XC-trainer

Manual

- vario
- altimeter
- datalogger
- 20channel GPS

XC-TrainerPro

XC-Trainer3DG

AIRCOTEC

flight instruments

www.aircotec.com

Congratulations!

With the ***AIR****COTEC XC-Trainer* you have purchased a Swiss Quality product that will put at your disposal not only the most advanced electronics but also a revolutionising user-friendliness and a ruggedness that all together will combine to make your flights more pleasurable. We hope it will accompany you on many great flights!

AIR*COTEC XC-Trainer*

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Translated to English by Mads Syndergaard

Safety Notice

The ***XC-Trainer*** is equipped with an advanced 20 channel GPS receiver. With sufficient satellite coverage this will guarantee a very high position accuracy.

Maps with inaccurate altitudes, incorrect altitude settings (pilot error) or simple instrument defects may lead to erroneous altitude indications. The pilot should always fly based on their own sound judgement and skills, and not rely solely on any instrument. This is particularly the case when flying with reduced visibility or when landing.

The manufacturer is not liable for damage incurred due to erroneous altitude or position indication by the instrument.

Consulting or even working with, the instrument should only be done when the situation allows it – otherwise please rely on the acoustic signals.

The ***XC-Trainer*** must be mounted in a way that does not endanger neither pilot nor tandem passenger (if applicable) in any way. Always make sure the XC-Trainer is mounted so that it does not impede the pilot's movements in the air on when launching/landing. Finally it is important to check that neither instrument nor part thereof may come loose, fall down and possibly hurt someone during the flight.

Before launching the pilot should verify that the instrument is working and that the rechargeable battery has sufficient power to last the entire flight.

The ***XC-Trainer*** is spray-proof but not waterproof. Should water manage to find it's way into the instrument we recommend opening the instrument and removing the batteries immediately. Then the innards may be dried carefully with a hair dryer (never attempt to dry in a microwave oven!). Should the instrument become flooded with seawater it must be thoroughly rinsed with fresh water before drying. Following this a comprehensive check at ***AIR****COTEC* is then required.

You use the ***XC-Trainer*** at you own risk. The manufacturer is not liable for damage or loss resulting from the use of the instrument, or the software included in the package.

Maintenance and care

The ***XC-Trainer*** is a technologically advanced and reliable instrument. With the proper maintenance and care it will give you many hours of trouble-free service. Not following these simple guidelines may severely compromise you flight instrument:

- Never drop the ***XC-Trainer*** or expose it to hard shocks/impacts
- Never drop in water. Ensure that water does not penetrate the instrument cover. It is NOT waterproof, and particularly salt water may lead to extensive damage to the electronics. Protect from salt-water spray, rain and humidity. Should the instrument get wet wipe it dry immediately? In case of water getting inside the instrument we suggest you let us check it for you at ***AIR****COTEC*.
- Protect the instrument from extreme temperatures. Both extreme highs and lows adversely affect battery performance and lifespan, and high temperatures in combination with humidity will accelerate any corrosion.

Include with your instrument

XC-trainerPro oder XC-Trainer3DG

- Instrument
- Quick charger for the battery
- Etui
- Manual
- USB-Kabel
- ***AIR****COTEC* CD

Geräte im Set:

XC-trainerPro_GZH **oder** XC-trainerPro_DH **oder** XC-trainerPro_BH oder
XC-trainer3DG _GZH **oder** XC-trainer3DG_DH **oder** XC-trainer3DG_BH

- Mounting system of your choice

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1. Technical Specifications

1.1 Altitude

-1000m to +8200m, resolution 1m
At launch the GPS module provides an automatic altitude setting (AMSL)

1.2 Vario

Digital indication from –90.0m/s to +90.0m/s
Analog indication from 0 to 5m/s and from 5 to 9,5 m/s
Acoustic signal for climbing initiates at +0.1m/s.
Acoustic signal for sink can be set to initiate between –0.1m/s and –5m/s. Settings in MENU/SETTINGS/VARIO
From –5m/s a sink alarm will be heard regardless of settings

1.3 Speed

(Only with speed sensor connected) 0 – 160km/h
Total-Energy-Compensation (TEC) 0 – 90%

1.4 Temperature

The sensor is placed on the right hand side of the instrument. It measures in centigrade from –25 to +75 degrees, resolution 0.1 degrees

1.5 GPS receiver

16 channel parallel, 2D/3D position (WGS84), Altitude, speed, direction. Internal aerial.

1.6 Data transfer protocols

USB: only XC-Trainer with USB
Serial: 1 start, 8 packets, 1 stop
Kabel: 9600/57600 bps (XON/OFF)
Infrared: IRDA-Standard 57600 bps

1.7 Clock

Flight recording in UTC
Display shows local time and elapsed time since launch

1.8 Memory

Flight data: 1MB flash, 184 in the circular buffer
Waypoints: 4KB flash for 224 waypoints

1.9 Power supply

Rechargeable Li-Ion 3.7V/1800mAh. Operating time per charging app. 15 hours. The instrument is equipped with an “intellicharge” system
To protect the Li-Ion battery the XC-Trainer will shut itself down when before the battery is completely flat, saving all flight data beforehand
Power consumption 75 mA

1.10 Dimensions

137x66x28mm, weight including battery 150g

2. XC-Trainer Firmware

2.1 Firmware Version V3.35-2011

Downloads and Firmware may be found at www.aircotec.ch

2.2 Flight Recorder

The integrated flight recorder saves position, altitude, climb/sinkrate, SOG, TAS (with speed sensor), heading and temperature every second for up to 145 hours.

2.3 Waypoints and routes

224 waypoints sorted in 14 lists with 16 waypoints each.
10 routes each with up to 16 turnpoints, selected from the 224 waypoints

2.4 Available data in the display

2.4.1 Permanent displays

Speed SOG and TAS (TAS with sensor attached), altitude, climb/sinkrate and heading. Relationship between right/left thermalling. Windspeed and –direction

When glide angle display is switched OFF in MENU/SETTINGS/XC-SETTINGS:

Graphical speed distribution curve with head- and tailwind indication, distance to turnpoint, local time and elapsed time since launch

When glide angle display is switched ON in MENU/SETTINGS/XC-SETTINGS:

Final glide calculator, turnpoint name, turnpoint altitude (AMSL), current glide angle, ETA (Estimated Time of Arrival), calculated glide to reach next turnpoint.

2.4.2 Additional information in the Map mode

Current heading, distance and bearing to next waypoint. Map scale can be set from 2.5x2.5km to 120x120km.
Waypoint cylinder is drawn on map, and a bar at the bottom of the display helps timing turnpoint efficiency for the last 125m

2.4.3 Additional information in the Thermal mode

Current heading, distance and bearing to next waypoint.
Graphical climb-rate distribution, wind compensated. Scale is 1x1km or 2x2km.

2. XC-Trainer Firmware (continued)

2.4.4 Additional information in the Vario mode

Analogue vario bar with 0-5m/s and 5-9,5 m/s resolution, digital vario to +-25m with pressor sensor and +- 90m over GPS.
Distance and heading to next turnpoint. Large digital vario display with large AMSL/AGL display, null able altimeter ALT0, average vario for the last 10/20 or 30 seconds.

2.4.5 Additional information in the Barogram/Temperature mode

Barogram showing the last 10 minutes +/- 500m
Thermogram averager showing last 30 seconds, +/-500m
Current air temperature

2.4.5.1 Additional information in G-Force mode (only XCT-3DG)

15 times per secound: MAX G-force from the last 5 scound digital,
Line chart show 10 secound on the screen.
60 times per secound: Line chart show 10 secound on the screen.

2.4.6 Route list

The XC-Trainer automatically switches to the next turnpoint in the route when the turnpoint cylinder has been breached. In the Route screen you may toggle the turnpoints of the route, manually drop one turnpoint and continue to the next or add turnpoints from the turnpoint list, for your viewing in Map- or Thermalling mode

2.4.7 Nearst waypoint list

Waypoints are sorted by the shortest possible order.
Manual waypoint witching.

2.4.8 Waypoint list

Waypoints are sorted alphabetically.
In this screen you may manually select a next waypoint, which will then take precedence over the active route

2.4.9 List of marked positions

List of the 10 latest “mark/enter” positions or the start marker, to be used for distance/bearing indications in either Map or Thermal mode

2.5 Tutorial flight

A tutorial flight of 24 minutes is available

3.Important Information

Important!

Please read before using the Instrument

3.1 Charging the integrated battery

The instrument must be charged before the first use. At the time of delivery, the battery is charged to 50% (this is the ideal condition for a Li-Ion battery)

Only charge using the charger delivered with your XC-Trainer. Charging is completed when the green light is extinguished. For your on-the-road needs we also provide a car charger (parts number: XC-CAR-charger).

3.2 Exit from all screens and modes

Exit from all display modes can be accomplished by pressing key number 3 for approximately 5 – 10 seconds. The XC-Trainer will then return to the main menu.

3.3 Auto Off

The instrument will turn itself off after 8 minutes if no keys are activated. This feature will negate your risk of showing up on launch with an empty battery. During flight the automatic shut-down function is deactivated.

When the battery is almost empty the instrument will begin to turn itself off. Any running flight recording will be duly saved.

4. Key function - overview

Key 1  **K1**	Key 2  **K2**	Key 3  **K3**
Switch ON: by pressing for > 0.3 seconds --- **In Start Menu:** >OFF switches the instrument off --- **In Flight mode (before start):** > Manually start a flight --- **In Flight mode :** >Set MARKS >Routepoint forward >Routepoint return --- **In Flight Replay mode:** >Start and Stop the flight being replayed --- **In Menus and Lists:** >Down / forwards >Alphanumerical entries, descending from Z to A and from 9 to 0	**In Start Menu:** NEW > New flight recording initiated --- **In MAP mode:** >Zoom 2,5 – 120km > track ON/OFF >MARK switch to Waypoint <u>In Thermal display mode:</u> >Zoom 1 and 2 km >North UP ON/OFF >Track ON/OFF <u>In VARIO display mode:</u> >Zeroing ALT display <u>In BAROGRAM display mode:</u> > adjust sound volume >with 3DG switch to G-Force --- **In Menus and Lists:** >Up / Backwards >Alphanumerical entries, ascending from A to Z and from 0 to 9	**In Start Menu:** MENU> Go to main menu --- **In Flight mode:** >Switching between display modes >Confirm entries >Back/Exit --- **In Flight Replay mode:** >Switching between screens >Confirming key entries >Back/Exit --- **In Main Menu and lists:** >Select >switch to other display mode >Back/Exit

Exit from flight recording mode or flight replay mode

 **key1** ***Press key 1 and key 3 about 3sec*** **key3** 

In certain cases all keys may have other functions as well, indicated by the text in the display above each key. As an example, if you're about to delete a flight the XC-Trainer will ask you if this is really your intention, and you confirm by pressing Key 2 or deny by pressing Key 1

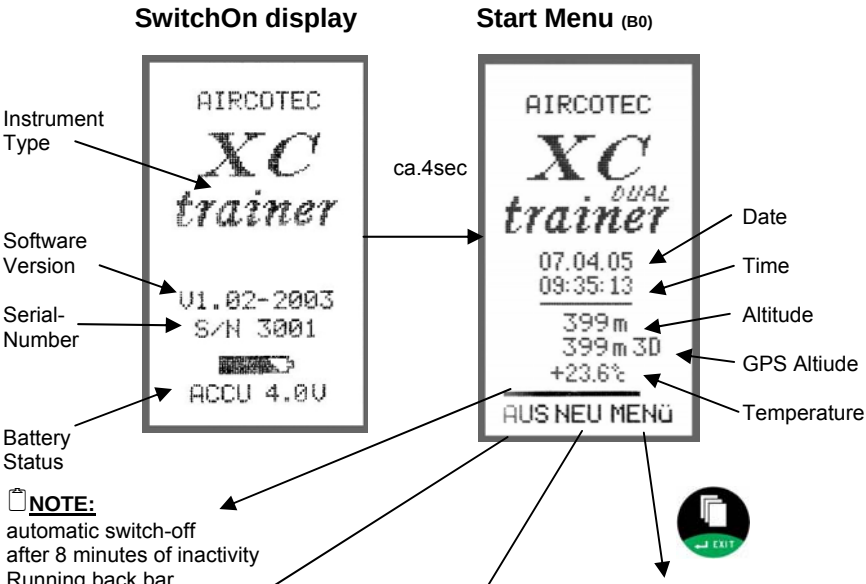
NO	YES	
Key1 	Key2 	Key3 

Special function:
When uploading firmware the program asks you to briefly confirm the upload by pressing Key 1 – further info in the download menu on www.aircotec.com

5.0 Switching the XC-Trainer ON / OFF

To switch on:

Press Key1 for app. 0.3 seconds ->
The **SwitchOn display** is shown for 4 seconds,
then it switches to the **Start Menu**



NOTE:
automatic switch-off
after 8 minutes of inactivity
Running back bar

OFF > Switches the Instrument off:

Press Key 1 briefly

NOTE:
After publication of the
Battery icon may within 2sec
be switched off again.

Main menu (B10) see 9.1

NEW > Starts a new flight recording:

Press Key2 brifly >
Map mode appears in the dispaly (see 8.5)
(Figure 1 at factory setting, otherwise
the picture was the first selected
MENU / SETTINGS / IMAGES) See page 9.4

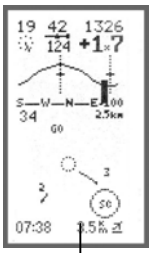
6. Flight recording menus

6.1 Menus-displays overview:

The flight mode contains four screens and four lists

NOTE: The following screenshots are examples from flight and do not match the screen at launch. When beginning a new flight the Map display (screen 1) is recognisable by the large circle in the middle and the clock display in the lower left corner (f.ex. 07:38).In Thermal Help display (screen 2) the circle is smaller and the clock display shows elapsed flying time (00:00). (see the detailed description in 8.7)

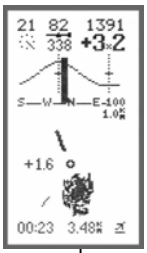
Map display (screen 1) (Details 8.5)



To switch between these two screen:

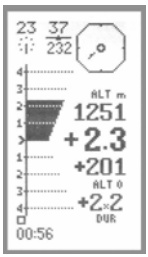
Key3 <0.2sec

Thermal Help display (screen 2) (Details 8.7)



Standard in flight mode is the **Map Display** (screen 1).
A brief press on Key3 changes to **Thermal Help display** (screen 2). One more Key3 press goes back to Map display

VARIO-display (Details 8.8)



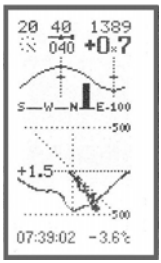
Vario or call barogram image, hold down Key3 till "Vario" or "Barogram" appears in the display
(Image name display in the center of the image VARIO ... ..)

Important!

One „click" is the time that you must hold the button down to switch to the next display in the sequence. This time can be set between 0.3 and 1 seconds (factory setting is 1sec).

NOTE: The image sequence can be in full mode (EASY-MOD N) itself be compiled (factory setting EASY mode N).

Barogramm display (Details 8.9)

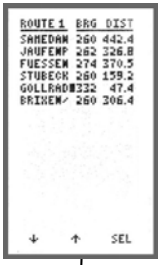


G-Force (only XC-Trainer3DG Details 25.)

6. Flight recording menus

6.2 List-overview:

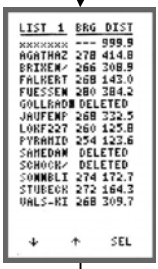
Liste 1: ROUTE (B5)
(Details 8.10.1)



Beginning with the Route list the selection is done acoustically. The tone pitch increases until the Position Mark list (list 4).
Select a waypoint from the chosen route (GOTO function; bypasses the ones in between).
(Select the route to be flown in SETTINGS/ROUTES)

3click (2,4sec)

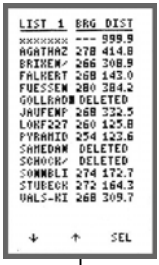
Liste 2: NEAREST (B6)
(Details 8.10.2)



Select one of 16 nearest waypoints (GOTO function), out of the maximum 223 stored waypoints. The waypoints are sorted according to the distance from you, with the nearest in the header of the list.

