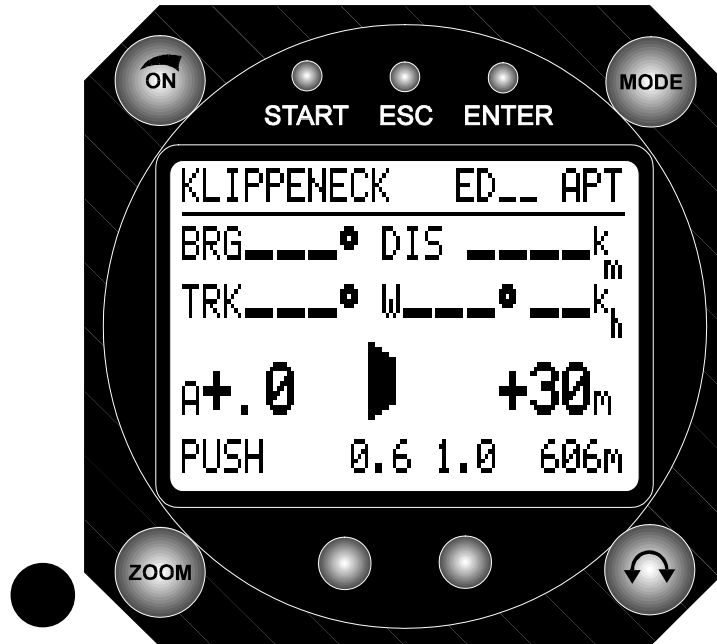


FILSER ELECTRONIC GMBH



LX5000

GPS and FLIGHT DATA SYSTEM

USER'S MANUAL

(version 6.0, 6.0 IGC, 7.0 and 7.0 IGC)

Introduction

The difference between the program versions 6.0 and 7.0:

All the vario and navigation functions are the same, but the program version 7.0 enables the use of the ATR 720 radio, which is functioning like a “black box”. All the differences in procedures are described in this manual. The basic difference between the versions 6.0 and 6.0 IGC is a hardware modification which makes the IGC version the official version according to the FAI rules. As far as the handling is concerned there are no differences between the two versions, but the flights in the V6.0 lack the integrity check. The V6.0 has smaller memory capacity (30 hours). The LX5000 is a state of the art variometer system, combining most modern GPS-technology and a variometer-system proven over the years.

Please, read this manual carefully in order to familiarize yourself with the LX5000, before installing it in the glider. The best way of doing this, is to practice the functions described in this manual at home, with the instrument connected to the battery or the battery charger. The LX5000 facilitates easy operation, requiring only minimum operator action during flight, if the required flight data are entered on the ground.

Please, note that the airport data (i.e. frequencies and various altitudes) stored in the LX5000 may not be valid any more, even after a very short time. For this reason, such data as well as the GPS navigation system should only be used to support conventional navigation, and not to replace it. Thorough flight-preparation using standard documentation is therefore strongly recommended.

FILSER ELECTRONIC will not be liable for, or guarantee the correctness and completeness of this manual. Hardware and software are subject to alterations.

This manual was written to the best of knowledge and belief. However, printing errors and other mistakes cannot be completely omitted. WE are looking forward to receiving your suggestions and comments.

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1 GENERAL DESCRIPTION

1.1 Technical Data

Voltage	9-36 VDC	
Power consumption (audio volume zero)	approx. 300 mA at 12 volts	
Operating temperature	-20 to +60 degrees C (degrees F)	
Storing temperature	-30 to +80 degrees C (degrees F)	
Dimensions		
LX5000	Ø80mm	length 160mm (excluding connector) approx.220mm (including connector)
Analogue instrument	Ø57mm	length 100mm (including connector)
Total weight	approx. 1500 grams	
GPS receiver	8-channel, parallel	
Pressure probes	1 Silizium pressure probe for the altimeter(variometer) and airspeed respectively	

1.2 Variometer System

The variometer system consists of

- the total energy compensated variometer,
- the net-relative variometer,
- the interval integrator,
- the speed command,
- the audio generator.

The interval integrator calculates the average rate of climb over a certain time constant which may be selected in the LX5000.

For the most common gliders a list of approximated polars is stored in the LX5000. The speed command signal is generated using the polar you have selected from this list. Additional coefficients for glider polars not contained in the list, may be calculated and stored in the LX5000. You may do this by using the computer program „POLAR EXE“ which is contained in the scope of supply.

The signal is available on the analog instrument and on the liquid crystal display, as well as through a tone created by the audio generator. The mode and the frequency of the audio tone may be selected in the SETUP program.

The parameters listed below influence the speed command signal:

- The McCready setting,
- the wingload setting,
- the glider polar,
- the wind,
- a correction to the polar, i.e. to compensate for bugs.

You may choose whether you wish to enter the wingload in kg/m² or in lb/ft². It is also possible to calculate the wingload in percent over the basic weight that has been used to calculate the selected glider polar. The loadfactor may be increased in 10%-steps to a maximum of 60% (=1.6 times the basic weight).

The decrement on the polar for a contaminated wing may be applied in 2.5%-steps up to a maximum correction of 30%. It is effective over the whole speed range of the polar.

The variometer may be dampened through a variable filter, which may be selected in the SETUP program:

- a small filter (value low) for quiet air
- a large filter (value high) for rough air.

1.3 Electronic Altimeter

The electronic altimeter is operated via state of the art temperature compensated pressure sondes. All heights indicated in the LX5000 are barometric heights. They are not GPS-heights.

After switching on the LX5000, the display shows the elevation of the airfield closest to your last landing site. This information is taken from the data base. You are then asked to enter the present elevation and the local altimeter setting (QNH). This step is necessary, as the LX5000 requires the barometric pressure for an altimeter reference, in order to make inflight corrections to the electronic altimeter possible. If the local altimeter setting is not available, it may be read in the airpressure window on your barometric altimeter after setting the indicator to field elevation.

A pressure correction on the electronic altimeter during flight will only be possible if, on starting the LX5000 the local altimeter setting (QNH) was entered

1.4 GPS Navigation

Using the GPS-navigation system, the LX5000 calculates position data with great precision. Containing a global model of magnetic variation, all courses calculated by the GPS are **magnetic**. GPS-speeds are ground speeds

Therefore the speed indicated by the GPS may differ from the speed shown on the pneumatic airspeed indicator, i.e. through the altitude error or a wind component.

The parameters calculated by the GPS are listed below:

- Magnetic track (TRK)
- Magnetic bearing to the turnpoint (BRG)
- Groundspeed (GS)
- Distance to the turnpoint (DIS)
- Estimated time of arrival at the turnpoint (ETA)
- Estimated time enroute to the turnpoint (ETE)
- Preselected magnetic track to the turnpoint (DTK, desired track)

1.5 Final Glide Calculator

The final glide calculator in the LX5000 calculates the deviation from the required glidepath with reference to the actual distance to the next turnpoint, taking into account the safety height you have selected in the SETUP-program. The quantitative deviation from the calculated glide path is shown in digital figures on the display, i.e. -320m.

The LX5000 has five options to calculate the wind, which may be selected in the navigation programs.

The wind (direction and velocity) required for the calculations during flight is calculated automatically and continuously updated and accounted for.

If the last turnpoint is close to the destination and the final glide altitude can be reached before passing it, this turnpoint may be programmed as a check point.

If you fly away from a programmed turnpoint or airport, the altitude required to return is calculated, taking into account the present windcomponent and the safety height (turn-around-point).

If there is no GPS-reception for more than 60 seconds, the LX5000 will automatically switch to calculating the distance by the use of the total air pressure. The last distance to the programmed turnpoint as calculated by the GPS will be used as basis for calculation.

1.6 Flight recording

The flight recorder integrated in the LX5000 records the position, the altitude and the vertical speed every twenty seconds during flight. For evaluation, this data may be viewed, saved and printed using a portable computer or a notebook.

The LX5000 has a memory capacity sufficient to record 30 hours flight time. After the storage space is filled the oldest data will be overwritten. Thus the last 30 hours recorded flight time will always be available.

1.7 Airport and Turnpoint Database

Approximately 5000 airports, 600 turnpoints and 100 tasks with up to 10 turnpoints each, may be stored in the LX5000. On delivery several thousand airports (i.e. of Europe) are stored. Using a personal computer or the controls of the LX5000 these may be called up, edited, added to or deleted easily. As an exception airports can only be added to or deleted from the airport file by using a personal computer. A diskette containing the program LXGPS is in the scope of supply.

Please note that FILSER ELECTRONIC cannot be liable for the correctness and relevance of the airport- and airspace data stored in the LX5000.

1.8 Geographic Coordinates

The geographic coordinates may be entered in degrees, minutes and either seconds or tenths of minutes.

Latitude: N/S DD.MM.mm or DD.MM.SS (N= North, S= South)

Longitude W/E DDD.MM.mm or DDD.MM.SS (W= West, E= East)

DD= degrees

MM= minutes

SS= seconds

mm= tenths of minutes

You may convert seconds into tenths of minutes using the formula below:

Tenths of minutes= seconds/ 0.6

Before entering geographic coordinates using existing publications, you should note the format used. You may either select the format in the SETUP-program or recalculate the last digits of the coordinates before entering them..

1.9 Glider Polars

Presently a list of 30 speed polars for the most common gliders is stored in the LX5000. You may select the required polar in the SETUP-menu. Two additional polars may be defined and stored for gliders not contained in the list.

All polars used are defined by three coefficients (a, b and c). Using the computer program POLAR EXE these coefficients may be calculated for any glider. Three polar coordinates must be taken from the speed polar of the respective glider (speed /sinkrate) and entered into the computer program. The three coefficients are then calculated and may be added to the list in the LX5000. It has proven to take the coordinates at speeds of 100, 130 and 160 km per hour

2 Installation

Please read the instructions below carefully before installing the instrument in the glider.

2.1 Mecanical Installation

A new method is being used for mounting the LX500 in the instrument pannel. The axils of the four main turn knobs (selectors) are at the same time the center axils for the fastening screws. This makes it possible to save space on installaton while using standard instrument size. Drilling plans for the instrument cutouts are available in the appendix.

For the installation please follow the instructions below. Also see Fig. 1: Mounting the LX5000 operating element.

- 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.
- Using the special screw diver, which is delivered with the instrument, remove the four special type screws.
- Now position the LX5000 in the cutout in the instrument pannel.
- Fasten the LX5000 with the special screws, using the special screwdriver.
- Now the turn knobs and the covers may be fastened again.

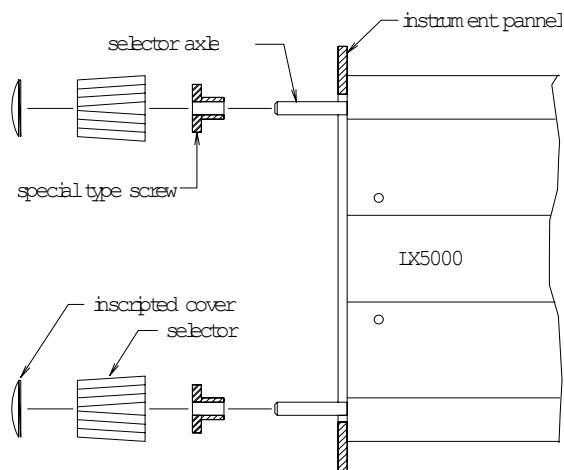


Fig. 1: Mounting the LX5000 Operating Element

2.2 Antenna

The GPS-antenna delivered with the instrument should be installed such, that it will not be shielded from above. The top of the instrument cover is considered the best location. It may also be installed under the cover, if the cover is not made of carbon fibre or metal and there are no other instruments installed above the antenna such as a compass or solar pannels.

Please, note that the antenna should not be shielded by metallic parts. It should not be installed close to the magnetic compass.

To achieve optimum reception you should test the antenna at different locations before finally installing it.

When laying the antenna cable the following principles should be accounted for:

- Avoid kinking the cable.
- Lay cable in largest radii possible.
- Do not roll or bundle it up, and do not wrap it around the antenna or other objects.
- Do not lay it together with or close to electrical- or other antenna cables (e.g. radio cable).

The antenna included for the installation, is suited exclusively for use inside the glider. An antenna for external installation is available from FILSER ELECTRONIC as an optional part.

