Raytheon Anschütz

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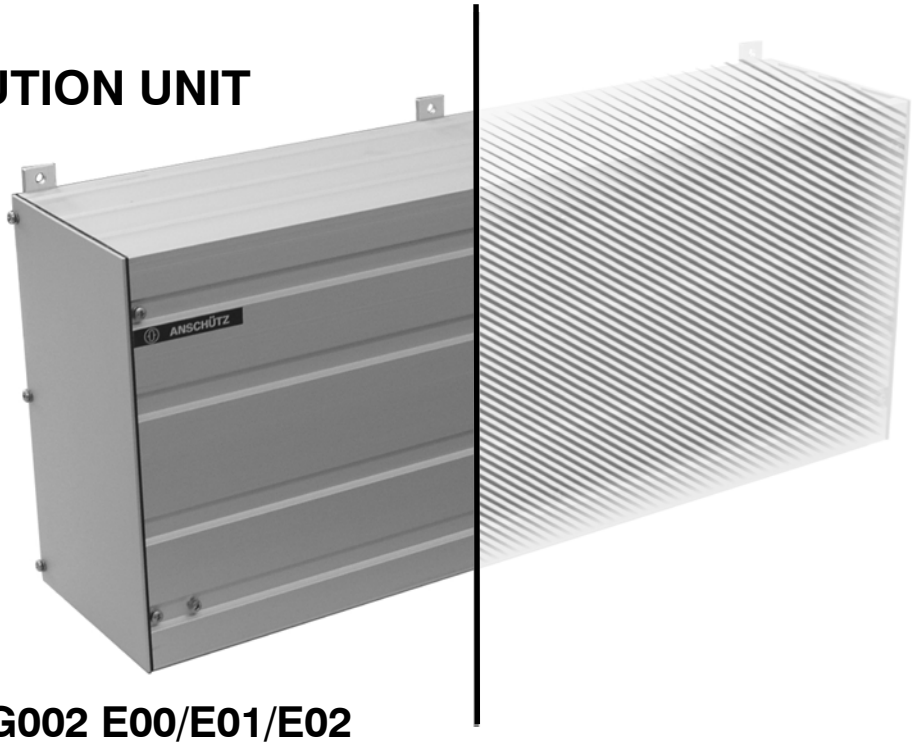
DISTRIBUTION UNIT



Type 138-118 NG002 E00/E01/E02

3970.DOC010302 Edition: December 2015

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Safety instructions / general hints

Installation, maintenance and repair work must be carried out only by properly trained and qualified staff with a good knowledge of national equipment safety regulations.

Due to the introduction of a new Performance Standard "MSC.302(87) Performance standard for Bridge Alert Management" and revised Test Standards "ISO 8728:2014 Ships and marine technology - Marine gyro-compasses" respectively ISO 16328:2014 Ships and marine technology - Gyro-compasses for high-speed craft" the alert handling and presentation of the Standard 22 gyro compass has been extended.

The above mentioned standards require a new alert philosophy called "Bridge Alert Management". The Standard 22 gyro compass is compliant to such standards in combination with Operator Unit Gyro, type 130-626.NG00x. Please refer to the manuals of Operator Unit Gyro, type 130-626.NG00x for any details about the alert handling and presentation. For new installations it is recommended to make use of the new alert management.

The DV-Bus of the Distribution Unit cannot be used any more if the gyro compass system is operated with the Operator Unit Gyro, type 130-626.NG00x.

If the system requires DV-Bus, the following is required:

- Operator Unit Gyro, type 130-613.NG00x
- Distribution Units up to development status 138-118.NG002 E01 respectively 138-118.NG003 E01
- Standard 22 up to development status 110-233.NG002 E01

Important:
Alert outputs must be connected to a central alert panel.

Alert Panels must have an acoustical and optical alert indication.

If more than one Distribution Unit is applied in a compass system, than each Distribution Unit must be configured in the same way with the same configuration.

After configuration changes the Distribution Unit and the Operator Unit must be reset, see section 5.
Changes must be made for all Distribution Units and Operator Units in a compass system.

Please note:
The cable length between devices which are connected via a RS 232 interface should not be longer then 10 m.

Otherwise a proper data transmission is not assured.

1 General

The Distribution Unit 138-118 NG002 consists of an aluminium casting in which 2 printed circuit board are integrated.

- I/O-PCB (NB06-332)
- Interface PCB (NB06-333).

At the bottom of the casting there are cable inlets for connecting repeaters, gyros and other heading receivers and sensors.

The task of this Distribution Unit is:

- Distribution of heading information to all connected heading receivers.
- System monitoring by alert-and status messages.
- Gateway between DV-Bus* and CAN-Bus*.
- Power supply of heading receivers (max. 9 repeater), Gyro compasses (STD 22) and Operator Unit.
- Storing of values for variation and deviation for the magnetic compass.
- Heading and rudder position for a connected printer.
- Generating a NMEA TIROT sentence (according to IMO) from the RoT data of the Gyro Compass Standard 22.
- Processing of the Raytheon Anschuetz magnetic probe.

There are no operating procedures during the normal operation of the Distribution Unit. Only the setting to work-procedure needs some settings performed by DIP-Switches at the CAN Network Modul Interface PCB.

Options are:

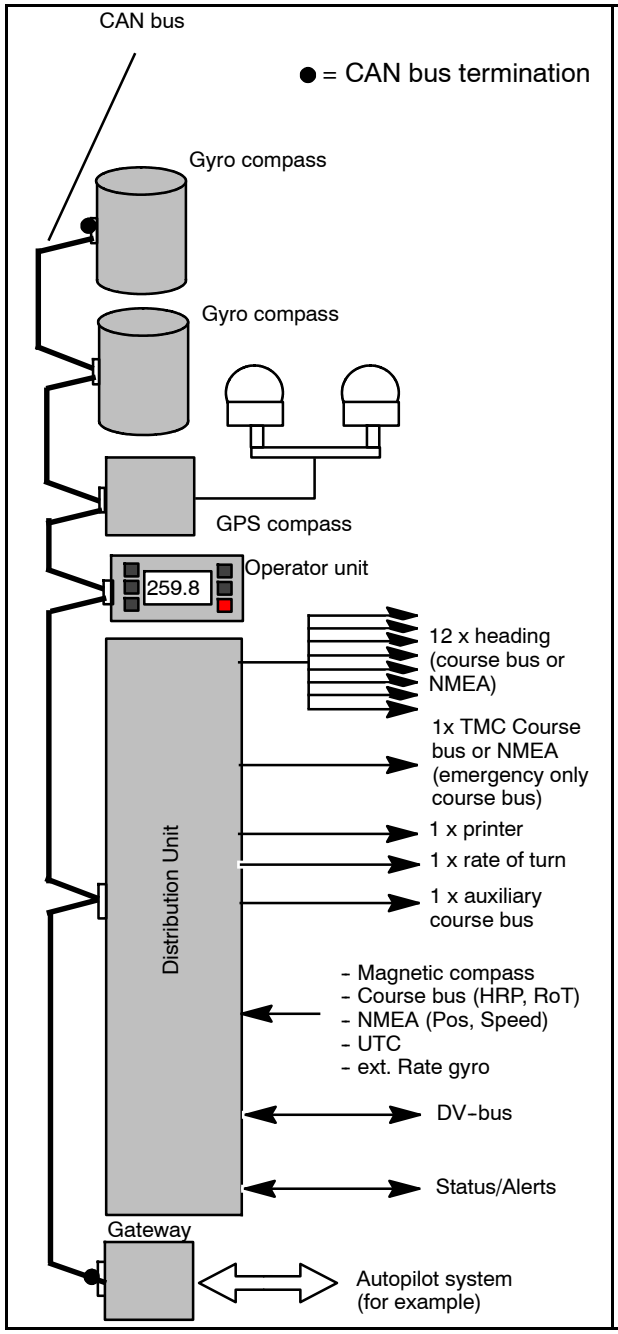
“Additional output box” for additional output signals (step signals).

“AC/DC-Converter” to generate the supply voltage for the Distribution Unit.

* Raytheon Anschütz specific

1.1 Principle of CAN-Bus

(CAN = Controller Area Network)



The CAN bus is a Multi-Master-Bus allowing the connection of all devices and systems regardless of their task and function. This means that any number of devices can be connected. These devices must be designed for CAN bus technology.
For the CAN bus it is essential that every bus user is addressable via a unique address. This address is set within each bus user.
The usable address range is from $01_{(16)}$ to $3F_{(16)}$ (address $00_{(16)}$ is reserved for development purposes).
Each bus user can send and receive data via the CAN bus.

The CAN bus must be terminated at both ends via an ohmic resistor (125 Ohms) only. This terminating resistor is activated by a jumper or a switch on the respective PCB.

There are 2 redundant bus systems (CAN1 and CAN2).

Note:
The total length of CAN bus cable should not exceed 400 m.

Fig.1: Principle of CAN bus

1.2 Principle of supply voltage distribution

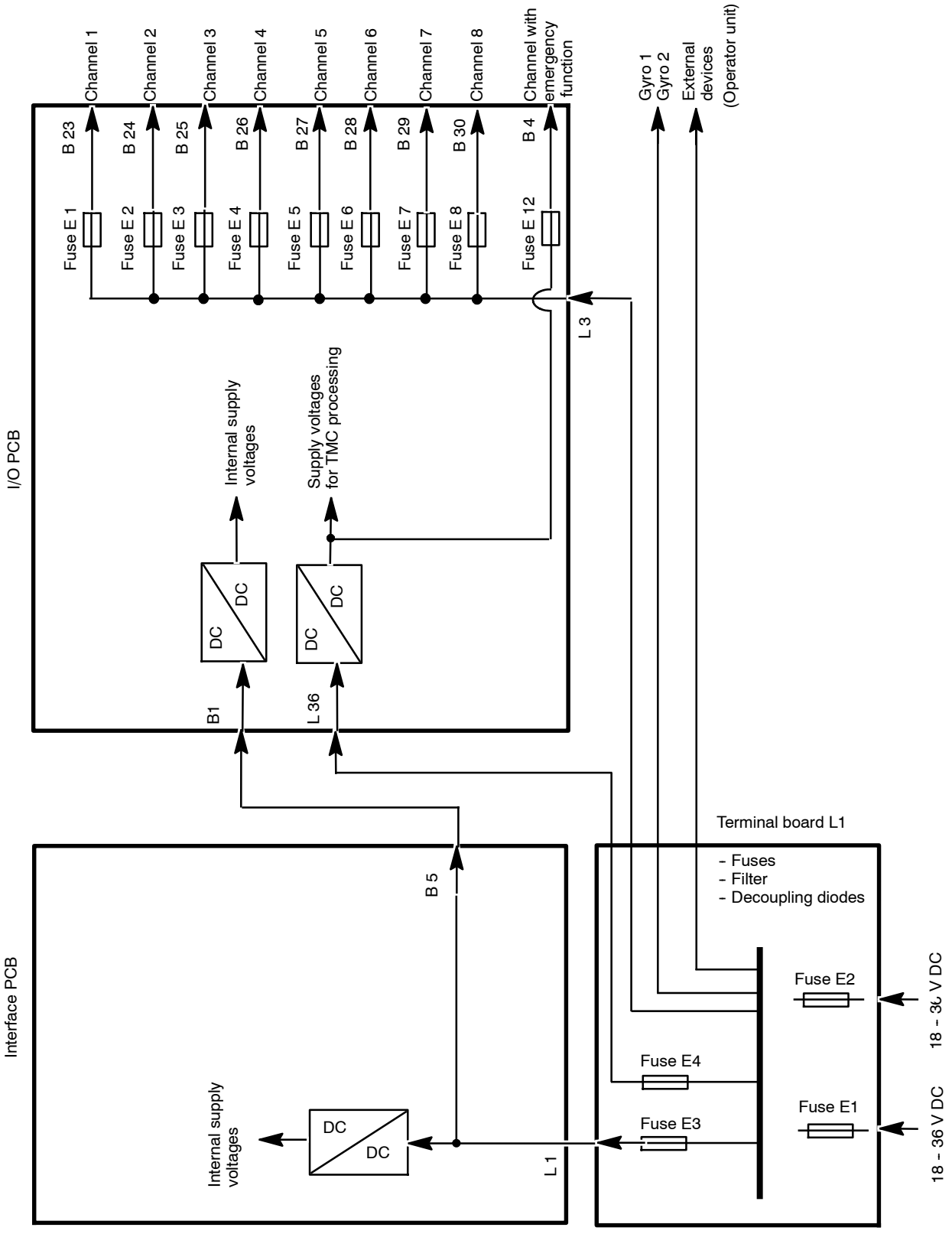


Fig.2: Principle of supply voltage distribution

The supply voltage of 24 V DC (18 to 36 V DC) is designed in that manner, that connected Gyro compasses, connected external devices (such as Operator Unit(s)), Magnetic sonde, heading receivers and the Distribution Unit itself are supplied without an influence to one another by decpoupling diodes.

The complete compass system is mainly protected by 2 fuses (10 A each). These fuses are placed on the Terminal board L 1.
Additional electronic components on this terminal board serve for a redundant supplying of a maximum of two connected Gyro compasses.

The generation of the internal supply voltages is performed with DC/DC converters.

The supply voltages (24 V DC) for all connected heading receivers (with supply voltage) are separately protected and picked off via a free installed cable from the Terminal board L 1 to terminal L 36 at the I/O PCB and are protected by a separate fuses.

The electronic for the signal processing of the Magnetic sonde including repeater (emergency repeater) is also protected by a separate fuse (Fuse E4).

Please note:
Some flag states respectively classification societies do not require an optical bypass for the magnetic compass. However, it needs to be ensured that the magnetic heading can be indicated at the steering repeater - also in case of failures of the gyro compass system.

For this purpose the Distribution Unit 138-118 NG002 is equipped with an independent path for the magnetic heading.
A redundancy in power supply for the Distribution Unit is obligatory for this application.

1.3 Principle of signal/data processing

Data source	Data type	Output	Data type
Rate of Turn Indicator	NMEA	Distribution Unit Rate of Turn	NMEA
Gyro compass 1	CAN Bus Course bus NMEA data	Repeater, Operator unit, Printer, Rate gyro	Selectable
Gyro compass 2	CAN Bus Course bus NMEA data	Repeater, Operator unit, Printer, Rate gyro	Selectable
Gyro Compass 3 or GPS Compass	CAN Bus Course bus NMEA data	Repeater, Operator unit, Printer, Rate gyro	Selectable
Pulse Log	Pulses	Speed Error Correction (SEC) CAN Bus	CAN Bus DV bus
Speed Log	NMEA data	Speed Error Correction (SEC) CAN Bus	CAN Bus DV bus
Log Direction	Contact (Pulse)	Speed Error Correction (SEC) CAN Bus	CAN Bus DV bus
CAN Bus*	CAN Bus RAN specific	Operator unit	CAN Bus RAN specific
DV Bus	Serial data (RS 485)	DV Bus ECDIS Nautoconning	Serial data (RS 485)
Course bus*	RAN specific. Gyro-internal generated	Repeater Autopilot Transducer	Serial data (RS 422)
Magnetic sonde	Channel with emergency function. Course bus with heading corrected	If the Distribution Unit fails, an uncorrected heading from the Magnetic sonde is output via plug B 4.	
Follow-Up Amplifier of an Autopilot system (via Gateway)	CAN Bus	Actual rudder position (rudder 1 and/or 2)	Printer data

*RAYTHEON Anschütz specific

1.4 Principles of alert/status processing

Alert/Status	Plug	Remarks
System Alert	B 11	There are two separate alert outputs for System Alert available. This alert occurs if the CAN bus is defect or if one of the PCB is defect. It is strongly recommended to connect the System Alert to a central alert panel.
Sensor Alert G1	B 12	This alert occurs if the connected compass Gyro 1 is faulty (there is no heading output). The compass will generate an alert also, if its status is in the heating stage or in the settling stage (see respective manual). The reason of alert is displayed at a connected Operator Unit.
Sensor Alert G2	B 13	This alert occurs if the connected compass Gyro 2 is faulty (there is no heading output). The compass will generate an alert also, if its status is in the heating stage or in the settling stage (see respective manual). The reason of alert is displayed at a connected Operator Unit.
Sensor Alert G3(GPS)	B 14	This alert occurs if the connected compass Gyro 3 or a connected GPS compass is faulty (there is no heading output). The Gyro compass will generate an alert also, if its status is in the heating stage or in the settling stage (see respective manual). The reason of alert is displayed at a connected Operator Unit.
Gyro selected	B 19	This status signal is output when a Gyro compass (G1-G3) is selected as the main heading source at the Operator unit.
Monitor Alert Gyro/TMC	B 16	This alert occurs if there is a heading difference between the selected heading source and the heading from a Magnetic compass.
Sensor Difference Alert	B 17	This alert occurs if there is a heading difference between connected Gyro compasses (G1-G3).
TMC selected	B 18	This status signal is output when the Magnetic compass is selected as the main heading source at the Operator unit.

Sensor Alert TMC	B 15	This alert occurs if the connected Magnetic sonde is defect or the TMC processing electronic of the Distribution Unit is defect. The reason of alert is displayed at a connected Operator Unit.
GPS Gyro selected	B 20	This status signal is output when a GPS compass (G3) is selected as the main heading source at the Operator unit.
CAN Bus disturbed	B 21	This status signal is output if the CAN Bus of the Distribution unit is disturbed or has failed (in the meaning of “both CAN buses are failed or disturbed”).
GENERAL ALERT RESET	B22	To connect a central alert unit for example (acknowledgement of all present alerts).
Course bus input	B35	(No Status- /no alert function) Serves to input Course bus. (Must NOT used in the Distribution Unit).
Sensor 1* selected	B50	Status signal. It shows “this the heading sensor is selected”. *The sequence is influenced by a fault of one or more sensors, see manual Operator Unit.
Sensor 2* selected	B51	
Sensor 3* selected	B52	
Sensor 4 selected/ Watch Alarm Reset (reset of dormant period)	B53	For magnetic compass only. Status signal - it shows that the magnetic compass is selected. Changeable by configuration (DIP-Switch B45/1) into a watch alert reset. This reset can be performed by an external connected device.
		Alerts must be connected to a central alert panel.

1.5 Technical Data

1.5.1 Mechanical Data

see Dimensional Drawing “Distribution Unit 138-118.HP005”

Equipment category:	IP22

1.5.2 Electrical Data

Supply Voltage:	18VDC.....36VDC (galvanically isolated)
Power consumption:	380W (with 2 Gyros 140W each 8 Repeaters 7W each and one Operator Unit 6W)

Microcontroller types:

Interface PCB	Fujitsu MB 91 F 467 BA
I/O PCB microcontroller for magnetic sonde processing	Fujitsu MB 91 F 464 A
I/O PCB microcontroller for I/O processing	Fujitsu MB 91 F 467 D

<u>Input:</u>

- NMEA GPS Pos
- CAN Bus
- DV Bus
- Course bus
- Pulse log direction
- NMEA Log
- TM sonde
- Pulselog
- NMEA (TIROT) - Rate of Turn Indicator
- Status signals (see section1.4)

Output:

- 8 Outputs (heading source adjustable, with supply voltage 24V DC)
- 1 Output - Course bus only (TMC with separate voltage supply)
- 4 Outputs (heading source adjustable, without supply voltage)
- Heading serial (Course bus)

- RoT +/-10V analog (polarity adjustable)
- Heading analog +/-10V
- Course and rudder position Printer Interface RS 232C*
- DV-bus
- CAN bus
- NMEA TIROT (if from a RoT indicator - if connected)
  otherwise
  a NMEA TIROT generated by the Distribution Unit (based on Gyro compass data)
  or
  a NMEA HEROT from a Gyro compass
  or
  a GPROT from a GPS compass
  is output (see also section 4.2.1.6).
- Status signals (see section1.4)

Optional with an “Additional Output Box 146-103
Fast NMEA, SIF, STEP

Relay outputs for status and alerts: max. load: 30 V DC / 1 A

* only in combination with a special gateway and only for a Raytheon Anschuetz specified printer

1.6 Information about LED's, push buttons, switches, plugs, fuses and connectors of the integrated PCB's

1.6.1 Terminal Board L1

The Terminal Board L1 is situated on the left side of the Interface PCB it serves mainly for supply voltage input, distribution and protection.

