NEXUS

PASSION FOR PERFORMANCE™

HPC Compass
NMEA Version

Installation and Operation Manual

This manual is written for the NMEA HPC Compass transducer 1.1
Edition: 1.4 May 2010

HPC Compass transducer
Installation Manual

Thank you for choosing a Nexus product. Through this manual we would like to help you to install your new Nexus product. Please read through this manual carefully before starting your installation. The six axis Nexus electronic compass measures the magnetic field and the roll and trim. Out from that, the magnetic course is calculated. An electronic compass is just as sensitive to magnetic disturbances as a magnetic compass but has the benefits that the transducer can be mounted away from the disturbances. From an instrument, the transducer can be automatic compensated.
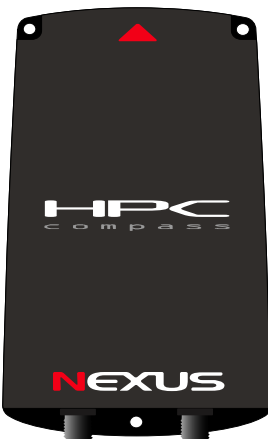
1 Installation

1.1 Location of the HPC Compass

The transducer should be mounted horizontal or vertical (see pictures below). The surface may be leaning ± 10 degrees from the horizontal or vertical plane.
It should be mounted perpendicular to the fore aft line (see picture on next page). Try to mount the transducer reasonably well away from magnetic disturbances such as objects containing iron, loudspeakers, window wipers etc. For safe distances, see page 11. The transducer does not have to be mounted in the centre of the boat. The optimum position for the transducer is in the gravity centre of the boat. At that position there may be magnetic disturbances, therefore the transducer normally is installed more forward. The transducer is normally mounted below deck but its water resistant enclosure allows for outside mount, which is preferable for some steel boats.
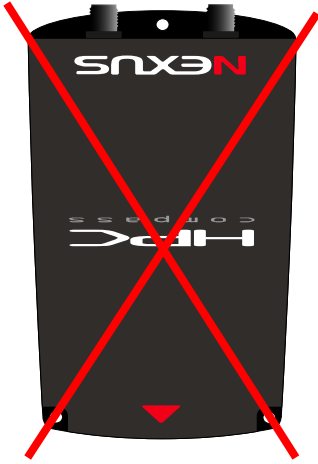
1.2 Check the location:

If you have large disturbance sources or a steel boat we recommend to connect the transducer, mount it temporary and check the readout before the final mount.
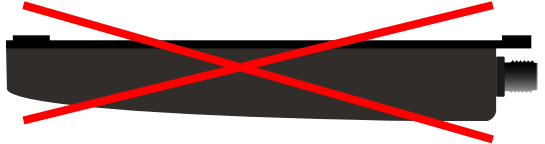

Horizontal mounting

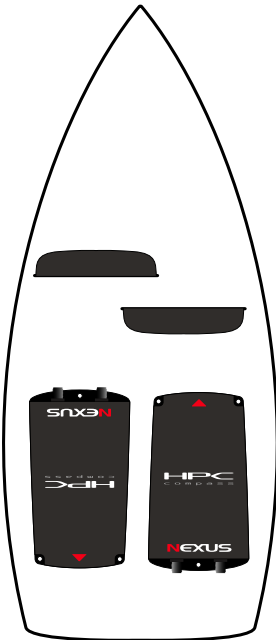Vertical mounting

Vertical mounting

Horizontal mounting

OK
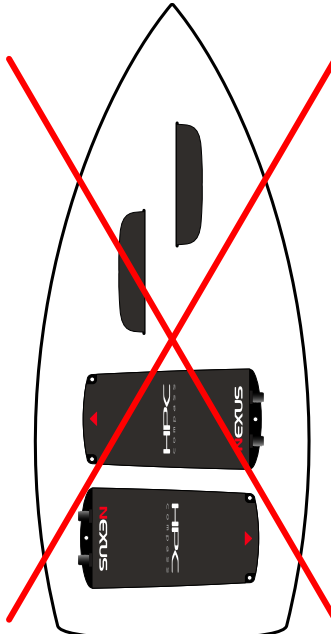
NOT OK

2 Electrical installation

The HPC Compass will output NMEA data on both the RS-232 and RS-422 output. The RS-232 is used for setup of the HPC (via a Computer) and the RS-422 is used for connection to other equipment. The unit is not powered via the D-sub connector.
If the D-sub connector is connected to a PC, the unit has to be powered via the RS-422 cable.

