

# FLUXGATE COMPASS

Product reference : 90-60-452



## USER GUIDE and INSTALLATION GUIDE

**nke** – Sailing competition

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# 1 USING

## 1.1 PRESENTATION

The **Topline Fluxgate Compass** sensor is a measuring instrument which provides the magnetic heading of the boat.

It is connected to the **TOPLINE bus** of your installation.

The sensor is equipped with a 6 meter long **TOPLINE bus** cable, an mounting bracket and two screws.

## ARCHITECTURE OF THE INSTALLATION

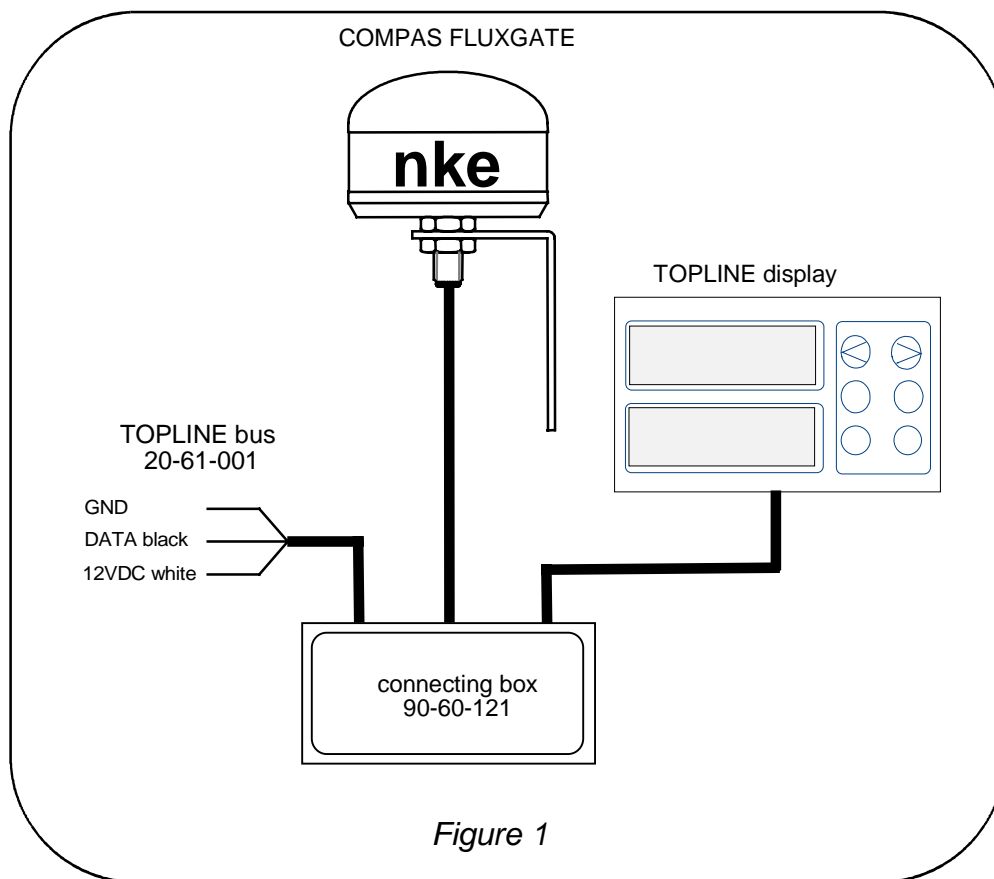


Figure 1

### IMPORTANT

- Read this user guide entirely before starting the installation.
- Any electrical connection on the **TOPLINE bus** must be carried out with the terminal box 90-60-121. Only use **TOPLINE bus** cable of the type 20-61-001.
- Any intervention on the **TOPLINE bus** must be carried out with the installation power switched off.
- For channel settings, please refer to your **TOPLINE** display guide.

## 1.2 LIST OF CHANNELS DISPLAYED

The **fluxgate compass**, connected to the **TOPLINE bus** of your installation, creates the channel below. It is accessible using the displays of the **TOPLINE** range.