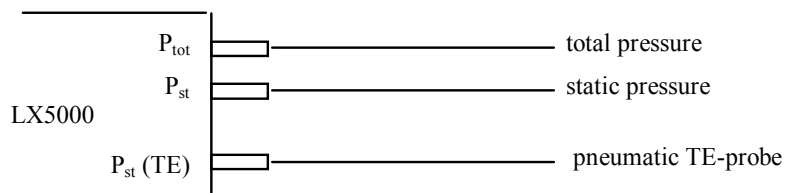
2.3 Pneumatic Connection

Three pneumatic connection pieces are mounted on the rear of the LX5000. These must be connected to the static pressure, the total pressure and the total energy compensation probe in the glider, as shown in figure two.

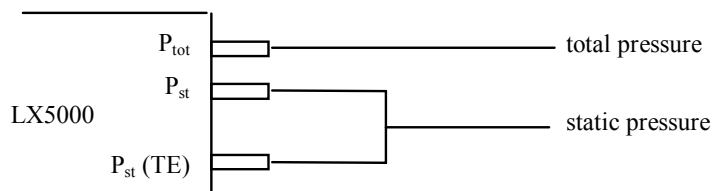
Caution:

Depending on the type of compensation used, either pneumatic or electric, please note that there is a difference in how the respective pneumatic lines must be connected.

a) LX5000 TE-compensated using **pneumatic** TE-probe



b) LX5000 **electronic** TE-compensation



The illustration shows the LX5000 top view

Fig. 2: Pneumatic Connections

Caution:

Blowing into the pressure probes will damage the equipment. In this case repair on warranty is not possible.

2.4 Cabling

The scope of supply for the LX5000 includes all cable assemblies necessary:

- **cable Electrical power supply** including the connectors for a personal computer and extensions.
- **Analog wiring** including the connectors for the loudspeaker, the analog indicator and the external speed command/variometer reversing switch.
- **485 databus** for the LCD vario display, compass and Doppelsitzer ??? connector (all three should be connected parallelly)

The two non-interchangeable 15 pin connectors on the cable assemblies will connect to the rear of the LX5000. They should be secured with the locking screws.

The two bare ends on the electrical power supply cable connect to the electrical power supply of the glider.

The cables in the glider should have a large diameter. You should see to a good ground connection.

The RED power supply must be protected by a fine wire fuse (1.0 Amps)

red end= + powersupply

blue end= - ground

The panel jack on the interface line for the personal computer may be installed in the instrument panel. The interface cable to the personal computer COM-port (scope of delivery) may be connected here.

The loudspeaker will connect to the analog wiring through the CINCH- plug. It should be installed as far away from the magnetic compass as possible to avoid deviation through the magnetic field of the speaker.

The temperature probe contained in the analog wiring should be installed in the fresh air duct of the glider.

The cable to the flap switch marked **SC** need not be connected if the external speed command/variometer switch (i.e. magnetic operated proximity switch on the flap handle or a manual switch) is not used.

The cable marked **VAR PRIOR** may be connected to a simple ON /OFF switch and may be installed in the instrument panel. If the switch is closed the LX5000 will always be in the vario-mode, regardless of the position of the flap switch or the setting of the automatic speed command.

The cable marked **NMEA** will only be needed with an external moving map system, e.g. handy Map

You will find an exact wiring diagram in the appendix.

3 Operation

The LX5000 was designed for simple and operator-friendly use. Even a short familiarisation will allow you to make good use of the LX5000 during flight.

3.1 Operating Elements

5 turn knobs (selectors), 1 potentiometer including the ON /OFF switch, and three push buttons are used to operate the LX5000(see fig. 3 below).

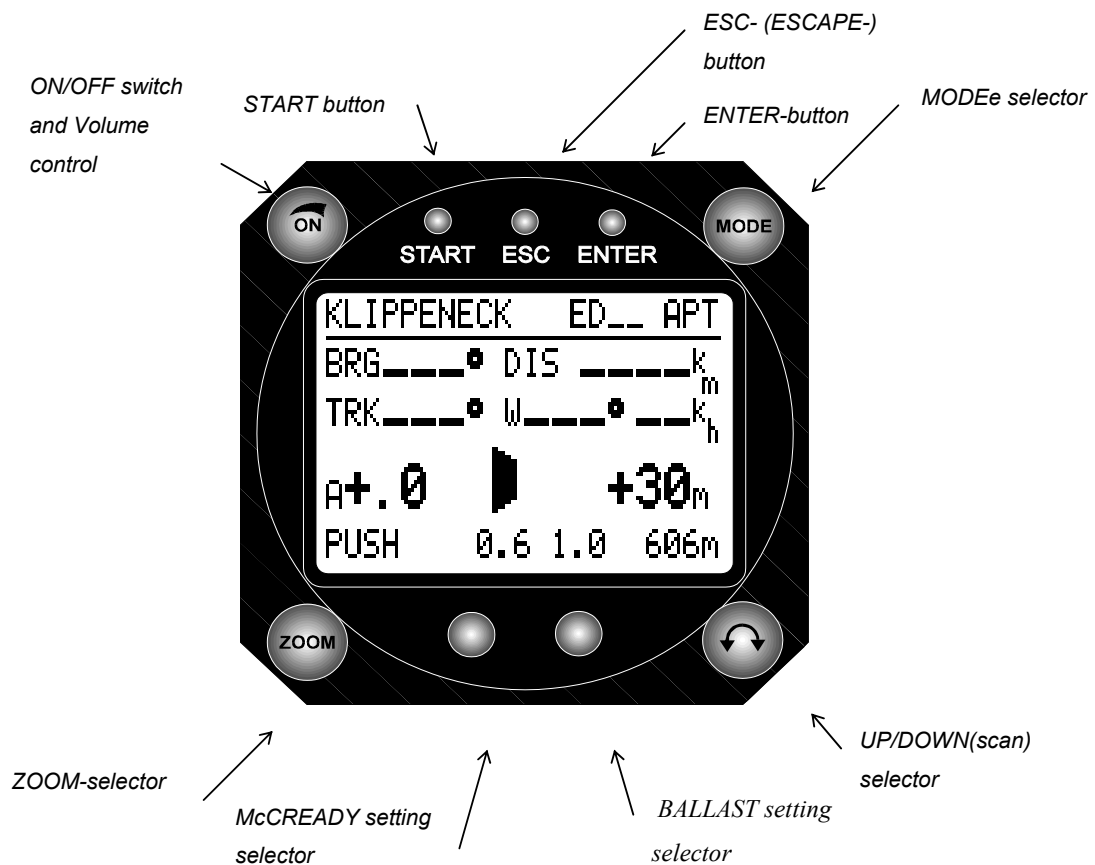


Fig.3: LX5000 Operating Controls

The operating controls function as described below:

	Function:
ON/OFF-switch	Switches the LX5000 ON and OFF. With the instrument switched on, the ON/OFF-switch controls the volume for the audio functions.
MODE selector	The MODE selector is used to select the various program modi in the LX5000. Also see para. 4.6 MENU STRUCTURE.
UP/DOWN selector	The UP/DOWN selector is used to select entries, to scan the alphabet or change the numbers 0 to 9 up or down and for selecting pages within the menus.
ZOOM	The ZOOM selector zooms the graphic displays with reference to the selected selector destination. In the APT and TP mode a DTK may be selected (preselected course). When entering alphanumeric data (i.e. to select a turnpoint) the cursor may be moved back and forth with the ZOOM selector.
McCREADY selector	Self explaining. The selected setting is shown in the display above the selector.
BALLAST selector	the setting may be entered in kg/m ² , lb/ft ² or in % above the basic weight.
ENTER push button	Using the ENTER push button, entries are confirmed or activated and menus or entry fields opened
ESCAPE push button	The ESCAPE push button is used to skip entries or to return from the APT; TP, or TSK edit modes to previous displays.
START button	For starting pre-programmed tasks (available only when airborne), for storing the current position as a turnpoint (available only in TP-mode) and for operating the stopwatch (available only in POS-mode) as well as for setting the cursor back during the editing procedure. In the APT-navigation program the complete APT name will be displayed momentarily upon pressing the START button.

3.2 Selecting and Editing Data

Selecting and editing data in the LX5000 is done according to the same pattern in all programs. The aim was to achieve a user-friendly and easy to learn operation through simple and logical procedures

If a program is selected where data (i.e. a combination of letters for a turnpoint name) may be entered, the cursor will flash on the first digit of the input field. You may now enter alpha-numerical data by scanning the alphabet or the numbers 0 to 9 using the UP/DOWN selector. Each digit must be confirmed with the ENTER push button. The cursor will move to the next digit

Pressing the ESCAPE push button, the entire input field will be skipped. This may be necessary if you wish to avoid pressing ENTER numerous times in order to confirm data already contained in the input field.

Example: Entering the Airfield Elevation

After switching on the LX5000 you are asked to enter the present field elevation.

Using the UP/DOWN selector you should enter the data in the position indicated by the cursor and confirm it with ENTER. If the altitude indicated in the inputfield was correct the whole field may be skipped using ESCAPE, or each figure may be confirmed by pressing ENTER.

In summary:

- Confirming an entry : press ENTER pushbutton
- Skipping an entry : press ESCAPE pushbutton
- Returning the cursor to the left : press START pushbutton.

This entry procedure is used for all inputs in the LX5000

3.2.1 Setting the Wingload

Using the ballast selector, the current wingload may be entered in kg/m², lb/ft² or in percent over the basic weight used to calculate the glider speed polar.

You may select the desired unit of measurement in the SETUP program.

Example for Calculating the Wing Load in Percent

Assuming a glider polar based on a wingload of 35 kg/m² was entered in the LX5000, the current Wingload however is 42 kg/m²:

$$\begin{array}{rcl} & \text{current wingload} & 42 \text{ kg/cm}^2 \\ \text{Required ballast setting in \%} = & \text{-----} = & \text{-----} = 1.2 \\ & \text{basic wingload} & 35 \text{ kg/cm}^2 \end{array}$$

In this example a ballast setting of 1.2 (20 % increase over the standard wingload) should be used. Independent of the unit used, the selected setting will be shown in the display above the BALLAST selector.

3.2.2 Adjusting the McCready setting

The McCREADY selector is used to adjust the McCready setting. The selected setting will be shown in the display above the McCREADY selector.

4 Display Description

The figures below show the displays of the LX5000 and the data shown.

4.1 Gliding Navigation Display 1

With the LX5000 the GLIDING navigation display is probably the display used most.

In the modi APT, TP and TSK two different gliding navigation displays are available, which may be selected in the SETUP program alternatively. First a description of display 1:

All values shown in the display refer to the turnpoint shown in the top line.

Please, remember all courses displayed in the LX5000 are MAGNETIC.

- BRG magnetic bearing to the turnpoint
- DIS distance of the glider to the turnpoint
- GS indicates present groundspeed
- TRK shows the magnetic track above ground

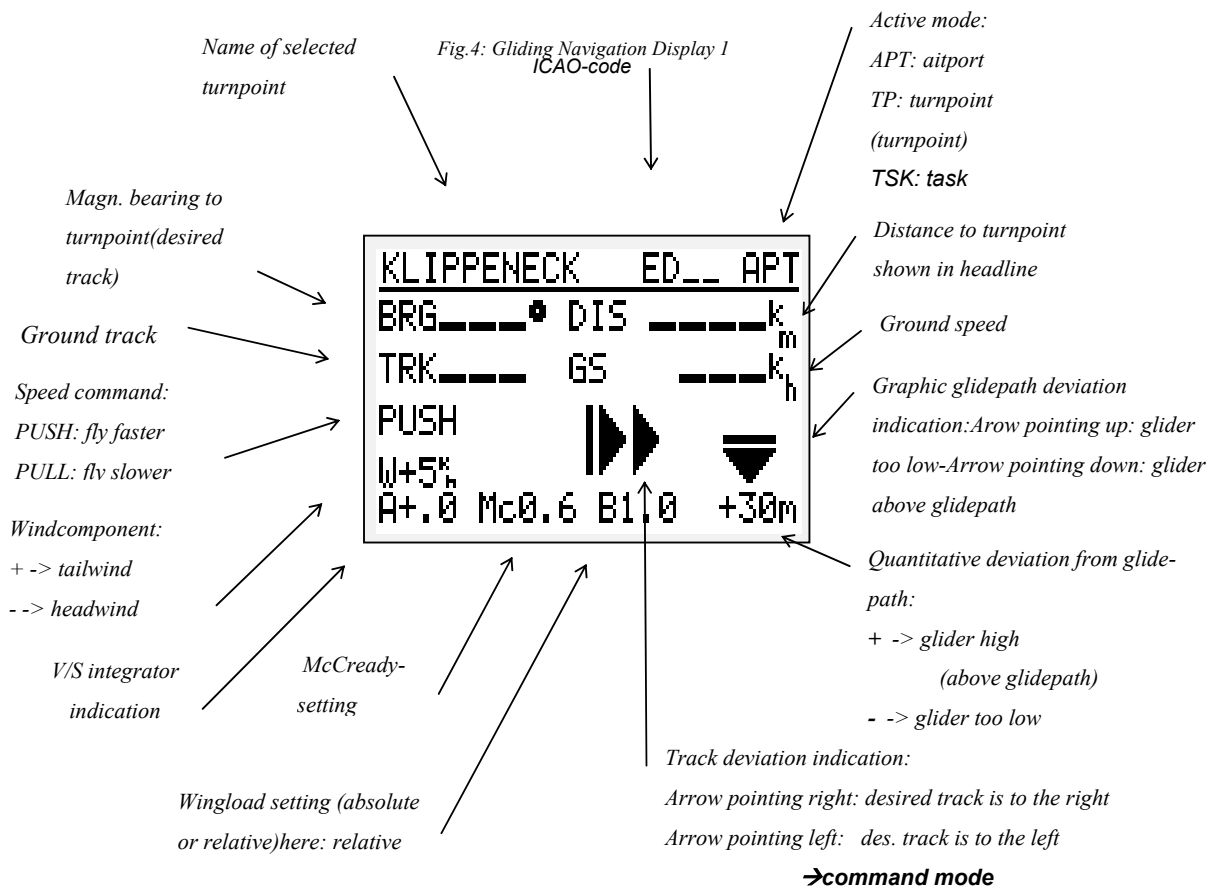


Fig. 4: Gliding Navigation Display 1

PUSH/PULL= speed command. **W** indicates the wind component as calculated by the LX5000, **A** the average climb rate, **Mc** the McCreey setting, and **B** the selected wingload setting.

