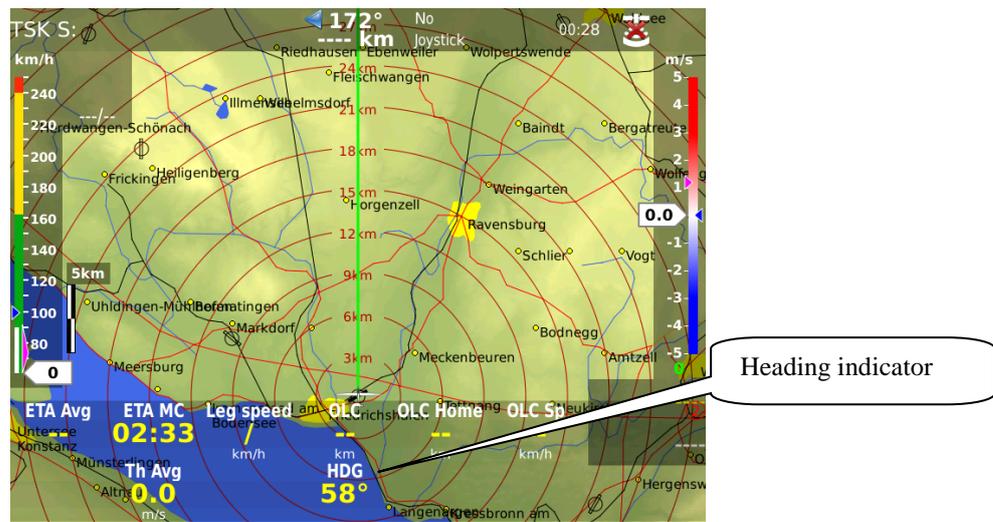# LX Compass module 3

## Electronic compass device
## User manual

# 1. General

The compass module is an electronic compass device (magnetic field sensor), which was developed for the LX 7007 PRO IGC, LX 7007C, LX 7000, LX 5000 retrofit and LX Zeus. The LX-device recognizes the compass module automatically when it is coupled onto the 485 bus.  The only configuration settings needed relates to the calibration procedure. An indication that the compass module is connected is the appearance of magnetic HDG reading in Nav Box line (on LX Zeus). Alternatively you go under Setup>Service>Detected Hardware (on LX Zeus) there should be green thick under Compass icon. Module consists of sensor device, 485 bus to 6-pin connector and 6-pin cable. LX Compass layout is approximately 49x27 mm and the cable length from sensor device to the interface is cca. 1500mm.

Heading indicator

The compass module does not only display magnetic heading but also calculates **wind vector in straight flight.**  The wind vector is calculated using the triangle of velocities method, where the vectors of ground speed with track, TAS with compass heading, and the wind vector form a triangle of velocities.

Wind

TAS and HDG

Groundspeed and TRK
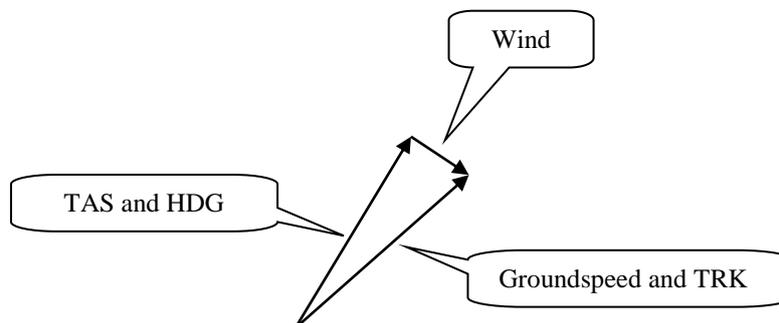
The angular difference between HDG and TRK depends on the magnitude of the wind vector and is normally quite small, which means that the measurement has to be quite precise if accuracy is to be achieved. While the GPS data (TRK and GS) is precise, small inaccuracies in the heading of about 5° can cause errors of up to 25km/h in the wind strength. This method only works during straight flight and the calculation is stopped as soon as HDG and TAS change rapidly as occurs when the glider is turning.

