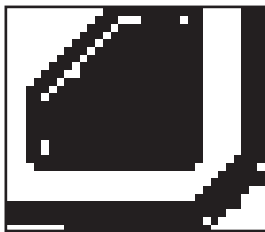
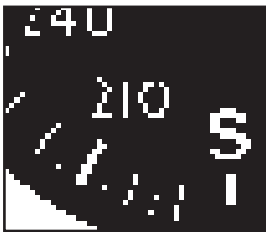
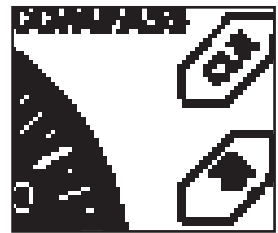


LOGIC COMPASS

Installation and Operating Instructions



LOGIC COMPASS

Installation and Operating Instructions

CONTENTS

Preface	42
Safety Instructions	43
Installation	43
Maintenance	44
 The VDO LOGIC COMPASS	 45
System components	46
Accessories	46
 The functions of the VDO LOGIC COMPASS	 47
Indications and Settings	47
Control keys	48
 Basic Settings	 49
Pointer damping adjustment	(<i>Damping</i>)... 50
Resetting average course and average distance	(<i>Reset Ø</i>) ... 51
Setting of desired course	(<i>Man. ⑥ ⑨</i>) .. 51
Setting of local magnetic deviation	(<i>Var.</i>)... 53
Automatic deviation adjustment	(<i>AutoCal.</i>) ... 54
Entering the sensor alignment	(<i>Align</i>) ... 56
Selection of NMEA data set	(<i>NMEA</i>) ... 58
 Main Functions	 59
Manual navigation assistance	(<i>Steer</i>) ... 60
Display of average course	(<i>Ø Head</i>)... 61
Display of average distance	(<i>Ø Dist</i>) ... 61
Display of course over ground	(<i>COG</i>) ... 62
Display of course to mark	(<i>CTM</i>) ... 62
Low voltage alarm	(<i>Alarm</i>)... 63
 Trouble Shooting	 64
 The NMEA interface	 65
Format of the NMEA data sets	66
 Maintenance of the VDO LOGIC COMPASS	 68

Installation of the VDO LOGIC COMPASS system	69
Installation of the indicating unit	69
Installation of the compass sensor	70
The Electrical installation	72
Electrical power supply	72
Repeater Connection.	73
NMEA Connection	74
Legend of Connection Diagram.	75
Cable Lengths	75
Technical Data	76

Dokument gehört immer an Bord!

Manual should always be kept on board!

PREFACE

With the purchase of a component from the VDO LOGIC system you selected a high-quality product, made to the accepted State of the Art. Advanced production methods and the respect of the applicable quality assurance standards guarantee that our products are shipped in excellent condition.

Thank you for your sound decision. We are certain that this system will provide you with valuable assistance and safety at sea.

You should be familiar with all functions of the system to guarantee easy and safe use of your VDO LOGIC COMPASS.

Please take the time to completely study this manual.

Your VDO Kienzle agent will be pleased to help you if, thereafter, you still have questions or problems.

Yours sincerely

VDO Kienzle Vertrieb und Service GmbH

© Copyright by VDO Kienzle Vertrieb und Service GmbH 1996
All rights reserved.

Safety Instructions

Please respect all instructions of this manual .

All texts marked with this symbol should have your particular attention. They are indications of particular importance for the operation of the system and for your safety.



The use of the compass system does not relieve you of your responsibility for your ship, which requires good seamanship. Always use your personal experience when interpreting the displayed values.

Safety Instructions concerning the installation

The compass system should be installed by your shipyard or by a compass specialist.

Use adequate working clothes when you install the system. Avoid clothing that may be caught by moving parts. Use a hair net if you have long hair.

Remove all metallic or electrically conducting jewellery, such as chains, bracelets, rings, etc. when working on the on-board electronics.

Disconnect the minus polarity at the battery before starting your work to prevent the risk of a short-circuit. Short-circuits can cause cable harness fires, battery explosions and damages of electronic memory systems. Please note that when you disconnect the battery, all volatile electronic memories will lose their contents, and will have to be re-programmed.

Run the engine compartment blower for a certain time before starting work in a gasoline engine compartment.

Check that there is enough room behind the installation opening. Pre-drill the opening and complete with keyhole saw (respect the safety instructions of the hand tool manufacturer).

SAFETY

Use insulated tools if you must work without disabling the power supply.

The electrical outputs of the compass display unit and the cables connected to them must be protected against direct contact or damage. This means that the cables must have a sufficient insulation resistance or voltage rating, and that touching the contact points is prevented.

Electrically conducting parts of the connected loads must also be protected by adequate measures against a direct contact. The use of non-insulated wires and contacts is strictly forbidden.

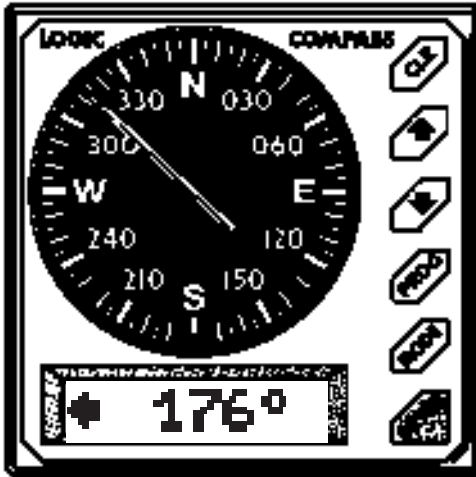
Safety Instructions concerning the maintenance

Repairs of compass system components can only be made by specialists authorized by VDO Kienzle. The VDO LOGIC compass system fulfills the applicable safety regulations.

Note: Capacitors in the unit can retain their charge, even if the unit is separated from its power supply.

Check that replacement fuses are of the indicated type and current rating. The use of temporarily repaired fuses or jumpering the fuse holder is strictly forbidden.

The VDO LOGIC COMPASS



The VDO LOGIC COMPASS is a reliable course indicating system designed for use in yachting.

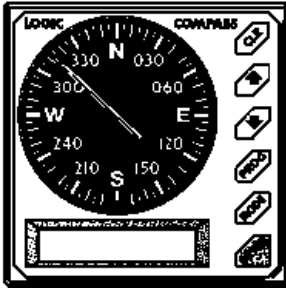
When in operation, the system displays the true course on an analogue graduation. Other values or help texts are displayed by an LC display beneath the dial.

The unit has six large keys on the unit front, logically allocated to the functions. This means that the unit is uncomplicated and easy to use.

