*LX*5000 **V** *9.0*

Variometer and GPS-Navigation System

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1 Contents

2 General

The instrument consists of two units, the main unit (80 mm) and LCD Vario indicator (57 mm). Additional LCD Vario indicators can be added.

The fast calculation processes and graphic displays are achieved by using modern microcontroller technology. The sensors are modern, highly precise, temperature compensated pressure sensors for altitude and speed to eliminate errors

Vario functions

- Vario, Netto, Relative and Average
- Speed command
- Final glide calculator
- TE compensation (TE-tube or electronic)

Navigation functions:

- Jeppesen airport and database or Europe (up to 5000 airports)
- 600 turnpoints
- 100 tasks
- Statistics
- Near airport function

The manual is written for all instruments having program version 9.x and also for all the instruments being hardware upgraded from 6.x to 8.x or 9.x

What does LX5000FAI mean?

LX5000 FAI has abuilt in **approved IGC logger** and therefore one additional pressure sensor for altitude. Special software on the device is responsible for stored data integrity, which means no manipulation is possible.

2.1 Technical data

- Power 8-16 V DC
- Consumption   400mA/12V (without audio)
- 80 mm std Aircraft cut-out main unit.
- 57 mm std. Aircraft cut-out LCD unit.
- Length 200 mm (incl. connector)
- NMEA output
- Winpilot interface
- 12 Channel GPS receiver
- External speaker
- Data compatible with LX 20 and Colibri
- IGC logger.
- PC communication
- Wiring
- Additional LCD Vario could be connected via 485 bus
- Weight: 800g

2.2 Rotary switches and keys (buttons)

The following control elements are mounted on the main unit

- Four rotary switches (selectors)
- Five keys (push buttons)

The LCD-Vario is designed as a slave unit, which means it has no control switches and keys.
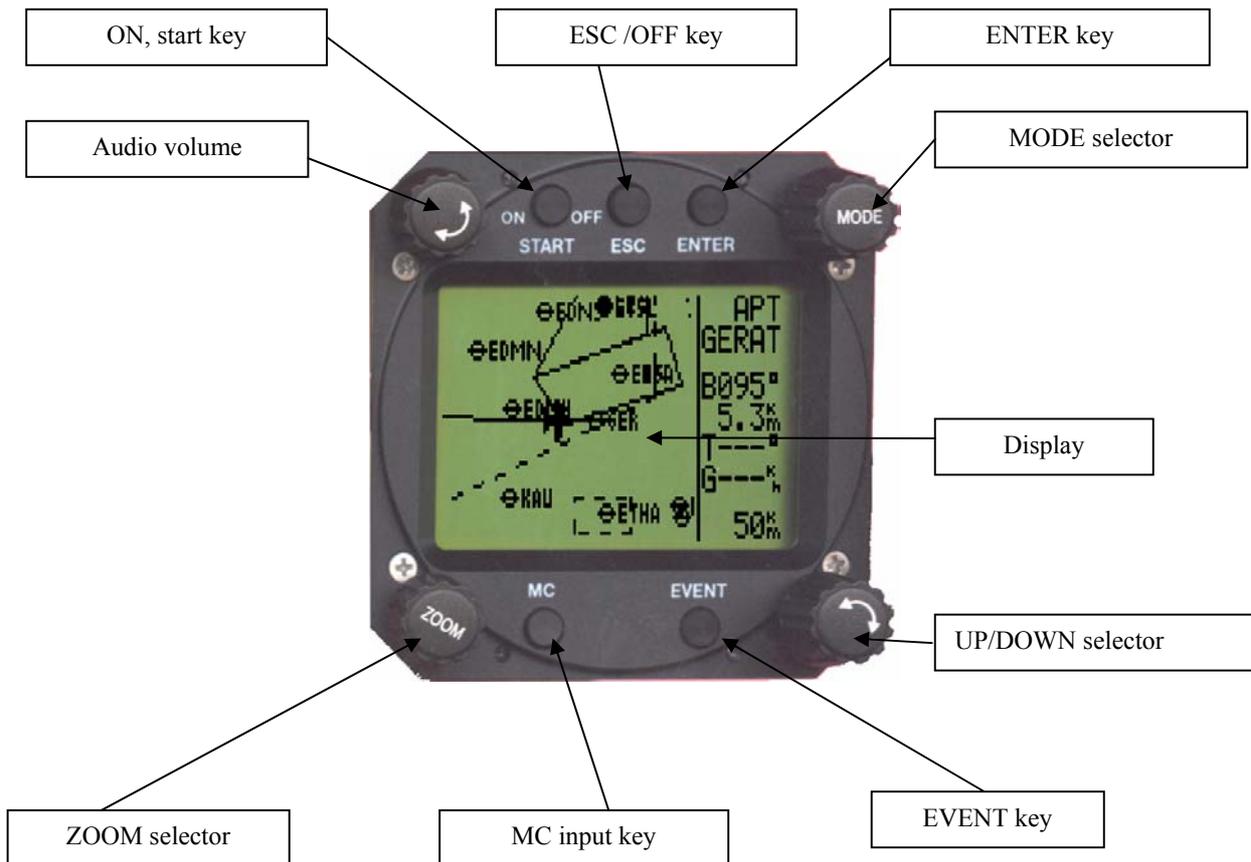
2.2.1 On/Start key

A short press on ON/Start key will switch the instrument **ON.** To switch the instrument off hold **ESC/OFF** key for a few seconds and the instrument will be switched off. To switch the instrument off during the flight it needs a confirmation from the pilot, **so the LX5000 cannot be switched off by mistake.**
IMPORTANT!
After having a short power brake during flight and the instrument will be off for a few seconds**, it will not produce two flights.**

During flight the key is used to start the task, to see more characters of airport names and, in the edit menu, to go one step back if e.g. an error has been made (see paragraph APT).

2.2.2 Mode selector (rotary switch)

The mode selector is used to change modes of operation. This switch has the **highest priority in** the system. Whenever it is activated **a mode changeover will happen.**

2.2.3 UP/Down Selector (rotary switch)

This rotary switch has a lower priority than the mode selector switch and is active all the time in the selected mode. It is mainly used for selecting sub menus during navigation and to scroll in the edit menu.

2.2.4 ENTER key

The main function of this key is **confirmation** and to start edit procedures.

2.2.5 ESC/OFF key

This is a multifunctional key, which has two main functions.

- After ESC is pressed a jump to the menu of the next higher level will follow
- During the input of letters and numbers (blinking cursor) **ESC confirms the whole row** (not necessary to press ENTER few times)

2.2.6 EVENT key

Activates the Event function (see Chapter 3.1.1.2, LOGGER)

2.2.7 MC/ BAL key

Provides Mc Cready (MC) and ballast setting. The ballast setting is possible after a double click. The value is changed with the UP/DOWN-selector. (In the elder series of LX5000 there are two separat rotary switches for MC and ballast)
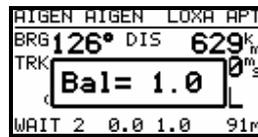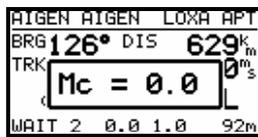
2.2.8 ZOOM (rotary switch)

This is a multifunctional rotary switch. Its main function is to change the **zoom level in the graphic mode.** Additionally the zoom switch is used as follows:

- To select turnpoints (only in TP main page)
- After a mistake during editing it is possible to go back some stages by rotating this knob (only when the cursor is blinking = editing is active)

3 Operation modes

The LX5000 has 7 modes or main menus. All of them are selected **directly by rotating the mode selector**. The diagram shows the menu (mode) structure of LX5000.

<div align="center">⇐**MODE**⇒</div>

GPS	NEAR	APT	TP	TSK	STATISTICS	SETUP
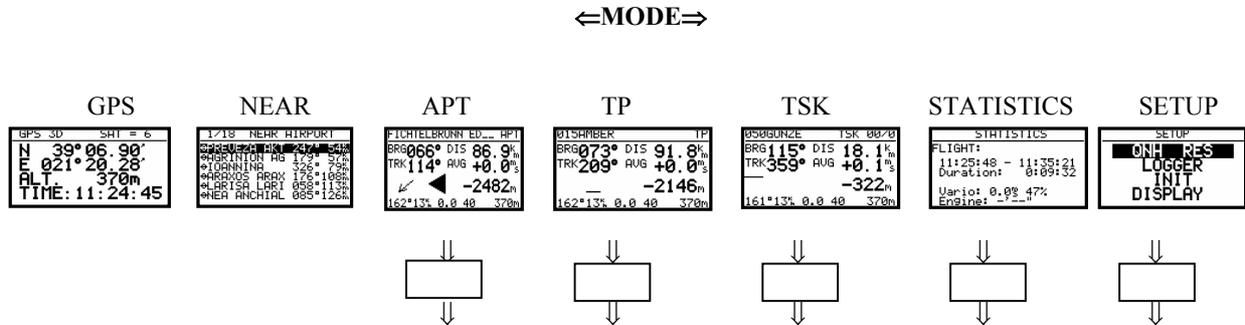
Navigation menus (APT, TP,TSK) have sub menus, which are selected using up/down selector.

GPS	GPS status, no inputs
NEAR	Near airport, choose one airport, no further inputs available
APT	Navigation and selection of airports
TP	Navigation, selection and edit of turnpoints
TSK	Navigation, selection and edit of task
STAT	Flight statistic and logbook

SETUP is organized in two levels. The first level (no password required) is accessible for everybody. For the second level, the pilot has to use the password. The password is not a top secret; it is the same for all instruments and published (in fact it is the last five nimbers of the Filser GmbH telephone number)

<div align="center">

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</div>

After installation of the LX5000, it is necessary to activate the password and adjust the settings of the instrument and the desired units.

3.1 SETUP

3.1.1   SETUP before password

Changes can be made at any time. This first level contains **no system settings** at all.

The up/down selector will select the different menus.
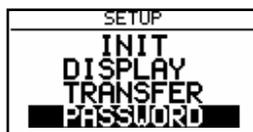
3.1.1.1 QNH RES (QNH and safety altitude)

After switching on, the pilot has an opportunity to input the actual QNH, taken from meteorological service. Using this feature it is possible to offset the altitude datum, which could have been changed due to pressure changes during the flight. Without input of **initial QNH** before the flight, this function is not active.
Any change of the QNH influences the measured altitude. A wrong setting can therefore cause an unprecise final glide.

```
        SETUP
QNH:  ----mb
MG.V.  AUTO!
ALT.R.  0000m
BUGS:    0.0%
```
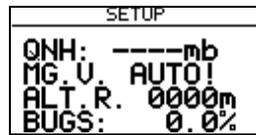
Procedure:
* Use the **up/down** selector to choose the item (QNH, ALT.R. MG.VAR. or BUGS)
* Press ENTER
* Use up/down and ENTER for input
* Close the procedure with ESC

Some GPS receivers don't deliver **magnetic variation (MG.V.)**. In that case the input of a typical value of variation for the area flown in is obligatory, especially if the magnetic compass is used for wind calculation, or magnetic track is used in navigation. Having a receiver, delivering variation, no input is possible and necessary (AUTO message will appear)

Example above: safety altitude 000m, QNH offset not possible.

"**BUGS**" is polar degradation because of "buggy" wings. The input is in glide ratio degradation percentage.
(5%, means glide ratio degradation is 5%)

3.1.1.2 LOGGER

As mentioned before, the flight recorder (logger) is approved by the IGC commission. (Governed by the FAI.)
After "enter" the LOGGER will follow.

```
  FLIGHT SETUP            FLIGHT SETUP
FLIGHT INFO              LOGTIME
  LOGTIME                (I)RECORD
(I)RECORD       to       (J)RECORD
(J)RECORD                  EVENT
```
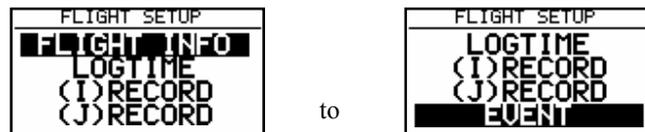
Under **"FLIGHT INFO"** all important data, such as pilot (name), glider type, call sign, competition sign and comp. class are stored. Also the name of the official observer can be entered. After pressing ENTER on FLIGHT INFO all these parameters are accessible. Naturally all these settings are available with a PC and the Lxe-program or via Colibri or LX20 (see Chapter 4). The settings are performed with ENTER UP/DOWN and ESC.
Example:

```
 FLIGHT INFO
 First name
 LUCIA
 Last name
 STAINKE
 Reg AA      CN CC
 Class  OPEN
```

> **Please note, there is an important change compared to earlier versions: With the version 9.0 the glider type, set under Setup ->Password -> Polar, see 3.1.2.10, is automatically written into the IGC file-header.**
> If one likes to fly with a polar other than that of the used glider, one should write the parameters of that polar into the user polar and should term it with the name of the used glider (important at decentralized competitions, Online-Contest, Barron-Hilton-Cup...)

Before leaving the FLIGHT INFO menu one can save the pilot´s data in a pilot list.

Confirming with Y(es) stores the pilot into the pilot list, what means this pilot can be chosen during the start-up procedure.

Important !

If the the pilot is not added to the list (ADD PILOT TO LIST **N**) one has the **private pilot modus**. In this case the LX5000 offers no choice of pilots and after 30sec the **SET ELEVATION** procedure is started.
On the other hand, having added more than one pilot to the list, a pilot can be chosen out of the list during the boot procedure (Choose with UP/DOWN and confirm with ENTER). This is called the **Multi-Pilot Option**. For details see chapter 3.4.

LOGTIME is an important setting for sufficient flight recording.
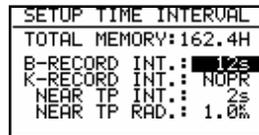
TOTAL MEMORY is the **capacity of memory** and depends on the settings only. This number is not reduced after some flights are stored. It changes only after new settings have been made in the setup. The total memory indicates how many hours of flight can be flown without loosing the flight data because of overwriting. **If the memory is full, the oldest flights will be overwritten without warning.**

B-RECORD: position, GPS altitude, pressure altitude, UTC and GPS status are recorded
Pilot sets record interval, the default value is 12 seconds.

K-RECORD: not active by default

NEAR TP INT.: being close to the turnpoint (inside NEAR RAD), the logging runs faster
NEAR TP RAD.: radius that defines NEAR

(I) RECORD
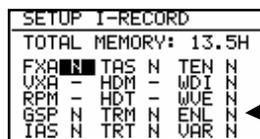
For motor gliders ENL: **Y**

Using this record some more flight parameters can be logged. Setting **Y** activates additional logging.

-FXA: current horizontal accuracy of GPS
-VXA: current vertical accuracy of GPS
-RPM: engine RPM
-GSP: groundspeed
-IAS: indicated airspeed
-TAS: TAS
-HDM: mg. heading
-TRM: magnetic track
-TRT: true track
-TEN: total energy

-WDI: wind direction
-WVE. wind
-VAR: vario
-ENL: engine noise level **(Must be Y when flying powered gliders)**

Each activated setting will reduce the **total memory capacity.**

(J)   RECORD

J record has the same settings as **I record**, but will build a separate file. Using this record **reduces the total memory significant.**

EVENT

After pressing EVENT key, the logger will run a limited time faster as defined in LOGTIME. Activation of EVENT is recorded as a **special record in the IGC file**. Some competition rules require using EVENT before departure.

```
SETUP EVENT MARKER

FIX INTERVAL:   2s
NUMBER OF FIX:  30
```
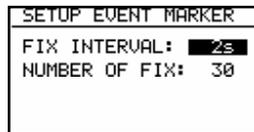
Example: after EVENT, 30 additional fixes will be logged in 2-second interval.