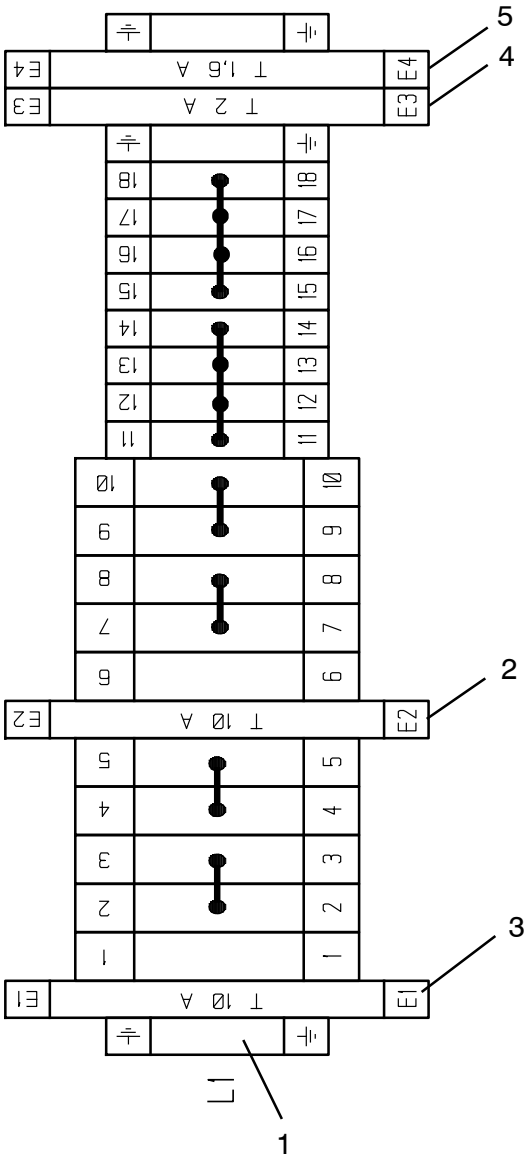


Fig.3: Terminal board L1

No.	Designation	Remark
Fig.3/1	Terminal board L1	Connection for the supply voltage for the Distribution Unit itself, for the connected compasses, the Operator Unit, the heading receivers and TMC processing
Fig.3/2	Fuse E1	10 A, T; 24V DC-Input Gyro 1
Fig.3/3	Fuse E2	10 A, T; 24V DC-Input Gyro 2
Fig.3/4	Fuse E3	2 A, T; Supply voltage Distribution Unit electronic
Fig.3/5	Fuse E4	1,6 A, T; Supply voltage TMC processing

1.6.2 Interface PCB (NB06-333)

The Interface PCB serves mainly for sensor signal inputs, DV-Bus connection, CAN-Bus connection and configuration of the Distribution Unit.

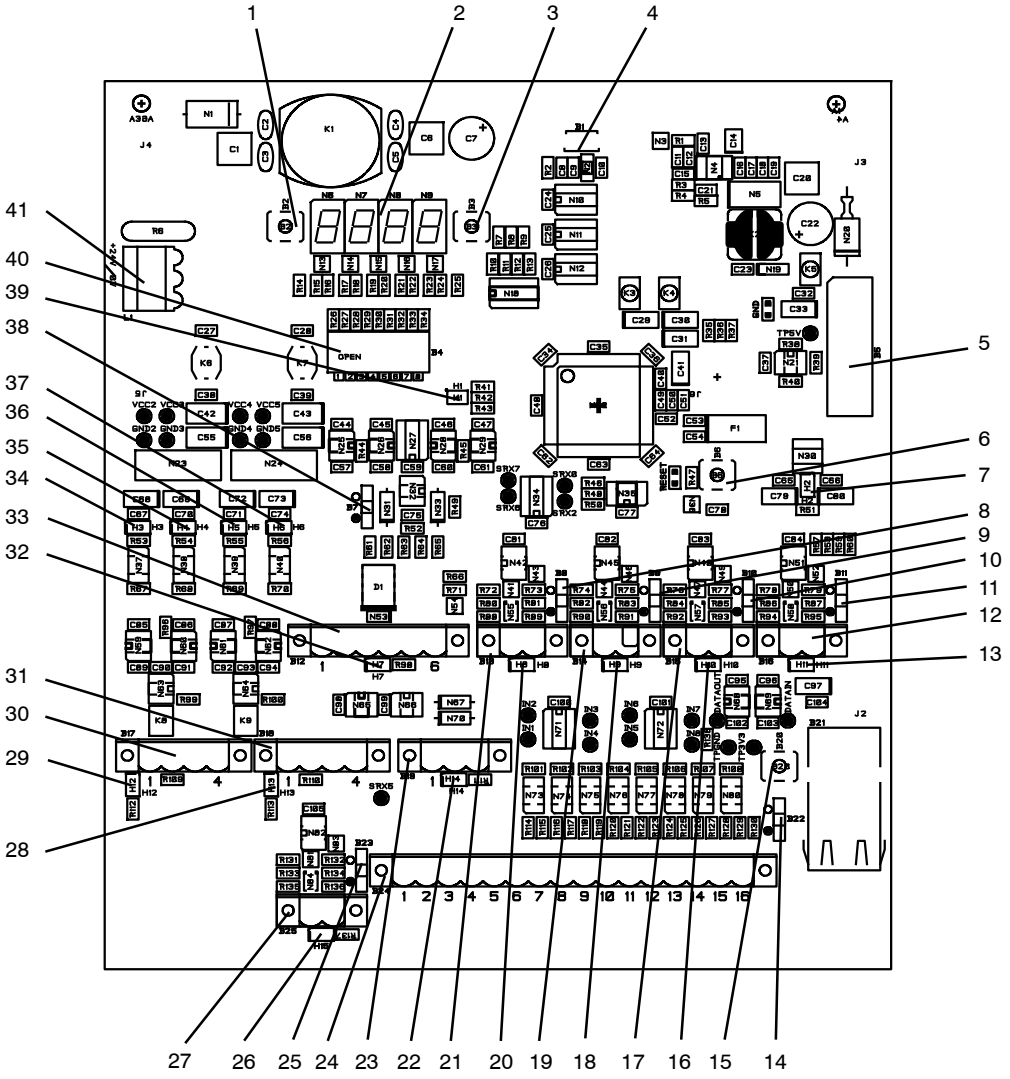


Fig.4: Interface PCB (NB06-333)

No.	Designation at the Interface PCB	Remark
Fig.4/1	Push button B2	To configure and to adjust the Distribution Unit (together with the display and Push button B3)
Fig.4/2	Display	Shows adjustments, configurations and heading
Fig.4/3	Push button B3	To configure and to adjust the Distribution Unit (together with the display and Push button B2)
Fig.4/4	Plug B1	To flash software into the microcontroller
Fig.4/5	Plug B5	Connection to I/O PCB
Fig.4/6	Push button B6	Reset microcontroller
Fig.4/7	LED H2 (green)	Future purpose
Fig.4/8	Switch B8	To terminate interface (NMEA at plug B13)*
Fig.4/9	Switch B9	To terminate data bus (GPS at plug B14)*
Fig.4/10	Switch B10	Not used
Fig.4/11	Switch B11	To terminate NMEA (TIROT) interface (at plug B16)*
Fig.4/12	Plug B16	To connect NMEA (TIROT) sensor at plug B16.
Fig.4/13	LED H11 (green)	Flashes according to data transmission at plug B16.
Fig.4/14	Switch B22	Not used
Fig.4/15	Push button B20	Not used
Fig.4/16	LED H10	Not used
Fig.4/17	Plug B15	Not used
Fig.4/18	LED H9 (green)	Flashes according to data transmission at plug B14 (GPS Pos).
Fig.4/19	Plug B14	To connect GPS data (Pos and UTC)
Fig.4/20	LED H8	Flashes according to data transmission at plug B13.
Fig.4/21	Plug B13	To connect NMEA data (speed)

* Switch has to be switched into the down position (closed) if there is a disturbed data transmission.
Voltage controlled interfaces are normally not terminated.
Current controlled interfaces should be terminated.

No.	Designation at the Interface PCB	Remark
Fig.4/22	LED H14 (green)	Lights up on Course bus output at plug B19.
Fig.4/23	Plug B19	Connection Course bus output
Fig.4/24	Plug B24	Connection of: - Pulse log input - Pulse log direction input - Status of second Distribution Unit "Switch Over" - Alert reset input (extern)
Fig.4/25	Switch B23	Not used
Fig.4/26	LED H15	Not used
Fig.4/27	Plug B25	Not used
Fig.4/28	LED H13 (green)	CAN1 bus data
Fig.4/29	LED H12 (green)	CAN2 bus data
Fig.4/30	Plug B17	Connection CAN2 bus
Fig.4/31	Plug B18	Connection CAN1 bus
Fig.4/32	LED H7 (green)	DV bus data
Fig.4/33	Plug B12	Connection DV bus
Fig.4/34	LED H3 (green)	+ 5V DC for CAN2 bus available
Fig.4/35	LED H4 (green)	+ 5V DC for CAN1 bus available
Fig.4/36	LED H5 (green)	+ 5V DC for Course bus available
Fig.4/37	LED H6 (green)	+ 5V DC for DV bus available
Fig.4/38	Switch B7	To terminate DV bus
Fig.4/39	LED H1 (green)	Status indication of the microcontroller: green 1/second = running green 3/second = Distribution Unit is inactive (only with a second Distribution Unit application) does not light up = defect
Fig.4/40	DIP-Switch B4	Switches to configure the Distribution Unit
Fig.4/41	Terminal board L1	To connect supply voltage (+ 24V DC) to the Distribution Unit

1.6.3 I/O PCB (NB06-332)

The I/O PCB serves mainly for connection of the heading receivers, supplying/processing of magnetic sonde and supplying/protection of voltage supplied heading repeaters.

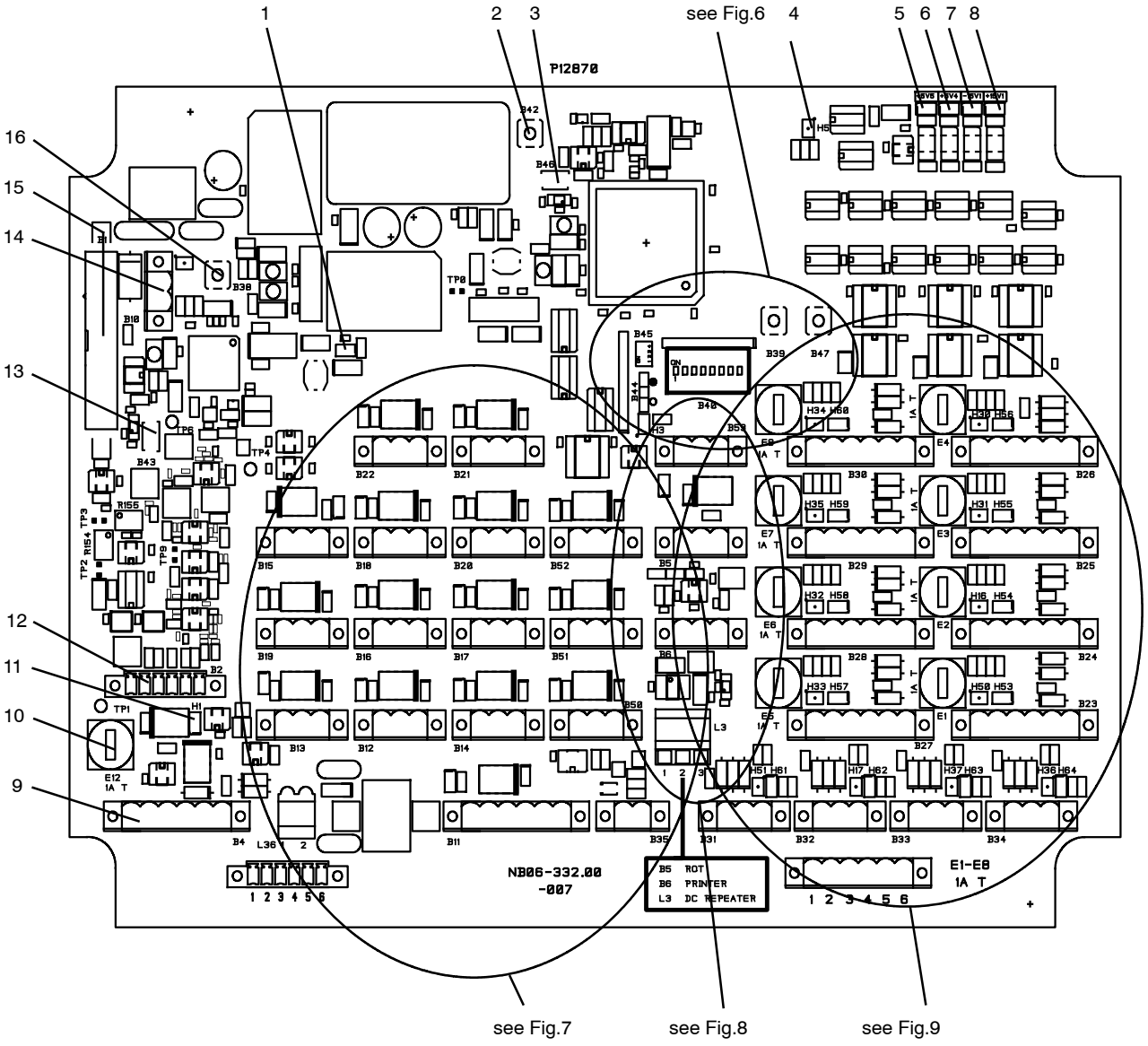


Fig.5: I/O PCB (NB06-332)

No.	Designation at the I/O PCB	Remark
Fig.5/1	LED H29 (green)	Supply voltage for Magnetic sonde processing is available (connected to Terminal board L36).
Fig.5/2	Push button B42	Reset for microcontroller (I/O processing).
Fig.5/3	Plug B46	To flash microcontroller (I/O processing). Microcontroller type, see section 1.5.2.
Fig.5/4	LED H5	Microcontroller heart beat LED green = microcontroller o.k. LED red = microcontroller not o.k.
Fig.5/5	LED H42 (green)	Lights up if operating voltages + 5V DC and +/- 15V DC are present
Fig.5/6	LED H40 (green)	
Fig.5/7	LED H44 (green)	
Fig.5/8	LED H43 (green)	
Fig.5/9	Plug B4	Course bus only. Normal operation: Heading from selected sensor (Gyro compass or Satellite compass) or corrected heading from a magnetic compass (if selected). Emergency operation: Uncorrected heading from a magnetic compass.
Fig.5/10	Fuse E12, 1A (slow)	Protects the supply voltage of repeater which is connected to plug B4.
Fig.5/11	LED H1 (green)	Lights up if heading for repeater at plug B4 is uncorrected heading from connected magnetic sonde. Indicates emergency operation also.
Fig.5/12	Plug B2	To connect Raytheon Anschütz magnetic sonde.
Fig.5/13	Plug B43	To flash microcontroller (TMC processing). Microcontroller type, see section 1.5.2.
Fig.5/14	Plug B10	Not used
Fig.5/15	Plug B1	Connection to Interface PCB

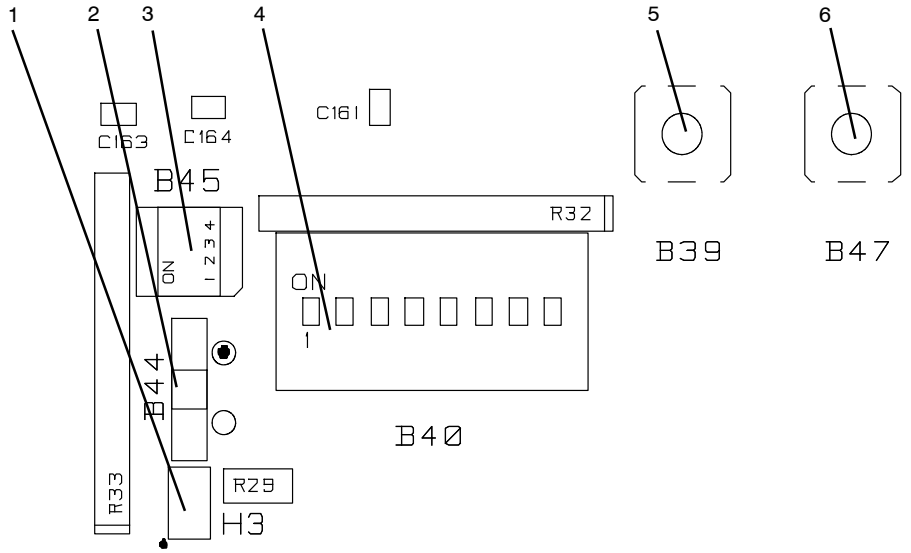


Fig.6: I/O PCB (NB06-332)

No.	Designation at the I/O PCB	Remark
Fig.6/1	LED H3 (white)	Not used in this application.
Fig.6/2	Switch B44	Not used in this application.
Fig.6/3	DIP-switch B45	To configure Distribution Unit (see section 4.2.2).
Fig.6/4	DIP-switch B40	”smooth elimination” heading difference (see section 4.1.2.4).
Fig.6/5	Push button B39	Not used in this application.
Fig.6/6	Push button B47	Not used in this application.

Independent the DIP-switch settings, all information is transferred via plug B1 of the Interface PCB.

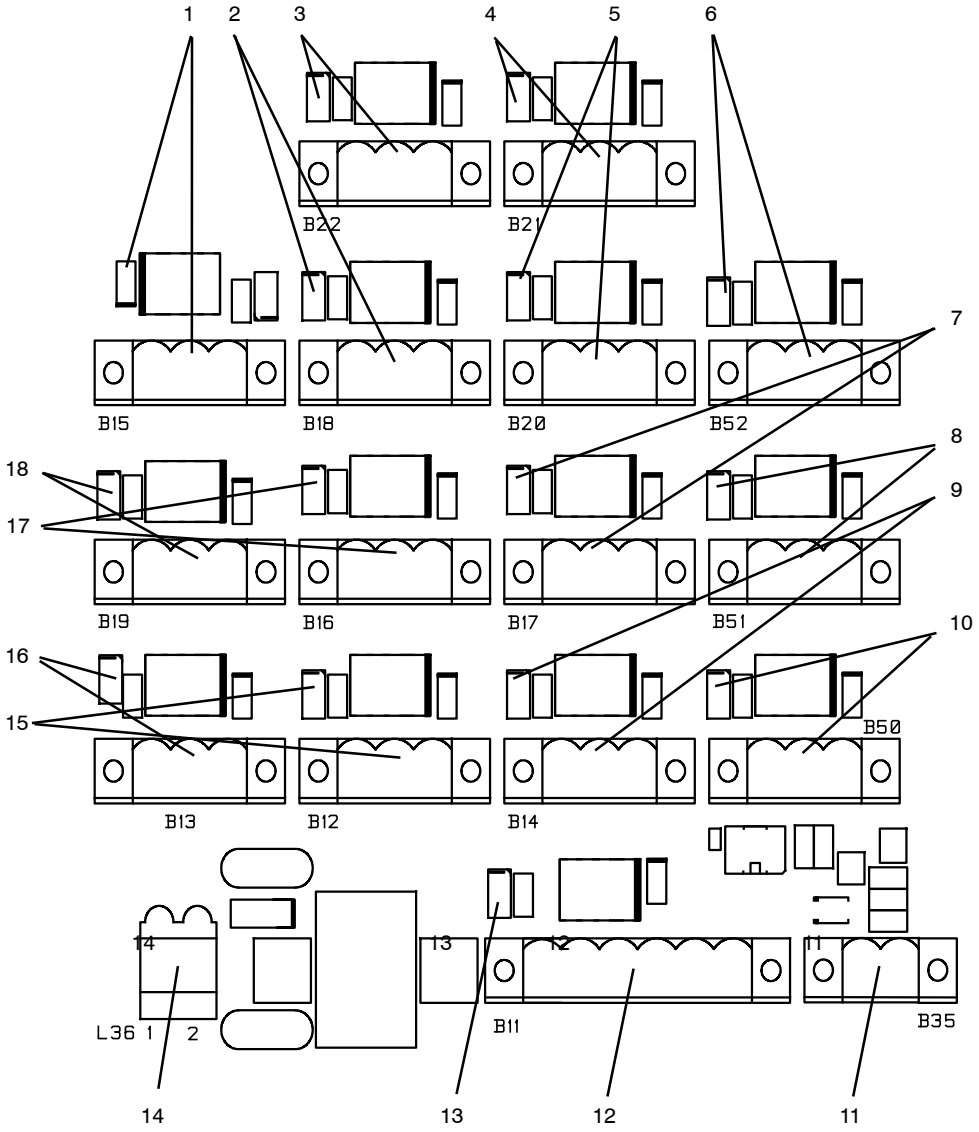


Fig.7: I/O PCB (NB06-332)

No.	Designation at the I/O PCB	Remark
Fig.7/1	Plug B15 with LED H12	Status-signal-connection with indication “SENSOR ALERT TMC”.
Fig.7/2	Plug B18 with LED H11	Status-signal-connection with indication “TMC SELECTED”.
Fig.7/3	Plug B22 with LED H15	”GENERAL ALERT RESET” to acknowledge all alerts generated by the Distribution Unit with an external device.
Fig.7/4	Plug B21 With LED H14	Status-signal-connection with indication “CAN BUS DISTURBED” (see also section 1.4). (in the meaning of “both CAN buses are failed or disturbed”).
Fig.7/5	Plug B20 with LED H13	Status-signal-connection with indication “GPS GYRO SELECTED”.
Fig.7/6	Plug B52 with LED H20	Status-signal-connection with indication “SENSOR 3 SELECTED”.
Fig.7/7	Plug B17 with LED H10	Status-signal-connection with indication “SENSOR DIFFERENCE ALERT”.
Fig.7/8	Plug B51 with LED H19	Status-signal-connection with indication “SENSOR 2 SELECTED”.
Fig.7/9	Plug B14 with LED H7	Status-signal-connection with indication “SENSOR ALERT G3/GPS”.
Fig.7/10	Plug B50 with LED H18	Status-signal-connection with indication “SENSOR 1 SELECTED”.
Fig.7/11	Plug B35	Not used Never use for Distribution Unit, type 138-118 NG002/NG003.
Fig.7/12	Plug B11	Status-signal-connection “SYSTEM ALERT” (two outputs parallel connected).
Fig.7/13	LED H2	Indication of Status-signal at plug B11.
Fig.7/14	Terminal board L36	Supply voltage 24V DC for Magnetic sonde processing (including emergency repeater at plug B4).
Fig.7/15	Plug B12 with LED H4	Status-signal-connection with indication “SENSOR ALERT G1”.
Fig.7/16	Plug B13 with LED H6	Status-signal-connection with indication “SENSOR ALERT G2”.

