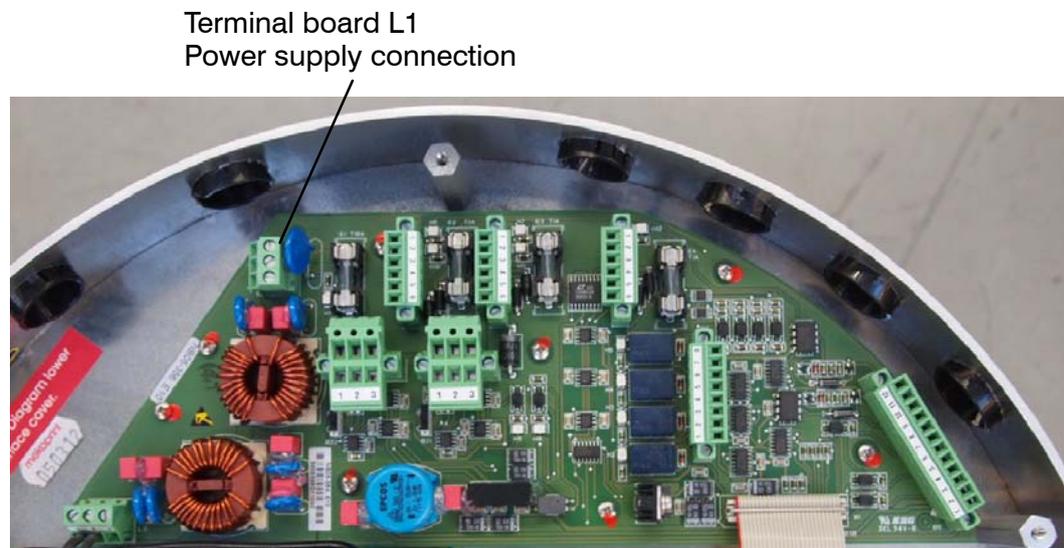


Figure 57: Measuring the compass power supply voltage

Terminal board L1	terminal 1	+24VDC
Terminal board L1	terminal 2	0V

Note: The absolute lower limit for the power supply voltage is 18VDC, the absolute upper limit is 36VDC!

When connecting cables, ensure that these values are adhered to.

Installation and Service manual Compass STD 22

Checking the DIP switch settings on the compass (see Figure 58):

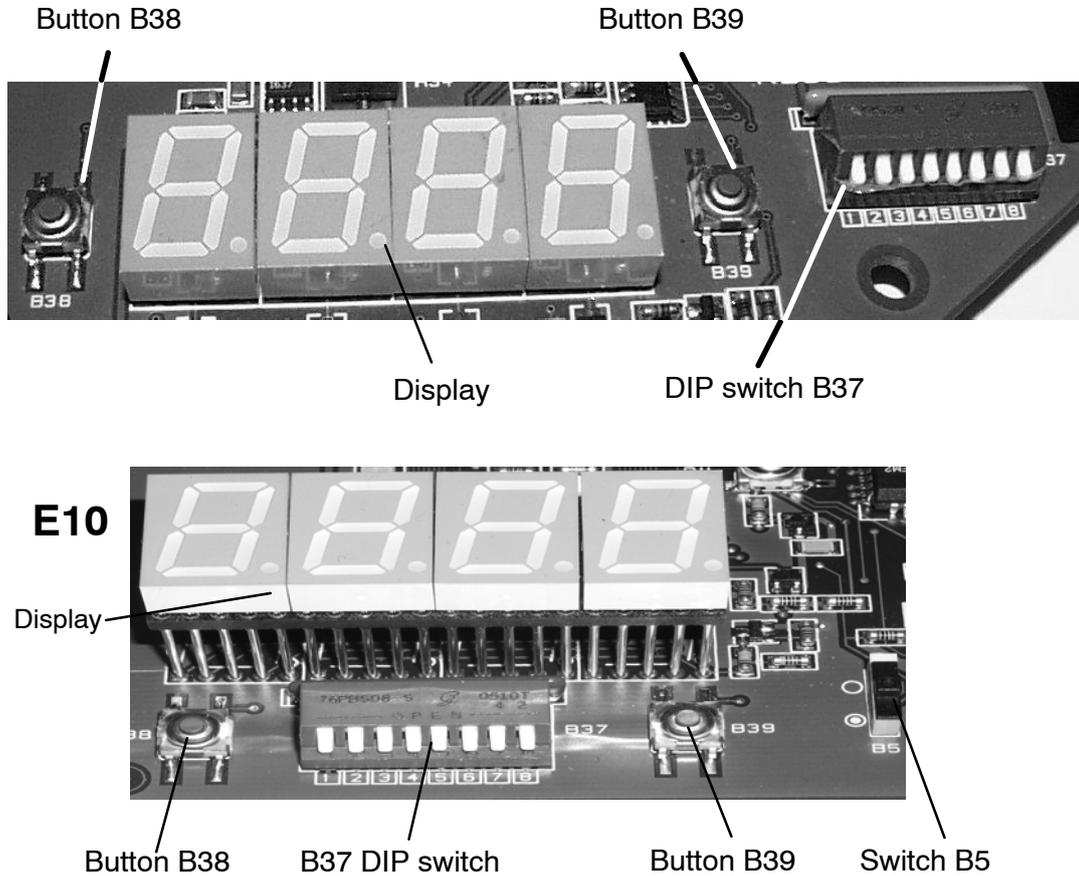
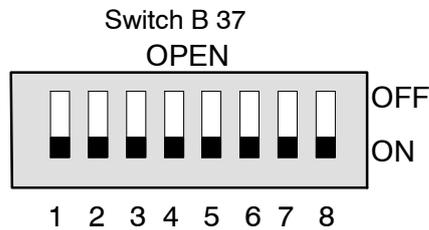


Figure 58: Checks on the compass before putting into operation

All DIP switches in the "ON" position



Switch position B5:

- Operation
- Development and service only

3.4.3.2 Switching on the compass

The compass goes into the heating stage for the first 30 minutes (this period will vary depending on the temperature of the supporting liquid), during which time the course output of the compass is unavailable and the letter “h” is displayed as the leading sign on the digital display (see Figure 59).

During the settling in stage (for 4 hours after switching on), the course output of the compass may be used; **however, the deviation from the actual course may still be considerable (as well as the connected course receiver).**

During this period, an additional dot appears in the digital display of the compass (see Figure 60).

(The “Quick Settling” option reduces the settling in stage to approximately 1 hour).

After 4 hours from switching on, the compass course may be used.

4 hours after switching on, the compass has an accuracy of $<2^\circ$.

After appr. 5 hours (after switching on), the compass has an accuracy of von $0,1^\circ \times 1/\cos$ latitude.

ON THE COMPASS

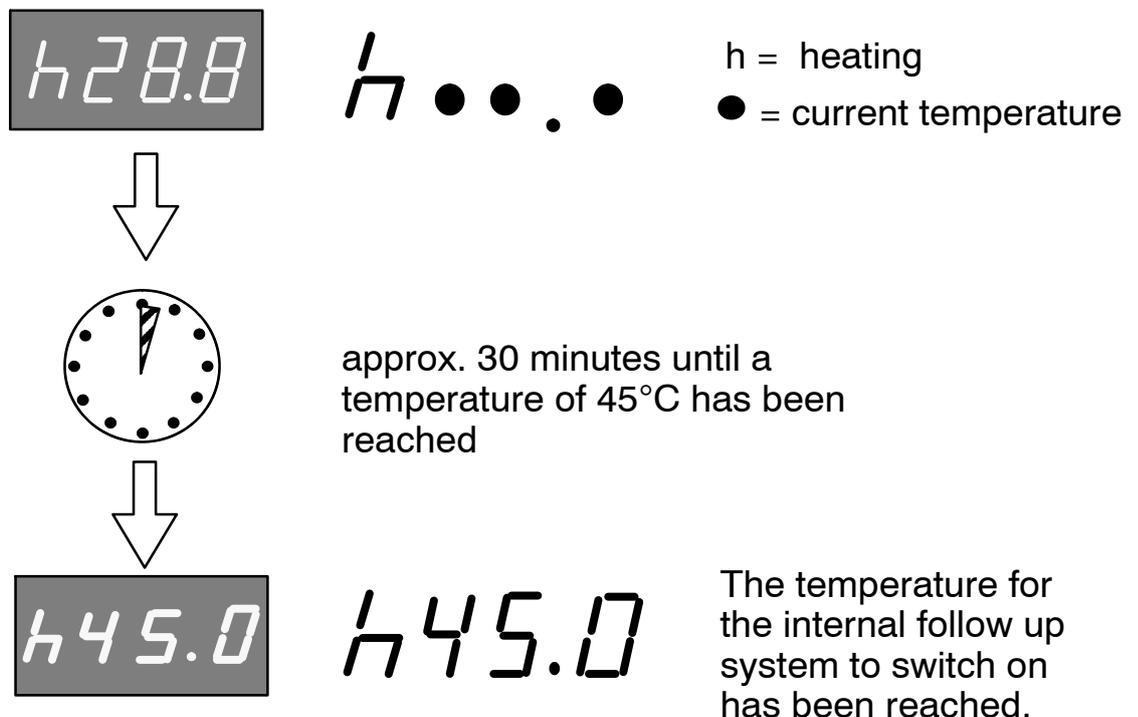


Figure 59: Indications on the compass during the heating stage

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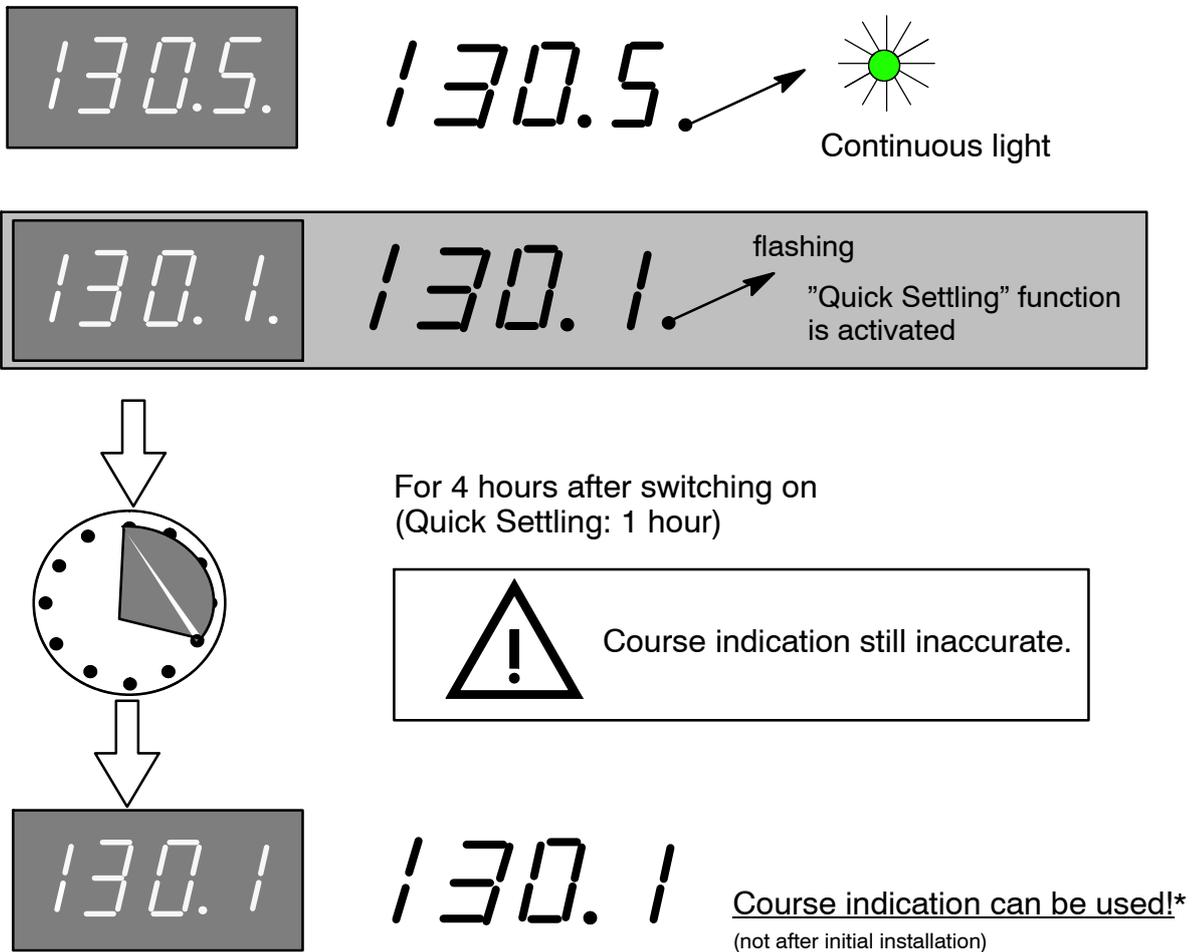


Figure 60: Indications on the compass during the settling in stage

3.4.3.3 Setting the compass zero (reference course)

Once the compass has been installed, it must be aligned according to its installation location. The compass zero is set using DIP switch B 37 and buttons B 38 and B 39.

The compass must have been in operation for at least 5 hours and/or the ship must be moored for the same time before the compass zero is set.

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).

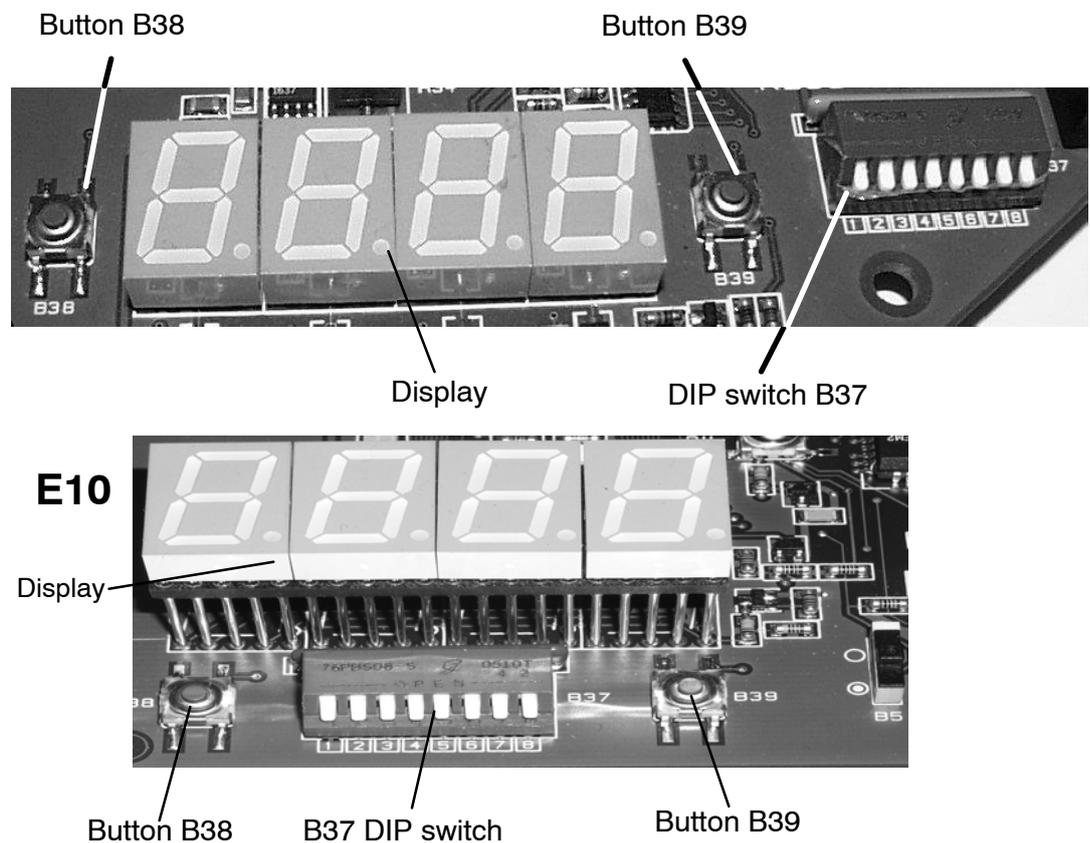


Figure 61: DIP switch B37 and buttons B38/B39

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The reference course to be set is determined from the ship's fore-and-aft line (e.g. take a bearing or obtain the pier course from the sea chart).

This reference course is entered according to the following procedure.

- Set DIP switch B37 "1" to the "OFF" position.
The digital indicator is now indicating "ALer" = Alignment Error
- Press button B38 or button B39 until the heading you require is displayed (B38 changes the value downwards and B39 changes it upwards).
- If you hold down the button the speed at which it changes will increase.
Set DIP switch B37 "1" to the "ON" position. This saves the set value in the compass.

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

- After the reference course has been set, read the alignment error (see next section) (See also Figure 62)

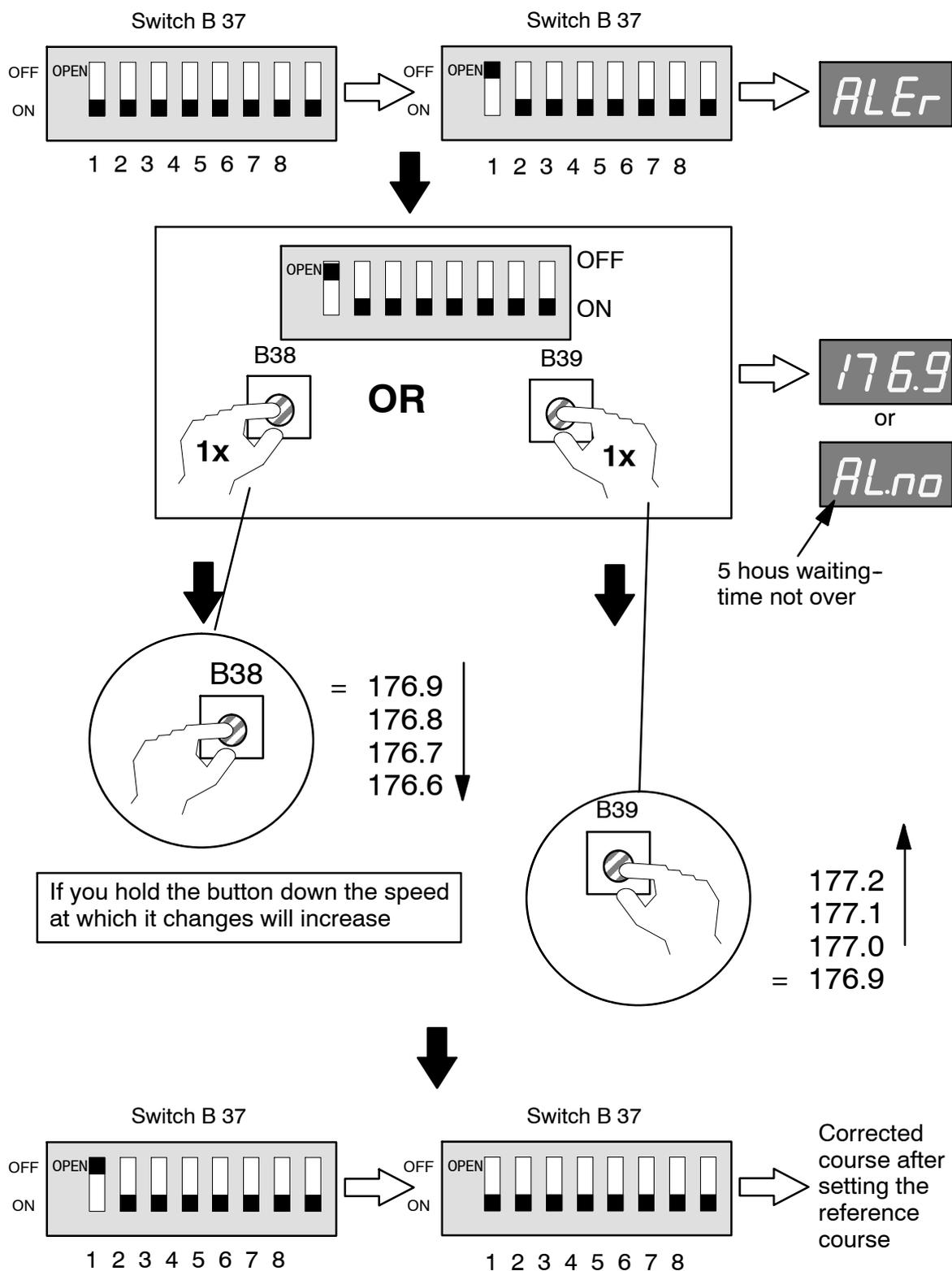


Figure 62: Procedure for setting the compass zero

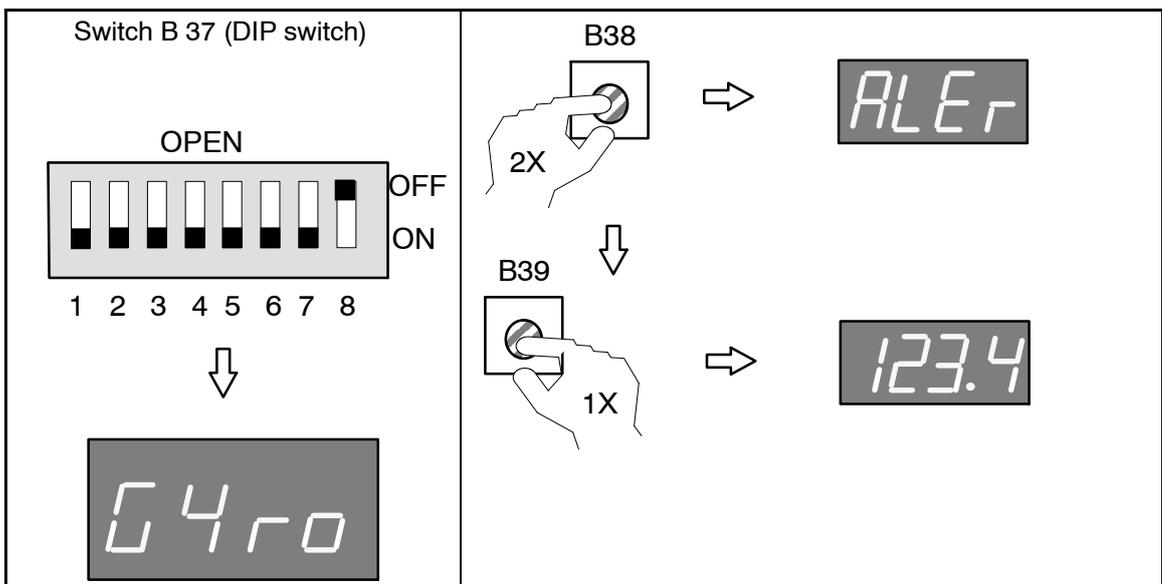
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3.4.3.4 Reading the alignment error

The alignment error must be entered in the table provided for that purpose on the inside of the cover.

Alignment Error	
123.4	

Figure 63: Table at the cover (inner side)



DIP switch “8” in “OFF” position.

NOTE:

It is essential to enter this value, because the alignment error will be needed if the sensor electronics are replaced, in order to determine the reference course for the new PCB.

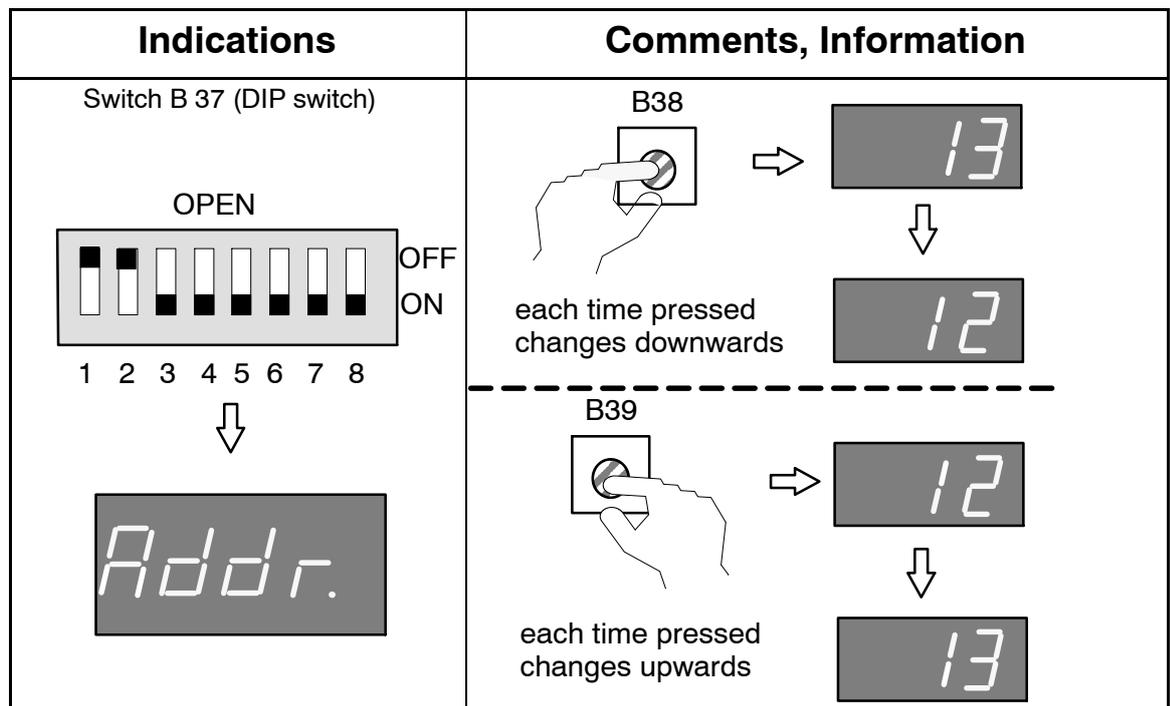
DIP switch “8” in “ON” position.

The STD 22 Compass is ready for use.

Replace the cover of the compass and screw it tight.

3.4.3.5 Setting the CAN bus address

Every CAN bus user must be reachable via an address.
 This address may be assigned in the CAN bus system only once.
 In the gyro compass, this address is set with the DIP switch.
 The CAN bus address for compasses can be set within a range from 10₍₁₀₎ to 19₍₁₀₎.
 The address 00₍₁₀₎ may not be used.



Below mentioned table shows the agreement for the CAN bus addresses within a compass system.

Device(s)	CAN-Bus-Address
Operator Units	01 to 09
Sensors (GPS-compass)	10 to 13
Sensors (Gyro Compass)	14 to 19
Distribution Units	20 to 29
Gateway	56 and 57

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3.4.3.6 Adjustment of essential operating modes

Unscrew and remove the cover of the compass enclosure.

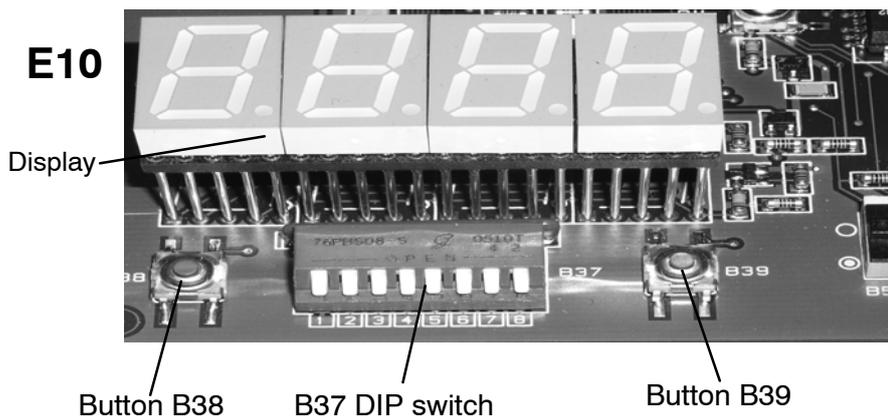
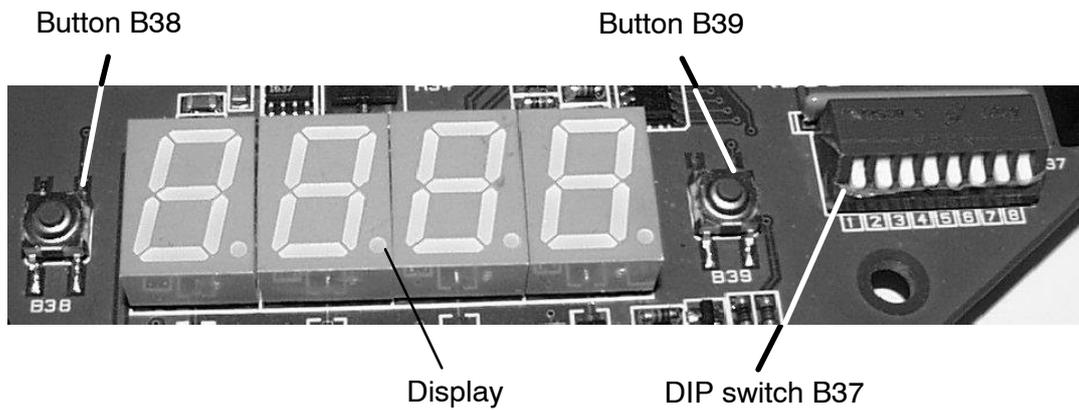
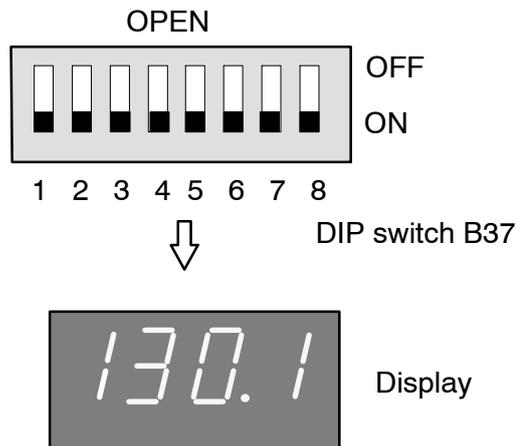


Figure 64: DIP switch B37 and button B38/B39

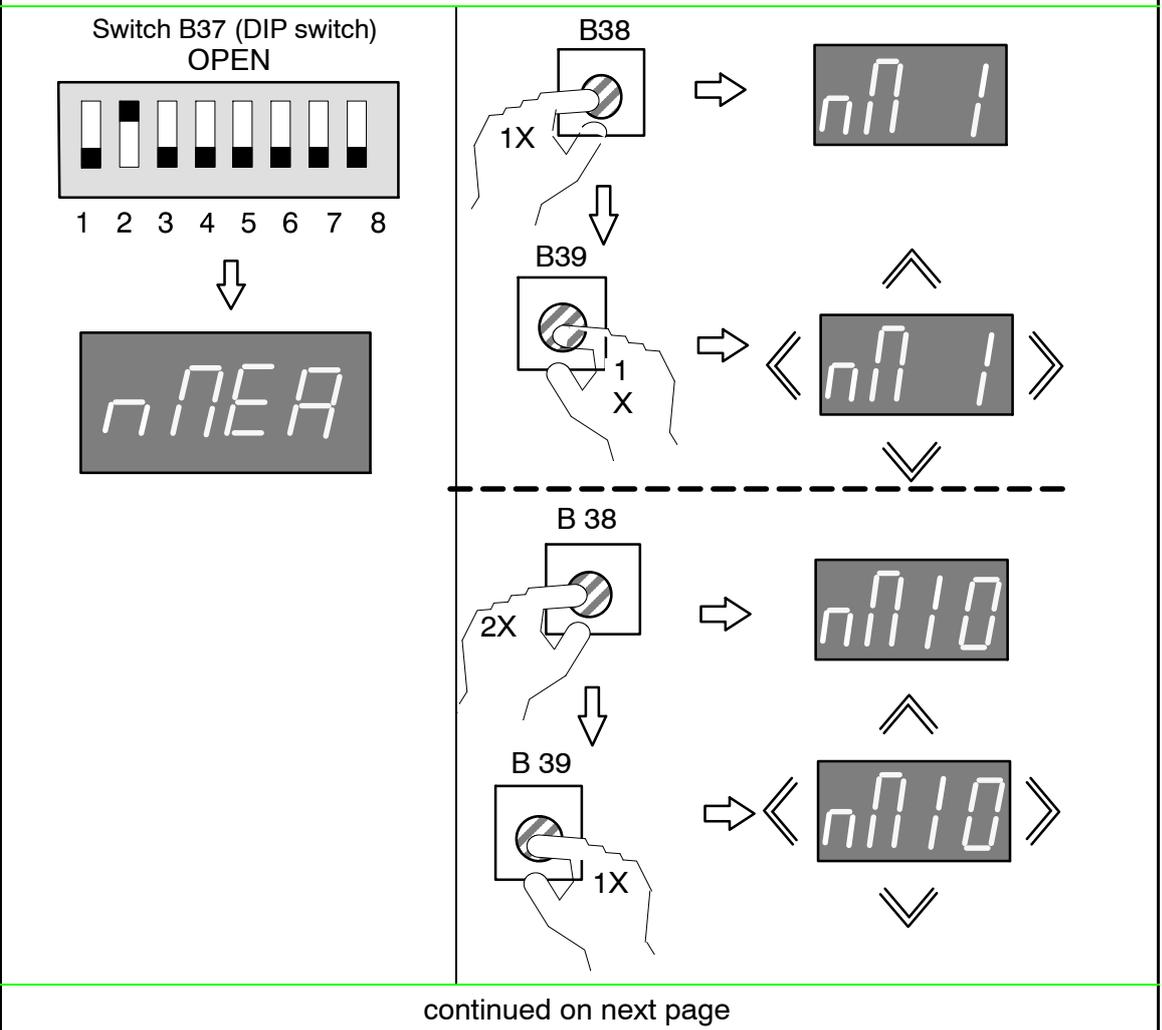
Initial status:



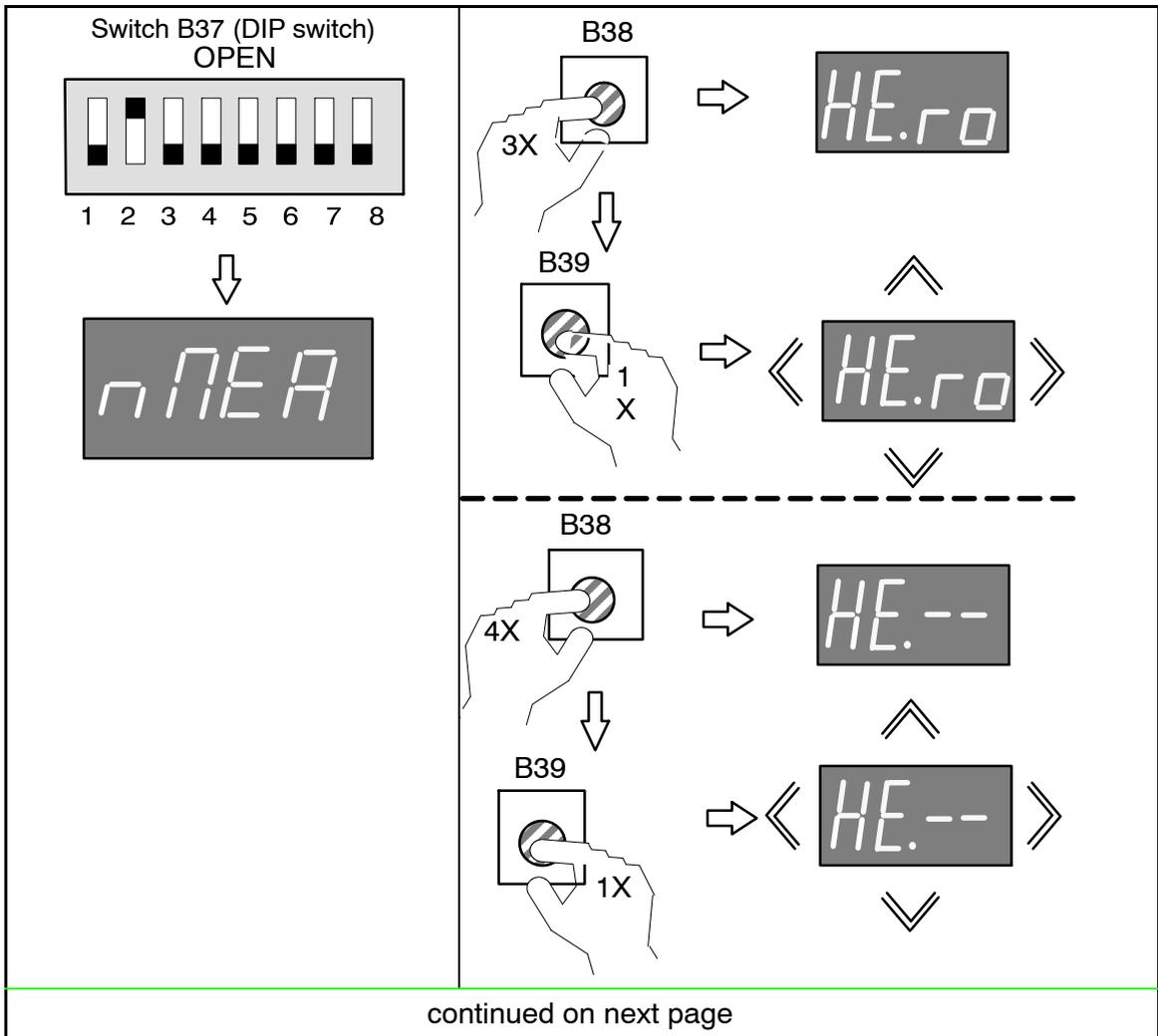
Note: The procedure to adjust essential operating modes is described on the next four pages.

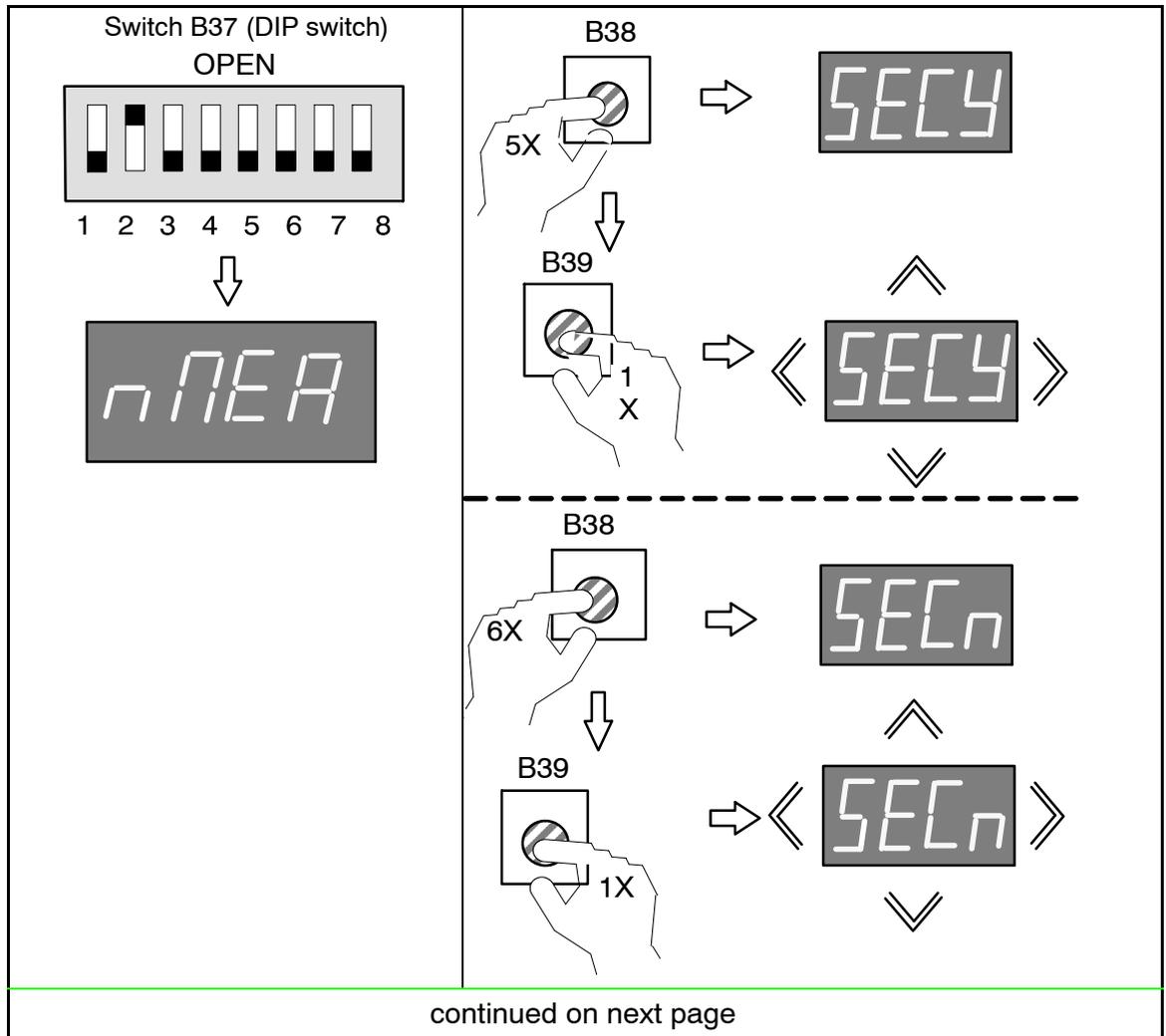
Set the repetition rate of the NMEA heading data output, the output with or without ROT (Rate of Turn), with or without oil residual error for the speed error correction and the setting of a connected Data Distribution Unit (not for STD 22 Compact Gyro Compass).

- 1 heading data transmission 1 telegram per second
 - 10 heading data transmission 10 telegrams per second
 - HE.ro heading with ROT.
 - HE.-- heading only
 - SECY heading data incorporating Speed Error Correction
 - SEcn heading data without Speed Error Correction
 - oELY Speed Error Correction with oil residual error (**recommended setting**)
 - oELn Speed Error Correction without oil residual error
 - ddUY with connected Data Distribution Unit
 - ddUn without Data Distribution Unit (**setting for STD 22 Compact Gyro Compass absolute necessary**)
 - nMSY NMEA output with SEC
 - nMSn NMEA output without SEC
- The indications in the flashing display are selected.