This unit can be connected to other installed VDO LOGIC units (e.g. LOGIC MULTIFUNCTION, LOG or WIND) by the VDO LOGIC bus, and data can be transferred. The main display unit has a NMEA 0183 output for data transfer to and from the navigator.

A maximum of two additional repeater displays and an acoustical warning unit can be connected.

System components



The unit consists of:

- Display unit with protective cover
- Drilling template for indicating instrument installation
- Neoprene pad for indicating instrument
- Mounting parts kit for indicating instrument
- Fluxgate compass sensor
- Connecting cable from display unit to compass sensor, 10 m
- Connecting cable from display unit to another display unit (11 wires, length 0.4 m)
- Product certificate
- Installation and operating instructions

Accessories (must be ordered separately)

- Cover for compass sensor, 240.113/003/001
- Acoustical warning unit N03 230 502
- LOGIC Front bezel for acoustical warning unit N05 800 496
- Repeater display unit LOGIC COMPASS, N01 510 502
- Connecting cable from display unit to repeater unit (6 wires), per meter, X10.719/002/001
- Connecting cable from display unit to display unit (11 wires), per meter, X10.719/002/002
- Extension line display unit to compass sensor, 10 m, N05 800 950

The functions of the VDO LOGIC COMPASS

Indications

- Display of true compass course (indication by pointer)
- Desired course with navigation (indication by LC display)
- Average course 1) (indication by LC display)
- Average distance 1) (indication by LC display)
- Course over ground 2) (indication by LC display)
- Course to mark 2) (indication by LC display)
- Low voltage alarm (indication by LC display)

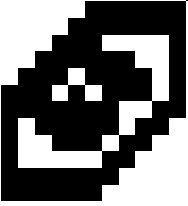
1) Only in combination with LOGIC LOG

2) Only in combination with a GPS navigator

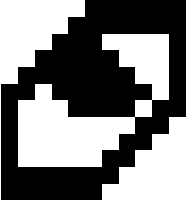
Settings

- Sensitivity selection, three degrees
- Reset of average course and average distance
- Setting of desired course for navigation assistance
- Setting of local compass deviation
- Automatic deviation adjustment
- Adjustment of sensor alignment
- Selection of NMEA data set

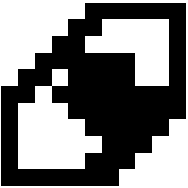
Control keys



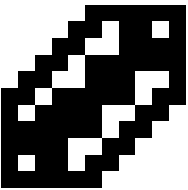
The “*CLEAR*”-key:
Use this key when programming the unit to reset values to zero.



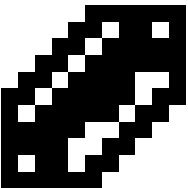
The “*UP ARROW*”-key:
This key increases set values. A short tip will increase the value by 1.0. The value will continuously increase if the key is held down.



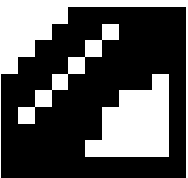
The “*DOWN ARROW*”-key:
This key decreases set values. A short tip will decrease the value by 1.0. The value will continuously decrease if the key is held down.



The “*PROG*”-key:
This key selects values for programming..



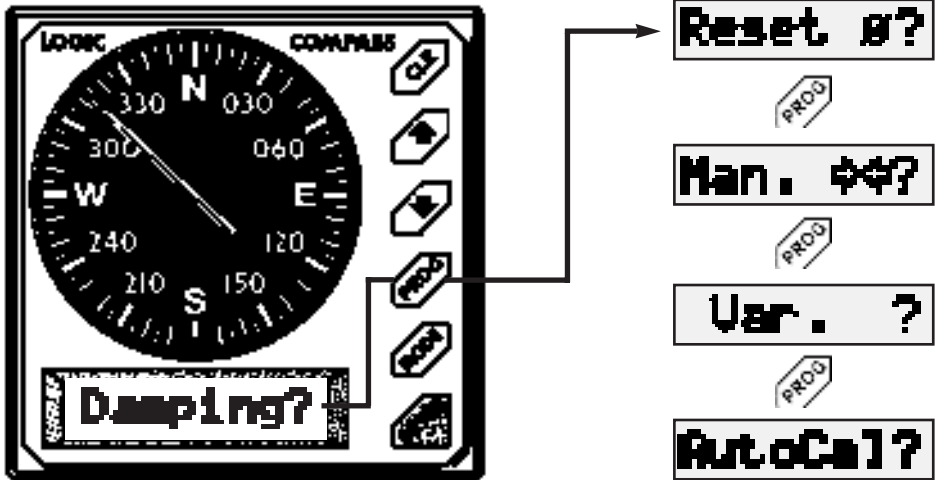
The “*MODE*”-key:
This key selects the values the LC display will display.



The “*ENTER*”-key:
This key terminates all programming functions and the selection of the values which will be displayed.

Basic Settings

The basic settings needed for a perfect operation are selected by pressing the "PROG" key once or several times.



Damping? Damping adjustment (see page 50)

Reset Ø? Reset average course and average distance (see page 51)

Man. ⓄⓄ ? Desired course setting (see page 51)

Var ? Setting of local deviation (see page 53)

AutoCal.? Automatic deviation adjustment (see page 54)

Align ? Sensor alignment entry (see page 56)

NMEA ? Selection of NMEA data set (see page 58)

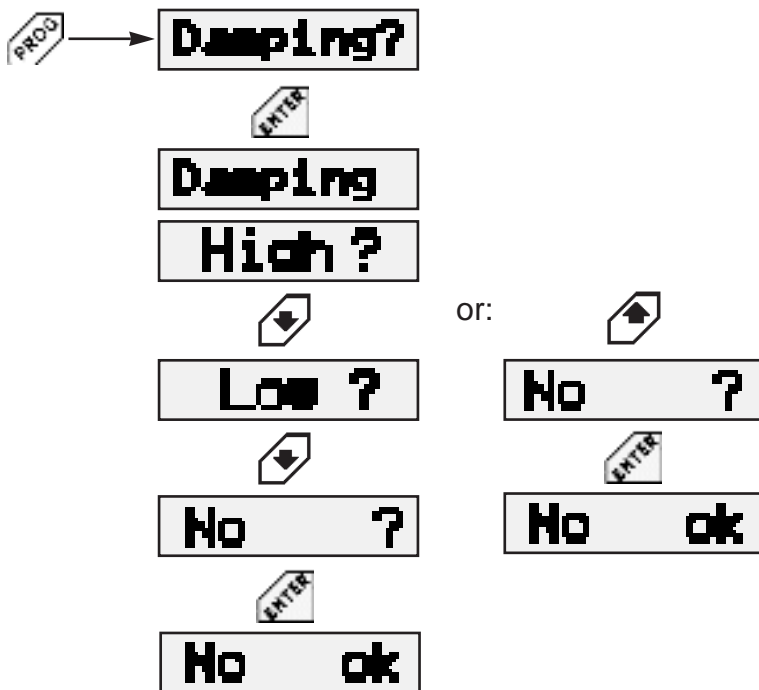
Exit ? Exit programming menu

Pointer damping adjustment (*Damping*)

Display damping influences the pointer movements. High damping averages sudden short course changes, thereby avoiding pointer oscillation. The course changes are displayed immediately if damping is low. Select a damping value corresponding to the motion of the sea.