In the right bottom corner the quantitative deviation from the calculated glidepath is shown, e.g. -320m.

Additionally a symbolised arrow above the figure indicates in the direction of the required correction.

4.2 Gliding Navigation Display 2

The gliding navigation display 2 offers the same basic information as display 1. It is also available in the APT; TP and TSK modes.

However instead of the groundspeed the calculated wind is indicated in direction and velocity. The indicated average rate of climb, as well as the quantitative deviation from the calculated glidepath are emphasised in bold characters. The course deviation arrow will vary in size according to the size of the actual deviation from course.

As an additional information the altitude is indicated in the lower right corner of the display. The desired unit m or ft may be selected in the SETUP program.

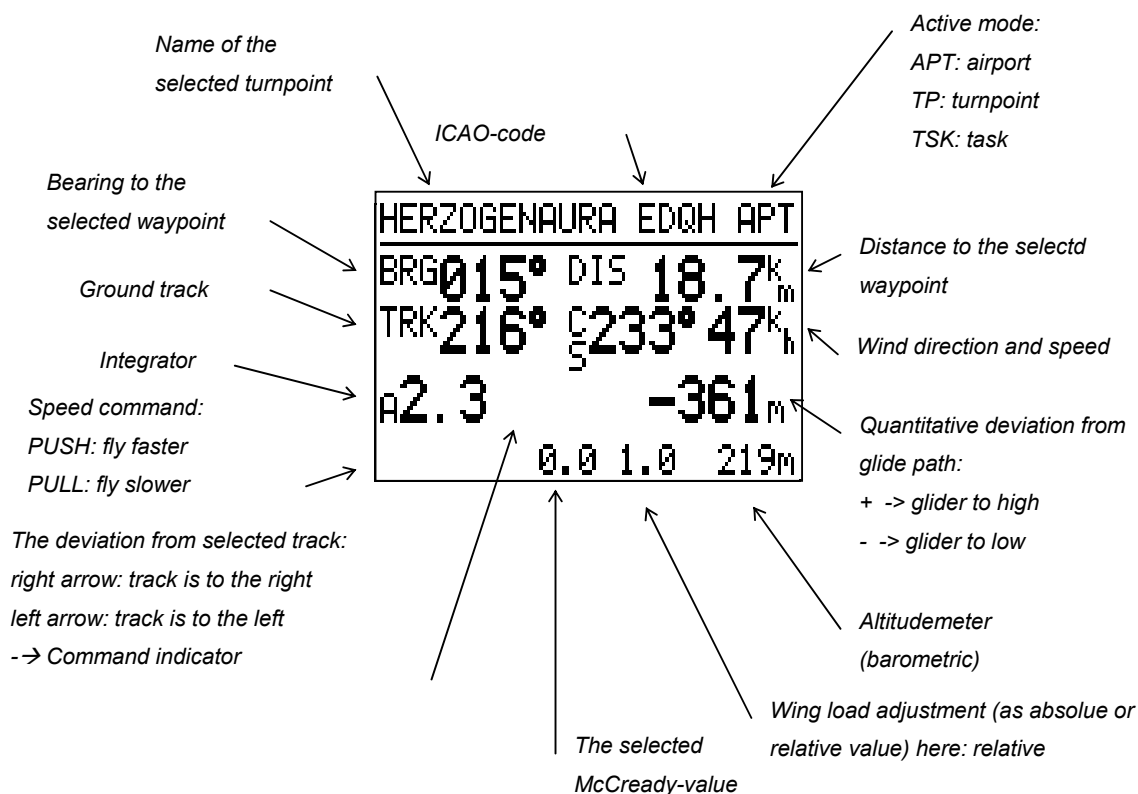


Fig 5: Gliding Navigation Display 2

4.3 Graphics Display

The graphics display supports navigation in the APT, TP and TSK modes through graphic and alphanumeric information.

This display is on the second page after the gliding navigation display, and may be selected by using the UP/DOWN selector.

The most important data i.e. BRG(B), TRK(T), GS(G) and Distance are shown on the right side of the display. The turnpoint name is shown in abbreviated form.

The graphics section of the display shows the present position of the glider in relation to the selected course and the to the selected turnpoint.

The different airspace structures may be shown together, or selected separately according to their type in the SETUP program.

There are two different symbols available, which may also be chosen in the SETUP program.

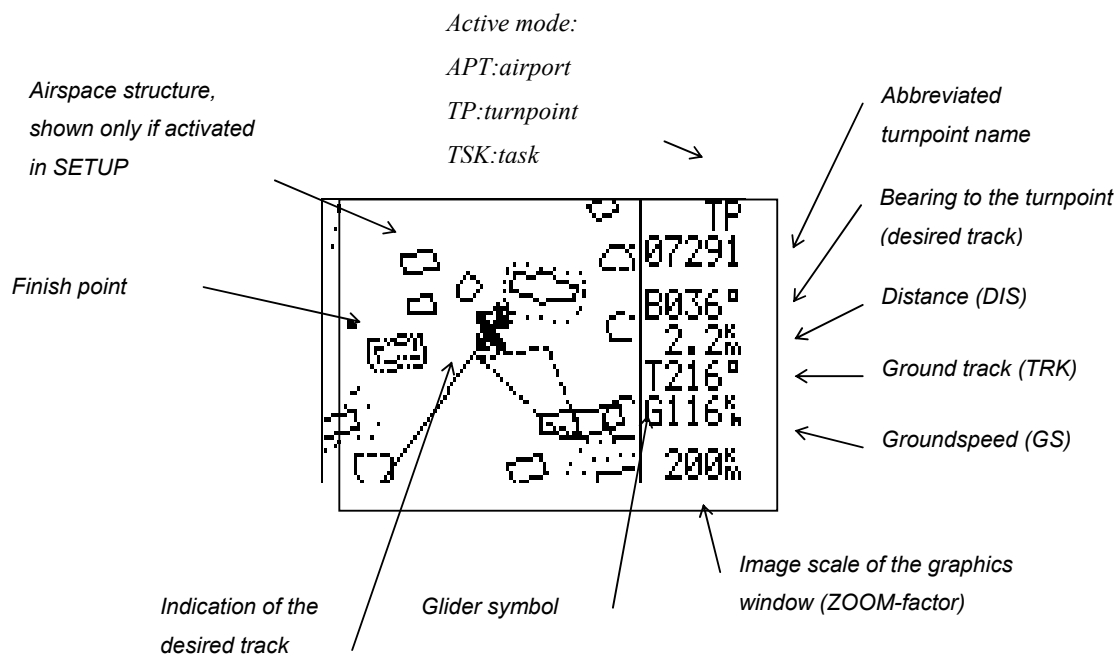


Fig.6: Graphics Display

If there are not enough satellites received for position fixing, the warning GPS BAD is shown on the bottom line of the graphics display.

Using the ZOOM selector you may change the range of the area displayed around the turnpoint between 200 km through 100, 50, 20, 10 and 5 to 2 km. The selected range is indicated on the bottom line in the data window. In the TASK mode Z (zoom) plus TSK LEG or FS (foto sector) will be displayed in the data section of the display, as selected with the ZOOM selector. If you continue turning the UP/DOWN turn knob one detent to the right, the navigation display will be shown.

4.4 Navigation Display

The information necessary to navigate to a certain point are shown in this display as in the gliding navigation displays. However, instead of the information related to gliding, a scale is shown on the bottom line of the display. Here any deviation from the desired track is indicated. The desired track may be preselected using the ZOOM selector if the Navigation display is active. This function resembles a track selection with an omni bearing selector on a VOR course deviation indicator.

All values calculated and shown in the display refer to the turnpoint shown in the head line.

- DTK preselected using the ZOOM selector. It resembles a preselected VOR course. (Magnetic course to turnpoint). This function is not available in TSK mode!
- CDI shows the deviation from the preselected course (DTK).
- XTE (Cross track error) shows the deviation from the preselected course in units of distance
- MT Magnetic track only by magnetic compass option
- HDG Compass (heading)

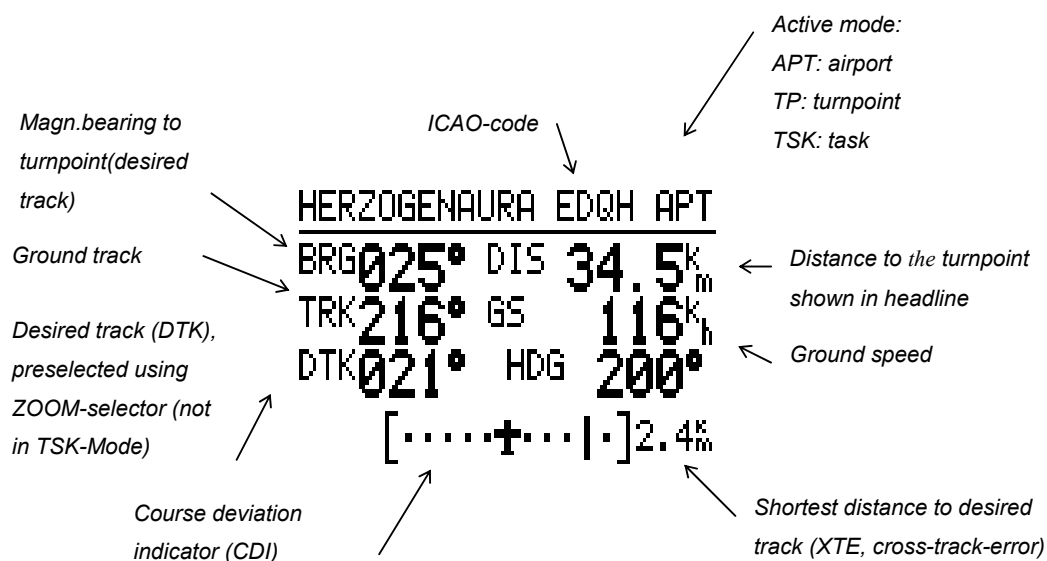


Fig.: 7 NavigationDisplay

If you do not need this display, it may be switched off in the SETUP program. See page 3.

If you continue turning the UP/DOWN selector one detent to the right, the arrival display will be shown.