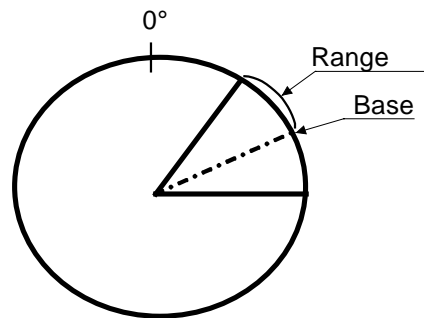
Channel	Display	Unit
Magnetic heading	MAGN HDG 245°	Degree

## 1.3 ALARMS SETTING

The setting of an alarm enables you to monitor the **magnetic heading** you are following. When the preset angle range is exceeded, a warning message is displayed and an audible alarm is activated.

### PROCEDURE

1. Display the **magnetic heading** channel.
2. Select the **BASE** sub-channel and enter the value of the reference heading selected for the alarm.
3. Select the **RANGE** sub-channel and enter the tolerance on each side of the reference heading.



To cancel the alarm, enter the value **0** in the **RANGE** sub-channel.

Thus, the setting of an alarm on the **compass** will allow you to supervise effectively the heading consistency of your boat.

To activate alarms, please refer to the user guide of your display.

## 1.4 FILTERING OF THE CHANNELS

The level of **filtering** of a channel determines the frequency of update of the data displayed.

For example, in rough sea when the boat moves significantly, it is useful to increase the filtering of the **magnetic heading** channel to stabilise the value displayed. Conversely, in calm sea, low filtering will be preferable to obtain a fast response of the display.

**Filtering** is adjustable between **1** and **32**, and the default value is **8**. The lower this value is, the lower the frequency of update is.

Please refer to the user guide of your display to carry out the filter setting.

## 1.5 TECHNICAL SPECIFICATIONS

- Power supply : 10 to 16VDC
- Consumption : 25mA
- Resolution : 1°
- Tightness : IP67
- Weight : 270g
- Operating temperature : -10°C to +50°C
- Storage temperature : -20°C to +60°C

## 1.6 DIAGNOSTIC OF 1ST LEVEL TROUBLESHOOTING

Before contacting technical support, please check the troubleshooting table below.

Problem	Possible causes and solutions
The <b>Topline</b> installation does not detect the compass.	The bus cable is not or is badly connected to the terminal box : check the connection inside the terminal box. Check the state of the cables : they must not show any sign of wear or cut.
The magnetic heading displayed is very different from that which the steering compass indicates.	Check that no equipment likely to disrupt the steering compass of your boat or the fluxgate compass is in the vicinity : please consult the list in the installation chapter.  Check that the steering compass of your boat is compensated.  Carry out a calibration of the compass.

If you do not manage to solve the problem, please contact your distributor.

## 2 SENSOR CALIBRATION

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The **fluxgate compass** is adjusted at the factory. However, an offset adjustment is required to adapt the sensor to the specificities of your boat and to obtain an optimum measurement accuracy. Follow the calibration procedure below, by visualising the settings on a display : please refer to the user guide of the display.

### 2.1 OFFSET SETTING

#### 2.1.1 Principle

After the installation, it is necessary to adjust the **OFFSET** of the **fluxgate compass** so that the **magnetic heading** displayed is identical to the true magnetic heading.

In order to do that, you must carry out an actual test at sea with your boat ; take the steering compass of your boat as reference, sail along a **0°** magnetic heading due North and make a note of the heading indicated by the **magnetic heading** channel of your display. Then, deduce the difference between the steering compass and the **magnetic heading** displayed : this value is the correction **offset** of the **fluxgate compass**.

#### CAUTION :

- If your steering compass is taken as reference, it must be compensated (calibrated) so that the calibration is correct.
- Before setting the offset, you must adjust the mechanical position of the **compass** : refer to the installation chapter 9.3.