Connection to a Nexus Instrument and to NMEA:

To PC (D-SUB)
RS-232

Power and NMEA
(RS-422

Colors
Green: +12V (not connected in the D-Sub)
Yellow: RxD
White: TxD
Screen: GND

Colors
Green: +12V
White: Data out A
Yellow: Data out B
Screen: GND
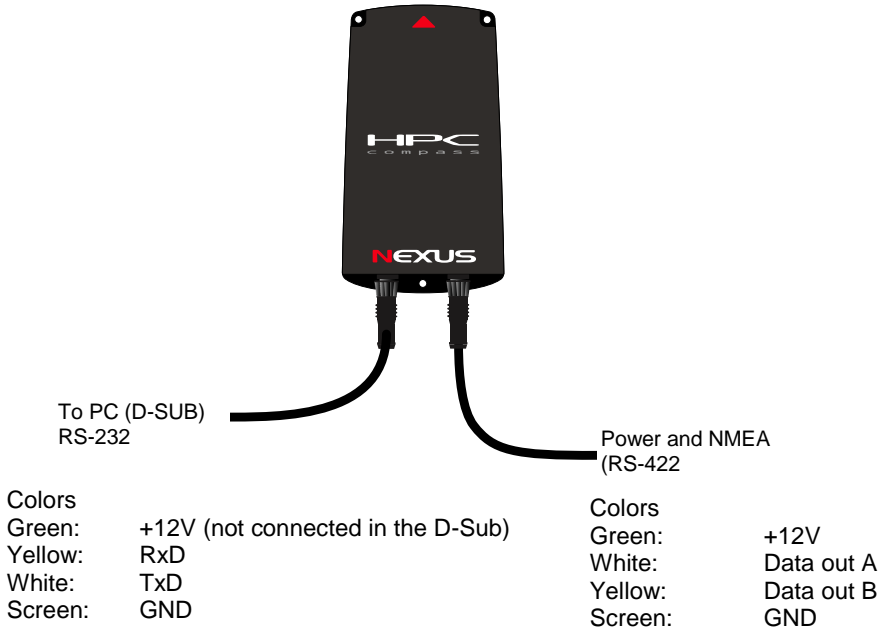
3   Setup and deviation

The HPC Compass is adjusted and compensated from a PC with the use of the Hyper terminal software which is a standard SW for Windows..

After installation:

1. Connect the power and NMEA data cable
2. Connect the PC cable to your computer
3. Start the hyper terminal SW
4. Set up the hyper terminal as follows:
   Baud rate:　　4800
   Data bits　　　8
   Parity:　　　none
   Stop bits:　　　1
   Flow Control:　None

5. Start to adjust the mounting angle of the HPC Compass. See below!
6. Auto deviate the HPC Compass See below!
7. Adjust the magnetic variation and misalignment See below!

3.1   Set-up from the Hyper terminal

3.1.1   Adjust the Heel and Trim

When the HPC is powered and connected to a PC you will get data out from it (factory set is 4800 baud, 8bits, 1 stop bit, no parity)
Run the Hyper terminal and use the following command to adjust Heel and trim

1. Make sure the boat is at 0° Roll and Trim
2. If you press ESC, the transmission stops
3. If you then press Z0 (Z and zero), the mounting plane (vertical or horizontal) is set.
4. If you then press Z0 (Z and zero) again, the Heel and Trim will be set to zero.

3.1.2   Automatic compass deviation compensation

Auto Deviation is performed by driving the boat in a circle up to 1¼ turn, so that the magnetic deviation can be measured, and by that compensated.

1. Start a smooth turn of the boat
2. If you press ESC, the transmission stops
3. If you then press C1 to start the Autodeviation
4. When you have finished the turn press ESC and C2 to stop the Autodeviation
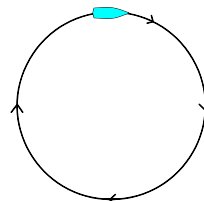
Note: You will get the best result in calm water with a smooth turn on the steering wheel independently of how the circle is performed. When activated, you can stop the automatic compass deviation at any time with the command C3.

3.1.3 Magnetic deviation

Magnetic variation. Maximum +/- 179.9°.
Easterly variation = no sign.
Westerly variation = minus (-) sign.
The local magnetic variation is usually printed in the sea chart.

1. Press ESC, to stop the transmission
2. If you press A? The current variation is displayed
3. Set the new variation in tens of degree (1 degree = 10)

Example 1. If you want 1.8 degree east enter the value A18
Example 2. If you want 5.5 degree west enter A-55

3.1.4 Compass misalignment correction

Compass transducer misalignment correction or the so called "A-fault". Can be set between 000°and 359°. Allows 180° reversed mounting if needed. Never mount the transducer in a 90° position relative to the boats fore-aft line.