Damping is set as follows:

Example:

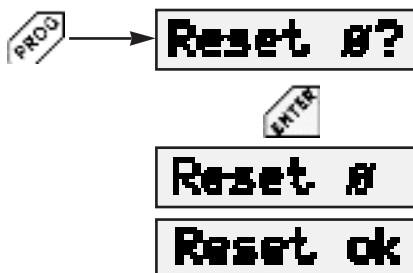


This example resets the calculated values of the average compound course and the average compound distance to zero.

Resetting average course and average distance (*Reset Ø*)

This function resets and restarts the calculation of the average compound course and the average compound distance.

Make the setting as follows:



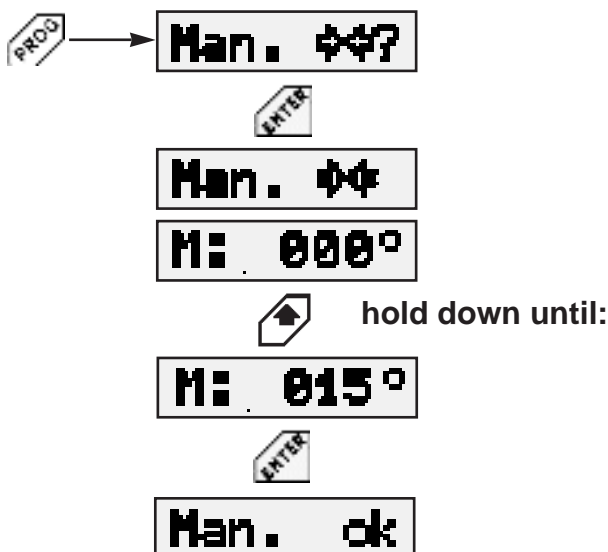
This example resets the calculated values of the average compound course and the average compound distance to zero.

Setting of the desired course (*Man. ⓐ ⓑ*)

This function sets the desired course. The setting serves for the navigation distance display under main function "Steer".

Make the setting as follows:

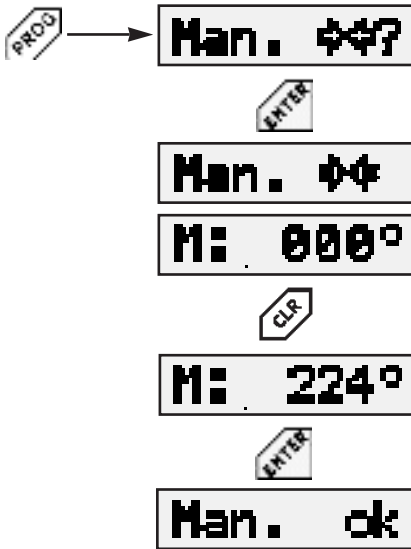
Example 1:



BASIC FUNCTIONS

This example 1 sets the desired course from 0° to 15°.

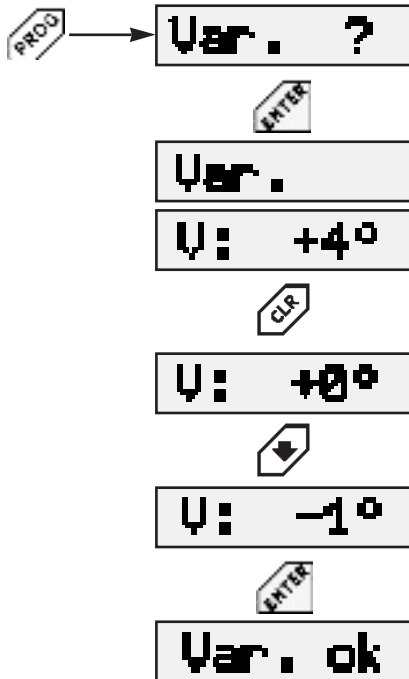
Example 2:



In this example 2 the current compass course (224° in this case) is set as desired course by pressing the "CLEAR" key.

Setting of the local deviation (Var)

This function is needed to set the locally applicable compass deviation (variation). The angular deviation value is read from the nautical chart. Setting the deviation simplifies charting, and the compass shows the true course after successful adjustment of the deviation (see page 54). Example:



The specified local deviation in this example is $+4^\circ$; after moving the ship to a different location it is set to -1° .

BASIC FUNCTIONS

Automatic deviation adjustment (*AutoCal*)

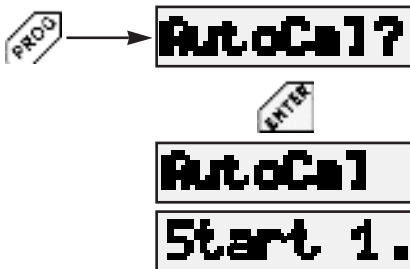
All iron masses on a ship are more or less magnetic, and affect the compass reading. This influence must be compensated in the case of a fluid compass or a fluxgate system.

An authorized specialist must make the fluid compass adjustment, but you can easily and reliably perform this operation on the VDO LOGIC COMPASS due to its automatic deviation compensation. The compensation of the faults B, C and D is automatic and simultaneous.

The automatic deviation compensation is done during a circular course with quiet sea, far away from port equipment and magnetic disturbances (such as steel bridges, sheet pilings, other ships). The diameter of the circle shall be five to six times the ship length. The speed should be about 2 knots.

No valid course is displayed by the pointer instrument during the adjustment operation.

Make the adjustment as follows:



Start the circular course now, and start the adjustment by pressing the "ENTER" key.



Continue the circular course until "Ready 1" and "Start 2" is displayed. The first part of the adjustment is completed, the program is stopped.



BASIC FUNCTION

Start a circular course in the opposite direction. Continue the adjustment by pressing the "ENTER" key.



Running2

Continue the circular course until "*Ready 2*" and "*Success*" is displayed, confirming the successful completion of the adjustment.

Ready 2

Success!