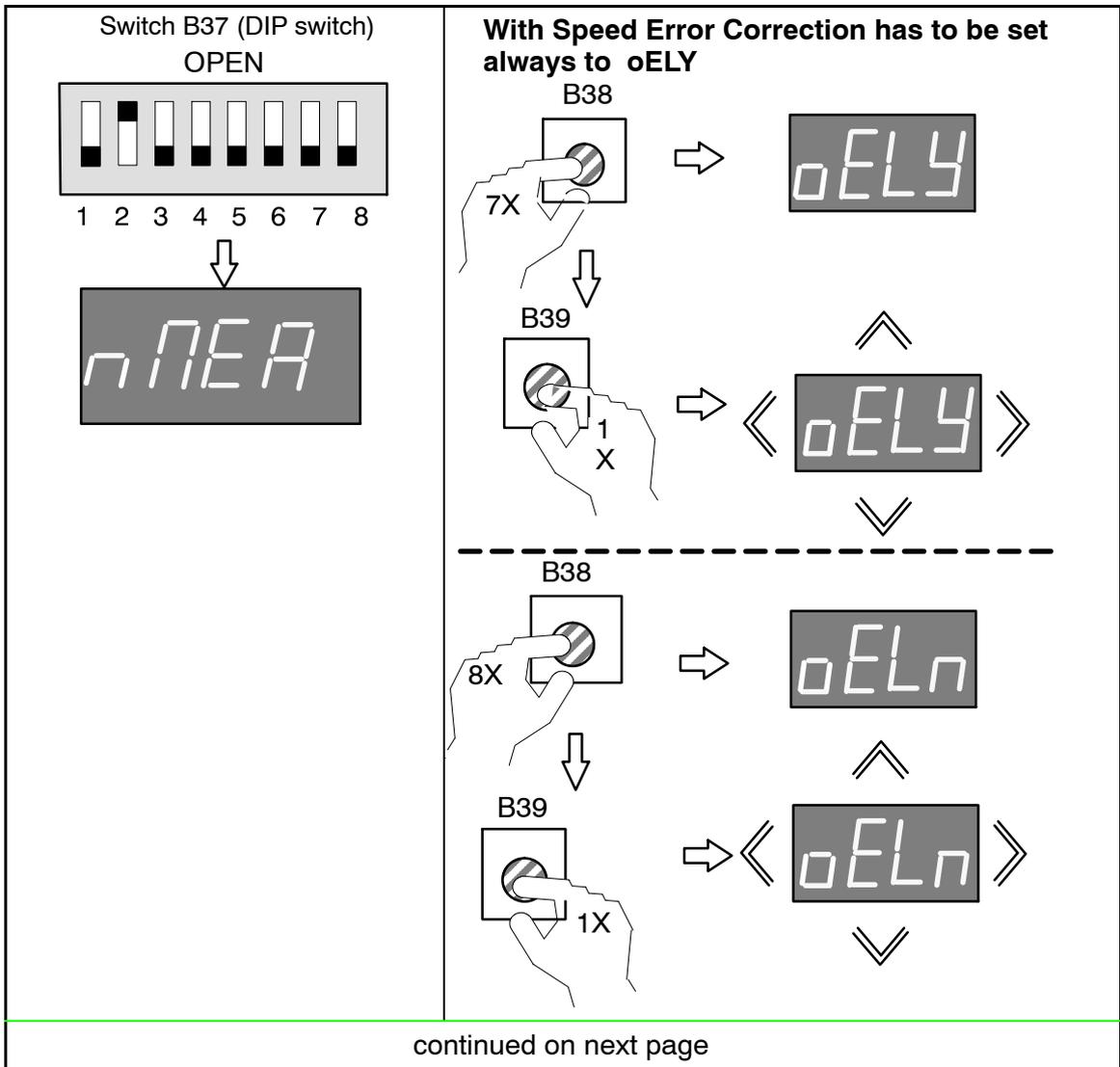


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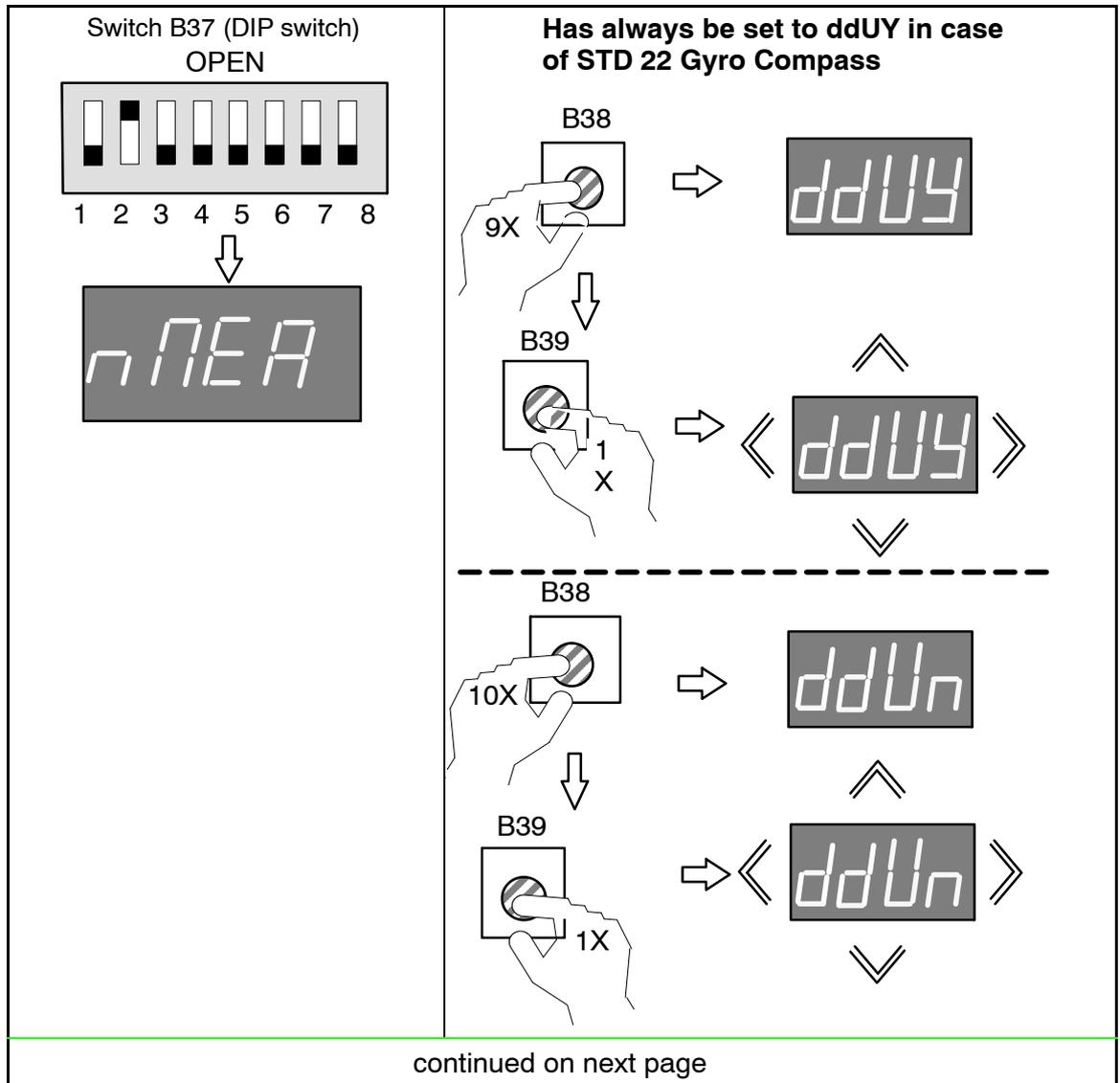
Installation and Service manual Compass STD 22



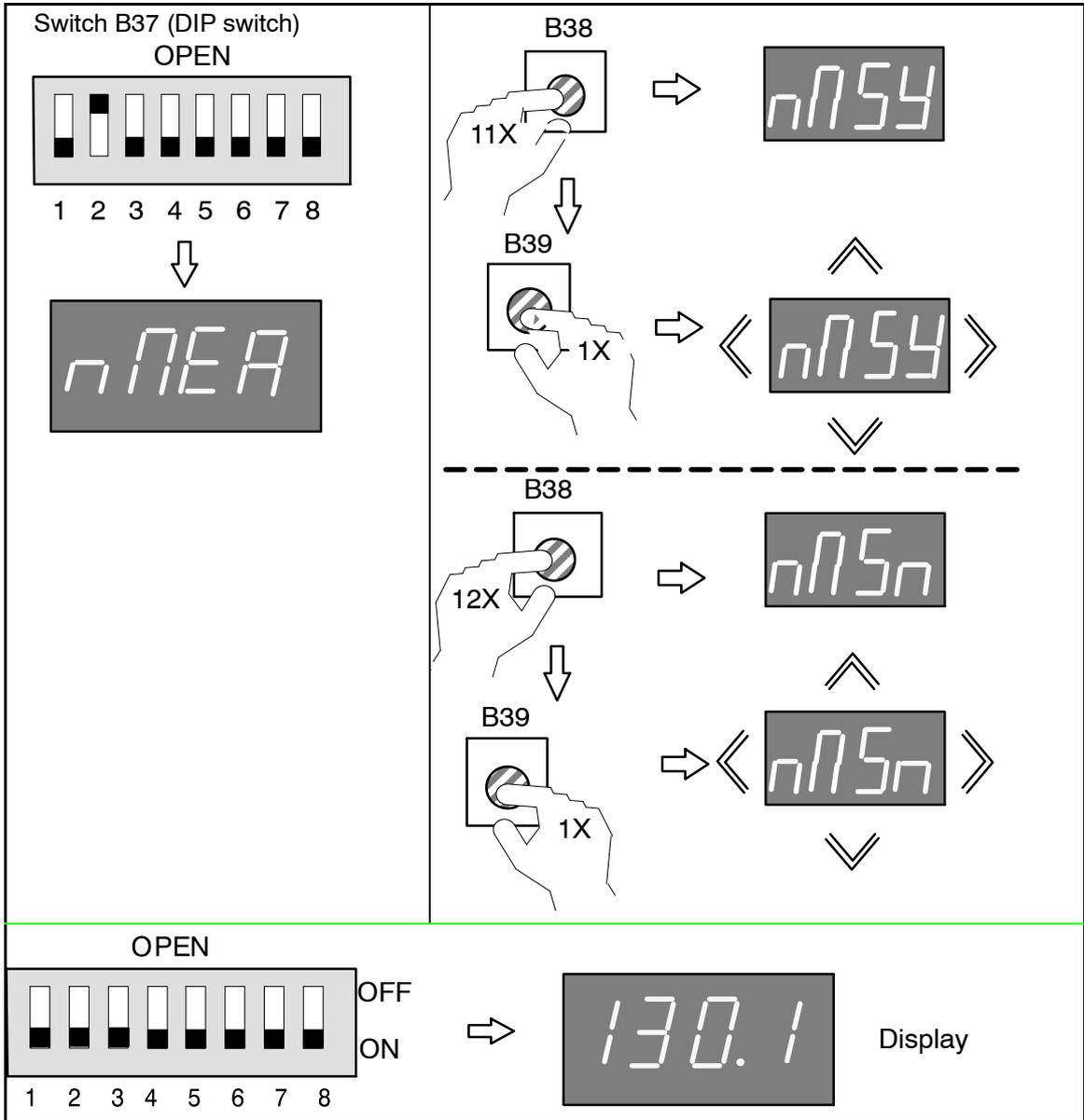
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Compass
STD 22



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3.4.3.7 **Function check on externally connected course receivers, Function check of RoT**

Unscrew and remove the cover of the compass enclosure.

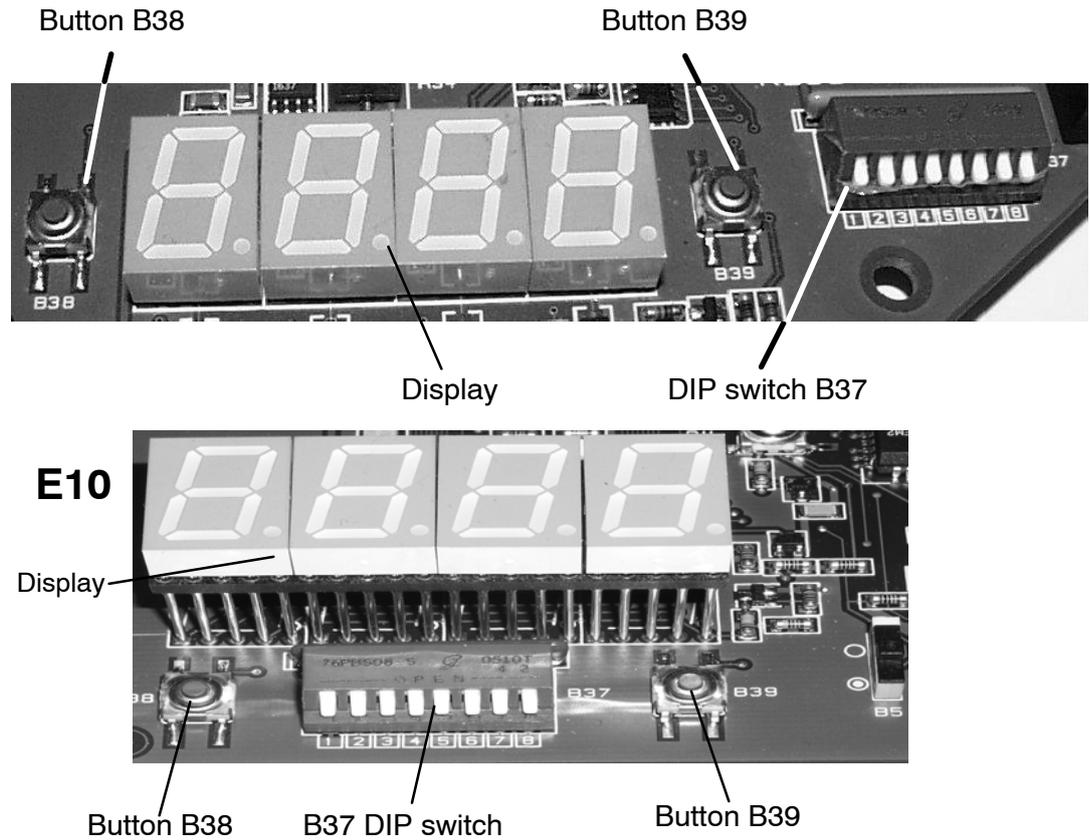
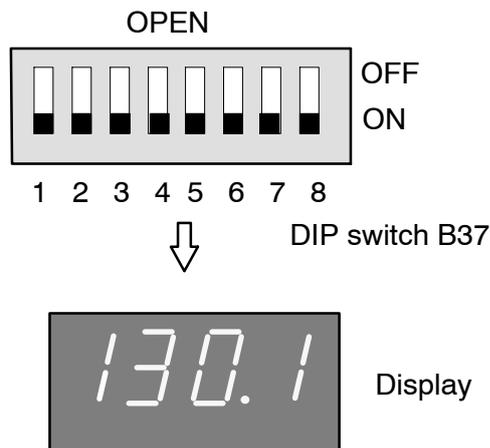


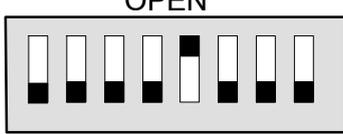
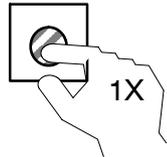
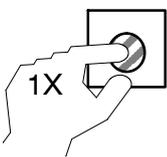
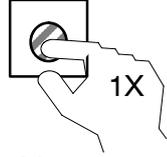
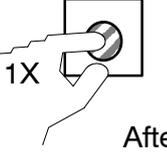
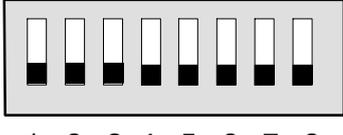
Figure 65: DIP switch B37 and button B38/B39

Initial status:



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Checking connected course receivers (course data).
 With this function the RoT of connected RoT-Indicators* can be tested as well (the rate of turn which is generated by this DIP switch position is 20° per minute).

<p>Switch B 37 (DIP switch)</p> <p style="text-align: center;">OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p> <p style="text-align: center;">↓</p> 	<p>B 39</p>  <p style="text-align: right;">1X</p> <div style="display: flex; align-items: center;">   <div style="display: flex; flex-direction: column; align-items: center;"> <p>130.0</p> <p>129.9</p> <p>129.8</p> <p>129.7</p> <p>129.6</p> </div>  </div> <p style="text-align: center;">Outer sphere turns cw</p> <hr style="border-top: 1px dashed black;"/> <p>B38</p>  <p style="text-align: right;">1X</p> <div style="display: flex; align-items: center;">   <div style="display: flex; flex-direction: column; align-items: center;"> <p>130.5</p> <p>130.4</p> <p>130.3</p> <p>130.2</p> <p>130.1</p> </div>  </div> <p style="text-align: center;">Outer sphere turns ccw</p>
<p>*Remark: Only for RoT-Indicators which are connected to the Distribution Unit. Note: A clockwise (cw) rotation of the outer sphere refers to a ships turn direction counterclockwise.</p>	
<p>Or (depending on the development status)</p>	
<p>Checking connected course receivers (course data). Connected course receiver follow with 20°/minute (cw or ccw) and a follow-up and encoder test is performed.</p>	
<p>Switch B 37 (DIP switch)</p> <p style="text-align: center;">OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p> <p style="text-align: center;">↓</p> 	<p>B 39</p>  <p style="text-align: right;">1X</p> <p style="text-align: center;">or</p> <p>B38</p>  <p style="text-align: right;">1X</p> <div style="display: flex; align-items: center; margin-top: 20px;">   <div style="display: flex; flex-direction: column; align-items: center;"> <p>The number of transmission errors is displayed</p>  </div> </div> <p style="margin-top: 20px;">After 60° - according to 3 minutes - (independant of cw or ccw) one segment lights up (starting with the upper one).</p>
<p style="text-align: center;">OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p>	<div style="display: flex; align-items: center; justify-content: center;">   <div style="margin-left: 10px;"> <p>Display</p> </div> </div>



4 Fuses, jumper, LED's, buttons and plugs

The meaning and the location of fuses, jumper LED's, buttons and plugs of the 3 PCB's: is given in the annex.

PCB	Part no.	Part no. (E10)
Connection PCB	NB05-365	110-233.X13
Power Supply PCB	110-233.102	110-233.X12
Sensor PCB	110-233.X08	110-233.X11
Outer Sphere PCB	110-233.101	110-233.X10

After removal of the cover this information can be helpful to locate a fault.

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5 DIP SWITCH settings

The facilities described below for entering settings and obtaining status information may only be used by suitably trained staff.

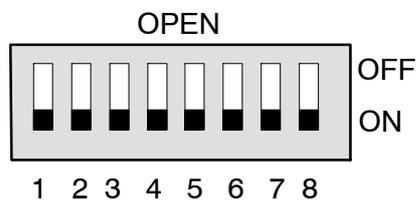
In particular, information and settings which are clearly identified as “service only” are only to be used by appropriately trained personnel.

Following adjustments and settings refer to the STD22 Compact Gyro Compass as well as for the STD 22 Gyro Compass.

Exceptions are marked.

With all DIP switches set to the “ON” position, the current heading is displayed again and all settings that have been made are stored in the compass.

Switch B 37 (DIP switch)



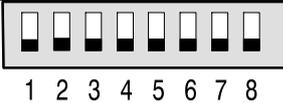
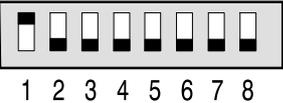
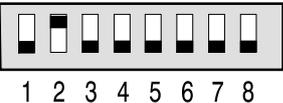
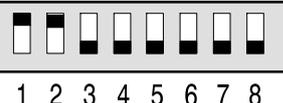
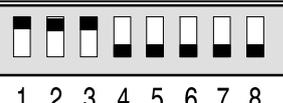
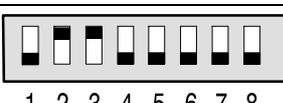
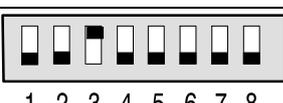
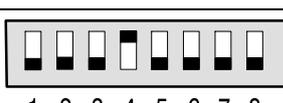
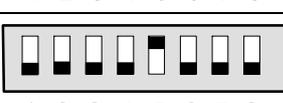
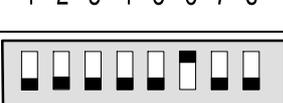
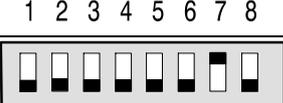
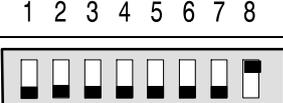
The individual switches are moved up to turn them “OFF” and down to turn them “ON”.

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Compass STD 22 Compact

5.1 Overview of functions of all DIP switch settings

Serial no.	DIP switch setting	Function
1	 1 2 3 4 5 6 7 8	Normal operation
2	 1 2 3 4 5 6 7 8	Setting compass zero (Alignment error)
3	 1 2 3 4 5 6 7 8	Set the repetition rate (1s/100ms) of the NMEA heading data output and the output with or without ROT
4	 1 2 3 4 5 6 7 8	Set the CAN bus address (for gyro compass STD 22 only)
5	 1 2 3 4 5 6 7 8	Set the interfaces for Channel 1 and Channel 2 (compass outputs)
6	 1 2 3 4 5 6 7 8	Set the ROT turning direction (Port +; STB -)
7	 1 2 3 4 5 6 7 8	Bypass the settling phase (Service only)
8	 1 2 3 4 5 6 7 8	Set the speed source for SEC
9	 1 2 3 4 5 6 7 8	Check connected course receivers (course data) (follow up turning) Function check of RoT Follow-op and encoder test
10	 1 2 3 4 5 6 7 8	Check the fan, the display and the follow-up. DO NOT PERFORM DURING THE HEATING PHASE!!
11	 1 2 3 4 5 6 7 8	Turn off the follow-up system (Service only)
12	 1 2 3 4 5 6 7 8	Adjustments to read-out of data. see following steps.

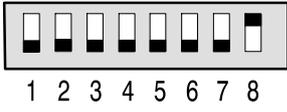
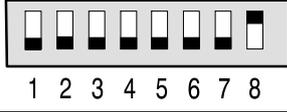
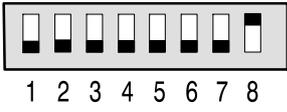
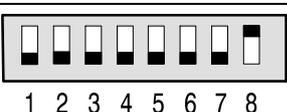
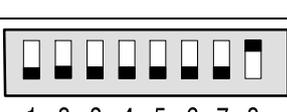
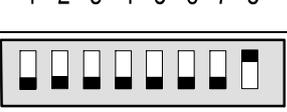
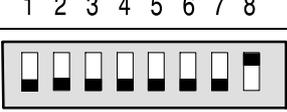
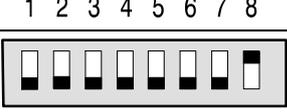
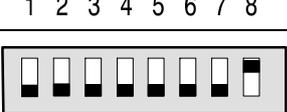
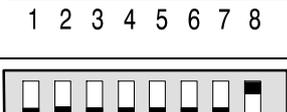
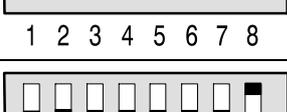
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Serial no.	DIP switch setting	Function
12 Step 1	 1 2 3 4 5 6 7 8	Indicate encoder heading
12 Step 2	 1 2 3 4 5 6 7 8	Indicate alignment error
12 Step 3	 1 2 3 4 5 6 7 8	Indicate SEC (Speed Error Correction)
12 Step 4	 1 2 3 4 5 6 7 8	Indicate ship's mains input voltage (24VDC) Nominal value: 18.0...36.0V
12 Step 5	 1 2 3 4 5 6 7 8	Indicate internal operating voltage of Power Supply PCB (14VDC) Nominal value: 14.0...16.0V
12 Step 6	 1 2 3 4 5 6 7 8	Indicate encoder supply voltage (15VDC) Nominal Value: 14.5...15.5V
12 Step 7	 1 2 3 4 5 6 7 8	Indicate inductive DC transmission supply voltage (60VDC) Nominal value: 58.0...62.0V
12 Step 8	 1 2 3 4 5 6 7 8	Indicate internal operating voltage of Power Supply PCB (19VDC) Nominal value: 17.0...20.5V
12 Step 9	 1 2 3 4 5 6 7 8	Indicate present current due to inductive transmission Nominal value: 0.05...4.0A typical: 2.0 A
12 Step 10	 1 2 3 4 5 6 7 8	Indicate operating voltage of heating Nominal value: 27.0...32.0V
12 Step 11	 1 2 3 4 5 6 7 8	Indicate heating voltage at heating element Nominal value: 0...23.5V
12 Step 12	 1 2 3 4 5 6 7 8	Indicate temperature of the supporting liquid in °C Nominal value: Operating temperature 49.4...50.1°C

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Serial no.	DIP switch setting	Function
12 Step 13	 1 2 3 4 5 6 7 8	Indicate supporting liquid 0.8 = level OK 0 <= 0.8 = level too low (warning)
12 Step 14	 1 2 3 4 5 6 7 8	Indicate operating voltage (73VAC) Nominal Value: <68.0...80.0V
12 Step 15	 1 2 3 4 5 6 7 8	Indicate DC operating voltage for 400Hz (78 - 79.5VDC) Nominal value: 78V Tolerance: 78.0...79.9V
12 Step 16	 1 2 3 4 5 6 7 8	Indicate gyro supply 54-56V _{EFF} Nominal value: During "start-up" 45...60V During operation 53...58V
12 Step 17	 1 2 3 4 5 6 7 8	Indicate gyro current 170-250mA _{EFF} Nominal value: During "start-up" 170....400mA During operation 170....350mA
12 Step 18	 1 2 3 4 5 6 7 8	Indicate operating voltage (13-17VDC) Nominal value: 12 ... 17V
12 Step 19	 1 2 3 4 5 6 7 8	Indicate internal operating voltage 15VDC (14.5-15.5VDC)
12 Step 20	 1 2 3 4 5 6 7 8	Indicate internal operating voltage 24VDC (21,5-25 VDC)
12 Step 21	 1 2 3 4 5 6 7 8	Indicate pump voltage 24V 50Hz (24V +/- 1V, 50 Hz) Nominal value: 21.0 ... 25V
12 Step 22	 1 2 3 4 5 6 7 8	Indicate pump current (150mA) Nominal value: 140...180mA
12 Step 23	 1 2 3 4 5 6 7 8	Indicate pick-up voltage (coded) <5mV
12 Step 24	 1 2 3 4 5 6 7 8	Indicate program number and software version of the program for the microprocessor on the sensor PCB.

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Serial no.	DIP switch setting	Function
12 Step 25	 1 2 3 4 5 6 7 8	Indicate program number and software version of the program for the microprocessor on the Power Supply PCB.
12 Step 26	 1 2 3 4 5 6 7 8	Indicate program number and software version of the program for microprocessor <u>MC 1</u> on the outer sphere PCB.
12 Step 27	 1 2 3 4 5 6 7 8	Indicate program number and software version of the program for microprocessor <u>MC 2</u> on the outer sphere PCB.
12 Step 28	 1 2 3 4 5 6 7 8	Operating time (years)
12 Step 29	 1 2 3 4 5 6 7 8	Operating time (hours)
12 Step 30	 1 2 3 4 5 6 7 8	Future purpose
12 Step 31	 1 2 3 4 5 6 7 8	Future purpose
13	 1 2 3 4 5 6 7 8	Error logbook
SEC 1 to 35	 1 2 3 4 5 6 7 8	DIP switch settings, Speed Error Correction (SEC) (for development purposes only see section 5.1.5)
14	 1 2 3 4 5 6 7 8	Delete: - Error logbook complete - Operating hours (years and hours)

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5.1.1 Adjustments of parameters (in ascending order of function)

DIP-switch	Step	Display	Function	Push button B38 (left)	Push button B39 (right)
1	0	ALEr AL.no	Alignment error setting 5 hours waiting-time not over	decrease	increase
1+2	0	Addr.	Address setting CAN bus	downwards	upwards
1 to 8	0	Fr.Cl	Clearing Logs		
	1	E.L.Ci	Error Log Clear, whole log will be cleared	choose	hold to 0 to clear
	2	Y.h.Cl	Years, hours Clear	choose	hold to 0 to clear
6	0	130.1	Fan, display and follow-up test	-----	-----
5	0	-FU-	Follow-up system manual operation, Function check of RoT Follow-up and encoder test	turns cw	turns ccw
7	0	FUoF	Follow-up system turn off for service	-----	activate
2	0	nNEA	NMEA telegram setting		
	1	nN1	NMEA telegram repetition 1Hz	choose	set
	2	nN10	NMEA telegram repetition 10Hz	choose	set
	3	HE.ro	Heading telegram with ROT	choose	set
	4	HE.--	Heading telegram without ROT	choose	set
	5	SECY	Activate SEC	choose	set
	6	SECn	Deactivate SEC	choose	set
	7	oELY	SEC with oil residual error	choose	set
	8	oELn	SEC without oil residual error	choose	set
	9	ddUY	System with DU	choose	set
	10	ddUn	System without DU	choose	set
	11	nMSy	NMEA with SEC	choose	set
	12	nMSn	NMEA without SEC	choose	set
1+2+3	0	Chn1	Output channel 1, type of telegram		
	1	HSEr	Select for heading serial	choose	set
	2	nNEA	Select for NMEA	choose	set
	3	Chn2	Output channel 2, type of telegram		
	4	HSEr	Select for heading serial	choose	set
	5	nNEA	Select for NMEA	choose	set
2+3	0	P ro	ROT polarity setting	choose	set
	1	ro	Positive polarity for ROT	choose	set
	2	ro -	Negative polarity for ROT	choose	set
3	0	A180	Settling phase bypass	choose	set

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DIP-switch	Step	Display	Function	Push button B38 (left)	Push button B39 (right)
4	0	LOG	Speed log settings		
	1	PLoG	Select for Puls log input	choose	set
	2	PLd-	Select for Puls log input (input interface inverted)	choose	set
	3	PLd	Select for Puls log input (input interface <u>not</u> inverted)	choose	set
	4	uhu.	Select for NMEA speed input	choose	set
	5	ubu.u	Select for NMEA speed input, speed through the water	choose	set
	6	ubu.G	Select for NMEA speed input, speed over ground	choose	set
	7	GLoG	select for GPS speed input	choose	set

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5.1.2 Adjustments of parameters (in ascending order of their appearance)

DIP-switch	Step	Display	Function	Push button B39 (right)	Push button B38 (left)
8	0	GYro	Reading measured data of the gyro		
	1	Enco	Encoder value	choose	display
	2	ALEr	Alignment error	choose	display
	3	SEC	SEC value	choose	display
	4	Pbor	24 V ships mains after input filter 12-32 V	choose	display
	5	Co14	14 V for 60 V inverter	choose	display
	6	P-En	15 V for encoder supply	choose	display
	7	P-60	60 V stabilized / ferrite transformer bridge	choose	display
	8	Co19	19 V from ferrite transformer	choose	display
	9	IndA	Current of ferrite transformer bridge	choose	display
	10	Co31	Voltage for heating circuit	choose	display
	11	C°-U	Voltage on heater element	choose	display
	12	-C°-	Supporting liquid temperature	choose	display
	13	Li-U	Supporting liquid level	choose	display
	14	Co73	73 V from ferrite transformer	choose	display
	15	78-U	78 V stabilized for gyro AC converter	choose	display
	16	GY-U	Gyro supply voltage	choose	display
	17	GY-A	Gyro supply current	choose	display
	18	Co15	15 V from ferrite transformer	choose	display
	19	P-15	15 V stabilized	choose	display
	20	P-24	24 V for pump AC converter	choose	display
	21	U-Pu	24 V AC pump voltage	choose	display
	22	A-Pu	Pump current	choose	display
	23	Ab9r	Follow up voltager W1/W2	choose	display
	24	Pr-S (auch Pr.01)*	Software sensor pcb	choose	display
	25	Pr-P (auch Pr.02)*	Software Power Supply PCB	choose	display
	26	PrG1 (auch Pr.03)*	Software MC1 outer sphere pcb	choose	display
	27	PrG2 (auch Pr.04)*	Software MC2 outer sphere pcb	choose	display
	28	runY	Operating years	choose	display
	29	runh	Operating hours	choose	display
	30	0007	future purpose		
	31	0008	future purpose		

* depending on the development status

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DIP-switch	Step	Display	Function	Push button B38 (left)	Push button B39 (right)
7+8	0	E.L.01	Errors according to error logbook	choose	Error type
	1	E.L.02-24	Errors according to error logbook	choose	number of errors
Depending on the development status 27 different error types E.L.01 to 27) can be displayed.					
			Clear selected error logbook	Hold 10s to clear	
6+7+8	0	UnCo	Uncorrected heading	choose	display
	1	FF	Correction value SEC	choose	display
	2	SPD	Speed input value	choose	display
	3	Br10	Latitude input	choose	display
	4	Corr	Corrected heading	choose	display
	5	_roh	Rough heading	choose	display
	6	o_FF	Correction value SEC with acc error	choose	display
	7	_FF	Correction value SEC without acc error	choose	display
	8	_oF	Acceleration error	choose	display
	9	SCi	Telegram traffic on serial interface	choose	display
	10	SrCS	Speed information source	choose	display
	11	PULS	Value from puls log	choose	display
	12	vtG.S	Value from GPS speed	choose	display
	13	vtG.h	Heading from GPS	choose	display
	14	uhu	Speed from NMEA telegram	choose	display
	15	SPd.L	Speed data transfer	choose	display
	16	PoS	Latitude in degrees	choose	display
	17	ASPd	Speed alarms	choose	display
	18	PoSn	Latitude data transfer	choose	display
	19	APoS	Latitude alarm	choose	display
	20	nAUC	Number of telegrams with checksum	choose	display
	21	nAn1	1 st table of NMEA requests	choose	display
	22	nAn2	2 nd table of NMEA requests	choose	display
	23	nSGG	Strings of GGA telegram	choose	display
	24	nSGL	Strings of GLL telegram	choose	display
25	nSLL	Strings of SLL telegram	choose	display	
Depending on development status the step 25 is dropped out. By this steps 26 to 34 are displaced to step 25 to 33.					
	26	nShu	String of VHW telegram	choose	display
	27	nStG	String of VTG telegram	choose	display
	28	nSbu	String of VBW telegram	choose	display
	29	Fb10	Software component SEC: Latitude	choose	display
	30	FS10	Software component SEC: Speed	choose	display
	31	FnSP	Software component SEC: Ships speed vector	choose	display
	32	FuTG	Software component SEC: Speed over ground	choose	display
	33	tiNE	Time since activating SEC	choose	display
	34	SCI	Display serial communication interface	choose	display

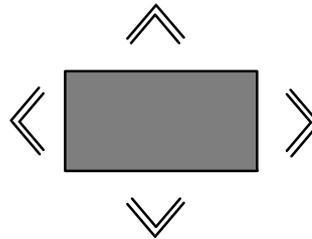
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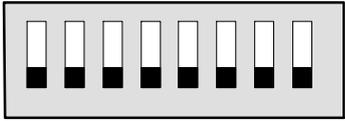
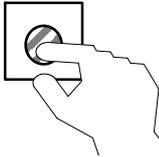
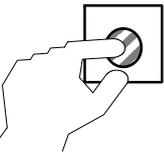
5.1.3 7 segment displays and their meaning

	= A		= S
	= B		= T
	= C		= U
	= D		= V
	= E		= W
	= F		= X
	= G		= Y
	= H		= Z
	= I		= 1
	= J		= 2
	= K		= 3
	= L		= 4
	= M		= 5
	= N		= 6
	= O		= 7
	= P		= 8
	= Q		= 9
	= R		= 0
	= comma		= *
	= point		= LF (Line Feed)

5.1.4 Functional description of DIP switch settings (for general use)

Note: In the following tables, a flashing display on the compass is represented like this.

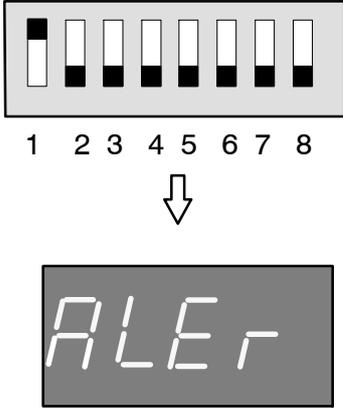
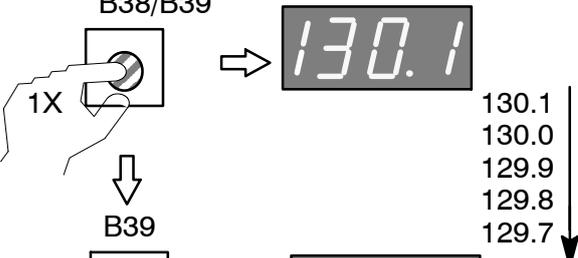
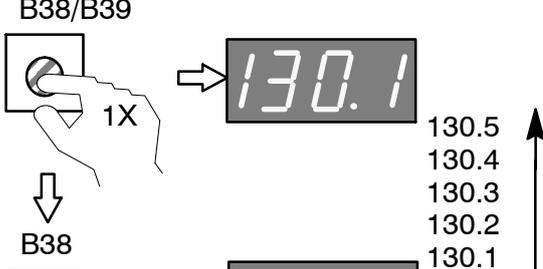
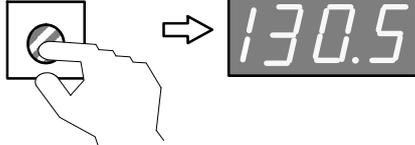


Serial No.	Indications	Comments, Information
1	<p>Normal operation</p> <p>If the decimal point flashes during normal operation, a warning can be displayed by means of the following procedure.</p> <hr style="border: 1px solid green;"/> <div style="text-align: center;">  <p>flashing</p> <p>Switch B 37 (DIP switch)</p> <div style="text-align: center; margin-top: 10px;"> <p>OPEN</p>  <p>1 2 3 4 5 6 7 8</p> </div> </div>	<div style="display: flex; align-items: center; margin-bottom: 20px;"> <div style="text-align: center;"> <p>B39</p>  </div> <div style="margin: 0 10px;">→</div> <div style="text-align: center;">  </div> </div> <p style="text-align: center;">Indicate warning 4 to 8 (if a warning appears, refer to operator manual)</p> <hr style="border-top: 1px dashed black;"/> <div style="display: flex; align-items: center;"> <div style="text-align: center;"> <p>B38</p>  </div> <div style="margin: 0 10px;">→</div> <div style="text-align: center;">  </div> </div> <p style="text-align: center;">Indicate warning 1 to 4 (if a warning appears, refer to operator manual)</p>

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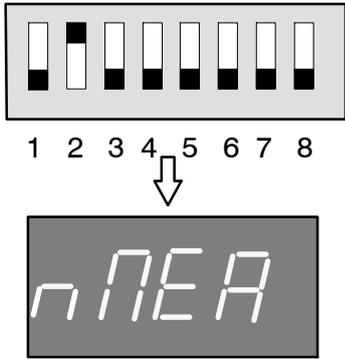
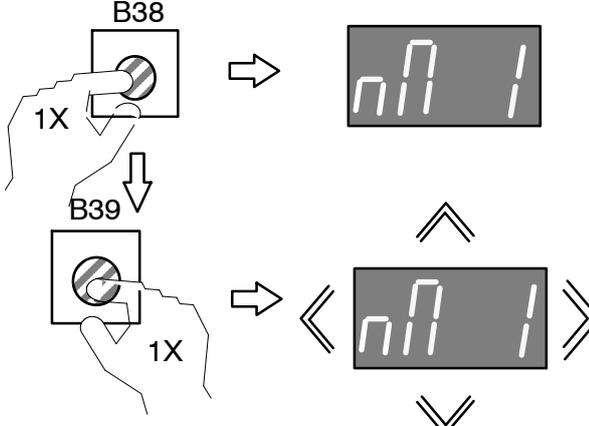
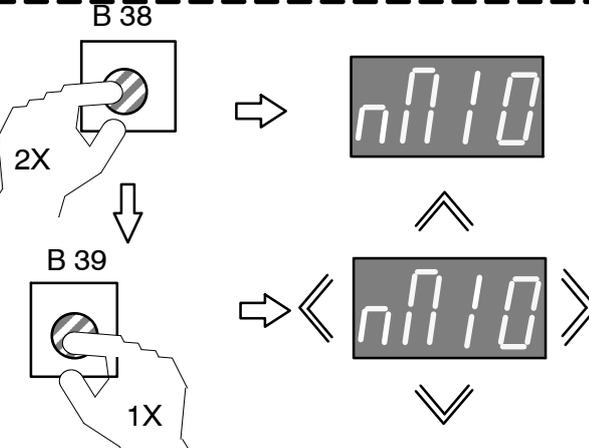
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Serial No.	Indications	Comments, Information
2	<p>Setting compass zero</p> <p>The compass zero must be set following installation. Use the pier course from the sea chart as reference. Observe the restrictions depending on time after switching on and mooring of the ship.</p> <div style="text-align: center;"> <p>Switch B 37 (DIP switch)</p> <p>OPEN</p>  </div>	<div style="text-align: center;"> <p>B38/B39</p>  <p>B39</p>  <p>Setting compass zero</p> <hr style="border-top: 1px dashed black;"/> <p>B38/B39</p>  <p>B38</p>  <p>Setting compass zero</p> </div>
<p>Setting of the compass zero is possible only 5 hours after switching on the compass, the ship must not be moored during this time. To try to perform this setting within this time leads to a message "AL.no" at the display.</p>		