To check the transducer position, sail/drive your boat in a straight line towards two visible objects in a line.

Maximum Misalignment. +/- 179.9°.

1. Press ESC, to stop the transmission
2. If you press D? The current variation is displayed
3. Set the new variation in tens of degree (1 degree = 10)

Example 1. If you want 1.8 degree enter the value D18
Example 2. If you want -5.5 degree enter D-55

3.1.5 Cancel earlier performed compass deviation

1. Press ESC, to stop the transmission
2. Press C0 to cancel the previous Autodeviation

3.1.6 Other commands and settings

^B	display current baud rate

^B<0|1|2|3>	set baud rate:
	   0 - 4800 (default)
	   1 - 9600
	   2 - 19200
	   3 - 38400

^R	display current output rate

^R<0|1|2|3>	set output rate:
	   0 - 0.5/s
	   1 - 1/s (default)
	   2 - 5/s
	   3 - 10/s

^S	display current output sentence[s]

^S<0-15>	set output sentence[s]:
	   0 - no output
	   1 - HDT (default)
	   2 - HDG
	   4 - XDR
	   8 - custom (HPR)
	   <any bit combinations 0 - 15>

^G	display heeling damping filter setting

^G<0|1|2|3>	set damping filter on heeling (roll & pitch):
	   0 - no filtering
	   1 - low (default)
	   2 - medium
	   3 - high

^H	display heading damping filter setting

^H<0|1|2|3>	set damping filter on heading:
	   0 - no filtering
	   1 - low (default)
	   2 - medium
	   3 - high

^C	show calibration status/progress

^C<0|1|2|3>	calibration:
	   0 - clear A-DEV data
	   1 - start A-DEV (with 1200s timeout)
	   2 - stop and compute A-DEV data
	   3 - stop (abort) calibration in progress

^A	display current magnetic variation setting
^Ax	set magnetic variation x10 ([-1800, 1799])
^D	display current misalignment setting
^Dx	set misalignment setting x10 ([-1800, 1799])
^V	display program version
^Z	display current mounting plane
^Z0	zero-out gravitational readings and set reference plane
^?	display command list
^<cmd>?	display help on specified command

4   Specifications

Type of compass sensor:	Magneto resistive sensor (three axis)
Type of heel/trim sensor:	Silicon sensor (three axis)
Dimensions:	102 x 57 x21mm
Weight:	40g
Enclosure:	Water proof
Temperature range:	-5° to +50° C (+40° to 122° F).
Voltage:	9-17V
Current consumption:	85mA
Power consumption @12V:	1,0W
Warranty period:	2 years, see separate conditions page 13-13
Maxim roll and pitch:	infinite
Inaccuracy (after calibration)	±1
Vibration:	11G @ 60Hz 10min.
Magnetic field strength:	8-80uT
Output signals:	NMEA 0183
NMEA sentences:	HDG, HDT, XDR and HPR
NMEA Output settings:	4800-38400 baud, 8 bits, no parity, one stop bit
NMEA Output rate:	1 to 10Hz

Examples:
$NXHDT,247.2,T*37
$NXHDG,250.6,1.4,W,2.0,W*59
$NXXDR,A,247.2,D,HDC,A,-1.8,D,PIT,A,-27.0,D,ROL*1F
$PTNTHPR,247.2,N,-1.8,N,-27.0,N*0B

Safe distances to magnetic disturbing objects:

Object	Safe distance
Main engine	2m (7ft.)
Radar magnetron	1.5m (5 ft.)
Horizontal and vertical steel plates and tanks	1m (3 ft.)
High power electric motors (bilge pump, refrigerators)	1m (3 ft.)
HF or VHF antennas	3m (10 ft.)
High current D.C. wires	1m (3ft.)
Magnetic meter movements and loudspeakers	1m (3 ft.)
Large bolts and fasteners	0,6m (2 ft.)
Ordinary steering compass	0,8m (2.5 ft.)