3.1.1.3   INIT

The following parameters can be re-defined using this setting.

```
INITIALIZE

VARIO FIL.:     4.0
VARIO INT.:     10s
VARIO RNG.:      5%
TAB: 1.5% ETA:   GS
AUTO SC:        OFF
WIND/COMPASS: N.C.
```
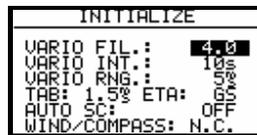
- VARIO FIL: damping of vario indicator from 0.5 up to 5, default setting is 1.0 (nominal seconds)
- VARIO INT: vario average time, 20 seconds default
- VARIO RNG: vario range
- TAB: audio dead zone during speed command flight
- ETA: Calculation of the estimated arrival time: GS based on the actual groundspeed, VAR based on the averaged variometer value of the complete flight so far, Mc based on the actual Mc-setting.
- AUTO SC: speed command change-over method
                    OFF: only with external switch
                    GPS: after climbing (circling) is detected using GPS, an automatically change over will happen
                    XXX: TAS in 5 km/h steps from 100 up to 160 km/h (knts, mph)

- WIND/COMPASS: compass is an optional device which can be connected to the LX5000 485 bus. The device delivers magnetic track and one additional wind calculation method can be used. The method needs a straight flight. The time for calculation is set using this menu (normal 15 seconds). Longer time means a better wind calculation.

3.1.1.4   DISPLAY

The contrast depends on the viewing angle of the pilot and on climatic factors (daylight intensity and temperature). To adjust it use this setting. To change the contrast rotate the up/down selector.

```
   SETUP DISPLAY
 LCD CONTRAST: ■

 ████████████
```

3.1.1.5   TRANSFER

To communicate with PC, LX 20 or Colibri use this menu. Data transfer is started after ENTER, for detailed information see Chapter 4.

3.1.1.6   PASSWORD

Sytem settings can be obtained, after entering the password (for detailed description see next paragraph 3.1.2)

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3.1.2   SETUP after password

After password input **(96990)** further 19 system settings are available. During the flight the password is inactive, that means after ENTER on password **the LX5000 jumps directly into the setup menu!**

3.1.2.1   TP   (Turn point)

All settings dealing with turnpoints can be done in this menu. The LX5000 is able to store 600 turnpoints.

```
       SETUP TP
 TP-QUICK POINT NAME
 DATE: ▮OFF▮       AP
 TP-QUICK POINT AUTO
 SELECT:   OFF
 NEAR RADIUS:     0.5%
 TP-SORT:  ALPHABET
```
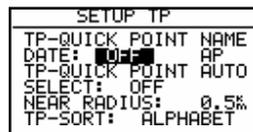
TP-QUICK POINT NAME

The pilot is able to store his **actual position** during the flight. Such turnpoints are called QUICK TP and are generally named like AP (actual point). How to store the actual position will be described later.
Settings:
DATE OFF will store the position like **AP: 12:35.** The numbers show the time of storing.
DATE ON will store the position under date and time (**28121330 for 28 dec. 13:30**).
To store the actual position, the START key should be pressed in TP mode.

TP-QUICK POINT – AUTO

SELECT: OFF after stored, the actual position will not be selected automatically
SELECT: ON after stored, the actual position will be selected automatically and ready for navigation

NEAR RADIUS

The setting has nothing to do with the setting described in LOGGER. The LX5000 has a very useful function named „Simple task". This function is active when a regular task is started. The instrument will detect being close to the turnpoint and after reaching of distance smaller than NEAR RADIUS, the turnpoint will be taken like a confirmed TP of

simple task. Simply said, flying from TP to TP would build a nice in-flight statistics and useful flight evaluation on the ground. For more information on this see Chapter 3.4, flying with the LX5000.

TP-SORT

The LX5000 is able to sort the turnpoints **under alphabet or under distances** (some kind of NEAR TP function). Being sorted under distance **the nearest TP** will appear, after starting of the select procedure.

3.1.2.2   OBS. ZONE (observation zone)

In this menu the different sector geometries for different kinds of tasks and competitions can be programmed.
The following sectors can be programmed:

- Sector for task start (START ZONE)
- Sector at the turn points (POINT ZONE)
- Finish line (FINISH ZONE)
- Templates

Templates are predefined geometries, where all sectors are programmed identically. Actual only 90^0-photosector and 500m-cylinder are available.

The programming of the sectors is generally done by defining two angles, two radii and the direction of the sectors symmetry axis (either by a fixed value or by automatic definition). The settings done here are "global", that means this definition is valid for all tasks. For 5 (five) tasks it is possible to program special sectors, **even for the single turnpoints of one task.** This is done "local" at the corresponding task in the task menu. A very useful function, when flying AAT (Assigned Area Task). The programming of a special sector for each point is necessary for the "Assigned Area Tasks". These (lokal) settings are done in the same way as they are described here. Where they have to be programmed, you can read in chapter 3.2.4.
Note: When working again in the SETUP OBS. ZONE menu after having defined "local" AAT-sectors, all these locals sectors are overwritten with the global values defined here!!

The basic principle of defining the sectors is done as follows:

3.1.2.2.1   START ZONE

To adjust the start zone, select the menu item START ZONE with [ENTER]. We get the following screen:
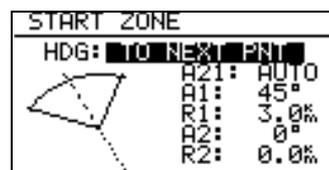
- HDG: defines orientation of the symmetry axis of the sector.
- A21:   Direction of the symmetry axis (in most cases AUTO)
- R1:   Radius of the sector, e.g. 3km for the FAI photo sector.
- A2:   Like A1, used for creating combined sectors.
- R2:   Like R1, also used for combined sectors

At first, this sounds very complicated, but some examples shall help you to understand the meaning of these settings.

Example 1:
In the default settings the 90°-FAI photo sector is set as start zone (see picture above), which means HDG is set to "TO NEXT POINT". The start zone is therefore symmetrical about the bearing to the next turnpoint.
A21 is set to AUTO, which is clear because the direction of the symmetry axis of the start zone is identical to the bearing to the first turnpoint. If A21 is set to AUTO, it's impossible to select this item and change its value.
A1 is 45°, because the half-angle is entered.
R1 is 3km.
A2 and R2 are both set to 0, that means: not programmed.

Example 2:
A 180°-start zone with 20km diameter is programmed the following way:


```
START ZONE
HDG: TO NEXT PNT
          A21:  AUTO
          A1:    90°
          R1:  10.0km
          A2:     0°
          R2:   0.0km
```
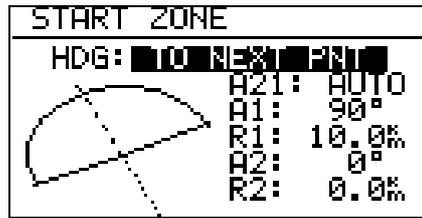
HDG: **TO NEXT POINT**
A21:   AUTO
A1:   90^0 R1:   10km
A2:   0   R2:   0

Note:
According to the IGC competition rules of May 2000 the current start sector for international championships is the classical start line. Because the LX5000 can't deal with a simple start line but needs a start sector, you use the 180°-sector of example 2. The only disadvantage: For the LX5000 it's sufficient to fly at least once into the sector so that the device accepts your start as valid. It makes no difference in which direction you leave the sector, but for the sports committee, it does!! You definitely need to cross the front line to get a valid start! (see picture below)

Start 1: not valid with start line

Start 2: valid with start line

Start 3: valid with start line

Start 4: not valid with start line
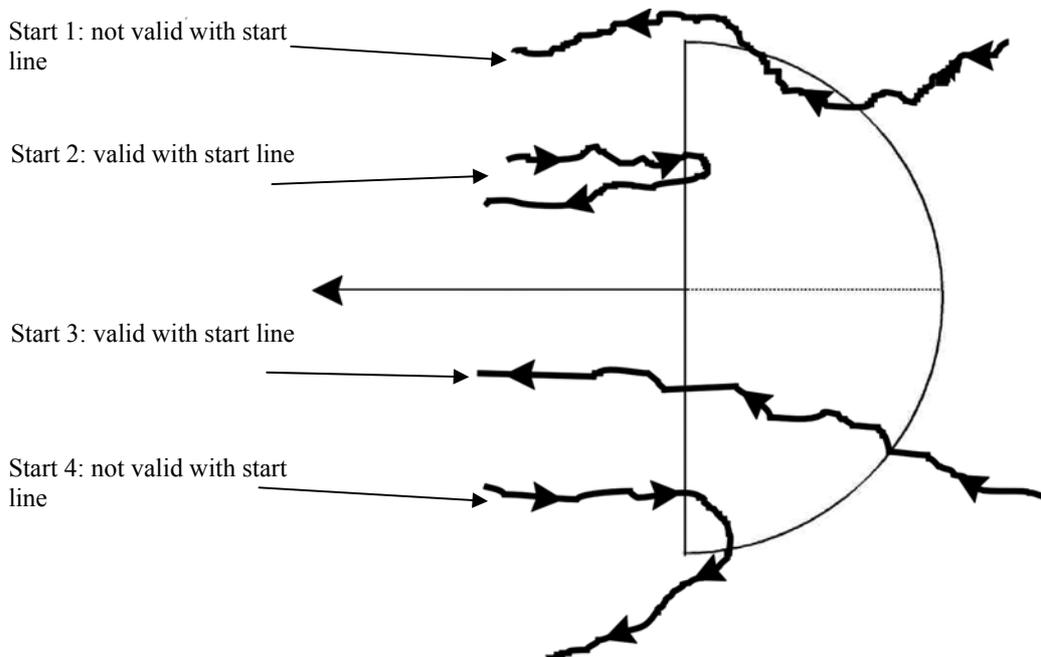
Therefore we recommend that you control your crossing of the line having the graphics page displayed.

Further settings possible for HDG:

- **R.FROM 1.TP**: This sort of start sector was planned for the world gliding championships 1999 in Bayreuth. A radius is drawn around the first turnpoint through the start point and a radial segment of a certain length is cut out symmetrically around the start point. The advantage of this system is that a pilot starting far outside at the end of that line has to fly the same distance to the first turnpoint as a pilot starting in the "middle". This is contrary to the classical start line where the distance to the first turnpoint is increasing the more one starts further from the center of that line.

```
┌─────────────────────────┐
│ START ZONE              │
├─────────────────────────┤
│ HDG: R.FROM 1.TP        │
│            A21: AUTO    │
│            A1:    90°    │
│            R1: 10.0K     │
│            A2:     0°    │
│            R2: ███2.0K███│
└─────────────────────────┘
```
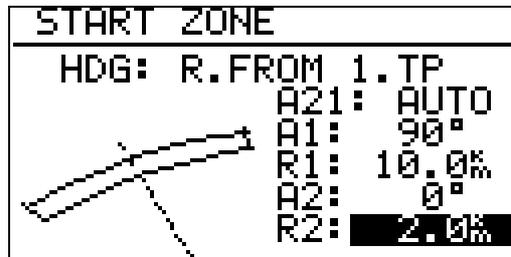
A21:   is fixed here to AUTO
A1:   is without function, only R1, which defines here the length of the segment, is of interest
R1:   describes the half-length of this segment
A2:   has no function here
R2:   two radials from the first turnpoint to the ends of the segment are constructed and elongated with R2. A second segment is drawn through these two new points. Together this defines a start sector by using two segments

- **FIXED VALUE:** The direction of the symmetry axis of the sector is adjusted to a fixed bearing. This bearing is entered as A21. The setting FIXED VALUE is normally not used for start sectors, but sometimes for finish zones (see "FINISH ZONE").

Note:
Please be aware that all the examples are intended to explain the programming procedures and therefore cannot claim absolute accuracy and completeness. For each kind of competition different types of sectors and rules for the correct documentation of these sectors may apply, which can be found in the particular competition rules. In case of doubt, the rules pertaining are defined in the FAI Sporting Code Section 3. E.g. For most of the national decentralised championships the start sector consists of the 90^0-photosector, for FAI-badges, 1000/2000km-diplomas and Barron-Hilton-Cup only the 90^0-photosector is allowed. For record flights a 1000m startline is used for recording the start time.

3.1.2.2.2   POINT ZONE

Now select the item POINT ZONE of OBS. ZONE. You will get the same options as for the START ZONE. The only difference is that you get more options for the settings of HDG. The current competition rules require a 500m-cylinder, so that the direction of the symmetry axis is not important. Nevertheless, all the possible settings are explained here, because in decentralised competitions or for record flights other sectors are valid:

- **SYMMETRICAL**: The symmetry axis of the turnpoint sector is orientated symmetrically about the line bisecting the inbound leg from the previous turnpoint and the outbound leg to the next turnpoint.
- **TO PREV POINT**: The symmetry axis is directed to the previous turnpoint. This option was intended for Cats Cradle and related tasks.
- **TO NEXT POINT**: The symmetry axis is directed to the next turnpoint. This option was intended for Cats Cradle, too.
- **TO START POINT**: The symmetry axis is directed to the start point. Again a Cats Cradle option.
- **FIXED VALUE**: The symmetry axis can be adjusted to any direction. This is the only option for which A21 is not set to AUTO.

Example 3:
We want to adjust the currently valid sector for the German decentralised competition (DMSt) until 2001 (from 2002 with the DMSt online only the 90^0 fotosector is valid). This is the 90°-photo sector combined with the 500m-cylinder:

HDG: SYMMETRICAL
A21:   AUTO
A1:   45^0
R1   3.0km
A2:   180^0
R2:   0.5km

```
┌─────────────────────────┐
│ TURNING POINT ZONE      │
├─────────────────────────┤
│ HDG: SYMETRIAL          │
│            A21: AUTO    │
│            A1:   45°     │
│            R1:   3.0ᴷₘ   │
│            A2:  180°     │
│            R2: ▓0.5ᴷₘ▓   │
└─────────────────────────┘
```
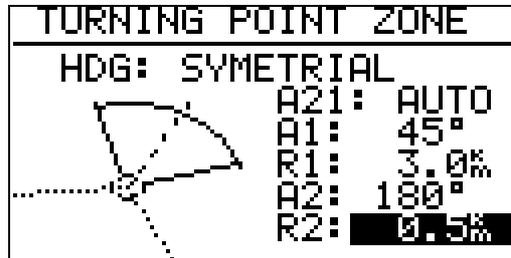
Note:
Please note that combined sectors must be programmed with the smaller radius for A2 and R2 (R1>R2!!). It's therefore impossible to program the figure of example 3 in just the reverse order.

Note also:
For record flights, FAI badges, 1000/2000km-diplomas and for the Barron-Hilton-Cup only the 90°-photo sector is valid, not the 500m-cylinder!! For some of the national decentralised competitions the combined figure consisting of 90^0-photosector and 500m-cylinder is valid.

3.1.2.2.3   FINISH ZONE

Select the item FINISH ZONE and confirm with [ENTER]. Although you get the same screen as for the previous items, there are only two options for HDG here:

- **TO LAST LEG**: The symmetry axis is directed back to the last turnpoint. This is the usual setting for decentralised competition flights.
- **FIXED VALUE**: The symmetry axis can be set to any direction (see example 4).

Example 4:
In a competition the finish line is orientated perpendicular to the runway's direction, independent from the bearing to the last turnpoint. The airfield's runway has the direction 06/24.
We select HDG: "FIXED VALUE" and can enter either 060° or 240° for A21, depending on the direction of the final glide. For example for a final glide in the direction 270° we have to enter A21: 060°. Now the "flat side" of the sector is directed back to the last leg (see picture below), the glider will enter the sector crossing the line.

```
┌─────────────────────────┐
│ FINISH ZONE             │
├─────────────────────────┤
│ HDG: FIXED VALUE        │
│            A21:   60°    │
│            A1: ▓90°▓     │
│            R1:   1.0ᴷₘ   │
│            A2:    0°     │
│            R2:   0.0ᴷₘ   │
└─────────────────────────┘
```
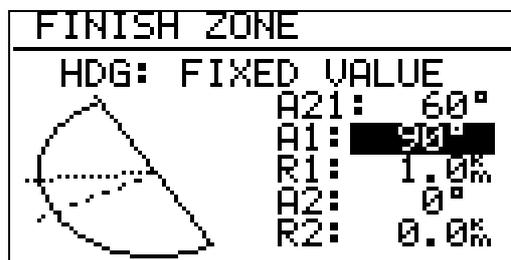
Note:
There are many ways to complete a flight. For decentralised competitions, record flights etc. the advice of the FAI Sporting Code should be enough. E.g. when flying BHC, badges, diplomas etc it is enough to land inside the airfield borders if the airfield is the finish point, while if one is using an external finish point, then the appropriate sector must be used (according the sporting code, the latter can be done in any case), but care should be taken to remember which one has to be used.