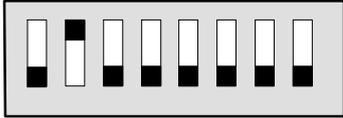
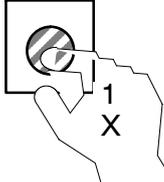
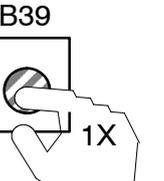
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Serial No.	Indications	Comments, Information
3		<p>Set the repetition rate of the NMEA heading data output, the output with or without ROT (Rate of Turn), with or without oil residual error for the speed error correction and the setting of a connected Data Distribution Unit (not for STD 22 Compact Gyro Compass).</p> <p>1 heading data transmission 1 telegram per second 10 heading data transmission 10 telegrams per second HE.ro heading with ROT. HE.-- heading only SECY heading data incorporating Speed Error Correction SECn heading data without Speed Error Correction oELY Speed Error Correction with oil residual error (recommended setting) oELn Speed Error Correction without oil residual error ddUY with connected Data Distribution Unit ddUn without Data Distribution Unit (setting for STD 22 Compact Gyro Compass absolute necessary) nMSy NMEA with SEC nMSn NMEA without SEC The indications in the flashing display are selected.</p>
<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p>Switch B 37 (DIP switch) OPEN</p>  </div> <div style="width: 65%;"> <div style="border-bottom: 1px dashed black; padding-bottom: 10px;"> <p>B38</p>  </div> <div style="padding-top: 10px;"> <p>B 38</p>  </div> </div> </div>		
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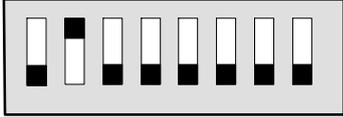
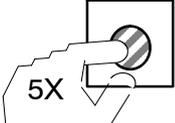
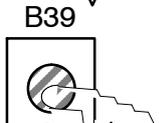
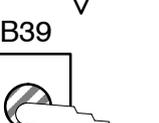
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Serial No.	Indications	Comments, Information
3 cont.	<p>Switch B 37 (DIP switch) OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p> <p style="text-align: center;">↓</p> 	<div style="border-bottom: 1px dashed black; padding-bottom: 10px;"> <p style="text-align: center;">B38</p>  <p style="text-align: center;">3X</p> <p style="text-align: center;">→</p>  <p style="text-align: center;">↓</p> <p style="text-align: center;">B39</p>  <p style="text-align: center;">1X</p> <p style="text-align: center;">→</p>  </div> <div style="border-top: 1px dashed black; padding-top: 10px;"> <p style="text-align: center;">B38</p>  <p style="text-align: center;">4X</p> <p style="text-align: center;">→</p>  <p style="text-align: center;">↓</p> <p style="text-align: center;">B39</p>  <p style="text-align: center;">1X</p> <p style="text-align: center;">→</p>  </div>
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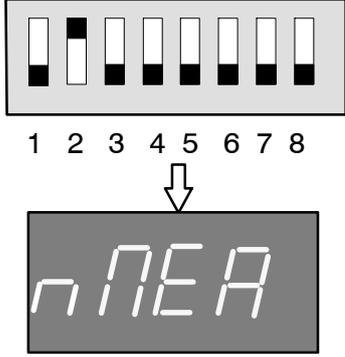
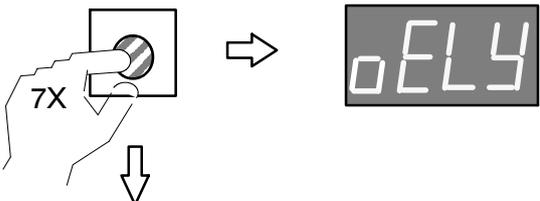
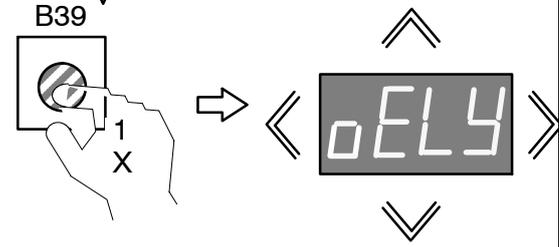
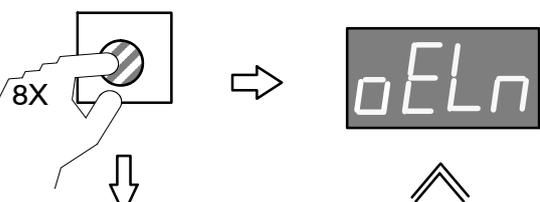
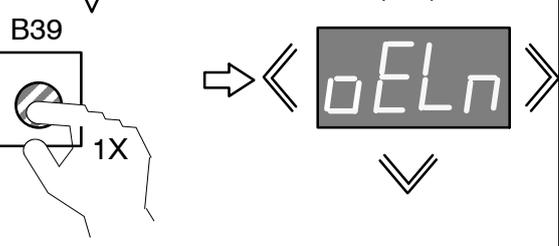
Installation and Service manual
 Compass STD 22
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Serial No.	Indications	Comments, Information
3 cont.	<p>Switch B 37 (DIP switch) OPEN</p>  <p>1 2 3 4 5 6 7 8</p>  	<div style="border-bottom: 1px dashed black; padding-bottom: 10px;"> <p>B38</p>  <p>5X</p>   <p>B39</p>  <p>1X</p>   </div> <div style="border-top: 1px dashed black; padding-top: 10px;"> <p>B38</p>  <p>6X</p>   <p>B39</p>  <p>1X</p>   </div>
continued on next page		

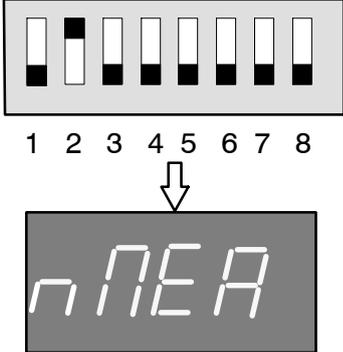
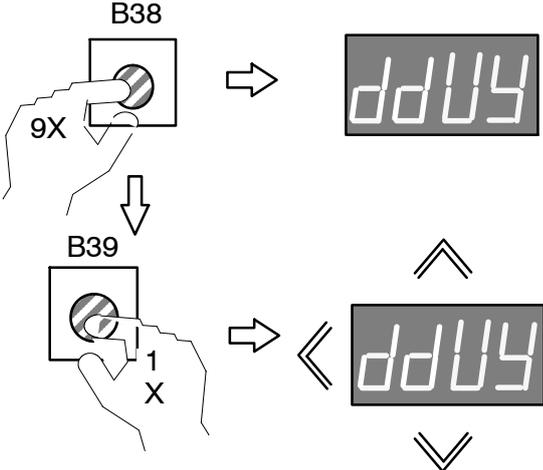
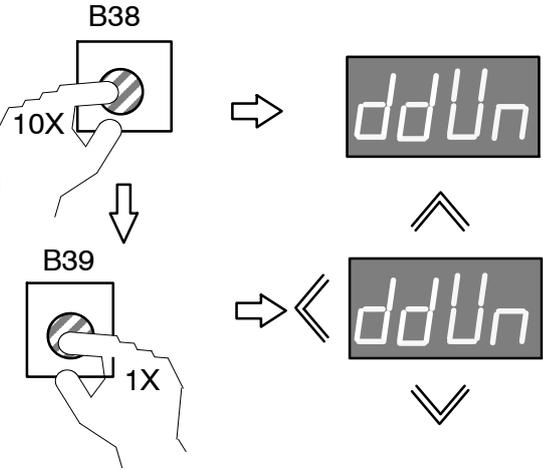
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Serial No.	Indications	Comments, Information
3 cont.	<p>Switch B 37 (DIP switch) OPEN</p> 	<p>With Speed Error Correction has to be set always to 0ELY</p> <p>B38</p>  <p>B39</p>  <hr style="border-top: 1px dashed black;"/> <p>B38</p>  <p>B39</p>  <p style="text-align: right;">continued on next page</p>

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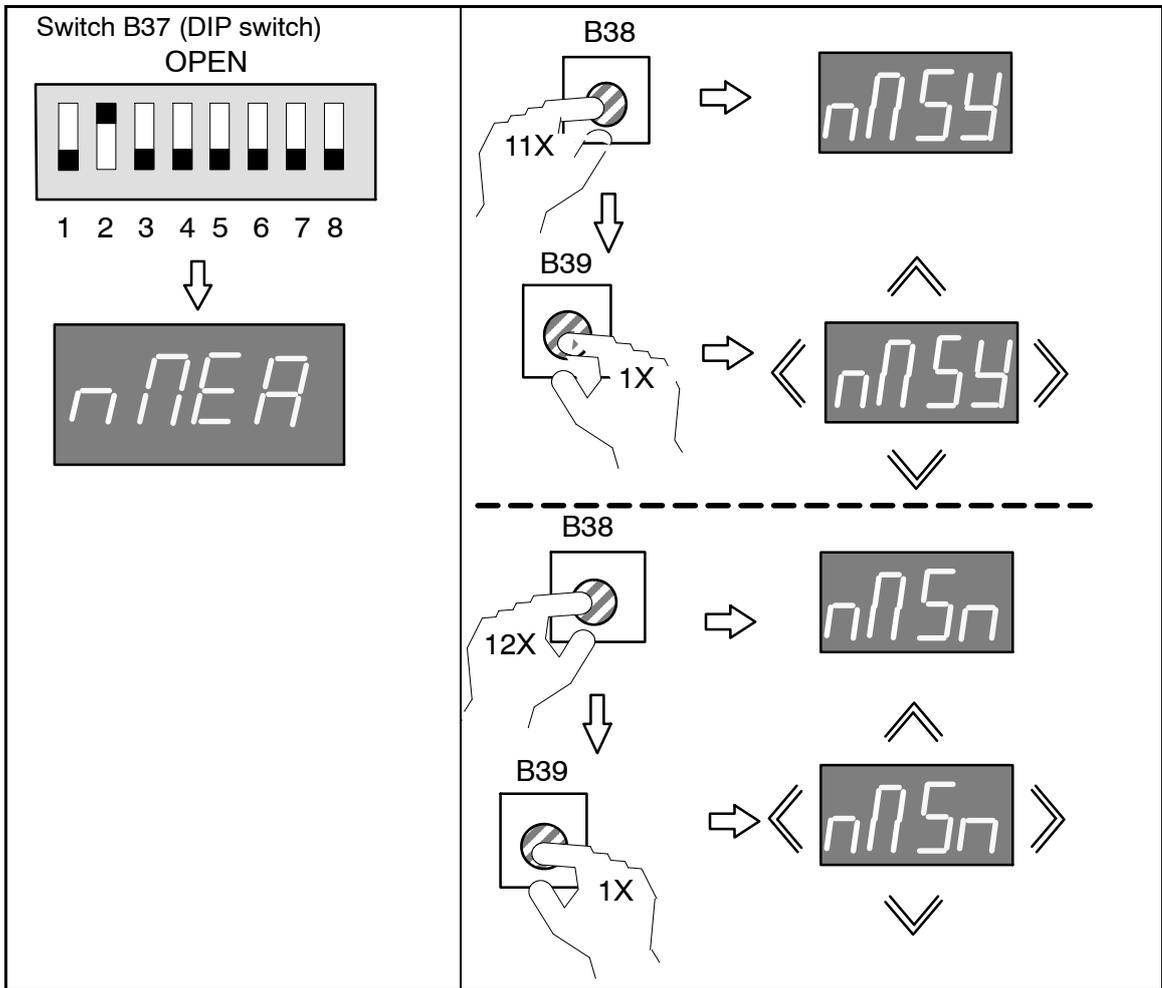
Compass
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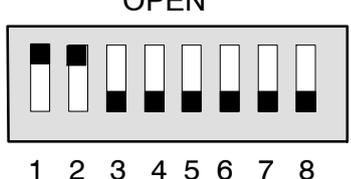
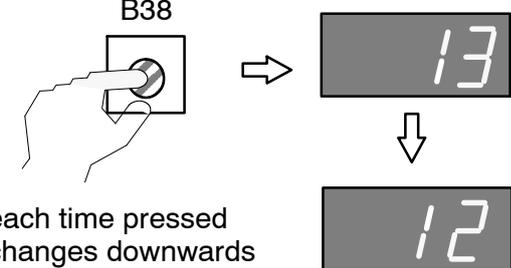
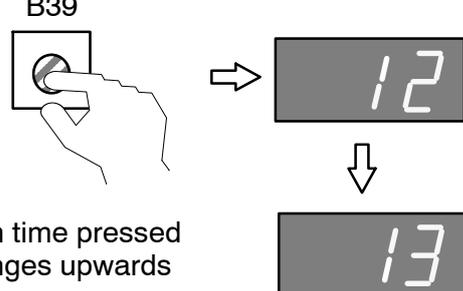
Serial No.	Indications	Comments, Information
3 cont.	<p>Switch B 37 (DIP switch) OPEN</p> 	<p>Has always be set to ddUY in case of STD 22 Gyro Compass</p>  <hr/>  <p>Has always be set to ddUn in case of STD 22 Compact Gyro Compass</p> <p>continued on next page</p>

Installation and Service manual

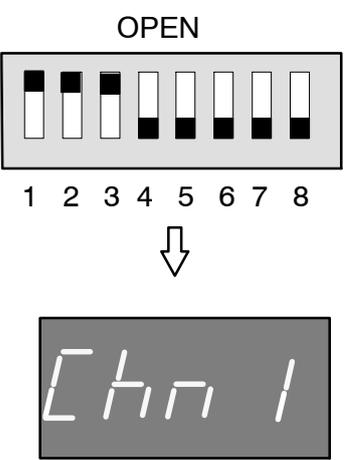
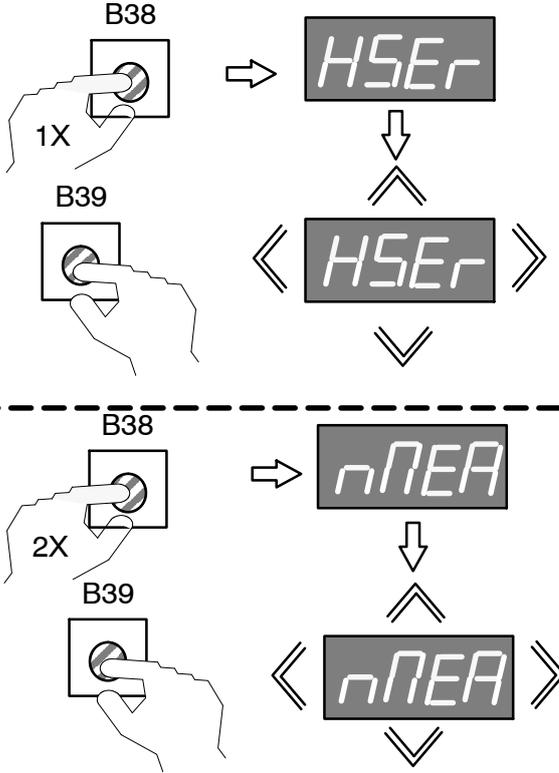
Compass STD 22

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Serial No.	Indications	Comments, Information
4	<p>Set the CAN bus address of the compass For STD 22 Gyro Compass only (only with Distribution Unit, Operation Unit and for further CAN bus users)</p> <p>Every CAN bus user has an address. This address may be assigned within the system only once. The CAN bus address for compasses (in general) can be set within a range from 10 to 19 (see table below). The address 00 may not be used.</p>	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p style="text-align: center;">Switch B 37 (DIP switch)</p> <p style="text-align: center;">OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p> <p style="text-align: center;">↓</p>  </div> <div style="width: 50%;"> <p style="text-align: center;">B38</p>  <p style="text-align: center;">each time pressed changes downwards</p> <hr style="border-top: 1px dashed black;"/> <p style="text-align: center;">B39</p>  <p style="text-align: center;">each time pressed changes upwards</p> </div> </div>
Example		
	Devices	CAN bus address
1	Operator Units	01 to 09
2	Sensors (GPS compass)	10 to 13
	Sensors (Gyro compass)	14 to 19
3	Distribution Units	20 to 29
4	Gateway	56 and 57
After changing the CAN bus address a RESET procedure has to be performed.		

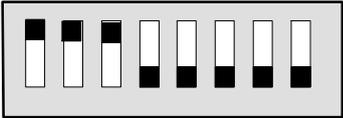
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Serial No.	Indications	Comments, Information
5	<p>Set the interfaces for Channel 1 and Channel 2.</p> <p>For STD 22 Compact Compass only HSEr = Heading serial (Course bus) nMEA = NMEA 0183</p> <p>The "flashing" setting is accepted.</p> <p>Switch B 37 (DIP switch)</p> 	 <p style="text-align: center;">continued on next page</p>

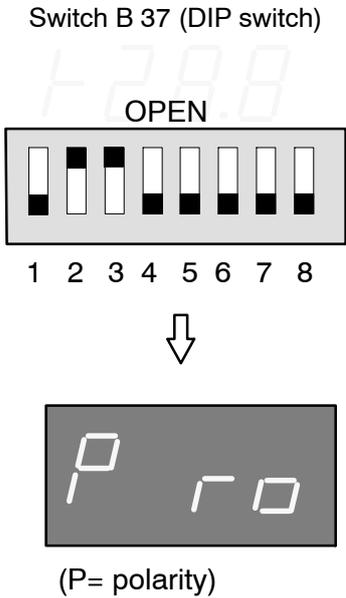
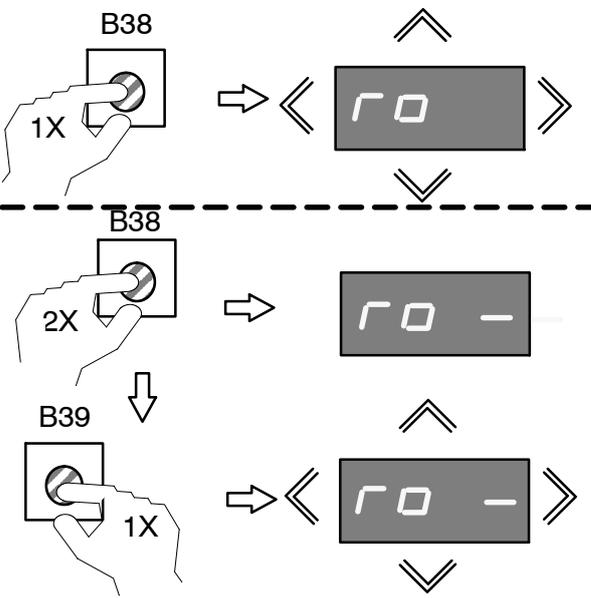
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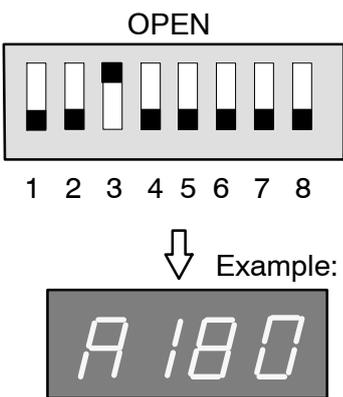
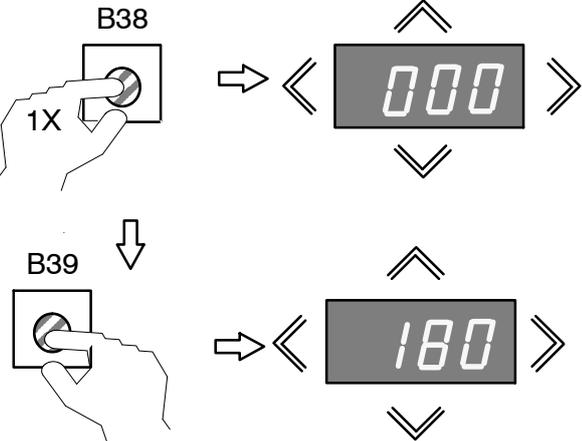
Compass
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Serial No.	Indications	Comments, Information
cont. No. 5	<p>Switch B 37 (DIP switch)</p> <p>OPEN</p>  <p>1 2 3 4 5 6 7 8</p>  	<p>B38 → [Chan 2]</p> <p>3X</p> <hr/> <p>B38 → HSEr</p> <p>4X</p> <p>B39</p> <p>← HSEr →</p> <hr/> <p>B38 → nNEA</p> <p>5X</p> <p>B39</p> <p>← nNEA →</p>

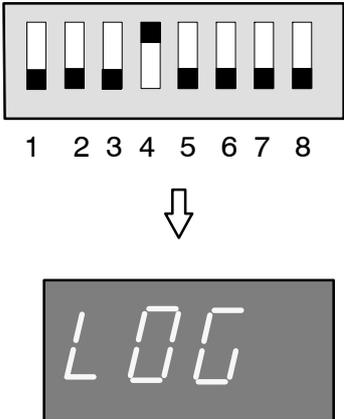
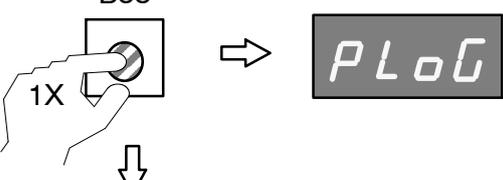
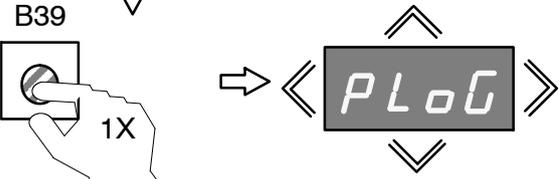
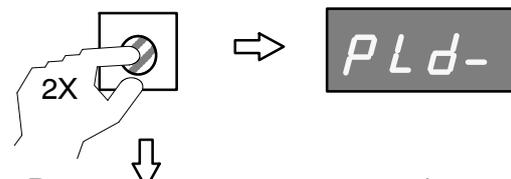
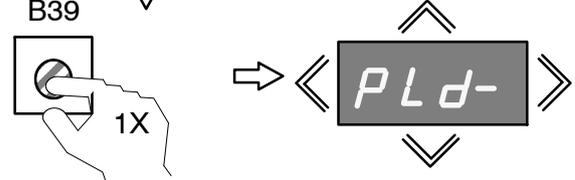
Installation and Service manual
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Serial No.	Indications	Comments, Information
6	<p>Set the polarity of ROT turning direction</p> <p>This information is supplied together with the course data to connected course receivers.</p> <p>Press button B38 to toggle between the two possible polarities. Press button B39 to select the polarity of the rate of turn.</p> <p>The indications in the <u>flashing</u> display are selected.</p> <p>A positive rate of turn is indicated by the absence of a minus sign.</p>  <p style="text-align: center;">(P= polarity)</p>	



Serial No.	Indications	Comments, Information
7	<p>Bridging over settling time</p> <p><u>CAUTION! When the settling in stage is by-passed, the display and all connected course receivers indicate that the course data is usable, even though there may be significant deviations.</u></p> <p><u>FOR SERVICE PURPOSES ONLY</u></p> <hr/> <p>Switch B 37 (DIP switch)</p>  <p>1 2 3 4 5 6 7 8</p> <p>Example: </p>	 <p>B38</p> <p>1X</p> <p>B39</p> <p>After the DIP switch is set into zero position the settling stage is by-passed</p>

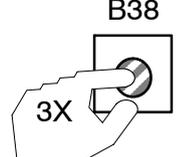
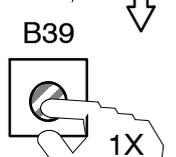
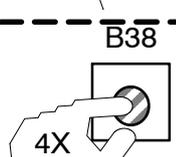
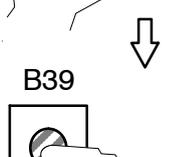
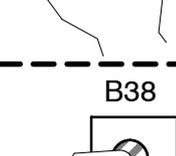
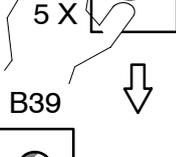
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Serial No.	Indications	Comments, Information
8	<p>Set the speed source for SEC (STD22 Compact only)</p> <p>This setting is used to select the source of the speed information for automatic Speed Error Correction.</p> <p>PLoG = Pulse Log PLd- = Puls Log (polarity of the input interface inverted) PLd = Puls Log (polarity of the input interface not inverted) uhu. = NMEA Log (means water speed in general) ubu.u = means NMEA Log specified with speed through the water ubu.G = means NMEA Log specified with speed over ground GLoG = GPS-receiver speed</p> <p>The indications in the <u>flashing</u> display are selected.</p> <p>If the setting does not correspond to the connected device, the course correction relay responds and gives an appropriate warning only to devices which are connected to this alarm output.</p>	
	<p style="text-align: center;">Switch B 37 (DIP switch)</p> <div style="text-align: center;">  </div>	<div style="display: flex; flex-direction: column;"> <div style="margin-bottom: 20px;"> <p style="text-align: center;">B38</p>  </div> <div style="margin-bottom: 20px;"> <p style="text-align: center;">B39</p>  </div> <hr style="border-top: 1px dashed black;"/> <div style="margin-bottom: 20px;"> <p style="text-align: center;">B38</p>  </div> <div> <p style="text-align: center;">B39</p>  </div> </div>

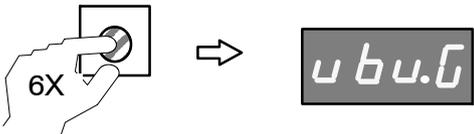
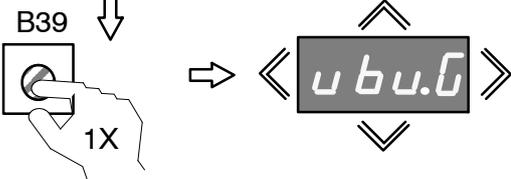
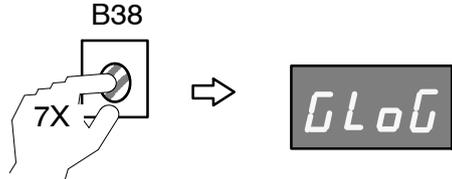
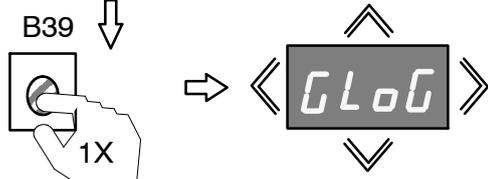
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Serial No.	Indications	Comments, Information
cont. No. 8		<div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; align-items: center; margin-bottom: 10px;">  → <div style="border: 1px solid black; padding: 5px; background-color: #ccc;">PLd</div> </div> <div style="display: flex; align-items: center; margin-bottom: 10px;"> ↓  → <div style="display: flex; align-items: center;"> { <div style="border: 1px solid black; padding: 5px; background-color: #ccc;">PLd</div> } </div> </div> <hr style="border-top: 1px dashed black; margin: 10px 0;"/> <div style="display: flex; align-items: center; margin-bottom: 10px;">  → <div style="border: 1px solid black; padding: 5px; background-color: #ccc;">uhu.</div> </div> <div style="display: flex; align-items: center; margin-bottom: 10px;"> ↓  → <div style="display: flex; align-items: center;"> { <div style="border: 1px solid black; padding: 5px; background-color: #ccc;">uhu.</div> } </div> </div> <hr style="border-top: 1px dashed black; margin: 10px 0;"/> <div style="display: flex; align-items: center; margin-bottom: 10px;">  → <div style="border: 1px solid black; padding: 5px; background-color: #ccc;">ubu.u.</div> </div> <div style="display: flex; align-items: center;"> ↓  → <div style="display: flex; align-items: center;"> { <div style="border: 1px solid black; padding: 5px; background-color: #ccc;">ubu.u.</div> } </div> </div> </div>

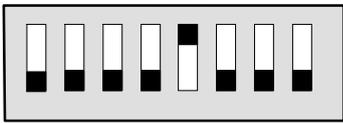
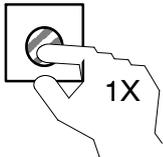
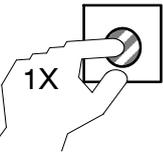
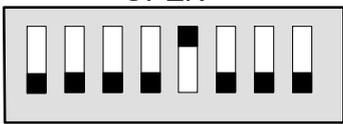
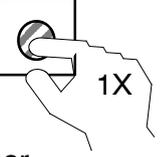
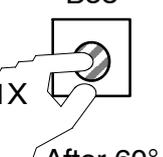
Installation and Service manual
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Serial No.	Indications	Comments, Information
cont. No. 8		<div style="text-align: center;"> <p>B38</p>  <p>6X</p> <p>B39</p>  <p>1X</p> <hr style="border-top: 1px dashed black;"/> <p>B38</p>  <p>7X</p> <p>B39</p>  <p>1X</p> </div>

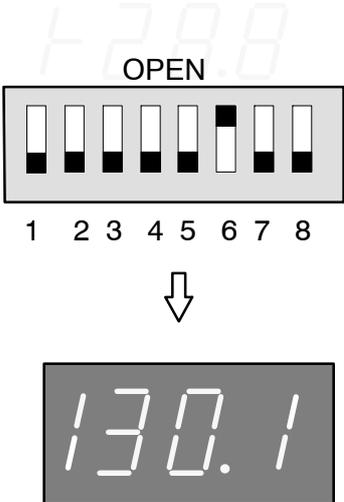
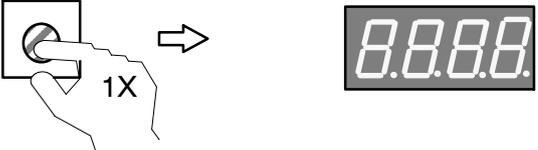
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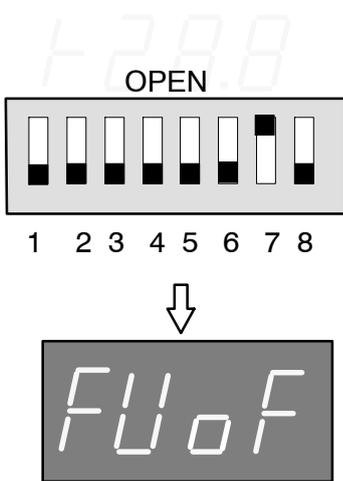
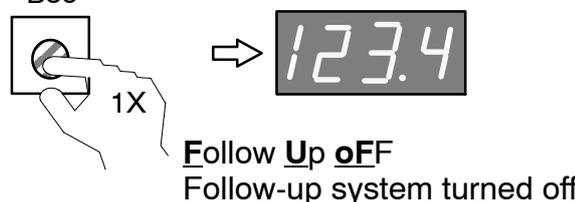
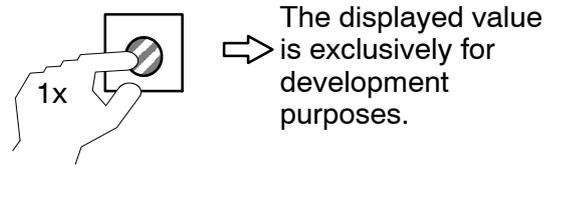


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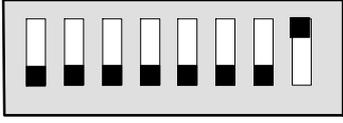
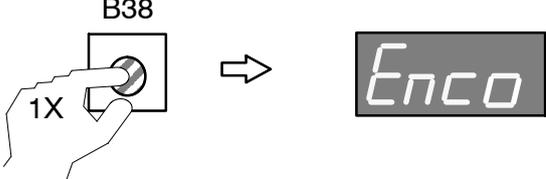
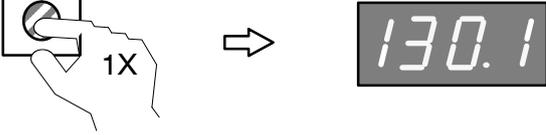
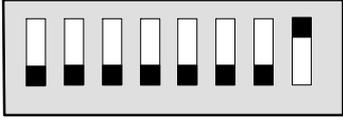
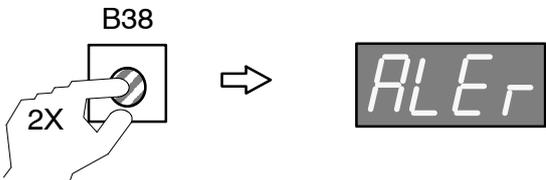
Serial No.	Indications	Comments, Information
9	<p>Check connected course receivers (check of follow-up function) and check of RoT. The check of RoT is only possible at RoT-Indicators which are connected to the Distribution Unit.</p> <p style="text-align: center;">Switch B 37 (DIP switch)</p> <div style="text-align: center;"> <p>OPEN</p>  <p>1 2 3 4 5 6 7 8</p> <p>↓</p>  </div>	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>B 39</p>  </div> <div style="width: 45%;">  <p style="text-align: center;">Outer sphere turns cw</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"></div> <div style="width: 45%; text-align: right;"> <p>130.1</p> <p>129.9</p> <p>129.8</p> <p>129.7</p> <p>129.6</p> </div> </div> </div> </div> <hr style="border-top: 1px dashed black;"/> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>B38</p>  </div> <div style="width: 45%;">  <p style="text-align: center;">Outer sphere turns ccw</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"></div> <div style="width: 45%; text-align: right;"> <p>130.1</p> <p>130.2</p> <p>130.3</p> <p>130.4</p> <p>130.5</p> </div> </div> </div> </div>
	<p>Or (depending on the development status)</p>	
	<p>Checking connected course receivers (course data). Connected course receiver follow with 20°/minute (cw or ccw) and a follow-up and encoder test is performed.</p>	
	<p>Switch B 37 (DIP switch)</p> <div style="text-align: center;"> <p>OPEN</p>  <p>1 2 3 4 5 6 7 8</p> <p>OFF ON</p> <p>↓</p>  </div>	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>B 39</p>  <p>or</p> <p>B38</p>  </div> <div style="width: 45%;">  <p style="text-align: center;">The number of transmission errors is displayed</p> <p>After 60° - according to 3 minutes - (independant of cw or ccw) one segment lights up (starting with the upper one).</p> </div> </div>

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Serial No.	Indications	Comments, Information
10	<p>Check the fan, the display and the follow-up. DO NOT PERFORM DURING HEATING STAGE!</p> <p><u>The current course is displayed on the connected course receivers.</u></p> <hr/> <p>Switch B 37 (DIP switch)</p> 	<p>B39</p>  <p>NOTE: If this function is activated during the heating stage inadvertently, the compass must be switched OFF and -ON again.</p>

Serial No.	Indications	Comments, Information
11	<p>Turn off the follow-up system</p> <p style="text-align: center;">(SERVICE ONLY)</p> <p>These switches turn off the follow-up system of the compass, in other words, the display no longer follows the course.</p> <p><u>Caution:</u> The displayed course and the course for all connected course receivers do not correspond to the ship's course.</p>	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Switch B 37 (DIP switch)</p>  </div> <div style="width: 45%;"> <p>B39</p>  <p style="text-align: center;">↓</p> <p>B38</p>  </div> </div>

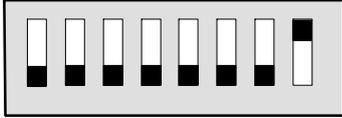
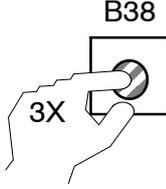
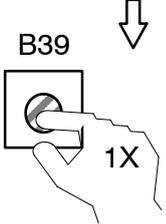
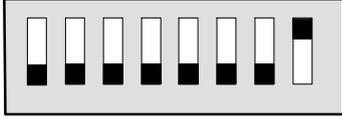
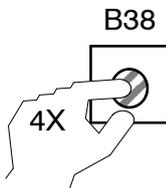
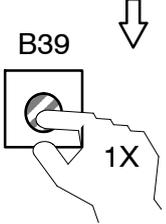
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Serial No.	Indications	Comments, Information
12	<p data-bbox="416 465 751 499">Indicate Encoder heading</p> <p data-bbox="475 517 770 551">Switch B 37 (DIP switch)</p> <p data-bbox="560 629 644 663">OPEN</p>  <p data-bbox="472 792 759 826">1 2 3 4 5 6 7 8</p> <p data-bbox="608 846 639 902">↓</p> 	 <p data-bbox="954 528 1010 562">B38</p> <p data-bbox="879 618 919 651">1X</p> <p data-bbox="863 730 919 763">↓</p>  <p data-bbox="863 752 919 786">B39</p> <p data-bbox="954 864 994 898">1X</p>
12.1	<p data-bbox="416 1104 735 1137">Indicate Alignment Error</p> <p data-bbox="475 1155 770 1189">Switch B 37 (DIP switch)</p> <p data-bbox="560 1267 644 1301">OPEN</p>  <p data-bbox="472 1431 759 1464">1 2 3 4 5 6 7 8</p> <p data-bbox="608 1485 639 1541">↓</p> 	 <p data-bbox="954 1155 1010 1189">B38</p> <p data-bbox="879 1267 919 1301">2X</p> <p data-bbox="863 1379 919 1413">↓</p>  <p data-bbox="863 1402 919 1435">B39</p> <p data-bbox="954 1514 994 1547">1X</p> <p data-bbox="1126 1559 1406 1615">Indicating the current Alignment Error</p>

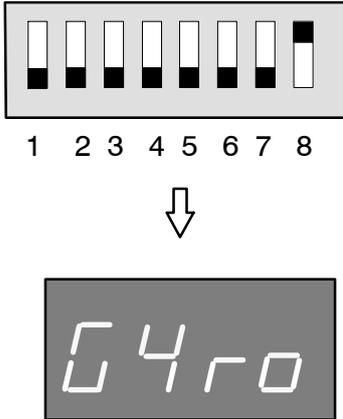
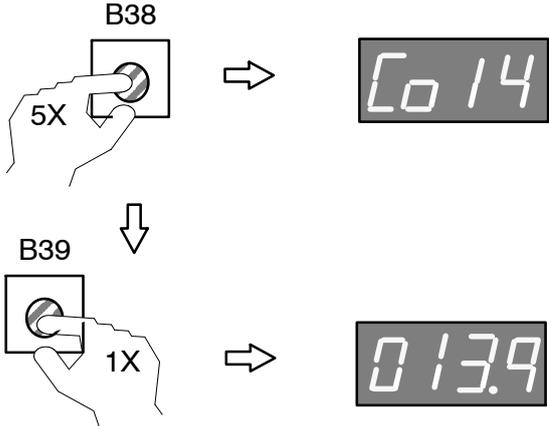
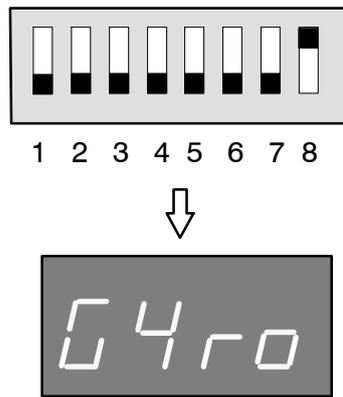
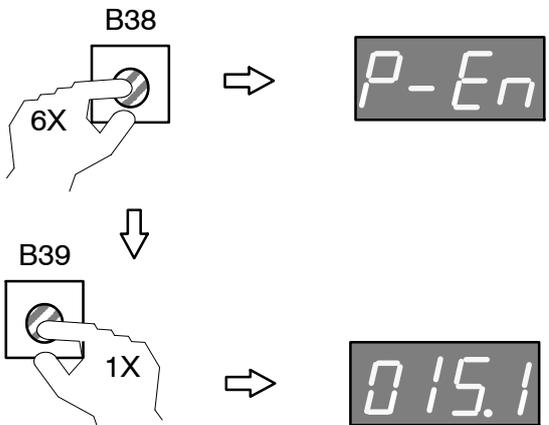
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Serial No.	Indications	Comments, Information
12.2	<p>Indicate SEC (Speed Error Correction) value The heading indication already takes this value into account.</p> <p>Switch B 37 (DIP switch) OPEN</p>  <p>1 2 3 4 5 6 7 8</p> <p style="text-align: center;">↓</p> 	 <p>B38 3X</p> <p style="text-align: center;">→</p>  <p style="text-align: center;">↓</p>  <p>B39 1X</p> <p style="text-align: center;">→</p> 
12.3	<p>Indicate supply voltage DC (P = Power) (input operating voltage 24VDC)</p> <p>Switch B 37 (DIP switch) OPEN</p>  <p>1 2 3 4 5 6 7 8</p> <p style="text-align: center;">↓</p> 	 <p>B38 4X</p> <p style="text-align: center;">→</p>  <p style="text-align: center;">↓</p>  <p>B39 1X</p> <p style="text-align: center;">→</p> 

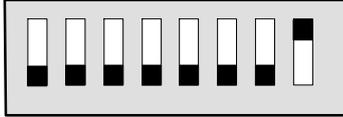
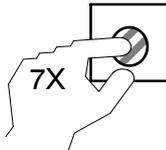
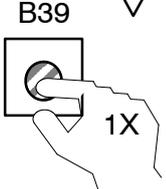
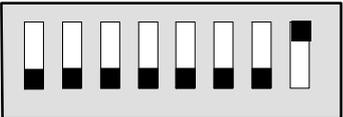
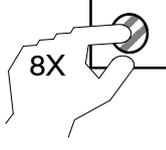
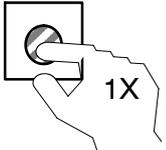
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Serial No.	Indications	Comments, Information
12.4	<p style="text-align: center;">Indicate: Internal operating voltage of Power Supply PCB</p> <p style="text-align: center;">Switch B 37 (DIP switch) OPEN</p> 	
12.5	<p style="text-align: center;">Indicate: Encoder supply voltage</p> <p style="text-align: center;">Switch B 37 (DIP switch) OPEN</p> 	