# 2.Installation of the compass module

The device consists of two parts, an electronic compass sensor and connector. The electronic compass sensor should be built somewhere far from metal parts, which can cause errors in reading. Respect flight direction arrow and install the unit horizontal. All Connections are plug_and_play, so mistake is not possible.

The **orientation** is clearly marked on the label which is on the top of the LX Compass (see picture bellow).



## 2.1.　　Where to install:

The compass module should be installed as far as possible away from magnetic, electrical and steel parts (loud speakers and analogue vario indicators contain strong magnets). Even the mechanical compass should be as far away from the sensor as possible. Minimum distance is 20cm. As mentioned above, the arrow should be aligned accurately in the flight direction and parallel to the fore and aft axis of the glider.

## 2.2.　　First test after installation:

An external reference compass is required which can either be a prismatic landing compass or a calibrated compass base on the airfield surface. Using the reference compass, the glider should be aligned in each of the eight main directions (360°, 45°, 90°, 135°, 180°, 225°, 270°and 335°). Now the glider should be oriented into north direction, while doing that watch the HDG displayed in Nav Box line of the LX Zeus (do not try to compensate the compass yet!).  If the HDG varies more than $\pm 5^0$, rotate the compass so, that the deviation decreases below $\pm 5^0$.

Now turn the aircraft into the other directions and read the displayed values (don't change the compass position anymore). If they vary more than $\pm 15^0$ look for another place for the compass module because there are too many interference on the current position of compass.

## 2.3.    **Adjusting the compass module:**

The compensation of the compass is made in the SYSTEM SETUP -> SERVICE -> COMPASS CALIBRATION.
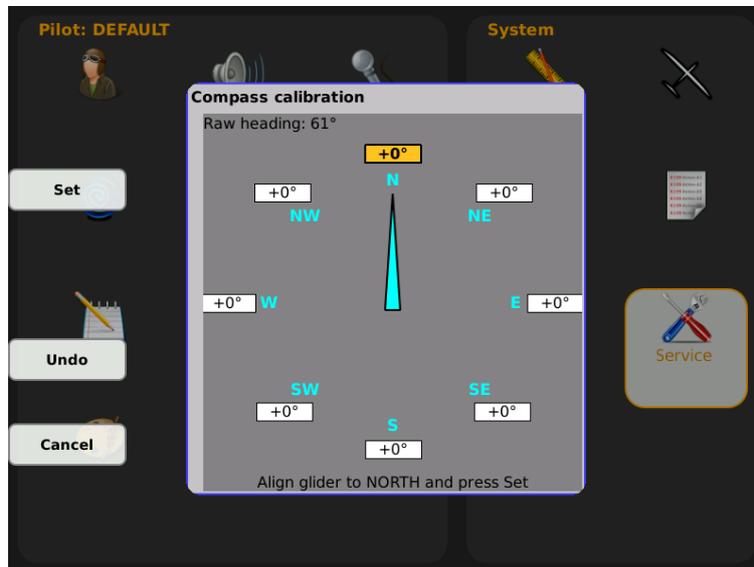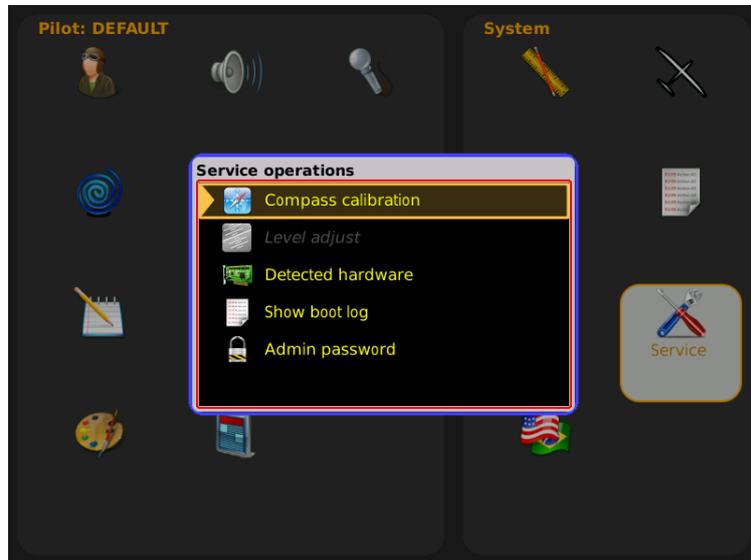