3.1.2.2.4   TEMPLATES

Templates are predefined sector geometries. Only the 500m-cylinder and the 90^0-FAI-photosector are available.
Note: Using one of these templates, the LX5000 will overwrite all user-defined sectors with the chosen template, there will be no additional confirmation!!

```
        ZONE TEMPLATE
     ▌FAI  SECTOR▐
       500m CYLN.
```

3.1.2.3   GPS

The pilot is able to set local time for his navigation.

IMPORTANT!
UTC offset has absolutely no influence on time logged in the logger. Logger always uses UTC.

```
        SETUP GPS
   UTC: ▌+00: 20:35:45▐
   GPS EARTH DATUM:
       WGS-1984
```

It is not possible to change the GPS earth datum. For IGC loggers **WGS 1984 is obligatory**.

3.1.2.4   UNITS

Practically all known units and combinations can be used in the LX5000.

```
        SETUP UNITS
   LAT/LON  D°MM.MM'
   DIST. km   SP. km/h
   VARIO m/s  HDG true
   WIND   km/h
   ALT.   m      QNH mb
   LOAD ▌OVERLOAD▐
```

- LAT, LON: decimal minutes or seconds
- DIST: km, NM, ml
- SP (speed)   km/h, kts, mph
- VARIO: m/s, kts
- HDG: magnetic or true
- WIND: km/h, kts, mph, m/s
- ALTITUDE: m, ft
- QNH: mb, mm, in
- LOAD: Overload, kg/m^2, lb/ft^2

$$\text{OVERLOAD} = \frac{\text{Glider + Pilot + Ballast}}{\text{Glider + Pilot}}$$

Example:
    Overload 1.2 means that the take off weight is 20% higher than unballasted.

3.1.2.5 GRAPHIC

The graphic display of the LX5000 offers valuable information, selected by the user. In order not not to overload the display some care should be taken by enabling only relevant airspace.

SYMBOL

The LX5000 graphic display supports two sizes of glider symbol. Rotate UP/DOWN selector to select the glider symbol. Additionally the flown track of the last x minutes can be shown as a line (This is entered under TAIL LENGTH). 0min means no line

```
       SETUP SYMBOL
 TAIL LENGHT:███1█min
 SYMBOL: LARGE
             ✈
```

AIRSPACE

This is a very important setting, which allows the pilot to define under what conditions the airspace will be shown on the display. The instruments are delivered with airspace **DISABLE** that means no airspace on the display at all. To enable airspace set **ENABLE** at first. There are 5 different types of airspace. Each has a different type of line to allow visible separation of different zones. The zones can be present all the time (setting ON) or closed by setting OFF. Using setting ON for all kinds of airspace will overload the display, so we offer to use settings, which are connected with zoom.

Example
Using setting for instance 50 km will show the airspace only at zoomfactor 50 km and lower. If the zoom is bigger than 50 km the particular airspace will not be active.
The following settings are recommended therefore preset as factory default:

```
       SETUP AIRSPACE

 AIRSPACE:  DISABLE
 ───── CTR ZONES      ON
 ─ ─ ─·R,P,D ZONES  100km
 ······TMA ZONES    100km
 ─·─·─ TRA ZONES     50km
 ──────TIZ ZONES     50km
```

Airspace type

Active, when zoom is 50 km or less

- CTR.   control zone
- R.P,D   restricted, prohibited, dangerous
- TRA   training zone
- TIZ   traffic information zones
- TMA   terminal zone

APT

The airports are displayed like symbols with names.

```
      APT GRAPHICS
 APT ZOOM:  50%
 APT NAME: ▪ICAO
```
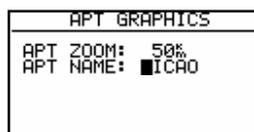
APT ZOOM: 50 km setting will show the airports only having zoom 50 km or lower, if the zoom is bigger than 50 km the airports will disappear completely in order to avoid an overload of the display (available settings ON, OFF, 5,10, 20, 50, 100 km)

APT NAME: The airports are not displayed only with symbols, some letters of the name or ICAO code can be added.
The pilot is able to choose between:

- ICAO will show ICAO code of the airport close to the symbol
- 2 char. up to 8 char. will display first letters of the airport
- NONE, without letters, only symbol

TP:
The same logic is used for displaying of turnpoints .

```
      TP GRAPHICS
TP GRAPHICS ENABLE
 type   zoom  name
T.POINT  50%  NONE
AIRPORT  50%  NONE
OUTLAND  50%  NONE
MARKER   50%  NONE
```

There are four types of turnpoints and each type has a different symbol on the screen.

- T. POINT   simple turnpoint **(landing isn't possible)**
- AIRPORT   turnpoint with all airport functions
- OUTLAND   turnpoint as an outlanding place
- MARKER   is not a permanent turnpoint, it is deleted when the instrument is switched off. It can be used to mark thermals for instance.

IMPORTANT!
The turnpoints marked landable will appear in the NEAR AIRPORT, displayed with corresponding symbols in front of the name (airport, outlanding).

3.1.2.6   PILOTES (Piloten Namen Eigabe)

The LX5000 version 9.0 supports a so called multi pilot function. The names of max. 30 pilots can be stored to a pilot list. This list is active as soon as the first pilot was entered under FLIGHT INFO and than copied into the pilot list. (see chapter **FLIGHT INFO**)

```
EDIT PILOTS      1/01
First name (Active)
LUCIA
Last name
STAINKE
Password LU
```

Marker, that this pilot
was chosen during the
start up procedure

Password is a pilot specific alphanumeric input, which enables every pilot to save his specific settings and to reactivate them during the start up procedure by choosing his name and entering his password. The actual values are stored under the name of the active pilot before switching off and can be reactivated when the device is switched on again (see above).
The following values are stored in the individual setting:

- final glide: RESERVE height
- Flight Info
- Settings under LOGGER
- INIT
- Display

Under password:

- TP
- OBSERVATION ZONES
- GPS
- UNITS

- GRAPHIC
- NMEA
- PC
- **POLAR**
- LOAD
- TE COMP.
- AUDIO
- INPUT
- LCD INDICATOR
- PAGE 1
- PAGE 3

Editing and adding more pilots „by hand" is possible by pressing ENTER:

```
EDIT PILOTS    5/05
First name
LUCIA
Last name     ┌─────┐
STAINKE       │ EDIT │
Password      │INSERT│
              │DELETE│
```

The function **INSERT** allows adding of more pilots (Up to 30). The message Active (upper right corner) indicates that specific settings of th shown pilot are active (means that this pilot has been chosen in the startup procedure).
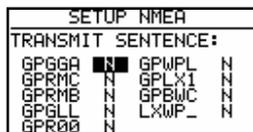
Important!
Having entered a new pilot switch the LX5000 off and then on again and chose the desired pilot.
A new entry can also be performed by entering that pilot into the FLIGHT INFO and copying to the pilot list.

3.1.2.7   NMEA

LX5000 delivers position data in the NMEA-format to other navigation devices in the cockpit if necessary.

```
     SETUP NMEA
TRANSMIT SENTENCE:

GPGGA  N   GPWPL   N
GPRMC  N   GPLXI   N
GPRMB  N   GPBWC   N
GPGLL  N   LXWP_   N
GPR00  N
```

All NMEA sentences are not active in default settings that means the pilot has to activate them if necessary. Normally GGA, RMC, and RMB are used. The pilots using **WinPilot** should **activate LXWP_ also.** Please see manual of your external device for information about the needed protocolls.
The data is available as Tx line on 9P sub D connector marked RS 232, see wiring.

3.1.2.8   PC

The speed of data transfer between LX5000 and other devices (PC, LX 20 or Colibri) can be adjusted in this menu. It is very important that both devices have the **same communication speed.**

```
      SETUP PC
COMMUNICATION SPEED:
   19200bps
```

The new Windows PC program **Lxe** is able to **adapt the communication speed automatically.** The old DOS programs (LXGPS and LXFAI) are not able to do that.

3.1.2.9   DEL TP/TSK

After **Y** all turnpoints and tasks will be deleted.

```
            SETUP
DELETE ALL TP AND
TSK: N
```

3.1.2.10 POLAR

Polars for nearly all gliders are in the library. To select them simply rotate UP/DOWN selector

```
        GLIDER POLAR
GLIDER: ASH 25
            a =   0.91
            b =  -1.14
            c =   0.77
```

The parameters a, b, and c of the glider polar can be calculated very simply by the pilot using LXPOLAR or POLAR.EXE, if the glider polar is not found in the library. After POLAR.EXE is started and three adequate points of the polar (Apr. 100 km/h, 130 km/h, 150 km/h) are entered, the parameters are calculated automatically. POLAR.EXE is delivered on the CD together with LXFAI. There is space for two USER polars (rotate UP/DOWN to the left).

Please note, there is an important change compared to earlier versions: With the version 9.0 the glider type, set under Setup ->Password -> Polar, see 3.1.1.2, is automatically written into the IGC file-header.
If one likes to fly with a polar other than that of the used glider, one should write the parameters of that polar into the user polar and should term it with the name of the used glider (important at decentralized competitions, Online-Contest, Barron-Hilton-Cup...)

```
        GLIDER POLAR
GLIDER: USER 2
            a =   1.90
            b =  -3.20
            c =   2.00
```

Name „user" should of course be replaced with the glider's name, to have the correct glider type in the IGC-header

3.1.2.11 LOAD

Normally the ballast setting is brought to minimum after the LX5000 has been switched off. Using setting SWITCH ON LOAD: SET, the load setting will remain the same as the last setting done in the previous flight.
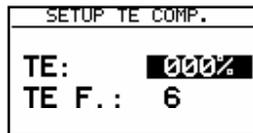
```
            LOAD
SWITCH ON LOAD:
        SET
```

3.1.2.12 TE COMP.

The LX5000 offers two methods of vario TE compensation.
- TE tube
- Electronic TE compensation

```
      SETUP TE COMP.

TE:        000%
TE F.:    6
```

TE setting 0% declares compensation using the TE tube
Using the tube the instrument has no influence on compensation; it depends only on the quality of the tube.
TE setting >0% = electronic TE compensation
To adjust TE composition at least one flight in not turbulent atmosphere is necessary. The procedure is as follows:

* Accelerate up to 160 km/h and keep the speed stable for a few seconds
* Reduce the speed to 80 km/h

Observe the vario indicator during the maneuver. At the beginning (160 km/h) vario will stay stable aty about. –2 m/s.
During the speed reduction the vario should move toward zero and should never exceed zero. Deviation in + shows that
the compensation is too low, increase % to compensate and vice versa.
TEF (filter) is the delay of compensation. Bigger numbers will increase the delay and opposite. During the first test one
should use delay 6.
If the static of the glider isn't correct, there is no way to adjust compensation. Having problems we suggest the following
test of the static inputs:
Connect the tubes for the electronic compensation and set at 0%. Accelerate to 160 km/h and reduce the speed. Observe
the vario indicator. If the needle is moving at first more into minus and after that towards +, the static source of the
glider is not suited and there is no way to provide a successful TE compensation electronically. The use of a dedicated
and accurate fin mounted static source might be helpful.

3.1.2.13 AUDIO

The pilot has several choices to adapt the audio to his preference.

```
       SETUP AUDIO

SC: VOL H      SC
VARIO:        LIN/POS
   0%:        0500Hz
+100%:        1500Hz
-100%:        0200Hz
           AUDIO-DEMO!
```

* SC: VOL H   audio volume will be increased by speed command (H) or decrease by (L)
* VARIO: several types of audio can be selected (please use AUDIO DEMO)
* 0%   frequency at 0 m/s
* +100%   frequency at + full deflection
* -100%   frequency at – full deflection

3.1.2.14 INPUT (Speed command external switch)

The LX5000 has input for an external speed command switch. Using the external switch it is possible to manually
change over SC/Vario. SC INPUT setting defines what status of the switch will change over to speed command. For
instance ON will change over to speed command immediately after the external switch is closed and vice versa.

```
       SETUP INPUT

SC INPUT:      ON
STALL W.:      070%
TEMPERATURE:   ON
TEMP. OFF.:    +0
```
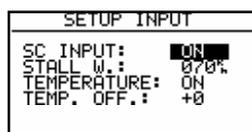
An external device called stall warning can be connected to the LX5000. The indicated speed, to activate the alarm, can
be set under STALL W.
The LX5000 is equipped with an external temperature sensor. Temperature ON will enable temperature measurement

and TEMP. OFF. allows precise adjustment (by user) the temperature.

There is another input called **VARIO PRIORITY.** If the input is connected to ground the instrument will change over into the vario-mode immediately, no matter what other settings might demand.

3.1.2.15 LCD IND. (LCD – vario indicator)

The LCD vario is an autonomous device connected to the 485 bus. Using bus, generally an unlimited number of devices can be connected to the LX5000. The LX5000 delivers 4 different data sets for the indicators, that means maximum **4 indicators are able to indicate different** and the rest of **them are simple repeaters.**

```
 SETUP LCD INDICATOR
CONTRAST: MED
        INDICATOR 1
        INDICATOR 2
        INDICATOR 3
        INDICATOR 4
```
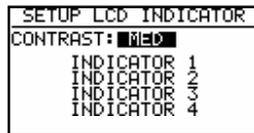
To adjust viewing angle use contrast setting from LOW to HIGH. The layout of the indicator consists of:
• Needle
• Two numerical displays
• Diverse symbols
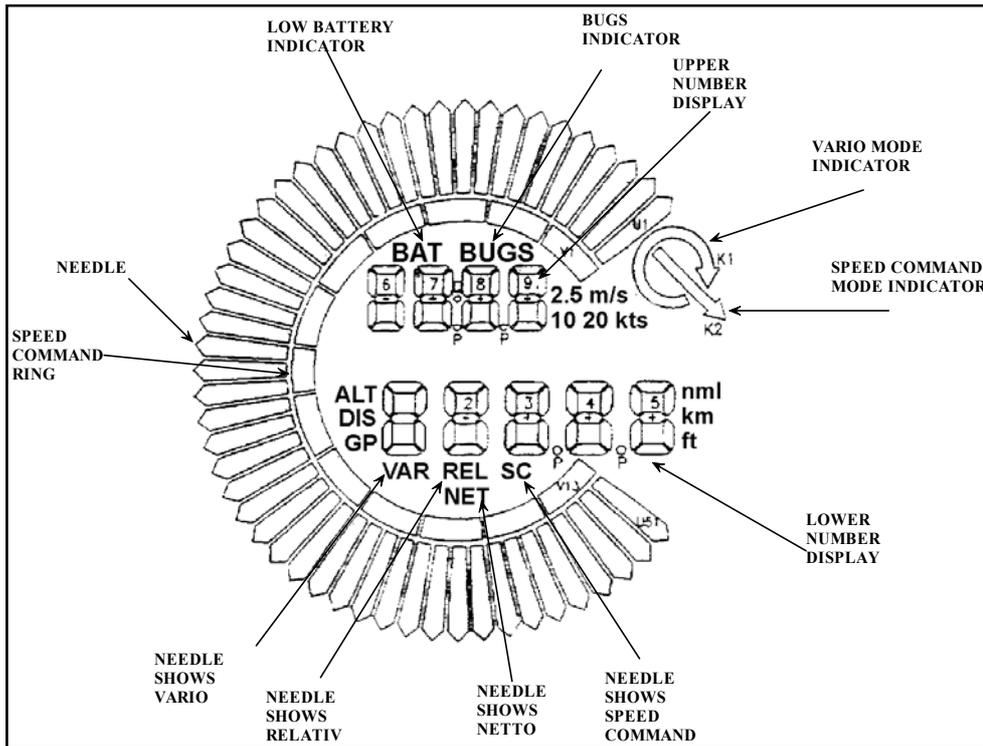
Needle
• SC Ring   **Always** SC indicator, regardless of mode.
• Upper Number Display
• Vario Mode Indicator
• Lower Number Display
• Netto
• Relative
• SC
• GP

Each indicator has a **DIP switch on the backside.** The position of the switch defines which data string the indicator controls.