No.	Designation at the I/O PCB	Remark
Fig.7/17	Plug B16 with LED H9	Status-signal-connection with indication “MONITOR ALERT GYRO TMC”.
Fig.7/18	Plug B19 with LED H8	Status-signal-connection with indication “GYRO SELECTED”.

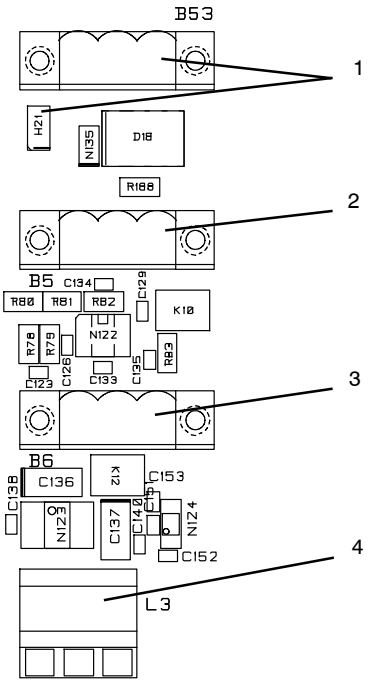


Fig.8: I/O PCB (NB06-332)

No.	Designation at the I/O PCB	Remark
Fig.8/1	Plug B53 with LED H21	Status-signal-connection with indication “SENSOR 4 SELECTED” or “WATCH ALARM RESET”.
Fig.8/2	Plug B5	To connect a RoT indicator (or heading analog). The source of the RoT output is normally the selected Gyro/GPS, or in case of a selected magnetic heading it is the last selected Gyro/GPS. Exception: If there is a RoT Gyro available, than it is this source always.
Fig.8/3	Plug B6	To connect a Course and rudder position printer via Gateway
Fig.8/4	Terminal board L3	24V DC supply voltage for connected repeater (channel 1 to 8).

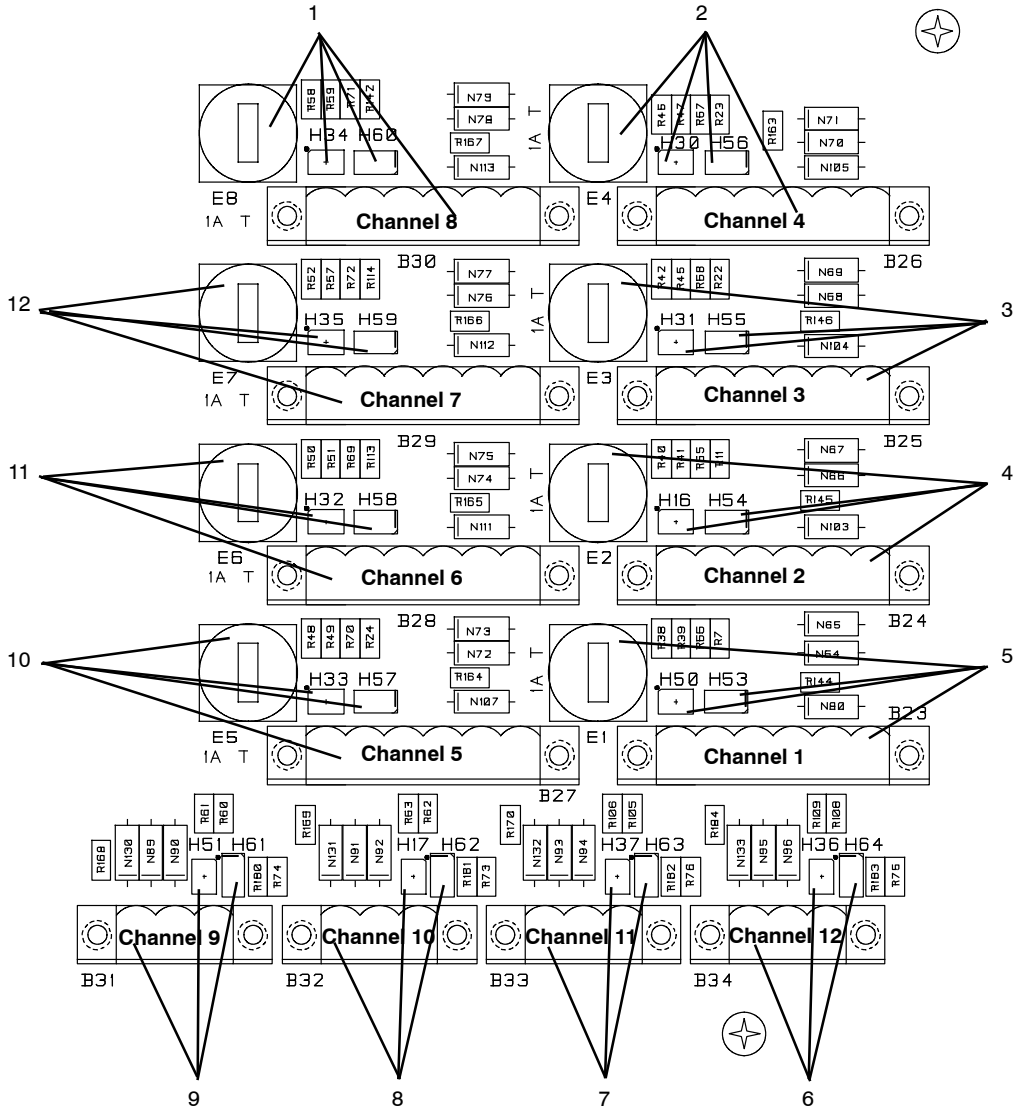


Fig.9: I/O PCB (NB06-332)

No.	Designation at the I/O PCB	Remark
Fig.9/1	Plug B 30 Fuse E 8 (1A, slow) LED H 34 (red, blue, green) LED H 60 (yellow)	Output channel **8** to connect repeater <u>with</u> supply voltage. Connection, protection and indication of the adjusted data format. LED H34 red = Course bus LED H34 green = NMEA 1 LED H34 blue = NMEA 2 LED H60 yellow = Course bus with heading offset (+180°)
Fig.9/2	B 26, E 4, H 30, H 56	Output channel **4**
Fig.9/3	B 25, E 3, H 31, H 55	Output channel **3**
Fig.9/4	B 24, E 2, H 16, H 54	Output channel **2**
Fig.9/5	B 23, E 1, H 50, H 53	Output channel **1**
Fig.9/10	B 27, E 5, H 33, H 57	Output channel **5**
Fig.9/11	B 28, E 6, H 32, H 58	Output channel **6**
Fig.9/12	B 29, E 7, H 35, H 59	Output channel **7**
Fig.9/6	B 34, H 36, H 64	Output channel **12** to connect repeater <u>without</u> supply voltage. Connection and indication of the adjusted data format. LED H36 red = Course bus LED H36 green = NMEA 1 LED H36 blue = NMEA 2 LED H64 yellow = Course bus with heading offset (+180°)
Fig.9/7	B 33, H 37, H 63	Output channel **11**
Fig.9/8	B 32, H 17, H 62	Output channel **10**
Fig.9/9	B 31, H 51, H 61	Output channel **9**

2 Installation of the Distribution Unit

2.1 General remarks

Caution
When establishing cable connections ensure that the cables are disconnected from the power supply.
It is essential to ensure that all cables are disconnected from the power supply, if necessary measure the voltage beforehand and/or disconnect the relevant distributor.

In order to ensure that the system operates correctly, it is essential that you follow the procedures described below for establishing cable connections.

- Strip approx. 180mm of the cable.
  Make sure you do not damage the shielding layer.

- Strip off the shielding to a remainder of approximately 15mm.

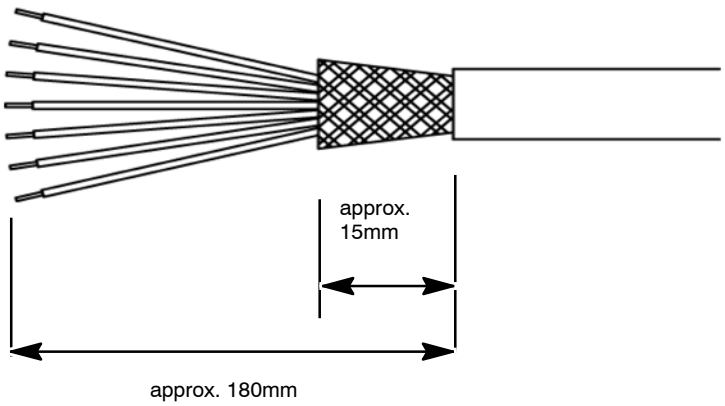


Fig.10 How to strip the connection cable

- Screw the cable gland out from the distribution box and push the screw connection components over the cable.
  It is absolutely essential that the sequence (as shown in Fig.11) is adhered to.
- Check the cone and counterpart on the earthing insert for corrosion and if necessary remove corrosion using an appropriate process (emery board).

- Push the counterpart of the earthing insert as far as the end of the cable shield.
- Push the earthing insert cone below the shielding against the counterpart. Observe a shared evenly distribution of the shielding via the cone (see Fig.11).

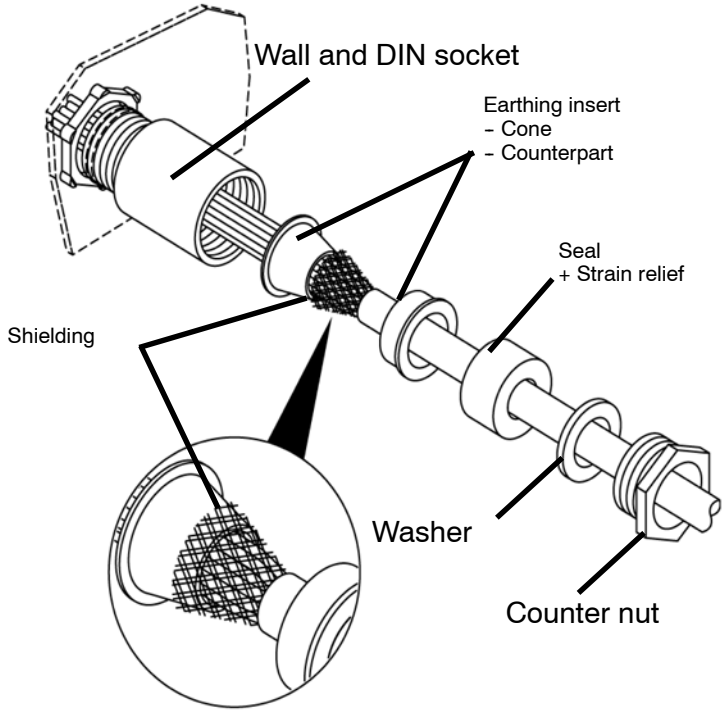
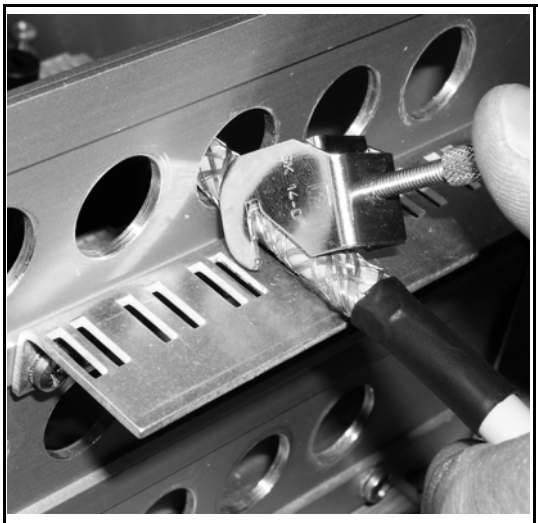
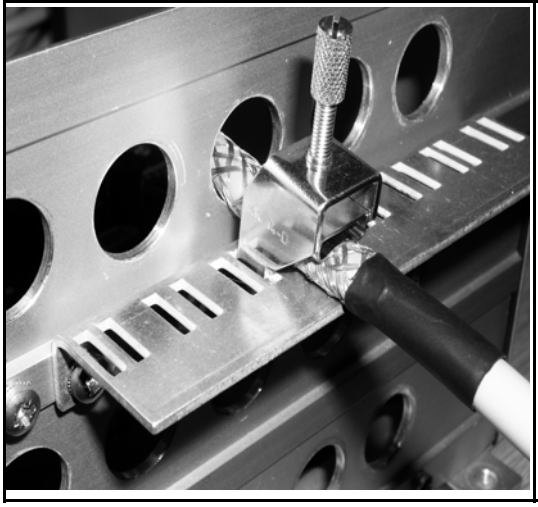


Fig.11 Making the cable entry

- Insert the earthing insert, the seal with and the washer into the cable gland, place the counter nut on top and hand-tighten.
- Strip the cable cores to a length of approx. 1.5cm, twist slightly and clamp on the cable end sleeves. Connect the cable strands in the junction box as shown in the table below. Hand-tighten the terminal screws concerned
- Check the connection is firm by pulling lightly.

Option: Cable connection with a screen clamp

	Attach the angle with cross slotted screws below the respective cable inlet at the housing. (angle and screws are part of the installation kit). Strip off the cable according to section 2.1.
	The screen must be led for appr. 15mm through the cable inlet (as shown).
	Jam the cable (screen area) with the screw-clamp at the angle and fix it with the knurled head screw.

2.1.1 General information about establishing an earth connection

In order to comply with the stringent EMC requirements, please abide by the information given below regarding cable connections.
Use the cable types specified.
Earth connections should be connected to the gyro compass and to the junction box.

> It is essential to ensure that these connections have **a common** reference to the ship's earth.
> Any additional components (options) must also be connected to the common earth!

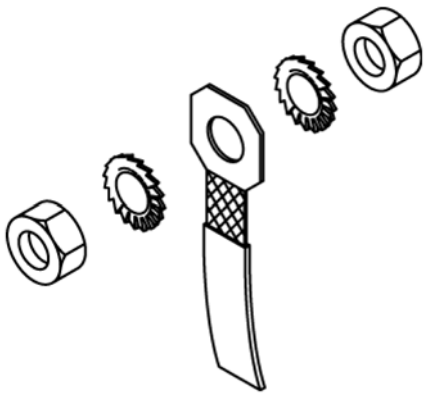


Fig.12: Establishing an earth connection

All earth connections must be made as shown in Fig.12.
The earthing cable attached to the cable bracket must possess a cross-section of minimum 1.5 mm^2.
The cable bracket should be mounted between two toothed discs.
Earth connections must be free of corrosion and well fastened.

2.2 Installation

The Distribution Unit has to be mounted according to the appended Dimensional Drawing 138-118.HP005, see also appended Block Diagram138-118.HP019 and Wiring Diagram 138-118.HP018.
The front cover should be removable.
Please note the comment depending the internal protection at the Dimensional Drawing.

Do not forget to lead the cables for supply voltage through the appended Ferroxcubes, to ensure the EMV regulations.
See figure below and appended Wiring Diagram.

Fig.13: Application of a Ferroxcube

2.2.1 Installation of the options

For installations of the options, as there are “Additional Output Box” and “AC/DC-Converter”, see service manual of the Compass STD 22 Compact.

NOTE: While connecting the AC/DC-Converter one cable inlet between “AC IN” and “DC OUT” must not be used

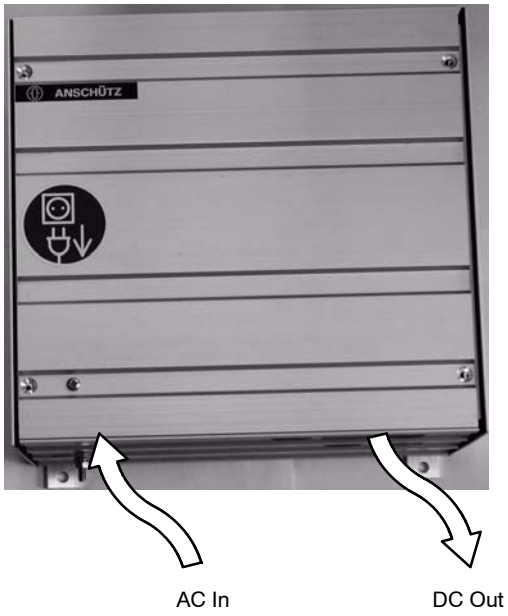
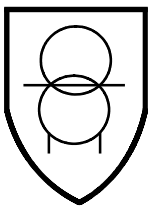


Fig.14: Connection at the AC/DC-Converter

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



The supply voltage has to be engineered as a low-security-voltage according to SELV.

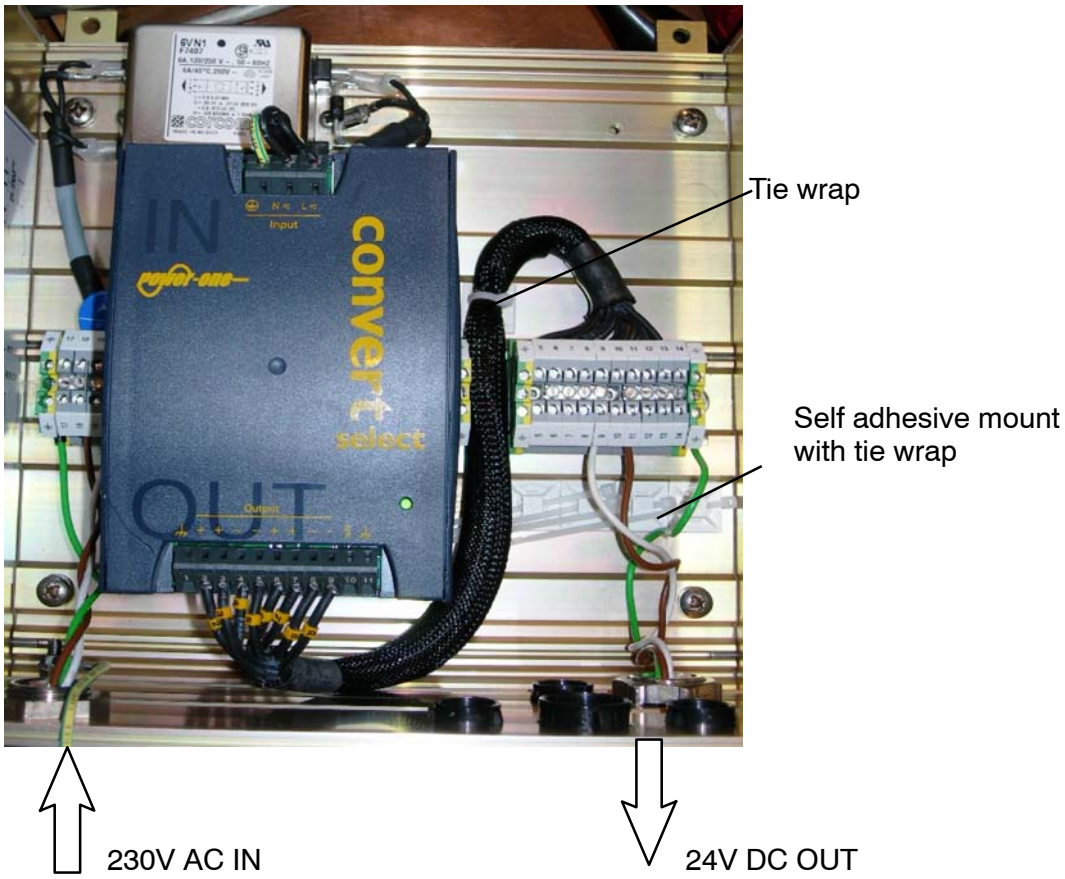


Fig.15 Cable connections at the AC/DC-Converter

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 Fig.15) with tie wraps and self adhesive tie mounts.

2.3 Connections

At a Distribution Unit with DV-bus application no connections for speed and/or position should be made.