4.5 Arrival Display

The APT, TP and TSK modes of the arrival display provide the user with current arrival data on the turnpoint (turnpoint or airport) presently selected. The arrival display includes the following information:

ACT.T	time
ETA	estimated time of arrival
ETE	estimated time enroute
W	wind -direction and velocity
V	battey power
TC	traffic cirquit or turnpoint altitude

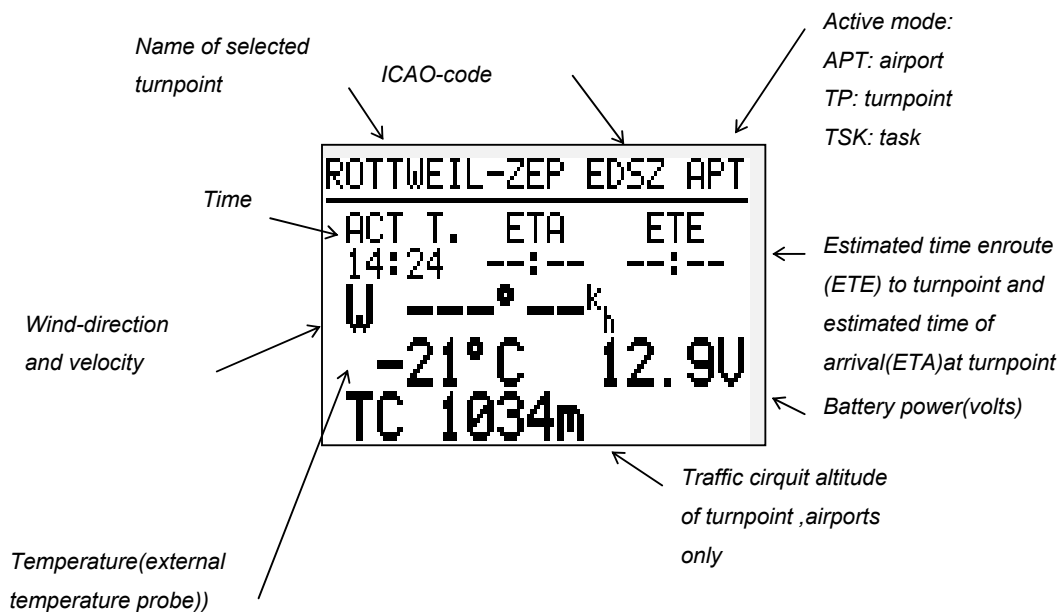


Fig.8: Arrival Display

If you continue turning the UP/DOWN selector one detent to the right, the INFO display will be shown, but only if the wapoint selected is an airfield.

4.6 Informaton Display

The information display provides you with any data required when approaching an airport. For data not published or available the respective positions in the display are filled with minus signs, ---.

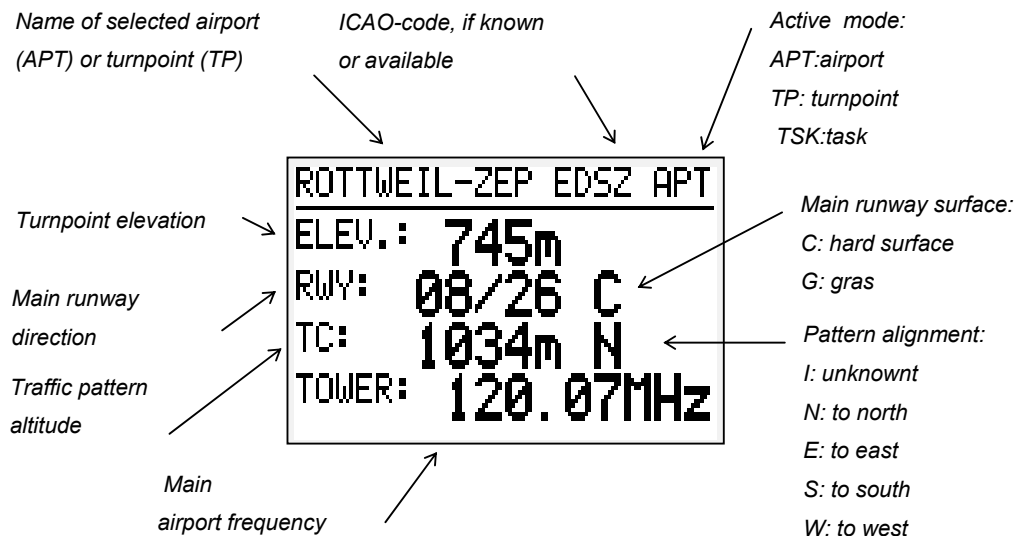


Fig.9: Info Display

Note:

The Info display is shown only when the active turnpoint is an airfield. If a turnpoint is active, data like tower frequency, traffic circuit etc are not available.

5.1 Airport (APT) Mode

In the airport mode, all functions related to airports may be executed. That is the navigation to an airport, the graphical display, the information about an airport, as well as the management of the airport data file. Also the modes for the wind calculation may be preselected here and the teamfunction is available. The two functions mentioned last are also available in the TP and TSK modes.

Fig. 11 illustrates the menu structure of the APT program.

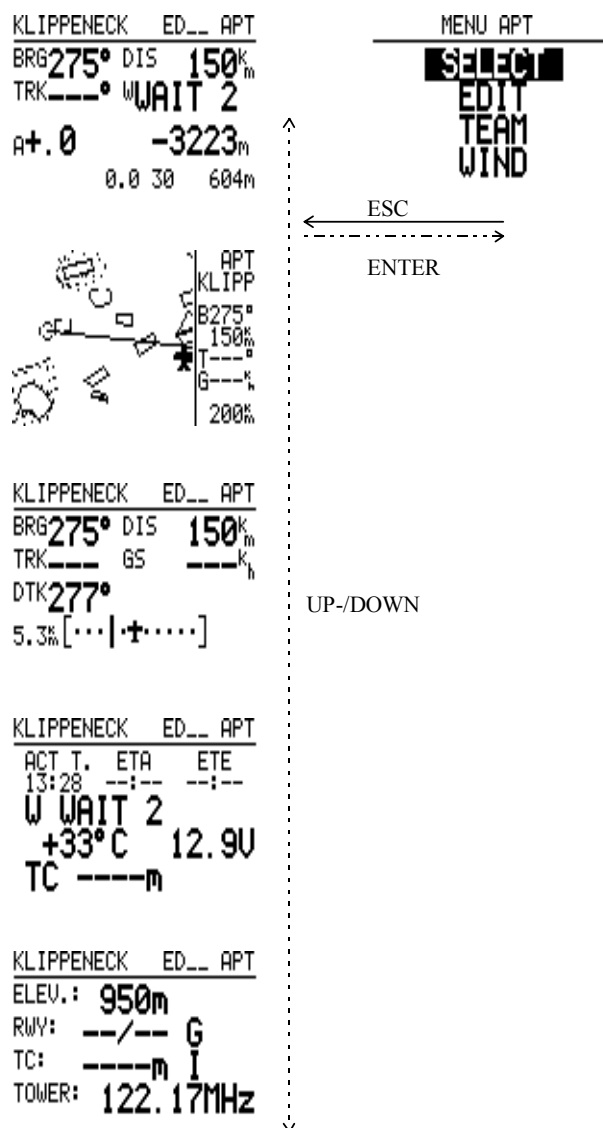


Fig.11: APT Mode Structure

You may reach the AIRPORT mode by turning the MODE selector until the APT display is shown. Using the UP/DOWN selector the different subprograms may be selected. From each of these sub programs you can reach the APT menus with ENTER. Here you will find the menus to select and edit airports, as well as the menu for the team function (TEAM) and the menu to select the wind calculation mode (WIND). These menus are selected with UP/DOWN and may be activated pressing the ENTER button.

Example: Selecting a new airport:

After having selected the AIRPORT program with the MODE selector you may activate the APT menu with ENTER. Using UP/DOWN place the cursor on SELECT and activate the menu with ENTER. You will find two ways to search for an airport:

a) Using ICAO code:	b) Using the name:
You may enter the ICAO code of the airport you are looking for. Each digit must be confirmed with ENTER.	The entry field for the ICAO code may be skipped using ESCAPE or by pressing the ENTER button four times.
If the airport is available, the LX5000 shows the GLIDING NAV display with the navigation data available for the selected airport.	Using UP/DOWN the country may be selected and must be confirmed with ENTER.
	By entering the first four letters of the airport name into the entry field with UP/DOW and ENTER the airport may be selected from the APT file.
	The bottom line of the display shows all airport names covered by the searchword. With UP/DOWN you may now select the airport and activate it with ENTER.
	The GLIDING NAV display will be shown displaying the navigation data for the selected airport.

5.1.1 Team

The TEAM function enables pilots to meet enroute if, for example, teampartners have lost sight of each other or intend to fly together.

Using TEAM you may fly directly to another aircraft's position provided the other glider is equipped with a GPS navigation instrument (preferable LX5000). Both pilots must have the same turnpoint selected and activated. Via radio, one pilot informs the other of his course and distance to the common turnpoint. The second pilot enters the data into the LX5000, via the TEAM menu in the APT or TP mode.

Course and Distance to the first pilots position will be displayed on the second pilot's GLIDING NAVIGATION display.

5.1.2 Wind

The LX5000 offers six different modes to calculate the wind.

From either mode APT, TP or TSK the submenus may be reached and the menu WIND activated with ENTER.

The following options to calculate the wind are available:

- FIX** the wind may be entered manually in direction and velocity as a fixed value.
(Entering the wind the units selected via SETUP must be taken into account).
The resulting wind component will be used for all calculations.
- GS** the wind is calculated using the ground speed while circling. This method requires a constant indicated airspeed (IAS).
- POS** the wind is calculated using the drift while circling e.g. thermaling.
- COMB** the wind is calculated during straight and level flight. For good results small heading changes are required.
- COMPON** wind component TAS-GS only in straight flight ???
- COMPASS** the wind is calculated using the optional magnetic compass.

The pilot may decide which of the options he wishes to use. It is possible to switch between the different modes at any time, however only one mode will be active at a time. If for instance **wait 6** is displayed instead of the wind value, the pilot should make another six turns to complete the wind calculations.

Please note, the GS and POS modes are only active when circling, the COMB mode only in 'straight and level' flight. FIX uses a selected wind and there is no recalculation. COMPASS is only available when using a magnetic compass which is available as option. The method is effective only by straight flight and when the track is kept as constant as possible. For other notes see the LX5000 magnetic compass manual.

5.2 Turnpoint (TP) Program

The APT and TP modes are mostly identical. The TP mode however refers to programmed turnpoints and airports stored in the TP file, where the APT mode only refers to airports stored in the APT file.

Turnpoints (TP) are selected or edited as described in section 5.1 AIRPORT.

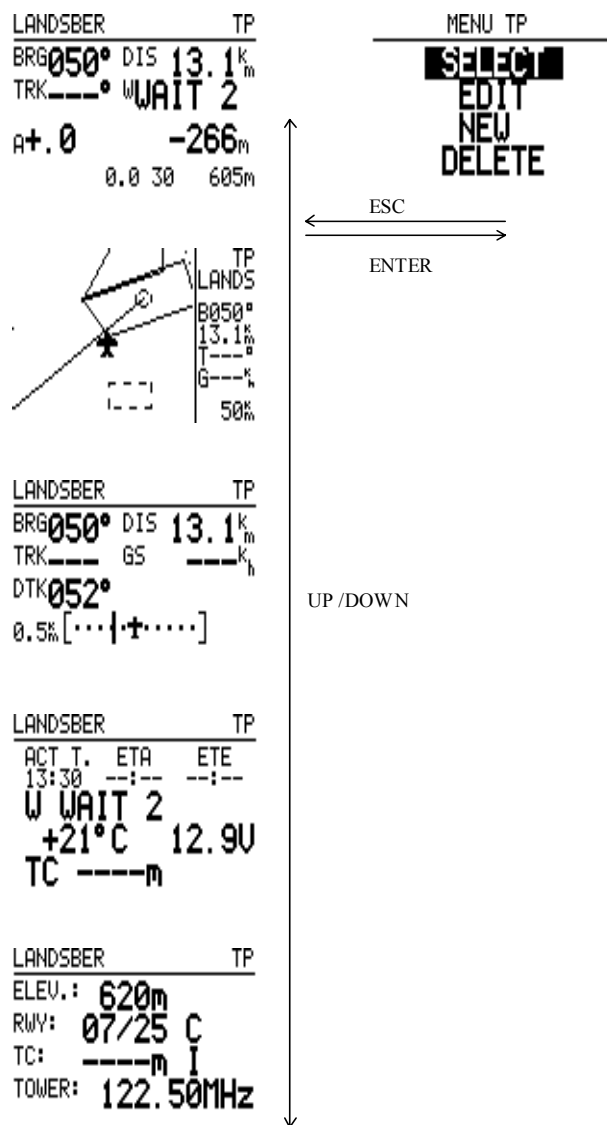


Fig.12: TP Mode Structure

After having selected the TP mode with the MODE selector you may activate the TP menu with ENTER. Using UP/DOWN you may then select the desired menu.