The automatic deviation adjustment has been successful. Press the "ENTER" key again. The pointer instrument now indicates the true compass course.

"*Break !*" is displayed if "ENTER" is pressed during the circular course. This may be necessary if the circular course cannot be completed, due to a passing ship for instance.

Break !

"*Error!*" is displayed if the circular course is interrupted or if the second circular course has not been completed correctly. This may be due to a strong ship-bound magnetic field at the compass sensor location, preventing the adjustment. In this case select a different position for the compass sensor.

Error !

In both cases the deviation adjustment must be repeated after pressing the "ENTER" key.



An automatic deviation adjustment should be made after compass installation, after each slipping, prior to important trips, after welding operations, after the installation of electric consumers, but at least once a year.

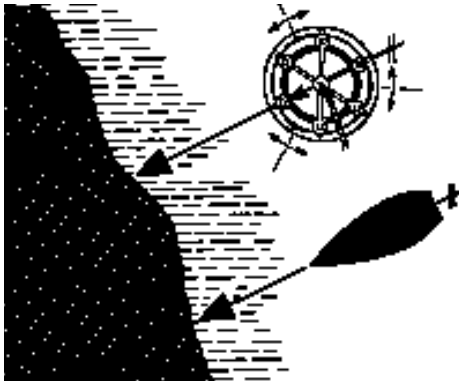
Please also note the "semi-permanent" magnetism of steel ships. This phenomenon is observed if the ship stays in the same direction for a certain time (e.g. winter), exposed to the earth magnetic field. After some days in the water this effect disappears. This means that compass deviation adjustments on steel ships should only be made after several days.

Entering the sensor alignment (*Align*)

After successful deviation adjustment ("*AutoCal*") and setting of the local magnetic deviation ("*Var*") check if the compass sensor is exactly aligned with the longitudinal ship axis.

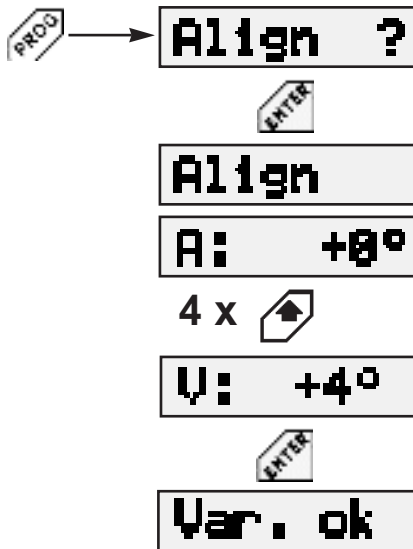
Make several position findings, using landmarks or fixed navigation guides, to determine the error in degrees (error A). Select a sufficiently large distance. The precision of the error determination increases with the distance.

Errors exceeding 4° can be corrected by turning the compass sensor.



BASIC FUNCTIONS

Correct smaller errors with the "Align" function as follows:



In this example the entry of the value corrects an error of $+4^\circ$.

Selection of the NMEA data set (NMEA)

Make the setting with this function if you intend to connect a navigator with NMEA 0183 interface to the LOGIC COMPASS.

Under the main functions "Mark" and "Course" the LC display of the LOGIC COMPASS will display the course to the target point, a navigation assistance and the course over ground if a navigator is connected. Depending on the navigator model this information will be sent in one of the following NMEA 0183 data sets:

- HSC
- BWC
- RMB

The correct data set can be found in your navigator manual. Select the BWC data set if you connect the LOGIC GPS NAVIGATOR.

Make the setting as follows:

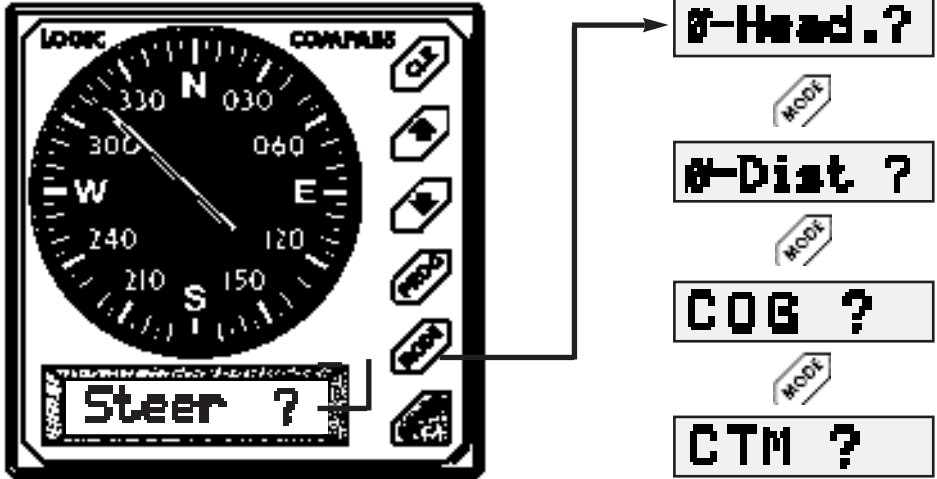
Example:



In this example the display unit is set to receive the NMEA data set BWC.

The main functions

The main functions of the VDO LOGIC COMPASS are selected or activated with the "MODE" key.



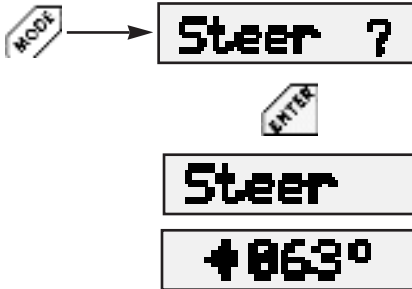
- | | | |
|--------------------|-----------------------------------|---------------|
| <i>Steer ?</i> | The manual steering assistance | (see page 60) |
| <i>Ø Heading ?</i> | Display of the average course | (see page 61) |
| <i>Ø Dist. ?</i> | Display of the average distance | (see page 61) |
| <i>COG ?</i> | Display of the course over ground | (see page 62) |
| <i>CTM ?</i> | Display of the course to the mark | (see page 62) |

The manual steering assistance (*Steer*)

The function Man. ⑥ ⑥ (see page 51) serves to set the desired course, which is displayed by function "Steer".

In addition to the desired course, directional arrows assist the navigation by showing the direction in which to steer the ship to maintain the desired course.

Example 1:



This example 1 shows a desired course of 63°. The current deviation of the compass course exceeds 5°. This is shown by the bold black arrow. Steer the ship to port to return to the desired course.

Example 2:



In this example 2 the desired course is 63°. The current deviation of the compass course is between 2° and 5°. This is shown by the black arrow outline.