Example:

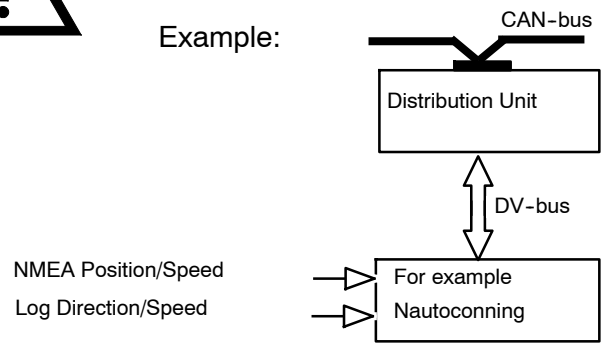


Fig.16 DV-bus application with the Distribution Unit

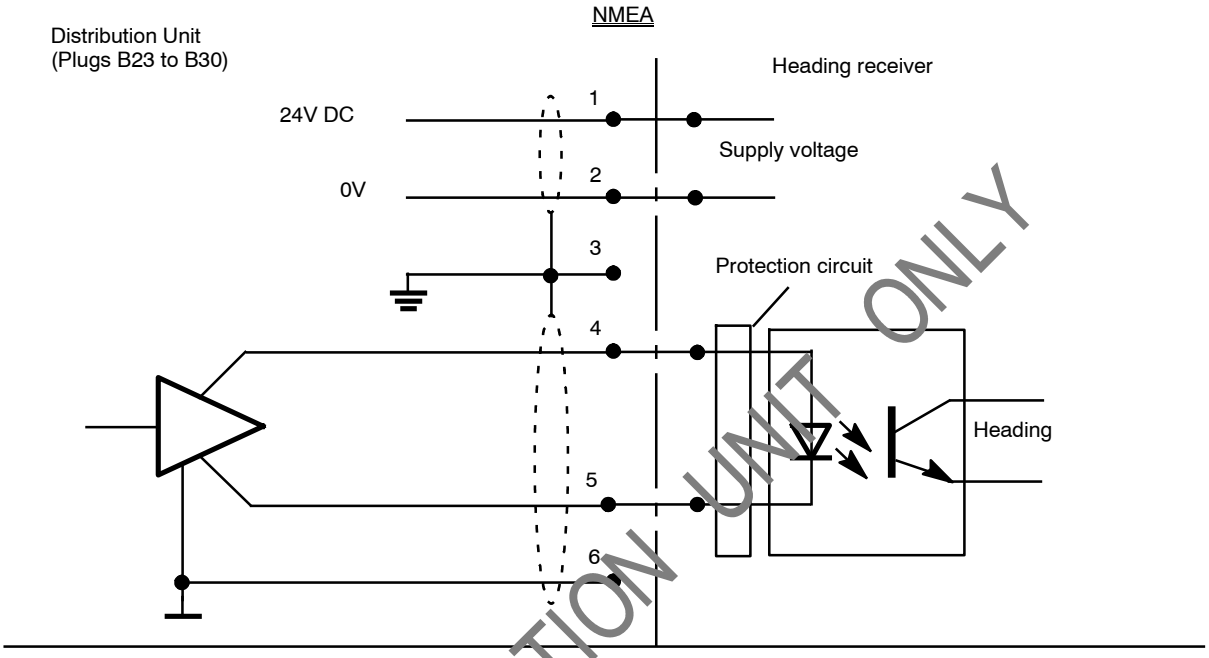
If DV-bus is configured then speed and/or position inputs are evaluated from the DV-bus only.

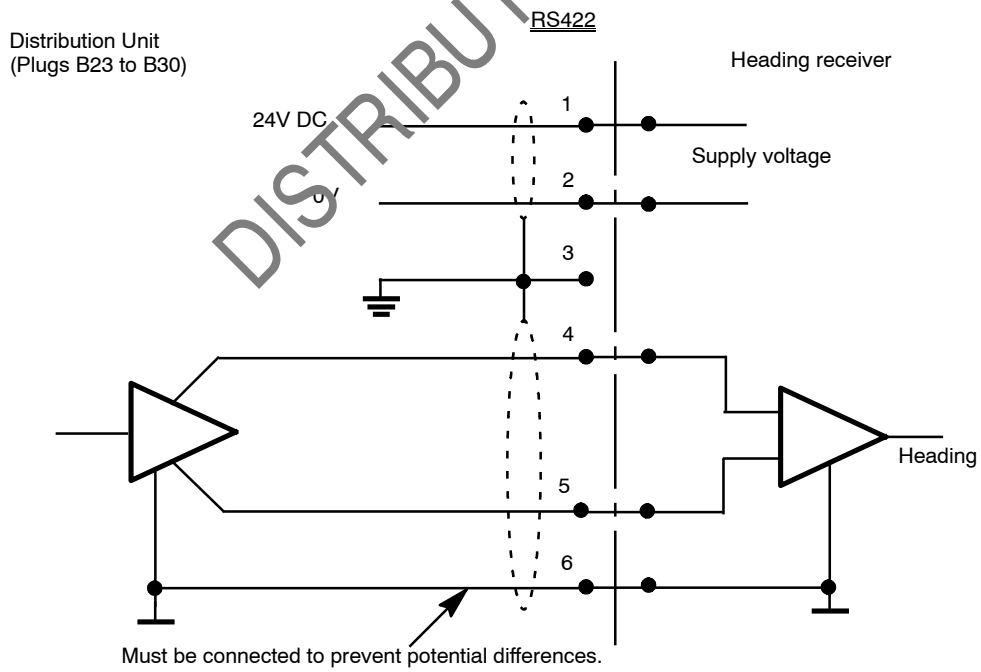
Please note:
If the actual time (UTC) is necessary in the system, the GPS data input at plug B14 must be connected with respective data, because the DV-bus time is not evaluated in the Distribution Unit.

All connections to terminal boards and plugs have to be made according appended drawings.
Please note manufacturer recommendations depending on the cable-diameters.

2.3.1 RS422-Interface or NMEA Interface of Heading Receiver

Conclusion for the connection of NON Raytheon Anschuetz products to the Distribution Unit:
If the NMEA input interface or the course bus input interface contains a “signal common / signal ground” connection, then this connection has to be connected to “signal common / signal ground” connection of the Distribition Unit (see principle scematic below).





2.3.2 Serial Interfaces

The serial interfaces are designed in accordance with IEC 61162-1 and IEC 61162-2.
Please refer to the following tables for more details.
The following telegrams can be received:

Interface	**Possible Talker Identifier**	**Possible Telegrams**	**Repetition / Baud Rate**
Global Positioning System fix data	all Talker (usually GP/GA/GL/GN/II/IN)	GGA	1Hz / 4800Bd
Geographic position – latitude/longitude	all Talker (usually GP/GA/GL/GN/II/IN)	GLL	1Hz / 4800Bd
UTC time and date	all Talker (usually GP/GA/GL/GN/II/IN)	ZDA	1Hz / 4800Bd
Dual ground/water speed	all Talker (usually VD/ VM/VW/II/IN)	VBW	1Hz / 4800Bd
Water speed and heading	all Talker (usually VD/ VM/VW/II/IN)	VHW	1Hz / 4800Bd
Course over ground and ground speed	all Talker (usually VD/ VM/VW/GP/II/IN)	VTG	1Hz / 4800Bd
Heading true	GP/GA/GL/HE/HC/HF	HDT	1Hz / 4800Bd 10Hz / 4800Bd 50Hz / 38400 Bd
True heading and status	GP/GA/GL/HE/HC/HF	THS	1Hz / 4800Bd 10Hz / 4800Bd 50Hz / 38400 Bd
Heading, deviation and variation	HC/HF	HDG	1Hz / 4800Bd 10Hz / 4800Bd 50Hz / 38400 Bd
Rate of turn	GP/GA/GL/HE TI	ROT	1Hz / 4800Bd 10Hz / 4800Bd 50Hz / 38400 Bd

Important:
The ground speed and the water speed within the VBW telegram will only be accepted if both parts, the transversal and the longitudinal, are available.

The following telegrams can be transmitted:

Interface	Possible Talker Identifier	Possible Telegrams	Repetition / Baud Rate
Heading true	HE/HC/GP	HDT	1Hz / 4800Bd 10Hz / 4800Bd 50Hz / 38400 Bd
True heading and status	HE/HC/GP	THS	1Hz / 4800Bd 10Hz / 4800Bd 50Hz / 38400 Bd
Heading, deviation and variation	HC	HDG	1Hz / 4800Bd 10Hz / 4800Bd 50Hz / 38400 Bd
Rate of turn	TI/HE	ROT	1Hz / 4800Bd 10Hz / 4800Bd 50Hz / 38400 Bd

Alternatively 9600 and 19200 Bd can be used for receiving data. Please note that these baud rates are not compliant to IEC 61162-1 and IEC 61162-2.
Important:
A repetition rate of 50Hz is recommended when connecting external heading sensors to the Distribution Unit.

According to IEC 61162 the following connection settings are used:

- Data bit: 8
- Parity: none
- Stop bit: 1

2.3.3 Connection of the Options

For connection of the options, as there are “Additional Output Box” and “AC/DC-Converter”, see service manual of the Compass STD 22 Compact.

For connection of a UTC-signal (time-synchronisation of a connected course-printer), see section 8 seq. no. 41.

2.3.3.1 Alert Information

For connection of a central Alert-Reset-function see respective drawings at the appendix.
With this function an Alert can be reset centrally.
This function has to be connected at plug B22 of the I/O PCB.

Please note:
In contradiction to former Distribution Units, an alert must be acknowledged, independent if its cause is cleared either by an action or automatically.

Important:
The Standard 22 gyro compass System is compliant to Bridge Alert management standards in combination with Operator Unit Gyro, type 130-626.NG00x. Please refer to the manuals of Operator Unit Gyro, type 130-626.NG00x for any details about the alert handling and presentation. For new installations it is recommended to make use of the new alert management.

3 Switching On the Distribution Unit

After connecting the supply voltage, the Distribution Unit is switched on.
All direct connected devices (as there are compass, repeater with supply voltage and Operator Unit) to the Distribution Unit are supplied with operating voltage as well.
There is no separate switch for the Distribution Unit.

4 Setting of Jumpers/Switches and Adjusting the DIP-Switches

After a change of switch settings or jumper settings or DIP-switch adjustments the Data Distribution Unit and the connected Operating Unit must be reset, see section 5.

4.1 Setting of Jumpers/Switches

Basically 3 jumpers/switches have to be awarded.
The jumpers activate the terminators (resistors which terminate the CAN-bus) and the switch activates the terminator for the DV-bus).

Is a Distribution Unit used as an so called “end-device” within a CAN-bus and DV-bus application, all jumpers and the switch have to be set.

Not inserted jumpers (open CAN-Bus and/or open DV-bus) lead to a faulty data transmission, which will lead to a faulty indication at the Operator Unit or to a heading jump at connected heading receivers.

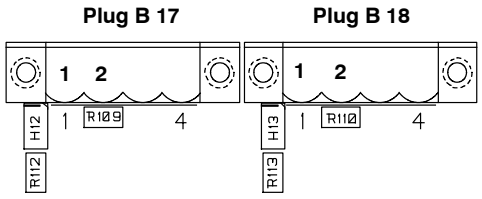


Fig.17: CAN-Bus terminators

Jumper between terminal 1 and 2 at plug B 17 for CAN1-Bus
Jumper between terminal 1 and 2 at plug B 18 for CAN2-Bus

Switch B 7
(see section 1.6.2)

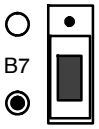


Fig.18: DV Bus terminator

Note: The terminator is activated when there is a small dot visible on the switch.

4.2 Setting of DIP-Switches

There are 3 DIP-Switches which can be set:
- DIP-Switch B4 (see section 4.2.1) at the Interface PCB.
- DIP-Switch B45 (see section 4.2.2) at the I/O PCB.
- DIP- Switch B40 (see section 4.2.1.4) at the I/O PCB.

4.2.1 Setting of DIP-Switch B4 at the Interface PCB

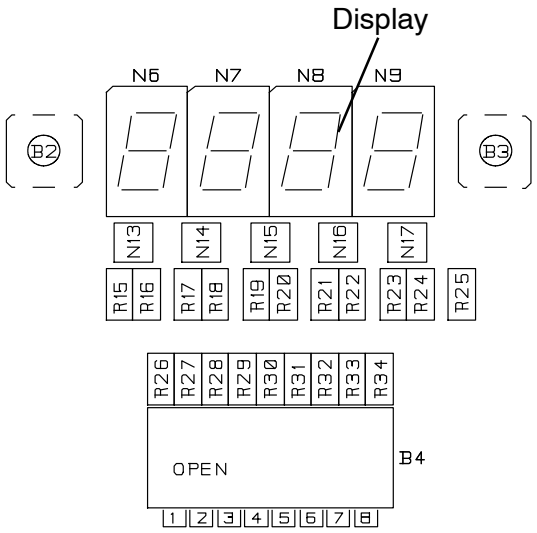


Fig.19: DIP-Switches, display and push buttons to select and adjust different operation modes

- DIP-Switch B 4 with 8 single switches
- Push button B 2 to select the modes within the respective DIP-Switch settings
- Push button B 3 to set selected mode
- Display

4.2.1.1 General information in use of the DIP-Switch B4 and push buttons B2/B3

The normal operation of the all DIP-Switches is the “DOWN”-position.
This means the respective switch is closed.
In the upper position the respective switch is open and by this, a mode can be selected and adjusted.
After a switch is set into the upper position, a mode can be selected by the the push button on the left of the display (push button B 2).
Before setting the selected mode the display-information does not blink.
After acknowledgement of selected mode with the push button on the right of the display (push button B 3) the display information is blinking - this means selected mode is set.
After setting a mode/configuration all switches have to be set into the down-position and the adjustments/configurations are stored automatically.

4.2.1.2 Setting of CAN Bus address

Each device within a CAN bus application has to be identified with an address.

> The CAN bus address must not be twice or more within one application - bus conflict.

> After changing the CAN bus address a reset procedure according to section 5 has to be performed.

The CAN bus address is already adjusted by the manufacturer.
Below mentioned procedure to adjust the address is only necessary if a second Distribution Unit should be connected.
To read out the CAN bus address it is only necessary to switch the DIP switches 1 and 2 into the upper position (”OPEN”).

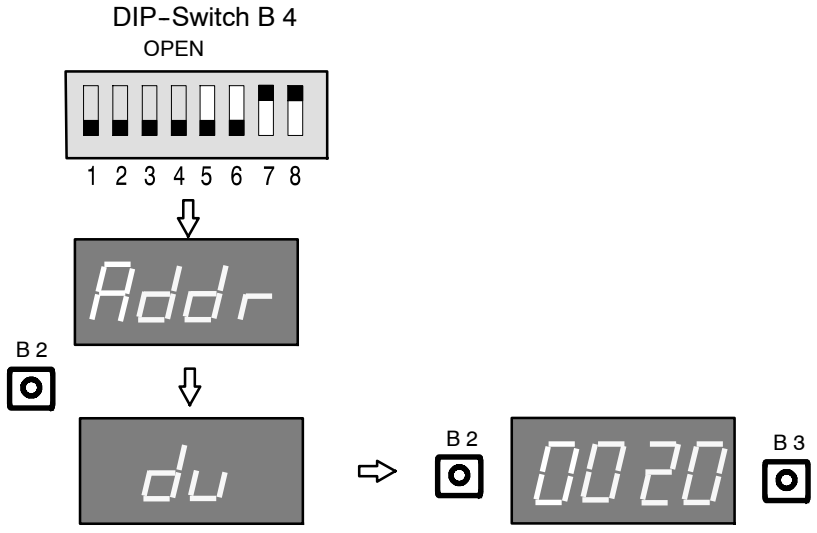


Fig.20: DIP-Switch position to adjust CAN-Bus address

Procedure:

- Switches 7 and 8 of the DIP-Switch into the upper position. Display = Addr
- Press push button B 2 - the device Distribution Unit (du) is shown in the display.
- With push button B 2 the numbers will count up and with push button B 3 the numbers will count down. The numbers will be shown in the display.
  Switch switches 7 and 8 into the lower position after the final number of the CAN bus address is adjusted.

Below mentioned table shows the CAN Bus addressees for one or several Distribution Units.

Restrictions:

Address 00 must not be used!!

Device(s)	CAN-Bus-Address
Operator Units	01 to 09
Sensors (GPS-compass STD 21)	10 to 13
Sensors (Gyro Compass STD22)	14 to 19
Distribution Units	20 to 29
Gateway	56 and 57

4.2.1.3 Adjustment of the 12 output channels

Each of the 12 output channels can be set to 4 different interfaces.
These interfaces are: Course bus, Course bus with a heading offset of +180°, NMEA1 and NMEA2.
With the formats NMEA1 and NMEA2 two different configurations can be adjusted, these configurations become active after selection (to the respective output channel).
For adjustment of this configurations see sections 4.2.1.4 .

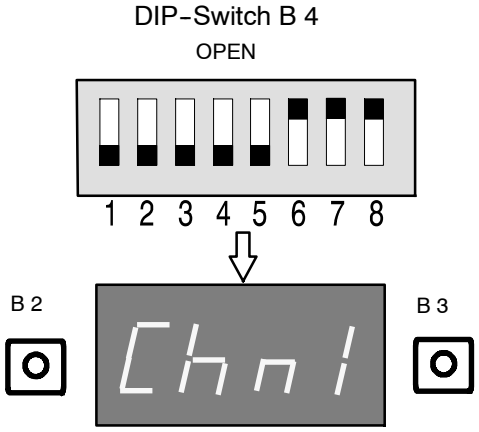


Fig.21: DIP-Switch position to adjust the 12 output channels

Procedure:

- Switches 6, 7 and 8 of the DIP-Switch B 4 into the upper position.
- By each operation of push button B 2 another channel and/or another format referring to the selected channel is selected and displayed.
- This adjustment has to be performed for each connected channel.
- Each adjustment of a format has to be set by operating push button B 3 (right side of the display). Set format blinks on the display.
- After adjustment of all connected channels, the DIP switches 6, 7 and 8 must be switched into the “DOWN” position again.

Note: For LED positions see Fig.9.

Number of operations of the push button B 2	Display	Interface format	Plug at the PCB/ LED which lights up
after switching of switches 6, 7 and 8 (B 4) into the upper position	***Chn1***		Plug B 23
1x	HSEr	Course bus	LED H 50 (red)
2x	nME1	NMEA1	LED H 50 (green)
3x	nME2	NMEA2	LED H 50 (blue)
4x	H180	+180° heading offset (Course bus only)	LED H 53 (yellow)
5x	***Chn2***		Plug B 24
6x	HSEr	Course bus	LED H 16 (red)
7x	nME1	NMEA1	LED H 16 (green)
8x	nME2	NMEA2	LED H 16 (blue)
9x	H180	+180° heading offset (Course bus only)	LED H 54 (yellow)
10x	***Chn3***		Plug B 25
11x	HSEr	Course bus	LED H 31 (red)
12x	nME1	NMEA1	LED H 31 (green)
13x	nME2	NMEA2	LED H 31 (blue)
14x	H180	+180° heading offset (Course bus only)	LED H 55 (yellow)
15x	***Chn4***		Plug B 26
16x	HSEr	Course bus	LED H 30 (red)
17x	nME1	NMEA1	LED H 30 (green)
18x	nME2	NMEA2	LED H 30 (blue)
19x	H180	+180° heading offset (Course bus only)	LED H 56 (yellow)
20x	***Chn5***		Plug B 27
21x	HSEr	Course bus	LED H 33 (red)
22x	nME1	NMEA1	LED H 33 (green)
23x	nME2	NMEA2	LED H 33 (blue)
24x	H180	+180° heading offset (Course bus only)	LED H 57 (yellow)
25x	***Chn6***		Plug B 28
26x	HSEr	Course bus	LED H 32 (red)
27x	nME1	NMEA1	LED H 32 (green)
28x	nME2	NMEA2	LED H 32 (blue)
29x	H180	+180° heading offset (Course bus only)	LED H 58 (yellow)
30x	***Chn7***		Plug B 29
31x	HSEr	Course bus	LED H 35 (red)
32x	nME1	NMEA1	LED H 35 (green)
33x	nME2	NMEA2	LED H 35 (blue)
34x	H180	+180° heading offset (Course bus only)	LED H 59 (yellow)
35x	***Chn8***		Plug B 30
36x	HSEr	Course bus	LED H 34 (red)
37x	nME1	NMEA1	LED H 34 (green)
38x	nME2	NMEA2	LED H 34 (blue)
39x	H180	+180° heading offset (Course bus only)	LED H 60 (yellow)

Number of operations of the push button B 2	Display	Interface format	Plug at the PCB/ LED which lights up
40x	***Chn9***		Plug B 31(without supply voltage for heading repeater)
41x	HSEr	Course bus	LED H 51 (red)
42x	nME1	NMEA1	LED H 51 (green)
43x	nME2	NMEA2	LED H 51 (blue)
44x	H180	+180° heading offset (Course bus only)	LED H 61 (yellow)
45x	***Ch10***		Plug B 32 (without supply voltage for heading repeater)
46x	HSEr	Course bus	LED H 17 (red)
47x	nME1	NMEA1	LED H 17 (green)
48x	nME2	NMEA2	LED H 17 (blue)
49x	H180	+180° heading offset (Course bus only)	LED H 62 (yellow)
50x	***Ch11***		Plug B 33 (without supply voltage for heading repeater)
51x	HSEr	Course bus	LED H 37 (red)
52x	nME1	NMEA1	LED H 37 (green)
53x	nME2	NMEA2	LED H 37 (blue)
54x	H180	+180° heading offset (Course bus only)	LED H 63 (yellow)
55x	***Ch12***		Plug B 34 (without supply voltage for heading repeater)
56x	HSEr	Course bus	LED H 36 (red)
57x	nME1	NMEA1	LED H 36 (green)
58x	nME2	NMEA2	LED H 36 (blue)
59x	H180	+180° heading offset (Course bus only)	LED H 64 (yellow)
60x	***Chn1***		Plug B 23

4.2.1.4 "Smooth elimination" of a heading difference

Important note for NAUT-AW classed vessels

NAUT-AW requires an automatic switch-over to the second gyro compass if the selected gyro compass fails.

Any heading difference present at this instant shall not cause any undue rudder order while in heading or track control mode.