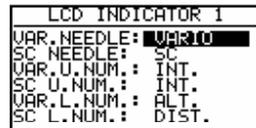| SW 1 ON	Indicator 1
SW 2 ON	Indicator2
SW 3 ON	Indicator3
all OFF	Indicator4

All indicators are by default set to **position 1.**
The pilot is able to define the functions of the indicators by himself using the following menu.

```
     LCD INDICATOR 1
VAR.NEEDLE: VARIO
SC NEEDLE:  SC
VAR.U.NUM.: INT.
SC U.NUM.:  INT.
VAR.L.NUM.: ALT.
SC L.NUM.:  DIST.
```

The needle and two numerical displays are programmable. All settings can be made for vario and speed command mode separately (VAR NEEDLE =needle in vario mode, SC NEEDLE = needle in SC mode).

Needle settings:
* Vario, SC, NETTO, RELATIVE (= netto – 0.7 m/s),

Upper digital display:
* Integrator, time, flight time, leg time

Lower digital display:
* ALT (NN altitude), distance, GL DIF. (final glide altitude difference), SPEED (TAS), LEG S. (speed on leg).

3.1.2.16 COMPASS

This unit is optional and has to be ordered as an extra. Power and data are connected via standard LX5000 485 bus. Without a compass unit connected the COMPAS setting is not active. The LX5000 will recognize the compass automatically. Compass is used to deliver mg. track to the LX5000. Having mg. track, an additional wind calculation method can be used and HDG indication will be present.

3.1.2.17 ENL

No settings are possible. The lower (MIC. LEVEL) bar will indicate engine noise level

```
     SETUP ENGINE
PRESET LEVEL: ■

                ENG OFF
MIC. LEVEL:
```
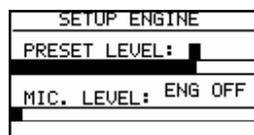
3.1.2.18 PAGE 1 (main navigation page)

There are three variants of that page and the pilot has to choose the most convenient for him.

| Wind komp. | Wind | Wind vektor |

| Final glide command | Final glide | Wind |
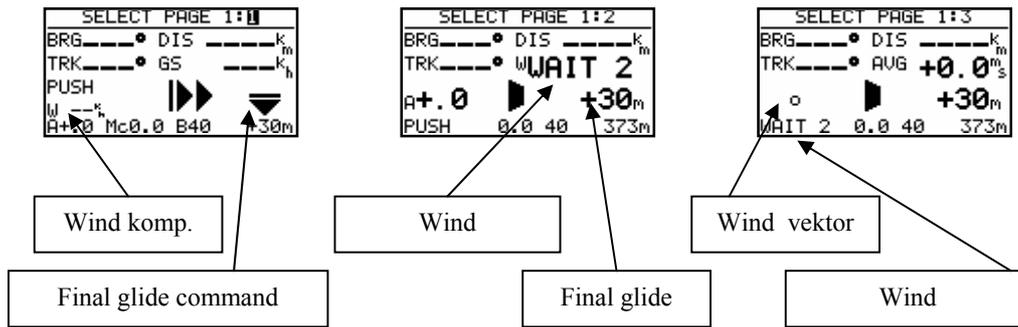
The default setting is variant 3, which offers in version 9.0 a calculation of the actual and target glide ratio (SC-mode)
The contents of this page differs, depending on the flight modus (SC or vario)

| Windvector | Altitude |

Netto

| actual glide ratio | Min. glide ratio to the turnpoint, resp. goal (TSK) |

Vario-mode   **Speed command mode**
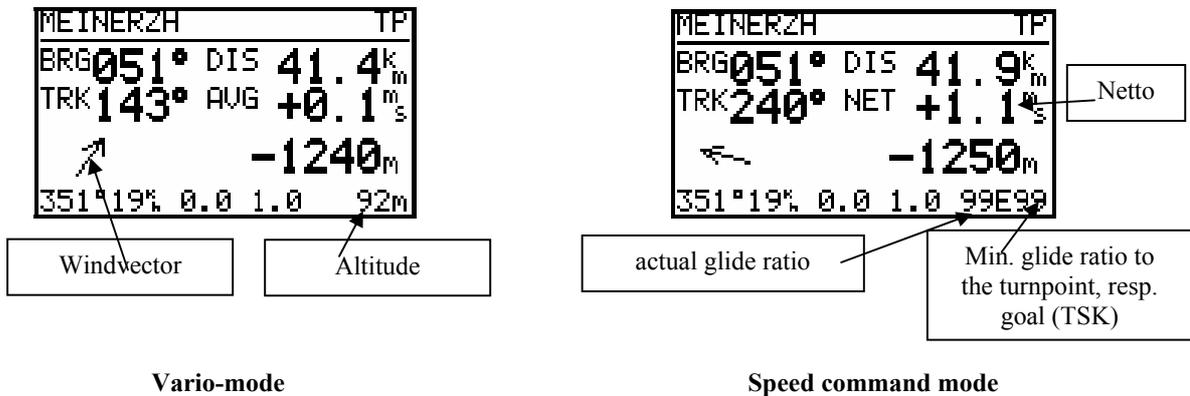
3.1.2.19 PAGE 3 (additional navigation page)

This page can only be activated or disabled.

3.2 Navigation functions

The LX5000 has the following navigation functions:

- GPS Status and coordinates
- Near Airport
- APT, Airport
- TP, Turnpoints
- TSK, Task
- STATISTICS separately during the flight and after flight ("Log book")

All mentioned functions can be selected using the mode selector.

3.2.1 GPS page

There are no settings possible in this page.

GPS STATUS

COORDINATES

```
GPS 3D     SAT = 6
N  49°55.12'
E 015°00.00'
ALT.    400m
TIME:11:40:38
```
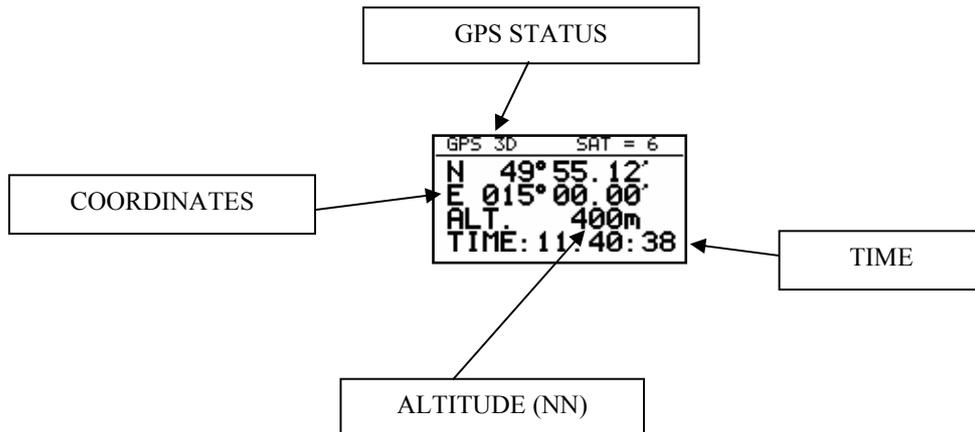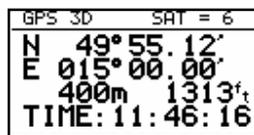
TIME

ALTITUDE (NN)

Rotate the UP/DOWN-selector and both altitudes (m and ft) will appear on the same screen.

```
GPS 3D     SAT = 6
N  49°55.12'
E 015°00.00'
    400m  1313'ₜ
TIME:11:46:16
```

Stop watch can be activated and deactivated under following procedure:

- Press START status STOP: 0: 00
- Press START status RUN: 0:12
- Press START status STOP: 0:50
- Press START status STOP: 0:00 Reset
- Press ENTER   TIME: 11:56:32 Time again

3.2.2 NEAR AIRPORT

The nearest airports will be shown using this mode. The airports are assorted by distance. Simply press ENTER on the desired airport and the LX5000 will change over to APT mode and all nav. features will be immediately present. To select the airport use UP/DOWN selector.

TP with attribut: airfield

TP with attribut: outlanding

Airport from data base

```
1/21   NEAR AIRPORT

⊗BAYREUTH    169°   1ᵏ
✦006SPWEI    136°   8ᵏ
✦005SPOCH    073°  13ᵏ
⊕ROSENTHAL-F 144°  19ᵏ
⊕ZELL-HAIDBE 036°  19ᵏ
⊕KULMBACH    321°  20ᵏ
```
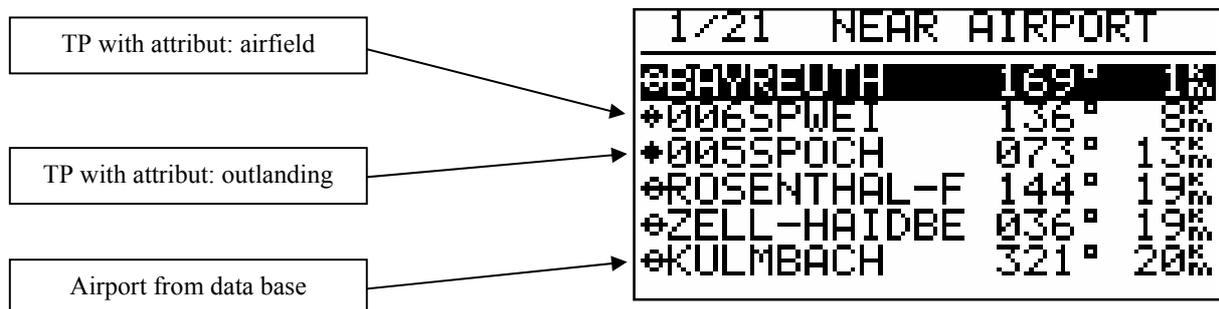
IMPORTANT!

Not only airports are indicated, but all **landable turnpoints too.** The airports and landable turnpoints are displayed with different symbols in front of the name. For more information see paragraph turnpoints .

3.2.3   APT Airports

This is one of the three main navigation modes (APT, TP, TSK). To change the mode simply rotate themode selector. The first page shows the basic navigation data (bearing, distance, ground track and ground speed). Additional information will follow in four more nav.-pages activated using the UP/DOWN selector. The airport memory of LX5000 has a capacity for approx. 5000 airports. The airport data can't be edited in the instrument; all necessary updates should be done using a PC. The database used in LX5000 is a Filser-licensed Jeppesen database. The database is not free, that means an update is possible only after getting a code. The code is available through Filser Electronic only and depends on the database version and serial number of the LX5000. The database can be downloaded from the Internet using the following addresses:
www.filser.de
www.lxnavigation.si

3.2.3.1   Navigation in APT

There are five navigation pages and the first one has the following structure.
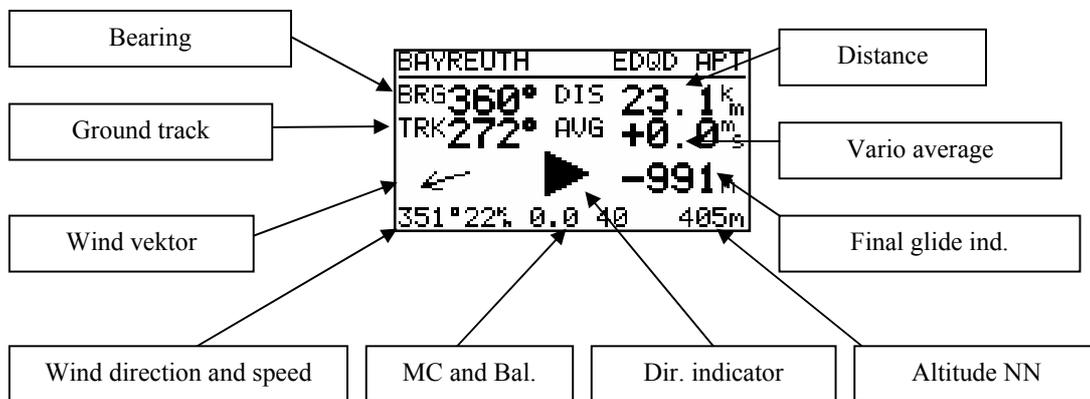
The airport names are normally displayed using 8 characters, after pressing START 12 characters will appear.

IMPORTANT!
TP and TSK have the same basic navigation pages as APT.
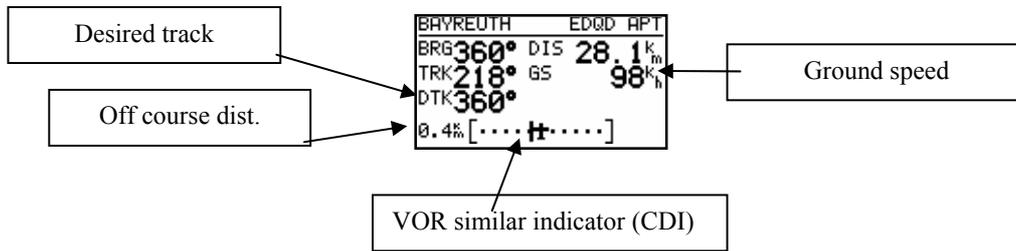
The course correction arrow (Dir. Indicator) will show the pilot where to turn (left or right) to proceed to the desired airport.

After rotating the UP/DOWN-selector the graphic page will appear. The same page will be found in TP and TSK (in the TSK-mode the task is additionally displayed)
The airports will be present with symbols and short names or ICAO corresponding to setting in 3.1.2.5.
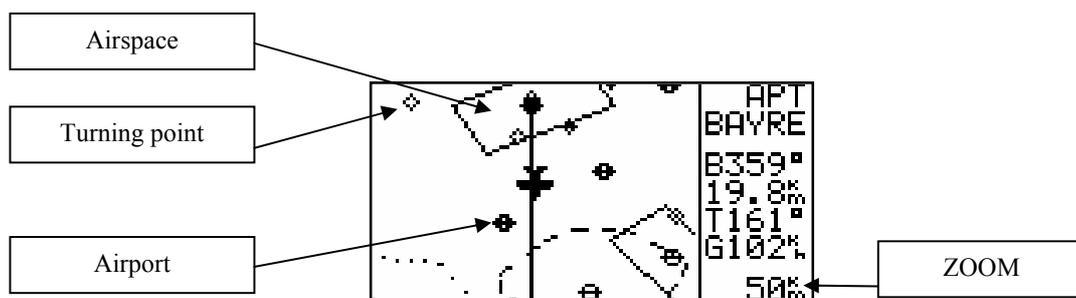
The glider symbol is all the time in the middle of the screen and the map is moving. To change the ZOOM simply rotate the ZOOM knob left or right. Following nav. page can be disabled in setup under. PAGE 3.

Desired track

Off course dist.

Ground speed

```
BAYREUTH     EDQD APT
BRG360° DIS 28.1km
TRK218° GS    98kh
DTK360°
0.4%[····+·····]
```

VOR similar indicator (CDI)

After rotating of UP/DOWN selector one reaches the so called arrival page

local time

temperature outside

Battery indicator

```
REUTTE HOEFE LOIR APT
ACT T.  ETA    ETE
10:47  16:02  05:14

Wind 350°18% 1'
OAT-29°CBAT11.2U
```

ETA (estimated time of arrival) and ETE (estimated time enroute) define the arrival time and the time needed to reach the target. Both depend on the settings in the INIT-menu. If there is no way to reach point (track and bearing differ more than 90^0) both times will be replaced with stars. If the windcalculation is not active (depending on the method) the age of the last windupdate in min is displayed right of the wind.