To search for an airport use SELECT. To change TP data use EDIT. To add a new turnpoint select NEW. To delete an active turnpoint use DELETE.

If for example you activate the menu NEW, you are first asked whether or not you wish to copy an airport into the turnpoint file: COPY APT DATA? N/Y. If you wish to do so Y (yes) must be confirmed with ENTER. The selection is as described in section 5.1 APT.

If the question is answered with no N (no) you may add a new turnpoint to the turnpoint file:

After having activated the entry field with ENTER, the name and the coordinates of the new turnpoint may be added to the turnpoint file as described above in section 5.1 APT. In both cases the new turnpoint will be available for the TASK mode.

The functions TEAM and WIND are also available in the TP program.

Please note:

- Airports to be used as turnpoints in a task must first be written into the turnpoint file.
- When entering coordinates it is important to use the format preselected in SETUP (seconds or tenths of minutes).

5.2.1 Quick turnpoint

Using the Quick turnpoint function you may store your present position as a turnpoint. To enable this the TP mode must be active and position fixing via satellite must be possible. The function is activated with START.

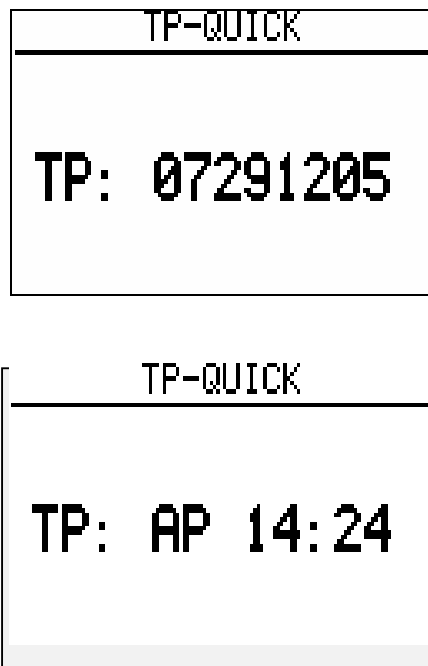


Fig.13: Quick-TP

The display will show e.g. **TP: AP 14:24**. With ESCAPE the present position may be stored, using AP and the time as identifier. At a later time this identifier may be overwritten with a name, and may be stored in the TP

file. QUICK turnpoints may be activated and used as normal turnpoints. The name of the Quick-TP can be configured by pilot himself. There are two different options, which are previously selected in SETUP in the TP menu. Anyway it is possible to select in the SETUP if to the Quick-TP will be flown immediately as to an navigation point. This function can be very useful if ???

5.3 Task (TSK) program

100 tasks with up to 10 turnpoints each may stored in the TASK mode. All turnpoints and airports stored in the turnpoint file may be used in a task. Airports to be used in a task must first be copied into the TP file.

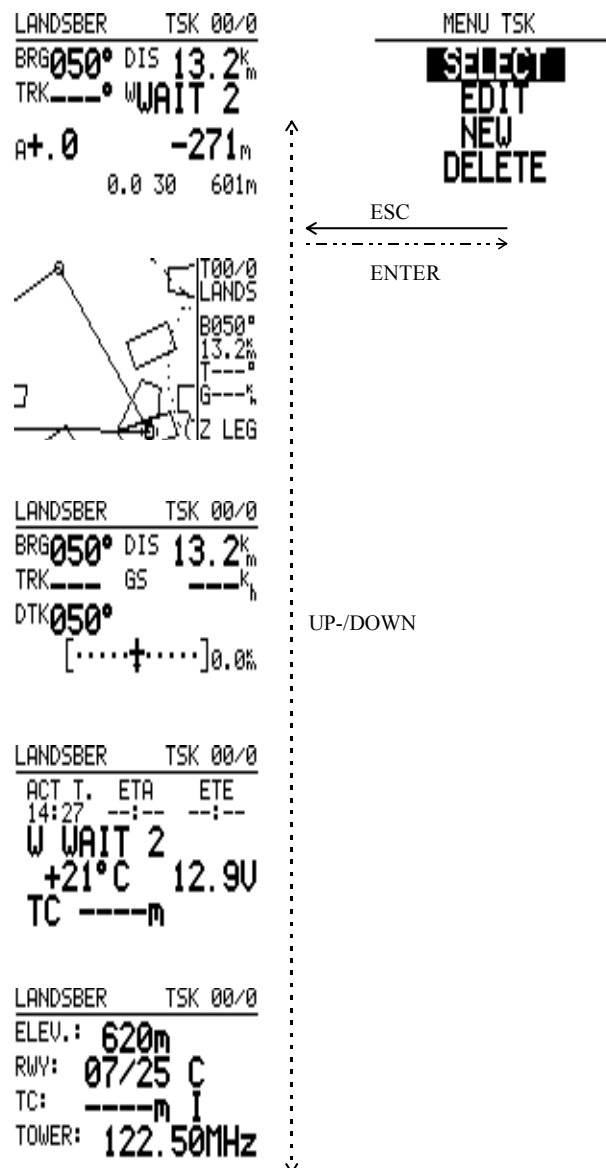


Fig.14: TSK mode structure

The tasks may be displayed graphically. For the graphics display there are three different graphical modes available:

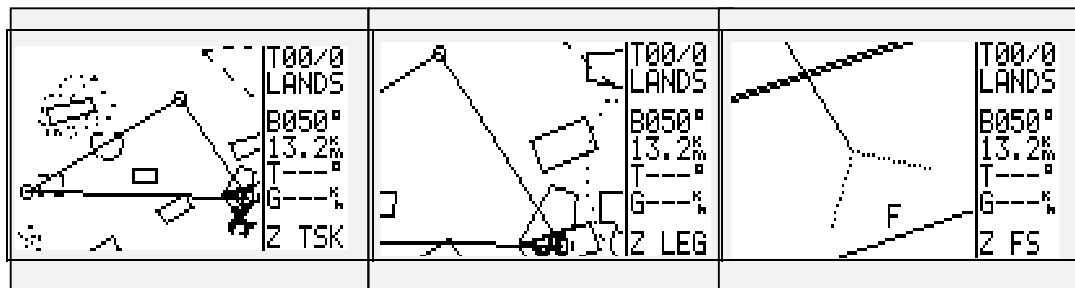


Fig 15: TaskGgraphical Modes

The selection of the three graphical modes may be done with the ZOOM.selector. The TSK mode must be active and the graphics display selected.

The three graphics can not be zoomed as in the APT and TP mode. You may either select the whole task to be displayed, the active leg of the task or the active foto sector. The active foto sector is the sector around the next turnpoint in the task. The airplane symbol shows the present position in relation to the next turnpoint.

5.3.1 Selection of a Task (TSK)

After having selected the TSK mode with the MODE selector you may activate the TSK menu with ENTER. Then confirm SELECT with ENTER.

In the headline of the display TSK SELECT and the number of the selected task are shown. Below the headline the turnpoints are listed in sequence, numbered 0 to 9. Points not programmed are marked NOT PROG.

TSK SELECT				
TSK SELECT: 00				
0	LANDSBER	5	NOT	PROG
1	AALEN-HE	6	NOT	PROG
2	KLIPPENE	7	NOT	PROG
3	LANDSBER	8	NOT	PROG
4	NOT PROG	9	NOT	PROG

Fig.16: Task Select

Using UP/DOWN you may scroll the 100 possible tasks. The selected task is then activated with ENTER. The first point in the selected task, normally zero, is shown on the GLIDING NAV display. Until the task is started in the air this point may be used for navigation to the start point. This is normally the departure airfield, but may

also be a displaced departure point. The the information for the first turnpoint is displayed only after the task is started.

5.3.2 Editing a Task (TSK EDIT)

With the TASK EDIT menu you may invert the sequence of the turnpoints in a task. Turnpoints may be edited or deleted. The last turnpoint before the destination may be entered as a checkpoint.

After having selected a task and the GLIDING NAVIGATION display is shown, and the TSK menu can be reentered with ENTER. Using the UP /DOWN selector EDIT is selected, and activated with ENTER. The Task is now shown on the display and may be edited.

You are asked whether you wish to invert the task. After entering either N or Y the total distance of the task and of each task leg is shown, as well as the course of each leg.

The last turnpoint may now be programmed as a checkpoint by selecting the respective entry field with the cursor. It may then be activated with ENTER.

To edit a turnpoint, the cursor is placed in the respective position with UP /DOWN and the entry field activated with ENTER.

In the submenu shown on the display, SELECT, INSERT or DELETE may be selected and activated.

Choosing SELECT you are asked to enter the first four letters of the name of the desired turnpoint, using the standard entry pattern. Now all turnpoints referring to the entry are displayed. UP /DOWN and ENTER will select the desired turnpoint and write it into the task in place of the point that was selected for replacement.

Pressing ESCAPE instead of entering the name will display all turnpoints in alphabetical order.

a) To search for a name	b) Scrolling through all TP's
<p>The name of a turnpoint may be entered in abbreviated form in the entry field marked by four stars. Each digit must be confirmed with ENTER</p>	<p>Instead of entering a searchword, ESCAPE is pressed once. All turnpoints will be shown in alphabetical order. The selection may be done with UP /DOWN and ENTER</p>

Airports contained in the TP file must be selected using the first four digits of their name, not the ICAO code.

The procedure described above must be repeated for every turnpoint to be changed.

5.3.3 Programming a new Task (NEW)

A task may be programmed in parts or completely in the TSK EDIT submenu as described in section 5.3.2, Editing a task. You are recommended to use an empty task.

The menu NEW protects a programmed task against being overwritten.

As described in TASK SELECT an empty task is selected and NEW is activated. COPY TSK will only be needed if an existing task is to be stored under a new task number. If this is not required, no N (no) may be entered and an empty task will appear on the display.

After selecting INVERT N or Y and checkpoint CP N or Y, the cursor may be placed on the first turnpoint -0- and activated with ENTER.

As in EDIT the submenu displays SELECT, INSERT and DELETE.

Using SELECT you may choose turnpoints from the turnpoint file and assign them to the turnpoints marked before:

a) To search for a name	b) Scrolling through all TP's
<p>The name of a turnpoint may be entered in abbreviated form in the entry field marked by four stars. Each digit must be confirmed with ENTER</p>	<p>Instead of entering a searchword ESCAPE is pressed once. All turnpoints will be shown in alphabetical order. The selection may be done with UP /DOWN and ENTER</p>

This procedure is repeated until all turnpoints for the task are programmed. As soon as more than two turnpoints are entered the LX5000 calculates and displays the total distance of the task. The distance and the course for each leg are also displayed.

5.3.4 Deleting a Task (DELETE)

A task can only be deleted if it is activated. It may be deleted in the TASK menu DELETE, if Y (yes) is selected and confirmed. Confirming no N (no) cancels deletion.

5.3.5 Declaring a task (DECLARE)

LX5000 offers the possibility to declare the task before the flight. There are two possibilities: current task can be either selected among the tasks which are saved in LX5000 or newly created.

TSK DECLARE COPY TSK DATA?N	TSK DECLARE DISTANCE: 347.2 0 GAP TAKE OFF 1 Gap 132 009 2 Albrtvll 171 182 3 Digne 43.4 340 4 Gap
---	---

after Y and ENT

Task selected from TSK menu can be also edited if desired. The procedure is finished by pushing ESC. The following message is displayed if the task has been declared properly “**TSK DECLARED**”. During the flight pilot can edit the this task or even select the other one, he also needn’t fly in a TSK menu. All these procedures have no influence on the task declaring, but scoring in competitions is done accordingly to the declared task. If the declared task has been changed during the flight, this flight is then under the FAI regulations invalid.

If the copying of the task is not wanted, answer the **COPY TSK DATA?** question with N (look the figure above).

IMPORTANT!

The badge or record flights have to be declared properly before the take off.

5.3.5 Flying a Task (TSK)

In order to fly a task, you should note that:

- The respective task must be programmed and activated.
- You are recommended to recheck the programmed task before the flight. You may do this by selecting the TASK EDIT submenu.
In all legs, the total distance and all courses are calculated and displayed. Possible mistakes may be found and corrected.
- A programmed task must be started manually by pressing the START button for at least one second when passing the departure point or start line.
- When passing a turnpoint, automatic switching to the next leg occurs when passing through the turnpoint foto sector.
- You may exit the TASK mode anytime to operate in another mode e.g. TP, APT or NEAR AIRPORT. Before reaching a turnpoint or the destination you should return to the defined TASK mode in order to get complete documentation

Before a task is started the LX5000 provides all flight data e.g. track,distance etc in relation to the first point in the task, normally programmed under zero.