Steer the ship to starboard to return to the desired course.

Example 3:



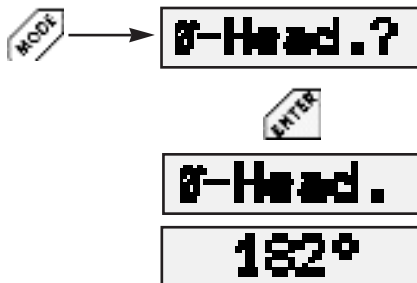
In this example 3 the desired course is 63°. The current deviation of the compass course is less than 2°. This is shown by the absence of navigation assistance arrows.

MAIN FUNCTIONS

Display of the average course (\emptyset Head.)

This function displays the average dead reckoning navigation course.

Example:



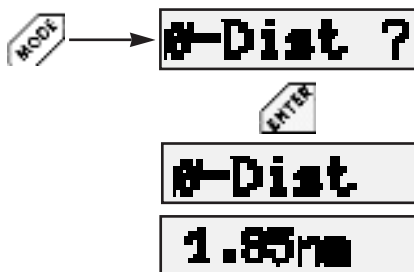
In this example the average dead reckoning navigation course is 182°. The average course can only be displayed if a VDO LOGIC LOG is connected. The display will show "Missing" if no such connection exists.

Missing

Display of the course over ground (\emptyset Dist)

This function displays the dead reckoning average distance.

Example:



In this example the average distance is 1.95 nm.

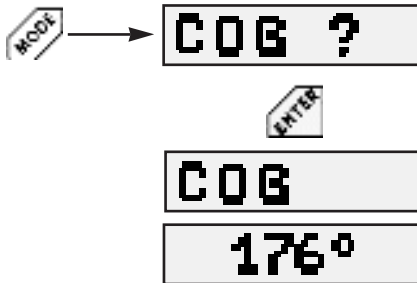
The average distance can only be displayed if a VDO LOGIC LOG is connected. The display will show "Missing" if no such connection exists.

Missing

Display of the course over ground (COG)

This function displays the course over ground sent by the navigator.

Example:



In this example the course over ground is 176°.

The course over ground can only be displayed if a navigator with NMEA 0183 interface is connected. The display will show "Missing" if no such connection exists.

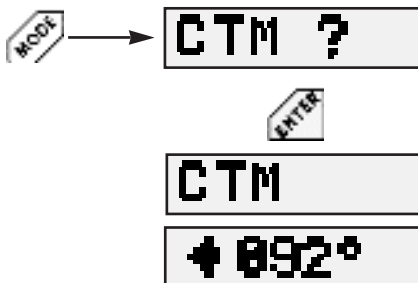
Missing

Display of the course to the mark (CTM)

This function displays the course to mark.

Navigation assistance arrows, in addition to the desired course, indicate the direction to which the ship should be steered to return to the desired course after a deviation.

Example:



In this example the course to mark is 92°.

The current deviation of the compass course exceeds 5°. This is shown by the bold black arrow.

MAIN FUNCTIONS

Steer the ship to port to return to the desired course. The navigation assistance display is the same as the navigation assistance described on page 21 for the display of the desired course.

The course over ground can only be displayed if a navigator with NMEA 0183 interface is connected. The display will show "*Missing*" if no such connection exists.

Missing

The low voltage alarm

A precise course indication of the VDO LOGIC COMPASS is not possible any more if the supply voltage drops below 10.8 V. "*Alarm!*" is displayed. The acoustical alarm, if connected, is sounded.

Alarm!

The alarm can be reset with the "ENTER" key. It will automatically shut down as soon as the supply voltage rises above 10.8 V again.

Trouble shooting

Error	Correction:
- No function of VDO LOGIC COMPASS	<ul style="list-style-type: none"> - Check electrical connections per wiring schematic - Check on-board voltage, supply voltage is 10.8 to 15 V DC
- LC- Display indicates "Missing"	<ul style="list-style-type: none"> - No navigator with NMEA 0183 interface is connected - Check NMEA connection on navigator - Select correct NMEA data set (NMEA)
- LC- Display indicates "Alarm !"	<ul style="list-style-type: none"> - Supply voltage is below 10.8 V. Check the on board voltage.
- Wrong indication	<ul style="list-style-type: none"> - Adjust deviation (<i>AutoCal</i>) - Adjust sensor alignment (<i>Align</i>) - Correct local magnetic deviation (<i>Var</i>)

The NMEA Interface

The NMEA (National Marine Electronics Association) is an organization of manufacturers, with the objective of developing standards for data transmission between units of different makes.

The VDO LOGIC COMPASS sends the following data sets corresponding to the NMEA standard 0183:

- \$IIHDT: true compass course
- \$IIHDM: magnetic compass course
- \$IIVHW: true and magnetic compass course

The VDO LOGIC COMPASS receives the following data sets corresponding to the NMEA standard 0183:

- \$IIHSC: true course to mark
- \$IIRMB: true course to mark
- \$IIBWC: true course to mark
- \$IIVTG: course over ground

The NMEA interface mostly corresponds to the serial interface RS422. In most cases the NMEA interface can be connected directly to the interface RS232 of the PC. Connect the PC as follows to read NMEA data:

LOGIC indicating instrument:	9-pin PC connector:	25-pin PC connector:
Terminal 9 (GND)	pin 5	pin 7
Terminal 20 (NMEA A out)	pin 2	pin 3

If this connection does not work, the PC has to be equipped with an interface RS422 to RS232. Connect the PC as follows:

LOGIC indicating instrument:	PC interface RS422 to RS232
Terminal 19 (NMEA B out)	IN B (Return)
Terminal 20 (NMEA A out)	IN A (Signal)

NMEA INTERFACE / MAINTENANCE

The NMEA data sets can be read under Windows 3.xx with the terminal program (accessories group), or under Windows 95 with the hyperterminal.