After rotating of UP/DOWN selector one reaches the last page showing some important airport data.

```
BAYREUTH     EDQD APT
ELEV.:  488m
RWY:   06/24 C
TC:    ----m I
TOWER: 127.52MHz
```
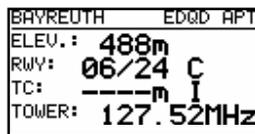
The traffic circuit is defined like altitude and orientation (N, E…). Orientation I means that it hasn't been defined.

3.2.3.2   Airport selection, team function and wind calculation

After ENTER an edit menu will appear.

3.2.3.2.1   Airport selection

```
    MENU APT
   ▮SELECT▮
    TEAM
    WIND
```

There are two ways to select an airport. The first direct way is using of ICAO code input. After code input the airport is selected immediately.

```
   APT SELECT
ICAO: ▮D**
```
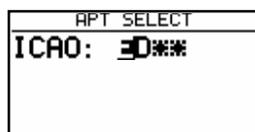
Entering the ICAO-Code for the desired airport is the dircet selection mode. E.g. here München

```
        APT SELECT
ICAO: EDDM


```

In case of a **mistake use START** button (or ZOOM) to step back.

If the ICAO-Code is unknown, the indirect way should be used. Simply confirm ICAO with ESC and select the state in which the airport is located (UP/DOWN selector).
After the state is selected, four stars are to be replaced with first four letters of the airport. All airports with the same first four letters will be shown (use UP/DOWN selector to find the right one). Confirm each character with ENTER.

```
        APT SELECT
ICAO: ED**
        GERMANY
APT:    M***
```

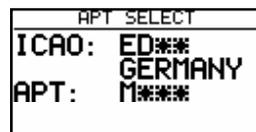If you input less than four characters the selection of the airports will be bigger. Confirming all stars with ENTER or after **ESC** all airports of the state will be present.

3.2.3.2.2   TEAM function

This special function is developed for pilots flying in a team. Sometime they loose visual contact. With using the TEAM FUNCTION they are able to locate each other in a very simple way. To be successful **both pilots have to select the same destination point** (APT, TP or TSK). The pilot who is ahead has to explain his bearing and distance **to the selected point by radio.** The second pilot has to activate the TEAM FUNCTION (enter) and input the distance and bearing given by his friend.

```
        TP TEAM
BRG:   259°
DIS:    34.3km
TO BAYREUTH
```
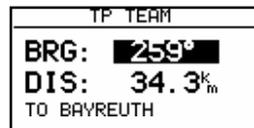
EXAMPLE!
259° and 34.3 km are data given by the leading pilot.

After input and ESC the instrument will change over into normal **TP navigation page** and the navigation data will show where the leading pilot is.

Team function. indicator →
```
TP TEAM                TP
BRG039° DIS 52.8km
TRK___° AVG +0.0ms
   o          -1608m
WAIT 2  0.0 40    405m
```
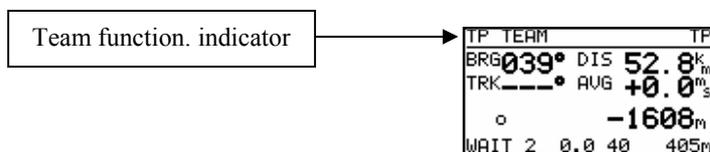
The team function is deactivated **after a new TP is** selected.

3.2.3.2.3   WIND calculation

The LX5000 is able to calculate wind (direction and speed). This function is the same in all three navigation modes. An further method (COMPASS) is available only after an additional compass unit is connected to the LX5000 RS485-bus. To change the method of calculation, use this menu as follows.

Manual corrections | Wind calculation method | Wind in direction and speed
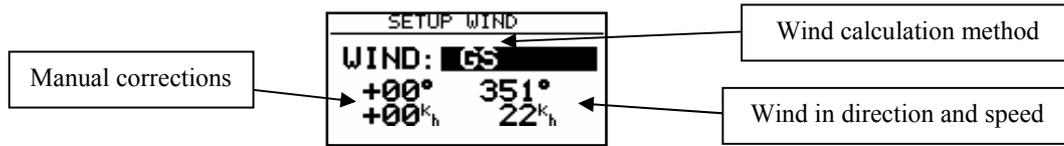
GSPEED DIF. is the simplest method. The calculation based on ground speed changes affected by wind influence during a circle. To get the first result a minimum of two full circles is necessary. The message **WAIT2 or WAIT 1**will inform the pilot how many circles should be done to get the result. It is very important **to keep the speed constant** (during the climbing) as good as possible to get real results. The pilot is able to adjust the wind using manual corrections.

POS DRIFT is the most exact method. It is based on position offset due to the wind during 6 full circles. These circles have to be staedy going and exact, other wise the result is not that precise. **WAIT 6 to 1** indicates how many circles are left until a result is produced.

COMBINATION is based on special algorithms. The inputs are groundspeed and TAS. The algorithms will calculate the wind if the **glider is slowly changing his track** (not exactly straight flight) or by climbing.

COMPON is delivering only **wind component** (head or tail wind). The calculation is simply based on difference GS-TAS. It works exclusively during straight flight.

FIX is not a real calculation, it allows the pilot simply to input the wind.

COMPASS wind calculation method is available only with the external compass device. On how to use the unit see COMPASS manual.

3.2.4   TP (turnpoints)

The LX5000 has memory to store up to 600 turnpoints. The turnpoint name can have max. 8 characters (letters or numbers). The menu structure is the same as in the APT-menu that means four or five pages. To add a turnpoint into the database select one of these four ways:

* Manual
* Copy from APT
* Data transfer from PC, LX20, Colibri (*.DA4 format)
* Memorizing of actual position

3.2.4.1   TP select

The procedure is similar to the procedure selecting APT. After pressing ENTER menu for SELECT, EDIT, NEW, DELETE, TEAM and WIND will open. To select turnpoint simply replace stars with the first letters of the TP.

IMPORTANT!

The LX5000 is able to sort the turnpoints under distance too (definition in setup). Using sorting by distance the **nearest TP will** appear after selection (**all stars confirmed with ESC**). To search for the TP use UP/DOWN selector and confirm with ENTER. Default setting is sorting by alphabet.

It is also possible to select TP by **using ZOOM** selector. It works exclusively from **the first page.** To change the TP simply rotate the ZOOM selector.

3.2.4.2   TP EDIT

Using this function the pilot is able to change TP data any time. The turnpoints in LX5000 have four attributes. Using attributes, the turnpoints will appear in the graphic´s, screen marked with special symbols.
The four different types of turnpoints are as follows:

* T.POINT   normal TP, not landable
* AIRFIELD   landable airfield
* OUTLAND   landable outlanding place
* MARKER   not landable (will disappear after switching OFF)

TP having **airfield and outland attribute are landable** and shown in the NEAR AIRPORT mode. In front of the name the pilot will find the symbol to know what kind of landing place it is (see NEAR). Marker is a temporarily limited attribut, a turnpoint , attributed with MARKER is deleted, when the LX5000 is switched off.

To start EDIT press ENTER.

```
         TP EDIT
 027BURGF    T.POINT
LAT.: N  49°47.63'
LON.: E 011°07.98'
ELEV.: 0001m
```

Name, attribute, coordinates and elevation can be altered.

3.2.4.3   TP NEW

There are more possibilities to add a new TP. After ENTER on NEW the procedure is started.

```
     TP NEW

  COPY APT

  DATA?N
```

After **Y** the well-known selection of an airport will follow. The result will be a new turnpoint copied from APT database. After **N** manual input of coordinates, name, attribute and elevation will follow.

```
         TP NEW
             T.POINT
LAT.: N  00°00.00'
LON.: E 000°00.00'
ELEV.: 0000m
```

3.2.4.4   TP delete

After activation of DELETE (Y) the TP will be deleted definitively.

```
        TP DELETE
 027BURGF
 DELETE: N
```
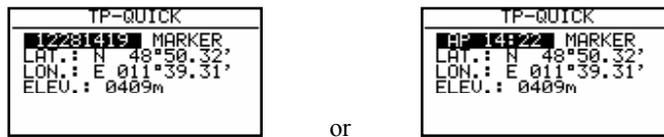
3.2.4.5   TEAM

The same as described in APT.

3.2.4.6   WIND

The same as described in APT.

3.2.4.7   TP QUICK (memorizing of actual position)

 The procedure can be activated by **pressing START key on the TP-mainpage only !**

```
      TP-QUICK                        TP-QUICK
12281419  MARKER            AP 1422  MARKER
LAT.: N  48°50.32'          LAT.: N  48°50.32'
LON.: E 011°39.31'          LON.: E 011°39.31'
ELEV.: 0409m                ELEV.: 0409m
```
                        or

The names of such points are offered in two different forms**. AP and TIME** or date and time **(12:28:14:19).** The form depends on setting in setup after password (TP). All data can be edited immediately and stored. This procedure is useful to memorize convenient landing places, thermals etc…
By default settings these points have **MARKER** attribute and are therefore deleted when the LX5000 is switched off. If one likes to keep these points, the attribut should be changed before switching off.

3.2.5   TSK (task)

The LX5000 task consists of maximum 10 turnpoints. The capacity is 100 tasks. Flying a task will offer following benefits:

- Accurate task statistics
- Simple navigation
- Automatic change over to next TP after confirmation
- TSK shown in the graphic display
- One step of ZOOM more (full task)

Important:

The final glide calculation is (beginning with version 9.0) now related to the complete task (including distance to the start point). Final gilde to as ingle turnpoint or airport is available in the TP- or APT-mode

The menu structure is similar to the APT and TP. The pilot is exactly informed about departure, TP confirmation and finish line. The graphical display is very useful.

TSK 00,start point

Distance to the **desired turnpoint**
After pressing ENTER: distance to the **task target** for 3 sec.

Start sector

Final glide for the complete task
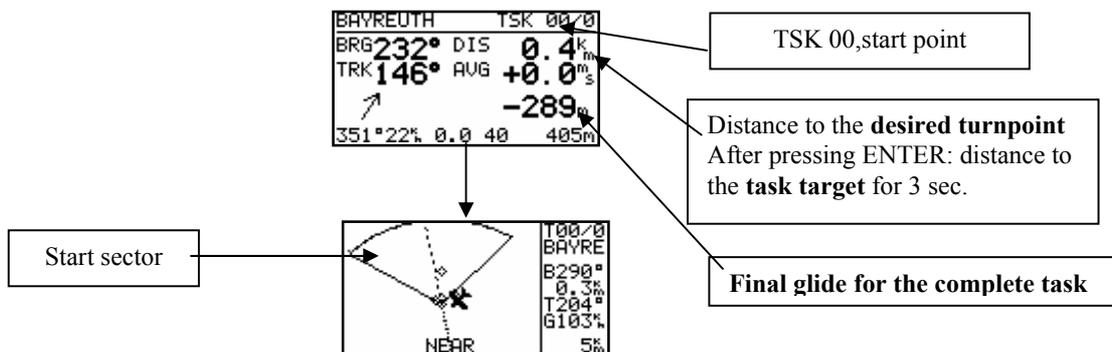
Approaching to the TP, NEAR message will inform the pilot that he is closing on the turnpoint. After the INSIDE message is displayed, the pilot is definitively sure that he has reached the observation zone (for inst. photosector).

The tasks are numerated from 00 to 99 and the turnpoints building a task from 0 up to 9. Point 0 is always start point (departure).

3.2.5.1   TSK select

All memorized tasks can be selected using the select procedure. The procedure is started after choosing the SELECT and confirmed by ENTER.

```
        TSK SELECT
TSK SELECT: 00

0 BAYREUTH 5 NOT PROG
1 055KELHE 6 NOT PROG
2 015AMBER 7 NOT PROG
3 BAYREUTH 8 NOT PROG
4 NOT PROG 9 NOT PROG
```

To select a task rotate UP/DOWN selector and confirm with ENTER.

3.2.5.2   TSK edit

The active TSK can be edited at any time, on the ground or during the flight.

total task distance →

```
TSK EDIT      TSK 01
127.3㎞  Time: --:--
0 LEVERKUS
1 DUESSELD 29.6㎞ 338°
2 MEINERZH 55.2㎞ 109°
3 LEVERKUS 42.5㎞ 257°
4 NOT PROG
```

Time (maximum time for the task, used in AAT): Entered in hours and minutes. This is not obligatory. After starting the task, this watch runs to zero

If a turnpoint is to be deleted, exchanged or inserted, the user selects the desired turnpoint with UP/DOWN and confirms with ENTER. A context box is opened:

```
TSK EDIT      TSK 01
127.3㎞  Time: --:--
0 LEVERKUS 2  SELECT
1 DUESSELD 3  INSERT
2 MEINERZH 4  DELETE
3 LEVERKUS    ZONE
4 NOT PROG    MOVE
```
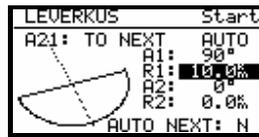
- **Select** exchanges the selected turnpoint with another
- **Insert** adds a turnpoint one position above
- **Delete** removes that turnpoit from the task

IMPORTANT!

In order to follow the latest regulations for AAT-tasks up to five tasks from 00 to 99 can be modified absolutely free, no matter which task number, but only 5 concomitant. Absolutely free means even each turnpoint can have an own sector. Starting EDIT procedure the additional items **ZONE and MOVE** will appear if selected task could be modified. If there is **no ZONE and MOVE**, that means five tasks are already modified. The modified task is active **for three flights.** After the third flight all sectors are set back to the default settings (defined in SETUP/OBS.ZONES). This delay allows the competition pilot to make three take offs without loosing his individual settings.
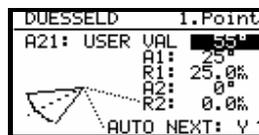
ZONE:
Herewith an individual sector can be assigned to each point of the task. In the following example this is a start sector to the 0. point Leverkusen

```
LEVERKUS      Start
A21: TO NEXT    AUTO
          A1:   90°
          R1: 10.0%
          A2:    0°
          R2:  0.0%
        AUTO NEXT: N
```

Please note: these settings are so called local settings. That means: If one enters again the menu SETUP / OBS.ZONE (under password, which are the "global" sectors for all tasks) after having set individual task sectors, all the local (individual) settings will be deleted and set back to the global values!
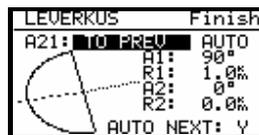
At the turnpoint sector setting one will find an additional setup item: **AUTO NEXT**. While flying "normal" tasks, the LX5000 will switch over to next turn point at once when a sector is reached. In an Area Task this is not very useful, because one might fly very far into the sector and will therefore still need navigation data for the sector´s reference point or a modified virtual point (MOVE-function, see below).