4click (3,2sec)

Liste 3: WAYPOINTS (B7)
(Details 8.10.3)

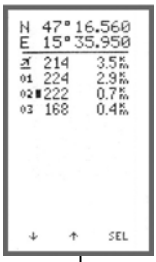


Select a waypoint from the waypoint list (GOTO function). The waypoint list is alphabetically sorted.

NOTE:
Place the cursor in the header to go to the next list. With the cursor displayed as a ▼ you can select a waypoint, with the cursor displayed as a ◀ you can go to the next list, toggling up and down between list with Key1 and Key2 . Key3 selects from list.

5Klick (4,0sec)

Liste 4: MARKED POSITIONS List (B8)
(Details 8.10.4)



Select a start point or a previously marked position (a good thermal)

Hold Key3 until the Main menu is displayed.

8click (6,4ec)

EXIT to main menue

7. Key functions in Flight Recording mode

7.1 General

Toggle between the available displays/screen by pressing Key3 until the name of the desired screen appears in the display.
The change-interval can be set between 0.3 and 1 seconds.
In MENU/SETTINGS/GENERAL/CLICK. Factory setting is 1 sec.
The following four screens and four lists are available through pressing Key3 :

See page 17 and 18

Screen 1: Map display	List1:Available Routes list
Screen 2: Thermal Help display	List2:Nearest waypoint list
Screen 3: Vario display	List3: Nearest waypoint lis
Screen4: Barogram/temperature display	List4: List of Position Marks
Screen5: G-Force (only XC-Trainer3DG)	

MAP-Mode:		Display:
Key 2 very short:	switchig 2,5 km / 7,5 km	'ZOOM' 2,5 km / 7,5 km
Key 2 short:	Other scales	'ZOOM' 15 km to 120 km
Key 2 long:	Track on / off	'TRACK ON/ 'TRACK OFF'
Key 2 very long:	Mark is memorized as a waypoint with current time	
Thermal-Mode:		Anzeige:
Key 2 very short:	Autocenter ON/OFF	'AUTOCENT' / 'AUTO ON/OFF'
Key 2 short:	switching 1 km / 2 km	'ZOOM' 1 km / 2 km
Key 2 long:	switching North-UP	'NORTH-UP' / 'TRACH-UP'
BAROGRAMM-Mode:		
Key 2 very short:	With XC-Trainer3DG (switching to G-force)	
Key 2 short:	Varioton OFF	'OFF'
Key 2 long:	Lautstärke 1 / 2 / 3	'VOL1' / 'VOL2' / 'VOL3'
Key 2 very long:	Sinkton ON / OFF	'SINKT ON' / 'SINKT OFF'

When you end your flight recording the vario audio volume level and the resolution in Thermal Help mode (1000m or 2000m) are saved for your future flights.

INFO:
In replay mode only the Thermal help screen resolution is saved – volume is always off.

7.2 Setting a Position MARK in Screens 1 through 4:

Any interesting spot (thermals etc.) can be instantly marked using Key1 . The Position Marks are consecutively marked from 1 through 99. It appears 5 seconds MARK XX. During this period, no other marks are set. This latency period is necessary because long press of one button, the route still further circuit and the DUR / DST (average / distance) deletion causes. (It has to expose a brand to be accepted).

7.3 ZOOM function in Map and Thermal Help display (screen 1 and 2)

Key2 changes the resolution (zooms) in screens one and two. Resolutions from 2.5x2.5 to 120x120km in screen 1 1x1km to 2x2km in screen are available. The longer you press Key2 the lower the resolution becomes. A quick click on Key2 switches the screen resolution between 2.5x2.5 and 7.5x7.5km

7.4 Altitude null in VARIO display (screen 3)

A short click on Key2 in VARIO mode nulls the Altitude. When launching this value is always set to 0.

7. Key functions in Flight Recording mode

7.5 Setting the volume level (only in Barogram display)

Short clicks on Key2 in Barogram display (screen 4) toggles the volume ON/OFF. Pressing Key2 longer changes the volume from OFF to LOUD. The little symbol in the digital vario display indicates the current setting
(OFF> ⁘, LOW> ═ , MEDIUM> ≡, LOUD> ≣)

7.6 Ending a Flight Recording

Pressing the Key3 and Key1 ca.2sec the flight is completed.

- The recording had not yet started:
When exiting with Taste3 +1 is the message 'FLIGHT DELETE' XCT and goes back to turn-up menu.

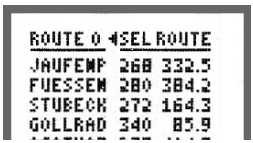
- The recording had already started:
When exiting with Taste3 +1 is the message 'SAVING FLIGHT' and then 'AUTO OFF' switch with the XCT.

7.7 Key functions in List 1 through 4

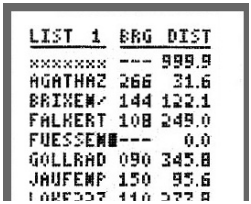
Select the desired ROUTE/LIST/ITEM/MARK with Key1 and Key2 and activate Key3.

Importent!

Place the cursor in the header of each list to toggle between ◄ and ▼ with Key3.
◄ is for switching between lists, ▼ is for selecting turnpoints from lists.



Move the ◄ cursor up or down in the Route list to select a route from 0 - 9. In the waypoint list the same cursor is used to leaf through the alphabetically sorted lists.

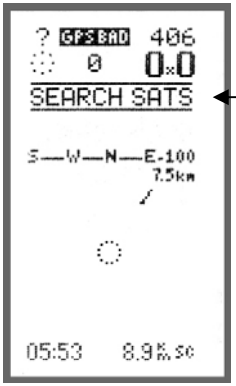


The ■ cursor is used to select a waypoint from the waypoints list. Move the cursor up or down using Key1 or Key2, confirm with Key3.
The instrument then automatically switches back to flight mode and the chosen waypoint is the new reference for distance, bearing and heading, and for the glide angle calculator provided it is engaged.

8.1 Automatic Start Flight recording

A flight recorder (NEW) will switch from the menu 'OFF NEW MENU' started out automatically when 30 seconds SOG> = 10 km / h (GPS-valid). For GPS-bad or SOG <10 km / h starting 30 seconds from the beginning. Visible is this countdown of the 30's as a small number 30 .. 0sec over Key2 . Only with valid GPS.

From the Start Menu one short push on Key2 takes you to the Flight mode.
Flight recording is activated automatically.



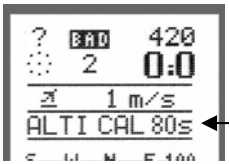
8.1.1 Satellite search

Begins after the start of the flight recording
GPS receivers to find the satellites.
Flashing message line in the upper-half display.

SEARCH SATS: 2D or 3D Mode
2D Mode: < 4 satellites, no GPS altitude available
3D Mode: > 4 satellites

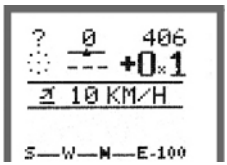
Once sufficient satellites have been found the XC-Trainer will switch to altitude calibration. Beneath the “BAD” symbol at the top of the screen you will see the number of satellites currently available.
To check for 2D or 3D mode go to List 4 (Position Marks), the coordinates will reveal the mode (Details 8.10.4)

8.1.2 Altitude calibration



Alti CAL 80s:
The automatic altitude calibration takes 80sec. The time will begin a countdown. With poor GPS coverage no GPS altitude will be available (2D mode) and the calibration will not begin (80sec. remain visible in the screen)
The automatically calibrated altitude is generally accurate down to +/- 15m

8.1.3 Flight recording



10 km/h or +/- 1mS

The recording begins when either of the following is recorded:
a) a groundspeed of more than 10km/h more than 5 sec.
b) the vario showing more than +/- 1m/s for more than 5 sec.

At the beginning of the recording the XC-Trainer will set a position mark for the takeoff and begin the time recording by null. The elapsed time is visible in the Thermal Help display (B2).

8.2 Manualy Start Flight recording

From the **Start Menu** (B0) a short push on the Key2 starts recording the flight. If however there is insufficient satellite coverage the recording will not start automatically.

8.2.1 Manual start

The flight recording may also be started manually without sufficient GPS signal.
Press Key1 to start recording manually.

8.2.2 Manual altitude setting

The altitude can be set manually before launching.
MENU/SET HEIGHT

Increase with key1 ↓, decrease with key 2 ↑,
confirm with key 3 .

NOTE:
When you have set the altitude manually the automatic calibration will not take place in the “NEW” mode. The manually set altitude overrules the “ALTICAL 80s” function.

QNH-Display

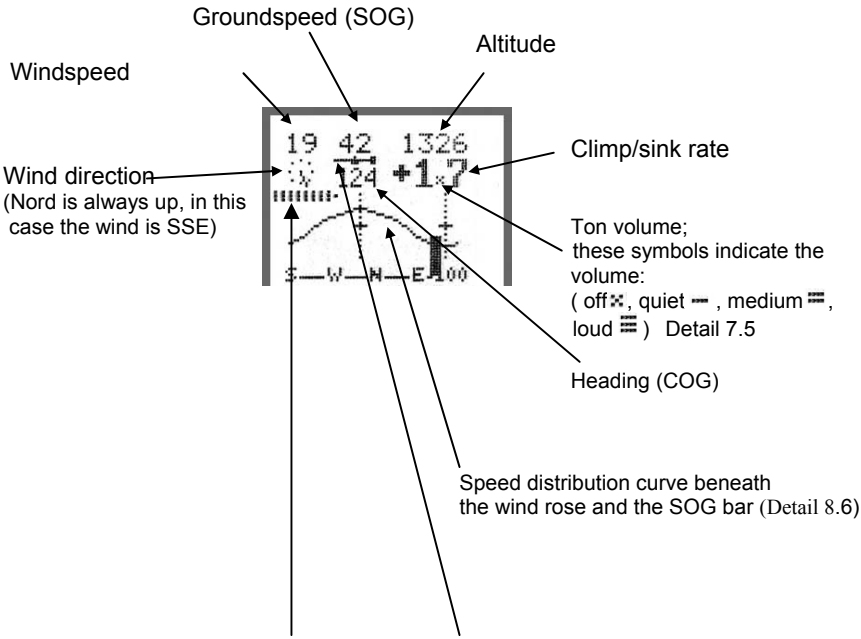
In order to show the correct QNH (in hPa) the location altitude must be set correctly. QNH is only displayed beneath app. 2000m as according to the definition of QNH it doesn’t make any sense at greater altitudes. Due to small differences in the pressure sensors the QNH may differ slightly between different instruments. This does not influence the altimeter accuracy.

Flight Level display

FL60 (Internationally accepted altitude setting, based on 1013,25hPa) Multiply FL by 100ft to get standard altitude in feet.

8.3 General Flight modes

The top half of the display 1, 2 and for has the following info:



Display of battery voltage in flight mode

In MAPPE / THERMAL / VARIO / BAROGRAM / G-FORCE appears top left on the wind direction display a horizontal row 1-9 short vertical bars, corresponding to a battery voltage of 2.9 to 4.2 volts. Less than 5 bar, the battery icon also appears, which corresponds to 3.4 volts, allowing at least 30 minutes in flight mode.
At 2.8 volts, the flight mode is automatically memorized the flight and regular.

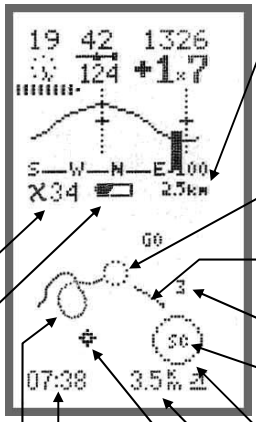
Relationship left/right thermalling

Left- and right circles are recorded separately and the relationship between then is summarised in the scales between SOG and Heading. If you're mainly thermalling right the scales will tip right and vice versa.
This will facilitate using both directions equally.

8.5 MAP display

Info in the lower half of the screen

MAP display (B1)



Die untere Hälfte des Bildes zeigt die Flugfläche von
The lower half of the screen shows the flying arena as a square with a resolution of 2.5 – 120km. Key2 switches cyclically between these resolutions. The longer Key2 is held the lower the resolution becomes, until it starts by 2.5x2.5km again. A short push on Key2 switches between 2.5x2.5 and 7.5x7.5.

The pilot position is always in the middle of the screen (in MAP display indicated with a large circle)

Narrow heading indicator. Shows the current heading (in this case SE)

”Position Mark” symbol. „1“ to „99“

Waypoint symbol. „AAA~ZZZ“,
in this case „SC“ for Schöckel

WPT cylinder depiction. (In this case with R=300m).
When entering a cylinder a beep will sound (detail 19.0)

Distance to chosen WPT, MARK or to the launch.

Local time in hr/min

Flashing indication pointing to the chosen WPT or MARK.
This line will disappear when dist>WPT is less than 1km (turnpoint is already visible).

Show track (Activate in MENU/SETTINGS/XC-SET>TRACK Y)
This makes it easier to see the when the turnpoint is rounded correctly. The track is displayed 5minutes back in time in resolution 2.5km, 10 minutes back in time in lower resolutions. With the resolution set to 120km no track will be shown.

LOW BATT symbol > battery is almost empty. Another 20 minutes before the instrument shuts off.

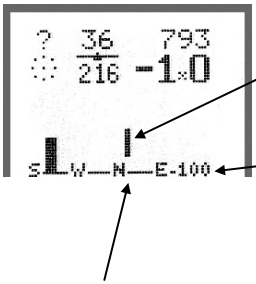
TAS (True AirSpeed) – only with speed probe connected.
Important!
Speed is only displayed app. 10sec. after the speed probe is activated.
Without a speed probe here, the GPS altitude is apparent.

The maximum 16 route points and/or the maximum 10 position marks + takeoff are displayed as symbols in MAP display.

8.6 Wind speed distribution curve

The wind speed distribution curve is always visible in the Thermal Help display (B2).
In **MAP display** the wind curve is visible only when the L/D calculator is deactivated.
In **BAROGRAM display** (B3) the wind curve is visible when the Distance/Average function is deactivated (see 18.0).

When turning on the instrument the wind curve is hidden. At least one 360, or a figure of eight must be flown for the XC-Trainer to calculate wind direction and –speed.



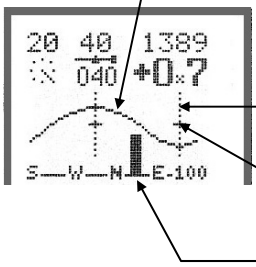
8.6.1 Basic wind curve display

A thin vertical line indicates the direction still needing to be flown in order to calculate a wind curve.

Two wind speed resolutions are available and are automatically set by the instrument. When a ground speed of 120km/h is reached the XC-Trainer switches from 100km/h resolution to 160km/h resolution (see illustration).

The bottom line shows the unfurled compass rose. North is in the middle, so that we have S—W—N—E-100 if “WIND T-UP” Y (factory set Y)

8.6.2 Active wind curve



The wind curve is a speed distribution curve. It indicates the average speed over ground (SOG) as a function of the compass heading.

Two thin lines above the wind rose indicate upwind/downwind

The length of the short lines crossing the wind direction lines indicate the average True Airspeed (TAS)

Speed Over Ground (SOG) bar:
The bar height shows the current SOG, the placement over the unfurled wind rose gives the Course Over Ground (COG).

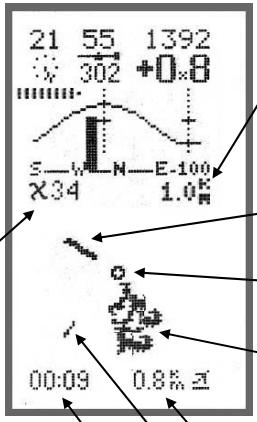
8.6.3 Wind distribution curve may be set to NORTH-UP or TRACK-UP

SETTINGS > XC-SET > WIND T-UP Y/N
If the WIND T-UP is set to Y the wind distribution curve in flight or replay mode will be displayed as follows: The vertical SOG/COG bar will remain centred (=flying direction) and only the height of the bar changes according to the SOG. When the COG changes the curve shifts left or right together with the compass line.