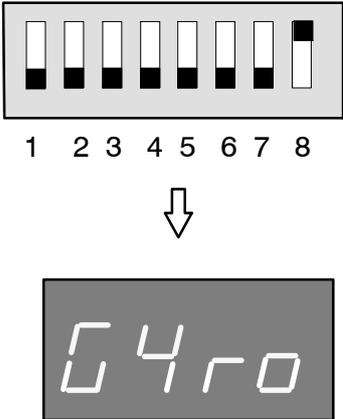
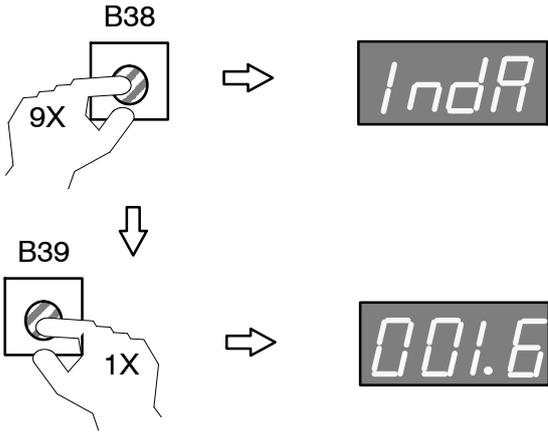
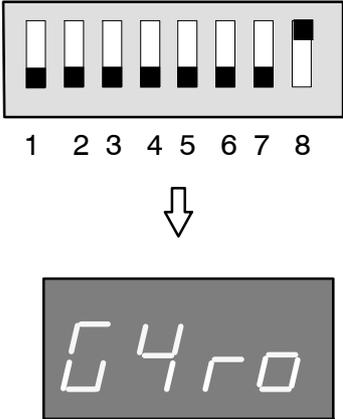
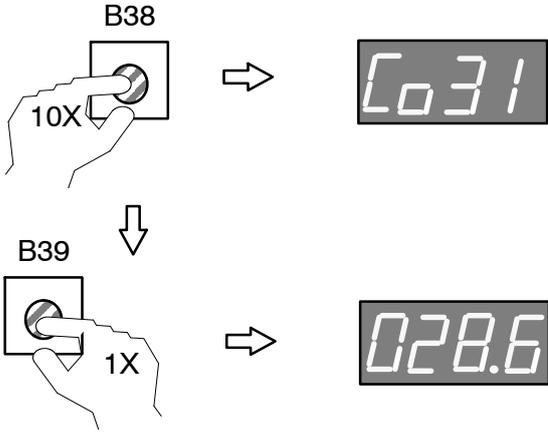
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Serial No.	Indications	Comments, Information
12.6	<p>Indicate: Inductive DC transmission supply voltage</p> <p>Switch B 37 (DIP switch)</p> <p>OPEN</p>  <p>1 2 3 4 5 6 7 8</p> <p style="text-align: center;">↓</p> 	 <p>B38 7X</p> <p style="text-align: center;">⇒</p>  <p style="text-align: center;">↓</p>  <p>B39 1X</p> <p style="text-align: center;">⇒</p> 
12.7	<p>Internal operating voltage of Power Supply PCB</p> <p>Switch B 37 (DIP switch)</p> <p>OPEN</p>  <p>1 2 3 4 5 6 7 8</p> <p style="text-align: center;">↓</p> 	 <p>B38 8X</p> <p style="text-align: center;">⇒</p>  <p style="text-align: center;">↓</p>  <p>B39 1X</p> <p style="text-align: center;">⇒</p> 

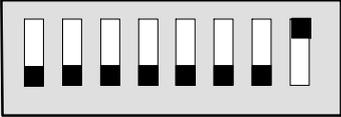
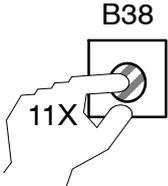
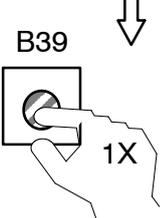
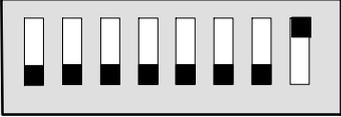
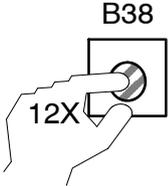
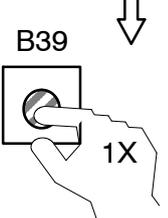
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Serial No.	Indications	Comments, Information
12.8	<p>Indicate: Operating current (inductive transmission) (for development purposes only)</p> <p>Switch B 37 (DIP switch)</p> <p>OPEN</p> 	
12.9	<p>Indicate: operating voltage of heating</p> <p>Switch B 37 (DIP switch)</p> <p>OPEN</p> 	

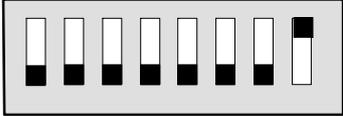
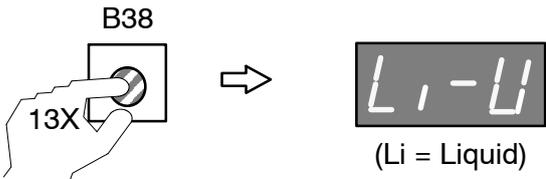
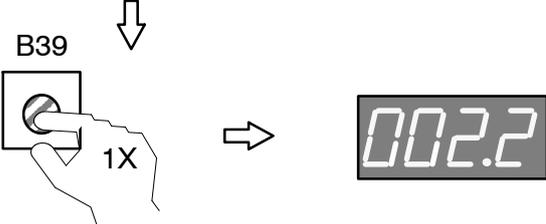
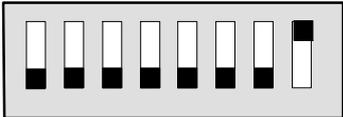
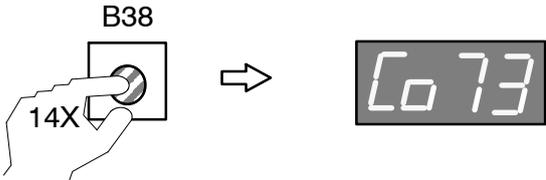
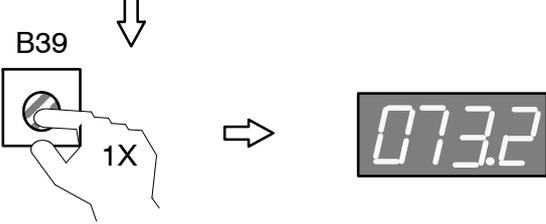
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Serial No.	Indications	Comments, Information
12.10	<p>Heating voltage at heating element</p> <p>Switch B 37 (DIP switch)</p> <p>OPEN</p>  <p>1 2 3 4 5 6 7 8</p> <p style="text-align: center;">↓</p> 	 <p>B38</p> <p>11X</p> <p>⇒</p>  <p style="text-align: center;">↓</p>  <p>B39</p> <p>1X</p> <p>⇒</p> 
12.11	<p>Indicate temperature of the supporting liquid in °C Nominal value: 49.4°C to 51.1°C</p> <p>Switch B 37 (DIP switch)</p> <p>OPEN</p>  <p>1 2 3 4 5 6 7 8</p> <p style="text-align: center;">↓</p> 	 <p>B38</p> <p>12X</p> <p>⇒</p>  <p style="text-align: center;">↓</p>  <p>B39</p> <p>1X</p> <p>⇒</p> 

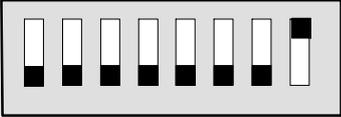
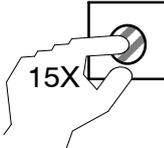
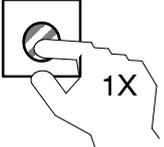
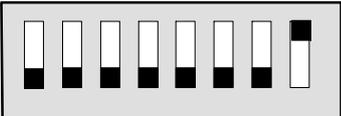
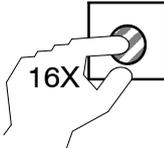
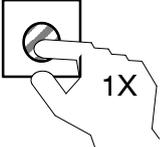
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Serial No.	Indications	Comments, Information
12.12	<p>Indicate supporting liquid level</p> <p>Indication ">"0.8 = liquid level OK</p> <p>Indication "<="0.8 = liquid level not OK (warning "C4")</p> <p style="text-align: center;">Switch B 37 (DIP switch)</p> <p style="text-align: center;">OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p> <p style="text-align: center;">↓</p> 	 <p style="text-align: center;">B38</p> <p style="text-align: center;">13X</p> <p style="text-align: center;">↓</p>  <p style="text-align: center;">B39</p> <p style="text-align: center;">1X</p>
12.13	<p>Indicate operating voltage</p> <p style="text-align: center;">Switch B 37 (DIP switch)</p> <p style="text-align: center;">OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p> <p style="text-align: center;">↓</p> 	 <p style="text-align: center;">B38</p> <p style="text-align: center;">14X</p> <p style="text-align: center;">↓</p>  <p style="text-align: center;">B39</p> <p style="text-align: center;">1X</p>

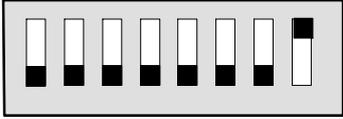
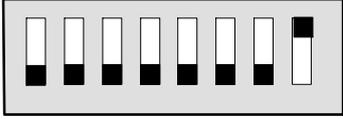
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Serial No.	Indications	Comments, Information
12.14	<p style="text-align: center;">Indicate DC operating voltage for 400Hz</p> <p style="text-align: center;">Switch B 37 (DIP switch)</p> <p style="text-align: center;">OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p> <p style="text-align: center;">↓</p> 	 <p style="text-align: center;">B38 15X</p> <p style="text-align: center;">⇒</p>  <p style="text-align: center;">↓</p>  <p style="text-align: center;">B39 1X</p> <p style="text-align: center;">⇒</p> 
12.15	<p style="text-align: center;">Indicate gyro supply</p> <p style="text-align: center;">Switch B 37 (DIP switch)</p> <p style="text-align: center;">OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p> <p style="text-align: center;">↓</p> 	 <p style="text-align: center;">B38 16X</p> <p style="text-align: center;">⇒</p>  <p style="text-align: center;">↓</p>  <p style="text-align: center;">B39 1X</p> <p style="text-align: center;">⇒</p> 

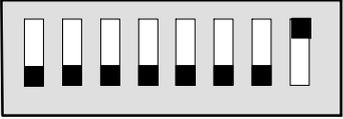
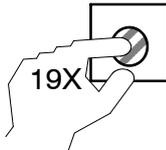
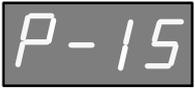
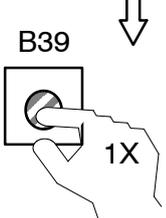
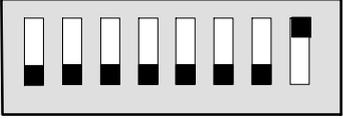
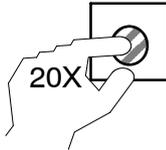
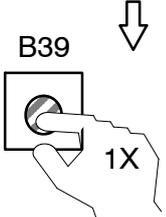
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Serial No.	Indications	Comments, Information
12.16	<p data-bbox="416 465 770 499">Indicate gyro current in mA</p> <hr/> <p data-bbox="475 551 770 584">Switch B 37 (DIP switch)</p> <p data-bbox="560 663 647 696">OPEN</p>  <p data-bbox="472 826 759 860">1 2 3 4 5 6 7 8</p> <p data-bbox="608 882 639 938">↓</p> 	 <p data-bbox="954 551 1010 584">B38</p> <p data-bbox="879 651 935 685">17X</p> <p data-bbox="863 752 919 808">↓</p>  <p data-bbox="863 786 919 819">B39</p> <p data-bbox="951 875 1007 909">1X</p>
12.17	<p data-bbox="416 1137 770 1171">Indicate operating voltage 15VDC</p> <hr/> <p data-bbox="475 1223 770 1256">Switch B 37 (DIP switch)</p> <p data-bbox="560 1335 647 1368">OPEN</p>  <p data-bbox="472 1498 759 1532">1 2 3 4 5 6 7 8</p> <p data-bbox="608 1554 639 1610">↓</p> 	 <p data-bbox="954 1223 1010 1256">B38</p> <p data-bbox="879 1323 935 1357">18X</p> <p data-bbox="863 1424 919 1480">↓</p>  <p data-bbox="863 1458 919 1491">B39</p> <p data-bbox="951 1547 1007 1581">1X</p>

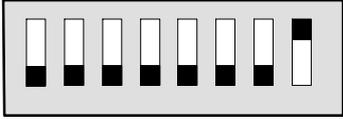
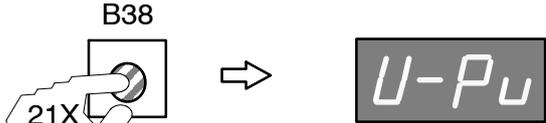
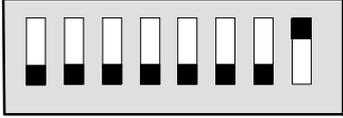
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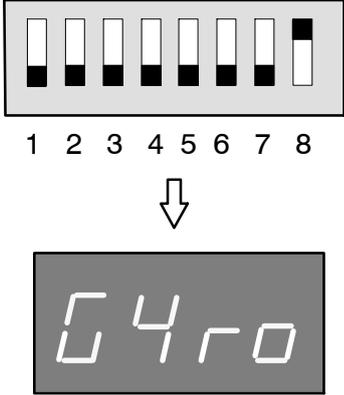
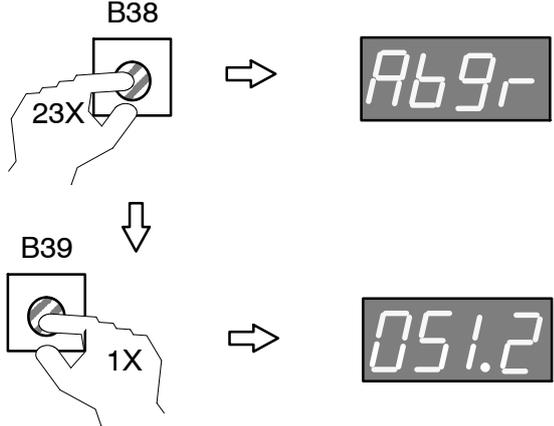
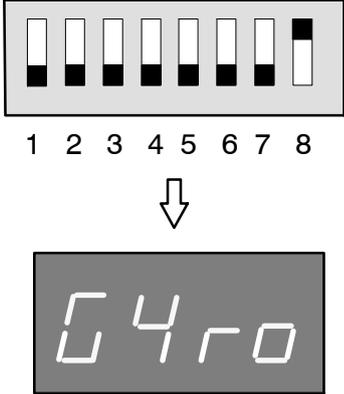
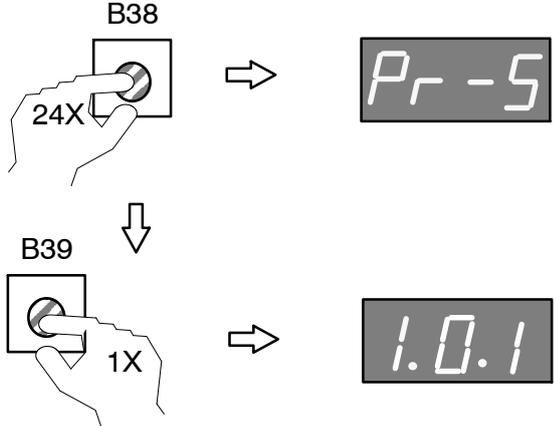


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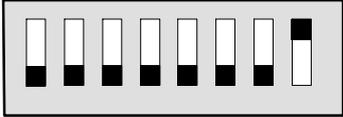
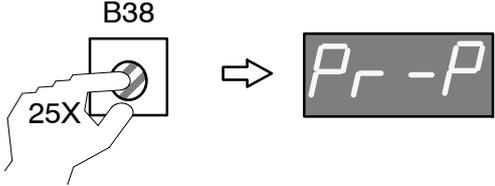
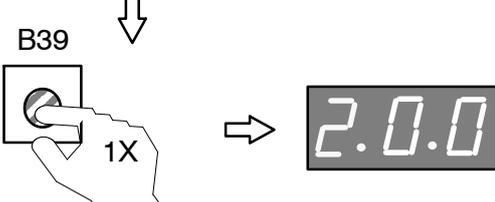
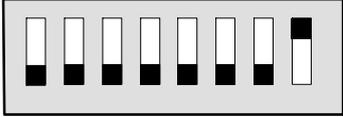
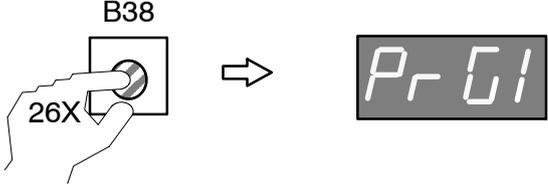
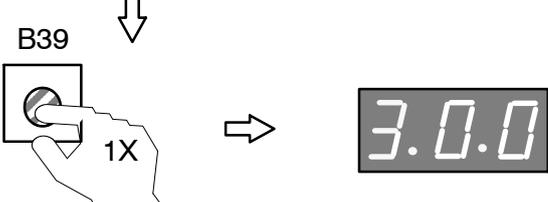
Serial No.	Indications	Comments, Information
12.18	<p>Indicate internal operating voltage 15VDC</p> <hr/> <p>Switch B 37 (DIP switch)</p> <p style="text-align: center;">OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p> <p style="text-align: center;">↓</p> 	 <p style="text-align: right;">B38</p> <p style="text-align: right;">19X</p> <p style="text-align: right;">⇒</p>  <p style="text-align: center;">↓</p>  <p style="text-align: right;">B39</p> <p style="text-align: right;">1X</p> <p style="text-align: right;">⇒</p> 
12.19	<p>Indicate internal operating voltage 24VDC</p> <hr/> <p>Switch B 37 (DIP switch)</p> <p style="text-align: center;">OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p> <p style="text-align: center;">↓</p> 	 <p style="text-align: right;">B38</p> <p style="text-align: right;">20X</p> <p style="text-align: right;">⇒</p>  <p style="text-align: center;">↓</p>  <p style="text-align: right;">B39</p> <p style="text-align: right;">1X</p> <p style="text-align: right;">⇒</p> 

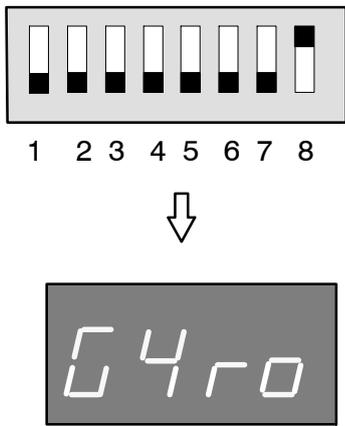
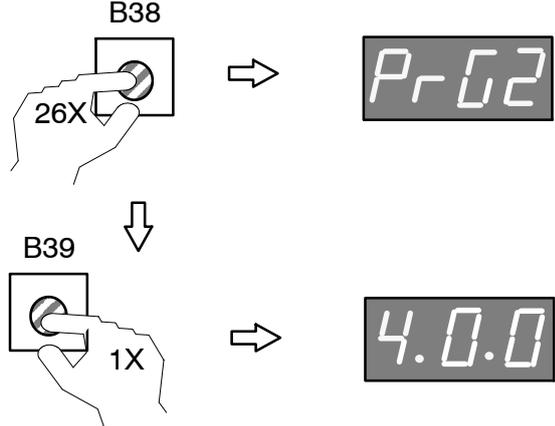
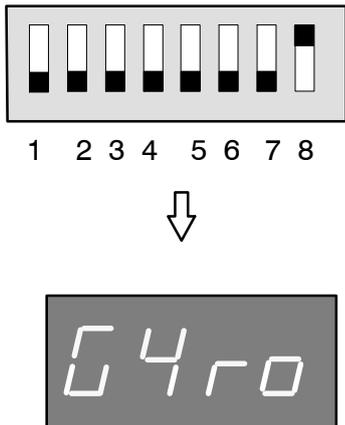
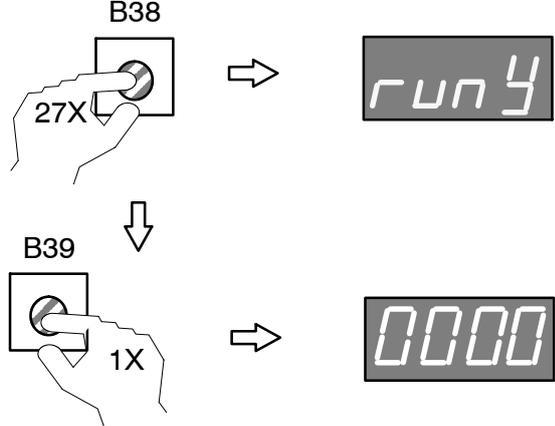
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Serial No.	Indications	Comments, Information
12.20	<p data-bbox="416 465 820 499">Indicate pump voltage 24V 50Hz</p> <p data-bbox="475 555 762 589">Switch B 37 (DIP switch)</p> <p data-bbox="560 663 644 696">OPEN</p>  <p data-bbox="469 826 759 860">1 2 3 4 5 6 7 8</p> <p data-bbox="608 882 639 938">↓</p> 	 <p data-bbox="954 555 1007 589">B38</p> <p data-bbox="874 658 927 692">21X</p> <p data-bbox="863 759 895 815">↓</p>  <p data-bbox="863 770 916 804">B39</p> <p data-bbox="954 904 991 938">1X</p>
12.21	<p data-bbox="416 1137 820 1171">Indicate pump current</p> <p data-bbox="475 1193 762 1227">Switch B 37 (DIP switch)</p> <p data-bbox="560 1301 644 1335">OPEN</p>  <p data-bbox="469 1464 759 1498">1 2 3 4 5 6 7 8</p> <p data-bbox="608 1520 639 1576">↓</p> 	 <p data-bbox="954 1193 1007 1227">B38</p> <p data-bbox="874 1296 927 1330">22X</p> <p data-bbox="863 1397 895 1453">↓</p>  <p data-bbox="863 1431 916 1464">B39</p> <p data-bbox="954 1543 991 1576">1X</p>

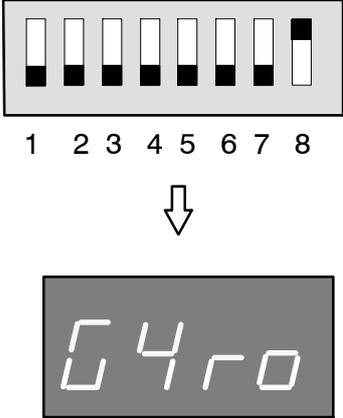
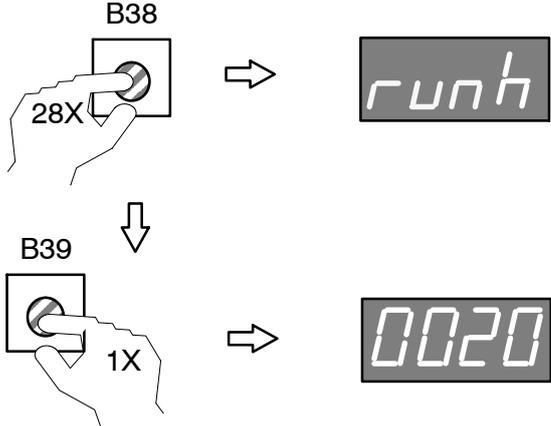
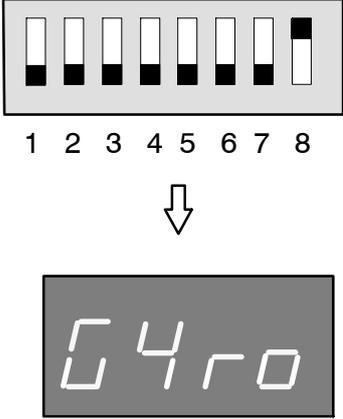
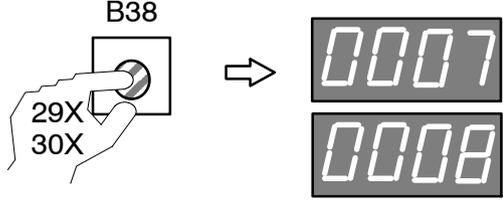
Serial No.	Indications	Comments, Information
12.22	<p>Indicate tap voltage (direct encoder voltage) Balancing voltage indication: approx. 512 (= approx. 5mV)</p> <p>Switch B 37 (DIP switch) OPEN</p> 	 <p>Button B39 hold down: display in degree Button B39 released again: display in a coded value (appr. 182 per degree)</p>
12.23	<p>Indicate program number and software version of the program for the microprocessor on the sensor PCB.</p> <p>Switch B 37 (DIP switch) OPEN</p> 	 <p>Depending on the development status a display as “Pr.01 → 10.01” is also possible.</p>

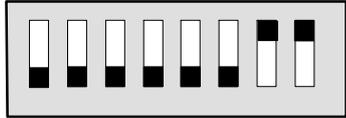
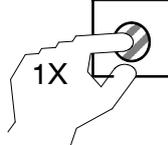
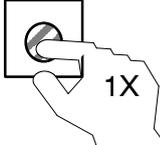
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Serial No.	Indications	Comments, Information
12.24	<p>Indicate program number and software version of the program for the microprocessor on the power PCB.</p> <p>Switch B 37 (DIP switch)</p> <p>OPEN</p>  <p>1 2 3 4 5 6 7 8</p> <p>↓</p> 	 <p>B38</p> <p>25X → Pr-P</p> <p>↓</p>  <p>B39</p> <p>1X → 2.0.0</p> <p>Depending on the development status a display as “Pr.02 → 10.02” is also possible.</p>
12.25	<p>Indicate program number and software version of the program for microprocessor <u>MC 1</u> on the outer sphere PCB.</p> <p>Switch B 37 (DIP switch)</p> <p>OPEN</p>  <p>1 2 3 4 5 6 7 8</p> <p>↓</p> 	 <p>B38</p> <p>26X → Pr 01</p> <p>↓</p>  <p>B39</p> <p>1X → 3.0.0</p> <p>Depending on the development status a display as “Pr.03 → 10.03” is also possible.</p>

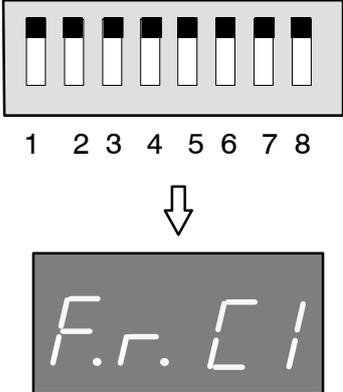
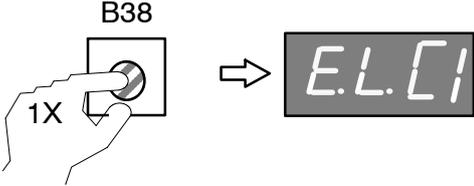
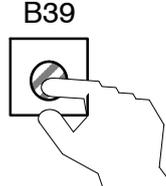
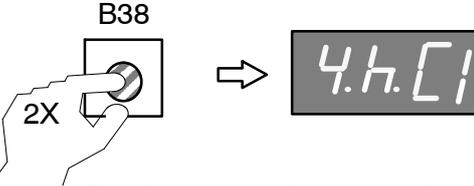
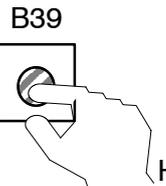
Serial No.	Indications	Comments, Information
12.26	<p>Indicate program number and software version of the program for microprocessor <u>MC 2</u> on the outer sphere PCB.</p> <p>Switch B 37 (DIP switch)</p> <p>OPEN</p> 	 <p>Depending on the development status a display as “Pr.04 → 10.04” is also possible.</p>
12.27	<p>Operating hours meter (years)</p> <p>Switch B 37 (DIP switch)</p> <p>OPEN</p> 	

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Serial No.	Indications	Comments, Information
12.28	<p>Operating hours meter (hours)</p> <p>Switch B 37 (DIP switch)</p> <p>OPEN</p> 	
12.29 12.30	<p>In F7 In F8</p> <p>Both functions are for future purpose</p> <p>Switch B 37 (DIP switch)</p> <p>OPEN</p> 	

Serial No.	Indications	Comments, Information																																				
13	<p>Error logbook. Indication of errors, warnings and status information, stating the frequency of occurrence.</p> <p style="text-align: center;">Switch B 37 (DIP switch)</p> <div style="text-align: center;"> <p>OPEN</p>  <p>1 2 3 4 5 6 7 8</p> <p>↓</p>  </div>	<div style="text-align: center;"> <p>B38</p>  <p>1X</p> <p>→ </p> </div> <table style="margin-left: auto; margin-right: auto;"> <tr><td>B38</td><td>2x↓</td><td>E.L. 3</td></tr> <tr><td>B38</td><td>3x↓</td><td>E.L. 4</td></tr> <tr><td>B38</td><td>4x↓</td><td>E.L. 5</td></tr> <tr><td>B38</td><td>5x↓</td><td>E.L. 6</td></tr> <tr><td>B38</td><td>6x↓</td><td>E.L. 7</td></tr> <tr><td></td><td>.....</td><td>24</td></tr> </table> <p>Depending on the development status:</p> <table style="margin-left: auto; margin-right: auto;"> <tr><td>B38</td><td>24x↓</td><td>E.L. 25</td></tr> <tr><td>B38</td><td>25x↓</td><td>E.L. 26</td></tr> <tr><td>B38</td><td>26x↓</td><td>E.L. 27</td></tr> <tr><td>B38</td><td>27x↓</td><td>C.L. 1</td></tr> <tr><td>B38</td><td>28x↓</td><td>C.L. 2</td></tr> <tr><td></td><td></td><td>C.L. 5</td></tr> </table> <hr style="border-top: 1px dashed black;"/> <div style="text-align: center;"> <p>Number of errors/warnings occurring</p> <p>B39</p>  <p>1X</p> <p>→ </p> </div>	B38	2x↓	E.L. 3	B38	3x↓	E.L. 4	B38	4x↓	E.L. 5	B38	5x↓	E.L. 6	B38	6x↓	E.L. 7		24	B38	24x↓	E.L. 25	B38	25x↓	E.L. 26	B38	26x↓	E.L. 27	B38	27x↓	C.L. 1	B38	28x↓	C.L. 2			C.L. 5
B38	2x↓	E.L. 3																																				
B38	3x↓	E.L. 4																																				
B38	4x↓	E.L. 5																																				
B38	5x↓	E.L. 6																																				
B38	6x↓	E.L. 7																																				
	24																																				
B38	24x↓	E.L. 25																																				
B38	25x↓	E.L. 26																																				
B38	26x↓	E.L. 27																																				
B38	27x↓	C.L. 1																																				
B38	28x↓	C.L. 2																																				
		C.L. 5																																				
<p>To delete error logbook:</p>		<p>press button B39 for approximately 10 seconds. the actual indicated line is deleted.</p>																																				

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Serial No.	Indications	Comments, Information
14	<p>Delete Error logbook complete. Delete hours meter complete (hours and years)</p> <p style="text-align: center;">Switch B 37 (DIP switch)</p> <p style="text-align: center;">OPEN</p> 	 <p style="text-align: center;">Delete Error log complete</p>  <p style="text-align: center;">Hold, until Error log is deleted complete</p>
		 <p style="text-align: center;">Delete hour meter complete</p>  <p style="text-align: center;">Hold, until hour meter is deleted complete</p>

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Information concerning the error logbook (see also section 8.1):

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

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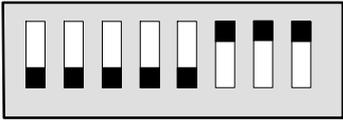
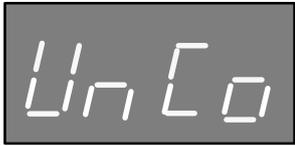
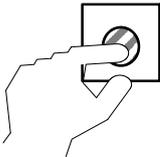
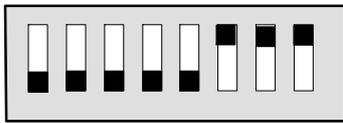
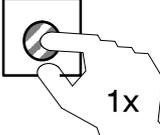
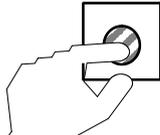
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5.1.5 Functional description of DIP switch settings (SEC)

All data stated below should be selected and read out for servicing purposes only.

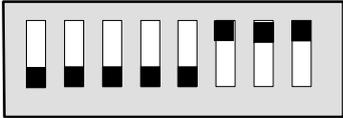
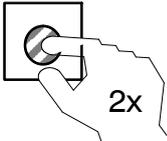
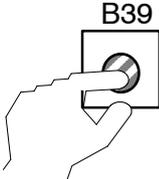
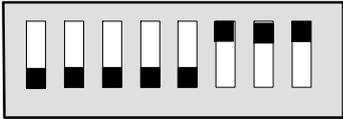
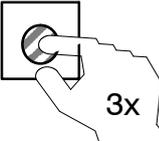
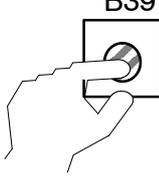
In standard operation the following data has no significance.

Seq. no.	Indications	Comments, Notes
1	<p>UnCo = (<u>U</u>ncorrected <u>C</u>ompass) = course without speed error correction value.</p> <p style="text-align: center;">Switch B37 (DIP switch) OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p> <p style="text-align: center;">↓</p> 	<p style="text-align: center;">B38</p>  <p style="text-align: center;">→</p> <p style="text-align: center;">Displays the uncorrected gyro course.</p>  <p style="text-align: center;">↓ ↑</p>  <p style="text-align: center;">Identical with Seq.no. 6</p>
2	<p>FF = <u>F</u>ahrt<u>F</u>ehler (Speed error) = the value by which the compass course is to be corrected (result from SEC), displayed in degrees, display value approx. max. 10° (see also number 3).</p> <p style="text-align: center;">Switch B37 (DIP switch) OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p>	<p style="text-align: center;">B38</p>  <p style="text-align: center;">1x</p> <p style="text-align: center;">→</p>  <hr style="border-top: 1px dashed black;"/> <p style="text-align: center;">B39</p>  <p style="text-align: center;">→</p>  <p style="text-align: center;">↓ ↑</p>  <p style="text-align: center;">The automatic Speed Error Correction function is defective. Speed or/and position faulty.</p> 

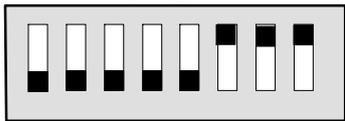
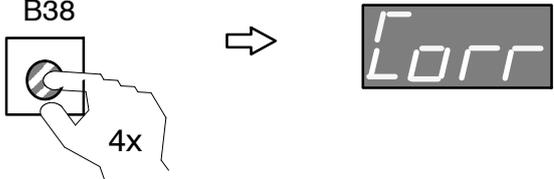
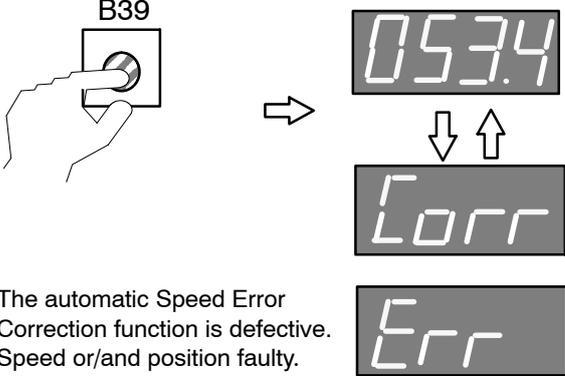
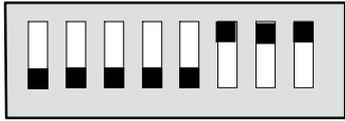
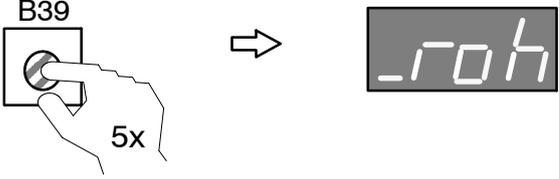
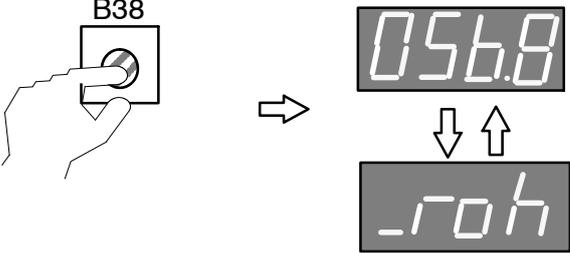
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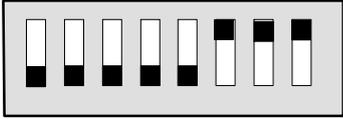
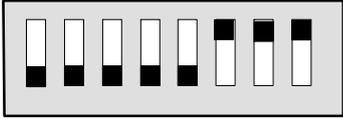


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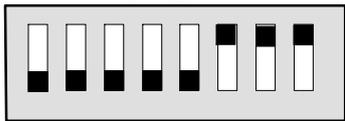
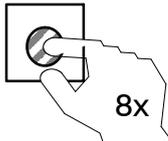
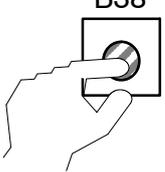
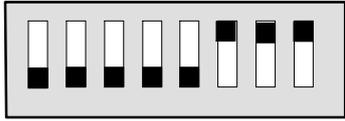
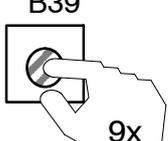
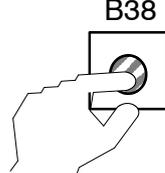
Seq. no.	Indications	Comments, Notes
3	<p>SPd = <u>S</u>peed = Ship's speed. This speed is provided from the connected and selected Log. (see also number 5). Displayed in knots, astern speed (- knots) is also possible.</p> <p style="text-align: center;">Switch B37 (DIP switch) OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p>	<p style="text-align: center;">B38</p>  <p style="text-align: right;">⇒ </p> <hr style="border-top: 1px dashed black;"/> <p style="text-align: center;">B39</p>  <p style="text-align: right;">⇒  ↓ ↑ </p> <p>Connected Log not providing any speed data. </p>
4	<p style="text-align: center;">Switch B37 (DIP switch) OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p>	<p style="text-align: center;">B38</p>  <p style="text-align: right;">⇒ </p> <hr style="border-top: 1px dashed black;"/> <p style="text-align: center;">B39</p>  <p style="text-align: right;">⇒  ↓ ↑ </p> <p>No latitude data available (GPS-receiver defective). </p>

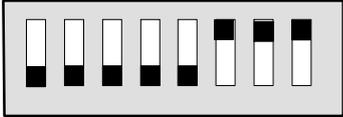
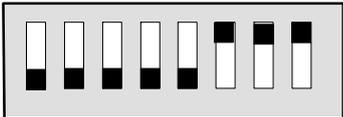
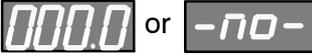
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Seq. no.	Indications	Comments, Notes
5	<p>Switch B37 (DIP switch)</p> <p style="text-align: center;">OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p>	<p style="text-align: center;">B38</p>  <p style="text-align: center;">4x</p> <hr style="border-top: 1px dashed black;"/> <p style="text-align: center;">B39</p>  <p style="text-align: center;">The automatic Speed Error Correction function is defective. Speed or/and position faulty.</p>
6	<p>Switch B37 (DIP switch)</p> <p style="text-align: center;">OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p>	<p style="text-align: center;">B39</p>  <p style="text-align: center;">5x</p> <hr style="border-top: 1px dashed black;"/> <p style="text-align: center;">B38</p>  <p style="text-align: center;">Identical with Seq.no. 1</p>

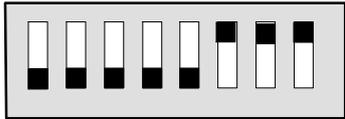
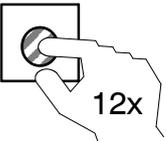
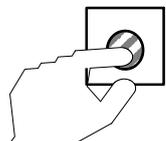
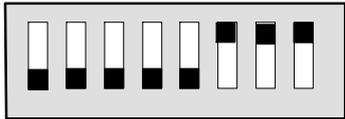
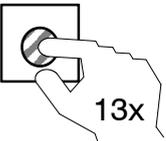
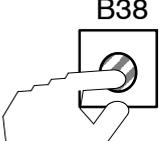
Seq. no.	Indications	Comments, Notes
7	<p>o_FF = Speed Error (FahrtFehler) + acceleration error. Indicated in degrees.</p> <p>Switch B37 (DIP switch) OPEN</p>  <p>1 2 3 4 5 6 7 8</p>	<p>B39 → </p> <hr/> <p>B38 →  ↓ ↑ </p> <p>The automatic Speed Error Correction function is defective. Speed or/and position faulty.</p> 
8	<p>_FF = Speed Error (FahrtFehler) without acceleration error. Indicated in degrees.</p> <p>Switch B37 (DIP switch) OPEN</p>  <p>1 2 3 4 5 6 7 8</p>	<p>B38 → </p> <hr/> <p>B39 →  ↓ ↑ </p> <p>The automatic Speed Error Correction function is defective. Speed or/and position faulty.</p> 

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Seq. no.	Indications	Comments, Notes
9	<p style="text-align: center;">_oF = Acceleration Error (Qelrestfehler) (no speed error components).</p> <p style="text-align: center;">Switch B37 (DIP switch)</p> <p style="text-align: center;">OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p>	<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;"> <p>B39</p>  <p>8x</p> </div> <div style="text-align: center;">   </div> </div> <hr style="border-top: 1px dashed black;"/> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;"> <p>B38</p>  </div> <div style="text-align: center;">     </div> </div> <p style="text-align: center; margin-top: 10px;">The automatic Speed Error Correction function is defective. Speed or/and position faulty.</p> 
10	<p style="text-align: center;">Sci = Serial Interface (Schnittstelle), telegram traffic on serial interface.</p> <p style="text-align: center;">Switch B37 (DIP switch)</p> <p style="text-align: center;">OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p>	<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;"> <p>B39</p>  <p>9x</p> </div> <div style="text-align: center;">   </div> </div> <hr style="border-top: 1px dashed black;"/> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;"> <p>B38</p>  </div> <div style="text-align: center;">     </div> </div> <p style="text-align: center; margin-top: 10px;">Contents alternate</p>  <div style="display: flex; justify-content: center; margin-top: 10px;"> <div style="text-align: center; margin-right: 10px;"> <p>Digit 2: NMEA interface (Speed in)</p> </div> <div style="text-align: center; margin-right: 10px;"> <p>Digit 1: GPS-reciver interface</p> </div> <div style="text-align: center;"> <p>Digit 0: Sum of all telegrams on both interfaces</p> </div> </div>

Seq. no.	Indications	Comments, Notes
11	<p>SrC.S = <u>S</u>ource <u>S</u>peed Information. Data about the source providing the speed value.</p> <p>Switch B37 (DIP switch) OPEN</p>  <p>1 2 3 4 5 6 7 8</p>	<p>B39 → </p> <p>10x</p> <hr/> <p>B38 → </p> <p>↓ ↑</p> <p></p> <p>Display options:</p> <p>  </p> <p>PULS = Pulse Log vTg = Speed over ground vhu = Speed trough water</p> <p>(vTg and vhu corresponds to NMEA 0183)</p>
12	<p>PULS = Speed value from Pulse Log. Indicated in Kts. Displays -no- if no Pulse Log selected or connected. Displays 0000 if there is no input from selected source. Display range -80 Kts to +80 Kts (astern and ahead)</p> <p>Switch B37 (DIP switch) OPEN</p>  <p>1 2 3 4 5 6 7 8</p>	<p>B39 → </p> <p>11x</p> <hr/> <p>B38 → </p> <p>↓ ↑</p> <p></p>