Set the AUTO NEXT to N (no), and the LX5000 will not switch to the next turn point when reaching the sector. The Pilot must switch over "by hand" using the START-button. In the example below an individual sector with 50^0 has been set at the first turnpoint. The automatic switch over is still active

```
DUESSELD    1.Point
A21: USER VAL   55°
          A1:   25°
          R1: 25.0%
          A2:    0°
          R2:  0.0%
        AUTO NEXT: Y
```
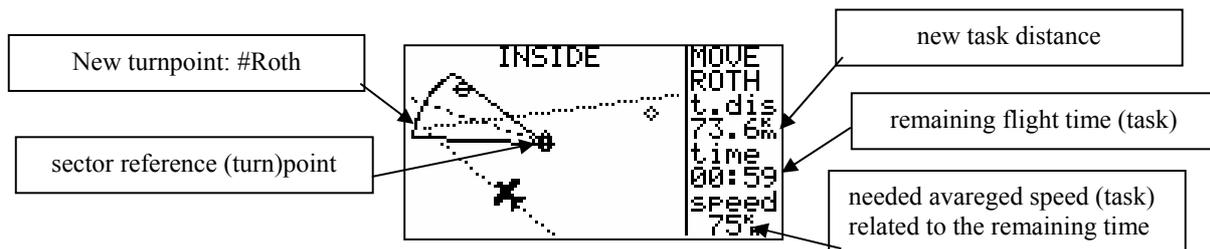
Change over after INSIDE

This procedure should now ben repeated for all turnpoints of the task (max. 8)
At the end the finish line has to be programmed

```
LEVERKUS     Finish
A21: TO PREV    AUTO
          A1:   90°
          R1:  1.0%
          A2:    0°
          R2:  0.0%
        AUTO NEXT: Y
```

Editing a task and the corresponding sectors, can also be done during flight, but declaration is then possible. How to fly the task see paragraph Fly LX5000.
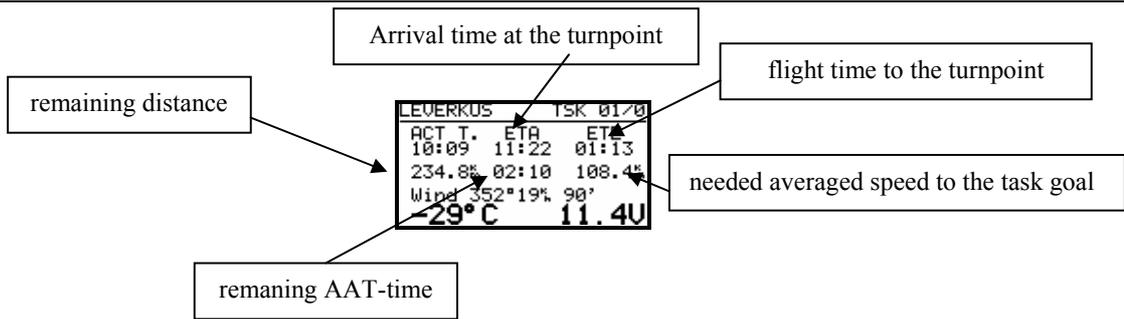
MOVE

In an AAT-Task the sectors are generally quite large, therefore it is reasonable to have the possibility of modifying the task during flight. All AAT-tasks (max. 5, see above) offer this possibility, by graphically moving the turnpoint in the sector (virtual turnpoint).

New turnpoint: #Roth

sector reference (turn)point

```
INSIDE    MOVE
          ROTH
          t.dis
          73.6km
          time
          00:59
          speed
          75km
```

new task distance

remaining flight time (task)

needed avareged speed (task) related to the remaining time

Having used the MOVE-function, the sector reference point has a # as first character. The sector and the reference point stay unchanged, but all navigation data is modified based on the new (virtual) point. E.g. the final glide is now calculated around that point, this applies accordingly for the statistics.

The point is moved using the rotary knobs **UP/DOWN** and **ZOOM**. As long as the moved point is inside the sector during the move procedure the message „**INSIDE**" is displayed.

The modified arrival page has the following values:

remaining distance

Arrival time at the turnpoint

flight time to the turnpoint

```
LEVERKUS     TSK 01/0
ACT.T.  ETA   ET
10:09  11:22  01:13
234.8   02:10  108.4
Wind 352 19%  90'
-29°C        11.4U
```

needed averaged speed to the task goal

remaning AAT-time

Using **ESC** one gets for 3 sec. ETA and ETE calculated up to the **task goal**.
The needed averaged speed is calculated from the remaining distance and the remaining AAT-time.

3.2.5.3   Task new

To build a new task, an empty task should be selected (all points NOT PROG), otherwise the first task with all points not programmed will be chosen by the LX5000 automatically.
Now start the procedure with ENTER on NEW.

```
        TSK NEW
EDIT NEW TSK:
   COPY TSK: N
```

Using **Y** it is possible to copy any task from the TSK memory. After **N** the pilot should select all necessary turnpoints using the method described above.
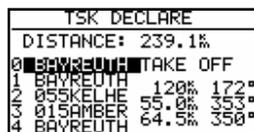
3.2.5.4   DECLARE

All FAI flights (badges, records, decentralised competitions) should be declared before take off. This procedure replaces previous procedures with camera and barograph.

IMPORTANT!
The declaration will not change the instrument functions. The declaration is only the procedure to show that the flight was declared before take off. All manipulation and functions of the LX5000 will be the same having declared the task or not. The only difference is in flight validation. **Redeclaration during the flight is not possible**. Editing the task during the flight will not **change the declaration.**

After ENTER on DECLARE, the last selected task will be shown.

```
        TSK DECLARE
DISTANCE: 239.1
0 BAYREUTH  TAKE OFF
1 BAYREUTH
2 055KELHE   120  172°
3 015AMBER   55.0  353°
4 BAYREUTH   64.5  350°
```

All known methods (select, insert, and delete) can be used to change the declaration. **Changing of declaration will not change the TSK.**
Take off point and start point as well as finish point and landing point will basically be same. If these points are not identical in your task you have to change either start point or take off point
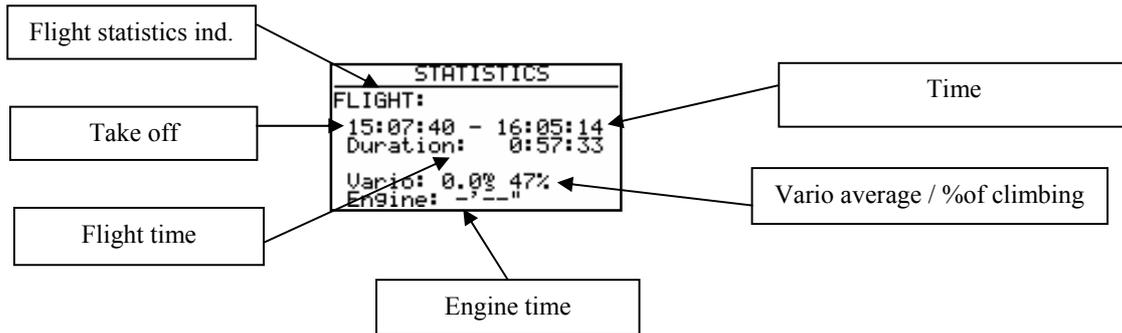**Normal procedure:**
*   Prepare TSK in EDIT menu (you will need it for navigation)
*   Press ENTER on declare and leave declare using ESC

3.2.6 Statistics

This mode is exclusively used to give the pilot information about his actual flight. There are two levels of statistics during the flight. Flight statistics is always active; the task statistics will be active after a task is started. On the ground only the logbook is available.
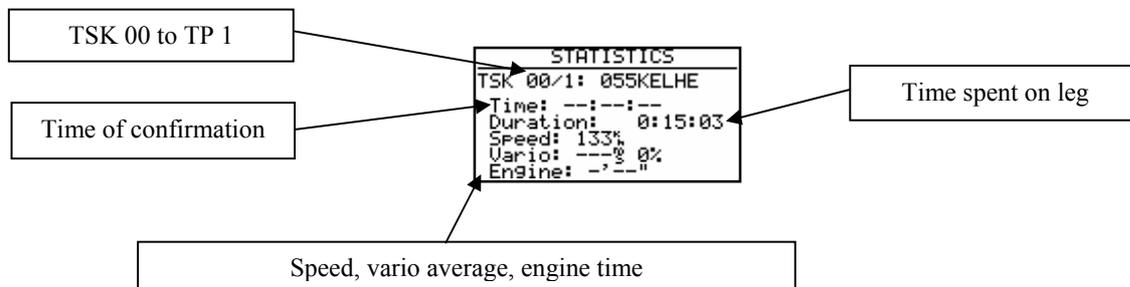
3.2.6.1 Flight statistics

The following data is available during the flight only. After STATISTICS is selected, the flight statistics data will appear on the LX5000 display.

Flight statistics ind.

Take off

Flight time

STATISTICS
FLIGHT:
15:07:40 - 16:05:14
Duration: 0:57:33

Vario: 0.0% 47%
Engine: -'--"

Time

Vario average / %of climbing
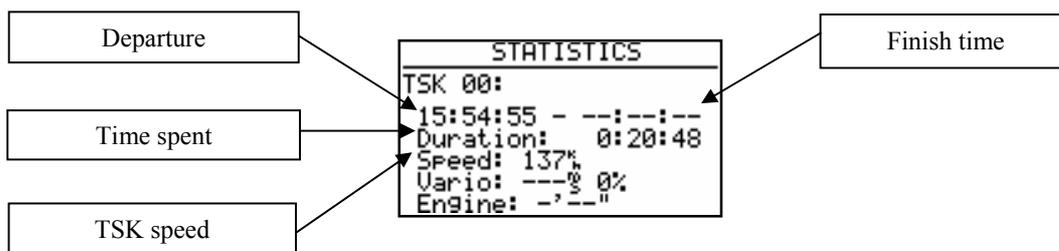
Engine time

3.2.6.2 TSK Statistics

This kind of statistics is present after the task is started (see paragraph Fly LX5000). Rotating the UP/DOWN selector will display statistic data for the actual leg.

TSK 00 to TP 1

Time of confirmation

STATISTICS
TSK 00/1: 055KELHE
Time: --:--:--
Duration: 0:15:03
Speed: 133%
Vario: ---% 0%
Engine: -'--"

Time spent on leg

Speed, vario average, engine time

Time means TP confirmation time and is normally not present before TP confirmation. For the completed legs the needed flighttime is displayed.
Rotating UP/DOWN selector will show statistics for all the completed legs and at the end there will be TSK statistics until the actual time.

Departure

Time spent

TSK speed

STATISTICS
TSK 00:
15:54:55 - --:--:--
Duration: 0:20:48
Speed: 137%
Vario: ---% 0%
Engine: -'--"

Finish time

3.2.6.3 LOG BOOK

This kind of statistics is available **only on ground**. The logbook shows the flights under date, take off and landing. The logbook will appear appr. 3 minutes after landing and this is the **sign that the flight is** finished.

```
           LOGBOOK
28.12.00 15:07 16:20
28.12.00 13:58 13:59
26.12.00 19:20 19:29
26.12.00 14:53 18:25
26.12.08 13:49 14:34
26.12.00 12:44 13:06
```

3.2.6.4 Statistics after flight

The LX5000 offers flight statistics and flight analyses. To start the procedure select the flight from logbook and press ENTER.

```
Flight: 1  13.01.98
PILOT: ERAZEM_POLUT
GLIDER: VENTUS_2

DURATION:   5:53:15
 9:27:28 - 15:20:43

TASK: 512.8%
```

The distance appears only if the flown task has been declared correctly otherwise, a message TASK NOT SPECIFIED is present.

After pressing ENTER the pilot is able to call four different kinds of LX5000 flight analyses.

```
Flight: 1  13.01.98
PILOT: ERAZEM_POLUT
GLIDER     ROUTE
         BAROGRAM
DURATI     TASK
 9:27:   STATISTICS
TASK:
```

- ROUTE   flown route will be shown
- BAROGRAM   barogram of the flight
- TASK   if the declared task has not been completed (one or more points are missing), the pilot is able to modify the task, to get real statistics of his flight. The TSK **declaration in logger will remain**, that means no influence on logger. The modified TSK will not be memorized; it is only temporary .
- STATISTICS   all legs and the whole task are analyzed
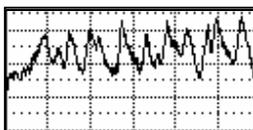
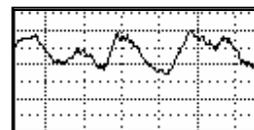**After ENTER on ROUTE one gets:**

after ZOOM
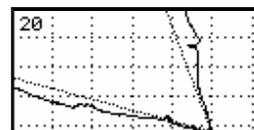
To arrange ZOOM press ENTER and a small cross will appear in the middle of the screen. To move the cross, rotate ZOOM and the UP/DOWN selector. Press enter after the cross is repositioned. Repeat the procedure fo the second cross and mark an area, which you wish to zoom.
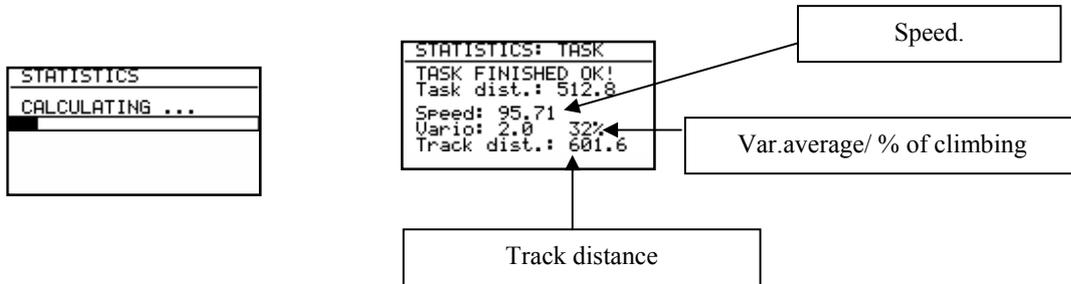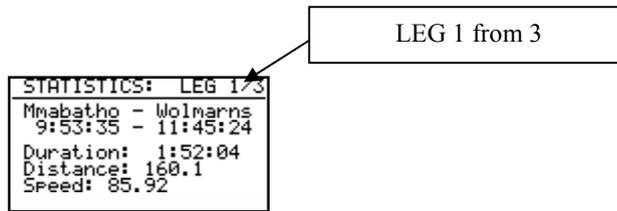
Barogram:

after zoom

The zoom procedure is similar, but there is no cross. After enter a vertical bar will appear which can be moved (UP/DOWN) and fixed with enter again. The same way is used for the second bar.
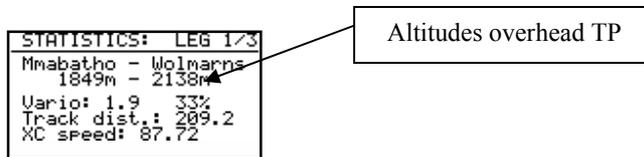
Statistics:
After pushing ENTER a task recalculation will follow. It can take some minutes, if the flight is very long and log time interval very short. The calculation procedure cannot be stopped. The single legs are available by rotating UP/DOWN.
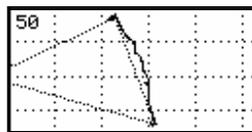
```
┌─────────────────┐        Speed.
│ STATISTICS      │
│ CALCULATING ... │
│ ▓               │
│                 │
└─────────────────┘

┌─────────────────────┐
│ STATISTICS: TASK    │
│ TASK FINISHED OK!   │
│ Task dist.: 512.8   │
│ Speed: 95.71        │
│ Vario: 2.0    32%   │     Var.average/ % of climbing
│ Track dist.: 601.6  │
└─────────────────────┘
         Track distance
```

Rotating UP/DOWN selector all legs can be analyzed in details.

```
                              LEG 1 from 3
┌─────────────────────┐
│ STATISTICS:  LEG 1/3│
│ Mmabatho - Wolmarns │
│  9:53:35 - 11:45:24 │
│ Duration:  1:52:04  │
│ Distance: 160.1     │
│ Speed: 85.92        │
└─────────────────────┘
```

Use ZOOM selector to activate next pages of leg statistics.

```
                              Altitudes overhead TP
┌─────────────────────┐
│ STATISTICS:  LEG 1/3│
│ Mmabatho - Wolmarns │
│  1849m - 2138m      │
│ Vario: 1.9    33%   │
│ Track dist.: 209.2  │
│ XC speed: 87.72     │
└─────────────────────┘
```

- XC speed is corrected average speed on leg. The altitude gain or loss is calculated.