(Source: DNV Nautical Safety; Part 6 Chapter 6, B 306 and K308, January 2014 version)

DNV added a guidance note to the above mentioned requirement that describes 2 possible solutions:

1. To maintain the present heading of the autopilot and any heading difference shall be smoothly eliminated or
2. to take the instant heading as new preset heading

Raytheon Anschütz heading and track control systems follow the second solution. Prerequisite is that the heading is supplied via course bus. This is a standard configuration and requires no specific configuration.

If heading and track control systems from other makers require solution 1 the "smooth elimination" of heading differences, the distribution unit provides a course bus output that smoothly eliminates a heading change with approx. 10°/minute.

In addition to the table in section 4.2.1.3 the above mentioned function can be added to the interface format "course bus +180°" on the 12 channels. Activation is carried out via Dip Switch 40/1 on the I/O PCB. The status is indicated via flash frequency on LED H5 with 3 Hz instead of 1 Hz (standard).

Please note:

- Use the "heading smooth function" only when required by specific notations such as DNV NAUT-AW
- Do not use this function with Raytheon Anschütz heading and track control systems. Make sure that the heading is supplied via course bus.
- If heading and track control systems from other makers are used please check the requirement with that maker.

4.2.1.5 Adjustment of NMEA Formats

The Distribution Unit can provide for each output one of three different data formats (Course bus, NMEA1 and NMEA2 - except the heading offset).
Selected format can be recognized by the respective LED colour.
The content of the course bus format cannot be changed, but both NMEA formats can be adjusted concerning to telegram-type and repetition rate.

Procedure for NMEA1:

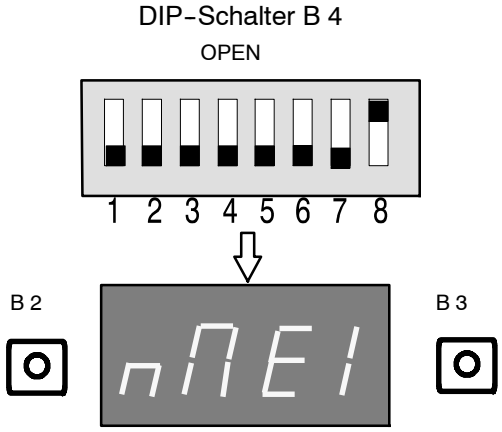


Fig.22: DIP-Switch position to adjust the NMEA1 interface

- Switch 8 of the DIP-Switch into the upper position.

Number of operations of push button B 2	Display	Baudrate	Interface
after switching switch 8 (B 4) into the upper position	nME1		NMEA Channel 1
1x	CY. 1	4800Bd	NMEA 1.0sec
2x	CY.10	4800Bd	NMEA 0.1sec
3x	cY.10	9600Bd	NMEA 0.1sec
4x	CY.50	38,4kBd	NMEA 0.02sec
5x	EHdT		HEHDT-Telegram
6x	CHdT		HCHDT-Telegram
7x	IHdG		HCHDG-Telegram
8x	IroT		TIROT-Telegram*
9x	EroT		HEROT-Telegram*

* to adjust the turn rate, see section 4.2.1.6

Meaning of the telegram abbreviations:

CY and cY means “Cycle”

CY1 = 1Hz
CY10 = 10Hz
CY50 = 50Hz

HEHDT = Heading corrected, from a Gyro compass
HCHDT = Heading corrected, from a Magnetic compass
HCHDG = Heading uncorrected from a Magnetic compass
TIROT = Turn rate from a turn rate sensor
HEROT = Turn rate from a Gyro compass

- By each operation of push button B 2 another format is selected and displayed.
- Each adjusted format has to be set wit push button B 3 (right of the display). The set format information blinks at the display.
- After adjustment of all connected channels, the switch 8 has to be set into lower position.

HCxxx-telegrams contain heading from magnetic compass.
Not all heading-receivers are allowed to used this heading source.
Telegramtype “HC” are transmitted from the respective channel also, when a Gyro is selected at the connected Operation Unit.

Heading receivers which applies to a magnetic compass source are visually designated with (for example):
“Magnetic heading only”

Procedure for NMEA2:

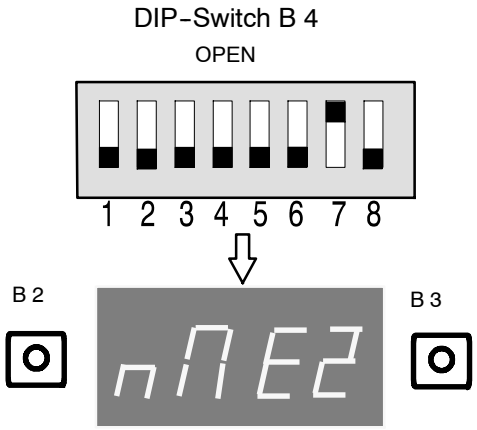


Fig.23: DIP-Switch position to adjust the NMEA2 interface

- Switch 7 of the DIP-Switch into the upper position.

Number of operations of push button B 2	Display	Baudrate	Interface
after switching switch 7 (B 4) into the upper position	nME1		NMEA Channel 2
1x	CY. 1	4800Bd	NMEA 1.0sec
2x	CY.10	4800Bd	NMEA 0.1sec
3x	cY.10	9600Bd	NMEA 0.1sec
4x	CY.50	38,4kBd	NMEA 0.02sec
5x	EHdT		HEHDT-Telegram
6x	CHdT		HCHDT-Telegram
7x	IHdG		HCHDG-Telegram
8x	IroT		TIROT-Telegram*
9x	EroT		HEROT-Telegram*

* to adjust the turn rate, see section 4.2.1.6

Meaning of the telegram abbreviations:

CY and cY means “Cycle”

CY1 = 1Hz
CY10 = 10Hz
CY50 = 50Hz

HEHDT = Heading corrected, from a Gyro compass
HCHDT = Heading corrected, from a Magnetic compass
HCHDG = Heading uncorrected from a Magnetic compass
TIROT = Turn rate from a turn rate sensor
HEROT = Turn rate from a Gyro compass

- By each operation of push button B 2 another format is selected and displayed.
- Each adjusted format has to be set wit push button B 3 (right of the display). The set format information blinks at the display.
- After adjustment of all connected channels, the switch 7 has to be set into lower position.

Please note:
Restrictions for NMEA channel 1 and NMEA channel 2.
On selection of NMEA repetition rate of 1 second, all selected telegrams can be transmitted.
But on selection of NMEA repetition rate of 0.1 second, only 2 selected telegrams can be transmitted.
More than 2 telegrams are not selectable at a repetition rate of 0.1 second.

HCxxx-telegrams contain heading from magnetic compass.
Not all heading-receivers are allowed to used this heading source.
Telegramtype “HC” are transmitted from the respective channel also, when a Gyro is selected at the connected Operation Unit.

Heading receivers which applies to a magnetic compass source are visually designated with (for example):
“Magnetic heading only”

4.2.1.6 Scaling of RoT analog output / Function of RoT NMEA output

Scaling of RoT analog output influences the indicators connected at plug B5 of the I/O PCB.
The function of Rot NMEA output influences the NMEA outputs at channel 1 to 12.

RoT analog output

For the RoT analog output an adjustment of the turn rate has to be performed.

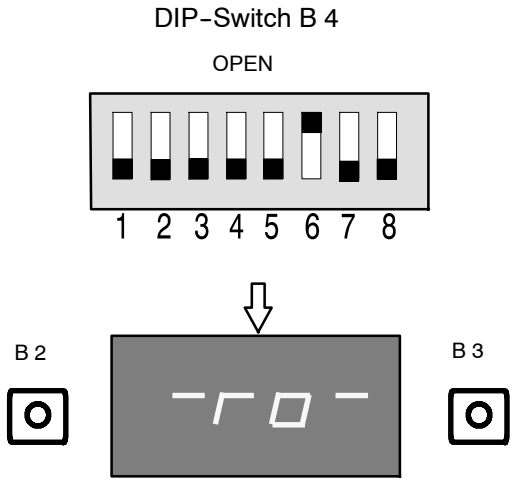


Fig.24: DIP-Switch position to adjust the turn rate

Procedure:

- Switch 6 of the DIP-Switch into the upper position.

Operation of push button B 2	Display	Rate of Turn
after switching (B 4) switch 6 into the upper position	-ro-	
1x	r 30	30 degree/minute
2x	r100	100 degree/minute
3x	r300	300 degree/minute
4x	Gy	analog heading output*

*Selection of “Gy” means: there is no RoT-function, the output is used for an analogue heading signal.

- By each operation of push button B 2 another rate of turn range is selected and displayed.
- Each adjusted rate has to be set wit push button B 3 (right of the display). The set format information blinks at the display.
- After adjustment, the switch 6 has to be set into lower position.

To test this function (RoT with 20°/minute) see manual for the compass STD 22.

Restriction:
If “Gy” is selected for an analog heading output, no turn rate can be adjusted.

Function of RoT NMEA output

If there is a TIROT sensor connected at plug B16, this data are primary displayed - even if there are other heading sensors selected.

General:

1. If a seperate RoT-Indicator (IMO) is connected (NMEA TIROT in or DV-Bus RoT in), then the RoT-Indicator has a higher priority than all other rate of turn sources.
2. If there is no separate RoT-Indicator connected but a Raytheon Anschuetz Gyro Compass STD 22, then a RoT-output NMEA HEROT or NMEA TIROT can be configured at the Distribution Unit.
   NMEA TIROT is allowed only if the compass system consisting of a Raytheon Anschuetz Gyro Compass STD 22 and a Distribution Unit 138-118 NG002 is applied as an independent RoT-Indicator.
3. If a connected Satellite compass is selected as heading sensor, a NMEA GPROT sentence is output from the Distribution Unit.
4. If other serial NMEA sensors input their data into the Distribution Unit, then it is not allowed to output them as NMEA TIROT data. For more details, see respective data of this not specified compasses (other serial sensors).

In case of a selected magnetic compass, the RoT from the last selected Gyro/GPS will be output (if there is no RoT-Gyro connected).

If one of the RoT sensors faults, then the Distribution Unit outputs the RoT of the last selected RoT sensor.

4.2.1.7 Selection of magnetic compass

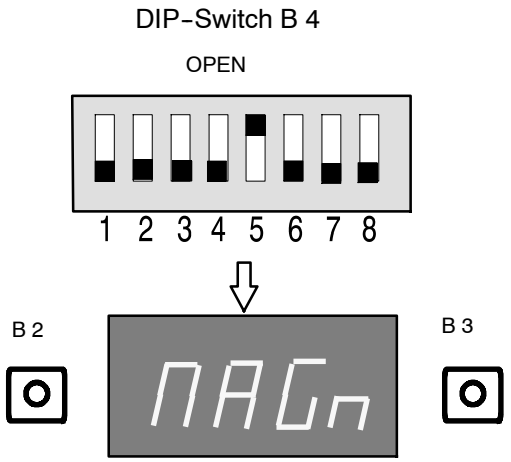


Fig.25: DIP-Switch position to adjust application with Magnetic compass

With this adjustment it is to determine if a magnetic compass is connected to this application.

- Switch 5 of the DIP-Switch (B 4) into the upper position.
- The display shows MAGn.
  If this display-information blinks, then it is selected and the Distribution Unit is prepared to support a magnetic compass.
- By operating the push button B 3 (right side) the selection is aborted. A blinking display means “magnetic compass selected”, not blinking means “magnetic compass not selected” (toggle function).
- After adjustment, the switch 5 has to be set into lower position.

If a magnetic compass is connected for the “emergency function” it has to be configured in above manner (information blinks).

After configuration changes depending the complete system, the Distribution Unit and the Operator Unit must be reset (see section 5.
Changes must be made for all Distribution Units and Operator Units in a compass system.

4.2.2 Setting of DIP-Switch B45 at the I/O PCB

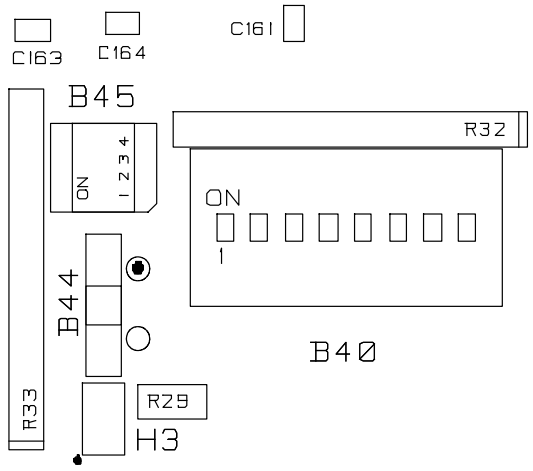


Fig.26: DIP-Switch B45

- DIP-Switch B 45 with 4 single switches.
- No push buttons to select the modes within the respective DIP-Switch settings.
- No Display.

4.2.2.1 Information to use of the DIP-Switch B45

The normal operation of the all DIP-Switches is the “RIGHT”-position.
This means the respective switch is opened (= OFF).
In the left position the respective switch is closed (= ON) and by this, a mode can be selected and adjusted.
After a switch position is changed, this function is performed at once.

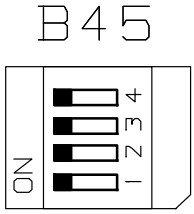


Fig.27: DIP-Switch 45 (all switches in “ON” position)

Switch and position	Function
Switch **1** to right position (OFF)	If this switch is set into the right position (OFF), then an external connected device (at plug B53) can be used to reset a “Watch Alarm Timer” (reset of dormant period).
Switch **1** to left position (ON)	Status-signal-connection “SENSOR 4 SELECTED”.
Switch **2** to right position (OFF)	NMEA identifier for all outputs is “HE” (identifier “GP” will be output as “HE”).
Switch **2** to left position (ON)	NMEA identifier for all outputs is “GP” (if a GPS is heading source).
Switch **3** to right position (OFF)	NMEA telegram type is HDT for all outputs which are configured as NMEA2.
Switch **3** to left position (ON)	NMEA telegram type is THS for all outputs which are configured as NMEA2.
Switch 4 to right position (OFF)	NMEA telegram type is HDT for all outputs which are configured as NMEA1.
Switch 4 to left position (ON)	NMEA telegram type is THS for all outputs which are configured as NMEA1.

Please note:
In the Distribution Unit adjusted NMEA formats must match to the adjusted formats of the connected repeater. Observe especially THS and HDT formats.

4.2.2.2 Setting of DV-bus address

For DV-bus application in the meaning of information to Distribution Unit for DV-bus operation and DV-bus address for the Distribution Unit see manual no.: 3648 “Operator unit 130-613” under section “DV-bus application”.

If there are performed adjustments or changes of adjustments referenced to the DV-bus, then the Distribution Unit must be reset, so that the adjustments become operative (see section 5.
This procedure has to be performed independent of the device in the system - crucial is the DV-bus application.

5 Power OFF-ON Procedures

Caution!
Power OFF-ON procedures and/or configuration changes must be permormed by trained an 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).

5.1 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).

5.2 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 below mentioned).

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 frontcover of the Distribution Unit.
- Press both RESET buttons, (located at each PC Board) if possible simultaneously.
  Button B6 at the Interface PCB and button B42 at the I/O PCB of the Distribution Unit (see respective manual of the Distribution Unit).
- Disconnect the Operator Unit from the terminal board L1 in the Distribution Unit for approx. 5 seconds and connect it again.
- Close the frontcover of the Distribution Unit and fix it with the screws.

6 Switching OFF the Distribution Unit

By switching OFF the supply voltage, the Distribution Unit is switched OFF.
All direct connected devices to the Distribution Unit, as there are compass, repeaters with supplied voltage and the Operator Unit are switched off as well.
A separate switching off of the Distribution Unit is not possible.

7 Maintenance and Repair

The Distribution Unit is maintenance free.
A repair is constrained to the exchange of the PCB's:

I/O PCB	Identnumber	see appended parts catalogue
Interface PCB	Identnumber	see appended parts catalogue

Operation during a repair (an end device is removed for example) can only be performed when the CAN-bus is terminated.
It is absolute necessary that the CAN-bus is terminated correctly on both ends.
If there is no terminator by jumpers within the respective devices, than each CAN-bus (CAN1 and CAN2) has to be terminated by, in total 4 resistors (each 125Ohm) from CAN-low to CAN-high.
See also section 1.1

Faults within the connected compass are not indicated. The have to be researched at the display of the respective compass.

7.1 Error indication

An error is displayed by a blinking “ERRO”.

Fig.28: Error display at the Distribution Unit

Operate the push button B 2 during an error is displayed.
Two different information can be displayed after that.

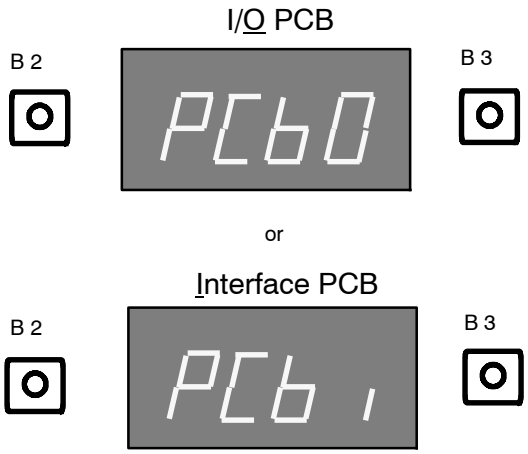


Fig.29: Display to determine an error

Error indication “PCB0” points to a faulty I/O PCB, an error indication “PCBI” points to a faulty Interface PCB.
Measures to continue determination of the error source:

PCB0 (I/O PCB)

PCB Type Error Type

Operate both push buttons B 2 and B 3 at the same time.
Display = “Er.02” means: I/O PCB faulty (internal supply voltage)
Display = “Er.01” means: I/O PCB or Interface PCB or both PCB‘s faulty
CAN-bus dialogue disturbed

PCBI (Interface PCB)

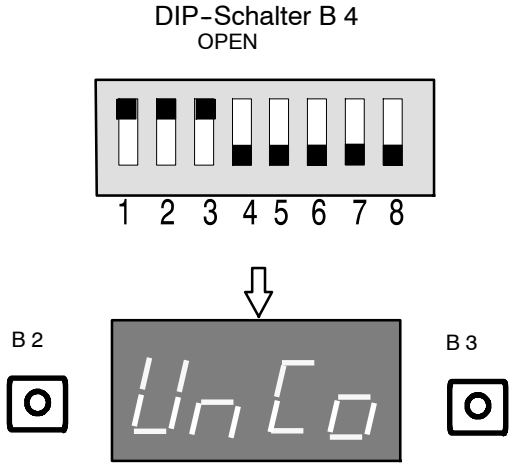
PCB Type Error Type

Operate both push buttons B 2 and B 3 at the same time.
Display = “Er.02” means: Interface PCB or I/O PCB or both PCB‘s faulty
CAN-bus dialogue disturbed
Display = “Er.01” means: Interface PCB faulty (internal voltage supply faulty)

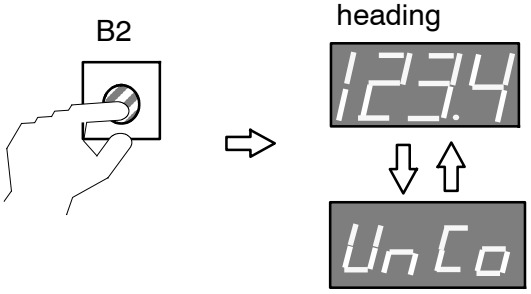
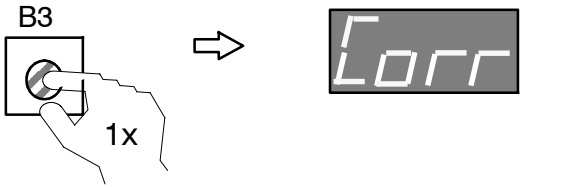
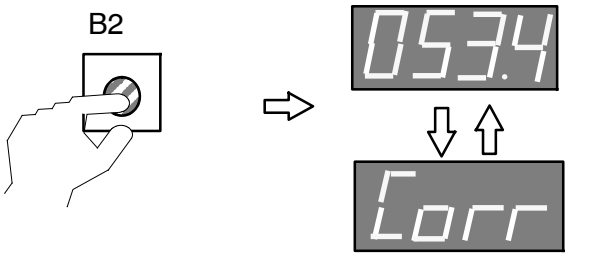
A check of the LEDs (according to section 1.6) can be helpful to isolate a fault.

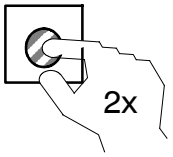
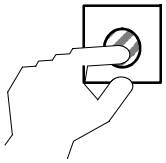
8 DIP switch settings in the Service mode

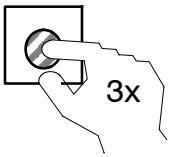
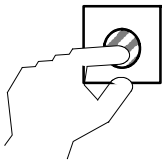
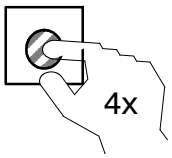
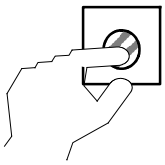
All data stated below should be selected and read out for servicing purposes only.
In standard operation the following data has no significance.
The Service Mode is switched ON with DIP-Switches 1, 2 and 3 into the upper position.