Use the following settings in the data transfer menu:

Transfer rate	4800 Baud
Data bits	8
Stop bits	1
Parity	none
Protocol	none

Format of the NMEA data sets

shown by examples

HDT= Heading, True

\$IIHDT,143,T

\$IIHDT,a ,T

a True compass course (143°)

T True

HDM= Heading, True

Example: \$IIHDM,143,M

\$IIHDM,a ,M

a True compass course (143°)

M Magnetic

VHW= Water Speed and Heading

Example: \$IIVHW,143,T,,,,,

\$IIVHW,a ,T

a True compass course (143°)

T True

NMEA INTERFACE

HSC= Heading Steering Command

\$IIHSC,210,T,210,M

\$IIHSC,a,T,b,M

- a Desired true course to mark (210°)
- T True
- b Desired true course to mark (210°)
- M Magnetic

RMB= Recommended Minimum Navigation Information

\$GPRMB,A,2.13,L,0003,0005,5006.32,N,00837.22,E,7.46,310,2.13,A

\$GPRMB,A,xte,b,c,d,Lat,e,Lon,f,dtm,ctm,wcv,A

- xte Cross Track Error [sm] (2.13 nm)
- b L or R (left)
- c Start mark (WP 3)
- d Target mark (WP 5)
- Lat Geographic latitude (50° 06' 32")
- e N or S (north)
- Lon Geographic longitude (008° 37' 22")
- f E or W (east)
- dtm Distance to target mark [nm] (7.46 nm)
- ctm Course to target mark (310°)
- wcv Approach speed [knots] (2.13 kn)
- A Alarm status

BWC= Bearing and Distance to Waypoint

\$GPBWC,113241,5006.32,N,00837.22,E,305,T,305,M,7.46,N,005

\$GPBWC,a,Lat,b,Lon,c,d,T,e,M,f,N,g

- a UTC Universal Time Coordinated (11hrs: 32 min: 41 sec)
- Lat Geographic latitude (50° 06' 32")
- b N or S (north)

NMEA INTERFACE

Lon	Geographic longitude	(008° 37' 22")
c	E or W	(east)
d	True course to mark	(305°)
T	True	
e	Magnetic course to mark	(305°)
M	Magnetic	
f	Distance to mark [nm]	(7.46 nm)
N	Nautical miles	
g	mark number	(WP 5)

VTG = Track made good and Ground Speed

\$GPVTG,305,T,305,M,4.52,N,8.37,K

\$GPVTG,a, T, b, M, c, N, d, K

a	COG true course over ground	(305°)
T	True	
b	COG magnetic course over ground	(305°)
M	Magnetic	
c	SOG speed over ground [knots]	(4.52 kn)
N	Nautical miles	
d	SOG speed over ground [km/h]	(8.37 km/h)
K	km/h	

Maintenance of the VDO LOGIC COMPASS

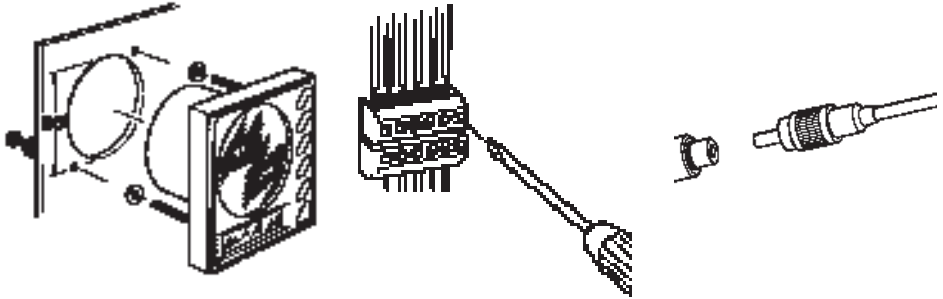
The display unit and the compass sensor are maintenance-free. Clean the display unit with a humid, nonfuzzing or antistatic cloth. Do not use cleaning detergents.

Installation of the VDO LOGIC COMPASS System



Please read the safety instructions on pages 43 and 44 before you start the installation.

Installation of the indicating unit



- Paste the supplied drilling template to the desired location.
- Drill the indicated holes.
- Slowly pull off the template.
- Carefully clean the surroundings before inserting the indicating instrument. Remove all chips.
- Place the supplied neoprene mat under the installation location.
- Screw in the threaded pins and connect the instrument per wiring diagram (see "Electrical installation"), then insert the instrument.
- Fix the instrument by tightening the knurled nuts. The knurled nuts should only be tightened hand-tight.

INSTALLATION

The drilling template has been designed for correct spacing of the instruments if other VDO LOGIC instruments are also installed, and to permit the installation of the white display unit protection cap.

Installation of the compass sensor

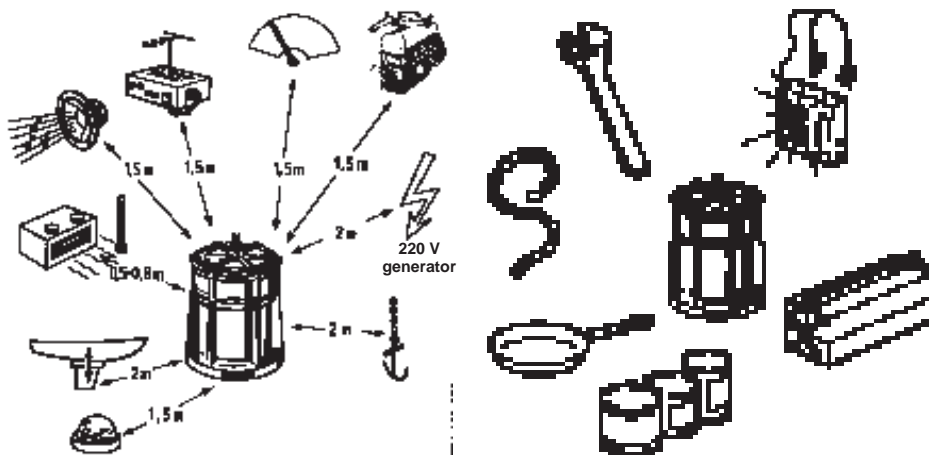
The earth magnetic field measurement uses the fluxgate principle: two crossed, concentric coils measure direction and strength of the field. The sensor can be mounted inside the hull in wood, fibreglass, Kevlar and aluminium hulls.

In the case of steel and ferrocement hulls the sensor shall be installed at least 1 m above the deck, but not higher than 5 m.



When installing the sensor check for sufficient distance to fixed iron parts, electrical cables and other objects generating magnetic fields.

Also keep sufficient distance to all movable disturbances, such as tins, pans, radios, etc.



Make a temporary sensor installation and a first deviation adjustment test "AutoCal". If it is not successful ("Error"), find a different location for the installation.

INSTALLATION

When the adequate location is found, fix the sensor with three brass or stainless steel screws to allow subsequent alignment using the oblong holes.

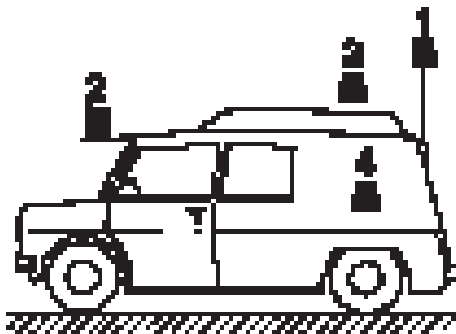
Mark the installation location with the enclosed hot-melt label.