Leg route (zoom possible too)

```
┌─────────────────────┐        ┌─────────────────────┐
│                     │        │                     │
│                     │        │                     │
│ Mmabath 9:53:35 FOTO│        │ Ganyesa 13:51:48 FOTO│
└─────────────────────┘        └─────────────────────┘
         Time of confirmation
```
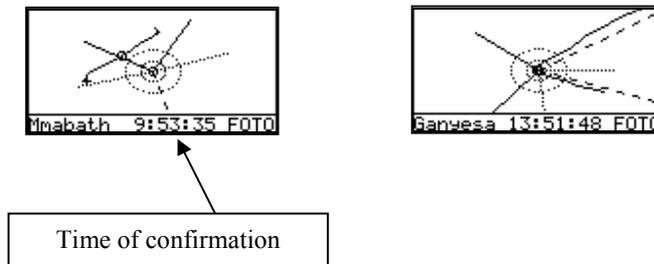
Press **ENTER to zoom** the sectors.

3.3 Variometer

All analogue signals of LX5000 (altitude, speed) are derived from high quality pressure sensors which means no flask is necessary. The vario signal is derived from the altitude signal. All signals are temperature compensated. Vario and speed signals are altitude compensated as well. A special device based on LCD has been developed for the vario indicator. Not only vario, but also a lot of additional information is displayed on the unit. The unit is programmable, that means the pilot is able to preset which information is important for him.

3.3.1   Vario

- range   5,10 and 2.5 m/s   10,20 and 5 kts
- five time constants   1s to 5s
- netto vario   lift or sink of air mass only
- Relative Vario   lift or sink during circling (does not depend on speed)

To compensate the vario there are two ways. The electronic TE compensation based on speed changes with time and the compensation with TE tube works the mechanical way. Using tube, the LX5000 has absolutely **no influence on compensation.** The quality of the signal depends on location, size and dimension of the tube. The installation must be leak-proof.

IMPORTANT!
To use electronic compensation connect TE-**Pst onto the static pressure source of the glider**
To use TE-tube **connect tube to TE-Pst**

3.3.2   Altimeter

The altimeter of LX5000 is temperature compensated from -20ºC up to + 60ºC. the altimeter is calibrated from 0 to 6000m, but indication goes up to 8000m. The displayed altitude is always NN (QNH) after correct input of airfield elevation (set alt.) after switching ON, otherwise it is 1013hpa.

3.3.2.1   IGC barogram recalibration procedure

The IGC variant of LX5000 has an additional pressure sensor for altitude recording. The sensor has no outlet, (FAI regulation) that means it is not available from outside. To follow the procedure it is necessary to uninstall the instrument from the glider. The instrument must be brought into a pressure chamber anyway.
Follow this procedure:

- Switch the instrument ON and wait some minutes (straight line on the barogram beginning)
- Set logtime to 1 second
- Climb Apr. 4 m/s up to 1000m (QNH 1013)
- Stop climbing for Aprox. 30 seconds
- Continue the procedure to 6000m
- Sink and provide the same procedure to 0m
- After reaching 0m wait Aprox. 3 minutes and switch the instrument off
- Leave the instrument minimum 5 minutes off
- Read and print the barogram using the Lxe PC program

The barogram will be stored like the last flight.

3.3.3 Speed command

Speed command is a very useful help to optimize the speed. There are many visual indicators (see LCD Vario). After the instrument changes to speed command mode, the audio will change and inform the pilot about his speed. Not to mix vario audio and speed command audio some special features were developed:

- Continuous audio signal in + possible (other kinds of signals can be chosen)
- No audio at correct speed (dead band).

3.3.4 Final glide calculator

The final glide calculator calculates the **final glide altitude difference** to the selected point (APT, TP) In the task mode the final glide is always calculated from the current position over all points to the goal. Indication + will inform the pilot that the glider is above the final glide and opposite. The final glide depends on **MC setting, wind, bugs and safety altitude.**

IMPORTANT!

Elevation of the landing place is calculated automatically, therefore it is very important that the TP database is correct. Using a safety altitude (reserve) the final glide should show **0m/ft-difference reading**. The only difference is that the glider won't arrive at 0m/ft, but at safety altitude. In that case the final glide is simply shifted XX meters/ft higher.

3.4 Flying with the LX5000

It is very important that both, the pilot and the instrument are well prepared for the flight. If that is done, flying with the LX5000 will be successful and fun.

3.4.1 Switching ON and selecting pilot

Pressing the **ON/START**-button will switch on the LX5000. A „booting routine" is started, and after that the pilot can be selected. Having an new device instead of a pilot the message „**UNKNOWN**" will appear, that means: no pilots entered.
After some seconds the LX5000 switches into the Set Elevation menu (entering elevation of the take off airfield). The first pilot has to be entered into the **FLIGHT INFO** and copied to the pilots list.

Usage as a single pilot (e.g. private owner)
If only one person is flying the glider, then it is enough to enter the pilot into the flight info only. Now the LX5000 shows the name of the pilot directly after the boot procedure and switches automatically into the SET ELEVATION menu.

Multipilot option
The use of this function makes the use of the device easier, especially the inputs before flight. Up to 30 pilots can be stored. The first pilot has to be entered into the **FLIGHT INFO** and copied into the pilots list via **ADD PILOT TO LIST Y**. Further pilots can be registered under **SETUP / PILOTS** with **INSERT.**
Pilots, who want to have their individual settings saved, should use the function **EDIT** (under SETUP / PILOTS). Besides the name a up to four character password can be entered. After the booting routine all pilots are available (selection with **UP/DOWN**). The „pilot" **UNKNOWN** can also be selcted, that choice deletes the FLIGHT INFO. As soon as a pilot has been selected, the LX5000 switches into the SET ELEVATION menu. If the pilot has protected his data with a password, he must repeat it now

```
Glider:
  ASH 25
Pilot:
M.SEISCHAB
```

```
Glider:
  ASH 25
Password:
    MI**
```

If the password was repeated correctly (having less than 4 chracters, one can skip the remaining „stars" with ENTER or ESC), the last settings, used by that pilot will be restored.
If the pilot is using no password, the last flown settings are restored, but there is no guarantee, that other pilots have not used his settings and changed something.

If the „pilot" UNKNOWN is selected, also the last flown settings are restored, regardless of pilot.

Tip:
If a pilot uses a glider with more configurations (e.g. 15m- and 18m-version), it is recommended to use the multipilot option, because the polar is also one of the restored individual settings.

3.4.2   SET ALT (take off elevation input)

We all know that air pressure changes all the time. After switching ON, the instrument doesn't know the elevation and the elevation should be entered.

<center>**SET ALT: 0185 m**</center>

The pilot has to input his **take off elevation.** The instrument will offer the last airport which was on the top list of NEAR AIRPORT, if it is OK, the pilot simply has to confirm the offered altitude. QNH setting is not mandatory (ESC to skip).

<center>**QNH:-------mb**</center>

After input of QNH the pilot will be able to offset his altimeter due to pressure changes during the flight. This will make his flight and specially his final glide safer. The best way to get an actual QNH is the meteorological service on the airfield or nearby. The input procedure is as follows:

- Rotate UP/DOWN and 1013 mb will be offered
- Use ENTER and UP/DOWN to adjust actual value

Note:
Without setting the QNH in the start procedure, the QNH cannot be changed during flight!!

3.4.3   Preflight check

It is strongly recommended to check all settings in the setup mode(only before password) especially if more pilots are flying the glider. All parameters will remain unchanged after switching off, the only exceptions are:
- QNH
- BUGS
- Ballast if not defined with **set** in setup LOAD

If you want to fly a task, it is recommended to transfer this task first from a PC, LX20 or Colibri. So the task can be prepared comfortably at home or at the competition briefing

IMPORTANT!!

When attempting an FAI badgeflight do not forget to use the „TASK DECLARE" procedure.
Declaration during or after the flight is not possible!

3.4.4   Performing the flight

It is recommended to switch the LX5000 on some minutes before the estimated start time, to have a secure GPS-reception, and the obligatory baseline for the barogram in the IGC-file

If a task (TSK) is to be flown successfully, please take care of some important things:
- Choose the correct task. You should prove (using the EDIT-mode) the correctness and the sequence of the single points.
- Point „0" is always the start point (not the take off point).
- Declare the task, if you want to achieve a FAI-badge, record, or decentralized flight.
- **Don´t forget to change the declaration, if your task start point is not the take off point!**

3.4.4.1 Preparing a task

It is quite important to prepare the task correctly quite a time before taking off, to avoid mistakes made in „panic". But all the described processes, exept declaration,can also be done during flight.

1. **Entering the task**
- copy the task file from a PC, LX20 or Colibri
- Copy to declare and, if necessary, edit
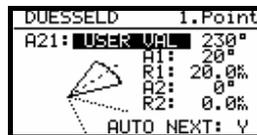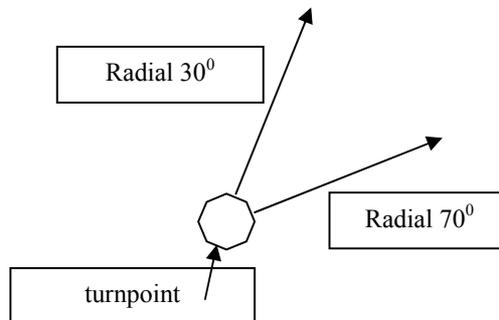- all values can be entered manually also

2. **check task**
- TP´s and their sequence correct
- Task distance

3. **Sector editing**
If one flys an AAT, the local sectors should be set in the ZONE-menu under TASK / EDIT.

Example

A sector is defined as an area between the radials 30^0 and 70^0 related to the turnpoint, the radius is 20km.

For that sector enter:

- A21 USER VALUE 230° ($50^0 + 180^0$); 50° is the symmetric axis between the two radials (30° + 20° = 50°, because the complete sector has 40^0)
- A1 20°, because the sector angle is 40^0
- A2 and R2 are 0

If the glider is flying into the start sector and the pilot decides to start the task, the following steps must be followed to start the task::

- Wait unti the message INSIDE appears
- press the START-button (short)

Navigation to turnpoint 1
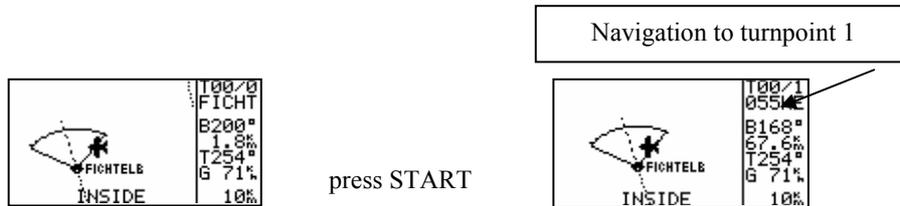
press START

This display is active exclusively during flight. A task cannot be started on the ground. Pressing the START-button short (about 1 sec.), starts the task. It can easily be controlled that the task is started: The TSK **navigation data** are now related to the **first turnpoint**.

It is also possible to start a task, while the glider is outside the start sector. In this case the pilot has to press START for a longer time (about 6 sec., but in any case so long until the TSK-navigation data to the first turnpoint appear).

A once started task can can be terminated any time and be restarted again. Press ENTER (if a task has already been started), and following screen appears:

press ENTER

Confirming **RESTART** with Y will stop the actual task. The task is now ready for another start...

All logger functions are not affected, when a restart is performed, as well as the declaration. The declaration is active until the glider has landed.

3.4.4.3 Automatic switch over

By default the LX5000 switches over to the **navigation data of the next turnpoint**, as soon as the **actual turnpoint is reached** (inside sector). If a turnpoint cannot be reached, the pilot can manually switch over to the next turnpoint by pressing START for approx. 6 sec. (just watch nav. data). Another possibility is to delete the unreachable turnpoint under TASK / EDIT. **Both processes do not affect the declaration!**

Important!
If AUTO NEXT N is set (under ZONE, e.g. for AAT), the pilot always has to switch over manually.

3.4.4.4 Using the MOVE function

When an AAT is flown, the pilot has to decide, how far into the sector he wants to fly. The MOVE function (see 3.2.5.2) modifies the task automatically, recalculates the distance, ETA, final glide and required averaged speed. This modifaction can exclusively be done under TASK / EDIT → MOVE.
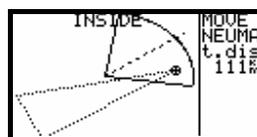
3.4.4.5   TSK END

After reaching the finish zone the task stops automatically. A very typical message **TSK END** will appear.
It is posssible to start a new task (during the flight) after TSK END, using the RESTART procedure.

3.4.4.6   Procedure after landing

FAI regulations require a straight line by barogram at the beginning and at the end. This is the reason that we recommend not to switch off the LX5000 immediately after landing. Apr. after 3 minutes a very typical message will appear on the screen.

CALCULATING SECURITY.

The mentioned message will remain for some seconds (depends on log time and flight time). After the procedure is finished the logger data is safe. **Never switch off the unit during the CALCULATING SECURITY.**
A very typical sign that the procedure is finished is **logbook instead of statistics page.**
If the unit is accidentally switched off immediately after landing, there will not be any problems. After switching it ON again the calculating security will start at first.

3.4.4.7   SIMPLE TASK

Simple task is active all the time **before a regular task is started**. The function is very useful for the pilots who do not fly tasks, but fly from TP to TP (the same as flying to APT). Simple task will bring similar statistics like a real task and the same holds true for flight evaluation using PC.
Immediately after take off, the current position is taken as the start point. Reaching an achievable TP or APT (has to be selected in TP or APT) the point is taken as a confirmed TP and so on. The radius to define confirmation is set by pilot in „NEAR TP". The simple task is growing on collecting points. The flight statistics is practically the same as a regular task. **TSK S** shows that no regular task is flown.

```
         STATISTICS
TSK S/1: FICHTELB
 Time: --:--:--
 Duration:    0:00:36
 Speed: ---ᵏ
 Vario: ---ᵐ 0%
 Engine: -'--"
```

After RESTART procedure the simple task will be restarted and present position will be taken as a new start.

4 PC and logger communication

LX5000 is able to communicate with:

- PC (LXe Program, LFAI, Strepla and CAL)
- LX 20
- Colibri
- Posigraph

The following data can be transferred bi-directional (LX20, Colibri, and Posigraph)
- TP and TSK data (DA4)
- Flight information

Using a combination with a logger (e.g. LX20) the pilot is able to prepare his flight at home or at the competition briefing, transfer the data from the PC into logger and on the airfield simple use the logger as a data source for LX5000.

4.1 Communication with PC

The communication is established via RS 232 port. To communicate with PC a special cable is delivered with the LX5000 (SUB D 9P and 5P round connector).

The CD with following programs is delivered together with LX5000:

- Lxe Windows program for communication, basic flight evaluation and database management
- LXFAI DOS program for flight evaluation
- Manuals for practically all LX instruments incl. Manual for **Lxe**

Another CD with high level flight analyzes PC program called **SeeYou** is delivered additionally**.**
Using Lxe following data exchange can be realized:

- Read logger
- Read da.4 (read TP and TSK)
- Read flight info
- Write da.4 (write TP and TSK)
- Write flight info
- Write APT
- Write airspace

The next very useful function is transfer of confirmation procedures. The pilot is able to prepare departure, TP and finish procedure using Lxe and to transfer them into LX5000. Use menu **ZONES in Lxe.**

Lxe can also be used for data base update. The data base update is not free (Europe). To provide update the user needs an **update code**. The code is available by **Filser Electronic**. The update code for database, which is delivered with the instrument, is written on CD covers. The CONNECT status is realized as follows

- LX5000 / SETUP – TRANSFER
- PC – run PC program LXe)
- LX5000 ENTER and wait some seconds till CONNECT appears

CONNECT indicates that both LX5000 and PC established connection and data transfer can be started.
Having problems with connection check the following:

- close all other applications occupying com port
- check cable and connector

4.2 Communication LX5000 – LX 20, Colibri

LX5000 is able to exchange data (bi-directional) with LX 20, Colibri and Posigraph. The following data can be transferred:

- DA.4 files (TP and TSK)
- Flight info

To establish data transfer use following steps:

STEP	LX 20	LX5000
1	Main MENU / LOGGER	SETUP / TRANSFER
2		ENTER
3	READ or WRITE key	Select t. function
4		ENTER

LX5000 acts like a master and will force LX 20 to follow his commands

Transfer functions (LX5000)

READ TP/TSK
READ INFO
WITE TP/TSK
WRITE INFO

Read means, LX5000 will read data from LX 20 and opposite

Communication with a Colibri-logger is much more simple. The Colibri will establish CONNECT automatically after pressing ENTER on TRANSFER by LX5000. The CONNECT status is signalled by a sound from the Colibri.