1. Orientate the glider  to **360⁰**
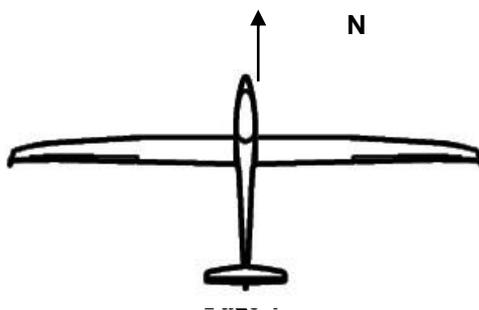
2. When the glider is aligned to **NORTH,** press **SET** to store measured value (actual measured **HDG** is displayed in top left angle of Compass calibration window).

3. Next position is NE (45°), rotate **the aircraft to 45°,** stabilize reading and press **SET** to **store** the measured value.

4. Repeat the procedure for the remaining directions



Example:



S
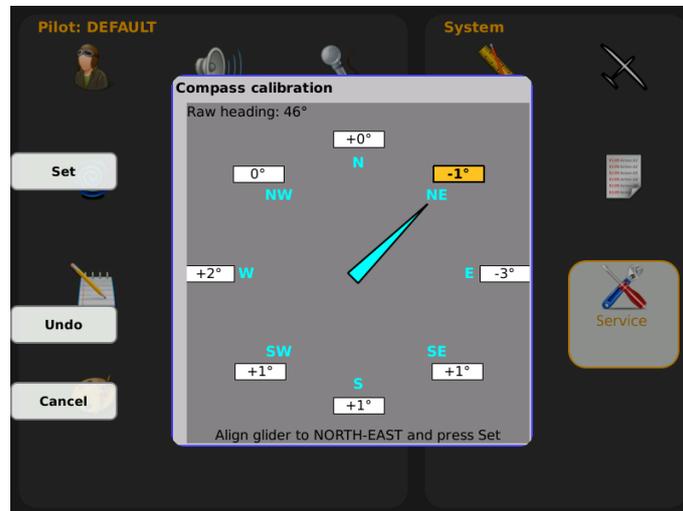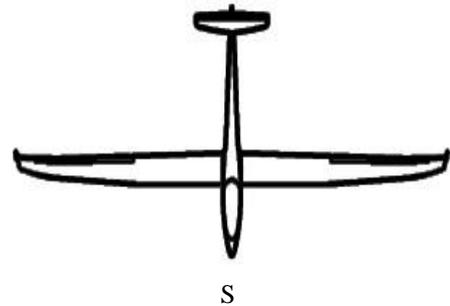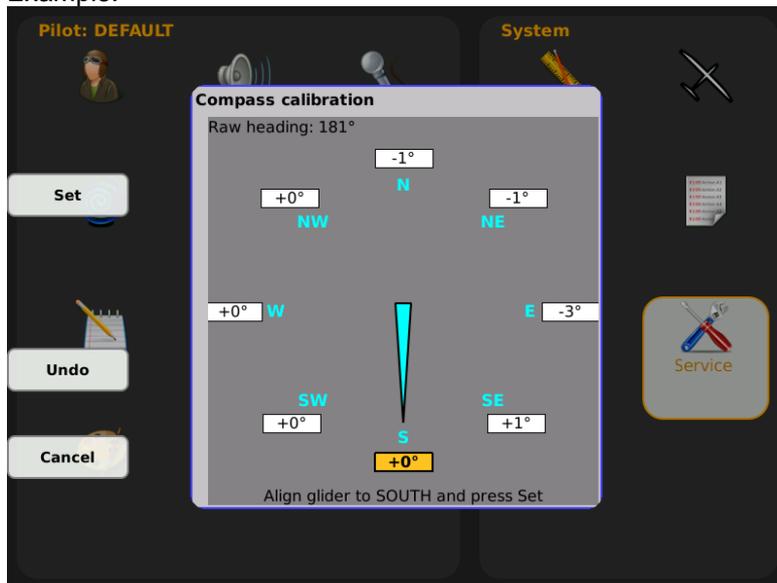
Typical situation after successful calibration procedure:
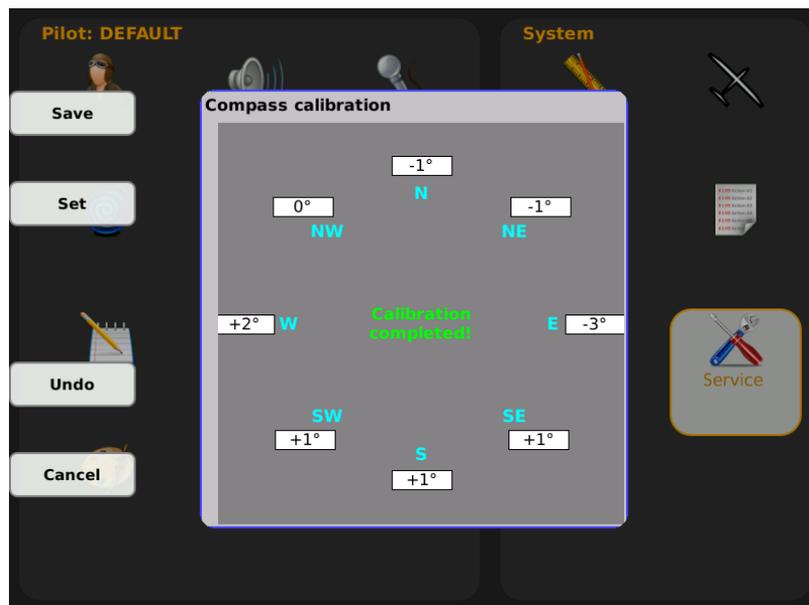


After calibration press **SAVE** to save the calibration and leave calibration window.

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**Important!**
Switch the unit **OFF**, by using esc/off button to store calibration data properly. The calibration data will remain until next calibration procedure. This does not apply for LX Zeus.

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# 3. Final check

Turn the airplane back to North and observe only HDG in Nav Box line.  The error should now be less than $1^0 – 2^0$ (better to have $1^0$!). Repeat this for all other directions. If the errors are larger than 2°, then one should search for faults in installation or in the adjustment procedure.  When you are satisfied with final result, your LX Zeus is ready to calculate the wind with the compass method.

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**Note!**
The calibration is specific for your combination of aircraft and compass, which means you, can not transfer the compass to another aircraft while using the same calibration values.
The parameters are stored and will not get deleted when a memory initialization is performed or the power supply is turn OFF.
It is recommended to repeat the calibration procedure every year or every time when you modify cockpit setup.