8.7 Thermal Help display, flight mode

8.7.1 Thermal Help display

Thermal Help indications (B2) with north-UP



The lower half of the display shows the flying arena as a square with 1x1km or 2x2km sides – switch between the two resolutions with Key2.
It is possible to set the XC-Trainer to switch automatically to Thermal Help display when lift is encountered (MENU/SETTINGS/XC-SET > AUTOCENT Y)

Course Over Ground (COG) indicator. Wide line that shows heading (COG). In this case NW)

Pilot position is always in the middle of the display. In Thermal Help display the pilot is shown as a small circle.

Visualised thermal.
The position of the lift shown is wind-speed compensated (Details 8.7.2)

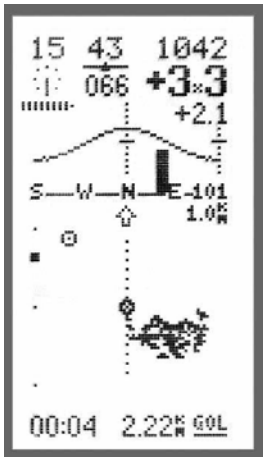
Distance to chosen WPT, MARK or Takeoff

Bearing (flashes) to selected WPT

Elapsed time in flight

True AirSpeed (TAS – only with speed probe connected)

Thermal Help indications (B2) with track-UP



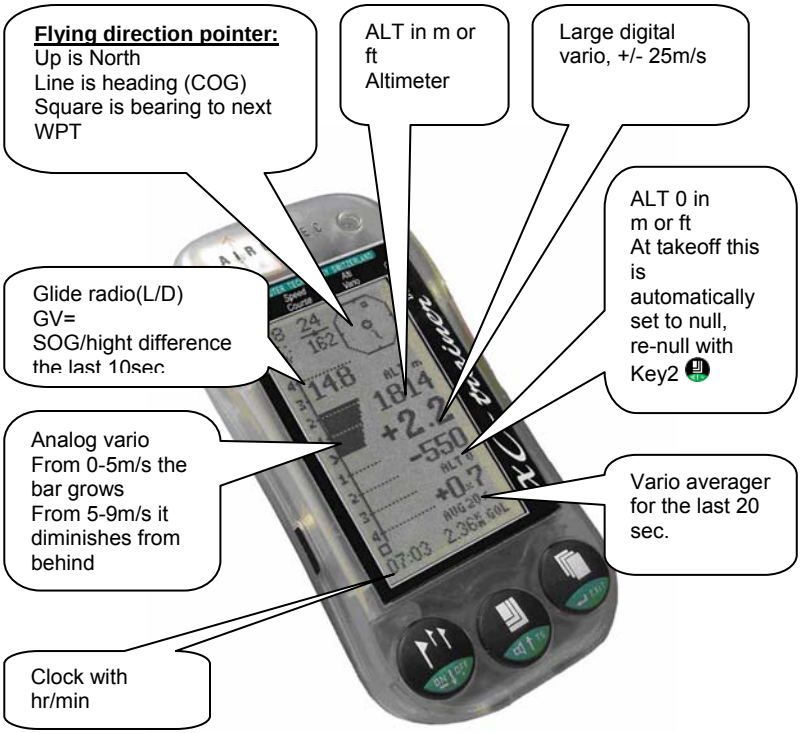
In XC SET the pilot may now choose between TRACK-UP N (equals North up) or TRACK-UP Y where the track is up. Only the CENTRING mode may be toggled in this way. Likewise, 4 clicks on Key2 toggles the track once in flying mode. The screen will briefly show 'NORTH UP' or 'TRACK UP'. In the TRACK UP mode a dotted line appears running through the pilot position to the top of the screen.
The latest setting is saved when the instrument is shut down.

8.7.2 Visualised thermal

Helps when utilising weak, broken-up lift or weak föhn waves.
Climb rates above 0m/s are marked as dots, the better the climb the fatter the dots. Should the pilot loose the thermal he needs only to fly back into the cluster of dots on the screen. The position of the thermal is intuitively displayed. Lift dots are only visible from the last 5 minutes and for +/- 150 vertical metres.

8.8 VARIO display

8.8.1 Large vario display (B2)



All other info displays are equal to the MAP display (see 8.3 and 8.5)

8.8.2 VARIO sounds

Climb tone is fixed at +0.1m/s. Sink tone can be set to begin between 0.0m/s and –5.0m/s (MENU/SETTINGS/VARIO > SINK)
When the sink tone is set to –5.0m/s it remains off until the sink alarm threshold is reached. This is set to –5.0m/s

INFO: Acoustic climbing signal off before the new flight has been initiated, onset value +0,3m/s

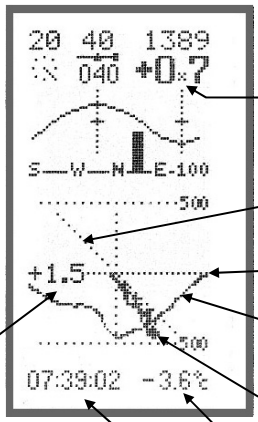
In order to get rid of the annoying beeping on launch, before the flight has even started, we have put a threshold value of 0.3m/s in.

8.8.3 Glide ratio (L/D) indicator also without waypoints entered

In the MAP screen the glide ratio (L/D) is included under the vario value, even when no turnpoint is selected. The L/D is calculated as (SOG average/altitude difference) during one minute! Any more often and the value would be all over the place.
There's no L/D indication before start, and when in climbing air or at speeds below 5km/h the value is shown as '?'.

8.9 BAROGRAMM display

Barogram/Temp display (B3)



Important!
The vario volume can ONLY be adjusted in this mode.

Key2 adjusts the vario volume in four steps (off, low, medium, loud, Details in 13.7)

Linie des adiabatischen TEMP (-1°C/100m).

Pilot position is always in the middle of the display

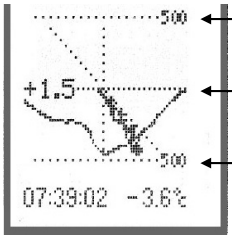
Barogram from the last 10 minutes to +/-500m relative to the pilot

Thermogram from the last 10minutes to +/-6°C rel. zu Pilot

Current temperature

Local time in hr/min/sec

Vario averager 30s.



Horizontal line 500m above the pilot

Pilot level

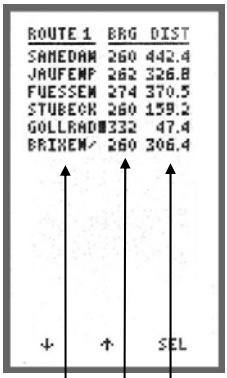
Horizontal line 500m beneath the pilot

Thermogram, temperature gradient

The BAROGRAM display also shows the thermogram from the last 10 minutes. The centre shows the current altitude and temperature. The display shows +/- 500m and +/- 6°C
The adiabatic gradient (-1°C /100m) is displayed as a diagonal line across the screen. The thermogram allows the pilot to see the thermal quality at different altitudes and inversions are particularly visible.

8.10 Lists in the Flight mode

8.10.1 ROUTE List (B5)



The ■ symbol shows the current waypoint in the selected route.

Select another waypoint with Key1 and Key2, confirm with Key3.

NOTE:

Place the cursor in the header to select a new route.
The ■ cursor must first be changed to a ◄ symbol, this is done with Key3.
Select a route between 0 - 9 with key1 or Key 2.
Change the cursor back to the ■ symbol to select a waypoint (using Key1 and key2) to have a lasting Bearing ad Distance indication, confirm with key3.

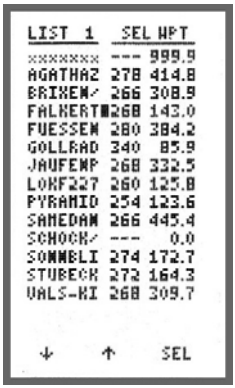
Distance to current waypoint, distance calculated up to 820km. When the distance is greater the display shows 999.9km with no bearing.

Heading to selected waypoint

Waypoint name

Select a waypoint from the route:
-maximum 16 waypoints are shown in MAP mode
-the waypoint name is shown with 3 letters
(for example SCH, A22)

8.10.2 NEAREST WAYPOINT list (B6)

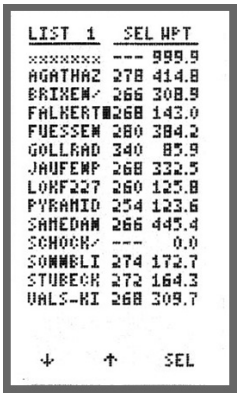


The ■ shows the current selected waypoint.
Select a waypoint from the nearest 16 waypoints. The waypoints are sorted according to distance from current position, with the nearest at the top of the list.
Select a waypoint with Key1 and Key2, confirm with Key3

Only the nearest 16 waypoints are available in the NEAREST list. The waypoint names are only shown with two letters in MAP mode.

8.10 List in the Flight mode (continued)

8.10.3 WAYPOINT List (B7)

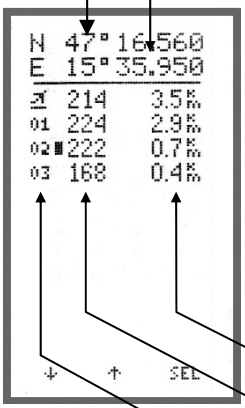


The ■ symbol shows the currently used waypoint in the list. Select a new waypoint with Key1 and Key2 , confirm with Key3

If more than 16 waypoint are stored in the memory they will be split up into lists with 16 waypoints/list. The lists are sorted alphabetically. To toggle between lists the cursor must be placed in the header, switch it from ■ to ◄ and select list with Key1 and Key2 . Then switch cursor back to ■ and select waypoint.

The MAP display shows waypoints ONLY when there is an active waypoint. The waypoint is displayed with just two letters.

8.10.4 MARKED POSITIONS list (B8)



Koordinates for the current position

2D/3D Info, small dot means 2D, large dot

The ■ symbol indicates the currently used Position Mark or Takeoff. Select another Position Mark with Key1 and Key2 , confirm with Key3 .
When 99 Position Marks have been stored the new ones will be numbered beginning from 0 again. Old marks stored in these positions will be overwritten. In flight-replay mode the Position Marks appear in the order that they have been stored.
The first Position Mark (Takeoff) will always remain in the list. Under Takeoff the 10 most recent appear (1~99 with bearing and distance)

Distance from currently selected position

Bearing or Course to current selected position

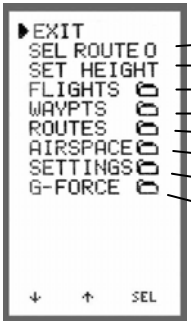
Takeoff or Position Mark number

9. Menu Screens Overview

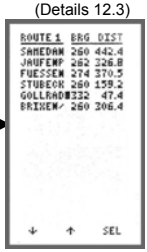
9.1 Menus Overview

Selecting in the available Menus is done with key1 ↓ or key2 ↑ activating is done with key3

Main Menu(B10)

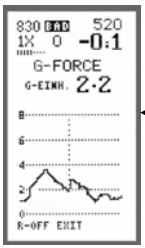


Select route (11)
(Details 12.3)

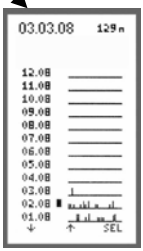


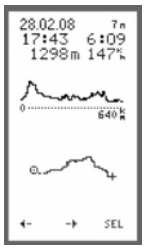
Manually entering altitude (B12)
(Details 8.2.2)

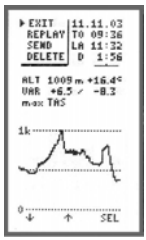
G-Force (Details 25)
only XC-Trainer_3DG



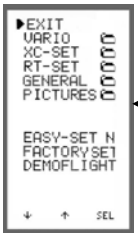
Flight book (Details 26)







SETTING Menu (B16)
(Details 9.2)



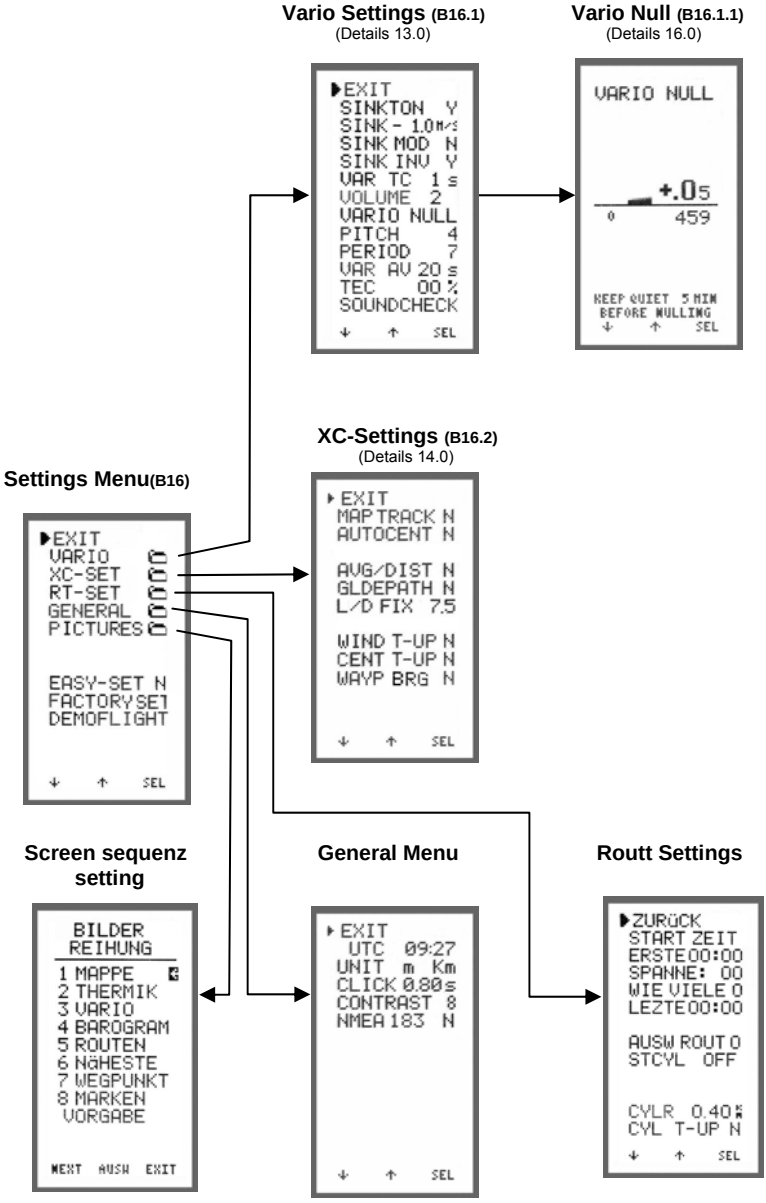
Airspace Menu(B16)
(Details 23)

Routes (B15) Menu
(Details 12.1)

Waypoint(B14) Menu
(Details 11.1)

9. Menu Screens Overview (continued)

9.2 SETTINGS Menu



9. Menu Screens Overview (continued)

9.3 Descriptions

Selecting in the available menus is done with Key1 and Key2,
activating is done with Key3

Main Menu:	Description	Factory setting (where applicable)
▶ EXIT	Back to Main Menu	
SEL ROUT 0	Select route	Route 0
SET HEIGHT	Set altitude manually	
FLIGHTS ##	Recorded flights overview	
WAYPTS ##	Waypoint Menu	
ROUTES ##	Route Menu	
AIRSPACE ##	Airspace Menu	
SETTINGS ##	Settings Menu	

Waypoint Menu:

▶ EXIT	Back to Main Menu
NEW WAYPT	Enter new Waypoint
EDIT WAYPT	Modify existing waypoint
DEL WAYPT	Delete waypoint
.	
COM: IRDA	Data transfer protocol (IrDA) / cable)
	NOTE: IrDA always active when instrument turn on
RECEIVE WP	Receive waypoint
SEND WP	Send a Waypoint
SEND ALL WP	Send all waypoint
.	
DIST WP-WP	Distance from waypoint-waypoint
DEL ALL WPT	Delete all waypoints
USED xxx	Number of used waypoints in memory
FREE xxx	Number of free waypoints in memory