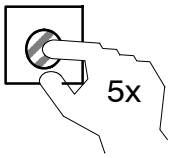
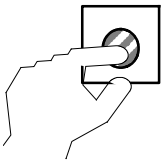
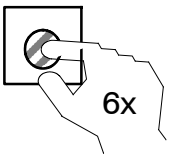
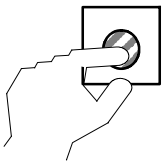


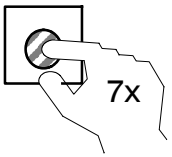
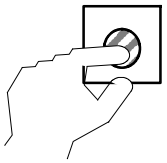
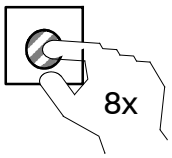
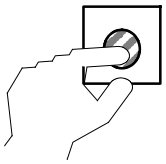
FOR SERVICE PERSONNEL ONLY

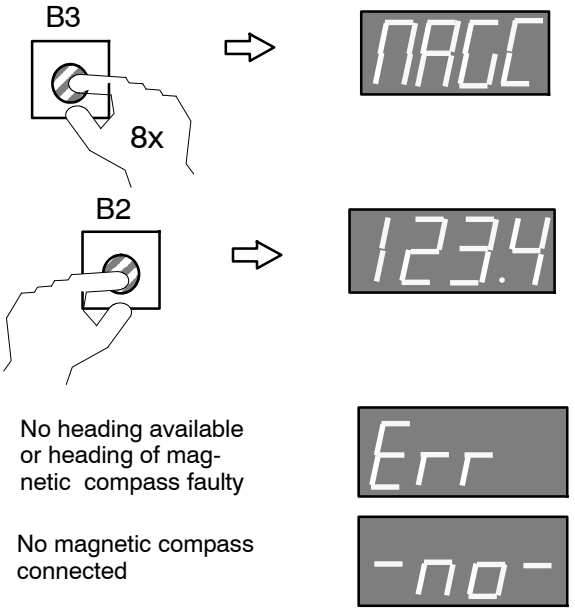
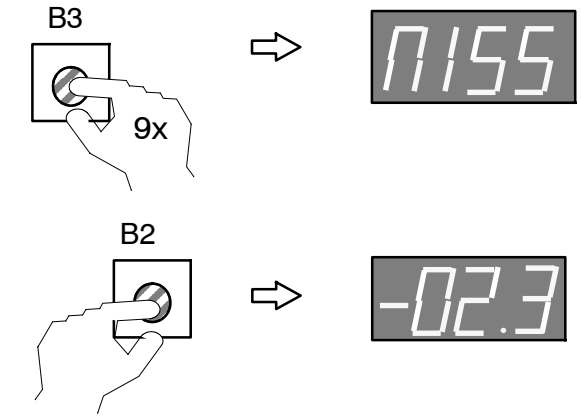
Seq. No.	Indications	Comments, Notes
1	UnCo = (Uncorrected Compass) = heading without speed error correction value.	
	DIP-Switch B4: positions 1,2 and 3 	Displays the un-corrected gyro heading 
2	Corr = Corrected course (course taking SEC into account)	
	DIP-Switch B4: positions 1,2 and 3	 
3	GYr1 = Displays corrected heading for Gyro compass 1	

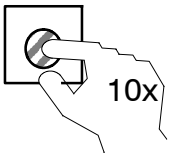
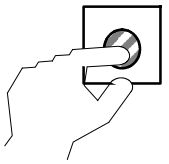
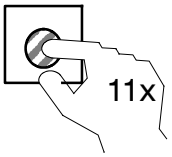
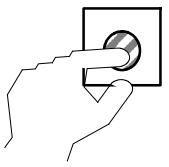
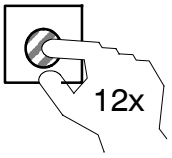
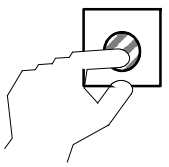
Seq. No.	Indications	Comments, Notes
	DIP-Switch B4: positions 1,2 and 3	B3   B2   If there is no "Gyro 1" connected. 

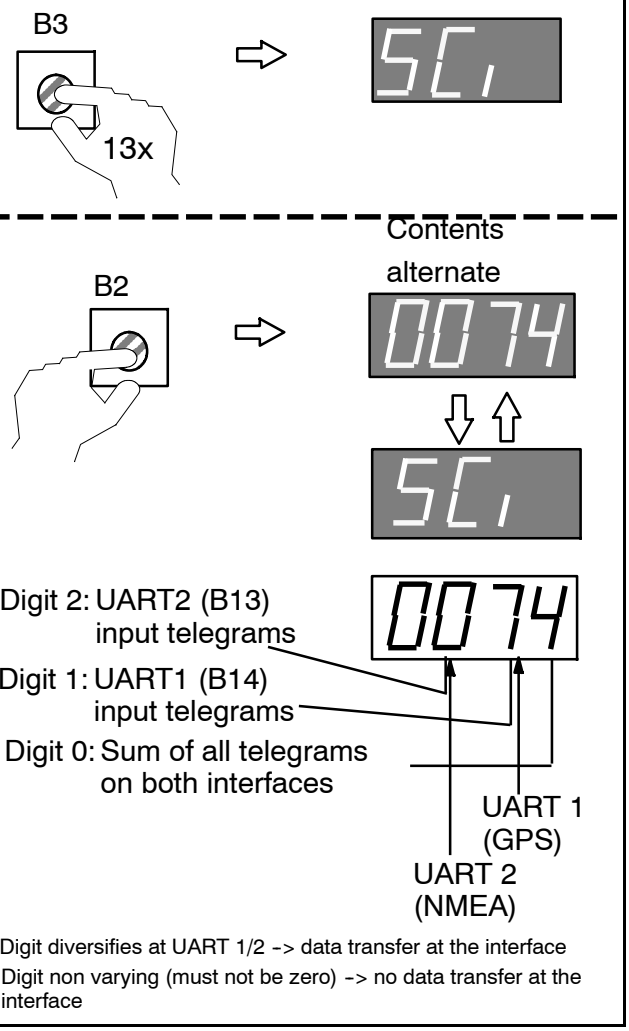
Seq. No.	Indications	Comments, Notes
4	Addr = Displays CAN-bus address for Gyro Compass 1	
	DIP-Switch B4: positions 1,2 and 3	B3   B2   If there is no "Gyro 1" connected. 
5	GYr2 = Displays corrected heading for Gyro compass 2	
	DIP-Switch B4: positions 1,2 and 3	B3   B2   If there is no "Gyro 2" connected. 

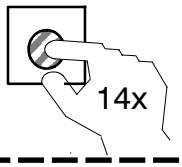
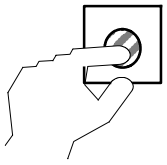
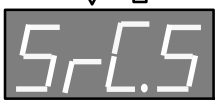
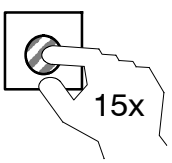
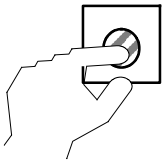
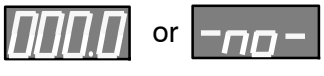
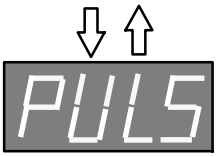
Seq. No.	Indications	Comments, Notes
6	Addr = Displays CAN-bus address for Gyro Compass 2	
	DIP-Switch B4: positions 1,2 and 3	B3   B2   If there is no "Gyro 2" connected. 
7	GYr3 = Displays corrected heading for Gyro compass 3	
	DIP-Switch B4: positions 1,2 and 3	B3   B2   If there is no "Gyro 3" connected. 

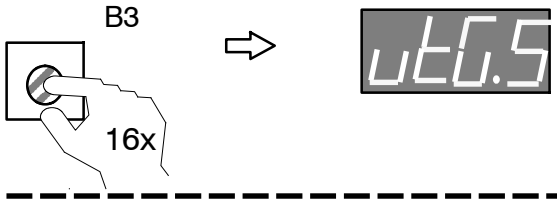
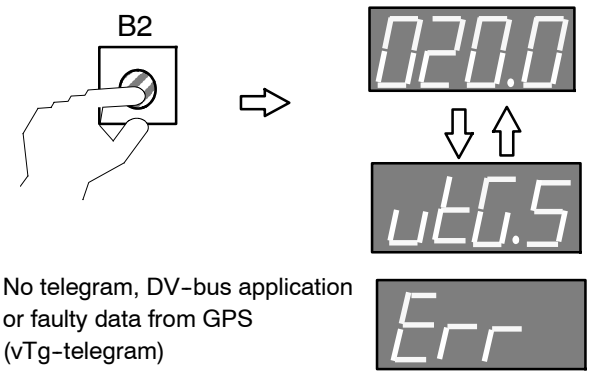
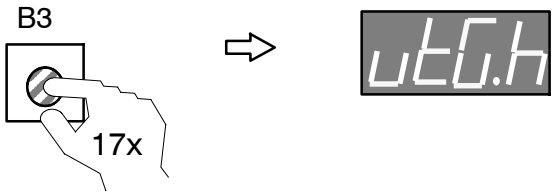
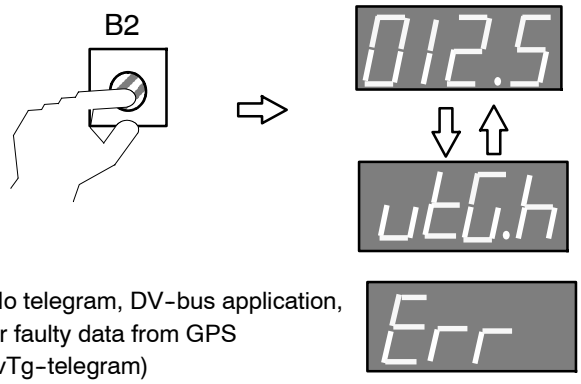
Seq. No.	Indications	Comments, Notes
8	Addr = Displays CAN-bus address for Gyro Compass 3	
	DIP-Switch B4: positions 1,2 and 3	B3   B2   If there is no "Gyro 3" connected. 
9	MAGS = Displays heading of magnetic compass	
	DIP-Switch B4: positions 1,2 and 3	B3   B2   No heading available or heading of magnetic compass faulty  No magnetic compass connected 

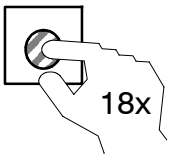
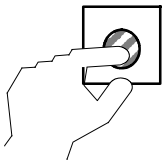
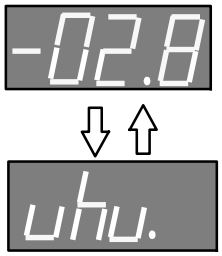
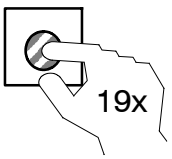
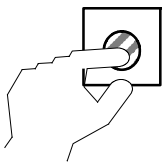
Seq. No.	Indications	Comments, Notes
10	MAGC = Displays corrected heading or magnetic compass Deviation and variation included	
	DIP-Switch B4: positions 1,2 and 3	
11	MISS = Displays Variation value	
	DIP-Switch B4: positions 1,2 and 3	

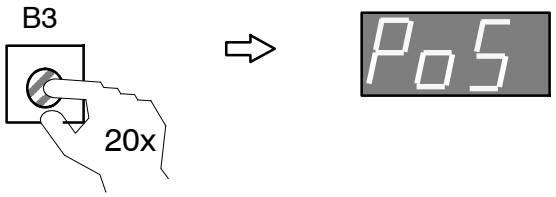
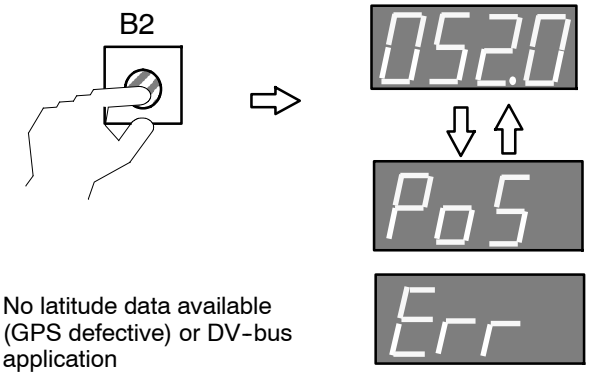
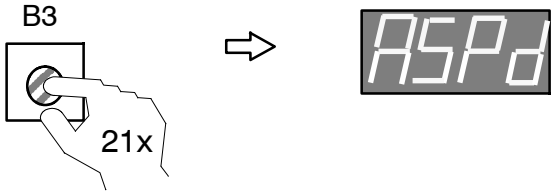
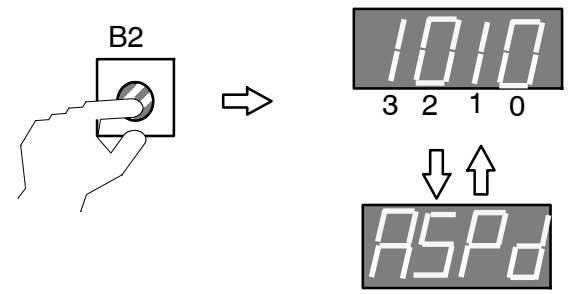
Seq. No.	Indications	Comments, Notes
12	dEvI = Displays deviation value Value out of an internal table, respective to the actual magnetic compass heading	
	DIP-Switch B4: positions 1,2 and 3	B3   B2  
13	Mrot = Displays Rate of Turn of the magnetic compass	
	DIP-Switch B4: positions 1,2 and 3	B3   B2   Display : Degree per minute Sign negative: Direction Port
14	V-M = Displays this speed, which is manually set at the Operator Unit	
	DIP-Switch B4: positions 1,2 and 3	B3   B2   Range: -90.0....90.0

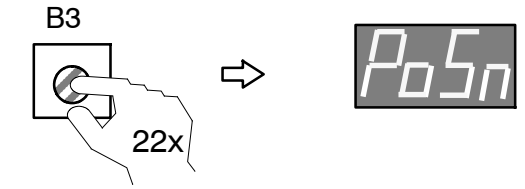
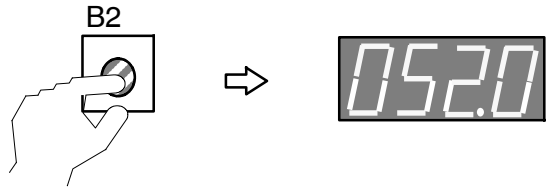
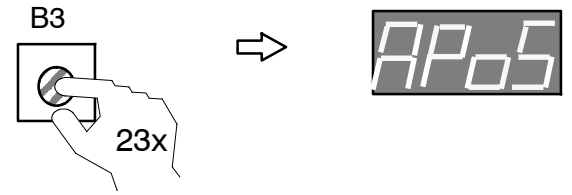
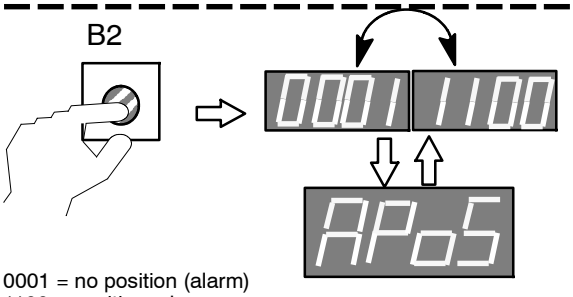
Seq. No.	Indications	Comments, Notes
15	SCi = Serial Interface, telegram traffic on serial interface	
	DIP-Switch B4: positions 1,2 and 3	 Digit diversifies at UART 1/2 -> data transfer at the interface Digit non varying (must not be zero) -> no data transfer at the interface

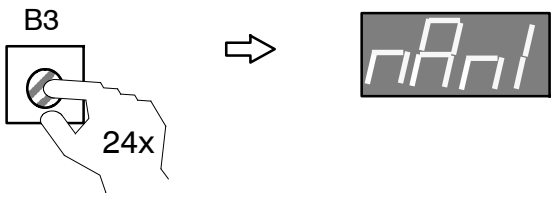
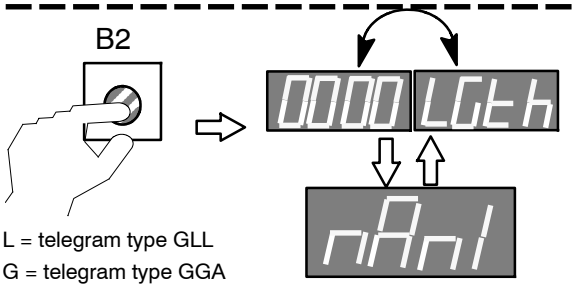
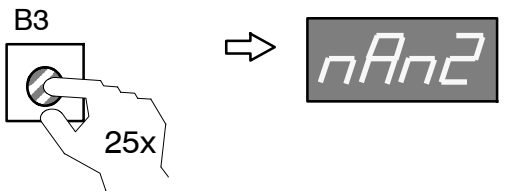
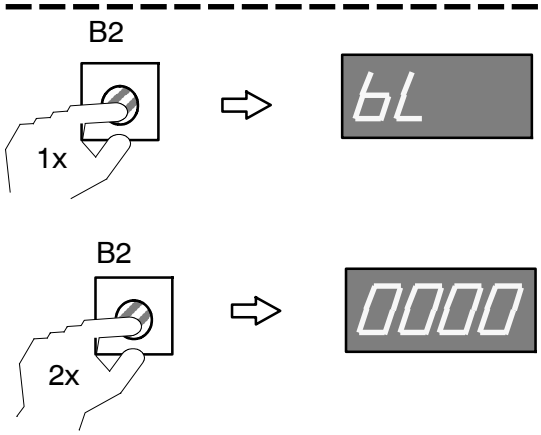
Seq. No.	Indications	Comments, Notes
16	SrC.S = Source of Speed Information Data about the source providing the speed value	
	DIP-Switch B4: positions 1,2 and 3	B3   B2    Display options:  PULS = Puls log* vTg = Speed over ground vhW = Speed through water (vtG and vhW corresponds to NMEA 0183) *also shown in DV-bus application
17	PULS = Speed value from puls 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 - 80Kts to + 80 Kts (astern and ahead)	
	DIP-Switch B4: positions 1,2 and 3	B3   B2   

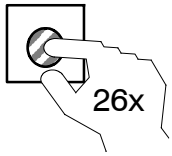
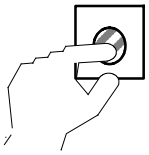
Seq. No.	Indications	Comments, Notes
18	vtG.S = Speed from GPS-telegram (speed over ground)	
	DIP-Switch B4: positions 1,2 and 3	
		 No telegram, DV-bus application or faulty data from GPS (vTg-telegram)
19	vtG.h = Course value from GPS telegram	
	DIP-Switch B4: positions 1,2 and 3	
		 No telegram, DV-bus application, or faulty data from GPS (vTg-telegram)

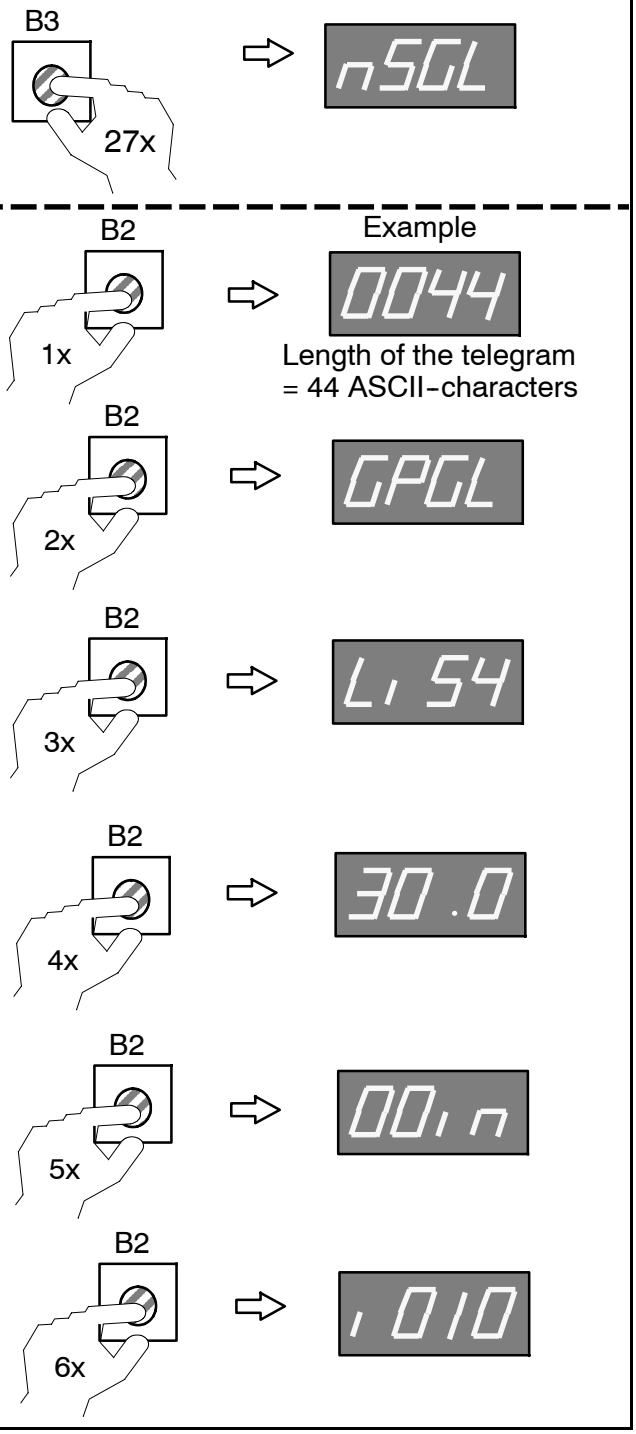
Seq. No.	Indications	Comments, Notes
20	vhw = Speed value in knots from NMEA telegram (speed through water)	
	DIP-Switch B4: positions 1,2 and 3	B3  
		B2  
		No telegram, DV-bus application, or faulty serial speed data (vHw-telegram) 
21	SPd.A = Speed in knots (actual value) (or value from DV-bus) The speed for which the source has been selected, is displayed.	
	DIP-Switch B4: positions 1,2 and 3	B3  
		B2  
		In case of a fault the last actual speed is displayed.