5.3.6 Starting a Task

The foto sector or the circle around a startpoint or turnpoint may be preselected in the SETUP TASK submenu. The size of the radii and through that the size of the sectors for the startpoint, turnpoint or finish point are defined here.

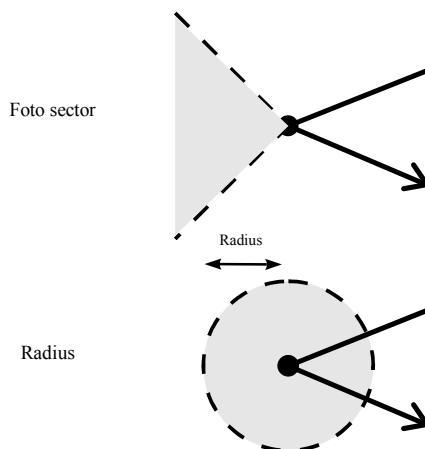


Fig. 16: Foto Sector Modes

The table below illustrates how a task is started and the switching to the next leg when a turnpoint is passed:

	Fotosector		Radius	
	within	outside	within	outside
starting a TSK	hold START-button for one second	hold START-button for five seconds	automatic	hold START-button for five seconds
passing a turnpoint	automatic	hold START-button for five seconds	automatic	hold START-button for five seconds

After you have completed a task, TASK END is shown until the glider has come to a full stop. This function is controlled by total pressure, not by ground speed as measured by the GPS. To delete TASK END in flight, the task must be started again by RESTART. You should note however, that parts of the task already flown will be deleted from statistics.

5.3.7 Restarting a Task (TSK Restart)

Restarting a task may become necessary, for example, if you wish to start a task again for a second departure in a competition. Activating RESTART will delete the statistics of those parts of the task already flown.



Fig. 17: TSK RESTART Menu

The function shown in fig. 17 may be activated with ENTER only if the TASK mode is active. The display as shown in fig 18 below is shown after selecting RESTART with UP /DOWN and activating it with ENTER.



Fig 18: Confirmation of TSK RESTART

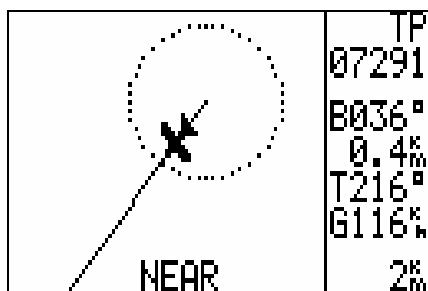
If you confirm RESTART with yes -Y- the task is reset. The first point in the task is shown on the navigation display as turnpoint. When passing the startline or the foto sector for the startpoint the task may be started again with ENTER.

Both displays are only available if a task was started during flight.

5.3.8 Simple task

This function is always functioning in the APT and TP menu as long as no other TASK has been started. Starting a task has higher priority. If ground speed of the glider exceeds the 50 km/h the current position will be automatically saved as startpoint. If the glider is near the selected turnpoint or airport the current position will be stored as a turnpoint. Pilot can select any turnpoint or airport and continue the flight. If the flight is done in graphic mode a cylinder is shown around the turnpoint. When the glider is close to the turnpoint, the message NEAR is displayed. The radius of the cylinder can be adjusted in LX5000 setup.

The statistic calculations are functioning as in TSK menu. If more than 10 turnpoints have been selected only first ten will be calculated and displayed in statistic. The full flight statistic can only be calculated and seen on your PC.



If the starting place is not wanted as startpoint it can be canceled by selecting a RESTART as in TASK menu. The restart is reached by pushing the ENTER key, now the function can be selected and activated. After the RESTART has been activated the current position is stored as a startpoint. The SIMPLE TASK function is very useful when flying “Cats and Cradle” tasks. The landing place should be selected before the landing in order to get the right statistic calculations.

5.4 SETUP Program

Any parameters necessary for the LX 5000 operation may be selected in the SETUP program.

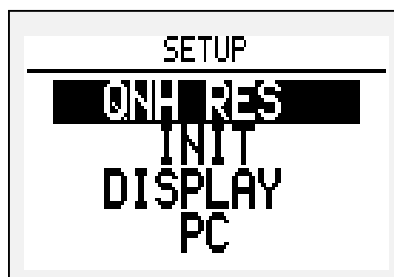


Fig 19: SETUP-Mode

Fig 19 above shows the display after starting the SETUP program. The list of SETUP menus below explains their meaning and how they may be activated.

QNH RES	ENTER → ← ESC	Selection of, QNH, for barometric pressure corrections during flight ALT. R = reserve height for final glide BUGS = decrement on the polar, applied in 2.5%-steps up to - 30%
INIT	ENTER → ← ESC	Selection of, Variometer filter, attenuation

		Variometer integrator, variable 10, 20 or 30 sec. Variometer indicator range, 2.5, 5 or 10 m/s Speed command tone cutout range, between 0 and +/- 2 m/s Automatic switching between Variometer and speed command, OFF, GPS or airspeed controlled
DISPLAY	ENTER → ← ESC	LCD-contrast, 0 to 100%
PC	ENTER → ← ESC	Communication via interface with personal computer
PASSWORD	ENTER → ← ESC	Password entry, 96990, access to the SETUP-PASSWORD menu

Fig. 20: Structure of the Setup Menu

The structure of the SETUP- PASSWORD menu is shown in the list below. These functions are only available via the password 96990.

TP		Quick point default name definition and definition if this point should be used as navigation point. Adjustment of the NEAR radius by Simple Task
TSK	ENTER → ← ESC	TSK-mode, selection of foto sector, radius, motor; Start, TP or finish radius, 0.1- 9.9 km
GPS	ENTER → ← ESC	Geodetic reference system selection, norm. WGS 1984 UTC-offset entry for local time indication
UNITS	ENTER → ← ESC	Selection of units, format of coordinates Distance: km, nm, ml Speed: km/h, mph, kts Vert. Speed: m/s, kts Wind: km/h, kts, mph, m/s Altitude: m, ft Load: kg/m ² , lb/ft ² , " OVERLOAD "
SYMBOL	ENTER → ← ESC	airplane symbol for graphics displ, small or large

AIRSPACE		Selection of airspace structures to be displayed in the graphics display
NMEA	<i>ENTER</i> → ← <i>ESC</i>	Interface ON or OFF for, GPGGA, GPRMC, GPRMB, GPGLL, GPR00, GPWPL, GPLX1
PC	<i>ENTER</i> → ← <i>ESC</i>	Communication speed selection between LX5000 and personal computer. Normally 19200 bps
DEL TP / TSK	<i>ENTER</i> → ← <i>ESC</i>	Deletion of all turnpoints, and tasks, from the LX5000 TP and TSK file. Confirmation Y (yes) or N (no)
POALAR	<i>ENTER</i> → ← <i>ESC</i>	Entry of a glider polar and glider type, USER1 oder 2, or activation of a speed polar from the polar file
LOAD	<i>ENTER</i> → ← <i>ESC</i>	Entry of a default glider wing load value which is used by LX5000 when it has been switched ON again. Selecting the MINIMUM ??? If SET is selected the entered wing load will be active immediately.

TE. COMP.	ENTER → ← ESC	<p>Selection of the electronic compensation strength and the attenuation for the compensation filter between 1% and 150%.</p> <hr/> <p>Note, when using a pneumatic TE probe TE must be set to 0 %</p>
AUDIO	ENTER → ← ESC	<p>Audio generator settings, seperately for variometer and speed command tone in both the negative and positive range:</p> <hr/> <p>Tone frequency, mode, cutout range and audio-demo</p>
Fortsetzung.....		
INPUT	ENTER → ← ESC	<p>Reversal of polarity for the external speed command switch.</p> <hr/> <p>Low speed warning threshold gate (option)</p> <hr/> <p>External temperature probe, ON /OFF and calibration</p> <hr/>
OUTPUT	ENTER → ← ESC	<p>Analog indicator; selection of mode, and installment of maximum three instruments. Each instrument can indicate variometer, speedcommand, net- and relative variometer functions seperately</p> <hr/>
LCD IND	ENTER → ← ESC	See LCD VARIO manual
COMPASS	ENTER → ← ESC	Calibration of the magnetic compass (optional)
PAGE 1	ENTER → ← ESC	Selection of Gliding navigation display one or two
PAGE 3	ENTER → ← ESC	Navigation display ON or OFF

Fig 21: SETUP-PASSWORD-Menu

5.4.1 QNH RES

If on starting the LX5000 an altimeter setting (QNH) was entered, it may be altered in this sub menu. This may be necessary if the barometric pressure has changed during a longer flight. Entering the new QNH will reset the altimeter, providing correct altitude information for the final glide calculation.

In order to reach the airfield at a safe height allowing a normal traffic pattern, a safety height should be entered. This height is added to the field elevation and taken account for in the final glide calculation.

LOGGER

In this menu all the necessary parameters for the FAI Logger adjustment can be found. There is no difference between the versions 6.0 and 6.0 IGC, except that the version 6.0 lacks the integrity check. After opening the menu, the following submenus are displayed:

```

FLIGHT SETUP
-----
FLIGHT INFO
LOGTIME
(I)RECORD
(J)RECORD

```

In FLIGHT INFO the glider specifications and pilot's name can be entered. LOGTIME is an important menu:

```

SETUP TIME INTERVAL
-----
TOTAL MEMORY: 28.0H
B-RECORD INT.: 20S
K-RECORD INT.: NOPR
NEAR TP INT.: 1s

```

-total memory means total storage capacity (not free capacity)

-B-RECORD INT logging interval outside the turning point

-NEAR TP INT logging interval near the turning point

The NEAR TP INT is usually set to 1 or 2 seconds. By LX5000 6.0 it is recommended to set B-RECORD to 20 seconds, so the total capacity is approx. 30 hours. If the B-RECORD is set to a smaller value the capacity will be shortened.

5.4.2 INIT

The parameters listed below may be selected in the INIT menu:

VARIO FILT.	The variometer -filter allows a variable damping of the variometer
VARIO INT.	The time for the interval integrator may be preselected here (normally 20Sek.)
VARIO RNG.	Scaling range for the vertical speed indicator (2.5, 5 and 10 m/s)
TAB	Audio tone cutout in speed command mode between 0 to $\pm 2m$

AUTO SC	Automatic switching between variometer and speed command controlled by airspeed.
GPS	Automatic switching between variometer and speed command, controlled by GPS when circling.
OFF	Switching between speed command and variometer controlled via external flap- or manual switch
100 kmh	Airspeed selection for automatic switching by speed in the range between 100 and 160
WIND	km/h.
COMPASS	Wind calculations (adjustable from 15 to 30 sec) Only if you have compass

5.4.3 DISPLAY

The contrast of the display may be adjusted to the prevailing light conditions and the angle of view. The contrast may be varied between zero and 100 %

5.4.4 TRANSFER

This menu enables the communication between LX5000 and:

- PC
- LX20
- LX21
- Colibri

Following data can be transferred (bidirectionally):

- TP and TSK database (with LXFAI program from PC, LX20, LX21, Colibri)
- Headers (glider and pilot data) (with LXFAI program from PC, LX20, LX21, Colibri)
- Logger transfer (with LXFAI program from PC)
- Airport database (with LXGPS program)

The data transfer with PC:

For transfer between LX5000 and PC, the LXFAI program is needed, this program is also used for communication with LX20, LX21 and Colibri FAI Loggers. The same program is also used to read data from LX5000 V6.0 IGC. Before starting the transfer process the SETUP mode should be active in LX5000 and the LXFAI should be run on PC.

PC

Read Logger

Setup Logger

Read flight info

LX 5000

```

SETUP
-----
INIT
DISPLAY
TRANSFER
PASSWORD

```

Write flight info

Read TP and TSK

Write TP and TSK

After pushing ENTER on LX5000 the message **CONNECT** is displayed, that means the communication between these two devices has been established. PC acts as “master” and LX5000 as “slave”. As example the pilot data transfer from PC to LX5000 will be described. Select the **Write flight info** on PC and push ENTER. After some time the message **DATA TRANSFER OK!** Will be displayed. Please pay attention on the direction

of the transfer. As mentioned PC acts as master, so the command **WRITE** will always write data from PC to LX5000.