ROUTE Menu:

▶ EXIT	Back to Main Menu
SEL ROUT 0	Select route for use/modification
NEW RTRPT	Enter new route point
EDIT ROUTE	Edit a route
REVERSE RT	Reverse a route
DEL RTEPT	Deleting a waypoint in a route
DEL ROUTE	Deleting a route
.	
COM: IRDA	Data transfer protocol (IrDA) / cable)
	NOTE: IrDA always active when instrument turn on
RECEIVE RT	Receive route
SEND ROUTE	Sending a route
PRECHECK N	Befor starting the system check the route

9. Menu Screens Overview (continued)

9.3 Descriptions

Main Menu:		Description	Factory setting (where applicable)
▶ EXIT		Back to Main Menu	
VARIO	##	Vario submenu	
XC-SET	##	XC – submenu	
RTE-SET	##	Route settings, start cylinder, cylinder radius	
GENERELL	##	General settings menu	
.			
EASY-SET	N	EASY set mode	
FACTORY SET		Return to factory settings	
DEMOFLIGHT		Load testflight to see trial demo	

VARIO Menu:

▶ EXIT		Back to Setting Menu	
SINKTONE	Y	Sinkalarm > -5m/sec (Acro)	Yes
SINK	-1.0m/s	Sink alarm begin	-1.0 m/s
SINK MOD	N	Sink ton modulation	No
SINK INV	N	Inverse sink tone	No
VAR TC	.5 s	Vario time constant	0,5 sec
VOLUME	2	Akustice volume	2
VARIO NULL		Null vario	
PITCH		Vario sound 0-9	5
PERIOD		Vario frequenc 0-9	7
VAR AV	20s	Vario average 10/20 and 30sec	20sec
TEC	00 %	Total energie compensation 0 %	
SOUNDCHECK		Testing adjusting sounds	

XC-Settings Menu:

▶ EXIT		Back to Setting Menu	
MAP TRACK	N	Show track on screen	No
AUTOZENT	Y	auto centering	Yes
DUR / DIST	N	Average/distance calculation in Barogram mode	No
GLDPFATH	N	Glide phate calclator	No
L/D FIX	7.5	Glide rade	7.5 FIX
WIND T-UP	N	Windcurve in track-UP	No
CENT T-UP	N	thermal centering in track-UP	No
WAYPT BRG	N	Waypont bearing	No

9. Menu Screens Overview (continued)

RT-SET Menü:

▶ EXIT	Zurück		
START TIME			
FIRST	00:00	first start time	
DELTA:	00	time to next start time	
MULTIPLE	0	multiple time	
AUTO-GO	N	This menu is only if MULTIPLE 0 then can select Y/N	
LAST	00:00	last start time auto calculate	
CYLSIG	10	Cylinder entering signal adjustable 3-10sec	
SEL ROUT	0	select routes	
STCYL OFF/TP1-3		witch for turn point must be start point select from 1-3 start cylinder diameter 0,4 -127,5 km	
STCYL)< IN		flight in or out from the start cylinder	
CYLR 0.400km		0.40 km normal cylinder diameter	0.400 km
CYL T-UP N		flight to cylinder in track-UP	

GENERAL Menu:

▶ EXIT		Back to Setting Menu	
LOCAL HH:MM		Local time setting	UTC
UNIT m km		Units(Meter/feet and km/nm)	m km
CLICK 0.60 s		Change-interval for screens with Key3	1 sec
CONTRAST 8		Screen contrast setting 1-19	8
NMEA 183	N		
IMPELLER	Y	Impeller ON/OFF	Y

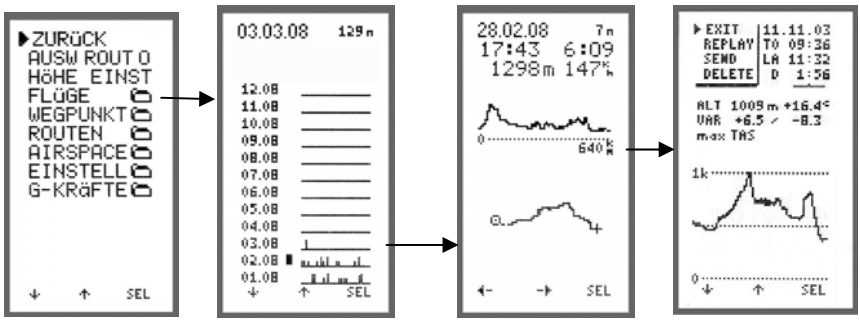
9.4 PICTURES:

Screen setting for yourself menu sequenc
With the Key 2 select screen

10. Logbook

10.1 Logbook description

Entrance over main menu

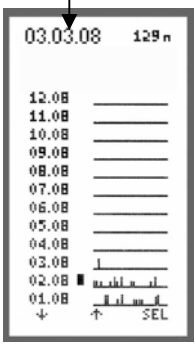


Main menu | year overview | flight overview | flight detail

10.2 Chart overview from the flight:

Select the month and the year using Key1 or Key2 (according to cursor position)
With Key3 ,select the first flight overview in this month

Current date



Flight number

The vertical line represents the flights during 1 month
The bar height shows the number of flights per day

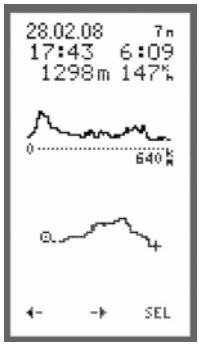
10. Logbook

10.3 Flight overview

The flight overview shows the bird's eye view and the barogram of the selected flight as well as date, flight number, start time, flight time, max altitude and max speed

It appears **BAROGRAM / maximum** values image.
In the lower half of the image, the flight path of the selected flight is Full Frame of 1.2 x 1.2 km visible up to 1200 x 1200 km. The format is automatically filled.
Starting point symbol = CIRCLE, symbol = CROSS country.

With Key1 or Key2 , select the flight you wish to review.
Key3 switches to the flight detail screen



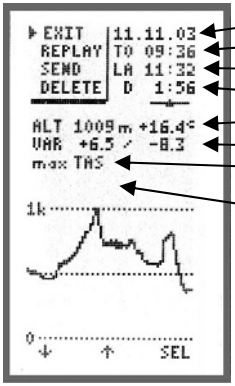
Flight overview

Scale from the flight
(for example 640x640km).

Bird's eye view (automatic ally scaled)

10.4 Flight Details

This screen has date, start and landing time, duration of flight and relation between right- and left hand thermalling.



Date
Start time
Landing time
Flight time
Max. altitude and the temperature at max. altitude
Max. climb rate, max. sink rate.
m Max. TAS (True Airspeed – only with speed probe connected)
Max SOG (Speed over Ground)

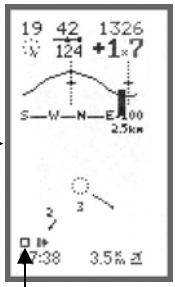
The barogram beneath the information above:
Duration of flight, with the resolution always set to fill the screen – from 200m vertical to 8000m vertical

EXIT to return to the logbook list with key3 .

10. Logbook (continued)

10.5 Flight replay mode

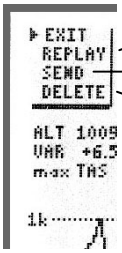
When replaying a flight all displays and functions are the same as during a flight. Only difference in the display is the RECORD symbol in the lower left hand corner of the screen.

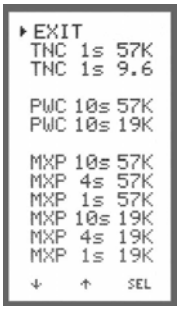


Rekorder Symbole

STOP (press Key1)
Start (press Key1)
fast forward (press Key1 1sec)
Rewind (press Key1 2sec)
Strat the replay
End of the flight

Replaying:
Press Key1 to start the replay. The flight is replayed in app. double speed. Use a long press on Key3 to exit and return to the list.
Use the Fast Forward or fast rewind function to be able to relive even long flights.



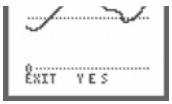


10.6 Send flights to a PC

The flights are uploaded to PC using either the RS232 cable or a USB converter.

Available data transfer protocols:
TNC is for communication with the TN-Complete software from Aircotec
PWC is only for communicating with competition software
MXP is for communication with CompeGPS, MAXpunkte and SeeYou
Time interval between the stored data and baud rate must also be set. Baud can be set to 9600bps or 56700bps

Important!
Remember to set the baud rate in the PC software to the same values as in the instrument! Select mode of transfer with Key1 and Key2 , confirm and send to PC with Key3



10.7 Delete flight

Move cursor to DELETE, press Key2.
Confirm with Key2 , exit with Key1

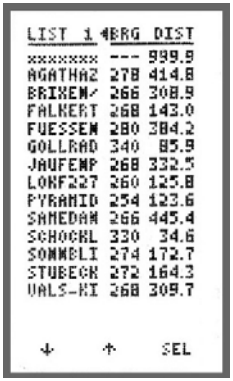
11. Waypoints

11.1 Available options in the Waypoint menu

▶ EXIT

11.3	Create new waypoint
11.4	Edit existing waypoint
11.5	Delete waypoint
11.6	Select data transfer protocol
11.7	Receive waypoints
11.8	Sending a waypoint
11.9	Sending all waypoints
11.10	Distance to selected waypoint andern
11.11	Delete all waypoints
11.12	Free Waypoints

11.2 General info waypoints



Maximum capacity is 224 stored waypoints

These are stored in 14 lists with 16 waypoints each. Maximum indicated distance is 820 km, more will have the display showing 999.9 without any bearing to waypoint.

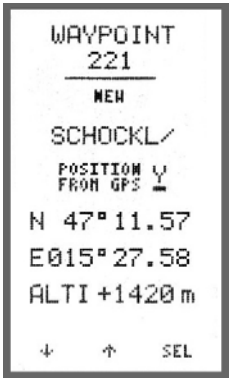
Notice:
The 1st place in list 1 is reserved for the waypoint 'xxxxxxx'. This cannot be deleted, and will appear in routes instead of deleted waypoints.

Routes can only be created using the 224 stored waypoints. If a waypoint is deleted that is being used in a stored route it will be replaced with the reserved waypoint mentioned above.

Key functions:

1. Select from list using Key1 and Key2 (select lists with the cursor in the header and the symbol ☚)
2. Change cursor to ▮ with Key3
3. Select the waypoint with Key1 and Key2
4. Use Key3 to go to waypoint details

11. Waypoints (continued)



11.3 New waypoint

If the memory is full the display will show „FREE 0“ for two seconds then return to the Menu. Otherwise an empty field will appear, with “FREE NNN”. The cursor is at the beginning of the line. Toggle letters and numbers using Key1 and Key2, confirm with Key3.
The first thing to appear is an arrow pointing left ← that allows you to go one step backwards in case of a wrong entry. Once all fields have been done the options EXIT or STORE appear, EXIT without storing by pressing Key1, store by pressing Key2 > display shows „UPDATING”.

If you try to store a waypoint under an already used name the STORE confirmation will result in the message WAYPOINT EXISTS. You then get the options to EXIT or to MODIFY. New points are initially stored at the beginning of the list. The display shows the number of free spaces in the memory “FREE NNN”

Waypoint Details
The waypoints are internally numbered from 1~224. This is only an internal memory and has no consequence for the day-to-day use.

Important!
When entering a waypoint name the last space is reserved for the symbol “→” or “/“.
These tell the XC-Trainer what you want it to do when you leave a turnpoint sector:
A ”→” makes the XCT switch automatically to next turnpoint in the route.
A “/“ means you must manually go to the ROUTE menu and switch to the next turnpoint.
Name: 7+1 alphanumerical characters: 'A~Z','0~9','→','/'
Proceed automatically to next turnpoint: 8th character = ”→”
Manually switch to next turnpoint: 8th character = ”/”

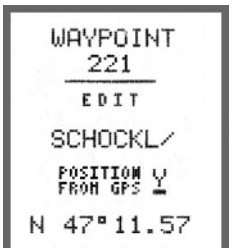
Position from GPS N/Y
Select Y to use the current position of the GPS. If GPS coverage is insufficient the display shows “BAD”, with good coverage “VAL” (Valid).
You may wait for VAL or save the last valid position, Continue with Key3

Position:
Latitude, Longitude in 0.0001 increments (1.85m)
Coordinates may be saved in ggg mm.mmm, ggg mm ss.s or UTM format.

Altitude:
Allows the instrument to do glide angle calculations (-1000 to +8200m

EXIT:
Press Key3 until the instrument returns to the main menu.

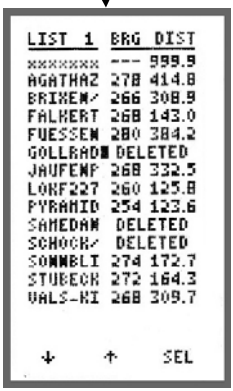
11. Waypoints (continued)



11.4 EDIT WAYPT

Select the waypoint to be modified from the list. Name, coordinates and altitude may be modified.
Store as in NEW WAYPT

Edit waypoint with Key1 – 3
Save and EXIT with Key 3



11.5 Delete

Select the waypoints from the list and click Delete > NAME DELETED

EXIT
Hold down Key3 to EXIT to main menu.

UPUPDATING...
Whenever waypoints have been modified the display sorts all lists anew. The lists are sorted alphabetically. Any waypoints marked for deleting are irrevocably deleted when the UPDATING… message appears.
Deleted waypoints that are used in stored routes are replaced with the “xxxxxxx” and must be manually edited in the ROUTE menu

11. Waypoints (continued)

11.6 Select data transfer protocol

COM: IRDA (infrared) or WIRE (cable)
This setting is transient. Default setting is always IRDA.
This means waypoints and routes can always be transferred from XCT-XCT via infrared.

11.7 RECEIVING

The number of free spaces in the memory are displayed FREE NNN. Waypoints received must be stored as in NEW WAYPT.
RECEIVE mode can be activated from the WAYPT sub-menus. When activated the XC-Trainer remains ready to receive new waypoints.
After receiving a waypoint the new waypoint is displayed and the instrument remains in RECEIVE mode, ready to receive more waypoints.

After three futile attempts the message **"TRANSMIT ERROR"** will appear and the new point will not be stored (both instruments must be set to the same IRDA transfer protocol in MENU/SETTINGS/GENERAL > COM

The new points are initially placed at the top of the list.

11.8 Sending

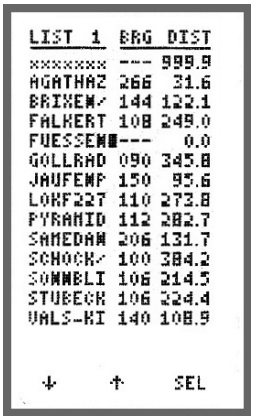
First select the desired waypoint from the list. The waypoint appears in the detailed display.
EXIT with Key1, send with Key2, return to list with key3.

After three futile attempts the message **"TRANSMIT ERROR"** will appear and the new point will not be stored (both instruments must be set to the same IRDA transfer protocol in MENU/SETTINGS/GENERAL > COM

11. Waypoints (continued)

11.9 Sending all waypoints

Select this setting to send all waypoints to another XC-Trainer or PC.



11.10 Distances

For measuring distances between waypoints (from ROUTE 1~9 and list 1~14).
Maximum distance given is 820km, above this and 999.9 appears, no bearing.

REFERENCE POINT
Any waypoint can be used as a reference point for the distance measurements (select with Key1 and Key2 , confirm with Key3). The bearing indicated (BRG) is from the reference point to the other waypoint.

11.11 Delete all waypoints

Confirm with „YES“ (Key1), cancel with „EXIT“. When confirmed, all waypoints are deleted!

11.12 Free Waypoints

FREE NNN
The memory has room for another NNN waypoints (maximum 223).