#### 2.1.2 Setting procedure of the offset coefficient (by default the value of the offset is **0**) :

1. Select the **calib offset** sub-channel of the **magnetic heading** channel.
2. Enter the new calculated **offset** coefficient and validate using the **enter** key. The new setting will be saved to the memory.

Please refer to the user guide of your display to perform the setting.

### 2.2 COMPASS AUTOCOMPENSATION

It is possible that on some boats, the **Fluxgate Compass** accuracy may be strongly disturbed by its environment. Despite a careful installation and an offset properly adjusted, an important difference remains between the **magnetic heading** displayed and the true magnetic heading, throughout the measurement range between **0** and **359°**. In this case, you can perform an autocompensation of the **Fluxgate Compass** to achieve an acceptable level of accuracy.

#### 2.2.1 Principle of the autocompensation

The operation consists in executing, **at a rigorously constant rotation speed**, an almost perfect circle with your boat, **clockwise**. While the boat describes this circle, the sensor will record the measurement points of a deviation curve, every **10°** with an accuracy of **0.25°**. Thus, your **Fluxgate Compass** will be accurately corrected between **0** and **359°**.

## 2.2.2 Autocompensation procedure for the fluxgate compass

In order to achieve a successful autocompensation, you must navigate :

- On smooth sea, with no current.
- Away from large magnetic masses such as cargo boats.
- In an open area allowing the execution of a circle with a diameter approximately 5 times the length of the boat.
- At a constant rotation speed of about 2 or 3 knots.
- 

**CAUTION** : the autocompensation operation of the Fluxgate Compass requires precision in the execution of the circle : constant speed of 2 to 3 knots and constant diameter of the circle. If you cannot maintain these two criteria, the autocompensation will not be successful.

1. Display the **magnetic heading** channel.
2. Launch the «autocompensation» mode according to the procedure described in your display guide.
3. Start to describe the circle then launch the autocompensation procedure.
4. One single circle is sufficient to perform the autocompensation correctly.
5. The display then sends out a message to the user indicating that the autocompensation is successful. The number **3** for the **Gyropilot** and the number **3000** alternately with **dashes** for the other **multifunction** displays.
6. Exit the autocompensation mode.

Please refer to the user guide of your display to perform the autocompensation procedure.

In case of problem during autocompensation, the display will notify the user of the cause of the fault indicating alternately, for 5 seconds, the message PAN with the following code :

- code 1 : Cancellation at user request.
- code 2 : Detection of a gyration in the opposite direction. Start again clockwise.
- code 3 : Excessive variation between 2 heading measurements. Reduce the speed of your boat to 2 or 3 knots.
- code 4 : Angle correction higher than 20°. In this case, start the autocompensation procedure over.

In case of autocompensation error, the measurements are not saved to the memory and the sensor resumes its normal operating mode.

## 3 INSTALLATION

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Before starting the installation, select an appropriate location for the sensor. Indeed, the **TOPLINE Fluxgate Compass**, just like the steering compass of your boat, is sensitive to metal masses, to the movements of the boat and the disturbances caused by electrical appliances. Although it can be autocompensated, the installation must be carefully carried out in order to achieve an optimum level of accuracy.

### 3.1 LIST OF ACCESSORIES

- TOPLINE terminal box : 90-60-121
- TOPLINE bus cable: 20-61-001

### 3.2 INSTALLATION PRECAUTIONS

The location of the sensor must be :

- as close as possible to the pitch and roll centres of the boat,
- more than one meter away from onboard magnetic compasses (to avoid a mutual disturbance),
- as far as possible from onboard magnetic masses (loudspeaker, radio transmitter or receiver...).

Below is a list of equipment likely to disrupt a fluxgate compass :

- The keel of the sailing boat (when it is made out of cast iron or steel).
- The radio and radar equipment.
- The boat's engine.
- Generators and battery chargers.
- Voltage regulators.
- Electrical motors.
- Tool boxes and anchors.
- The electrical windlass.
- High voltage electrical cables.