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# 4. Wind computing during flight

For the wind calculation a finite time is needed to make the calculation. **This time (in seconds)** is entered in the **SETUP > WIND and set the time under Time for straight flight.** The longer the time the more accurate is the computed wind, and vice versa.
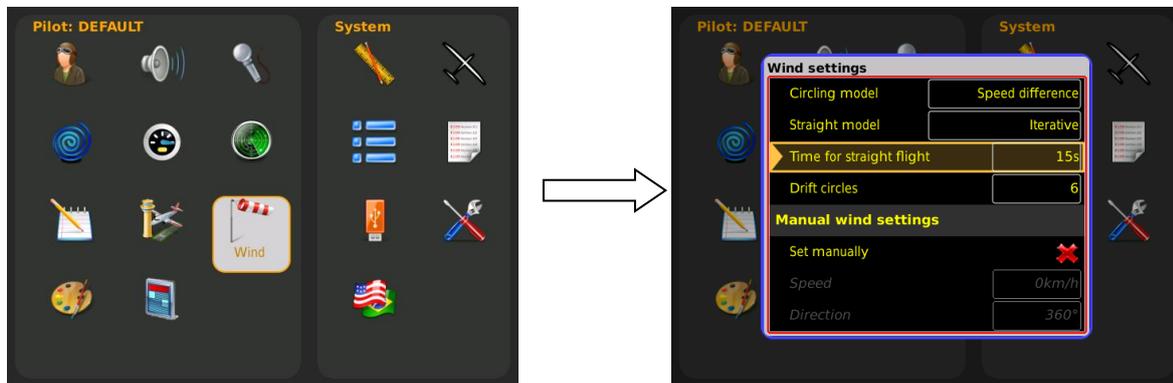
If the pilot intends to use the wind calculation with the compass module, he has to select item **Compass in Setup > Wind and go under Straight model** (press enter to choose item and then press enter to confirm).
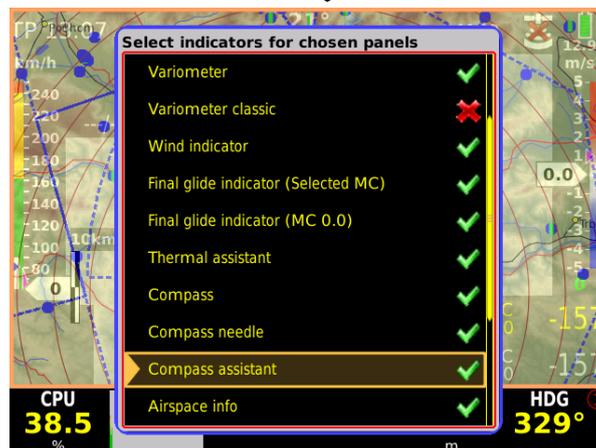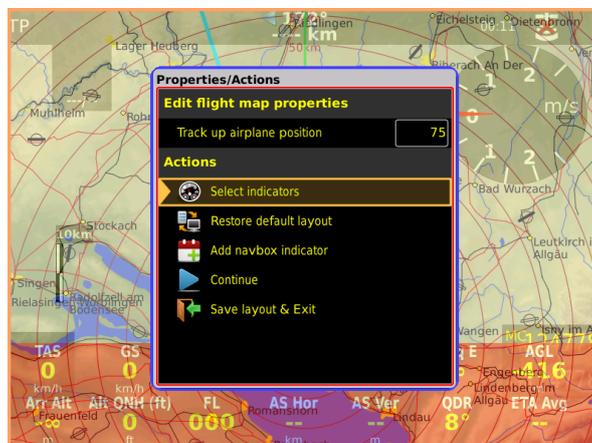
## 4.1.    Compass assist

If you want to activate Compass assist go to Setup -> Layout, select the desired layout and then click Edit. Compass assist will be automatically added on your layout if you click Restore default layout (when Compass is connected to Zeus).
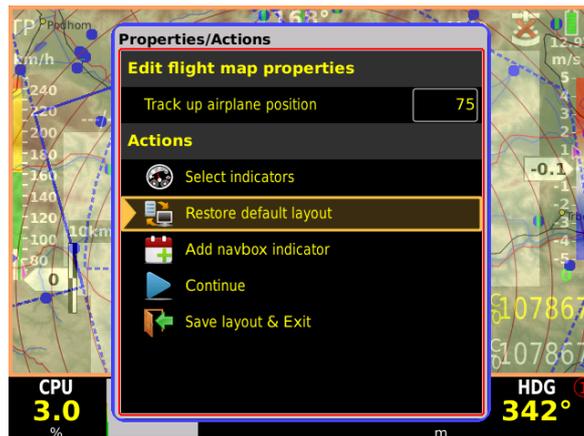
You can also add Compass assist manually by Editing the selected Layout and choose Select indicator. You can also activate Compass needle and Compass.