12. Route points

12.1 Route Menu

Select with Key1 or Key2, confirm with Key3

▶ EXIT		
12.3	Select route	
12.4	Create new route	
12.5	Modify existing route	
12.6	Reverse route	
11.6	Delete route point	
11.7	Delete route	
11.8	Select data transfer protocol	
11.9	Receive route	
11.10	Send route	

12.2 General

Number of routes
10 routes with maximum 16 waypoints each may be stored

Routes can be created using the max. 224 stored waypoints in the waypoints list or they can be transferred from another XCT, from a PC or from a Top Navigator.

When a route is received please note that it's waypoints will only be stored if there aren't already waypoints stored under the same names. The instrument compares the first 7 characters of the waypoint names. The position coordinates are not compared in this process.

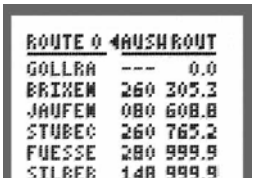
Indicated distances in ROUTES

The ROUTE menu allows for two different indicated distances;

A) When the cursor is in the header (Route select)
The distance shown is the total route distance, from takeoff to goal via all turnpoints. Bearings from turnpoint to turnpoint is also shown.

B) Cursor in the header (point select)
Distances from individual route point to the next in the sequence. Bearings from turnpoint to turnpoint is also shown.

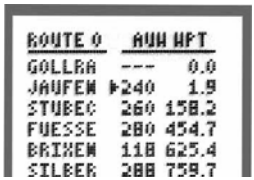
12. Route points (continued)



12.3 Select route

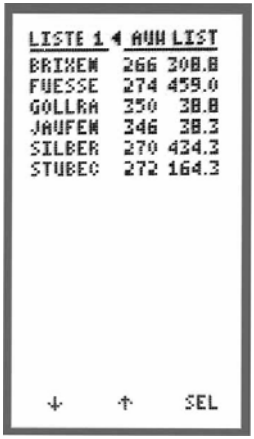
Select one of 10 routes (0-9) to fly or modify.

Use Key1 and Key2 to select, Key3 to confirm/activate.



12.4 New rout or add new waypoint to route

Use Key2 "NEW" to display the Waypoint list.



Selecting a waypoint from the waypoint list

1. Select a waypoint from the list with Key1 and Key2

NOTE:
It is only possible to browse several lists when more than 16 waypoints have been stored.

2. Use Key3 to change the cursor to ▮

3. Select a waypoint from the list with Key1 and Key2

4. Add the waypoint to the route with Key3

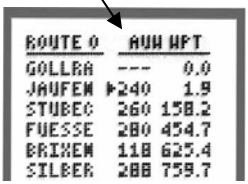
EXIT to route menu with Key1

12. Route points (continued)

12.5 Modify existing route

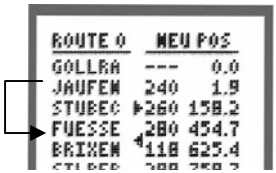
This function allows you to rearrange the sequence of the route points in a route.

Current activity info



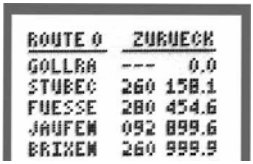
1. Selecting the route point to be moved:

Select a waypoint to be moved (in this case JAUFENP) from the route with Key1 or Key2 . Confirm with Key3 and a new cursor appears◀.



2. Moving the route point:

Go to the desired location of the route point. Place the selected route point with Key1 or Key2 , confirm with Key3 ◀ (in this case between STUBECK and FUESSEN)



The route sequence has now been modified.

Press Key3 „NEXT“ to move more route points.
Press Key1 to return to the route menu.

12.6 Reverse Route

Reversing a route will make the beginning into the end and vice versa.

Press Key2 „REVERS“

Press Key1 to return to the route menu.

12. Route points (continued)

12.7 DELETE route point

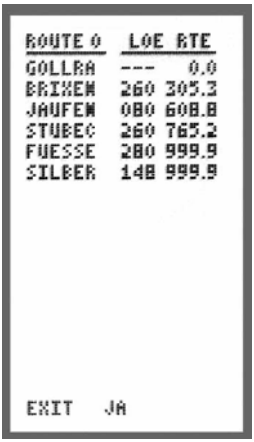
Select a waypoint to be deleted from the route with Key1 and Key2. Confirm with Key3. The XCT asks "DELETE?" You may mark several point to be deleted.

Use Key2 to bring the cursor back up into the header

Confirm the delete function with Key3. The instrument returns to route menu.

INFO:
The waypoints are only deleted from the route, not from the waypoint list.

12.8 DELETE route



Press Key2 „YES" to delete route.

Press Key1 „EXIT" to return to the route menu.

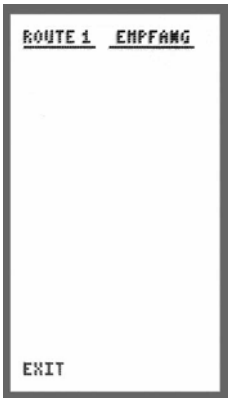
12.9 Select data transfer protocol

COM:IRDA (infrared) or WIRE (cable)
This setting is transient. Default setting is always IRDA.
This means waypoints and routes can always be transferred from XCT-XCT via infrared.

12. Route points (continued)

Send/Receive:

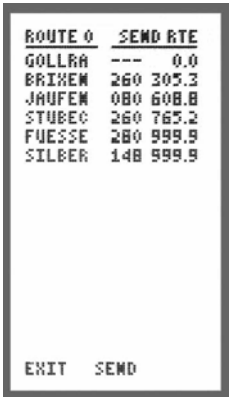
Data may be transferred XCT- XCT, XCT – Top Navigator or XCT – PC



12.10 Receiving route

Only routes with a number that isn't already taken may be received. If you try to send a route with a number that is already taken in the receiving XCT the message "NOT EMPTY" appears.

The XCT is always ready to receive routes in RECEIVE mode. When the transfer is completed the route is displayed.



12.11 Sending route

First the route must be selected (see 12.3). The route must be valid or the instrument reads "EMPTY RTE")

Press Key2 to send the route.

After 3 unsuccessful attempts the sending is aborted and "ERROR" appears.

12. Route points (continued)

12.12 Arrival altitudes overview in Routs / NEARST / WAYPOINT lists

When choosing a landing spot among several options we need not only the distance separating us from it but also the altitude. The new software thus gives approximate arrival altitudes for up to 16 waypoints in the stored lists. The arrival altitudes are calculated based on the L/D entered in the XC-SET MENU and shown as little pins each indicating 200m

NEAHEST	BRG°	DIST(km)	
TIMMER	034 ||||||	6.6	Arrival > 1000 m (und mehr)
WEIZ	186 |||||	7.2	Arrival > 800 m
KAPFEN	072 ||||	8.3	Arrival > 600 m
TURNAU	034 |||	10.0	Arrival > 400 m
ZELTWE	038 ||	12.7	Arrival > 200 m
WOLFSB	222 |	14.2	Arrival > 0 m
FUERST	234	17.4	Arrival < 0 m (unter Gleitpfad!)

Calculating example: L/D is set to 8.0, landing is at 740m, current altitude is 2500m, distance to landing is 10km. Arrival altitude is (2500-740) –10000/8=510m or three pins (|||)

12.13 Route-sequence displayed in the MAP screen in competition mode:

When in comp mode (route entered and active), a complete chain of turnpoints is shown in the right-hand side of the screen in MAP mode:
----- Start gate turnpoint
--- turnpoint
□Current active turnpoint
--- turnpoint
The start cylinder turnpoint is shown as a longer line.
The current turn point is shown as a small square patch.

12.14 Reset of all TPT radii:

When deleting a route 0...9 ALL cylinder radii will be reset to the value set in SETTINGS/RTE-SET/CYLR (400 m).

12.15 Check the active route before start:

When the pilot presses NEW to begin a new flight, the active route is displayed at first. Each turnpoint is shown with the preset turnpoint radius, and the cumulative distance. The screen shows ‘CHECK ALL’. Use the new screen to re-check everything before launch!
If no route is entered the screen displays ‘EMPTY RTE’
Confirm all by pressing NEXT, or return to the turn-on-menu by pressing EXIT
This new function may be activated in MENU/ROUTES/PRECHECK Y

13. VARIO-Settings

General settings:

1. Move cursor ▶up and down with Key1 and Key2, select submenu with Key3.
2. Use Key1 and Key2 to increase/decrease settings or to confirm (YES)or EXIT (NO)
3. Press Key3 to activate change.

13.0 Sinkalarm"SINKTON Y"

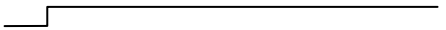
At -5.0 m / s, the sink alarm can be switched off with N.
Special Acroflügen in this function is useful.

13.1 Sink tone threshold "SINK – 1.0m/s"

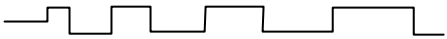
For setting the sink tone threshold. Values between 0.0m/s and 5.0m/s may be selected. With a setting of 5.0m/s the sink tone is off.

13.2 Sink ton modulation „SINK MOD N"

Select YES for



Select NO for



13.3 Sink tone inversion "SINK INV N/Y"

Select N for a deepening pitch by increased sink
Select Y for a rising pitch by increased sink

13.4 Vario sensitivity "VAR TC .5s"

Only available in the XC-Trainer Dual.
Adjustable from 0.5s to 4s integration. This influences the vario sensitivity and may help filter out disturbances caused by things other than thermals.

13.5 Sink tone volume "VOLUME"

Adjustable from 0-3, with 0 = Off, 1 = Low, 2 = Medium and 3 = High. This setting may also be adjusted during flight in the BAROGRAM mode (see 7.5).

13.6 Vario Null "DUALSENSOR"

This option is only available in the XC-Trainer Dual (Details in 16.0).

13.7 PITCH

Ajusting from the sound of the vario

13.8 PERIOD

Setting the frequency pips at various heights Vario.

13. VARIO-Settings

13.9 Vario average

Adjustable vario average 10/20/30sec (factory setting 20sec) .

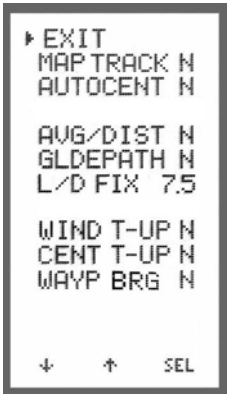
13.10 Setting TEC (Total Energy Compensation)

NOTE: This feature is only useful for hanggliders.
Set the TEC from 0% to 90%, 70% will be a sensible setting for most hanggliders.
Paragliders set to 0%
This feature only works when a speed probe is connected
Explanation TEC:
When accelerating the hangglider the resulting effective sink will not be taken into account (easier to discern what sink is caused by high speed and what is caused by sinking air).
When slowing down (pushing out) the glider climbs, but as it also slows down the XCT compensates for the “control bar thermal”.

13.11 Soundcheck

The set with tone frequency and sound can be heard at all Vario levels.

14. XC-SettingsEinstellungen



14.1 Track "TRACK Y"

Select Y to have a track drawn in MAP display (details 8.5)

Track in zoom: M2.5km-> 5 min;
M7.5/15/30/60km-> 10 min lang;
M120km-> no Track

14.2 Auto centering „AUTOCENT Y"

Standard setting is Y.
Setting the AUTOCENT to Y makes the XCT switch automatically from MAP display or BAROGRAM display to the Thermal Help display when lift is encountered. When leaving the thermal the instrument switches back to the previous display.

NOTE:
The AUTOCENT setting may also be seen in the MAP or Thermal Help display. When active a small A appears before the screen resolution figure.
You may also deactivate this function from the Thermal Help display.

Zoom settings and subsequent AUTOCENT status:
A1km: AUTOCENT active
A2km: AUTOCENT active
1km: AUTOCENT OFF
2km: AUTOCENT OFF

14.3 Average- and distance settings "AVG/DIST"

Select Y to have Average and distance information available in the Barogram mode (details 16.0)

14.4 L/D calculator "GLDEPATH Y/N"

Select Y to have the final glide calculator available in MAP mode (details 17.0)

14.5 Glide rate

Setting the glide rate of the aircraft according to the manufacturer (details 17.2)

14.6 Windcurve stationary or revolving

WIND T-UP N	Windcurve and compas stationary, direction pointer revolving.
WIND T-UP Y	Windcurve and compas revolving, direction pointer stationary

14.7 centering mode "CENT T-UP"

CENT T-UP N	The direction pointer revolving, the thermal screen stationary.
CENT T-UP Y	The direction pointer stationary, the thermal screen revolving.

14.8 Waypoint bearing

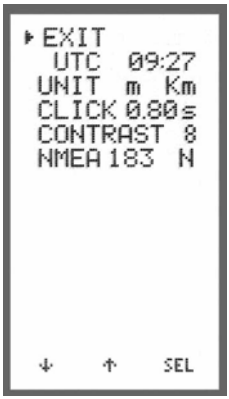
WAY BRG N	Normal MAP
WAY BRG Y	Waypoint bearing in track-UP (Detail 22)

Also be switched in flight (map mode) with double-click Key2

15. General-Settings

Key Functions

1. Move cursor ▶up and down with Key1 and Key2, select submenu with Key3.
2. Use Key1 and Key2 to increase/decrease settings or to confirm **YES** or EXIT **NO**
3. Press Key3 to activate change.



EXIT
Returns to the main menu

15.1 UTC or local time

Adjusting the local time for all times in the various displays.
Adjustable +/- 12 hours within the correct date.
The internal clock is always in UTC.

If the instrument has not had a chance to update the GPS time the display shows UTC xx:xx
When LOCAL is selected the display shows LOCAL xx:xx

15.2 Units "UNITS m Km"

Options:

m Km	Meter/Km
FT KM	Feet/Km
M NM	Miles/Nautical Miles
FT NM	Feet/Nautical Miles

15.3 Change Interval for Key3 "CLICK 1s"

Adjustable from 0.30 to 1sec. This is the time you hold down Key3 for toggling the various displays.
When set to 0.8s: MAP -> VARIO = 0.8s MAP to ROUTE = 1.6s etc.

15.4 Contrast "CONTRAST 8"

Setting the screen contrast between 0 and 19 (factory setting is 8)

15.5 Transfer Protocol "NMEA 183 N"

Transferring GPS information to an external recipient using the most prevalent PDA software, the WINPILOT GPRMC and GPGGA.
Permanently set to 57.600bps. The transfer is only available in flight mode.

15.6 Speedsensor OFF or ON

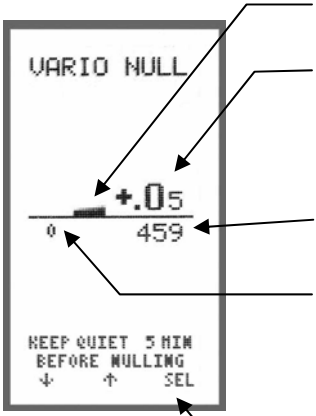
15.7 Vario calibration (Deatil 16.2)

16. Vario adjust

16.1 VARIO null

Important!

Only null the vario in a closed and room. Turn instrument on and wait app. 5 min until the electronics have stabilised.



Analogue display with +/- 0-1m

Digital vario with 1cm resolution

Current altitude (measured barometrically)

Vario correction value 0-100

VARIO NULL
Use Key1 and Key2 to change the vario correction value so that the indicated value on the vario is close to 0.00

EXIT back to General SETTINGS menu

NOTE: This display is often used to demonstrate the sensitivity of the instrument

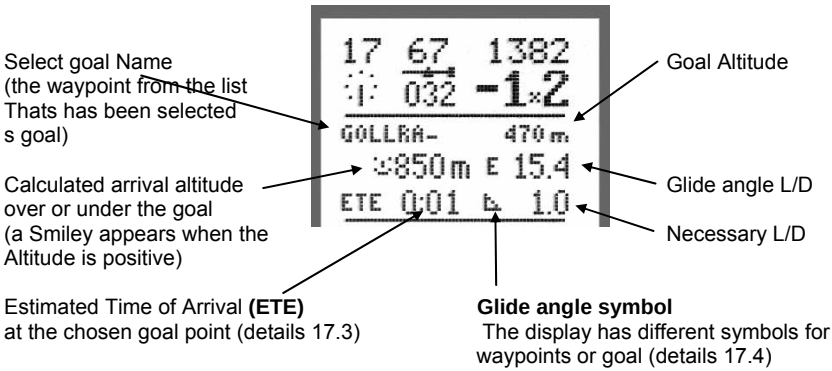
16.2 VARIO Calibration

In SETTINGS/GENERAL/C-VARIO the calibration of the vario pressure sensor can be performed.
You should sink (or climb) in a cable railway approximately 1...2 m/s (200...400 fpm) during 100 seconds.
The sinking (climbing) speed need not be constant.
Leaving by 'EXIT' before the calibration is completed causes the old constant to remain.
The range of the vario constant is 200...255.