Before installing the **Fluxgate Compass**, you can check that the location will not be disrupted, following the procedure below :

Place a bearing compass at the selected location. Then, with your boat, execute a full 360° circle in order to compare the information provided by the steering compass and the boarding compass. If the variations are lower than 10°, the location is suitable.

<p><b>CAUTION</b> : the metal spanner that you use when screwing the nut disrupts the compass. Move the spanner away from the compass when you check the magnetic heading</p>
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### 3.3 INSTALLATION OF THE COMPASS

1. Install the mounting bracket as vertically as possible using the two screws provided or any other non-magnetic screws (nylon screw, brass screw).
2. Loosen the lower nut of the compass.
3. Position the compass on the bracket and tighten the lower nut slightly.



### 3.4 ADJUSTEMENT OF THE COMPASS POSITION

You must adjust the mechanical position of the **compass**. This operation is essential before performing any calibration.

#### Procedure

1. Start the installation.
2. Select the **magnetic heading** channel on your display.
3. Position the boat so it faces the magnetic North, as indicated by the steering compass of the boat.
4. Loosen the lower nut of the sensor.
5. Position the sensor so that the heading displayed on the **magnetic heading** channel corresponds to the magnetic North. If you have a small gap, you will be able to correct it with an offset one. Tighten the lower nut in order to secure the sensor to its bracket.

### 3.5 CONNECTION TO THE TOPLINE BUS

1. Make the **compass** bus cable run towards the **TOPLINE** terminal box of your installation.
2. Connect the bus cable inside the terminal box :

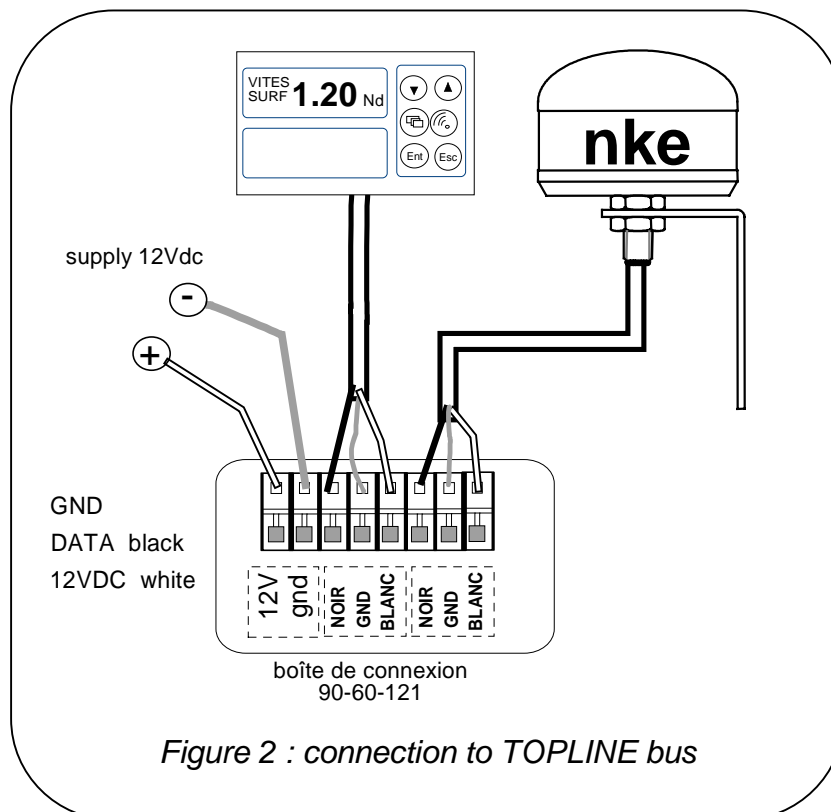


Figure 2 : connection to TOPLINE bus

If you reduce the length of the bus cable, strip and galvanise the wires before connecting them inside the terminal box.