5 Installation

The LX5000 main unit needs one standrad 80-mm cut-out. Each Vario indicator needs one standrd 57 mm cut-out. Three pressure connectors are on the rear side of the instrument. A label on the rear side shows their functions.

- Ptot =   Pitot, Total pressure
- TE =   TE probe
- Pst =   Static

Using electronic compensation:

- TE/Pst   Static
- Pst   Static
- Ptot   Pitot

Using TE tube

- TE/Pst   TE tube
- Pst   Static
- Ptot   Pitot

IMPORTANT!
Having changed Ptot and Static, there will be no integrator (average climbing) indication during the flight
The unit is connected to the power via 25 SUB D connector. There is **no fuse in the instrument** so it is
VERY IMPORTANT to use an external fuse (2A). For power supply extension use min. 0.5 mm² cables.
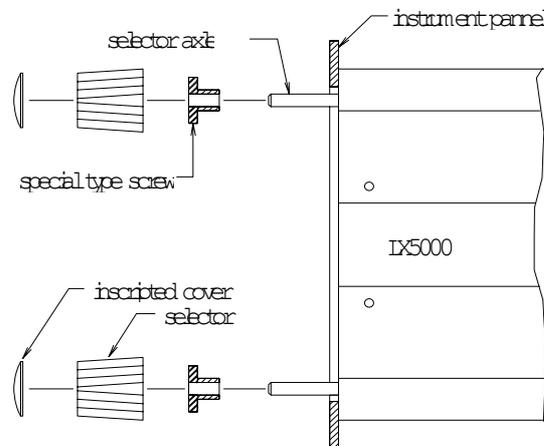

Installation of the LX5000

- Prepare the cutouts in the instrument pannel according to the drilling plans.
- Remove the inscripted covers from the four main selectors on the LX5000.
- While holding the selectors, open the screws which are now visible with a screwdriver. Now the selectors may be removed.
- Remove the four special type screws.
- Now position the LX5000 in the cutout in the instrument pannel.
- Fasten the LX5000 with the special screws.
- Now the turn knobs and the covers may be fastened again.
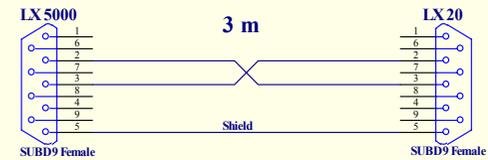
Dimensions for mounting:

ř80.0mmh11

ř89.0mm

6mm
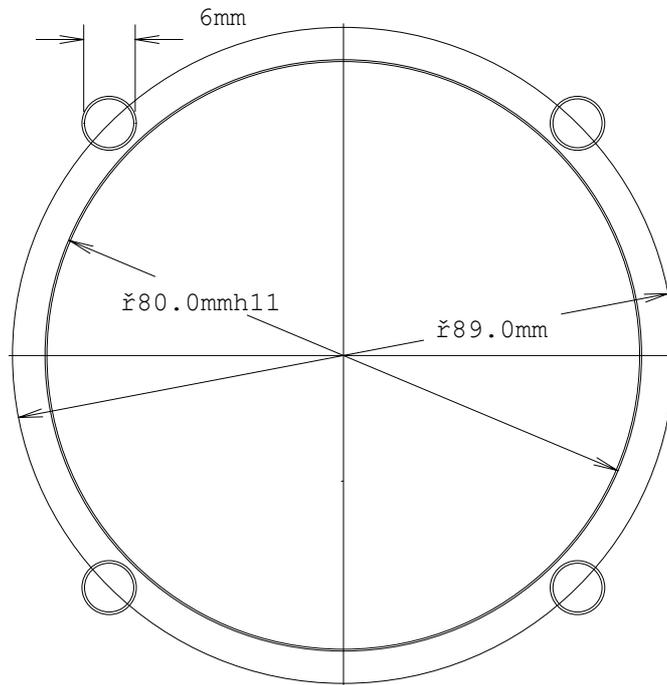
5.1 Wiring

LX 5000 V8.x Wiring

5.2 Tree structure Diagram
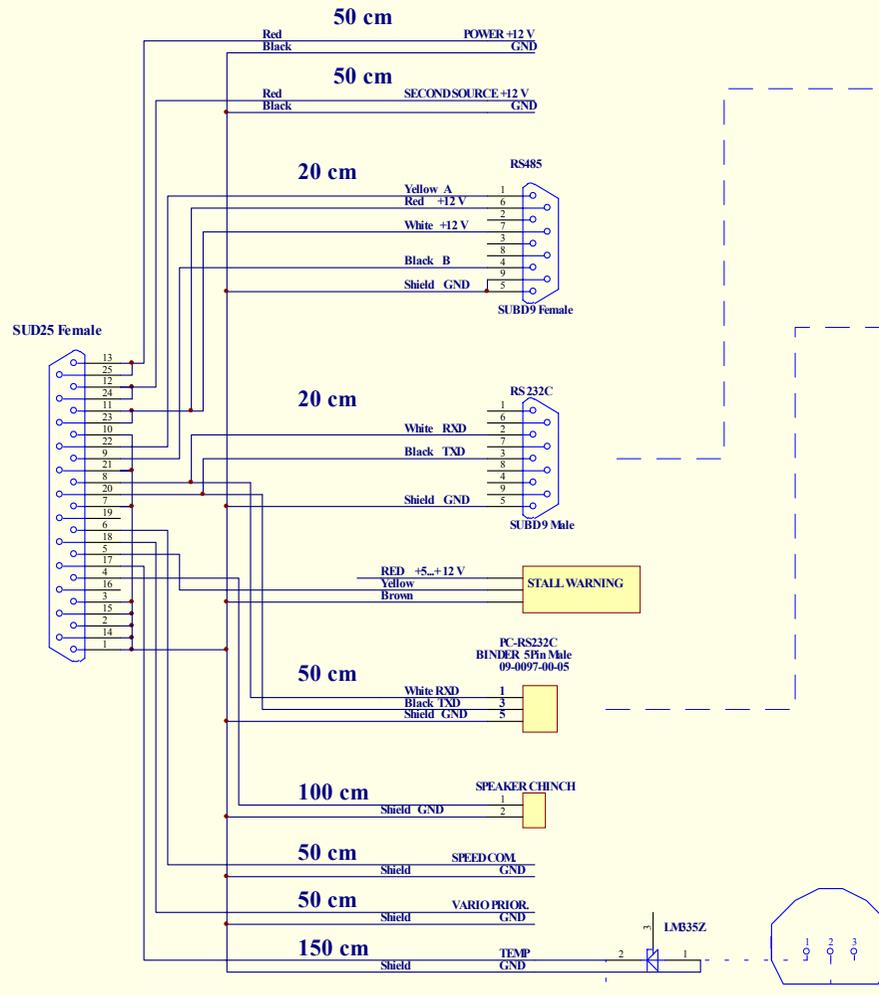
⇔
MODE

6 Passwords

96990   **System parameters**
55556   **External NMEA input (internal GPS is disconnected)**
         The function is active till switching OFF or new input of 5556
         After using password 5556 is INTEGRITY lost

99999   **Delete logger (all logger data will be deleted)**

7 Options

7.1 LX5000 Compass Module

7.1.1 General

The compass module is an electronic compass (magnetic field sensor) , which was devloped for the LX5000. The LX5000 recognizes the compass module automatically, therefore only the compensation procedure and no additional settings in the LX5000 are needed.

A typical sign that the compass is connected, is the magnetic HDG status line on the navigation page 3 of the LX5000.

The compass module is commonly not only used for displaying mag. heading. In most cases it is installed for the **windvector calculation in straight flight.** The windvector is calculated following the well known triangle method, where the vectors of groundspeed with track and TAS with compass-HDG and the windvector together are a triangle.
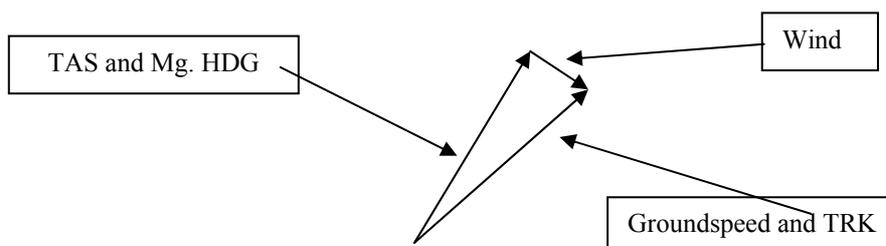
The angle difference between HDG and TRK sizes the wind course (strictly speaking: the difference of the vectors mentioned above gives the wind in direction and strength). The angle difference between HDG and TRK is quite small, which means that the measurement has to be quite exact. The GPS-data (TRK and GS) are that exact. If the

compass is now uncertain (about 5^0), it can cause errors up to 25km/h in the wind strength.
This method only works during straight flight. The algorithm is stopped, as soon as HDG and TAS vary too much.

7.1.2 Installation of the compass module

The device comes in a plastic housing (80 x 60 x 40mm). On the cover one will find the type label with serial number and flight direction (arrows. The type label shall always be upside!). The connection to the RS485-bus of the LX5000 is done directly by a 9-pin SUB D connector with 3m of cable. The optimal connection is a free RS485 ports on the back side of a LCD vario indicator, where two of these ports are located. If there are no more free RS485 ports, a splitting unit can be ordered from Filser Electronic.

7.1.2.1 where to install:

The compass module should be installed as far as possible away from magnetic, electrical and iron parts (speaker and anolog varios are very interfering). Even the mechanical compass should be far away. Minimum distance is 20cm. As mentioned above, the arrows should look forward into flight direction (parallel to pitch attitude). For a proper installation a plane area parallel to the horizontal plane is needed.

7.1.2.2 First test after installation:

This a test for proofing the proper installation. Therefore a reference compass is required (either a master compass or a compassplane on the airfield ground). With the referene compass one should be able to mark the eight main directions (360°, 45°, 90°, 135°, 180°, 225°, 270°and 335°). Now the plane should be oriented into north direction, while doing that watch the HDG displayed on Nav.-page 3 of the LX5000 (do not try to compensate the compass yet!). If HDG varies more than $\pm5^0$, turn the compass so ,that the variation decreases below $\pm5^0$.
Now turn the aircraft into the other directions and read the displayed values (now don´t change the compass position anymore). If they vary more than $\pm10^0$ one has to find another place for the compass module

7.1.3 Adjusting the compass module:

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

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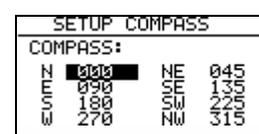
1. Orientate the aircraft again to 360^0.
2. Set the cursor on N and press ENTER (actual HDG is displayed).
3. Press ENTER again (storing the measured value)
4. Set the cursor on 45°, orientate the aircraft to 45° and again store the measured value.
5. Repeat the procedure for the remaining directions

```
    SETUP COMPASS
COMPASS:

N  055      NE  045
E  090      SE  135
S  180      SW  225
W  270      NW  315
```

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

7.1.4   final test:

Switch the LX5000 back to Nav.-Page 3 and proof again all 8 directions. The error should now be less than $1^0 - 2^0$ (better to have 1^0 !!). If the errors are bigger, then one should search for faults in istallation or in the adjustment procedure. When the final test has been positive, your LX5000 is ready to calculate the wind with the compass method.

Please note:!
The calibration is specific for your combination of aircraft and compass, that means you can not transfer the compass to another aircraft while using the same calibration values.
The parameters are stored in an EEPROM, so they won´t get lost when a memory init is performed or the internal Li-battery is exchanged.
It is recommended to repeat the calibration procedure every year.

7.1.5   **Windcalculation during flight**

For the windcalculation a certain time is needed. **This time (given in sec.) until one receives a result** shall be entered in the **INIT-menu under WIND/COMPASS**. Longer times produce more exact results and vice versa.

If the pilot intends to use the windcalculation 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 Nav.-Page, move the cursor onto WIND and press ENTER again) and choose the item **COMPASS**.

Please note !
- Windcalculation with 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
   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 produced result is the new wind vector
   If the limits given above are exceeded during the measurement, the procedure will be stopped and started again as soon as the condition are fulfilled again.

   The higher the speed, the bigger the uncertainty in the result will be.

What the pilot should do during windcalculation:

   -keeping speed and flight direction as constant as possible
   -watch the winddisplay on one main Nav.-page (lower left corner)
   -WAIT means that now the conditions for the measurement were fulfilled for more than 5 sec.
   -When the measurement is started a time counter will start counting backwards (like 15, 14, 13, ...). That is the time until receiving a result.
-   **When the procedure has run without problems, a new wind will be calculated and displayed.**

7.2 LX5000 –Remote control unit

7.2.1 General

The unit consists of an aluminium housing (80x60x20 mm), a rubber keyboard and a micro controller. The keys made of rubber are used to ensure comfortable manipulation. All LX5000, having a program version 8.2 or higher, are ready to support the LX-Remote. There are no additional settings needed on the LX5000 or on the LX-Remote. The remote unit is detected automatically after the LX5000 is switched on.

All keys have only one function, no combinations, no double functions. All keys correspond 100% to the LX5000 usage philosophy.
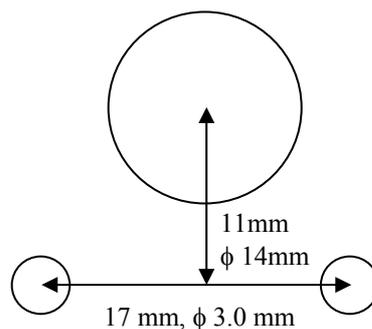
Remote	LX5000
⇐ MODE MODE ⇒	Mode Selector knob
⇑ ⇓	Up/down selector knob
ESC,EVENT,ENTER,MC,START	ESC,EVENT,ENTER,MC,START/ON key
+ ZOOM, -ZOOM	ZOOM knob

7.2.2 Getting started

The following parts are delivered:

- LX-Remote unit
- Flexible cable with telephone connectors on both sides (can be bought in your telephone shop)
- RS485 BUS cable

The RS485-BUS cable consists of 0.5 m cable, 9P SUB D male connector, printed circuit board and a small aluminium plate for fixing. The printed circuit board is normally fixed on the instrument panel. To do that, it is necessary to drill three holes as shown in the picture below.

11mm
φ 14mm

17 mm, φ 3.0 mm

7.2.3 Electronic connection

As described, the LX Remote should be connected to the LX5000 RS485-BUS. To do that, a free port on the digital vario rear side (9 P female) should be used. If there are no free ports (other devices connected) it is necessary to order a RS485 Splitting Unit to split one input into 3 outputs. Having done everything correct the LX-Remote will be detected automatical by the LX5000 after this is switched on and activated.

8 Revision history

Version 8.2	3.1.1.1 3.2.4.2
Options	*insert pp 49 - 53*
Version 9.0	2.2.7; 3.1.1.2; 3.1.1.3; 3.1.2.5; 3.1.2.6; 3.1.2.13; 3.1.2.17; 3.2.2.1; 3.2.2.2.3; 3.2.4; 3.3.4; 3.4; 3.4.2; 3.4.4.1; 3.4.4.3; 3.4.4.4