The data transfer with LX 20, LX 21 and Colibri loggers:

The LX5000 combined with any of these loggers represents optimal and very comfortable solution. The flight is prepared with PC and all the data are then written to the logger and before the flight also to LX5000. With these procedure the use of portable PC is excluded (the logger plays it's role) and the data in logger are the same as in LX5000. When reading from logger the LX5000 acts as master. Here is a brief description:

The **FAI LOGGER** menu should be active on LX 20, by LX 21 and Colibri this isn't necessary. The **TRANSFER** has to be selected on LX5000. Please consider the following order:

LX 5000	LX 20	LX 21	Colibri
ENTER	Read or Write	Green button	Event button

Shortly after that the message **WAITING FOR CONNECTION** will be displayed on LX5000 and after the connection has been established the beep tone of the logger will be heard and on the LX5000 the following menu will be displayed:

READ TP/TSK
READ INFO
WRITE TP/TSK
WRITE INFO
WRITE SETUP

Write means the data transfer from LX5000 to logger, read has the opposite function. The procedure is ended by pushing the ESC on LX5000.

5.4.5 Password

The **PASSWORD** menu contains sub menus, where basic setups and data related to the glider, which remain constant, may be entered. They are protected against inadvertent changes by a password.

The password can not be changed and reads:

96990

After entering the password (the tel.nr. of FILSER ELECTRONIC) the submenus in the **SETUP PASSWORD** menu are available:

PASSWORD: 55556

After entering this password the integral GPS receiver is switched OFF and the device expects the external NMEA signal. This function can be deactivated by switching the instrument OFF or by reentry of the same password.

5.3.5 TP

In this menu the default name of the Quick-TP can be selected. If the Date OFF is selected, the name is composed of two different ASCII signs followed by current time. The ASCII signs used, can be selected by user ??? If the two letters selected happen to be “TP” Quick-TP name will be TP08:39. Time 8:39 is the time when the START button in the TP menu has been pressed.

The option Date ON offers the different art of your Quick-TP name composed of month, day and current time. For instance if the Quick-TP’s name is 07160842, that means that the START button in the TP menu has been pressed on the 16th of July at 08:42.

The option SELECT ON activates the applicated TP as the actual navigation point.

NEAR RADIUS has influence only when SIMPLE TASK is flown and defines a cylinder (0-9,9 km) which should be overflowed to accept this point as a TP of simple task.

5.4.6 TSK

The different modes for starting a task may be selected in this submenu. Also the size of the radii around the turnpoints may be selected, which define the sectors, where switching to the next leg in a task occurs.

Presently there are two modes available:

- Radius
 - In the radius mode switching to a new leg occurs when flying through acircle around a turnpoint.
 - Starting or stopping a task occurs after passing through a defined circle around a start or finish point.
- Fotosector
 - Switching occurs when passing the defined foto sectors.

The radii defining the size uf the circles and sectors may be selected between 0.1 and 9.9 km.

5.4.7 GPS

The time the GPS operates with is UTC, former GMT. A time difference may be preselected to display the local time on the clock:

- UTC + 0 UTC is indicated
- UTC + 1 indicates central European winter time
- UTC + 2 indicates central European summer time (daylight saving)

The GPS DATE is normally set to the Uniform Geodetic Reference System WGS 1984. It ajusts, in short, the GPS coordinates systemto the earth’s surface. The selected reference system should not be changed as this will decrease the precession of the navigation data.

5.4.11 NMEA

Here the NMEA0183 interface is configured. The interface may be used for connecting the LX5000 to external appliances like a handy map. Data records may be switched on or off as required. Data records required for specific appliances are normally available from the respective manufacturer. If there are no appliances connected to the NMEA interface, all data records may remain deactivated.

5.4.12 PC (Personal Computer Adjustments)

The Baud-rate for communication between computer and LX5000 is adjusted in this sub menu. It is normally set to 19200 Baud. Communication between LX5000 and Computer is only supported if the Baud-rate matches.

5.4.13 DEL TP/TSK

Here you may delete all turnpoints and tasks completely and irrevocably if you answer DELETE ALL TP AND TSK with Y (yes). The airport file stored in the LX5000 can not be deleted.

5.4.14 Polar

The submenu POLAR contains 30 speed polars for the most common gliders. Any polar may be easily selected and activated.

Two additional polars not contained in the file may be defined and stored. With the aid of the computer program POLAR EXE (scope of supply) three polar coefficients may be calculated. The coefficients are entered in the LX5000, POLAR submenu. The calculation is based on three coordinates taken from the speed polar. It has proven to take the coordinates at speeds of 100, 130 and 160 km/h. For MIN LOAD the weight should be entered, that was used as basic glider weight to calculate the speed polar

5.4.15 TE Comp

In this submenu you may select the compensaton mode and, if using electronic compensation, the compensation level.

It is important to note:

- Using a **pneumatic** total energy (TE) probe the compensation level must be set to 000%. Pneumatic TE compensation can not be attenuated electronically.
- If you choose **electonic** compensation you may vary the compensation level using the TE function, and attenuate the signal using TE F.

It is not possible to publish TE values for specific gliders, as electronic compensation depends on many variables, just to mention static port location. A test flight in calm conditions will deliver the best results.

When doing the compensation flight you should consider the the points noted below:

- The air should be very calm
- LX5000 must be in VARIO mode, not in Speed command!
- Select SETUP program,TE-COMP menu
- Increase airspeed to 160 km/h (99 mph / 87 kts)and maintain for 20 sec.
- Slowly reduce airspeed to 80 km/h (50 mph / 43 kts). With optimum compensation the variometer will indicate vertical speed versus airspeed congruent to the values in the speed polar.

If during speed reduction too much sink rate is indicated on the variometer, the selected TE setting must be decreased (compensation too large).

If the variometer indicates not enough sinkrate or even climb, the TE setting must be increased (compensation too small).The procedure above should be repeated until an optimum compensation is achieved. Settings between one and 150 % are available.

The filter to dampen the signal may be varied between 0 and 9. The higher value increases the attenuation.

5.4.16 Audio

Various audio signals for the variometer and speed command mode may be selected via the AUDIO submenu. The audio frequency, tone modes and various ranges for masking the audio signal in the speed command mode are available:

SC	Masking the audio tone including the choice of: SC audio tone in positive and negative speed command range SC POS audio tone in positive speed command range only SC NEG audio tone in negative speed command range only
VARIO	Audio tone modes in vario-mode including the choice of: LINEAR normal audio tone over the whole variometer range LIN/NEG normal audio tone interrupted in negative variometer range LIN/POS normal audio tone interrupted in positive variometer range DIGITAL digital tone over the whole variometer range DIG/NEG digital tone interrupted in negative variometer range DIG/POS digital tone interrupted in positive variometer range
0%	Selection of the audio frequency (Herz) for zero indication on the analog variometer
+100%	Selection of the audio frequency (Herz) for max climb indicated on the analog variometer
-100%	Selection of the audio frequency (Herz) for max.descent indicated on the analog variometer.

You may listen to the selected audio tone in the the submenu AUDIO DEMO via loudspeaker.

5.4.17 Input

The INPUT menu enables you to select the analog indicator functions as shown in the list below:

SC INPUT	Overriding the external speed command switch ON: switch closed → speed command mode switch open → variometer mode OFF: switch closed → variometer mode switch open → speed command mode
STALL W.	The airspeed gate for the stallwarning may be selected. This feature requires an external buzzer.
TEMPERATURE	The temperature indication may be switched off if an external temperature probe is not connected
TEMP. OFF (offset).	The external temperature probe may be adjusted by +/- 9°C

5.4.18 Output

Up to three analog instruments may be connected to the LX5000. Any combination of indications as shown below may be selected for both, the variometer and speed command mode.

VARIO	Indicates the „normal“ variometer signal
SC	Indicates the speed command signal
NETTO	Indicates the NET variometer signal
REALTIV	Indicates the RELATIV-variometer signal
OFF	Indicator off

The fig. below shows an example of the options available:

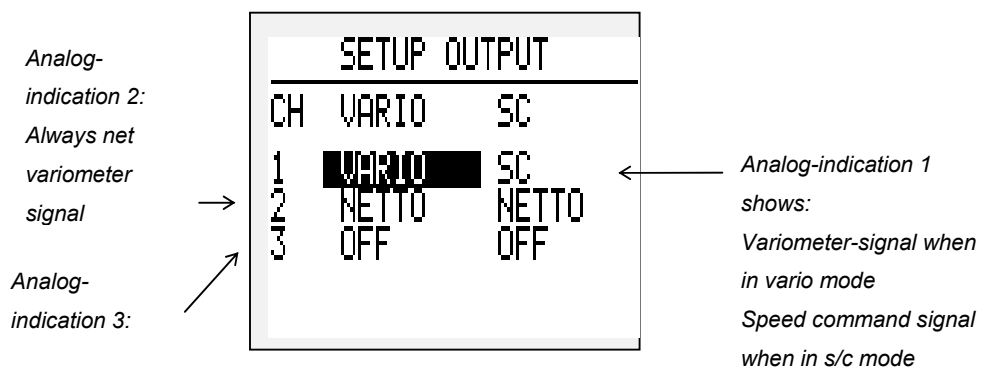


Fig. 22: Analog Indicator Configuration

5.5 Near Airport Program

The NEAR AIRPORT program continuously calculates data for the 10 airports nearest to your position. The data listed below are shown on the display as seen in fig.23.

- The abbreviated name of the airport, 16 digits maximum.
- The bearing (BRG) to the airport.
- The distance to the airport.

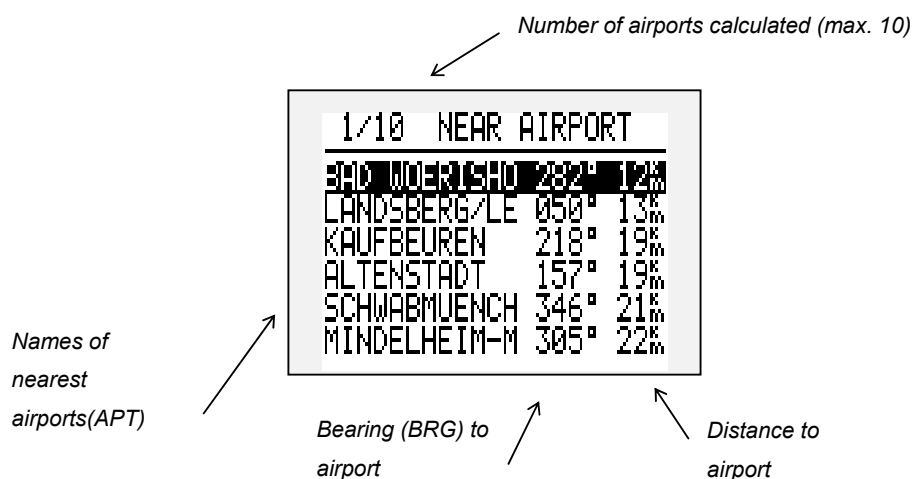


Fig. 23: Near airport

Using UP /DOWN you may place the cursor onto the selected airfield. ENTER activates the marked airfield. The program changes automatically to the APT mode and displays the navigation data for the selected airfield.

Note:

If GPS reception is not sufficient for navigation, GPS BAD is shown on the display. The GPS requires at least five minutes continuous GPS reception to enable the NEAR AIRPORT mode. Only airports stored in the APT file are available for navigation.

5.6 Statistics Program

The LX 5000 offers two different arts of the statistics:

- Statistics during the flight
- The logbook and the complete statistics with barogram and flight route for every flight which is included in the logbook

STATISTICS DURING THE FLIGHT

There are two different levels: the flight statistic and task statistics, which is available only when the TSK has been started (also by SIMPLE TSK). As soon as the statistics is selected by MODE selector switch, the statistic display appears.

STATISTICS

FLIGHT:

12:30:22 **13:30:22** 12:30:22 is the start time (take off); 13:30:22 is the current time

DURATION: **1:00:00** duration of the flight

VARIO: 1,5 m/s 23% vario average and the Kurbelanteil ???

ENGINE: 12:20 the duration of the engine flight

The statistics is based on all the flown legs and also the actual leg. The task statistics can be activated by UP/DOWN rotatory switch.

STATISTICS

TSK 00/1: GAP/AD the active TP

TIME: 12:00:00 **13:10:00**

DURATION: 1:10:00

SPEED: 99 km/h

VARIO: 1,2 m/s 23%

ENGINE:

The average speed and distance are shown also for the currently active leg. The next page displays the total flight statistics.

STATISTICS

TSK00

10:43:22 - - : - - 10:43 is the start time (Abflugzeit) ???