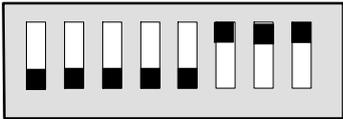
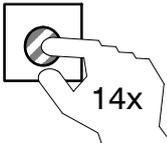
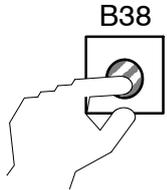
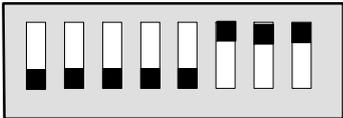
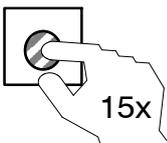
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Seq. no.	Indications	Comments, Notes
13	<p style="text-align: center;">vtG.S = Speed from GPS-receiver telegram (speed over ground).</p> <p style="text-align: center;">Switch B37 (DIP switch)</p> <p style="text-align: center;">OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p>	<div style="display: flex; align-items: center;"> <div style="text-align: center;"> <p>B39</p>  <p>12x</p> </div> <div style="margin-left: 20px;"> <p>→</p>  </div> </div> <hr style="border-top: 1px dashed black;"/> <div style="display: flex; align-items: center;"> <div style="text-align: center;"> <p>B38</p>  </div> <div style="margin-left: 20px;"> <p>→</p>  <p>↓ ↑</p>  </div> </div> <p style="font-size: small;">No, or faulty data from GPS-receiver (vTg- telegram).</p> 
14	<p style="text-align: center;">vtG.h = Course value from GPS-receiver telegram</p> <p style="text-align: center;">Switch B37 (DIP switch)</p> <p style="text-align: center;">OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p>	<div style="display: flex; align-items: center;"> <div style="text-align: center;"> <p>B39</p>  <p>13x</p> </div> <div style="margin-left: 20px;"> <p>→</p>  </div> </div> <hr style="border-top: 1px dashed black;"/> <div style="display: flex; align-items: center;"> <div style="text-align: center;"> <p>B38</p>  </div> <div style="margin-left: 20px;"> <p>→</p>  <p>↓ ↑</p>  </div> </div> <p style="font-size: small;">No, or faulty data from GPS-receiver (vTg- telegram).</p> 

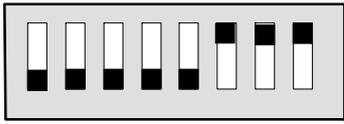
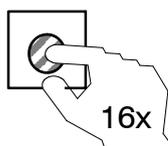
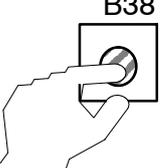
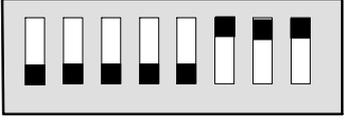
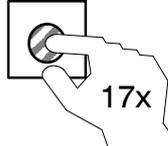
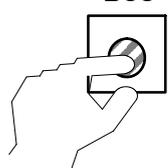
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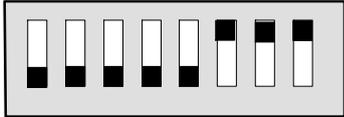
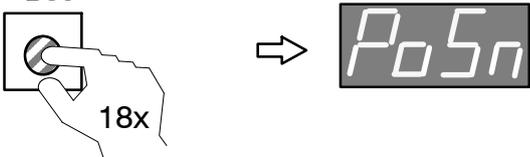
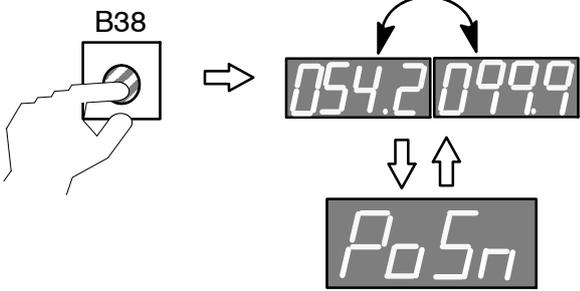
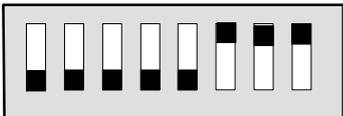
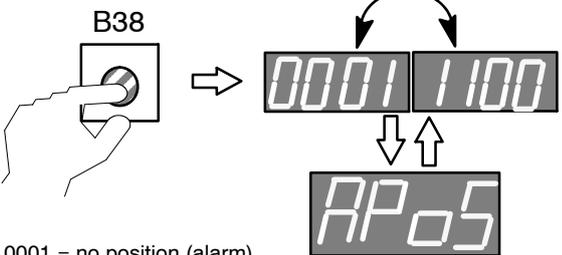


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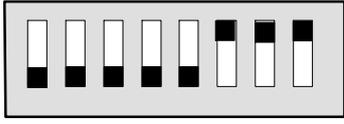
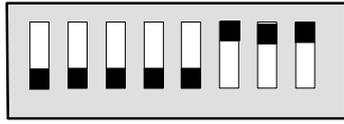
Seq. no.	Indications	Comments, Notes
15	<p>vhw = Speed value in knots from NMEA telegram VHW (speed through water).</p> <p style="text-align: center;">Switch B37 (DIP switch)</p> <p style="text-align: center;">OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p>	<div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> <p>B39</p>  <p>14x</p> </div> <div style="margin-right: 20px;">→</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">vhw.</div> </div> <hr style="border-top: 1px dashed black;"/> <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> <p>B38</p>  </div> <div style="margin-right: 20px;">→</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">-02.8</div> </div> <div style="text-align: center; margin: 5px 0;"> <p>↓ ↑</p> </div> <div style="border: 1px solid black; padding: 5px; text-align: center;">vhw.</div> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-top: 10px;">Err</div> <p style="font-size: small; margin-top: 10px;">No, or faulty serial speed data (vHw- telegram).</p>
16	<p>SPd.L = Speed in knots (from Log). The speed for which the source has been selected, is displayed. The display alternates between 099.0 (=accepting value) and, say, 052.8 (speed in knots). If no value is accepted (transferred) the display stays at 099.0.</p> <p style="text-align: center;">Switch B37 (DIP switch)</p> <p style="text-align: center;">OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p>	<div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> <p>B38</p>  <p>15x</p> </div> <div style="margin-right: 20px;">→</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">SPd.L</div> </div> <hr style="border-top: 1px dashed black;"/> <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> <p>B38</p>  </div> <div style="margin-right: 20px;">→</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">052.8 099.0</div> </div> <div style="text-align: center; margin: 5px 0;"> <p>↻</p> <p>↓ ↑</p> </div> <div style="border: 1px solid black; padding: 5px; text-align: center;">SPd.L</div> <p style="font-size: small; margin-top: 10px;">If the display changes value (similar as shown), there is a data transfer on this interface. No change (constant 99.0) means there is no data transfer</p>

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Seq. no.	Indications	Comments, Notes																								
17	<p>PoS = Position – latitude in degrees.</p> <p style="text-align: center;">Switch B37 (DIP switch)</p> <p style="text-align: center;">OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p>	<div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>B39</p> <p>16x</p> </div> <div style="margin-left: 20px;"> <p>→</p>  </div> </div> <hr style="border-top: 1px dashed black;"/> <div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>B38</p> </div> <div style="margin-left: 20px;"> <p>→</p>  <p>↓ ↑</p>  <p>↓ ↑</p>  </div> </div> <p style="margin-top: 10px;">No latitude data available (GPS-receiver defective).</p>																								
18	<p>ASPd = Alarm “speed”</p> <p style="text-align: center;">Switch B37 (DIP switch)</p> <p style="text-align: center;">OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p>	<div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>B39</p> <p>17x</p> </div> <div style="margin-left: 20px;"> <p>→</p>  </div> </div> <hr style="border-top: 1px dashed black;"/> <div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>B38</p> </div> <div style="margin-left: 20px;"> <p>→</p>  <p>3 2 1 0</p> <p>↓ ↑</p>  </div> </div>																								
	<table border="0" style="width: 100%;"> <tr> <td style="width: 33%;">Digit 3 “Speed OK”</td> <td style="width: 33%;">Display 1</td> <td style="width: 33%;">Speed OK</td> </tr> <tr> <td></td> <td>Display 0</td> <td>Speed not OK</td> </tr> <tr> <td>Digit 2 “Speed Alarm</td> <td>Display 1</td> <td>Speed Alarm</td> </tr> <tr> <td></td> <td>Display 0</td> <td>No Speed Alarm</td> </tr> <tr> <td>Digit 1 “Auto Speed OK”</td> <td>Display 1</td> <td>Auto Speed OK</td> </tr> <tr> <td></td> <td>Display 0</td> <td>Auto Speed not OK</td> </tr> <tr> <td>Digit 0 “Auto Alarm”</td> <td>Display 1</td> <td>Auto Speed Alarm</td> </tr> <tr> <td></td> <td>Display 0</td> <td>No Auto Speed Alarm</td> </tr> </table>	Digit 3 “Speed OK”	Display 1	Speed OK		Display 0	Speed not OK	Digit 2 “Speed Alarm	Display 1	Speed Alarm		Display 0	No Speed Alarm	Digit 1 “Auto Speed OK”	Display 1	Auto Speed OK		Display 0	Auto Speed not OK	Digit 0 “Auto Alarm”	Display 1	Auto Speed Alarm		Display 0	No Auto Speed Alarm	
Digit 3 “Speed OK”	Display 1	Speed OK																								
	Display 0	Speed not OK																								
Digit 2 “Speed Alarm	Display 1	Speed Alarm																								
	Display 0	No Speed Alarm																								
Digit 1 “Auto Speed OK”	Display 1	Auto Speed OK																								
	Display 0	Auto Speed not OK																								
Digit 0 “Auto Alarm”	Display 1	Auto Speed Alarm																								
	Display 0	No Auto Speed Alarm																								

Seq. no.	Indications	Comments, Notes
19	<p>PoS_n = Latitude value derived from automatic latitude input. Indicated in degrees.</p> <p>Switch B37 (DIP switch)</p> <p>OPEN</p>  <p>1 2 3 4 5 6 7 8</p>	<p>B39</p>  <p>18x</p> <hr/> <p>B38</p>  <p>If the display changes value (similar as shown), there is a data transfer on this interface. No change (constant 099.9) means there is no data transfer</p>
20	<p>APoS = Alarm position input</p> <p>Switch B37 (DIP switch)</p> <p>OPEN</p>  <p>1 2 3 4 5 6 7 8</p>	<p>B39</p>  <p>19x</p> <hr/> <p>B38</p>  <p>0001 = no position (alarm) 1100 = position o.k.</p>

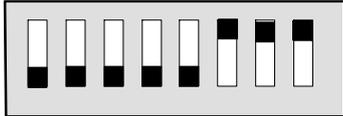
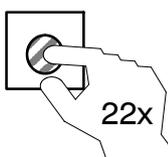
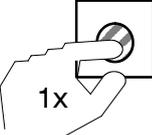
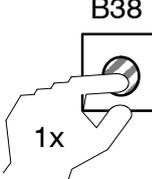
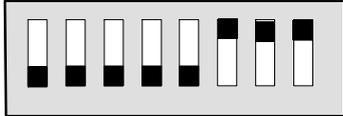
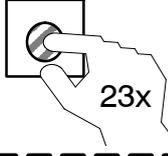
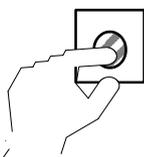
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Seq. no.	Indications	Comments, Notes
21	<p>nAUC = Number of telegrams with checksum.</p> <p>Switch B37 (DIP switch) OPEN</p>  <p>1 2 3 4 5 6 7 8</p>	<p>B39 → </p> <p>20x</p> <hr/> <p>B38 → </p> <p>↓ ↑</p> <p></p> <p>1st digit = number of decoder requests 2nd digit = number of read-in NMEA-telegrams with correct check sum</p>
22	<p>nAn1 = 1st table for NMEA-requests</p> <p>Switch B37 (DIP switch) OPEN</p>  <p>1 2 3 4 5 6 7 8</p>	<p>B39 → </p> <p>21x</p> <hr/> <p>B38 → </p> <p>↓ ↑</p> <p></p> <p>L = telegram type GLL G = telegram type GGA t = telegram type VTG h = telegram type VHW 1st digit = number of L-types 2nd digit = number of G-types 3rd digit = number of t-types 4th digit = number of h-types</p>

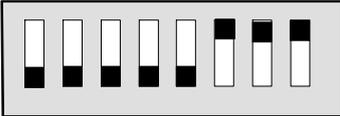
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Seq. no.	Indications	Comments, Notes
23	<p>nAn2 = 2nd table for NMEA-requests</p> <p style="text-align: center;">Switch B37 (DIP switch) OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p>	<div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> <p>B39</p>  <p>22x</p> </div> <div style="margin-right: 20px;"> <p>⇒</p> </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>nAn2</p> </div> </div> <hr style="border-top: 1px dashed black;"/> <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> <p>B38</p>  <p>1x</p> </div> <div style="margin-right: 20px;"> <p>⇒</p> </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>bL</p> </div> </div> <div style="display: flex; align-items: center; margin-top: 10px;"> <div style="margin-right: 20px;"> <p>B38</p>  <p>1x</p> </div> <div style="margin-right: 20px;"> <p>⇒</p> </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>0000</p> </div> </div> <p style="font-size: small; margin-top: 10px;"> b = telegram type VBW l = telegram type SLL 1st digit = number of b-types 2nd digit = number of l-types </p>
24	<p>nSGG = NMEA-telegram (Strings of the GGA-telegram)</p> <p style="text-align: center;">Switch B37 (DIP switch) OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p>	<div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> <p>B39</p>  <p>23x</p> </div> <div style="margin-right: 20px;"> <p>⇒</p> </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>nSGG</p> </div> </div> <hr style="border-top: 1px dashed black;"/> <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> <p>B38</p>  </div> <div style="margin-right: 20px;"> <p>⇒</p> </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>0000</p> </div> </div> <p style="font-size: small; margin-top: 5px;"> Number of ASCII-characters per telegram 0000 = no telegram </p> <p style="font-size: small; margin-top: 10px;"> The number of operations depends on the number of characters. (1 display content = max. 4 ASCII-character) </p> <p style="font-weight: bold; margin-top: 10px;">See sequ. no 25</p>

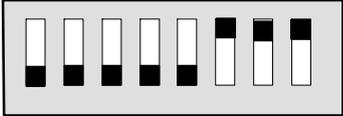
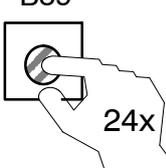
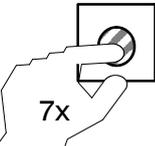
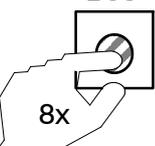
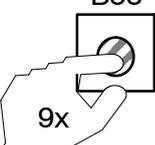
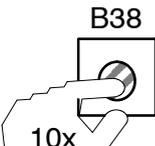
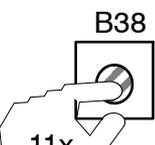
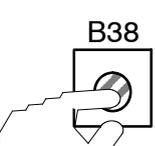
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Seq. no.	Indications	Comments, Notes
25	<p>nSGL = NMEA-telegram (Strings of the GLL-telegram)</p> <p>Switch B37 (DIP switch) OPEN</p>  <p>1 2 3 4 5 6 7 8</p>	<p>B39 → </p> <hr/> <p>B38 →  Example: Length of the telegram = 44 ASCII-characters</p> <p>B38 → </p> <p>B38 → </p> <p>B38 → </p> <p>B38 → </p> <p>B38 → </p>

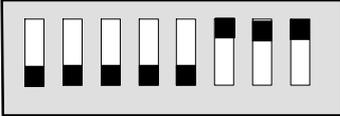
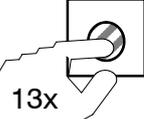
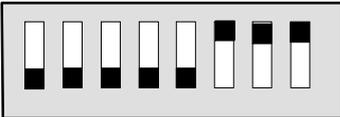
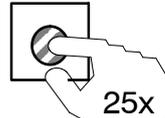
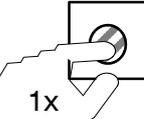
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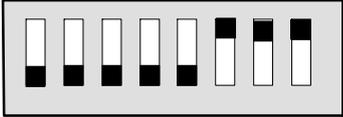
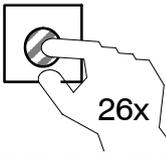
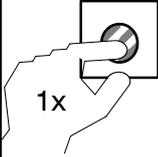
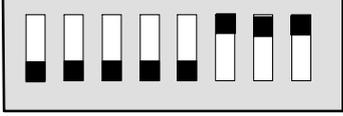
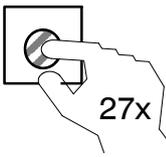
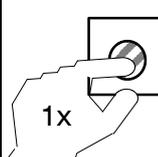


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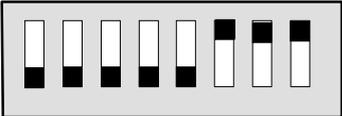
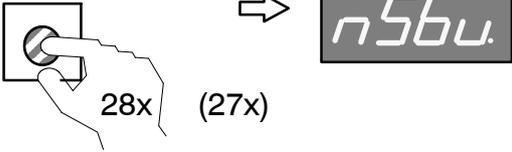
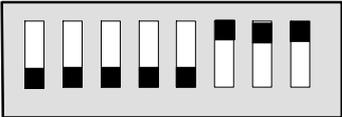
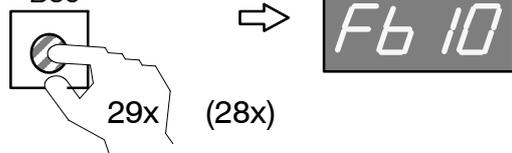
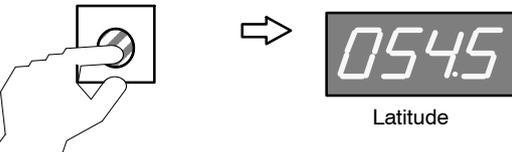
Seq. no.	Indications	Comments, Notes
cont. 25	nSGL = NMEA-telegram (Strings of the GLL-telegram)	
	<p style="text-align: center;">Switch B37 (DIP switch) OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p>	<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;"> <p>B39</p>  <p>24x</p> </div> <div style="text-align: center;"> <p>→</p>  </div> </div> <hr style="border-top: 1px dashed black;"/> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;"> <p>B38</p>  <p>7x</p> </div> <div style="text-align: center;"> <p>→</p>  </div> </div> <div style="display: flex; justify-content: space-between; align-items: center; margin-top: 10px;"> <div style="text-align: center;"> <p>B38</p>  <p>8x</p> </div> <div style="text-align: center;"> <p>→</p>  </div> </div> <div style="display: flex; justify-content: space-between; align-items: center; margin-top: 10px;"> <div style="text-align: center;"> <p>B38</p>  <p>9x</p> </div> <div style="text-align: center;"> <p>→</p>  </div> </div> <div style="display: flex; justify-content: space-between; align-items: center; margin-top: 10px;"> <div style="text-align: center;"> <p>B38</p>  <p>10x</p> </div> <div style="text-align: center;"> <p>→</p>  </div> </div> <div style="display: flex; justify-content: space-between; align-items: center; margin-top: 10px;"> <div style="text-align: center;"> <p>B38</p>  <p>11x</p> </div> <div style="text-align: center;"> <p>→</p>  </div> </div> <div style="display: flex; justify-content: space-between; align-items: center; margin-top: 10px;"> <div style="text-align: center;"> <p>B38</p>  <p>12x</p> </div> <div style="text-align: center;"> <p>→</p>  <p>Checksum</p> </div> </div>

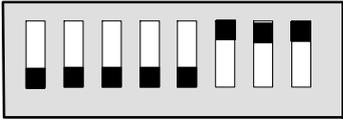
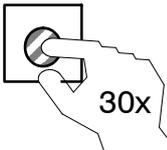
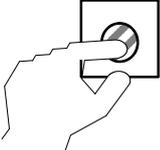
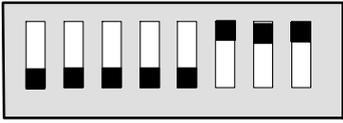
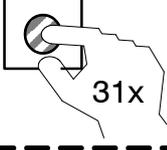
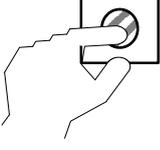
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Seq. no.	Indications	Comments, Notes
cont. 25	<p>nSGL = NMEA-telegram (Strings of the GLL-telegram)</p> <p style="text-align: center;">Switch B37 (DIP switch) OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p>	<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;"> <p>B39</p>  <p>24x</p> </div> <div style="text-align: center;"> <p>⇒</p>  </div> </div> <hr style="border-top: 1px dashed black;"/> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;"> <p>B38</p>  <p>13x</p> </div> <div style="text-align: center;"> <p>⇒</p>  </div> </div>
		<p>With the 1st operation of the contact switch B38, the number of ASCII-characters is displayed. If the display shows "0000", no telegram-output took place. With every further operation of contact switch B38, 4 consecutive ASCII-characters are displayed.</p>
26	<p>nSLL = NMEA-telegram (Strings of the SLL-telegram)</p> <p style="text-align: center;">Switch B37 (DIP switch) OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p>	<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;"> <p>B39</p>  <p>25x</p> </div> <div style="text-align: center;"> <p>⇒</p>  </div> </div> <hr style="border-top: 1px dashed black;"/> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;"> <p>B38</p>  <p>1x</p> </div> <div style="text-align: center;"> <p>⇒</p>  </div> </div> <p style="text-align: right;">Number of ASCII-characters per telegram 0000 = no telegram</p> <p>The number of operations depends on the number of characters. (1 display content = max. 4 ASCII-characters)</p> <p>See seq. no. 25</p>
		<p>Depending on the development status this step is no longer applicable. By this the amount of operation of button B39 is reduced (-1) for all following steps.</p>

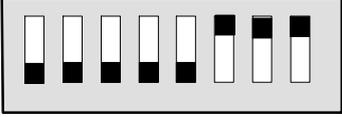
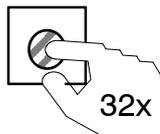
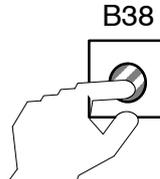
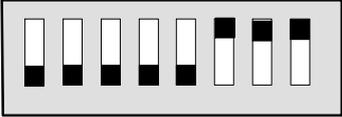
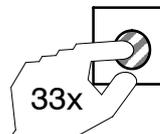
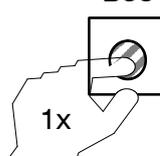
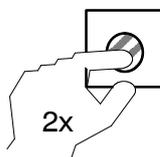
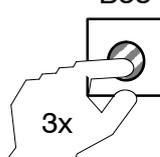
Seq. no.	Indications	Comments, Notes
27	<p>nShw = NMEA-telegram (Strings of the VHW-telegram)</p> <p>Switch B37 (DIP switch) OPEN</p>  <p>1 2 3 4 5 6 7 8</p>	<p>B39</p>  <p>26x (25x)</p>  <hr/> <p>B38</p>  <p>1x</p>  <p>Number of ASCII-characters per telegram 0000 = no telegram</p> <p>The number of operations depends on the number of characters. (1 display content = max. 4 ASCII-characters)</p> <p>See seq. no. 25</p>
28	<p>nStG = NMEA-telegram (Strings of the VTG-telegram)</p> <p>Switch B37 (DIP switch) OPEN</p>  <p>1 2 3 4 5 6 7 8</p>	<p>B39</p>  <p>27x (26x)</p>  <hr/> <p>B38</p>  <p>1x</p>  <p>Number of ASCII-characters per telegram 0000 = no telegram</p> <p>The number of operations depends on the number of characters. (1 display content = max. 4 ASCII-characters)</p> <p>See seq. no. 25</p>

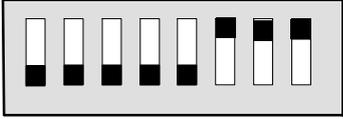
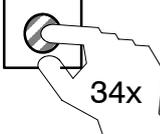
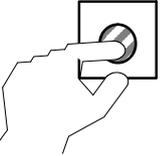
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Seq. no.	Indications	Comments, Notes
29	<p>nSbw = NMEA-telegram (String of the VBW-telegram)</p> <p style="text-align: center;">Switch B37 (DIP switch) OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p>	<div style="border-bottom: 1px dashed black; padding-bottom: 10px;"> <p style="text-align: center;">B39</p>  <p style="text-align: center;">28x (27x)</p> </div> <div style="padding-top: 10px;"> <p style="text-align: center;">B38</p>  <p style="text-align: center;">1x</p> <p style="text-align: center;">0000</p> <p style="text-align: center;">Number of ASCII-characters per telegram 0000 = no telegram</p> <p>The number of operations depends on the number of characters. (1 display content = max. 4 ASCII-characters)</p> <p>See seq. no. 25</p> </div>
30	<p style="text-align: center;">Development only!</p> <p>Fb10 = Software component of speed error correction: Latitude</p> <p style="text-align: center;">Switch B37 (DIP switch) OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p>	<div style="border-bottom: 1px dashed black; padding-bottom: 10px;"> <p style="text-align: center;">B39</p>  <p style="text-align: center;">29x (28x)</p> </div> <div style="padding-top: 10px;"> <p style="text-align: center;">B38</p>  <p style="text-align: center;">Latitude</p> </div>

Seq. no.	Indications	Comments, Notes
31	<p style="text-align: center;">Development only!</p> <p>FS10 = Software component speed error correction: Ship's speed</p> <p style="text-align: center;">Switch B37 (DIP switch) OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p>	<p style="text-align: center;">B39</p>  <p style="text-align: center;">30x (29x)</p> <p style="text-align: center;">⇒ </p> <hr style="border-top: 1px dashed black;"/> <p style="text-align: center;">B38</p>  <p style="text-align: center;">⇒ </p> <p style="text-align: center;">Ship's speed (kn)</p>
32	<p style="text-align: center;">Development only!</p> <p>FnSP = Software component speed error correction: North-component of the ship's-speed-vector</p> <p style="text-align: center;">Switch B37 (DIP switch) OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p>	<p style="text-align: center;">B39</p>  <p style="text-align: center;">31x (30x)</p> <p style="text-align: center;">⇒ </p> <hr style="border-top: 1px dashed black;"/> <p style="text-align: center;">B38</p>  <p style="text-align: center;">⇒ </p> <p style="text-align: center;">North-component of the ship's-speed-vector (with negative sign = south component)</p>

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Seq. no.	Indications	Comments, Notes
33	<p>Development only!</p> <p>FutG = Software component speed error correction: Course over ground (Value of the VTG-telegram)</p>	<div style="border-bottom: 1px dashed black; padding-bottom: 5px;"> <p style="text-align: center;">Switch B37 (DIP switch) OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p> </div> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>B39</p>  <p>32x</p> </div> <div style="text-align: center;"> <p>(31x)</p>  </div> </div> <hr style="border-top: 1px dashed black;"/> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>B38</p>  </div> <div style="text-align: center;">  <p>0000 = no telegram 123.4 = course value</p> </div> </div>
34	<p>tIME = Time since activating speed error correction. (Reset with power-off)</p>	<div style="border-bottom: 1px dashed black; padding-bottom: 5px;"> <p style="text-align: center;">Switch B37 (DIP switch) OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p> </div> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>B39</p>  <p>33x</p> </div> <div style="text-align: center;"> <p>(32x)</p>  </div> </div> <hr style="border-top: 1px dashed black;"/> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>B38</p>  <p>1x</p> </div> <div style="text-align: center;">  <p>days (max. 99) hours</p> </div> </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;"> <div style="text-align: center;"> <p>B38</p>  <p>2x</p> </div> <div style="text-align: center;">  <p>minutes seconds</p> </div> </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;"> <div style="text-align: center;"> <p>B38</p>  <p>3x</p> </div> <div style="text-align: center;">  </div> </div>

Seq. no.	Indications	Comments, Notes
35	<p style="text-align: center;">Development only!</p> <p>SCI . = Serial Communication Interface (NMEA Log / GPS input)</p> <hr/> <p>Switch B37 (DIP switch) OPEN</p>  <p style="text-align: center;">1 2 3 4 5 6 7 8</p>	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; align-items: center; margin-bottom: 20px;"> <div style="text-align: center;"> <p>B39</p>  <p>34x (33x)</p> </div> <div style="margin: 0 20px;">⇒</div> <div style="text-align: center;">  </div> </div> <hr style="border-top: 1px dashed black;"/> <div style="display: flex; align-items: center;"> <div style="text-align: center;"> <p>B38</p>  </div> <div style="margin: 0 20px;">⇒</div> <div style="text-align: center;">  </div> </div> <p>The content of the two digits is during a data transfer unrecognisable. Just the digits 1₍₁₆₎ and 0₍₁₆₎ are visible for a short moment; 10₍₁₆₎ means line feed. All other sequentially indicated values are for development purpose only.</p> </div>

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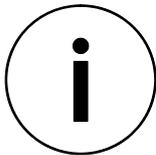
6 Tasks to be performed regularly

A task to perform regularly is to clean the internal of the gyro compass time by time. Especially the filter grid at the bottom of the compass housing has to be cleaned.

6.1 Changing the supporting liquid and the distilled water, cleaning the internal of the outer sphere and replacing the pump rotor

At 18 - 24 months intervals below mentioned measures must be performed completely:

- Removing the outer sphere from the compass enclosure, see section 6.1.1
- Draining out the supporting liquid and the distilled water, see section 6.1.2
- Dismantle the gyrosphere, see section 6.1.3
- Cleaning of the gyrosphere and the outer sphere, see section 6.1.4
- Renew the pump rotor, see section 6.1.5
- Assemble the outer sphere, see section 6.1.6
- Filling with supporting liquid and distilled water, see section 6.1.7
- Inserting the outer sphere in the compass enclosure and set the compass into operation, see section 6.1.8



The supporting liquid and distilled water must not be changed whilst at sea (except in the case of dual systems).

Tools/special tools required:

- Filler Pipe
- Injector
- Suction Cup

Spare parts required:

- Servicepack STD 22 (110-233.X19), comprising of:
 - Supporting liquid (148-162.E02)
 - Distilled water (148-398)
 - Filler Pipe (148-389.00-002)
 - Set of Gaskets (110-222.X01)
 - Pump Rotor With Axis (110-233.X17)
- Set of screws (110-233.X03 if required)
- Set of small parts (110-233.X50)

If required:

- Screw (distilled water)
- Screw (supporting liquid)
- Screw (ventilation)

6.1.1 Removing the outer sphere from the compass enclosure

- Turn off the 24V power supply of the gyro compass and secure it against reconnecting.
- Wait min. 15 minutes until the gyrosphere does not turn any more.
- Undo the two screws at the top and bottom of the door of the gyro compass enclosure and lift out the door, paying attention to the earthing strip.
- Remove the plug from the outer sphere (see Figure 66/2).

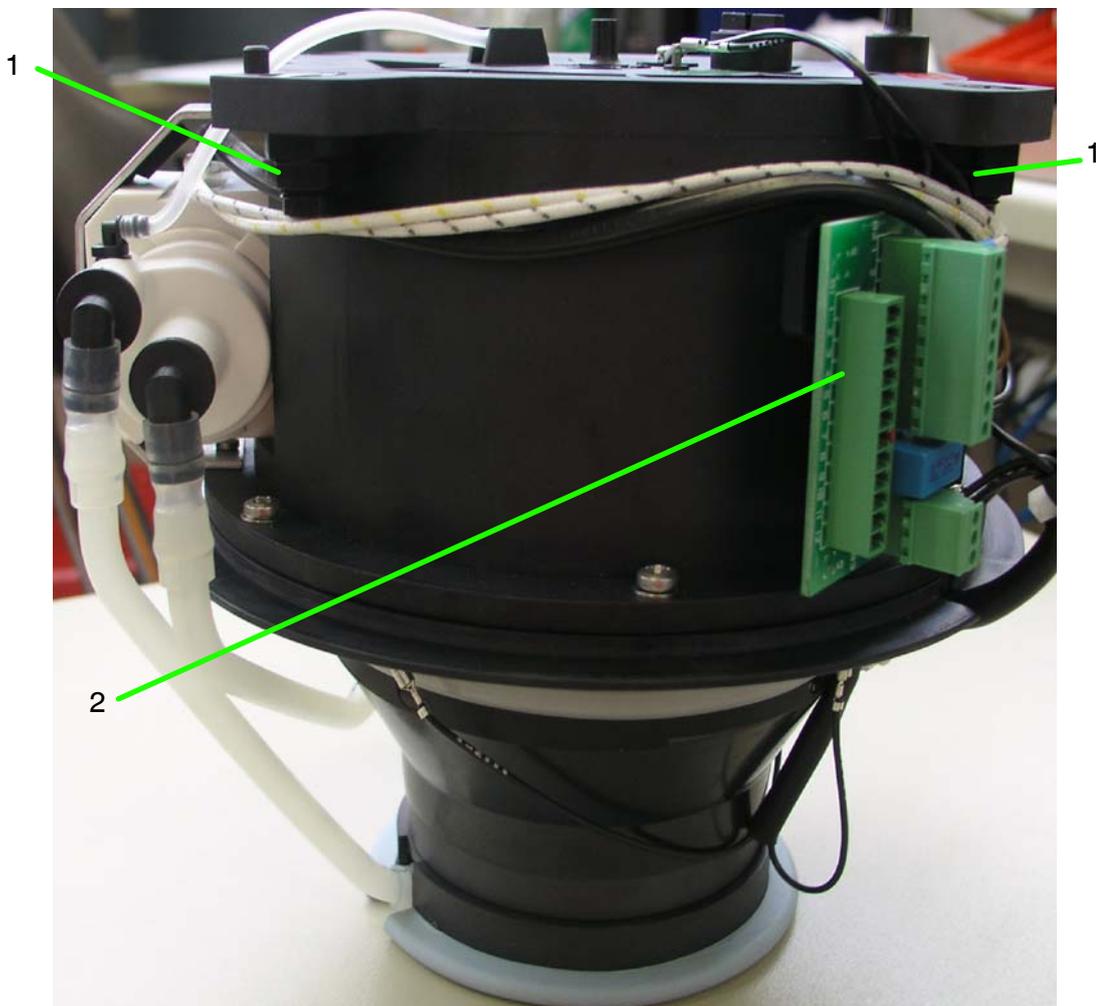


Figure 66: Dismantling the outer sphere

- Place both hands (see Figure 66/1) 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

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device), carefully remove it from the compass enclosure and set it down.

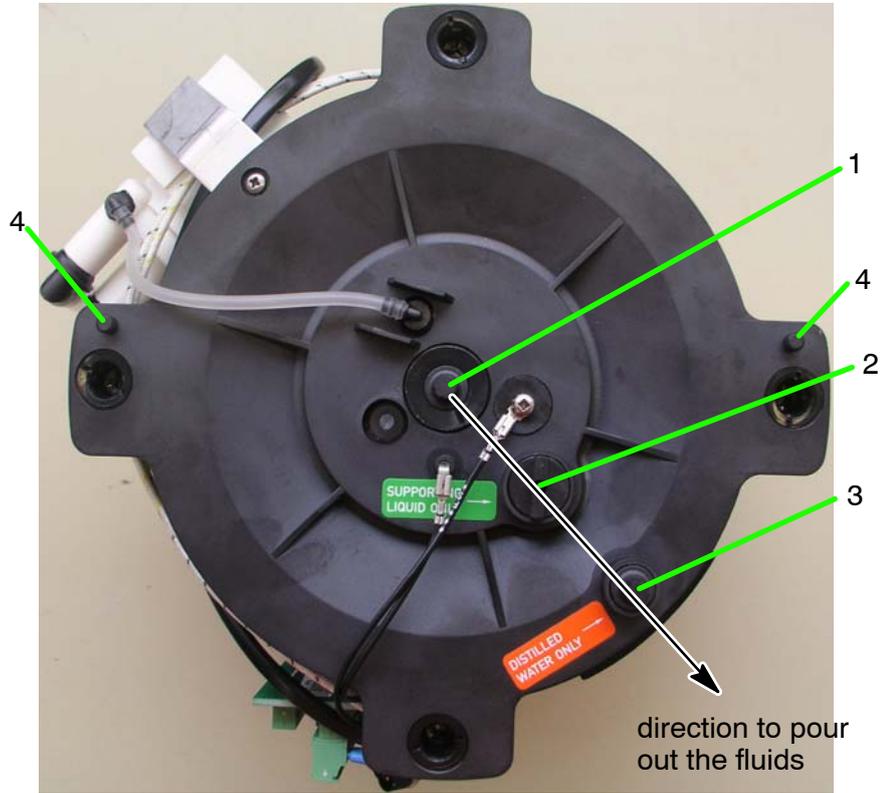


Figure 67: Dismantled outer sphere (overhead view)

6.1.2 Draining out in the supporting liquid and distilled water

(see Figure 67)

- Remove the ventilation screw (Figure 67/1) to vent the system
- Remove the supporting liquid screw (Figure 67/2) so that the supporting liquid can be poured out
- Holding the outer sphere with both hands, pour out the supporting liquid and throw it away (no special measures are needed for disposal).
Observe the direction to pour out the fluids (see Figure 67).
- Remove the distilled water screw (Figure 67/3), so that the distilled water can be poured out. Remove the remaining distilled water from the outer sphere with the injector.
- Check the supporting liquid and the distilled water.
Observe the direction to pour out the fluids (see Figure 67)



- Used supporting liquid and used distilled water must not be reused.
- All the following tasks on the outer sphere must be carried out slowly. On no account do them jerkily. Slow handling is necessary, because otherwise the gyrosphere will fail to float in the supporting liquid, and jerky movements will cause it to strike against the inner wall of the outer sphere.



- There is a risk of damage. Continue to handle in this way until you have finished filling with the new liquids.
- Supporting liquid should be stored in a cold, dry and dark place. Please pour away liquid leftovers. Do not mix supporting liquids.



- Use only original supporting liquid and distilled water from Raytheon Anschutz.
- Do not warm up the supporting liquid or the distilled water prior to filling them in to achieve a shorter heating period.
- Always handle the gyrosphere in an upright position.

- After pouring out the liquids (distilled water and supporting liquid) for the first time, **slowly** return the outer sphere to the initial position.
- Wait approximately 10 seconds and then carefully repeat the pouring out process. If necessary, use the injector to suck out the remaining distilled water through the distilled water filling opening.

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6.1.3 Dismatle the gyrosphere

Initial status:

The outer sphere is dismantled, the supporting liquid and the distilled water are poured out.



The gyrosphere must always be handled in an upright position. The number (as shown) must be on top during handling.

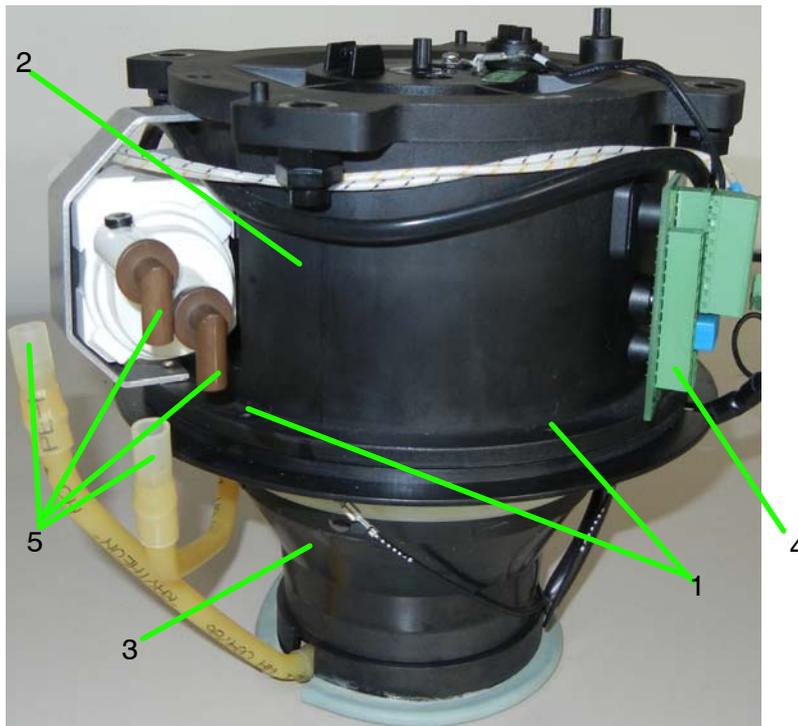


Figure 68: Outer sphere

- Remove the hose connections (Figure 68/5).
- Remove plug B3 (Figure 68/4).
Unscrew the 6 screws (Figure 68/1) that connect the upper and lower half of the outer sphere and separate the upper half from the lower half of the outer sphere (see also Figure 69).
- Remove the gasket (Figure 69/1) out of the slot of the lower half of the outer sphere (do not use the gasket again).
Anschütz distilled water (for rinsing out the outer sphere)
screw driver for cross-slotted screws
gasket (O-Ring)

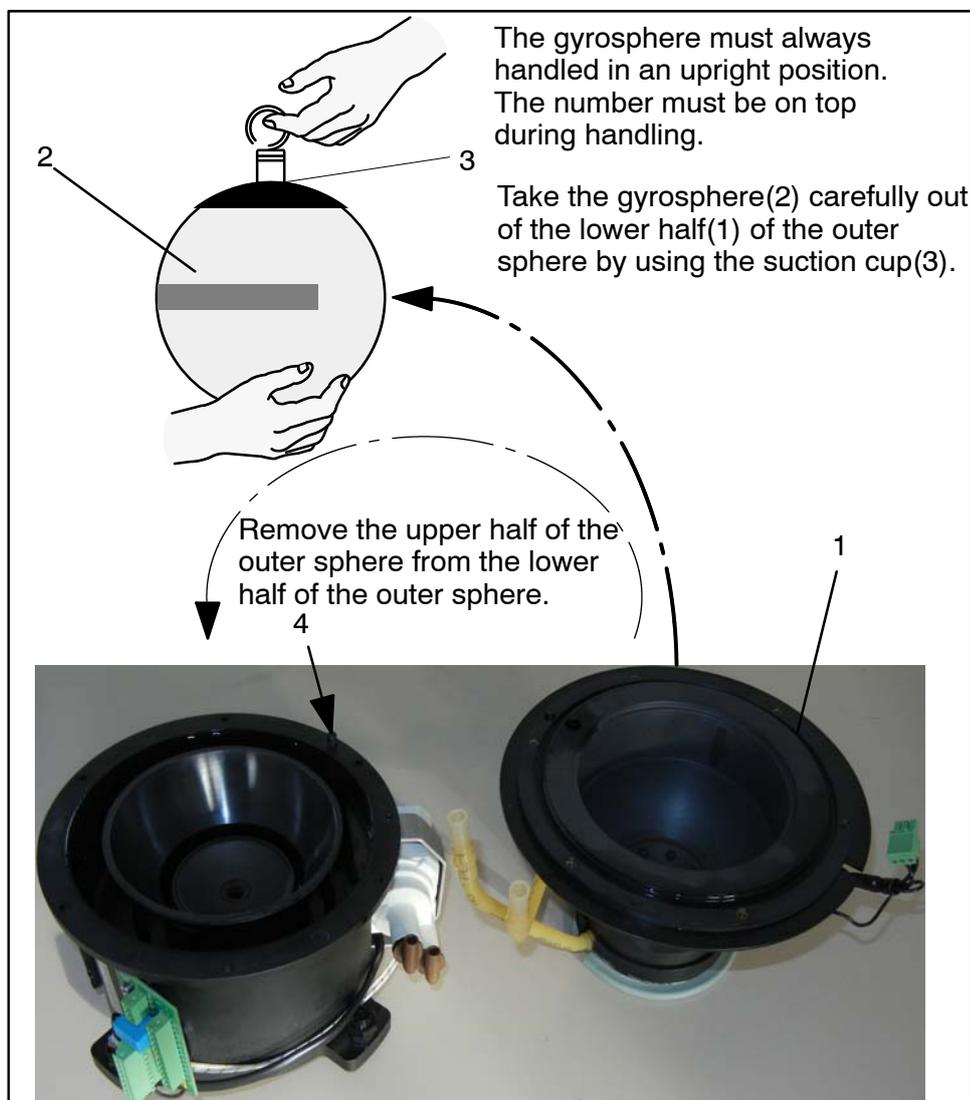


Figure 69: Upper half and lower half of the outer sphere separated
Taking out/inserting the gyrosphere

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6.1.4 Cleaning of the gyrosphere and the outer sphere

Necessary special tools/consumables:

lint-free cotton cloth

warm (approx. 30° C to 35° C), clear and clean drinking water

Initial status:

The gyrosphere is dismantled.