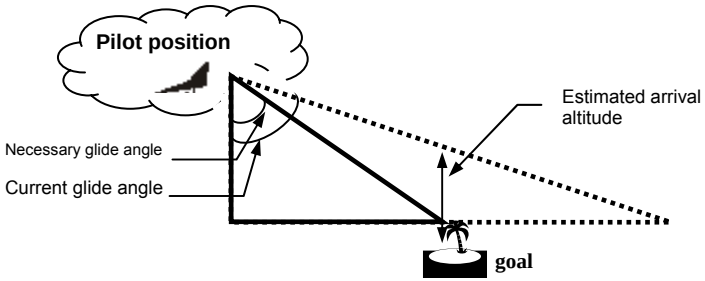
17. L/D displaying in Flight mode(s)

17.1 Definition of the L/D display

Indicated L/D is visible in the top half of the MAP display, when the L/D calculator is activated in the XC SET menu (otherwise the wind curve is displayed, see 8.6)
Setting MENU/EINSTELL/XC-EINSTELL > GLIDEPHAT Y



17.2 Reading the L/D information



In MAP mode the current glide angle E is calculated based on distance travelled and vertical metres lost in the last minute of the flight.

When climbing the glide E cannot be calculated so the display shows the set L/D instead. This can be adjusted between 5.0 and 60 in SETTINGS/XC-SET → L/D

.

17. L/D displaying in Flight mode (continued)

17.2 Reading the L/D information

In strong sink the calculated current glide is adjusted with a factor 0.5. If you have set L/D to be 8.0 the instrument will adjust to 4.0

When climbing the opposite happens, the instrument adjust with a factor 1.2. A set L/D of 8 will be adjusted to 10 by the instrument.

This maintains the displayed glide angle within reasonable limits.

17.3 L/D adjustable or variable for final glide calculation

The L/D is adjustable from 5.0 to 60 just as it has always been. When flying through sinking air the GPATH calculation is effected by multiplying the set L/D with up to 0.5, when flying in buoyant air the set L/D may be multiplied by up to 1.25. This means that the final glide arrival altitude fluctuates greatly especially in lively air.
To counter this we have made a new option where the L/D may be set to FIX in SETTINGS > XC-SET > L/D FIX. When this setting is chosen the GPATH calculation remains based on the set L/D and does not fluctuate with moving air. The factory setting is FIX 7.5

17.4 Reading the ETA information

The ETA (Estimated Time of Arrival) is the local time that you will arrive at your goal at the current heading and speed.
ETA is not accurate when flying slowly in lifting air. When you leave the lift and speed up the ETA is calculated as an average based on the previous 30-100s and fairly accurate. The wind speed is automatically compensated through the SOG (speed over ground)

17.5 L/D symbols in the display

The display gives the glide angle information to the next turnpoint or to goal.

 is visible when the calculation is based on the next turnpoint.

 is visible when the final glide calculation is based on barometrically calculated altitude.

 is visible when the final glide calculation is based on GPS altitude

Die Gleitpfad Berechnung und Gleitverhältnis (NUR AUF DAS ZIEL) erfolgt genauer mit der aktuellen GPS Höhe. Die GPS Höhe wird nur auf den letzten Punkt einer Route (Finish) verwendet.

Glide angle symbol  with a line under means the glide angle is calculated as Distance/vertical difference.
If the GPS altitude is not available (2D or GPS Bad) the instrument will use the barometric altitude and the symbol will be  .

17. L/D displaying in Flight mode (continued)

17.6 Beispiele einer Gleitanzeige

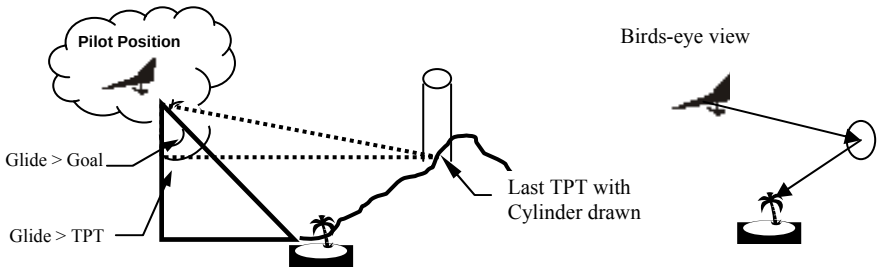
When heading for a goal via a last turnpoint the following may be the case:

- A) Necessary glide to goal is more than to the last turn point,or
- B) Necessary glide to goal is less than to the last turn point

The instrument always bases it's calculations on the most difficult of the two.

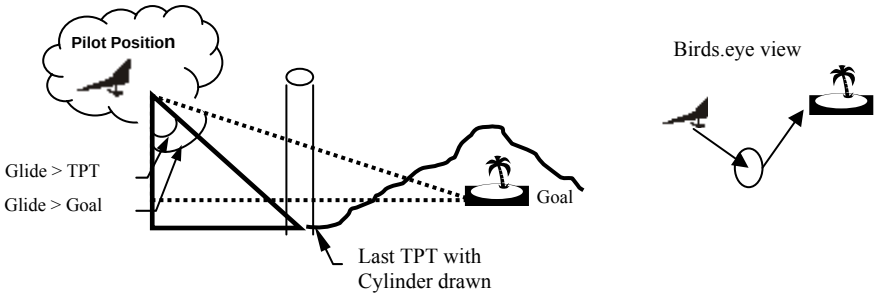
In a general situation:
Pilot is gliding towards goal but via a last turn point. The XCT will then automatically show the necessary glide to the either turn point or goal, whichever is the hardest to reach.

Situation A



The necessary glide to the turn point (TPT) is 12.6. To goal is only 6.5.
The display shows glide to turnpoint and the symbo ◣.

Situation B



The necessary glide to the turn point is 6.5. To goal is 12.6. The display shows glide to turnpoint and the symbol ⊙

17. L/D displaying in Flight mode (continued)

If you don't want the automatic glide angle display to goal you may enter the last waypoint in the route twice. Example:

TAUERN	Start line
REISKO	1. turnpoint
FERLAC	2. turnpoint
OSWALD■	3. turnpoint
OSWALD	3. turnpoint
FELDKIRCH	Goal

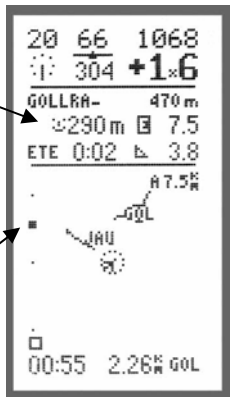
This ensures that all glides are calculated to OSWALD

17.7 Graphic arrival altitude display

The estimated arrival height is visible to within +/-500m in Thermal Help and BAROGRAM display as a small square ■ in the left side of the display that wanders up and down along an axis. +500m, 0m and –500m are marked as dots.
If the estimated arrival altitude is more than +500/-500m the square becomes a „=" and remains at the extreme end of the scale.

Examples of graphics:

Arrival height 290m



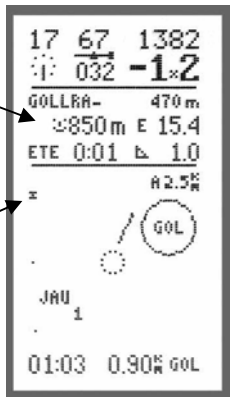
+500m

0m

-500m

Small square ■ in Thermal Help and BAROGRAM mode

Arrival height 850m



Small = symbol when exceeding +/-500m

17. L/D displaying in Flight mode (continued)

17.8 Finish, goal:

The last TP in the ROUTE is always automatically set as the goal and marked with two concentric circles with radius 500 and 250m. This indicates a goal line of app. 1km – 500m length.
The two circles are only shown in MAP mode in the 2.5 km and 7.5 km resolutions. They help the pilot in discerning the exact overflying of the virtual goal line. Due to limitations caused by the actual screen resolution the exact radii are 480 and 220m – this translates into greater positive error margin for the pilot.

17.9 Final glide calculator to the goal via TP before goal:

This functionality only works for goal via last turnpoint. The goal must be set as the LAST TP in a route.
All info displayed is relative to the least reachable of the two, either the goal line or the last TP before goal and is calculated based on comparing the distance/altitude ratios.

The L/D of the wing must be entered in XC-SET (eg. L/D = 8.0). In any case, the last TP will always be used when the necessary glide to reach the last TP or the goal is greater than 1.4*L/D; see the example 'C' below: ◣ to last TP=12 is greater than 11.2 (1.4 * L/D 8.0).
This checks void the possible conflict where the last TP is easilier reached than the goal (and the instrument would thus point to goal without taking into considerance the last TP), but both are beyond realistic gliding ratio, for example; ◣ TP = 60, ◣ goal = 70. The glide ratio needed to get to goal is greater than to the last TP, but L/D 60 is still unrealistic for the last TP and the instrument thus points to the last TP until a realistic value is reached according to the formula '|_\' < 1.4 * L/D.

Examples:
a) TPT ' ◣ □' 8.4 and goal via last TP '◣ ' 6.5 -> the instrument will indicate TP '◣ ' 8.4
b) TPT '◣ ' 5.2 and goal via last TP '◣ ' 6.5-> the instrument will indicate GOAL ' ⊙ ' 6.5
c) TPT '◣ '12.0 and goal via last TP '◣ '14.8-> the instrument will indicate TP '◣ '12.0

The pilot may overrule the automatic function when gliding towards the last TP before goal by clicking once on Key1 in the MAP mode. This causes the instrument to toggle between pointing towards the goal or towards the last TP before the goal.

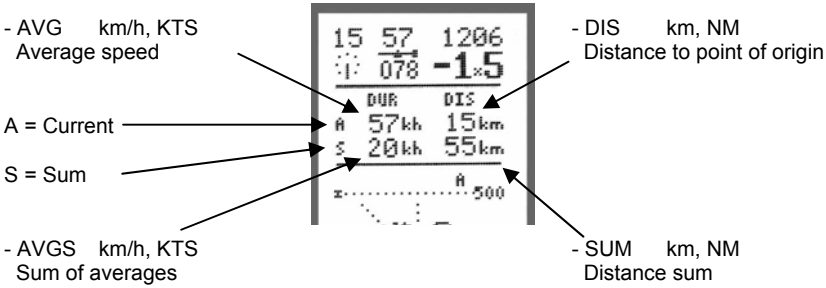
Once the goal becomes reachable in mode "fixed to last TP" (see above) an auxiliary flashing
symbol '⊙' will appear next to the ◣ sympol:
'ETE 0:08 ⊙ ◣ 7.6'.
One click on Key1 then restores the 'Automatic' mode and the display then shows
'ETE 0:08 ◣ ⊙ 5.4'
which is the glide ratio to the goal via the last TP.

NOTE: Since the primary function of Key1 is setting marks, these marks will also be set. The closest possible time span between two marks in MAP and CENTRING modes is 3 seconds, in BARO mode it must be 10 seconds to be able reseting the AVG display sum distances by a longer keypress of Key1 (see XCT manual).

18. Average- and Distance calculation

18.1 Description of the display

This is visible in Barogram mode (details 8.1) when activated in
MENU/SETTINGS/XC-SET > AVG/DIST Y



18.2 Detailed description

AVG = Distance from point of origin to actual position/drawn on the time difference. The average speed is only calculated when the distance pos – point of origin is >/= 2km

DIS = Distance from point of origin to actual position

AVGS = Total distance/total time spent

SUM = Distance-sum = Distance to point of origin + travelled distance average.

At the beginning of the flight the point of origin is set for Takeoff and the sums are zeroed.

Moving of the point of origin to the current position:

a) When the automatic continuation of ROUTES through leaving the turnpoint cylinder is active, and

b) In recording mode:

Press Key1 in an empty waypoint position for 2 seconds until the MARK tone changes and a short beep is heard. In Barogram mode the symbol ‘A’ is shown and the DST=0.

18. Average- and Distance calculation

18.3 Distance via Marks summation:

This new function will give the total distance flown via marks
In order to activate it, go to SETTINGS/XC-SET/DUR-DIST and set to 'Y'.

In the BARO screen the actual distance and average speed from the most recent mark, as well as the total distance and avg. speed via all marks is shown.

Press KEY1 briefly in BARO to set a mark that is NOT included in this distance calculation. The 'normal' marks may be set using KEY1 from the MAP, CENTRE, VARIO and BARO screens.

a) Hold the KEY1 for one second in the BARO screen to set a mark that is included in the new distance calculator. The distance to the previous mark made as described under a) as well as the total distance via all marks is shown. This new mark also deletes the previous distance from last mark to current (SUM=SUM+LEG, but the LEG ('CLR LEG') is deleted every time we set a new mark .

b) Hold the KEY1 for two seconds to set a new mark that overrules all previous marks, i.e. 'CLR LEG' + 'CLR SUM'

This allows the pilot to begin the distance measuring at any point during the flight and even to resume recording if the pilot should decide to restart.

Please not that the system depends on the pilot to set the marks correctly in BARO mode as described under a) and b).

Small changes to the displaying:

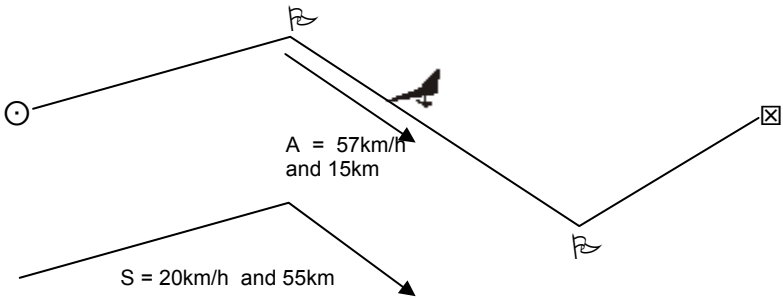
The average speed is shown as soon as 1km has been flown (used to be 2km). And the distances LEG and SUM are shown in 100m resolution (used to be 1km).

18. Average- and Distance calculation (continued)

18.3 Examples

Calculating based on Takeoff

		AVG	DIS
Actual	**A**	57km/h	15km
Sum	**S**	20km/h	55km

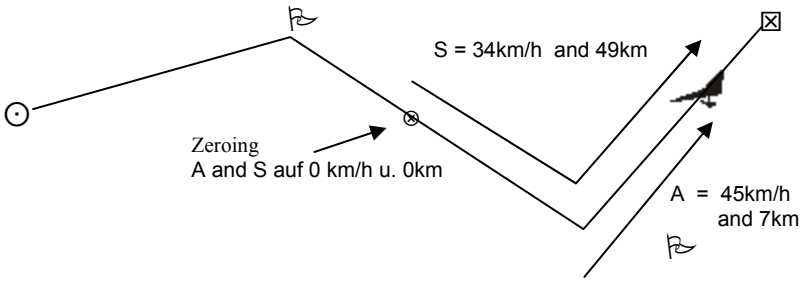


AVGS is very low: the pilot spent a lot of time thermalling

Zeroing in flight:

During the flight ACTUAL and SUM were zeroed with Key1

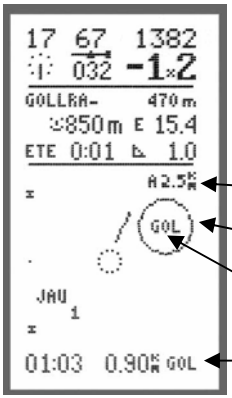
		AVG	DIS
Actual	**A**	45km/h	7km
Sum	**S**	34km/h	49km



19. Cylinder depiction

19.1 General

The start cylinder radius and turnpoint cylinder radius are set in MENU/SETTINGS/XC-SET. The radius may be set from 0 – 2500m



The cylinder is only depicted in MAP mode and only in resolutions 2.5km and 7.5km

NOTE:
No cylinder is shown when the waypoint was chosen from a list, i.e. when it is not part of a route.