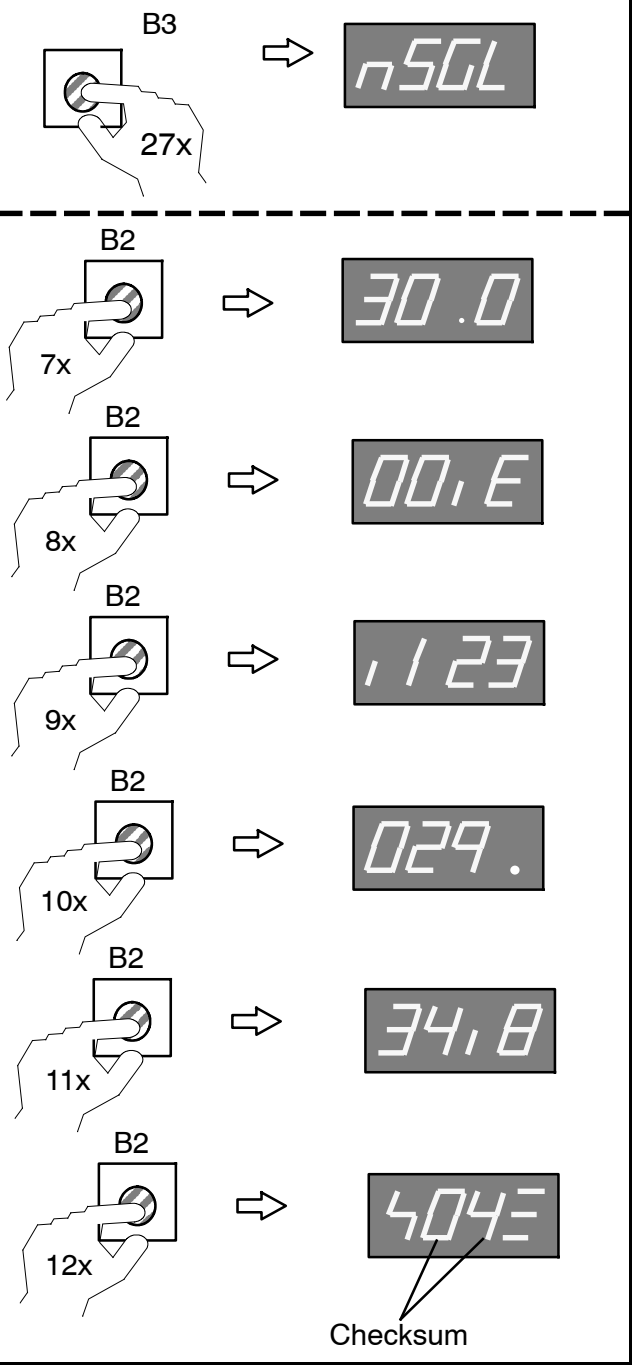
Seq. No.	Indications	Comments, Notes
22	PoS = Position - latitude in degrees	
	DIP-Switch B4: positions 1,2 and 3 Automatic latitude from GPS or actual latitude from the DV bus	  No latitude data available (GPS defective) or DV-bus application
23	ASPd = Alarm Speed	
	DIP-Switch B4: positions 1,2 and 3	 
	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 OK; Display 0: No Auto Speed Alarm	

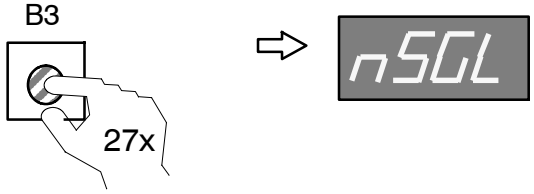
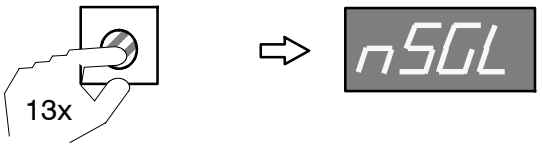
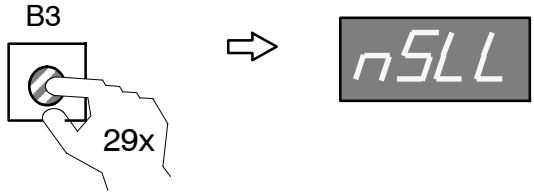
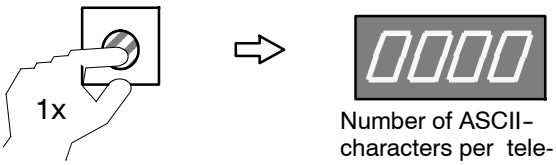
Seq. No.	Indications	Comments, Notes
24	PoSn = Latitude value derives from automatic latitude input. Indicated in degrees	
	DIP-Switch B4: positions 1,2 and 3 Actual latitude (or manual set latitude value) or automatic latitude from the DV bus	  In case of a fault, the last actual latitude is displayed.
25	APoS = Alarm position input	
	DIP-Switch B4: positions 1,2 and 3	  0001 = no position (alarm) 1100 = position o.k.

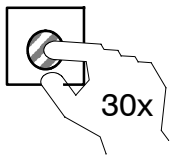
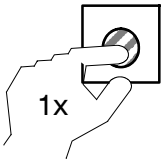
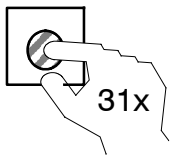
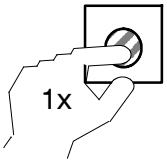
Seq. No.	Indications	Comments, Notes
26	nAn1 = 1st table for NMEA-requests	
	DIP-Switch B4: positions 1,2 and 3	  L = telegram type GLL G = telegram type GGA t = telegram type VTG h = telegram type VHW 1st digit = number of L-types 2nd digit = number of G-types 3rd digit = number of t-types 4th digit = number of h-types
27	nAn2 = nd table for NMEA-requests	
	DIP-Switch B4: positions 1,2 and 3	  b = telegram type VBW l = telegram type SLL 1st digit = number of b-types 2nd digit = number of l-types

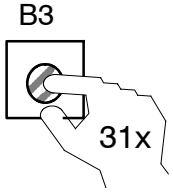
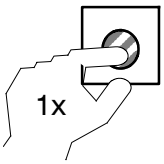
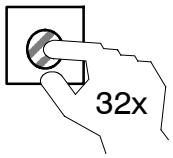
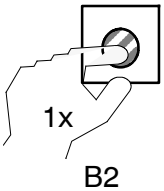
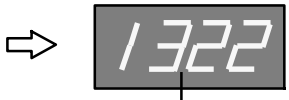
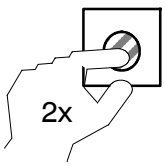
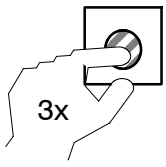
Seq. No.	Indications	Comments, Notes
28	nSGG = NMEA-telegram (strings of the GGA-telegram)	
	DIP-Switch B4: positions 1,2 and 3	B3   B2   Number of ASCII-characters per telegram 0000 = no telegram The number of operations depends on the number of characters. (1 display content = max. 4 ASCII-characters) **See sequ. no. 29**

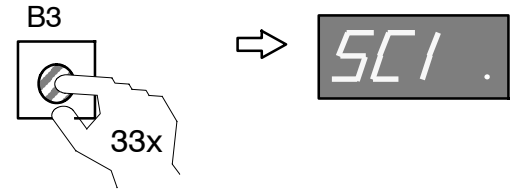
Seq. No.	Indications	Comments, Notes
29	nSGL = NMEA-telegram (String of the GLL-telegram)	
	DIP-Switch B4: positions 1,2 and 3	

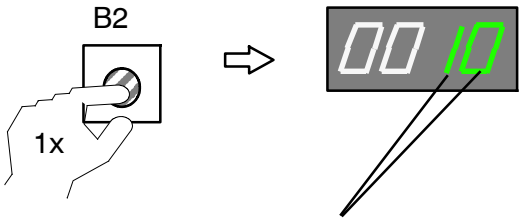
Seq. No.	Indications	Comments, Notes
cont. 29	nSGL = NMEA-telegram (Strings of the GLL-telegram)	
	DIP-Switch B4: positions 1,2 and 3	

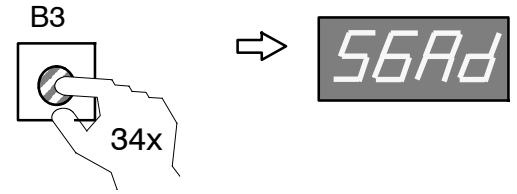
Seq. No.	Indications	Comments, Notes
cont. 29	nSGL = NMEA-telegram (Strings of the GLL-telegram)	
	DIP-Switch B4: positions 1,2 and 3	B3  B2 
	With the 1st operation of the contact switch B2, the number of ASCII-characters is displayed. If the display shows “0000”, no telegram-output took place. With every further operation of contact switch, 4 consecutive ASCII-characters are displayed.	
30	nSLL = NMEA-telegram (Strings of the SLL-telegram)	
	DIP-Switch B4: positions 1,2 and 3	B3  B2  Number of ASCII-characters per telegram 0000 = no telegram The number of operations depends on the number of characters (1 display content = max. 4 ASCII-characters) **See seq. no. 29**

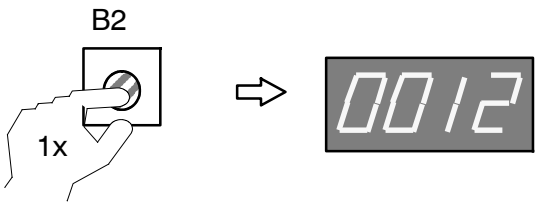
Seq. No.	Indications	Comments, Notes
31	nShw = NMEA-telegram (Strings of the VHW-telegram)	
	DIP-Switch B4: positions 1,2 and 3	B3   B2   Number of ASCII-characters per telegram 0000 = no telegram The number of operations depends on the number of characters. (1 display content = max. 4 ASCII-characters) **See seq. no. 29**
32	nStG = NMEA-telegram (Strings of the VTG-telegram)	
	DIP-Switch B4: positions 1,2 and 3	B3   B2   Number of ASCII-characters per telegram 0000 = no telegram The number of operations depends on the number of characters. (1 display content = max. 4 ASCII-characters) **See seq. no. 29**

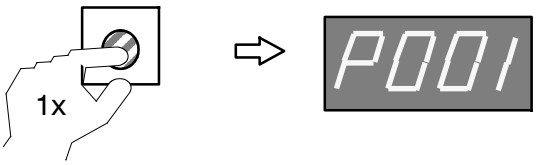
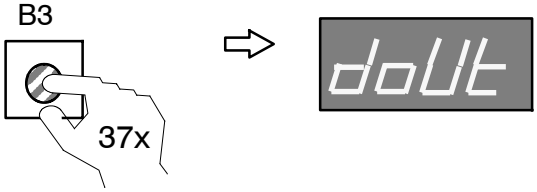
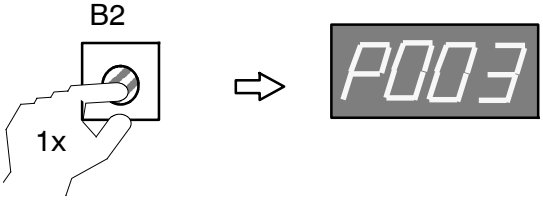
Seq. No.	Indications	Comments, Notes
33	nSbw = NMEA-telegram (String of the VBW-telegram)	
	DIP-Switch B4: positions 1,2 and 3	B3  
		B2   Number of ASCII-characters per telegram 0000 = no telegram The number of operations depends on the number of characters. (1 display content = max. 4 ASCII-characters) **See seq. no. 29**
34	tIME = Time since activating speed error correction (Reset with power-off)	
	DIP-Switch B4: positions 1,2 and 3	B3  
		B2   days hours (max. 99 B2   minutes Seconds B2  

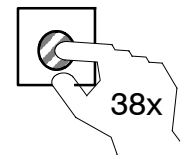
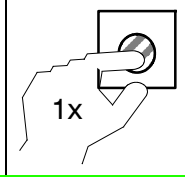
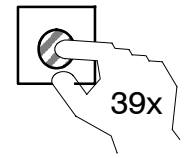
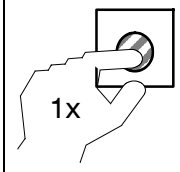
<table>
<tr><th>Seq. No.</th><th>Indications</th><th>Comments, Notes</th></tr>
<tr><td>35</td><td colspan="2">Development only!
SCI . = Serial Communication Interface
NMEA Log/ GPS input)</td></tr>
<tr><td></td><td>DIP-Switch B4:
positions 1,2 and 3</td><td> 



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.</td></tr>
<tr><td>36</td><td colspan="2">SGAd = CAN-bus address of selected gyro sensor</td></tr>
<tr><td></td><td>DIP-Switch B4:
positions 1,2 and 3</td><td> 


</td></tr>
</table>

Seq. No.	Indications	Comments, Notes
37	AAdd = Alarm address of a defective Gyro compass	
	DIP-Switch B4: positions 1,2 and 3	B3  B2  0000 → no faulty Gyro otherwise the CAN address.
38	dUin = Software version of the CAN-bus processor of the Interface PCB	
	DIP-Switch B4: positions 1,2 and 3	B3  B2 
39	doUt = Software version of the I/O-PCB of the Distribution Unit	
	DIP-Switch B4: positions 1,2 and 3	B3  B2 

Seq. No.	Indications	Comments, Notes
40	dubS = Software version of the DV-bus processor of the Interface PCB	
	DIP-Switch B4: positions 1,2 and 3	B3   B2  
41	UTC = Time of *ZDA-Telegram	
	DIP-Switch B4: positions 1,2 and 3	B3   B2   Hours 2x ⇨ Minutes Seconds 3x ⇨ Day Month 4x ⇨ Year
With this signal the time for a connected course printer is synchronised. This UTC-signal normally is received via a GPS receiver. The signal may be connected at terminal board L2, terminal 15 (RX+) and terminal 16 (RX-)		

8.1 Table of DIP-switch functions

DIP-switch	Step	Display	Function	Push button B2 (left)	Push button B3 (right)
7+8	1	Addr.	CAN-bus address setting of Distribution Unit and external heading sensors.	choose device	select
	2	"number" of address	Adjusting the respective address.	upwards	downwards
3		CHEc	Display test and Relay test (all relays are active) (Display 8.8.8.8)	no function	start
4	1	nG03	Type of Distribution Unit is displayed		
5	1	MAGn	Magnetic compass activation		
	2	MAGn	Bring display to flash to activate input	choose	set
8		nME1	NMEA channel 1 configuration		
	1	CY.1	Adjusting Baudrate: 1/sec, 4800Bd	choose	set
	2	CY.10	Adjusting Baudrate: 10/sec, 4800Bd	choose	set
	3	cY.10	Adjusting Baudrate: 10/sec, 9600Bd	choose	set
	4	CY.50	Adjusting Baudrate: 50/sec, 38.4kBd	choose	set
	5	EHdT	Select for HEHDT telegram	choose	set
	6	CHdT	Select for HCHDT telegram	choose	set
	7	IHdG	Select for HCHDG telegram	choose	set
	8	IroT	Select for TIROT telegram	choose	set
	9	EroT	Select for HEROT telegram	choose	set
7		nME2	NMEA channel 2 configuration		
	1	CY.1	Adjusting Baudrate: 1/sec, 4800Bd	choose	set
	2	CY.10	Adjusting Baudrate: 10/sec, 4800Bd	choose	set
	3	cY.10	Adjusting Baudrate: 10/sec, 9600Bd	choose	set
	4	CY.50	Adjusting Baudrate: 50/sec, 38.4kBd	choose	set
	5	EHdT	Select for HEHDT telegram	choose	set
	6	CHdT	Select for HCHDT telegram	choose	set
	7	IHdG	Select for HCHDG telegram	choose	set
	8	IroT	Select for TIROT telegram	choose	set
	9	EroT	Select for HEROT telegram	choose	set

DIP-switch	Step	Display	Function	Push button B2 (left)	Push button B3 (right)
1+2+3		UnCo	Uncorrected course without SEC	display	choose
	1	Corr	Corrected course with SEC	display	choose
	2	Gyr1	Uncorrected heading of gyro 1	display	choose
	3	Addr	CAN-bus address of gyro 1	display	choose
	4	Gyr2	Uncorrected heading of gyro 2	display	choose
	5	Addr	CAN-bus address of gyro 2	display	choose
	6	Gyr3	Uncorrected heading of gyro 3	display	choose
	7	Addr	CAN-bus address of gyro 3	display	choose
	8	NAGS	Uncorrected heading of magnetic compass	display	choose
	9	NAGC	Corrected heading of magnetic compass	display	choose
	10	NISS	Variation value	display	choose
	11	dEul	Deviation value	display	choose
	12	Nrot	Rate of turn of magnetic compass	display	choose
	13	u_N	Manual speed input from operator unit	display	choose
	14	Sci	Telegram traffic on serial interface	display	choose
	15	SrC.S	Speed source information	display	choose
	16	PULS	Speed value from puls log	display	choose
	17	vtG.S	Speed value from GPS	display	choose
	18	vtG.h	Course value from GPS	display	choose
	19	uhu.	Speed value from NMEA telegram (vhw)	display	choose
	20	SPD.A	Selected speed value in knots	display	choose
	21	PoS	Latitude in degrees	display	choose
	22	ASPD	Alarm speed information	display	choose
	23	PoSn	Latitude from automatic latitude input	display	choose
	24	APoS	Alarm position input information	display	choose
	25	nAn1	1st table of NMEA requests	display	choose
	26	nAn2	2nd table of NMEA requests	display	choose
	27	nSGG	String of GGA telegram	display	choose
	28	nSGL	String of GLL telegram	display	choose
	29	nSLL	String of SLL telegram	display	choose
	30	nShu	String of VHW telegram	display	choose
	31	nStG	String of VTG telegram	display	choose
	32	nSbu	String of VBW telegram	display	choose
	33	tINE	Time since activating SEC	display	choose
	34	SCI	Display serial communication interface	display	choose
	35	SGAd	CAN-bus address of selected sensor	display	choose
	36	AAdd	Alarm address of defective Gyro	display	choose
	37	dUIn	Software version interface pcb processor	display	choose
	38	doUt	Software version I/O pcb processor	display	choose
	39	dubs	Software version DV-bus processor	display	choose
	40	UtC	Time telegram content	display	choose
6+7+8	1	Chn1	Output channels 1-8 data selection	choose	
	2	HSEr	Select for Course bus (LED red)	choose	set

DIP-switch	Step	Display	Function	Push button B2 (left)	Push button B3 (right)
	3	nME1	Select for NMEA, 1/sec (LED green)	choose	set
	4	nME2	Select for NMEA, 10/sec (LED blue)	choose	set
	5	H180	Select for Course bus +180° offset	choose	set
	6	Chn2		choose	
	7	HSEr	Select for heading serial (LED red)	choose	set
	8	nME1	Select for NMEA, 1/sec (LED green)	choose	set
	9	nME2	Select for NMEA, 10/sec (LED blue)	choose	set
	10	H180	Select for Course bus +180° offset	choose	set
	11	Chn3		choose	
	12	HSEr	Select for heading serial (LED red)	choose	set
	13	nME1	Select for NMEA, 1/sec (LED green)	choose	set
	14	nME2	Select for NMEA, 10/sec (LED blue)	choose	set
	15	H180	Select for Course bus +180° offset	choose	set
	16.....	CHn4....12		choose	
		Same procedure than for channels above			
6	1	-ro-	RoT analog output scaling	choose	
	2	r30	Select for 30°/minute	choose	set
	3	r100	Select for 100°/minute	choose	set
	4	r300	Select for 300°/minute	choose	set
	5	Gy	Select for analog heading output	choose	set