DURATION: **0:12:23** the duration of the TSK

SPEED: **140 km/h** average speed

VARIO: 1,3 m/s 29% vario average

ENGINE:

STATISTICS AFTER THE FLIGHT

This statistics is available after the end of the flight. It is very important that the logger isn't turned OFF at least 3 minutes after the glider has stopped. The typical sign that the flight hasn't ended is the absence of the LOGBOOK in statistics mode (the only shown statistics is the flight statistics). After selecting the statistics mode the LOGBOOK appears:

LOGBOOK


The different flights are selected by UP/DOWN rotatory switch and after pushing ENTER the statistics is displayed.

```

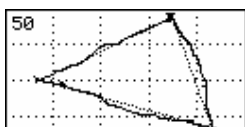
Flight: 1 13.01.98
-----
PILOT: ERAZEM_POLUT
GLIDER: VENTUS_2
DURATION: 5:53:15
          9:27:28 - 15:20:43
TASK: 512.8%
    
```

After pushing ENTER the following options are available:

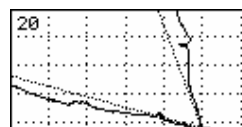
```

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

After selecting ROUTE :

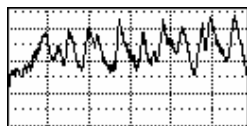


and after ZOOM

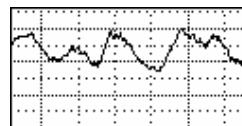


The ZOOM function is activated by pushing ENTER. After that a cross is displayed in the middle, which is then moved by UP/DOWN and ZOOM. After pushing ENTER the first corner is defined and in the same way the second one. So the square, which will be zoomed has been defined.

Barogram:



and after ZOOM



The ZOOM function is activated by ENTER. After that a balk is displayed, which is moved by UP/DOWN switch. After pushing ENTER the first point is defined and in the same way the second one should be selected.

Task:

```

          CHANGE TASK
          -----
DISTANCE: 512.8
0 Mmabatho TAKE OFF
1 Mmabatho 160 164
2 Wolmarns 190 290
3 Ganvesa 163 057
4 Mmabatho
    
```

The previously programmed task is displayed, which can also be changed in this menu (for instance one TP has not been reached). It is also possible to enter some additional turning points.

Statistics:

```

STATISTICS
CALCULATING ...

```

```

STATISTICS: TASK
TASK FINISHED OK!
Task dist.: 512.8
Speed: 95.71
Vario: 2.0 32%
Track dist.: 601.6

```

The CALCULATING procedure can take a few minutes (this depends on the length of the task and the log intervals). The different legs of the TSK can be selected by UP/DOWN switch.

```

STATISTICS: LEG 1/3
Mmabatho - Wolmarns
9:53:35 - 11:45:24
Duration: 1:52:04
Distance: 160.1
Speed: 85.92

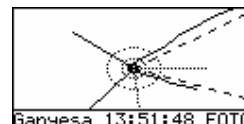
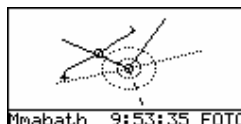
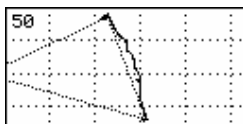
```

The other leg statistics displays are reached by ZOOM switch:

```

STATISTICS: LEG 1/3
Mmabatho - Wolmarns
1849m - 2138m
Vario: 1.9 33%
Track dist.: 209.2
XC speed: 87.72

```



The figures are showing:

- The take off altitude and the TP altitude; the flown distance; XT speed shows the altitude difference between the departure point and the TP
- flight route between two TP (can be zoomed)
- Photo sector or cylinder (zoomed with ENTER); 3 cylinders 500, 1000 and 2000 m
- Photo sector or cylinder TP

In the same way all the legs can be analysed (use UP/DOWN switch to select desired leg). All the legs are numbered, for instance leg 1/3 means first leg of total three. By pushing the ESC key the statistics is brought to the beginning.

5.7 POS Program

The POSITION program informs you about :

- The number of satellites received
- The status of the GPS receiver, 2D or 3D navigation or the coordinates of the LAST FIX
- The present position, coordinates latitude and longitude
- The barometric altitude
- The time, UTC or local as preselected in the INIT menu
- And shows the stopwatch if activated with START
- with UP/DOWN switch other displays can be reached (altitude in meters and in feet, satellite constants and signal quality)

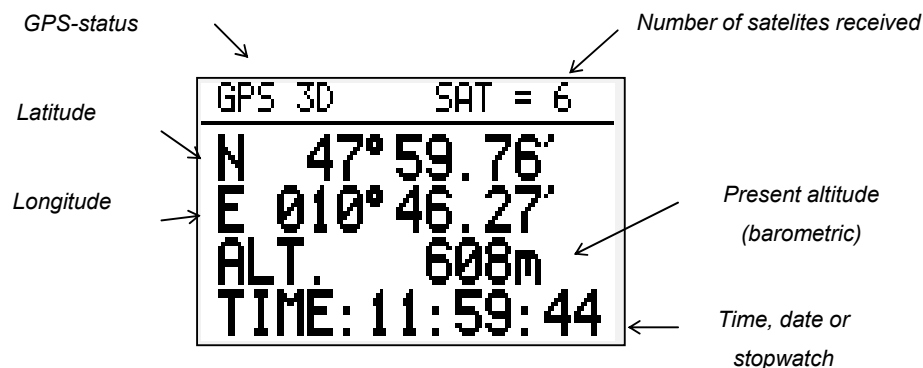


Fig. 25: POSITION Display

Instead of the TIME the DATE may be displayed as long as the ENTER button is pressed and held.

The stopwatch may be activated by pressing the START button once,

- pressing START again activates the timer
- pressing START again stops the timer
- pressing START once more resets the timer.

Only if this last function is active the normal clock can be reactivated with ENTER. As long as the ENTER button is held, the date will be displayed.

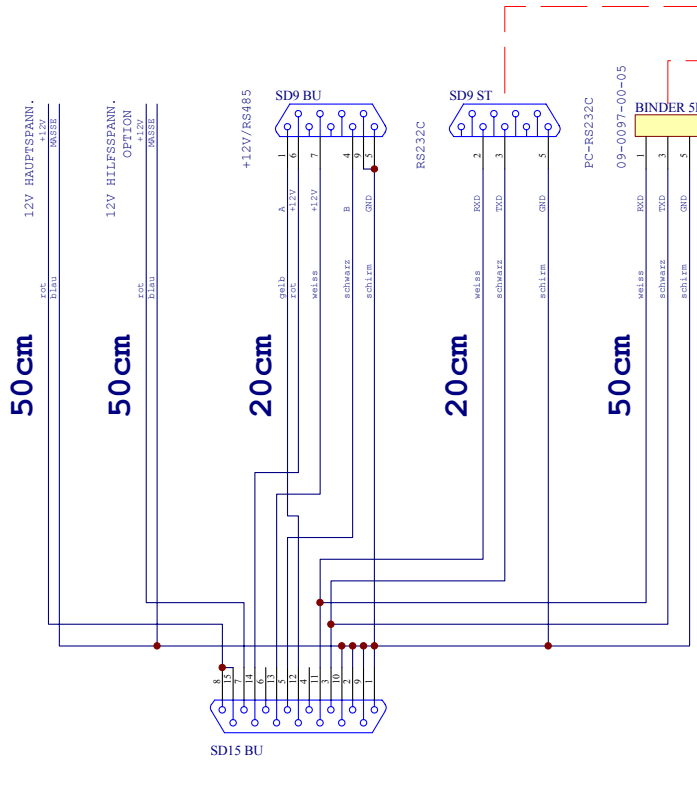
Note:

LAST FIX is indicated when the GPS is not ready for navigation. During this time the coordinates last stored in the GPS module are displayed. The present position is only indicated if the GPS is in 2D or 3D mode. Which of the two GPS modes are active has no influence on the operation of the LX5000.

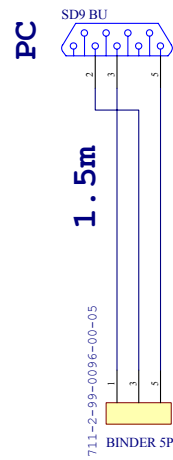
6 Appendix

6.1 Wiring

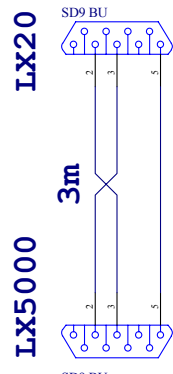
LX5000/LX500 VERSORUNGSKABEL



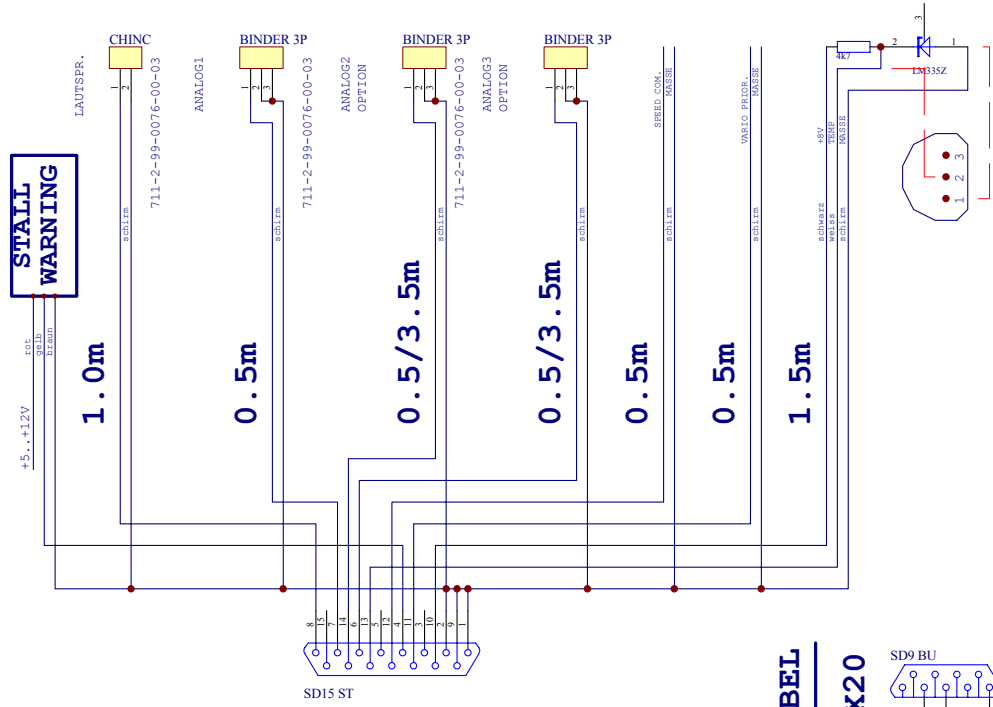
LX5000/LX500 PC KABEL



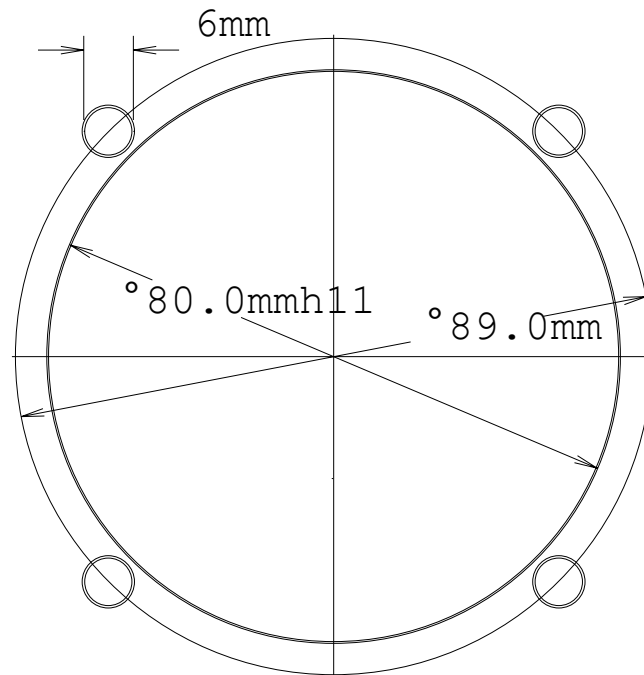
LX5000/LX20 KABEL



LX5000 I/O KABEL



6.2 Drilling Plan



Drawing not to scale.

To mount the plug on the interface cable in the instrument pannel, a hole of 9 mm indiameter is needed.

The cutout needed for the analog indicators conforms to standard with 2 1/4"

6.3 BZT Document of Registration