Scale

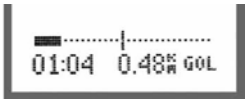
Cylinder f.ex. 400m

Waypoint name with 3 first characters

Distance to waypoint with 3 first characters

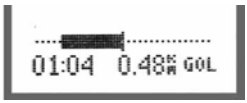
When approaching the cylinder (< than 1200) the display automatically switches to 2.5km resolution

Approaching < 250m



When approaching the cylinder a bar is displayed near the screen footer. This bar diminishes from left towards the middle in 4m steps.

Approaching < 125m



Below 125m the bar is twice the thickness. When the cylinder circumference is breached an audio signal sounds. The thick bar re-emerges to the right, growing from the middle.

NOTE:
I In the demo flight (MENU/SETTINGS/TESTFLIGHT) this can be simulated perfectly. The test flight must be loaded and the test turnpoints entered (in all new instruments this has already been done see 20.0).

19. Cylinder depiction (continued)

19.2 Turnpoint cylinder radius range extended up to 25km

The turnpoints may now be entered with a radius of up to 25 km in 0.1 km increments. When closer than 1 km the instrument switches to MAP scale 2.5 km. As long as the pilot is close to the cylinder of the current TP the instrument remains in MAP scale 2.5 km. When leaving the turnpoint for the next one, the instrument returns to the preset MAP scale.
Cylinders are now always shown to scale in the MAP mode. Cylinders with radius up to 1km are shown as full circles whereas cylinders with a radius greater than 1 km are shown as arcs. Cylinders are NOT shown at resolutions other than 2.5 km!
When setting RTE-SET/CYL T-UP Y the cylinder is displayed Track-Up (scale 2.5 km). In this case an arrow and a dotted vertical subsidiary line are additionally displayed in the upper part of the MAP that points to the cylinder in the optically correct direction.
Modulated tone while entering a cylinder:
A new modulated tone of 10 s duration has been added when entering a cylinder correctly. The purpose is to indicate HOW long the pilot is inside the cylinder to be absolutely sure that the turnpoint has been logged correctly.
If the turnpoint is only very briefly tagged and the distance then again greater than the stipulated turnpoint radius, the tone ends before 10 s. The pilot will thus know if the turnpoint was logged securely, or a bit risky.
The distance bar at the bottom of the screen appears as per usual while passing a normal turnpoint cylinder. This bar shows the distance to the turnpoint cylinder from 260m outside to 260 m inside very accurate.

19.3 Automatic/manual waypoint progression

This must already be set when the waypoints are entered.

The 8th character in the waypoint name is reserved for this function.

- For automatic waypoint/route progression enter „ →“(F.ex. GOLLRA→)
- For manual progression enter „/“ (F.ex. GOLLRA/)

20. Start cylinder depiction

20.1 Graphic displaying of the Start Cylinder in MAP mode:

The start cylinder is only shown as a SYMBOL "[" in the 2.5 km, 7.5 km and 15 km MAP resolutions. It will display between the pilot position (always in the middle of the map) and the start turnpoint to indicate the start circle section.

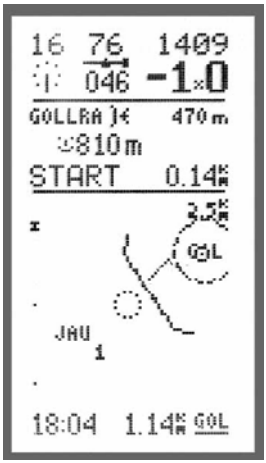
Start point east of the pilot. Pilot is inside the cylinder and flying south.

Start point east of the pilot. Pilot is outside the cylinder and flying south.

20.2 Automatic changeover of star-cylinder

Once closer than 500 m to the start cylinder the start cylinder symbol "[" will display in double size. It is also shown in scale 1.2 km regardless of the MAP scale. Once again, the start cylinder symbol will appear in resolution 1.2 km when within 500 m away from it. All other turnpoints and CTR points will display in the screen resolution set, of course.

20. Start cylinder depiction



In the CENTRING mode the cylinder symbol "[" is also shown in 1.2 km resolution whenever closer than 500 m – even when the overall screen resolution is set to 2.5 km.

Therefore, when closer than 500 m the pilot thus always has the enlarged start cylinder in view. (magnifiying glass function)

The horizontal +/- 250m distance bar at the bottom of the MAP display, shown when approaching/leaving normal turnpoints, is not displayed for the start cylinder due to the enlarged startcylinder symbol within 500 m.

When the STCYL is set to IN in XC-SET the automatic switch to the next TP happens 250m inside the start cylinder. When STCYL is set to OUT it happens 250m outside the start cylinder. This ensures that the important start procedure is clearly visible at all times.

The automatic switching to the next TP may be overruled by adding a "/" at the end of the TP name, eg. "LIEZEN /".
If the centre of the start cylinder is also a normal TP (most common scenario), it must be added to the ROUTE as a normal TP right after the start cylinder TP. It will be given the default TP radius, normally 400m.
Once again, the same TP must be added to the route twice.

Setting of the position of a start cylinder TP in a route is done in SETTINGS/XC-SET/ STCYL TPx, (x = OFF, 1…3).

20.3 Optional NORTH-UP or TRACK-UP displaying in the MAP and CENTERING screens

SETTINGS > XC-SET:
XC-SET > CENT T-UP Y/N(only for centring mode)
SETTINGS > RTE-SET > CYL T-UP Y/N (only for MAP mode with resolution 2.5km and start/turnpoint cylinders)

Recognising N-UP and T-UP in MAP and CENT mode:
NORTH-UP: A pointer around the pilot indicates the current COG
TRACK-UP: In MAP mode an arrow points towards the top of the screen, in full length when the SOG is > 0, otherwise empty. In CENT mode the arrow runs through the pilot position and is punctuated.

In MAP mode the turnpoint cylinder (usually 400m) is only visible in the 2.5km screen resolution and only when the turnpoint is within 1.2km of the pilot position. The cylinder itself is an uninterrupted circle in N-UP mode, and a punctuated circle in T-UP mode.

The cylinder itself has a little line pointing to the next turnpoint, and the track from the last 60 seconds is drawn in. This helps the pilot optimise the turnpoint approach for the shortest possible distance between turnpoints.

20. Start cylinder depiction

The turnpoint name is replaced by a '+' in the centre of the cylinder to avoid the name obstructing the flight track.
Other turnpoint names and CTR lines remain visible by N-UP in the high MAP resolution as there are not likely to be any more turnpoints visible when using 2.5km screen resolution.
The normal 4-8min. track and any other screen icons are suppressed to minimise screen clutter during the important turnpoint rounding phase.

When CYL is set to T-UP or when the GPS signal is bad (GPS BAD) the cylinder and the track is suppressed due to the lack of necessary information. The name of the turnpoint remains visible until the GPS signal is once again normal.

The last turnpoint of the route (goal) has an extra cylinder with an 185m radius around it. No line pointing to next turnpoint is visible.

Important notice: The screen resolution is not high enough to allow using only the track and the cylinder to ensure the correct rounding of turnpoints. For this purpose you should always rely on the distance bar at the bottom of the screen.

The start cylinder is shown as a \---/ symbol in MAP mode, in resolutions from 2.5 to 15km. The T-UP (when set in RTE-SET > CYL T-UP > Y) only appears in 2.5km screen resolution, all other resolutions have N-UP. The T-UP start cylinder symbol only appears within a 1100m range.

The start cylinder symbol is shown larger than life when within a 500m range, independently of the chosen screen resolution (between 2.5 and 15km).
The start cylinder symbol is also shown in CENT mode when within the 500m range so that even when thermal ling the pilot may maintain the overview.

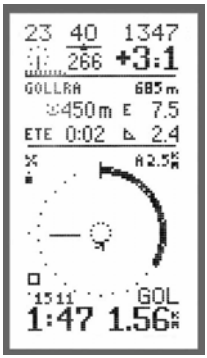
When the GPS signal is insufficient the start cylinder symbol is suppressed.

If the RTE-SET > CYL T-UP is set to Y the screen will show the track from the last 60 seconds to help the pilot visualize the start anyway. The normal track in N-UP mode is suppressed.

Control zone lines are always visible in N-UP mode.

21. Waypoint Bearing

Waypoint bearing now in Track Up mode



With this software release (3.25) you may view the local time and a waypoint selected from either of the waypoint lists *including the bearing and distance* to the selected waypoint in the MAP mode (see illustration).

To see this, go to SETTINGS/XC-SET/ and set WAYPT T-UP to Y (default setting). To change back to the normal MAP mode in flight, click twice on KEY2.

The new MAP mode clock shows M:SS in large typography, HH:MM in smaller (see illustration)

The distance to the waypoint is shown in the lower right-hand corner, in large typography. Three digits are shown: 999km, 99.9km or 9.98km. Above the distance the three first characters of the waypoint name are shown. If the instrument is heading towards a Mark this field will show ‘m00’…’m99’.

The bearing (BRG) to the next wpt is shown relative to the current flight direction (COG – Course Over Ground) with a large arc around the pilot position in the screen centre: As the difference between COG and BRG increases, the perimeter arc grows,

for example:

COG=BRG:	The arc disappears, and an arrow appears.
COG - > BRG=90° off to the left:	A quarter of a full circle arc in the top left corner of screen
COG - > BRG=180° off:	Full half circle arc either left or right

The first waypoint ‘xNxxxx’ is defined as the North reference. If this waypoint is selected the MAP screen will show a large N in the lower right-hand corner instead of the distance and name. In the CENTER and VARIO screens the same is the case, an ‘xNx’ is shown instead of the wpt name.

Waypoints, marks and airspace, as well as the track from the last few minutes (when activated) is always shown in N-UP in the chosen resolution.

As the pilot approaches a turnpoint cylinder the instrument switches back to normal mode, and only the M:SS (minutes and seconds) remain enlarged.

22. Competition

22.1 Multiple start times

Multiple start times (for speed runs)
in SETTINGS > RTE-SET START TIME

FIRST HH:MM	The first start time, may be set between 00:00 and 23:55 in 5 minutes increments
DELTA :mm	mm may be set from 05 to 55 minutes in increments of 5
MULTIPLE N	N=number of available start times. Up to 9 equally spaced start times may be set
LAST HH:MM	Calculated by the instrument based on the above settings

If N=0 then can select AUTO-GO Y or N.
The pilot cross the startline the system switch automaticaly to the next WPT.

In order to make sure that you get the correct start-time countdown, all START settings must be done with the utmost care. Here's a step-by-step instruction:

- First compose the route and activate it
- Then go to RTE-SET and enter all parameters carefully
- Go to XC-SET to verify that GPATH is set to Y – if you fail to do so there will be no GPATH indications for approaching turnpoints although the GPATH to start cylinder will still be displayed

In recording/flight mode the start time will be displayed as follows:
The remaining time till S1 is shown as a countdown 'S1 mm:ss' until the first start time is reached. After that 'S2 mm:ss' is displayed, then S3 etc. The last possible start time is LAST = FIRST + (N-1)*DELTA.
When counting down to the last start time 'SN' flashes next to the 'mm:ss'
Once the last start time has come and gone 'GATE X' (closed) is displayed.
Each start time is marked with an acoustic signal.
If there is only one start time (race to goal) 'S1' flashes as it is the only start time.

If there is more than 90 minutes remaining until S1 the display shows 'SN+90', where N is the number of starts set above.

22.2 Start turnpoint with a start cylinder around it:

Entering the start cylinder:
The TP which will be used as the centre of the start cylinder is set in XC-SET with the STCYL TP x function. If 'OFF' is selected all turnpoints will have the default TP radius, normally 400m. By setting x to 1,2 or 3 the start may be set around the 1st, 2nd or the 3rd turnpoint in the route. In the 'ROUTE' list the turnpoint selected will be marked with an *'s'*.

Marking of the Start TP:
The name of the TP in the glide angle display has an IN/OUT symbol depending on whether it was set as a cylinder that must be entered or exited. The 3-character TP abbreviation will be underlined.

22. Competition

22.3 Glide angle optimisation for entering/leaving start cylinders:

When the 'GLDPATH Y' is set in XC-SET the MAP mode will help optimising the start cylinder timing. The glide angle display shows the following:

Display with normal TP:

Liezen 1735 m
-2880m E 8.0
ETE 08:25 d 6.4

Display with start cylinder TP:

Liezen)< 1735 m
-2880 28 km/h
STA 03:27 1.62 km

The distance to the start cylinder is shown with a black rectangular label '#' when the pilot is flying on the 'wrong' side of the start cylinder radius: When the start cylinder radius around TP "Liezen)<" is e.g. 10km and the pilot is 11.62 km from the TP, the display shows 1.62 km. If he is 9.98 km from the TP - and thus already inside the start cylinder - the display will show
"STA 01:58 # 0.02 km". The exact opposite goes on when STCYL OUT has been set in XC-SET.

The time difference 'STA mm:ss' counts down. If the start time is set to 14:30 and the local time is 14:26:33, "STA 03:27" will display. At 14:30 an acoustic signal will sound for 5 seconds. After the start time "START" will display instead STA min:sec.
(Maximum countdown time is min:sec 99:59.)

The ground speed necessary to reach the start cylinder from the current position exactly at the start time when gliding in a straight line towards the start cylinder is also displayed (28 km/h). This information is ONLY displayed until the start time is reached.

22.4 Turnpoint cylinder radius freely adjustable between 100m and 25km

In MENU/ROUTES/CYL RADIUS you may now compile a list of up to 15 different turn point cylinder radii.

The 15 different turn points (except 16.RP) may be given a specific turn point radius in any chosen route from R0 to R9. The 16.RP place is used to store the number of the route where these individual turn point radii are active – thus, only the chosen route will have individual turn point radii.

The route point number 16 cannot have its own radius, as this storage space is used to store the number of the route where you wish for the individual radii to take effect. This turn point automatically gets the default turn point radius set
in SETTINGS/RTE-SET/CYLR

NOTICE:
Once you have activated a route the appointed turn point radii will apply to this route. This means that you must take care not to change route in the instrument once you have entered the individual turn point radii.

22. Competition

The correct sequence of things is:

A) Choose the route number you wish to enter by going to ROUTES/SEL ROUTE and appointing a number from 0 to 9.
B) Then enter the route in the usual manner
C) Now enter the cylinder radii in the ROUTES/CYL RADIUS: The radius may be toggled in 100m steps from 100m to 2500m

Route 3	Radius (km)
TPT1	0.4
STSTEF	2.5
KLEIN	0.6
TPT4	1.0
GOAL	0.4

Note that the start cylinder radius entered under SETTINGS/RTE-SET/STE-CYL will have priority over any radius set in the above manner.
You may enter ONE start cylinder in either of the turn points 1 to 3 that will be active for the active route, and give this start cylinder a radius in the SETTINGS/RTE-SET menu – any diverging radius set in the ROUTES/CYL RADIUS menu will be ignored, but not changed, by the instrument.

During the flight you may activate any route stored under 0 to 9. Doing so will apply the set radii from the ROUTE/CYL RADIUS to the new route.
COMPETITION CHANGES FROM VERSION 3.16

NOTICE: When approaching the turn point the screen switches to the most appropriate resolution, either 2.5x2.5km or 7.5x7.5km, and the turn point cylinder is shown as a circle. If the cylinder radius is greater than 1km the screen will switch to 7.5x7.5km resolution.

All turn points with a radius of less than 1km will be shown in 2.5x2.5km resolution. Note that the accuracy of the screen in 7.5x7.5km resolution is not good – best to keep track of your turn point passage by using the distance bar which still has the 4m step resolution even in the lower screen resolution.