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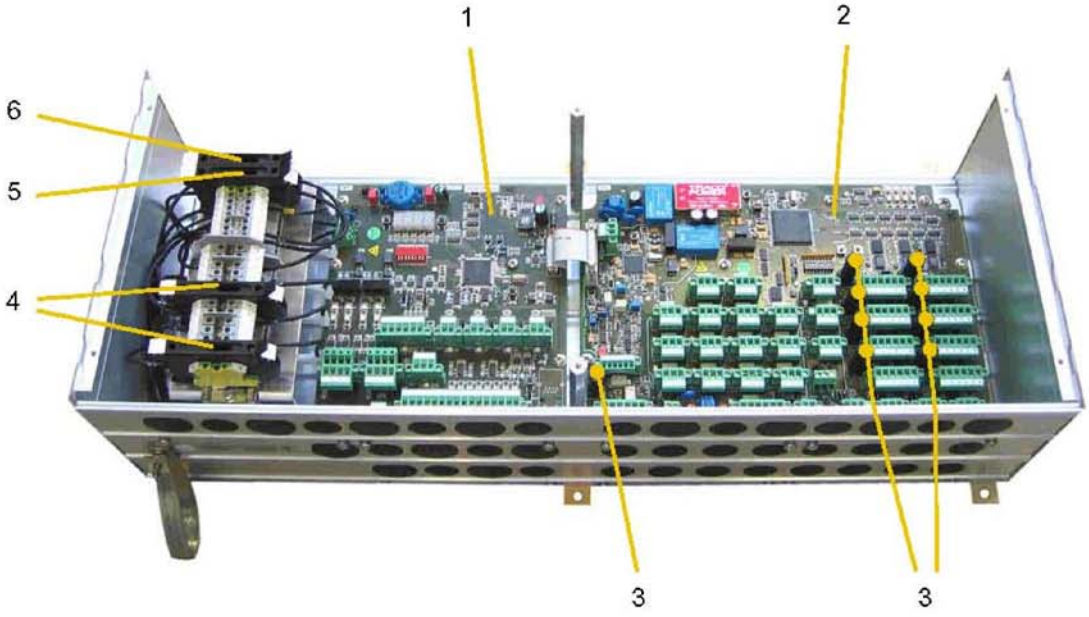

Pos.	Benennung	Designation	Zeichnungs-Nr. Part-No.	Stck. Qty.	Lager-Nr. Stock-No.	Herst.- Code MFRC	Versorgungs-Nr. NSN
1	Interface PCB, AT	Interface PCB, recond.	138-118.105 E01 AT	1	3610542	D2865	
2	I/O PCB, AT	I/O PCB, recond.	138-118.106 AT	1	3610500	D2865	
3	G-Sicherungseinsatz	Fuse	T 1 A L 250 V IEC 127-2	9	1762017	D3841	5920-12-167-4252
4	G-Sicherungseinsatz	Fuse	T 10 A 250 V 189140 10	2	1762137	D2598	5920-00-780-8905
5	G-Sicherungseinsatz	Fuse	T 2 A 250 V 19313	1	1762138	D3841	5920-12-302-1358
6	G-Sicherungseinsatz	Fuse	T 1,6 A 250 V 19313	1	1762090	D3841	5920-00-117-8280

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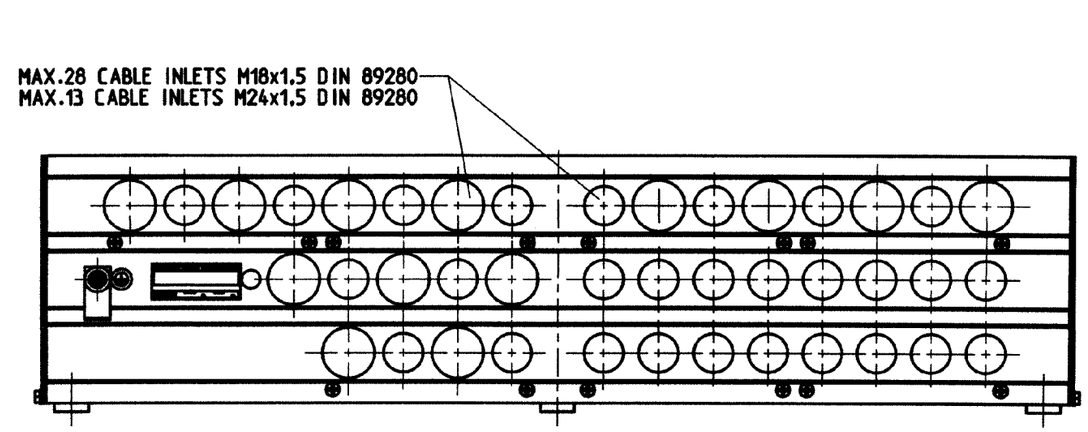
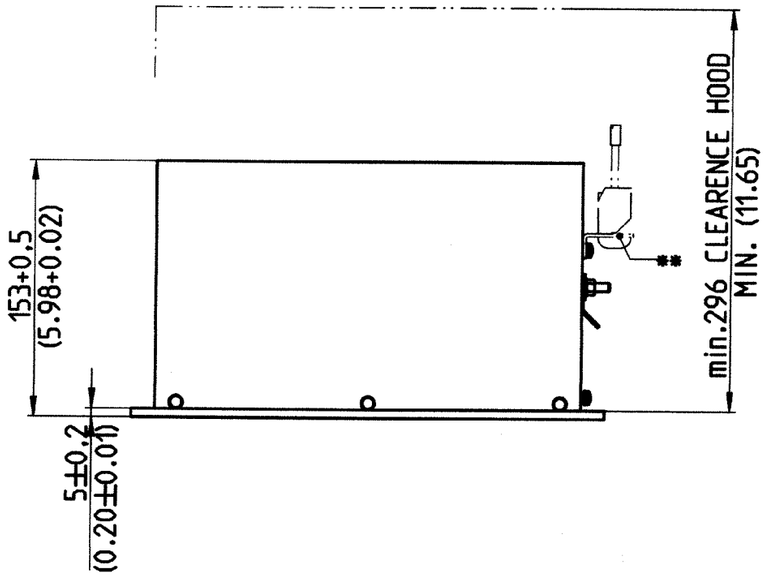
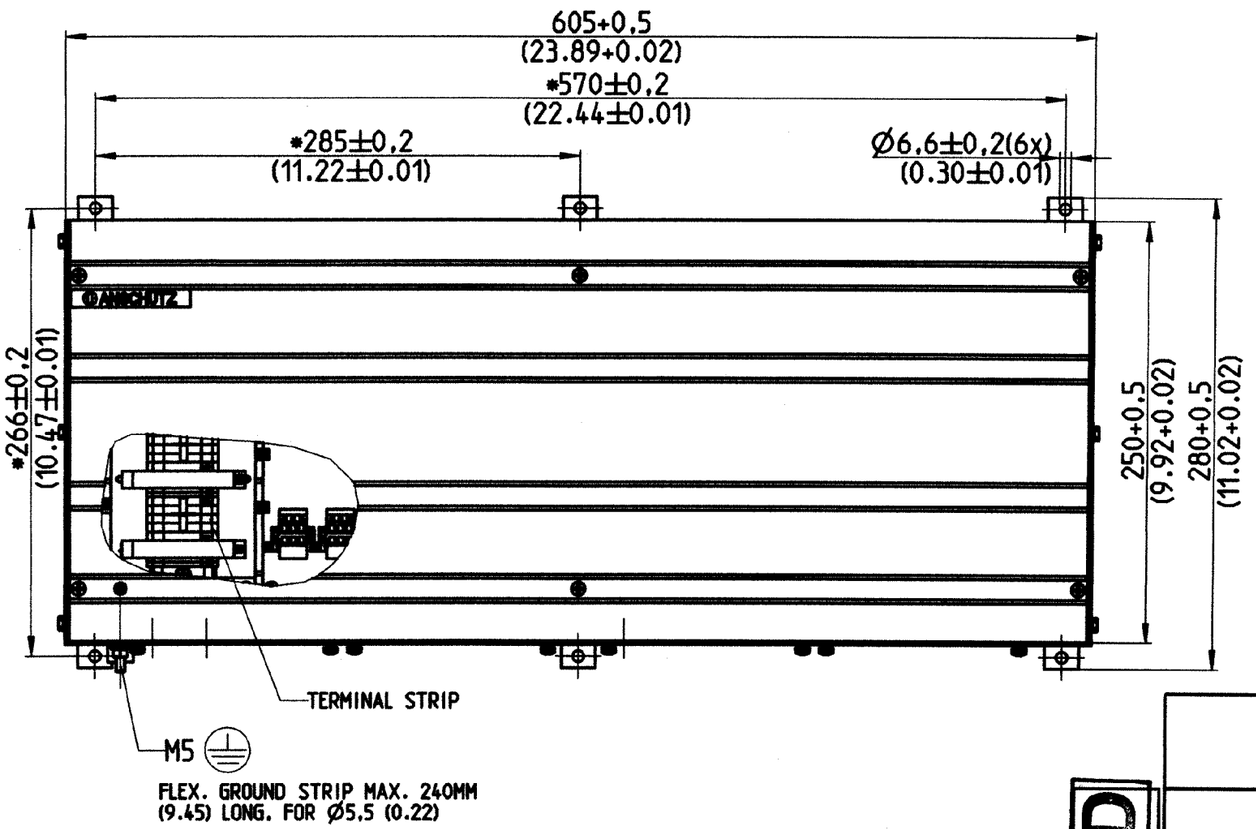






OPTIONAL:
CABLE INLETS: 7X 148-406 (3XM18, 2XM24)
4X 148-608 (2XM18)
** SHIELDING CLAMP: 7X 148-606 (Ø=8 TILL Ø=20)

ON 148-606 (SHIELDING CLAMP) APPLICATIONS,
TYPE OF ENCLOSURE IP22 IS ONLY VALID WITH
WALL MOUNTING AND CABLE OUTPUTS DOWNWARDS.

TYPE OF ENCLOSURE EN 60529 IP 22 - BULKHEAD MOUNTED

* REFERRING TO DRILLING SCHEME ON BOARD

DIMENSIONS WITHOUT TOLERANCES ARE MAXIMUM DIMENSIONS

DISTANCE FROM MAGNETIC COMPASS
STANDARD TYPE: 0,30 m
STEERING TYPE: 0,30 m

mm (INCH)

CAD

REV.	REVISIONS	DATE	NAME
E	0600931	30.08.06	Zm
D	1028.138	12.01.05	ZM
C	K228	29.07.04	Zm
B	1020.138	21.04.04	ZM
A	1002.138	27.08.03	ZM

	DATE	NAME
DR.	12.01.05	Zm
APPR.	6.9.06	
CHK.	27.9.06	
RELEASE:	26.06.03	

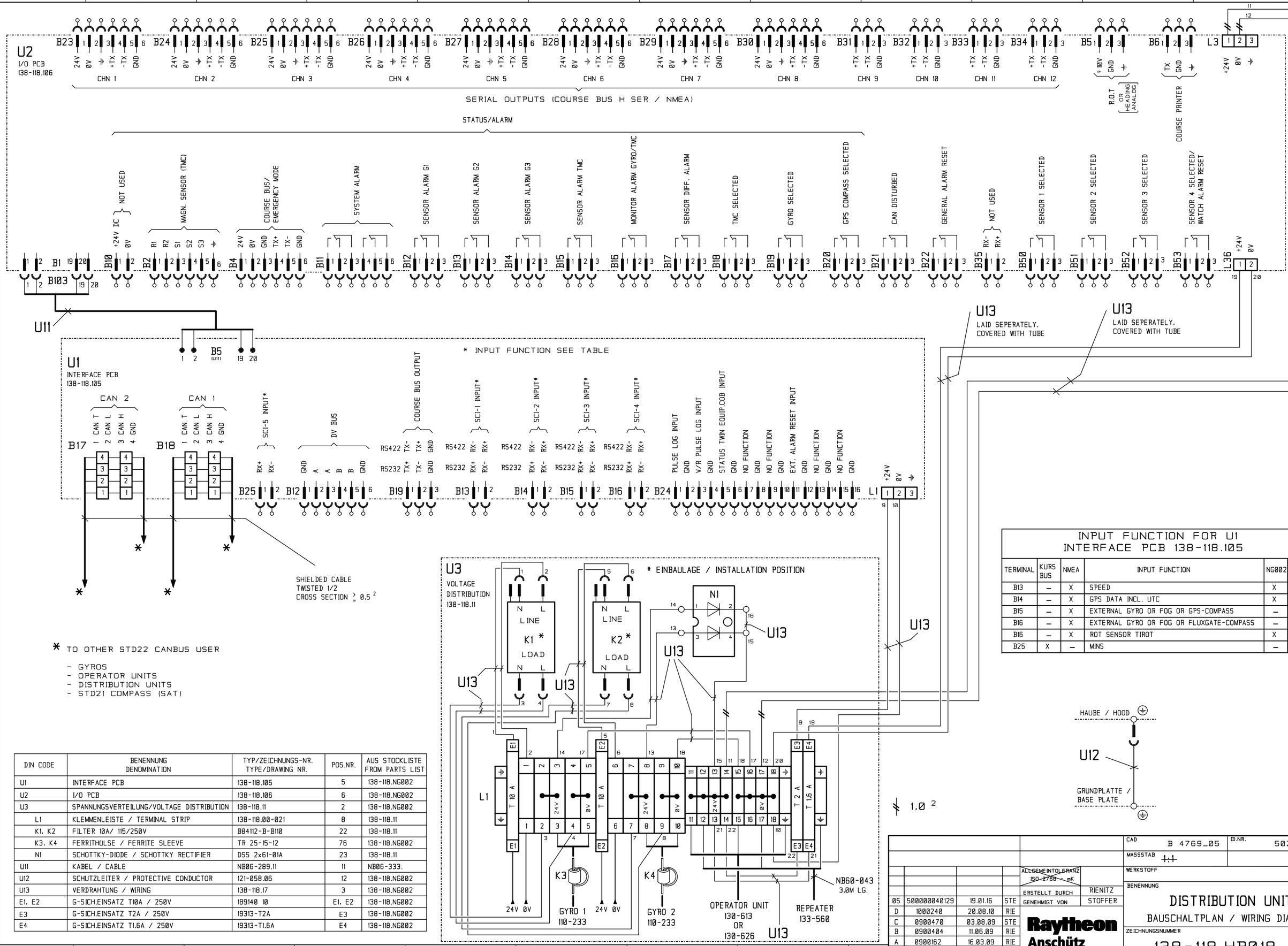
Raytheon Anschütz

CAD 3D | Id.Nr. 5014432

SCALE: - | WEIGHT: ca. 7,5 Kg

DRAWING TITLE:
Distribution Unit
DIMENSIONAL DRAWING

DRAWING NO.: 138-118.HP005 | SH. 1 | OF 1



INPUT FUNCTION FOR U1 INTERFACE PCB 138-118.105

TERMINAL	KURS BUS	NMEA	INPUT FUNCTION	NG002	NG003
B13	–	X	SPEED	X	X
B14	–	X	GPS DATA INCL. UTC	X	X
B15	–	X	EXTERNAL GYRO OR FOG OR GPS-COMPASS	–	X
B16	–	X	EXTERNAL GYRO OR FOG OR FLUXGATE-COMPASS	–	X
B16	–	X	ROT SENSOR TIROT	X	X
B25	X	–	MINS	–	X

DIN CODE	BENENNUNG DENOMINATION	TYP/ZEICHNUNGS-NR. TYPE/DRAWING NR.	POS.NR.	AUS STOCKLISTE FROM PARTS LIST
U1	INTERFACE PCB	138-118.105	5	138-118.NG002
U2	I/O PCB	138-118.106	6	138-118.NG002
U3	SPANNUNGSVERTEILUNG/VOLTAGE DISTRIBUTION	138-118.11	2	138-118.NG002
L1	KLEMMENLEISTE / TERMINAL STRIP	138-118.00-021	8	138-118.11
K1, K2	FILTER 10A/ 115/250V	BB4112-B-B110	22	138-118.11
K3, K4	FERRITHOLSE / FERRITE SLEEVE	TR 25-15-12	76	138-118.NG002
N1	SCHOTTKY-DIODE / SCHOTTKY RECTIFIER	DSS 2x61-01A	23	138-118.11
U11	KABEL / CABLE	NB06-289.11	11	NB06-333.
U12	SCHUTZLEITER / PROTECTIVE CONDUCTOR	121-058.06	12	138-118.NG002
U13	VERDRAHTUNG / WIRING	138-118.17	3	138-118.NG002
E1, E2	G-SICH.EINSATZ T10A / 250V	189140 10	E1, E2	138-118.NG002
E3	G-SICH.EINSATZ T2A / 250V	19313-T2A	E3	138-118.NG002
E4	G-SICH.EINSATZ T1.6A / 250V	19313-T1.6A	E4	138-118.NG002

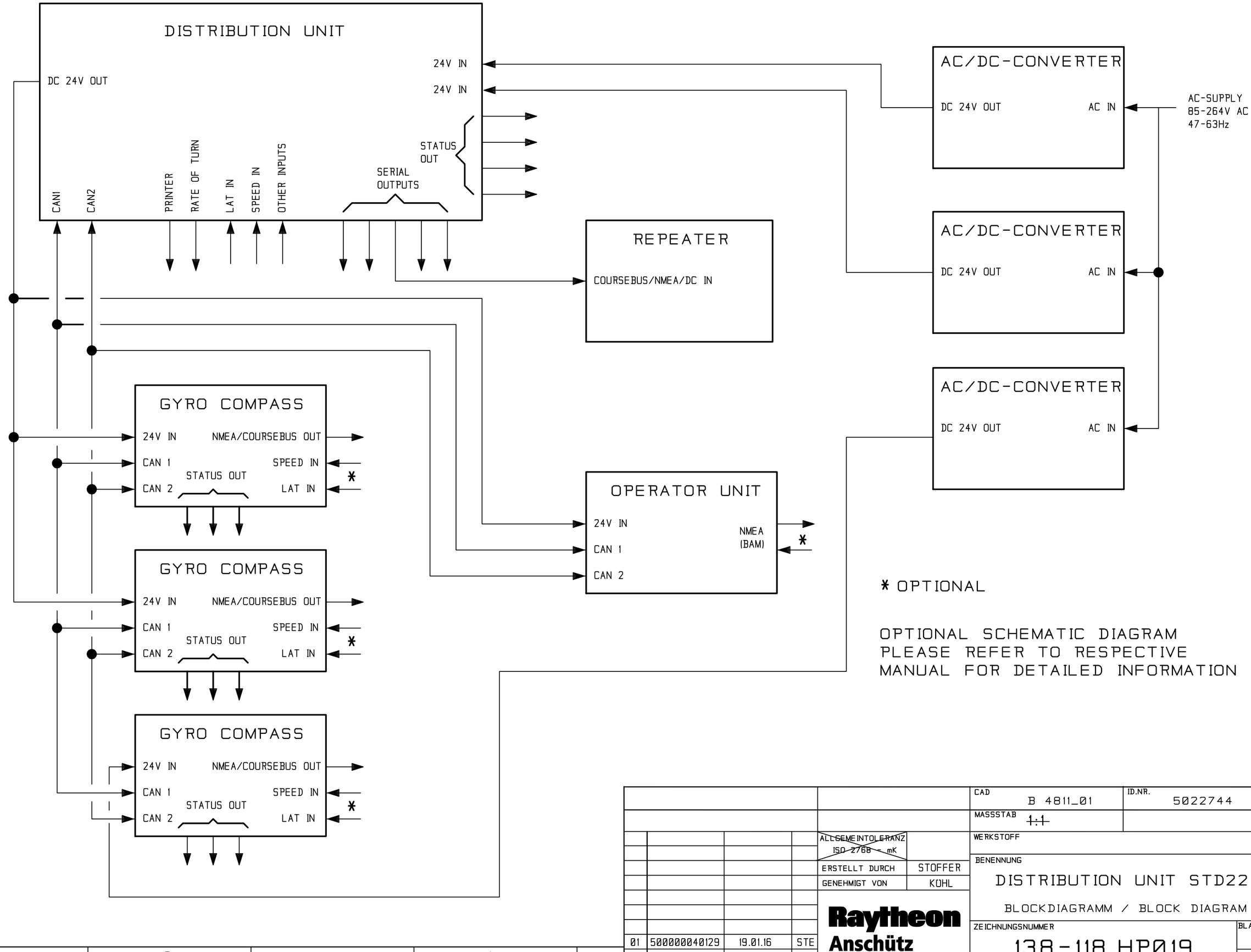
VER.	ÄNDERUNG	AUSGABEDATUM	NAME
05	5000000040129	19.01.16	STE
D	1000240	20.08.10	RIE
C	0900470	03.08.09	STE
B	0900404	11.06.09	RIE
A	0900162	16.03.09	RIE

ALLGEMEINTOLERANZ ISO 2768 – mK
ERSTELLT DURCH: RIENITZ
GENEHMIGT VON: STOFFER

Raytheon Anschütz

CAD: B 4769_05
ID.NR.: 5021478
MASSSTAB: 1:1
WERKSTOFF:
BENENNUNG: DISTRIBUTION UNIT
BAUSCHALTPLAN / WIRING DIAGRAM
ZEICHNUNGSNUMMER: 138-118.HP018
BLATT: 1
VON:

A3-D



* OPTIONAL

OPTIONAL SCHEMATIC DIAGRAM
PLEASE REFER TO RESPECTIVE
MANUAL FOR DETAILED INFORMATION

VER.	ÄNDERUNG	AUSGABEDATUM	NAME
01	500000040129	19.01.16	STE

ALLGEMEINTOLERANZ ISO 2768 - mK

ERSTELLT DURCH: STOFFER
GENEHMIGT VON: KÜHL

Raytheon Anschütz

CAD: B 4811_01
ID.NR.: 5022744
MASSSTAB: 1:1
WERKSTOFF:
BENENNUNG: DISTRIBUTION UNIT STD22
BLOCKDIAGRAMM / BLOCK DIAGRAM
ZEICHNUNGSNUMMER: 138-118.HP019
BLATT: 1
VON: 1