5   NMEA explanation

HDG Heading – Deviation & Variation

```
        1   2 3 4  5 6
        |   | | |  | |
$--HDG,x.x,x.x,a,x.x,a*hh

1) Magnetic Sensor heading in degrees
2) Magnetic Deviation, degrees
3) Magnetic Deviation direction, E = Easterly, W = Westerly
4) Magnetic Variation degrees
5) Magnetic Variation direction, E = Easterly, W = Westerly
6) checksum
```

HDT Heading – True

```
        1  2 3
        |  | |
$--HDT,x.x,T*hh

1) Heading Degrees, true
2) T = True
3) Checksum
```

XDR Transducer Measurements

```
        1 2  3 4   5 6  7 8   9 10 11 12    13
        | |  | |   | |  | |   | |  |  |     |
$--XDR,a,x.x,a,c--c,a,x.x,a,c--c,a,x.x,a,c--c *hh

1) Transducer type (A for angular displacement)
2) Measurement data (Heading)
3) Units of measurement (D for degrees)
4) Name of transducer (HDC for heading)
5) Transducer type (A for angular displacement)
6) Measurement data (Pitch)
7) Units of measurement (D for degrees)
8) Name of transducer (PIT for pitch)
9) Transducer type (A for angular displacement)
10) Measurement data (Roll)
11) Units of measurement (D for degrees)
12) Name of transducer (ROL for roll)
13) checksum
```

HPR Transducer Measurements (proprietary data)

```
            1   2   3   4   5   6   7
            |   |   |   |   |   |   |
$PTNTHPR,x.x,a,x.x,a,x.x,a *hh

1) Heading
2) N for Number
3) Pitch in degrees
4) N for Number
5) Roll in degrees
6) N for Number
7) checksum
```

Checksum

The checksum is the 8-bit exclusive OR (no start or stop bits) of all characters in the sentence, including "," and "^" delimiters, between but not including "$" or "!" and the "*" delimiters. The hexadecimal value of the most significant and least significant 4 bits of the result is converted to two ASCII characters (0-9, A-F (upper case)) for transmission. The most significant character is transmitted first.

Warranty

WARRANTY

GENERAL

All our products are designed and built to comply to the highest class industry standards. If the products are correctly installed, maintained and operated, as described in the installation and operation manual, they will provide long and reliable service. Our international Network of distributors can provide you with the information and assistance you may require virtually anywhere in the world.
Please read through and fill in this warranty card and send it to your national distributor for product registration.

LIMITED WARRANTY

The warranty covers repair of defective parts due to faulty Manufacturing and includes labour when repaired in the country of purchase. The warranty period is stated in the product manual, and commences from the date of purchase. The above warranty is the Manufacturer's only warranty and no other terms, expressed or implied, will apply. The Manufacturer specifically excludes the implied warranty of merchantability and fitness for a particular purpose.

CONDITIONS

• The supplied warranty card and receipt with proof of purchase date, must be shown to validate any warranty claim. Claims are to be made in accordance with the claims procedure outlined below.
• The warranty is non-transferrable and extends only to the original purchaser.
• The warranty does not apply to Products from which serial numbers have been removed, faulty installation or incorrect fusing, to conditions resulting from improper use, external causes, including service or modifications not performed by the Manufacturer or by its national distributors, or operation outside the environmental parameters specified for the Product.
• The Manufacturer will not compensate for consequential damage caused directly or indirectly by the malfunction of its equipment. The Manufacturer is not liable for any personal damage caused as a consequence of using its equipment.
• The Manufacturer, its national distributors or dealers are not liable for charges arising from sea trials, installation surveys or visits to the boat to attend to the equipment, whether under warranty or not. The right is reserved to charge for such services at an appropriate rate.
• The Manufacturer reserves the right to replace any products returned for repair, within the warranty period, with the nearest equivalent, if repair within a reasonable time period should not be possible.
• The terms and conditions of the warranty as described do not affect your statutory rights.

CLAIMS PROCEDURE

Equipment should be returned to the national distributor, or one of its appointed dealers, in the country where it was originally purchased. Valid claims will then be serviced and returned to the sender free of charge.

Alternatively, if the equipment is being used away from the country of purchase, it may be returned to the national distributor, or one of its appointed dealers, in the country where it is being used. In this case valid claims will cover parts only. Labour and return postage will be invoiced to the sender at an appropriate rate.

DISCLAIMER

Common sense must be used at all times when navigating and the Manufacturer's navigation equipment should only be considered as aids to navigation.
The Manufacturers policy of continuous improvement may result in changes to product specification without prior notice.

File id: _____

WARRANTY CARD
TO BE RETURNED TO YOUR NATIONAL DISTRIBUTOR

OWNER:

Name:_____

Street :_____

City/Zip Code :_____

Country:_____

Product name: Serial number:

	A	B	C		1	2	3	4	5	6	7
_____	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐
_____	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐
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_____	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐

Date of purchase:_____ Date installed:_____

Dealers stamp:

☐ Tick here if you do not wish to receive news about future products