When you have done one of the settings mentioned above, Compass assist will appear on the main screen when the conditions for wind calculations are right for 5 sec. You can find conditions in Note bellow.
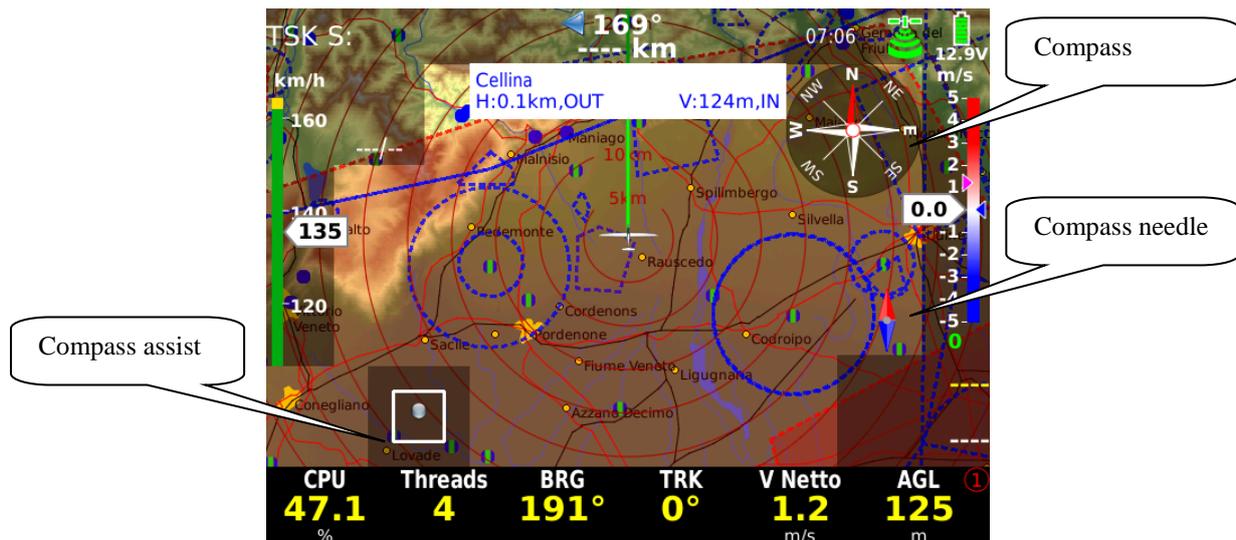
For wind calculation you have to keep the ball in the square! If the ball is too high (from center) you have to slow down, too low – speed up, left – turn left, right – turn right.

Example of ideal position of the ball:



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**Note!**

The wind calculation with the compass works exclusively in **straight flight**.

The calculation is **automatically started** when the following conditions are fulfilled for at least 5 sec.:

Speed should be constant – It should vary not more than ± **10km/h** (6kts)

Flight direction should be constant, variation should be less than ± **5°**

The measurement takes that amount of time (in sec.), that was defined in the **WIND** menu

To see the calculation starts go to Panel layout and activate **Compass assist**. When the conditions are right for 5 sec, the calculation will start.

The result is a **new** wind vector

If the limits given above are exceeded during the measurement, the procedure **will be stopped** and restarted as soon as the conditions are fulfilled again.

The calculated wind direction and speed is averaged in a time period of last **5 minutes.**

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