22. Competition

22.5 Auto-advancing to next turnpoint at the start cylinder:

General conditions:

- SETTINGS/EASY-SET N
- SETTINGS/RTE-SET

MULTIPLE 1 Auto-advance is only activated using ONE start time.

AUTO-GO Y Auto-advance is only valid for the start cylinder.

STCYL TP1…TP3

Radius from 0 to 127 km

STCYL IN/OUT

-A route must be entered

Operating the start cylinder in flight mode:

- A route with a start turnpoint must be active in ROUTES – the distance to the start gate is shown in MAP/CENTER/VARIO screens in the lower right hand corner.
- In the MAP display the name of the TP, the STCYL IN/OUT symbol, the start time countdown and the distance to the start gate are always shown instead of the wind graph.
- Upon reaching the start time the display shows 'START' – if more start times are entered, the last one will display a 'GATE X'.
- If the pilot is located on the wrong side of the start gate before start gate opening a "prohibition sign" (a circle with a slash through it) appears next to the countdown timer. If the pilot is still on the wrong side, and hasn't yet taken the start, once the start gate opens, a fat circle appears instead of the prohibition sign. (These symbols replace the black rectangle used before.)
- When start gate opens a constant 3 s tone sounds, when on the right side of the start gate; if the pilot is on the wrong side an intermittent 9 s tone sounds.

Advice for correct start gate negotiation:

Unlike the distance to normal route turnpoints, which up to a radius of 25 km are calculated in increments of 4 m, the distance to the start gate, which may be set to up to 127 km distance, is calculated in increments of 20 m. If you include the GPS inaccuracy this amounts to a total of up to 40 m of position error! Note that it is ALWAYS the pilots' responsibility to have a correct start sequence logged – do not cut it too close!

22. Competition

Start Cylinder may be set to up to 127km radius:
If the pilot is on the wrong side of a start gate at startgate opening time a 'forbidden' icon appears next to the countdown clock. After the stargate opening time the symbol is replaced by a fat-bordered circle. These icons replace the black square known from previous software updates.
Once the start gate is taken correctly a modulated pitch tone is heard during 7 seconds. This alert is not coupled to the AUTO GO Y/NO.

The auto-advance function at the start cylinder

- The auto-advance from the start gate is only activated when ALL the above parameters are fulfilled AND

- when the instrument is set to STCYL OUT and the pilot is already more than 250 m OUTSIDE the start cylinder, but not more than 1 km outside

- when the instrument is set to STCYL IN and the pilot is already more than 250 m INSIDE the start cylinder, but not more than 1 km inside

- This ensures that the auto-advance is only activated in the interval between 250 m and 1 km, to the risk of a false start. The instrument only advances after 250 m, because the correct start gate display is needed right on the cylinder radius. If the pilot is more than 1 km away the auto-advancing is disabled and must be done manually.

- The start gate symbol ____/ is shown corresponding to MAP scale 1.2 km when the pilot is in the 500 m range of the start gate.

- When setting RTE-SET/CYL T-UP Y ONLY the start gate symbol is displayed enlarged Track-Up at scale 1.2 km. All other items displayed in the MAP, eg. Waypoints, marks and CTR's remain always North-Up at preset scale.

- In Track-Up mode an arrow and a dotted vertical subsidiary line are additionally displayed in the upper part of the MAP that points to the cylinder in the optically correct direction.

- The start gate symbol is displayed North-Up in the scales 2.5 km to15 km. At the larger scales 30 km to120 km the start gate is not visible.

- When the start is done correctly a modulated tone of 7 s duration sounds. Note that this is only the case when the pilot moves a minimum of 50 m from one side of the start cylinder to the other side in the correct direction toward the next turnpoint. This new audible signal is not linked to the Auto-advance function.

- The distance bar, which we know from the turnpoint approach, is NOT displayed for the start gate.

23. AIRSPACE

23.1 Airspace Menu (CTR) in MAP mode:

- Load airspace information using AIRSPACE.exe
  Download this freeware from www.aircotec.com
- View CTR in the XC-Trainer (Detail 23.2)
-Deletes all airspace information (some parts are indelible)
-Select port (cable or infrared)
-Receive details from other XCT (both set to IRDA or cable)
-Send complete airspace info to other XCT

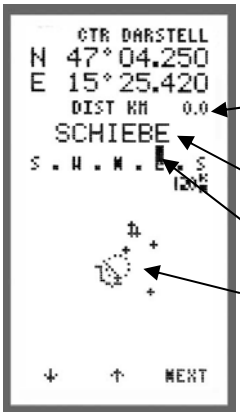
USED xxx Memory spaces already in use
FREE yyy Free memory spaces
(data blocks correspond to 1 waypoint)

It is only possible to transfer the ENTIRE airspace from the PC or another XCT.
Any previously recorded airspace info will be overwritten.

Currently only polygons can be drawn. We are working on circles and curves.
-The loaded airspace is only visible in MAP mode. It cannot be removed.
No audio alarms will be heard.
- AIRSPACE.exe: New Aircotec PC freeware that reads and encodes in OPEN AIR format and converts to a file that can be uploaded to the XC-Trainer. It is not possible to enter airspace info directly into the instrument.

Airspace files can be downloaded from www.winpilot.com/OpenAir . To install AIRSPACE.EXE first download from www.aircotec.com , save to disk and install using the included LOAD file. All CTR's will be visible, select the ones you wish to upload to XCT and send.

23.2 Airspace Display:



Koordinat

Distance from the present position to the current focus

Current command of the keys

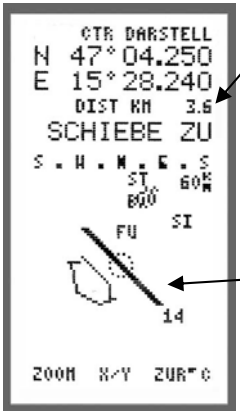
Where is pushed toward
For example NO

CTR and Waypoint

The initial screen is always on 120x120km Scales and represents the current coordinate position on the screen, generates
With button 1 or button 2, the CTR and the waypoints are moved on the screen.

23. AIRSPACE

23.3 Airspace Display move



Distance from the present position to the current focus

Current command of the keys

scale

Sliding direction change with X / Y (horizontally, vertically, left to right and top up)

ZOOM switch from 2.5 km to 120 km

Exit from the CTR menu is long with 3 button press.

24. GPS hight storing

GPS height

The GPS height is recorded every second in addition to the barometric height.

The GPS height is displayed during flight instead of TAS, when an impeller is not connected or TAS=0. SETTINGS/GENERAL/ IMPELLER / N

Note:
TAS will be displayed during flight, but is not stored due to storing of the GPS height.

When reading the flight, between BARO altitude, GPS altitude, or both heights are selected:

FLIGHTS/SEND:
SEL HEIGHT: Select GPS - BARO - ALL(both heights)

The selected height(s) are sent by all data formats TNC, PWC, MXP.

MaxPunkte version 6.1.4 was adapted reading both heights simultaneously using MXP format.

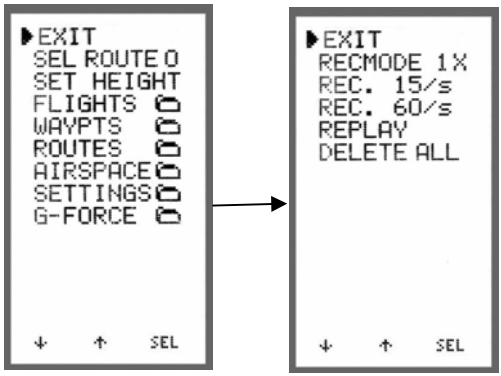
Further tips to GPS altitudes:
Different GPS receivers may, at the same time and same place, record quite substantially different altitudes. The error is up to 1,7 times greater than the horizontal position error. Our experience shows that the altitudes may fluctuate up to +/- 30m.

The GPS module used in the XCT (Furuno GH81) delivers a much damped altitude output. When the instrument is thus subjected to very great altitude changes within short time spans, the output may have some lag.

If the GPS reception is poor and the pilot is performing aerobatics with substantial roll (so that the antenna is not facing upwards) the GPS altitude may briefly be interrupted/zeroed. This leads to the altitude being recorded as null, something that will be easy to see from the track log.

25. G-Force (only for XC-Trainer3DG)

25.1 Entrance over main menu > select G-FORCE submenu



-Record mode switch able from 1 to 3 axes
-Record mode 15 times per second
-Record mode 60 times per second
-Record replay
-Delete all records (individual records cannot be deleted).

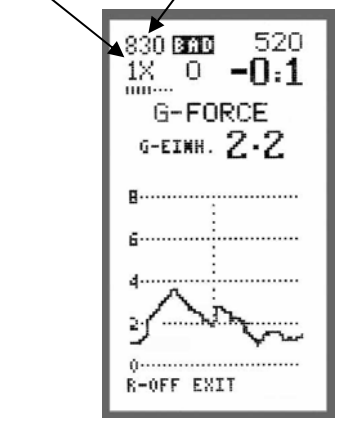
25.2 Start G-force recording in the flight mode

1. Enter flight mode.
2. The flight recording must be started
3. In the BAROGRAMM screen, toggle between BAROGRAMM and G-Force with key2.
4. The G-force recording is switched ON with key3.

Info: In the flight record mode, G-force is stored 15 times per second.

Axis display

free memory in minutes (memory is full in about 14 hours in 1 axis mode).



Altimeter
Vario

Max G-force from the last 5 second

The line chart show 10 second

Switch REC ON or OFF by toggling the REC button.

25. G-Force (only for XC-Trainer3DG)

25.3 Start G-force recording from the menu

Enter over main menu > select G-force submenu

1. Select 1 axis or 3 axes
2. Select 15 times per second or 60 times per second

25.4 Record 15 times per second

Axis display

free memory in minutes

Date
Time

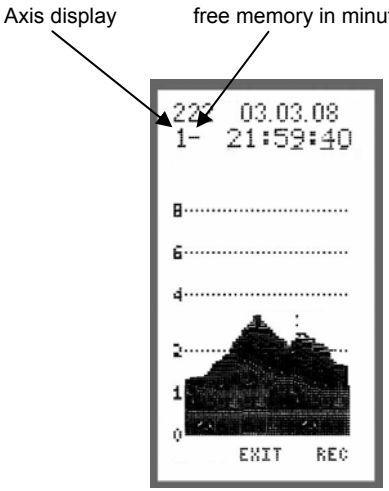
Max G-force from the last 5 second

The line chart show 10 second on the screen

Switch REC ON or OFF by toggling the REC button.

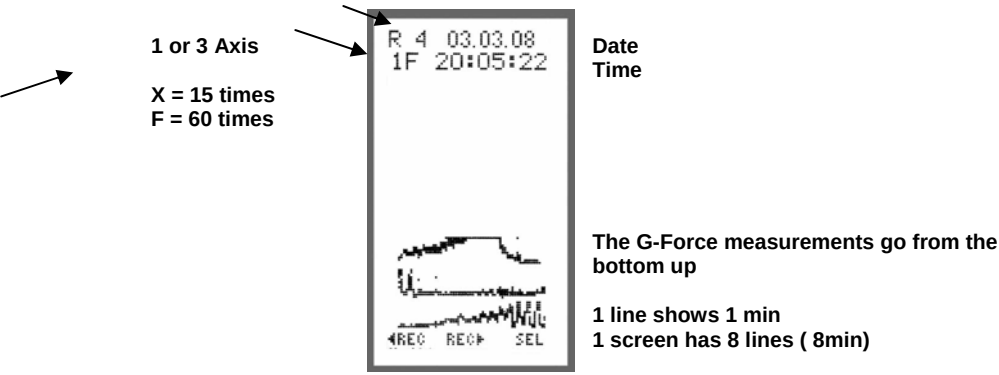
25. G-Force (only for XC-Trainer3DG)

25.5 Record 60 times per second



Switch REC ON or OFF by toggling the REC button.

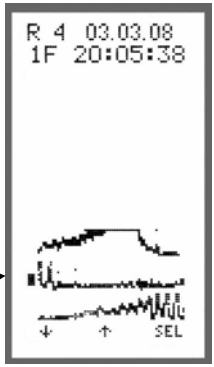
25.6 Select G-Force Record



Toggle through the recordings with key 1 or key and select the record for detailed viewing with key 3.

25. G-Force (only for XC-Trainer3DG)

Select the detail display in the recording:

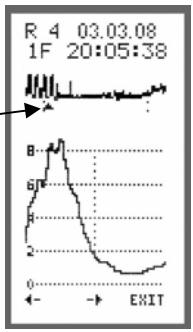


Record select
With key 1 or 2 (according to cursor position)

Select the line using SEL

The screen now shows the 1 min record in detail
Move up and down the recording with Key1 and Key2 (use the arrow beneath the record).

Record detail:



Record time in hours/minutes/second

Arrow beneath the record

With record 15 times/sec record is 1 second per screen
With record 60 times/sec record is 0,25 second per screen

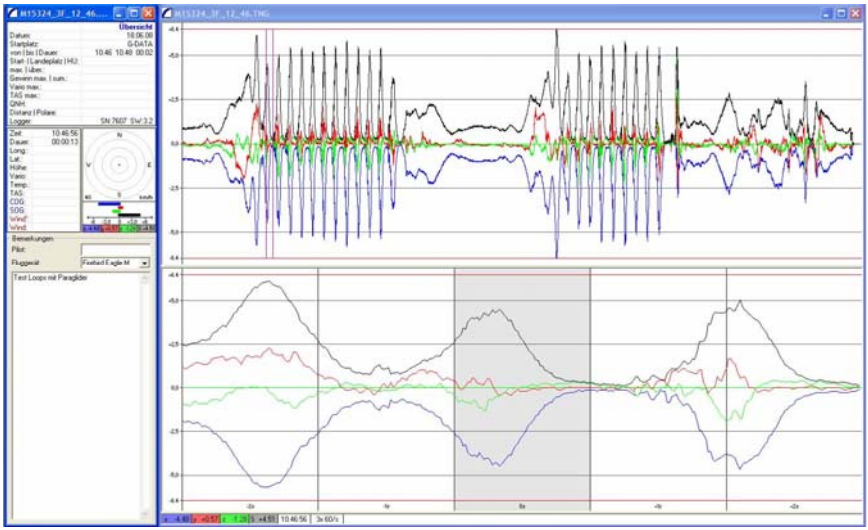
To EXIT from the detail screen > hold key3 about 3 seconds

25. G-Force (only for XC-Trainer3DG)

25.7 Readout of G-forces in TN Complete

In order to select the recording and send it to TN Complete, go to the G-forces menu and select PLAY/SEND. TN Complete automatically assigns it to the correct flight, provided the flight is also stored in TN Complete.

This is a graphic depiction of a 3-axis recording in TN-Complete:



26. Miscellaneous

26.1 Route example

The tutorial route is ideal to get to know a number of functions.

Upon delivery this route is always stored, along with the necessary waypoints.

Should the route and/or the have been deleted they can be restored using the waypoints below (see 11.3 and 12.4)

Name	Latitude	Longitude	Höhe
GOLLRAD	N47°15.960'	E015°34.910'	685 m
JAUFENP	N47°16.660'	E015°35.730'	783 m
STUBEK	N47°18.910'	E015°32.870'	555 m
BRIXEN	N47°15.480'	E015°32.800'	551 m
FUESSEN	N47°09.910'	E015°29.840'	350 m
SILBERT	N47°11.900'	E015°44.200'	440 m

When replaying this demo flight two turn point cylinders appear and are correctly rounded.

27. Accessories

XC_BH XC-leg mount

XC_DH XC-hang glider mount

XC_GZH XC-harness mount for paragliders

XC-Etui XC-bag

TN-Complete Licence

XC-PC cable

XC-SS-DGH-K
XC-SS-DGH-L Speed sensor with mounting for HG and PG, with short (K) or long (L) cable – 50 or 120cm

XC-SS-mS
Speed sensor with stabiliser, cable 200cm

SS-DGH Speed sensor mount for paraglider

Note:

Aircotec flight instrument GmbH
Alteggerstr.8
A-8083 St.Stefan iR AUSTRIA

Aircotec GmbH

CH-6048 Horw SCHWEIZ