- Clean the gyrosphere and the insides of both halves of the outer sphere with warm, clear and clean drinking water with a lint-free cotton cloth (do not use brushes).
- Rinse out both halves of the outer sphere with clear and clean drinking water, turn both halves to the bottom and let the water leak out.
Let the both halves dry for a moment.

6.1.5 Renew the pump rotor

Initial status:

The gyrosphere is dismantled.

Necessary special tools/consumables:

Pump rotor with axis, 110-233.X17

- Pump rotor with axis and rubber bearing
- Gasket
- Tool, to remove the inner rubber bearing (4mm spacer bolt)

Open the pump unit (see Figure 70)

- Open the pump unit carefully by turning the pump head counter clockwise. Take care of the hose connections.
- Remove rotor, gasket and ceramic shaft.

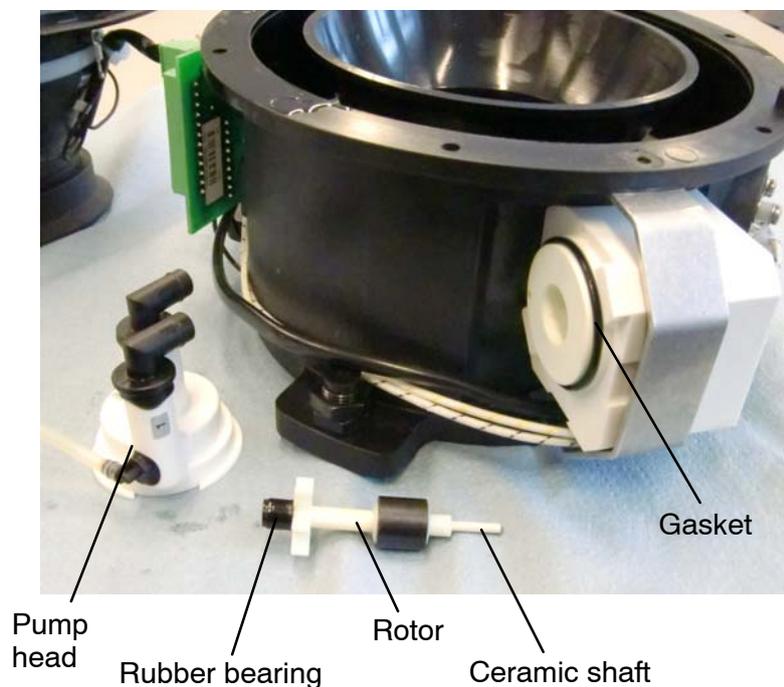


Figure 70: Pump rotor with axis dismantled

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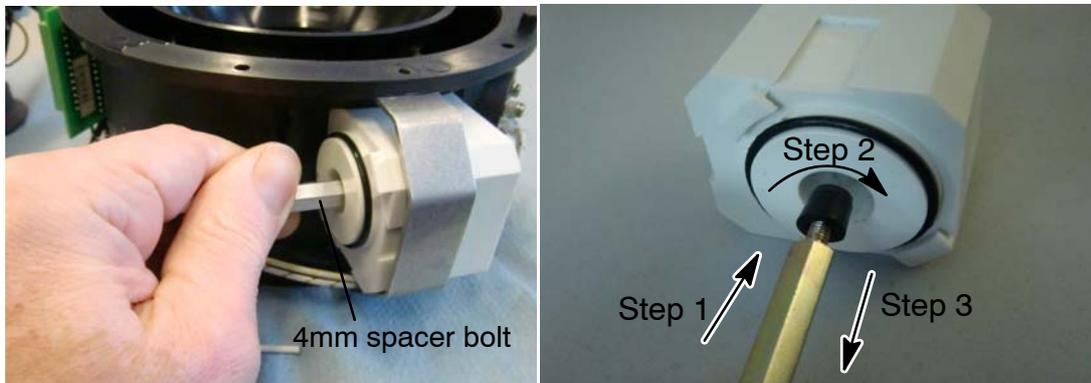


Figure 71: Remove inner rubber bearing

Remove the inner rubber bearing (see Figure 71)

The (second) rubber bearing often remains inside the pump casing.

- Screw in the spacer bolt and pull out the inner rubber bearing.
- Rinse the inner pump with distilled water.
- Let the both halves of the pump dry for a moment.

Reassemble the pump unit (see Figure 72)



Figure 72: Reassemble the pump unit

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-
- Push the new complete pump axis into the pump casing.
 - Insert a new gasket.
 - Turn the pump head again onto the pump casing.
Take care for the right position of the hose connections.

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6.1.6 Assemble the gyrosphere

Necessary special tools/consumables:
Suction cup

Initial conditions:

Pump rotor is renewed and the pump is assembled. Gyrosphere and internal of the upper and lower sphere are clean and dry.

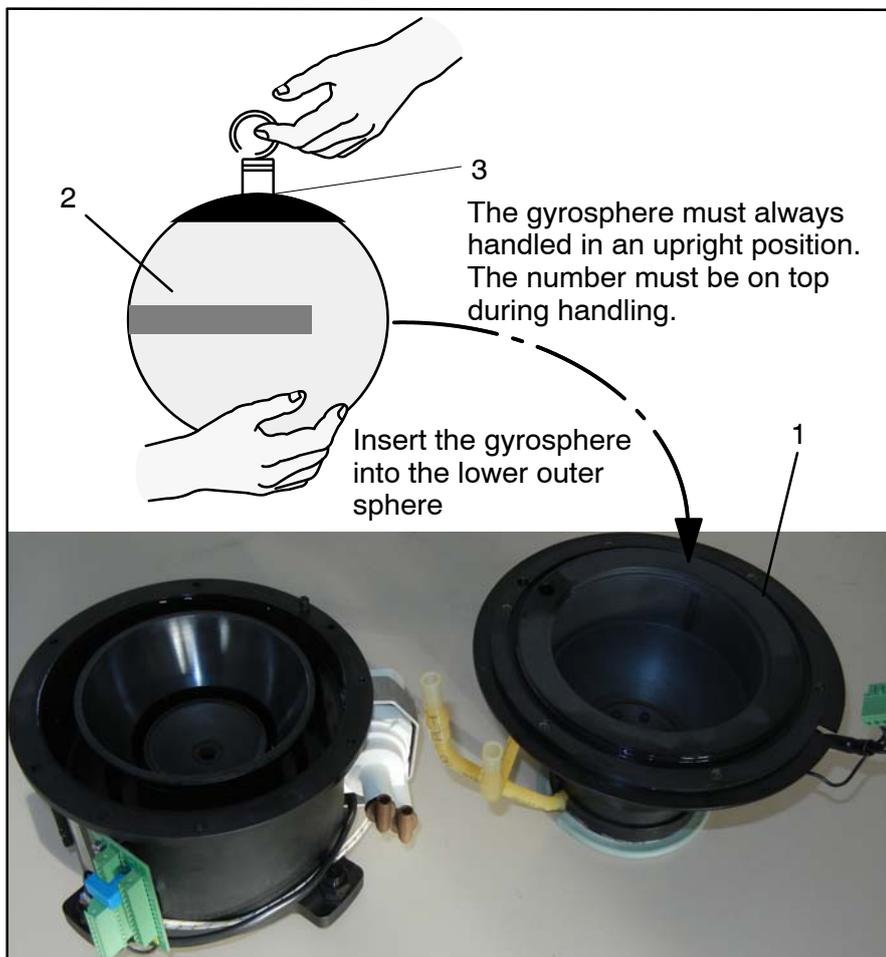


Figure 73: Reassemble the outer sphere

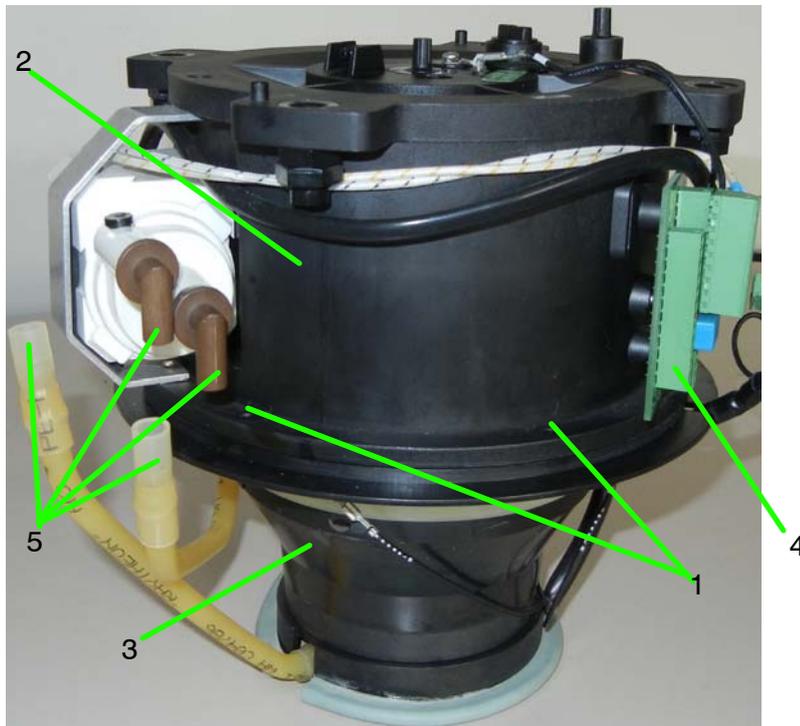


Figure 74: Outer sphere

- Insert the gyrosphere (using the suction cup) into the lower outer sphere (see Figure 73).
- Insert a new O-ring (Figure 73/1) in the lower half of the outer sphere.
- Replace the upper half of the outer sphere on the lower half.
- Screw in the six screws (see Figure 74/1).
- Insert plug B3 (see Figure 74/4).
- Connect the pipes again (see Figure 74/5).
- Fix the hoses at the pump again
(from the bottom of the outer sphere to the right input of the pump and from the side of the outer sphere to the left input of the pump - see Figure 74).

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6.1.7 Filling with distilled water and supporting liquid

Necessary special tools/consumables:

Filling tools for distilled water and supporting liquid

Injector

Supporting liquid

Distilled water

O-rings for the filling opening screws

Initial conditions:

Outer sphere is assembled.

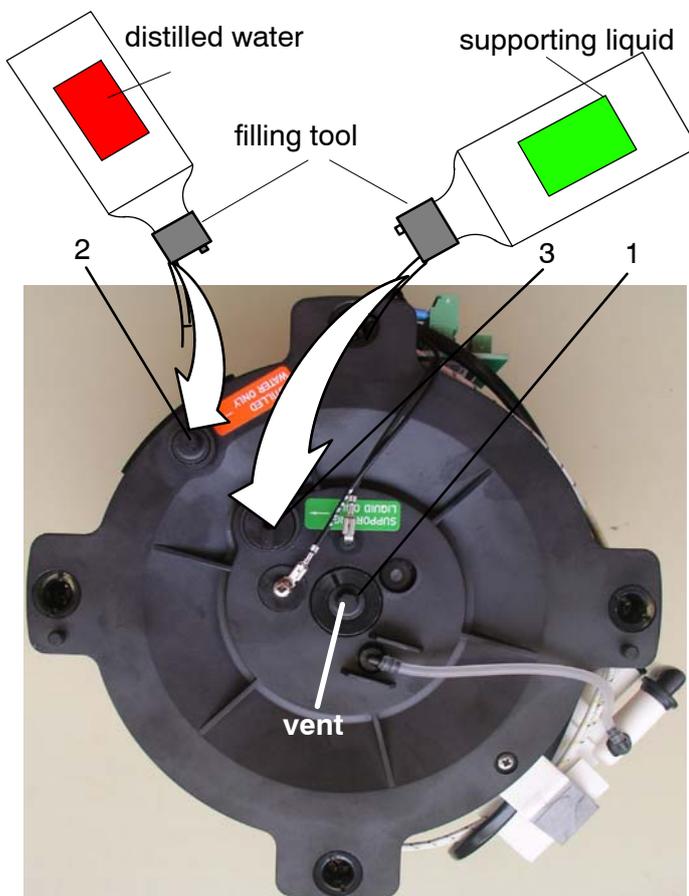
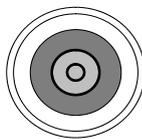


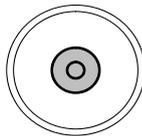
Figure 75: Filling in supporting liquid and distilled water

- Attach the filling device to the distilled water bottle and pour the entire contents (230cm³) into the distilled water filling opening (look for the identifying label) – do not forget to open the vent screw.
- Close the distilled water filling opening with the screw.
Use a new sealing ring.

- Attach the filling device to the supporting liquid bottle and pour the supporting liquid (840cm³) into the supporting liquid filling opening (look for the identifying label).
- Check the liquid level at the measuring cone (Figure 75/1) and Figure 76.
- Using the injector, top up or suck out supporting liquid (check via the measuring cone) until the “liquid level: OK” is reached.
- Close the supporting liquid filling opening with the screw.
Use a new sealing ring.
- Close the ventilation screw.
Use a new sealing ring.



Liquid level: OK
(supporting liquid at operational temperature (appr. 50° C))



Liquid level: too low
or
Liquid level O.K. - supporting liquid cold (appr. 20° C)

Figure 76: Measuring cone (top view)

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6.1.8 Inserting the outer sphere in the compass enclosure and set the compass into operation

- 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.
- Guide the cable with the plug to the left around the outer sphere and plug it in.
- 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 stage as described in section 2.6.4.3 or 3.4.3.2 .

7 Power OFF-ON Procedures



Caution!

Power OFF-ON procedures and/or configuration changes must be performed by trained and qualified personnel only.

Below mentioned procedures are necessary after flashing a new software and/or after a configuration of system components (configuration changes or new devices/components).

7.1 Flashing new Software



Caution!

A Power OFF-ON procedure for the compass should last not longer than 1 second. Otherwise the compass settling procedure is performed (4 hours settling stage, Quick settling is not possible).

After flashing a new software it is recommended to reset the respective device by a power OFF-ON procedure, but a RESET (with respective push button if available) is absolutely necessary.

A power OFF-ON procedure can be performed either by switching of the supply voltage at a main supply distribution or by removing respective power cables (there are no separate power switches – neither at the compass nor at distribution units or operator units).

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7.2 Changing configuration of system components or connecting of other/new system components



Please note:

It is not necessary to switch OFF and ON a device/component after configuration changes or after connecting other/new system components.

Instead of a power OFF - ON a RESET procedure can be applied (as mentioned below).

A RESET procedure must be performed for below mentioned applications:

- DV-Bus is changed
- Individual Speed is changed
- CAN bus addressees are changed
- External sensors are changed or added
- Type of Distribution Unit is changed
- Magnetic compass connection is changed

This RESET procedure must be performed at the connected Distribution Unit by pressing the RESET push buttons on both PC Boards and for the Operator Unit by switching OFF the supply voltage.

A RESET or a power OFF for the compass is not necessary.



Please note:

For this procedure it is necessary that the Distribution Units and the Operator Unit are not switched OFF.

- Open the front cover of the Distribution Unit.
- Press both RESET buttons, (located at each PC Board) if possible simultaneously (see respective manual of the Distribution Unit).
Button B6 at the Interface PCB and button B42 at the I/O PCB of the Distribution Unit.
- Disconnect the Operator Unit from the terminal board in the Distribution Unit for approx. 5 seconds and connect it again.
- Close the front cover of the Distribution Unit and fix it with the screws.

8 Error messages and warnings

8.1 Error messages

An error is indicated in the digital display of the compass by a flashing “Erro” (for error).

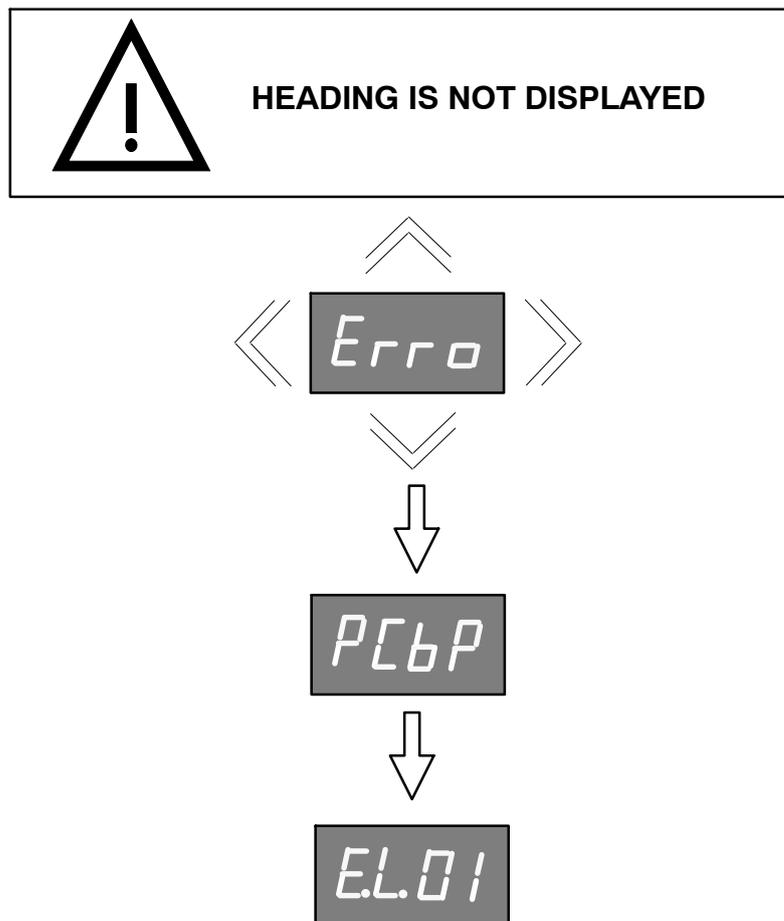


Figure 77: “Error message” in digital display

Following error groups can be displayed:

- PCbP = Error on Power Supply PCB
- PCbS = Error on sensor PCB
- PCbC = Error on connection PCB
- PCbG = Error on outer sphere PCB

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Following error codes are possible (referring to their error group):

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

To delete the content of the error log book, see section 5.1.4 Nr. 14

8.2 Warnings

Warning indicate a malfunction during operational use.
The heading continues to be displayed.
A warning is indicated by a flashing decimal point.

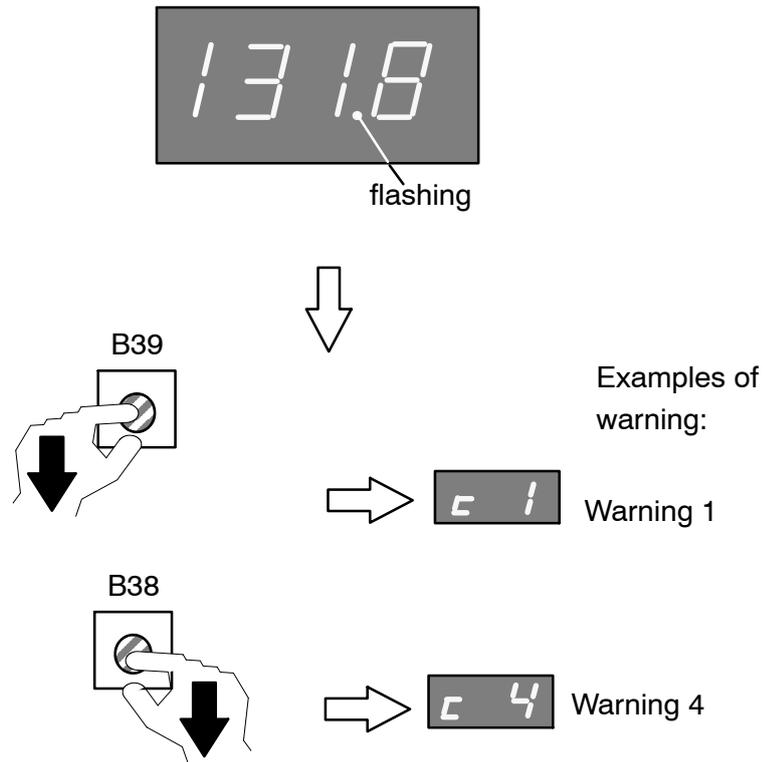


Figure 78: DIP switch B37 and button B38/B39

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The following warnings may appear:

- C1= Fan failure
- C2= Heater failure
- C3= Supporting liquid > 60°C
- C4= Supporting liquid level too low
- C5= Voltage cut-off

8.2.1 **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.
- Open the door on the compass
- If necessary cool the outer sphere using an external fan.

These measures should be continued 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.



8.2.2 **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.

8.2.3 **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”

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8.2.4 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 (Figure79/1), the supporting liquid screw (Figure79/3) and the distilled water screw (Figure79/2).
- 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 80.
- Fill in the remaining content of the bottle into the inlet for distilled water until the Dip-Stick shows a level according to Figure 81.
- 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 2.6.4.3 or 3.4.3.2

Installation and Service manual

Compass STD 22

Compass STD 22 Compact

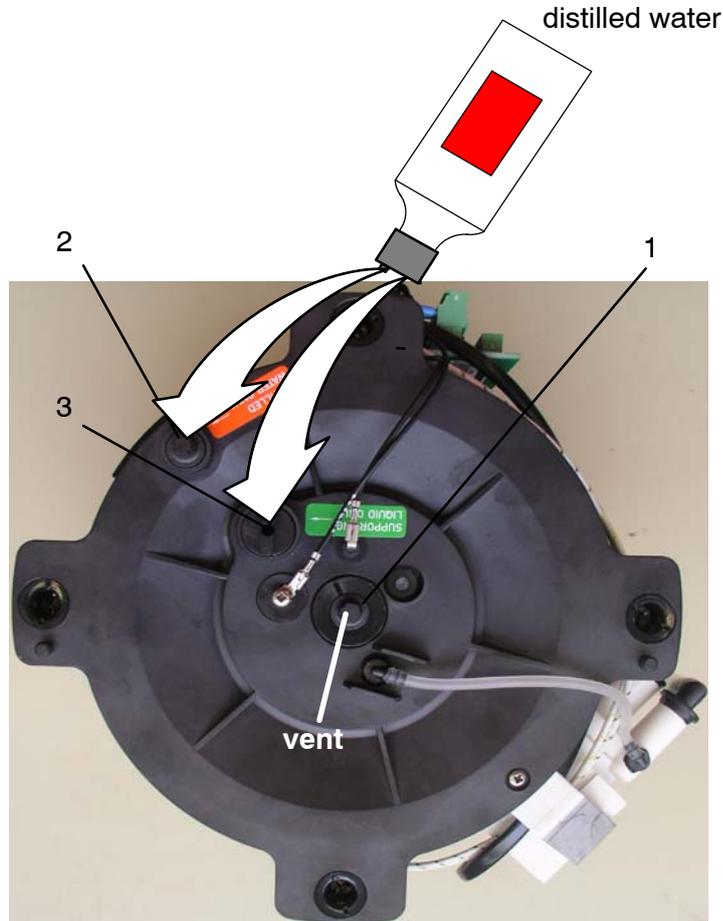


Figure 79: Immediate measure to fill up with distilled water

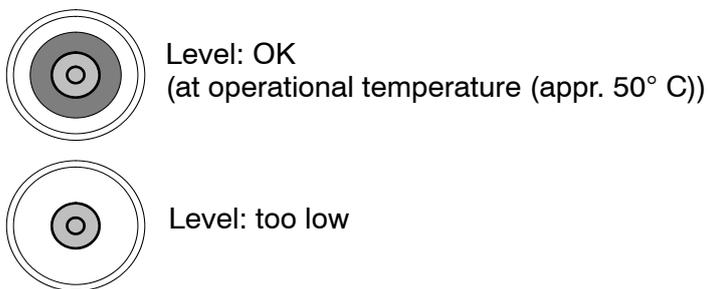


Figure 80: Measuring cone (top view)

Installation and Service manual
Compass STD 22
Compass STD 22 Compact



Compass
STD 22

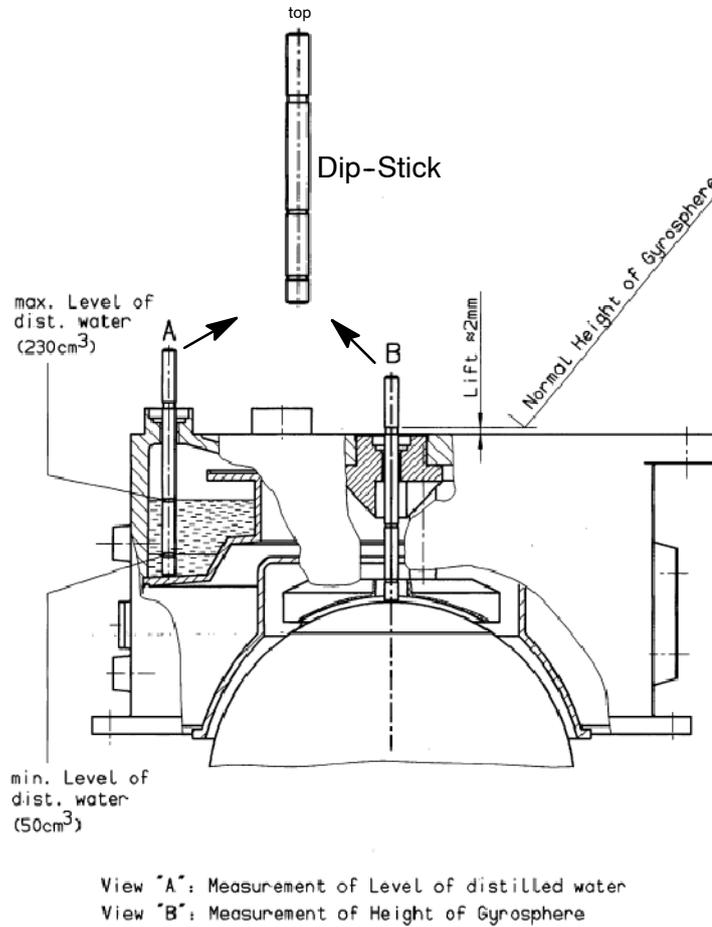


Figure 81: Dip-Stick levels

Installation and Service manual

Compass STD 22

Compass STD 22 Compact

8.2.5 **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.

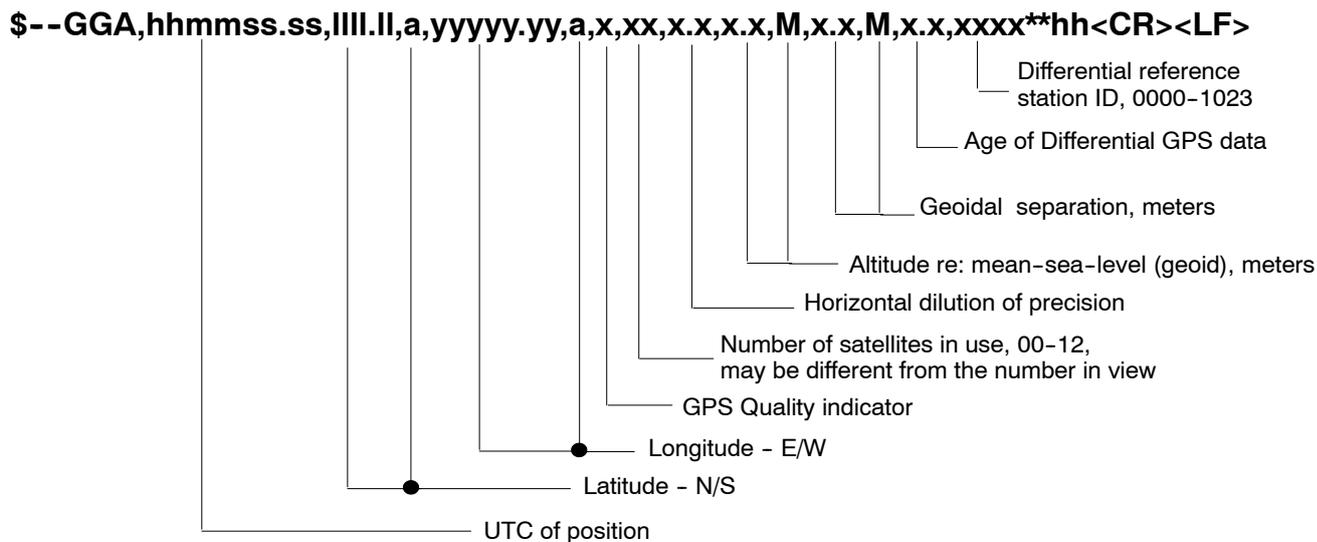
In the case of a voltage cut-off (supporting liquid temperature does not fall to below 45°C) and the voltage supply has been restored, the settling stage is indicated again (see also section 3.4.3.2 “Compass indications during the settling stage”).

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

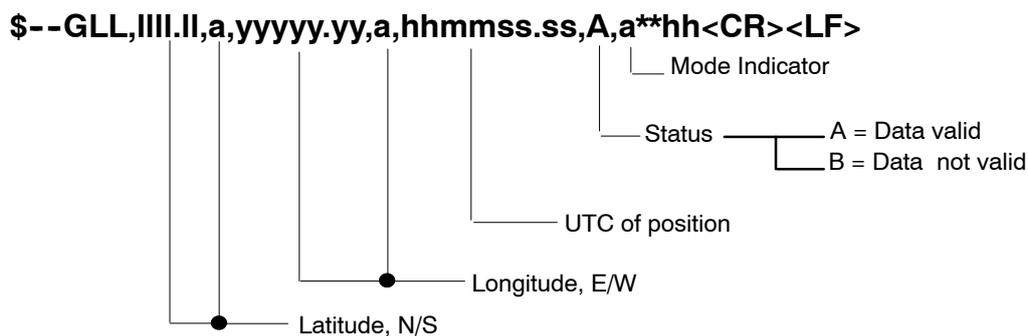


9 NMEA-Formats

- **NMEA 0183 Format GGA**
 GGA ⇒ Global Positioning System Fix Data



- **NMEA 0183 Format GLL**
 GLL ⇒ Geopgrhic Position - Latitude/Longitude



Installation and Service manual

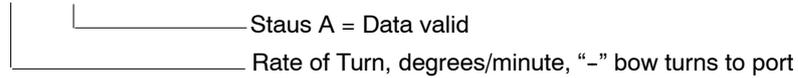
Compass STD 22

Compass STD 22 Compact

- **NMEA 0183 Format ROT**

ROT ⇒ Rate of Turn

\$--ROT,x.x,A*hh<CR><LF>



- **NMEA 0183 Format HDT**

HDT ⇒ Heading, True

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



- **NMEA 0183 Format HDG**

HDG ⇒ Heading, Magnetic

\$--HDG,x.x, , , , *hh<CR><LF>



- **NMEA 0183 Format VTG**

VTG ⇒ Velocity Through Ground

\$--VTG,x.x,T,x.x,M,x.x,N,x.x,K*hh<CR><LF>

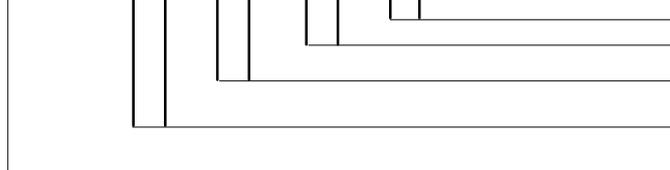




- **NMEA 0183 Format VHW**

VHW ⇒ Water Speed and Heading

\$--VHW,x.x,T,x.x,M,x.x,N,x.x,K*hh<CR><LF>

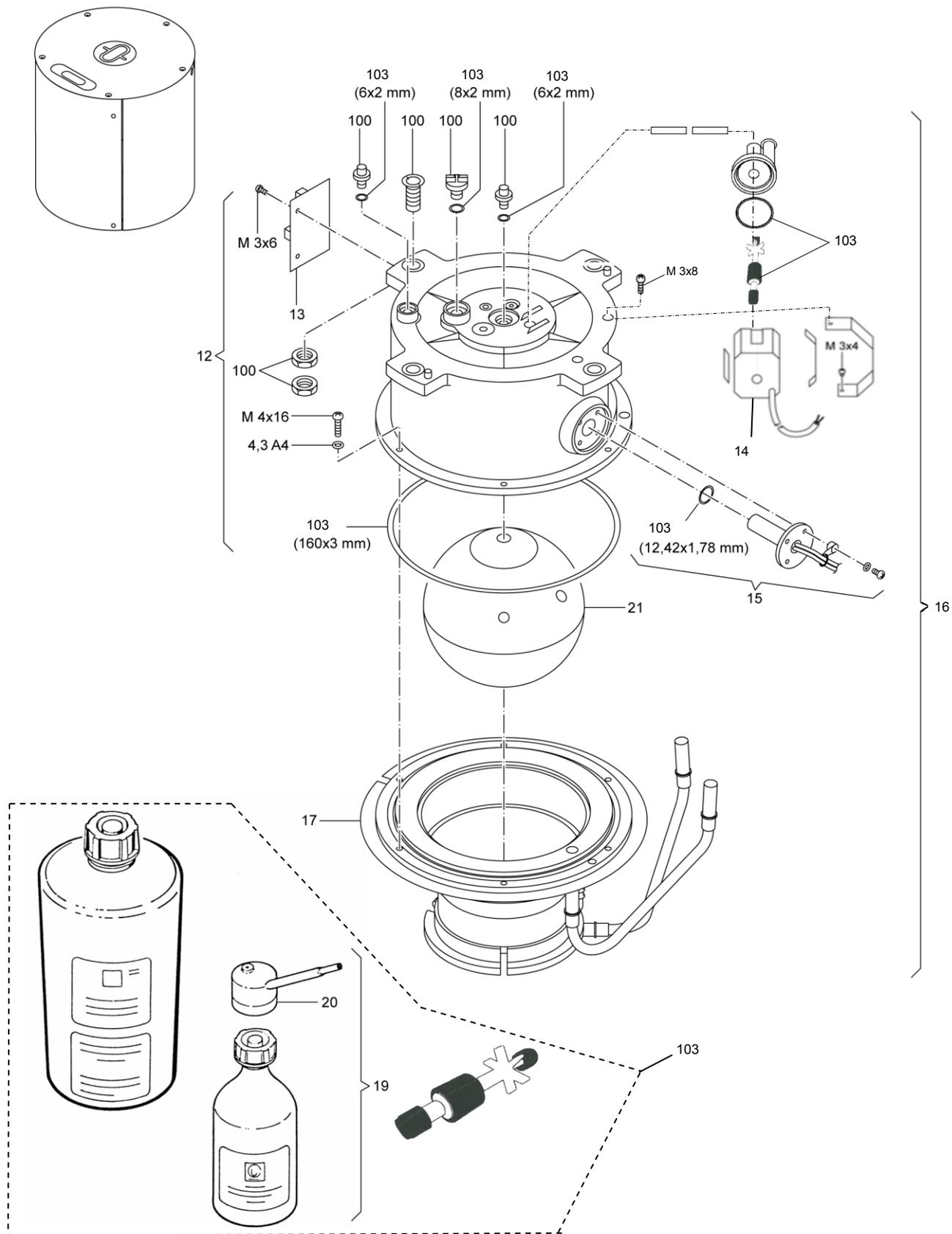


Speed, km/hr
Speed, knots
Heading, degrees Magnetic
Heading, degrees True
Talker

Kreiselkompaß STD.22
 Gyro Compass STD.22
 Type 110-233.NG001E10



Ersatzteilkatalog
 SPARE PARTS
 CATALOGUE



Kreiselkompaß STD.22
Gyro Compass STD.22
Type 110-233.NG001E10



Ersatzteilkatalog
SPARE PARTS
CATALOGUE

Pos.	Lager-Nr. Stock-No.	Benennung	Designation	Zeichnungs-Nr. Part-No.	Stck. Qty.	Herst.-Code MFRC
1	3609658	SPG-Versorgung	Power Supply PCB	110-233.X12	1	D2865
2	3609659	Anschluss-PCB	Connection PCB	110-233.X13	1	D2865
3	3609657	Sensor-PCB	Sensor PCB	110-233.X11	1	D2865
4	1762140	G-Sicherungseinsatz	Fuse	T 10 A L 250V 19195	1	D8882
5	1762017	G-Sicherungseinsatz	Fuse	T 1 A L 250V IEC 127-2	3	D8882
6	1504226	Lüfter	Fan	110-233.00-002	1	D2865
7	3628864	Schrittmotor, vollst.	Step Motor, compl.	110-234.47	1	D2865
8	3609621	Hüllkugel-PCB	Outer Sphere PCB	110-233.X10	1	D2865
9	3604567	Encoder, kompl.	Encoder, compl.	110-233.X01	1	D2865
10 ¹	3604060	Gelenk	Hinge	110-233.11	1	D2865
11	3604090	Kabelstamm	Cable Loom	110-233.28	1	D2865
12	3604569	Obere Hüllkugel	Upper Hemisphere	110-233.X07	1	D2865
13	3604661	Klemmenleiste mit Temperatursensor	Terminal PCB with Temperature Sensor	110-233.X09	1	D2865
14	3602315	Pumpe	Pump	110-231.40	1	D2865
15	3602608	Heizung, kompl.	Heater, compl.	110-231.X01	1	D2865
16	3604568	Hüllkugel, kompl.	Outer Sphere, compl.	110-233.X04	1	D2865
17	3604571	Untere Hüllkugel	Lower Hemisphere	110-233.X02	1	D2865
18	-----	frei	blank	-----	--	-----
19	1508499	Destilliertes Wasser	Distilled Water	148-398	1	D2865
20	1507674	Kappe	Filler Pipe	148-398.00-002	1	D2865
21	4004566	Kreiselkugel, neu	Gyrosphere, new	111-006.E01	1	D2865
	4004792	Kreiselkugel, AT	Gyrosphere, Reconditioned	111-006.E01 AT		D2865
100	3604573	Kleinteile-Satz	Set of small Parts	110-233.X50		D2865
103	3610981	Servicepack STD 22 enthält: Tragflüssigkeit Destilliertes Wasser Kappe Satz Dichtungen Pumpenrotor mit Achse	Servicepack STD 22 comprising of:	110-233.X19	1	D2865
			Supporting Liquid	148-162.E02	1	
			Distilled Water	148-398	1	
			Filler Pipe	148-398.00-002	1	
			Set of Gaskets	110-222.X01	1	
Pump Rotor with Axis	110-233.X17	1				
	3604572	Schraubensatz	Set of Screws	110-233.X03		D2865

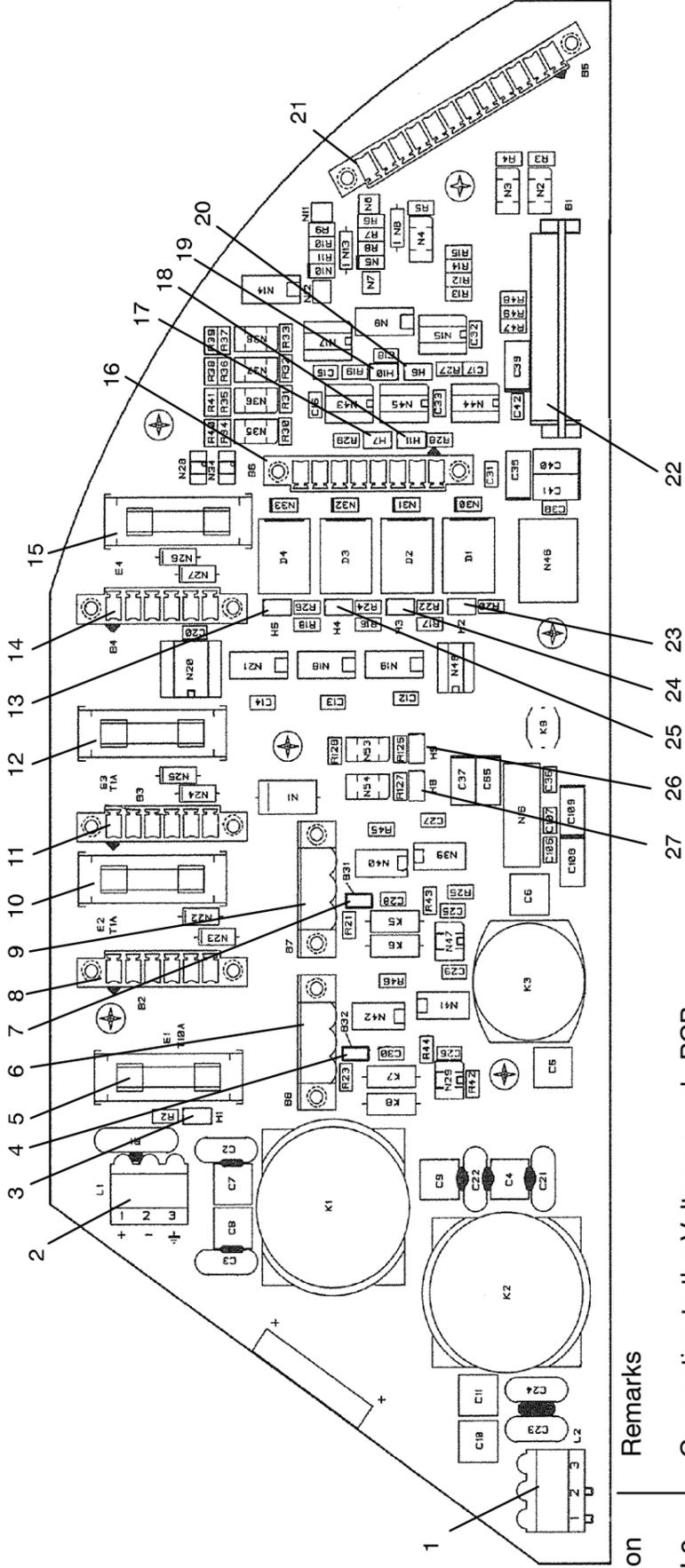
¹ incl. Pos. 11

All depicted items which are not mentioned in the text are not applicable for this unit. Since further development may necessitate making modifications to existing equipment, its conformity with the relevant illustrations and drawings is not always ensured. Raytheon Anschutz will be under no liability whatever that may arise from any such differences.