Never use steel screws for the fixation (they are magnetic). The sensor shall always be installed and stored in vertical direction.

The marking arrow on the sensor shall always be parallel to the longitudinal ship axis and point to the prow.

If you want to install the VDO LOGIC COMPASS on land vehicles, note the following for the compass sensor installation location:



1. Remove the sensor from the influence of the sources of interference of the vehicle or its load by a wooden or aluminium mast.
2. This solution should be preferred. Distance to chassis 0.3 m approximately.
3. In this case the influence of the load on the roof should be checked.
4. An internal installation is possible if the body is made of aluminium or plastic. Check the influence of the load.

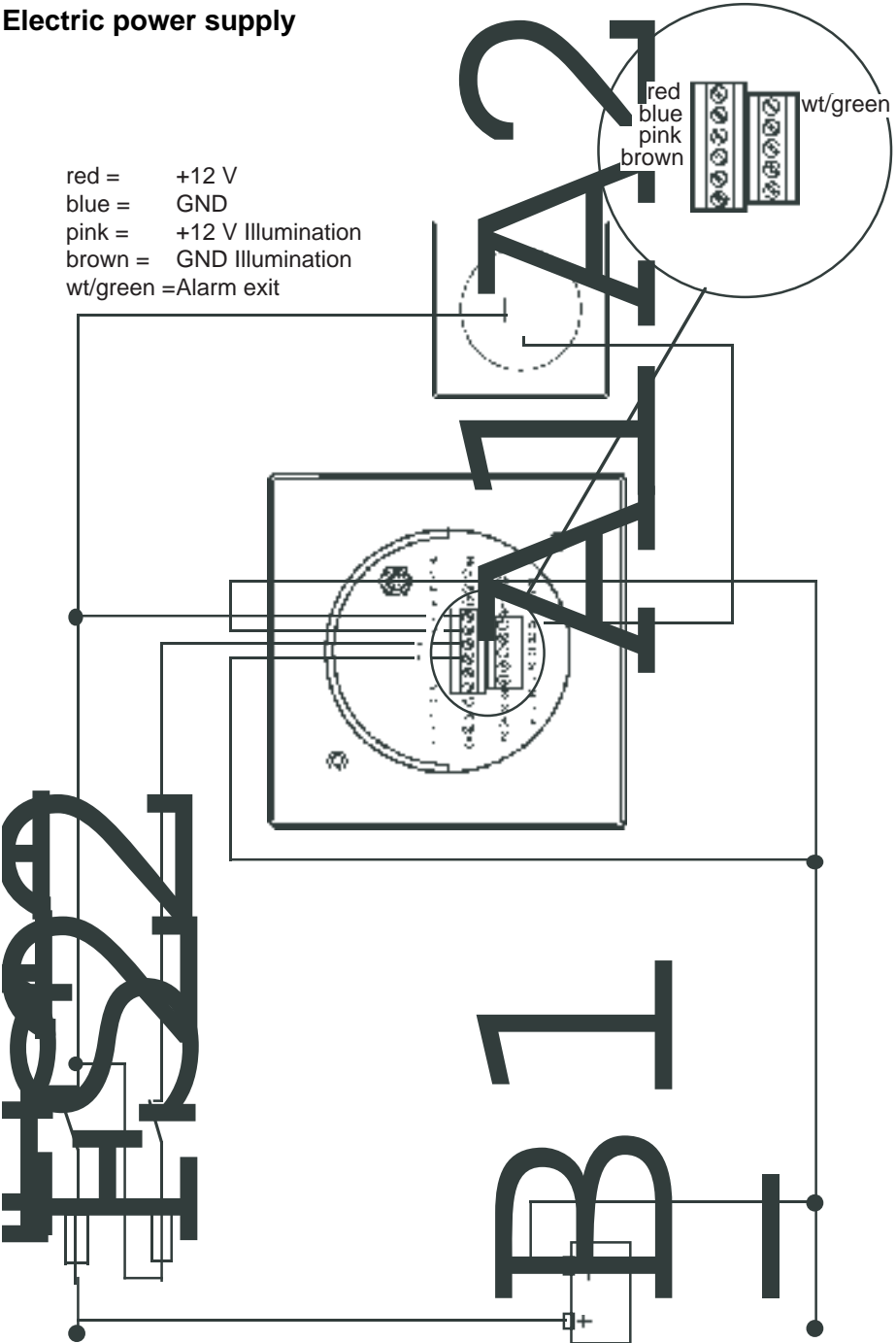


The deviation adjustment "AutoCal" must be repeated each time the load is changed.

