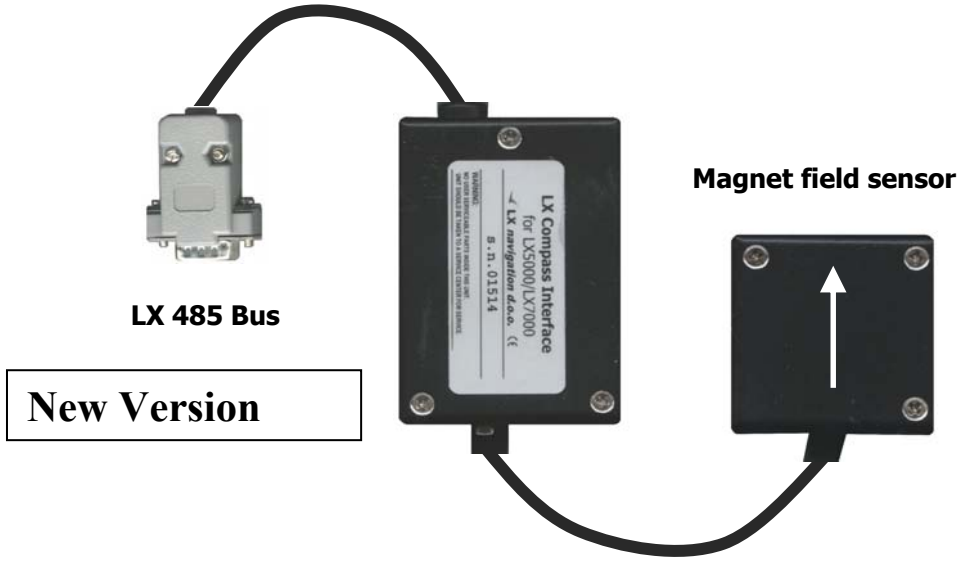
# Compass Module

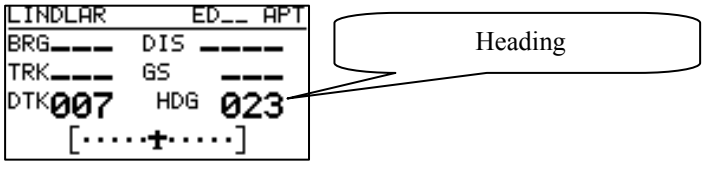



**New Version**

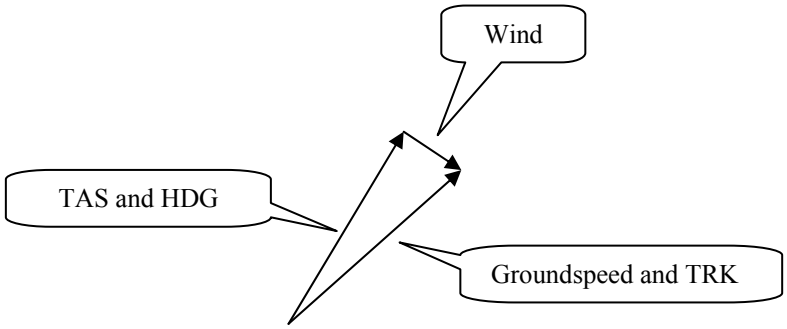
**previous Version**


# General

The compass module is an electronic compass (magnetic field sensor), which was developed for the LX 7000 PRO IGC. It also works with the LX5000 starting with version 6.x and with the brand new **LX7007 pro IGC** The LX system recognizes the compass module automatically when it is coupled onto the 485 bus. The only configuration settings needed relate to the compensation procedure. An indication that the compass module is connected is the appearance of magnetic HDG reading on



navigation page 3 of the LX system.
The compass module not only permits the display of magnetic heading but also permits the calculation of the **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.




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.

# 1 Installation of the compass module

The device consists of two parts, a compass sensor and electronic device. The compass sensor should be built somewhere far from iron parts, which can cause errors in reading. Respect flight direction arrow and install the unit horizontal. All connections are plug_and_play, so there is no mistake possible. A **485 splitting** unit to extend LX 485 bus is included. The box with electronic could be installed on the convenient place in the glider , orientation doesn't matter.

## *1.1 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 arrows should be aligned accurately in the flight direction and parallel to the fore and aft axis of the glider. For a proper installation a plane area parallel to the horizontal plane is needed.

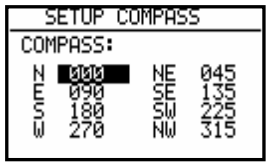
## *1.2 First test after installation:*

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 on Nav.-page 3 of the LX 7000 PRO IGC (do not try to compensate the compass yet!). If the HDG varies more than $\pm 5^0$, turn 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 $\pm 10^0$ look for another place for the compass module.

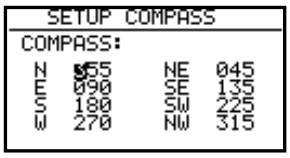
# 2 Adjusting the compass module:

The compensation of the compass is made in the SETUP menu after entering the password (96990).


pressing ENTER




1. Orientate the glider again to $360^0$.
2. Set the cursor on N and press ENTER (actual HDG is displayed).
3. Press ENTER again (storing the measured value)
4. Set the cursor on 45°, orientate the aircraft to 45° and again store the measured value.
5. Repeat the procedure for the remaining directions




The compensation table will look similar to that above when you have finished the procedure. Leave the menu with ESC.

# 3 Final test:

Switch the LX 7000 PRO IGC back to Nav.-Page 3 and check again all 8 directions. The error should now be less than $1^0 – 2^0$ (better to have $1^0$ !). If the errors are larger, then one should search for faults in installation or in the adjustment procedure. When the final test is satisfactory, your LX 7000 PRO IGC is ready to calculate the wind with the compass method.

**Please Note!:**
The calibration is specific for your combination of aircraft and compass, which means you cannot transfer the compass to another aircraft while using the same calibration values.
The parameters are stored in an EEPROM, so they will not get deleted when a memory initialization is performed or the internal Li-battery is exchanged.
It is recommended to repeat the calibration procedure every year.

# 4 Wind calculation during flight

For the wind calculation a finite time is needed to make the calculation. **This time (in seconds)** is entered in the **INIT menu under WIND/COMPASS**. 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 in one of the three Nav Pages the wind menu (just press ENTER when you are on one of the Nav Pages, move the cursor onto WIND and press ENTER again). Then choose the item **COMPASS**.

**Please Note!:**
- The wind calculation with the compass works exclusively in straight flight.
- The calculation is 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 INIT menu
The result is a new vector wind
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 higher the speed, the greater the potential error in the calculated wind.

**What the pilot should do during wind calculation:**

- **Keep the speed and flight direction as constant as possible**
- **Watch the wind display on one of main Nav pages (lower left corner)**
- **If WAIT is displayed, it means that the conditions for the measurement are waiting to be stabilized**
- **When the measurement is started, a time counter will start counting down (like 15, 14, 13, ...). This is the time in seconds until the calculation is finished**
- **When the procedure is completed without problems, a new wind vector will be displayed.**

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