Installation and Service manual
Compass STD 22
Compass STD 22 Compact



Kompass
STD 22



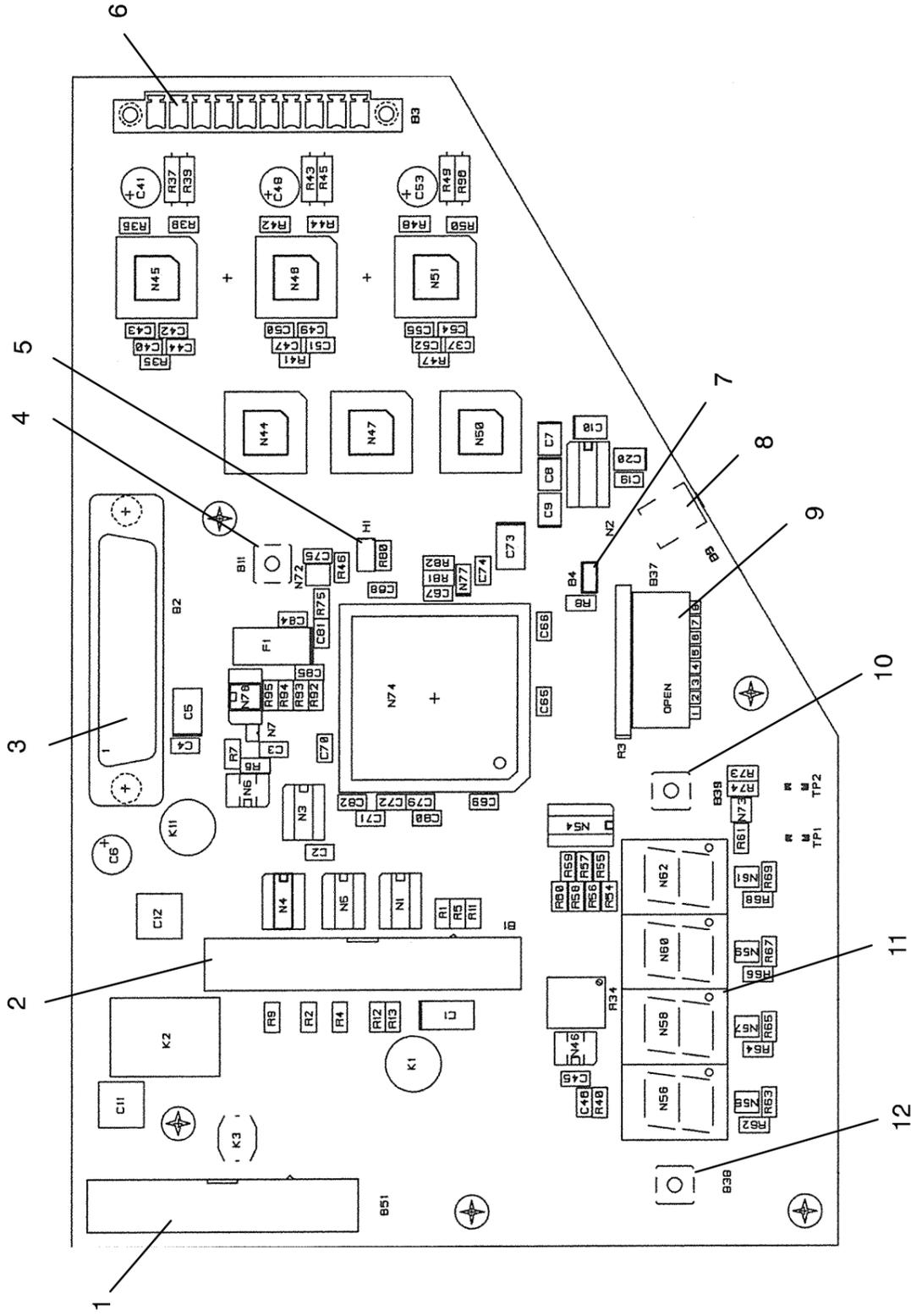
No.	Designation	Remarks
1	Terminal L2	Connection to the Voltage supply PCB
2	Terminal L1	Connection Supply Voltage 24VDC
3	LED H1	Indication Supply Voltage 24VDC
4	Jumper B32	Terminator for für CAN1
5	Fuse E1	Compass, 10A, T
6	Plug B8	CAN-bus, CAN1
7	Jumper B31	Terminator for CAN2
8	Plug B2	serial Interface NMEA/Coursebus Channel1
9	Plug B7	CAN-Bus, CAN2
10	Fuse E2	Channel1, 1A, T
11	Plug B3	serial Interface NMEA/Coursebus Channel2
12	Fuse E3	Channel2, 1A, T
13	LED H5	Function indicator of relay D4, AVAILABLE
14	Plug B4	Output Coursebus
15	Fuse E4	Coursebus output, 1A, T
16	Plug B6	Statussignals
17	LED H7	Output Channel2 (lights up red = Coursebus)
18	LED H11	Output Channel2 (lights up green = NMEA)
19	LED H10	Output Channel1 (lights up green = NMEA)
20	LED H6	Output Channel1 (lights up red = Coursebus)
21	Plug B5	NMEA In, Puls Log In, QS (STD 22C)
22	Plug B1	Connection to the Sensor PCB
23	LED H2	Function indicator of relay D1, QS
24	LED H3	Function indicator of relay D2, SEC
25	LED H4	Function indicator of relay D3, System error
26	LED H9	CAN2 Supply Voltage +5VDC
27	LED H8	CAN1 Supply Voltage +5VDC

NB05-356
Connection PCB

Installation and Service manual
Compass STD 22
Compass STD 22 Compact



Kompass
STD 22



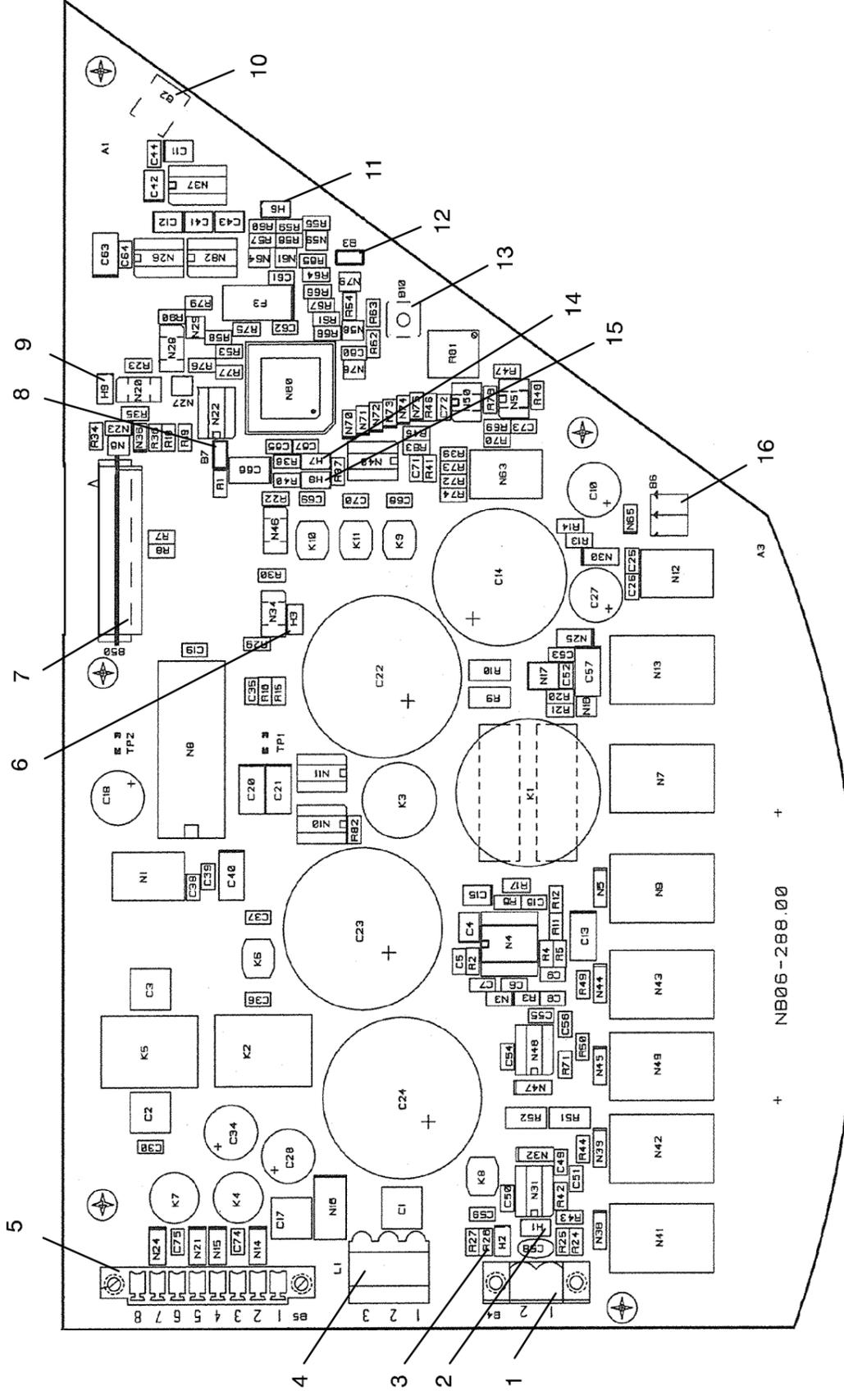
No.	Designation	Remarks
1	Plug B51	Connection to Supply PCB (STD 22)
2	Plug B1	Connectio to the NMEA-THREESTATE-MODUL
3	Plug B2	Connection to the Shaft-Encoder
4	Push button B11	Processor Reset
5	LED H1	Processor monitoring
6	Plug B3	Connection to the step motor
7	Jumper B4	Testpurpose only, Output Coursebus or NMEA
8	Plug B9	Connection for programming FLASH-PROM
9	DIP switch B37	Setting of parametrs and operation modes, read-out of Compass information
10	Push button B39	Selection and setting in combination with DIP switch
11	Display	Selection and setting in combination with DIP switch
12	Push button B38	Selection and setting in combination with DIP switch

110-233.X08
Sensor PCB

Installation and Service manual
Compass STD 22
Compass STD 22 Compact



Kompass
STD 22



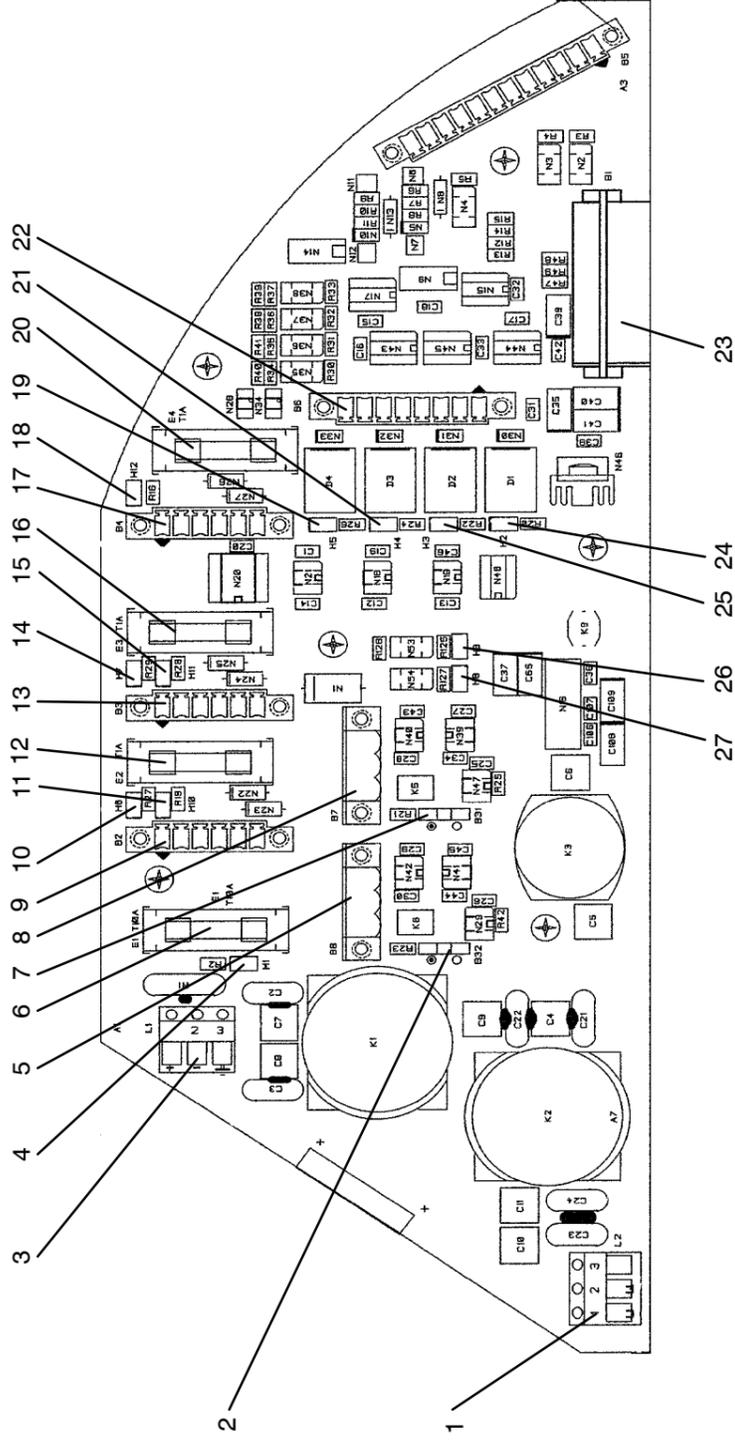
No.	Designation	Remarks
1	Plug B4	Connection inductivity primary coil
2	LED H1	Output voltage for inductive transmission
3	LED H2	Output voltage for inductive transmission
4	Terminal L1	Connection for Ship's supply 24VDC
5	Plug B5	Connection inductivity secondary coil
6	LED H3	Operating voltage relay-supply 12VDC
7	Ülug B50	Connection to the Sensor PCB
8	Jumper B7	Only for manufacturers application
9	LED H9	Operating voltage Shaft-Encoder 15VDC
10	Plug B2	Connection for programming FLASH-PROM
11	LED H6	lights up (red) while programming
12	Jumper B3	Must be set to FLASH the processor
13	Push button B10	Processor Reset
14	LED H7	lights up (red) on malfunction of the supply PCB
15	LED H8	Processor monitoring
16	Plug B6	Connection for the fan

110-233.102
Power Supply PCB

Installation and Service manual
Compass STD 22
Compass STD 22 Compact



Kompass
STD 22



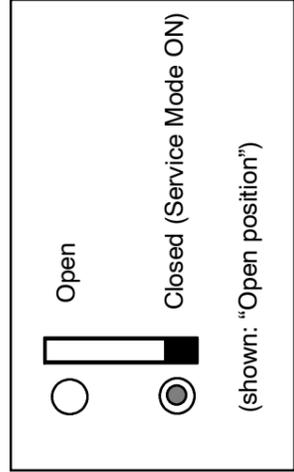
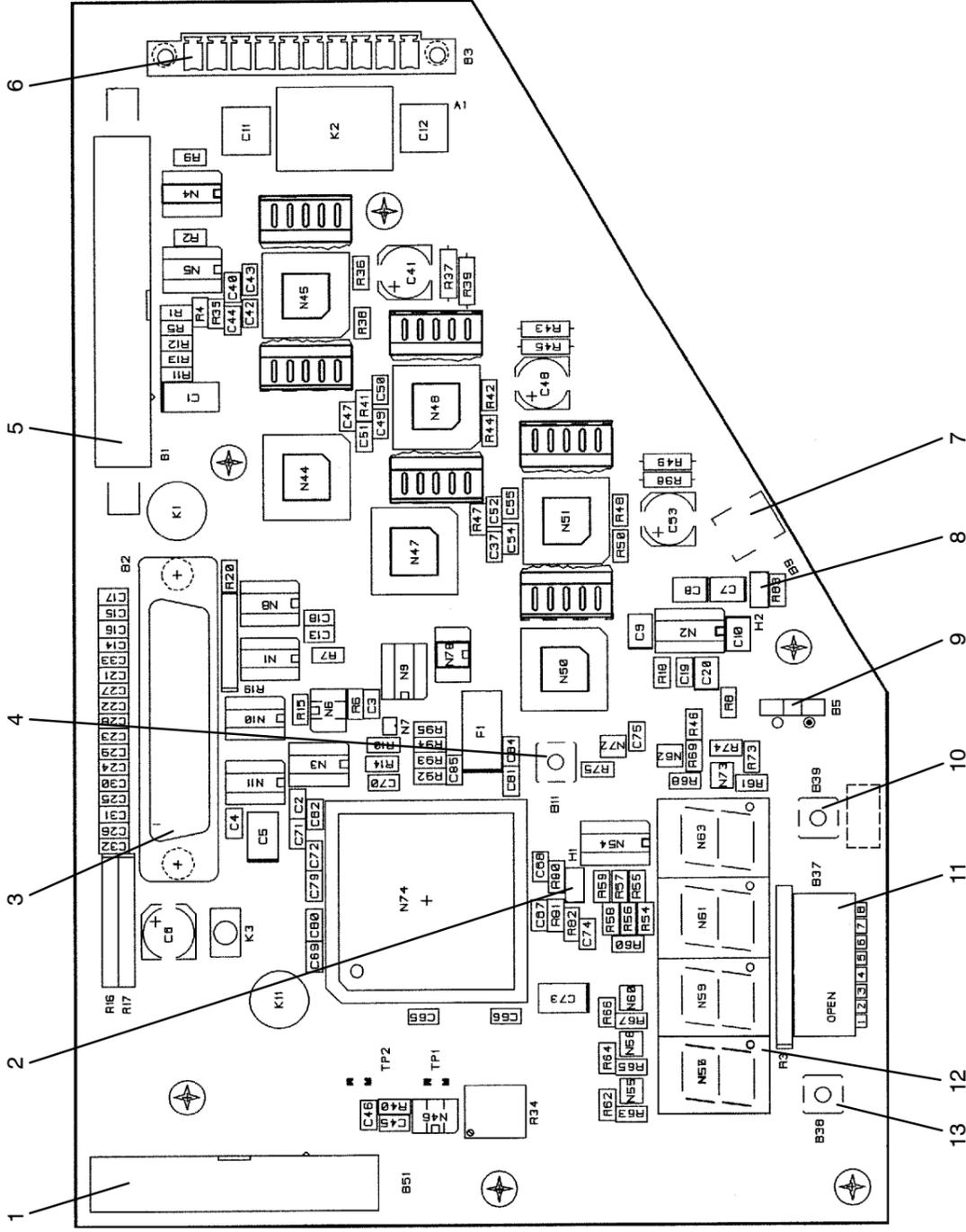
No.	Designation	Remarks
1	Terminal L2	Connection to the Voltage supply PCB
2	Switch B32	Terminator for CAN1 (switched into upper position = terminator set)
3	Terminal L1	Connection Supply Voltage 24V DC
4	LED H1	Indication Supply Voltage 24V DC
5	Plug B8	CAN-bus, CAN2
6	Fuse E1	Compass, 10A, T
7	Switch B31	Terminator for CAN2 (switched into upper position = terminator set)
8	Plug B7	CAN-bus, CAN1
9	Plug B2	serial Interface NMEA/Coursebus Channel 1
10	LED H6	CAN1 Supply Voltage +5V DC
11	LED H10	Output Channel1 (lights up green = NMEA)
12	Fuse E2	Channel1, 1A, T
13	Plug B3	serial Interface NMEA/Coursebus Channel2
14	LED H7	Output Channel2 (lights up red = Coursebus)
15	LED H11	Output Channel2 (lights up green = NMEA)
16	Fuse E3	Channel2, 1A, T
17	Plug B4	Output Coursebus
18	LED H12	Output Coursebus (B4) (lights up red = Coursebus)
19	LED H5	Function indicator of relay D4, AVAILABLE
20	Fuse E4	Coursebus output, 1A, T
21	LED H4	Function indicator of relay D3, SYSTEM ERROR
22	Plug B6	Statussignals
23	Plug B1	Connection to Sensor PCB
24	LED H2	Function indicator of relay D1, QS
25	LED H3	Function indicator of relay D2, SEC
26	LED H9	CAN2 Supply Voltage +5VDC
27	LED H8	CAN1 Supply Voltage +5VDC

E10 110-233.X13
Connection PCB

Installation and Service manual
Compass STD 22
Compass STD 22 Compact



Kompass
STD 22



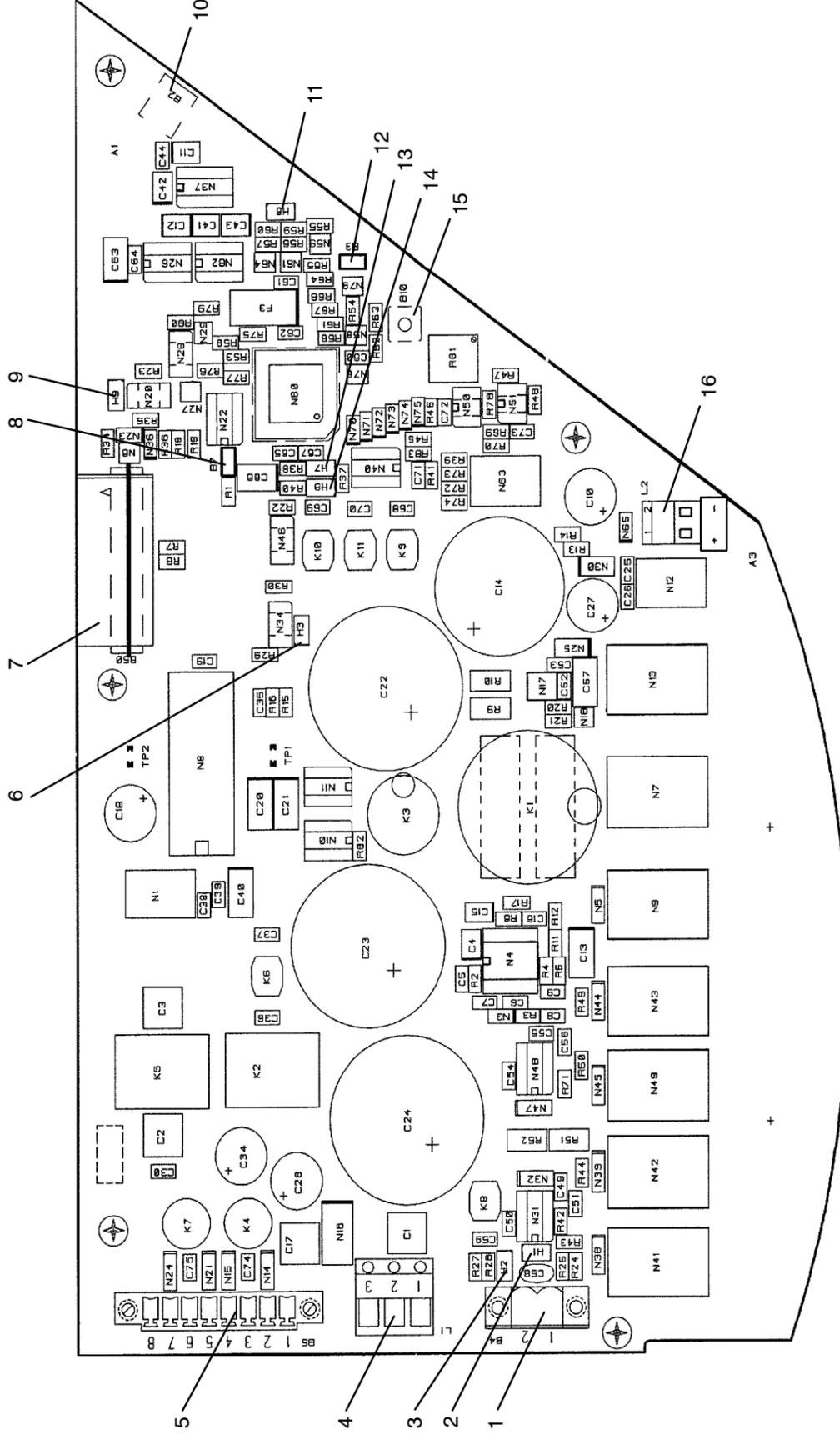
No.	Designation	Remarks
1	Plug B51	Connection to Supply PCB (STD 22M)
2	LED H1	Processor monitoring
3	Plug B2	Connection to the Shaft-Encoder
4	Push button B11	Processor Reset
5	Plug B1	Connection to the NMEA-THREESTATE-MODUL
6	Plug B3	Connection to the step motor
7	Plug B9	Plug to connect external devices in the Service Mode
8	LED H2	Blinking while "Service Mode"
9	Switch B5	Switching on into Service Mode (development and service only)
10	Push button B39	Selection and setting in combination with DIP switch
11	DIP switch B37	Selection and setting in combination with DIP switch
12	Display	
13	Push button B38	Selection and setting in combination with DIP switch

E10 110-233.X11
Sensor PCB



Kompass
STD 22

Installation and Service manual
Compass STD 22
Compass STD 22 Compact



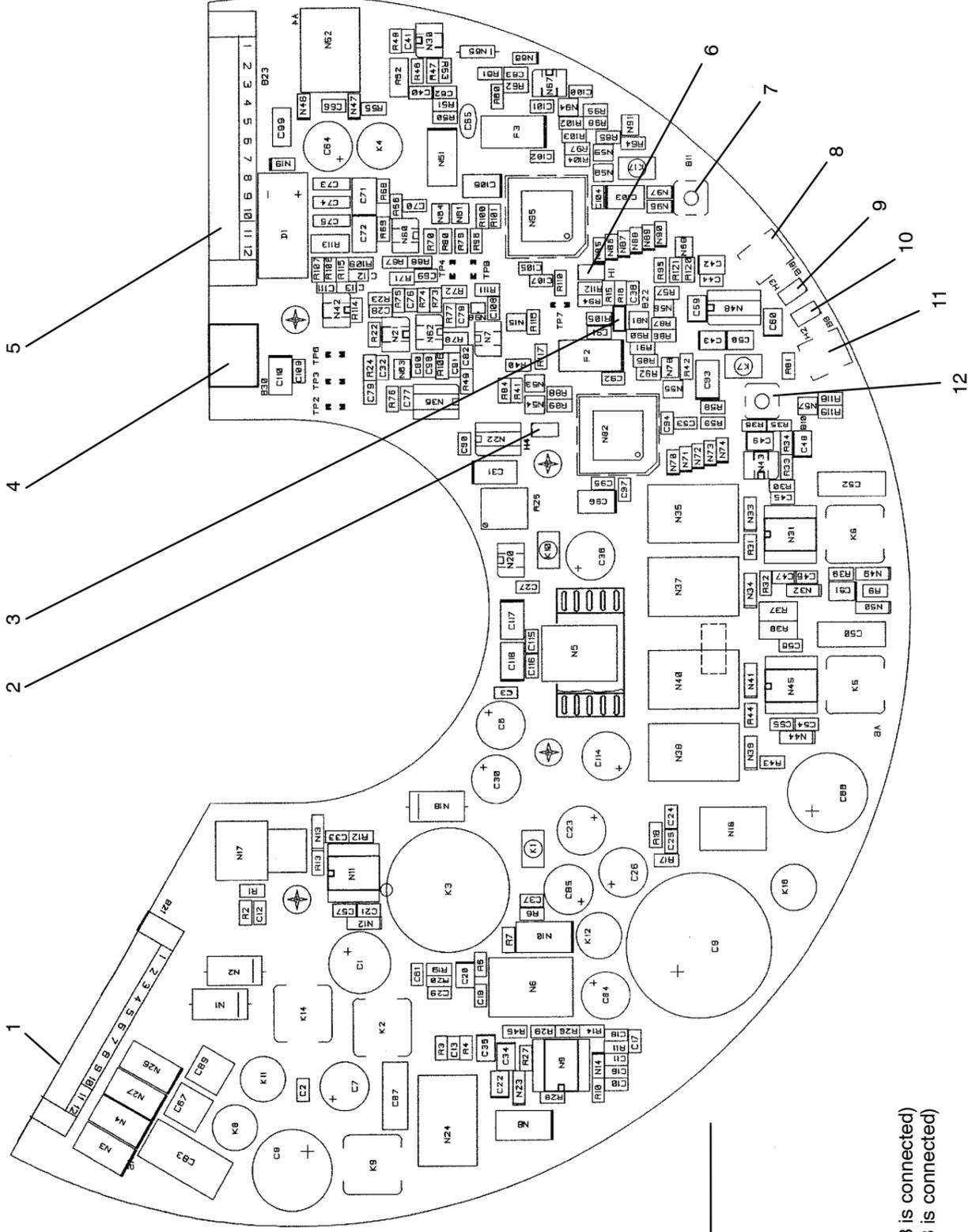
No.	Designation	Remarks
1	Plug B4	Connection inductivity primary coil
2	LED H1	Output voltage for inductive transmission
3	LED H2	Output voltage for inductive transmission
4	Terminal L1	Connection for Ship's supply 24VDC
5	Plug B5	Connection inductivity secondary coil
6	LED H3	Operating voltage relay-supply 12VDC
7	Plug B50	Connection to the Sensor PCB
8	Jumper B7	Only for manufacturers application
9	LED H9	Operating voltage Shaft-Encoder 15VDC
10	Plug B2	Connection for programming FLASH-PROM
11	LED H6	lights up (red) while programming
12	Jumper B3	Must be set to FLASH the processor
13	Push button B10	Processor Reset
14	LED H7	lights up (red) on malfunction of the supply PCB
15	LED H8	Processor monitoring
16	Terminal L2	Connection for the fan

E10 110-233.X12
Power Supply PCB

Installation and Service manual
Compass STD 22
Compass STD 22 Compact

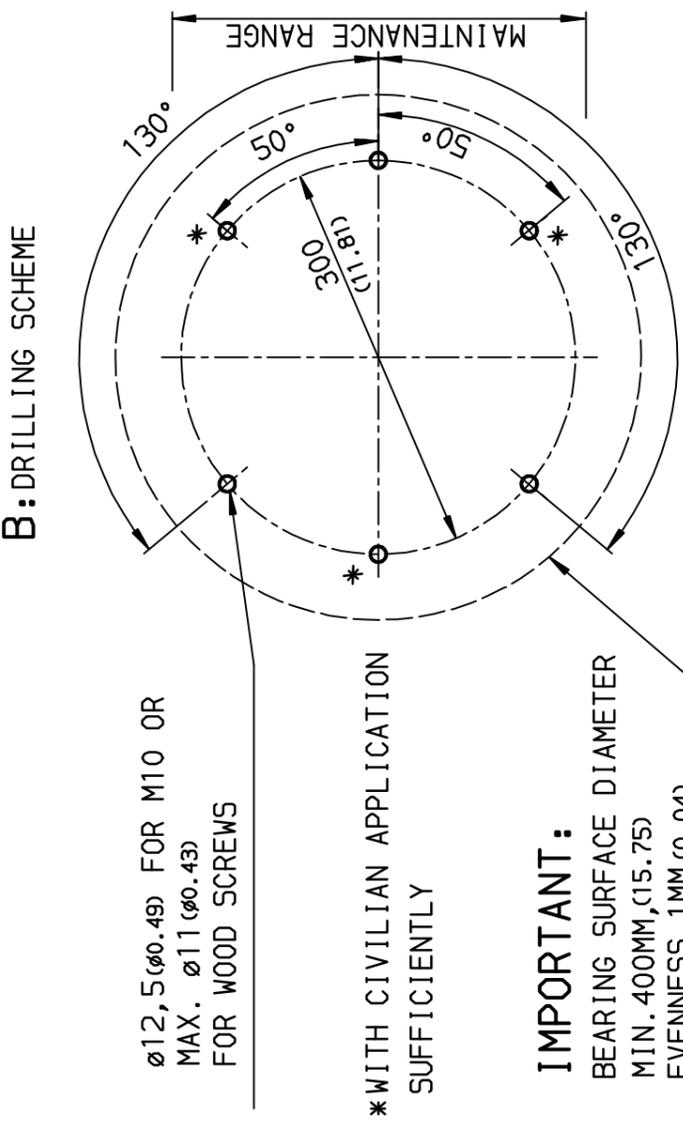
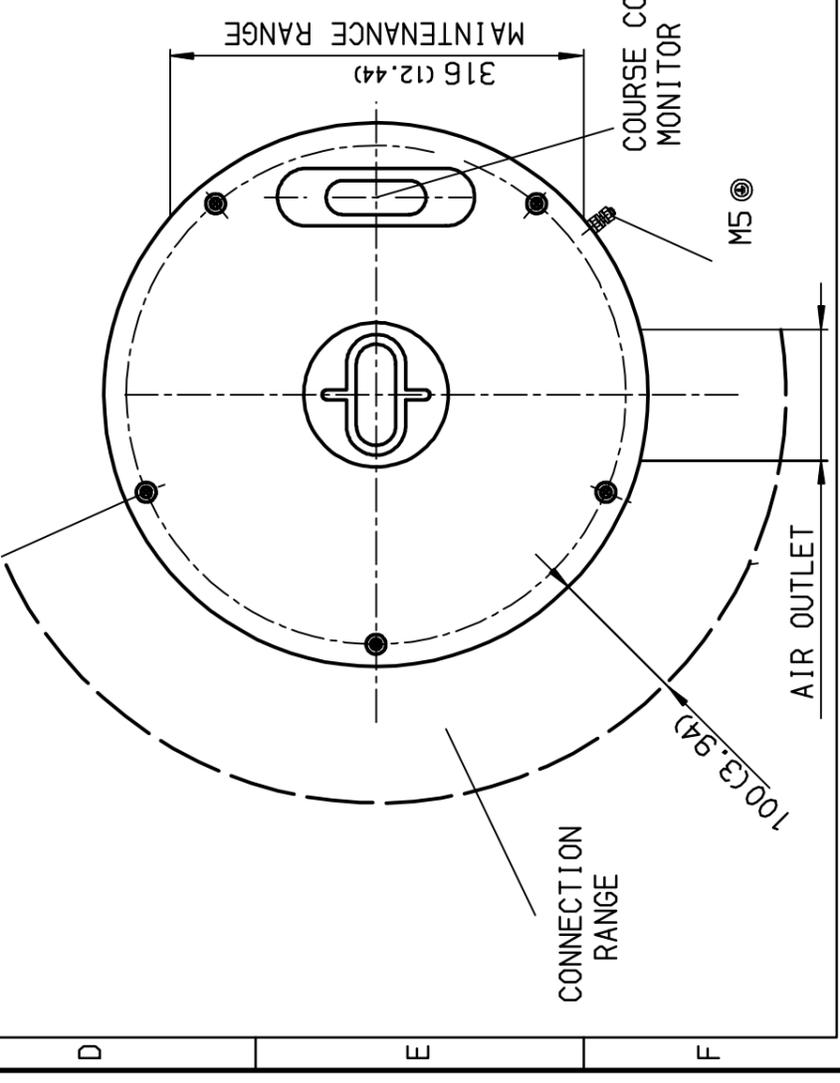
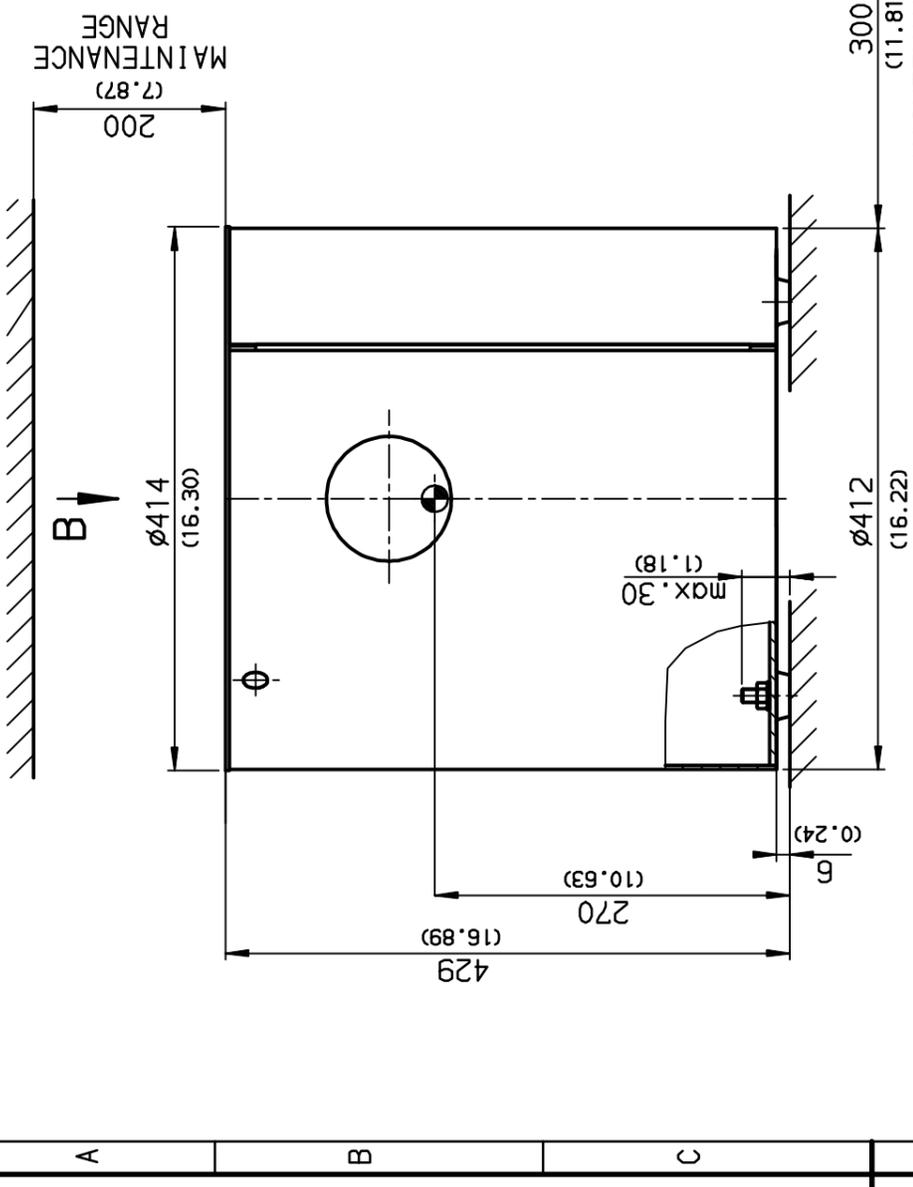


Kompass
STD 22



No..	Designation	Remarks
1	Plug B21	Connection to the ferrite transformer
2	LED H4	Processor clock MC2
3	Jumper B22	Development only
4	Plug B30	Internal CAN bus
5	Stecker B23	Connection to the terminal Strip PCB
6	LED H1	Processor clock MC1
7	Push button B11	Reset function (after flashing of MC1)
8	Plug B18	Connection to flash MC1
9	LED H3	Flashing MC1 (light up when Plug B18 is connected)
10	LED H2	Flashing MC2 (lights up when Plug B8 is connected)
11	Plug B8	Connection to flash MC2
12	Push button B10	Reset function (after flashing of MC2)

E10 110-233.X10
Outer Sphere PCB



Ø12,5(Ø0.49) FOR M10 OR
MAX. Ø11(Ø0.43)
FOR WOOD SCREWS

* WITH CIVILIAN APPLICATION
SUFFICIENTLY

IMPORTANT:
BEARING SURFACE DIAMETER
MIN. 400MM,(15.75)
EVENNESS 1MM(0.04)

STANDARD 22 MUST BE MOUNTED ON A
SOLID BASE, E.G. ON A 6MM ALUMINIUM
OR 30MM WOODEN BASE.
THE COMPASS MUST BE MOUNTED SO
THAT IT IS PERPENDICULAR TO
THE HORIZON(+/- 2MM)

● CENTRE OF GRAVITY
TYPE OF ENCLOSURE: IP 23

DIMENSIONS WITHOUT TOLERANCES ARE MAXIMUM DIMENSIONS
TO THIS SHEET BELONG SHEET 2

DISTANCE FROM MAGNETIC COMPASS STANDARD TYPE: 0,60m		STEERING TYPE: 0,40m		CAD: MEDUSA		Id.Nr. 5014915	
Arbeitspause		SCALE		WEIGHT: 17,5 kg		DRAWING TITLE:	
mm (INCH)		DATE		NAME		GYRO COMPASS	
26.08.08		2003		Zm		KOP	
30.06.06		DR.		Zm		APPR.	
20.12.05		Kop		Kop		14.07.06	
08.03.05		Kop		Kop		14.07.06	
08.11.04		Kop		Kop		A/15.06.03	
03.03.04		Kop		Kop		14.05.06	
26.09.03		Kop		Kop		14.05.06	
14.05.06		Kop		Kop		14.05.06	
REV.		REVISIONS		DATE		NAME	
BL.2		BL.1+2		BL.1+2		BL.1+2	

Raytheon
Anschutz

DIMENSIONAL DRAWING

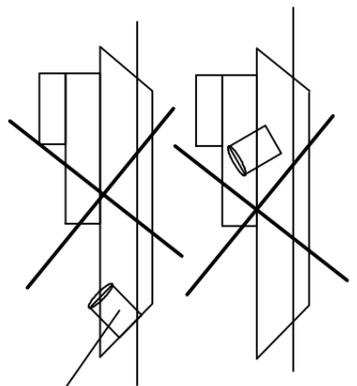
DRAWING NO.:
110-233.HP005

SH. 1
OF 2

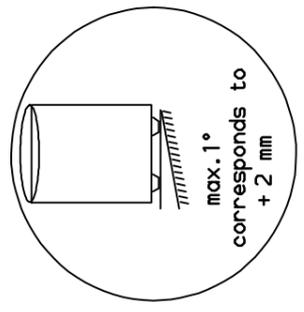
Ers. für

Installation requirements

The Standard 22 gyro compass is approved according IMO regulations. The accuracy of a compass is subject to dynamic influences caused by the ship and environmental conditions. It is recommended to install the compass as close as possible to the roll and pitch axis of the ship to reduce the dynamical influences to the compass.