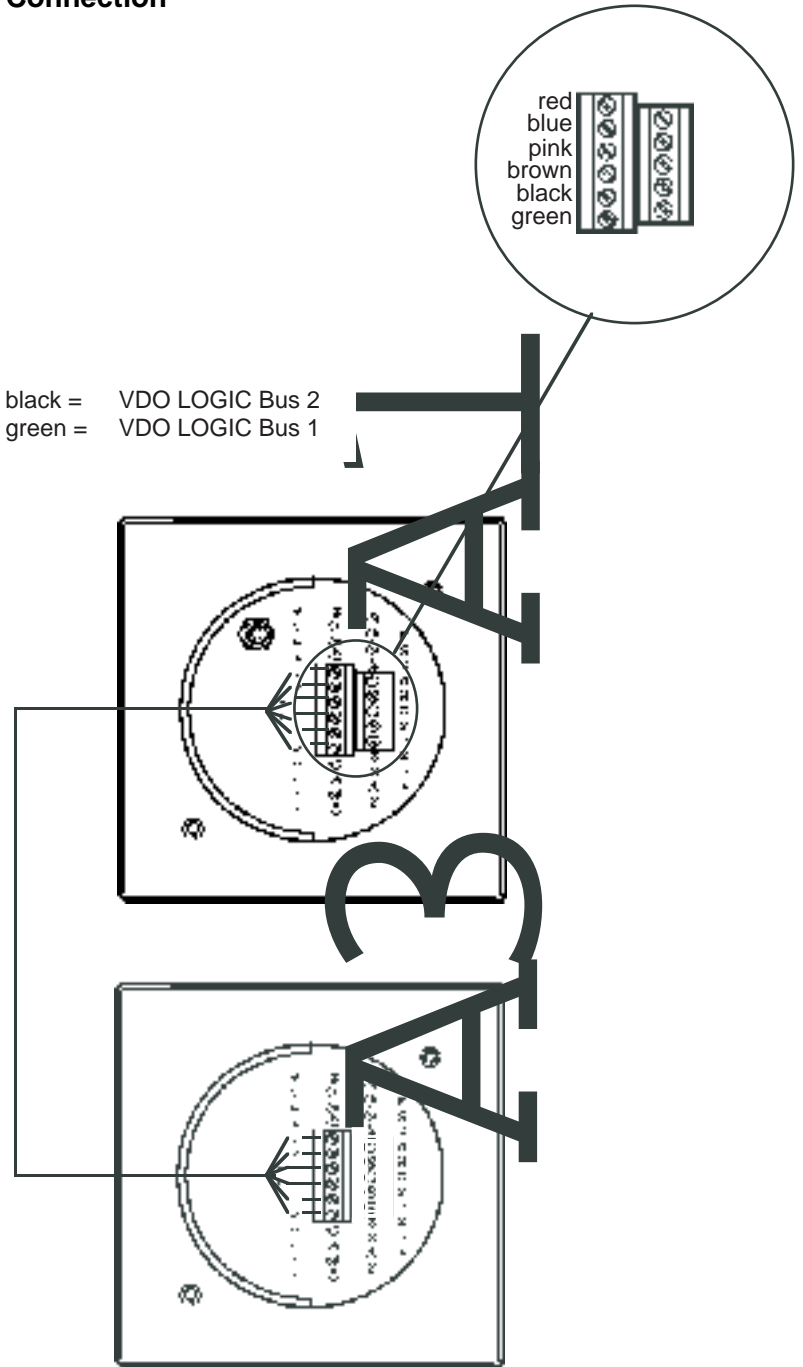
Electrical installation

Electric power supply

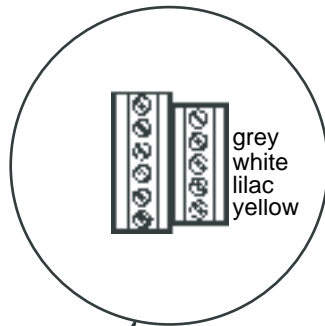
- red = +12 V
- blue = GND
- pink = +12 V Illumination
- brown = GND Illumination
- wt/green = Alarm exit



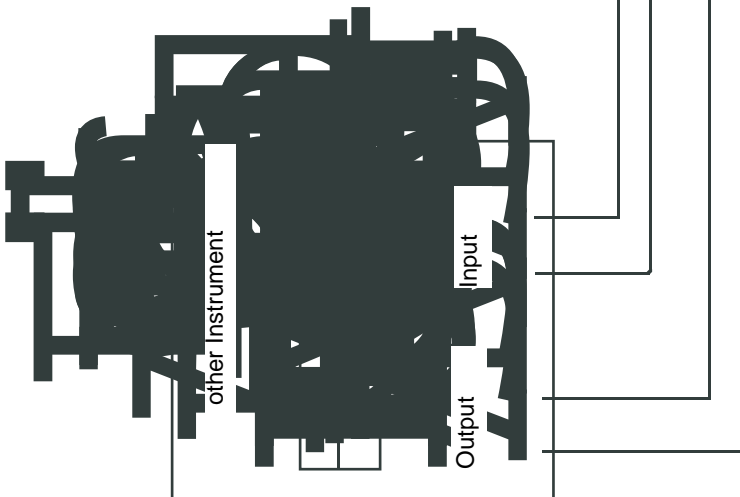
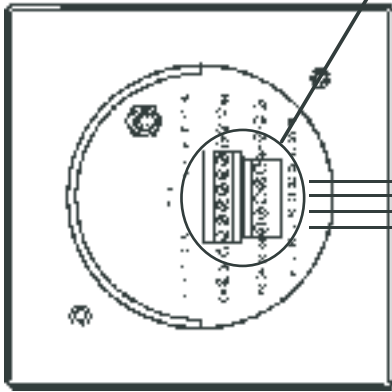
Repeater Connection



NMEA Connection



grey = NMEA U183 A in
white = NMEA U183 B in
lilac = NMEA U183 A out
yellow = NMEA U183 B out



Legend of Connection Diagram

1. Current Supply

B1	Ship's battery
F1	5-amp fuse for instrument
F2	5-amp fuse for internal lighting
S1	On-off switch for navigation instruments
S2	On-off switch for internal lighting
A1	Indicator
A2	Acoustical warner

2. Connection of Repeater

A1	Main Instrument
A3	Repeater

Cable Lengths

The permissible cable lengths for use with the LOGIC bus depend on the number of indicators and of the quality of cable in question.

A standard installation with two steering positions usually comprises 12 indicators. The indicators at a steering position are linked with the cable supplied with the indicators if their arrangement permits doing so.

Up to a length of 8 meters (26 feet), unshielded cable may be used to bridge the distance between two steering positions.

If a longer connecting cable is required, or if more than 12 indicators are to be connected, shielded cable will have to be used for each of the leads of the LOGIC Bus. In either case cable meeting the RG 58 standard will be a must. The shielding of the two cables will have to be connected at the main instrument side to terminal 9 of the indicator.

If shielded cable is used for connection to the LOGIC bus, the cable run between the two steering positions must not exceed a maximum length of 16 meters (52 feet).



The total number of indicators connected to the LOGIC bus must not exceed 15 in that case.

Technical Data

Measuring principle:	Magnetic field measurement by fluxgate Coil system with gimbal suspension oil-dampened
Accuracy	$\pm 2^\circ$ after adjustment
Applications	Field strength; 8 to 50 A/m max inclination, pitch direction $\pm 35^\circ$ max inclination, roll direction $\pm 50^\circ$
Supply voltage:	10.8 to 15 V DC
Current consumption:	about 80 mA, 120 mA with lighting
Operating temperature:	-10°C to $+60^\circ\text{C}$
Type of protection:	Display unit: IP 65 at front per DIN 40050 Compass sensor P 65 per DIN 40050
EMC protection:	CE: EN 50081-1, EN 50082-1
Data output:	Display unit: VDO LOGIC bus NMEA 0183
Output rate:	about 1 value per second
Dimensions:	Indicating instrument: 125 x 125 x 23 mm Installation depth (with connector) 60 mm Installation diameter 85 mm Compass sensor Diameter 120 mm approx. Height 140 mm approx.

Technical modifications reserved

LOGIC COMPASS

08 600 840
Ausgabe/Edition: 9/96

VDO Kienzle
Vertrieb und Service GmbH
Rüsselsheimer Straße 22
D-60326 Frankfurt am Main
Tel.: (069) 7586-0
Fax: (069) 7586-210