STD 22
The compass must be mounted so that it is perpendicular to the horizon (+/- 2 mm). This arrangement prevents compass functions from being impaired by the rolling and pitching of the vessel.



Setting the compass zero - reference course (Alignment Error)

The alignment error results from the first installation of the compass or after a replacement of the gyrosphere. An exact evaluation of error and its correction is only possible if the ship is moored. If there is an incorrect heading reference during normal ships operation, the ship has to be moored for a minimum of 5 hours, before a correction can be performed. For the procedure to adjust the alignment error see service manual, section 2.2.1.1

TO THIS SHEET BELONG SHEET 1

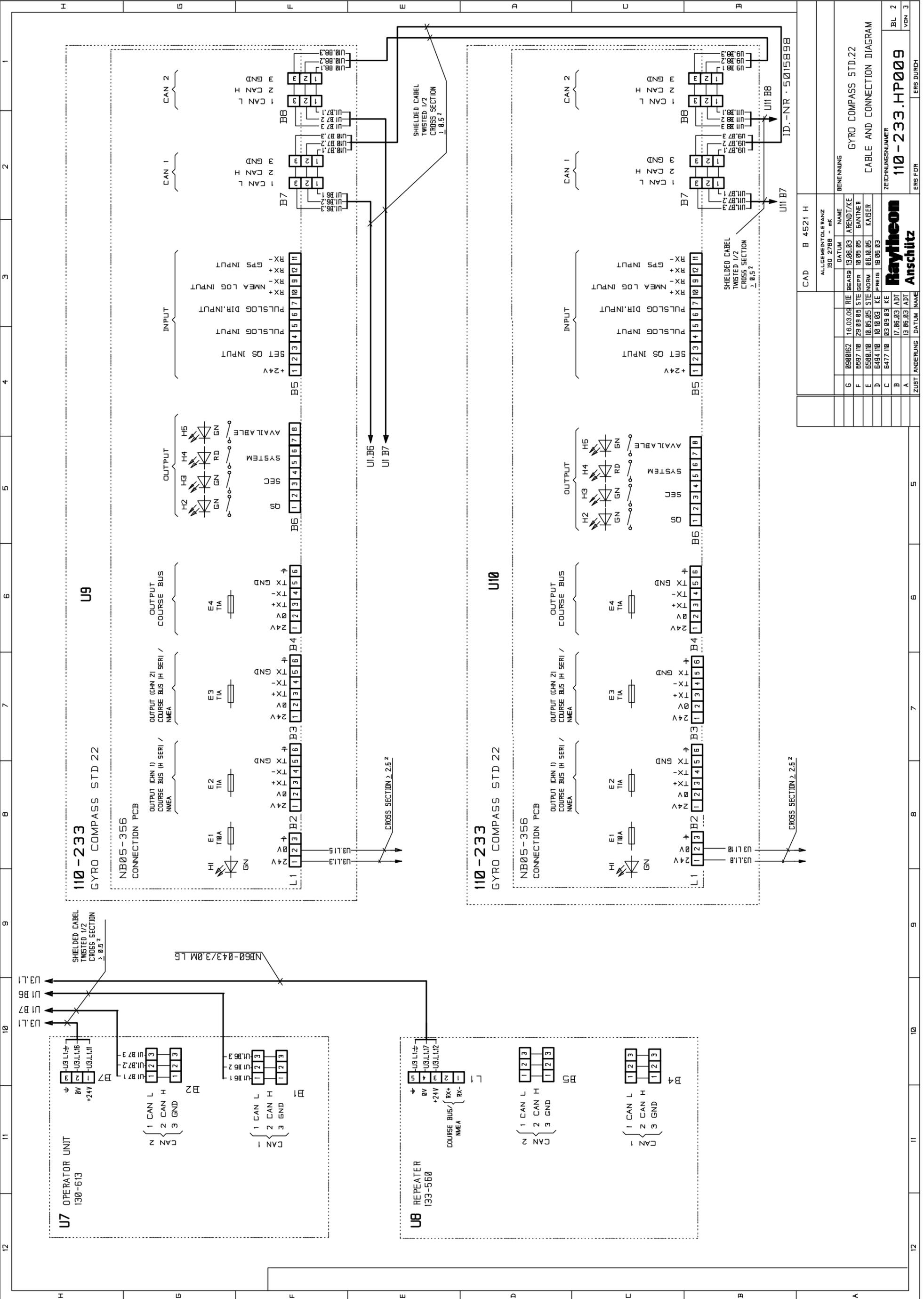
DISTANCE FROM MAGNETIC COMPASS

STANDARD TYPE: STEERING TYPE:
0,60m 0,40m

CAD: MEDUSA

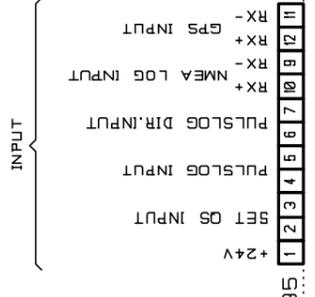
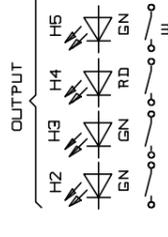
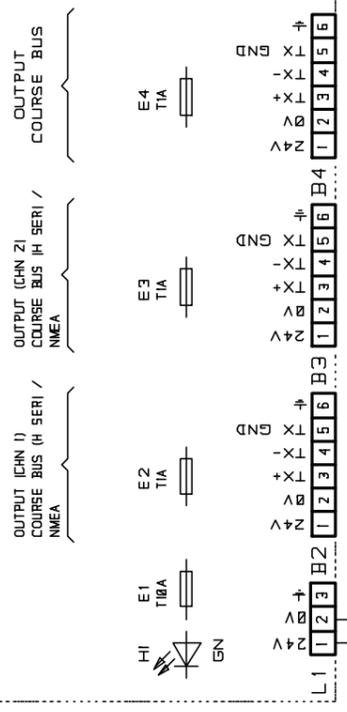
Id.Nr. 5014915

SCALE: -		WEIGHT: 17,5 Kg	
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DRAWING NO.: 110-233.HP005			
SH. 2 OF 2			
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G	0600557	29.06.08	Zm
mm CINCH		DATE	NAME
DR.		29.06.06	Zm
APPR.		14.07.06	Bey
CHK.		14.07.06	Kai
RELEASE:		A/16.06.03	
Raytheon Anschütz			



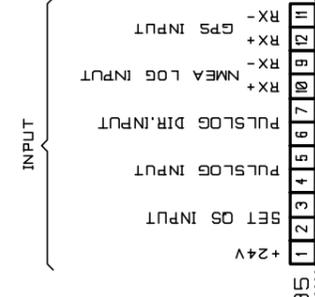
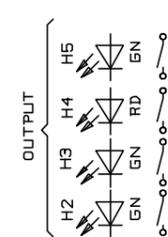
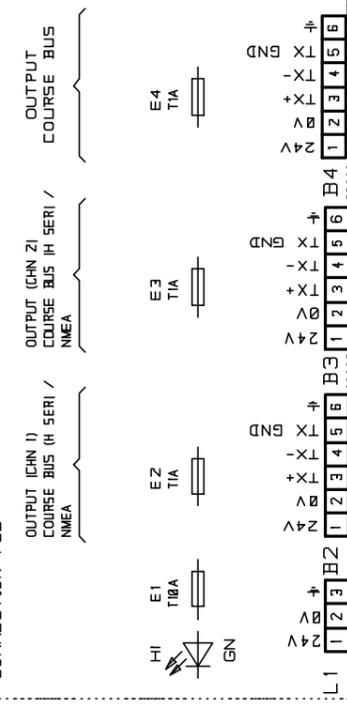
110-233
GYRO COMPASS STD 22

NB05-356
CONNECTION PCB



110-233
GYRO COMPASS STD 22

NB05-356
CONNECTION PCB

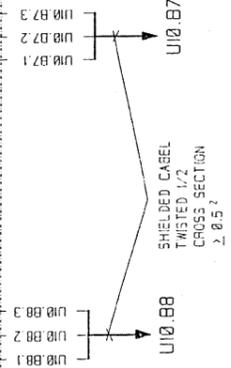
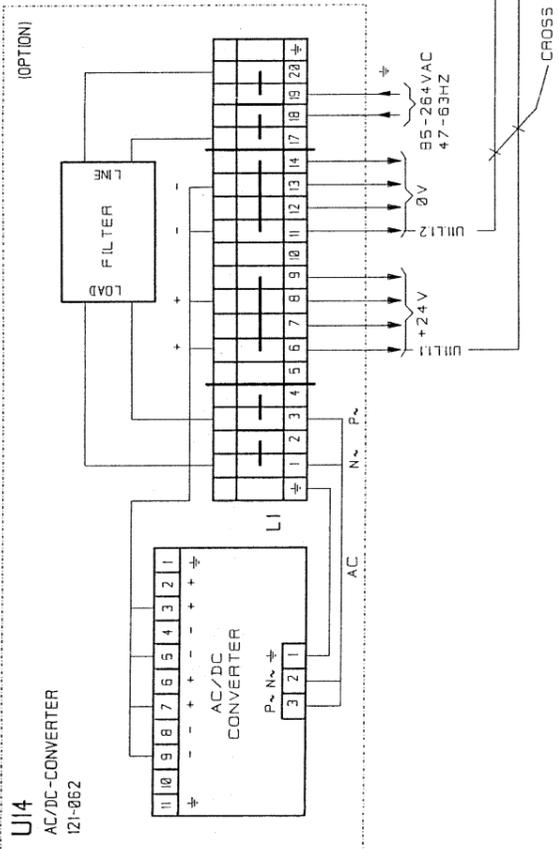
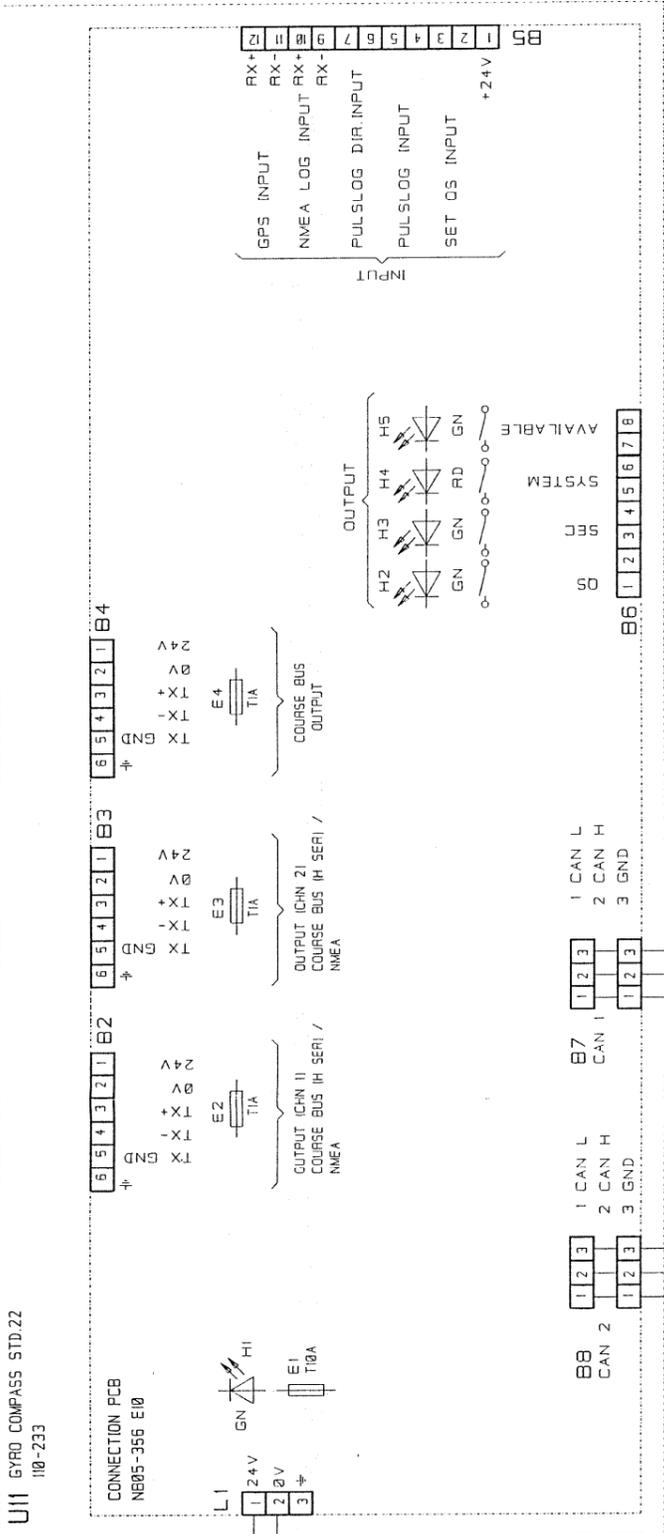


CAD B 4521 H	
ALLEGEMENTOLERANZ RD. 2768 - mk	
BEARBEITUNG	DATUM
G 0500162	16.03.09
F 0597 10	29.09.05
E 0508.10	10.05.05
D 0494 10	10.10.03
C 0477 10	03.09.03
B	17.06.03
A	13.05.03
ZUST.	ÄNDERUNG
	DATUM
	NAME
BENENNUNG	
GYRO COMPASS STD.22	
CABLE AND CONNECTION DIAGRAM	
ZEICHNUNGSNUMMER	
110-233.HP009	
BL 2	ERS DURCH
YDN 3	

Raytheon
Anschutz

ID.-NR. 5015898

U11 GYRO COMPASS STD.22
110-233



ID.-NR.: 5018996

CAD B 4656 A

06.04.2009 vs1

GYRO COMPASS STD.22
CABLE AND CONNECTION DIAGRAM

ZEICHNUNGSNUMMER
110-233.HP029

Raytheon
Raytheon Marine GmbH
Germany

DATUM	NAME
2005	STOFFER
BEARB.	29.09.
GEPR.	29.09.
INDRM	6.10.05
PREIG	6.10.05

BL. 3
VON 3

ERS FÜR
ERS DURCH

BLATT
ZUSTÄNDIGER
DATUM

NAME

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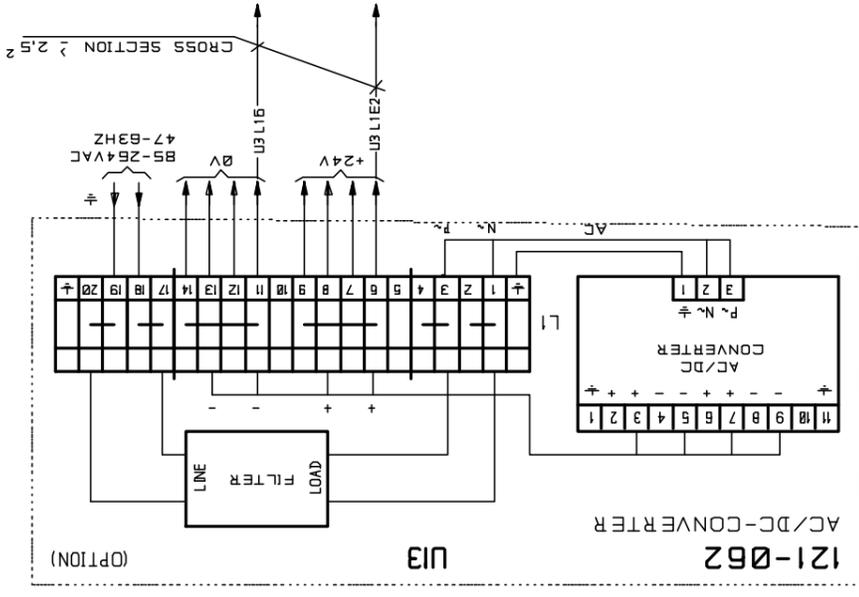
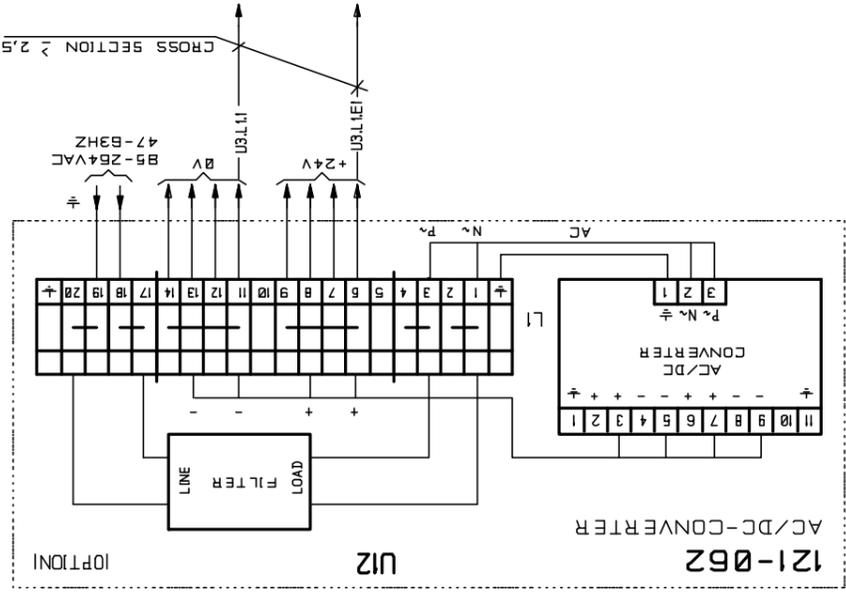
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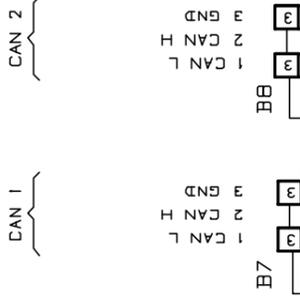
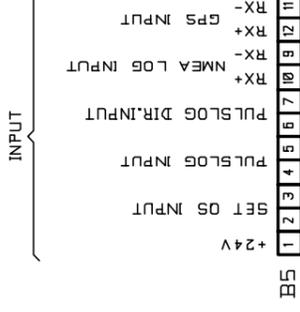
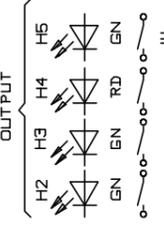
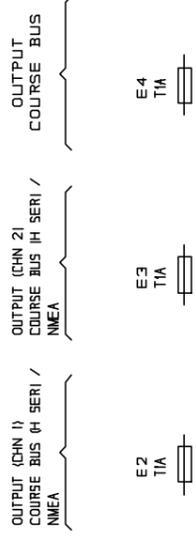
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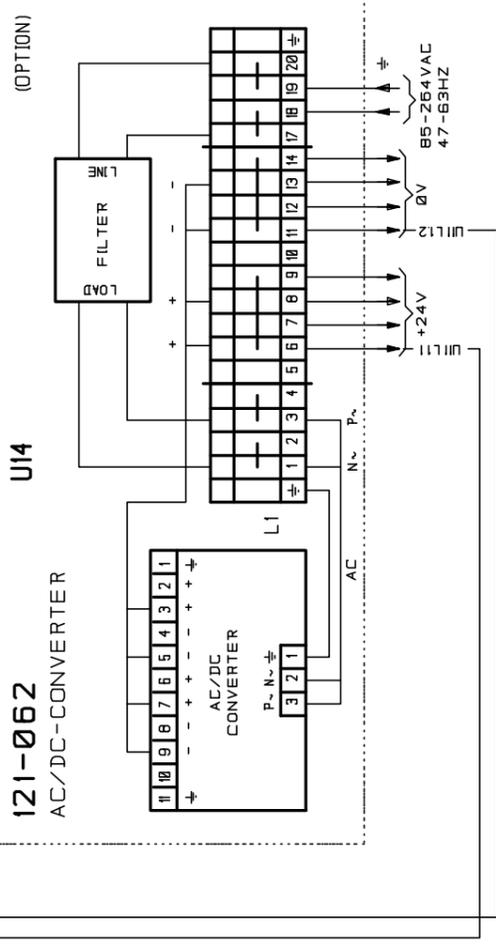
110-233
GYRO COMPASS STD.22

NB05-356
CONNECTION PCB



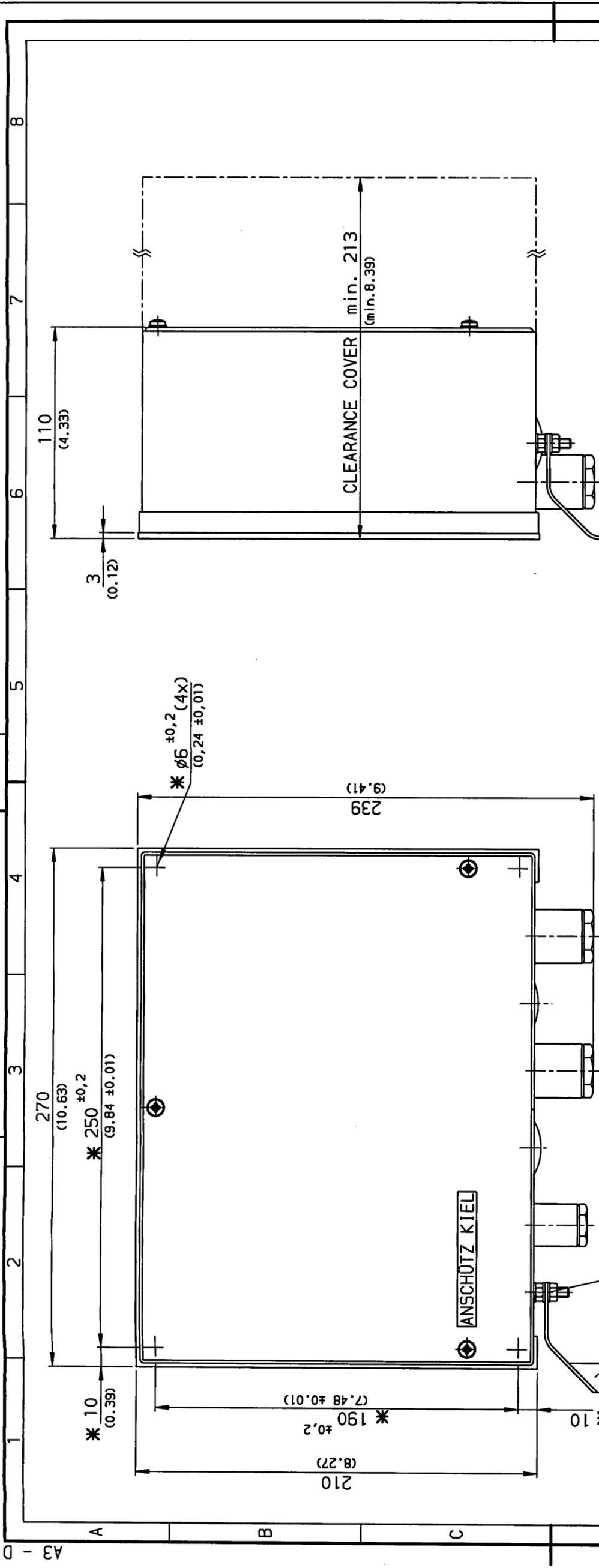
SHIELDED CABEL
TWISTED 1/2
CROSS SECTION
2.05²

CROSS SECTION 2.25²



ID -NR · 5021970

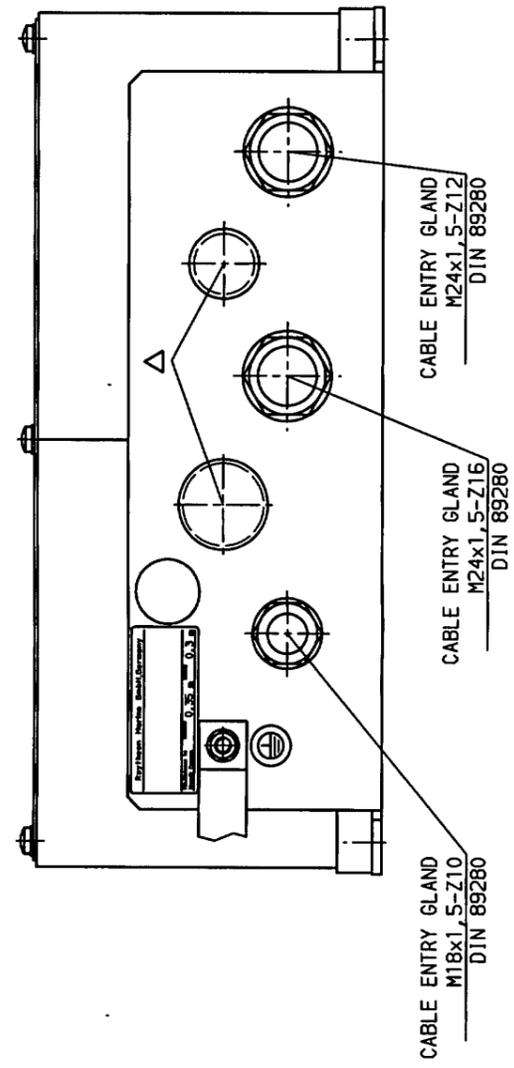
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BEARB	04.03.09	RIENITZ	GYRO COMPASS STD.22		
GEPR	05.03.09	RAMM	CABLE AND CONNECTION DIAGRAM		
NORM	16.03.09	LUDZWIJEK	ZEICHNUNGSNUMMER		
PREB	16.03.09		110-233.HP034		
ZUSTÄNDERUNG		DATUM		NAMEN	
ERS.FOR		ERS.DURCH		BL 3 VDN 3	



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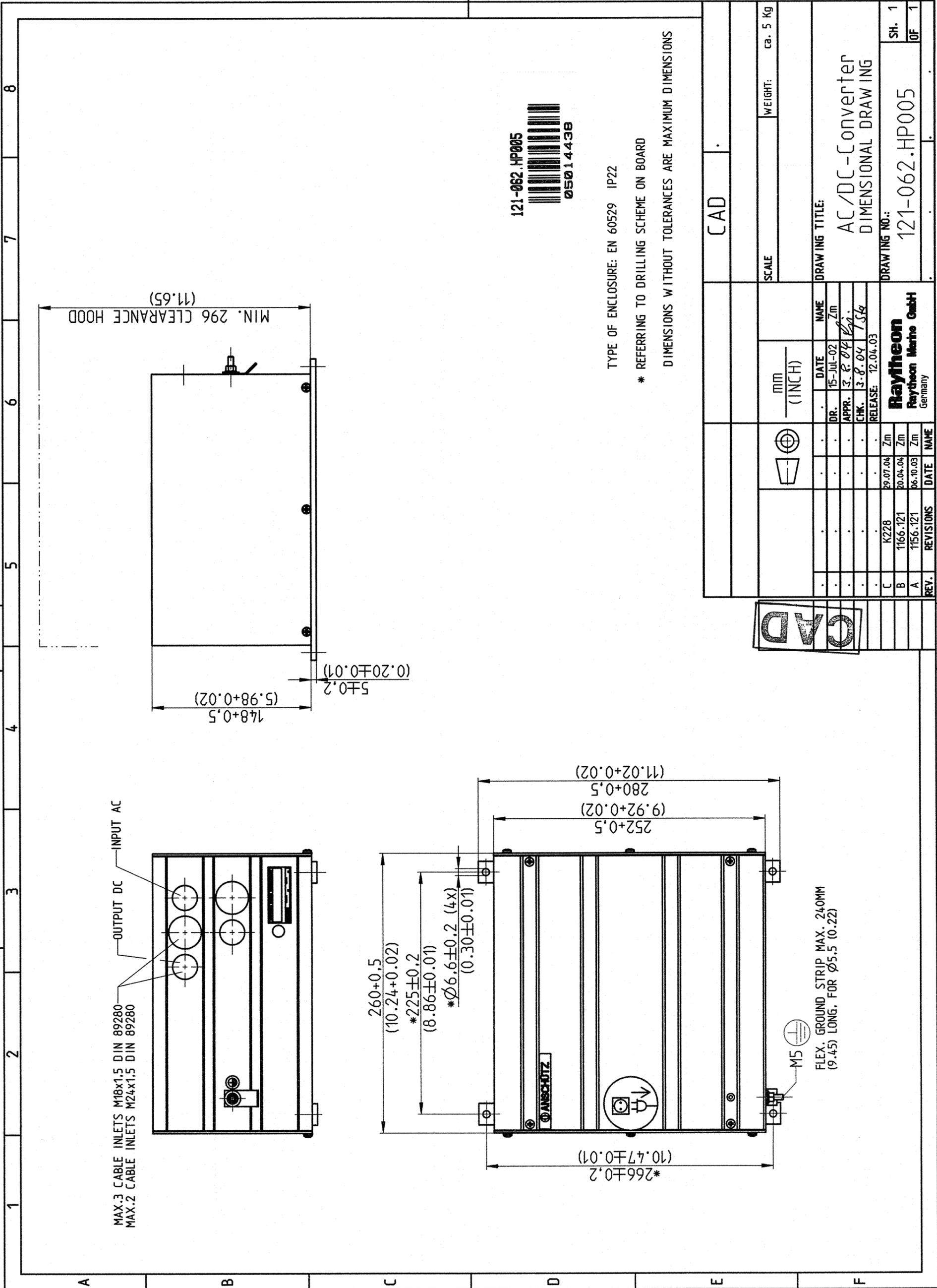
△ AS ACCESSORIES CAN BE COMPLETED
 *REFERRING TO DRILLING SCHEME ON BOARD SHIP
 TYPE OF ENCLOSURE : IP 22 EN 60529
 ALL DIMENSIONS WITHOUT TOLERANCES ARE MAXIMUM DIMENSIONS

DISTANCE FROM MAGNETIC COMPASS STANDARD TYPE : 0,35m		STEERING TYPE : 0,30m		SCALE : -		WEIGHT : ≈2 Kg	
CAD		mm (INCH)		DRAWING TITLE: ADDITIONAL OUTPUT BOX DIMENSIONAL DRAWING		DRAWING NO. : 146-103.HP005	
REV.	REV. NO.	DATE	NAME	DR.	DATE	NAME	SH. 1
C	026.146	26.02.04	Haf	17.9.	17.9.	Haf	OF 1
B	025.146	03.02.04	Haf	APPR.	16.7.04	Haf	
A	024.146	20.11.03	Haf	CHK.	27.2.04	Haf	
RELEASE: 2.10.2003							
Raytheon Raytheon Marine GmbH Germany							



VIEW X

146-103.HP005
 05016409



SCALE		WEIGHT: ca. 5 Kg	
DRAWING TITLE: AC/DC-Converter DIMENSIONAL DRAWING			
DRAWING NO.: 121-062.HP005			
SH. 1		OF 1	

MIN (INCH)	DATE	NAME
⊕	15-Jul-02	Zm
⊕	3.8.04	Zm
⊕	3.8.04	Zm
⊕	12.04.03	Zm

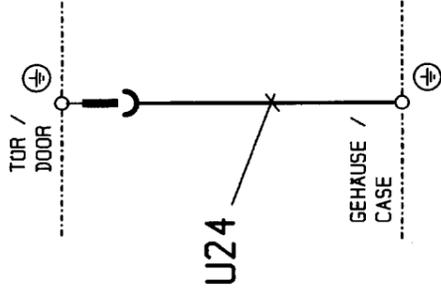
REV.	REVISIONS	DATE	NAME
C	K228	29.07.04	Zm
B	1166.121	20.04.04	Zm
A	1156.121	06.10.03	Zm

Raytheon
 Raytheon Marine GmbH
 Germany

RELEASE: 12.04.03

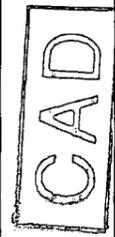
APPR. 3.8.04
 CHK. 3.8.04

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DIN CODE	BENENNUNG DENOMINATION	TYP-/ZEICHNUNGS-NR. TYPE NO./DRAWING NO.	POS.NR. POS.NO.	AUS STOCKLISTE FROM PARTS LIST	GILT FÜR APPLIES TO
U1	SENSOR PCB	110-233.100	6	110-233.NG001	
U2	HOLLKUGEL-PCB / OUTER SPHERE PCB	110-233.101	2	110-233.01	
U3	SPG-VERSORGUNG / POWER SUPPLY	110-233.102	7	110-233.NG001	
U4	HOLLKUGEL / OUTER SPHERE	110-233.20	3	110-233.NG001	
U5	KLEMMENLEISTEN-PCB/TERMINAL STRIP PCB	110-233.15	3	110-233.20	
U6	ANSCHLUSS-PCB / CONNECTION PCB	NB05-356	8	110-233.NG001	
U10	ELEKTR.-OPT. WINKELCODIERER / ELECTR.-OPT. ANGLE CODER	CSA 964096 CF04	5	110-233.01	
U11	SCHRITTMOTOR / STEPPING MOTOR	110-233.47	5	110-233.NG001	
U12	LOFTER / FAN	110-233.00-002	4	110-233.NG001	
U13	PRIMARSPULE / PRIMARY COIL	110-233.02	3	110-233.01	
U14	SEKUNDARSPULE / SECONDARY COIL	110-233.03	4	110-233.01	
U15	HEIZPATRONE / HEATING CARTRIDGE	110-231.22	12	110-233.20	
U16	PUMPE / PUMP	110-231.40	2	110-233.20	
U17	OBERE HOLLKUGEL / UPPER HEMISPHERE	110-233.25	1	110-233.20	
U18	LAGERSCHALE / BEARING BOWL	110-233.37	4	110-233.20	
U21	KABEL / CABLE	NB06-288.11	11	NB06-288	
U22	KABEL / CABLE	NB05-356.11	11	NB05-356	
U23	KABELSTAMM / CABLE LOOM	110-233.28	35	110-233.11	
U24	SCHUTZLEITER / PROTECTIVE CONDUCTOR	110-231.13	25	110-233.07	

BL.2 : A2 - C



CAD B 4511 C M 1:1

ALLGEMEINTOLERANZ
ISO 2768 - mK

2003	DATUM	NAME
BEARB	01.09.	KEMPMANN
GEPR	01.09.	<i>Willy</i>
NORM	1.10	<i>Kawa</i>
FREIG	07.07.03	

BENENNUNG
GYRO COMPASS STD.22
BAUSCHALTPLAN / WIRING DIAGRAM

ZEICHNUNGSNUMMER
110-233.HP008

ERS. DURCH
ERS. FÜR

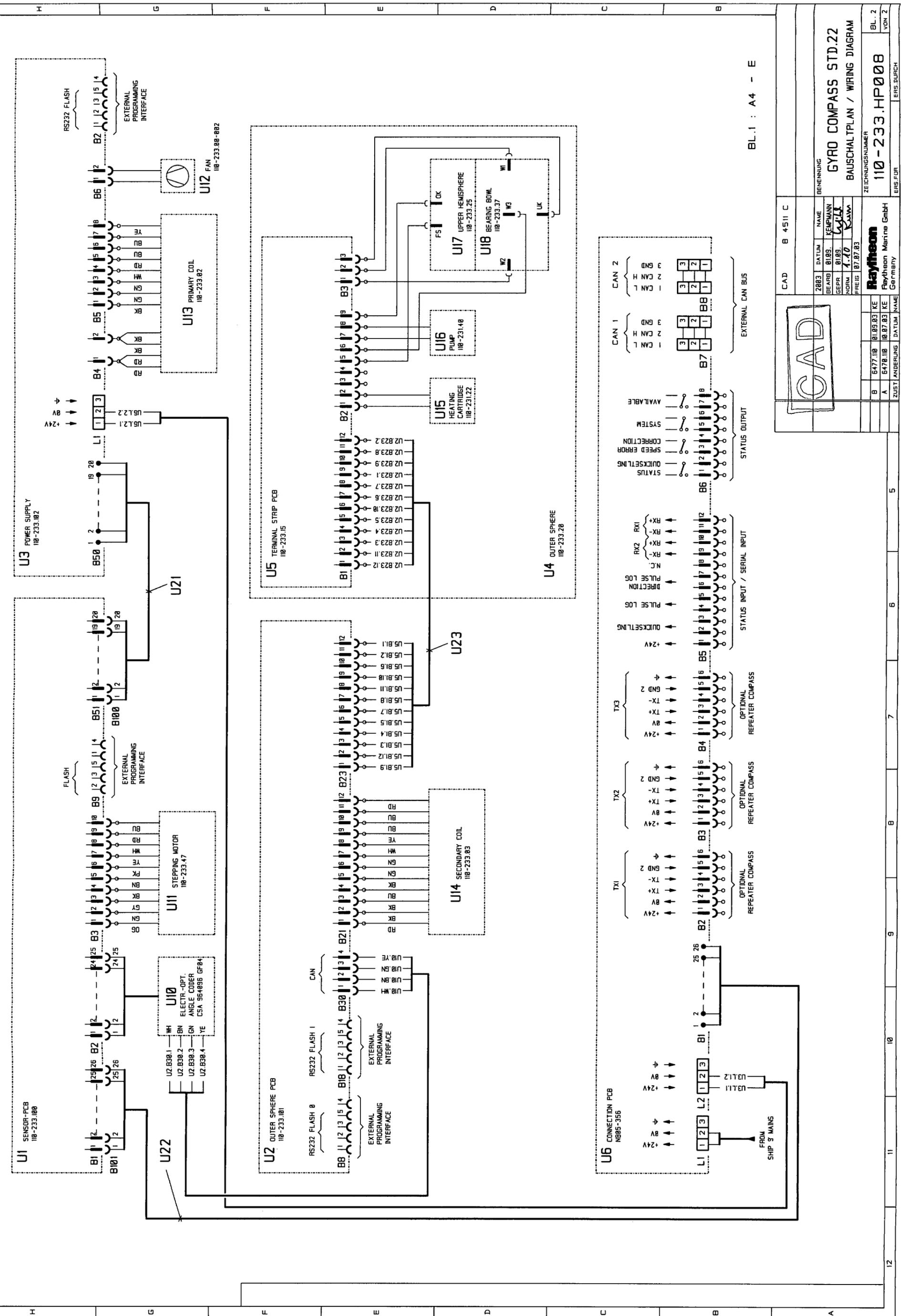
Raytheon
Raytheon Marine GmbH
Germany

ZUST	ANDERUNG	DATUM	NAME
B	6477.110	01.09.03	KE
A	6470.110	10.07.03	KE

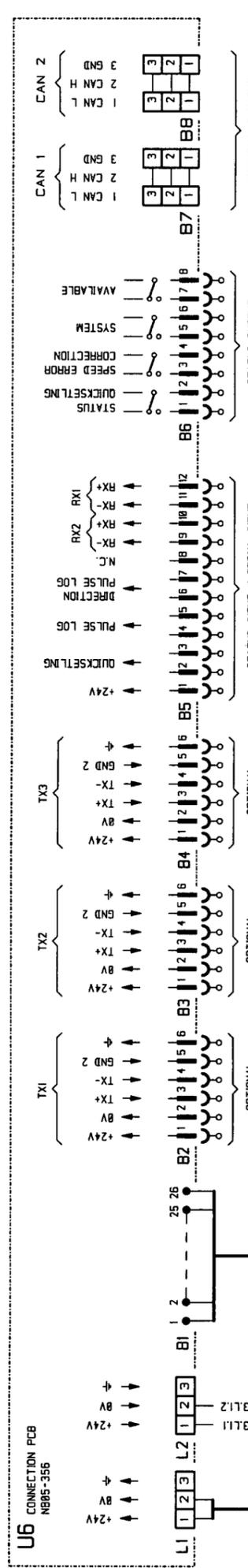
BLATT

2
2

BL. 1
VON 2



BL.1 : A4 - E



BENENNUNG		CAD B 4511 C	
GYRO COMPASS STD.22			
BAUSCHALTPLAN / WIRING DIAGRAM			
ZEICHNUNGSNUMMER		110-233.HP008	
ERS.FÜR		ERS.DURCH	
VON 2		VON 2	

2003		NAME	
BEARBE	01.09.	KELPMANN	
GEPR	01.09.	WILL	
NORM	1.10	RAW	
FRZ	07.07.03		

RAYTHEON		DATEI NAME	
Raytheon Marine GmbH		B 6477.10	
Germany		01.09.03	
		KE	
		A 6470.10	
		07.07.03	
		KE	
		ZUSTÄNDIG	
		ANDERUNG	
		DATEI NAME	

CAD		DATEI NAME	
B 4511 C		B 6477.10	
		01.09.03	
		KE	
		A 6470.10	
		07.07.03	
		KE	
		ZUSTÄNDIG	
		ANDERUNG	
		DATEI NAME	

